FORT SHERIDAN 506
COASTAL AND RAVINE RESTORATION
APPENDIX A

U.S. Army Corps of Engineers, Chicago District
Environmental and Hydraulic Engineering Section

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CHAPTER 1. INTRODUCTION

The proposed restoration project is located east of Sheridan Road in the City of Lake Forest and Highland Park, Illinois in Deerfield Township Fort Sheridan, Illinois and has a footprint of approximately 120 acres. The nearshore lake area consists of sand, gravel and cobble substrates that would provide excellent habitat for littoral fishes and invertebrates, but many manmade, unnatural structures litter the bottom of the project site, disrupting the natural substrate movement. The goal of this project is to stabilize the coastal communities and to restore historical native plant communities along Lake Michigan and nearshore fish habitat. These goals are to be accomplished through a combination of objectives including eliminating excessive infrastructure from the beach, bluffs and ravines, attenuating or rerouting excessive storm water discharged from the neighboring developments, and stabilizing the bluff, ravine and dune communities to reduce erosion and sedimentation into Lake Michigan.

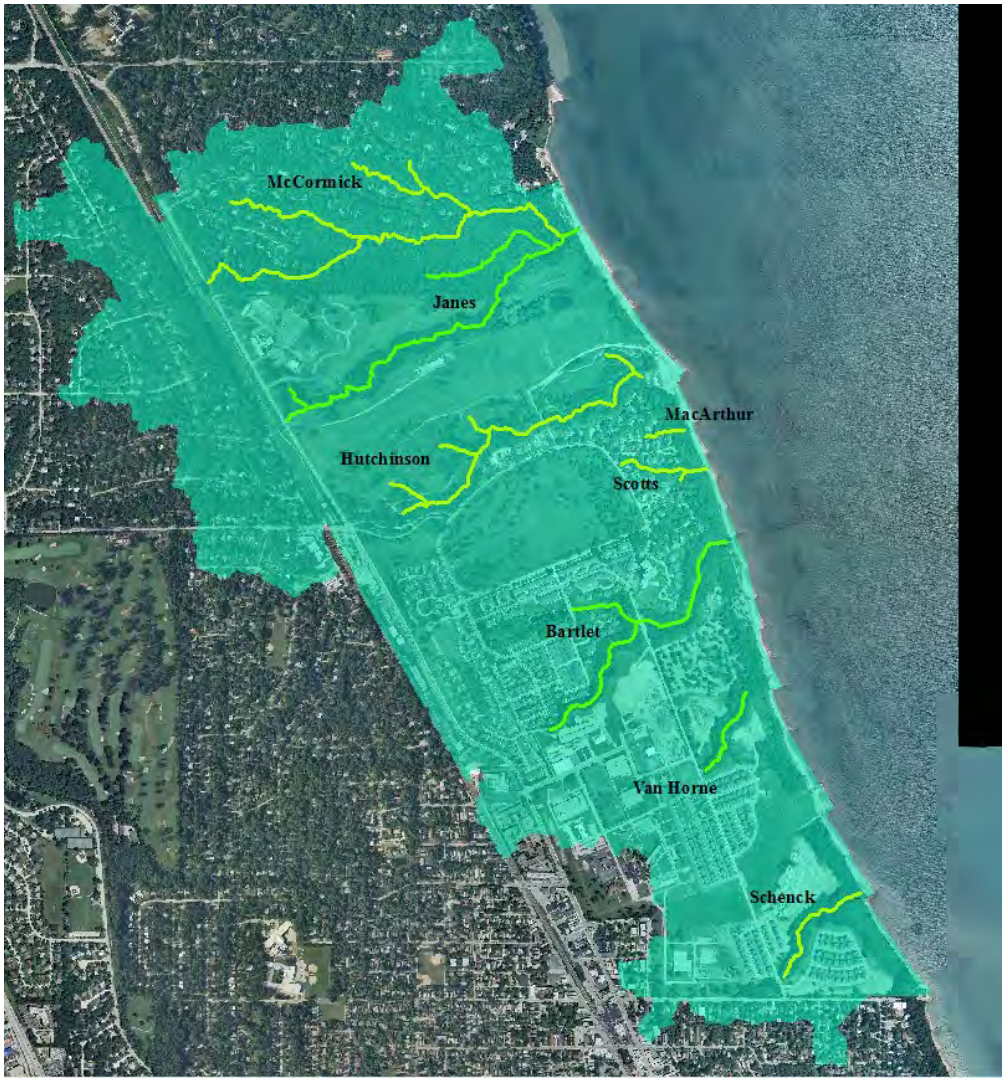

Figure 1.1 Fort Sheridan 506 Project Footprint

CHAPTER 2. PREVIOUS STUDIES

In October 2009, the Alliance for the Great Lakes assessed the conditions of the ravines from Lake Zurich to Glencoe, intending to develop a study that would serve as a tool for future stakeholders to make informed decisions about where to focus restoration efforts and resources in order to improve the ecology of the Lake Michigan region. As all of the ravines involved in this project were included in the study, it provided an initial assessment by which problematic areas could be more closely investigated during field visits.

In the 2008, Shabica & Associates conducted a walkthrough of Scotts Ravine. Notable features, potential issues, and recommendations for potential remediation methods were included in the report.

From late 2008 through the mid-2009, Greengard, Inc. performed a series of investigations into several methods to address excessive erosion in Scotts Ravine. Some of these methods included utilizing a portion of the head of the ravine for detention storage, installing an in-ravine pipe, and creating a false ravine floor overtop and installing detention basins in the park area adjacent to the head of the ravine and rerouting storm sewer lines to initially discharge through the detention basin. Greengard, Inc. and the local community deemed the in-ravine detention storage and park area detention basins infeasible. As part of the studies, pre- and post-development watersheds and discharges for Scotts Ravine were generated.

CHAPTER 3. SITE DESCRIPTION

Based on data from the USEPA, the Pike-Root watershed covers over 410 square miles, stretching from south of Milwaukee to south of Chicago, and includes over 113 miles of Lake Michigan shoreline on the west side of Lake Michigan. In the project vicinity, the watershed extends approximately 0.95 miles inland from the lake. The prominent geological feature of the area is the ravine and bluff system at the interface between the tablelands and lake.

These unique landforms and special coastal climate combined to create a diverse ecosystem that provides habitat for a number of sensitive plant and animal species. The result of over 100 years of urbanization, however, has been the increase in net volume and peak discharge of storm runoff through the replacement of pervious areas with impervious and the introduction of storm sewer networks. This in turn has resulted in the accelerated erosion of the ravine systems. Ravine beds have been deeply incised and slopes have been undercut, endangering adjacent structures and roadways.

3.1. McCormick/Janes Ravine

McCormick Ravine is 8840 feet long and has a drainage area of 252 acres. Of this area, 59.5% is residential, 2.5% is governmental, 14.5% is paved roadways, and 23.4% is open space or forest preserve. This urbanization has resulted in widespread sloughing and channel incision of the ravine floor of up to approximately 48 inches. Although Janes Ravine discharges just upstream

of McCormick Ravine's mouth, the two ravines are considered separate. A culvert spans a section of the southernmost tributary that was previously used by the U.S. Army as a dump site and backfilled. Over time, the inlet to this culvert has silted over, passing only a small amount of storm water downstream and causing water to pond during even modest storm events. This in turn made it necessary to construct gabions along the upstream headwall to protect the inlet, as shown in Figure 3.1. In an attempt to convey the excessive storm water discharge without further degradation to the ravine, a vitrified clay pipe was constructed along the floor of the ravine near its mouth. This connected to a junction box at its confluence with Janes Ravine and ultimately discharged directly to the beach. This system eventually failed, as shown in Figure 3.2. Portions of the junction box remain at the confluence, preventing further headcutting into McCormick Ravine.

Janes Ravine is 6640 feet long and has a drainage area of 76.9 acres. Of this area, 8.9% is governmental and 91.1% is open space or forest preserve. In 2009, work was undertaken by the USACE and Lake County Forest Preserve District (LCFPD) to remediate the ravine. Excess storm water was diverted from the ravine through a swale to a pond situated on the adjacent uplands before ultimately being discharged to the lake. Portions of the ravine slopes were reinforced and the bottom armored with cobbles up to the City of Lake Forest's property line. After the failure of the in-ravine pipe at the confluence of McCormick and Janes Ravines, the junction box that once serviced this ravine ceased functioning. The flow conveyed by Janes Ravine flanked the structure and, over a series of months, resulted in the ravine downcutting nearly seven feet at the confluence, shown in Figure 3.3. This incision continues to widen and translate upstream, ultimately threatening to undermine the remediation efforts of the upstream portion of the ravine.

Figure 3.1 McCormick Ravine – Culvert in Southernmost Tributary

Figure 3.2 McCormick Ravine – Failed In-Ravine Structure at Confluence

Figure 3.3 Janes Ravine – Channel Incision at Confluence

3.2. Hutchinson Ravine

Hutchinson Ravine is 5420 feet long and has a drainage area of 69.2 acres. Of this area, 4.8% is residential, 3.3% is commercial, 2.2% is paved roadways, and 89.7% is open space or forest preserve. The former drinking water treatment plant for Fort Sheridan was constructed on the beach at the mouth of the ravine. As part of this construction, flows conveyed in the ravine were diverted to a culver that lies behind the treatment plant and discharges directly to Lake Michigan. The installation has since been converted to a private residence. Prior to the Janes Ravine remediation, the head of Hutchinson Ravine was restored. Excess storm water was rerouted through the swale later utilized by the rerouted flows for Janes Ravine. Portions of the ravine slopes were reinforced, the bottom armored with cobbles, and grade control structures introduced. Not all storm sewer outfalls were able to be included in this project, ultimately leading to some of the newly introduced features being damaged, as shown in Figure 3.4. The last remaining sewer outfall is located near the western edge of Scotts Ravine's tributary area.

Figure 3.4 Hutchinson Ravine – Failed Structure

3.3. MacArthur Ravine

MacArthur Ravine is 520 feet long and has a drainage area of 11.9 acres. Of this area, 51.3% is residential, 9.8% is paved roadways and 38.9% is open space or forest preserve. Its mouth does not actually extend to the shoreline, but instead discharges over the revetment on the beach. Over its length, the ravine drops approximately 50 feet; this steepness has exacerbated the downcutting and sloughing typical of ravines in the area as shown in Figure 3.5. While not a significant concern at the moment, private access roads for adjacent residences could potentially be threatened should the degradation of the ravine continue.

Figure 3.5 MacArthur Ravine – Typical Channel

3.4. Scotts Ravine

Scotts Ravine is 1170 feet long and has a drainage area of 86.1 acres. Of this area, 18.0% is residential, 15.2% is paved roadways and 66.8% is open space or forest preserve. The majority of this tributary area is discharged through sewer outfalls located at the heads of the ravine and its tributary. While this resulted in degradation of the ravine, substantial efforts have been made by local stakeholders to mitigate further damage to the ravine. Much of the ravine's bed has been armored with stone and broken concrete. The slopes have been reinforced at several locations using gabions and timber deadmen. Despite this, however, the ravine continues to experience issues. The sewer outfalls at the head of the ravine have scoured the original plunge pool, exposing previously installed filter cloth. The armoring of the tributary consists of broken slabs of concrete without base stone or filter cloth, exposing the underlying layers to erosion. The mouth of the ravine is elevated by a seven-foot concrete check dam that is experiencing scour at its base due to wave action.

3.5. Bartlett Ravine

Bartlett Ravine is 4290 feet long and has a drainage area of 189.3 acres. Of this area, 37.6% is residential, 3.6% is commercial, 35.1% is governmental, 15.1% is paved roadways, and 8.6% is open space or forest preserve. A bituminous concrete pavement runs down the center of the ravine, serving as an access road to the lift station located on the beach. Its length is periodically punctuated by the storm sewer outfalls of its adjacent tributary areas. Near the mouth of the ravine one such outfall is situated near the top of an offshoot of the ravine, the resultant storm water discharge causing erosion and sloughing within the offshoot. Along its length a pair of

gutters channels runoff into the storm sewer that discharges to the lake. As the grates for the inlet structures for the storm sewer under these gutters become clogged, however, storm water is conveyed in the gutter. When the terminal inlet structure near the mouth of the ravine becomes clogged, the storm water for the tributary area is forced along the periphery of the road as shown in Figure 3.6. This has resulted in the erosion of the toe of the bluff and, in the spring of 2011, caused the undermining of the access road. A man-made pond at the head of its tributary receives the discharge from several storm sewer networks which discharges to an armored channel that leads to the paved main channel. This pond was not designed to provide significant detention storage, so what little is available quickly becomes utilized. Further downstream in an offshoot of the tributary, a broken concrete headwall reinforces the slope above a sewer outfall. Downstream of this, the channel is armored using stone and broken concrete.

Figure 3.6 Bartlett Ravine – Storm Water Bypassing Structure

3.6. Van Horne Ravine

Van Horne Ravine is 1110 feet long and has a drainage area of 57.0 acres. Of this area, 61.3% is governmental and 38.7% is open space or forest preserve. The dominant governmental use in the tributary area is a series of Naval housing developments. The storm sewers that service these areas connect to single outfall located at the head of the ravine. The result of the increased discharge has been excessive downcutting of the ravine bed, sloughing of the adjacent slopes, and the undermining of the outfall structure, as shown in Figure 3.7. The latter has occurred to such an extent that the road above the outfall was threatened, prompting local stakeholders to attempt to take corrective actions (most recently dumping concrete slurry down the slope to prevent the failure of the adjacent road). The sloughing at the head has also exposed a clay field

tile which currently continues to discharge to the head. At some point an earth dam was constructed across the mouth of the ravine, through which connectivity to the lake is provided through a concrete culvert. Because of the degradation of the upstream portions of the ravine, however, the sediments have accreted over the inlet. The depth of cover to the crown of the culvert has been estimated to be as high as 5 feet.

Figure 3.7 Van Horne Ravine – Failed Outfall Structure at Head of Ravine

3.7. Schenck Ravine

Schenck Ravine is 1520 feet long and has a drainage area of 67.4 acres. Of this area, 18.5% is residential, 1.8% is commercial, 68.2% is governmental, 10.8% is paved roadways, and 0.6% is open space or forest preserve. Similar to Van Horne Ravine to the north, the dominant governmental land use is Naval housing developments, which were constructed adjacent to the ravine after 2007. Prior to 1940, a road was constructed that bisected the ravine near its head. The outfalls for two sewer networks, one servicing the road to the west and the other the southern edge of the community to the east, converge into a single outfall structure. The introduction of this additional flow has caused the ravine bed to incise several feet. At its mouth, the ravine drops approximately 23 feet over a distance of 180 feet. The storm sewer outfall for the housing development near the mouth was originally piped to the floor of the ravine. Eventually the pipe failed, as shown in Figure 3.8, snapping off near the crest of the ravine slope and thereafter allowing the storm water to jet down the slope.

Figure 3.8 Schenck Ravine – Failed Outfall Near Mouth of Ravine

When the Naval housing development to the east was developed, the designers included a series of shallow basins along the ravine and bluff, intending to provide facilities to capture pollutants from the "first flush" of rainfall. The easternmost of these discharges into the ravine while the outlets of the other two converge on a single point near the top of the bluff. Although the slope below the outfall was initially armored, the sizing proved inadequate and resulted in the washing out of the majority of the stone, as shown in Figure 3.9.

3.8. Shoreline

The project area includes approximately 1.9 miles of shoreline with most characteristics varying throughout. The beach width varies from 150 feet to being virtually nonexistent. Armoring in the backshore area varies from being nonexistent to boulders 2 to 3 feet in diameter. The typical slope throughout the project is relatively consistent: the onshore slope is approximately 0.1 ft/ft, transitioning into a nearshore slope of 0.04 ft/ft. After approximately 80 to 100 feet this slope reduces to approximately 0.008 ft/ft offshore. Due to the variability of the characteristics, the shoreline is divided into several reaches for the purpose of this section.

Figure 3.9 Schenck Ravine – Failed Armoring of Bluff Slope

3.8.1. Reach 1

This reach extends from the northern project limit south to the mouth of McCormick Ravine, covering approximately 580 feet. The beach width varies between 25 and 50 feet and no armoring is present along the toe of the bluff. Although the lower portions of the bluff appear relatively stable, the top of the bluff show severe erosion throughout this reach, as shown in Figure 3.10. There are no coastal structures within this reach.

3.8.2. Reach 2

This reach extends south from the mouth of McCormick Ravine south 1060 feet. The beach width varies between 60 to 100 feet and in general no armoring is present along the toe of the bluff. The outfall for the Janes/Hutchinson Ravine remediation pond is centrally located along the reach and is flanked on either side by moderately sized boulders. A riprap blanket was placed at the base of the outfall, as can be seen in Figure 3.11. The bluffs throughout this reach appear stable and do not show signs of erosion. In addition to the outfall, two groins are located within this reach, each approximately 150 feet long.

Figure 3.10 McCormick Ravine – Reach 1

Figure 3.11 Remediation Pond Outfall – Reach 2

3.8.3. Reach 3

This reach extends from 930 feet north of the Hutchinson Ravine outfall to 230 feet south of the mouth of Bartlett Ravine, covering approximately 3080 feet. The beach width varies between being negligible to 90 feet, although typically is fairly narrow as shown in Figure 3.12. Armoring is frequently present along this reach in the form of a revetment 5 to 7 feet high consisting of moderately sized boulders. The bluffs throughout this reach appear stable and do not show signs of erosion except for one isolated location due to a sewer outfall located near the top. A groin field extends throughout the southern end of the reach, spaced every 300 to 400 feet and extending approximately 150 feet from shore. The former drinking water treatment plant is located within this reach and is bounded on either side by a pair of outfalls. The outfall south of the installation is for Hutchinson Ravine. The outfall to the north conveys drainage from the access road to the lake. MacArthur and Bartlett Ravines discharge to the beach along this reach.

3.8.4. Reach 4

This reach extends from 230 feet south of the mouth of Bartlett Ravine to the Landfill 7 outfall, covering approximately 3080 feet. The beach width varies between 30 and 90 feet and no armoring is present along the toe of the bluff. The bluffs throughout this reach appear stable and do not show signs of erosion except for one isolated location due to a sewer outfall located near the top. The groin field from Reach 3 extends throughout Reach 4, with the structures still extending approximately 150 feet from shore, but spaced every 300 to 500 feet. The lift station south of Bartlett Ravine and the Van Horne Ravine outlet are located within this reach.

Figure 3.12 Hutchinson to Bartlett Ravine – Reach 3

Figure 3.13 Bartlett Ravine to Landfill 7 – Reach 4

3.8.5. Reach 5

This reach extends from the Landfill 7 outfall to the mouth of Schenck Ravine, covering approximately 1070 feet. The beach width varies between 40 and 90 feet. Armoring is present along the toe of the bluff in the form of a revetment approximately three to four feet high. Two groins are present within this reach, each approximately 150 feet long and spaced every 580 feet. Vegetation has grown on the beach where it widens on the updrift side of the groins. The groin at the southern end of the reach has been flanked by discharge coming from Schenck Ravine.

3.8.6. Reach 6

This reach extends from the mouth of Schenck Ravine to the southern project limit, covering approximately 1120 feet. The beach width varies between 15 and 45 feet, tapering from its narrowest at the northern end to its widest at the southern end. Armoring is present along the toe of the bluff in the form of a revetment approximately five to seven feet high consisting of moderately sized boulders. Although comparisons of aerial photographs show that there is little to no change in the configuration of the boulders at the toe of the bluff from year to year, from site visits it is apparent that some armor stones have shifted and moved lakeward. This is illustrated in Figure 3.15. There are no coastal structures within this reach.

Figure 3.14 Landfill 7 to Schenck Ravine – Reach 5

Figure 3.15 Schenck Ravine to Southern Limit – Reach 6

CHAPTER 4. HYDROLOGIC AND HYDRODYNAMIC DATA COLLECTION

Data collection and the initial estimation of parameters used to hydrologically model the ravines included in this study are discussed in this section. Data collection activities included subbasin delineation, current land-use, and soils information compilation.

4.1. Subwatershed Delineation

Pre- and post-development watersheds were generated using HEC-GeoHMS and a 2-foot digital elevation model (DEM) that was developed from available LiDAR data. Although the LiDAR data will not be representative of the grading prior to the development of the area, data from an earlier time period is not available.

While the pre-development watersheds were developed taking into account only the ravine centerlines, the post-development watersheds also incorporated the storm sewer networks that discharge to the ravines. This was accomplished by superimposing the storm sewer lines onto the DEM using ArcHydro and decreasing the elevations of the grid points that intersected. The pre- and post-development drainage areas for each ravine are shown in Tables 4.1 and 4.2, respectively. Pre-and post-development watershed delineations for each ravine are shown in Figures 4.1 and 4.2.

4.2. Land-use Delineation

Information detailing the pre-development land-use for the project area was not available, so pre-development delineation was based upon the recommendations of USACE ecologists. It was assumed that the bluffs were upland forests with shrub prairie while the ravines were forest once the slopes stabilized.

Post-development land-use utilized current land-use maps developed and defined by NIPC and represent the land use status as of 2001. Through the comparison of aerial photographs it was determined that significant changes between 2001 and present have not occurred. Land use in the project area primarily consists of government and residential space, which makes up approximately 44.5% of the total project area. The next major land use, consisting of approximately 31.2% of the project area is forest and open space. The remaining 24.3% consists of retail and roadways. A map of the existing land use designations is shown in Figure 4.3.

4.3. Soil Information Compilation

Soil maps created as part of the National Cooperative Soil Survey (NCSS), which is led by the USDA-NRCS, were used for classifying the hydrologic characteristics of the soils in the watershed. The USDA-NRCS soil categorization scheme contains the soils coverage Map Unit Symbol (MUSYM) attribute. The MUSYM is the same soil survey designation as the Soil Conservation Service (SCS) designation and corresponds to the hydrologic soil group for soil types A through D, but has four additional categories. The project area primarily consists of

hydrologic soil group type C. Soils in this group tend to be composed of between 20percent and 40 percent clay, resulting in somewhat restricted rates of infiltration and transmissivity. As a result, soils in this group have a moderately high potential for runoff when saturated (USDA, 2007).

Table 4.1 Pre-Development Subbasin Drainage Areas

Subbasin	Area (mi^2)
McCormick	0.326
Janes	0.170
Hutchinson	0.283
MacArthur	0.008
Scotts	0.111
Bartlett	0.260
Van Horne	0.111
Schenck	0.101

Table 4.2 Post-Development Subbasin Drainage Areas

Subbasin	Area (mi^2)	Percent Change from Pre-Development
McCormick	0.385	+18.1%
Janes	0.120	-29.4%
Hutchinson	0.108	-61.8%
MacArthur	0.012	+50.0%
Scotts	0.121	+9.0%
Bartlett	0.297	+14.2%
Van Horne	0.089	-19.8%
Schenck	0.097	-3.9%

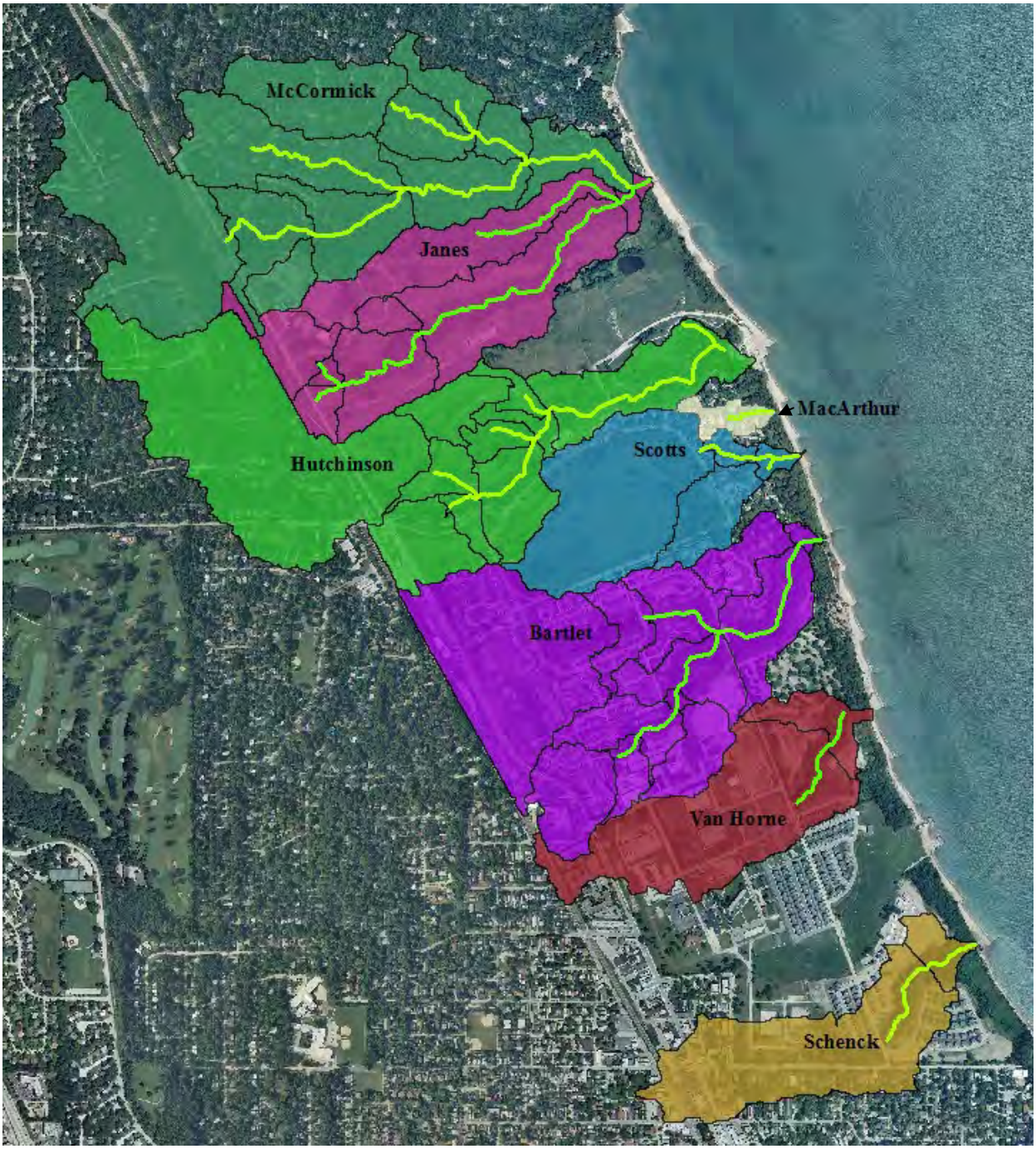

Figure 4.1 Pre-Development Subbasins

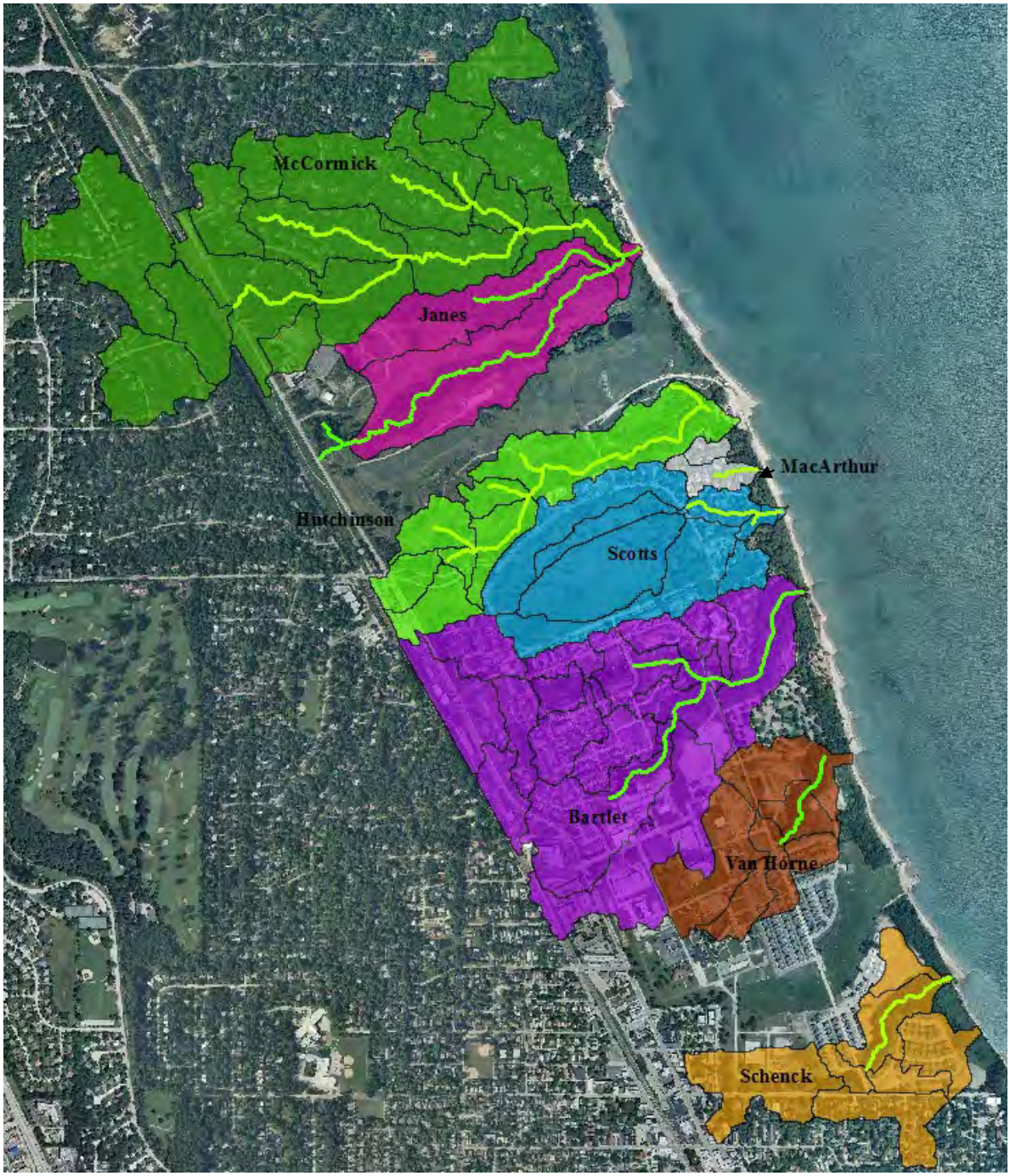

Figure 4.2 Post-Development Subbasins

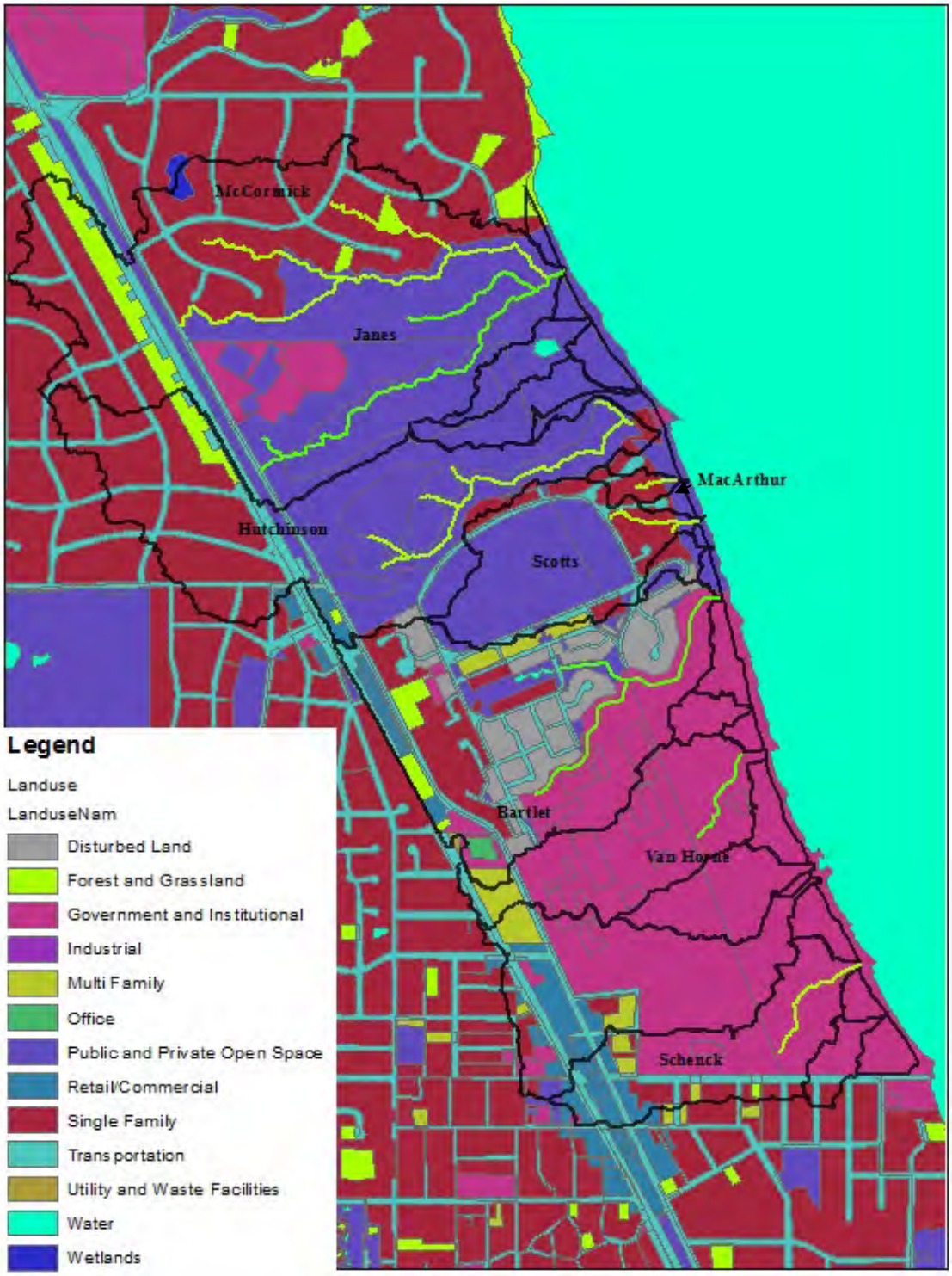

Figure 4.3 Post-Development Land-use of Project Area

CHAPTER 5. HYDROLOGIC AND HYDRAULIC MODELING USING SWMM 5.0

While HEC-HMS was selected as the primary hydrologic model from which peak flow data would be extracted for use in the hydraulic modeling, it is limited to modeling pipe flow using the Kinematic Wave method and so does not simulate pressurized flow or charging in the sewer network. A supplementary model was necessary to simulate this portion of the watershed using the Dynamic Wave method which would allow for such considerations. EPA's SWMM version 5.0 was selected that would be used to simulate the sewered portions of the watersheds and to develop discharge hydrographs at the outlets of each sewer network to be applied to the ravines in the HEC-HMS model. SWMM is similar to HEC-HMS in that it represents the watershed as an interconnected system of subcatchments that simulate the precipitation runoff process and hydraulic components that connect the subcatchments, but adds the additional functionality of modeling a storm sewer network through a series of conduits and junctions. Each component is represented by a set of parameters that specify the physical processes. Inputs to the SWMM model include subcatchment area and its interconnectivity, hydrologic parameters, and physical characteristics of the storm sewer infrastructure. The result of the model is the hydrographs at the outlets of the storm sewers where they discharge to the ravines. This information was used as input to the HEC-HMS models and to develop required detention storage volumes.

5.1. Subcatchment Delineation

Each discrete storm sewer network was modeled as a single system in the SWMM model. The subcatchment delineation described in Section 4.1 was used to define the overall area tributary to the individual storm sewer networks, but these were further refined into smaller subcatchments. This was accomplished by defining smaller areas tributary to a storm sewer inlet point based upon topography and structure configuration. Variations from the subcatchment delineation defined through ArcGIS were made based upon residential development shown in the most recent aerial photographs.

5.2. Subcatchment Parameters

Subcatchment parameters included such things as overall area, characteristic width, percent slope, percent impervious, Manning's n, depth of depression storage, percentage of impervious area without depression storage, and SCS curve number. Subcatchment area and percent impervious were based on measurements taken from aerial photography in ArcGIS. The characteristic width is defined as the area divided by the longest flow path, which was estimated using topography and aerial photographs. The average percent slope was estimated using the DEM and longest flow path – elevations were taken at distances corresponding to 85% and 15% of the longest lengths and the slope defined using the distance between these points. The values for Manning's n were left at their default values of 0.01 and 0.1 for impervious and pervious areas, respectively. Similarly, the values for depth of depression were left at their default values of 0.05. These values can be used to calibrate the models should data become available later on. The SCS curve number applied to the pervious area only and was defined as 74.

5.3. Storm Sewer Data

Storm sewer data was provided by the local municipalities and consisted of information relating to pipe size and invert elevations, structure rim elevations and outfall invert elevations. This information was used as input into the model. Ponding was allowed to occur at all structures except those located on ravine or bluff slopes. The existing condition storm sewer models only flooded at three locations during the 100-year event. As one criteria for any project measure is to not worsen the existing storm sewer system, it is not necessary to model overland flow between each structure. Since it is uncertain which ravines will be carried forward to final design, it was unnecessary to model the three locations where flooding and bypass would occur. These model features will be incorporated during the next design phase.

In some instances inconsistencies were found in the data, typically appearing the in the form of adverse slopes given the specified invert elevations, outlet inverts of structures higher than the inlet inverts and pipe series leading into segments at an overall higher elevation than those upstream. As these instances were encountered they were noted and later rectified through a series of field surveys conducted in early 2011. Schematic layouts of the post-development condition SWMM models are shown in Appendix A.

5.4. Storage Unit Data

Storage units in SWMM are specified by their invert elevation, maximum depth and a storage area-depth curve. Information detailing the existing water-quality enhancement basins adjacent to Schenck Ravine was determined through field surveys and photographs. Cross-sections were surveyed at each structure and at the midpoint between each structure. Points were also collected at the ends of each basin. The survey data was used to develop a TIN in ArcGIS, from which areas at various elevations were extracted.

A storage area-depth relationship was developed for the pond at the head of the north tributary to Bartlett Ravine by contour data provided by Lake County. From these, areas corresponding to various elevations were determined.

5.5. Storage Outlet Data

Outlets to the storage units in the SWMM models are specified by identifying the inlet offset relative to the bottom of the storage unit and the corresponding outlet rating curve. The rating curve for the outlets of the existing water-quality enhancement basins was not provided by the local municipalities, so one was estimated. Based on site photographs, the outlet structures were estimated to be 6” beehive grate inlets atop two 2” concrete rings. Using the specifications provided by a manufacturer, the weir perimeter and open area were identified as 6.0 feet and 1.1 ft^2, respectively. It is assumed that flow into the inlet does not begin until the depth in the detention basin overtops the concrete rings. While the depth is between 4” and 7 ½”, the inlet acts as a weir. After the depth exceeds 7 ½”, however, the inlet begins acting as an orifice. Using the weir and orifice coefficients specified by the manufacturer, the relationship between the depth and flowrate was determined using the following equations: The structures are shown in Figure 5.1.

$$Q = 3.0(P)d^{1.5} \text{ for weir flow}$$
$$Q = 4.89(A)d^{0.5} \text{ for orifice flow}$$

Figure 5.1 Schenck Ravine Outlet Grates

Limited details were available for the rectangular weir structure separating the two ponds at the head of Bartlett Ravine's tributary. Using LiDAR data, the elevation of the crest of the weir was estimated. By measuring the width of the weir from aerial photographs in ArcGIS, it was possible to relate this information to a photograph showing the structure in profile, allowing the photographs scale to be estimated. From the photograph and the estimated crest elevation, it was possible to estimate the elevation at which the weir would overflow as well as the elevation and size of the openings below the weir. The structure is shown in Figure 5.2.

Similarly, limited data was available for the pair of culverts that served as outlets for the lower pond. Culvert dimensions and invert elevations were provided in the original site plan, but during a site visit it was found that the weirs had been added to both culverts. Using a similar approach as before, using the known width of the culvert the scale of a photograph was estimated. With the known invert elevation, it was possible to estimate the elevation and width of the weir. The one of the culverts and is shown in Figure 5.3.

5.6. Precipitation Data

Without data to calibrate the models, observed precipitation data was not required. Instead, the models used synthetic events to drive the output. Time distributions of heavy rainfall at a point were taken from Table 10 of Bulletin 71. First quartile rainfall distributions were applied to the

6-hour rainfall events. Second quartile rainfall distributions were applied to the 12-hour rainfall events. Third quartile rainfall distributions were applied to the 24-hour rainfall events. Fourth quartile rainfall distributions were applied to the 48- and 72-hour rainfall events. Rainfall depths corresponding to a particular duration and return interval of the Northeastern Illinois region were identified in Table 13 of Bulletin 70. These values were applied to the corresponding Huff rainfall distribution curve as noted above to generate a cumulative hyetograph at a point. To

Figure 5.2 Bartlett Ravine Weir Outlet Structure

Figure 5.3 Bartlett Ravine Culvert and Weir Outlet Structure

account for the variation in rainfall depths over an area compared to that at a point, values from Table 35 of Bulletin 70 were employed. The smallest area for which ratios were available was 10 square miles, so its values were adopted for this project. The ratio corresponding to each storm duration was identified and applied to the appropriate hyetographs. The referenced tables in this section are shown in Appendix B. The values selected from Tables 13 and 35 of Bulletin 70 are highlighted in yellow. The synthetic rainfall depths for the return periods used are shown in Table 5.1.

Table 5.1 Synthetic Precipitation Depths

Storm Duration (hr)	Rain Depth (Inches)							Huff and Angel Distribution
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	
6 hrs	2.28	2.85	3.35	4.13	4.85	5.68	6.87	1st Quartile
12 hrs	2.64	3.31	3.89	4.79	5.62	6.59	7.91	2nd Quartile
24 hrs	3.04	3.80	4.47	5.51	6.46	7.58	9.17	3rd Quartile
48 hrs	3.30	4.09	4.81	5.88	6.84	8.16	9.78	4th Quartile
72 hrs	3.55	4.44	5.18	6.32	7.41	8.78	10.54	4th Quartile

5.7. Model Calibration

Calibration of the SWMM models was not possible due to the absence of storm sewer monitoring data. While this will contribute to additional inaccuracies in the outfall hydrographs, there is still a sufficient amount of confidence to permit the models to be used. The storm sewer geometry was generated from data collected by the local sponsors and/or through field surveys. Any differences between this data and what actually exists is assumed to be limited by the accuracy with which it can be measured (i.e. it is assumed that data provided by the local sponsors is correct unless obviously questionable). As the majority of the data was provided to the nearest hundredth of a foot, the impact of these inaccuracies upon the outfall hydrographs should be minimal. The greatest source of error in the model will manifest in the estimation of the characteristic basin width. While this value is commonly used as a calibration parameter for the timing of the hydrographs (which can become an issue depending upon the complexity of the storm sewer network), the absence of calibration data makes an adjustments from the baseline value impractical. While the final output may not be perfectly representative, it provides a reasonable approximation for the storm sewer's response to design storm events. For the purposes of this study, any inaccuracies in the modeling results can be accounted for through a more liberal application of a safety coefficient for proposed measures.

5.8. Model Results

During the feasibility level of the study, only those storms that the Lake County Stormwater Management Commission (Lake County SMC) uses for regulatory purposes – the 2-year and 100-year 24-hour rainfall events – were simulated for detention structure features. Any detention structures included as a measure would be limited in its release rate for these events based on its tributary area. Proposed structures were incorporated into the existing storm sewer infrastructure

and sized for these rainfall events, trying to balance between matching the pre-development condition flow rates and meeting the Lake County SMC requirements. All other measures (i.e. riffles, weirs, aprons) used the 100-year 24-hour rainfall event as the design condition and did not consider the lower return period event.

Regardless of whether the rainfall event was attenuated, the resultant outfall hydrograph needed to be incorporated into the HEC-HMS model to estimate the relationship between the timing of the hydrograph peaks of the system. The outfall hydrographs for the 100-year 24-hour rainfall events are shown in Appendix C for baseline and selected with-project conditions. Bartlett Ravine is excluded from this summary as no proposed measure attempted to modify the flow from the outfalls. A summation of the peak flows from each outfall was used as the design condition at the mouth.

The recommended plan for McCormick Ravine does not call for modification of the storm sewer network. One of the alternatives considered, however, considered attenuation of all the tributary outfalls; based on the figures shown in Appendix C, it is clear that these efforts would have varying degrees of impact. Even though most of these storage units would be placed in-street and would require significant rerouting of municipal infrastructure, this also served to restrict their placement when rerouting was impractical. Suitable space was available along the storm sewer near the mouth of the ravine (indicated by the marked difference between baseline and with-project conditions), while the smaller subbasins midreach along the ravine show little improvement.

One of the measures for MacArthur Ravine called for the rerouting of the storm sewer discharge directly to the beach. By reducing the area tributary to the outfall at the head of the ravine, the peak discharge was greatly reduced.

The Hutchinson Ravine measure demonstrates how even with providing additional storm sewer inlets along the curbline it would be possible to attenuate the flows to a more acceptable level. Although the pulse is attenuated and results in flows occurring up to two days longer than otherwise would occur, based on modeling they should be at a sufficiently low level that no detrimental impact to the channel is anticipated.

Although the Scotts Ravine recommended plan calls for an in-ravine pipe, the release rates for the two detention features is worth noting. While the discharge to the head of the ravine is reduced for both above and below ground storage, the discharge to the tributary increases – in the case of above ground detention, substantially. This permits the restoration of a longer length of the ravine, but necessitates the reinforcement of the tributary and reaches downstream.

The outfall hydrographs for the displayed measures for Van Horne Ravine were very similar. Although both reduced the peak discharge for the design event, the flow was attenuated, lasting approximately 10 hours longer than the baseline condition. It was assumed that this condition is more acceptable for restoration activities.

The first two options considered for Schenck Ravine included variations of underground detention storage. Both attenuated the flow, although as can be seen in the figure shown in

Appendix C, Option #1 is significantly more drawn out compared to Option #2 or the baseline condition. A comparison of the proposed cistern versus the baseline condition is also provided. While only a modest amount of attenuation is achieved, the local sponsors feel that having a structure in place to capture the "first flush" will be a benefit to the water quality of the discharge.

CHAPTER 6. HYDROLOGIC MODELING USING HEC-HMS 3.4

The hydrology of the ravines' subbasins and the flow routing through the ravines were modeled using version 3.4 of USACE's HEC-HMS software. The HEC-HMS hydrologic model simulates the surface runoff response of a river basin to precipitation. This is done by representing the watershed as an interconnected system of inflow hydrographs, subbasins that simulate the precipitation runoff process and hydraulic components that connect the subbasins. Each component is represented by a set of parameters that specify the physical processes. Inputs to the HEC-HMS model include subbasin area and their interconnectivity, SCS curve numbers, hydrologic parameters, representing physical processes (infiltration, travel times, etc.), and channel storage. Junctions were placed at the intersection of two or more reaches and at the outlet of each reach. The result of the model is the computation of peak flows and volumes at specific locations in the ravines. A summary of the relationship between the geometries of the SWMM, HEC-HMS, and HEC-RAS models is provided in Appendix D for reference.

6.1. SCS Curve Number Determination

Loss rates for the rainfall-runoff analysis were determined by the United States Department of Agriculture, Soil Conservation Service (SCS) curve number method, as documented in SCS Technical Release 55, *Urban Hydrology for Small Watersheds* (1986). The ravine watersheds were divided into polygons discretized by land-use, hydrologic soil classification, and subwatershed. Each polygon in the watershed was assigned a curve number based on land use and soil classification. A table detailing these values and their corresponding land uses is shown in Appendix E. Composite curve numbers for each subbasin were determined by multiplying the polygon area by the assigned curve number, summing these values for each subbasin, and finally dividing this sum by the total area of the watershed area. The resulting composite curve number for each subbasin is also shown in Appendix E.

6.2. SCS Unit Hydrograph Parameters

Due to the limited availability of information on the area, the subbasins were modeled using SCS unit hydrographs. In this method, once the time of concentration has been determined, the lag time – the time period between peak rainfall and peak runoff – can be approximated by:

$$t_{lag} = 0.6t_c$$

The method used to determine the time of concentration for the pre-development condition is documented in SCS TR-55. In this method the longest flowpath is determined, for this study

using the topographical information available. This flowpath is divided into three consecutive travel components – sheet flow, shallow concentrated flow, and channel flow. The time of concentration, t_c, is defined as the sum of the travel time (T_t) along each of these flow components, where T_t is the ratio of the flow length of that component to the flow velocity:

$$T_t = \frac{L}{3600V}$$

In this equation, T_t is the travel time in hours, L is the flow length in feet, 3600 is a conversion factor from seconds to hours, and V is the average velocity in feet per second.

Sheet flow is flow that occurs over plane surfaces and occurs over the initial length of the flowpath, up to 300 feet along the flowpath. For sheet flow of 100 feet or less, T_t is determined using Manning's kinematic solution:

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} s^{0.4}}$$

In this equation, T_t is the travel time in hours, n is the Manning's roughness coefficient, L is the flow length in feet, P_2 is the 2-year, 24-hour rainfall in inches, and s is the land slope in feet per foot. It was assumed that sheet flow occurred over the first 100 feet along the flowpath. The n values used in this equation are for very shallow flow depths; values for various surface conditions are tabulated in Appendix F.

The flow length of shallow concentrated flow began after the first 100 feet and ended when the flowpath intersected the main channel or where bank lines became visible in the aerial photographs or in the contour maps. The average velocity for shallow concentrated flow is estimated using the following equations:

$$V = 16.1345 s^{0.5} \text{ for unpaved surfaces}$$
$$V = 20.3282 s^{0.5} \text{ for paved surfaces}$$

In this equation, V is the average velocity in feet per second and s is the watercourse slope in feet per foot. Given the typically large size of the subbasins delineated in this project, a single value for an averaged watercourse slope may not accurately estimate the travel time. In an attempt to better capture this variable, incremental travel times for regions of similar slopes were calculated.

The flow length of channel flow was measured along the channel centerline from the point at which shallow concentrated flow ended. The average velocity of the channel flow was determined by identifying the cross-sections of the HEC-RAS model that were along this portion of the flowpath. The velocity of flow in the portion of the channel when the reach was at bank-full elevation was tabulated for each cross-section and averaged.

6.3. Modified Puls and Channel Routing

The modified Puls method was used for routing flow downstream between subbasins in HEC-HMS. For each ravine, the applicable HEC-RAS model was run using a range of discharges. Volume-discharge relationships were obtained from the output and added to the HEC-HMS model for the previously determined reaches. The volume-discharge relationships for the pre- and post-development conditions can be found in Appendix G. HEC-HMS was then run using a synthetic rainfall event and the output analyzed. If the peak flows generated by the HEC-HMS model exceeded the maximum flow in the volume-discharge relationship for a reach, the upper limit of the range of discharges for that reach in the HEC-RAS model was increased and the process repeated.

6.4. Model Calibration

For the purposes of modeling the watersheds of the project area, a moderate amount of generalization was employed. While adjustments can be made to parameters used to characterize the hydrologic properties of these basins, the absence of observed data eliminates this possibility. The inability to calibrate the HEC-HMS models reduces the accuracy of and confidence in the final results of the simulations. Through careful estimation of the input parameters for the model, however, the final results can nevertheless be taken as a useful approximation for the watersheds response to a given rainfall event.

Possible sources of error in the HEC-HMS model include generalization of the subbasins loss rate through a single curve number value, inaccuracies in the estimation of a subbasins lag time, and approximation of the discharge-storage relationship for a given reach. It is assumed that by calculating the curve number as described in section 6.1 and lag time as described in section 6.2, the influence of these errors due to generalization can be minimized. The remaining variable that must be considered is the discharge-storage relationship. For the feasibility level study, the cross-sections were based on LiDAR data, but this data's inherent error can be accounted for through a more liberal application of a safety coefficient for the design measures. During the next design phase survey data will be collected for each cross-section, allowing for a more accurate representation of the discharge-storage relationship within a given reach.

6.5. Precipitation Data

The HEC-HMS models were run using the 100-year 24-hour rainfall event of the same depth and distribution as the EPA-SWMM model. During the next design phase EPA-SWMM output will be generated for the 6-, 12-, and 48-hour durations for the 100-year event to allow the HEC-HMS models to be run for the full range of events.

Without data to calibrate the models, observed precipitation data was not required. Instead, the models used synthetic events to drive the output. Time distributions of heavy rainfall at a point were taken from Table 10 of Bulletin 71. First quartile rainfall distributions were applied to the 6-hour rainfall events. Second quartile rainfall distributions were applied to the 12-hour rainfall events. Third quartile rainfall distributions were applied to the 24-hour rainfall events. Fourth quartile rainfall distributions were applied to the 48- and 72-hour rainfall events. Rainfall depths

corresponding to a particular duration and return interval of the Northeastern Illinois region were identified in Table 13 of Bulletin 70. These values were applied to the corresponding Huff rainfall distribution curve as noted above to generate a cumulative hyetograph at a point. To account for the variation in rainfall depths over an area compared to that at a point, values from Table 35 of Bulletin 70 were employed. The smallest area for which ratios were available was 10 square miles, so its values were adopted for this project. The ratio corresponding to each storm duration was identified and applied to the appropriate hyetographs. The referenced tables in this section are shown in Appendix C. The values selected from Tables 13 and 35 of Bulletin 70 are highlighted in yellow. The synthetic rainfall depths for the return periods used are shown in Table 5.1.

6.6. Modeling Results

Simulations were performed using the pre-development models to determine which duration would yield the largest peak flow for the 2-year rainfall event. Once the critical events had been determined, the peak discharges for the pre-development condition at the locations corresponding to the existing outfalls could be identified. These were used to define the allowable discharge from the sewer networks at the corresponding locations. Tables 6.2 and 6.3 show the results of the critical duration analysis, as observed at the mouth of the ravines along Lake Michigan.

For some combination of measures, it was unrealistic to achieve the allowable discharge within the ravine. In those cases the allowable discharge was increased to the pre-development 100-year 24-hour discharge. Although this value does not correspond to the peak discharge for the 100-year rainfall event, it was not desirable to allow the maximum design flow to approach such a large value. Instead, the median event – 24-hours – was selected.

Table 6.1 Pre-Development Critical Duration Analysis Peak Discharge (cfs), 2-Year Event

	McCormick Janes	Hutchinson	MacArthur	Scotts	Bartlett	Van Horne	Schenck
6-hour	41.4	30.6	0.4	9.2	23.1	9.3	8.8
12-hour	46.3	34.5	0.4	10.2	25.4	10.3	9.7
24-hour	43.8	33.3	0.4	9.5	23.7	9.7	9
48-hour	29.9	22.8	0.3	6.5	16.2	6.7	6.2
72-hour	22.9	17.5	0.2	5	12.4	5.1	4.7

Table 6.2 Pre-Development Critical Duration Analysis Peak Discharge (cfs), 100-Year Event

	McCormick Janes	Hutchinson	MacArthur	Scotts	Bartlett	Van Horne	Schenck
6-hour	300.3	215.5	2.7	63.5	164.4	55.9	61.3
12-hour	259.4	193.2	2.3	55.9	140.7	56.8	53.1
24-hour	190.1	143.3	1.6	41.3	103.2	42.1	39.0
48-hour	113	86.4	1.0	24.6	61.0	25.2	23.2
72-hour	84.3	64.2	0.7	18.4	45.6	18.8	15.6

A comparison of the peak flows along the ravine for the pre- and post-developed conditions are provided in Appendix H. Post-developed condition hydrologic models were not developed for all ravines – Hutchinson, MacArthur and Bartlett Ravines were omitted. Any work for Hutchinson Ravine would be limited to the tributary storm sewer at the mouth. MacArthur Ravine is sufficiently small relative to its tributary area that any runoff generated within the ravine itself was insignificant compared to the inflow from its tributary area. The floor of Bartlett Ravine has been developed to the point where it is more road than ravine – a complete SWMM model would have been more appropriate had the data been available.

The hydrographs at the mouth of McCormick and Scotts Ravine show little difference between the pre- and post-development condition. Once the critical duration for the post-development condition has been identified in the next design phase, comparisons can be made between the hydrographs for other durations and the values of the critical durations themselves. It would be expected that the hydrographs for Van Horne and Schenck would be similar to the others, but because development has removed significant portions of its tributary area, the corresponding response to the synthetic event has been depressed.

The peak discharge for each reach was applied to the corresponding upstream cross-section in the appropriate HEC-RAS model. This would allow for a conservative design within each reach.

CHAPTER 7. DEVELOPMENT OF THE HEC-RAS HYDRAULIC MODEL

The hydraulics of the Fort Sheridan ravines were modeled using version 4.1 of USACE's HEC-RAS software. The HEC-RAS model for the ravines consists of several component data sources including channel geometry, structure information, roughness parameters, and flow/stage boundary conditions. All ravines were modeled in the same project, but were represented as individual geometry files. Flow data used to generate the volume-discharge relationships was developed using the procedure described in Section 5.3.

7.1. Cross-Section Geometry

The geometry data used in the HEC-RAS model was assembled primarily using a 2-foot digital elevation model (DEM), created using available LiDAR data. The centerline of the channel was

defined as a point on the thalweg based on the available elevation data. Cross-section cutlines were defined approximately every 100 feet.

The pre-development condition models used the same cross-section cutlines as the post-development condition models, but did not include any adjustments for downcutting. McCormick and Van Horne Ravines were modeled as contiguous and omitted the areas where the military filled and thereby blocked. The difference in elevation between the ravine floor and the bluffs in the models were consistent with what was observed in the field.

The post-development condition models included slight modifications to the ravine floor to account for downcutting. The spacing of the LiDAR data was such that the downcutting may not have been captured. It is also possible that a data point may have accurately captured the elevation of the downcut channel, but the density of the data points may have been insufficient to adequately capture the rapid changes of the profile. In either event, it was assumed that the ravine profile generated using the LiDAR data did not include downcutting, so the ravine floor was lowered based upon width and depth measurements made in the field of the incised channels.

7.2. Structure Information

Two culverts appeared in the post-development condition hydraulic model – one in McCormick Ravine and one at the outlet of Van Horne Ravine. The structures were modeled based on information obtained during site visits and through historical documentation. The culvert diameters and invert elevations relative to the ravine floor were measured and any treatments to the mouths (i.e. headwalls, blockages, etc.) were noted. The depth below grade of the inlet to the culvert in Van Horne Ravine was estimated by a local engineer who is familiar with the site – a better assessment is not available due to its lack of accessibility and the lack of historic data.

Ineffective flow boundaries were added to the bounding cross-sections for all bridges and culverts. The ineffective areas were set to be dynamic, meaning that once the areas are overtopped, the area is allowed to enter the flow field and add conveyance.

7.3. Friction Roughness Factors

Manning's n values for the post-development condition were determined using notes taken from field observations and photographs taken of the site. The median Manning's n value for a given surface was selected as the initial value. The reference tables used to determine roughness values are included in Appendix F.

Based on the guidance of Corps ecologists, the ravines in their pre-developed state were described as a mesic forest. This could be described as a modest amount of trees with substantial ground cover. Given the options available in the Overbank Roughness Coefficient table of Appendix F, this was approximated by the "scattered brush, heavy weeds" or "light brush in trees in winter". The normal value of 0.050 was applied throughout the model. When

considering the Manning's n value for the ravine channel, method modified from Aldridge and Garrett, 1973 was applied, where:

$$n = m \cdot \left(n_b + n_1 + n_2 + n_3 + n_4\right)$$

In this equation, n_b is the base value for Manning's n, m is an adjustment factor for the degree of meandering, and n_1 through n_4 are adjustment values to account for channel irregularity, variations in the channel cross-section, obstructions, and vegetation. For this application, the following values were selected for the base value and adjustment values/factors:

n_b = 0.024 (sand/fine gravel)
n_1 = 0.003 (minor – slightly eroded or sloughed side-slopes)
n_2 = 0.003 (alternating occasionally)
n_3 = 0.005 (minor obstructions)
n_4 = 0.010 (small/medium amount of vegetation in channel)
m = 1.15 (appreciable meandering)

When selecting values for each of the variables, the median value was typically selected. When considering the amount of vegetation in the channel, although it would be expected that vegetation would grow within the channel to some extent, it was uncertain to what degree this would occur. It was therefore decided to select the median value between a small and medium amount of vegetation. After summing the base and adjustment values and applying the adjustment factor, the resultant composite Manning's n value is 0.052. This value was applied uniformly to the channels of the pre-development condition HEC-RAS model.

7.4. HEC-RAS Boundary Conditions

The HEC-RAS model was run as a mixed flow regime model, allowing for both upstream and downstream control. Discharges at the heads of the ravines are supplied by sewer outfalls and the mouths are assumed to be free flowing without backwater effects, so critical depth was used as both the upstream and downstream boundary condition.

7.5. HEC-RAS Discharge Data

Critical duration analyses could not be performed for each combination of measures in an acceptable timeframe given the number of measures being considered. The Lake County Stormwater Management Commission limits release rates of proposed detention basins for the 2-year and 100-year 24-hour rainfall events, so these events were considered the design storm event at the feasibility level. Peak discharges were determined for each sewer outfall and at the outlet of each subwatershed in HEC-HMS. Discharges from sewer outfalls were applied to the nearest adjacent cross-section while peak discharges for subwatersheds were applied to the cross-section at the upstream boundary of the subwatershed. This approach would produce the most reasonably conservative combination of peak flows given the model output. For measures considering in-ravine pipe flow, only the peak discharges from the subwatersheds were used as input (i.e. the existing condition models weren't directly applicable, but the required data could be extracted without an additional model being created).

7.6. Model Calibration

Calibration of the HEC-RAS model was not possible due to the absence of observed gage data, but the results of the modeling are nevertheless useful for the purposes of this study. The geometry data was developed using a combination of LiDAR data and observations and measurements made in the field. As described in Chapters 5 and 6 of this appendix, the flow data was created through similar methods of approximating the existing conditions. Although the results of the HEC-RAS models will be influenced by the errors introduced through the flow data input generated by the other models and the error in the approximation of the channel geometry, these can be negated through the liberal application of a safety coefficient in the design of any proposed measures.

7.7. Model Results

A tabulated summary of the HEC-RAS model results for the pre- and post-development conditions for each ravine are shown in Appendix I. Reaches for each ravine have been put into sequence from mouth to head for convenient reference. Appendix J will provide a comparison between existing and with-project water surface profiles. Given the array of measures being considered, it was not possible to incorporate each into a separate HEC-RAS geometry file in an acceptable timeframe. The method for preliminary design is described in Chapter 9.

Modeling results of McCormick Ravine model indicate that channel velocities in excess of 3.5 ft/s (the maximum permissible velocity for water transporting colloidal silts in an ordinary firm loam channel) is prevalent throughout the ravine. Although measures were proposed to address this issue, the recommended plan limits an engineered solution to the mouth of the ravine and a short distance up the main branch (Reach Main-1). Although modeled velocities do not indicate an excess channel velocity until cross-section 269.0372, riffles are proposed from the upstream limit to the confluence to stabilize the bed. The slope between two cross-sections for the same total discharge that resulted in an acceptable channel velocity are used as the assumed final slope configuration for design. A similar approach was used in Janes Ravine where the channel velocities were in excess along the reach immediately upstream of the confluence (Main-2).

The proposed design for Scotts Ravine assumes that the discharge from the head of the ravine is routed through an in-ravine pipe, leaving the discharge from the north and tributary outfalls to flow across the ravine floor. These, combined with the runoff generated within the ravine itself, should be equivalent to the estimate for the pre-development condition. The channel velocities were again used to assess the channel stability for the design condition. Except at cross-section 369.6301, the reach upstream of the confluence appeared stable. A slope extracted from between two upstream cross-sections served as the assumed stable slope for riffle design.

The proposed design for Schenck Ravine removes all of the storm sewer discharge from the ravine, leaving only the runoff generated by the ravine itself. Even with these accommodations, based on the HEC-RAS results the slope within the ravine is sufficiently steep to allow an excessive velocity to develop for the design storm event, necessitating the placement of riffles. As done in the other ravines, the slope between two cross-sections where the velocities were acceptable for a given discharge was adopted as the assumed stable channel slope for feasibility design.

CHAPTER 8. HYDRODYNAMIC MODELING USING CGWAVE

The wave transformation along the project shoreline due to refraction and shoaling was modeled using SMS version 10.1 and CGWAVE. CGWAVE is a two-dimensional wave transformation model that can be used to predict wave properties. This is accomplished by delineating a project domain in the SMS interface and performing calculations at each cell within a user defined grid. Inputs to the model include water depths and wave data. For this application monochromatic wave conditions were used. The results of this model are the resultant wave heights and directions at discretized locations throughout the project area. This data was used as design wave conditions for proposed coastal remediation methods.

8.1. Bathymetric Data

Bathymetric data for the Lake Michigan shoreline in this region was collected in September 2008 as part of the USACE's National Coastal Mapping Program (NCMP). An early review of the data revealed the presence of gaps in the data set, possibly the result of LiDAR reflecting off a large bed of floating vegetation or turbid water conditions. The difference in elevation at the boundary of the data gap was consistent with neighboring areas, however, suggesting that the typical shore parallel contours continued through this area.

8.2. Lake Level Data

As part of a coastal and hydraulic analysis conducted by Baird and Associates in 2001, a combined probability analysis was performed to estimate the recurrence of extreme high water levels along the Chicago shoreline when considering both storm surge and lake level fluctuations. A summary of the results of this analysis are shown in Table 8.1.

Table 8.1 Estimates of Extreme High Water Levels

Return Period (years)	Elevation (LWD)	(NAVD88)	(IGLD85)
10	5.9	583.7	583.24
20	6.3	584.1	583.64

8.3. Wave Data

The base model focused primarily on low frequency (20-year) events with Angle Class III and II approaches. The local shoreline is orientated 320° from north and shore normal is 50°. Angle Class III waves have an orientation of 320° to 20°. Angle Class II waves have an orientation of 20° to 80°. Angle Class I waves have an orientation of 80° to 140°. The angle class locations relative to the project are illustrated in Figure 8.1.

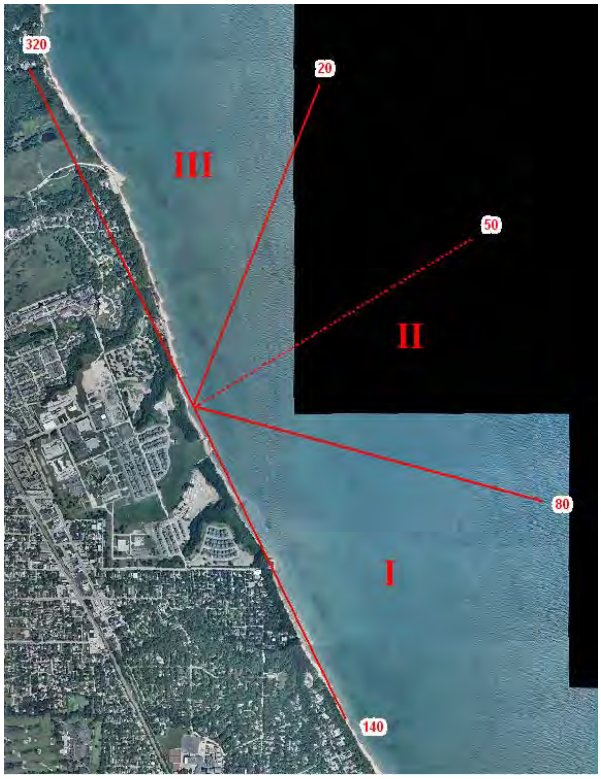

Figure 8.1 Definition of Site Angle Classes

Wave data from the Wave Information Study (WIS) (Hubertz et. Al, 1991) was utilized in this analysis. The WIS hindcast location closest to Fort Sheridan is station M04. The WIS study does not include information on the wave periods that correspond to wave heights. Wave periods presented in Resio and Vincent (1976) were utilized. The Resio and Vincent grid code closest to Fort Sheridan is Grid Point 33. In previous reports applicable to the southern Lake Michigan region, there has been discussion on the lack of agreement between hindcast wave periods and measured wave periods. Based on this apparent bias, a 2.0 second upward adjustment was made to the Resio and Vincent hindcast periods used in this analysis. Table 8.2 contains the wave heights and periods for the 10- and 20-year events for angle classes I, II and III. The design wave height for high-water conditions was used by determining the maximum wave height corresponding to combinations of the 10- and 20-year waves and lake levels. An H/d ratio of 0.68 was applied for wave breaking.

Table 8.2 Wave Heights and Periods for the 10- and 20-Year Events

	Angle Class I		Angle Class II		Angle Class III	
Return Period (year)	H_o (m)	Adj. Period (s)	H_o (m)	Adj. Period (s)	H_o (m)	Adj. Period (s)
10	2.8	9.3	3.59	10.1	5.7	12.2
20	2.9	9.4	3.81	10.3	5.88	12.3

8.4. Boundary Conditions

The shoreline was defined at a water depth of 0.1 meters to minimize model instability due to having a zero or negative depth value within the model domain. Reflection coefficients were assigned to the coastal boundary, ranging from 0.0 to 1.0 as reflection increased. Sloping beaches were given a 0.0 reflection coefficient while rubble mound structures and revetments were given a reflection coefficient of 0.5. The lakeward limit of the domain was defined as open water.

CHAPTER 9. PROPOSED REMEDIATION METHODS

Although each ravine and its tributary area were investigated individually and remediation measures designed for particular applications, these measures were not always exclusive to a particular ravine. This chapter details the toolbox of measures employed in this study and any simplifications that may have been used while designing at the feasibility level. Individual design calculations for the measures included in the recommended plan can be found in Appendix K. Design calculations for the remaining measures – those included in plan formulation but not selected for the recommended plan – can be found in Appendix L.

9.1. Riffle Design

Establishing a stable grade in an eroding channel is an important step in a restoration project and grade control structures have long been used for this task. Increasing channel stability is typically accomplished by providing a fixed point in the bed and decreasing channel slope through sedimentation upstream of the structure. Many traditional grade control structures, however, have undesirable consequences when included in ecosystem restoration projects. While providing the same stabilization benefits of traditional grade control structures, riffles allow for the opportunity to create habitat and increase reoxygentation.

The consideration for the inclusion of riffles within a reach of a ravine was based on the results from the HEC-RAS modeling. For the purposes of this feasibility study, it was assumed that flow velocities exceeding 3.5 feet per second would result in the suspension of both fine and coarse sediments. Locations where this threshold velocity was exceeded were selected for the placement of riffles. When these reaches extended across multiple cross-sections, they were further subdivided into groups of similar slope.

The design methodology adopted for this project is detailed in EMSR 4-XX. In this method, the riffle spacing is based on a limiting slope, S_L. In the absence of data describing the grain size distribution of the sediment, it was necessary to make an assumption of the limiting slope. The results of the HEC-RAS model were again employed. The cross-sections adjacent to the reach in question typically had a similar profile and the same flow rate. Once it had been confirmed that the resultant velocity for these cross-sections was below the threshold value, the channel slope was measured and used as the limiting slope.

Having identified a limiting slope, the relationship used to compute the amount of drop removed between the riffles is as follows:

$$H = (S_o - S_L)x$$

In this equation, H is the amount of drop removed in the reach, S_O is the original bed slope, S_L is the limiting bed slope, and x is the length of the reach. The maximum total drop across the length of a riffle was typically based on the depth of channel incision within the reach. The total drop removed in the reach, H, was divided by the drop across each structure to determine the required number of structures.

The stones for the weir were sized using conventional riprap design guidance as provided in EM 1110-2-1601. This guidance provides a modification to the Maynord equation as follows:

$$d_{30} = C\left[\left(\frac{\Gamma_W}{\Gamma_S - \Gamma_W}\right)^{0.5} \times \frac{V}{\sqrt{K_1 g d}}\right]^{2.5}$$

$$C = SF \times C_S \times C_V \times C_T \times d$$

In this equation d_m is the stone size m percent finer by weight, SF is the factor of safety, C_S is the stability coefficient, C_V is the velocity distribution coefficient, C_T is the thickness coefficient, d is the depth of flow, Γ_X is the specific weight of stone or water, V is the local velocity, and K_1 is the side slope correction. Guidance in EM 1110-2-1601 recommends a stability coefficient of 0.375 for rounded rock, a velocity coefficient of 1.25, and a local velocity to be equal to 160% of the channel velocity. Since the stones are placed in the bed, the side slope correction can be assumed to be equal to unity. The thickness coefficient can be assumed to be equal to unity provided that the design criteria outlined in EM 1110-2-1601 is followed.

The configuration of the riffles consists of a series of stones constructed with an upstream slope of 1V:4H and a downstream slope of 1V:10H. The design documentation recommends an interior angle of approximately 120 degrees, but there can be significant variability to this estimate. A narrow channel, which many of the reaches could be characterized as being, may prohibit any shape other than a line of stones perpendicular to the channel. The angle of the stones will deflect flows from the banks and thus provide a measure of local bank protection. To reduce the possibility of flanking, the entire structure should be keyed into the banks.

It can be expected that water would initially flow freely through the voids in the stones until they become filled with suspended sediment, provided that there is an adequate supply. To accelerate this process and thereby reduce the impacts further downstream due to interruption of the natural sediment load usually conveyed the area behind each riffle will be prefilled with alluvium consistent with that typically found on site.

9.2. Step-Pool Design

Step-pools serve a similar function as riffles in that they provide a mechanism for mitigating the erosive effects of flow over an excessively steep slope. They also provide the additional benefit of providing an engineered scour hole at the base of the structure that assists in the diffusion of energy.

As with riffles, the consideration for the inclusion of step-pools within a reach of a ravine was based on the results from the HEC-RAS modeling. For the purposes of this feasibility study, it was assumed that flow velocities exceeding 3.5 feet per second would result in the suspension of both fine and coarse sediments. Locations where this threshold velocity was exceeded were selected for the placement of step-pools. When these reaches extended across multiple cross-sections, they were further subdivided into groups of similar slope.

The design methodology adopted for this project is detailed in D.B. Thomas' paper titled "A Design Procedure for Sizing Step-Pool Structures". In this method, the step-pool height is determined. This is established based on the resulting elevation difference between the existing slope and a limiting slope, S_L, for a given reach. In the absence of data describing the grain size distribution of the sediment, it was necessary to make an assumption of the limiting slope. The results of the HEC-RAS model were again employed. The cross-sections adjacent to the reach in question typically had a similar profile and the same flow rate. Once it had been confirmed that the resultant velocity for these cross-sections was below the threshold value, the channel slope was measured and used as the limiting slope. The variables considered are illustrated in the figure below.

Having identified a limiting slope, the relationship used to compute the amount of drop removed between the riffles is as follows:

$$H = (S_O - S_L)x$$

In this equation, H is the amount of drop removed in the reach, S_O is the original bed slope, S_L is the limiting bed slope, and x is the length of the reach. The maximum total drop across the length of a riffle was typically based on the depth of channel incision within the reach. The total drop removed in the reach, H, was divided by the drop across each structure to determine the required number of structures.

Next, the active channel width and weir width are specified. There is not significant variation along the floor of the ravine within a given reach, allowing for an assumption that a representative active channel width can be estimated based on discharge resulting from the 25-year event. The weir width assumes a slight contraction in width prior to the drop structure, so a 1 foot reduction to the active channel width is assumed for this project.

Once the 2-, 25-, and 100-year unit discharges for the weir have been determined, the minimum D_{30} boulder size is determined using the Corps' steep-slope riprap design equation for the 100-year unit discharge.

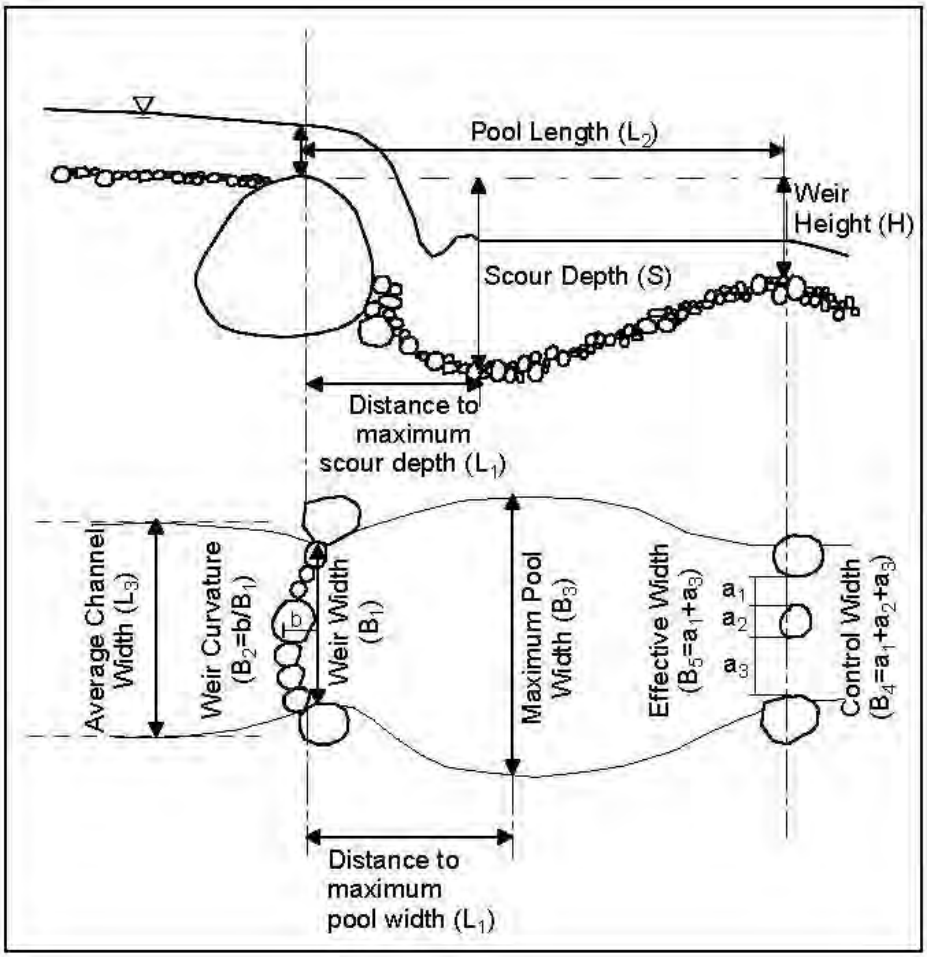

Figure 9.1 Plan and Profile of Step-Pool

$$D_{30} = \frac{1.95 S_o^{0.555} q^{2/3}}{g^{1/3}}$$

where S_o is the channel slope and q is the unit discharge.

The pool length can then be found with the following equation:

$$\frac{L_2}{L_3} = 0.409 + 4.211\frac{H}{L_3} + 87.341\frac{S_o q_{25}}{\sqrt{g(L_3)^{2/3}}}$$

where L_2 is the pool length, L_3 is the average channel width, H is the weir height, q_{25} is the unit discharge for the 25-year event and S_o is the channel slope.

The estimated scour depth is computed with the following equation:

$$\frac{S}{L_3} = -0.0118 + 1.394\frac{H}{L_3} + 5.514\frac{S_o q_{25}}{\sqrt{g(L_3)^{2/3}}}$$

where S is the scour depth.

The effective width at the downstream control for the 2-year event is defined by the equation

$$B_5 = 0.92 \cdot B_1$$

The maximum pool width for the 2-year event is defined by the equation

$$B_3 = 1.2 \cdot B_1$$

Once the physical parameters of the step-pool have been defined, the proposed design is checked to ensure that the specified structure height and spacing meet the required elevation drop based on the difference between the proposed and existing channel slopes.

9.3. In-Ravine Pipe Design

It was not always practical to attenuate the flow upstream of the ravine, sometimes due to the lack of available space for such facilities or the anticipated cost of establishing such facilities. In some instances the ravine had degraded to such an extent that it was more effective to simply replace the floor of the ravine rather than to attempt to restore it. In these situations the establishment of an in-ravine pipe system was considered. Through this remediation method, storm sewer flows bypass the ravine and are routed directly to the beach. While this method preserves the ravine slopes and adjacent structures at the top, the floor of the ravine is sacrificed, as are any improvements to water quality that could have been gained through attenuation and filtration in the ravine.

The in-ravine pipe systems were designed using a variation of the existing condition SWMM model. The outfall for each storm sewer would remain in place, but would discharge to a truncated length of ravine, the bed of which would be armored with stone. Storm water would enter the in-ravine pipe via an inlet structure placed on the ravine floor; the in-ravine pipe was placed along the floor of the ravine without excavation. Additional manholes were placed at junctions as needed. The 100-year 24-hour rainfall event was used as the design condition for the sizing of the pipe diameters.

9.4. Detention Storage Design

When rerouting storm sewer flow away from the ravines was not an option, the next most desirable approach was to attenuate the discharges to a more manageable peak flow. Although much of the region is highly developed, an adequate amount of undeveloped space was available in the project area to make this a viable option for most of the ravines. In addition to reducing

the peak flow from large return period events, some detention facilities provided the added benefit of capturing the "first flush" of a rainfall event and reducing the amount of contaminants that are discharged to the ravine or lake.

An initial estimate for the required detention storage volume was created by developing an outflow hydrograph from the storm sewer network in question. An unmodified existing condition SWMM model was run using the 100-year 24-hour event. From this outflow hydrograph an allowable release rate was subtracted based on the peak discharge from the undeveloped 2-year storm event.

Once the preliminary volume had been determined, a location was identified based on whether it is above ground or below and the following criteria:

- Adequacy of available surface area based on permissible depth to develop required volume (for surface storage)
- Adequacy of available space to develop required volume (for underground storage)
- Adequate depth for clearance above the proposed detention storage facility (for underground storage)
- Does not interfere with existing sanitary sewer lines or water mains

After a location has been identified a detention storage and outlet element were introduced into the SWMM model based on the required characteristics.

The SWMM model was rerun using the 100-year 24-hour event. The results were reviewed to determine whether the detention element and outlet were sized properly. If not, adjustments were made to the detention volume or diameter outlet. If needed, a secondary outlet located at a higher elevation was introduced.

9.5. Stone Weir Design

While riffles offer an approach to raise the bed slope over a given reach, they do so over a protracted distance. In instances where a controlled elevation drop was required but horizontal distance is limited, as is the case at the mouths of Schenck and Van Horne Ravines, a different sort of structure is required. The stone weirs described in the California DOT's "Fish Passage Design for Road Crossing" were found to meet the necessary requirements. The conceptual layout and typical profile for the stone weirs are shown in Figure 9.1 and Figure 9.2, respectively.

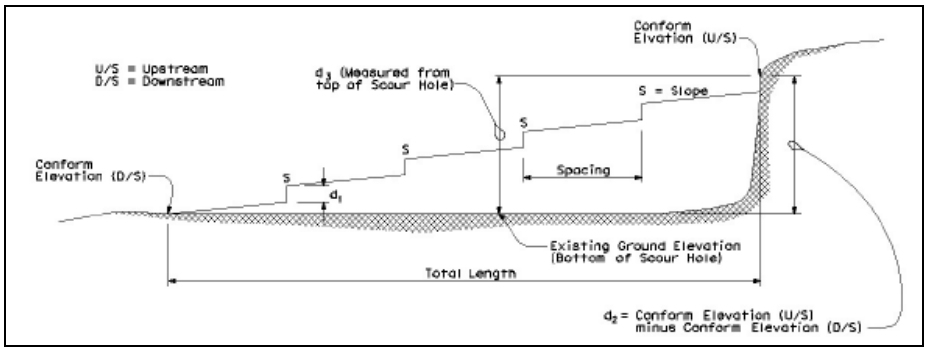

Figure 9.2 Profile of Stone Weir

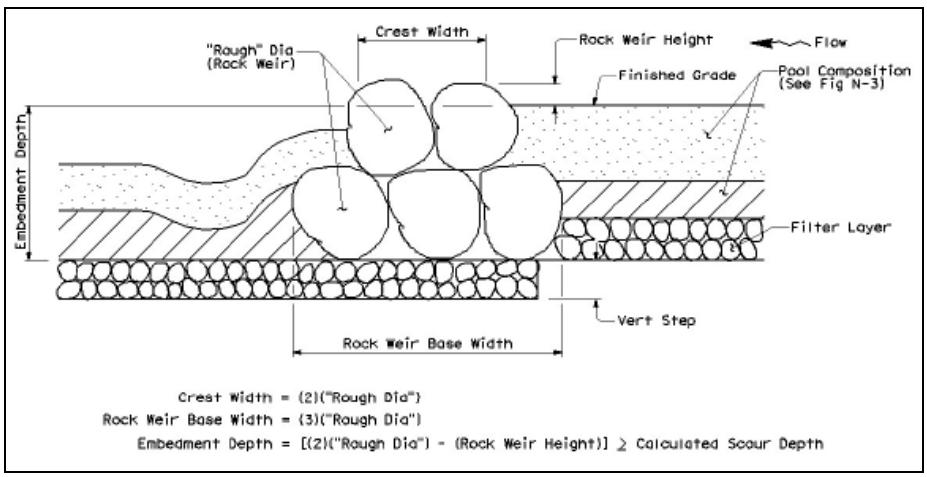

Figure 9.3 Profile of Stone Weir

A vertical step height, d_1, was assumed based on the total drop required of the series of stone weirs and varied between 0.5 feet and 1 foot (the recommended minimum and maximum values). Based on this assumed value, the preliminary number of stone weirs was estimated by dividing the total required drop d_3 by d_1:

$$VerticalSteps = \frac{d_3}{d_1}$$

The conceptual layout for the stone weirs is shown in Figure 9.1.
Due to the limitation of the horizontal space, the weir spacing was found by dividing the total available space by the number of vertical steps.

The third step outlined in the CDOT manual suggests finding elevation difference of the total project length, d_2. This is differentiated from d_3 as the methodology assumes the prior existence of a scour hole at the base of the drop; where d_3 is measured at the base of the scour hole, d_2 is

measured at the top. In this project's application there is no existing scour hole, so it is assumed that d_2 equals d_3.

A step-pool slope can be calculated by the following equation:

$$S_{SP} = \frac{d_2 - [d_1 N_{SP}]}{N_{SP} L_{SP}}$$

where S_{SP} is the step-pool slope, d_2 is the total drop, d_1 is the vertical step height, N_{SP} is the number of step pools and L_{SP} is the length of the step pools. For the feasibility level design, the slope between step pools is assumed to be zero. Although this assumption is not realistic for the final design, it simplifies the design of the individual stone weirs and provides an estimate for the upper limit for the number of structures required for this measure.

The preliminary profile of the individual was estimated assuming that h_1, the rock weir height, was equal to h_3, since the slope between structures equals zero. The depth of scour, h_4, is estimated by solving for the maximum water depth at the weir, D_{mxb}:

$$D_{mxb} = 1.14 D_{mnc} \left(1.72 + \frac{0.0084W}{D_{mnc}} \right)$$

where D_{mnc} is the mean channel depth upstream of the weir in feet and W is the water surface width upstream of the weir. This was then subtracted by the mean channel depth upstream of the weir, D_{mnc} to find the scour depth:

$$h_3 = D_{mxb} - D_{mnc}$$

Design guidance suggests that the sum of h_3 and h_4 be no less than 2 feet. These dimensions are preliminary until modeling in HEC-RAS can be used to refine the assumptions made. Similar to the riffle design, the stone weirs are prefilled with sediment to reduce the impacts further downstream due to interruption of the natural sediment load. The stone weir profile is shown in Figure 9.2.

9.6. Design of Steep Slope Armoring

Some measures necessitated the use of riprap armoring to protect slopes from discharges. In these instances the design guidance provided in EM 1110-2-1601 under 3-7.e. In this, the D_{30} stone sizing is calculated using the following equation:

$$D_{30} = \frac{1.95 S^{0.555} q^{2/3}}{g^{1/3}}$$

where S is the bed slope and q is the unit discharge. The unit discharge, q, is estimated by dividing the total flow by the bottom width of the chute and multiplying it by a flow concentration factor of 1.25. It assumes a straight channel with side slopes of 1V:2.5H or flatter.

9.7. Stone Apron Design

Whenever a pipe or other conduit discharged a flow to a natural channel or surface, the concentrated flow necessitated the use of some sort of stone armoring to prevent the development of scour at the base of the structure. The stone apron design outlined in FHWA's HEC-14 manual was selected for this application. While the design does not dissipate significant energy except through increased roughness for a short distance, it does aid in the transition to the natural channel by distributing the flow across the entire channel. These measures were typically included at the base of outfalls discharging to the beach.

The median required stone size, D_{50} is calculated by taking the greater of the results from two empirical equations:

$$D_{50} = 0.2D\left(\frac{Q}{D^{2.5}\sqrt{g}}\right)\left(\frac{D}{TW}\right)$$

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right)$$

where Q is the design discharge, D is the culvert diameter, TW is the tailwater depth, S is the riprap specific gravity, V is the velocity at the exit of the dissipater, and g is the acceleration due to gravity. Since the tailwater depth was generally unknown, 0.4D was used instead per guidance found in HEC-14.

Once a stone size has been estimated, Table 10.1 of HEC-14, shown below, is entered to determine the recommended apron dimensions.

Table 9.1 Table 10.1 from HEC-14: Riprap Classes and Apron Dimensions

Class	D_{50} (mm)	D_{50} (ft)	Apron Length	Apron Depth
1	125	5	4D	$3.5D_{50}$
2	150	6	4D	$3.3D_{50}$
3	250	10	5D	$2.4D_{50}$
4	350	14	6D	$2.2D_{50}$
5	500	20	7D	$2.0D_{50}$
6	550	22	8D	$2.0D_{50}$

9.8. Plunge Pool Design

Plunge pools were included at the bases of pipes or conduits which discharged flows within a ravine. Where riprap aprons were primarily used to distribute flow, plunge pools have the capacity to serve as energy dissipaters while also preventing the development of excessive scour. The design criteria for these plunge pools were taken from FHWA's HEC-14.

The pools are pre-shaped and lined with stone that is at least twice the thickness of the median stone size. The stone floor is constructed to the approximate scour depth, h_s, that would occur in a thick pad of the stone. The h_s/D_{50} of the material should be greater than 2. The length of the energy dissipating pool, L_s, is $10h_s$, but no less than $3W_O$; the length of the apron, L_A, is $5h_s$, but no less than W_O. The overall length of the basin (pool plus apron), L_B, is $15h_s$, but no less than $4W_O$. A stone cutoff wall or sloping apron can be constructed if downstream channel degradation is anticipated

A pair of equations is used to provide a balance between the need to avoid an under-designed basin and the costs of oversizing a basin.

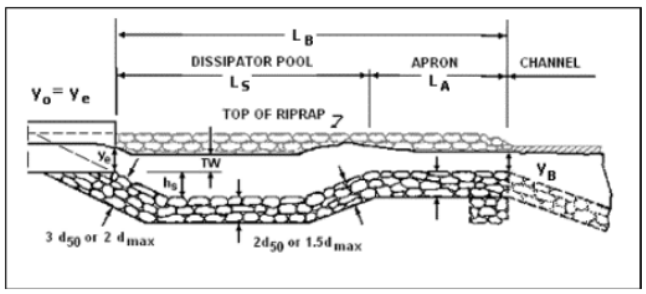

Figure 9.4 Profile of Plunge Pool

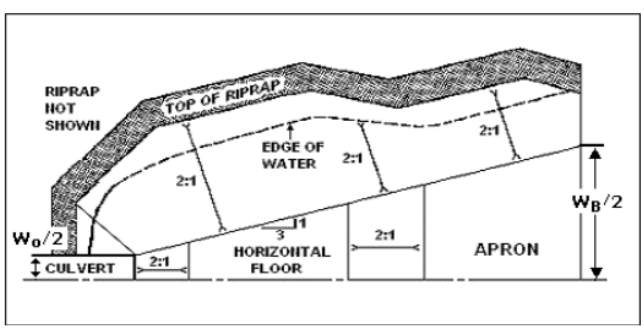

Figure 9.5 Half Plan of Plunge Pool

Once the culvert outlet velocity and depth have been estimated, the equivalent brink depth, y_e is calculated. Using this information the median stone size that will satisfy the plunge pool design criteria listed above can be calculated using the following equation:

$$\frac{h_s}{y_e} = 0.86\left(\frac{D_{50}}{y_e}\right)^{-0.55}\left(\frac{V_o}{\sqrt{gy_e}}\right) - C_o$$

In this equation, h_s is the dissipater pool depth, y_e is the equivalent brink depth, D_{50} is the median stone size, and C_O is the tailwater parameter. C_O is defined by the following relationship:

$C_O = 2.0$	$TW/y_e < 0.75$
$C_O = 4.0(TW/y_e) - 1.0$	$0.75 < TW/y_e < 1.0$
$C_O = 3.0$	$1.0 < TW/y_e$

After these equations have been satisfied, the length of the dissipation pool can be calculated. The walls and apron of the basin are transitioned so that the cross-section of the basin at the exit conforms to the cross-section of the natural channel. Ordinarily the last step is to compare the exit velocity, taken to be critical velocity, to the allowable exit velocity and performing design iterations until the two converge. At the feasibility level, however, this step was omitted from the design process.

It was noted in the studies upon which this design is based that rounded material performed as well as angular rock.

9.9. Baffled Chute Design

Where sewer outfalls discharge to the top of the bluff but the horizontal distance is prohibitively short such that stone weirs are no longer feasible, a harder structure is required. The USBR Type IX Baffled Apron was selected. Through a series of baffles placed throughout the slope, the flow is prevented from acceleration excessively and is brought to the base of the structure with velocities equal to no more than one-third of the critical velocity. The methodology presented in FHWA's HEC-14 was used for design.

Per design guidance, a recessed approach chute is used to route the storm sewer outflow, similar to what is shown in Figure 9.3. The standard baffle size will be 10" high, 9" deep, and 14" feet wide. Due to the alternating rows, however, partial blocks will be present adjacent to the walls. The chute is extends below the bed level of the beach with the lower row of baffles buried to control scour. A stone apron is provided to prevent turbulence from undermining the walls.

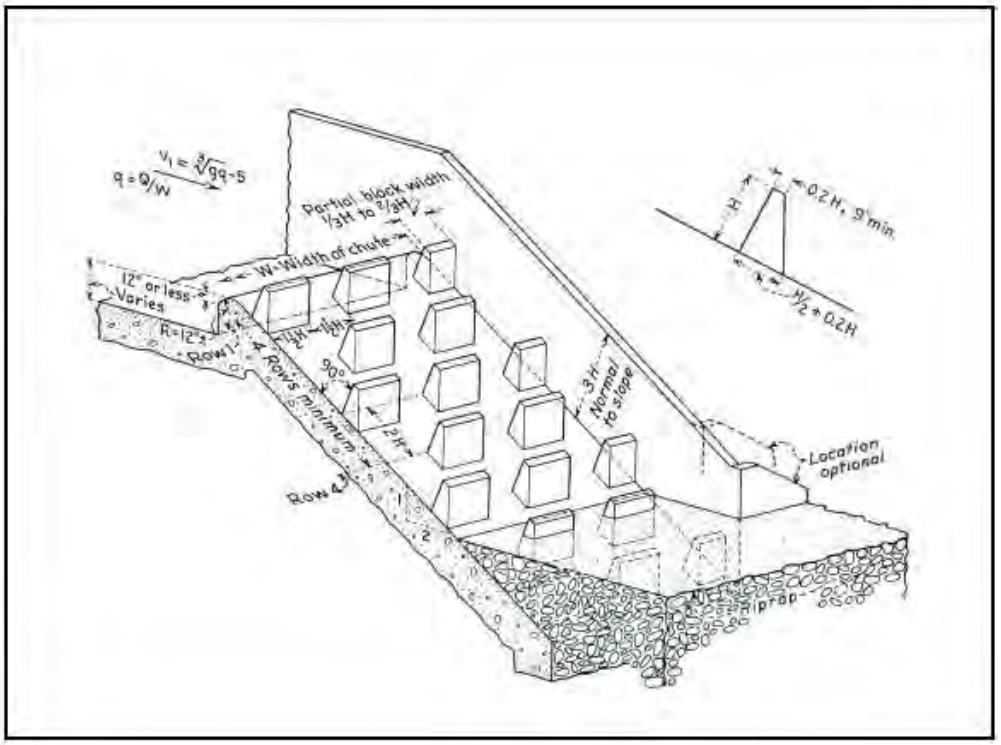

Figure 9.6 USBR Type IX Baffled Apron

9.10. Breakwater Design

Several locations within the project have little or negligible beach width, limiting the establishment of shoreline vegetation and exposing the toe of the bluff to detrimental wave attack. In these locations it is proposed to develop pocket beaches through the construction of nearshore breakwaters. Similar designs to the one north in Lake Forest have been shown to be effective and stable, requiring little to no additional fill since their original construction.

Given the expense associated with this type of structure, it is not anticipated that all of the proposed locations for these structures will be selected for implementation by the local sponsors. In light of this, a representative cross-section was designed, assuming the same offshore spacing that was used in the Lake Forest system to the north. After calculating a breakwater submergence factor, a preliminary median stone size of 3.4 feet or 3.2 tons was selected. The crest elevation of the structure has been prescribed by planning to be 584.0 IGLD85. The design calculations can be found in Appendix D.

A total of three breakwater systems were proposed in the measures for shoreline remediation. To assist in the estimation of the required pre-fill volume for the structures, McCormick's method was used to estimate the shoreline's response. In McCormick's method, the incident wave angle and structure configuration is used to estimate the shoreline response. As the local sponsor intends to use a larger substrate than currently existing on the beach, it is anticipated that the resultant beach face will be steeper than that already present. As the median stone size has not been specified, however, for the purposes of the feasibility study the shoreline volume was

estimated as a triangular wedge with a slope equivalent to the current state of the shoreline. This is assumed to provide a conservative estimate for the total required fill volume. These calculations can be found in Appendix D.

9.11. Revetment Design

In locations where there is an inadequate beach width to provide protection to the toe of the bluff, it is proposed to place a stone revetment if one is not already present. Given the number of locations where the revetment could be placed, a single representative cross-section was established for the preliminary design.

Based on the incident wave height and a safety factor of 1.5, a stone size of 280 pounds or 1.2 feet in diameter was selected. The revetment would be 2.4 feet thick with an underlayer 1.2 feet thick, extend 4 feet from the beach, and be embedded 2.5 feet below the existing grade to control scour.

CHAPTER 10. RECOMMENDED PLAN

During the plan formulation process, approximately fifty remediation measures were considered. After several iterations and through local sponsor input, the resultant combinations of ravine measures were further refined to avoid over-design and are summarized in this section. As the coastal measures will not be reworked until after the feasibility phase, they are not included in this section. The calculations for the recommended plan are presented in Appendix C whereas the calculations for the remaining measures considered are included in Appendix D.

10.1. McCormick/Janes Ravines

In the proposed measures for McCormick and Janes Ravine, the failed structures at the confluence and pipe along McCormick Ravine would be removed. Riffles would be placed in McCormick and Janes Ravines to address the sudden drop currently carried by the failed structures and to address downcutting along both ravines. The riffles in McCormick Ravine would use 12-inch structures using D_{30} = 1.26 foot stone spaced every 99 feet, requiring a total of six riffles. The riffles in Janes Ravine would use 12-inch structures using D30 = 0.5 foot stone spaced every 19 feet, requiring a total of eleven structures. At the confluence, a plunge pool would be constructed to provide a mechanism to combine the flows from the two ravines and to change the direction of the flow coming from Janes Ravine. The plunge pool would have an overall length of 45 feet, with a pool length of 30 feet and an apron length of 15 feet. Stones of D_{50} = 0.25 feet would be placed between 0.5 and 0.75 feet thick.

10.2. Hutchinson Ravine

In the proposed measures for Hutchinson Ravine, flows from the last unregulated storm sewer outfall would be attenuated in a detention basin prior to discharging to the ravine. The existing

storm sewer would be intercepted and rerouted towards the Forest Preserve property immediately south of the roadway. Stormwater would be attenuated in a detention basin approximately 6 feet deep with a footprint of 41,500 square feet. The outlet structure would utilize an 8” restrictor, reducing the peak design volume to 5.8 cfs. The sizing of the detention basin and outlet structure were based on SWMM model results. After leaving the basin, flows would travel directly to the outfall structure. It would be necessary to field verify that the existing apron would be capable of resisting the attenuated flows.

10.3. Scotts Ravine

In the proposed measures for Scotts Ravine, excess storm water would be conveyed to the ravine with the assistance of engineered structures. The existing check dam at the mouth of the ravine would be removed to permit connectivity between Lake Michigan and the ravine. Storm water discharged from the outfall at the head of the ravine would initially pass through a 27.7 foot long, 2 foot deep plunge pool consisting of D_{50} = 1.0 foot stone. Downstream of the plunge pool, the flow passes over 22 step-pools. The pools have a typical height of 1.1 foot, a weir width of 4 feet, a scour depth of 1.6 feet, and a pool length of 8 feet. From the confluence to the mouth of the ravine, the flow passes over 18 step-pools. The pools have a typical height of 1.3 feet, a weir width of 4 feet, a scour depth of 1.8 feet, and a pool length of 10 feet. Storm water discharged from the outfall at the head of the tributary would initially pass through a 13.6 foot long, 1.5 foot deep plunge pool consisting of D_{50} = 0.8 foot stone. In order to accommodate the minimal slope of the plunge pool, a portion of the channel will have to be filled. The slope from the end of the plunge pool to the confluence would be stabilized using seven step-pools. The pools would gradually decrease in size from the end of the plunge pool towards the confluence. The pools would all have a typical height of 2 feet, but would have a variable weir width between 13 and 4 feet, a variable scour depth of 2.8 to 2.0 feet, and a variable pool length of 15.2 to 11.7 feet. The final step-pool at the mouth of the ravine would be keyed in using the crushed stone from the removed check-dam.

10.4. Bartlett Ravine

The measures included in the recommended plan are intended to provide protection for the toe of the northern bluff and the access road while safely conveying storm water from the paved ravine floor to the beach. During the feasibility phase a local sponsor completed modifications to the inlet structure near the mouth of the ravine that would reduce the tendency of the structure becoming clogged. Mesh screens were installed at its openings and the outlet pipe replaced. Should this structure not be regularly maintained, leaf litter and other debris would continue to build up, ultimately resulting in the screens becoming clogged and the same bypassed flow currently observed continuing to occur. For this reason an element of redundancy has been built into the recommended plan for this ravine should maintenance activities not be performed.

The existing gutter that currently runs along the toe of the bluff would continue downstream of the final inlet structure as a vertical faced curb and gutter placed along the northern and southern edges of the pavement. While the northern gutter would follow the toe of the bluff, the southern gutter would follow a tangent to the curve of the bluff, channelizing any overland flow within the

limits of the proposed measure. The existing bituminous concrete pavement would be replaced with a shallow v-shaped PCC pavement, the idea being to move any surface runoff bypassing the final inlet structure away from the toe of the bluff towards the center of the channel. The initial 30 feet of the pavement would gradually transition from a crowned to shallow v-shaped profile. At the end of the transition a three-foot wide grated inlet would be installed curb-to-curb over a six-foot deep trench that would intercept the existing storm sewer line. A series of three 30-inch diameter pipes would provide conveyance for the peak design discharge, discharging the flow directly to the beach. The last 30 feet of the PCC pavement would gradually transition to a flat profile.

In the event that the both the existing inlet and proposed grated trench become sufficiently blocked with leaf litter, storm water would bypass both structures and run off the pavement end of the pavement at the end of the ravine. As the flow transitioned from a shallow v-shaped to a flat profile, surface runoff would gradually disperse over a wider area, reducing the requirement for larger stone sizes where the flow would be most concentrated. To protect the slope at the end of the pavement from again being eroded, it would be armored using D_{30} = 0.9 feet stones.

The three pipes from the grated trench and the armored slope would both ultimately reach the same location on the beach. A plunge pool would be placed at the base of the slope. Based on the number and size of the sewer pipes, the plunge pool would be 2 feet deep, 30 feet long, 33 feet wide, and use D_{50} = 1 foot stone varying between 2 and 3 feet thick.

In order to protect this aspect of the recommended plan from wave attack, it would be necessary to integrate the plunge pool into a shore protection feature. The shoreline adjacent to the mouth of Barlett Ravine would be expanded through the introduction of a nearshore breakwater. The breakwater would be placed 130 feet offshore, be 125 feet long, and use the same typical profile outlined in section 10.8 of this report. The groin to the north of the ravine would be removed and replaced with pre-filled beach material. Based on shoreline response calculations using the McCormick method, it is anticipated that the introduction of this structure will result in mild shoreline recession immediately adjacent to it. Approximately 80 feet of revetment – as detailed in section 10.8 – would need to be provided at the northern intersection of the proposed tombolo with the existing shoreline. The existing revetment south of the structure would need to be field verified for adequacy of its existing stone size and thickness.

Based on the estimated slope between the end of the plunge pool and the typical lake level, it is anticipated that the flow would eventually erode any channel that formed, eventually undermining the toe of the plunge pool. It would therefore be necessary to establish a channel within the proposed tombolo with defined banks and a stabilized slope. The channel banks would be stabilized using materials at the discretion of ecologic planners (i.e. stone, tree trunks, root wads, etc.). The slope would be stabilized through the placement of three riffles spaced every 40 feet, the first of which would be placed at the toe of the plunge pool's apron. The first riffle would be 12 inches in height while the remaining two would be 15 inches in height. It is anticipated that the channel would periodically fill in during storm events, but would reestablish itself over time. The intention of the engineered channel in this instance is not to provide an unchanging conduit by which storm water is conveyed, but to provide practical limitations to the dynamic equilibrium of the coastal system.

10.5. Schenck Ravine

In the proposed measures for Schenck Ravine, excess storm water would be conveyed to the lake through an in-ravine pipe. Storm water from the outfall at the head of the ravine would initially pass over a 9 foot long, 3.75 foot thick apron consisting of D_{50} = 1.5 foot stone. Approximately 100 feet of the channel downstream of the plunge pool would be armored using D_{30} = 0.66 foot stone 1 foot thick. These flows would enter the 18 inch diameter in-ravine pipe through an inlet structure depicted on sheet 1 of the calculation pages. From the upstream limit to the spur, the in-ravine pipe would run along the existing bed of the ravine and be provided 36 inches of cover – 24 inches of stone backfill and 12 inches of topsoil. The in-ravine pipe would convey flow from this inlet structure directly to the beach. Additional analysis is required to ensure that the pipe constructed on the steeper bluff slope will be stable for the duration of the design life.

For the feasibility study, the peak discharges from the HEC-HMS model were introduced to the geometry of the HEC-RAS model, simulating the assumption that the storm water is completely rerouted and the channel slope is translated vertically to the engineered surface above the in-ravine pipe. Based on these assumptions, the resultant channel velocities at some locations suggested that a reduction would be necessary to avoid the additional loss of channel material. This would be achieved by introducing nine 12-inch riffles spaced 71 feet apart consisting of D_{30} = 0.4 foot stone.

The existing "water quality feature" situated approximately 450 feet downstream of the ravine head currently relies upon outlet control to develop detention storage and discharges to the top of the ravine slope. With the recommended plan, 2" concrete rings would be added to each inlet, providing a slight increase to the potential detention storage. Approximately 60 feet downstream of the final inlet, a new structure would be introduced. From this structure a 12-inch pipe would run directly to the ravine floor where it would tie into the in-ravine pipe.

Downstream of the "water quality feature" a sanitary sewer lift station is located adjacent to and slightly above the ravine floor. The existing failed inlet structure and curb and gutter would be replaced and rerouted to discharge directly into the in-ravine pipe.

The existing storm sewer at the mouth of the ravine currently discharges through a failed outfall structure, resulting in the flows being entering the ravine at the top of the slope versus at the bottom. In the recommended plan, the storm sewer flows would be attenuated through an underground detention structure placed in the vacant field at the top of the slope. The 6-inch outlet and 12-inch overflow would lead to a manhole structure 10-feet deep. From this, a shallowly laid outlet pipe would direct the discharge directly into the in-ravine pipe.

Due to the limited distance and required overall vertical drop (22.8 feet over a length of 183 feet), a system of 23 cobble weirs would be constructed down the slope. It should be noted that these structures are quite similar to the cobble riffles employed elsewhere in this project and their description as a weir is a misnomer; they are so named to differentiate them from their shallower-sloped counterparts. The structures would use D_{30} = 0.5 feet stones spaced every 8 feet, crest to crest. Each crest would be 15 inches wide and would be situated 0.5 feet above the upstream bed. The structure would be embedded 0.9 feet relative to the downstream bed and provide 1 foot of drop across the structure, resulting in a total structure height of 2.4 feet. A

minimum of 18 inches of base stone would be provided to prevent piping and to increase the stability of the system. The channel between two structures would be pre-filled using suitable substrate. The weir at the downstream limit would terminate in a1:10 slope.

10.6. Shoreline

Nearshore breakwater systems were initially proposed at several locations along the project's shoreline. Due to the uncertainty of the number that would be adopted and the potential for numerous design configuration iterations, a single representative cross-sectional design was used for the feasibility level. The nearshore breakwaters would consist of two separate layers, one primary and one underlayer. The primary armor stones would consist of D_{50} = 3.4 feet sized stones and be laid 6.8 feet thick. The underlayer would utilize D_{50} = 1.7 foot stones. The stone toe bench would have a width of 3.4 feet and a thickness of 2.4 feet. At the updrift and downdrift limits of the structures, attached breakwaters would be constructed, spaced 200 feet relative to the ends of the offshore breakwater. The pre-filled beach cell landward of the nearshore structure would be stabilized through the construction of cobble, timber, or sheet pile groins connecting the center of the structure to the shore.

The volume necessary to prefill the cells behind the structures was estimated through the application of the McCormick method (McCormick, 1993). Once the planform of the anticipated shoreline response was estimated, the volume contained within the nearshore slope was estimated by assuming a triangular section. Although this is acknowledged to not be the best approach to estimating the required beach fill, the local sponsor has expressed a strong interest in using a beach fill significantly coarser than what is currently present. It is therefore assumed that the final design's equilibrium profile would steeper than the current profile and that the feasibility level estimate is an adequate approach.

As noted in the recommended plan, a stone revetment would be required in some locations. This structure would consist of two layers of stone, a primary armor layer and a secondary underlayer. The primary armor stones of would consist of a 2.4 thick layer of D_{50} = 1.2 feet sized stones. The underlayer would consist of a 1.2 foot thick layer of D_{50} = 0.6 foot sized stones. The profile would extend four feet above the existing beach and 2.5 feet below.

CHAPTER 11. POTENTIAL IMPROVEMENTS

Given the number of proposed remediation measures and the limitation of funds and time, the design at the feasibility level excluded some steps of the design processes for some of the measures. While their inclusion should not dramatically alter the initial design, they must be considered for final design. This section outlines the steps excluded in the current design and other ways that the models could currently be improved.

Without stage and flow data to calibrate the models, the results will be questionable. While the failure of the design due to this lack of information can be avoided through an increased safety

factor, this creates the potential for over-design. By collecting gage data in the ravines and sewers the confidence in the appropriateness of the design can be increased.

When first created, the width characteristic of the subbasins in the SWMM models is defined using a longest flow path that does not differentiate between the lengths associated with pervious or impervious areas. As the width characteristic is what is used to define the time of concentration for the subbasin, the current approach will lead to an overestimation of the time of concentration. One technique to account for this is to omit the portions of the subcatchment travel length that would have more concentrated flow (i.e. pipes or gutters). The velocity is much higher along these pathways than along the pervious surface pathways so these overland flow pathways dominate the response time, which is what the travel length represents. This approach was not employed in this model because the concentrated flow travel length in some subcatchments was significant. To account for this the flow length used for each subcatchment was computed as a composite of the impervious and pervious surface travel lengths, with the impervious travel length multiplied by ⅓. This de-emphasizes the "fast moving" part of the travel length while not omitting it entirely. The one-third value is based on average flows over impervious and pervious surfaces for conditions that would be expected within the watershed. It is recognized that this method cannot be representative of all hydraulic conditions though the method is valid so long as it is consistent among all subcatchments. It should be noted that the SWMM models have been modified to incorporate the design guidance and compared against the original SWMM models using the 100-year 24-hour event. The peak flow rates increased between 0.5% and 0.7% while the timing of the peak showed no change. When incorporated into the SWMM models for the detention basins at the heads of Scotts and Van Horne Ravines, there was no change to the peak outflow or storage. While this demonstrates the small degree of influence the width characteristic has, it should nevertheless be incorporated into the model to provide a better initial representation of the parameter should model calibration ever be attempted.

The Hutchinson Ravine measure to attenuate the storm water discharge through a detention structure was considered at the last moment after the ownership of the adjacent parcel was discovered. A post-development condition HEC-HMS model was not developed for this ravine – as a result neither was an allowable release rate. This model should be developed in the next design phase to confirm that the proposed release rate is of a sufficiently low level.

In order to find the appropriate stone sizing for proposed measures, a wide array of depths and corresponding velocities must be considered. A wider array of synthetic rainfall events should be simulated in SWMM and HEC-HMS to create input for the HEC-RAS models.

Not all of the measures proposing the introduction of a detention storage facility included a feature allowing for overflow. Should any of these measures be selected, it should be ensured that such a feature is included in the model. The performance of the facilities should be investigated for additional durations of the 100-year event.

The current HEC-RAS models' geometry files are based on LiDAR data several years old. The models used for final design calculations should integrate updated survey data. Those ravines where an in-ravine pipe is employed should have the current thalwag defined; channel cross-

section data should be integrated into the existing geometries otherwise. Late in the feasibility design phase a document was found describing the U.S. Army's intent on removing the landfill in McCormick Ravine's southern tributary when funding becomes available; this alteration should be included in the project geometry to ascertain what impact it will have, if any, of the final design.

Based on the cross-sections collected in the proposed survey noted above, additional reaches should be defined in the HEC-HMS model. By subdividing the existing reaches based on the new data, more accurate discharge-storage relationships can be defined for the ravines.

Current HEC-RAS modeling for measures involving in-ravine pipe make assumptions about the final constructed channel profile. Cross-sections in the applicable models should be modified based on input from the Civil Design section to reflect the final design profile. Measures dependent upon modeling results can then be modified based on the new results.

The proposed riffle designs should be incorporated into the HEC-RAS geometry files to refine the specified depths and velocities, allowing for the modification of the selected stone size as necessary. Similar steps should be considered for the proposed stone weirs. This will not only allow for a refinement of the design parameters, but also the potential for a reduction in size or number of riffles and a resultant increase in the length between structures. Additionally, the slope between stone weirs should be incorporated in the final design.

The current coastal designs assume the characteristics of a typical design wave are applicable throughout the project. The final design should determine design wave conditions at each proposed measure's particular location and adjust the current design as appropriate. The stability of the proposed beach fill should be ascertained through the development of a sediment transport model.

The median stone size of the proposed beach fill substrate is unknown at this time. Once this has been determined, the resultant equilibrium beach profile should be estimated and used to refine the required fill volume for the coastal measures. From this it should be determined whether a perched beach will be more economically beneficial.

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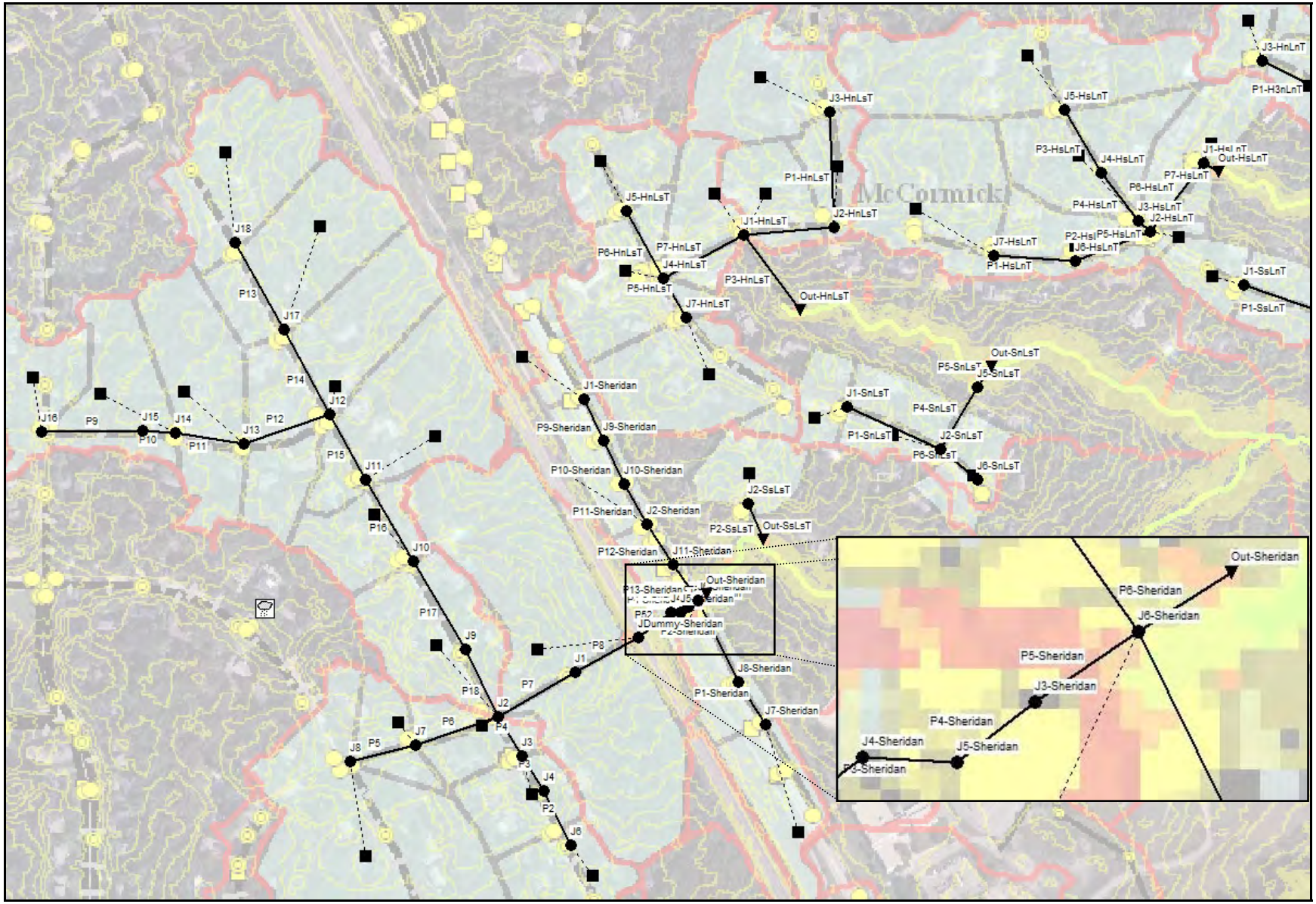
Appendix A.

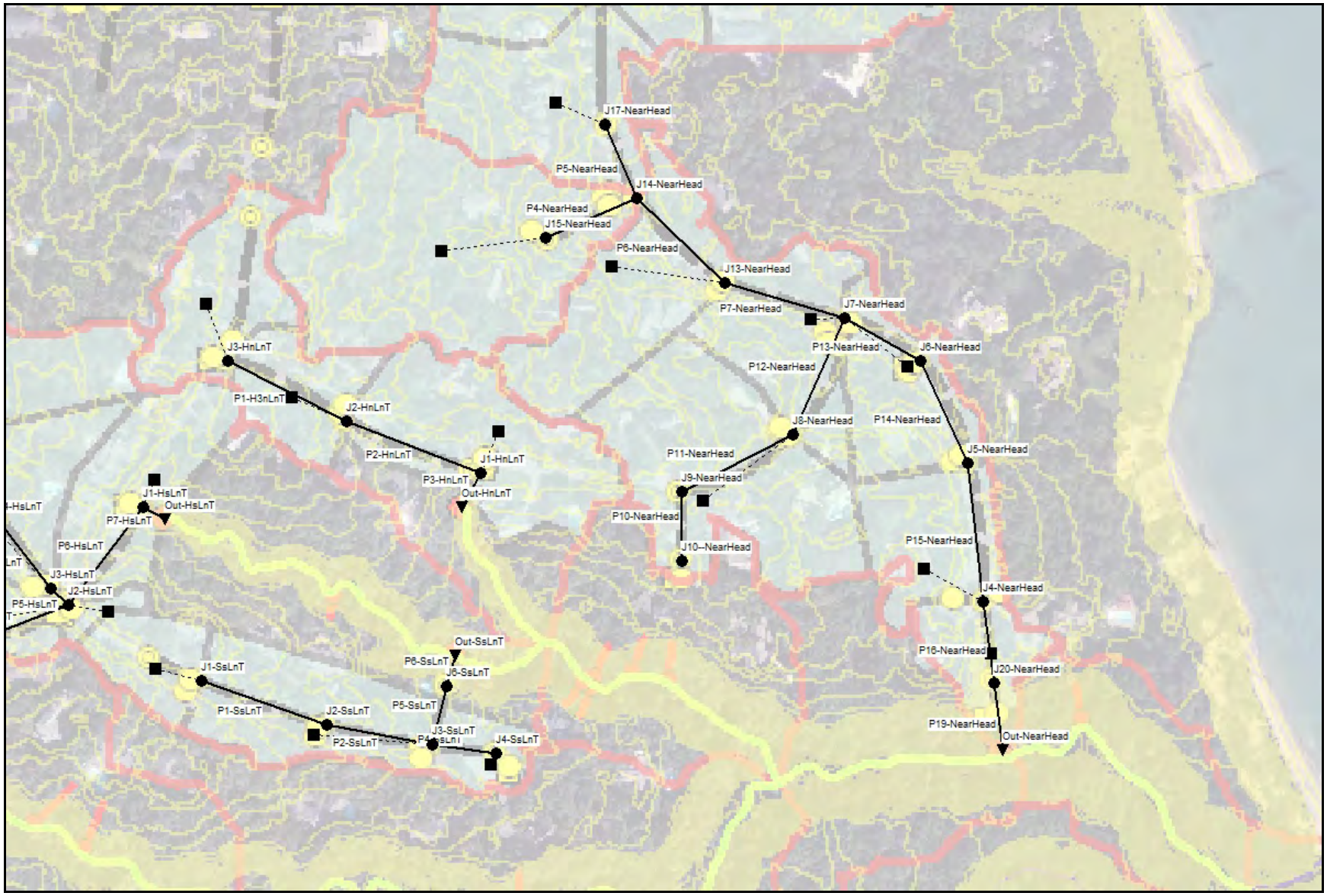
SCHEMATIC LAYOUTS OF SWMM MODELS

McCormick/Janes Ravines
Hutchinson Ravine
MacArthur Ravine
Scotts Ravine
Bartlett Ravine
Van Horne Ravine
Schenck Ravine

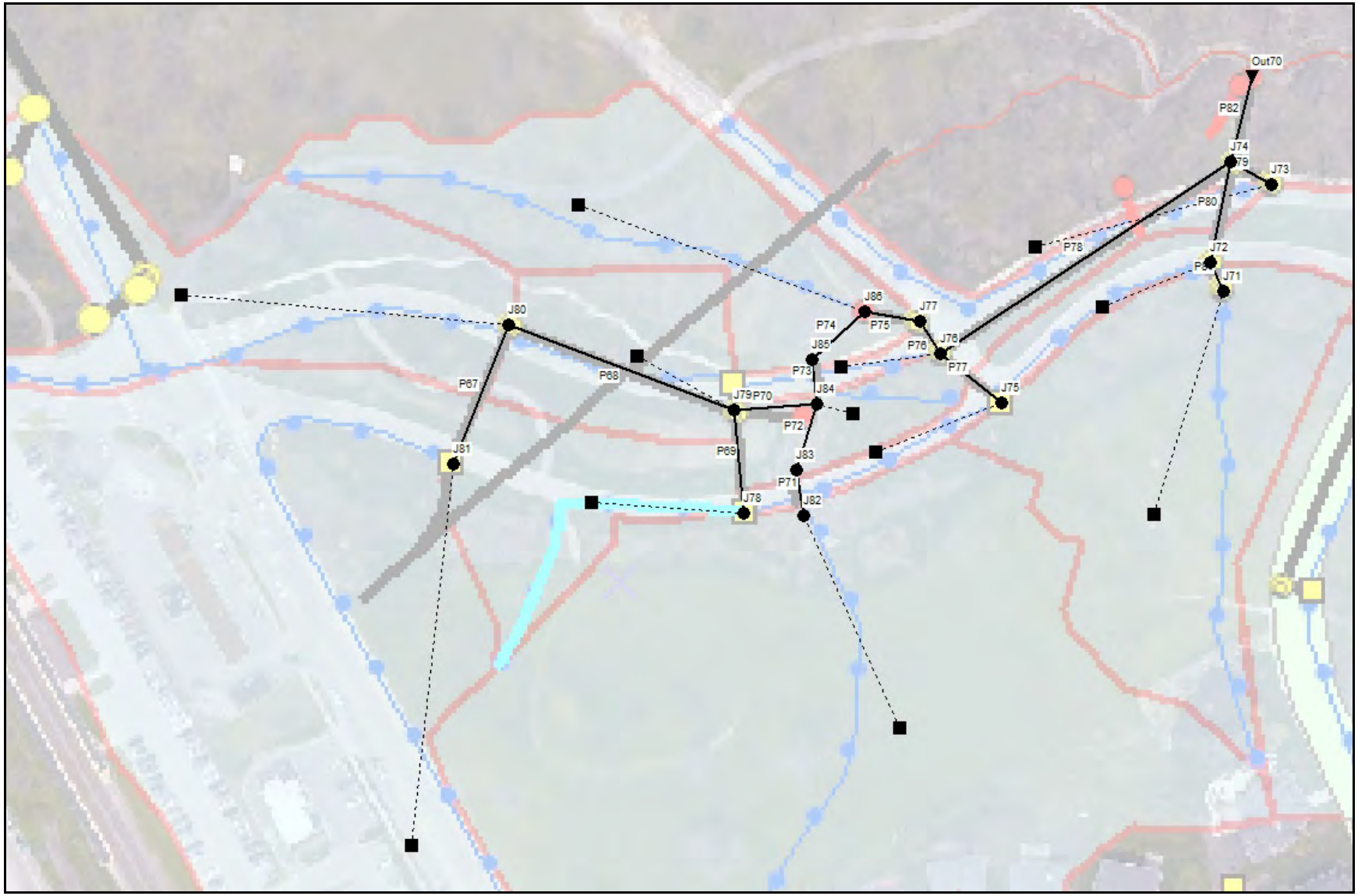
McCormick/Janes Ravine – Western Section



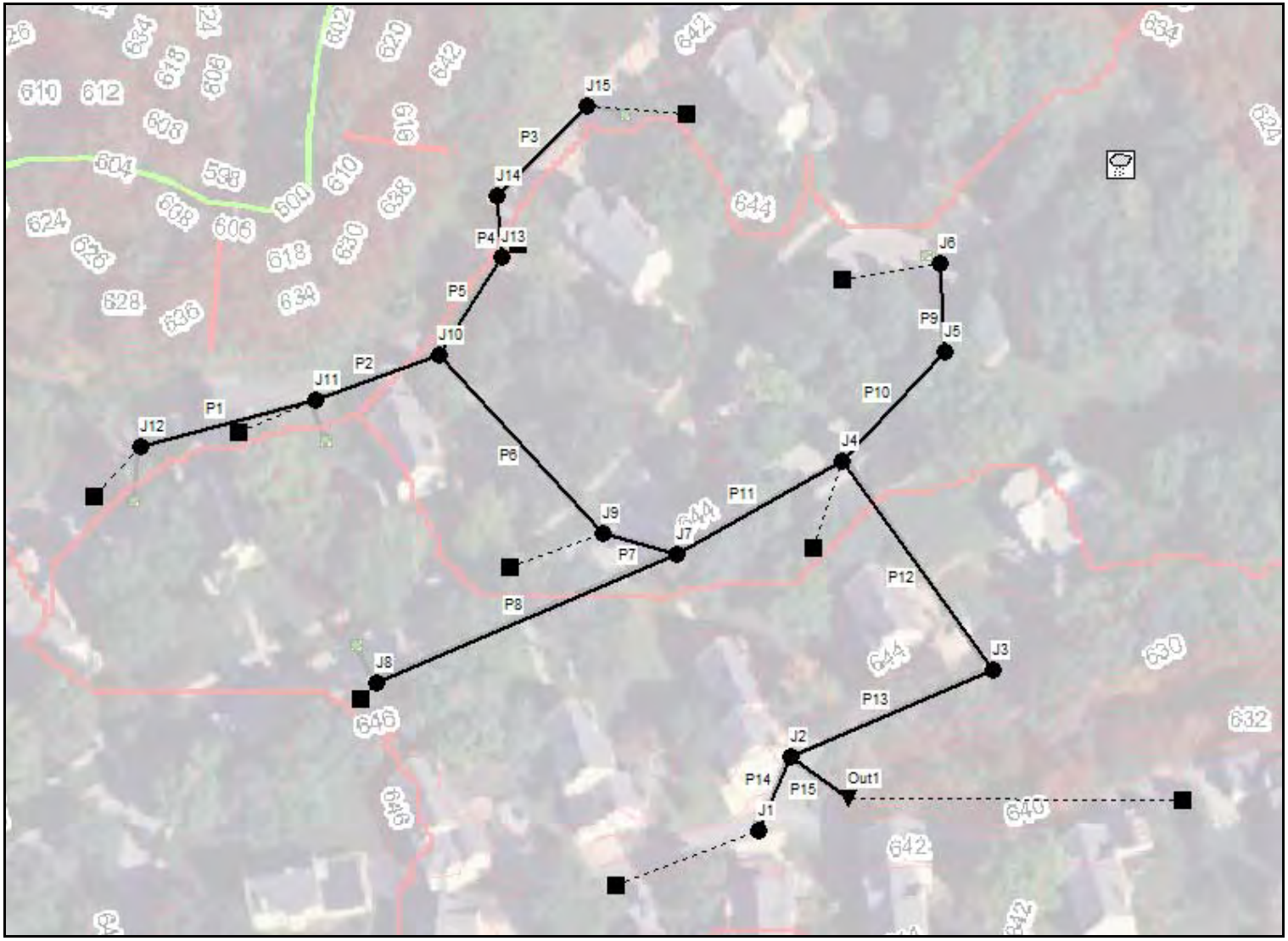
McCormick/Janes Ravine – Eastern Section



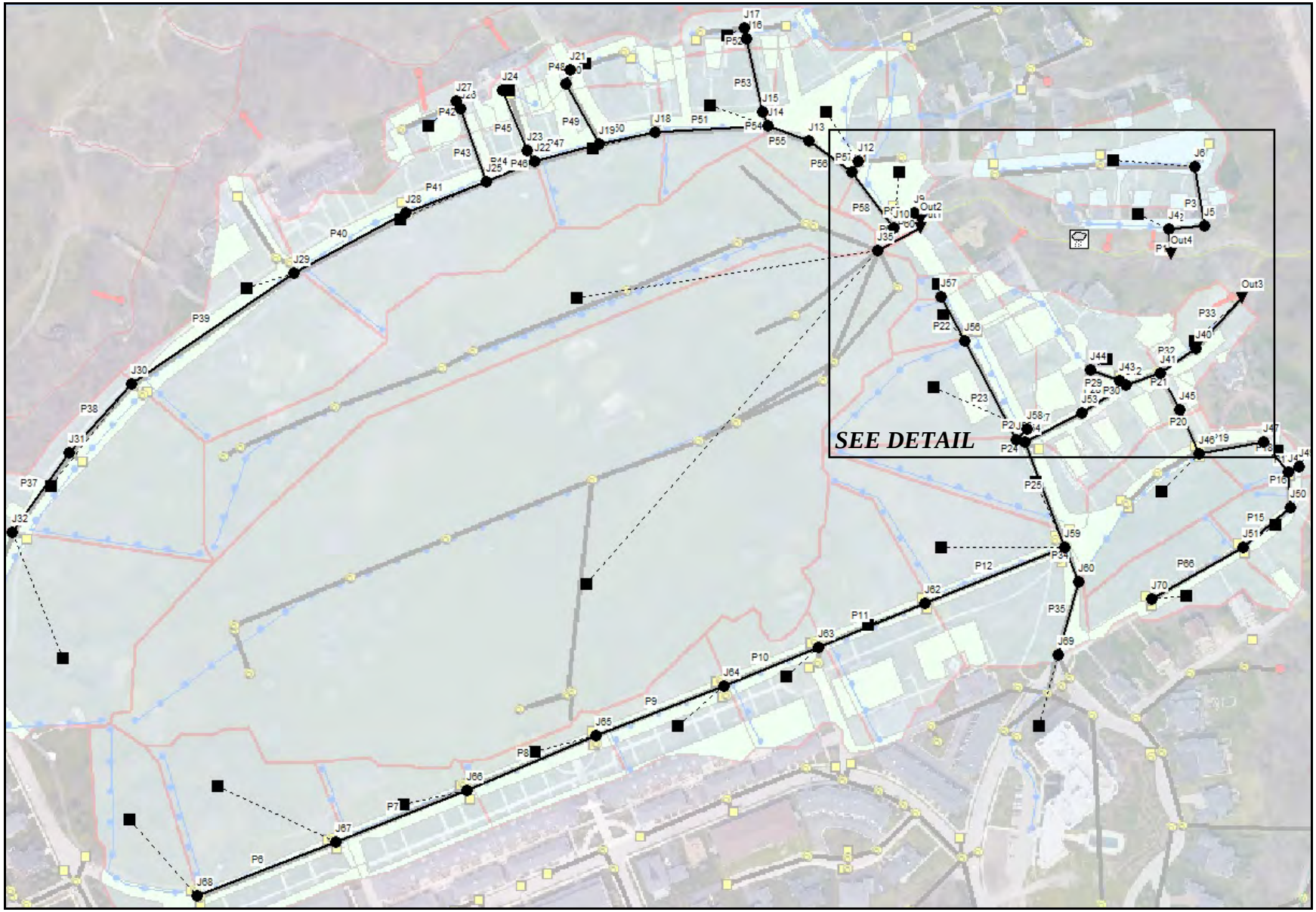
Hutchinson Ravine



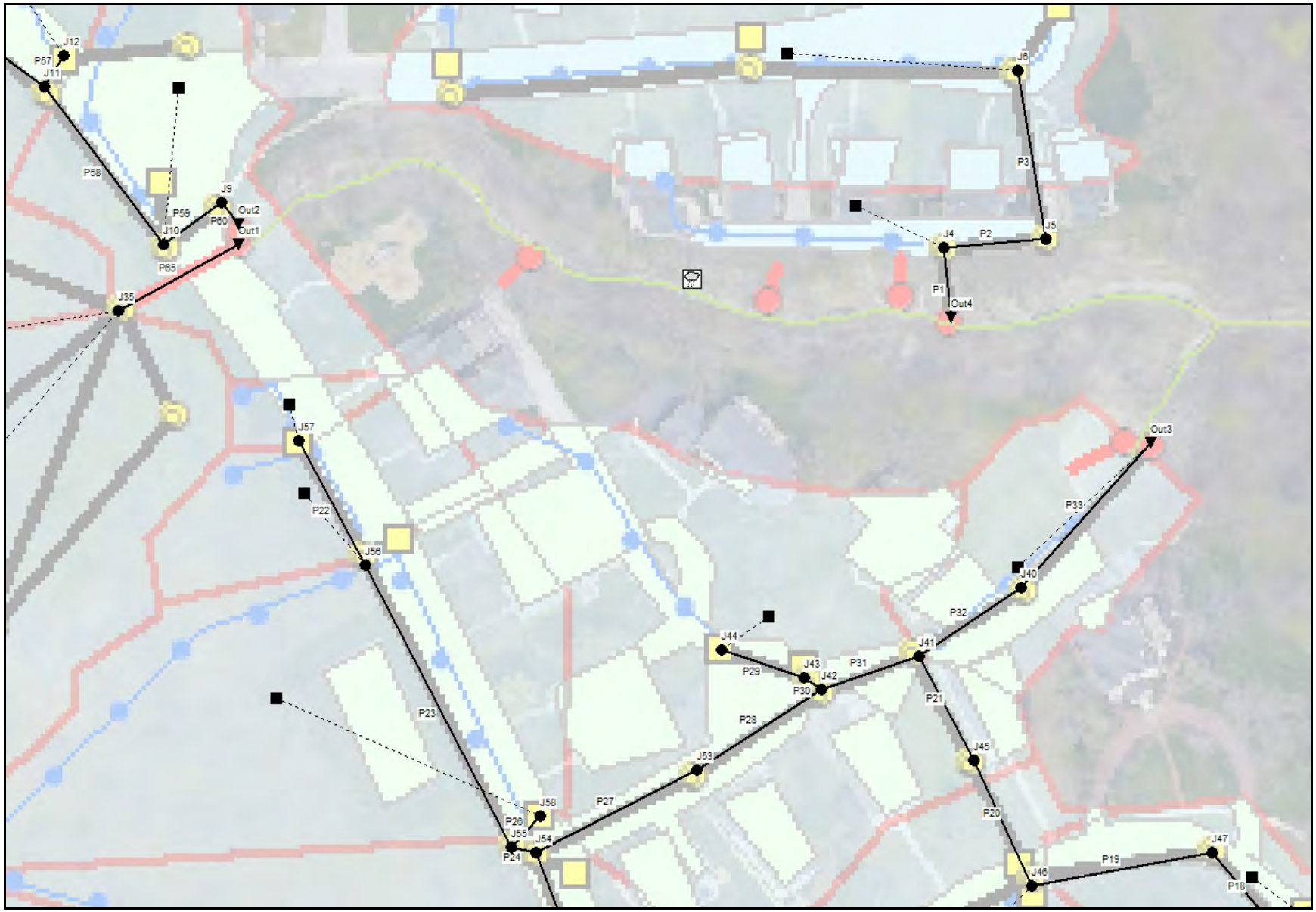
MacArthur Ravine



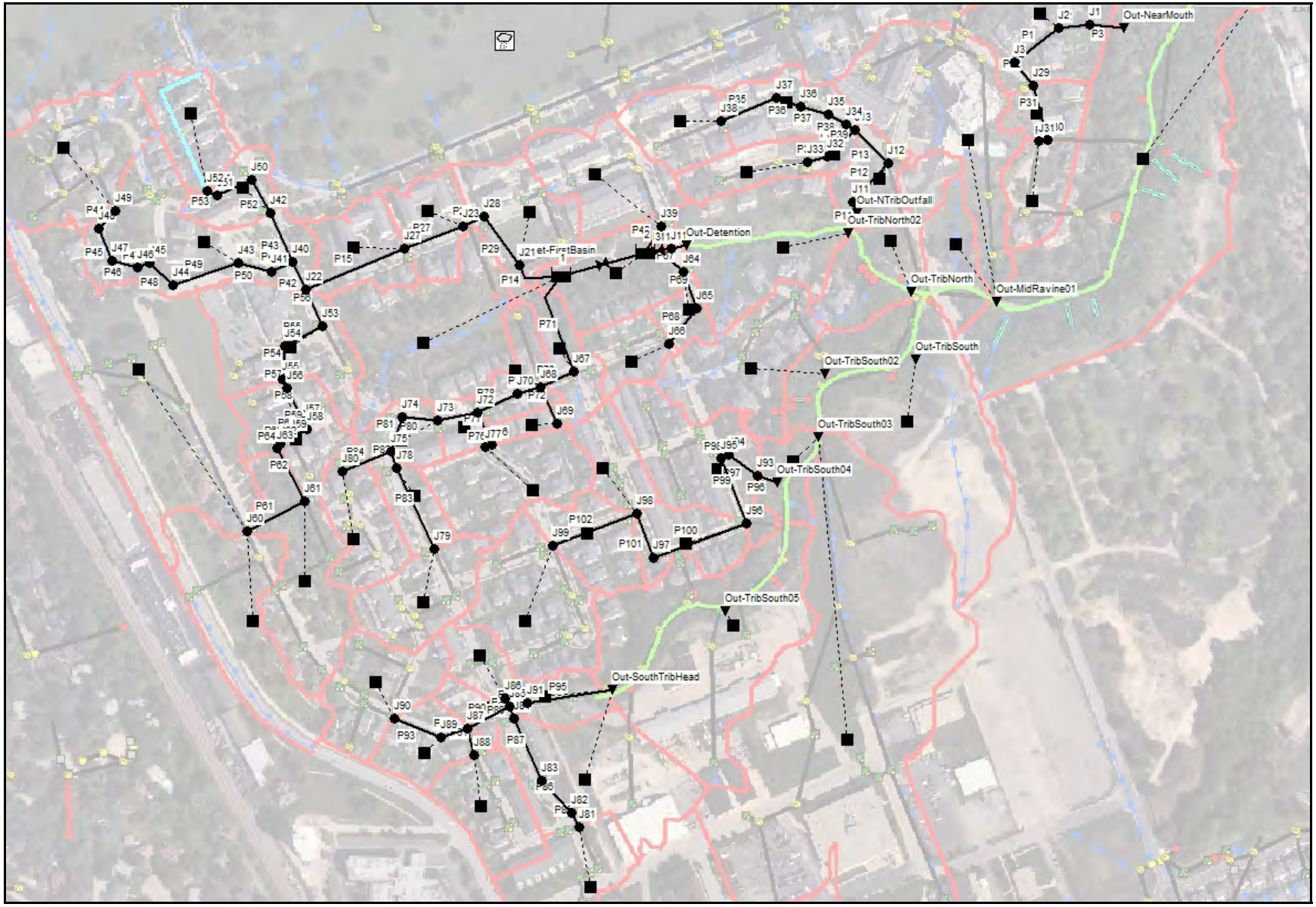
Scotts Ravine - Total



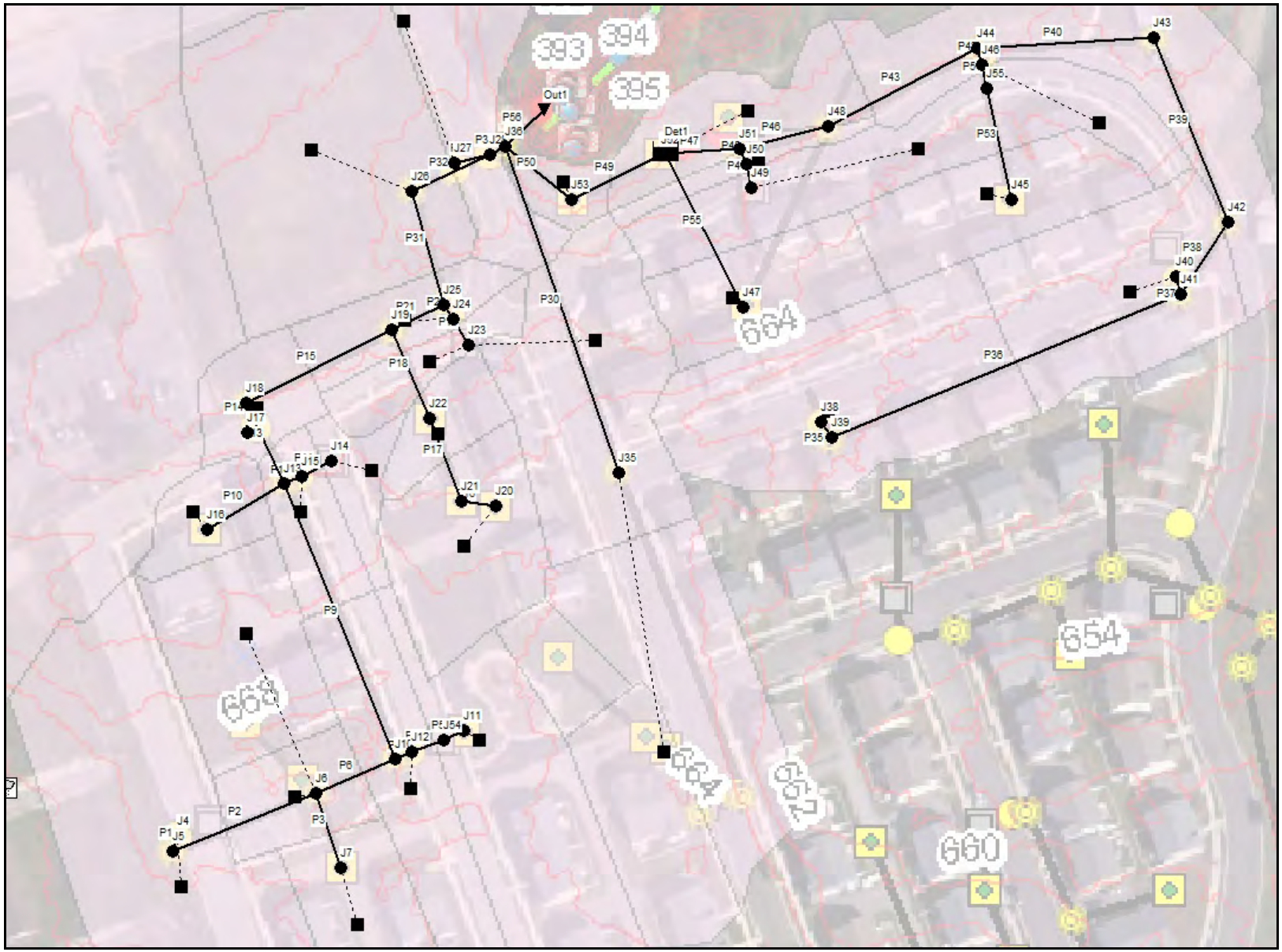
Scotts Ravine – Detail



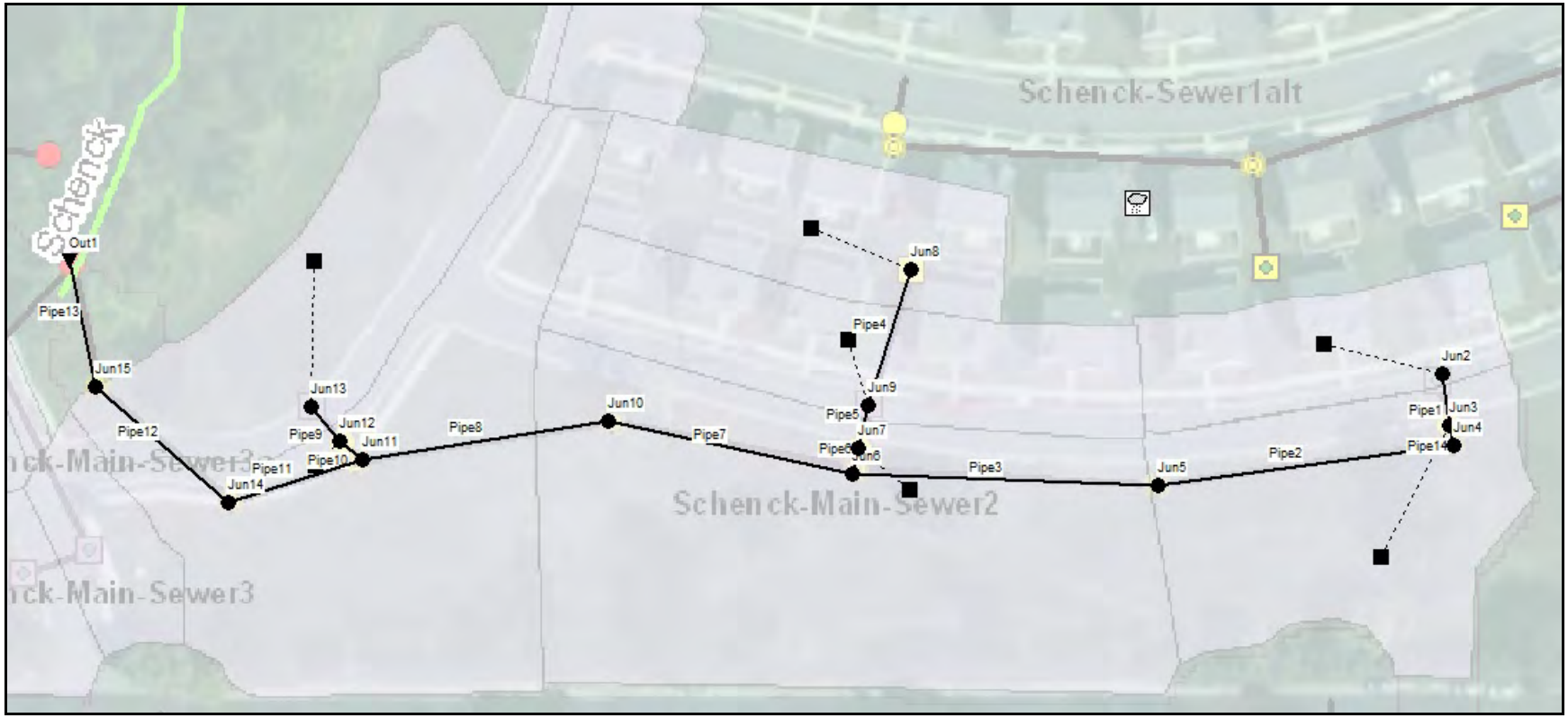
Bartlett Ravine



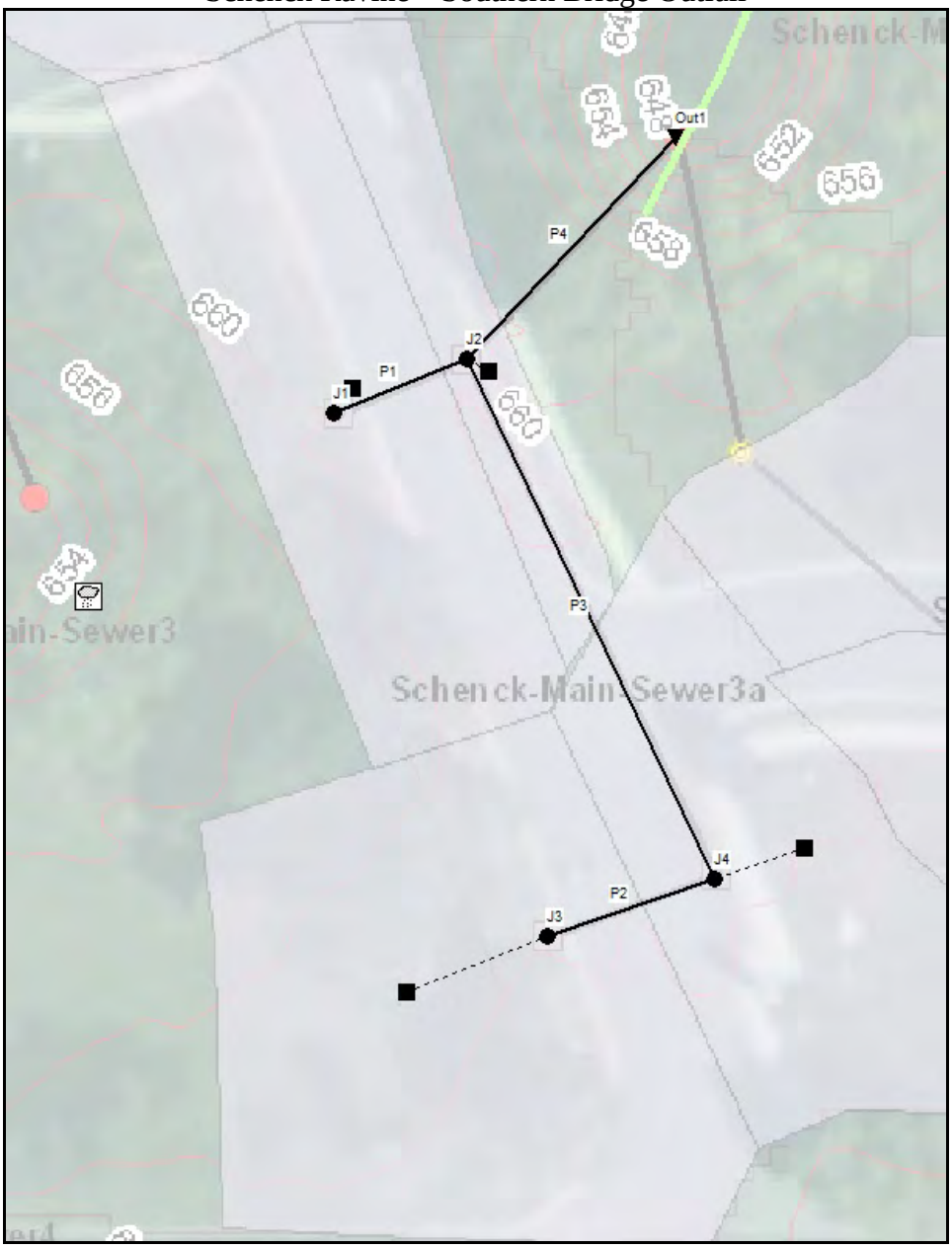
Van Horne Ravine



Schenck Ravine – South of Subdivision

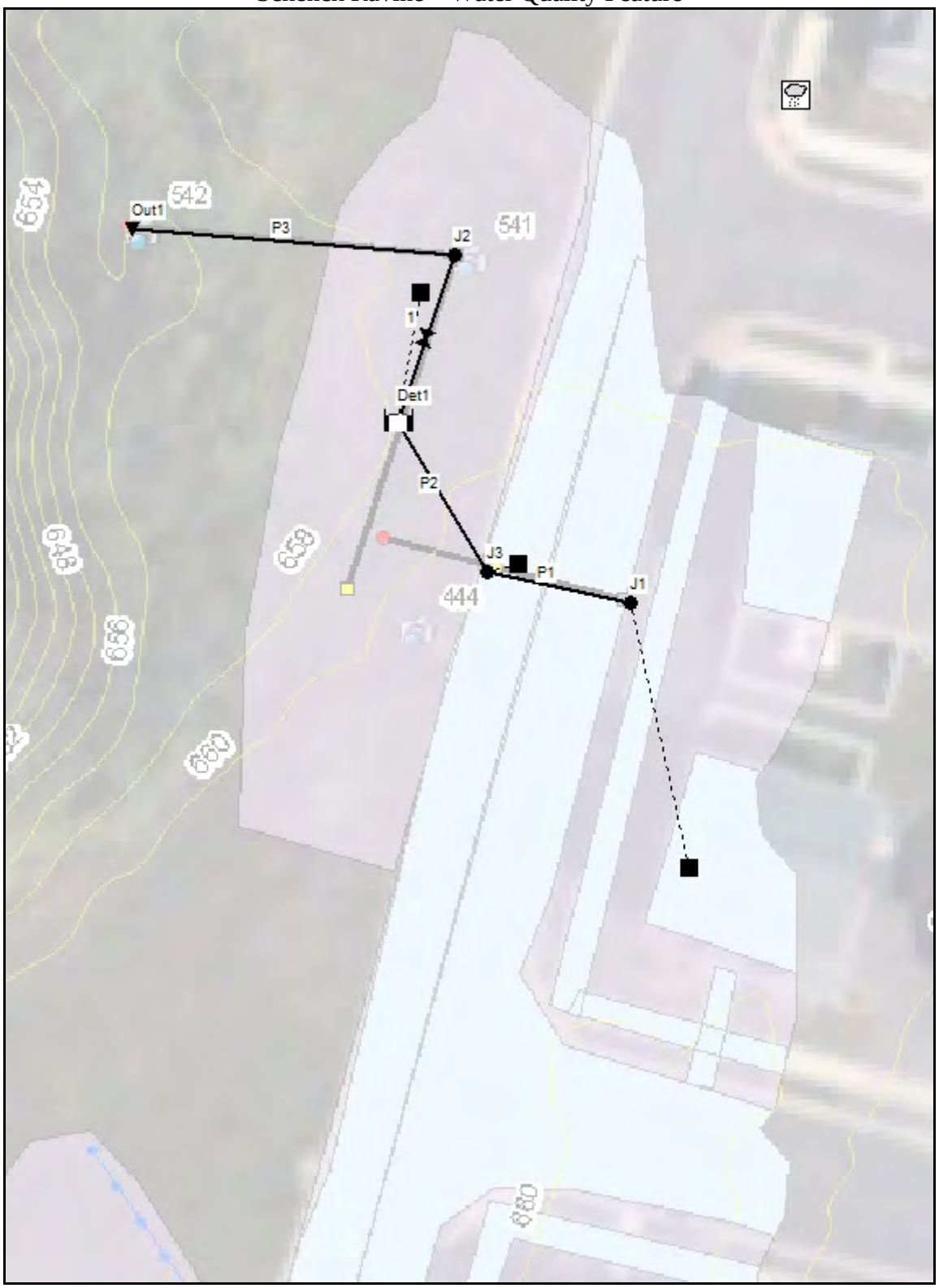


Schenck Ravine – Southern Bridge Outfall

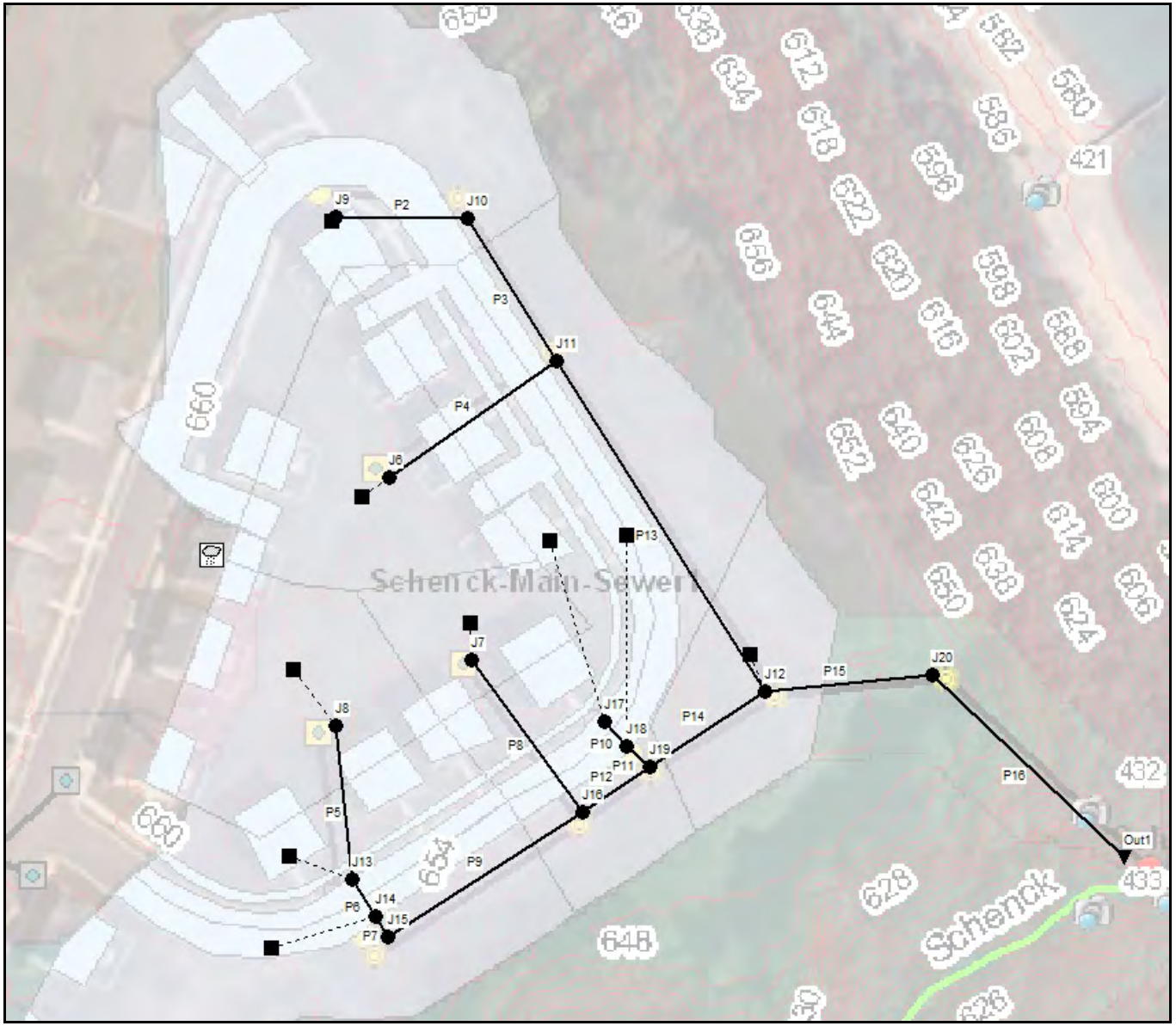


Schenck Ravine – Northern Bridge Outfall

Schenck Ravine – Water Quality Feature



Schenck Ravine – Subdivision at Head



Appendix B.

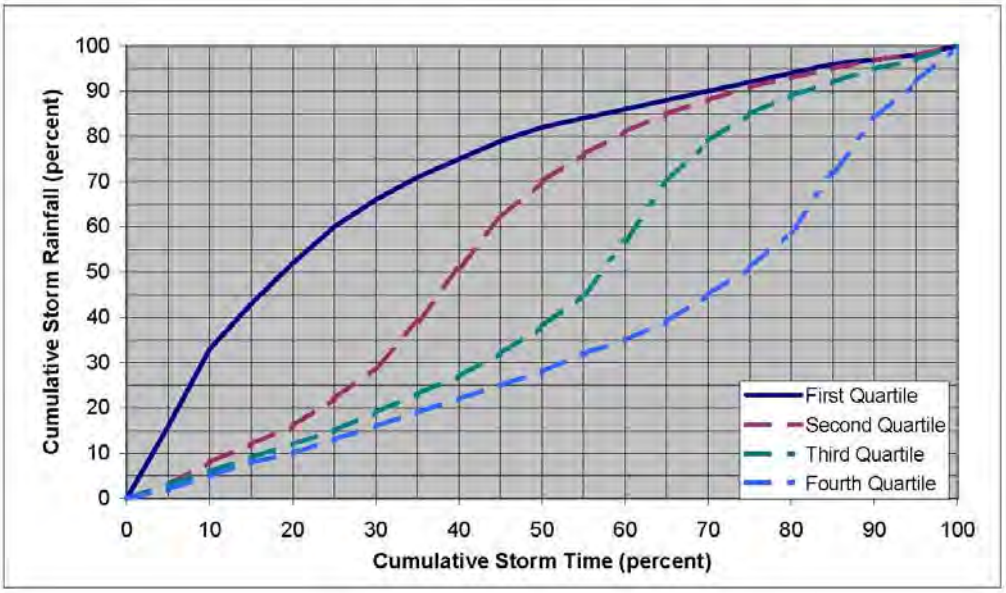
REFERENCES FOR DETERMINING SYNTHETIC PRECIPITATION

NOAA Bulletin 71, Table 10
ISWS Bulletin 70, Table 13
ISWS Bulletin 70, Table 35

Huff, F.A. and Angel, J.R. *Rainfall Frequency Atlas of the Midwest (Bulletin 71).* National Oceanic and Atmospheric Administration. 1992.

Median Time Distributions of Heavy Storm Rainfall at a Point

Cumulative storm rainfall (percent) for given storm type



Cumulative Storm Time (percent)	First quartile	Second quartile	Third quartile	Fourth quartile
0	0	0	0	0
5	16	3	3	2
10	33	8	6	5
15	43	12	9	8
20	52	16	12	10
25	60	22	15	13
30	66	29	19	16
35	71	39	23	19
40	75	51	27	22
45	79	62	32	25
50	82	70	38	28
55	84	76	45	32
60	86	81	57	35
65	88	85	70	39
70	90	88	79	45
75	92	91	85	51
80	94	93	89	59
85	96	95	92	72
90	97	97	95	84
95	98	98	97	92
100	100	100	100	100

From NOAA "Bulletin 71, Rainfall Frquency Atlas of the Midwest", 1992

Huff, F.A. and Angel, J.R. *Rainfall Distributions and Hydroclimatic Characteristics of Heavy Rainstorms in Illinois (Bulletin 70).* Illinois State Water Survey. 1989.

Table 13. Sectional Frequency Distributions for Storm Periods of 5 Minutes to 10 Days and Recurrence Intervals of 2 Months to 100 Years

Storm codes

1 – 10 days
2 – 5 days
3 – 72 hours
4 – 48 hours
5 – 24 hours
6 – 18 hours
7 – 12 hours
8 – 6 hours
9 – 3 hours
10 – 2 hours
11 – 1 hour
12 – 30 minutes
13 – 15 minutes
14 – 10 minutes
15 – 5 minutes

Sectional (zone) codes

1 – Northwest
2 – Northeast
3 – West
4 – Central
5 – East
6 – West Southwest
7 – East Southeast
8 – Southwest
9 – Southeast
10 – South

Rainfall (inches) for given recurrence interval

Storm code	*Zone code*	*2-month*	*3-month*	*4-month*	*6-month*	*9-month*	*1-year*	*2-year*	*5-year*	*10-year*	*25-year*	*50-year*	*100-year*
1	1	2.14	2.60	2.97	3.50	4.02	4.37	5.23	6.30	7.14	8.39	9.64	11.09
1	2	2.02	2.48	2.80	3.30	3.79	4.12	4.95	6.04	6.89	8.18	9.38	11.14
1	3	2.27	2.78	3.13	3.68	4.23	4.60	5.60	6.91	7.89	9.24	10.36	11.90
1	4	2.10	2.58	2.92	3.43	3.93	4.29	5.12	6.27	7.10	8.19	9.10	10.18
1	5	2.13	2.62	2.96	3.48	4.00	4.35	5.15	6.21	6.97	8.04	8.90	9.92
1	6	2.16	2.65	2.99	3.52	4.05	4.40	5.35	6.62	7.45	8.66	9.79	11.26
1	7	2.30	2.80	3.16	3.70	4.27	4.64	5.58	6.80	7.61	8.66	9.70	10.87
1	8	2.22	2.74	3.09	3.63	4.18	4.54	5.54	6.80	7.80	9.20	10.44	11.81
1	9	2.30	2.88	3.23	3.80	4.33	4.75	5.74	7.09	8.07	9.54	10.68	11.79
1	10	2.55	3.15	3.58	4.21	4.84	5.26	6.36	7.81	8.90	10.34	11.36	12.50
2	1	1.76	2.12	2.38	2.76	3.17	3.45	4.13	5.10	5.91	7.21	8.36	9.97
2	2	1.66	1.98	2.24	2.60	2.99	3.25	3.93	4.91	5.70	6.93	8.04	9.96
2	3	1.92	2.30	2.56	2.97	3.41	3.71	4.57	5.80	6.65	7.90	8.95	10.50
2	4	1.77	2.12	2.37	2.78	3.20	3.48	4.17	5.11	5.84	6.76	7.98	9.21
2	5	1.75	2.10	2.37	2.75	3.15	3.42	4.12	4.96	5.67	6.76	7.65	8.78
2	6	1.77	2.13	2.39	2.78	3.19	3.47	4.19	5.32	6.20	7.44	8.53	9.93
2	7	1.85	2.22	2.50	2.90	3.31	3.63	4.34	5.33	6.11	7.28	8.37	9.65
2	8	1.85	2.21	2.49	2.90	3.31	3.62	4.40	5.46	6.34	7.68	8.88	10.68
2	9	1.90	2.29	2.59	3.00	3.45	3.75	4.48	5.57	6.50	7.91	9.16	10.57
2	10	2.09	2.52	2.83	3.29	3.77	4.10	4.99	6.20	7.21	8.45	9.45	10.82
3	1	1.58	1.90	2.11	2.45	2.82	3.06	3.73	4.67	5.42	6.59	7.64	8.87
3	2	1.53	1.83	2.02	2.34	2.70	2.93	3.55	4.44	5.18	6.32	7.41	8.78
3	3	1.72	2.05	2.28	2.64	3.02	3.30	4.08	5.11	5.87	6.97	7.95	9.48
3	4	1.59	1.91	2.12	2.44	2.80	3.05	3.70	4.55	5.26	6.15	7.25	8.16
3	5	1.61	1.93	2.16	2.48	2.85	3.10	3.71	4.57	5.20	6.17	6.97	7.83
3	6	1.63	1.95	2.16	2.50	2.88	3.13	3.81	4.85	5.68	6.84	7.76	8.92
3	7	1.62	1.90	2.15	2.50	2.87	3.12	3.73	4.64	5.32	6.39	7.35	8.54
3	8	1.67	1.97	2.20	2.54	2.93	3.22	3.94	4.92	5.74	6.97	8.12	9.55
3	9	1.73	2.02	2.25	2.62	3.00	3.27	3.92	4.92	5.75	7.05	8.23	9.40
3	10	1.88	2.25	2.49	2.87	3.30	3.59	4.36	5.48	6.34	7.53	8.54	9.52
4	1	1.47	1.74	1.93	2.24	2.58	2.80	3.42	4.28	4.96	6.07	7.02	8.07
4	2	1.44	1.70	1.90	2.18	2.49	2.70	3.30	4.09	4.81	5.88	6.84	8.16
4	3	1.61	1.88	2.09	2.42	2.76	3.01	3.68	4.56	5.50	6.45	7.56	8.80
4	4	1.48	1.76	1.95	2.25	2.58	2.81	3.38	4.19	4.86	5.78	6.62	7.51
4	5	1.51	1.77	1.95	2.26	2.57	2.82	3.40	4.16	4.77	5.66	6.40	7.16
4	6	1.52	1.81	2.00	2.30	2.64	2.87	3.49	4.45	5.21	6.28	7.12	8.19
4	7	1.52	1.78	1.98	2.30	2.64	2.87	3.42	4.26	4.88	5.84	6.75	8.00
4	8	1.57	1.85	2.06	2.38	2.75	2.97	3.59	4.52	5.26	6.43	7.36	8.81
4	9	1.59	1.87	2.07	2.40	2.76	3.00	3.60	4.52	5.28	6.48	7.58	8.62
4	10	1.75	2.08	2.31	2.65	3.02	3.30	4.00	5.03	5.80	6.93	7.86	8.79
5	1	1.40	1.64	1.80	2.08	2.36	2.57	3.11	3.95	4.63	5.60	6.53	7.36
5	2	1.38	1.61	1.76	2.03	2.31	2.51	3.04	3.80	4.47	5.51	6.46	7.58
5	3	1.53	1.77	1.95	2.24	2.56	2.79	3.45	4.29	4.93	6.07	7.04	8.20
5	4	1.39	1.63	1.80	2.04	2.32	2.52	3.02	3.76	4.45	5.32	6.08	6.92
5	5	1.36	1.58	1.75	2.00	2.27	2.47	3.01	3.71	4.26	5.04	5.87	6.61
5	6	1.42	1.66	1.84	2.10	2.38	2.59	3.11	3.93	4.65	5.57	6.46	7.45
5	7	1.40	1.63	1.78	2.07	2.35	2.55	3.03	3.80	4.44	5.37	6.23	7.41
5	8	1.49	1.73	1.90	2.20	2.48	2.71	3.28	4.13	4.76	6.02	7.07	8.21
5	9	1.44	1.68	1.85	2.12	2.41	2.62	3.16	4.00	4.62	5.79	6.71	7.73
5	10	1.63	1.91	2.10	2.41	2.74	2.97	3.62	4.51	5.21	6.23	7.11	8.27

Table 13. Continued

Rainfall (inches) for given recurrence interval

Storm code	Zone code	2-month	3-month	4-month	6-month	9-month	1-year	2-year	5-year	10-year	25-year	50-year	100-year
6	1	1.30	1.52	1.66	1.92	2.18	2.37	2.86	3.63	4.26	5.15	6.01	6.92
6	2	1.26	1.47	1.61	1.86	2.12	2.30	2.79	3.50	4.11	5.06	5.95	6.97
6	3	1.41	1.64	1.80	2.07	2.36	2.57	3.18	3.95	4.53	5.59	6.47	7.55
6	4	1.27	1.51	1.66	1.88	2.12	2.28	2.75	3.46	4.09	4.90	5.59	6.37
6	5	1.25	1.47	1.62	1.84	2.09	2.27	2.77	3.41	3.92	4.63	5.37	6.08
6	6	1.31	1.53	1.68	1.93	2.19	2.38	2.86	3.61	4.28	5.12	5.95	6.85
6	7	1.29	1.50	1.64	1.90	2.16	2.35	2.79	3.49	4.08	4.94	5.73	6.81
6	8	1.35	1.59	1.74	2.00	2.29	2.49	3.02	3.80	4.38	5.54	6.51	7.55
6	9	1.33	1.55	1.71	1.95	2.22	2.41	2.91	3.68	4.25	5.33	6.17	7.11
6	10	1.51	1.77	1.95	2.22	2.52	2.74	3.33	4.15	4.79	5.74	6.54	7.61
7	1	1.23	1.43	1.57	1.81	2.06	2.24	2.71	3.43	4.03	4.88	5.66	6.51
7	2	1.20	1.40	1.53	1.77	2.01	2.18	2.64	3.31	3.89	4.79	5.62	6.59
7	3	1.34	1.56	1.70	1.94	2.22	2.43	2.96	3.73	4.29	5.28	6.13	7.14
7	4	1.19	1.40	1.53	1.77	2.01	2.17	2.62	3.27	3.87	4.63	5.29	6.02
7	5	1.18	1.38	1.53	1.74	1.98	2.15	2.62	3.23	3.7[illegible]	4.38	5.08	5.75
7	6	1.24	1.44	1.57	1.82	2.07	2.25	2.71	3.39	3.97	4.84	5.62	6.48
7	7	1.21	1.42	1.55	1.80	2.04	2.22	2.63	3.30	3.86	4.67	5.42	6.45
7	8	1.28	1.50	1.64	1.88	2.15	2.35	2.86	3.60	4.14	5.24	6.15	7.14
7	9	1.25	1.46	1.60	1.85	2.10	2.28	2.75	3.48	4.02	5.04	5.84	6.72
7	10	1.42	1.66	1.83	2.10	2.38	2.59	3.15	3.93	4.53	5.42	6.19	7.20
8	1	1.06	1.24	1.37	1.56	1.77	1.93	2.33	2.96	3.48	4.20	4.90	5.69
8	2	1.03	1.21	1.32	1.52	1.74	1.88	2.28	2.85	3.35	4.13	4.85	5.68
8	3	1.15	1.34	1.47	1.67	1.91	2.10	2.58	3.22	3.70	4.55	5.28	6.15
8	4	1.03	1.21	1.34	1.53	1.74	1.89	2.26	2.82	3.33	3.99	4.56	5.19
8	5	1.00	1.18	1.32	1.49	1.70	1.85	2.26	2.78	3.20	3.78	4.38	4.96
8	6	1.07	1.24	1.37	1.57	1.78	1.94	2.33	2.95	3.48	4.18	4.85	5.59
8	7	1.06	1.23	1.37	1.55	1.74	1.87	2.27	2.85	3.33	4.03	4.67	5.56
8	8	1.12	1.30	1.44	1.64	1.87	2.03	2.45	3.10	3.57	4.52	5.30	6.16
8	9	1.08	1.27	1.41	1.60	1.81	1.97	2.37	3.00	3.47	4.34	5.03	5.80
8	10	1.23	1.44	1.58	1.71	2.05	2.23	2.73	3.39	3.91	4.68	5.31	6.21
9	1	0.91	1.06	1.16	1.33	1.52	1.65	1.99	2.53	2.97	3.59	4.18	4.90
9	2	0.88	1.02	1.13	1.30	1.47	1.60	1.94	2.43	2.86	3.53	4.14	4.85
9	3	0.98	1.15	1.26	1.44	1.65	1.79	2.21	2.75	3.15	3.89	4.51	5.25
9	4	0.89	1.03	1.13	1.30	1.47	1.61	1.93	2.41	2.85	3.41	3.89	4.43
9	5	0.87	1.02	1.12	1.28	1.46	1.58	1.93	2.37	2.73	3.22	3.74	4.23
9	6	0.91	1.07	1.18	1.34	1.52	1.66	1.99	2.51	2.98	3.56	4.14	4.77
9	7	0.89	1.05	1.15	1.32	1.50	1.63	1.94	2.43	2.84	3.44	3.99	4.74
9	8	0.95	1.12	1.22	1.40	1.59	1.73	2.10	2.63	3.08	3.86	4.52	5.25
9	9	0.92	1.08	1.21	1.37	1.55	1.68	2.02	2.56	2.96	3.71	4.29	4.95
9	10	1.06	1.23	1.35	1.54	1.75	1.90	2.32	2.89	3.33	3.99	4.55	5.29
10	1	0.84	0.97	1.06	1.23	1.40	1.52	1.83	2.33	2.74	3.31	3.86	4.47
10	2	0.81	0.95	1.05	1.20	1.36	1.48	1.79	2.24	2.64	3.25	3.82	4.47
10	3	0.91	1.06	1.17	1.32	1.50	1.65	2.02	2.53	2.91	3.58	4.15	4.84
10	4	0.82	0.95	1.04	1.19	1.37	1.48	1.78	2.22	2.62	3.14	3.59	4.08
10	5	0.79	0.93	1.03	1.17	1.34	1.46	1.78	2.19	2.52	2.97	3.44	3.90
10	6	0.84	0.98	1.08	1.24	1.41	1.53	1.84	2.32	2.74	3.28	3.81	4.39
10	7	0.83	0.97	1.07	1.22	1.38	1.50	1.79	2.24	2.62	3.17	3.67	4.39
10	8	0.88	1.02	1.13	1.28	1.47	1.60	1.94	2.44	2.87	3.55	4.20	4.84
10	9	0.85	1.00	1.12	1.26	1.43	1.55	1.85	2.36	2.72	3.41	3.96	4.56
10	10	0.97	1.13	1.25	1.43	1.62	1.76	2.14	2.66	3.07	3.68	4.20	4.88
11	1	0.67	0.78	0.86	0.98	1.11	1.21	1.46	1.86	2.18	2.63	3.07	3.51
11	2	0.65	0.76	0.84	0.96	1.09	1.18	1.43	1.79	2.10	2.59	3.04	3.56
11	3	0.72	0.84	0.92	1.06	1.21	1.31	1.60	2.02	2.32	2.86	3.31	3.85
11	4	0.65	0.76	0.83	0.95	1.09	1.18	1.42	1.77	2.09	2.50	2.86	3.25
11	5	0.64	0.74	0.81	0.93	1.07	1.16	1.41	1.74	2.00	2.39	2.74	3.11
11	6	0.67	0.79	0.87	0.99	1.12	1.21	1.46	1.85	2.19	2.62	3.04	3.50
11	7	0.66	0.77	0.85	0.97	1.10	1.20	1.42	1.78	2.09	2.52	2.93	3.48
11	8	0.70	0.81	0.89	1.02	1.15	1.26	1.54	1.93	2.27	2.84	3.32	3.86
11	9	0.68	0.79	0.88	1.00	1.13	1.23	1.49	1.88	2.20	2.72	3.15	3.63
11	10	0.77	0.90	0.99	1.13	1.29	1.40	1.70	2.12	2.45	2.93	3.34	3.89
12	1	0.52	0.61	0.68	0.77	0.87	0.95	1.15	1.46	1.71	2.07	2.42	2.77
12	2	0.51	0.60	0.65	0.75	0.86	0.93	1.12	1.41	1.65	2.04	2.39	2.80
12	3	0.57	0.66	0.73	0.83	0.95	1.03	1.27	1.59	1.82	2.25	2.61	3.03
12	4	0.52	0.60	0.66	0.75	0.86	0.93	1.12	1.39	1.64	1.97	2.25	2.56
12	5	0.50	0.58	0.64	0.74	0.84	0.91	1.11	1.37	1.57	1.87	2.16	2.45
12	6	0.53	0.61	0.68	0.78	0.88	0.96	1.15	1.46	1.72	2.06	2.39	2.75
12	7	0.52	0.60	0.66	0.76	0.86	0.93	1.12	1.41	1.64	1.99	2.31	2.74
12	8	0.55	0.64	0.71	0.81	0.92	1.00	1.22	1.53	1.78	2.25	2.62	3.03
12	9	0.53	0.62	0.68	0.78	0.89	0.97	1.17	1.47	1.73	2.14	2.48	2.86
12	10	0.61	0.70	0.77	0.89	1.01	1.10	1.34	1.66	1.93	2.31	2.63	3.06

Table 13. Concluded

Rainfall (inches) for given recurrence interval

Storm code	Zone code	2-month	3-month	4-month	6-month	9-month	1-year	2-year	5-year	10-year	25-year	50-year	100-year
13	1	0.38	0.45	0.50	0.57	0.64	0.70	0.84	1.07	1.25	1.51	1.76	1.99
13	2	0.37	0.44	0.48	0.55	0.63	0.68	0.82	1.03	1.21	1.49	1.75	2.05
13	3	0.41	0.48	0.53	0.61	0.69	0.75	0.91	1.16	1.33	1.64	1.90	2.21
13	4	0.37	0.44	0.49	0.56	0.63	0.68	0.81	1.02	1.20	1.44	1.64	1.87
13	5	0.37	0.43	0.47	0.54	0.62	0.67	0.81	1.00	1.14	1.37	1.60	1.85
13	6	0.38	0.45	0.49	0.57	0.64	0.70	0.84	1.06	1.26	1.52	1.75	2.01
13	7	0.38	0.44	0.49	0.56	0.63	0.69	0.82	1.03	1.20	1.45	1.68	2.00
13	8	0.40	0.47	0.52	0.59	0.67	0.73	0.89	1.12	1.29	1.63	1.91	2.22
13	9	0.39	0.46	0.50	0.58	0.65	0.71	0.85	1.08	1.25	1.56	1.81	2.09
13	10	0.43	0.51	0.56	0.65	0.74	0.80	0.98	1.22	1.41	1.68	1.92	2.23
14	1	0.31	0.36	0.40	0.46	0.52	0.57	0.68	0.87	1.02	1.23	1.44	1.62
14	2	0.30	0.35	0.39	0.45	0.51	0.55	0.67	0.84	0.98	1.21	1.42	1.67
14	3	0.34	0.39	0.43	0.49	0.56	0.61	0.74	0.94	1.08	1.33	1.55	1.81
14	4	0.30	0.35	0.39	0.45	0.50	0.55	0.66	0.83	0.98	1.17	1.34	1.52
14	5	0.30	0.35	0.38	0.43	0.49	0.54	0.66	0.81	0.94	1.12	1.28	1.46
14	6	0.31	0.36	0.40	0.46	0.52	0.57	0.68	0.87	1.02	1.22	1.42	1.64
14	7	0.31	0.36	0.40	0.45	0.51	0.56	0.66	0.83	0.98	1.18	1.37	1.63
14	8	0.33	0.38	0.42	0.49	0.55	0.60	0.72	0.91	1.05	1.32	1.55	1.81
14	9	0.32	0.37	0.41	0.47	0.53	0.58	0.70	0.88	1.02	1.27	1.48	1.70
14	10	0.36	0.42	0.46	0.53	0.60	0.65	0.80	0.99	1.14	1.37	1.56	1.82
15	1	0.17	0.20	0.22	0.25	0.29	0.31	0.37	0.47	0.56	0.67	0.78	0.89
15	2	0.17	0.19	0.21	0.24	0.28	0.30	0.36	0.46	0.54	0.66	0.78	0.91
15	3	0.18	0.21	0.23	0.26	0.30	0.33	0.40	0.51	0.59	0.73	0.84	0.98
15	4	0.17	0.19	0.21	0.24	0.28	0.30	0.36	0.45	0.53	0.64	0.73	0.83
15	5	0.17	0.19	0.21	0.24	0.28	0.30	0.36	0.44	0.51	0.61	0.70	0.79
15	6	0.17	0.20	0.22	0.25	0.29	0.31	0.37	0.47	0.56	0.67	0.78	0.89
15	7	0.17	0.20	0.22	0.25	0.29	0.31	0.36	0.46	0.54	0.64	0.75	0.89
15	8	0.18	0.21	0.23	0.26	0.30	0.33	0.40	0.50	0.58	0.72	0.85	0.99
15	9	0.18	0.20	0.22	0.26	0.29	0.32	0.38	0.48	0.55	0.69	0.81	0.93
15	10	0.20	0.23	0.25	0.29	0.33	0.36	0.43	0.54	0.62	0.75	0.85	0.99

Huff, F.A. and Angel, J.R. *Rainfall Distributions and Hydroclimatic Characteristics of Heavy Rainstorms in Illinois (Bulletin 70).* Illinois State Water Survey. 1989.

Table 35. Relations between Areal Mean and Point Rainfall Frequency Distributions

Ratio of areal to point rainfall for given area

Storm period (hours)	10 sq mi	25 sq mi	50 sq mi	100 sq mi	200 sq mi	400 sq mi
0.5	0.88	0.80	0.74	0.68	0.62	0.56
1.0	0.92	0.87	0.83	0.78	0.74	0.70
2.0	0.95	0.91	0.88	0.84	0.81	0.78
3.0	0.96	0.93	0.90	0.87	0.84	0.81
6.0	0.97	0.94	0.92	0.89	0.87	0.84
12.0	0.98	0.96	0.94	0.92	0.90	0.88
24.0	0.99	0.97	0.95	0.94	0.93	0.91
48.0	0.99	0.98	0.97	0.96	0.95	0.94

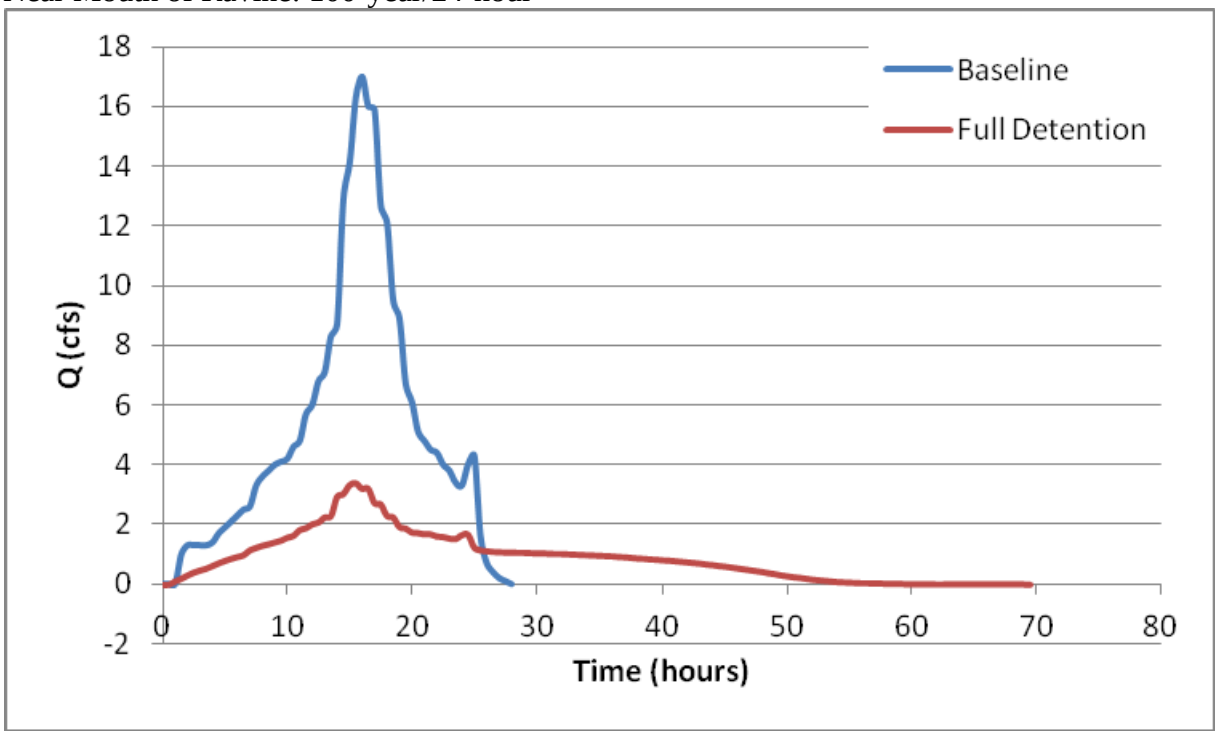
Appendix C.

STORM SEWER OUTFALL HYDROGRAPHS FROM SWMM MODELING

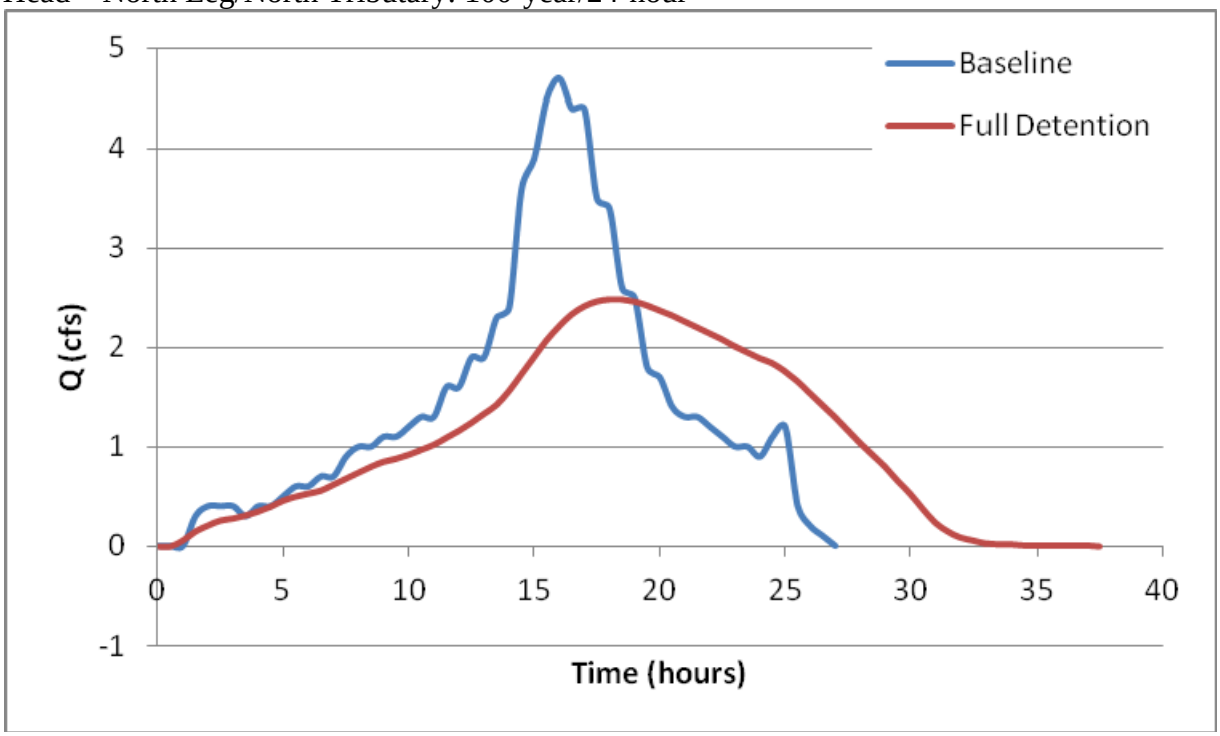
McCormick/Janes Ravine
MacArthur Ravine
Hutchinson Ravine
Scotts Ravine
Van Horne Ravine
Schenck Ravine

McCormick/Janes Ravine

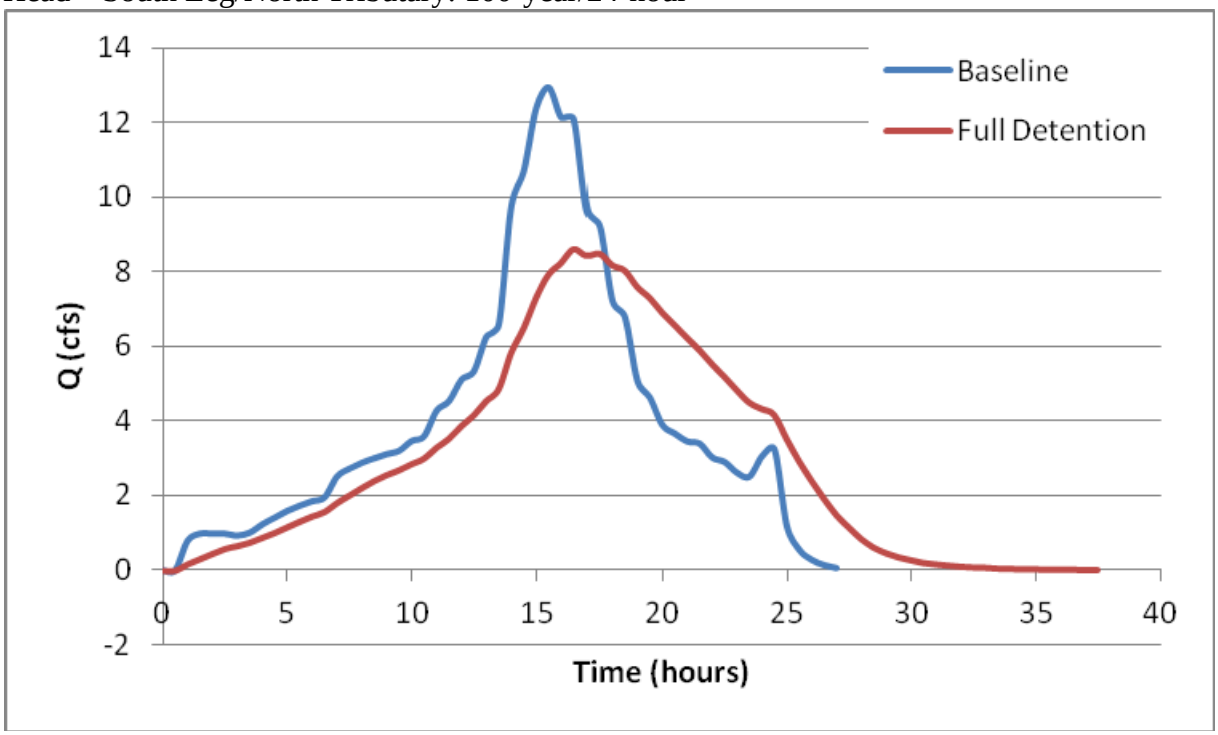
Near Mouth of Ravine: 100-year/24-hour



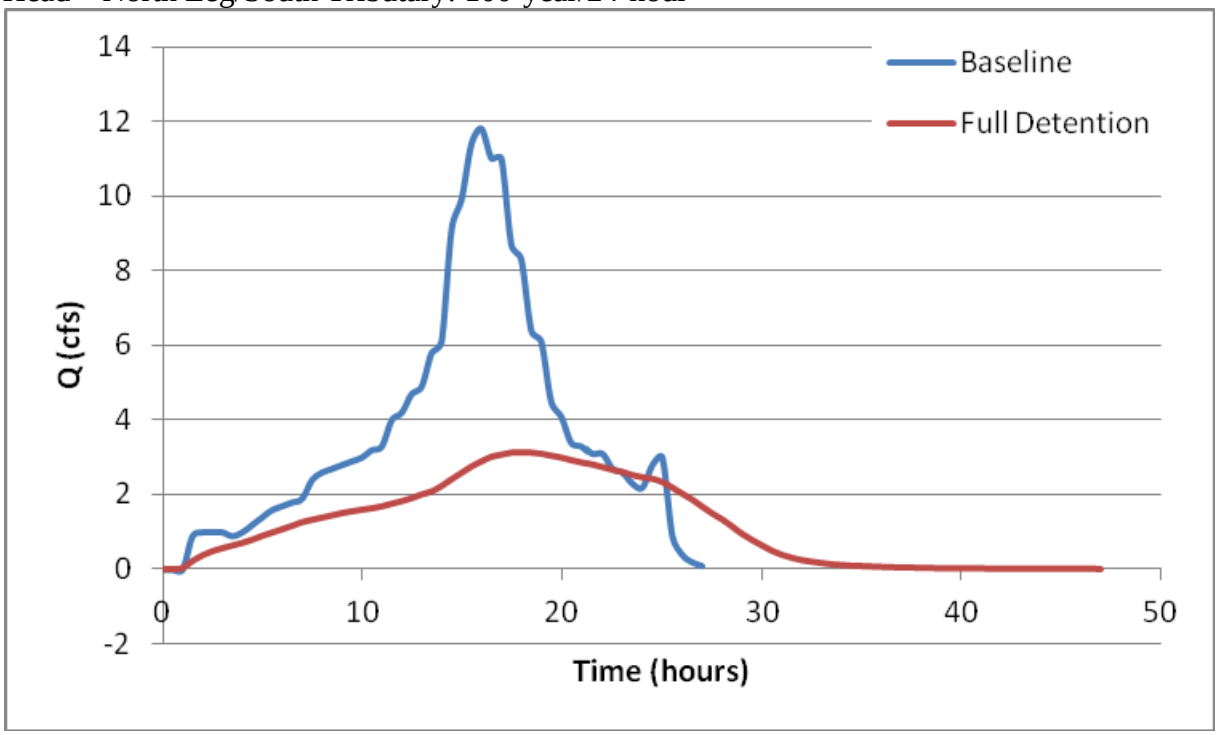
Head – North Leg/North Tributary: 100-year/24-hour



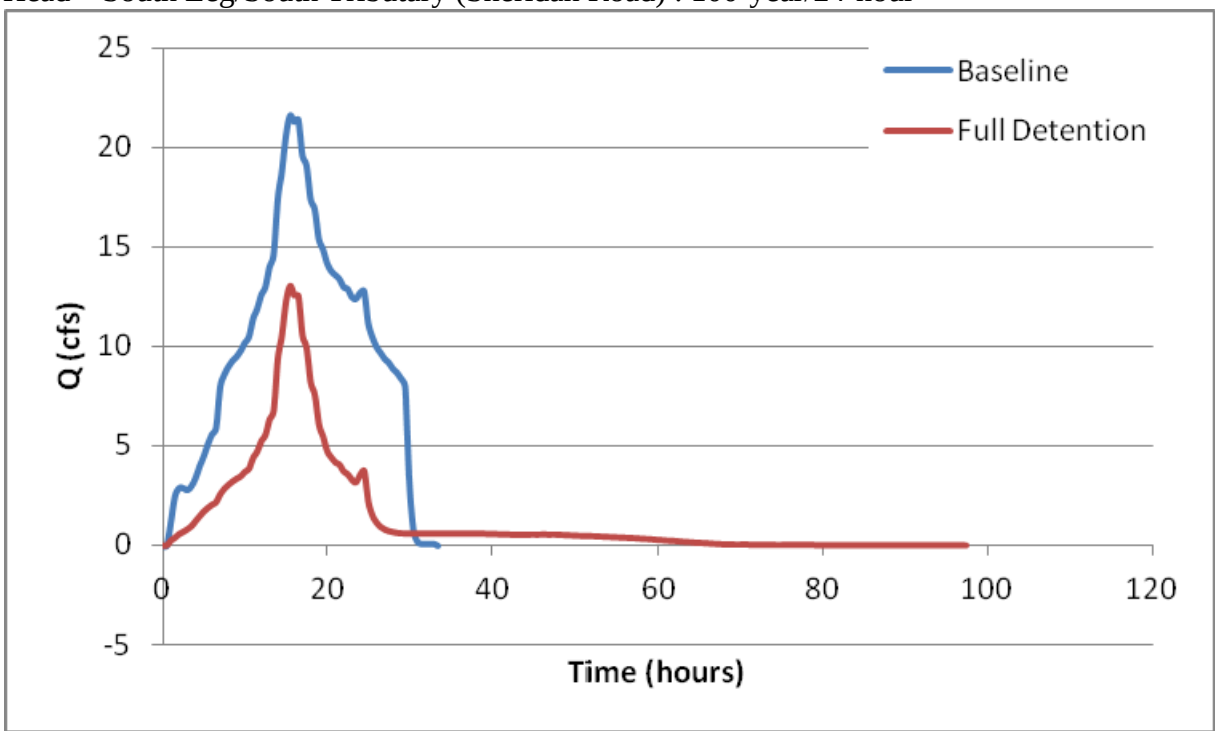
Head – South Leg/North Tributary: 100-year/24-hour



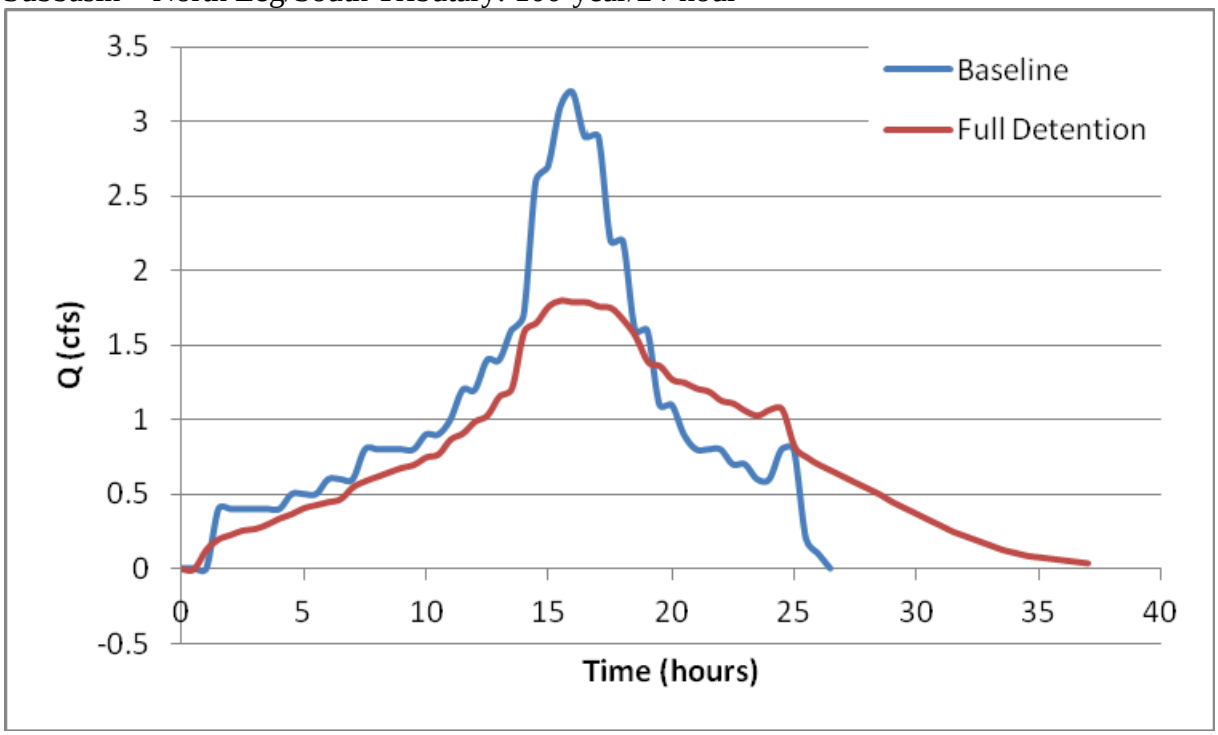
Head – North Leg/South Tributary: 100-year/24-hour



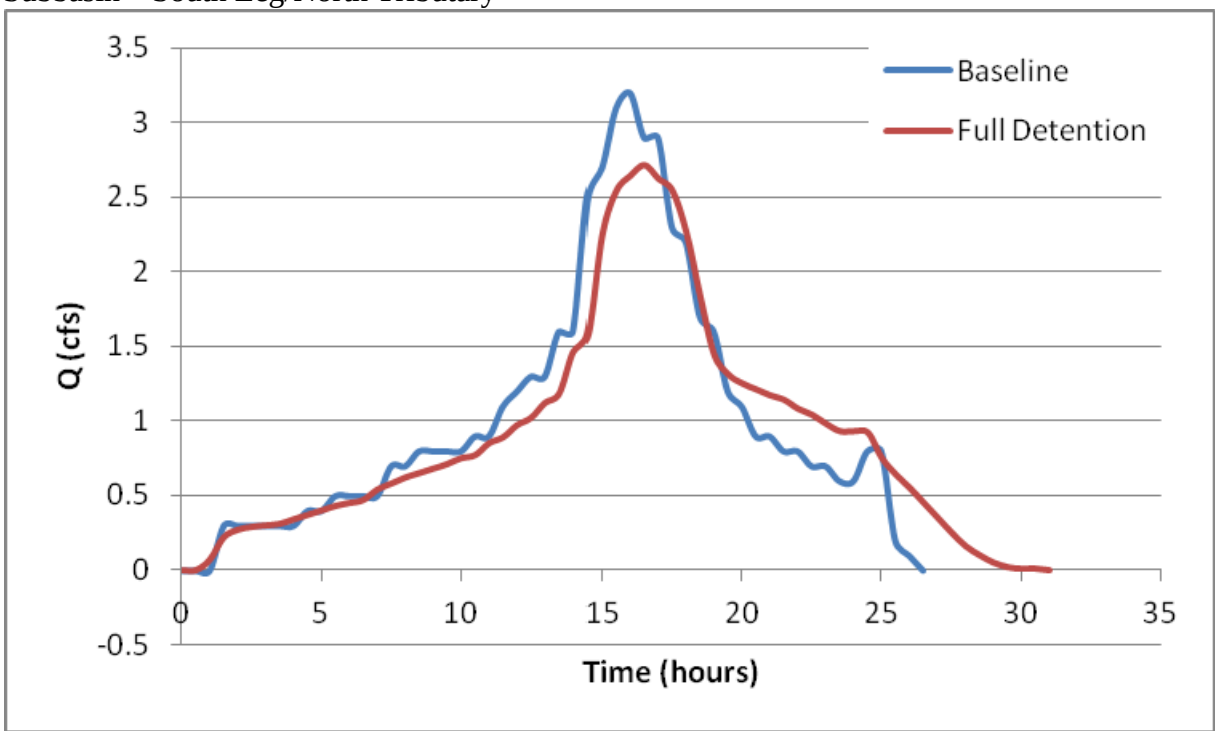
Head – South Leg/South Tributary (Sheridan Road) : 100-year/24-hour



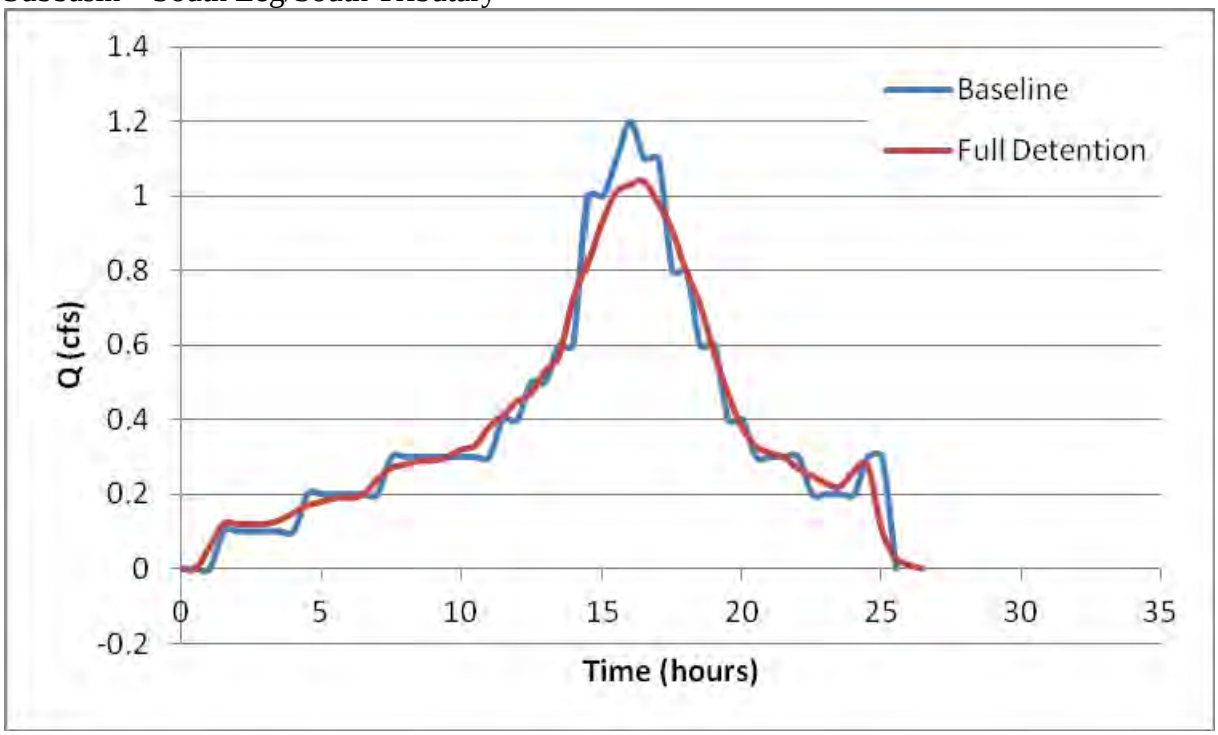
Subbasin – North Leg/South Tributary: 100-year/24-hour



Subbasin – South Leg/North Tributary

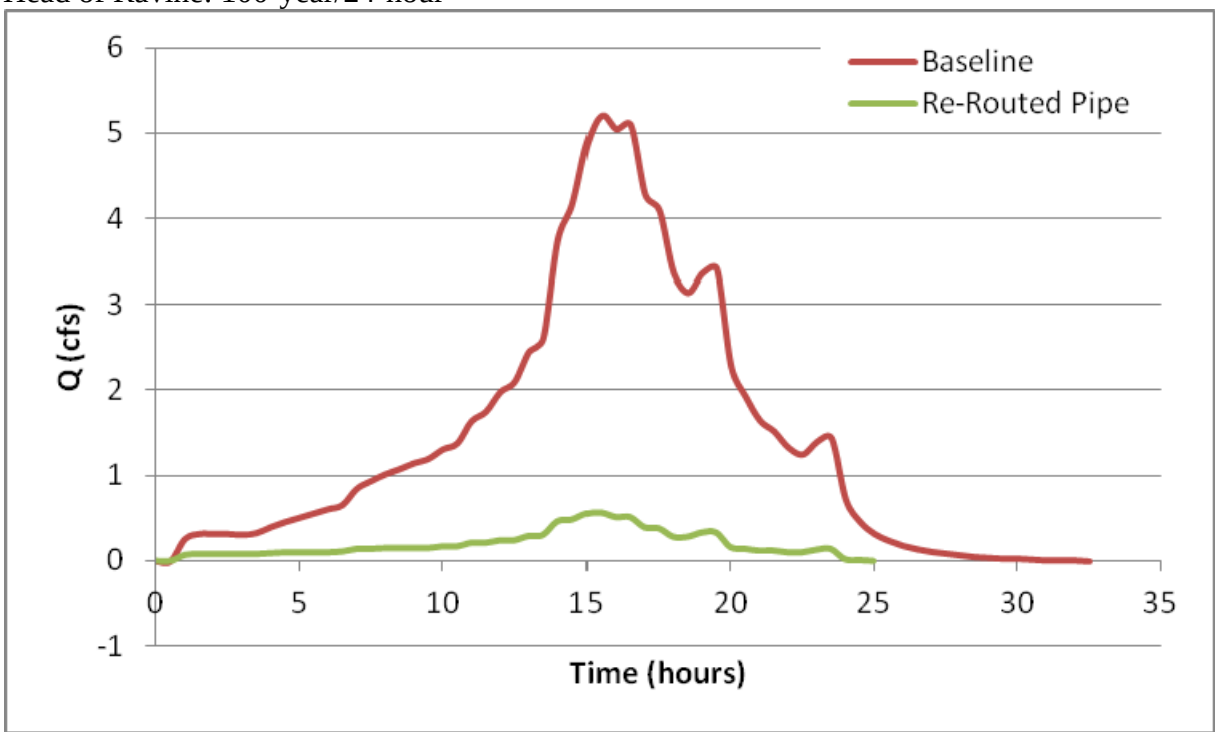


Subbasin – South Leg/South Tributary



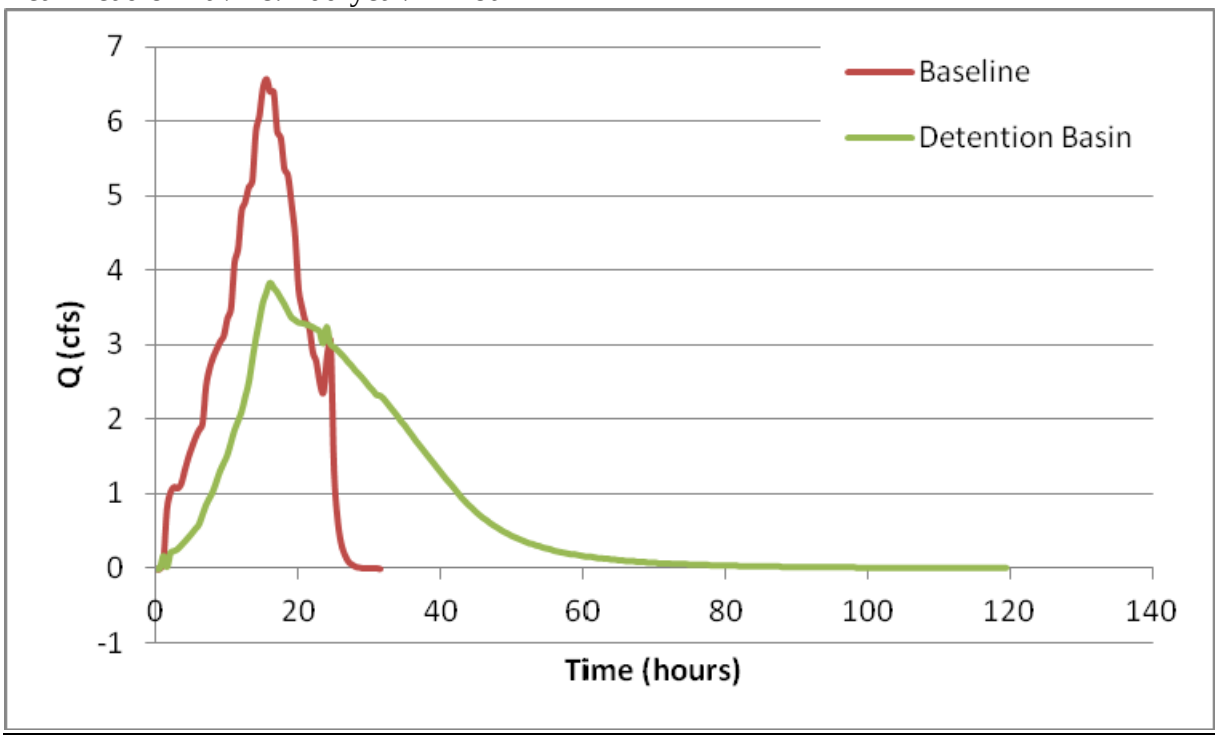
MacArthur Ravine

Head of Ravine: 100-year/24-hour



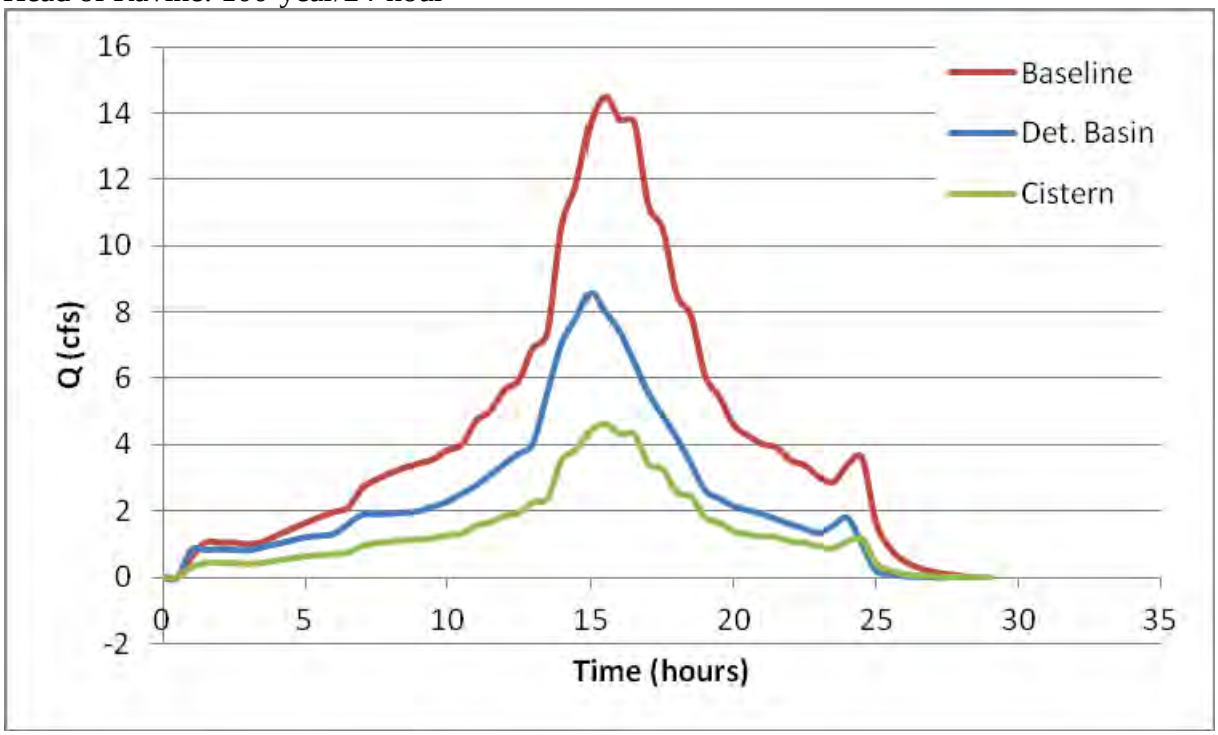
Hutchinson Ravine

Near Head of Ravine: 100-year/24-hour

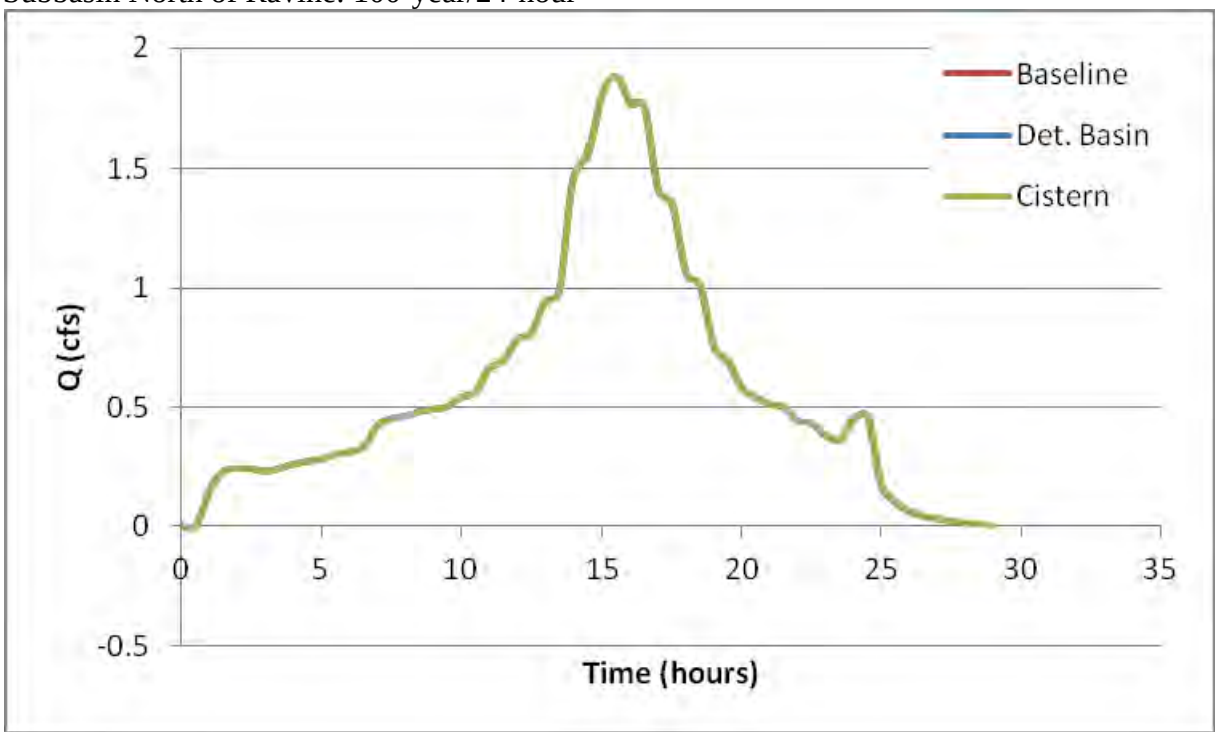


Scotts Ravine

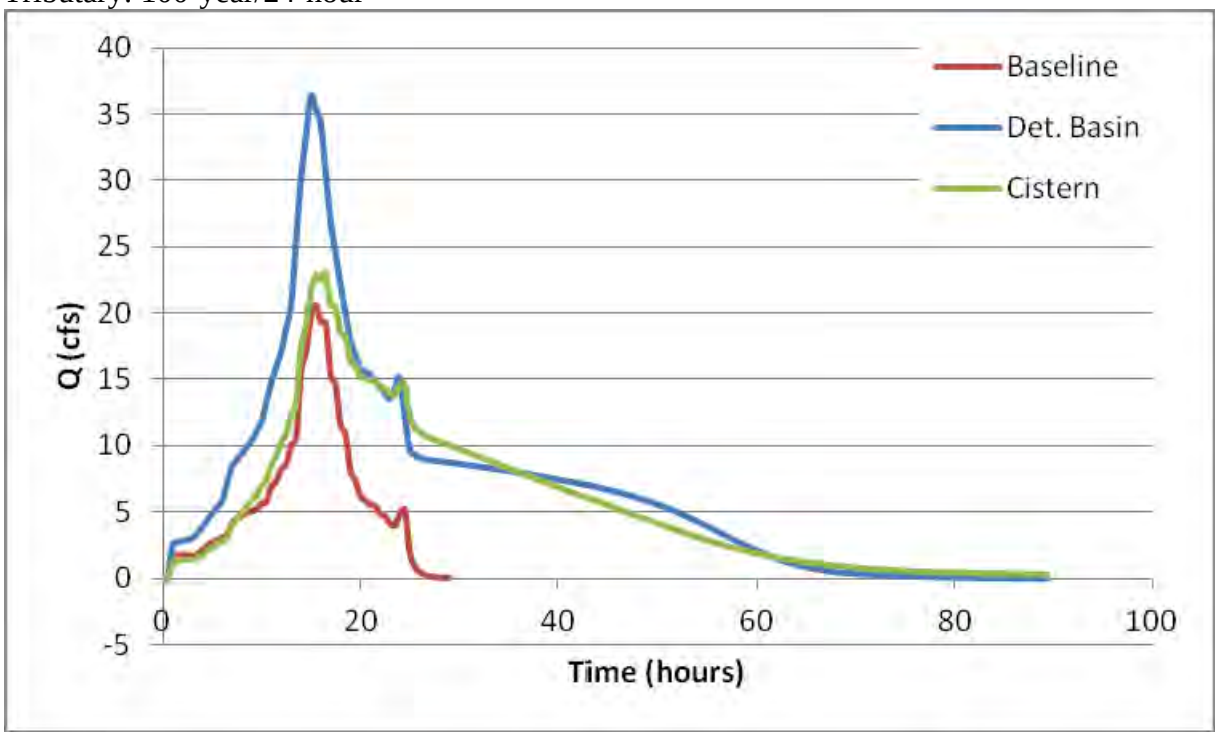
Head of Ravine: 100-year/24-hour



Subbasin North of Ravine: 100-year/24-hour

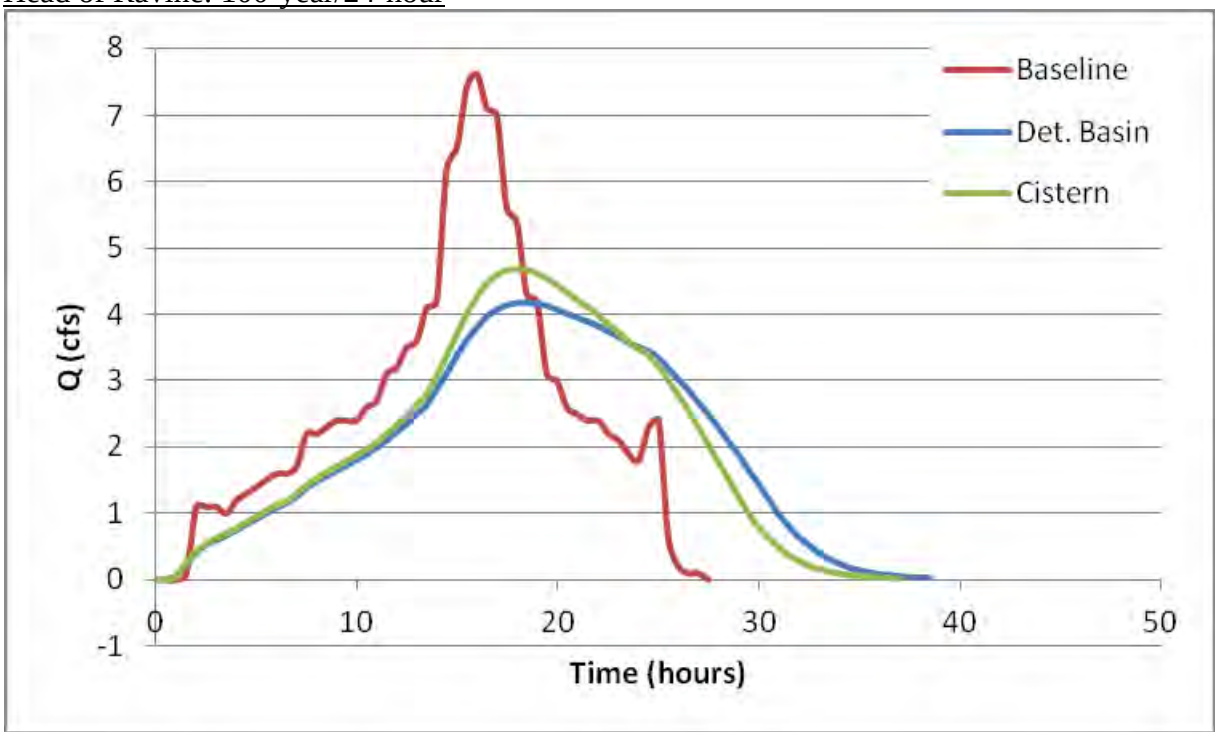


Tributary: 100-year/24-hour



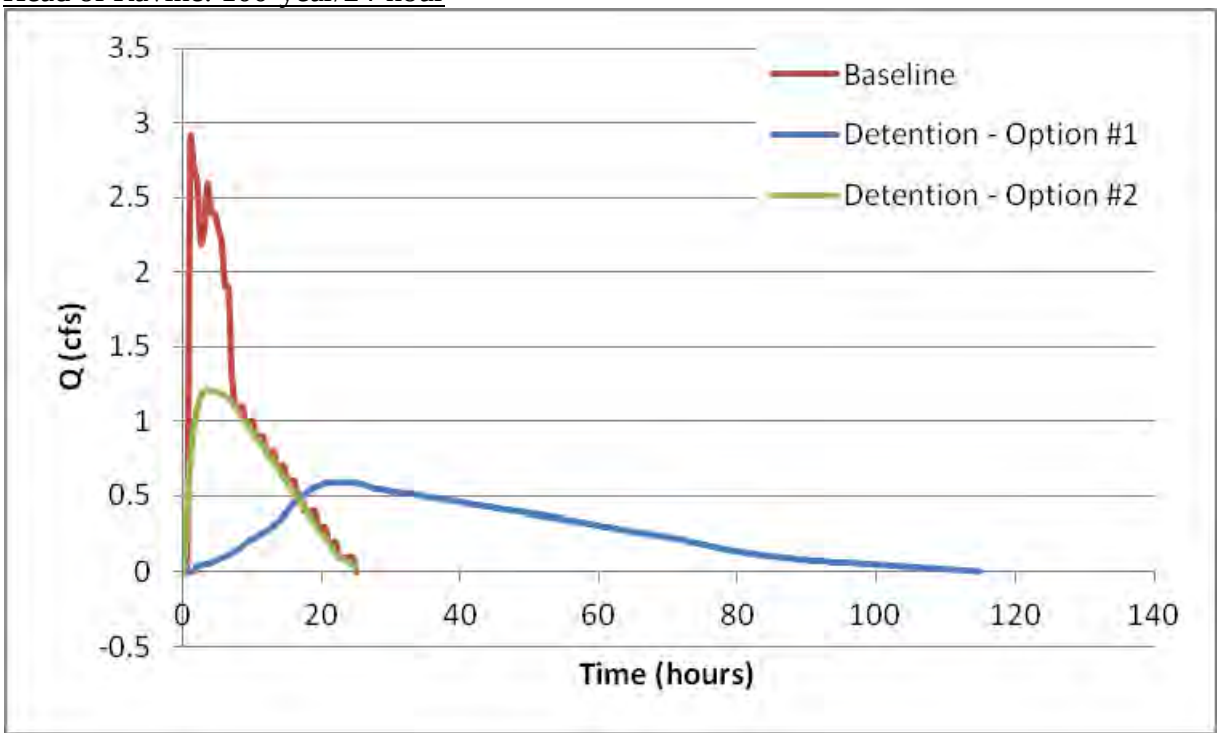
Van Horne Ravine

Head of Ravine: 100-year/24-hour

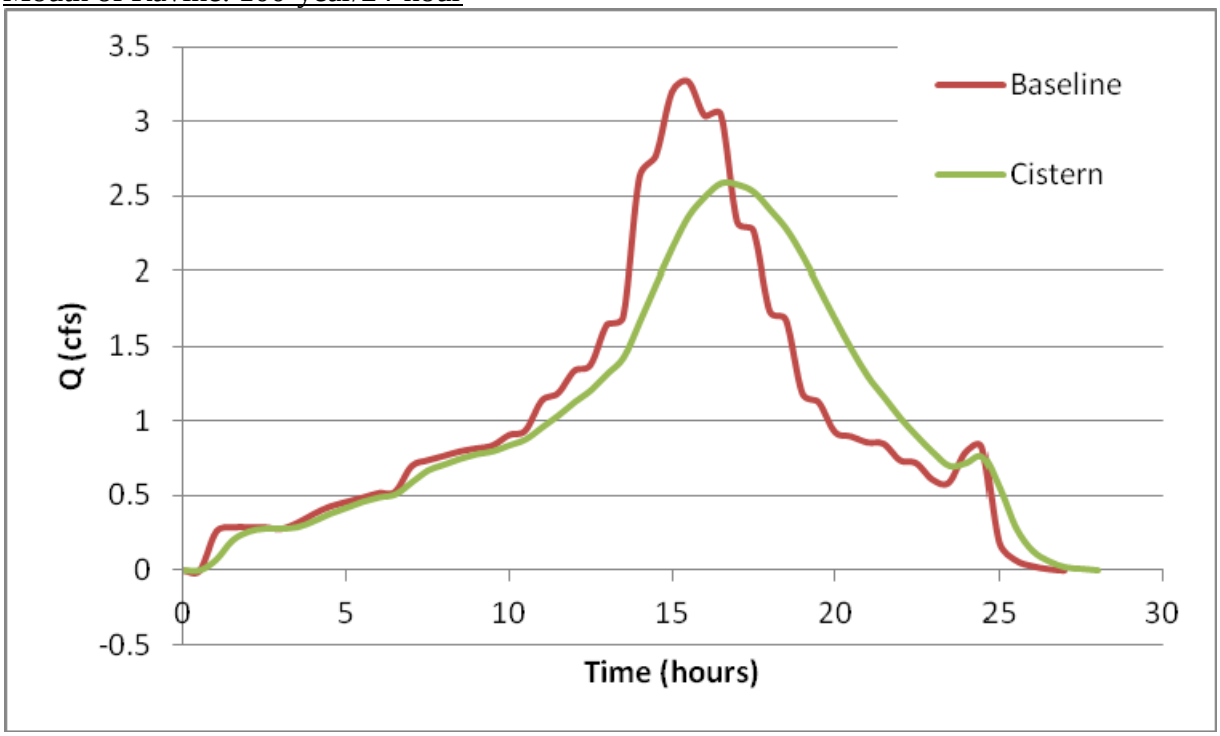


Schenck Ravine

Head of Ravine: 100-year/24-hour



Mouth of Ravine: 100-year/24-hour



Appendix D.

RELATIONSHIP BETWEEN MODEL GEOMETRIES

Summary
McCormick/Janes Ravine
Hutchinson Ravine
MacArthur Ravine
Scotts Ravine
Bartlett Ravine
Van Horne Ravine
Schenck Ravine

Summary

HEC-HMS Geometries

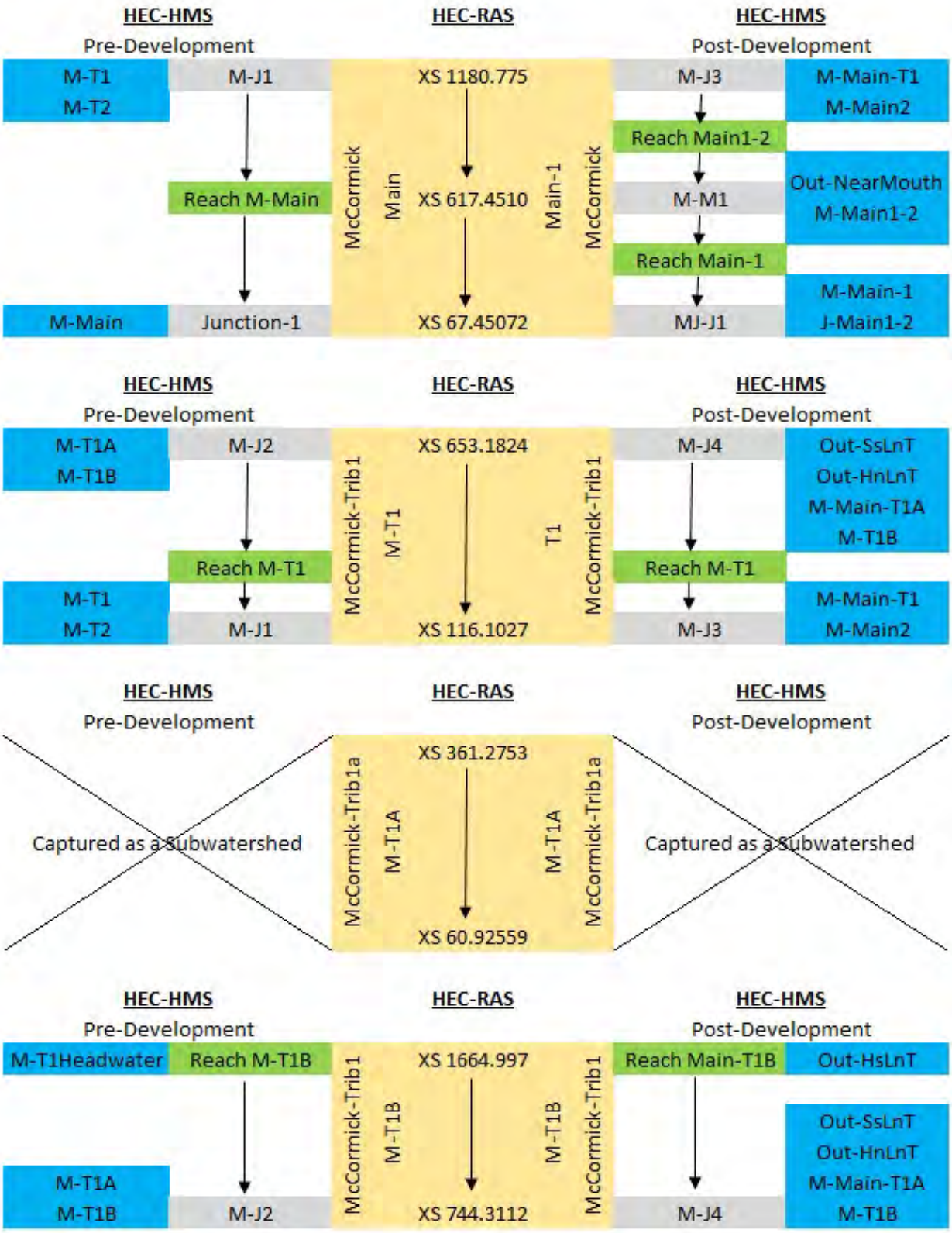
Subbasins
Junctions
Reaches

Naming Conventions:
AA-Main = Subbasin on Main Branch
AA-T# = Subbasin on Tributary
Out = Outfall
SsLnT = Subbasin of South Leg of North Tributary
HnLnT = Head of North Leg of North Tributary

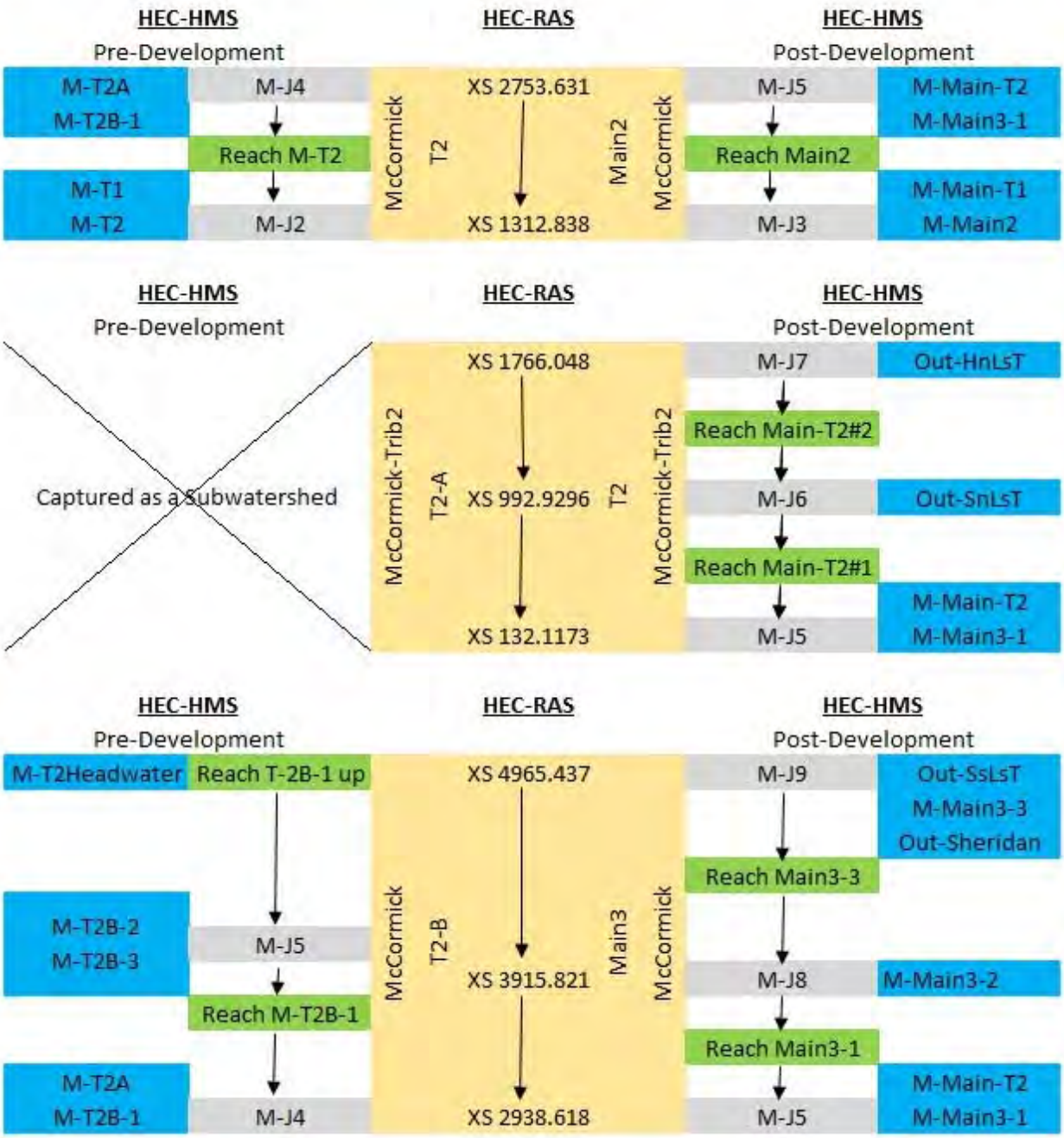
HEC-RAS Geometries

Pre-Development RIVER	Pre-Development REACH	XS	Post-Development REACH	Post-Development RIVER

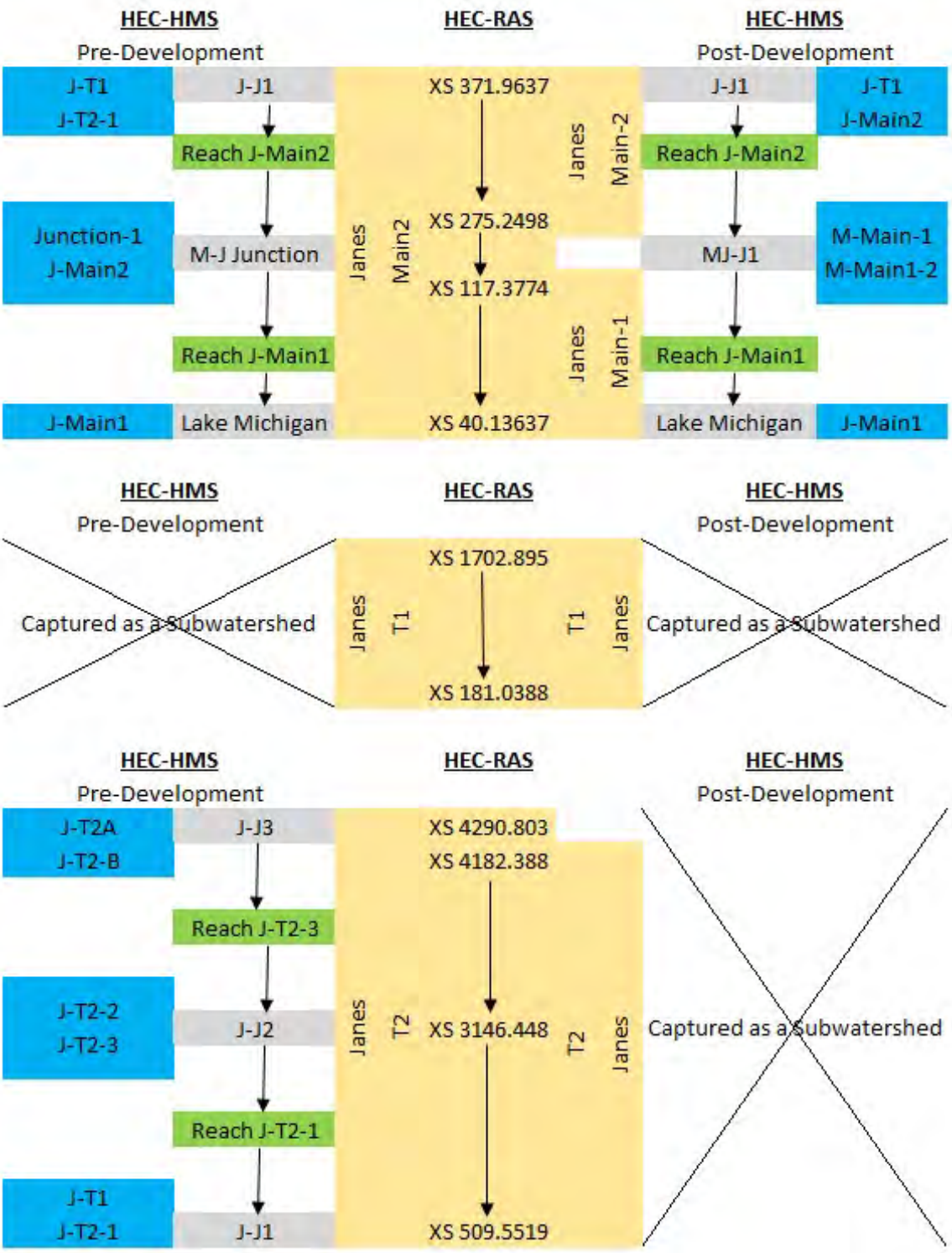
McCormick/Janes Ravine



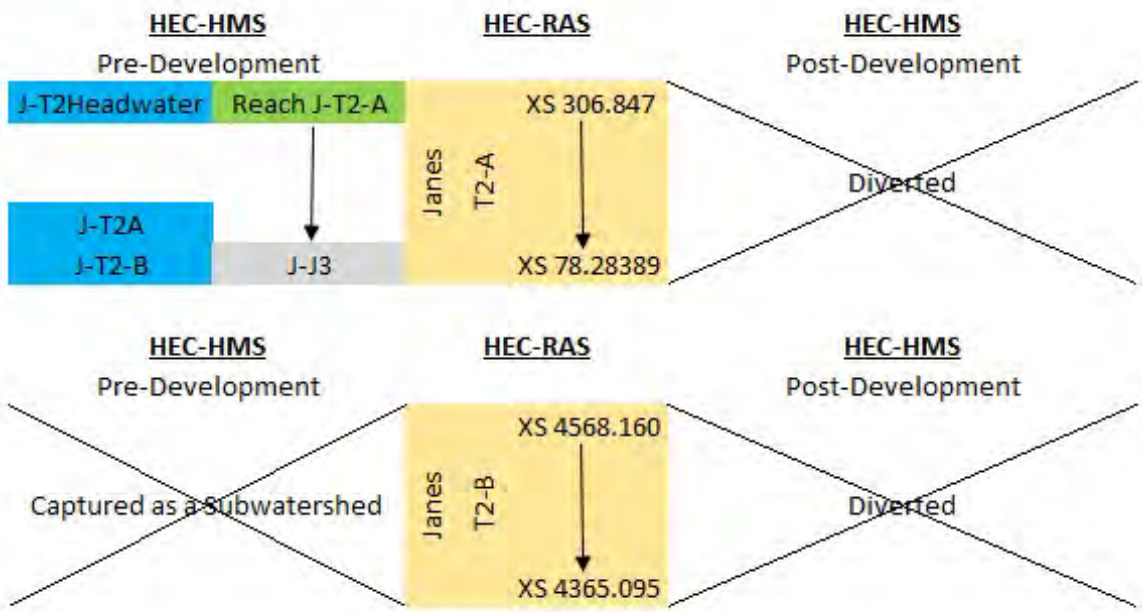
McCormick/Janes Ravine, cont.



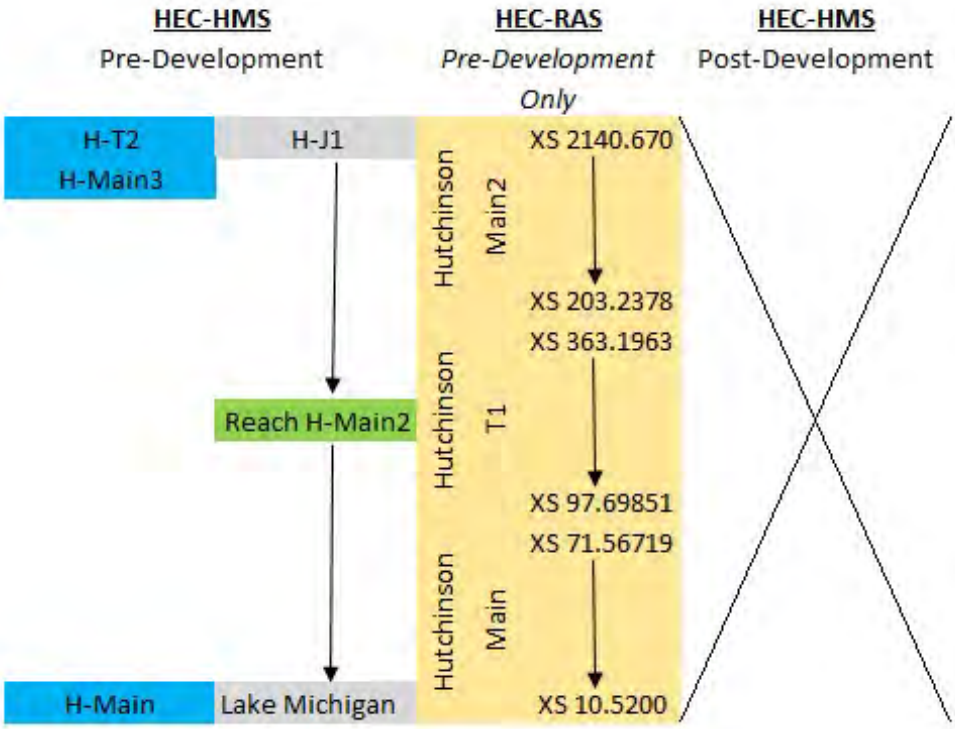
McCormick/Janes Ravine, cont.



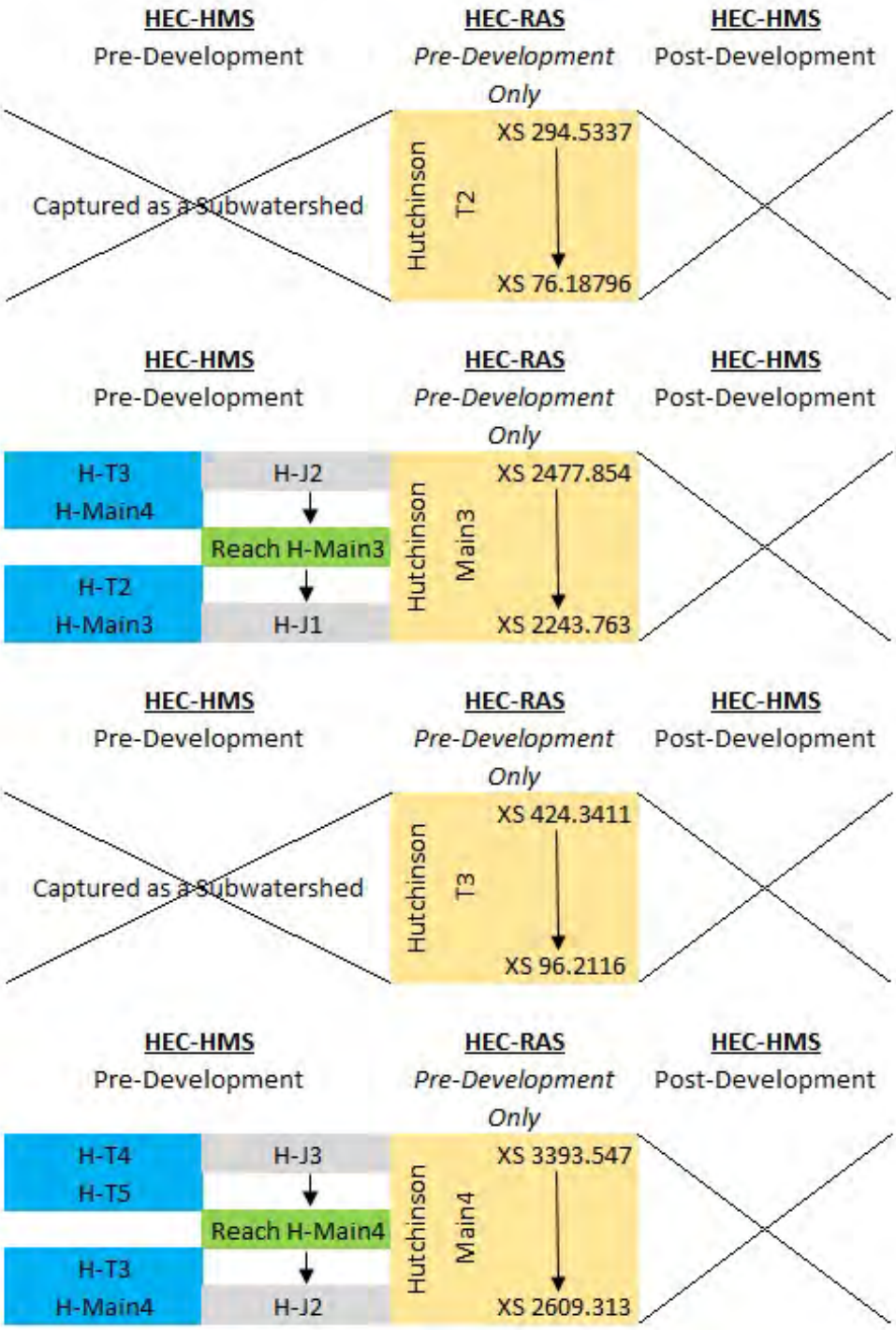
McCormick/Janes Ravine, cont.



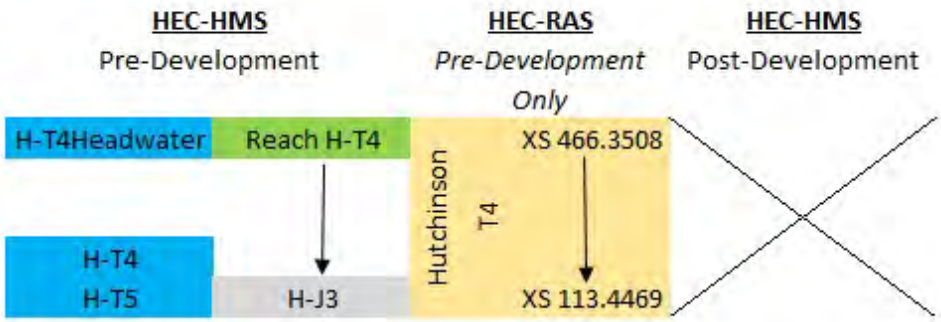
Hutchinson Ravine

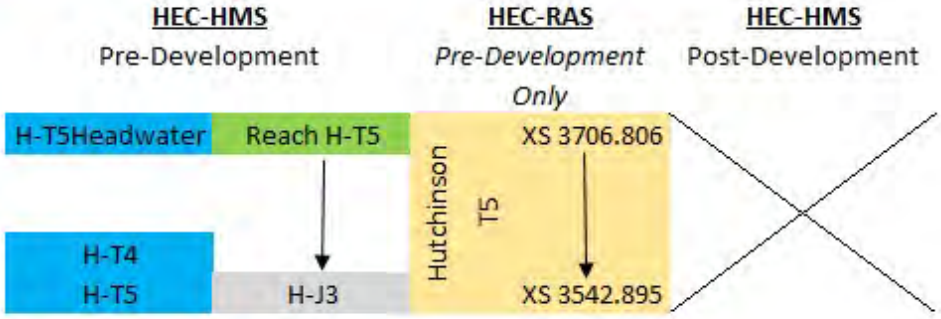


Hutchinson, cont.

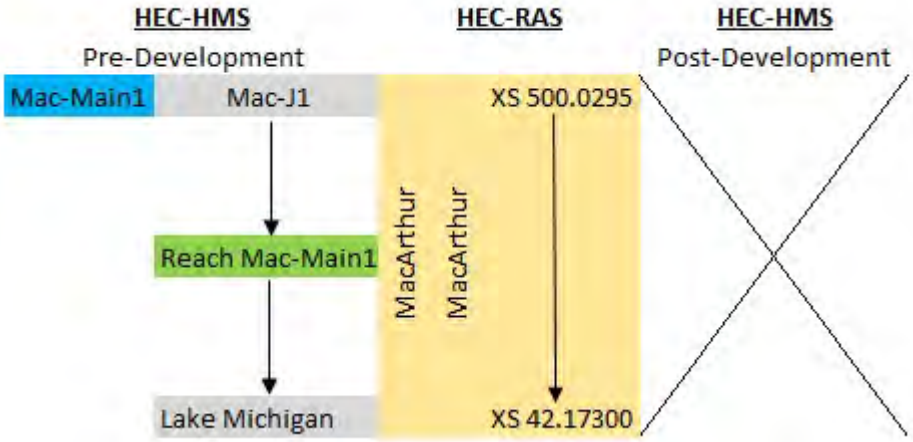


Hutchinson, cont.

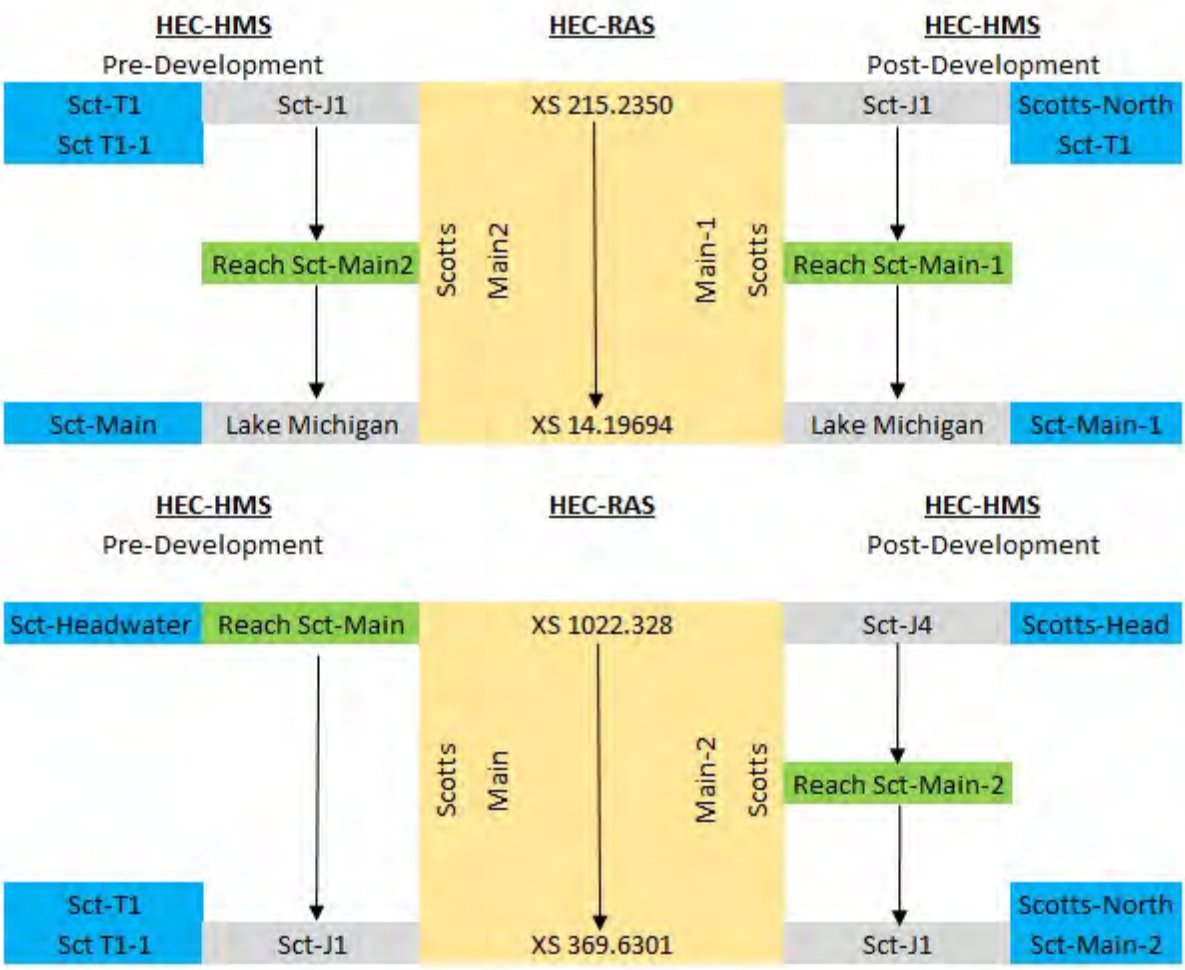




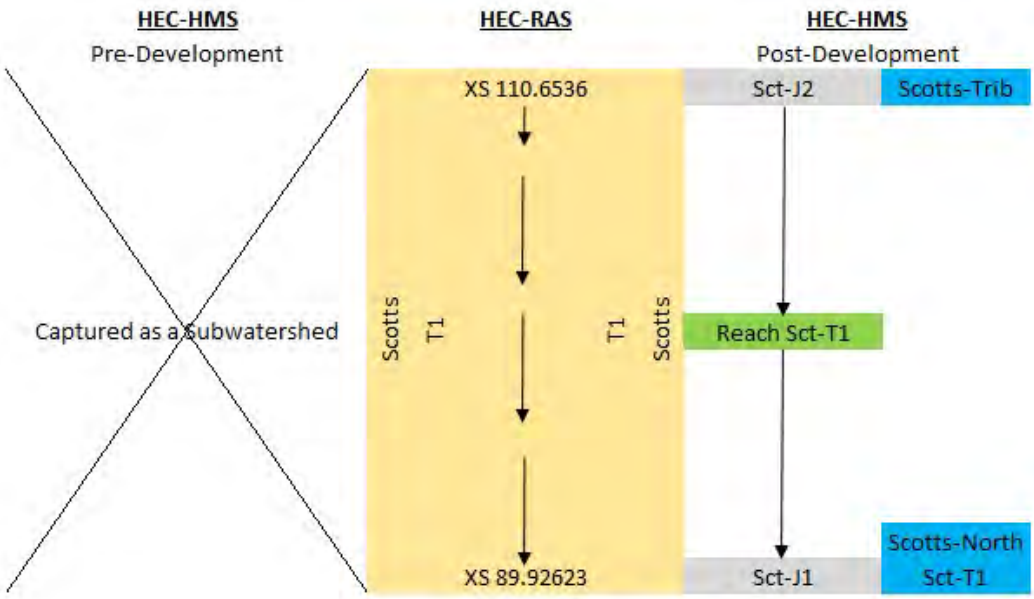
MacArthur Ravine



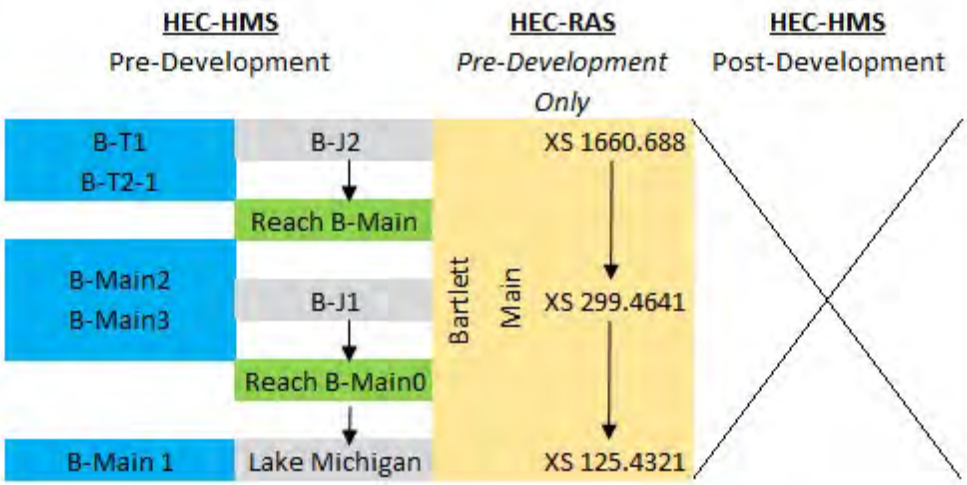
Scotts Ravine



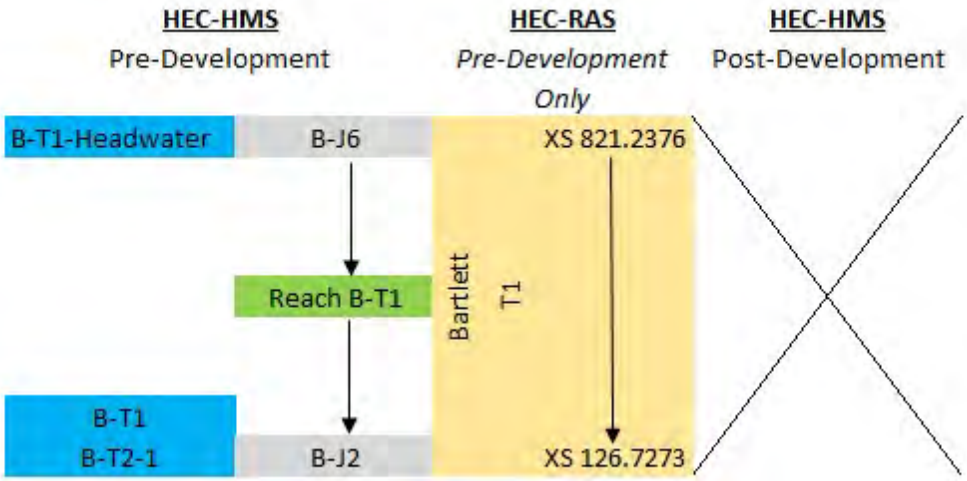
Scotts Ravine, cont.

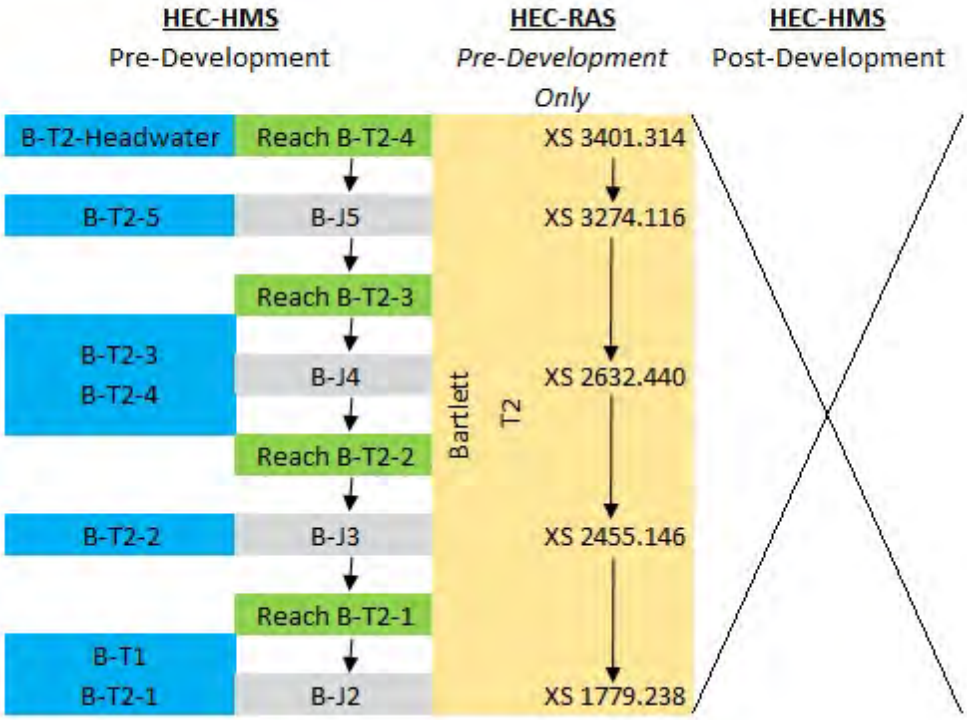


Bartlett Ravine

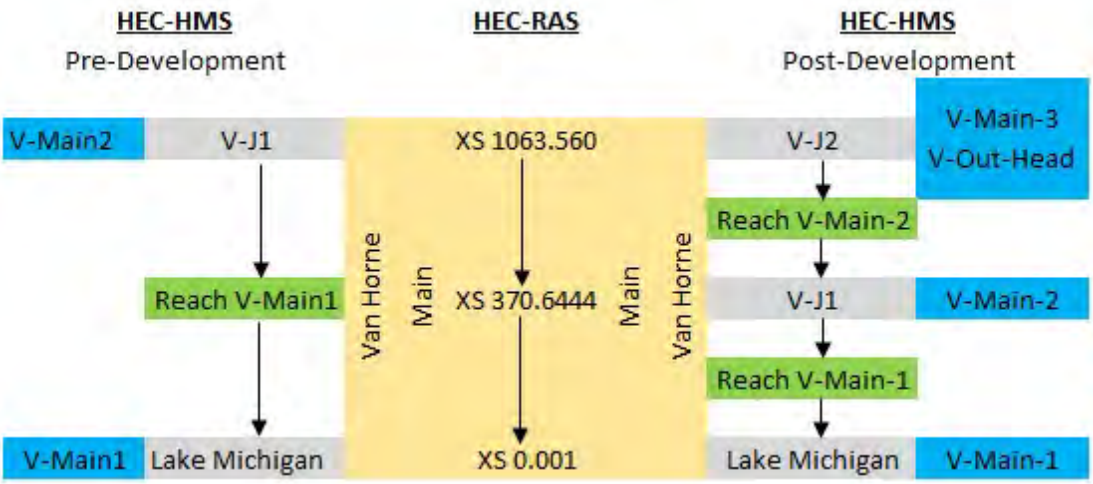


Bartlett Ravine, cont.

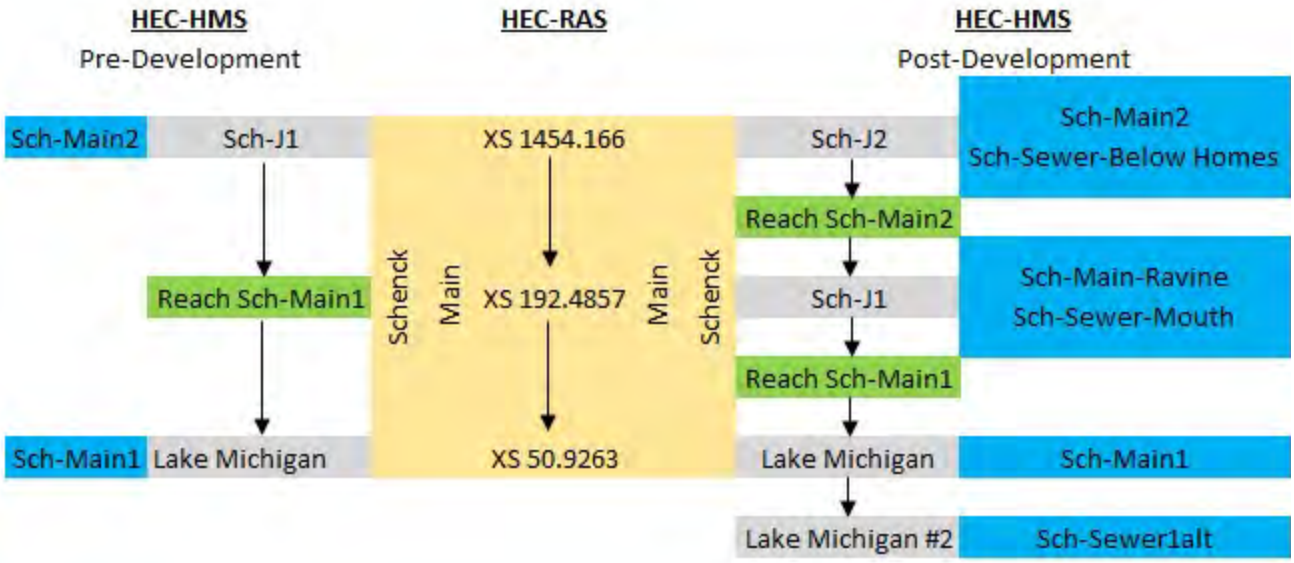




Van Horne Ravine



Schenck Ravine



Appendix E.

DETERMINING SCS CURVE NUMBERS

NIPC Land-use for Fort Sheridan Ravines
Subwatershed Composite Curve Numbers

SCS CURVE NUMBERS BY LAND-USE AND SOIL CLASSIFICATION GROUP

NIPC Landuse for Fort Sheridan Ravines						
		Curve Numbers for Hydrologic Soil Groups				
		A	B	C	D	NRCS Cover Type
	URBAN & BUILT-UP LAND					
1100	RESIDENTIAL	67	78	86	89	
1110	Single Duplex and Townhouse Units	61	75	83	87	Residential: 1/4 acre avg. lot size (100' x 100')
1120	Farmhouse	51	68	79	84	Residential: 1 acre avg. lot size
1130	Multi-Family	77	85	90	92	Residential: 1/8 acre avg. lot size (75' x 75')
1140	Mobile Home Parks and Trailer Courts	77	85	90	92	Residential: 1/8 acre avg. lot size (75' x 75')
1200	COMMERCIAL AND SERVICES	86	90	93	94	
1210	Primary Retail/Service	89	92	94	95	Urban Districts: Commercial & Business
1211	Shopping Malls	89	92	94	95	Urban Districts: Commercial & Business
1212	Retail Centers	89	92	94	95	Urban Districts: Commercial & Business
1220	Primarily Office/Professional	89	92	94	95	Urban Districts: Commercial & Business
1221	Office Campus/Research Park	77	84	89	91	75% Commercial & Business, 25% Open Space
1222	Single-Structure Office Building	77	84	89	91	75% Commercial & Business, 25% Open Space
1223	Business Park	77	84	89	91	Urban Districts: Commercial & Business
1230	Urban Mix	89	92	94	95	Urban Districts: Commercial & Business
1231	Urban Mix With Dedicated Parking	89	92	94	95	Urban Districts: Commercial & Business
1232	Urban Mix , No Dedicated Parking	89	92	94	95	Urban Districts: Commercial & Business
1240	Cultural/Entertainment	89	92	94	95	Urban Districts: Commercial & Business
1250	Hotel/Motel	89	92	94	95	Urban Districts: Commercial & Business
1300	INSTITUTIONAL	71	81	87	90	
1310	Medical and Health Care Facilities	64	77	84	88	50% Commercial & Business, 50% Open Space
1320	Educational	64	77	84	88	50% Commercial & Business, 50% Open Space
1330	Governmental administration and services	89	92	94	95	Urban Districts: Commercial & Business
1340	Prisons and Correctional Facilities	89	92	94	95	Urban Districts: Commercial & Business
1350	Religious Facilities	77	84	89	91	75% Commercial & Business, 25% Open Space
1360	Cemeteries	39	61	74	80	Open Space: Good
1370	Other Institutional	77	84	89	91	75% Commercial & Business, 25% Open Space
1400	INDUSTRIAL AND WAREHOUSING AND WHOLESALE TRADE	81	88	91	93	
1410	Mineral Extraction	81	88	91	93	Urban Districts: Industrial
1420	Manufacturing and Processing	81	88	91	93	Urban Districts: Industrial
1430	Warehousing/Distribution Center	81	88	91	93	Urban Districts: Industrial
1440	Industrial Park	81	88	91	93	Urban Districts: Industrial
1500	TRANSPORTATION, COMMUNICATION, AND UTILITIES	75	84	89	91	
1510	Automotive Transportation	83	89	92	93	Streets & Road: Paved-Open Ditches (Including ROW)
1511	Interstate and Tollway	83	89	92	93	Streets & Road: Paved-Open Ditches (Including ROW)
1512	Other Roadway	83	89	92	93	Streets & Road: Paved-Open Ditches (Including ROW)

		Curve Numbers for Hydrologic Soil Groups				
		A	B	C	D	NRCS Cover Type
1520	Other Linear Transportation w/ Assoc. Facilities	83	89	92	93	Streets & Road: Paved-Open Ditches (Including ROW)
1530	Aircraft Transportation	83	89	92	93	Streets & Road: Paved-Open Ditches (Including ROW)
1540	Independent Parking	98	98	98	98	Impervious Areas: Paved Parking Lots
1550	Communication	49	69	79	84	Open Space: Fair Condition
1560	Utilities & Waste Facilities	39	61	74	80	Open Space: Good
	AGRICULTURAL LAND					
2100	Row Crops, Grains, & Grazing	64	75	83	86	Open Space: Good
2200	Nurseries, Greenhouses, Orchards, Tree Farms, & Sod Farm	64	75	83	86	Open Space: Good
2300	Agricultural , Other	64	75	83	86	Open Space: Good
	OPEN SPACE					
3100	Open Space, Primarily Recreational	39	61	74	80	Open Space: Good
3200	Golf Courses	39	61	74	80	Open Space: Good
3300	Open Space, Primarily Conservation (Forest & Natural Preserves	39	61	74	80	Open Space: Good
3400	Hunting Clubs, Scout Camps, & Private Campgrounds	39	61	74	80	Open Space: Good
3500	Linear Open-Space Corridors	39	61	74	80	Open Space: Good
3600	Other Open Space	39	61	74	80	Open Space: Good
	VACANT AND WETLANDS					
4100	VACANT LAND	35	62	76	83	Open Space: Good
4110	Forest and Grassland	30	55	70	77	Woods: Good
4120	Wetlands	40	68	81	88	Meadow (+10)
4200	UNDER DEVELOPMENT OR CONSTRUCTION	50	68	79	84	Open Space: Fair Condition
4210	Residential	61	75	83	87	Residential: 1/4 acre avg. lot size (100' x 100')
4220	Non-Residential Includes Unidentifiable Lots	39	61	74	80	Open Space: Good
4300	OTHER VACANT	39	61	74	80	Open Space: Fair Condition
	WATER					
5100	Rivers, Streams & Canals	98	98	98	98	Water (98)
5200	Lakes, Reservoirs & Lagoons	78	89	96	98	Pasture, Grassland: Poor (+10)
5300	Lake Michigan	98	98	98	98	

Pre-Development Composite Curve Numbers for HEC-HMS Models

McCormick Ravine

Subbasin	Composite CN
Main	74.05
T1	74.00
T1A	74.00
T1B	74.00
T1Headwater	74.00
T2	74.00
T2A	74.00
T2B-1	74.00
T2B-2	74.00
T2B-3	74.00
T2Headwater	74.00

Janes Ravine

Subbasin	Composite CN
Main1	72.12
Main2	74.00
T1	74.00
T2-1	74.00
T2-2	74.00
T2-3	74.00
T2A	74.00
T2B	74.00
T2Headwater	74.00

Hutchinson Ravine

Subbasin	Composite CN
Main	74.05
Main3	74.00
Main4	74.00
T2	74.00
T2Headwater	74.00
T3	74.00
T4	74.00
T4Headwater	74.00
T5	74.00
T5Headwater	74.00

MacArthur Ravine

Subbasin	Composite CN
Main1	74

Scotts Ravine

Subbasin	Composite CN
Main	74.09
T1	74.00
T1-1	74.00
T1Headwater	74.00

Bartlett Ravine

Subbasin	Composite CN
Main1	74.79
Main2	74.00
Main3	74.03
T1	74.00
T1-Headwater	74.00
T1-Headwater	74.00
T2-1	74.00
T2-2	74.00
T2-3	74.00
T2-4	74.00
T2-5	74.00
T2-Headwater	74.00

Van Horne Ravine

Subbasin	Composite CN
Main1	73.96
Main2	74.00

Schenck Ravine

Subbasin	Composite CN
Main1	74.23
Main2	74.00

Post-Development Composite Curve Numbers for HEC-HMS Models

McCormick Ravine

Subbasin	Composite CN
Main-1	71.13
Main-2	74.14
Main-T1	79.00
Main-T1A	78.00
Main-T1B	79.50
Main-T2	79.97
Main2	74.00
Main3-1	73.81
Main3-2	85.29
Main3-3	74.00

Janes Ravine

Subbasin	Composite CN
Main-1	68.36
Main-2	70.12
Main2	70.40
T1	70.47

Scotts Ravine

Subbasin	Composite CN
Main-1	70.15
Main-2	84.31
T1	76.83

Van Horne Ravine

Subbasin	Composite CN
Main-1	80.91
Main-2	76.95
Main-3	85.87

Schenck Ravine

Subbasin	Composite CN
Main-1	70.00
Main-2	76.30

Appendix F.

ESTIMATING HYDRAULIC ROUGHNESS COEFFICIENTS

Roughness Coefficients for Sheet Flow
Base Values of Manning's n
Values for Adjusting the Roughness of a Channel

ROUGHNESS COEFFICIENTS FOR SHEET FLOW

Surface Description	n[1]
Smooth surfaces (concrete, asphalt, gravel, or	0.011
Fallow (no residue)	0.05
Cultivated soils:	
Residue cover ≤ 20%	0.06
Residue cover ≥ 20%	0.17
Grass:	
Short Grass Prairie	0.15
Dense Grasses	0.24
Bermudagrass	0.41
Range (natural)	0.13
Woods:	
Light Underbrush	0.4
Dense Underbrush	0.8

OVERBANK ROUGHNESS COEFFICIENTS

Table 4-1. Values of the Manning's Roughness Coefficient *n*
[Modified from Chow, 1959, Table 4-1]

Type of Channel and Description	Minimum	Normal	Maximum
Flood Plains			
a. Pasture, no brush			
1. Short grass	0.250	0.030	0.035
2. High grass	0.300	0.035	0.050
b. Cultivated areas			
1. No crop	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in winter	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Dense willows, summer, straight	0.110	0.150	0.200
2. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
3. Same as above, but with heavy growth of sprouts	0.050	0.060	0.080
4. Heavy stand of timber, a few down trees, little undergrowth, flood stage below branches	0.080	0.100	0.120
5. Same as above, but with flood stage reaching branches	0.100	0.120	0.160

Sturm, T.W. *Open Channel Hydraulics*. New York: McGraw-Hill, 2001.

BASE VALUES FOR ROUGHNESS OF A CHANNEL

Table 1. Base Values of Manning's n
[Modified from Aldridge and Garrett, 1973, Table 1]

		Base *n* Value	
Bed Material	Median Size of Bed Material (in millimeters)	Straight Uniform Channel[1]	Smooth Channel[2]
Sand Channels			
Sand[3]	0.2	0.012	- -
	0.3	0.017	- -
	0.4	0.02	- -
	0.5	0.022	- -
	0.6	0.023	- -
	0.8	0.025	- -
	1.0	0.026	- -
Stable Channels and Flood Plains			
Concrete	- -	0.012-0.018	0.011
Rock Cut	- -	- -	0.025
Firm Soil	- -	0.025-0.032	0.02
Coarse Sand	1-2	0.026-0.035	- -
Fine Gravel	- -	- -	0.024
Gravel	2-64	0.028-0.035	- -
Coarse Gravel	- -	- -	0.026
Cobble	64-256	0.030-0.05	- -
Boulder	>256	0.040-0.070	- -

- - No Data

[1] Bensen & Dalrymple - - No Data

[2] For indicated Material; Chow (1959)

[3] Only for upper regime flow where grain roughness is predominant

VALUES FOR ADJUSTING ROUGHNESS OF A CHANNEL

Table 2. Adjustment values for factors that affect the roughness of a channel
[Modified from Aldridge and Garrett, 1973, Table 2]

Channel conditions		*n* value adjustment[1]	Example
Degree of Irregularity (n_1)	Smooth	0.0000	Compares to the smoothest channel attainable in a given bed material
	Minor	0.001-0.005	Compares to carefully dredged channels in good condition but having slightly eroded or scoured side slopes
	Moderate	0.006-0.010	Compares to dredged channels having moderate to considerable bed roughness and moderately sloughed or eroded side slopes
	Severe	0.011-0.020	Badly sloughed or scalloped banks of natural streams; badly eroded or sloughed sides of canals or drainage channels; unshaped, jagged, and irregular surfaces of channels in rock
Variation in channel cross-section (n_2)	Gradual	0.0000	Size and shape of channel cross-sections change gradually
	Alternating occassionally	0.001-0.005	Large and small cross-sections alternate occassionally, or the main flow occassionally shifts from side to side owing to changes in cross-sectional shape
	Alternating frequently	0.010-0.015	Large and small-cross-sections alternate frequently, or the main flow frequently shifts from side to side owing to changes in cross-sectional shape
Effect of obstruction (n_3)	Negligible	0.000-0.004	A few scattered obstructions, which include debris deposits, stumps, exposed roots, logs, piers, or isolated boulders, that occupy less than 5 percent of the cross-sectional area
	Minor	0.005-0.015	Obstructions occupy less than 15 percent of the cross-sectional area, and the spacing between obstructions is such that the spehere of influence around one obstruction does not extend to the sphere of influence around another obstruction. Smaller adjustments are used for curved smooth-surfaced objects than are used for sharp-edged angular objects.
	Appreciable	0.020-0.030	Obstructions occupy from 15 to 50 percent on the cross-sectional area, or the space between obstructions is small enough to cause the effects of several obstructions to be additive, thereby blocking an equivalent part of a cross section
	Severe	0.040-0.050	Obstructions occupy more than 50 percent of the cross-sectional area, or the space between obstructions is small enough to cause turbulence across most of the cross section
Amount of vegetation (n_4)	Small	0.002-0.010	Dense growths of flexible turf grass, such as Bermuda, or weeds growing where the average depth of flow is at least two times the height of the vegetation; supple tree seedlings such as willow, cottonwood, arrowweed, or saltcedar growing where the average depth of flow is at least three times the height of the vegetation
	Medium	0.010-0.025	Turf grass growing where the average depth of flow is from one to two times the height of the vegetation; moderately dense stemmy grass, weeds, or tree seedlings growing where the avearge depth of flow is from two to three times the height of the vegetation; brushy, moderately dense vegetation, similar to 1-to 2-year-old willow trees in the dormant season, growing along the banks, and no significant vegetation is evident along the channel bottoms where the hydraulic radius exceeds 2 feet
	Large	0.025-0.050	Turf grass growing where the average depth of flow is about equal to the height of the vegetation; 8- to 10-year-old willow or cottonwood trees intergrown with some weeds and brush (none of the vegetation in foilage); and no significant vegetation exists along channel botttoms where the hydraulic radius is greater than 2 feet
	Very Large	0.050-0.100	Turf grass growing where the average depth of flow is less than half the height of the vegetation; bushy willow trees about 1 year old intergrown with weeds along side slopes (all vegetation in full foilage), or dense cattails growing along channel bottom; trees intergrown with weeds and brush (all vegetation in full) foilage).

Table 2. Continued

Channel conditions		*n* value adjustment[1]	Example
Degree of meandering[2] *(m)*	Minor	1.0000	Ratio of the channel length to valley length is 1.0 to 1.2
	Apprciable	1.1500	Ratio of the channel length to valley length is 1.2 to 1.5
	Severe	1.3000	Rato of the channel length to valley length is greater than 1.5

[1] Adjustments for degree of irregularity, variations in cross section, effect of obstructions, and vegetation are added to the base n value (Table 1) before multiplying by the adjustment for meander.

[2] Adjustment values apply to flow confined in the channel and do not apply where downvalley flow crosses meanders.

Cowan, W.L. *Estimating Hydraulic Roughness Coefficients.* Agricultural Engineering, 37(7), pp. 473-475, 1956.

Appendix G.

DISCHARGE-STORAGE RELATIONSHIP FOR HEC-HMS MODELS

McCormick/Janes Ravine
Hutchinson Ravine
MacArthur Ravine
Scotts Ravine
Bartlett Ravine
Van Horne Ravine
Schenck Ravine

Discharge-Storage Relationships – Pre-Developed Condition

McCormick Ravine

Main		T1		T1B		T2		T2B-1		T2B-3	
Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft
0	0	0	0	0	0	0	0	0	0	0	0
25	0.37	25	0.15	25	0.19	25	0.45	25	0.22	25	0.25
50	0.58	50	0.25	50	0.29	50	0.71	50	0.36	50	0.38
75	0.76	75	0.33	75	0.38	75	0.94	75	0.47	75	0.49
100	0.92	100	0.41	100	0.46	100	1.14	100	0.57	100	0.6
125	1.06	125	0.48	125	0.53	125	1.32	125	0.66	125	0.7
150	1.19	150	0.54	150	0.6	150	1.49	150	0.74	150	0.79
175	1.32	175	0.6	175	0.66	175	1.65	175	0.82	175	0.88
200	1.44	200	0.66	200	0.72	200	1.8	200	0.9	200	0.96
250	1.66	250	0.77	250	0.84	250	2.09	250	1.05	250	1.12
300	1.87	300	0.88	300	0.96	300	2.37	300	1.19	300	1.27
350	2.08	350	0.98	350	1.07	350	2.63	350	1.33	350	1.42
400	2.27	400	1.08	400	1.18	400	2.9	400	1.47	400	1.49
450	2.45	450	1.17	450	1.28	450	3.14	450	1.61	450	1.62
500	2.63	500	1.26	500	1.38	500	3.38	500	1.74	500	1.74
600	2.97	600	1.44	600	1.58	600	3.84	600	1.96	600	1.99

Janes Ravine

Main1		Main2		T1		T2-1		T2-3		T2A	
Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft
0	0	0	0	0	0	0	0	0	0	0	0
25	0.02	25	0.02	25	0.31	25	0.67	25	0	25	0.08
50	0.03	50	0.04	50	0.5	50	1.04	50	0.36	50	0.13
75	0.03	75	0.05	75	0.67	75	1.35	75	0.48	75	0.17
100	0.04	100	0.07	100	0.82	100	1.63	100	0.58	100	0.21
125	0.05	125	0.08	125	0.96	125	1.88	125	0.68	125	0.25
150	0.06	150	0.09	150	1.1	150	2.12	150	0.76	150	0.28
175	0.06	175	0.1	175	1.23	175	2.35	175	0.85	175	0.31
200	0.07	200	0.11	200	1.35	200	2.56	200	0.94	200	0.34
250	0.08	250	0.12	250	1.59	250	2.97	250	1.1	250	0.4
300	0.09	300	0.13	300	1.83	300	3.37	300	1.25	300	0.45
350	0.1	350	0.15	350	2.05	350	3.73	350	1.4	350	0.5
400	0.11	400	0.16	400	2.27	400	4.09	400	1.54	400	0.55
450	0.12	450	0.18	450	2.48	450	4.43	450	1.67	450	0.6
500	0.13	500	0.19	500	2.68	500	4.77	500	1.8	500	0.64
600	0.15	600	0.21	600	3.11	600	5.43	600	2.06	600	0.73

Discharge-Storage Relationships – Pre-Developed Condition, cont.

Hutchinson Ravine

Main		Main3		Main4		T4		T5	
Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft
0	0	0	0	0	0	0	0	0	0
25	0.52	25	0.07	25	0.17	25	0.09	25	0.02
50	0.84	50	0.11	50	0.28	50	0.14	50	0.04
75	1.1	75	0.14	75	0.36	75	0.19	75	0.05
100	1.34	100	0.15	100	0.46	100	0.23	100	0.05
125	1.56	125	0.16	125	0.53	125	0.27	125	0.07
150	1.77	150	0.19	150	0.6	150	0.31	150	0.07
175	1.97	175	0.21	175	0.66	175	0.34	175	0.09
200	2.17	200	0.23	200	0.74	200	0.38	200	0.1
250	2.54	250	0.26	250	0.87	250	0.45	250	0.11
300	2.89	300	0.29	300	0.99	300	0.51	300	0.14
350	3.23	350	0.32	350	1.11	350	0.57	350	0.15
400	3.56	400	0.35	400	1.22	400	0.63	400	0.17
450	3.88	450	0.38	450	1.33	450	0.69	450	0.17
500	4.18	500	0.4	500	1.44	500	0.74	500	0.19
600	4.78	600	0.46	600	1.65	600	0.85	600	0.23

MacArthur Ravine

Main1	
Q (cfs)	Storage acre-ft
0	0
25	0.05
50	0.08
75	0.11
100	0.14
125	0.16
150	0.18
175	0.21
200	0.23
250	0.27
300	0.3
350	0.34
400	0.37
450	0.41
500	0.44
600	0.5

Scotts Ravine

Main		T1	
Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft
0	0	0	0
25	0.05	25	0.1
50	0.09	50	0.16
75	0.12	75	0.2
100	0.14	100	0.25
125	0.17	125	0.28
150	0.18	150	0.33
175	0.21	175	0.36
200	0.23	200	0.4
250	0.26	250	0.47
300	0.29	300	0.53
350	0.32	350	0.6
400	0.35	400	0.66
450	0.38	450	0.72
500	0.41	500	0.78
600	0.46	600	0.9

Van Horne Ravine

Main1	
Q (cfs)	Storage acre-ft
0	0
25	0.12
50	0.18
75	0.23
100	0.27
125	0.31
150	0.35
175	0.38
200	0.41
250	0.47
300	0.53
350	0.58
400	0.63
450	0.68
500	0.73
600	0.82

Schenck Ravine

Main1	
Q (cfs)	Storage acre-ft
0	0
25	0.09
50	0.14
75	0.18
100	0.22
125	0.25
150	0.29
175	0.32
200	0.35
250	0.41
300	0.47
350	0.47
400	0.52
450	0.57
500	0.62
600	0.71

Discharge-Storage Relationships – Pre-Developed Condition, cont.

Bartlett Ravine

Main1		Main3		T1		T2-1		T2-2		T2-3		T2-4	
Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft
0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0.04	25	0.4	25	0.12	25	0.16	25	0.03	25	0.11	25	0.04
50	0.07	50	0.64	50	0.2	50	0.25	50	0.05	50	0.17	50	0.07
75	0.09	75	0.84	75	0.27	75	0.33	75	0.07	75	0.22	75	0.1
100	0.11	100	1.01	100	0.33	100	0.39	100	0.08	100	0.26	100	0.12
125	0.13	125	1.17	125	0.39	125	0.46	125	0.09	125	0.31	125	0.14
150	0.15	150	1.31	150	0.45	150	0.51	150	0.11	150	0.36	150	0.15
175	0.16	175	1.45	175	0.5	175	0.57	175	0.12	175	0.39	175	0.18
200	0.18	200	1.58	200	0.56	200	0.63	200	0.13	200	0.43	200	0.19
250	0.2	250	1.84	250	0.65	250	0.73	250	0.15	250	0.5	250	0.23
300	0.23	300	2.08	300	0.74	300	0.82	300	0.17	300	0.55	300	0.25
350	0.26	350	2.3	350	0.84	350	0.91	350	0.19	350	0.6	350	0.29
400	0.28	400	2.52	400	0.92	400	1	400	0.21	400	0.66	400	0.32
450	0.3	450	2.73	450	1	450	1.08	450	0.23	450	0.72	450	0.34
500	0.33	500	2.92	500	1.09	500	1.17	500	0.24	500	0.77	500	0.37
600	0.37	600	3.31	600	1.24	600	1.32	600	0.27	600	0.88	600	0.42

Discharge-Storage Relationships – Post-Developed Condition

McCormick Ravine

Main-1		Main-2		Main3-1		Main3-3		T1		T1B		T2#1		T2#2	
Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.25	0.02	1.25	0.02	25	0.18	25	0.25	0.5	0.01	0.25	0.01	0.38	0.01	0.38	0.005
2.5	0.04	2.5	0.021	50	0.25	50	0.34	1	0.011	0.5	0.015	0.75	0.015	0.75	0.01
5	0.06	5	0.04	75	0.38	75	0.49	2	0.02	1	0.02	1.5	0.02	1.5	0.02
10	0.09	10	0.07	100	0.46	100	0.6	4	0.04	2	0.03	3	0.03	3	0.03
15	0.12	15	0.09	125	0.53	125	0.7	6	0.05	3	0.035	4.5	0.04	4.5	0.04
20	0.15	20	0.11	150	0.6	150	0.79	8	0.06	4	0.04	6	0.05	6	0.05
25	0.18	25	0.12	175	0.66	175	0.88	10	0.07	5	0.05	7.5	0.06	7.5	0.06
50	0.29	50	0.2	200	0.73	200	0.96	20	0.12	10	0.07	15	0.1	15	0.09
75	0.38	75	0.26	250	0.85	250	1.12	30	0.16	15	0.1	22.5	0.14	22.5	0.12
100	0.46	100	0.33	300	0.96	300	1.27	40	0.19	20	0.12	30	0.17	30	0.14
150	0.61	150	0.44	350	1.07	350	1.41	60	0.26	30	0.16	45	0.23	45	0.19
200	0.75	200	0.53	400	1.17	400	1.55	80	0.33	40	0.19	60	0.28	60	0.24
250	0.88	250	0.62	450	1.27	450	1.68	100	0.39	50	0.23	75	0.33	75	0.28
275	0.94	275	0.66	500	1.37	500	1.82	110	0.42	55	0.24	82.5	0.36	82.5	0.3
300	0.99	300	0.71	600	1.55	600	2.07	120	0.45	60	0.26	90	0.38	90	0.32
600	1.64														
1200	2.75														

Discharge-Storage Relationships – Post-Developed Condition, cont.

Janes Ravine

Main1		Main2	
Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft
0	0	0	0
2	0.005	0.75	0.01
4	0.0075	1.5	0.013
8	0.01	3	0.016
16	0.013	6	0.02
24	0.016	9	0.03
32	0.02	12	0.04
40	0.025	15	0.045
80	0.03	30	0.07
120	0.04	45	0.09
160	0.05	60	0.1
240	0.07	90	0.14
320	0.09	120	0.16
400	0.1	150	0.24
440	0.11	165	0.26
480	0.115	180	0.28

Hutchinson Ravine

Main-1		Main-2		Main-3	
Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft
0	0	0	0	0	0
3	0.14	2	0.03	1	0
6	0.23	4	0.06	2	0.001
9	0.31	6	0.08	3	0.002
15	0.44	10	0.11	5	0.005
30	0.75	20	0.2	10	0.01
45	1.05	30	0.28	15	0.015
60	1.34	40	0.36	20	0.02
75	1.6	50	0.44	25	0.025
90	1.87	60	0.53	30	0.03
105	2.16	70	0.63	35	0.032
120	2.49	80	0.75	40	0.034
150	3.3	100	0.89	50	0.036
180	4.45	120	0.95	60	0.04
210	6.33	140	1.02	70	0.045
240	10.07	160	1.08	80	0.05

Scotts Ravine

Main-1		Main2		T1	
Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft
0	0	0	0	0	0
1	0.005	0.75	0.01	0.25	0.001
2	0.01	1.5	0.02	0.5	0.002
4	0.013	3	0.022	1	0.003
6	0.016	4.5	0.025	1.5	0.004
8	0.019	6	0.03	2	0.005
10	0.02	7.5	0.04	2.5	0.006
15	0.025	11.3	0.05	3.75	0.007
20	0.03	15	0.07	5	0.01
25	0.035	18.8	0.08	6.25	0.011
30	0.04	22.5	0.09	7.5	0.012
40	0.045	30	0.1	10	0.013
50	0.05	37.5	0.12	12.5	0.014
60	0.06	45	0.13	15	0.015
70	0.065	52.5	0.14	17.5	0.018
80	0.07	60	0.16	20	0.02
				30	0.025

Discharge-Storage Relationships – Post-Developed Condition, cont.

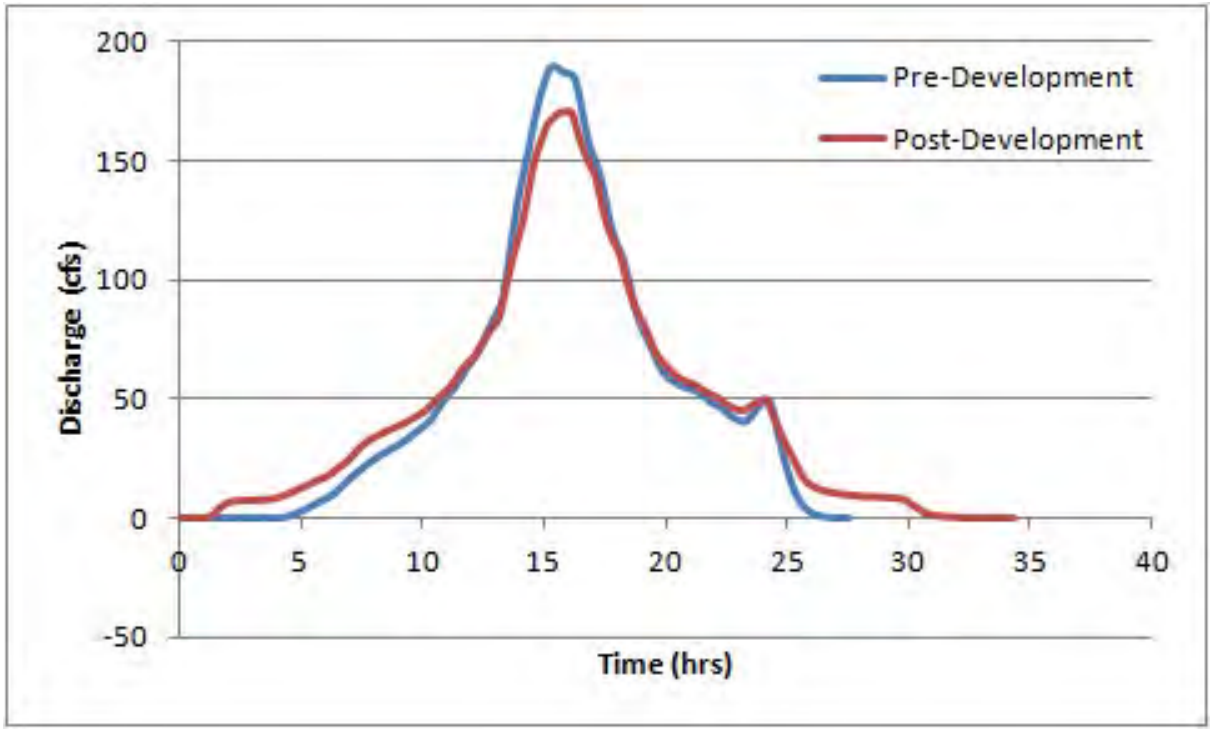
Van Horne Ravine				Schenck Ravine			
Main-1		Main-2		Main-1		Main-2	
Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft	Q (cfs)	Storage acre-ft
0	0	0	0	0	0	0	0
1	0.02	1	0.01	8	0.01	1	0.02
2	0.06	2	0.02	10	0.011	2	0.03
4	0.12	4	0.04	15	0.012	4	0.05
6	0.21	6	0.05	20	0.013	6	0.07
8	0.32	8	0.06	25	0.014	8	0.09
10	0.45	10	0.07	30	0.015	10	0.1
15	0.61	15	0.09	40	0.02	15	0.14
20	0.84	20	0.11	50	0.022	20	0.17
25	1.18	25	0.13	60	0.024	25	0.19
30	1.71	30	0.17	70	0.03	30	0.22
35	2.62	35	0.22	80	0.032	40	0.27
40	4.09	40	0.31			50	0.32
50	7.21	50	0.88			60	0.36
60	13.37	60	2.32			70	0.41
70	24.59	70	5.35			80	0.45

Appendix H.

PEAK FLOW RATES FROM HEC-HMS MODELING

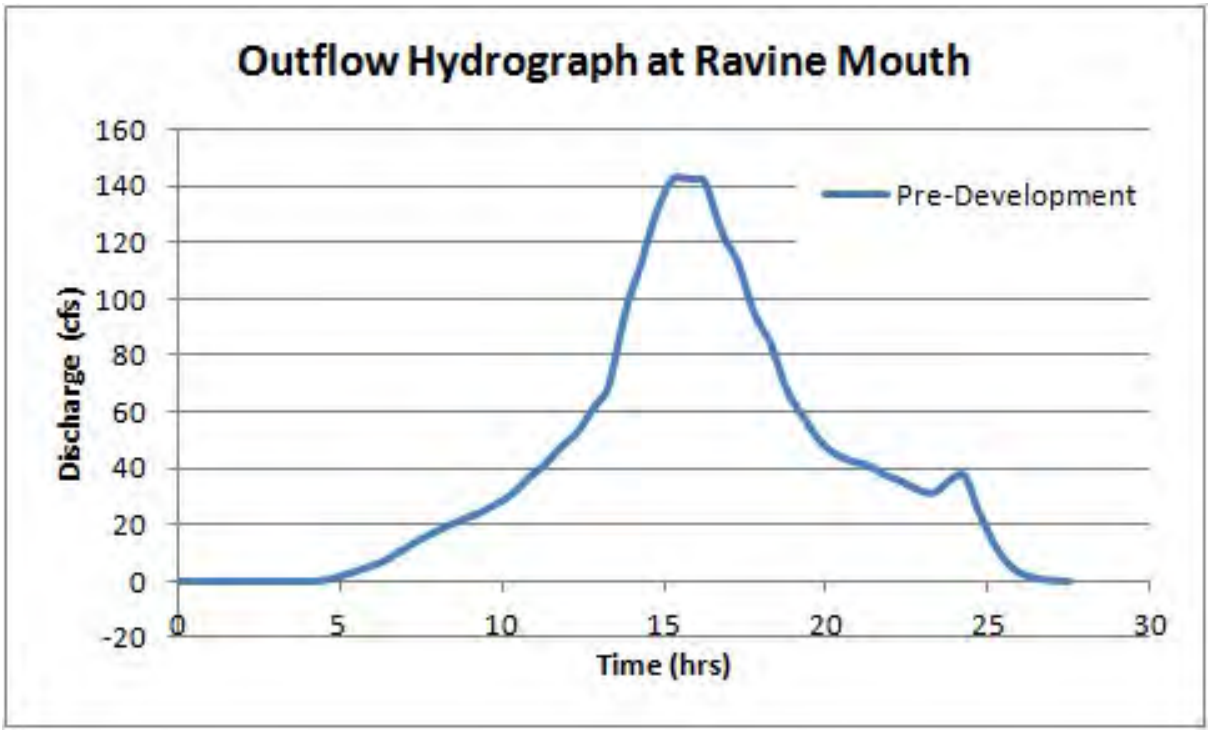
McCormick/Janes Ravine
Hutchinson Ravine
MacArthur Ravine
Scotts Ravine
Bartlett Ravine
Van Horne Ravine
Schenck Ravine

McCormick/Janes Ravine



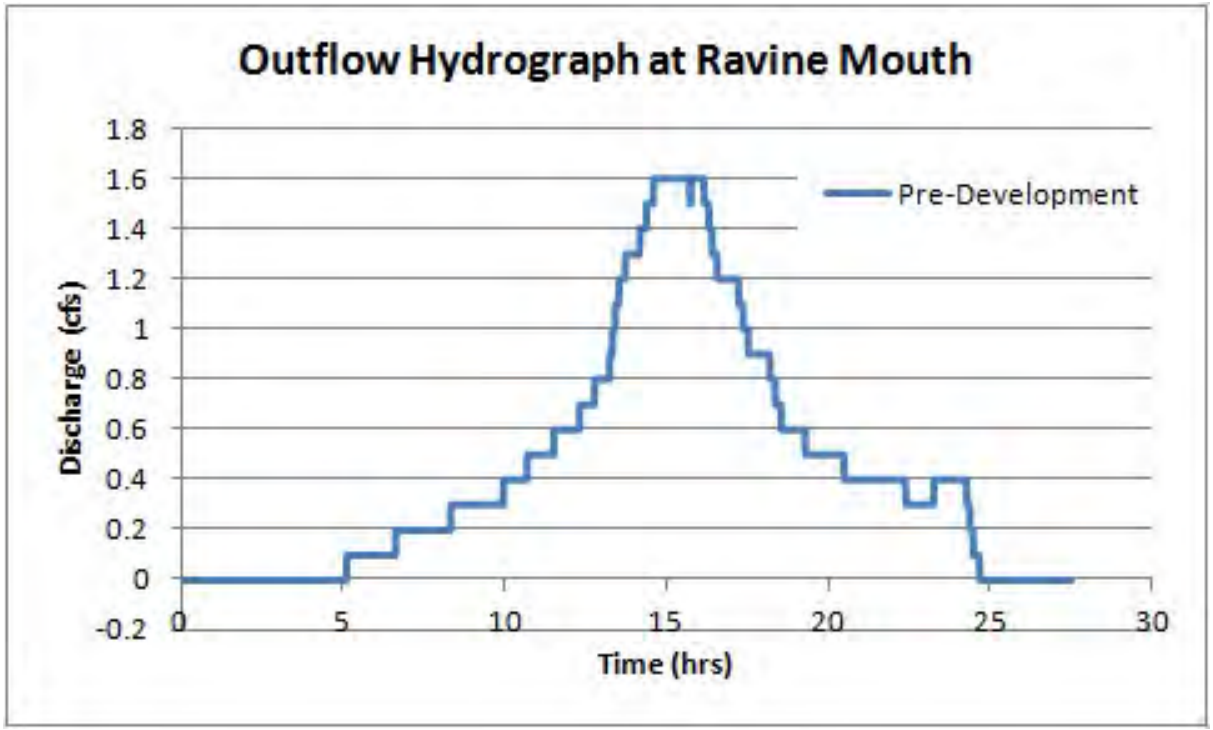
	Q (cfs) - 100yr24hrs	
	Pre-Dev	Post-Dev
Lake Michigan	190.1	170.5
M-J Junction	189.6	170.2
J-J1	64.2	41.2
J-J2	-	-
J-J3	-	-
M-M1	-	125.9
M-J3	118.0	105.4
M-J4	25.9	25.8
M-J5	78.8	67.1
M-J6	-	15.0
M-J7	18.8	11.8
M-J8	49.5	33.4
M-J9	36.9	29.4

Hutchinson Ravine



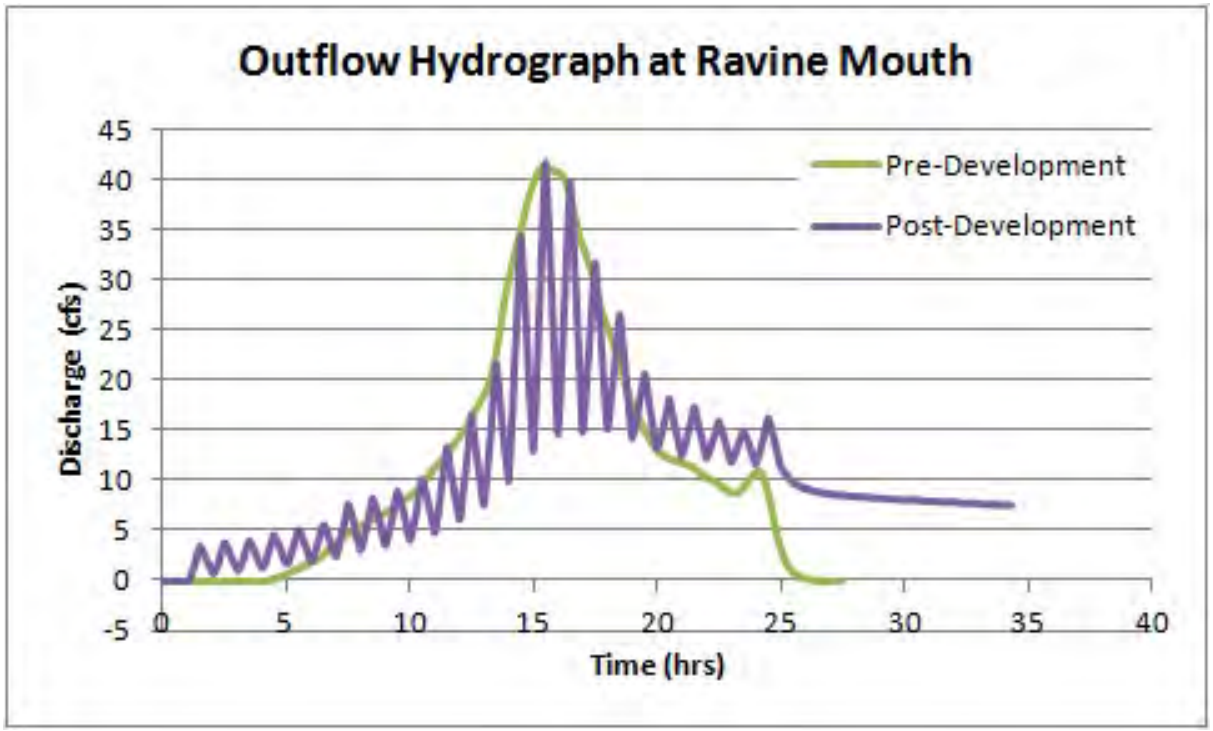
	Q (cfs) - 100yr24hrs	
	Pre-Dev	Post-Dev
Lake Michigan	143.3	-
H-J1	127.3	-
H-J2	117.4	-
H-J3	106.2	-

MacArthur Ravine



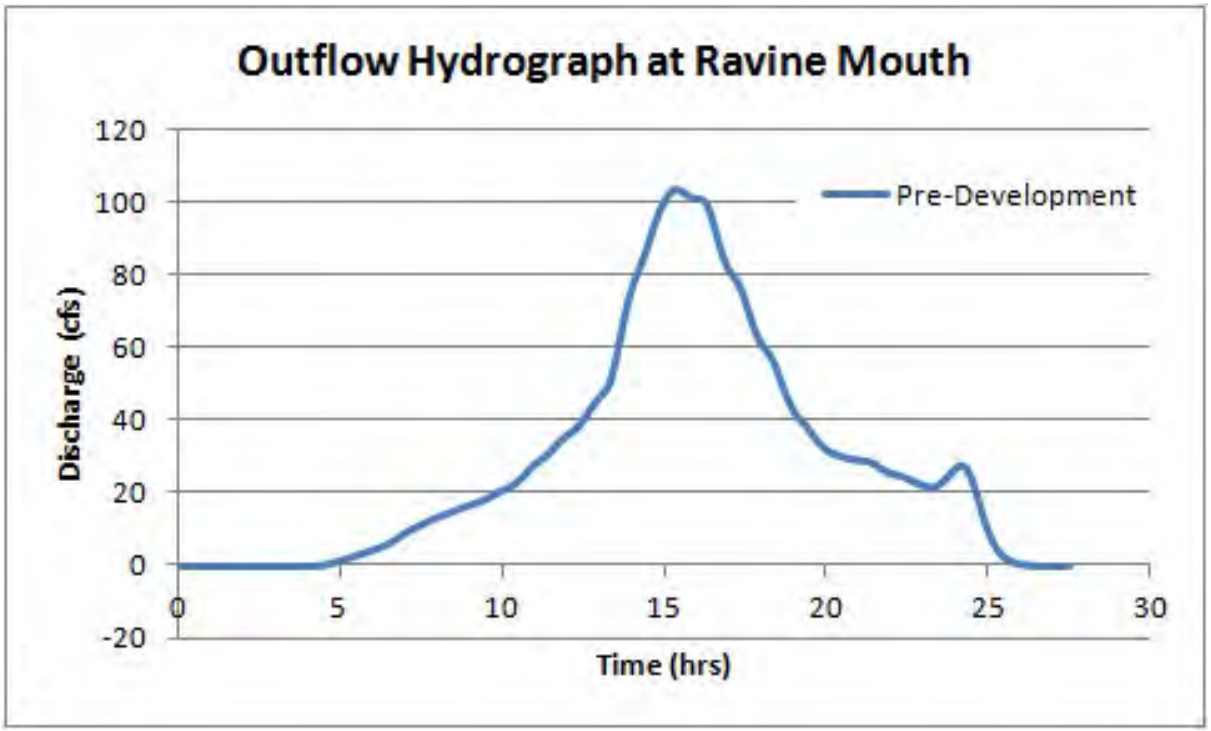
	Q (cfs) - 100yr24hrs	
	Pre-Dev	Post-Dev
Lake Michigan	1.6	-
Mac-J1	1.6	-

Scotts Ravine



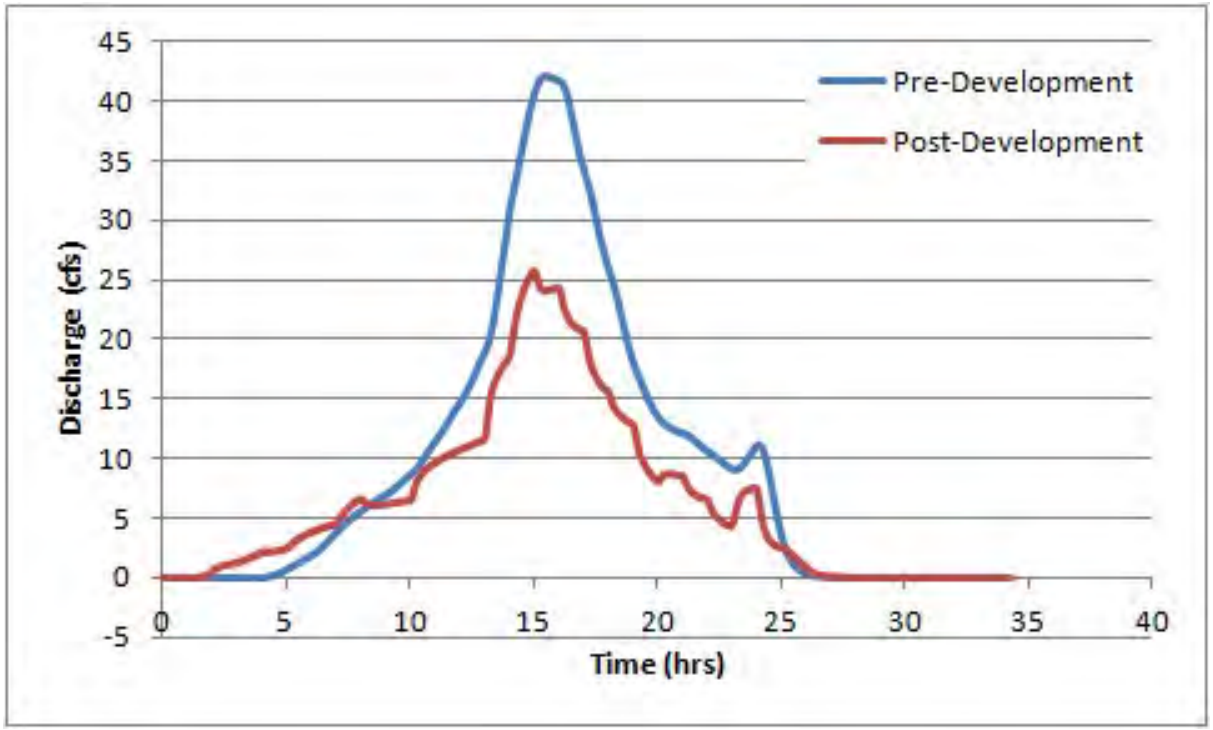
	Q (cfs) - 100yr24hrs	
	Pre-Dev	Post-Dev
Lake Michigan	41.3	41.8
Sct - J1	40.0	41.4
Sct - J2	8.0	29.7
Sct - J4	30.5	7.3

Bartlett Ravine



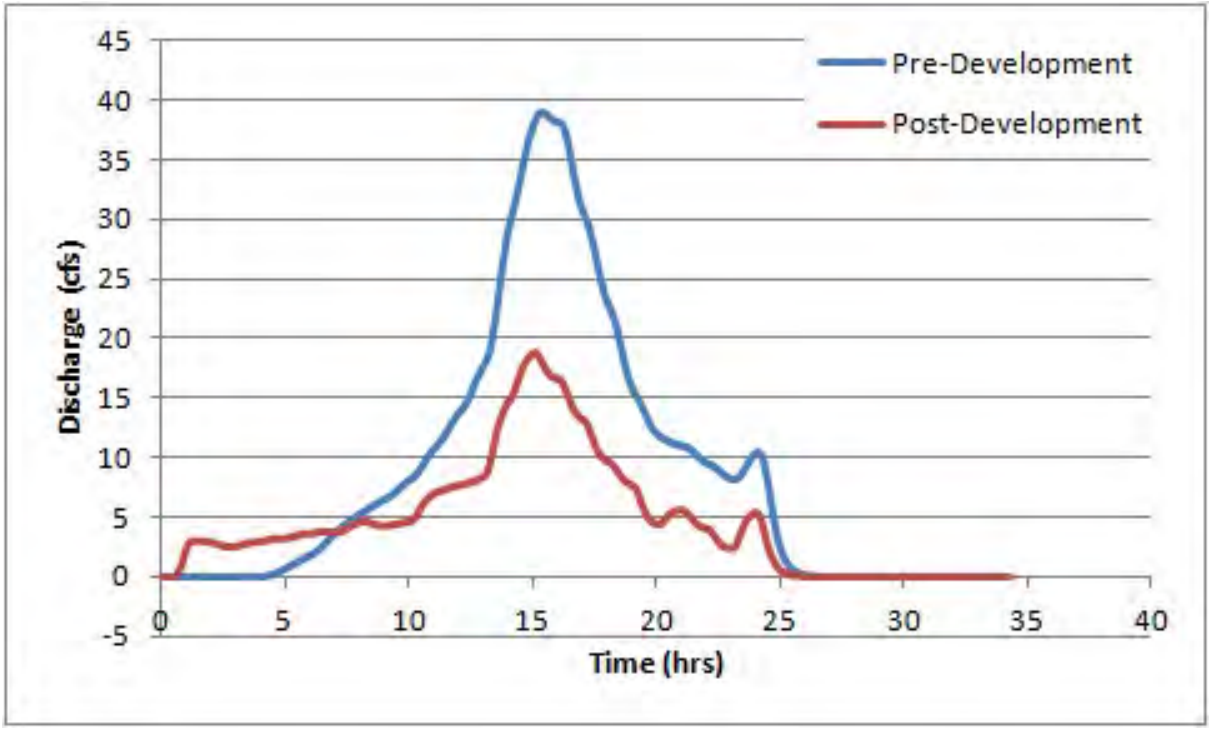
	Q (cfs) - 100yr24hrs	
	Pre-Dev	Post-Dev
Lake Michigan	103.2	-
B-J1	102.6	-
H-J2	85.5	-
H-J3	27.7	-
H-J4	27.2	-
H-J5	13.2	-
H-J6	41.7	-

Van Horne Ravine



	Q (cfs) - 100yr24hrs	
	Pre-Dev	Post-Dev
Lake Michigan	42.1	25.0
V-J1	36.6	15.9
V-J2	-	11.8

Schenck Ravine



	Q (cfs) - 100yr24hrs	
	Pre-Dev	Post-Dev
Lake Michigan	39.0	18.0
Sch-J1	35.2	17.9
Sch-J2	-	7.7

Appendix I.

HEC-RAS RESULTS – PRE- AND POST-DEVELOPMENT

McCormick/Janes Ravines
Hutchinson Ravine
MacArthur Ravine
Scotts Ravine
Van Horne Ravine
Schenck Ravine

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	67.45072	Q=25	25	585.2	585.91	585.91	586.14	0.053111	3.84	6.51	14.53	1.01
Main	67.45072	Q=50	50	585.2	586.19	586.19	586.51	0.047139	4.57	10.93	17.13	1.01
Main	67.45072	Q=75	75	585.2	586.4	586.4	586.8	0.043062	5.12	14.71	18.8	1
Main	67.45072	Q=100	100	585.2	586.58	586.58	587.05	0.040098	5.51	18.31	20.25	0.99
Main	67.45072	Q=125	125	585.2	586.74	586.74	587.27	0.038287	5.85	21.67	21.51	0.99
Main	67.45072	Q=150	150	585.2	586.89	586.89	587.47	0.03597	6.16	24.84	22.62	0.98
Main	67.45072	Q=175	175	585.2	587.03	587.03	587.66	0.033756	6.42	28.07	23.7	0.97
Main	67.45072	Q=200	200	585.2	587.15	587.15	587.83	0.032366	6.66	31.12	24.68	0.96
Main	67.45072	Q=250	250	585.2	587.39	587.39	588.14	0.029776	7.06	37.27	26.54	0.95
Main	67.45072	Q=300	300	585.2	587.61	587.61	588.42	0.02792	7.4	43.22	28.07	0.93
Main	67.45072	Q=350	350	585.2	587.8	587.8	588.68	0.026981	7.74	48.69	29.37	0.93
Main	67.45072	Q=400	400	585.2	587.98	587.98	588.92	0.026079	8.03	54.11	30.56	0.93
Main	67.45072	Q=450	450	585.2	588.16	588.16	589.14	0.025209	8.28	59.49	31.69	0.92
Main	67.45072	Q=500	500	585.2	588.32	588.32	589.35	0.024429	8.51	64.82	32.77	0.92
Main	67.45072	Q=600	600	585.2	588.62	588.62	589.74	0.023393	8.94	74.95	34.74	0.92
Main	163.866	Q=25	25	587.46	588.39	588.15	588.48	0.01365	2.31	10.81	18.64	0.54
Main	163.866	Q=50	50	587.46	588.71	588.42	588.84	0.014421	2.88	17.34	22.35	0.58
Main	163.866	Q=75	75	587.46	588.94		589.11	0.014979	3.3	22.7	24.48	0.6
Main	163.866	Q=100	100	587.46	589.13		589.34	0.015382	3.63	27.53	26.26	0.63
Main	163.866	Q=125	125	587.46	589.29		589.53	0.015479	3.91	31.97	27.9	0.64
Main	163.866	Q=150	150	587.46	589.43		589.7	0.015647	4.21	35.73	29.05	0.65
Main	163.866	Q=175	175	587.46	589.54	589.2	589.85	0.016056	4.51	39.07	29.97	0.67
Main	163.866	Q=200	200	587.46	589.65	589.3	590	0.016199	4.77	42.45	30.89	0.68
Main	163.866	Q=250	250	587.46	589.85	589.51	590.27	0.016562	5.24	48.79	32.53	0.7
Main	163.866	Q=300	300	587.46	590.03	589.69	590.52	0.016889	5.65	54.75	34	0.72
Main	163.866	Q=350	350	587.46	590.2		590.75	0.016974	6	60.67	35.4	0.74
Main	163.866	Q=400	400	587.46	590.36		590.96	0.01702	6.31	66.39	36.5	0.75
Main	163.866	Q=450	450	587.46	590.5		591.16	0.017233	6.62	71.67	37.5	0.76
Main	163.866	Q=500	500	587.46	590.64	590.34	591.35	0.017276	6.89	77	38.48	0.77
Main	163.866	Q=600	600	587.46	590.91	590.61	591.7	0.017281	7.36	87.37	40.33	0.78

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	269.0372	Q=25	25	589.63	590.47	590.4	590.65	0.033982	3.32	7.53	14.95	0.82
Main	269.0372	Q=50	50	589.63	590.78	590.69	591.02	0.031342	3.99	12.52	17.66	0.84
Main	269.0372	Q=75	75	589.63	591		591.32	0.030033	4.49	16.71	19.11	0.85
Main	269.0372	Q=100	100	589.63	591.19	591.08	591.56	0.029666	4.89	20.44	20.32	0.86
Main	269.0372	Q=125	125	589.63	591.36	591.24	591.78	0.029686	5.24	23.86	21.36	0.87
Main	269.0372	Q=150	150	589.63	591.5	591.39	591.98	0.029692	5.54	27.09	22.31	0.89
Main	269.0372	Q=175	175	589.63	591.64	591.53	592.16	0.029866	5.82	30.08	23.06	0.9
Main	269.0372	Q=200	200	589.63	591.76	591.65	592.33	0.030149	6.08	32.89	23.74	0.91
Main	269.0372	Q=250	250	589.63	591.99	591.89	592.64	0.030012	6.5	38.48	25.02	0.92
Main	269.0372	Q=300	300	589.63	592.17	592.09	592.92	0.030238	6.94	43.27	25.99	0.94
Main	269.0372	Q=350	350	589.63	592.34	592.28	593.18	0.030635	7.35	47.74	26.86	0.96
Main	269.0372	Q=400	400	589.63	592.5	592.47	593.42	0.031122	7.73	51.96	27.66	0.98
Main	269.0372	Q=450	450	589.63	592.65	592.64	593.65	0.031337	8.06	56.17	28.43	0.99
Main	269.0372	Q=500	500	589.63	592.8	592.8	593.87	0.030601	8.31	60.68	29.27	0.99
Main	269.0372	Q=600	600	589.63	593.09	593.09	594.28	0.029266	8.8	69.15	30.84	0.99
Main	355.8186	Q=25	25	589.27	590.92		590.93	0.001101	0.98	25.51	23.98	0.17
Main	355.8186	Q=50	50	589.27	591.37		591.39	0.001502	1.35	37.05	27.28	0.2
Main	355.8186	Q=75	75	589.27	591.69		591.73	0.001728	1.62	46.32	29.38	0.22
Main	355.8186	Q=100	100	589.27	591.95		592.01	0.001856	1.86	54.2	30.73	0.24
Main	355.8186	Q=125	125	589.27	592.18		592.25	0.001963	2.06	61.4	31.92	0.25
Main	355.8186	Q=150	150	589.27	592.39		592.47	0.002056	2.25	68.09	32.99	0.26
Main	355.8186	Q=175	175	589.27	592.58		592.67	0.002138	2.42	74.39	33.96	0.27
Main	355.8186	Q=200	200	589.27	592.75		592.85	0.002216	2.57	80.32	34.86	0.28
Main	355.8186	Q=250	250	589.27	593.07		593.19	0.00234	2.84	91.61	36.48	0.29
Main	355.8186	Q=300	300	589.27	593.35		593.49	0.002442	3.09	102.19	37.92	0.3
Main	355.8186	Q=350	350	589.27	593.61		593.78	0.002523	3.3	112.31	39.25	0.31
Main	355.8186	Q=400	400	589.27	593.86		594.04	0.002588	3.5	122.06	40.49	0.32
Main	355.8186	Q=450	450	589.27	594.09		594.29	0.002644	3.68	131.49	41.65	0.32
Main	355.8186	Q=500	500	589.27	594.3		594.52	0.002705	3.85	140.39	42.72	0.33
Main	355.8186	Q=600	600	589.27	594.69		594.94	0.002799	4.15	157.6	44.59	0.34

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	424.0896	Q=25	25	589.71	591.02		591.04	0.002546	1.3	19.26	22.34	0.25
Main	424.0896	Q=50	50	589.71	591.49		591.53	0.002665	1.63	30.75	26.24	0.26
Main	424.0896	Q=75	75	589.71	591.83		591.89	0.002818	1.87	40.18	29.02	0.28
Main	424.0896	Q=100	100	589.71	592.1		592.17	0.002934	2.07	48.34	31.12	0.29
Main	424.0896	Q=125	125	589.71	592.34		592.42	0.002986	2.24	55.91	32.85	0.3
Main	424.0896	Q=150	150	589.71	592.55		592.64	0.002946	2.4	62.96	34.26	0.3
Main	424.0896	Q=175	175	589.71	592.74		592.84	0.002921	2.54	69.64	35.54	0.31
Main	424.0896	Q=200	200	589.71	592.92		593.03	0.002913	2.67	76.01	36.72	0.31
Main	424.0896	Q=250	250	589.71	593.24		593.37	0.002903	2.91	88.21	38.88	0.32
Main	424.0896	Q=300	300	589.71	593.53		593.68	0.0029	3.12	99.75	40.54	0.32
Main	424.0896	Q=350	350	589.71	593.8		593.96	0.002896	3.3	110.74	41.73	0.33
Main	424.0896	Q=400	400	589.71	594.05		594.23	0.002891	3.47	121.26	42.7	0.33
Main	424.0896	Q=450	450	589.71	594.28		594.48	0.002887	3.62	131.37	43.61	0.33
Main	424.0896	Q=500	500	589.71	594.5		594.71	0.002899	3.77	140.89	44.44	0.34
Main	424.0896	Q=600	600	589.71	594.9		595.14	0.002923	4.04	159.15	46.28	0.34
Main	617.451	Q=25	25	589.87	591.37	590.5	591.38	0.001288	1	25.12	26.04	0.18
Main	617.451	Q=50	50	589.87	591.88	590.76	591.9	0.001409	1.26	39.62	30.69	0.2
Main	617.451	Q=75	75	589.87	592.24	590.96	592.28	0.001521	1.46	51.42	33.88	0.21
Main	617.451	Q=100	100	589.87	592.54	591.13	592.58	0.001611	1.62	61.88	36.45	0.22
Main	617.451	Q=125	125	589.87	592.8	591.28	592.84	0.001684	1.75	71.49	38.65	0.23
Main	617.451	Q=150	150	589.87	593.02	591.41	593.07	0.001744	1.87	80.27	40.48	0.23
Main	617.451	Q=175	175	589.87	593.21	591.53	593.27	0.00175	1.98	88.33	41.73	0.24
Main	617.451	Q=200	200	589.87	593.39	591.64	593.46	0.001752	2.09	95.92	42.78	0.24
Main	617.451	Q=250	250	589.87	593.72	591.85	593.8	0.001759	2.29	110.34	44.71	0.25
Main	617.451	Q=300	300	589.87	594.02	592.03	594.11	0.00177	2.46	123.9	46.61	0.25
Main	617.451	Q=350	350	589.87	594.29	592.2	594.4	0.001781	2.62	136.88	48.44	0.26
Main	617.451	Q=400	400	589.87	594.55	592.36	594.66	0.00179	2.76	149.42	50.15	0.26
Main	617.451	Q=450	450	589.87	594.79	592.51	594.91	0.001797	2.89	161.62	51.69	0.26
Main	617.451	Q=500	500	589.87	595.01	592.65	595.15	0.001807	3.01	173.31	53.02	0.27
Main	617.451	Q=600	600	589.87	595.43	592.91	595.58	0.001821	3.23	195.88	55.42	0.27

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	751.7308	Q=25	25	591.99	592.75	592.75	593	0.051122	4.01	6.24	12.65	1.01
Main	751.7308	Q=50	50	591.99	593.05	593.05	593.41	0.046013	4.8	10.43	14.85	1.01
Main	751.7308	Q=75	75	591.99	593.29	593.29	593.73	0.04309	5.31	14.13	16.41	1.01
Main	751.7308	Q=100	100	591.99	593.49	593.49	594	0.041296	5.7	17.56	17.72	1.01
Main	751.7308	Q=125	125	591.99	593.67	593.67	594.23	0.040024	6.02	20.76	18.8	1.01
Main	751.7308	Q=150	150	591.99	593.83	593.83	594.44	0.038931	6.3	23.83	19.74	1.01
Main	751.7308	Q=175	175	591.99	593.97	593.97	594.64	0.03806	6.53	26.78	20.6	1.01
Main	751.7308	Q=200	200	591.99	594.11	594.11	594.82	0.037306	6.74	29.66	21.4	1.01
Main	751.7308	Q=250	250	591.99	594.36	594.36	595.14	0.035875	7.09	35.25	22.87	1.01
Main	751.7308	Q=300	300	591.99	594.57	594.57	595.44	0.034808	7.47	40.19	23.86	1.01
Main	751.7308	Q=350	350	591.99	594.77	594.77	595.71	0.033727	7.78	45.08	24.79	1.01
Main	751.7308	Q=400	400	591.99	594.96	594.96	595.97	0.032324	8.09	49.64	25.63	1
Main	751.7308	Q=450	450	591.99	595.13	595.13	596.22	0.031138	8.39	54.11	26.43	0.99
Main	751.7308	Q=500	500	591.99	595.31	595.31	596.45	0.029261	8.58	59.08	27.29	0.98
Main	751.7308	Q=600	600	591.99	595.62	595.62	596.88	0.027691	9.05	67.8	28.73	0.97
Main	885.8018	Q=25	25	594.43	595.56	595.21	595.64	0.010235	2.35	10.63	14.24	0.48
Main	885.8018	Q=50	50	594.43	595.96	595.53	596.09	0.010997	2.97	16.85	16.73	0.52
Main	885.8018	Q=75	75	594.43	596.26	595.77	596.44	0.011465	3.38	22.17	18.6	0.55
Main	885.8018	Q=100	100	594.43	596.5	595.98	596.72	0.01181	3.73	26.81	19.8	0.56
Main	885.8018	Q=125	125	594.43	596.71	596.17	596.96	0.01205	4.02	31.12	20.83	0.58
Main	885.8018	Q=150	150	594.43	596.9	596.33	597.18	0.012301	4.27	35.1	21.68	0.59
Main	885.8018	Q=175	175	594.43	597.07	596.48	597.39	0.012516	4.5	38.87	22.45	0.6
Main	885.8018	Q=200	200	594.43	597.23	596.62	597.57	0.012715	4.71	42.46	23.15	0.61
Main	885.8018	Q=250	250	594.43	597.51	596.87	597.91	0.013104	5.08	49.2	24.42	0.63
Main	885.8018	Q=300	300	594.43	597.77	597.1	598.22	0.013406	5.4	55.58	25.56	0.65
Main	885.8018	Q=350	350	594.43	597.99	597.31	598.5	0.013609	5.7	61.44	26.61	0.66
Main	885.8018	Q=400	400	594.43	598.19	597.53	598.75	0.013902	6	66.73	27.55	0.67
Main	885.8018	Q=450	450	594.43	598.37	597.7	598.98	0.014173	6.29	71.83	28.42	0.68
Main	885.8018	Q=500	500	594.43	598.51	597.88	599.19	0.014672	6.62	75.95	29.08	0.7
Main	885.8018	Q=600	600	594.43	598.81	598.21	599.6	0.014991	7.16	84.74	30.43	0.72

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	998.6823	Q=25	25	597.59	598.28	598.28	598.5	0.053075	3.77	6.63	15.22	1.01
Main	998.6823	Q=50	50	597.59	598.54	598.54	598.86	0.047632	4.51	11.08	17.86	1.01
Main	998.6823	Q=75	75	597.59	598.75	598.75	599.14	0.044589	5	14.99	19.67	1.01
Main	998.6823	Q=100	100	597.59	598.93	598.93	599.38	0.042543	5.37	18.63	21.21	1.01
Main	998.6823	Q=125	125	597.59	599.09	599.09	599.59	0.041072	5.66	22.08	22.58	1.01
Main	998.6823	Q=150	150	597.59	599.23	599.23	599.77	0.04004	5.92	25.35	23.8	1.01
Main	998.6823	Q=175	175	597.59	599.36	599.36	599.94	0.039014	6.14	28.48	24.74	1.01
Main	998.6823	Q=200	200	597.59	599.47	599.47	600.1	0.038332	6.37	31.42	25.52	1.01
Main	998.6823	Q=250	250	597.59	599.69	599.69	600.4	0.036919	6.73	37.12	26.9	1.01
Main	998.6823	Q=300	300	597.59	599.89	599.89	600.66	0.035871	7.05	42.57	28.15	1.01
Main	998.6823	Q=350	350	597.59	600.08	600.08	600.9	0.034333	7.27	48.16	29.39	1
Main	998.6823	Q=400	400	597.59	600.28	600.25	601.13	0.032517	7.42	53.93	30.61	0.98
Main	998.6823	Q=450	450	597.59	600.45	600.4	601.34	0.031099	7.6	59.22	31.61	0.97
Main	998.6823	Q=500	500	597.59	600.61	600.54	601.55	0.029593	7.76	64.49	32.52	0.96
Main	998.6823	Q=600	600	597.59	600.9	600.82	601.93	0.028068	8.15	73.94	34.1	0.95
Main	1083.475	Q=25	25	597.74	599		599.03	0.002136	1.19	21.09	24.63	0.23
Main	1083.475	Q=50	50	597.74	599.42		599.45	0.002523	1.57	31.86	27.58	0.26
Main	1083.475	Q=75	75	597.74	599.72		599.78	0.00279	1.84	40.7	29.78	0.28
Main	1083.475	Q=100	100	597.74	599.98		600.05	0.00298	2.06	48.6	31.62	0.29
Main	1083.475	Q=125	125	597.74	600.19		600.27	0.00309	2.26	55.44	32.87	0.3
Main	1083.475	Q=150	150	597.74	600.38		600.47	0.00316	2.44	61.61	33.79	0.31
Main	1083.475	Q=175	175	597.74	600.54		600.65	0.003244	2.62	67.3	34.62	0.32
Main	1083.475	Q=200	200	597.74	600.7		600.82	0.003301	2.77	72.85	35.42	0.33
Main	1083.475	Q=250	250	597.74	600.99		601.13	0.003416	3.06	83.19	36.85	0.34
Main	1083.475	Q=300	300	597.74	601.25		601.42	0.003509	3.31	92.91	38.14	0.35
Main	1083.475	Q=350	350	597.74	601.48		601.67	0.003629	3.55	101.75	39.28	0.36
Main	1083.475	Q=400	400	597.74	601.69		601.9	0.00374	3.77	110.12	40.32	0.37
Main	1083.475	Q=450	450	597.74	601.88		602.12	0.003835	3.97	118.14	41.1	0.38
Main	1083.475	Q=500	500	597.74	602.07		602.33	0.003925	4.16	125.82	41.83	0.39
Main	1083.475	Q=600	600	597.74	602.42		602.72	0.004062	4.5	140.64	43.21	0.4

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	1180.775	Q=25	25	598.58	599.41	599.22	599.5	0.01725	2.44	10.24	19.43	0.59
Main	1180.775	Q=50	50	598.58	599.82	599.48	599.93	0.011245	2.59	19.29	24.21	0.51
Main	1180.775	Q=75	75	598.58	600.13	599.67	600.25	0.009398	2.74	27.36	27.56	0.48
Main	1180.775	Q=100	100	598.58	600.39	599.83	600.52	0.008417	2.87	34.84	30.13	0.47
Main	1180.775	Q=125	125	598.58	600.61	599.98	600.75	0.007998	3.01	41.47	32.04	0.47
Main	1180.775	Q=150	150	598.58	600.79	600.11	600.95	0.007741	3.15	47.55	33.44	0.47
Main	1180.775	Q=175	175	598.58	600.96	600.23	601.13	0.007551	3.28	53.33	34.67	0.47
Main	1180.775	Q=200	200	598.58	601.12	600.33	601.3	0.007377	3.39	58.98	35.84	0.47
Main	1180.775	Q=250	250	598.58	601.41	600.53	601.61	0.00713	3.58	69.74	37.96	0.47
Main	1180.775	Q=300	300	598.58	601.68	600.71	601.9	0.006858	3.75	79.95	39.74	0.46
Main	1180.775	Q=350	350	598.58	601.91	600.87	602.15	0.006525	3.93	89.22	41	0.46
Main	1180.775	Q=400	400	598.58	602.12	601.03	602.38	0.006297	4.1	98.08	42.17	0.46
Main	1180.775	Q=450	450	598.58	602.32	601.17	602.6	0.006129	4.26	106.61	43.26	0.46
Main	1180.775	Q=500	500	598.58	602.51	601.31	602.81	0.006002	4.41	114.85	44.3	0.46
Main	1180.775	Q=600	600	598.58	602.86	601.57	603.2	0.005794	4.69	130.85	46.22	0.46
M-T1	116.1027	Q=25	25	606.11	606.91	606.91	607.17	0.05096	4.11	6.08	11.8	1.01
M-T1	116.1027	Q=50	50	606.11	607.24	607.24	607.6	0.045306	4.85	10.32	14.27	1
M-T1	116.1027	Q=75	75	606.11	607.48	607.48	607.93	0.042967	5.36	14	15.97	1.01
M-T1	116.1027	Q=100	100	606.11	607.69	607.69	608.2	0.041044	5.72	17.47	17.42	1.01
M-T1	116.1027	Q=125	125	606.11	607.86	607.86	608.43	0.039662	6.08	20.56	18.45	1.01
M-T1	116.1027	Q=150	150	606.11	608.02	608.02	608.65	0.037969	6.38	23.56	19.3	1
M-T1	116.1027	Q=175	175	606.11	608.17	608.17	608.85	0.036491	6.64	26.51	20.11	1
M-T1	116.1027	Q=200	200	606.11	608.31	608.31	609.04	0.035271	6.86	29.39	20.87	0.99
M-T1	116.1027	Q=250	250	606.11	608.55	608.55	609.38	0.033418	7.32	34.6	22.01	0.99
M-T1	116.1027	Q=300	300	606.11	608.78	608.78	609.69	0.031448	7.72	39.67	22.96	0.98
M-T1	116.1027	Q=350	350	606.11	608.99	608.99	609.98	0.029982	8.07	44.57	23.85	0.97
M-T1	116.1027	Q=400	400	606.11	609.19	609.19	610.25	0.028621	8.37	49.45	24.7	0.97
M-T1	116.1027	Q=450	450	606.11	609.38	609.38	610.51	0.027377	8.64	54.31	25.52	0.96
M-T1	116.1027	Q=500	500	606.11	609.56	609.56	610.75	0.026605	8.91	58.89	26.28	0.95
M-T1	116.1027	Q=600	600	606.11	609.91	609.91	611.2	0.024718	9.32	68.42	27.78	0.94

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1	179.5178	Q=25	25	606.11	607.66	606.91	607.7	0.003083	1.59	15.72	15.23	0.28
M-T1	179.5178	Q=50	50	606.11	608.15	607.25	608.22	0.003892	2.1	23.78	17.95	0.32
M-T1	179.5178	Q=75	75	606.11	608.49	607.51	608.59	0.004299	2.49	30.22	19.54	0.35
M-T1	179.5178	Q=100	100	606.11	608.77	607.74	608.89	0.004625	2.81	35.8	20.74	0.37
M-T1	179.5178	Q=125	125	606.11	609.01	607.93	609.16	0.004909	3.09	40.89	21.79	0.39
M-T1	179.5178	Q=150	150	606.11	609.22	608.11	609.39	0.005112	3.33	45.65	22.67	0.4
M-T1	179.5178	Q=175	175	606.11	609.41	608.27	609.6	0.005269	3.57	49.88	23.31	0.41
M-T1	179.5178	Q=200	200	606.11	609.58	608.4	609.8	0.005399	3.79	53.94	23.9	0.42
M-T1	179.5178	Q=250	250	606.11	609.89	608.67	610.16	0.005665	4.19	61.47	24.97	0.44
M-T1	179.5178	Q=300	300	606.11	610.17	608.91	610.48	0.005881	4.55	68.55	25.94	0.45
M-T1	179.5178	Q=350	350	606.11	610.42	609.13	610.78	0.00606	4.86	75.3	26.85	0.47
M-T1	179.5178	Q=400	400	606.11	610.66	609.33	611.06	0.006227	5.16	81.71	27.68	0.48
M-T1	179.5178	Q=450	450	606.11	610.88	609.52	611.32	0.006375	5.43	87.88	28.46	0.49
M-T1	179.5178	Q=500	500	606.11	611.08	609.7	611.56	0.006504	5.68	93.86	29.2	0.5
M-T1	179.5178	Q=600	600	606.11	611.46	610.06	612.02	0.006774	6.15	105.08	30.53	0.52
M-T1	279.4417	Q=25	25	608.32	609.21	609.21	609.5	0.050343	4.31	5.8	10.29	1.01
M-T1	279.4417	Q=50	50	608.32	609.56	609.56	609.97	0.044628	5.14	9.72	12	1.01
M-T1	279.4417	Q=75	75	608.32	609.84	609.84	610.34	0.041977	5.68	13.2	13.34	1.01
M-T1	279.4417	Q=100	100	608.32	610.07	610.07	610.64	0.040311	6.09	16.42	14.46	1.01
M-T1	279.4417	Q=125	125	608.32	610.27	610.27	610.91	0.038975	6.44	19.42	15.26	1.01
M-T1	279.4417	Q=150	150	608.32	610.45	610.45	611.16	0.037924	6.73	22.28	16	1.01
M-T1	279.4417	Q=175	175	608.32	610.62	610.62	611.38	0.037071	6.99	25.05	16.67	1
M-T1	279.4417	Q=200	200	608.32	610.77	610.77	611.59	0.036572	7.27	27.52	17.26	1.01
M-T1	279.4417	Q=250	250	608.32	611.05	611.05	611.97	0.034492	7.72	32.53	18.4	1
M-T1	279.4417	Q=300	300	608.32	611.31	611.31	612.32	0.032727	8.08	37.49	19.46	0.99
M-T1	279.4417	Q=350	350	608.32	611.57	611.57	612.64	0.030867	8.34	42.58	20.49	0.98
M-T1	279.4417	Q=400	400	608.32	611.78	611.78	612.93	0.030341	8.67	47.06	21.35	0.98
M-T1	279.4417	Q=450	450	608.32	612	612	613.21	0.02927	8.9	51.83	22.24	0.97
M-T1	279.4417	Q=500	500	608.32	612.2	612.2	613.47	0.028656	9.14	56.32	23.04	0.97
M-T1	279.4417	Q=600	600	608.32	612.57	612.57	613.95	0.02685	9.54	65.24	24.52	0.95

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1	349.1169	Q=25	25	609.82	610.95		611.05	0.012282	2.55	9.82	13.37	0.52
M-T1	349.1169	Q=50	50	609.82	611.36		611.51	0.012815	3.19	15.68	15.62	0.56
M-T1	349.1169	Q=75	75	609.82	611.67		611.87	0.013007	3.61	20.79	17.35	0.58
M-T1	349.1169	Q=100	100	609.82	611.92		612.16	0.013149	3.93	25.45	18.79	0.59
M-T1	349.1169	Q=125	125	609.82	612.13		612.41	0.01311	4.24	29.52	19.87	0.61
M-T1	349.1169	Q=150	150	609.82	612.32		612.64	0.013039	4.52	33.34	20.8	0.61
M-T1	349.1169	Q=175	175	609.82	612.49		612.85	0.012832	4.78	36.94	21.6	0.62
M-T1	349.1169	Q=200	200	609.82	612.65		613.04	0.012684	5.02	40.42	22.33	0.62
M-T1	349.1169	Q=250	250	609.82	612.93		613.39	0.012714	5.48	46.79	23.63	0.64
M-T1	349.1169	Q=300	300	609.82	613.18		613.71	0.012662	5.87	52.97	24.81	0.65
M-T1	349.1169	Q=350	350	609.82	613.41		614	0.01268	6.22	58.83	25.89	0.66
M-T1	349.1169	Q=400	400	609.82	613.64		614.28	0.012474	6.5	64.88	26.96	0.66
M-T1	349.1169	Q=450	450	609.82	613.85		614.53	0.012457	6.79	70.46	27.85	0.67
M-T1	349.1169	Q=500	500	609.82	614.04		614.78	0.012363	7.04	76.05	28.69	0.67
M-T1	349.1169	Q=600	600	609.82	614.4		615.23	0.012347	7.51	86.52	30.18	0.68
M-T1	413.2939	Q=25	25	610.09	611.51	610.97	611.57	0.005726	1.98	12.66	14.14	0.37
M-T1	413.2939	Q=50	50	610.09	611.98	611.31	612.08	0.006338	2.52	19.86	16.53	0.4
M-T1	413.2939	Q=75	75	610.09	612.32	611.57	612.45	0.006709	2.91	25.79	18.15	0.43
M-T1	413.2939	Q=100	100	610.09	612.6	611.79	612.76	0.006869	3.24	31.01	19.31	0.44
M-T1	413.2939	Q=125	125	610.09	612.84	611.99	613.03	0.007138	3.53	35.64	20.28	0.46
M-T1	413.2939	Q=150	150	610.09	613.04	612.16	613.27	0.007388	3.79	39.94	21.14	0.47
M-T1	413.2939	Q=175	175	610.09	613.23	612.31	613.48	0.007591	4.04	43.89	21.88	0.49
M-T1	413.2939	Q=200	200	610.09	613.39	612.45	613.68	0.007681	4.27	47.61	22.51	0.49
M-T1	413.2939	Q=250	250	610.09	613.7	612.73	614.03	0.007885	4.7	54.57	23.64	0.51
M-T1	413.2939	Q=300	300	610.09	613.97	612.97	614.36	0.008055	5.07	61.16	24.67	0.53
M-T1	413.2939	Q=350	350	610.09	614.22	613.19	614.66	0.008212	5.41	67.41	25.6	0.54
M-T1	413.2939	Q=400	400	610.09	614.45	613.4	614.94	0.008344	5.72	73.42	26.47	0.55
M-T1	413.2939	Q=450	450	610.09	614.66	613.59	615.2	0.00848	6	79.16	27.24	0.56
M-T1	413.2939	Q=500	500	610.09	614.86	613.8	615.45	0.008603	6.27	84.71	27.93	0.57
M-T1	413.2939	Q=600	600	610.09	615.23	614.14	615.91	0.008843	6.76	95.23	29.16	0.58

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M-T1	504.1011	Q=25	25	613.15	614.12	614.12	614.42	0.050143	4.38	5.71	9.86	1.01
M-T1	504.1011	Q=50	50	613.15	614.48	614.48	614.9	0.044782	5.22	9.58	11.54	1.01
M-T1	504.1011	Q=75	75	613.15	614.76	614.76	615.28	0.042303	5.77	13	12.85	1.01
M-T1	504.1011	Q=100	100	613.15	615	615	615.59	0.040536	6.17	16.2	13.97	1.01
M-T1	504.1011	Q=125	125	613.15	615.21	615.21	615.86	0.038945	6.48	19.29	14.96	1.01
M-T1	504.1011	Q=150	150	613.15	615.39	615.39	616.11	0.037977	6.84	21.94	15.71	1.01
M-T1	504.1011	Q=175	175	613.15	615.55	615.55	616.34	0.036173	7.17	24.52	16.36	1
M-T1	504.1011	Q=200	200	613.15	615.71	615.71	616.56	0.034069	7.42	27.21	17.01	0.99
M-T1	504.1011	Q=250	250	613.15	616	616	616.96	0.031401	7.9	32.34	18.18	0.97
M-T1	504.1011	Q=300	300	613.15	616.27	616.27	617.32	0.029253	8.28	37.44	19.27	0.96
M-T1	504.1011	Q=350	350	613.15	616.52	616.52	617.65	0.027607	8.62	42.44	20.29	0.95
M-T1	504.1011	Q=400	400	613.15	616.76	616.76	617.96	0.026443	8.94	47.26	21.22	0.94
M-T1	504.1011	Q=450	450	613.15	616.99	616.99	618.24	0.024923	9.17	52.41	22.18	0.93
M-T1	504.1011	Q=500	500	613.15	617.2	617.2	618.51	0.024203	9.44	57.05	23	0.92
M-T1	504.1011	Q=600	600	613.15	617.58	617.58	619.01	0.023124	9.93	66.03	24.43	0.92
M-T1	590.9022	Q=25	25	615.62	616.58	616.35	616.69	0.015898	2.64	9.48	14.98	0.58
M-T1	590.9022	Q=50	50	615.62	616.94	616.65	617.1	0.016015	3.23	15.5	18.13	0.62
M-T1	590.9022	Q=75	75	615.62	617.22	616.89	617.42	0.015797	3.61	20.75	20.23	0.63
M-T1	590.9022	Q=100	100	615.62	617.44	617.08	617.68	0.015563	3.93	25.45	21.58	0.64
M-T1	590.9022	Q=125	125	615.62	617.64	617.25	617.91	0.015398	4.19	29.84	22.77	0.64
M-T1	590.9022	Q=150	150	615.62	617.82	617.39	618.12	0.01508	4.39	34.17	23.89	0.65
M-T1	590.9022	Q=175	175	615.62	617.99	617.53	618.31	0.014981	4.58	38.19	24.88	0.65
M-T1	590.9022	Q=200	200	615.62	618.14	617.66	618.49	0.014993	4.76	41.97	25.78	0.66
M-T1	590.9022	Q=250	250	615.62	618.42	617.9	618.82	0.014739	5.05	49.52	27.49	0.66
M-T1	590.9022	Q=300	300	615.62	618.66	618.11	619.1	0.014352	5.34	56.18	28.61	0.67
M-T1	590.9022	Q=350	350	615.62	618.87	618.31	619.36	0.013897	5.63	62.41	29.46	0.67
M-T1	590.9022	Q=400	400	615.62	619.08	618.49	619.61	0.01344	5.87	68.59	30.27	0.66
M-T1	590.9022	Q=450	450	615.62	619.27	618.64	619.85	0.013205	6.12	74.36	31.01	0.67
M-T1	590.9022	Q=500	500	615.62	619.46	618.81	620.08	0.012817	6.32	80.36	31.76	0.67
M-T1	590.9022	Q=600	600	615.62	619.82	619.09	620.51	0.012153	6.67	92.13	33.19	0.66

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1	653.1824	Q=25	25	617.84	618.69	618.69	618.96	0.050771	4.17	5.99	11.34	1.01
M-T1	653.1824	Q=50	50	617.84	618.99	619.02	619.4	0.04948	5.09	9.83	13.48	1.05
M-T1	653.1824	Q=75	75	617.84	619.21	619.27	619.74	0.051862	5.83	12.87	14.88	1.1
M-T1	653.1824	Q=100	100	617.84	619.37	619.48	620.03	0.054908	6.49	15.4	15.75	1.16
M-T1	653.1824	Q=125	125	617.84	619.52	619.67	620.29	0.057129	7.04	17.75	16.51	1.2
M-T1	653.1824	Q=150	150	617.84	619.65	619.83	620.53	0.059087	7.53	19.93	17.19	1.23
M-T1	653.1824	Q=175	175	617.84	619.76	619.98	620.75	0.061549	8	21.87	17.75	1.27
M-T1	653.1824	Q=200	200	617.84	619.85	620.12	620.98	0.064331	8.51	23.51	18.13	1.31
M-T1	653.1824	Q=250	250	617.84	620.02	620.38	621.4	0.069049	9.42	26.59	18.82	1.38
M-T1	653.1824	Q=300	300	617.84	620.16	620.62	621.79	0.073673	10.25	29.39	19.42	1.44
M-T1	653.1824	Q=350	350	617.84	620.3	620.84	622.17	0.077621	11	32.04	19.98	1.5
M-T1	653.1824	Q=400	400	617.84	620.42	621.05	622.53	0.081089	11.67	34.57	20.5	1.54
M-T1	653.1824	Q=450	450	617.84	620.54	621.26	622.87	0.084047	12.29	37.02	20.99	1.58
M-T1	653.1824	Q=500	500	617.84	620.65	621.44	623.22	0.086626	12.91	39.24	21.45	1.62
M-T1	653.1824	Q=600	600	617.84	620.84	621.79	623.88	0.090945	14.07	43.42	22.32	1.69
M-T1A	60.92559	Q=25	25	624.81	625.5	625.84	626.83	0.43506	9.29	2.69	7.66	2.76
M-T1A	60.92559	Q=50	50	624.81	625.69	626.21	627.75	0.422637	11.54	4.36	9.14	2.88
M-T1A	60.92559	Q=75	75	624.81	625.84	626.46	628.48	0.417938	13.08	5.82	10.22	2.96
M-T1A	60.92559	Q=100	100	624.81	626	626.69	628.84	0.364658	13.62	7.5	11.33	2.84
M-T1A	60.92559	Q=125	125	624.81	626.13	626.89	629.18	0.337213	14.15	9.06	12.28	2.78
M-T1A	60.92559	Q=150	150	624.81	626.25	627.08	629.46	0.315017	14.56	10.61	13.16	2.73
M-T1A	60.92559	Q=175	175	624.81	626.36	627.24	629.74	0.291699	14.98	12.08	13.77	2.67
M-T1A	60.92559	Q=200	200	624.81	626.46	627.4	630.02	0.270743	15.41	13.49	14.22	2.62
M-T1A	60.92559	Q=250	250	624.81	626.65	627.68	630.54	0.240812	16.17	16.23	15.07	2.54
M-T1A	60.92559	Q=300	300	624.81	626.83	627.94	630.97	0.217263	16.77	18.98	15.87	2.46
M-T1A	60.92559	Q=350	350	624.81	626.99	628.2	631.37	0.200894	17.33	21.63	16.61	2.41
M-T1A	60.92559	Q=400	400	624.81	627.14	628.4	631.75	0.188942	17.85	24.21	17.3	2.37
M-T1A	60.92559	Q=450	450	624.81	627.28	628.62	632.11	0.179769	18.33	26.68	17.8	2.35
M-T1A	60.92559	Q=500	500	624.81	627.42	628.81	632.45	0.172604	18.79	29.08	18.27	2.33
M-T1A	60.92559	Q=600	600	624.81	627.67	629.2	633.09	0.16135	19.63	33.74	19.16	2.29

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1A	109.6149	Q=25	25	631.05	631.94	631.94	632.26	0.048838	4.54	5.5	8.72	1.01
M-T1A	109.6149	Q=50	50	631.05	632.34	632.34	632.78	0.043567	5.3	9.43	10.95	1
M-T1A	109.6149	Q=75	75	631.05	632.61	632.62	633.18	0.039441	6.04	12.54	11.99	1
M-T1A	109.6149	Q=100	100	631.05	632.81	632.87	633.53	0.04102	6.84	14.94	12.73	1.04
M-T1A	109.6149	Q=125	125	631.05	632.98	633.1	633.84	0.041704	7.49	17.24	13.4	1.07
M-T1A	109.6149	Q=150	150	631.05	633.14	633.3	634.13	0.042796	8.09	19.33	13.99	1.11
M-T1A	109.6149	Q=175	175	631.05	633.28	633.49	634.4	0.043788	8.64	21.32	14.52	1.13
M-T1A	109.6149	Q=200	200	631.05	633.4	633.67	634.65	0.044659	9.13	23.22	15.02	1.16
M-T1A	109.6149	Q=250	250	631.05	633.64	634	635.12	0.046202	10.02	26.82	15.91	1.2
M-T1A	109.6149	Q=300	300	631.05	633.83	634.29	635.56	0.048441	10.87	29.99	16.65	1.25
M-T1A	109.6149	Q=350	350	631.05	634.01	634.57	635.97	0.050407	11.63	32.99	17.33	1.29
M-T1A	109.6149	Q=400	400	631.05	634.17	634.82	636.35	0.052179	12.33	35.86	17.95	1.32
M-T1A	109.6149	Q=450	450	631.05	634.32	635.04	636.72	0.053837	12.99	38.59	18.53	1.36
M-T1A	109.6149	Q=500	500	631.05	634.46	635.25	637.07	0.055329	13.6	41.23	19.06	1.39
M-T1A	109.6149	Q=600	600	631.05	634.72	635.65	637.73	0.057909	14.7	46.29	20.05	1.44
M-T1A	175.2342	Q=25	25	635.87	636.28	636.76	639.42	1.48191	14.21	1.76	6.65	4.87
M-T1A	175.2342	Q=50	50	635.87	636.44	637.11	641.21	1.470077	17.54	2.85	7.79	5.11
M-T1A	175.2342	Q=75	75	635.87	636.56	637.38	642.28	1.350987	19.18	3.91	8.75	5.06
M-T1A	175.2342	Q=100	100	635.87	636.69	637.61	642.8	1.182232	19.85	5.04	9.67	4.85
M-T1A	175.2342	Q=125	125	635.87	636.81	637.82	642.96	0.979468	19.9	6.28	10.49	4.52
M-T1A	175.2342	Q=150	150	635.87	636.92	638.02	643.15	0.821083	20.04	7.5	11.03	4.23
M-T1A	175.2342	Q=175	175	635.87	637.03	638.2	643.35	0.714784	20.19	8.71	11.55	4.02
M-T1A	175.2342	Q=200	200	635.87	637.13	638.36	643.53	0.63779	20.34	9.91	12.04	3.86
M-T1A	175.2342	Q=250	250	635.87	637.32	638.67	643.87	0.529463	20.62	12.29	12.93	3.61
M-T1A	175.2342	Q=300	300	635.87	637.5	638.95	644.22	0.441163	20.95	14.63	13.61	3.38
M-T1A	175.2342	Q=350	350	635.87	637.66	639.2	644.59	0.384675	21.32	16.91	14.25	3.23
M-T1A	175.2342	Q=400	400	635.87	637.82	639.45	644.91	0.341999	21.64	19.21	14.86	3.1
M-T1A	175.2342	Q=450	450	635.87	637.97	639.66	645.23	0.311263	21.97	21.46	15.43	3.01
M-T1A	175.2342	Q=500	500	635.87	638.11	639.87	645.52	0.286412	22.27	23.71	15.99	2.92
M-T1A	175.2342	Q=600	600	635.87	638.38	640.27	646.04	0.248561	22.79	28.21	17.04	2.79

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1A	256.649	Q=25	25	648.65	649.51	649.51	649.79	0.042338	4.33	6.1	11.59	0.96
M-T1A	256.649	Q=50	50	648.65	649.85	649.85	650.24	0.035215	5.25	10.45	13.99	0.94
M-T1A	256.649	Q=75	75	648.65	650.11	650.11	650.59	0.03185	5.86	14.37	15.63	0.93
M-T1A	256.649	Q=100	100	648.65	650.32	650.33	650.88	0.03119	6.42	17.69	16.73	0.94
M-T1A	256.649	Q=125	125	648.65	650.47	650.52	651.13	0.032824	7.05	20.33	17.56	0.98
M-T1A	256.649	Q=150	150	648.65	650.61	650.69	651.37	0.034201	7.6	22.78	18.3	1.02
M-T1A	256.649	Q=175	175	648.65	650.73	650.85	651.59	0.035384	8.1	25.11	18.97	1.05
M-T1A	256.649	Q=200	200	648.65	650.85	651.01	651.79	0.036471	8.55	27.31	19.59	1.07
M-T1A	256.649	Q=250	250	648.65	651.05	651.27	652.17	0.038507	9.38	31.42	20.69	1.12
M-T1A	256.649	Q=300	300	648.65	651.23	651.52	652.52	0.040512	10.14	35.16	21.65	1.16
M-T1A	256.649	Q=350	350	648.65	651.39	651.74	652.84	0.041972	10.8	38.8	22.54	1.2
M-T1A	256.649	Q=400	400	648.65	651.54	651.96	653.15	0.043576	11.42	42.16	23.35	1.23
M-T1A	256.649	Q=450	450	648.65	651.68	652.17	653.43	0.044809	11.98	45.46	24.11	1.26
M-T1A	256.649	Q=500	500	648.65	651.81	652.33	653.7	0.046126	12.52	48.57	24.8	1.29
M-T1A	256.649	Q=600	600	648.65	652.03	652.67	654.22	0.049074	13.57	54.24	26.01	1.35
M-T1A	318.1733	Q=25	25	652.18	652.77	653.02	653.65	0.254473	7.68	3.36	9.37	2.16
M-T1A	318.1733	Q=50	50	652.18	652.95	653.37	654.43	0.268704	10.03	5.23	10.81	2.36
M-T1A	318.1733	Q=75	75	652.18	653.12	653.63	654.95	0.237897	11.24	7.14	11.96	2.32
M-T1A	318.1733	Q=100	100	652.18	653.26	653.85	655.36	0.217204	12.13	8.97	12.97	2.29
M-T1A	318.1733	Q=125	125	652.18	653.4	654.05	655.7	0.200906	12.82	10.75	13.86	2.25
M-T1A	318.1733	Q=150	150	652.18	653.52	654.23	655.97	0.185443	13.31	12.52	14.48	2.2
M-T1A	318.1733	Q=175	175	652.18	653.63	654.39	656.25	0.176561	13.82	14.15	15.04	2.18
M-T1A	318.1733	Q=200	200	652.18	653.74	654.54	656.5	0.168514	14.26	15.77	15.57	2.16
M-T1A	318.1733	Q=250	250	652.18	653.94	654.8	656.94	0.155453	15	18.95	16.56	2.13
M-T1A	318.1733	Q=300	300	652.18	654.13	655.06	657.29	0.142253	15.51	22.21	17.52	2.07
M-T1A	318.1733	Q=350	350	652.18	654.3	655.29	657.63	0.133643	16.01	25.29	18.27	2.04
M-T1A	318.1733	Q=400	400	652.18	654.46	655.51	657.94	0.126634	16.45	28.3	18.91	2.01
M-T1A	318.1733	Q=450	450	652.18	654.62	655.71	658.21	0.119591	16.8	31.36	19.54	1.98
M-T1A	318.1733	Q=500	500	652.18	654.77	655.91	658.48	0.114681	17.16	34.27	20.12	1.96
M-T1A	318.1733	Q=600	600	652.18	655.09	656.26	658.84	0.099399	17.41	41.03	21.48	1.87

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1A	361.2753	Q=25	25	656.31	657.07	657.07	657.33	0.041215	4.26	6.39	12.98	0.94
M-T1A	361.2753	Q=50	50	656.31	657.39	657.39	657.75	0.034171	5.11	11.1	16.08	0.92
M-T1A	361.2753	Q=75	75	656.31	657.63	657.63	658.06	0.032333	5.75	15.07	17.83	0.93
M-T1A	361.2753	Q=100	100	656.31	657.83	657.83	658.32	0.030879	6.24	18.79	19.32	0.93
M-T1A	361.2753	Q=125	125	656.31	658	658	658.56	0.029878	6.64	22.29	20.63	0.94
M-T1A	361.2753	Q=150	150	656.31	658.15	658.15	658.76	0.029622	7.03	25.48	21.75	0.95
M-T1A	361.2753	Q=175	175	656.31	658.31	658.31	658.96	0.028517	7.31	28.93	23.12	0.94
M-T1A	361.2753	Q=200	200	656.31	658.45	658.45	659.13	0.027736	7.56	32.23	24.33	0.94
M-T1A	361.2753	Q=250	250	656.31	658.7	658.7	659.45	0.026359	7.98	38.72	26.55	0.94
M-T1A	361.2753	Q=300	300	656.31	658.91	658.91	659.73	0.026067	8.42	44.53	28.44	0.94
M-T1A	361.2753	Q=350	350	656.31	659.12	659.12	659.99	0.025216	8.75	50.7	30.56	0.94
M-T1A	361.2753	Q=400	400	656.31	659.32	659.32	660.22	0.024298	9	56.92	32.55	0.93
M-T1A	361.2753	Q=450	450	656.31	659.49	659.49	660.43	0.02383	9.27	62.74	34.32	0.93
M-T1A	361.2753	Q=500	500	656.31	659.67	659.67	660.63	0.022818	9.42	69.11	36.13	0.92
M-T1A	361.2753	Q=600	600	656.31	659.88	659.88	661	0.02483	10.25	76.86	38.17	0.97
M-T1B	744.3112	Q=25	25	621.96	622.92	622.88	623.17	0.042439	4.05	6.17	10.62	0.94
M-T1B	744.3112	Q=50	50	621.96	623.23	623.23	623.63	0.045143	5.06	9.88	12.69	1.01
M-T1B	744.3112	Q=75	75	621.96	623.5	623.5	623.98	0.042409	5.54	13.54	14.45	1.01
M-T1B	744.3112	Q=100	100	621.96	623.72	623.72	624.27	0.040414	5.98	16.75	15.66	1.01
M-T1B	744.3112	Q=125	125	621.96	623.91	623.91	624.53	0.03803	6.32	19.87	16.68	1
M-T1B	744.3112	Q=150	150	621.96	624.07	624.07	624.76	0.036094	6.69	22.65	17.38	0.99
M-T1B	744.3112	Q=175	175	621.96	624.18	624.23	624.99	0.037949	7.21	24.61	17.86	1.03
M-T1B	744.3112	Q=200	200	621.96	624.29	624.38	625.2	0.039375	7.69	26.52	18.31	1.06
M-T1B	744.3112	Q=250	250	621.96	624.5	624.66	625.59	0.040262	8.43	30.49	19.23	1.1
M-T1B	744.3112	Q=300	300	621.96	624.69	624.91	625.95	0.040848	9.08	34.29	20.06	1.12
M-T1B	744.3112	Q=350	350	621.96	624.88	625.15	626.28	0.040995	9.64	38.03	20.85	1.14
M-T1B	744.3112	Q=400	400	621.96	625.04	625.38	626.59	0.041203	10.15	41.6	21.58	1.16
M-T1B	744.3112	Q=450	450	621.96	625.21	625.6	626.88	0.04101	10.58	45.2	22.29	1.17
M-T1B	744.3112	Q=500	500	621.96	625.37	625.78	627.15	0.040305	10.94	48.94	23	1.17
M-T1B	744.3112	Q=600	600	621.96	625.66	626.13	627.65	0.039918	11.65	55.77	24.12	1.19

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1B	810.6002	Q=25	25	624.11	625.12	624.98	625.29	0.024676	3.37	7.48	11.85	0.73
M-T1B	810.6002	Q=50	50	624.11	625.46	625.31	625.75	0.023566	4.35	11.85	13.61	0.77
M-T1B	810.6002	Q=75	75	624.11	625.7	625.58	626.1	0.02475	5.14	15.3	14.85	0.81
M-T1B	810.6002	Q=100	100	624.11	625.9	625.81	626.4	0.025973	5.81	18.32	15.85	0.85
M-T1B	810.6002	Q=125	125	624.11	626.06	626.01	626.67	0.027686	6.44	20.91	16.66	0.9
M-T1B	810.6002	Q=150	150	624.11	626.2	626.2	626.91	0.029036	6.98	23.36	17.4	0.93
M-T1B	810.6002	Q=175	175	624.11	626.38	626.38	627.13	0.027607	7.26	26.51	18.3	0.92
M-T1B	810.6002	Q=200	200	624.11	626.54	626.54	627.34	0.026693	7.52	29.47	19	0.92
M-T1B	810.6002	Q=250	250	624.11	626.82	626.82	627.72	0.025667	8.03	34.98	20.22	0.92
M-T1B	810.6002	Q=300	300	624.11	627.07	627.07	628.05	0.024816	8.46	40.28	21.21	0.92
M-T1B	810.6002	Q=350	350	624.11	627.3	627.3	628.36	0.024269	8.85	45.29	22.08	0.92
M-T1B	810.6002	Q=400	400	624.11	627.53	627.53	628.65	0.023404	9.15	50.45	22.95	0.92
M-T1B	810.6002	Q=450	450	624.11	627.74	627.74	628.92	0.022969	9.46	55.24	23.72	0.92
M-T1B	810.6002	Q=500	500	624.11	627.92	627.92	629.18	0.022978	9.81	59.55	24.39	0.93
M-T1B	810.6002	Q=600	600	624.11	628.28	628.28	629.65	0.022321	10.32	68.59	25.75	0.93
M-T1B	879.0649	Q=25	25	624.29	625.82	625.16	625.86	0.004043	1.77	14.14	14.31	0.31
M-T1B	879.0649	Q=50	50	624.29	626.3	625.5	626.38	0.004651	2.33	21.54	16.4	0.35
M-T1B	879.0649	Q=75	75	624.29	626.64	625.76	626.76	0.004846	2.77	27.46	17.73	0.37
M-T1B	879.0649	Q=100	100	624.29	626.94	625.99	627.09	0.004942	3.11	32.93	18.87	0.39
M-T1B	879.0649	Q=125	125	624.29	627.21	626.17	627.38	0.005002	3.4	38.07	19.88	0.4
M-T1B	879.0649	Q=150	150	624.29	627.45	626.35	627.65	0.00505	3.66	42.95	20.8	0.41
M-T1B	879.0649	Q=175	175	624.29	627.65	626.5	627.88	0.005214	3.91	47.22	21.57	0.42
M-T1B	879.0649	Q=200	200	624.29	627.84	626.65	628.09	0.005344	4.14	51.35	22.29	0.43
M-T1B	879.0649	Q=250	250	624.29	628.18	626.94	628.49	0.005547	4.55	59.27	23.69	0.45
M-T1B	879.0649	Q=300	300	624.29	628.48	627.2	628.83	0.005746	4.91	66.61	24.86	0.46
M-T1B	879.0649	Q=350	350	624.29	628.76	627.44	629.16	0.005895	5.23	73.65	25.88	0.47
M-T1B	879.0649	Q=400	400	624.29	629.01	627.67	629.45	0.00605	5.53	80.29	26.8	0.48
M-T1B	879.0649	Q=450	450	624.29	629.25	627.88	629.73	0.006164	5.8	86.79	27.67	0.49
M-T1B	879.0649	Q=500	500	624.29	629.48	628.1	629.99	0.006237	6.04	93.24	28.5	0.5
M-T1B	879.0649	Q=600	600	624.29	629.89	628.47	630.48	0.00641	6.49	105.36	30.01	0.51

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1B	943.7003	Q=25	25	627.83	628.8	628.8	629.08	0.051109	4.26	5.87	10.7	1.01
M-T1B	943.7003	Q=50	50	627.83	629.15	629.15	629.53	0.045919	4.97	10.06	13.38	1.01
M-T1B	943.7003	Q=75	75	627.83	629.41	629.41	629.87	0.043261	5.43	13.82	15.39	1.01
M-T1B	943.7003	Q=100	100	627.83	629.61	629.61	630.15	0.041207	5.91	16.95	16.43	1.01
M-T1B	943.7003	Q=125	125	627.83	629.79	629.79	630.4	0.037518	6.28	20.07	17.28	0.99
M-T1B	943.7003	Q=150	150	627.83	629.95	629.95	630.63	0.035637	6.64	22.93	18.02	0.99
M-T1B	943.7003	Q=175	175	627.83	630.11	630.11	630.85	0.033685	6.93	25.83	18.75	0.98
M-T1B	943.7003	Q=200	200	627.83	630.22	630.26	631.05	0.035169	7.39	27.81	19.23	1.01
M-T1B	943.7003	Q=250	250	627.83	630.49	630.53	631.42	0.031941	7.81	33.36	20.51	0.99
M-T1B	943.7003	Q=300	300	627.83	630.7	630.79	631.76	0.032311	8.39	37.62	21.44	1.01
M-T1B	943.7003	Q=350	350	627.83	630.88	631.02	632.07	0.032693	8.92	41.67	22.28	1.03
M-T1B	943.7003	Q=400	400	627.83	631.06	631.23	632.36	0.032802	9.37	45.64	23	1.04
M-T1B	943.7003	Q=450	450	627.83	631.22	631.44	632.63	0.032936	9.8	49.46	23.68	1.06
M-T1B	943.7003	Q=500	500	627.83	631.38	631.62	632.89	0.03299	10.18	53.21	24.32	1.07
M-T1B	943.7003	Q=600	600	627.83	631.67	631.97	633.37	0.033093	10.88	60.4	25.45	1.09
M-T1B	1005.909	Q=25	25	630.45	631.35	631.26	631.54	0.031365	3.52	7.12	12.5	0.81
M-T1B	1005.909	Q=50	50	630.45	631.52	631.57	631.97	0.052505	5.41	9.36	13.35	1.09
M-T1B	1005.909	Q=75	75	630.45	631.73	631.83	632.34	0.051722	6.3	12.22	14.36	1.13
M-T1B	1005.909	Q=100	100	630.45	631.87	632.05	632.67	0.057306	7.26	14.29	15.05	1.22
M-T1B	1005.909	Q=125	125	630.45	632.02	632.25	632.95	0.056394	7.86	16.68	15.8	1.23
M-T1B	1005.909	Q=150	150	630.45	632.17	632.42	633.21	0.054847	8.34	19.05	16.52	1.24
M-T1B	1005.909	Q=175	175	630.45	632.3	632.59	633.44	0.053998	8.79	21.27	17.17	1.25
M-T1B	1005.909	Q=200	200	630.45	632.42	632.75	633.66	0.053368	9.2	23.42	17.77	1.26
M-T1B	1005.909	Q=250	250	630.45	632.65	633.04	634.07	0.052188	9.9	27.58	19.02	1.27
M-T1B	1005.909	Q=300	300	630.45	632.84	633.3	634.44	0.052353	10.58	31.36	20.15	1.29
M-T1B	1005.909	Q=350	350	630.45	633.02	633.53	634.78	0.052277	11.17	35.05	21.2	1.31
M-T1B	1005.909	Q=400	400	630.45	633.18	633.76	635.1	0.052776	11.74	38.46	22.11	1.33
M-T1B	1005.909	Q=450	450	630.45	633.33	633.97	635.4	0.053051	12.25	41.81	22.97	1.35
M-T1B	1005.909	Q=500	500	630.45	633.47	634.16	635.68	0.053455	12.73	45.03	23.76	1.36
M-T1B	1005.909	Q=600	600	630.45	633.72	634.48	636.2	0.05402	13.58	51.26	25.23	1.39

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1B	1072.597	Q=25	25	633.49	634.36	634.36	634.64	0.04988	4.29	5.83	10.47	1.01
M-T1B	1072.597	Q=50	50	633.49	634.7	634.7	635.12	0.042733	5.19	9.72	12.1	1
M-T1B	1072.597	Q=75	75	633.49	634.95	634.97	635.49	0.043242	5.96	12.79	13.25	1.04
M-T1B	1072.597	Q=100	100	633.49	635.17	635.21	635.81	0.039065	6.46	15.88	14.16	1.02
M-T1B	1072.597	Q=125	125	633.49	635.34	635.41	636.1	0.039419	7.06	18.33	14.84	1.04
M-T1B	1072.597	Q=150	150	633.49	635.48	635.6	636.36	0.040658	7.64	20.48	15.41	1.08
M-T1B	1072.597	Q=175	175	633.49	635.62	635.78	636.61	0.041476	8.15	22.56	15.94	1.1
M-T1B	1072.597	Q=200	200	633.49	635.74	635.94	636.84	0.042171	8.61	24.57	16.44	1.12
M-T1B	1072.597	Q=250	250	633.49	635.96	636.24	637.28	0.04388	9.47	28.25	17.32	1.17
M-T1B	1072.597	Q=300	300	633.49	636.16	636.52	637.67	0.044356	10.16	31.94	18.16	1.19
M-T1B	1072.597	Q=350	350	633.49	636.35	636.77	638.04	0.045379	10.82	35.29	18.87	1.22
M-T1B	1072.597	Q=400	400	633.49	636.53	637.03	638.37	0.044946	11.32	38.91	19.61	1.23
M-T1B	1072.597	Q=450	450	633.49	636.7	637.24	638.69	0.045179	11.82	42.21	20.26	1.25
M-T1B	1072.597	Q=500	500	633.49	636.86	637.43	638.98	0.045106	12.26	45.53	20.89	1.26
M-T1B	1072.597	Q=600	600	633.49	637.15	637.81	639.53	0.045312	13.09	51.76	21.9	1.28
M-T1B	1142.837	Q=25	25	636.4	637.35	637.28	637.56	0.034921	3.7	6.76	11.54	0.85
M-T1B	1142.837	Q=50	50	636.4	637.66	637.62	638	0.039178	4.74	10.55	13.46	0.94
M-T1B	1142.837	Q=75	75	636.4	637.87	637.87	638.34	0.042664	5.49	13.65	14.85	1.01
M-T1B	1142.837	Q=100	100	636.4	638.09	638.09	638.63	0.040957	5.87	17.03	16.23	1.01
M-T1B	1142.837	Q=125	125	636.4	638.27	638.27	638.88	0.039441	6.26	19.99	17.11	1.01
M-T1B	1142.837	Q=150	150	636.4	638.43	638.43	639.11	0.036969	6.6	22.82	17.7	1
M-T1B	1142.837	Q=175	175	636.4	638.58	638.58	639.32	0.035242	6.91	25.53	18.25	0.99
M-T1B	1142.837	Q=200	200	636.4	638.73	638.73	639.53	0.033731	7.19	28.2	18.78	0.99
M-T1B	1142.837	Q=250	250	636.4	639	639	639.9	0.031059	7.65	33.5	19.78	0.97
M-T1B	1142.837	Q=300	300	636.4	639.25	639.25	640.24	0.029464	8.07	38.46	20.67	0.97
M-T1B	1142.837	Q=350	350	636.4	639.49	639.49	640.55	0.027529	8.38	43.64	21.57	0.95
M-T1B	1142.837	Q=400	400	636.4	639.7	639.7	640.85	0.026856	8.74	48.18	22.32	0.95
M-T1B	1142.837	Q=450	450	636.4	639.9	639.9	641.12	0.025933	9.03	52.85	23.07	0.95
M-T1B	1142.837	Q=500	500	636.4	640.1	640.1	641.38	0.02517	9.3	57.42	23.77	0.94
M-T1B	1142.837	Q=600	600	636.4	640.48	640.48	641.87	0.023571	9.74	66.67	25.1	0.93

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1B	1240.974	Q=25	25	639.75	640.59	640.5	640.75	0.030138	3.23	7.74	14.67	0.78
M-T1B	1240.974	Q=50	50	639.75	640.67	640.78	641.16	0.077467	5.6	8.94	15.39	1.28
M-T1B	1240.974	Q=75	75	639.75	640.81	641.01	641.52	0.091713	6.81	11.09	16.6	1.43
M-T1B	1240.974	Q=100	100	639.75	640.92	641.19	641.86	0.102829	7.8	12.99	17.61	1.54
M-T1B	1240.974	Q=125	125	639.75	641.01	641.36	642.17	0.113143	8.72	14.59	18.32	1.64
M-T1B	1240.974	Q=150	150	639.75	641.09	641.52	642.47	0.118797	9.5	16.16	18.93	1.71
M-T1B	1240.974	Q=175	175	639.75	641.17	641.66	642.75	0.122929	10.18	17.67	19.49	1.76
M-T1B	1240.974	Q=200	200	639.75	641.24	641.79	643.03	0.127537	10.84	19.07	20	1.82
M-T1B	1240.974	Q=250	250	639.75	641.38	642.03	643.51	0.130461	11.88	21.97	21.01	1.87
M-T1B	1240.974	Q=300	300	639.75	641.51	642.25	643.96	0.133007	12.79	24.68	21.87	1.92
M-T1B	1240.974	Q=350	350	639.75	641.63	642.45	644.36	0.133962	13.57	27.33	22.5	1.96
M-T1B	1240.974	Q=400	400	639.75	641.78	642.64	644.59	0.12171	13.82	30.91	23.32	1.9
M-T1B	1240.974	Q=450	450	639.75	641.86	642.82	645.04	0.130024	14.74	32.75	23.74	1.98
M-T1B	1240.974	Q=500	500	639.75	641.99	642.98	645.28	0.122968	15.04	35.87	24.42	1.94
M-T1B	1240.974	Q=600	600	639.75	642.23	643.31	645.74	0.113302	15.64	41.82	25.68	1.9
M-T1B	1317.998	Q=25	25	644.08	644.9	644.9	645.17	0.050519	4.19	5.97	11.17	1.01
M-T1B	1317.998	Q=50	50	644.08	645.22	645.22	645.61	0.044618	4.99	10.04	13.55	1.01
M-T1B	1317.998	Q=75	75	644.08	645.47	645.47	645.96	0.03911	5.63	13.5	14.54	0.99
M-T1B	1317.998	Q=100	100	644.08	645.68	645.68	646.26	0.035824	6.13	16.73	15.41	0.98
M-T1B	1317.998	Q=125	125	644.08	645.88	645.88	646.53	0.033256	6.53	19.86	16.2	0.96
M-T1B	1317.998	Q=150	150	644.08	646.06	646.06	646.77	0.031608	6.89	22.82	16.92	0.96
M-T1B	1317.998	Q=175	175	644.08	646.23	646.23	647	0.030295	7.2	25.69	17.59	0.95
M-T1B	1317.998	Q=200	200	644.08	646.39	646.39	647.21	0.029029	7.46	28.55	18.23	0.95
M-T1B	1317.998	Q=250	250	644.08	646.67	646.67	647.6	0.027516	7.97	33.9	19.37	0.94
M-T1B	1317.998	Q=300	300	644.08	646.94	646.94	647.95	0.026053	8.36	39.22	20.4	0.94
M-T1B	1317.998	Q=350	350	644.08	647.18	647.18	648.27	0.025008	8.72	44.3	21.27	0.93
M-T1B	1317.998	Q=400	400	644.08	647.33	647.4	648.57	0.026944	9.37	47.39	21.78	0.97
M-T1B	1317.998	Q=450	450	644.08	647.6	647.62	648.84	0.024075	9.42	53.57	22.77	0.94
M-T1B	1317.998	Q=500	500	644.08	647.75	647.82	649.11	0.024999	9.89	56.95	23.29	0.96
M-T1B	1317.998	Q=600	600	644.08	648.02	648.19	649.61	0.026553	10.75	63.44	24.26	1

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1B	1379.684	Q=25	25	646.18	647.22	647.09	647.41	0.027297	3.49	7.16	10.98	0.76
M-T1B	1379.684	Q=50	50	646.18	647.32	647.44	647.89	0.072224	6.06	8.25	11.48	1.26
M-T1B	1379.684	Q=75	75	646.18	647.53	647.72	648.28	0.074664	6.93	10.83	12.57	1.32
M-T1B	1379.684	Q=100	100	646.18	647.7	647.95	648.61	0.077847	7.65	13.07	13.45	1.37
M-T1B	1379.684	Q=125	125	646.18	647.85	648.13	648.91	0.080104	8.24	15.16	14.23	1.41
M-T1B	1379.684	Q=150	150	646.18	647.99	648.32	649.18	0.07969	8.73	17.19	14.86	1.42
M-T1B	1379.684	Q=175	175	646.18	648.11	648.48	649.43	0.079684	9.22	19.02	15.34	1.44
M-T1B	1379.684	Q=200	200	646.18	648.22	648.63	649.68	0.080554	9.69	20.71	15.78	1.47
M-T1B	1379.684	Q=250	250	646.18	648.43	648.93	650.13	0.080718	10.49	24.01	16.59	1.49
M-T1B	1379.684	Q=300	300	646.18	648.61	649.18	650.55	0.079117	11.2	27.13	17.32	1.51
M-T1B	1379.684	Q=350	350	646.18	648.79	649.43	650.93	0.076979	11.8	30.25	18.02	1.51
M-T1B	1379.684	Q=400	400	646.18	648.96	649.67	651.28	0.074429	12.29	33.41	18.7	1.51
M-T1B	1379.684	Q=450	450	646.18	649.12	649.88	651.61	0.072961	12.78	36.39	19.32	1.51
M-T1B	1379.684	Q=500	500	646.18	649.28	650.1	651.9	0.070193	13.15	39.6	19.96	1.5
M-T1B	1379.684	Q=600	600	646.18	649.58	650.47	652.46	0.066685	13.85	45.67	21.13	1.49
M-T1B	1420.161	Q=25	25	648.64	649.47	649.47	649.75	0.050396	4.19	5.97	11.14	1.01
M-T1B	1420.161	Q=50	50	648.64	649.81	649.81	650.19	0.045302	4.97	10.06	13.36	1.01
M-T1B	1420.161	Q=75	75	648.64	650.05	650.05	650.53	0.042189	5.54	13.55	14.67	1.01
M-T1B	1420.161	Q=100	100	648.64	650.27	650.27	650.82	0.039357	5.98	16.79	15.63	1
M-T1B	1420.161	Q=125	125	648.64	650.46	650.46	651.08	0.0372	6.33	19.92	16.5	0.99
M-T1B	1420.161	Q=150	150	648.64	650.63	650.63	651.32	0.03613	6.66	22.8	17.27	0.99
M-T1B	1420.161	Q=175	175	648.64	650.79	650.79	651.54	0.034801	6.98	25.47	17.85	0.99
M-T1B	1420.161	Q=200	200	648.64	650.94	650.94	651.74	0.033119	7.24	28.18	18.41	0.98
M-T1B	1420.161	Q=250	250	648.64	651.21	651.21	652.12	0.030988	7.74	33.3	19.41	0.97
M-T1B	1420.161	Q=300	300	648.64	651.46	651.46	652.46	0.029176	8.14	38.35	20.35	0.96
M-T1B	1420.161	Q=350	350	648.64	651.7	651.7	652.78	0.027616	8.49	43.34	21.23	0.95
M-T1B	1420.161	Q=400	400	648.64	651.92	651.92	653.08	0.02667	8.82	48.04	22.07	0.95
M-T1B	1420.161	Q=450	450	648.64	652.14	652.14	653.36	0.025278	9.06	53.07	22.94	0.94
M-T1B	1420.161	Q=500	500	648.64	652.33	652.33	653.62	0.024937	9.38	57.37	23.65	0.94
M-T1B	1420.161	Q=600	600	648.64	652.7	652.7	654.11	0.023542	9.84	66.53	25.09	0.93

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1B	1484.14	Q=25	25	648.09	650.01	648.94	650.03	0.001382	1.26	20.15	16.33	0.19
M-T1B	1484.14	Q=50	50	648.09	650.5	649.29	650.55	0.001868	1.8	28.86	18.7	0.24
M-T1B	1484.14	Q=75	75	648.09	650.87	649.55	650.94	0.002185	2.2	36.03	20.41	0.26
M-T1B	1484.14	Q=100	100	648.09	651.17	649.78	651.27	0.002422	2.52	42.43	21.78	0.28
M-T1B	1484.14	Q=125	125	648.09	651.43	649.99	651.55	0.002612	2.8	48.3	22.91	0.3
M-T1B	1484.14	Q=150	150	648.09	651.67	650.16	651.8	0.002767	3.05	53.83	23.92	0.31
M-T1B	1484.14	Q=175	175	648.09	651.88	650.32	652.04	0.002901	3.27	59.05	24.85	0.32
M-T1B	1484.14	Q=200	200	648.09	652.08	650.48	652.26	0.00301	3.47	64.1	25.67	0.33
M-T1B	1484.14	Q=250	250	648.09	652.45		652.65	0.003176	3.81	73.71	26.93	0.35
M-T1B	1484.14	Q=300	300	648.09	652.78		653.01	0.003307	4.12	82.74	28.06	0.36
M-T1B	1484.14	Q=350	350	648.09	653.08		653.34	0.003421	4.39	91.28	29.09	0.37
M-T1B	1484.14	Q=400	400	648.09	653.36		653.65	0.003506	4.63	99.54	30	0.38
M-T1B	1484.14	Q=450	450	648.09	653.61		653.93	0.00359	4.85	107.33	30.71	0.39
M-T1B	1484.14	Q=500	500	648.09	653.86		654.2	0.003649	5.06	115.01	31.4	0.39
M-T1B	1484.14	Q=600	600	648.09	654.31		654.7	0.003773	5.44	129.41	32.69	0.4
M-T1B	1530.33	Q=25	25	649.94	650.75	650.75	650.99	0.051512	3.99	6.26	12.84	1.01
M-T1B	1530.33	Q=50	50	649.94	651.05	651.05	651.4	0.046374	4.76	10.5	15.21	1.01
M-T1B	1530.33	Q=75	75	649.94	651.28	651.28	651.71	0.04354	5.25	14.3	17.06	1.01
M-T1B	1530.33	Q=100	100	649.94	651.48	651.48	651.97	0.041646	5.61	17.84	18.62	1.01
M-T1B	1530.33	Q=125	125	649.94	651.65	651.65	652.2	0.040142	5.93	21.08	19.83	1.01
M-T1B	1530.33	Q=150	150	649.94	651.79	651.79	652.4	0.038358	6.28	23.96	20.63	1.01
M-T1B	1530.33	Q=175	175	649.94	651.94	651.94	652.6	0.035867	6.54	26.96	21.39	0.99
M-T1B	1530.33	Q=200	200	649.94	652.06	652.06	652.78	0.03457	6.81	29.71	22.07	0.99
M-T1B	1530.33	Q=250	250	649.94	652.42	652.31	653.12	0.025384	6.76	38.07	24.02	0.88
M-T1B	1530.33	Q=300	300	649.94	652.78	652.54	653.45	0.019786	6.7	46.83	25.9	0.8
M-T1B	1530.33	Q=350	350	649.94	653.09		653.76	0.016703	6.73	55.18	27.56	0.75
M-T1B	1530.33	Q=400	400	649.94	653.38		654.06	0.014593	6.77	63.45	29.07	0.71
M-T1B	1530.33	Q=450	450	649.94	653.64	653.13	654.33	0.013257	6.85	71.27	30.42	0.69
M-T1B	1530.33	Q=500	500	649.94	653.9	653.3	654.59	0.012163	6.92	79.15	31.72	0.67
M-T1B	1530.33	Q=600	600	649.94	654.36	653.64	655.07	0.010703	7.08	94.36	34.2	0.64

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1B	1572.278	Q=25	25	650.34	651.65	651.25	651.74	0.008644	2.39	10.58	12.92	0.45
M-T1B	1572.278	Q=50	50	650.34	652.04	651.6	652.2	0.009817	3.24	15.98	14.94	0.51
M-T1B	1572.278	Q=75	75	650.34	652.32	651.86	652.54	0.010849	3.89	20.33	16.36	0.55
M-T1B	1572.278	Q=100	100	650.34	652.54	652.09	652.83	0.011758	4.44	24.13	17.5	0.59
M-T1B	1572.278	Q=125	125	650.34	652.73	652.29	653.08	0.012581	4.92	27.55	18.48	0.62
M-T1B	1572.278	Q=150	150	650.34	652.9	652.48	653.31	0.013355	5.35	30.68	19.29	0.65
M-T1B	1572.278	Q=175	175	650.34	653.04	652.65	653.52	0.014184	5.76	33.5	19.97	0.68
M-T1B	1572.278	Q=200	200	650.34	653.18	652.81	653.71	0.01486	6.13	36.23	20.61	0.7
M-T1B	1572.278	Q=250	250	650.34	653.32	653.1	654.03	0.018583	7.13	39.23	21.27	0.79
M-T1B	1572.278	Q=300	300	650.34	653.5	653.37	654.35	0.020617	7.86	43.07	22.04	0.84
M-T1B	1572.278	Q=350	350	650.34	653.67	653.6	654.66	0.022031	8.47	46.97	22.79	0.88
M-T1B	1572.278	Q=400	400	650.34	653.84	653.83	654.94	0.023109	9	50.83	23.52	0.91
M-T1B	1572.278	Q=450	450	650.34	654.02	654.02	655.21	0.023175	9.38	55.28	24.33	0.92
M-T1B	1572.278	Q=500	500	650.34	654.22	654.22	655.46	0.022596	9.64	60.21	25.19	0.92
M-T1B	1572.278	Q=600	600	650.34	654.58	654.58	655.93	0.022005	10.15	69.4	26.73	0.92
M-T1B	1613.01	Q=25	25	650.36	651.89	651.18	651.94	0.002937	1.71	15.01	14.42	0.28
M-T1B	1613.01	Q=50	50	650.36	652.35	651.51	652.44	0.003681	2.38	22.12	16.37	0.33
M-T1B	1613.01	Q=75	75	650.36	652.69	651.77	652.81	0.004207	2.89	27.92	17.8	0.36
M-T1B	1613.01	Q=100	100	650.36	652.97	652	653.13	0.004607	3.3	33.06	18.98	0.39
M-T1B	1613.01	Q=125	125	650.36	653.21	652.2	653.4	0.004932	3.65	37.78	20.03	0.41
M-T1B	1613.01	Q=150	150	650.36	653.43	652.39	653.65	0.005206	3.97	42.19	20.95	0.42
M-T1B	1613.01	Q=175	175	650.36	653.62	652.56	653.88	0.005444	4.25	46.36	21.79	0.44
M-T1B	1613.01	Q=200	200	650.36	653.81	652.73	654.09	0.00564	4.5	50.38	22.57	0.45
M-T1B	1613.01	Q=250	250	650.36	654.13	653.02	654.47	0.005965	4.95	58.02	23.98	0.47
M-T1B	1613.01	Q=300	300	650.36	654.44	653.29	654.82	0.006126	5.32	65.61	25.31	0.48
M-T1B	1613.01	Q=350	350	650.36	654.73	653.54	655.15	0.006225	5.63	73.02	26.54	0.49
M-T1B	1613.01	Q=400	400	650.36	654.99	653.77	655.45	0.006285	5.9	80.26	27.68	0.5
M-T1B	1613.01	Q=450	450	650.36	655.24	653.99	655.73	0.006366	6.16	87.08	28.64	0.51
M-T1B	1613.01	Q=500	500	650.36	655.45	654.18	655.98	0.00648	6.42	93.42	29.42	0.52
M-T1B	1613.01	Q=600	600	650.36	655.86	654.56	656.46	0.006649	6.87	105.71	30.86	0.53

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
M-T1B	1664.997	Q=25	25	652.49	653.37	653.37	653.67	0.043264	4.48	5.84	10.29	0.97
M-T1B	1664.997	Q=50	50	652.49	653.74	653.74	654.17	0.035737	5.46	9.91	12.08	0.95
M-T1B	1664.997	Q=75	75	652.49	654.02	654.02	654.55	0.032362	6.12	13.56	13.48	0.94
M-T1B	1664.997	Q=100	100	652.49	654.27	654.27	654.87	0.030054	6.62	17.02	14.66	0.94
M-T1B	1664.997	Q=125	125	652.49	654.48	654.48	655.15	0.028629	7.04	20.26	15.64	0.93
M-T1B	1664.997	Q=150	150	652.49	654.67	654.67	655.4	0.027643	7.41	23.34	16.48	0.93
M-T1B	1664.997	Q=175	175	652.49	654.85	654.85	655.64	0.026811	7.73	26.31	17.19	0.93
M-T1B	1664.997	Q=200	200	652.49	655.01	655.01	655.85	0.026336	8.04	29.12	17.84	0.93
M-T1B	1664.997	Q=250	250	652.49	655.31	655.31	656.24	0.025427	8.56	34.58	19.03	0.94
M-T1B	1664.997	Q=300	300	652.49	655.58	655.58	656.59	0.024599	9	39.89	20.13	0.94
M-T1B	1664.997	Q=350	350	652.49	655.82	655.82	656.92	0.024214	9.42	44.84	21.1	0.94
M-T1B	1664.997	Q=400	400	652.49	656.07	656.07	657.21	0.023163	9.7	50.2	22.1	0.93
M-T1B	1664.997	Q=450	450	652.49	656.27	656.27	657.49	0.022967	10.05	54.82	22.85	0.94
M-T1B	1664.997	Q=500	500	652.49	656.47	656.47	657.75	0.022601	10.34	59.46	23.53	0.94
M-T1B	1664.997	Q=600	600	652.49	656.84	656.84	658.24	0.022111	10.89	68.37	24.83	0.94
T2	1312.838	Q=25	25	601.97	602.37		602.45	0.029957	2.25	11.09	36.03	0.72
T2	1312.838	Q=50	50	601.97	602.47	602.45	602.65	0.048652	3.36	14.89	38.24	0.95
T2	1312.838	Q=75	75	601.97	602.58	602.58	602.82	0.051144	3.94	19.06	40.04	1.01
T2	1312.838	Q=100	100	601.97	602.68	602.68	602.97	0.048438	4.28	23.38	41.6	1.01
T2	1312.838	Q=125	125	601.97	602.78	602.78	603.1	0.046034	4.55	27.46	42.85	1
T2	1312.838	Q=150	150	601.97	602.87	602.87	603.23	0.045022	4.81	31.16	43.96	1.01
T2	1312.838	Q=175	175	601.97	602.95	602.95	603.34	0.043706	5.03	34.82	45.02	1.01
T2	1312.838	Q=200	200	601.97	603.03	603.03	603.45	0.042509	5.21	38.38	46	1.01
T2	1312.838	Q=250	250	601.97	603.17	603.17	603.65	0.040925	5.56	44.99	47.59	1.01
T2	1312.838	Q=300	300	601.97	603.3	603.3	603.83	0.039645	5.85	51.3	49.06	1.01
T2	1312.838	Q=350	350	601.97	603.42	603.42	604	0.038493	6.1	57.41	50.44	1.01
T2	1312.838	Q=400	400	601.97	603.54	603.54	604.16	0.037252	6.3	63.46	51.75	1
T2	1312.838	Q=450	450	601.97	603.67	603.64	604.31	0.034387	6.41	70.22	52.87	0.98
T2	1312.838	Q=500	500	601.97	603.8	603.74	604.45	0.031627	6.5	76.98	53.77	0.95
T2	1312.838	Q=600	600	601.97	604.04	603.93	604.73	0.026902	6.66	90.46	55.13	0.9

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1403.425	Q=25	25	603.62	604.15		604.2	0.013376	1.82	13.7	33.38	0.5
T2	1403.425	Q=50	50	603.62	604.41		604.48	0.010936	2.16	23.15	37.58	0.49
T2	1403.425	Q=75	75	603.62	604.59	604.28	604.69	0.010933	2.48	30.29	40.03	0.5
T2	1403.425	Q=100	100	603.62	604.74	604.39	604.86	0.011381	2.76	36.25	41.97	0.52
T2	1403.425	Q=125	125	603.62	604.87	604.5	605.01	0.011795	3	41.62	43.57	0.54
T2	1403.425	Q=150	150	603.62	604.98	604.59	605.14	0.012034	3.21	46.78	45.04	0.55
T2	1403.425	Q=175	175	603.62	605.09	604.68	605.27	0.01227	3.39	51.62	46.37	0.57
T2	1403.425	Q=200	200	603.62	605.18	604.77	605.38	0.012529	3.56	56.15	47.58	0.58
T2	1403.425	Q=250	250	603.62	605.36	604.92	605.59	0.012827	3.88	64.46	49.34	0.6
T2	1403.425	Q=300	300	603.62	605.51	605.06	605.78	0.013136	4.17	72.05	50.73	0.61
T2	1403.425	Q=350	350	603.62	605.65	605.19	605.95	0.013426	4.43	79.18	52	0.63
T2	1403.425	Q=400	400	603.62	605.77	605.3	606.11	0.013738	4.68	85.87	53.16	0.64
T2	1403.425	Q=450	450	603.62	605.88	605.42	606.26	0.014405	4.95	91.31	54.08	0.66
T2	1403.425	Q=500	500	603.62	605.96	605.53	606.39	0.015038	5.23	96.17	54.89	0.68
T2	1403.425	Q=600	600	603.62	606.11	605.73	606.63	0.016592	5.79	104.54	56.24	0.72
T2	1460.474	Q=25	25	603.16	604.32	603.64	604.33	0.000917	0.75	33.27	40.96	0.15
T2	1460.474	Q=50	50	603.16	604.63	603.8	604.65	0.001302	1.08	46.48	44	0.18
T2	1460.474	Q=75	75	603.16	604.86	603.94	604.89	0.001579	1.33	56.53	45.75	0.21
T2	1460.474	Q=100	100	603.16	605.04	604.05	605.07	0.001806	1.55	64.8	46.84	0.23
T2	1460.474	Q=125	125	603.16	605.19	604.15	605.24	0.001993	1.75	72.26	47.8	0.24
T2	1460.474	Q=150	150	603.16	605.34		605.39	0.002154	1.92	79.1	48.66	0.26
T2	1460.474	Q=175	175	603.16	605.47		605.53	0.0023	2.08	85.44	49.45	0.27
T2	1460.474	Q=200	200	603.16	605.58		605.66	0.002438	2.23	91.34	50.17	0.28
T2	1460.474	Q=250	250	603.16	605.8		605.89	0.002694	2.51	102.09	51.4	0.3
T2	1460.474	Q=300	300	603.16	605.98		606.1	0.002922	2.76	111.88	52.45	0.31
T2	1460.474	Q=350	350	603.16	606.16	604.83	606.29	0.003124	2.99	121	53.38	0.33
T2	1460.474	Q=400	400	603.16	606.32	604.95	606.47	0.00331	3.21	129.54	54.24	0.34
T2	1460.474	Q=450	450	603.16	606.46	605.06	606.63	0.003496	3.41	137.43	55.03	0.35
T2	1460.474	Q=500	500	603.16	606.59	605.17	606.79	0.003684	3.61	144.77	55.75	0.37
T2	1460.474	Q=600	600	603.16	606.84	605.38	607.07	0.004019	3.97	158.65	57.08	0.39

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1529.53	Q=25	25	603.87	604.51	604.51	604.73	0.05399	3.74	6.69	15.76	1.01
T2	1529.53	Q=50	50	603.87	604.78	604.78	605.08	0.048122	4.39	11.38	19.29	1.01
T2	1529.53	Q=75	75	603.87	604.98	604.98	605.34	0.045667	4.81	15.59	22.14	1.01
T2	1529.53	Q=100	100	603.87	605.15	605.15	605.56	0.043651	5.11	19.56	24.51	1.01
T2	1529.53	Q=125	125	603.87	605.29	605.29	605.74	0.042246	5.42	23.09	26.03	1.01
T2	1529.53	Q=150	150	603.87	605.42	605.42	605.92	0.039739	5.63	26.68	27.35	1
T2	1529.53	Q=175	175	603.87	605.56	605.53	606.07	0.036295	5.74	30.58	28.72	0.97
T2	1529.53	Q=200	200	603.87	605.68	605.64	606.22	0.033886	5.93	33.97	30.3	0.95
T2	1529.53	Q=250	250	603.87	605.88	605.84	606.49	0.031164	6.31	40.4	33.08	0.94
T2	1529.53	Q=300	300	603.87	606.06	606.03	606.74	0.029455	6.65	46.59	35.18	0.93
T2	1529.53	Q=350	350	603.87	606.11	606.21	606.97	0.035726	7.48	48.47	35.73	1.03
T2	1529.53	Q=400	400	603.87	606.32	606.36	607.17	0.030841	7.51	55.91	37.81	0.97
T2	1529.53	Q=450	450	603.87	606.39	606.51	607.37	0.033901	8.08	58.72	38.57	1.03
T2	1529.53	Q=500	500	603.87	606.48	606.64	607.57	0.035677	8.54	62.08	39.33	1.06
T2	1529.53	Q=600	600	603.87	606.62	606.9	607.95	0.039978	9.46	67.75	40.56	1.14
T2	1682.002	Q=25	25	607.68	608.66	608.43	608.77	0.015636	2.68	9.33	14.15	0.58
T2	1682.002	Q=50	50	607.68	609	608.73	609.19	0.01711	3.43	14.58	16.27	0.64
T2	1682.002	Q=75	75	607.68	609.26	608.97	609.51	0.018082	3.95	19	17.86	0.67
T2	1682.002	Q=100	100	607.68	609.47	609.17	609.77	0.019034	4.37	22.86	19.13	0.7
T2	1682.002	Q=125	125	607.68	609.64	609.35	610	0.019629	4.78	26.2	20.05	0.73
T2	1682.002	Q=150	150	607.68	609.78	609.51	610.2	0.020788	5.18	29.04	20.8	0.76
T2	1682.002	Q=175	175	607.68	609.89	609.65	610.38	0.022615	5.62	31.31	21.38	0.8
T2	1682.002	Q=200	200	607.68	609.99	609.8	610.55	0.023999	6.03	33.42	21.84	0.83
T2	1682.002	Q=250	250	607.68	610.17	610.04	610.87	0.026184	6.76	37.47	22.69	0.88
T2	1682.002	Q=300	300	607.68	610.33	610.26	611.18	0.028191	7.43	41.18	23.44	0.93
T2	1682.002	Q=350	350	607.68	610.48	610.48	611.47	0.029732	8.01	44.79	24.15	0.97
T2	1682.002	Q=400	400	607.68	610.68	610.68	611.74	0.028583	8.33	49.61	25.07	0.96
T2	1682.002	Q=450	450	607.68	610.88	610.88	611.99	0.026968	8.55	54.78	26.01	0.95
T2	1682.002	Q=500	500	607.68	611.05	611.05	612.23	0.02643	8.84	59.27	26.81	0.95
T2	1682.002	Q=600	600	607.68	611.39	611.39	612.67	0.024953	9.29	68.52	28.26	0.94

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1780.912	Q=25	25	609.6	610.53	610.38	610.67	0.023608	3.01	8.32	14.55	0.7
T2	1780.912	Q=50	50	609.6	610.88	610.68	611.08	0.021183	3.59	13.93	17.39	0.7
T2	1780.912	Q=75	75	609.6	611.14	610.9	611.39	0.019904	4.05	18.65	19.12	0.71
T2	1780.912	Q=100	100	609.6	611.36	611.1	611.66	0.019064	4.39	23.05	20.61	0.71
T2	1780.912	Q=125	125	609.6	611.55		611.89	0.018678	4.69	27.12	21.89	0.71
T2	1780.912	Q=150	150	609.6	611.72		612.1	0.017836	4.96	30.93	22.88	0.71
T2	1780.912	Q=175	175	609.6	611.89		612.3	0.016685	5.16	34.96	23.88	0.7
T2	1780.912	Q=200	200	609.6	612.05		612.48	0.015991	5.36	38.74	24.78	0.7
T2	1780.912	Q=250	250	609.6	612.33		612.82	0.015089	5.72	45.91	26.31	0.69
T2	1780.912	Q=300	300	609.6	612.6		613.13	0.014159	6	53.13	27.72	0.69
T2	1780.912	Q=350	350	609.6	612.84		613.41	0.013482	6.25	60.1	29.01	0.68
T2	1780.912	Q=400	400	609.6	613.03		613.66	0.013575	6.58	65.79	30	0.69
T2	1780.912	Q=450	450	609.6	613.2		613.89	0.013848	6.91	70.92	30.81	0.7
T2	1780.912	Q=500	500	609.6	613.38		614.12	0.013792	7.16	76.46	31.65	0.71
T2	1780.912	Q=600	600	609.6	613.7		614.53	0.013898	7.66	86.68	33.16	0.72
T2	1860.551	Q=25	25	610.92	611.78		611.84	0.010022	2.03	12.33	20.55	0.46
T2	1860.551	Q=50	50	610.92	612.11		612.21	0.010155	2.55	19.63	23.42	0.49
T2	1860.551	Q=75	75	610.92	612.37		612.5	0.010077	2.89	25.96	25.62	0.5
T2	1860.551	Q=100	100	610.92	612.58		612.73	0.009913	3.18	31.55	27.33	0.51
T2	1860.551	Q=125	125	610.92	612.76		612.95	0.009727	3.42	36.8	28.78	0.52
T2	1860.551	Q=150	150	610.92	612.93		613.13	0.009552	3.66	41.54	29.86	0.52
T2	1860.551	Q=175	175	610.92	613.07		613.3	0.009521	3.88	45.93	30.83	0.53
T2	1860.551	Q=200	200	610.92	613.21		613.46	0.00944	4.07	50.25	31.75	0.54
T2	1860.551	Q=250	250	610.92	613.47		613.76	0.009239	4.41	58.67	33.45	0.54
T2	1860.551	Q=300	300	610.92	613.7		614.04	0.009047	4.69	66.78	34.93	0.55
T2	1860.551	Q=350	350	610.92	613.93		614.29	0.008839	4.93	74.73	36.33	0.55
T2	1860.551	Q=400	400	610.92	614.14		614.53	0.008612	5.14	82.62	37.66	0.55
T2	1860.551	Q=450	450	610.92	614.34		614.76	0.008406	5.33	90.33	38.82	0.55
T2	1860.551	Q=500	500	610.92	614.53		614.98	0.008241	5.5	97.82	39.89	0.55
T2	1860.551	Q=600	600	610.92	614.89		615.38	0.007941	5.8	112.4	41.74	0.55

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1941.272	Q=25	25	612.19	612.91		612.98	0.020874	2.19	11.43	29.6	0.62
T2	1941.272	Q=50	50	612.19	613.16		613.26	0.017373	2.56	19.54	34.84	0.6
T2	1941.272	Q=75	75	612.19	613.36		613.48	0.015105	2.76	27.19	38.98	0.58
T2	1941.272	Q=100	100	612.19	613.53		613.67	0.013637	2.94	34.04	41.31	0.57
T2	1941.272	Q=125	125	612.19	613.69		613.84	0.012495	3.1	40.43	42.81	0.56
T2	1941.272	Q=150	150	612.19	613.83		613.99	0.011707	3.23	46.51	44.19	0.55
T2	1941.272	Q=175	175	612.19	613.96		614.13	0.01101	3.35	52.53	45.52	0.54
T2	1941.272	Q=200	200	612.19	614.08		614.27	0.010357	3.46	58.17	46.31	0.53
T2	1941.272	Q=250	250	612.19	614.32		614.52	0.009277	3.65	69.13	47.67	0.52
T2	1941.272	Q=300	300	612.19	614.53		614.76	0.008534	3.83	79.59	48.94	0.51
T2	1941.272	Q=350	350	612.19	614.74		614.98	0.007943	3.98	89.79	50.07	0.5
T2	1941.272	Q=400	400	612.19	614.94		615.19	0.007455	4.11	99.78	51.15	0.49
T2	1941.272	Q=450	450	612.19	615.13		615.4	0.007056	4.23	109.55	52.19	0.49
T2	1941.272	Q=500	500	612.19	615.31		615.59	0.006725	4.34	119.11	53.19	0.48
T2	1941.272	Q=600	600	612.19	615.65		615.96	0.0062	4.53	137.64	54.69	0.47
T2	2038.465	Q=25	25	613.45	614.27		614.32	0.009803	1.88	13.27	24.37	0.45
T2	2038.465	Q=50	50	613.45	614.53		614.63	0.011606	2.5	19.99	27.16	0.51
T2	2038.465	Q=75	75	613.45	614.72		614.85	0.013102	2.96	25.3	29.18	0.56
T2	2038.465	Q=100	100	613.45	614.87		615.04	0.014479	3.36	29.8	30.78	0.6
T2	2038.465	Q=125	125	613.45	614.99		615.2	0.015593	3.72	33.61	32	0.63
T2	2038.465	Q=150	150	613.45	615.1		615.35	0.016451	4.04	37.24	33.12	0.66
T2	2038.465	Q=175	175	613.45	615.2		615.49	0.017211	4.35	40.46	33.98	0.68
T2	2038.465	Q=200	200	613.45	615.28		615.62	0.018076	4.65	43.34	34.7	0.71
T2	2038.465	Q=250	250	613.45	615.43		615.85	0.019628	5.21	48.7	36	0.75
T2	2038.465	Q=300	300	613.45	615.57		616.07	0.020768	5.69	53.84	37.21	0.78
T2	2038.465	Q=350	350	613.45	615.7	615.5	616.28	0.021715	6.12	58.72	38.28	0.81
T2	2038.465	Q=400	400	613.45	615.83	615.65	616.47	0.022309	6.49	63.6	39.28	0.83
T2	2038.465	Q=450	450	613.45	615.95	615.8	616.66	0.022729	6.83	68.38	40.25	0.85
T2	2038.465	Q=500	500	613.45	616.07	615.93	616.83	0.022938	7.13	73.18	41.2	0.86
T2	2038.465	Q=600	600	613.45	616.3	616.18	617.17	0.022891	7.62	82.89	43.09	0.88

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	2125.413	Q=25	25	613.96	614.97		615.02	0.006874	1.81	13.8	20.49	0.39
T2	2125.413	Q=50	50	613.96	615.33		615.41	0.007236	2.29	21.82	24.03	0.42
T2	2125.413	Q=75	75	613.96	615.58		615.69	0.007475	2.68	28.13	26.18	0.44
T2	2125.413	Q=100	100	613.96	615.79		615.93	0.007543	3.01	33.73	27.83	0.46
T2	2125.413	Q=125	125	613.96	615.97		616.14	0.007698	3.31	38.79	29.25	0.47
T2	2125.413	Q=150	150	613.96	616.12		616.32	0.007929	3.58	43.39	30.48	0.49
T2	2125.413	Q=175	175	613.96	616.27		616.49	0.008079	3.81	47.85	31.63	0.5
T2	2125.413	Q=200	200	613.96	616.4		616.64	0.008198	4.03	52.15	32.62	0.51
T2	2125.413	Q=250	250	613.96	616.64		616.93	0.008387	4.4	60.28	34.13	0.52
T2	2125.413	Q=300	300	613.96	616.86		617.19	0.008554	4.74	67.86	35.43	0.54
T2	2125.413	Q=350	350	613.96	617.06		617.43	0.008687	5.03	75.07	36.61	0.55
T2	2125.413	Q=400	400	613.96	617.25		617.65	0.008804	5.3	81.96	37.71	0.56
T2	2125.413	Q=450	450	613.96	617.42		617.86	0.008923	5.56	88.54	38.73	0.57
T2	2125.413	Q=500	500	613.96	617.58		618.06	0.009058	5.8	94.8	39.71	0.58
T2	2125.413	Q=600	600	613.96	617.87	617.08	618.42	0.009377	6.25	106.48	41.59	0.6
T2	2235.308	Q=25	25	615.54	616.31		616.47	0.032503	3.27	7.65	15.05	0.81
T2	2235.308	Q=50	50	615.54	616.63		616.86	0.02845	3.88	12.88	17.64	0.8
T2	2235.308	Q=75	75	615.54	616.87		617.16	0.026917	4.3	17.43	19.59	0.8
T2	2235.308	Q=100	100	615.54	617.05		617.4	0.026233	4.75	21.11	20.66	0.82
T2	2235.308	Q=125	125	615.54	617.21		617.62	0.025649	5.15	24.44	21.6	0.83
T2	2235.308	Q=150	150	615.54	617.36		617.83	0.025023	5.49	27.68	22.47	0.83
T2	2235.308	Q=175	175	615.54	617.49	617.35	618.01	0.024686	5.81	30.74	23.26	0.84
T2	2235.308	Q=200	200	615.54	617.62	617.47	618.19	0.02448	6.1	33.66	24	0.85
T2	2235.308	Q=250	250	615.54	617.84	617.71	618.51	0.024436	6.64	39.1	25.31	0.86
T2	2235.308	Q=300	300	615.54	618.04	617.94	618.8	0.024341	7.1	44.31	26.5	0.88
T2	2235.308	Q=350	350	615.54	618.22	618.14	619.07	0.024253	7.51	49.31	27.53	0.89
T2	2235.308	Q=400	400	615.54	618.39	618.33	619.32	0.024308	7.89	54.03	28.46	0.9
T2	2235.308	Q=450	450	615.54	618.55	618.51	619.55	0.024371	8.25	58.58	29.32	0.91
T2	2235.308	Q=500	500	615.54	618.7	618.68	619.77	0.024416	8.57	63	30.14	0.92
T2	2235.308	Q=600	600	615.54	618.99	618.99	620.19	0.024026	9.11	72.01	31.74	0.93

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	2330.407	Q=25	25	616.72	617.78		617.83	0.007868	1.92	13.04	19.67	0.42
T2	2330.407	Q=50	50	616.72	618.12		618.21	0.008336	2.45	20.48	23.41	0.45
T2	2330.407	Q=75	75	616.72	618.38		618.5	0.00844	2.84	26.85	26.12	0.47
T2	2330.407	Q=100	100	616.72	618.59		618.74	0.008478	3.16	32.51	28.28	0.48
T2	2330.407	Q=125	125	616.72	618.77		618.95	0.008453	3.44	37.81	30.1	0.49
T2	2330.407	Q=150	150	616.72	618.93		619.14	0.008421	3.68	42.91	31.75	0.5
T2	2330.407	Q=175	175	616.72	619.09		619.31	0.008339	3.88	47.93	33.3	0.51
T2	2330.407	Q=200	200	616.72	619.23		619.47	0.008229	4.06	52.84	34.49	0.51
T2	2330.407	Q=250	250	616.72	619.5		619.78	0.007976	4.35	62.41	36.49	0.51
T2	2330.407	Q=300	300	616.72	619.75		620.05	0.007755	4.59	71.62	38.31	0.51
T2	2330.407	Q=350	350	616.72	619.98		620.3	0.007558	4.81	80.54	39.89	0.51
T2	2330.407	Q=400	400	616.72	620.19		620.54	0.007367	4.99	89.29	41.34	0.51
T2	2330.407	Q=450	450	616.72	620.4		620.76	0.007193	5.16	97.86	42.72	0.51
T2	2330.407	Q=500	500	616.72	620.59		620.98	0.007037	5.31	106.27	44.03	0.51
T2	2330.407	Q=600	600	616.72	620.95		621.37	0.00679	5.59	122.51	46.41	0.51
T2	2401.954	Q=25	25	617.73	618.4	618.2	618.43	0.008739	1.44	17.38	43.93	0.4
T2	2401.954	Q=50	50	617.73	618.68	618.34	618.72	0.006065	1.64	30.52	48.2	0.36
T2	2401.954	Q=75	75	617.73	618.91	618.45	618.96	0.005065	1.79	41.86	50.47	0.35
T2	2401.954	Q=100	100	617.73	619.12	618.55	619.17	0.00447	1.91	52.49	52.5	0.34
T2	2401.954	Q=125	125	617.73	619.3	618.64	619.36	0.004118	2.01	62.31	54.19	0.33
T2	2401.954	Q=150	150	617.73	619.47	618.72	619.54	0.003864	2.1	71.56	55.53	0.33
T2	2401.954	Q=175	175	617.73	619.63	618.79	619.7	0.003673	2.18	80.43	56.77	0.32
T2	2401.954	Q=200	200	617.73	619.78	618.86	619.86	0.003517	2.25	89.03	57.96	0.32
T2	2401.954	Q=250	250	617.73	620.05	619	620.14	0.003281	2.38	105.05	59.91	0.32
T2	2401.954	Q=300	300	617.73	620.3	619.12	620.4	0.003059	2.5	120.05	61.42	0.31
T2	2401.954	Q=350	350	617.73	620.53	619.23	620.63	0.002893	2.62	134.35	62.78	0.31
T2	2401.954	Q=400	400	617.73	620.75	619.34	620.86	0.002763	2.72	148.16	64.07	0.31
T2	2401.954	Q=450	450	617.73	620.95	619.44	621.08	0.00266	2.82	161.53	65.29	0.3
T2	2401.954	Q=500	500	617.73	621.15	619.54	621.28	0.002576	2.91	174.51	66.46	0.3
T2	2401.954	Q=600	600	617.73	621.52	619.72	621.66	0.002452	3.08	199.26	68.37	0.3

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	2500.483	Q=25	25	619.99	620.61	620.61	620.82	0.053222	3.63	6.89	16.78	1
T2	2500.483	Q=50	50	619.99	620.86	620.86	621.15	0.048769	4.34	11.53	20.13	1.01
T2	2500.483	Q=75	75	619.99	621.05	621.05	621.41	0.045496	4.81	15.59	22.08	1.01
T2	2500.483	Q=100	100	619.99	621.22	621.22	621.63	0.043524	5.18	19.3	23.65	1.01
T2	2500.483	Q=125	125	619.99	621.37	621.37	621.83	0.041221	5.44	22.99	25.11	1
T2	2500.483	Q=150	150	619.99	621.49	621.49	622	0.040244	5.73	26.19	26.28	1.01
T2	2500.483	Q=175	175	619.99	621.61	621.61	622.16	0.038918	5.99	29.28	27.33	1
T2	2500.483	Q=200	200	619.99	621.72	621.72	622.32	0.03747	6.2	32.41	28.34	1
T2	2500.483	Q=250	250	619.99	621.92	621.92	622.6	0.035126	6.59	38.37	30.13	0.99
T2	2500.483	Q=300	300	619.99	622.11	622.11	622.85	0.032854	6.93	44.1	31.68	0.98
T2	2500.483	Q=350	350	619.99	622.28	622.28	623.08	0.03098	7.22	49.76	33	0.97
T2	2500.483	Q=400	400	619.99	622.44	622.44	623.3	0.029746	7.51	55.13	34.18	0.96
T2	2500.483	Q=450	450	619.99	622.6	622.6	623.51	0.028703	7.76	60.4	35.3	0.96
T2	2500.483	Q=500	500	619.99	622.74	622.74	623.7	0.027783	7.99	65.6	36.37	0.95
T2	2500.483	Q=600	600	619.99	623.02	623.02	624.06	0.026003	8.37	76.04	38.42	0.94
T2	2652.687	Q=25	25	621.86	622.9		622.95	0.006293	1.72	14.56	21.97	0.37
T2	2652.687	Q=50	50	621.86	623.26		623.33	0.006622	2.16	23.19	26.3	0.4
T2	2652.687	Q=75	75	621.86	623.51	622.96	623.61	0.006841	2.49	30.29	29.04	0.42
T2	2652.687	Q=100	100	621.86	623.72	623.12	623.84	0.007012	2.78	36.41	31.15	0.44
T2	2652.687	Q=125	125	621.86	623.88	623.26	624.03	0.007166	3.05	41.74	32.8	0.45
T2	2652.687	Q=150	150	621.86	624.04	623.39	624.2	0.007239	3.29	46.92	34.33	0.46
T2	2652.687	Q=175	175	621.86	624.18	623.5	624.36	0.007333	3.5	51.81	35.8	0.47
T2	2652.687	Q=200	200	621.86	624.31	623.61	624.51	0.007436	3.7	56.48	37.36	0.48
T2	2652.687	Q=250	250	621.86	624.54	623.8	624.78	0.007628	4.05	65.4	40.15	0.49
T2	2652.687	Q=300	300	621.86	624.75	623.98	625.03	0.007743	4.35	74.17	43.71	0.51
T2	2652.687	Q=350	350	621.86	624.93	624.16	625.25	0.007892	4.63	82.64	47.57	0.52
T2	2652.687	Q=400	400	621.86	625.11	624.31	625.45	0.007957	4.86	91.29	51.35	0.53
T2	2652.687	Q=450	450	621.86	625.27	624.47	625.64	0.007979	5.06	99.88	54.29	0.53
T2	2652.687	Q=500	500	621.86	625.42	624.6	625.81	0.007977	5.24	108.34	56.56	0.54
T2	2652.687	Q=600	600	621.86	625.7	624.87	626.13	0.007922	5.55	124.87	60.3	0.54

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	2702.534	Q=25	25	622.01	623.06	622.41	623.07	0.001274	0.87	28.58	35.87	0.17
T2	2702.534	Q=50	50	622.01	623.45	622.59	623.47	0.001421	1.16	43.1	39.01	0.19
T2	2702.534	Q=75	75	622.01	623.73	622.74	623.76	0.001565	1.38	54.49	41.25	0.21
T2	2702.534	Q=100	100	622.01	623.96	622.86	624	0.001674	1.57	64.11	42.85	0.22
T2	2702.534	Q=125	125	622.01	624.15	622.97	624.2	0.001778	1.75	72.35	44.04	0.23
T2	2702.534	Q=150	150	622.01	624.32	623.08	624.38	0.001858	1.91	80.09	45.12	0.24
T2	2702.534	Q=175	175	622.01	624.48	623.17	624.55	0.001932	2.05	87.31	46.1	0.25
T2	2702.534	Q=200	200	622.01	624.63	623.26	624.7	0.002001	2.18	94.09	46.98	0.26
T2	2702.534	Q=250	250	622.01	624.89		624.98	0.002128	2.42	106.62	48.5	0.27
T2	2702.534	Q=300	300	622.01	625.13		625.23	0.002233	2.63	118.28	49.79	0.28
T2	2702.534	Q=350	350	622.01	625.34		625.46	0.002339	2.83	128.94	50.95	0.29
T2	2702.534	Q=400	400	622.01	625.53		625.67	0.002438	3.02	138.94	52.01	0.3
T2	2702.534	Q=450	450	622.01	625.71		625.86	0.002538	3.19	148.28	52.98	0.31
T2	2702.534	Q=500	500	622.01	625.87		626.04	0.002639	3.36	157.03	53.87	0.32
T2	2702.534	Q=600	600	622.01	626.17		626.37	0.002832	3.68	173.31	55.47	0.33
T2	2753.631	Q=25	25	623.5	623.96	623.96	624.11	0.059105	3.12	8.01	26.59	1
T2	2753.631	Q=50	50	623.5	624.15	624.15	624.36	0.054194	3.69	13.55	32.78	1.01
T2	2753.631	Q=75	75	623.5	624.29	624.29	624.54	0.05088	4.05	18.5	37.05	1.01
T2	2753.631	Q=100	100	623.5	624.41	624.41	624.7	0.048551	4.33	23.07	40.35	1.01
T2	2753.631	Q=125	125	623.5	624.51	624.51	624.83	0.046931	4.56	27.39	43.21	1.01
T2	2753.631	Q=150	150	623.5	624.6	624.6	624.96	0.045645	4.79	31.34	45.09	1.01
T2	2753.631	Q=175	175	623.5	624.68	624.68	625.07	0.044214	4.97	35.23	46.8	1.01
T2	2753.631	Q=200	200	623.5	624.76	624.76	625.17	0.043209	5.13	38.95	48.38	1.01
T2	2753.631	Q=250	250	623.5	624.94	624.9	625.36	0.037461	5.25	47.59	51.29	0.96
T2	2753.631	Q=300	300	623.5	625.22	625.03	625.57	0.023781	4.77	62.86	55.76	0.79
T2	2753.631	Q=350	350	623.5	625.45	625.15	625.78	0.017643	4.64	75.66	58.05	0.7
T2	2753.631	Q=400	400	623.5	625.65	625.25	625.98	0.014417	4.6	87.63	60.12	0.65
T2	2753.631	Q=450	450	623.5	625.83	625.35	626.16	0.012476	4.61	98.89	62	0.62
T2	2753.631	Q=500	500	623.5	626	625.45	626.34	0.011192	4.65	109.58	63.51	0.59
T2	2753.631	Q=600	600	623.5	626.31	625.63	626.66	0.009592	4.76	129.61	65.86	0.56

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	132.1173	Q=25	25	627.96	629.08	628.89	629.23	0.021038	3.12	8.02	12.06	0.67
T2-A	132.1173	Q=50	50	627.96	629.42	629.24	629.67	0.023545	3.97	12.6	14.29	0.74
T2-A	132.1173	Q=75	75	627.96	629.66	629.49	630	0.025633	4.63	16.22	15.5	0.8
T2-A	132.1173	Q=100	100	627.96	629.86	629.7	630.28	0.027432	5.16	19.38	16.49	0.84
T2-A	132.1173	Q=125	125	627.96	630.02	629.9	630.52	0.02903	5.66	22.08	17.23	0.88
T2-A	132.1173	Q=150	150	627.96	630.16	630.06	630.74	0.03055	6.14	24.48	17.83	0.91
T2-A	132.1173	Q=175	175	627.96	630.12	630.22	630.96	0.045406	7.37	23.78	17.66	1.11
T2-A	132.1173	Q=200	200	627.96	630.21	630.37	631.18	0.048207	7.87	25.47	18.08	1.15
T2-A	132.1173	Q=250	250	627.96	630.43	630.64	631.56	0.049206	8.56	29.41	19.01	1.18
T2-A	132.1173	Q=300	300	627.96	630.62	630.89	631.91	0.049785	9.13	33.2	19.87	1.21
T2-A	132.1173	Q=350	350	627.96	630.8	631.11	632.24	0.050728	9.67	36.71	20.63	1.23
T2-A	132.1173	Q=400	400	627.96	630.97	631.33	632.54	0.050749	10.1	40.3	21.38	1.24
T2-A	132.1173	Q=450	450	627.96	631.11	631.53	632.83	0.051885	10.59	43.38	21.99	1.27
T2-A	132.1173	Q=500	500	627.96	631.25	631.7	633.1	0.051529	11.01	46.52	22.52	1.28
T2-A	132.1173	Q=600	600	627.96	631.52	632.05	633.61	0.050409	11.73	52.79	23.54	1.29
T2-A	199.0991	Q=25	25	630.73	631.59	631.59	631.85	0.051224	4.1	6.09	11.89	1.01
T2-A	199.0991	Q=50	50	630.73	631.91	631.91	632.28	0.045242	4.89	10.26	14.43	1.01
T2-A	199.0991	Q=75	75	630.73	632.15	632.15	632.6	0.040487	5.42	13.99	16.03	0.99
T2-A	199.0991	Q=100	100	630.73	632.36	632.36	632.88	0.03787	5.84	17.47	17.39	0.98
T2-A	199.0991	Q=125	125	630.73	632.54	632.54	633.12	0.035976	6.19	20.73	18.52	0.98
T2-A	199.0991	Q=150	150	630.73	632.7	632.7	633.35	0.034289	6.54	23.7	19.33	0.97
T2-A	199.0991	Q=175	175	630.73	632.84	632.84	633.55	0.032916	6.85	26.6	20.09	0.97
T2-A	199.0991	Q=200	200	630.73	633	633	633.74	0.030519	7.03	29.82	20.9	0.95
T2-A	199.0991	Q=250	250	630.73	633.25	633.25	634.09	0.029276	7.54	35.09	21.76	0.95
T2-A	199.0991	Q=300	300	630.73	633.48	633.48	634.41	0.028231	7.97	40.15	22.53	0.95
T2-A	199.0991	Q=350	350	630.73	633.7	633.7	634.7	0.02709	8.32	45.17	23.27	0.95
T2-A	199.0991	Q=400	400	630.73	633.89	633.89	634.98	0.026515	8.68	49.82	23.94	0.95
T2-A	199.0991	Q=450	450	630.73	634.1	634.1	635.24	0.025383	8.93	54.79	24.63	0.94
T2-A	199.0991	Q=500	500	630.73	634.28	634.28	635.49	0.02485	9.21	59.32	25.25	0.94
T2-A	199.0991	Q=600	600	630.73	634.61	634.61	635.95	0.0242	9.76	67.88	26.37	0.94

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	269.4769	Q=25	25	630.06	632.07	630.87	632.08	0.000942	1.03	24.3	18.56	0.16
T2-A	269.4769	Q=50	50	630.06	632.57	631.2	632.6	0.001434	1.46	34.2	21	0.2
T2-A	269.4769	Q=75	75	630.06	632.94	631.45	632.99	0.001777	1.77	42.33	22.82	0.23
T2-A	269.4769	Q=100	100	630.06	633.23	631.66	633.3	0.001989	2.03	49.24	23.96	0.25
T2-A	269.4769	Q=125	125	630.06	633.48	631.84	633.56	0.002134	2.27	55.33	24.93	0.26
T2-A	269.4769	Q=150	150	630.06	633.71	632.01	633.8	0.002257	2.48	61.04	25.81	0.27
T2-A	269.4769	Q=175	175	630.06	633.91	632.16	634.02	0.002364	2.67	66.44	26.61	0.28
T2-A	269.4769	Q=200	200	630.06	634.1	632.31	634.22	0.002478	2.86	71.41	27.33	0.29
T2-A	269.4769	Q=250	250	630.06	634.44	632.57	634.6	0.002644	3.17	81.08	28.68	0.31
T2-A	269.4769	Q=300	300	630.06	634.75	632.81	634.94	0.00278	3.46	90.18	29.89	0.32
T2-A	269.4769	Q=350	350	630.06	635.04	633.02	635.25	0.002898	3.71	98.8	30.99	0.33
T2-A	269.4769	Q=400	400	630.06	635.3	633.22	635.54	0.002989	3.94	107.16	31.88	0.34
T2-A	269.4769	Q=450	450	630.06	635.55	633.4	635.81	0.003081	4.15	115.05	32.7	0.35
T2-A	269.4769	Q=500	500	630.06	635.78	633.56	636.06	0.003154	4.35	122.79	33.49	0.36
T2-A	269.4769	Q=600	600	630.06	636.22	633.9	636.54	0.003273	4.7	137.71	34.97	0.37
T2-A	353.0578	Q=25	25	633.45	634.26	634.26	634.52	0.050651	4.09	6.12	11.93	1.01
T2-A	353.0578	Q=50	50	633.45	634.58	634.58	634.94	0.045561	4.83	10.35	14.47	1.01
T2-A	353.0578	Q=75	75	633.45	634.81	634.81	635.26	0.042736	5.38	13.95	16.01	1.01
T2-A	353.0578	Q=100	100	633.45	635.01	635.01	635.54	0.039242	5.82	17.26	17	1
T2-A	353.0578	Q=125	125	633.45	635.18	635.18	635.79	0.036992	6.24	20.24	17.74	0.99
T2-A	353.0578	Q=150	150	633.45	635.35	635.35	636.02	0.034757	6.58	23.22	18.45	0.98
T2-A	353.0578	Q=175	175	633.45	635.5	635.5	636.23	0.033123	6.88	26.08	19.12	0.97
T2-A	353.0578	Q=200	200	633.45	635.65	635.65	636.43	0.031667	7.14	28.91	19.75	0.97
T2-A	353.0578	Q=250	250	633.45	635.92	635.92	636.79	0.029513	7.61	34.37	20.91	0.96
T2-A	353.0578	Q=300	300	633.45	636.16	636.16	637.12	0.027977	8.01	39.62	21.97	0.95
T2-A	353.0578	Q=350	350	633.45	636.39	636.39	637.42	0.026602	8.35	44.81	22.98	0.94
T2-A	353.0578	Q=400	400	633.45	636.61	636.61	637.7	0.025589	8.66	49.81	23.85	0.94
T2-A	353.0578	Q=450	450	633.45	636.8	636.8	637.97	0.02497	8.96	54.51	24.58	0.94
T2-A	353.0578	Q=500	500	633.45	637	637	638.22	0.023921	9.18	59.55	25.35	0.93
T2-A	353.0578	Q=600	600	633.45	637.34	637.34	638.68	0.023306	9.72	68.28	26.62	0.93

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	445.2593	Q=25	25	633.83	635.25	634.61	635.29	0.003205	1.5	16.68	18.41	0.28
T2-A	445.2593	Q=50	50	633.83	635.72	634.9	635.78	0.00356	1.94	25.75	20.7	0.31
T2-A	445.2593	Q=75	75	633.83	636.06	635.13	636.14	0.003849	2.27	33.11	22.38	0.33
T2-A	445.2593	Q=100	100	633.83	636.34	635.32	636.44	0.003992	2.54	39.47	23.58	0.34
T2-A	445.2593	Q=125	125	633.83	636.58	635.49	636.7	0.004133	2.77	45.27	24.63	0.35
T2-A	445.2593	Q=150	150	633.83	636.79	635.64	636.93	0.004245	2.99	50.64	25.54	0.36
T2-A	445.2593	Q=175	175	633.83	636.98	635.78	637.14	0.004284	3.18	55.65	26.3	0.37
T2-A	445.2593	Q=200	200	633.83	637.16	635.91	637.34	0.004329	3.36	60.43	27	0.38
T2-A	445.2593	Q=250	250	633.83	637.49	636.15	637.7	0.0044	3.69	69.52	28.29	0.39
T2-A	445.2593	Q=300	300	633.83	637.79	636.36	638.03	0.004456	3.97	78.13	29.46	0.4
T2-A	445.2593	Q=350	350	633.83	638.06	636.57	638.33	0.004512	4.22	86.28	30.45	0.41
T2-A	445.2593	Q=400	400	633.83	638.32	636.75	638.62	0.004549	4.45	94.17	31.36	0.41
T2-A	445.2593	Q=450	450	633.83	638.56	636.94	638.88	0.004588	4.67	101.74	32.22	0.42
T2-A	445.2593	Q=500	500	633.83	638.78	637.09	639.13	0.004645	4.87	108.89	33	0.43
T2-A	445.2593	Q=600	600	633.83	639.2	637.41	639.6	0.00469	5.23	123.09	34.49	0.43
T2-A	530.8471	Q=25	25	637.66	638.43	638.43	638.68	0.051601	4	6.25	12.78	1.01
T2-A	530.8471	Q=50	50	637.66	638.73	638.73	639.08	0.046274	4.8	10.42	14.91	1.01
T2-A	530.8471	Q=75	75	637.66	638.96	638.96	639.4	0.043189	5.32	14.1	16.34	1.01
T2-A	530.8471	Q=100	100	637.66	639.16	639.16	639.67	0.041244	5.72	17.48	17.5	1.01
T2-A	530.8471	Q=125	125	637.66	639.34	639.34	639.91	0.039803	6.06	20.64	18.43	1.01
T2-A	530.8471	Q=150	150	637.66	639.5	639.5	640.12	0.038748	6.34	23.65	19.27	1.01
T2-A	530.8471	Q=175	175	637.66	639.65	639.65	640.32	0.037835	6.59	26.56	20.05	1.01
T2-A	530.8471	Q=200	200	637.66	639.78	639.78	640.5	0.037052	6.8	29.39	20.78	1.01
T2-A	530.8471	Q=250	250	637.66	640.03	640.03	640.84	0.035743	7.2	34.71	22.05	1.01
T2-A	530.8471	Q=300	300	637.66	640.25	640.25	641.14	0.034355	7.57	39.71	23.13	1
T2-A	530.8471	Q=350	350	637.66	640.47	640.47	641.42	0.032759	7.85	44.81	24.18	1
T2-A	530.8471	Q=400	400	637.66	640.66	640.66	641.69	0.031888	8.13	49.57	25.13	0.99
T2-A	530.8471	Q=450	450	637.66	640.85	640.85	641.93	0.030383	8.37	54.37	25.91	0.98
T2-A	530.8471	Q=500	500	637.66	641.02	641.02	642.17	0.02945	8.64	58.72	26.54	0.98
T2-A	530.8471	Q=600	600	637.66	641.32	641.32	642.61	0.02815	9.15	67.05	27.69	0.98

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	643.2175	Q=25	25	638.88	640.37	639.87	640.45	0.007438	2.27	11	11.96	0.42
T2-A	643.2175	Q=50	50	638.88	640.85	640.24	640.98	0.008459	2.9	17.22	14.16	0.46
T2-A	643.2175	Q=75	75	638.88	641.19	640.53	641.36	0.00914	3.37	22.25	15.39	0.49
T2-A	643.2175	Q=100	100	638.88	641.46	640.77	641.68	0.009722	3.75	26.67	16.39	0.52
T2-A	643.2175	Q=125	125	638.88	641.71	640.98	641.96	0.010213	4.07	30.72	17.25	0.54
T2-A	643.2175	Q=150	150	638.88	641.92	641.16	642.21	0.010628	4.35	34.51	18.02	0.55
T2-A	643.2175	Q=175	175	638.88	642.11	641.33	642.44	0.011005	4.6	38.07	18.72	0.57
T2-A	643.2175	Q=200	200	638.88	642.28	641.5	642.65	0.011257	4.84	41.3	19.22	0.58
T2-A	643.2175	Q=250	250	638.88	642.58	641.79	643.02	0.011796	5.31	47.14	20.05	0.6
T2-A	643.2175	Q=300	300	638.88	642.84	642.06	643.35	0.01235	5.74	52.48	20.77	0.62
T2-A	643.2175	Q=350	350	638.88	643.07	642.29	643.66	0.012968	6.15	57.33	21.41	0.65
T2-A	643.2175	Q=400	400	638.88	643.28	642.53	643.94	0.013374	6.54	61.78	21.99	0.66
T2-A	643.2175	Q=450	450	638.88	643.46	642.72	644.2	0.013935	6.93	65.73	22.49	0.68
T2-A	643.2175	Q=500	500	638.88	643.62	642.92	644.45	0.014441	7.3	69.55	22.97	0.7
T2-A	643.2175	Q=600	600	638.88	643.94	643.3	644.92	0.015302	7.98	76.9	23.86	0.73
T2-A	742.6647	Q=25	25	642.67	643.56	643.61	643.9	0.065433	4.71	5.31	10.1	1.14
T2-A	742.6647	Q=50	50	642.67	643.86	643.96	644.37	0.06512	5.73	8.72	12.24	1.2
T2-A	742.6647	Q=75	75	642.67	644.11	644.23	644.72	0.061379	6.28	11.95	13.96	1.2
T2-A	742.6647	Q=100	100	642.67	644.31	644.44	645.01	0.058953	6.75	14.81	15	1.2
T2-A	742.6647	Q=125	125	642.67	644.48	644.63	645.27	0.056408	7.13	17.54	15.8	1.19
T2-A	742.6647	Q=150	150	642.67	644.65	644.8	645.5	0.053533	7.4	20.28	16.56	1.18
T2-A	742.6647	Q=175	175	642.67	644.81	644.96	645.71	0.051645	7.65	22.88	17.25	1.17
T2-A	742.6647	Q=200	200	642.67	644.96	645.1	645.91	0.049612	7.85	25.49	17.91	1.16
T2-A	742.6647	Q=250	250	642.67	645.19	645.36	646.29	0.047921	8.4	29.79	18.69	1.16
T2-A	742.6647	Q=300	300	642.67	645.4	645.61	646.63	0.046844	8.9	33.84	19.38	1.17
T2-A	742.6647	Q=350	350	642.67	645.59	645.85	646.95	0.04634	9.36	37.63	20.01	1.18
T2-A	742.6647	Q=400	400	642.67	645.76	646.05	647.26	0.047158	9.86	40.93	20.54	1.2
T2-A	742.6647	Q=450	450	642.67	645.91	646.26	647.55	0.048058	10.32	44.06	21.02	1.22
T2-A	742.6647	Q=500	500	642.67	646.05	646.44	647.84	0.048917	10.76	47.06	21.48	1.24
T2-A	742.6647	Q=600	600	642.67	646.29	646.81	648.38	0.051789	11.66	52.33	22.26	1.29

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	801.236	Q=25	25	646.21	647.01	647.01	647.27	0.050871	4.13	6.05	11.64	1.01
T2-A	801.236	Q=50	50	646.21	647.3	647.33	647.71	0.050086	5.14	9.73	13.22	1.06
T2-A	801.236	Q=75	75	646.21	647.51	647.58	648.06	0.053061	5.98	12.55	14.14	1.12
T2-A	801.236	Q=100	100	646.21	647.68	647.79	648.37	0.055862	6.66	15.02	14.9	1.17
T2-A	801.236	Q=125	125	646.21	647.82	647.98	648.64	0.058545	7.25	17.24	15.55	1.21
T2-A	801.236	Q=150	150	646.21	647.95	648.16	648.9	0.061955	7.82	19.19	16.1	1.26
T2-A	801.236	Q=175	175	646.21	648.06	648.32	649.13	0.064661	8.31	21.06	16.61	1.3
T2-A	801.236	Q=200	200	646.21	648.16	648.47	649.36	0.067852	8.79	22.74	17.06	1.34
T2-A	801.236	Q=250	250	646.21	648.35	648.73	649.78	0.071704	9.58	26.11	17.92	1.4
T2-A	801.236	Q=300	300	646.21	648.53	648.97	650.15	0.074328	10.22	29.34	18.7	1.44
T2-A	801.236	Q=350	350	646.21	648.69	649.2	650.51	0.075949	10.85	32.28	19.38	1.47
T2-A	801.236	Q=400	400	646.21	648.83	649.41	650.85	0.074834	11.39	35.2	19.95	1.48
T2-A	801.236	Q=450	450	646.21	648.98	649.61	651.16	0.073709	11.88	38.08	20.5	1.49
T2-A	801.236	Q=500	500	646.21	649.11	649.81	651.47	0.072802	12.34	40.89	21.03	1.5
T2-A	801.236	Q=600	600	646.21	649.4	650.17	651.99	0.067886	12.97	47.09	22.14	1.48
T2-A	844.97	Q=25	25	648.16	649.07	649.04	649.32	0.043591	4.07	6.14	10.68	0.95
T2-A	844.97	Q=50	50	648.16	649.39	649.39	649.79	0.044867	5.07	9.86	12.52	1.01
T2-A	844.97	Q=75	75	648.16	649.66	649.66	650.14	0.042256	5.58	13.43	14.07	1.01
T2-A	844.97	Q=100	100	648.16	649.88	649.88	650.44	0.040279	6	16.66	15.29	1.01
T2-A	844.97	Q=125	125	648.16	650.06	650.06	650.7	0.038148	6.4	19.61	16.2	1
T2-A	844.97	Q=150	150	648.16	650.23	650.23	650.94	0.035782	6.75	22.45	16.96	0.99
T2-A	844.97	Q=175	175	648.16	650.4	650.4	651.16	0.033894	7.05	25.25	17.68	0.98
T2-A	844.97	Q=200	200	648.16	650.55	650.55	651.37	0.032067	7.3	28.08	18.38	0.97
T2-A	844.97	Q=250	250	648.16	650.84	650.84	651.75	0.029708	7.76	33.47	19.63	0.96
T2-A	844.97	Q=300	300	648.16	651.1	651.1	652.1	0.027945	8.15	38.72	20.79	0.95
T2-A	844.97	Q=350	350	648.16	651.34	651.34	652.41	0.026418	8.48	43.95	21.88	0.94
T2-A	844.97	Q=400	400	648.16	651.56	651.56	652.71	0.025463	8.8	48.89	22.86	0.93
T2-A	844.97	Q=450	450	648.16	651.78	651.78	652.98	0.024476	9.07	53.88	23.77	0.93
T2-A	844.97	Q=500	500	648.16	651.99	651.99	653.23	0.023416	9.28	58.96	24.57	0.92
T2-A	844.97	Q=600	600	648.16	652.33	652.33	653.71	0.022807	9.82	67.75	25.9	0.92

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	892.3795	Q=25	25	648.5	649.95	649.46	650.03	0.007214	2.24	11.18	12.19	0.41
T2-A	892.3795	Q=50	50	648.5	650.44	649.82	650.56	0.007963	2.84	17.6	14.31	0.45
T2-A	892.3795	Q=75	75	648.5	650.78	650.1	650.95	0.008639	3.3	22.73	15.75	0.48
T2-A	892.3795	Q=100	100	648.5	651.04	650.34	651.25	0.008955	3.72	26.96	16.61	0.5
T2-A	892.3795	Q=125	125	648.5	651.26	650.55	651.52	0.009282	4.11	30.69	17.3	0.52
T2-A	892.3795	Q=150	150	648.5	651.46	650.74	651.76	0.009546	4.45	34.21	17.92	0.54
T2-A	892.3795	Q=175	175	648.5	651.64	650.89	651.99	0.009809	4.77	37.5	18.48	0.55
T2-A	892.3795	Q=200	200	648.5	650.42	651.04	652.48	0.13212	11.51	17.38	14.24	1.84
T2-A	892.3795	Q=250	250	648.5	650.63	651.33	652.96	0.131776	12.25	20.4	15.15	1.86
T2-A	892.3795	Q=300	300	648.5	650.81	651.61	653.39	0.128487	12.89	23.29	15.88	1.87
T2-A	892.3795	Q=350	350	648.5	650.98	651.85	653.8	0.122679	13.47	26.04	16.44	1.85
T2-A	892.3795	Q=400	400	648.5	651.15	652.08	654.17	0.1159	13.96	28.82	16.96	1.83
T2-A	892.3795	Q=450	450	648.5	651.31	652.32	654.53	0.110844	14.43	31.5	17.44	1.81
T2-A	892.3795	Q=500	500	648.5	651.46	652.53	654.85	0.105109	14.8	34.31	17.93	1.79
T2-A	892.3795	Q=600	600	648.5	651.77	652.92	655.41	0.094974	15.4	39.98	18.89	1.74
T2-A	933.8324	Q=25	25	651.87	652.73	652.73	653.01	0.049542	4.21	5.93	10.81	1
T2-A	933.8324	Q=50	50	651.87	653.08	653.08	653.47	0.044463	5.01	9.97	12.84	1
T2-A	933.8324	Q=75	75	651.87	653.34	653.34	653.82	0.042448	5.55	13.51	14.38	1.01
T2-A	933.8324	Q=100	100	651.87	653.55	653.55	654.11	0.040561	5.98	16.74	15.59	1.01
T2-A	933.8324	Q=125	125	651.87	653.74	653.74	654.36	0.038236	6.32	19.85	16.61	1
T2-A	933.8324	Q=150	150	651.87	653.91	653.91	654.6	0.03627	6.68	22.64	17.29	0.99
T2-A	933.8324	Q=175	175	651.87	654.07	654.07	654.82	0.034457	6.99	25.4	17.93	0.99
T2-A	933.8324	Q=200	200	651.87	654.22	654.22	655.03	0.032742	7.25	28.16	18.54	0.98
T2-A	933.8324	Q=250	250	651.87	654.49	654.49	655.4	0.030406	7.72	33.45	19.66	0.97
T2-A	933.8324	Q=300	300	651.87	654.75	654.75	655.75	0.028648	8.12	38.59	20.69	0.96
T2-A	933.8324	Q=350	350	651.87	654.99	654.99	656.06	0.02712	8.46	43.68	21.66	0.95
T2-A	933.8324	Q=400	400	651.87	655.21	655.21	656.36	0.026033	8.77	48.58	22.56	0.94
T2-A	933.8324	Q=450	450	651.87	655.43	655.43	656.63	0.024784	9.02	53.62	23.39	0.93
T2-A	933.8324	Q=500	500	651.87	655.63	655.63	656.89	0.024107	9.29	58.28	24.12	0.93
T2-A	933.8324	Q=600	600	651.87	655.98	655.98	657.37	0.023299	9.81	67.05	25.44	0.93

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	992.9296	Q=25	25	651.91	653.45	652.76	653.49	0.002996	1.57	16.07	16.9	0.27
T2-A	992.9296	Q=50	50	651.91	653.91	653.09	653.98	0.003313	2.12	24.5	19.57	0.31
T2-A	992.9296	Q=75	75	651.91	654.27	653.32	654.36	0.003493	2.5	31.74	21.6	0.33
T2-A	992.9296	Q=100	100	651.91	654.55	653.52	654.67	0.003687	2.83	38.06	23.21	0.34
T2-A	992.9296	Q=125	125	651.91	654.8	653.71	654.93	0.003822	3.1	43.99	24.62	0.36
T2-A	992.9296	Q=150	150	651.91	655.02	653.87	655.18	0.003909	3.33	49.67	25.9	0.36
T2-A	992.9296	Q=175	175	651.91	655.23	654.02	655.41	0.003965	3.53	55.19	27.03	0.37
T2-A	992.9296	Q=200	200	651.91	655.42	654.17	655.61	0.004025	3.72	60.4	28.02	0.38
T2-A	992.9296	Q=250	250	651.91	655.77	654.44	655.99	0.004084	4.03	70.58	29.9	0.39
T2-A	992.9296	Q=300	300	651.91	656.09	654.68	656.34	0.004116	4.3	80.35	31.62	0.4
T2-A	992.9296	Q=350	350	651.91	656.38	654.9	656.65	0.004135	4.54	89.77	33.19	0.4
T2-A	992.9296	Q=400	400	651.91	656.65	655.11	656.95	0.004139	4.75	98.97	34.66	0.41
T2-A	992.9296	Q=450	450	651.91	656.9	655.31	657.22	0.004142	4.93	107.82	35.89	0.41
T2-A	992.9296	Q=500	500	651.91	657.14	655.49	657.48	0.004128	5.1	116.58	37.05	0.41
T2-A	992.9296	Q=600	600	651.91	657.59	655.81	657.96	0.004082	5.39	133.7	39.11	0.42
T2-A	1066.659	Q=25	25	654.69	655.57	655.57	655.85	0.049336	4.18	5.98	10.99	1
T2-A	1066.659	Q=50	50	654.69	655.91	655.91	656.29	0.046009	4.96	10.07	13.55	1.01
T2-A	1066.659	Q=75	75	654.69	656.17	656.17	656.62	0.042827	5.4	13.88	15.56	1.01
T2-A	1066.659	Q=100	100	654.69	656.37	656.37	656.9	0.04105	5.85	17.13	16.87	1.01
T2-A	1066.659	Q=125	125	654.69	656.55	656.55	657.15	0.037499	6.22	20.24	17.77	0.99
T2-A	1066.659	Q=150	150	654.69	656.71	656.71	657.38	0.035493	6.57	23.16	18.58	0.99
T2-A	1066.659	Q=175	175	654.69	656.86	656.86	657.59	0.033565	6.85	26.08	19.36	0.98
T2-A	1066.659	Q=200	200	654.69	657.01	657.01	657.78	0.031658	7.09	29.06	20.12	0.96
T2-A	1066.659	Q=250	250	654.69	657.28	657.28	658.14	0.029625	7.56	34.55	21.45	0.95
T2-A	1066.659	Q=300	300	654.69	657.52	657.52	658.47	0.027924	7.94	39.96	22.68	0.95
T2-A	1066.659	Q=350	350	654.69	657.75	657.75	658.77	0.026469	8.26	45.31	23.8	0.94
T2-A	1066.659	Q=400	400	654.69	657.92	657.96	659.04	0.027084	8.74	49.34	24.57	0.96
T2-A	1066.659	Q=450	450	654.69	658.12	658.17	659.3	0.026065	9	54.32	25.51	0.95
T2-A	1066.659	Q=500	500	654.69	658.25	658.36	659.55	0.027075	9.46	57.73	26.13	0.98
T2-A	1066.659	Q=600	600	654.69	658.49	658.69	660.02	0.02888	10.31	64.22	27.27	1.02

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	1139.289	Q=25	25	657.37	658.37	658.26	658.56	0.028982	3.48	7.19	11.67	0.78
T2-A	1139.289	Q=50	50	657.37	658.47	658.59	659.02	0.073175	5.92	8.45	12.35	1.26
T2-A	1139.289	Q=75	75	657.37	658.67	658.85	659.39	0.075206	6.84	10.97	13.37	1.32
T2-A	1139.289	Q=100	100	657.37	658.84	659.06	659.72	0.074796	7.56	13.28	14.09	1.35
T2-A	1139.289	Q=125	125	657.37	658.98	659.26	660.02	0.07481	8.17	15.41	14.72	1.37
T2-A	1139.289	Q=150	150	657.37	659.11	659.44	660.29	0.075807	8.74	17.36	15.28	1.4
T2-A	1139.289	Q=175	175	657.37	659.23	659.61	660.55	0.077022	9.25	19.19	15.79	1.43
T2-A	1139.289	Q=200	200	657.37	659.35	659.76	660.78	0.076893	9.67	21.05	16.29	1.45
T2-A	1139.289	Q=250	250	657.37	659.56	660.03	661.21	0.076715	10.39	24.6	17.2	1.47
T2-A	1139.289	Q=300	300	657.37	659.74	660.29	661.61	0.078006	11.07	27.8	17.98	1.5
T2-A	1139.289	Q=350	350	657.37	659.9	660.53	661.99	0.078283	11.74	30.71	18.65	1.53
T2-A	1139.289	Q=400	400	657.37	660.07	660.76	662.33	0.0759	12.24	33.84	19.34	1.52
T2-A	1139.289	Q=450	450	657.37	660.22	660.97	662.65	0.073864	12.7	36.92	20	1.52
T2-A	1139.289	Q=500	500	657.37	660.38	661.16	662.94	0.071592	13.09	40.04	20.64	1.52
T2-A	1139.289	Q=600	600	657.37	660.66	661.53	663.49	0.068281	13.81	46.06	21.77	1.51
T2-A	1192	Q=25	25	660.51	661.29	661.29	661.56	0.050744	4.14	6.04	11.56	1.01
T2-A	1192	Q=50	50	660.51	661.62	661.62	661.99	0.045531	4.92	10.17	13.78	1.01
T2-A	1192	Q=75	75	660.51	661.87	661.87	662.33	0.042775	5.44	13.78	15.26	1.01
T2-A	1192	Q=100	100	660.51	662.08	662.08	662.61	0.040841	5.83	17.16	16.51	1.01
T2-A	1192	Q=125	125	660.51	662.26	662.26	662.85	0.039395	6.18	20.23	17.57	1.01
T2-A	1192	Q=150	150	660.51	662.42	662.42	663.08	0.037561	6.49	23.2	18.51	1
T2-A	1192	Q=175	175	660.51	662.58	662.58	663.28	0.035678	6.72	26.22	19.42	0.99
T2-A	1192	Q=200	200	660.51	662.73	662.73	663.48	0.03456	6.96	29.06	20.24	0.99
T2-A	1192	Q=250	250	660.51	662.98	662.98	663.82	0.032627	7.4	34.42	21.68	0.98
T2-A	1192	Q=300	300	660.51	663.22	663.22	664.14	0.030468	7.77	39.69	22.99	0.97
T2-A	1192	Q=350	350	660.51	663.45	663.45	664.43	0.028314	8.06	45.14	24.28	0.95
T2-A	1192	Q=400	400	660.51	663.65	663.65	664.71	0.027204	8.37	50.14	25.38	0.94
T2-A	1192	Q=450	450	660.51	663.84	663.84	664.96	0.026171	8.63	55.11	26.27	0.94
T2-A	1192	Q=500	500	660.51	664.02	664.02	665.2	0.025451	8.89	59.87	27.09	0.94
T2-A	1192	Q=600	600	660.51	664.37	664.37	665.64	0.023819	9.3	69.6	28.71	0.92

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	1259.899	Q=25	25	662.04	663.12	662.85	663.23	0.014294	2.68	9.32	13.15	0.56
T2-A	1259.899	Q=50	50	662.04	663.49	663.18	663.67	0.015175	3.47	14.56	15.62	0.61
T2-A	1259.899	Q=75	75	662.04	663.76	663.43	664.01	0.015799	4.01	19.1	17.48	0.64
T2-A	1259.899	Q=100	100	662.04	663.97	663.65	664.28	0.016101	4.49	22.96	18.69	0.67
T2-A	1259.899	Q=125	125	662.04	664.15	663.84	664.52	0.016501	4.93	26.42	19.68	0.69
T2-A	1259.899	Q=150	150	662.04	664.32	664	664.74	0.016859	5.31	29.67	20.56	0.71
T2-A	1259.899	Q=175	175	662.04	664.46	664.16	664.94	0.017396	5.68	32.61	21.28	0.73
T2-A	1259.899	Q=200	200	662.04	664.59	664.31	665.12	0.017668	6	35.54	21.94	0.74
T2-A	1259.899	Q=250	250	662.04	664.83	664.57	665.46	0.018306	6.58	40.97	23.1	0.77
T2-A	1259.899	Q=300	300	662.04	665.04	664.81	665.77	0.01911	7.12	45.83	24.1	0.8
T2-A	1259.899	Q=350	350	662.04	665.21	665.04	666.05	0.020235	7.66	50.05	24.93	0.83
T2-A	1259.899	Q=400	400	662.04	665.03	665.24	666.35	0.034584	9.55	45.54	24.04	1.07
T2-A	1259.899	Q=450	450	662.04	665.17	665.43	666.62	0.035457	10.04	49.03	24.73	1.1
T2-A	1259.899	Q=500	500	662.04	665.3	665.63	666.88	0.036325	10.5	52.36	25.37	1.12
T2-A	1259.899	Q=600	600	662.04	665.55	665.98	667.37	0.037861	11.35	58.71	26.55	1.16
T2-A	1323.272	Q=25	25	664.13	664.95	664.95	665.21	0.050743	4.15	6.02	11.45	1.01
T2-A	1323.272	Q=50	50	664.13	665.27	665.27	665.65	0.045614	4.93	10.14	13.7	1.01
T2-A	1323.272	Q=75	75	664.13	665.52	665.52	665.98	0.042677	5.45	13.76	15.18	1.01
T2-A	1323.272	Q=100	100	664.13	665.74	665.74	666.27	0.040891	5.84	17.12	16.43	1.01
T2-A	1323.272	Q=125	125	664.13	665.92	665.92	666.51	0.03964	6.16	20.29	17.53	1.01
T2-A	1323.272	Q=150	150	664.13	666.09	666.09	666.73	0.038591	6.43	23.34	18.53	1.01
T2-A	1323.272	Q=175	175	664.13	666.25	666.25	666.94	0.037594	6.65	26.31	19.44	1.01
T2-A	1323.272	Q=200	200	664.13	666.38	666.38	667.12	0.036738	6.91	28.98	20.13	1.01
T2-A	1323.272	Q=250	250	664.13	666.63	666.63	667.47	0.034801	7.35	34.14	21.32	1
T2-A	1323.272	Q=300	300	664.13	666.86	666.86	667.79	0.032715	7.75	39.05	22.28	0.99
T2-A	1323.272	Q=350	350	664.13	667.08	667.08	668.08	0.030273	8.04	44.23	23.25	0.97
T2-A	1323.272	Q=400	400	664.13	667.28	667.28	668.36	0.029393	8.39	48.75	24.07	0.97
T2-A	1323.272	Q=450	450	664.13	667.47	667.47	668.62	0.028152	8.67	53.48	24.89	0.96
T2-A	1323.272	Q=500	500	664.13	667.65	667.65	668.86	0.027101	8.92	58.15	25.68	0.96
T2-A	1323.272	Q=600	600	664.13	668.01	668.01	669.32	0.025246	9.34	67.5	27.43	0.94

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	1388.66	Q=25	25	665.38	666.44		666.52	0.010423	2.29	10.91	15.48	0.48
T2-A	1388.66	Q=50	50	665.38	666.82		666.95	0.010822	2.86	17.46	18.14	0.51
T2-A	1388.66	Q=75	75	665.38	667.11		667.28	0.010947	3.29	22.86	20.07	0.53
T2-A	1388.66	Q=100	100	665.38	667.33		667.54	0.010932	3.66	27.54	21.49	0.55
T2-A	1388.66	Q=125	125	665.38	667.53		667.77	0.010902	3.99	31.84	22.66	0.56
T2-A	1388.66	Q=150	150	665.38	667.7		667.98	0.010906	4.29	35.92	23.72	0.57
T2-A	1388.66	Q=175	175	665.38	667.87		668.18	0.010869	4.54	39.88	24.7	0.58
T2-A	1388.66	Q=200	200	665.38	668.01		668.36	0.01095	4.79	43.57	25.59	0.59
T2-A	1388.66	Q=250	250	665.38	668.28	667.68	668.69	0.011007	5.21	50.71	27.19	0.6
T2-A	1388.66	Q=300	300	665.38	668.53	667.91	668.99	0.011052	5.58	57.51	28.61	0.61
T2-A	1388.66	Q=350	350	665.38	668.75	668.12	669.26	0.011167	5.92	63.87	29.89	0.62
T2-A	1388.66	Q=400	400	665.38	668.96	668.32	669.52	0.011006	6.18	70.55	31.05	0.63
T2-A	1388.66	Q=450	450	665.38	669.16	668.51	669.76	0.010967	6.43	76.8	32.07	0.63
T2-A	1388.66	Q=500	500	665.38	669.35	668.68	669.99	0.010891	6.66	82.98	33.05	0.64
T2-A	1388.66	Q=600	600	665.38	669.71	669.01	670.41	0.010742	7.07	95.05	34.99	0.64
T2-A	1458.658	Q=25	25	666.26	667.45		667.64	0.026104	3.49	7.17	10.63	0.75
T2-A	1458.658	Q=50	50	666.26	667.84		668.12	0.026248	4.23	11.81	13.09	0.79
T2-A	1458.658	Q=75	75	666.26	668.12		668.47	0.027312	4.79	15.65	14.82	0.82
T2-A	1458.658	Q=100	100	666.26	668.33		668.76	0.027576	5.31	18.87	15.98	0.85
T2-A	1458.658	Q=125	125	666.26	668.49	668.37	669.02	0.028227	5.84	21.56	16.79	0.87
T2-A	1458.658	Q=150	150	666.26	668.64	668.54	669.25	0.02879	6.31	24.1	17.52	0.9
T2-A	1458.658	Q=175	175	666.26	668.77	668.71	669.47	0.029419	6.74	26.49	18.17	0.92
T2-A	1458.658	Q=200	200	666.26	668.9	668.86	669.68	0.029902	7.13	28.8	18.79	0.94
T2-A	1458.658	Q=250	250	666.26	669.15	669.15	670.06	0.029316	7.72	33.74	20.03	0.95
T2-A	1458.658	Q=300	300	666.26	669.41	669.41	670.4	0.02771	8.12	39.03	21.29	0.94
T2-A	1458.658	Q=350	350	666.26	669.66	669.66	670.71	0.025758	8.39	44.62	22.54	0.92
T2-A	1458.658	Q=400	400	666.26	669.87	669.87	671	0.025186	8.75	49.45	23.59	0.93
T2-A	1458.658	Q=450	450	666.26	670.08	670.08	671.27	0.024236	9.01	54.55	24.65	0.92
T2-A	1458.658	Q=500	500	666.26	670.28	670.28	671.52	0.023584	9.27	59.42	25.59	0.92
T2-A	1458.658	Q=600	600	666.26	670.66	670.66	671.98	0.022048	9.66	69.49	27.42	0.9

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	1525.701	Q=25	25	668.14	669.09	668.92	669.23	0.021733	3.04	8.22	13.19	0.68
T2-A	1525.701	Q=50	50	668.14	669.46	669.24	669.67	0.020392	3.68	13.6	15.6	0.69
T2-A	1525.701	Q=75	75	668.14	669.75	669.48	670.01	0.019427	4.07	18.44	17.48	0.7
T2-A	1525.701	Q=100	100	668.14	669.99	669.69	670.29	0.018846	4.4	22.74	19.02	0.7
T2-A	1525.701	Q=125	125	668.14	670.2	669.87	670.54	0.018125	4.68	26.81	20.39	0.7
T2-A	1525.701	Q=150	150	668.14	670.38	670.03	670.76	0.01759	4.95	30.61	21.55	0.71
T2-A	1525.701	Q=175	175	668.14	670.55	670.18	670.96	0.016785	5.18	34.32	22.51	0.7
T2-A	1525.701	Q=200	200	668.14	670.7	670.33	671.15	0.016139	5.39	37.95	23.42	0.7
T2-A	1525.701	Q=250	250	668.14	670.98	670.57	671.49	0.015533	5.8	44.64	25	0.7
T2-A	1525.701	Q=300	300	668.14	671.22	670.8	671.8	0.015336	6.19	50.79	26.37	0.71
T2-A	1525.701	Q=350	350	668.14	670.63	671.01	672.12	0.056803	9.84	36.24	23	1.3
T2-A	1525.701	Q=400	400	668.14	670.8	671.22	672.4	0.053981	10.2	40.27	23.98	1.29
T2-A	1525.701	Q=450	450	668.14	670.96	671.4	672.66	0.051944	10.54	44.16	24.89	1.28
T2-A	1525.701	Q=500	500	668.14	671.12	671.58	672.9	0.050015	10.84	48.07	25.78	1.27
T2-A	1525.701	Q=600	600	668.14	671.38	671.91	673.36	0.048398	11.49	55.12	27.2	1.27
T2-A	1580.077	Q=25	25	670.23	671.1	671.1	671.36	0.050115	4.08	6.12	11.87	1
T2-A	1580.077	Q=50	50	670.23	671.41	671.41	671.78	0.045757	4.88	10.26	14.44	1.01
T2-A	1580.077	Q=75	75	670.23	671.66	671.66	672.11	0.041128	5.41	13.98	16.1	1
T2-A	1580.077	Q=100	100	670.23	671.87	671.87	672.39	0.038516	5.82	17.46	17.51	0.99
T2-A	1580.077	Q=125	125	670.23	672.04	672.04	672.63	0.035699	6.19	20.67	18.57	0.98
T2-A	1580.077	Q=150	150	670.23	672.2	672.2	672.85	0.033811	6.53	23.72	19.51	0.97
T2-A	1580.077	Q=175	175	670.23	672.36	672.36	673.06	0.032119	6.81	26.76	20.41	0.96
T2-A	1580.077	Q=200	200	670.23	672.5	672.5	673.25	0.030471	7.05	29.82	21.27	0.95
T2-A	1580.077	Q=250	250	670.23	672.77	672.77	673.59	0.028073	7.46	35.77	22.82	0.93
T2-A	1580.077	Q=300	300	670.23	673	673	673.9	0.027003	7.87	41.09	23.79	0.93
T2-A	1580.077	Q=350	350	670.23	673.21	673.21	674.19	0.026095	8.22	46.25	24.71	0.93
T2-A	1580.077	Q=400	400	670.23	673.37	673.41	674.46	0.026969	8.72	50.18	25.45	0.96
T2-A	1580.077	Q=450	450	670.23	673.52	673.61	674.72	0.027676	9.17	54	26.16	0.98
T2-A	1580.077	Q=500	500	670.23	673.65	673.79	674.96	0.028621	9.62	57.47	26.78	1
T2-A	1580.077	Q=600	600	670.23	673.93	674.12	675.41	0.029019	10.3	65.05	28.1	1.03

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	1639.996	Q=25	25	671.87	672.9		673.02	0.017358	2.76	9.07	14.28	0.61
T2-A	1639.996	Q=50	50	671.87	673.25		673.43	0.017934	3.45	14.51	17.01	0.65
T2-A	1639.996	Q=75	75	671.87	673.47		673.73	0.018731	4.11	18.42	18.07	0.69
T2-A	1639.996	Q=100	100	671.87	673.66		673.99	0.019279	4.64	21.94	18.97	0.72
T2-A	1639.996	Q=125	125	671.87	673.82		674.22	0.020095	5.12	25.04	19.73	0.75
T2-A	1639.996	Q=150	150	671.87	673.96	673.75	674.43	0.020876	5.56	27.89	20.41	0.78
T2-A	1639.996	Q=175	175	671.87	674.09	673.9	674.63	0.021465	5.94	30.62	21.03	0.8
T2-A	1639.996	Q=200	200	671.87	674.21	674.04	674.81	0.022276	6.32	33.08	21.58	0.82
T2-A	1639.996	Q=250	250	671.87	674.41	674.3	675.15	0.023888	7.03	37.59	22.55	0.87
T2-A	1639.996	Q=300	300	671.87	674.6	674.54	675.47	0.02511	7.64	41.86	23.43	0.9
T2-A	1639.996	Q=350	350	671.87	674.77	674.76	675.76	0.02612	8.18	45.93	24.27	0.93
T2-A	1639.996	Q=400	400	671.87	674.96	674.96	676.03	0.025683	8.54	50.71	25.26	0.94
T2-A	1639.996	Q=450	450	671.87	675.16	675.16	676.28	0.024887	8.83	55.7	26.24	0.93
T2-A	1639.996	Q=500	500	671.87	675.36	675.36	676.52	0.023725	9.03	61.04	27.26	0.92
T2-A	1639.996	Q=600	600	671.87	675.69	675.69	676.97	0.022944	9.52	70.34	28.95	0.92
T2-A	1688.42	Q=25	25	671.91	673.36	672.77	673.42	0.00467	1.86	13.47	14.61	0.34
T2-A	1688.42	Q=50	50	671.91	673.79	673.12	673.89	0.005636	2.5	20.27	16.93	0.39
T2-A	1688.42	Q=75	75	671.91	674.09	673.37	674.23	0.006258	3.03	25.48	18.35	0.42
T2-A	1688.42	Q=100	100	671.91	674.34	673.59	674.52	0.006657	3.44	30.24	19.56	0.45
T2-A	1688.42	Q=125	125	671.91	674.56	673.78	674.78	0.006958	3.8	34.67	20.62	0.47
T2-A	1688.42	Q=150	150	671.91	674.76	673.94	675.01	0.007166	4.1	38.92	21.59	0.48
T2-A	1688.42	Q=175	175	671.91	674.94	674.1	675.23	0.007364	4.38	42.92	22.45	0.49
T2-A	1688.42	Q=200	200	671.91	675.11	674.26	675.43	0.007493	4.62	46.82	23.18	0.5
T2-A	1688.42	Q=250	250	671.91	675.43	674.53	675.8	0.00765	5.04	54.38	24.55	0.52
T2-A	1688.42	Q=300	300	671.91	675.72	674.79	676.13	0.007741	5.39	61.63	25.79	0.53
T2-A	1688.42	Q=350	350	671.91	675.99	675.02	676.44	0.007782	5.7	68.67	26.94	0.54
T2-A	1688.42	Q=400	400	671.91	676.22	675.24	676.72	0.007917	6.01	75.11	27.96	0.55
T2-A	1688.42	Q=450	450	671.91	676.43	675.45	676.98	0.008081	6.3	81.17	28.88	0.56
T2-A	1688.42	Q=500	500	671.91	674.69	675.63	677.68	0.089254	14.17	37.41	21.25	1.69
T2-A	1688.42	Q=600	600	671.91	674.92	675.99	678.3	0.088982	15.13	42.51	22.37	1.71

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-A	1733.616	Q=25	25	675.87	676.58	676.74	677.12	0.133737	5.91	4.23	9.84	1.59
T2-A	1733.616	Q=50	50	675.87	676.82	677.07	677.64	0.133805	7.24	6.91	11.81	1.67
T2-A	1733.616	Q=75	75	675.87	677	677.33	678.05	0.136635	8.21	9.13	13.17	1.73
T2-A	1733.616	Q=100	100	675.87	677.14	677.54	678.43	0.138904	9.12	11	14.03	1.79
T2-A	1733.616	Q=125	125	675.87	677.26	677.73	678.76	0.139919	9.85	12.77	14.8	1.83
T2-A	1733.616	Q=150	150	675.87	677.39	677.89	679.02	0.132033	10.25	14.78	15.63	1.81
T2-A	1733.616	Q=175	175	675.87	677.5	678.05	679.28	0.130621	10.74	16.52	16.32	1.82
T2-A	1733.616	Q=200	200	675.87	677.61	678.21	679.51	0.125569	11.11	18.31	16.99	1.81
T2-A	1733.616	Q=250	250	675.87	677.84	678.48	679.87	0.106994	11.54	22.3	18.38	1.72
T2-A	1733.616	Q=300	300	675.87	678.03	678.72	680.21	0.097482	12.01	26	19.58	1.68
T2-A	1733.616	Q=350	350	675.87	678.24	678.95	680.47	0.085236	12.2	30.27	20.87	1.6
T2-A	1733.616	Q=400	400	675.87	678.44	679.16	680.7	0.075771	12.35	34.62	22.12	1.54
T2-A	1733.616	Q=450	450	675.87	678.62	679.35	680.93	0.069741	12.55	38.73	23.19	1.5
T2-A	1733.616	Q=500	500	675.87	678.81	679.54	681.13	0.063503	12.65	43.15	24.32	1.45
T2-A	1733.616	Q=600	600	675.87	679.17	679.87	681.49	0.053767	12.78	52.25	26.53	1.36
T2-A	1766.048	Q=25	25	678.83	679.52	679.52	679.75	0.05326	3.81	6.57	14.9	1.01
T2-A	1766.048	Q=50	50	678.83	679.8	679.8	680.11	0.04754	4.43	11.29	18.71	1
T2-A	1766.048	Q=75	75	678.83	680	680	680.38	0.042216	4.91	15.46	22.47	0.99
T2-A	1766.048	Q=100	100	678.83	680.18	680.18	680.6	0.037026	5.27	19.63	25.49	0.96
T2-A	1766.048	Q=125	125	678.83	680.34	680.34	680.8	0.032909	5.52	23.98	28.44	0.92
T2-A	1766.048	Q=150	150	678.83	680.47	680.47	680.97	0.031381	5.81	27.88	31.1	0.92
T2-A	1766.048	Q=175	175	678.83	680.61	680.61	681.13	0.028826	5.97	32.33	34.26	0.9
T2-A	1766.048	Q=200	200	678.83	680.73	680.73	681.27	0.027028	6.12	36.69	36.96	0.88
T2-A	1766.048	Q=250	250	678.83	680.92	680.92	681.51	0.02613	6.52	44.19	41.33	0.88
T2-A	1766.048	Q=300	300	678.83	681.13	681.13	681.73	0.023484	6.67	53.13	45.99	0.85
T2-A	1766.048	Q=350	350	678.83	681.28	681.28	681.91	0.023103	6.95	60.17	48.59	0.86
T2-A	1766.048	Q=400	400	678.83	681.41	681.41	682.09	0.023017	7.24	66.74	50.94	0.87
T2-A	1766.048	Q=450	450	678.83	681.55	681.55	682.25	0.022034	7.39	74.25	53.53	0.86
T2-A	1766.048	Q=500	500	678.83	681.66	681.66	682.4	0.022041	7.63	80.45	55.5	0.86
T2-A	1766.048	Q=600	600	678.83	681.88	681.88	682.67	0.021828	8.03	92.58	58.73	0.87

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-B	2938.618	Q=25	25	627.88	628.76	628.54	628.85	0.014092	2.28	10.97	19.84	0.54
T2-B	2938.618	Q=50	50	627.88	629.06	628.79	629.19	0.015188	2.86	17.46	23.65	0.59
T2-B	2938.618	Q=75	75	627.88	629.27	628.99	629.44	0.016065	3.31	22.68	26.23	0.62
T2-B	2938.618	Q=100	100	627.88	629.44	629.15	629.65	0.016818	3.67	27.33	28.31	0.65
T2-B	2938.618	Q=125	125	627.88	629.58	629.3	629.83	0.017409	4	31.45	29.98	0.67
T2-B	2938.618	Q=150	150	627.88	629.7	629.43	629.99	0.017898	4.34	34.98	31.23	0.69
T2-B	2938.618	Q=175	175	627.88	629.8	629.54	630.13	0.018526	4.66	38.21	32.33	0.71
T2-B	2938.618	Q=200	200	627.88	629.9	629.65	630.27	0.019009	4.94	41.36	33.37	0.73
T2-B	2938.618	Q=250	250	627.88	630.04	629.84	630.51	0.021269	5.57	46.24	34.98	0.79
T2-B	2938.618	Q=300	300	627.88	630.03	630.02	630.72	0.031511	6.75	45.8	34.82	0.96
T2-B	2938.618	Q=350	350	627.88	630.19	630.19	630.95	0.030047	7.05	51.69	36.82	0.95
T2-B	2938.618	Q=400	400	627.88	630.35	630.35	631.15	0.028842	7.32	57.51	38.69	0.94
T2-B	2938.618	Q=450	450	627.88	630.5	630.5	631.34	0.027225	7.5	63.75	40.5	0.93
T2-B	2938.618	Q=500	500	627.88	630.64	630.64	631.52	0.026356	7.71	69.42	41.71	0.93
T2-B	2938.618	Q=600	600	627.88	630.89	630.89	631.85	0.025072	8.1	80.27	43.77	0.92
T2-B	3050.464	Q=25	25	630.02	630.79		630.93	0.025506	3.01	8.3	15.37	0.72
T2-B	3050.464	Q=50	50	630.02	631.12	630.95	631.32	0.023937	3.61	13.86	18.63	0.74
T2-B	3050.464	Q=75	75	630.02	631.36	631.17	631.61	0.023206	4.05	18.55	20.82	0.75
T2-B	3050.464	Q=100	100	630.02	631.54	631.35	631.85	0.022485	4.47	22.49	22.12	0.76
T2-B	3050.464	Q=125	125	630.02	631.69	631.5	632.06	0.02221	4.87	26.02	23.14	0.77
T2-B	3050.464	Q=150	150	630.02	631.83	631.64	632.25	0.02222	5.22	29.29	24.05	0.79
T2-B	3050.464	Q=175	175	630.02	631.97	631.78	632.43	0.021989	5.53	32.54	24.92	0.79
T2-B	3050.464	Q=200	200	630.02	632.08	631.9	632.6	0.022183	5.83	35.47	25.68	0.81
T2-B	3050.464	Q=250	250	630.02	632.33	632.13	632.91	0.021109	6.25	41.94	27.34	0.81
T2-B	3050.464	Q=300	300	630.02	632.66	632.35	633.24	0.016708	6.21	51.56	29.7	0.74
T2-B	3050.464	Q=350	350	630.02	632.82	632.55	633.48	0.017659	6.68	56.33	30.8	0.77
T2-B	3050.464	Q=400	400	630.02	632.97	632.73	633.71	0.018499	7.12	60.88	31.81	0.79
T2-B	3050.464	Q=450	450	630.02	633.08	632.9	633.92	0.019769	7.58	64.64	32.63	0.83
T2-B	3050.464	Q=500	500	630.02	633.21	633.07	634.12	0.020536	7.97	68.72	33.44	0.85
T2-B	3050.464	Q=600	600	630.02	633.17	633.37	634.54	0.031322	9.75	67.34	33.2	1.04

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-B	3124.306	Q=25	25	632.43	633.12	633.08	633.31	0.041442	3.57	7.01	14.51	0.9
T2-B	3124.306	Q=50	50	632.43	633.38	633.36	633.69	0.043986	4.48	11.16	17.12	0.98
T2-B	3124.306	Q=75	75	632.43	633.58	633.58	633.98	0.044094	5.04	14.89	19.17	1.01
T2-B	3124.306	Q=100	100	632.43	633.76	633.76	634.22	0.041824	5.42	18.47	20.79	1.01
T2-B	3124.306	Q=125	125	632.43	633.91	633.91	634.43	0.039256	5.78	21.72	21.89	1
T2-B	3124.306	Q=150	150	632.43	634.05	634.05	634.63	0.037167	6.11	24.8	22.79	0.99
T2-B	3124.306	Q=175	175	632.43	634.19	634.19	634.81	0.035037	6.37	27.92	23.67	0.98
T2-B	3124.306	Q=200	200	632.43	634.31	634.31	634.98	0.033396	6.62	30.96	24.5	0.97
T2-B	3124.306	Q=250	250	632.43	634.54	634.54	635.3	0.031144	7.05	36.76	26	0.96
T2-B	3124.306	Q=300	300	632.43	634.76	634.76	635.58	0.029005	7.39	42.62	27.51	0.95
T2-B	3124.306	Q=350	350	632.43	634.91	634.96	635.85	0.030148	7.92	46.76	28.55	0.98
T2-B	3124.306	Q=400	400	632.43	635.05	635.14	636.09	0.030945	8.39	50.83	29.53	1
T2-B	3124.306	Q=450	450	632.43	635.18	635.31	636.33	0.031686	8.82	54.74	30.44	1.02
T2-B	3124.306	Q=500	500	632.43	635.29	635.48	636.55	0.032973	9.28	58.12	31.2	1.05
T2-B	3124.306	Q=600	600	632.43	635.52	635.78	636.97	0.033894	10	65.48	32.8	1.08
T2-B	3203.58	Q=25	25	634.72	635.5		635.62	0.021524	2.82	8.98	17.43	0.67
T2-B	3203.58	Q=50	50	634.72	635.78		635.98	0.020384	3.62	14.31	19.74	0.7
T2-B	3203.58	Q=75	75	634.72	636		636.27	0.020312	4.21	18.77	21.33	0.72
T2-B	3203.58	Q=100	100	634.72	636.17		636.5	0.021005	4.73	22.45	22.06	0.75
T2-B	3203.58	Q=125	125	634.72	636.32	636.17	636.71	0.021739	5.19	25.74	22.68	0.78
T2-B	3203.58	Q=150	150	634.72	636.45	636.31	636.9	0.022603	5.62	28.67	23.23	0.81
T2-B	3203.58	Q=175	175	634.72	636.56	636.44	637.08	0.023563	6.02	31.33	23.72	0.83
T2-B	3203.58	Q=200	200	634.72	636.66	636.56	637.25	0.024695	6.41	33.72	24.15	0.86
T2-B	3203.58	Q=250	250	634.72	636.85	636.79	637.56	0.026282	7.09	38.35	24.95	0.91
T2-B	3203.58	Q=300	300	634.72	637	637	637.85	0.028224	7.75	42.33	25.63	0.95
T2-B	3203.58	Q=350	350	634.72	637.2	637.2	638.12	0.027536	8.13	47.38	26.46	0.95
T2-B	3203.58	Q=400	400	634.72	637.38	637.38	638.37	0.026884	8.46	52.3	27.25	0.96
T2-B	3203.58	Q=450	450	634.72	637.56	637.56	638.61	0.026312	8.76	57.1	27.99	0.96
T2-B	3203.58	Q=500	500	634.72	637.73	637.73	638.84	0.025428	9	62.1	28.74	0.95
T2-B	3203.58	Q=600	600	634.72	638.04	638.04	639.26	0.02466	9.5	71.09	29.88	0.95

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-B	3332.569	Q=25	25	637.52	638.3		638.42	0.021885	2.83	8.93	17.41	0.67
T2-B	3332.569	Q=50	50	637.52	638.56	638.42	638.77	0.022902	3.76	13.77	19.52	0.73
T2-B	3332.569	Q=75	75	637.52	638.77	638.63	639.05	0.022968	4.38	18.02	21.18	0.76
T2-B	3332.569	Q=100	100	637.52	638.95	638.81	639.29	0.022349	4.83	22	21.97	0.77
T2-B	3332.569	Q=125	125	637.52	639.12	638.97	639.51	0.02169	5.19	25.75	22.69	0.78
T2-B	3332.569	Q=150	150	637.52	639.28	639.11	639.71	0.021004	5.49	29.38	23.36	0.78
T2-B	3332.569	Q=175	175	637.52	639.43	639.24	639.9	0.020316	5.74	32.92	24	0.78
T2-B	3332.569	Q=200	200	637.52	639.57	639.36	640.08	0.019674	5.97	36.39	24.62	0.78
T2-B	3332.569	Q=250	250	637.52	639.83		640.4	0.018639	6.36	43.05	25.75	0.78
T2-B	3332.569	Q=300	300	637.52	640.09		640.7	0.017552	6.66	49.72	26.84	0.77
T2-B	3332.569	Q=350	350	637.52	640.27		640.97	0.017921	7.08	54.83	27.64	0.78
T2-B	3332.569	Q=400	400	637.52	640.45		641.21	0.018169	7.46	59.8	28.4	0.8
T2-B	3332.569	Q=450	450	637.52	640.61	640.36	641.45	0.018573	7.83	64.34	29.05	0.82
T2-B	3332.569	Q=500	500	637.52	640.76	640.53	641.66	0.018991	8.19	68.62	29.58	0.83
T2-B	3332.569	Q=600	600	637.52	641.04	640.84	642.08	0.019405	8.79	77.18	30.61	0.85
T2-B	3462.388	Q=25	25	640.18	640.97		641.09	0.019462	2.73	9.27	17.56	0.64
T2-B	3462.388	Q=50	50	640.18	641.26		641.45	0.018797	3.53	14.7	19.9	0.67
T2-B	3462.388	Q=75	75	640.18	641.48		641.74	0.018763	4.11	19.27	21.43	0.7
T2-B	3462.388	Q=100	100	640.18	641.66		641.97	0.019187	4.6	23.14	22.19	0.72
T2-B	3462.388	Q=125	125	640.18	641.82		642.18	0.019648	5.03	26.61	22.85	0.75
T2-B	3462.388	Q=150	150	640.18	641.95		642.38	0.020177	5.42	29.78	23.44	0.77
T2-B	3462.388	Q=175	175	640.18	642.08		642.56	0.020678	5.78	32.73	23.97	0.79
T2-B	3462.388	Q=200	200	640.18	642.19	642.02	642.72	0.021104	6.1	35.54	24.47	0.8
T2-B	3462.388	Q=250	250	640.18	642.4	642.25	643.04	0.02188	6.69	40.79	25.37	0.83
T2-B	3462.388	Q=300	300	640.18	642.59	642.46	643.32	0.022843	7.24	45.47	26.15	0.86
T2-B	3462.388	Q=350	350	640.18	642.79	642.66	643.59	0.022392	7.61	50.82	27.01	0.87
T2-B	3462.388	Q=400	400	640.18	642.97	642.84	643.84	0.022148	7.95	55.88	27.8	0.87
T2-B	3462.388	Q=450	450	640.18	643.15	643.02	644.08	0.021807	8.25	60.9	28.56	0.88
T2-B	3462.388	Q=500	500	640.18	643.32	643.19	644.31	0.021489	8.52	65.78	29.23	0.88
T2-B	3462.388	Q=600	600	640.18	643.62	643.5	644.73	0.021286	9.06	74.77	30.32	0.89

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-B	3564.603	Q=25	25	642.18	642.97		643.09	0.019748	2.75	9.23	17.54	0.64
T2-B	3564.603	Q=50	50	642.18	643.25		643.44	0.020195	3.61	14.36	19.76	0.69
T2-B	3564.603	Q=75	75	642.18	643.46		643.73	0.020225	4.21	18.8	21.33	0.72
T2-B	3564.603	Q=100	100	642.18	643.65		643.97	0.019914	4.65	22.85	22.13	0.73
T2-B	3564.603	Q=125	125	642.18	643.82		644.18	0.019645	5.03	26.61	22.85	0.75
T2-B	3564.603	Q=150	150	642.18	643.97		644.38	0.019197	5.33	30.27	23.53	0.75
T2-B	3564.603	Q=175	175	642.18	644.12		644.57	0.018851	5.61	33.76	24.15	0.75
T2-B	3564.603	Q=200	200	642.18	644.26		644.75	0.018546	5.86	37.11	24.74	0.76
T2-B	3564.603	Q=250	250	642.18	644.51		645.07	0.018068	6.29	43.51	25.83	0.76
T2-B	3564.603	Q=300	300	642.18	644.75	644.46	645.36	0.01752	6.65	49.75	26.84	0.77
T2-B	3564.603	Q=350	350	642.18	644.94	644.66	645.63	0.017738	7.06	55.03	27.67	0.78
T2-B	3564.603	Q=400	400	642.18	645.12	644.84	645.88	0.017855	7.42	60.16	28.46	0.79
T2-B	3564.603	Q=450	450	642.18	645.29	645.02	646.11	0.018033	7.76	65	29.13	0.8
T2-B	3564.603	Q=500	500	642.18	645.45	645.19	646.33	0.018237	8.08	69.58	29.69	0.82
T2-B	3564.603	Q=600	600	642.18	645.75	645.5	646.75	0.018289	8.62	78.77	30.79	0.83
T2-B	3648.901	Q=25	25	644.18	644.92		645.06	0.027915	3.05	8.27	17.1	0.75
T2-B	3648.901	Q=50	50	644.18	645.18	645.08	645.42	0.027273	3.97	13	19.2	0.79
T2-B	3648.901	Q=75	75	644.18	645.38	645.29	645.7	0.02712	4.62	17.05	20.82	0.82
T2-B	3648.901	Q=100	100	644.18	645.54	645.48	645.94	0.0274	5.15	20.57	21.69	0.85
T2-B	3648.901	Q=125	125	644.18	645.69	645.63	646.15	0.027599	5.6	23.78	22.31	0.87
T2-B	3648.901	Q=150	150	644.18	645.82	645.77	646.35	0.027876	6	26.74	22.87	0.89
T2-B	3648.901	Q=175	175	644.18	645.94	645.9	646.53	0.028577	6.4	29.38	23.36	0.91
T2-B	3648.901	Q=200	200	644.18	646.05	646.02	646.7	0.028746	6.73	32.05	23.85	0.92
T2-B	3648.901	Q=250	250	644.18	646.26	646.25	647.02	0.02902	7.32	37.1	24.74	0.95
T2-B	3648.901	Q=300	300	644.18	646.46	646.46	647.31	0.028362	7.76	42.26	25.62	0.95
T2-B	3648.901	Q=350	350	644.18	646.66	646.66	647.58	0.027565	8.13	47.36	26.46	0.95
T2-B	3648.901	Q=400	400	644.18	646.84	646.84	647.83	0.02688	8.46	52.31	27.25	0.95
T2-B	3648.901	Q=450	450	644.18	647.02	647.02	648.07	0.026301	8.76	57.11	27.99	0.96
T2-B	3648.901	Q=500	500	644.18	647.19	647.19	648.3	0.025435	9	62.1	28.74	0.95
T2-B	3648.901	Q=600	600	644.18	647.5	647.5	648.72	0.024688	9.5	71.07	29.87	0.95

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-B	3734.503	Q=25	25	646.18	646.97		647.09	0.020165	2.76	9.17	17.51	0.65
T2-B	3734.503	Q=50	50	646.18	647.24		647.44	0.020533	3.63	14.28	19.73	0.7
T2-B	3734.503	Q=75	75	646.18	647.46		647.72	0.020649	4.24	18.67	21.31	0.73
T2-B	3734.503	Q=100	100	646.18	647.64		647.96	0.020493	4.7	22.64	22.09	0.74
T2-B	3734.503	Q=125	125	646.18	647.8		648.18	0.020382	5.09	26.29	22.79	0.76
T2-B	3734.503	Q=150	150	646.18	647.95	647.77	648.38	0.020217	5.42	29.76	23.43	0.77
T2-B	3734.503	Q=175	175	646.18	648.1	647.9	648.56	0.019823	5.7	33.19	24.05	0.77
T2-B	3734.503	Q=200	200	646.18	648.23	648.02	648.74	0.019677	5.97	36.38	24.61	0.78
T2-B	3734.503	Q=250	250	646.18	648.46	648.25	649.05	0.01962	6.46	42.32	25.63	0.79
T2-B	3734.503	Q=300	300	646.18	648.67	648.46	649.34	0.019838	6.92	47.69	26.51	0.81
T2-B	3734.503	Q=350	350	646.18	648.85	648.66	649.61	0.020176	7.36	52.66	27.3	0.83
T2-B	3734.503	Q=400	400	646.18	649.02	648.84	649.85	0.020525	7.76	57.35	28.03	0.84
T2-B	3734.503	Q=450	450	646.18	649.18	649.02	650.09	0.020859	8.13	61.83	28.7	0.86
T2-B	3734.503	Q=500	500	646.18	649.32	649.19	650.31	0.021404	8.51	65.87	29.24	0.88
T2-B	3734.503	Q=600	600	646.18	649.59	649.5	650.72	0.02202	9.16	73.91	30.22	0.9
T2-B	3836.993	Q=25	25	648.18	648.98	648.82	649.09	0.018994	2.71	9.34	17.59	0.63
T2-B	3836.993	Q=50	50	648.18	649.26		649.45	0.018929	3.54	14.67	19.88	0.67
T2-B	3836.993	Q=75	75	648.18	649.48		649.73	0.018875	4.12	19.23	21.42	0.7
T2-B	3836.993	Q=100	100	648.18	649.67		649.97	0.018975	4.58	23.22	22.2	0.72
T2-B	3836.993	Q=125	125	648.18	649.82		650.19	0.019216	4.99	26.81	22.89	0.74
T2-B	3836.993	Q=150	150	648.18	649.97		650.38	0.019268	5.34	30.24	23.52	0.75
T2-B	3836.993	Q=175	175	648.18	650.1		650.56	0.019591	5.68	33.32	24.08	0.77
T2-B	3836.993	Q=200	200	648.18	650.23		650.73	0.019706	5.97	36.37	24.61	0.78
T2-B	3836.993	Q=250	250	648.18	650.46		651.05	0.019724	6.47	42.24	25.61	0.8
T2-B	3836.993	Q=300	300	648.18	650.68		651.34	0.019471	6.88	47.99	26.56	0.8
T2-B	3836.993	Q=350	350	648.18	650.89		651.61	0.019213	7.24	53.55	27.44	0.81
T2-B	3836.993	Q=400	400	648.18	651.08	650.84	651.87	0.01901	7.57	58.88	28.26	0.82
T2-B	3836.993	Q=450	450	648.18	651.26	651.02	652.1	0.018753	7.86	64.13	29.02	0.82
T2-B	3836.993	Q=500	500	648.18	651.44		652.33	0.018352	8.1	69.43	29.67	0.82
T2-B	3836.993	Q=600	600	648.18	651.77	651.5	652.75	0.017908	8.56	79.34	30.86	0.82

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-B	3915.821	Q=25	25	649.3	650.23		650.31	0.012917	2.29	10.92	18.31	0.52
T2-B	3915.821	Q=50	50	649.3	650.56		650.69	0.01319	2.87	17.41	21.07	0.56
T2-B	3915.821	Q=75	75	649.3	650.81		650.98	0.013232	3.26	23.03	23.09	0.57
T2-B	3915.821	Q=100	100	649.3	651.03		651.22	0.013255	3.56	28.12	24.7	0.59
T2-B	3915.821	Q=125	125	649.3	651.21		651.43	0.013164	3.83	32.64	26.01	0.6
T2-B	3915.821	Q=150	150	649.3	651.37		651.63	0.012974	4.06	37.06	27.23	0.6
T2-B	3915.821	Q=175	175	649.3	651.53		651.81	0.012714	4.25	41.44	28.38	0.6
T2-B	3915.821	Q=200	200	649.3	651.67		651.98	0.012537	4.43	45.64	29.45	0.61
T2-B	3915.821	Q=250	250	649.3	651.93		652.28	0.012174	4.76	53.38	31.14	0.61
T2-B	3915.821	Q=300	300	649.3	652.16		652.55	0.011876	5.07	60.57	32.55	0.62
T2-B	3915.821	Q=350	350	649.3	652.37		652.8	0.011578	5.34	67.63	33.78	0.62
T2-B	3915.821	Q=400	400	649.3	652.56		653.04	0.011373	5.59	74.34	34.73	0.62
T2-B	3915.821	Q=450	450	649.3	652.75		653.26	0.011189	5.81	80.87	35.64	0.62
T2-B	3915.821	Q=500	500	649.3	652.92		653.47	0.011061	6.02	87.15	36.49	0.63
T2-B	3915.821	Q=600	600	649.3	653.26	652.53	653.86	0.010712	6.38	99.7	38.13	0.63
T2-B	4000.72	Q=25	25	650.6	651.52		651.65	0.019378	2.83	8.88	15.42	0.64
T2-B	4000.72	Q=50	50	650.6	651.84		652.04	0.019093	3.63	14.14	18.13	0.68
T2-B	4000.72	Q=75	75	650.6	652.07		652.34	0.018945	4.23	18.59	19.98	0.7
T2-B	4000.72	Q=100	100	650.6	652.26		652.59	0.018916	4.7	22.64	21.46	0.72
T2-B	4000.72	Q=125	125	650.6	652.43		652.81	0.019167	5.12	26.27	22.53	0.74
T2-B	4000.72	Q=150	150	650.6	652.58		653.01	0.01946	5.49	29.65	23.49	0.76
T2-B	4000.72	Q=175	175	650.6	652.71		653.2	0.019768	5.83	32.82	24.36	0.77
T2-B	4000.72	Q=200	200	650.6	652.83	652.65	653.37	0.019993	6.13	35.89	25.17	0.79
T2-B	4000.72	Q=250	250	650.6	653.05		653.68	0.02065	6.7	41.49	26.43	0.81
T2-B	4000.72	Q=300	300	650.6	653.24	653.11	653.96	0.02137	7.22	46.59	27.5	0.84
T2-B	4000.72	Q=350	350	650.6	653.42	653.31	654.22	0.021845	7.67	51.53	28.5	0.86
T2-B	4000.72	Q=400	400	650.6	653.58	653.5	654.46	0.022264	8.08	56.22	29.35	0.88
T2-B	4000.72	Q=450	450	650.6	653.73	653.68	654.69	0.022608	8.45	60.75	30.15	0.89
T2-B	4000.72	Q=500	500	650.6	653.87	653.84	654.91	0.02287	8.8	65.18	30.9	0.91
T2-B	4000.72	Q=600	600	650.6	654.15	654.15	655.31	0.023016	9.38	74	32.36	0.92

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-B	4131.901	Q=25	25	652.32	653.45	653.15	653.55	0.011334	2.58	9.84	13.67	0.51
T2-B	4131.901	Q=50	50	652.32	653.82	653.47	654	0.01203	3.43	15.27	15.89	0.56
T2-B	4131.901	Q=75	75	652.32	654.09	653.73	654.34	0.012552	4.04	19.88	17.56	0.59
T2-B	4131.901	Q=100	100	652.32	654.33	653.95	654.62	0.012887	4.52	24.09	18.95	0.62
T2-B	4131.901	Q=125	125	652.32	654.53	654.15	654.87	0.013116	4.92	28.02	20.11	0.63
T2-B	4131.901	Q=150	150	652.32	654.71	654.32	655.1	0.013282	5.26	31.74	21.02	0.65
T2-B	4131.901	Q=175	175	652.32	654.87	654.49	655.3	0.013429	5.57	35.26	21.84	0.66
T2-B	4131.901	Q=200	200	652.32	655.03	654.64	655.5	0.013454	5.84	38.74	22.61	0.67
T2-B	4131.901	Q=250	250	652.32	655.31	654.9	655.85	0.013558	6.32	45.31	24.01	0.68
T2-B	4131.901	Q=300	300	652.32	655.57	655.14	656.17	0.013581	6.72	51.62	25.27	0.69
T2-B	4131.901	Q=350	350	652.32	655.79	655.37	656.46	0.013716	7.1	57.48	26.39	0.71
T2-B	4131.901	Q=400	400	652.32	655.05	655.57	656.88	0.051844	11.53	39.26	22.73	1.31
T2-B	4131.901	Q=450	450	652.32	655.2	655.78	657.16	0.051633	11.99	42.77	23.48	1.33
T2-B	4131.901	Q=500	500	652.32	655.35	655.96	657.43	0.051306	12.4	46.22	24.19	1.33
T2-B	4131.901	Q=600	600	652.32	655.62	656.31	657.91	0.050367	13.11	53.04	25.55	1.34
T2-B	4236.668	Q=25	25	656.12	657.01	657.01	657.28	0.049585	4.22	5.94	11.17	1.01
T2-B	4236.668	Q=50	50	656.12	657.34	657.34	657.73	0.040929	5.07	10.1	13.76	0.98
T2-B	4236.668	Q=75	75	656.12	657.61	657.61	658.08	0.034652	5.61	14.03	15.7	0.94
T2-B	4236.668	Q=100	100	656.12	657.82	657.82	658.37	0.031946	6.08	17.63	17.28	0.93
T2-B	4236.668	Q=125	125	656.12	658.02	658.02	658.62	0.029566	6.43	21.23	18.73	0.92
T2-B	4236.668	Q=150	150	656.12	658.19	658.19	658.85	0.028607	6.78	24.46	19.78	0.92
T2-B	4236.668	Q=175	175	656.12	658.36	658.36	659.05	0.027131	7.03	27.83	20.75	0.91
T2-B	4236.668	Q=200	200	656.12	658.5	658.5	659.24	0.026359	7.29	30.91	21.5	0.91
T2-B	4236.668	Q=250	250	656.12	658.76	658.76	659.59	0.025804	7.81	36.51	22.81	0.92
T2-B	4236.668	Q=300	300	656.12	658.99	658.99	659.9	0.02498	8.21	42.07	24.04	0.92
T2-B	4236.668	Q=350	350	656.12	659.21	659.21	660.18	0.02435	8.57	47.42	25.16	0.92
T2-B	4236.668	Q=400	400	656.12	659.42	659.42	660.45	0.023494	8.86	52.89	26.26	0.91
T2-B	4236.668	Q=450	450	656.12	659.61	659.61	660.69	0.023073	9.15	57.94	27.19	0.92
T2-B	4236.668	Q=500	500	656.12	659.78	659.78	660.92	0.022877	9.45	62.64	27.87	0.92
T2-B	4236.668	Q=600	600	656.12	660.1	660.1	661.35	0.022526	9.97	71.73	29.2	0.93

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-B	4346.191	Q=25	25	655.71	657.54	656.43	657.56	0.000708	0.98	27.07	23.03	0.14
T2-B	4346.191	Q=50	50	655.71	658.05	656.72	658.08	0.000946	1.38	39.81	26.87	0.17
T2-B	4346.191	Q=75	75	655.71	658.43	656.94	658.47	0.001095	1.67	50.47	29.6	0.19
T2-B	4346.191	Q=100	100	655.71	658.74	657.13	658.79	0.001205	1.9	60.02	31.9	0.2
T2-B	4346.191	Q=125	125	655.71	659	657.3	659.06	0.001296	2.1	68.75	33.88	0.22
T2-B	4346.191	Q=150	150	655.71	659.24	657.45	659.31	0.001375	2.28	76.89	35.62	0.23
T2-B	4346.191	Q=175	175	655.71	659.45	657.6	659.53	0.001443	2.44	84.62	37.25	0.23
T2-B	4346.191	Q=200	200	655.71	659.65	657.73	659.73	0.0015	2.58	92.06	38.73	0.24
T2-B	4346.191	Q=250	250	655.71	660	657.98	660.1	0.001587	2.83	106.34	41.41	0.25
T2-B	4346.191	Q=300	300	655.71	660.32	658.19	660.43	0.001659	3.04	119.83	43.86	0.26
T2-B	4346.191	Q=350	350	655.71	660.61	658.39	660.74	0.001715	3.23	132.83	46.09	0.27
T2-B	4346.191	Q=400	400	655.71	660.87	658.58	661.01	0.001767	3.41	145.19	48.14	0.27
T2-B	4346.191	Q=450	450	655.71	661.12	658.76	661.27	0.001808	3.56	157.28	50.07	0.28
T2-B	4346.191	Q=500	500	655.71	661.35	658.92	661.51	0.001843	3.7	169.04	51.87	0.28
T2-B	4346.191	Q=600	600	655.71	661.78	659.23	661.96	0.001891	3.95	191.9	54.96	0.29
T2-B	4506.758	Q=25	25	660.21	660.96	660.96	661.23	0.050693	4.16	6.02	11.49	1.01
T2-B	4506.758	Q=50	50	660.21	661.28	661.28	661.68	0.041175	5.09	9.99	13.29	0.98
T2-B	4506.758	Q=75	75	660.21	661.54	661.54	662.04	0.035807	5.7	13.67	14.69	0.96
T2-B	4506.758	Q=100	100	660.21	661.77	661.77	662.34	0.032857	6.18	17.1	15.87	0.95
T2-B	4506.758	Q=125	125	660.21	661.97	661.97	662.61	0.030795	6.57	20.38	16.93	0.94
T2-B	4506.758	Q=150	150	660.21	662.15	662.15	662.85	0.029295	6.91	23.55	17.9	0.93
T2-B	4506.758	Q=175	175	660.21	662.32	662.32	663.07	0.028174	7.21	26.61	18.78	0.93
T2-B	4506.758	Q=200	200	660.21	662.48	662.48	663.27	0.027121	7.47	29.64	19.62	0.92
T2-B	4506.758	Q=250	250	660.21	662.76	662.76	663.64	0.02563	7.93	35.42	20.92	0.92
T2-B	4506.758	Q=300	300	660.21	663.01	663.01	663.97	0.024957	8.37	40.69	21.97	0.92
T2-B	4506.758	Q=350	350	660.21	663.24	663.24	664.27	0.024266	8.74	45.86	22.96	0.92
T2-B	4506.758	Q=400	400	660.21	663.45	663.45	664.55	0.023673	9.07	50.9	23.88	0.92
T2-B	4506.758	Q=450	450	660.21	663.65	663.65	664.82	0.023267	9.38	55.73	24.73	0.92
T2-B	4506.758	Q=500	500	660.21	663.85	663.85	665.07	0.022469	9.61	60.88	25.61	0.92
T2-B	4506.758	Q=600	600	660.21	664.2	664.2	665.53	0.021932	10.13	70.06	27.1	0.92

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-B	4601.489	Q=25	25	660.53	662.08	661.42	662.12	0.003692	1.68	14.92	15.93	0.3
T2-B	4601.489	Q=50	50	660.53	662.53	661.76	662.6	0.00406	2.27	22.67	18.76	0.34
T2-B	4601.489	Q=75	75	660.53	662.86	662.01	662.97	0.004276	2.69	29.41	20.91	0.36
T2-B	4601.489	Q=100	100	660.53	663.15	662.21	663.28	0.004433	3.02	35.53	22.7	0.37
T2-B	4601.489	Q=125	125	660.53	663.39	662.4	663.55	0.004544	3.3	41.29	24.23	0.38
T2-B	4601.489	Q=150	150	660.53	663.61	662.57	663.79	0.0046	3.53	46.8	25.34	0.39
T2-B	4601.489	Q=175	175	660.53	663.81	662.73	664.01	0.004671	3.74	51.95	26.31	0.4
T2-B	4601.489	Q=200	200	660.53	664	662.88	664.21	0.004735	3.94	56.87	27.21	0.41
T2-B	4601.489	Q=250	250	660.53	664.33	663.14	664.58	0.004839	4.28	66.21	28.83	0.42
T2-B	4601.489	Q=300	300	660.53	664.63	663.4	664.92	0.004895	4.57	75.18	30.31	0.43
T2-B	4601.489	Q=350	350	660.53	664.91	663.62	665.23	0.004942	4.83	83.86	31.94	0.44
T2-B	4601.489	Q=400	400	660.53	665.17	663.81	665.51	0.004991	5.07	92.2	33.44	0.44
T2-B	4601.489	Q=450	450	660.53	665.41	664.02	665.77	0.005021	5.28	100.41	34.92	0.45
T2-B	4601.489	Q=500	500	660.53	665.63	664.18	666.02	0.005067	5.49	108.25	36.27	0.45
T2-B	4601.489	Q=600	600	660.53	666.05	664.51	666.48	0.005072	5.82	123.97	38.73	0.46
T2-B	4701.448	Q=25	25	663.41	664.12	664.12	664.35	0.052848	3.86	6.47	14.26	1.01
T2-B	4701.448	Q=50	50	663.41	664.4	664.4	664.73	0.046878	4.61	10.85	16.73	1.01
T2-B	4701.448	Q=75	75	663.41	664.61	664.61	665.02	0.04354	5.14	14.62	18.42	1.01
T2-B	4701.448	Q=100	100	663.41	664.8	664.8	665.27	0.04039	5.55	18.13	19.73	1
T2-B	4701.448	Q=125	125	663.41	664.96	664.96	665.5	0.038093	5.88	21.51	20.91	0.99
T2-B	4701.448	Q=150	150	663.41	665.11	665.11	665.7	0.036448	6.16	24.75	21.99	0.98
T2-B	4701.448	Q=175	175	663.41	665.25	665.25	665.88	0.03518	6.41	27.84	22.94	0.98
T2-B	4701.448	Q=200	200	663.41	665.37	665.37	666.06	0.033919	6.68	30.7	23.68	0.98
T2-B	4701.448	Q=250	250	663.41	665.61	665.61	666.38	0.031509	7.11	36.4	25.1	0.97
T2-B	4701.448	Q=300	300	663.41	665.82	665.82	666.66	0.02966	7.48	41.94	26.31	0.96
T2-B	4701.448	Q=350	350	663.41	666.02	666.02	666.93	0.028503	7.82	47.16	27.36	0.95
T2-B	4701.448	Q=400	400	663.41	666.2	666.2	667.18	0.027431	8.12	52.33	28.36	0.95
T2-B	4701.448	Q=450	450	663.41	666.38	666.38	667.41	0.026401	8.38	57.48	29.33	0.94
T2-B	4701.448	Q=500	500	663.41	666.55	666.55	667.63	0.025715	8.63	62.38	30.22	0.94
T2-B	4701.448	Q=600	600	663.41	666.87	666.87	668.04	0.024097	9.03	72.43	31.96	0.93

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-B	4838.243	Q=25	25	665.75	666.81	666.48	666.88	0.009202	2.02	12.4	19.52	0.45
T2-B	4838.243	Q=50	50	665.75	667.13	666.76	667.24	0.009583	2.66	19.12	23.14	0.48
T2-B	4838.243	Q=75	75	665.75	667.36	666.95	667.51	0.009844	3.13	24.88	25.7	0.51
T2-B	4838.243	Q=100	100	665.75	667.56	667.12	667.74	0.010075	3.51	30.09	27.73	0.53
T2-B	4838.243	Q=125	125	665.75	667.73	667.28	667.94	0.010319	3.84	34.89	29.48	0.55
T2-B	4838.243	Q=150	150	665.75	667.88	667.42	668.12	0.010492	4.12	39.43	30.85	0.56
T2-B	4838.243	Q=175	175	665.75	668.01	667.55	668.29	0.010614	4.37	43.71	31.68	0.57
T2-B	4838.243	Q=200	200	665.75	668.14	667.67	668.44	0.010712	4.59	47.79	32.45	0.58
T2-B	4838.243	Q=250	250	665.75	668.37	667.89	668.72	0.010947	4.99	55.35	33.8	0.6
T2-B	4838.243	Q=300	300	665.75	668.57	668.08	668.97	0.011161	5.35	62.35	34.92	0.61
T2-B	4838.243	Q=350	350	665.75	668.76	668.25	669.21	0.011249	5.66	69.17	35.98	0.62
T2-B	4838.243	Q=400	400	665.75	668.94	668.42	669.43	0.011319	5.94	75.71	36.96	0.63
T2-B	4838.243	Q=450	450	665.75	669.11	668.56	669.63	0.011472	6.21	81.77	37.85	0.64
T2-B	4838.243	Q=500	500	665.75	669.26	668.71	669.83	0.011509	6.44	87.85	38.66	0.65
T2-B	4838.243	Q=600	600	665.75	669.56	668.98	670.19	0.011602	6.87	99.27	39.88	0.66
T2-B	4927.736	Q=25	25	667.41	668.25	668.23	668.5	0.045368	3.94	6.34	12.03	0.96
T2-B	4927.736	Q=50	50	667.41	668.56	668.56	668.92	0.04523	4.82	10.37	14.44	1
T2-B	4927.736	Q=75	75	667.41	668.76	668.79	669.24	0.048679	5.6	13.4	15.93	1.07
T2-B	4927.736	Q=100	100	667.41	668.91	669	669.53	0.052305	6.33	15.85	16.92	1.13
T2-B	4927.736	Q=125	125	667.41	669.04	669.17	669.79	0.05269	6.93	18.18	17.66	1.16
T2-B	4927.736	Q=150	150	667.41	669.16	669.33	670.03	0.053484	7.48	20.34	18.31	1.19
T2-B	4927.736	Q=175	175	667.41	669.29	669.48	670.24	0.05212	7.88	22.68	19	1.19
T2-B	4927.736	Q=200	200	667.41	669.41	669.63	670.44	0.050633	8.22	25.01	19.65	1.19
T2-B	4927.736	Q=250	250	667.41	669.63	669.89	670.81	0.048392	8.83	29.5	20.86	1.2
T2-B	4927.736	Q=300	300	667.41	669.83	670.14	671.14	0.046772	9.35	33.79	21.96	1.2
T2-B	4927.736	Q=350	350	667.41	670.02	670.36	671.45	0.045372	9.8	37.98	22.97	1.2
T2-B	4927.736	Q=400	400	667.41	670.19	670.56	671.73	0.04429	10.21	42.01	23.79	1.2
T2-B	4927.736	Q=450	450	667.41	670.35	670.75	671.99	0.04339	10.59	45.92	24.52	1.2
T2-B	4927.736	Q=500	500	667.41	670.51	670.94	672.24	0.042285	10.91	49.87	25.24	1.2
T2-B	4927.736	Q=600	600	667.41	670.79	671.26	672.7	0.041206	11.54	57.17	26.44	1.2

McCormick Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2-B	4965.437	Q=25	25	669.08	669.82	669.78	670.04	0.037441	3.76	6.85	13.68	0.88
T2-B	4965.437	Q=50	50	669.08	670.09	670.09	670.44	0.037278	4.87	10.87	15.88	0.94
T2-B	4965.437	Q=75	75	669.08	670.33	670.33	670.76	0.034319	5.51	14.77	17.74	0.94
T2-B	4965.437	Q=100	100	669.08	670.53	670.53	671.03	0.031537	5.94	18.58	19.29	0.93
T2-B	4965.437	Q=125	125	669.08	670.7	670.7	671.26	0.030399	6.34	21.98	20.37	0.93
T2-B	4965.437	Q=150	150	669.08	670.87	670.87	671.47	0.028725	6.63	25.45	21.37	0.92
T2-B	4965.437	Q=175	175	669.08	671.01	671.01	671.66	0.028095	6.94	28.53	21.99	0.92
T2-B	4965.437	Q=200	200	669.08	671.14	671.14	671.84	0.028023	7.25	31.3	22.53	0.93
T2-B	4965.437	Q=250	250	669.08	671.38	671.38	672.17	0.027172	7.75	36.91	23.58	0.94
T2-B	4965.437	Q=300	300	669.08	671.6	671.6	672.47	0.026645	8.19	42.16	24.52	0.94
T2-B	4965.437	Q=350	350	669.08	671.8	671.8	672.75	0.026196	8.58	47.21	25.39	0.95
T2-B	4965.437	Q=400	400	669.08	672	672	673.01	0.025406	8.89	52.37	26.26	0.95
T2-B	4965.437	Q=450	450	669.08	672.18	672.18	673.25	0.024907	9.19	57.23	26.98	0.95
T2-B	4965.437	Q=500	500	669.08	672.35	672.35	673.49	0.024749	9.5	61.72	27.64	0.95
T2-B	4965.437	Q=600	600	669.08	672.68	672.68	673.92	0.02366	9.95	71.24	28.98	0.95

Janes Ravine - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	40.13637	Q=25	25	579.96	580.6	580.6	580.83	0.052955	3.79	6.6	15.02	1.01
Main2	40.13637	Q=50	50	579.96	580.88	580.88	581.19	0.047428	4.5	11.11	17.92	1.01
Main2	40.13637	Q=75	75	579.96	581.08	581.08	581.47	0.042751	5.01	15.01	19.74	0.99
Main2	40.13637	Q=100	100	579.96	581.26	581.26	581.72	0.039915	5.43	18.6	21.21	0.99
Main2	40.13637	Q=125	125	579.96	581.42	581.42	581.93	0.037792	5.78	22	22.49	0.98
Main2	40.13637	Q=150	150	579.96	581.56	581.56	582.12	0.035563	6.09	25.25	23.58	0.97
Main2	40.13637	Q=175	175	579.96	581.69	581.69	582.3	0.033697	6.35	28.46	24.61	0.96
Main2	40.13637	Q=200	200	579.96	581.82	581.82	582.47	0.031994	6.57	31.67	25.59	0.95
Main2	40.13637	Q=250	250	579.96	582.04	582.04	582.78	0.030063	7.01	37.66	27.34	0.95
Main2	40.13637	Q=300	300	579.96	582.26	582.26	583.05	0.028277	7.35	43.63	28.98	0.94
Main2	40.13637	Q=350	350	579.96	582.45	582.45	583.31	0.027051	7.66	49.35	30.46	0.93
Main2	40.13637	Q=400	400	579.96	582.63	582.63	583.54	0.026104	7.95	54.9	31.8	0.93
Main2	40.13637	Q=450	450	579.96	582.79	582.79	583.76	0.025283	8.2	60.35	33.05	0.92
Main2	40.13637	Q=500	500	579.96	582.96	582.96	583.96	0.02442	8.41	65.85	34.2	0.92
Main2	40.13637	Q=600	600	579.96	583.24	583.24	584.34	0.023607	8.86	75.89	36.07	0.92
Main2	117.9774	Q=25	25	581.29	582.23	581.92	582.3	0.009629	2.09	11.99	18.94	0.46
Main2	117.9774	Q=50	50	581.29	582.56	582.19	582.67	0.010236	2.71	18.65	21.78	0.5
Main2	117.9774	Q=75	75	581.29	582.79	582.4	582.95	0.010529	3.21	23.96	23.3	0.53
Main2	117.9774	Q=100	100	581.29	582.99	582.56	583.19	0.010849	3.61	28.64	24.57	0.55
Main2	117.9774	Q=125	125	581.29	583.16	582.71	583.4	0.011125	3.96	32.94	25.68	0.57
Main2	117.9774	Q=150	150	581.29	583.31	582.85	583.58	0.011453	4.28	36.88	26.65	0.58
Main2	117.9774	Q=175	175	581.29	583.45	582.98	583.76	0.011687	4.56	40.66	27.56	0.6
Main2	117.9774	Q=200	200	581.29	583.58	583.11	583.92	0.011941	4.83	44.22	28.38	0.61
Main2	117.9774	Q=250	250	581.29	583.81	583.33	584.22	0.012316	5.29	51.01	29.88	0.63
Main2	117.9774	Q=300	300	581.29	584.02	583.54	584.49	0.012621	5.69	57.39	31.14	0.65
Main2	117.9774	Q=350	350	581.29	584.21	583.73	584.73	0.01288	6.06	63.45	32.3	0.67
Main2	117.9774	Q=400	400	581.29	584.38	583.91	584.96	0.013114	6.39	69.22	33.33	0.68
Main2	117.9774	Q=450	450	581.29	584.55	584.08	585.18	0.013345	6.69	74.71	34.24	0.69
Main2	117.9774	Q=500	500	581.29	584.69	584.24	585.38	0.013649	7	79.8	35.06	0.71
Main2	117.9774	Q=600	600	581.29	584.98	584.54	585.76	0.013962	7.51	90.02	36.65	0.72
Main2	275.2498	Q=25	25	589.72	590.24	590.24	590.34	0.071947	2.59	9.64	48.95	1.03

Janes Ravine - Pre-Development

Main2	275.2498	Q=50	50	589.72	590.36	590.36	590.51	0.06214	3.13	16	55.01	1.02
Main2	275.2498	Q=75	75	589.72	590.45	590.45	590.64	0.057259	3.5	21.44	58.51	1.02
Main2	275.2498	Q=100	100	589.72	590.54	590.54	590.76	0.052162	3.75	26.66	61.11	1
Main2	275.2498	Q=125	125	589.72	590.61	590.61	590.86	0.050929	4.01	31.17	63.5	1.01
Main2	275.2498	Q=150	150	589.72	590.68	590.68	590.96	0.049828	4.23	35.49	65.7	1.01
Main2	275.2498	Q=175	175	589.72	590.74	590.74	591.04	0.048295	4.44	39.46	67.22	1.01
Main2	275.2498	Q=200	200	589.72	590.8	590.8	591.13	0.046583	4.62	43.36	68.6	1.01
Main2	275.2498	Q=250	250	589.72	590.91	590.91	591.28	0.043414	4.93	51.06	71.2	1
Main2	275.2498	Q=300	300	589.72	591.01	591.01	591.42	0.041332	5.2	58.3	73.48	0.99
Main2	275.2498	Q=350	350	589.72	591.1	591.1	591.56	0.038952	5.43	65.5	75.42	0.98
Main2	275.2498	Q=400	400	589.72	591.19	591.19	591.68	0.037536	5.65	72.17	76.8	0.98
Main2	275.2498	Q=450	450	589.72	591.27	591.27	591.8	0.036384	5.86	78.6	78.08	0.98
Main2	275.2498	Q=500	500	589.72	591.35	591.35	591.91	0.03565	6.06	84.66	79.27	0.98
Main2	275.2498	Q=600	600	589.72	591.51	591.51	592.12	0.033622	6.38	97.1	81.85	0.97
Main2	371.9637	Q=25	25	591.33	592.17	591.9	592.23	0.00902	1.82	13.83	27.36	0.43
Main2	371.9637	Q=50	50	591.33	592.42	592.13	592.51	0.010295	2.45	21.22	32.28	0.49
Main2	371.9637	Q=75	75	591.33	592.6	592.29	592.73	0.011253	2.9	27.35	35.82	0.53
Main2	371.9637	Q=100	100	591.33	592.74	592.43	592.9	0.012286	3.29	32.58	38.74	0.56
Main2	371.9637	Q=125	125	591.33	592.87	592.56	593.06	0.0129	3.6	37.65	41.52	0.58
Main2	371.9637	Q=150	150	591.33	592.98	592.67	593.19	0.013451	3.88	42.32	44.05	0.61
Main2	371.9637	Q=175	175	591.33	593.07	592.77	593.32	0.014008	4.15	46.58	46.33	0.63
Main2	371.9637	Q=200	200	591.33	593.15	592.88	593.43	0.014593	4.41	50.51	48.1	0.64
Main2	371.9637	Q=250	250	591.33	593.3	593.04	593.63	0.015718	4.87	57.65	50.55	0.68
Main2	371.9637	Q=300	300	591.33	593.43	593.21	593.81	0.016693	5.29	64.26	52.68	0.71
Main2	371.9637	Q=350	350	591.33	593.54	593.34	593.97	0.017795	5.69	70.12	54.46	0.74
Main2	371.9637	Q=400	400	591.33	593.64	593.46	594.13	0.018677	6.04	75.82	56.14	0.76
Main2	371.9637	Q=450	450	591.33	593.74	593.59	594.28	0.01941	6.36	81.31	57.49	0.79
Main2	371.9637	Q=500	500	591.33	593.83	593.71	594.41	0.020045	6.66	86.51	58.38	0.8
Main2	371.9637	Q=600	600	591.33	593.71	593.89	594.71	0.036648	8.66	79.63	57.19	1.08
T1	181.0388	Q=25	25	598.08	598.99	598.99	599.27	0.049898	4.32	5.79	10.2	1.01
T1	181.0388	Q=50	50	598.08	599.34	599.34	599.74	0.044978	5.1	9.81	12.4	1.01
T1	181.0388	Q=75	75	598.08	599.57	599.61	600.1	0.047846	5.84	12.85	13.83	1.07
T1	181.0388	Q=100	100	598.08	599.79	599.83	600.4	0.046589	6.28	15.93	15.13	1.08

T1	181.0388	Q=125	125	598.08	599.94	600.02	600.67	0.045588	6.82	18.4	15.86	1.09
T1	181.0388	Q=150	150	598.08	600.09	600.19	600.91	0.044797	7.29	20.76	16.53	1.1
T1	181.0388	Q=175	175	598.08	600.24	600.36	601.14	0.042525	7.62	23.33	17.22	1.09
T1	181.0388	Q=200	200	598.08	600.38	600.51	601.35	0.041322	7.95	25.72	17.85	1.09
T1	181.0388	Q=250	250	598.08	600.63	600.8	601.74	0.039391	8.54	30.35	19	1.09
T1	181.0388	Q=300	300	598.08	600.82	601.06	602.11	0.04054	9.23	34.04	19.87	1.12
T1	181.0388	Q=350	350	598.08	601.03	601.3	602.43	0.039215	9.67	38.3	20.83	1.12
T1	181.0388	Q=400	400	598.08	601.19	601.53	602.75	0.040168	10.23	41.69	21.56	1.15
T1	181.0388	Q=450	450	598.08	601.33	601.74	603.05	0.041341	10.78	44.83	22.22	1.18
T1	181.0388	Q=500	500	598.08	601.47	601.95	603.34	0.042102	11.27	47.98	22.86	1.2
T1	181.0388	Q=600	600	598.08	601.73	602.28	603.87	0.043601	12.16	53.91	23.87	1.24
T1	285.9061	Q=25	25	602.56	603.51	603.45	603.74	0.037569	3.85	6.5	11	0.88
T1	285.9061	Q=50	50	602.56	603.8	603.79	604.19	0.041259	4.98	10.07	12.89	0.97
T1	285.9061	Q=75	75	602.56	604.04	604.04	604.55	0.038777	5.74	13.27	13.89	0.99
T1	285.9061	Q=100	100	602.56	604.22	604.27	604.87	0.040019	6.48	15.84	14.64	1.03
T1	285.9061	Q=125	125	602.56	604.38	604.47	605.15	0.041093	7.12	18.2	15.29	1.06
T1	285.9061	Q=150	150	602.56	604.52	604.66	605.41	0.042044	7.68	20.41	15.88	1.09
T1	285.9061	Q=175	175	602.56	604.64	604.83	605.66	0.044289	8.27	22.26	16.36	1.14
T1	285.9061	Q=200	200	602.56	604.75	604.99	605.9	0.045804	8.78	24.11	16.82	1.17
T1	285.9061	Q=250	250	602.56	604.95	605.3	606.34	0.048735	9.73	27.51	17.64	1.23
T1	285.9061	Q=300	300	602.56	605.16	605.57	606.72	0.047669	10.32	31.46	18.55	1.23
T1	285.9061	Q=350	350	602.56	605.32	605.8	607.1	0.050008	11.08	34.46	19.21	1.28
T1	285.9061	Q=400	400	602.56	605.51	606.04	607.42	0.048688	11.53	38.21	19.95	1.28
T1	285.9061	Q=450	450	602.56	605.69	606.24	607.71	0.047583	11.93	41.83	20.54	1.28
T1	285.9061	Q=500	500	602.56	605.86	606.44	607.99	0.046544	12.29	45.39	21.11	1.28
T1	285.9061	Q=600	600	602.56	606.18	606.81	608.51	0.045059	12.96	52.21	22.16	1.28
T1	381.2896	Q=25	25	606.32	607.28	607.25	607.54	0.0424	4.1	6.1	10.25	0.94
T1	381.2896	Q=50	50	606.32	607.64	607.6	608.02	0.039258	4.94	10.11	12.01	0.95
T1	381.2896	Q=75	75	606.32	607.88	607.88	608.39	0.041985	5.71	13.14	13.18	1.01
T1	381.2896	Q=100	100	606.32	608.11	608.11	608.69	0.040549	6.12	16.34	14.32	1.01
T1	381.2896	Q=125	125	606.32	608.32	608.32	608.96	0.03906	6.46	19.34	15.25	1.01
T1	381.2896	Q=150	150	606.32	608.49	608.49	609.21	0.037728	6.83	22	15.91	1.01
T1	381.2896	Q=175	175	606.32	608.65	608.65	609.44	0.035494	7.13	24.69	16.51	1

T1	381.2896	Q=200	200	606.32	608.81	608.81	609.66	0.03397	7.42	27.26	17.07	0.99
T1	381.2896	Q=250	250	606.32	609.1	609.1	610.05	0.031346	7.89	32.37	18.13	0.98
T1	381.2896	Q=300	300	606.32	609.31	609.37	610.42	0.031742	8.5	36.4	18.93	1
T1	381.2896	Q=350	350	606.32	609.57	609.61	610.75	0.029552	8.81	41.39	19.87	0.98
T1	381.2896	Q=400	400	606.32	609.75	609.86	611.06	0.030354	9.35	44.94	20.51	1.01
T1	381.2896	Q=450	450	606.32	609.91	610.07	611.36	0.031005	9.83	48.39	21.12	1.03
T1	381.2896	Q=500	500	606.32	610.06	610.28	611.65	0.031744	10.3	51.64	21.67	1.05
T1	381.2896	Q=600	600	606.32	610.35	610.68	612.18	0.03296	11.14	57.91	22.7	1.08
T1	478.169	Q=25	25	610.46	611.35	611.39	611.69	0.061067	4.7	5.32	9.55	1.11
T1	478.169	Q=50	50	610.46	611.64	611.75	612.2	0.067379	6.05	8.27	10.87	1.22
T1	478.169	Q=75	75	610.46	611.85	612.04	612.61	0.072655	7.02	10.69	11.84	1.3
T1	478.169	Q=100	100	610.46	612.02	612.28	612.97	0.076873	7.79	12.84	12.65	1.36
T1	478.169	Q=125	125	610.46	612.19	612.48	613.27	0.078602	8.37	14.93	13.38	1.4
T1	478.169	Q=150	150	610.46	612.34	612.67	613.54	0.078091	8.8	17.05	14.09	1.41
T1	478.169	Q=175	175	610.46	612.47	612.85	613.8	0.078047	9.25	18.93	14.67	1.43
T1	478.169	Q=200	200	610.46	612.59	613	614.04	0.077378	9.65	20.77	15.21	1.44
T1	478.169	Q=250	250	610.46	612.83	613.28	614.47	0.075196	10.28	24.45	16.24	1.44
T1	478.169	Q=300	300	610.46	613.03	613.55	614.86	0.073763	10.89	27.82	17.04	1.45
T1	478.169	Q=350	350	610.46	613.21	613.81	615.24	0.071481	11.46	31.01	17.63	1.45
T1	478.169	Q=400	400	610.46	613.39	614.04	615.59	0.069656	11.98	34.09	18.18	1.46
T1	478.169	Q=450	450	610.46	613.55	614.25	615.93	0.068478	12.47	37.03	18.69	1.46
T1	478.169	Q=500	500	610.46	613.7	614.45	616.24	0.067002	12.9	40	19.19	1.46
T1	478.169	Q=600	600	610.46	613.99	614.87	616.83	0.065076	13.7	45.65	20.11	1.47
T1	589.8321	Q=25	25	616.67	617.64	617.65	617.94	0.051044	4.38	5.71	10	1.02
T1	589.8321	Q=50	50	616.67	617.98	618	618.41	0.046262	5.29	9.48	11.93	1.03
T1	589.8321	Q=75	75	616.67	618.25	618.27	618.79	0.0429	5.91	12.83	13.18	1.03
T1	589.8321	Q=100	100	616.67	618.48	618.5	619.1	0.040523	6.36	15.99	14.27	1.02
T1	589.8321	Q=125	125	616.67	618.66	618.7	619.38	0.039564	6.87	18.61	14.9	1.04
T1	589.8321	Q=150	150	616.67	618.81	618.88	619.64	0.039629	7.37	20.92	15.4	1.05
T1	589.8321	Q=175	175	616.67	618.95	619.05	619.88	0.039576	7.82	23.14	15.86	1.07
T1	589.8321	Q=200	200	616.67	619.08	619.21	620.11	0.039692	8.24	25.24	16.29	1.08
T1	589.8321	Q=250	250	616.67	619.31	619.52	620.53	0.040521	9.02	29.09	17.04	1.12
T1	589.8321	Q=300	300	616.67	619.52	619.8	620.92	0.041032	9.7	32.75	17.73	1.14

T1	589.8321	Q=350	350	616.67	619.71	620.06	621.29	0.041951	10.35	36.1	18.34	1.17
T1	589.8321	Q=400	400	616.67	619.88	620.28	621.63	0.042724	10.93	39.31	18.86	1.2
T1	589.8321	Q=450	450	616.67	620.05	620.5	621.96	0.043137	11.45	42.48	19.33	1.22
T1	589.8321	Q=500	500	616.67	620.2	620.71	622.27	0.043936	11.97	45.4	19.76	1.24
T1	589.8321	Q=600	600	616.67	620.48	621.12	622.86	0.044962	12.88	51.1	20.56	1.27
T1	696.9404	Q=25	25	623.05	623.85	623.91	624.2	0.067519	4.71	5.31	10.31	1.16
T1	696.9404	Q=50	50	623.05	624.1	624.25	624.7	0.075969	6.21	8.09	11.76	1.29
T1	696.9404	Q=75	75	623.05	624.28	624.51	625.12	0.084345	7.38	10.28	12.7	1.4
T1	696.9404	Q=100	100	623.05	624.42	624.74	625.5	0.092327	8.37	12.14	13.46	1.5
T1	696.9404	Q=125	125	623.05	624.54	624.94	625.86	0.097118	9.27	13.77	14.01	1.57
T1	696.9404	Q=150	150	623.05	624.66	625.13	626.18	0.098185	9.98	15.45	14.57	1.6
T1	696.9404	Q=175	175	623.05	624.77	625.3	626.48	0.099677	10.64	17.02	15.07	1.64
T1	696.9404	Q=200	200	623.05	624.87	625.46	626.77	0.100411	11.22	18.56	15.54	1.66
T1	696.9404	Q=250	250	623.05	625.06	625.76	627.27	0.09895	12.14	21.69	16.46	1.69
T1	696.9404	Q=300	300	623.05	625.24	626.03	627.73	0.09835	12.97	24.64	17.29	1.71
T1	696.9404	Q=350	350	623.05	625.41	626.28	628.13	0.095979	13.62	27.65	18.09	1.72
T1	696.9404	Q=400	400	623.05	625.57	626.51	628.49	0.093607	14.18	30.63	18.84	1.72
T1	696.9404	Q=450	450	623.05	625.71	626.71	628.85	0.092837	14.75	33.38	19.51	1.73
T1	696.9404	Q=500	500	623.05	625.86	626.89	629.15	0.090077	15.17	36.36	20.21	1.72
T1	696.9404	Q=600	600	623.05	626.13	627.25	629.72	0.086657	15.97	42	21.48	1.72
T1	761.1885	Q=25	25	626.79	627.62	627.62	627.91	0.049782	4.27	5.86	10.52	1.01
T1	761.1885	Q=50	50	626.79	627.97	627.97	628.37	0.043947	5.06	9.91	12.85	1
T1	761.1885	Q=75	75	626.79	628.22	628.22	628.73	0.039272	5.72	13.27	13.83	0.99
T1	761.1885	Q=100	100	626.79	628.44	628.44	629.04	0.03571	6.22	16.47	14.67	0.98
T1	761.1885	Q=125	125	626.79	628.65	628.65	629.32	0.033061	6.62	19.56	15.44	0.96
T1	761.1885	Q=150	150	626.79	628.83	628.83	629.57	0.031596	6.99	22.43	16.12	0.96
T1	761.1885	Q=175	175	626.79	629	629	629.8	0.030178	7.31	25.28	16.76	0.95
T1	761.1885	Q=200	200	626.79	629.17	629.17	630.02	0.028798	7.57	28.13	17.39	0.95
T1	761.1885	Q=250	250	626.79	629.46	629.46	630.42	0.027455	8.09	33.34	18.47	0.94
T1	761.1885	Q=300	300	626.79	629.74	629.74	630.78	0.02588	8.48	38.63	19.46	0.93
T1	761.1885	Q=350	350	626.79	629.99	629.99	631.11	0.025056	8.87	43.5	20.24	0.93
T1	761.1885	Q=400	400	626.79	630.21	630.21	631.42	0.024464	9.23	48.16	20.95	0.93
T1	761.1885	Q=450	450	626.79	630.44	630.44	631.71	0.023452	9.5	53.1	21.68	0.93

T1	761.1885	Q=500	500	626.79	630.63	630.63	631.98	0.023348	9.84	57.3	22.29	0.93
T1	761.1885	Q=600	600	626.79	631.01	631.02	632.49	0.022731	10.4	65.84	23.46	0.94
T1	870.2839	Q=25	25	631.25	631.98	632.1	632.42	0.095728	5.34	4.74	10.62	1.37
T1	870.2839	Q=50	50	631.25	632.19	632.43	632.98	0.117207	7.19	7.12	12.17	1.59
T1	870.2839	Q=75	75	631.25	632.34	632.68	633.44	0.13212	8.52	9.08	13.3	1.73
T1	870.2839	Q=100	100	631.25	632.47	632.89	633.84	0.142988	9.57	10.83	14.25	1.84
T1	870.2839	Q=125	125	631.25	632.57	633.08	634.22	0.15392	10.5	12.38	15.03	1.93
T1	870.2839	Q=150	150	631.25	632.68	633.25	634.55	0.153677	11.22	13.96	15.67	1.96
T1	870.2839	Q=175	175	631.25	632.77	633.4	634.85	0.151647	11.85	15.51	16.27	1.98
T1	870.2839	Q=200	200	631.25	632.86	633.55	635.14	0.150394	12.43	17	16.81	2
T1	870.2839	Q=250	250	631.25	633.04	633.82	635.63	0.145191	13.35	19.98	17.77	2.01
T1	870.2839	Q=300	300	631.25	633.19	634.07	636.08	0.141407	14.15	22.81	18.55	2.01
T1	870.2839	Q=350	350	631.25	633.34	634.29	636.48	0.137223	14.82	25.61	19.28	2.02
T1	870.2839	Q=400	400	631.25	633.48	634.49	636.83	0.132106	15.36	28.44	20.01	2
T1	870.2839	Q=450	450	631.25	633.61	634.7	637.2	0.130413	15.96	31	20.64	2.01
T1	870.2839	Q=500	500	631.25	633.74	634.89	637.51	0.12673	16.42	33.69	21.28	2.01
T1	870.2839	Q=600	600	631.25	633.98	635.21	638.06	0.119871	17.2	39.04	22.5	1.99
T1	938.0349	Q=25	25	635.84	636.67	636.67	636.94	0.04897	4.16	6.05	11.72	1
T1	938.0349	Q=50	50	635.84	636.99	636.99	637.37	0.040953	4.99	10.26	14	0.98
T1	938.0349	Q=75	75	635.84	637.24	637.24	637.72	0.036798	5.64	13.85	15.29	0.97
T1	938.0349	Q=100	100	635.84	637.45	637.45	638.01	0.033866	6.12	17.26	16.43	0.96
T1	938.0349	Q=125	125	635.84	637.65	637.65	638.27	0.031185	6.48	20.66	17.44	0.94
T1	938.0349	Q=150	150	635.84	637.82	637.82	638.5	0.030124	6.84	23.67	18.15	0.94
T1	938.0349	Q=175	175	635.84	637.98	637.98	638.72	0.029245	7.17	26.57	18.81	0.94
T1	938.0349	Q=200	200	635.84	638.13	638.13	638.92	0.028305	7.44	29.46	19.45	0.94
T1	938.0349	Q=250	250	635.84	638.4	638.4	639.29	0.027154	7.95	34.88	20.59	0.94
T1	938.0349	Q=300	300	635.84	638.65	638.65	639.62	0.026027	8.36	40.2	21.62	0.94
T1	938.0349	Q=350	350	635.84	638.89	638.89	639.93	0.025092	8.72	45.36	22.52	0.93
T1	938.0349	Q=400	400	635.84	639.1	639.1	640.21	0.024655	9.08	50.14	23.33	0.94
T1	938.0349	Q=450	450	635.84	639.31	639.31	640.48	0.02372	9.34	55.24	24.16	0.93
T1	938.0349	Q=500	500	635.84	639.5	639.5	640.73	0.023294	9.63	59.9	24.9	0.93
T1	938.0349	Q=600	600	635.84	639.85	639.85	641.2	0.022721	10.16	68.82	26.25	0.94

Janes Ravine - Pre-Development

T1	1017.8	Q=25	25	636.49	637.94	637.45	638.03	0.0062	2.43	11.14	12.82	0.4
T1	1017.8	Q=50	50	636.49	638.38	637.85	638.53	0.007208	3.25	17.17	14.52	0.45
T1	1017.8	Q=75	75	636.49	638.72	638.13	638.92	0.007805	3.84	22.2	15.8	0.49
T1	1017.8	Q=100	100	636.49	638.98	638.37	639.23	0.008388	4.33	26.52	16.83	0.52
T1	1017.8	Q=125	125	636.49	639.2	638.58	639.5	0.008941	4.77	30.39	17.69	0.54
T1	1017.8	Q=150	150	636.49	639.41	638.77	639.76	0.009291	5.14	34.14	18.49	0.56
T1	1017.8	Q=175	175	636.49	639.6	638.94	639.98	0.009639	5.48	37.63	19.21	0.58
T1	1017.8	Q=200	200	636.49	639.77	639.11	640.2	0.00992	5.78	41	19.86	0.59
T1	1017.8	Q=250	250	636.49	638.72	639.41	640.94	0.086258	12.76	22.24	15.81	1.62
T1	1017.8	Q=300	300	636.49	638.91	639.69	641.37	0.085195	13.53	25.41	16.57	1.64
T1	1017.8	Q=350	350	636.49	639.09	639.95	641.78	0.084871	14.24	28.39	17.25	1.65
T1	1017.8	Q=400	400	636.49	639.26	640.17	642.14	0.083728	14.83	31.37	17.9	1.66
T1	1017.8	Q=450	450	636.49	639.41	640.39	642.5	0.083661	15.42	34.14	18.49	1.68
T1	1017.8	Q=500	500	636.49	639.57	640.58	642.81	0.081822	15.86	37.11	19.1	1.68
T1	1017.8	Q=600	600	636.49	639.87	640.98	643.35	0.078047	16.59	43.01	20.19	1.67
T1	1141.493	Q=25	25	642.89	643.73	643.73	644.01	0.043447	4.35	6.02	11.24	0.97
T1	1141.493	Q=50	50	642.89	644.08	644.08	644.48	0.035514	5.28	10.32	13.55	0.94
T1	1141.493	Q=75	75	642.89	644.34	644.34	644.83	0.032137	5.9	14.19	15.26	0.93
T1	1141.493	Q=100	100	642.89	644.57	644.57	645.12	0.030352	6.4	17.7	16.36	0.93
T1	1141.493	Q=125	125	642.89	644.76	644.76	645.38	0.029005	6.81	21.02	17.3	0.93
T1	1141.493	Q=150	150	642.89	644.93	644.93	645.62	0.028517	7.2	24.03	18.11	0.94
T1	1141.493	Q=175	175	642.89	645.1	645.1	645.83	0.027815	7.53	27.03	18.88	0.94
T1	1141.493	Q=200	200	642.89	645.25	645.25	646.03	0.027007	7.8	30.02	19.61	0.94
T1	1141.493	Q=250	250	642.89	645.52	645.52	646.4	0.026305	8.33	35.52	20.9	0.94
T1	1141.493	Q=300	300	642.89	645.77	645.77	646.73	0.025525	8.76	40.91	22.09	0.94
T1	1141.493	Q=350	350	642.89	646.01	646.01	647.03	0.024676	9.11	46.26	23.18	0.94
T1	1141.493	Q=400	400	642.89	646.22	646.22	647.31	0.02413	9.45	51.32	24.12	0.94
T1	1141.493	Q=450	450	642.89	646.44	646.44	647.57	0.023306	9.7	56.53	24.99	0.94
T1	1141.493	Q=500	500	642.89	646.62	646.62	647.81	0.023094	10.01	61.15	25.71	0.94
T1	1141.493	Q=600	600	642.89	646.95	646.95	648.26	0.02295	10.59	69.84	27.02	0.95
T1	1239.776	Q=25	25	643.85	645.11	644.64	645.17	0.005301	2.22	12.75	15.76	0.37
T1	1239.776	Q=50	50	643.85	645.54	644.97	645.65	0.005716	2.88	20.24	18.5	0.41
T1	1239.776	Q=75	75	643.85	645.87	645.23	646.01	0.005964	3.34	26.6	20.49	0.43

T1	1239.776	Q=100	100	643.85	646.14	645.43	646.31	0.006126	3.71	32.38	22.14	0.45
T1	1239.776	Q=125	125	643.85	646.37	645.62	646.57	0.006287	4.02	37.66	23.52	0.46
T1	1239.776	Q=150	150	643.85	646.59	645.79	646.8	0.006306	4.27	42.84	24.64	0.47
T1	1239.776	Q=175	175	643.85	646.78	645.94	647.02	0.006332	4.49	47.74	25.61	0.47
T1	1239.776	Q=200	200	643.85	646.96	646.08	647.22	0.00637	4.69	52.41	26.5	0.48
T1	1239.776	Q=250	250	643.85	647.29	646.35	647.58	0.006386	5.04	61.44	28.15	0.49
T1	1239.776	Q=300	300	643.85	647.59	646.58	647.91	0.006415	5.35	69.95	29.61	0.5
T1	1239.776	Q=350	350	643.85	647.85	646.79	648.21	0.006458	5.63	78	30.94	0.51
T1	1239.776	Q=400	400	643.85	648.1	646.98	648.48	0.00648	5.88	85.81	32.16	0.51
T1	1239.776	Q=450	450	643.85	648.33	647.16	648.74	0.006521	6.12	93.22	33.24	0.52
T1	1239.776	Q=500	500	643.85	648.55	647.35	648.98	0.006524	6.32	100.6	34.27	0.52
T1	1239.776	Q=600	600	643.85	648.96	647.66	649.43	0.006483	6.68	115.12	36.23	0.53
T1	1369.564	Q=25	25	649.15	649.83	649.83	650.06	0.043656	3.94	6.7	15.29	0.95
T1	1369.564	Q=50	50	649.15	650.11	650.11	650.43	0.035734	4.75	11.63	18.91	0.92
T1	1369.564	Q=75	75	649.15	650.32	650.32	650.72	0.033214	5.33	15.85	20.91	0.92
T1	1369.564	Q=100	100	649.15	650.5	650.5	650.95	0.031741	5.79	19.71	22.51	0.93
T1	1369.564	Q=125	125	649.15	650.66	650.66	651.16	0.030289	6.14	23.46	23.96	0.92
T1	1369.564	Q=150	150	649.15	650.8	650.8	651.35	0.029847	6.5	26.84	25.2	0.93
T1	1369.564	Q=175	175	649.15	650.94	650.94	651.52	0.028622	6.74	30.4	26.44	0.92
T1	1369.564	Q=200	200	649.15	651.06	651.06	651.68	0.02825	7.02	33.58	27.42	0.93
T1	1369.564	Q=250	250	649.15	651.28	651.28	651.97	0.027298	7.46	39.84	29.18	0.93
T1	1369.564	Q=300	300	649.15	651.48	651.48	652.23	0.026516	7.83	45.81	30.69	0.93
T1	1369.564	Q=350	350	649.15	651.66	651.66	652.47	0.026127	8.19	51.4	32.03	0.94
T1	1369.564	Q=400	400	649.15	651.82	651.82	652.69	0.025712	8.51	56.87	33.3	0.94
T1	1369.564	Q=450	450	649.15	651.98	651.98	652.9	0.025225	8.78	62.3	34.48	0.94
T1	1369.564	Q=500	500	649.15	652.14	652.14	653.1	0.024767	9.02	67.62	35.57	0.94
T1	1369.564	Q=600	600	649.15	652.41	652.41	653.46	0.024313	9.5	77.58	37.53	0.95
T1	1533.785	Q=25	25	652.78	653.65	653.45	653.76	0.013825	2.67	10	17.56	0.56
T1	1533.785	Q=50	50	652.78	653.94	653.73	654.12	0.015786	3.57	15.41	20.43	0.63
T1	1533.785	Q=75	75	652.78	654.15	653.95	654.4	0.016731	4.2	20.09	22.61	0.67
T1	1533.785	Q=100	100	652.78	654.33	654.13	654.63	0.017448	4.7	24.26	24.27	0.7
T1	1533.785	Q=125	125	652.78	654.48	654.3	654.83	0.018168	5.13	28.01	25.53	0.73
T1	1533.785	Q=150	150	652.78	654.62	654.44	655.02	0.018433	5.48	31.65	26.51	0.74

T1	1533.785	Q=175	175	652.78	654.74	654.57	655.18	0.019104	5.83	34.82	27.34	0.77
T1	1533.785	Q=200	200	652.78	654.86	654.69	655.34	0.019379	6.12	38.05	28.16	0.78
T1	1533.785	Q=250	250	652.78	655.06	654.9	655.63	0.020098	6.67	43.96	29.6	0.81
T1	1533.785	Q=300	300	652.78	655.24	655.11	655.89	0.020752	7.16	49.45	30.88	0.83
T1	1533.785	Q=350	350	652.78	655.41	655.28	656.13	0.021215	7.59	54.81	32.23	0.85
T1	1533.785	Q=400	400	652.78	655.57	655.45	656.35	0.021699	8	59.98	33.7	0.87
T1	1533.785	Q=450	450	652.78	655.71	655.62	656.57	0.022182	8.38	64.9	35.04	0.89
T1	1533.785	Q=500	500	652.78	655.84	655.78	656.76	0.02274	8.75	69.53	36.25	0.9
T1	1533.785	Q=600	600	652.78	656.09	656.07	657.13	0.023529	9.39	78.62	38.52	0.93
T1	1636.531	Q=25	25	655.86	656.45	656.45	656.65	0.042549	3.93	7.39	18.99	0.94
T1	1636.531	Q=50	50	655.86	656.7	656.7	656.97	0.037607	4.74	12.54	22.76	0.94
T1	1636.531	Q=75	75	655.86	656.88	656.88	657.22	0.036385	5.35	16.88	25.33	0.96
T1	1636.531	Q=100	100	655.86	657.04	657.04	657.42	0.034743	5.77	21.02	27.44	0.96
T1	1636.531	Q=125	125	655.86	657.17	657.17	657.6	0.033649	6.13	24.89	29.23	0.96
T1	1636.531	Q=150	150	655.86	657.3	657.3	657.77	0.032922	6.45	28.57	30.83	0.96
T1	1636.531	Q=175	175	655.86	657.41	657.41	657.92	0.032117	6.72	32.19	32.33	0.97
T1	1636.531	Q=200	200	655.86	657.51	657.51	658.05	0.031592	6.97	35.64	33.71	0.97
T1	1636.531	Q=250	250	655.86	657.69	657.69	658.3	0.031781	7.49	41.77	36.02	0.99
T1	1636.531	Q=300	300	655.86	657.88	657.88	658.53	0.030221	7.82	49	39.54	0.98
T1	1636.531	Q=350	350	655.86	658.05	658.05	658.73	0.029141	8.11	55.96	42.72	0.98
T1	1636.531	Q=400	400	655.86	658.17	658.17	658.92	0.030336	8.58	61.21	45.24	1
T1	1636.531	Q=450	450	655.86	658.34	658.34	659.09	0.028859	8.77	69.18	50.07	0.99
T1	1636.531	Q=500	500	655.86	658.48	658.42	659.26	0.028528	9.07	76.86	55.95	1
T1	1636.531	Q=600	600	655.86	658.91	658.91	659.57	0.022389	8.9	107.86	88.7	0.9
T1	1702.895	Q=25	25	656.02	657.25	656.77	657.3	0.0041	1.95	15.2	20.4	0.33
T1	1702.895	Q=50	50	656.02	657.61	657.06	657.69	0.005034	2.62	23.42	24.77	0.38
T1	1702.895	Q=75	75	656.02	657.89	657.28	658	0.005533	3.08	30.78	28.89	0.41
T1	1702.895	Q=100	100	656.02	658.1	657.47	658.24	0.005962	3.45	37.41	32.48	0.43
T1	1702.895	Q=125	125	656.02	658.29	657.62	658.44	0.006375	3.79	43.71	36.44	0.46
T1	1702.895	Q=150	150	656.02	658.46	657.78	658.63	0.006653	4.07	50.28	41.19	0.47
T1	1702.895	Q=175	175	656.02	658.61	657.92	658.8	0.006914	4.33	56.89	46.56	0.49
T1	1702.895	Q=200	200	656.02	658.75	658.04	658.96	0.007145	4.57	64.07	53.88	0.5
T1	1702.895	Q=250	250	656.02	659.01	658.26	659.23	0.00739	4.95	80.09	71.95	0.52

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T1	1702.895	Q=300	300	656.02	659.22	658.46	659.44	0.007366	5.18	96.54	86.98	0.52
T1	1702.895	Q=350	350	656.02	659.39	658.63	659.62	0.007111	5.28	112.94	98.22	0.52
T1	1702.895	Q=400	400	656.02	659.57	658.79	659.78	0.006609	5.27	130.88	108.4	0.5
T1	1702.895	Q=450	450	656.02	659.71	659.1	659.93	0.006342	5.31	147.34	117.09	0.5
T1	1702.895	Q=500	500	656.02	659.86	659.29	660.07	0.005959	5.29	165.2	125.5	0.48
T1	1702.895	Q=600	600	656.02	660.12	659.48	660.34	0.006623	5.83	203.68	183.82	0.52
T2	509.5519	Q=25	25	593.61	594.14		594.19	0.026799	1.86	13.44	53.53	0.65
T2	509.5519	Q=50	50	593.61	594.31		594.39	0.019353	2.19	22.87	56.01	0.6
T2	509.5519	Q=75	75	593.61	594.46		594.55	0.016203	2.41	31.18	57.98	0.58
T2	509.5519	Q=100	100	593.61	594.59		594.69	0.014063	2.57	38.93	59.25	0.56
T2	509.5519	Q=125	125	593.61	594.71	594.44	594.82	0.01305	2.73	45.81	60.36	0.55
T2	509.5519	Q=150	150	593.61	594.81		594.94	0.012203	2.87	52.43	61.35	0.54
T2	509.5519	Q=175	175	593.61	594.91		595.05	0.011592	3	58.49	61.95	0.54
T2	509.5519	Q=200	200	593.61	595.01		595.16	0.011043	3.12	64.42	62.53	0.53
T2	509.5519	Q=250	250	593.61	595.18		595.36	0.010361	3.34	75.37	63.57	0.53
T2	509.5519	Q=300	300	593.61	595.35		595.54	0.00978	3.53	85.91	64.57	0.53
T2	509.5519	Q=350	350	593.61	595.5		595.71	0.00935	3.7	95.9	65.48	0.52
T2	509.5519	Q=400	400	593.61	595.64		595.87	0.009047	3.86	105.33	66.29	0.52
T2	509.5519	Q=450	450	593.61	595.78		596.02	0.008833	4.01	114.26	67.04	0.52
T2	509.5519	Q=500	500	593.61	595.9		596.17	0.008679	4.16	122.77	67.75	0.52
T2	509.5519	Q=600	600	593.61	596.14		596.44	0.008393	4.42	139.22	69.07	0.53
T2	607.4537	Q=25	25	593.65	594.79	594.23	594.82	0.002807	1.3	19.29	25.26	0.26
T2	607.4537	Q=50	50	593.65	595.07	594.47	595.13	0.004041	1.91	26.74	27.77	0.32
T2	607.4537	Q=75	75	593.65	595.27	594.66	595.36	0.005085	2.39	32.38	29.53	0.37
T2	607.4537	Q=100	100	593.65	595.43	594.81	595.55	0.005972	2.81	37.21	30.97	0.41
T2	607.4537	Q=125	125	593.65	595.57	594.94	595.72	0.00678	3.17	41.47	32.2	0.45
T2	607.4537	Q=150	150	593.65	595.69	595.07	595.87	0.007453	3.5	45.47	33.22	0.47
T2	607.4537	Q=175	175	593.65	595.8	595.19	596.01	0.0081	3.8	49.1	33.98	0.5
T2	607.4537	Q=200	200	593.65	595.89	595.3	596.14	0.008722	4.08	52.45	34.67	0.52
T2	607.4537	Q=250	250	593.65	596.07	595.51	596.38	0.009777	4.59	58.78	35.94	0.56
T2	607.4537	Q=300	300	593.65	596.22	595.7	596.6	0.01083	5.06	64.34	37.02	0.6
T2	607.4537	Q=350	350	593.65	596.36	595.86	596.8	0.011771	5.5	69.53	37.91	0.63
T2	607.4537	Q=400	400	593.65	596.49	596.02	596.99	0.012622	5.89	74.4	38.61	0.66

T2	607.4537	Q=450	450	593.65	596.61	596.17	597.16	0.013408	6.26	79.01	39.25	0.68
T2	607.4537	Q=500	500	593.65	596.72	596.32	597.34	0.014147	6.61	83.39	39.86	0.71
T2	607.4537	Q=600	600	593.65	597.25	596.58	597.81	0.01038	6.37	105.21	42.74	0.62
T2	731.9712	Q=25	25	595.72	596.42	596.42	596.65	0.052919	3.86	6.48	14.31	1.01
T2	731.9712	Q=50	50	595.72	596.7	596.7	597.02	0.047193	4.56	10.96	17.25	1.01
T2	731.9712	Q=75	75	595.72	596.91	596.91	597.31	0.044243	5.05	14.86	19.37	1.01
T2	731.9712	Q=100	100	595.72	597.09	597.09	597.55	0.041208	5.46	18.4	20.9	1
T2	731.9712	Q=125	125	595.72	597.24	597.24	597.77	0.038	5.82	21.74	22.06	0.99
T2	731.9712	Q=150	150	595.72	597.39	597.39	597.97	0.035578	6.12	25.01	23.15	0.98
T2	731.9712	Q=175	175	595.72	597.53	597.53	598.15	0.033436	6.37	28.27	24.18	0.96
T2	731.9712	Q=200	200	595.72	597.65	597.65	598.32	0.032076	6.62	31.35	25.12	0.96
T2	731.9712	Q=250	250	595.72	597.89	597.89	598.63	0.029651	7.02	37.49	26.87	0.94
T2	731.9712	Q=300	300	595.72	598.03	598.1	598.91	0.031884	7.69	41.45	27.84	0.99
T2	731.9712	Q=350	350	595.72	598.18	598.29	599.18	0.032822	8.21	45.66	28.84	1.02
T2	731.9712	Q=400	400	595.72	598.32	598.47	599.42	0.033633	8.68	49.69	29.77	1.04
T2	731.9712	Q=450	450	595.72	598.44	598.64	599.66	0.034678	9.14	53.36	30.5	1.07
T2	731.9712	Q=500	500	595.72	598.56	598.8	599.88	0.035424	9.56	57.01	31.17	1.09
T2	731.9712	Q=600	600	595.72	598.78	599.1	600.3	0.036746	10.32	63.94	32.42	1.13
T2	827.6824	Q=25	25	598.3	599.2	599	599.31	0.016855	2.67	9.39	15.59	0.6
T2	827.6824	Q=50	50	598.3	599.49	599.28	599.69	0.018146	3.58	14.22	17.52	0.66
T2	827.6824	Q=75	75	598.3	599.72	599.5	599.99	0.018989	4.24	18.3	18.98	0.7
T2	827.6824	Q=100	100	598.3	599.9	599.7	600.24	0.020167	4.82	21.77	20.14	0.74
T2	827.6824	Q=125	125	598.3	600.04	599.88	600.47	0.021444	5.34	24.82	21.12	0.78
T2	827.6824	Q=150	150	598.3	600.17	600.03	600.67	0.022769	5.82	27.56	21.95	0.82
T2	827.6824	Q=175	175	598.3	600.28	600.19	600.86	0.02409	6.26	30.08	22.68	0.85
T2	827.6824	Q=200	200	598.3	600.39	600.32	601.04	0.025135	6.66	32.52	23.36	0.88
T2	827.6824	Q=250	250	598.3	600.58	600.57	601.36	0.027103	7.39	37.04	24.56	0.92
T2	827.6824	Q=300	300	598.3	600.81	600.81	601.66	0.025899	7.77	42.8	25.91	0.92
T2	827.6824	Q=350	350	598.3	601.01	601.01	601.93	0.02529	8.13	48.08	26.9	0.92
T2	827.6824	Q=400	400	598.3	601.19	601.19	602.18	0.024773	8.46	53.2	27.82	0.92
T2	827.6824	Q=450	450	598.3	601.37	601.37	602.42	0.024206	8.74	58.28	28.71	0.92
T2	827.6824	Q=500	500	598.3	601.54	601.54	602.64	0.023653	8.99	63.3	29.56	0.92
T2	827.6824	Q=600	600	598.3	601.87	601.87	603.06	0.022745	9.45	73.02	31.07	0.92

T2	950.5703	Q=25	25	598.98	600.22	599.69	600.26	0.004295	1.69	14.91	18.14	0.32
T2	950.5703	Q=50	50	598.98	600.65	599.98	600.72	0.004665	2.19	23.35	21.38	0.35
T2	950.5703	Q=75	75	598.98	600.96	600.2	601.06	0.004803	2.56	30.35	23.62	0.37
T2	950.5703	Q=100	100	598.98	601.22	600.39	601.34	0.004849	2.86	36.65	25.15	0.38
T2	950.5703	Q=125	125	598.98	601.45	600.56	601.59	0.004844	3.11	42.61	26.39	0.39
T2	950.5703	Q=150	150	598.98	601.66	600.71	601.82	0.004835	3.32	48.28	27.53	0.4
T2	950.5703	Q=175	175	598.98	601.85	600.85	602.03	0.004822	3.51	53.73	28.57	0.4
T2	950.5703	Q=200	200	598.98	602.03	600.98	602.23	0.00482	3.68	58.93	29.54	0.41
T2	950.5703	Q=250	250	598.98	602.36	601.22	602.59	0.004795	3.98	68.97	31.25	0.41
T2	950.5703	Q=300	300	598.98	602.63	601.43	602.89	0.004922	4.28	77.58	32.38	0.42
T2	950.5703	Q=350	350	598.98	602.88	601.62	603.17	0.005005	4.54	85.86	33.37	0.43
T2	950.5703	Q=400	400	598.98	603.11		603.43	0.005082	4.78	93.72	34.3	0.44
T2	950.5703	Q=450	450	598.98	603.33		603.67	0.005176	5.01	101.11	35.14	0.45
T2	950.5703	Q=500	500	598.98	603.53		603.9	0.005242	5.22	108.36	35.95	0.46
T2	950.5703	Q=600	600	598.98	603.91		604.33	0.005374	5.61	122.08	37.43	0.47
T2	1061.56	Q=25	25	600.95	601.7	601.7	601.95	0.052154	3.94	6.35	13.45	1.01
T2	1061.56	Q=50	50	600.95	602	602	602.33	0.046905	4.59	10.9	16.92	1.01
T2	1061.56	Q=75	75	600.95	602.22	602.22	602.62	0.044161	5.07	14.8	19.18	1.01
T2	1061.56	Q=100	100	600.95	602.41	602.41	602.86	0.040584	5.4	18.61	20.95	0.99
T2	1061.56	Q=125	125	600.95	602.56	602.56	603.08	0.039357	5.79	21.78	22.16	1
T2	1061.56	Q=150	150	600.95	602.7	602.7	603.27	0.036758	6.09	24.99	23.17	0.99
T2	1061.56	Q=175	175	600.95	602.83	602.83	603.45	0.034753	6.36	28.13	24.12	0.98
T2	1061.56	Q=200	200	600.95	602.95	602.95	603.62	0.033275	6.6	31.16	25	0.97
T2	1061.56	Q=250	250	600.95	603.19	603.19	603.93	0.030648	7.01	37.21	26.67	0.95
T2	1061.56	Q=300	300	600.95	603.4	603.4	604.21	0.028867	7.36	42.98	27.88	0.94
T2	1061.56	Q=350	350	600.95	603.59	603.59	604.47	0.027804	7.7	48.33	28.75	0.94
T2	1061.56	Q=400	400	600.95	603.78	603.76	604.71	0.026151	7.93	54.02	29.58	0.93
T2	1061.56	Q=450	450	600.95	603.99	603.93	604.93	0.02423	8.08	60.06	30.43	0.91
T2	1061.56	Q=500	500	600.95	604.18	604.09	605.15	0.022743	8.22	65.93	31.24	0.89
T2	1061.56	Q=600	600	600.95	604.53	604.39	605.56	0.020612	8.51	77.25	32.74	0.86
T2	1216.334	Q=25	25	602.2	603.55	603.03	603.59	0.004336	1.52	16.65	25.13	0.31
T2	1216.334	Q=50	50	602.2	603.92	603.33	603.98	0.004469	1.93	26.77	29.52	0.34

T2	1216.334	Q=75	75	602.2	604.18	603.53	604.26	0.004507	2.26	34.76	31.79	0.35
T2	1216.334	Q=100	100	602.2	604.4	603.7	604.49	0.004592	2.53	41.83	33.67	0.36
T2	1216.334	Q=125	125	602.2	604.59	603.83	604.7	0.004612	2.75	48.56	35.41	0.37
T2	1216.334	Q=150	150	602.2	604.76	603.94	604.89	0.004674	2.95	54.75	36.98	0.38
T2	1216.334	Q=175	175	602.2	604.92	604.06	605.06	0.004718	3.13	60.68	38.39	0.39
T2	1216.334	Q=200	200	602.2	605.07	604.15	605.22	0.004745	3.28	66.42	39.68	0.39
T2	1216.334	Q=250	250	602.2	605.33	604.35	605.51	0.004797	3.57	77.26	41.77	0.4
T2	1216.334	Q=300	300	602.2	605.57	604.52	605.78	0.004828	3.81	87.53	43.56	0.41
T2	1216.334	Q=350	350	602.2	605.8	604.68	606.02	0.004832	4.02	97.48	45.22	0.42
T2	1216.334	Q=400	400	602.2	606	604.84	606.25	0.004846	4.22	106.96	46.77	0.42
T2	1216.334	Q=450	450	602.2	606.19	604.99	606.45	0.004915	4.41	115.65	48.17	0.43
T2	1216.334	Q=500	500	602.2	606.36	605.13	606.65	0.004955	4.59	124.26	49.52	0.43
T2	1216.334	Q=600	600	602.2	606.7	605.39	607.01	0.004978	4.89	141.19	51.99	0.44
T2	1295.347	Q=25	25	603.89	604.53	604.53	604.74	0.054492	3.65	6.85	16.88	1.01
T2	1295.347	Q=50	50	603.89	604.78	604.78	605.08	0.048498	4.38	11.43	19.6	1.01
T2	1295.347	Q=75	75	603.89	604.98	604.98	605.34	0.045269	4.84	15.49	21.64	1.01
T2	1295.347	Q=100	100	603.89	605.14	605.14	605.56	0.043345	5.21	19.19	23.21	1.01
T2	1295.347	Q=125	125	603.89	605.29	605.29	605.76	0.041544	5.52	22.63	24.27	1.01
T2	1295.347	Q=150	150	603.89	605.42	605.42	605.94	0.039911	5.78	25.97	25.25	1
T2	1295.347	Q=175	175	603.89	605.54	605.54	606.11	0.039308	6.03	29.01	26.12	1.01
T2	1295.347	Q=200	200	603.89	605.66	605.66	606.26	0.038048	6.23	32.09	26.91	1
T2	1295.347	Q=250	250	603.89	605.86	605.86	606.55	0.036661	6.67	37.54	28.08	1.01
T2	1295.347	Q=300	300	603.89	606.05	606.05	606.81	0.034649	6.99	43.09	29.23	1
T2	1295.347	Q=350	350	603.89	606.21	606.21	607.05	0.033394	7.35	48	30.26	1
T2	1295.347	Q=400	400	603.89	606.38	606.38	607.28	0.03183	7.63	53.07	31.28	0.99
T2	1295.347	Q=450	450	603.89	606.48	606.54	607.5	0.033569	8.12	56.29	31.91	1.02
T2	1295.347	Q=500	500	603.89	606.57	606.69	607.71	0.035689	8.62	59.09	32.45	1.06
T2	1295.347	Q=600	600	603.89	606.74	606.97	608.12	0.038883	9.5	64.78	33.52	1.12
T2	1394.651	Q=25	25	606.2	607.2	606.96	607.31	0.014909	2.61	9.6	14.69	0.57
T2	1394.651	Q=50	50	606.2	607.54	607.26	607.71	0.016574	3.33	15.04	17.22	0.63
T2	1394.651	Q=75	75	606.2	607.79	607.5	608.02	0.017789	3.84	19.55	19.04	0.67
T2	1394.651	Q=100	100	606.2	607.98	607.7	608.27	0.018465	4.29	23.33	20.11	0.7
T2	1394.651	Q=125	125	606.2	608.14	607.86	608.49	0.019293	4.73	26.56	20.97	0.72

T2	1394.651	Q=150	150	606.2	608.28	608.02	608.69	0.020096	5.14	29.41	21.67	0.75
T2	1394.651	Q=175	175	606.2	608.4	608.16	608.87	0.020604	5.51	32.2	22.33	0.77
T2	1394.651	Q=200	200	606.2	608.51	608.28	609.04	0.021398	5.87	34.69	22.91	0.79
T2	1394.651	Q=250	250	606.2	608.72	608.53	609.36	0.022586	6.5	39.48	23.98	0.83
T2	1394.651	Q=300	300	606.2	608.89	608.76	609.66	0.024105	7.11	43.64	24.88	0.87
T2	1394.651	Q=350	350	606.2	609.05	608.97	609.93	0.025279	7.65	47.66	25.71	0.9
T2	1394.651	Q=400	400	606.2	609.19	609.16	610.19	0.026566	8.17	51.33	26.45	0.94
T2	1394.651	Q=450	450	606.2	609.36	609.36	610.44	0.026266	8.51	55.88	27.34	0.94
T2	1394.651	Q=500	500	606.2	609.53	609.53	610.67	0.025404	8.75	60.8	28.23	0.94
T2	1394.651	Q=600	600	606.2	609.87	609.87	611.1	0.023834	9.17	70.56	29.71	0.92
T2	1530.396	Q=25	25	609.88	610.73	610.73	610.99	0.050672	4.15	6.03	11.48	1.01
T2	1530.396	Q=50	50	609.88	611.06	611.06	611.43	0.045478	4.88	10.24	14.05	1.01
T2	1530.396	Q=75	75	609.88	611.24	611.31	611.76	0.052671	5.76	13.02	15.51	1.11
T2	1530.396	Q=100	100	609.88	611.4	611.5	612.04	0.055431	6.43	15.56	16.53	1.16
T2	1530.396	Q=125	125	609.88	611.53	611.67	612.31	0.057506	7.11	17.64	17.04	1.21
T2	1530.396	Q=150	150	609.88	611.64	611.84	612.56	0.059059	7.7	19.61	17.51	1.24
T2	1530.396	Q=175	175	609.88	611.76	611.99	612.79	0.058412	8.16	21.7	18	1.26
T2	1530.396	Q=200	200	609.88	611.86	612.14	613	0.058519	8.6	23.63	18.43	1.27
T2	1530.396	Q=250	250	609.88	612.09	612.4	613.39	0.055347	9.22	27.83	19.34	1.27
T2	1530.396	Q=300	300	609.88	612.29	612.65	613.74	0.052737	9.74	31.91	20.19	1.26
T2	1530.396	Q=350	350	609.88	612.5	612.88	614.05	0.049686	10.14	36.09	21.02	1.25
T2	1530.396	Q=400	400	609.88	612.69	613.09	614.34	0.04727	10.49	40.18	21.81	1.24
T2	1530.396	Q=450	450	609.88	612.87	613.31	614.6	0.044836	10.78	44.34	22.58	1.22
T2	1530.396	Q=500	500	609.88	613.05	613.48	614.86	0.043154	11.07	48.31	23.29	1.21
T2	1530.396	Q=600	600	609.88	613.37	613.84	615.33	0.040516	11.6	56.04	24.61	1.2
T2	1543.127	Q=25	25	610.32	611.31	611.25	611.54	0.036945	3.85	6.49	10.84	0.88
T2	1543.127	Q=50	50	610.32	611.6	611.6	611.99	0.043912	5.02	9.97	12.69	1
T2	1543.127	Q=75	75	610.32	611.86	611.86	612.34	0.042507	5.56	13.49	14.33	1.01
T2	1543.127	Q=100	100	610.32	612.09	612.09	612.64	0.040036	5.94	16.84	15.7	1
T2	1543.127	Q=125	125	610.32	612.26	612.26	612.9	0.03775	6.38	19.72	16.75	1
T2	1543.127	Q=150	150	610.32	612.45	612.45	613.13	0.034368	6.66	22.88	17.84	0.97
T2	1543.127	Q=175	175	610.32	612.61	612.61	613.35	0.032748	6.96	25.77	18.78	0.97
T2	1543.127	Q=200	200	610.32	612.76	612.76	613.55	0.031035	7.2	28.74	19.7	0.96

T2	1543.127	Q=250	250	610.32	613.04	613.04	613.92	0.028423	7.62	34.59	21.39	0.94
T2	1543.127	Q=300	300	610.32	613.31	613.31	614.25	0.026288	7.95	40.46	22.96	0.92
T2	1543.127	Q=350	350	610.32	613.53	613.53	614.54	0.025327	8.3	45.72	23.98	0.92
T2	1543.127	Q=400	400	610.32	613.75	613.75	614.82	0.024292	8.58	51	24.86	0.91
T2	1543.127	Q=450	450	610.32	613.93	613.93	615.07	0.024005	8.91	55.66	25.57	0.92
T2	1543.127	Q=500	500	610.32	614.13	614.13	615.31	0.023153	9.13	60.74	26.32	0.91
T2	1543.127	Q=600	600	610.32	614.47	614.47	615.77	0.022471	9.63	69.86	27.61	0.91
T2	1626.466	Q=25	25	610.25	611.95	611.1	611.99	0.001963	1.5	17.53	15.92	0.23
T2	1626.466	Q=50	50	610.25	612.48	611.45	612.54	0.002321	2.04	26.55	18.39	0.27
T2	1626.466	Q=75	75	610.25	612.86	611.7	612.94	0.002589	2.44	33.81	19.85	0.29
T2	1626.466	Q=100	100	610.25	613.16	611.92	613.27	0.002826	2.78	40.06	21.03	0.31
T2	1626.466	Q=125	125	610.25	613.43	612.12	613.56	0.00302	3.07	45.76	22.02	0.32
T2	1626.466	Q=150	150	610.25	613.66	612.29	613.81	0.003191	3.33	51.01	22.85	0.34
T2	1626.466	Q=175	175	610.25	613.88	612.47	614.05	0.003328	3.56	56.03	23.62	0.35
T2	1626.466	Q=200	200	610.25	614.08	612.62	614.27	0.003462	3.78	60.74	24.32	0.36
T2	1626.466	Q=250	250	610.25	614.43	612.89	614.66	0.003707	4.17	69.47	25.56	0.38
T2	1626.466	Q=300	300	610.25	614.73	613.15	615	0.003926	4.53	77.52	26.65	0.39
T2	1626.466	Q=350	350	610.25	615.01	613.38	615.32	0.004116	4.84	85.13	27.64	0.41
T2	1626.466	Q=400	400	610.25	615.27	613.6	615.61	0.004295	5.14	92.29	28.53	0.42
T2	1626.466	Q=450	450	610.25	615.51	613.82	615.88	0.004439	5.41	99.3	29.41	0.43
T2	1626.466	Q=500	500	610.25	615.73	614	616.14	0.004594	5.66	105.88	30.23	0.44
T2	1626.466	Q=600	600	610.25	616.15	614.36	616.61	0.00483	6.12	118.75	31.77	0.46
T2	1737.211	Q=25	25	613.98	614.94	614.94	615.2	0.051485	4.11	6.08	11.87	1.01
T2	1737.211	Q=50	50	613.98	615.25	615.25	615.62	0.043352	4.87	10.34	14.48	0.99
T2	1737.211	Q=75	75	613.98	615.5	615.5	615.95	0.039745	5.45	14.02	16.11	0.98
T2	1737.211	Q=100	100	613.98	615.71	615.71	616.23	0.036813	5.85	17.6	17.55	0.97
T2	1737.211	Q=125	125	613.98	615.89	615.89	616.47	0.035193	6.19	20.94	18.8	0.97
T2	1737.211	Q=150	150	613.98	616.06	616.06	616.69	0.03352	6.49	24.12	19.84	0.96
T2	1737.211	Q=175	175	613.98	616.2	616.2	616.89	0.032258	6.79	27.02	20.47	0.96
T2	1737.211	Q=200	200	613.98	616.34	616.34	617.07	0.03126	7.07	29.83	21.06	0.96
T2	1737.211	Q=250	250	613.98	616.58	616.58	617.42	0.029774	7.56	35.21	22.15	0.96
T2	1737.211	Q=300	300	613.98	616.82	616.82	617.74	0.028266	7.95	40.54	23.18	0.95
T2	1737.211	Q=350	350	613.98	617.03	617.03	618.03	0.027306	8.31	45.58	24.11	0.95

T2	1737.211	Q=400	400	613.98	617.25	617.25	618.3	0.025936	8.58	50.87	25.05	0.94
T2	1737.211	Q=450	450	613.98	617.44	617.44	618.55	0.025249	8.87	55.72	25.88	0.93
T2	1737.211	Q=500	500	613.98	617.6	617.6	618.79	0.025095	9.19	60.09	26.61	0.94
T2	1737.211	Q=600	600	613.98	617.95	617.95	619.24	0.023847	9.64	69.51	28.06	0.93
T2	1820.971	Q=25	25	613.49	615.4	614.25	615.42	0.000722	0.99	26.34	21.01	0.14
T2	1820.971	Q=50	50	613.49	615.89	614.55	615.92	0.001048	1.44	37.11	23.41	0.18
T2	1820.971	Q=75	75	613.49	616.25	614.78	616.3	0.001263	1.77	45.93	25.02	0.2
T2	1820.971	Q=100	100	613.49	616.55	614.97	616.61	0.001435	2.04	53.59	26.33	0.22
T2	1820.971	Q=125	125	613.49	616.81	615.14	616.88	0.001579	2.28	60.51	27.36	0.24
T2	1820.971	Q=150	150	613.49	617.04	615.3	617.12	0.001706	2.5	66.86	28.23	0.25
T2	1820.971	Q=175	175	613.49	617.24	615.44	617.35	0.001817	2.69	72.84	29.06	0.26
T2	1820.971	Q=200	200	613.49	617.44	615.59	617.55	0.001914	2.87	78.55	29.87	0.27
T2	1820.971	Q=250	250	613.49	617.79	615.84	617.93	0.002081	3.19	89.28	31.36	0.29
T2	1820.971	Q=300	300	613.49	618.1	616.06	618.26	0.002219	3.46	99.35	32.68	0.3
T2	1820.971	Q=350	350	613.49	618.39	616.27	618.57	0.002333	3.71	108.94	33.9	0.31
T2	1820.971	Q=400	400	613.49	618.65	616.47	618.86	0.002438	3.94	118	35.01	0.32
T2	1820.971	Q=450	450	613.49	618.9	616.66	619.13	0.002524	4.15	126.82	36.04	0.33
T2	1820.971	Q=500	500	613.49	619.14	616.83	619.38	0.002592	4.34	135.43	36.88	0.33
T2	1820.971	Q=600	600	613.49	619.57	617.16	619.85	0.002727	4.69	151.53	38.41	0.35
T2	1942.739	Q=25	25	616.14	617.06	617.06	617.35	0.041448	4.39	5.97	10.8	0.95
T2	1942.739	Q=50	50	616.14	617.41	617.41	617.83	0.034658	5.35	10.21	13.06	0.94
T2	1942.739	Q=75	75	616.14	617.7	617.7	618.19	0.031067	5.96	14.13	14.85	0.92
T2	1942.739	Q=100	100	616.14	617.93	617.93	618.49	0.029186	6.45	17.75	16.34	0.92
T2	1942.739	Q=125	125	616.14	618.13	618.13	618.75	0.027955	6.85	21.14	17.41	0.92
T2	1942.739	Q=150	150	616.14	618.3	618.3	618.99	0.027381	7.23	24.25	18.26	0.92
T2	1942.739	Q=175	175	616.14	618.47	618.47	619.2	0.026617	7.54	27.35	19.08	0.92
T2	1942.739	Q=200	200	616.14	618.62	618.62	619.4	0.026227	7.84	30.25	19.82	0.93
T2	1942.739	Q=250	250	616.14	618.9	618.9	619.76	0.024977	8.29	36.14	21.21	0.92
T2	1942.739	Q=300	300	616.14	619.15	619.15	620.09	0.024575	8.74	41.36	22.13	0.93
T2	1942.739	Q=350	350	616.14	619.36	619.36	620.38	0.02438	9.16	46.28	22.96	0.94
T2	1942.739	Q=400	400	616.14	619.59	619.59	620.66	0.023629	9.47	51.46	23.8	0.93
T2	1942.739	Q=450	450	616.14	619.78	619.78	620.92	0.023409	9.8	56.16	24.54	0.94
T2	1942.739	Q=500	500	616.14	619.95	619.95	621.17	0.023527	10.16	60.44	25.2	0.95

T2	1942.739	Q=600	600	616.14	620.3	620.3	621.63	0.023086	10.7	69.37	26.54	0.95
T2	1997.813	Q=25	25	615.31	617.46	616.09	617.47	0.000519	0.98	28.06	19.65	0.13
T2	1997.813	Q=50	50	615.31	617.97	616.4	618	0.000823	1.45	38.82	22.06	0.17
T2	1997.813	Q=75	75	615.31	618.35	616.65	618.4	0.001042	1.8	47.56	23.7	0.19
T2	1997.813	Q=100	100	615.31	618.67	616.87	618.72	0.001217	2.09	55.19	25.04	0.21
T2	1997.813	Q=125	125	615.31	618.93	617.06	619.01	0.001369	2.35	62.04	26.14	0.23
T2	1997.813	Q=150	150	615.31	619.17	617.23	619.26	0.001498	2.57	68.41	27.04	0.24
T2	1997.813	Q=175	175	615.31	619.39	617.39	619.49	0.001612	2.77	74.36	27.87	0.25
T2	1997.813	Q=200	200	615.31	619.59	617.54	619.7	0.001714	2.96	80.04	28.63	0.26
T2	1997.813	Q=250	250	615.31	619.95	617.82	620.09	0.001894	3.29	90.56	29.93	0.28
T2	1997.813	Q=300	300	615.31	620.27	618.06	620.43	0.00205	3.59	100.31	31.06	0.29
T2	1997.813	Q=350	350	615.31	620.56	618.29	620.75	0.00218	3.86	109.58	32.1	0.31
T2	1997.813	Q=400	400	615.31	620.83	618.5	621.04	0.002302	4.11	118.3	33.05	0.32
T2	1997.813	Q=450	450	615.31	621.08	618.69	621.31	0.002404	4.33	126.78	33.95	0.33
T2	1997.813	Q=500	500	615.31	621.32	618.89	621.57	0.002491	4.54	135.03	34.77	0.33
T2	1997.813	Q=600	600	615.31	621.76	619.23	622.05	0.00265	4.92	150.65	36.28	0.35
T2	2072.624	Q=25	25	618.23	619.24	619.24	619.56	0.04366	4.55	5.7	9.71	0.98
T2	2072.624	Q=50	50	618.23	619.62	619.62	620.07	0.035261	5.51	9.77	11.62	0.95
T2	2072.624	Q=75	75	618.23	619.92	619.92	620.46	0.031959	6.18	13.41	13.1	0.94
T2	2072.624	Q=100	100	618.23	620.18	620.18	620.79	0.029302	6.65	16.95	14.4	0.92
T2	2072.624	Q=125	125	618.23	620.39	620.39	621.07	0.028184	7.09	20.12	15.27	0.93
T2	2072.624	Q=150	150	618.23	620.59	620.59	621.33	0.027097	7.44	23.2	16.04	0.92
T2	2072.624	Q=175	175	618.23	620.76	620.76	621.56	0.026709	7.8	26.02	16.69	0.93
T2	2072.624	Q=200	200	618.23	620.92	620.92	621.78	0.026256	8.11	28.78	17.29	0.93
T2	2072.624	Q=250	250	618.23	621.23	621.23	622.18	0.025193	8.62	34.25	18.4	0.93
T2	2072.624	Q=300	300	618.23	621.49	621.49	622.54	0.02476	9.11	39.27	19.38	0.94
T2	2072.624	Q=350	350	618.23	621.76	621.76	622.87	0.02373	9.45	44.56	20.35	0.93
T2	2072.624	Q=400	400	618.23	621.98	621.98	623.18	0.023642	9.86	49.14	21.15	0.94
T2	2072.624	Q=450	450	618.23	622.2	622.2	623.46	0.02326	10.2	53.84	21.95	0.94
T2	2072.624	Q=500	500	618.23	622.42	622.42	623.73	0.022596	10.45	58.74	22.75	0.94
T2	2072.624	Q=600	600	618.23	622.81	622.81	624.23	0.021849	10.96	67.93	24.17	0.94
T2	2163.506	Q=25	25	619.95	621.11	620.75	621.19	0.009461	2.29	10.93	14.5	0.46

T2	2163.506	Q=50	50	619.95	621.51	621.07	621.64	0.009913	2.94	17.1	16.58	0.5
T2	2163.506	Q=75	75	619.95	621.81	621.31	621.99	0.009943	3.39	22.4	18.08	0.52
T2	2163.506	Q=100	100	619.95	622.06	621.51	622.28	0.009966	3.8	26.91	19.08	0.53
T2	2163.506	Q=125	125	619.95	622.28	621.7	622.54	0.009897	4.13	31.2	19.99	0.54
T2	2163.506	Q=150	150	619.95	622.48	621.86	622.77	0.00988	4.43	35.24	20.81	0.55
T2	2163.506	Q=175	175	619.95	622.66	622.01	622.99	0.009841	4.69	39.14	21.58	0.56
T2	2163.506	Q=200	200	619.95	622.83	622.15	623.2	0.009742	4.92	42.99	22.31	0.57
T2	2163.506	Q=250	250	619.95	623.15	622.42	623.57	0.009637	5.32	50.29	23.62	0.57
T2	2163.506	Q=300	300	619.95	623.45	622.66	623.91	0.009483	5.66	57.4	24.82	0.58
T2	2163.506	Q=350	350	619.95	623.71	622.89	624.22	0.009469	5.98	63.96	25.81	0.59
T2	2163.506	Q=400	400	619.95	623.96	623.11	624.52	0.009308	6.24	70.67	26.79	0.59
T2	2163.506	Q=450	450	619.95	624.19	623.31	624.79	0.009238	6.49	77	27.68	0.59
T2	2163.506	Q=500	500	619.95	624.41	623.51	625.04	0.009229	6.73	83	28.5	0.6
T2	2163.506	Q=600	600	619.95	624.81	623.86	625.52	0.009146	7.16	94.83	30.05	0.61
T2	2258.038	Q=25	25	622.01	622.96	622.96	623.27	0.040347	4.57	5.82	9.99	0.95
T2	2258.038	Q=50	50	622.01	623.34	623.34	623.77	0.033585	5.53	10.03	12.17	0.93
T2	2258.038	Q=75	75	622.01	623.63	623.63	624.15	0.030784	6.2	13.79	13.84	0.93
T2	2258.038	Q=100	100	622.01	623.83	623.87	624.47	0.032241	6.94	16.68	14.97	0.97
T2	2258.038	Q=125	125	622.01	624	624.08	624.75	0.033565	7.57	19.29	15.8	1.01
T2	2258.038	Q=150	150	622.01	624.13	624.27	625	0.035661	8.21	21.49	16.35	1.05
T2	2258.038	Q=175	175	622.01	624.28	624.44	625.24	0.035917	8.65	23.91	16.95	1.07
T2	2258.038	Q=200	200	622.01	624.41	624.59	625.45	0.036493	9.09	26.15	17.48	1.09
T2	2258.038	Q=250	250	622.01	624.64	624.88	625.86	0.037489	9.87	30.37	18.44	1.12
T2	2258.038	Q=300	300	622.01	624.86	625.15	626.22	0.038015	10.52	34.44	19.31	1.15
T2	2258.038	Q=350	350	622.01	625.06	625.4	626.55	0.038455	11.11	38.32	20.11	1.17
T2	2258.038	Q=400	400	622.01	625.23	625.61	626.87	0.039127	11.67	41.93	20.83	1.19
T2	2258.038	Q=450	450	622.01	625.41	625.82	627.15	0.03903	12.11	45.7	21.56	1.2
T2	2258.038	Q=500	500	622.01	625.56	626.02	627.43	0.039636	12.6	49.05	22.18	1.22
T2	2258.038	Q=600	600	622.01	625.87	626.4	627.93	0.039588	13.35	55.99	23.37	1.24
T2	2368.82	Q=25	25	626.05	626.9		627.08	0.029589	3.41	7.38	13.4	0.79
T2	2368.82	Q=50	50	626.05	627.16	627.12	627.49	0.033623	4.65	11.04	14.78	0.89
T2	2368.82	Q=75	75	626.05	627.36	627.36	627.83	0.035948	5.54	14.1	15.85	0.96
T2	2368.82	Q=100	100	626.05	627.57	627.57	628.12	0.033563	6.04	17.5	16.95	0.95

T2	2368.82	Q=125	125	626.05	627.76	627.76	628.37	0.031743	6.45	20.76	17.94	0.95
T2	2368.82	Q=150	150	626.05	627.94	627.94	628.6	0.029556	6.73	24.11	18.87	0.93
T2	2368.82	Q=175	175	626.05	628.09	628.09	628.81	0.029015	7.08	26.97	19.54	0.94
T2	2368.82	Q=200	200	626.05	628.23	628.23	629.01	0.028225	7.36	29.86	20.19	0.94
T2	2368.82	Q=250	250	626.05	628.5	628.5	629.37	0.026861	7.84	35.47	21.42	0.94
T2	2368.82	Q=300	300	626.05	628.75	628.75	629.69	0.025958	8.26	40.79	22.52	0.94
T2	2368.82	Q=350	350	626.05	628.97	628.97	629.99	0.025136	8.63	45.99	23.54	0.93
T2	2368.82	Q=400	400	626.05	629.19	629.19	630.27	0.024288	8.94	51.17	24.52	0.93
T2	2368.82	Q=450	450	626.05	629.38	629.38	630.53	0.023908	9.26	55.95	25.39	0.93
T2	2368.82	Q=500	500	626.05	629.58	629.58	630.77	0.023094	9.49	61.08	26.3	0.93
T2	2368.82	Q=600	600	626.05	629.92	629.92	631.22	0.022382	9.99	70.44	27.91	0.93
T2	2451.901	Q=25	25	627.55	628.64		628.78	0.015164	3.2	8.46	12.23	0.6
T2	2451.901	Q=50	50	627.55	629.04	628.78	629.26	0.014634	4.05	13.88	14.63	0.63
T2	2451.901	Q=75	75	627.55	629.34	629.05	629.63	0.014429	4.63	18.53	16.16	0.65
T2	2451.901	Q=100	100	627.55	629.57		629.92	0.015207	5.19	22.29	17.27	0.68
T2	2451.901	Q=125	125	627.55	629.76		630.18	0.015896	5.68	25.71	18.22	0.71
T2	2451.901	Q=150	150	627.55	629.92		630.41	0.016667	6.14	28.79	19.04	0.74
T2	2451.901	Q=175	175	627.55	630.09		630.62	0.016918	6.49	31.99	19.85	0.75
T2	2451.901	Q=200	200	627.55	630.23		630.82	0.017375	6.85	34.88	20.56	0.77
T2	2451.901	Q=250	250	627.55	630.49	630.26	631.18	0.018054	7.46	40.42	21.85	0.8
T2	2451.901	Q=300	300	627.55	630.73	630.52	631.5	0.01855	7.99	45.66	22.95	0.82
T2	2451.901	Q=350	350	627.55	630.94	630.75	631.8	0.019066	8.48	50.54	23.91	0.84
T2	2451.901	Q=400	400	627.55	631.12	630.97	632.07	0.019634	8.94	55.08	24.73	0.86
T2	2451.901	Q=450	450	627.55	631.31	631.18	632.33	0.019863	9.32	59.73	25.53	0.87
T2	2451.901	Q=500	500	627.55	631.46	631.35	632.57	0.020504	9.74	63.74	26.21	0.89
T2	2451.901	Q=600	600	627.55	631.77	631.7	633.02	0.021122	10.43	71.99	27.54	0.92
T2	2526.197	Q=25	25	627.27	628.94	627.94	628.96	0.00083	1.02	26.08	23.16	0.15
T2	2526.197	Q=50	50	627.27	629.45	628.21	629.48	0.001057	1.42	38.69	26.63	0.18
T2	2526.197	Q=75	75	627.27	629.83	628.42	629.87	0.001202	1.71	49.15	29.13	0.2
T2	2526.197	Q=100	100	627.27	630.13	628.6	630.18	0.001315	1.94	58.35	31.08	0.21
T2	2526.197	Q=125	125	627.27	630.4	628.77	630.46	0.001398	2.14	66.79	32.51	0.22
T2	2526.197	Q=150	150	627.27	630.63	628.91	630.7	0.001468	2.31	74.65	33.76	0.23
T2	2526.197	Q=175	175	627.27	630.85	629.05	630.93	0.00152	2.46	82.13	34.71	0.24

T2	2526.197	Q=200	200	627.27	631.05	629.18	631.14	0.001568	2.6	89.2	35.59	0.24
T2	2526.197	Q=250	250	627.27	631.42	629.42	631.52	0.001647	2.85	102.52	37.18	0.26
T2	2526.197	Q=300	300	627.27	631.74	629.63	631.86	0.001718	3.07	114.84	38.59	0.26
T2	2526.197	Q=350	350	627.27	632.04	629.83	632.18	0.001777	3.27	126.51	39.89	0.27
T2	2526.197	Q=400	400	627.27	632.32	630.02	632.46	0.00183	3.45	137.62	41.1	0.28
T2	2526.197	Q=450	450	627.27	632.57	630.19	632.73	0.001876	3.62	148.32	42.24	0.28
T2	2526.197	Q=500	500	627.27	632.82	630.35	632.99	0.001915	3.77	158.7	43.32	0.29
T2	2526.197	Q=600	600	627.27	633.26	630.64	633.46	0.001982	4.05	178.58	45.32	0.3
T2	2628.187	Q=25	25	631.37	632.25	632.25	632.54	0.04173	4.4	6.03	11.19	0.96
T2	2628.187	Q=50	50	631.37	632.6	632.6	633	0.034514	5.32	10.4	13.64	0.93
T2	2628.187	Q=75	75	631.37	632.88	632.88	633.35	0.030858	5.91	14.42	15.57	0.92
T2	2628.187	Q=100	100	631.37	633.1	633.1	633.64	0.02922	6.39	18.01	16.8	0.92
T2	2628.187	Q=125	125	631.37	633.28	633.28	633.9	0.028579	6.84	21.22	17.62	0.93
T2	2628.187	Q=150	150	631.37	633.45	633.45	634.13	0.028131	7.22	24.25	18.36	0.93
T2	2628.187	Q=175	175	631.37	633.61	633.61	634.34	0.027493	7.55	27.24	19.06	0.94
T2	2628.187	Q=200	200	631.37	633.76	633.76	634.54	0.027087	7.85	30.09	19.71	0.94
T2	2628.187	Q=250	250	631.37	634.03	634.03	634.9	0.026439	8.38	35.54	20.88	0.95
T2	2628.187	Q=300	300	631.37	634.28	634.28	635.23	0.025657	8.81	40.9	21.98	0.95
T2	2628.187	Q=350	350	631.37	634.5	634.5	635.53	0.02517	9.21	45.97	22.97	0.95
T2	2628.187	Q=400	400	631.37	634.73	634.73	635.81	0.024372	9.52	51.19	23.97	0.95
T2	2628.187	Q=450	450	631.37	634.93	634.93	636.07	0.023923	9.83	56.12	24.91	0.95
T2	2628.187	Q=500	500	631.37	635.11	635.11	636.32	0.023879	10.17	60.61	25.73	0.96
T2	2628.187	Q=600	600	631.37	635.46	635.46	636.77	0.023227	10.68	69.92	27.35	0.96
T2	2778.977	Q=25	25	634.19	635.34		635.45	0.010962	2.63	9.57	12.18	0.5
T2	2778.977	Q=50	50	634.19	635.72		635.91	0.012189	3.55	14.58	14.15	0.57
T2	2778.977	Q=75	75	634.19	636	635.63	636.27	0.013102	4.23	18.77	15.61	0.61
T2	2778.977	Q=100	100	634.19	636.24	635.86	636.57	0.01369	4.77	22.61	16.84	0.64
T2	2778.977	Q=125	125	634.19	636.45	636.08	636.84	0.014034	5.21	26.24	17.92	0.66
T2	2778.977	Q=150	150	634.19	636.64	636.26	637.08	0.014291	5.59	29.7	18.9	0.67
T2	2778.977	Q=175	175	634.19	636.8	636.44	637.3	0.014599	5.94	32.94	19.76	0.69
T2	2778.977	Q=200	200	634.19	636.96	636.61	637.5	0.0148	6.24	36.07	20.43	0.7
T2	2778.977	Q=250	250	634.19	637.24	636.92	637.87	0.015051	6.77	42	21.37	0.72
T2	2778.977	Q=300	300	634.19	637.48	637.16	638.2	0.015575	7.28	47.23	22.16	0.74

T2	2778.977	Q=350	350	634.19	637.71	637.4	638.51	0.015885	7.72	52.32	22.91	0.76
T2	2778.977	Q=400	400	634.19	637.91	637.61	638.79	0.016296	8.15	57.01	23.57	0.78
T2	2778.977	Q=450	450	634.19	638.1	637.83	639.06	0.01663	8.53	61.55	24.2	0.79
T2	2778.977	Q=500	500	634.19	638.29	638.02	639.31	0.016757	8.86	66.18	24.83	0.8
T2	2778.977	Q=600	600	634.19	638.61	638.36	639.78	0.017385	9.53	74.42	25.9	0.83
T2	2908.227	Q=25	25	634.23	636		636.04	0.002466	1.62	16.13	14.89	0.26
T2	2908.227	Q=50	50	634.23	636.52		636.59	0.00284	2.2	24.5	17.2	0.29
T2	2908.227	Q=75	75	634.23	636.9		637	0.003099	2.62	31.38	18.63	0.31
T2	2908.227	Q=100	100	634.23	637.23		637.35	0.00327	2.95	37.6	19.84	0.33
T2	2908.227	Q=125	125	634.23	637.51		637.65	0.003419	3.24	43.27	20.88	0.34
T2	2908.227	Q=150	150	634.23	637.75		637.92	0.00355	3.49	48.56	21.8	0.36
T2	2908.227	Q=175	175	634.23	637.98		638.17	0.003666	3.73	53.56	22.64	0.37
T2	2908.227	Q=200	200	634.23	638.18		638.39	0.003776	3.94	58.29	23.42	0.37
T2	2908.227	Q=250	250	634.23	638.55		638.8	0.00398	4.33	67.12	24.79	0.39
T2	2908.227	Q=300	300	634.23	638.88		639.16	0.004118	4.65	75.52	25.89	0.4
T2	2908.227	Q=350	350	634.23	639.18		639.5	0.004237	4.95	83.48	26.89	0.41
T2	2908.227	Q=400	400	634.23	639.46		639.81	0.004335	5.21	91.14	27.82	0.42
T2	2908.227	Q=450	450	634.23	639.72		640.1	0.004421	5.46	98.53	28.68	0.43
T2	2908.227	Q=500	500	634.23	639.97		640.37	0.004501	5.69	105.65	29.5	0.44
T2	2908.227	Q=600	600	634.23	640.43		640.88	0.004618	6.09	119.5	31.01	0.45
T2	3036.213	Q=25	25	635.78	636.68		636.9	0.03822	3.74	6.68	12.03	0.88
T2	3036.213	Q=50	50	635.78	637.18		637.39	0.018963	3.7	13.63	15.52	0.68
T2	3036.213	Q=75	75	635.78	637.55		637.78	0.014179	3.87	19.81	17.76	0.61
T2	3036.213	Q=100	100	635.78	637.86		638.11	0.011723	4.08	25.47	19.36	0.58
T2	3036.213	Q=125	125	635.78	638.13		638.4	0.010355	4.26	30.87	20.77	0.56
T2	3036.213	Q=150	150	635.78	638.37		638.66	0.009471	4.44	36.06	21.99	0.55
T2	3036.213	Q=175	175	635.78	638.59		638.9	0.008851	4.59	41.08	23.09	0.54
T2	3036.213	Q=200	200	635.78	638.8		639.12	0.008399	4.74	45.93	24.11	0.53
T2	3036.213	Q=250	250	635.78	639.17		639.52	0.007786	5.01	55.22	25.94	0.52
T2	3036.213	Q=300	300	635.78	639.5		639.89	0.00736	5.24	64.14	27.52	0.52
T2	3036.213	Q=350	350	635.78	639.81		640.22	0.007042	5.45	72.74	28.89	0.51
T2	3036.213	Q=400	400	635.78	640.09		640.52	0.006788	5.63	81.1	30.14	0.51
T2	3036.213	Q=450	450	635.78	640.35		640.81	0.006585	5.81	89.25	31.31	0.51

T2	3036.213	Q=500	500	635.78	640.6		641.08	0.00642	5.97	97.18	32.41	0.51
T2	3036.213	Q=600	600	635.78	641.07		641.58	0.006144	6.25	112.69	34.46	0.51
T2	3146.448	Q=25	25	637.4	638.62	638.22	638.69	0.008839	2.21	11.3	14.86	0.45
T2	3146.448	Q=50	50	637.4	638.91	638.55	639.06	0.012251	3.15	15.96	16.7	0.55
T2	3146.448	Q=75	75	637.4	639.13	638.79	639.36	0.014287	3.87	19.69	17.85	0.62
T2	3146.448	Q=100	100	637.4	639.31	638.99	639.61	0.015701	4.45	23.06	18.82	0.66
T2	3146.448	Q=125	125	637.4	639.48	639.17	639.85	0.016555	4.93	26.3	19.71	0.69
T2	3146.448	Q=150	150	637.4	639.64	639.33	640.07	0.01683	5.3	29.59	20.57	0.71
T2	3146.448	Q=175	175	637.4	639.8	639.49	640.27	0.016941	5.63	32.81	21.38	0.72
T2	3146.448	Q=200	200	637.4	639.94	639.63	640.46	0.016924	5.91	35.99	22.15	0.73
T2	3146.448	Q=250	250	637.4	640.22	639.9	640.81	0.016657	6.38	42.28	23.61	0.74
T2	3146.448	Q=300	300	637.4	640.47	640.15	641.13	0.016219	6.75	48.5	24.79	0.74
T2	3146.448	Q=350	350	637.4	640.72	640.39	641.43	0.015718	7.06	54.6	25.65	0.74
T2	3146.448	Q=400	400	637.4	640.94	640.58	641.7	0.015239	7.32	60.59	26.46	0.74
T2	3146.448	Q=450	450	637.4	641.16	640.76	641.96	0.014794	7.56	66.48	27.24	0.74
T2	3146.448	Q=500	500	637.4	641.37	640.96	642.21	0.014386	7.77	72.28	27.99	0.73
T2	3146.448	Q=600	600	637.4	641.77	641.28	642.68	0.013679	8.14	83.64	29.39	0.73
T2	3251.178	Q=25	25	640.48	641.22	641.22	641.47	0.051869	3.99	6.26	12.88	1.01
T2	3251.178	Q=50	50	640.48	641.52	641.52	641.88	0.0435	4.77	10.59	15.91	0.99
T2	3251.178	Q=75	75	640.48	641.76	641.76	642.19	0.038101	5.26	14.71	18.45	0.96
T2	3251.178	Q=100	100	640.48	641.96	641.96	642.44	0.035501	5.64	18.53	20.18	0.95
T2	3251.178	Q=125	125	640.48	642.12	642.12	642.66	0.033681	6.03	21.9	21.3	0.95
T2	3251.178	Q=150	150	640.48	642.28	642.28	642.87	0.031957	6.34	25.23	22.35	0.94
T2	3251.178	Q=175	175	640.48	642.41	642.41	643.05	0.031044	6.64	28.32	23.28	0.94
T2	3251.178	Q=200	200	640.48	642.55	642.55	643.23	0.029306	6.84	31.66	24.16	0.93
T2	3251.178	Q=250	250	640.48	642.78	642.78	643.54	0.028065	7.3	37.4	25.24	0.93
T2	3251.178	Q=300	300	640.48	642.99	642.99	643.83	0.027429	7.72	42.69	26.19	0.93
T2	3251.178	Q=350	350	640.48	643.18	643.18	644.1	0.026798	8.09	47.84	27.09	0.94
T2	3251.178	Q=400	400	640.48	643.37	643.37	644.34	0.026051	8.4	52.96	27.95	0.94
T2	3251.178	Q=450	450	640.48	643.54	643.54	644.58	0.025528	8.69	57.85	28.76	0.94
T2	3251.178	Q=500	500	640.48	643.7	643.7	644.8	0.025152	8.97	62.56	29.51	0.94
T2	3251.178	Q=600	600	640.48	644.02	644.02	645.21	0.023952	9.4	72.25	30.96	0.93

T2	3331.656	Q=25	25	640.14	641.83	640.93	641.86	0.001614	1.41	18.98	17.26	0.21
T2	3331.656	Q=50	50	640.14	642.3	641.26	642.36	0.002148	1.99	27.76	19.59	0.26
T2	3331.656	Q=75	75	640.14	642.65	641.51	642.73	0.002541	2.42	34.76	21.23	0.29
T2	3331.656	Q=100	100	640.14	642.92	641.73	643.03	0.002868	2.78	40.8	22.48	0.31
T2	3331.656	Q=125	125	640.14	643.16	641.93	643.29	0.00314	3.09	46.27	23.51	0.33
T2	3331.656	Q=150	150	640.14	643.37	642.1	643.52	0.003389	3.37	51.26	24.41	0.35
T2	3331.656	Q=175	175	640.14	643.56	642.26	643.73	0.003589	3.62	56.05	25.25	0.36
T2	3331.656	Q=200	200	640.14	643.73	642.41	643.93	0.003798	3.86	60.42	25.98	0.38
T2	3331.656	Q=250	250	640.14	644.05	642.68	644.28	0.004127	4.28	68.81	27.31	0.4
T2	3331.656	Q=300	300	640.14	644.33	642.92	644.6	0.004409	4.65	76.62	28.5	0.42
T2	3331.656	Q=350	350	640.14	644.58	643.15	644.89	0.004648	4.98	84.02	29.59	0.43
T2	3331.656	Q=400	400	640.14	644.81	643.36	645.16	0.004866	5.28	91.04	30.58	0.45
T2	3331.656	Q=450	450	640.14	645.03	643.55	645.41	0.005053	5.56	97.74	31.37	0.46
T2	3331.656	Q=500	500	640.14	645.24	643.75	645.65	0.005203	5.81	104.34	32.12	0.47
T2	3331.656	Q=600	600	640.14	645.61	644.09	646.08	0.005524	6.29	116.45	33.47	0.49
T2	3442.407	Q=25	25	643.48	644.13	644.13	644.34	0.053772	3.7	6.78	16.83	1.01
T2	3442.407	Q=50	50	643.48	644.39	644.39	644.69	0.041026	4.46	11.61	20.27	0.95
T2	3442.407	Q=75	75	643.48	644.59	644.59	644.96	0.036248	4.99	16.02	23.33	0.94
T2	3442.407	Q=100	100	643.48	644.77	644.77	645.18	0.032555	5.35	20.44	26.15	0.92
T2	3442.407	Q=125	125	643.48	644.92	644.92	645.37	0.030591	5.66	24.53	28.14	0.91
T2	3442.407	Q=150	150	643.48	645.05	645.05	645.54	0.029493	5.96	28.32	29.73	0.91
T2	3442.407	Q=175	175	643.48	645.17	645.17	645.7	0.028736	6.22	31.93	31.11	0.91
T2	3442.407	Q=200	200	643.48	645.28	645.28	645.84	0.027869	6.44	35.54	32.4	0.9
T2	3442.407	Q=250	250	643.48	645.48	645.48	646.11	0.027116	6.87	42.15	34.6	0.91
T2	3442.407	Q=300	300	643.48	645.65	645.65	646.34	0.026889	7.28	48.22	36.52	0.92
T2	3442.407	Q=350	350	643.48	645.75	645.84	646.56	0.029672	7.91	52.03	37.66	0.97
T2	3442.407	Q=400	400	643.48	645.85	645.98	646.77	0.03183	8.46	55.81	38.55	1.02
T2	3442.407	Q=450	450	643.48	645.92	646.11	646.98	0.035288	9.09	58.47	39.06	1.08
T2	3442.407	Q=500	500	643.48	645.99	646.26	647.18	0.037872	9.63	61.42	39.63	1.12
T2	3442.407	Q=600	600	643.48	646.15	646.49	647.55	0.041485	10.53	67.62	40.78	1.19
T2	3578.809	Q=25	25	646.15	647.25	646.96	647.35	0.011921	2.62	9.65	13.21	0.52
T2	3578.809	Q=50	50	646.15	647.58	647.28	647.78	0.014267	3.63	14.25	14.79	0.61
T2	3578.809	Q=75	75	646.15	647.82	647.53	648.11	0.015876	4.37	18.03	15.97	0.66

T2	3578.809	Q=100	100	646.15	648.01	647.76	648.39	0.017766	5.04	21.1	16.87	0.71
T2	3578.809	Q=125	125	646.15	648.18	647.95	648.64	0.019135	5.6	23.98	17.67	0.75
T2	3578.809	Q=150	150	646.15	648.33	648.13	648.87	0.020243	6.09	26.69	18.39	0.79
T2	3578.809	Q=175	175	646.15	648.46	648.3	649.08	0.021325	6.55	29.19	19.04	0.82
T2	3578.809	Q=200	200	646.15	648.58	648.46	649.28	0.022345	6.97	31.54	19.63	0.85
T2	3578.809	Q=250	250	646.15	648.8	648.75	649.65	0.024042	7.73	35.98	20.67	0.89
T2	3578.809	Q=300	300	646.15	649	649	649.98	0.025229	8.37	40.25	21.54	0.93
T2	3578.809	Q=350	350	646.15	649.24	649.24	650.29	0.024308	8.72	45.51	22.56	0.92
T2	3578.809	Q=400	400	646.15	649.46	649.46	650.58	0.023806	9.07	50.44	23.48	0.92
T2	3578.809	Q=450	450	646.15	649.67	649.67	650.84	0.022913	9.32	55.64	24.41	0.92
T2	3578.809	Q=500	500	646.15	649.87	649.87	651.1	0.022469	9.6	60.45	25.24	0.92
T2	3578.809	Q=600	600	646.15	650.22	650.22	651.56	0.021884	10.12	69.61	26.71	0.92
T2	3648.852	Q=25	25	647.89	648.64	648.64	648.9	0.048859	4.06	6.18	12.3	0.99
T2	3648.852	Q=50	50	647.89	648.97	648.95	649.33	0.036409	4.86	10.59	14.37	0.93
T2	3648.852	Q=75	75	647.89	649.24	649.2	649.68	0.03155	5.42	14.6	16.02	0.9
T2	3648.852	Q=100	100	647.89	649.47	649.42	649.96	0.027937	5.8	18.56	17.5	0.88
T2	3648.852	Q=125	125	647.89	649.67	649.61	650.22	0.026501	6.18	22.09	18.73	0.88
T2	3648.852	Q=150	150	647.89	649.85	649.79	650.45	0.024917	6.46	25.67	19.84	0.87
T2	3648.852	Q=175	175	647.89	650.02	649.94	650.65	0.023974	6.73	28.98	20.6	0.86
T2	3648.852	Q=200	200	647.89	650.18	650.09	650.85	0.022555	6.91	32.5	21.31	0.85
T2	3648.852	Q=250	250	647.89	650.49	650.35	651.2	0.020501	7.23	39.24	22.49	0.83
T2	3648.852	Q=300	300	647.89	650.77	650.58	651.53	0.019249	7.53	45.56	23.54	0.82
T2	3648.852	Q=350	350	647.89	650.97	650.8	651.82	0.019514	7.97	50.52	24.34	0.83
T2	3648.852	Q=400	400	647.89	651.17	651	652.09	0.019524	8.35	55.48	25.11	0.84
T2	3648.852	Q=450	450	647.89	651.35	651.19	652.34	0.01994	8.75	59.83	25.77	0.86
T2	3648.852	Q=500	500	647.89	651.52	651.37	652.58	0.020079	9.09	64.3	26.42	0.87
T2	3648.852	Q=600	600	647.89	651.84	651.71	653.04	0.020266	9.69	72.96	27.72	0.89
T2	3759.27	Q=25	25	650.15	651.26	651.01	651.4	0.013349	3.05	8.87	12.5	0.57
T2	3759.27	Q=50	50	650.15	651.6	651.37	651.84	0.01615	4.15	13.46	14.61	0.66
T2	3759.27	Q=75	75	650.15	651.84	651.64	652.17	0.018075	4.95	17.16	15.79	0.72
T2	3759.27	Q=100	100	650.15	652.03	651.86	652.46	0.020018	5.65	20.25	16.72	0.77
T2	3759.27	Q=125	125	650.15	652.21	652.06	652.71	0.021081	6.2	23.27	17.58	0.8
T2	3759.27	Q=150	150	650.15	652.35	652.24	652.94	0.022715	6.75	25.77	18.13	0.85

T2	3759.27	Q=175	175	650.15	652.49	652.41	653.16	0.023519	7.2	28.37	18.69	0.87
T2	3759.27	Q=200	200	650.15	652.61	652.56	653.36	0.024897	7.67	30.54	19.15	0.9
T2	3759.27	Q=250	250	650.15	652.83	652.83	653.73	0.026478	8.43	34.99	20.05	0.95
T2	3759.27	Q=300	300	650.15	653.09	653.09	654.07	0.025681	8.87	40.25	21.06	0.95
T2	3759.27	Q=350	350	650.15	653.32	653.32	654.38	0.025173	9.28	45.24	21.98	0.95
T2	3759.27	Q=400	400	650.15	653.55	653.55	654.66	0.024219	9.57	50.45	22.88	0.95
T2	3759.27	Q=450	450	650.15	653.76	653.76	654.93	0.023812	9.89	55.21	23.65	0.95
T2	3759.27	Q=500	500	650.15	653.93	653.93	655.18	0.02411	10.28	59.27	24.28	0.96
T2	3759.27	Q=600	600	650.15	654.29	654.29	655.66	0.023378	10.8	68.37	25.75	0.96
T2	3960.516	Q=25	25	653.37	654.32		654.45	0.017537	2.99	8.6	13.87	0.63
T2	3960.516	Q=50	50	653.37	654.71	654.45	654.91	0.014629	3.67	14.63	16.85	0.62
T2	3960.516	Q=75	75	653.37	655.01	654.7	655.25	0.013272	4.11	20.07	18.87	0.61
T2	3960.516	Q=100	100	653.37	655.27	654.91	655.55	0.012327	4.43	25.18	20.39	0.61
T2	3960.516	Q=125	125	653.37	655.5	655.09	655.8	0.011798	4.72	29.92	21.67	0.6
T2	3960.516	Q=150	150	653.37	655.71	655.26	656.04	0.01126	4.94	34.56	22.62	0.6
T2	3960.516	Q=175	175	653.37	655.9	655.41	656.25	0.010932	5.16	38.9	23.48	0.6
T2	3960.516	Q=200	200	653.37	656.08	655.55	656.45	0.010533	5.33	43.29	24.31	0.6
T2	3960.516	Q=250	250	653.37	656.41	655.8	656.82	0.010118	5.67	51.42	25.86	0.6
T2	3960.516	Q=300	300	653.37	656.67	656.03	657.13	0.01021	6.05	58.39	27.17	0.61
T2	3960.516	Q=350	350	653.37	656.91	656.23	657.42	0.010227	6.37	65.18	28.39	0.62
T2	3960.516	Q=400	400	653.37	657.13	656.44	657.69	0.010343	6.69	71.47	29.48	0.63
T2	3960.516	Q=450	450	653.37	657.34	656.62	657.93	0.010404	6.97	77.65	30.5	0.64
T2	3960.516	Q=500	500	653.37	657.55	656.8	658.18	0.010232	7.17	84.29	31.54	0.64
T2	3960.516	Q=600	600	653.37	657.92	657.13	658.62	0.010224	7.61	96.34	33.47	0.65
T2	4078.035	Q=25	25	656.15	657.12	657.11	657.41	0.037669	4.43	6.08	10.86	0.92
T2	4078.035	Q=50	50	656.15	657.48	657.48	657.88	0.032817	5.4	10.45	13.59	0.92
T2	4078.035	Q=75	75	656.15	657.75	657.75	658.23	0.030251	6.03	14.44	15.59	0.91
T2	4078.035	Q=100	100	656.15	657.98	657.98	658.52	0.028422	6.49	18.2	17.15	0.91
T2	4078.035	Q=125	125	656.15	658.17	658.17	658.78	0.027637	6.91	21.61	18.33	0.92
T2	4078.035	Q=150	150	656.15	658.35	658.35	659	0.026956	7.27	24.9	19.39	0.92
T2	4078.035	Q=175	175	656.15	658.51	658.51	659.21	0.026228	7.56	28.13	20.39	0.92
T2	4078.035	Q=200	200	656.15	658.66	658.66	659.4	0.025479	7.81	31.34	21.32	0.92
T2	4078.035	Q=250	250	656.15	658.92	658.92	659.74	0.025198	8.34	36.92	22.55	0.93

T2	4078.035	Q=300	300	656.15	659.15	659.15	660.05	0.024753	8.77	42.36	23.68	0.93
T2	4078.035	Q=350	350	656.15	659.38	659.38	660.34	0.02407	9.12	47.8	24.77	0.93
T2	4078.035	Q=400	400	656.15	659.58	659.58	660.6	0.023701	9.45	52.93	25.75	0.93
T2	4078.035	Q=450	450	656.15	659.76	659.76	660.85	0.023781	9.82	57.55	26.58	0.94
T2	4078.035	Q=500	500	656.15	659.93	659.93	661.08	0.023578	10.11	62.27	27.36	0.95
T2	4078.035	Q=600	600	656.15	660.27	660.27	661.51	0.022874	10.59	71.84	28.94	0.95
T2	4182.388	Q=25	25	658.43	659.55	659.32	659.7	0.014413	3.15	8.5	11.84	0.59
T2	4182.388	Q=50	50	658.43	659.93	659.68	660.17	0.015876	4.18	13.26	13.87	0.66
T2	4182.388	Q=75	75	658.43	660.2	659.96	660.53	0.017037	4.93	17.22	15.34	0.7
T2	4182.388	Q=100	100	658.43	659.96	660.21	660.88	0.057768	8.1	13.71	14.04	1.26
T2	4182.388	Q=125	125	658.43	660.12	660.41	661.18	0.05725	8.74	16.09	14.94	1.28
T2	4182.388	Q=150	150	658.43	660.27	660.59	661.44	0.056748	9.28	18.35	15.64	1.29
T2	4182.388	Q=175	175	658.43	660.41	660.76	661.69	0.056178	9.75	20.52	16.2	1.3
T2	4182.388	Q=200	200	658.43	660.53	660.91	661.91	0.055905	10.18	22.57	16.68	1.31
T2	4182.388	Q=250	250	658.43	660.76	661.2	662.33	0.055081	10.93	26.51	17.51	1.33
T2	4182.388	Q=300	300	658.43	660.95	661.46	662.72	0.056099	11.69	29.94	18.2	1.36
T2	4182.388	Q=350	350	658.43	661.15	661.7	663.07	0.055201	12.25	33.56	18.91	1.37
T2	4182.388	Q=400	400	658.43	660.58	661.94	665.74	0.202202	19.7	23.37	16.85	2.51
T2	4182.388	Q=450	450	658.43	660.78	662.14	665.74	0.172646	19.45	26.82	17.58	2.36
T2	4182.388	Q=500	500	658.43	660.98	662.34	665.75	0.148856	19.19	30.42	18.3	2.22
T2	4182.388	Q=600	600	658.43	661.36	662.72	665.87	0.117579	18.87	37.6	19.66	2.03
T2	4290.803	Q=25	25	670.04	670.44	670.56	670.83	0.133882	5.2	5.2	18.91	1.55
T2	4290.803	Q=50	50	670.04	670.55	670.79	671.33	0.189808	7.43	7.41	20.94	1.93
T2	4290.803	Q=75	75	670.04	670.65	670.97	671.73	0.210639	8.86	9.46	22.66	2.09
T2	4290.803	Q=100	100	670.04	670.73	671.11	672.06	0.218842	9.9	11.39	24.07	2.19
T2	4290.803	Q=125	125	670.04	670.81	671.25	672.33	0.219405	10.71	13.32	25.53	2.23
T2	4290.803	Q=150	150	670.04	670.88	671.37	672.58	0.220397	11.41	15.13	26.83	2.27
T2	4290.803	Q=175	175	670.04	670.94	671.47	672.83	0.222675	12.06	16.82	27.98	2.31
T2	4290.803	Q=200	200	670.04	671	671.55	673.04	0.222316	12.61	18.51	29.1	2.33
T2	4290.803	Q=250	250	670.04	671.1	671.82	673.45	0.225389	13.65	21.64	31.23	2.39
T2	4290.803	Q=300	300	670.04	671.22	671.95	673.69	0.208966	14.14	25.45	33.81	2.35
T2	4290.803	Q=350	350	670.04	671.3	672.06	674.02	0.212724	14.96	28.33	35.65	2.4
T2	4290.803	Q=400	400	670.04	672.13	672.17	672.75	0.027756	7.64	68.87	58.98	0.94

T2	4290.803	Q=450	450	670.04	672.19	672.27	672.89	0.030578	8.17	72.35	59.79	1
T2	4290.803	Q=500	500	670.04	672.23	672.36	673.04	0.033851	8.73	75.21	60.44	1.05
T2	4290.803	Q=600	600	670.04	672.32	672.55	673.32	0.040071	9.76	80.61	61.66	1.15
T2-A	78.28389	Q=25	25	671	672.08		672.18	0.009261	2.67	10.68	15.44	0.48
T2-A	78.28389	Q=50	50	671	672.43		672.59	0.010856	3.55	16.48	18.01	0.55
T2-A	78.28389	Q=75	75	671	672.67	672.35	672.89	0.012234	4.22	21.03	19.52	0.6
T2-A	78.28389	Q=100	100	671	672.87	672.54	673.15	0.013239	4.76	25.07	20.78	0.63
T2-A	78.28389	Q=125	125	671	673.02	672.72	673.36	0.014609	5.29	28.37	21.74	0.68
T2-A	78.28389	Q=150	150	671	673.17		673.56	0.01555	5.73	31.57	22.57	0.71
T2-A	78.28389	Q=175	175	671	673.29		673.75	0.016532	6.15	34.44	23.23	0.74
T2-A	78.28389	Q=200	200	671	673.43		673.92	0.016808	6.45	37.62	23.94	0.75
T2-A	78.28389	Q=250	250	671	673.54	673.41	674.21	0.021669	7.56	40.26	24.51	0.86
T2-A	78.28389	Q=300	300	671	673.7	673.63	674.5	0.023705	8.26	44.38	25.39	0.91
T2-A	78.28389	Q=350	350	671	673.85	673.84	674.77	0.025468	8.89	48.28	26.19	0.95
T2-A	78.28389	Q=400	400	671	674.04	674.04	675.02	0.025468	9.28	53.11	27.14	0.96
T2-A	78.28389	Q=450	450	671	674.21	674.21	675.26	0.025296	9.61	57.92	28.07	0.96
T2-A	78.28389	Q=500	500	671	674.38	674.38	675.48	0.024942	9.9	62.78	28.97	0.97
T2-A	78.28389	Q=600	600	671	674.69	674.69	675.9	0.024516	10.43	72.07	30.66	0.97
T2-A	161.9002	Q=25	25	671.33	672.64		672.69	0.00306	1.78	16.28	19.03	0.29
T2-A	161.9002	Q=50	50	671.33	673.09		673.16	0.003453	2.33	25.5	22.51	0.32
T2-A	161.9002	Q=75	75	671.33	673.41		673.5	0.003711	2.73	33.14	24.78	0.34
T2-A	161.9002	Q=100	100	671.33	673.68		673.79	0.003877	3.04	40.01	26.48	0.36
T2-A	161.9002	Q=125	125	671.33	673.91		674.04	0.003981	3.29	46.42	27.9	0.37
T2-A	161.9002	Q=150	150	671.33	674.12		674.26	0.004102	3.52	52.28	29.15	0.38
T2-A	161.9002	Q=175	175	671.33	674.31		674.47	0.004186	3.72	57.94	30.3	0.39
T2-A	161.9002	Q=200	200	671.33	674.48		674.66	0.004272	3.91	63.23	31.23	0.4
T2-A	161.9002	Q=250	250	671.33	674.8		675	0.00438	4.23	73.36	32.85	0.41
T2-A	161.9002	Q=300	300	671.33	675.08		675.31	0.004464	4.51	82.92	34.31	0.42
T2-A	161.9002	Q=350	350	671.33	675.34		675.59	0.004534	4.76	91.93	35.52	0.42
T2-A	161.9002	Q=400	400	671.33	675.58		675.85	0.004593	4.98	100.55	36.6	0.43
T2-A	161.9002	Q=450	450	671.33	675.8		676.1	0.004647	5.19	108.83	37.62	0.44
T2-A	161.9002	Q=500	500	671.33	676.01		676.33	0.004708	5.39	116.83	38.68	0.44
T2-A	161.9002	Q=600	600	671.33	676.4		676.76	0.004802	5.75	132.27	40.63	0.46

T2-A	254.4662	Q=25	25	672	673.02	672.67	673.09	0.007	2.19	12.48	18.75	0.41
T2-A	254.4662	Q=50	50	672	673.46	672.96	673.56	0.005866	2.63	21.5	22.17	0.4
T2-A	254.4662	Q=75	75	672	673.79	673.19	673.91	0.005518	2.96	29.19	24.64	0.41
T2-A	254.4662	Q=100	100	672	674.06	673.37	674.2	0.00539	3.23	36.17	26.92	0.41
T2-A	254.4662	Q=125	125	672	674.3	673.53	674.45	0.005285	3.46	42.78	28.92	0.42
T2-A	254.4662	Q=150	150	672	674.51	673.67	674.68	0.005223	3.66	49.04	30.7	0.42
T2-A	254.4662	Q=175	175	672	674.7	673.81	674.88	0.005135	3.82	55.09	32.03	0.42
T2-A	254.4662	Q=200	200	672	674.88	673.93	675.07	0.005076	3.97	60.77	33.03	0.42
T2-A	254.4662	Q=250	250	672	675.2	674.17	675.41	0.004986	4.24	71.61	34.87	0.43
T2-A	254.4662	Q=300	300	672	675.48	674.38	675.72	0.004921	4.47	81.87	36.53	0.43
T2-A	254.4662	Q=350	350	672	675.75	674.59	676	0.004885	4.68	91.61	38.06	0.43
T2-A	254.4662	Q=400	400	672	675.99	674.76	676.26	0.004858	4.88	101	39.5	0.44
T2-A	254.4662	Q=450	450	672	676.21	674.91	676.51	0.004834	5.05	110.12	40.86	0.44
T2-A	254.4662	Q=500	500	672	676.43	675.06	676.74	0.004807	5.22	119.06	42.18	0.44
T2-A	254.4662	Q=600	600	672	676.83	675.34	677.17	0.004751	5.5	136.43	44.6	0.45
T2-A	306.847	Q=25	25	673.63	674.32	674.32	674.54	0.03958	4.05	7	15.86	0.92
T2-A	306.847	Q=50	50	673.63	674.58	674.58	674.9	0.036608	4.98	11.57	18.25	0.94
T2-A	306.847	Q=75	75	673.63	674.8	674.8	675.19	0.03472	5.61	15.62	20.12	0.95
T2-A	306.847	Q=100	100	673.63	674.98	674.98	675.43	0.033168	6.07	19.41	21.72	0.95
T2-A	306.847	Q=125	125	673.63	675.14	675.14	675.65	0.03145	6.42	23.15	23.19	0.95
T2-A	306.847	Q=150	150	673.63	675.29	675.29	675.83	0.030447	6.74	26.6	24.3	0.95
T2-A	306.847	Q=175	175	673.63	675.42	675.42	676.01	0.029974	7.04	29.74	25.07	0.95
T2-A	306.847	Q=200	200	673.63	675.53	675.53	676.17	0.029666	7.33	32.73	25.78	0.96
T2-A	306.847	Q=250	250	673.63	675.75	675.75	676.47	0.029062	7.82	38.48	27.09	0.97
T2-A	306.847	Q=300	300	673.63	675.95	675.95	676.74	0.02824	8.21	44.13	28.32	0.97
T2-A	306.847	Q=350	350	673.63	676.14	676.14	676.99	0.027797	8.59	49.43	29.43	0.97
T2-A	306.847	Q=400	400	673.63	676.31	676.31	677.22	0.027437	8.93	54.54	30.46	0.98
T2-A	306.847	Q=450	450	673.63	676.47	676.47	677.44	0.027201	9.25	59.49	31.48	0.98
T2-A	306.847	Q=500	500	673.63	676.63	676.63	677.65	0.026538	9.5	64.74	32.6	0.98
T2-A	306.847	Q=600	600	673.63	676.92	676.92	678.03	0.025888	9.99	74.51	34.62	0.98
T2-B	4365.095	Q=25	25	675.65	676.23	676.23	676.43	0.048768	3.66	7.07	18.81	0.97
T2-B	4365.095	Q=50	50	675.65	676.48	676.48	676.76	0.038419	4.38	12.36	23.24	0.93

T2-B	4365.095	Q=75	75	675.65	676.67	676.67	677.01	0.035075	4.9	16.93	25.81	0.92
T2-B	4365.095	Q=100	100	675.65	676.82	676.82	677.21	0.033231	5.32	21.1	27.81	0.92
T2-B	4365.095	Q=125	125	675.65	676.96	676.96	677.39	0.032212	5.69	24.96	29.54	0.93
T2-B	4365.095	Q=150	150	675.65	677.08	677.08	677.56	0.031233	5.99	28.73	31.21	0.93
T2-B	4365.095	Q=175	175	675.65	677.2	677.2	677.71	0.03019	6.24	32.48	32.85	0.93
T2-B	4365.095	Q=200	200	675.65	677.31	677.31	677.85	0.029472	6.47	36.07	34.34	0.93
T2-B	4365.095	Q=250	250	675.65	677.51	677.51	678.1	0.027761	6.83	43.33	37.19	0.92
T2-B	4365.095	Q=300	300	675.65	677.66	677.66	678.33	0.028348	7.3	49.17	39.54	0.94
T2-B	4365.095	Q=350	350	675.65	677.84	677.84	678.53	0.026864	7.55	56.44	42.94	0.93
T2-B	4365.095	Q=400	400	675.65	678	678	678.72	0.025653	7.76	63.63	46.06	0.92
T2-B	4365.095	Q=450	450	675.65	678.14	678.14	678.89	0.024933	7.97	70.41	48.8	0.92
T2-B	4365.095	Q=500	500	675.65	678.28	678.28	679.05	0.023889	8.12	77.6	51.52	0.91
T2-B	4365.095	Q=600	600	675.65	678.49	678.49	679.35	0.024346	8.65	88.82	55.95	0.93
T2-B	4415.47	Q=25	25	677.02	677.7	677.57	677.8	0.017342	2.7	10.39	23.14	0.61
T2-B	4415.47	Q=50	50	677.02	677.93	677.81	678.1	0.019498	3.55	16.22	27.06	0.68
T2-B	4415.47	Q=75	75	677.02	678.11		678.33	0.02058	4.14	21.2	29.87	0.72
T2-B	4415.47	Q=100	100	677.02	678.26		678.52	0.021093	4.59	25.76	31.99	0.75
T2-B	4415.47	Q=125	125	677.02	678.39		678.69	0.02092	4.92	30.17	33.55	0.76
T2-B	4415.47	Q=150	150	677.02	678.5	678.38	678.84	0.02135	5.25	34.01	34.83	0.78
T2-B	4415.47	Q=175	175	677.02	678.61		678.98	0.021607	5.54	37.72	36.02	0.79
T2-B	4415.47	Q=200	200	677.02	678.71	678.58	679.11	0.021727	5.79	41.33	37.14	0.8
T2-B	4415.47	Q=250	250	677.02	678.88	678.75	679.35	0.022424	6.29	47.81	39.06	0.83
T2-B	4415.47	Q=300	300	677.02	679.06	678.92	679.57	0.021763	6.61	54.99	41.18	0.83
T2-B	4415.47	Q=350	350	677.02	679.19	679.07	679.76	0.022534	7.03	60.66	42.88	0.85
T2-B	4415.47	Q=400	400	677.02	679.31	679.21	679.95	0.02353	7.44	65.75	44.36	0.88
T2-B	4415.47	Q=450	450	677.02	679.42	679.34	680.12	0.024222	7.81	70.88	45.86	0.9
T2-B	4415.47	Q=500	500	677.02	679.51	679.47	680.28	0.025643	8.24	75.03	47.2	0.93
T2-B	4415.47	Q=600	600	677.02	679.74	679.71	680.58	0.025526	8.72	86.07	50.57	0.95
T2-B	4501.978	Q=25	25	679.52	679.99	679.99	680.16	0.047884	3.39	7.96	24.94	0.95
T2-B	4501.978	Q=50	50	679.52	680.2	680.2	680.43	0.039344	4.07	13.69	29.73	0.92
T2-B	4501.978	Q=75	75	679.52	680.36	680.35	680.64	0.035929	4.54	18.68	32.8	0.91
T2-B	4501.978	Q=100	100	679.52	680.49	680.48	680.81	0.034665	4.95	23.13	35.38	0.92
T2-B	4501.978	Q=125	125	679.52	680.6	680.6	680.97	0.034429	5.33	27.13	37.58	0.94

T2-B	4501.978	Q=150	150	679.52	680.7	680.71	681.11	0.035019	5.7	30.69	39.42	0.96
T2-B	4501.978	Q=175	175	679.52	680.81	680.8	681.23	0.032328	5.84	35.16	41.25	0.93
T2-B	4501.978	Q=200	200	679.52	680.86	680.9	681.35	0.035235	6.28	37.46	42.11	0.98
T2-B	4501.978	Q=250	250	679.52	680.99	681.06	681.57	0.036924	6.86	43.08	44.16	1.02
T2-B	4501.978	Q=300	300	679.52	681.11	681.19	681.77	0.038642	7.39	48.2	45.93	1.06
T2-B	4501.978	Q=350	350	679.52	681.22	681.33	681.96	0.039684	7.85	53.38	48.07	1.09
T2-B	4501.978	Q=400	400	679.52	681.33	681.46	682.13	0.039694	8.21	58.82	50.24	1.1
T2-B	4501.978	Q=450	450	679.52	681.42	681.6	682.29	0.040327	8.57	63.75	52.18	1.12
T2-B	4501.978	Q=500	500	679.52	681.5	681.68	682.45	0.042376	9.02	67.62	53.62	1.15
T2-B	4501.978	Q=600	600	679.52	681.67	681.87	682.73	0.042718	9.59	77.06	56.96	1.17
T2-B	4568.16	Q=25	25	681.64	682.26	682.19	682.38	0.024667	2.99	9.57	24.76	0.71
T2-B	4568.16	Q=50	50	681.64	682.45	682.41	682.65	0.028841	3.96	14.82	29.02	0.81
T2-B	4568.16	Q=75	75	681.64	682.59	682.57	682.86	0.031656	4.66	19.08	31.58	0.88
T2-B	4568.16	Q=100	100	681.64	682.72	682.7	683.04	0.032663	5.17	23.13	33.83	0.91
T2-B	4568.16	Q=125	125	681.64	682.83	682.82	683.2	0.033096	5.58	26.97	35.76	0.93
T2-B	4568.16	Q=150	150	681.64	682.93	682.93	683.34	0.032864	5.9	30.77	37.57	0.94
T2-B	4568.16	Q=175	175	681.64	683.03	683.03	683.47	0.032	6.14	34.63	39.14	0.94
T2-B	4568.16	Q=200	200	681.64	683.11	683.11	683.59	0.032857	6.46	37.68	40.3	0.96
T2-B	4568.16	Q=250	250	681.64	683.28	683.28	683.82	0.031431	6.84	45.06	43.78	0.96
T2-B	4568.16	Q=300	300	681.64	683.45	683.45	684.02	0.030043	7.14	52.4	47.07	0.96
T2-B	4568.16	Q=350	350	681.64	683.59	683.59	684.2	0.029318	7.43	59.32	50.16	0.96
T2-B	4568.16	Q=400	400	681.64	683.72	683.72	684.36	0.029067	7.73	65.86	53.09	0.96
T2-B	4568.16	Q=450	450	681.64	683.84	683.84	684.52	0.028629	7.99	72.73	56.75	0.97
T2-B	4568.16	Q=500	500	681.64	683.98	683.98	684.66	0.026849	8.07	80.96	60.55	0.95
T2-B	4568.16	Q=600	600	681.64	684.19	684.19	684.92	0.026037	8.43	93.99	65.24	0.94

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	10.52001	Q=25	25	592.29	593	593	593.24	0.052023	3.95	6.33	13.31	1.01
Main	10.52001	Q=50	50	592.29	593.29	593.29	593.64	0.046199	4.74	10.54	15.34	1.01
Main	10.52001	Q=75	75	592.29	593.52	593.52	593.95	0.043406	5.26	14.27	16.94	1.01
Main	10.52001	Q=100	100	592.29	593.72	593.72	594.21	0.041461	5.63	17.75	18.31	1.01
Main	10.52001	Q=125	125	592.29	593.89	593.89	594.44	0.040167	5.95	20.99	19.49	1.01
Main	10.52001	Q=150	150	592.29	594.04	594.04	594.65	0.038558	6.25	24.03	20.54	1.01
Main	10.52001	Q=175	175	592.29	594.18	594.18	594.84	0.036643	6.55	26.86	21.23	1
Main	10.52001	Q=200	200	592.29	594.31	594.31	595.03	0.034935	6.8	29.68	21.89	0.99
Main	10.52001	Q=250	250	592.29	594.55	594.55	595.36	0.032383	7.25	35.13	23.12	0.98
Main	10.52001	Q=300	300	592.29	594.78	594.78	595.67	0.030111	7.61	40.58	24.29	0.96
Main	10.52001	Q=350	350	592.29	594.99	594.99	595.95	0.028854	7.96	45.65	25.32	0.96
Main	10.52001	Q=400	400	592.29	595.19	595.19	596.21	0.02753	8.25	50.78	26.33	0.95
Main	10.52001	Q=450	450	592.29	595.37	595.37	596.46	0.026457	8.51	55.79	27.22	0.94
Main	10.52001	Q=500	500	592.29	595.55	595.55	596.69	0.025588	8.76	60.67	28.04	0.94
Main	10.52001	Q=600	600	592.29	595.87	595.87	597.12	0.024507	9.24	69.9	29.6	0.94
Main	71.56719	Q=25	25	592.82	593.99	593.53	594.04	0.005604	1.71	14.65	20.38	0.35
Main	71.56719	Q=50	50	592.82	594.37	593.81	594.45	0.005891	2.17	23.2	24.62	0.38
Main	71.56719	Q=75	75	592.82	594.64	594.03	594.74	0.00581	2.53	30.28	27.53	0.4
Main	71.56719	Q=100	100	592.82	594.87	594.2	594.99	0.005763	2.81	36.87	30	0.41
Main	71.56719	Q=125	125	592.82	595.08	594.34	595.22	0.005695	3.05	43.23	32.23	0.41
Main	71.56719	Q=150	150	592.82	595.26	594.47	595.42	0.005689	3.26	49.18	34.2	0.42
Main	71.56719	Q=175	175	592.82	595.43	594.6	595.6	0.005623	3.43	55.14	36.06	0.42
Main	71.56719	Q=200	200	592.82	595.58	594.72	595.77	0.005556	3.58	60.95	37.68	0.43
Main	71.56719	Q=250	250	592.82	595.87	594.94	596.09	0.005413	3.84	72.31	40.64	0.43
Main	71.56719	Q=300	300	592.82	596.14	595.14	596.37	0.005245	4.05	83.43	42.94	0.43
Main	71.56719	Q=350	350	592.82	596.39	595.32	596.64	0.005066	4.21	94.46	45.1	0.43
Main	71.56719	Q=400	400	592.82	596.62	595.49	596.88	0.004915	4.36	105.14	46.88	0.43
Main	71.56719	Q=450	450	592.82	596.84	595.64	597.11	0.004775	4.49	115.59	48.39	0.43
Main	71.56719	Q=500	500	592.82	597.05	595.8	597.33	0.004647	4.61	125.86	49.84	0.42
Main	71.56719	Q=600	600	592.82	597.45	596.06	597.75	0.004407	4.8	146.06	52.35	0.42
T1	97.69851	Q=25	25	598.82	599.49	599.49	599.73	0.048367	3.95	6.4	13.54	0.98

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	97.69851	Q=50	50	598.82	599.75	599.79	600.14	0.05065	5.06	10.13	15.71	1.06
T1	97.69851	Q=75	75	598.82	599.91	600.02	600.46	0.058553	6.05	12.79	17.09	1.17
T1	97.69851	Q=100	100	598.82	600.05	600.22	600.74	0.062765	6.78	15.3	18.3	1.24
T1	97.69851	Q=125	125	598.82	600.17	600.38	600.99	0.066535	7.4	17.57	19.29	1.29
T1	97.69851	Q=150	150	598.82	600.28	600.52	601.21	0.069323	7.92	19.72	20.12	1.34
T1	97.69851	Q=175	175	598.82	600.38	600.66	601.42	0.070302	8.4	21.76	20.78	1.36
T1	97.69851	Q=200	200	598.82	600.47	600.79	601.63	0.07059	8.85	23.68	21.32	1.38
T1	97.69851	Q=250	250	598.82	600.64	601.03	602	0.070981	9.64	27.37	22.33	1.42
T1	97.69851	Q=300	300	598.82	600.78	601.25	602.36	0.07267	10.4	30.66	23.19	1.46
T1	97.69851	Q=350	350	598.82	600.94	601.46	602.67	0.071377	10.94	34.21	24.09	1.46
T1	97.69851	Q=400	400	598.82	601.07	601.65	602.96	0.070588	11.46	37.61	24.92	1.48
T1	97.69851	Q=450	450	598.82	601.2	601.83	603.24	0.070191	11.94	40.84	25.68	1.49
T1	97.69851	Q=500	500	598.82	601.33	601.99	603.49	0.069224	12.35	44.13	26.43	1.49
T1	97.69851	Q=600	600	598.82	601.55	602.31	603.98	0.0691	13.18	50.1	27.7	1.52
T1	196.2559	Q=25	25	603.03	603.75	603.72	603.97	0.03929	3.8	6.74	13.81	0.9
T1	196.2559	Q=50	50	603.03	604.02	604.02	604.38	0.037795	4.88	10.87	16.28	0.95
T1	196.2559	Q=75	75	603.03	604.26	604.26	604.69	0.033384	5.43	15.03	18.41	0.93
T1	196.2559	Q=100	100	603.03	604.46	604.46	604.95	0.031449	5.9	18.76	19.86	0.92
T1	196.2559	Q=125	125	603.03	604.63	604.63	605.18	0.029793	6.26	22.37	21.18	0.92
T1	196.2559	Q=150	150	603.03	604.79	604.79	605.38	0.028814	6.59	25.73	22.14	0.92
T1	196.2559	Q=175	175	603.03	604.93	604.93	605.57	0.028238	6.9	28.86	22.93	0.92
T1	196.2559	Q=200	200	603.03	605.06	605.06	605.75	0.027804	7.18	31.86	23.67	0.93
T1	196.2559	Q=250	250	603.03	605.3	605.3	606.07	0.026961	7.66	37.67	25.02	0.93
T1	196.2559	Q=300	300	603.03	605.52	605.52	606.36	0.025783	8.03	43.5	26.26	0.93
T1	196.2559	Q=350	350	603.03	605.71	605.71	606.62	0.02552	8.42	48.59	27.1	0.93
T1	196.2559	Q=400	400	603.03	605.9	605.9	606.87	0.02515	8.75	53.6	27.9	0.94
T1	196.2559	Q=450	450	603.03	606.07	606.07	607.1	0.024695	9.04	58.56	28.68	0.94
T1	196.2559	Q=500	500	603.03	606.23	606.23	607.32	0.024488	9.34	63.22	29.38	0.94
T1	196.2559	Q=600	600	603.03	606.55	606.55	607.73	0.023535	9.79	72.84	30.78	0.94
T1	274.1962	Q=25	25	604.84	605.86	605.65	605.98	0.018344	2.79	8.96	14.47	0.62
T1	274.1962	Q=50	50	604.84	605.73	605.96	606.49	0.138492	7.01	7.13	13.19	1.68

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	274.1962	Q=75	75	604.84	605.87	606.19	606.9	0.1531	8.15	9.21	14.63	1.81
T1	274.1962	Q=100	100	604.84	606	606.38	607.26	0.160188	9.04	11.07	15.68	1.89
T1	274.1962	Q=125	125	604.84	606.1	606.55	607.6	0.163811	9.83	12.74	16.37	1.94
T1	274.1962	Q=150	150	604.84	606.19	606.71	607.93	0.168428	10.6	14.2	16.89	2
T1	274.1962	Q=175	175	604.84	606.28	606.86	608.21	0.163857	11.18	15.77	17.33	2.01
T1	274.1962	Q=200	200	604.84	606.37	607	608.48	0.159877	11.69	17.29	17.75	2.01
T1	274.1962	Q=250	250	604.84	606.53	607.26	608.97	0.15333	12.6	20.21	18.53	2.02
T1	274.1962	Q=300	300	604.84	606.68	607.5	609.4	0.145838	13.31	23.14	19.28	2.01
T1	274.1962	Q=350	350	604.84	606.83	607.73	609.79	0.14028	13.95	25.95	19.97	2
T1	274.1962	Q=400	400	604.84	606.96	607.93	610.16	0.136042	14.54	28.66	20.62	2
T1	274.1962	Q=450	450	604.84	607.09	608.12	610.49	0.131202	15.03	31.4	21.25	1.99
T1	274.1962	Q=500	500	604.84	607.21	608.32	610.81	0.128129	15.52	34	21.83	1.99
T1	274.1962	Q=600	600	604.84	607.46	608.65	611.33	0.117888	16.17	39.64	23.11	1.95
T1	363.1963	Q=25	25	610.69	611.49	611.49	611.74	0.041063	4.22	6.46	13.14	0.94
T1	363.1963	Q=50	50	610.69	611.8	611.8	612.16	0.036125	5.16	10.81	15.25	0.94
T1	363.1963	Q=75	75	610.69	612.04	612.04	612.49	0.033462	5.8	14.7	16.92	0.94
T1	363.1963	Q=100	100	610.69	612.24	612.24	612.76	0.031887	6.3	18.3	18.33	0.95
T1	363.1963	Q=125	125	610.69	612.42	612.42	613	0.030613	6.7	21.73	19.57	0.95
T1	363.1963	Q=150	150	610.69	612.59	612.59	613.21	0.029185	7.01	25.13	20.6	0.94
T1	363.1963	Q=175	175	610.69	612.74	612.74	613.41	0.02871	7.33	28.16	21.4	0.94
T1	363.1963	Q=200	200	610.69	612.87	612.87	613.59	0.028227	7.62	31.11	22.16	0.95
T1	363.1963	Q=250	250	610.69	613.13	613.13	613.92	0.027246	8.1	36.88	23.56	0.95
T1	363.1963	Q=300	300	610.69	613.35	613.35	614.23	0.026642	8.53	42.32	24.81	0.95
T1	363.1963	Q=350	350	610.69	613.56	613.56	614.5	0.025987	8.9	47.67	25.98	0.95
T1	363.1963	Q=400	400	610.69	613.76	613.76	614.76	0.025238	9.2	53.02	27.1	0.95
T1	363.1963	Q=450	450	610.69	613.95	613.95	614.99	0.024755	9.49	58.11	28.11	0.95
T1	363.1963	Q=500	500	610.69	614.13	614.13	615.22	0.024018	9.71	63.31	29.01	0.95
T1	363.1963	Q=600	600	610.69	614.43	614.43	615.63	0.023929	10.28	72.21	30.47	0.96
Main2	203.2378	Q=25	25	595.01	595.59	595.59	595.8	0.054401	3.61	6.93	17.35	1.01
Main2	203.2378	Q=50	50	595.01	595.88	595.84	596.13	0.040569	4.03	12.41	21.09	0.93
Main2	203.2378	Q=75	75	595.01	596.07	596.03	596.39	0.037229	4.51	16.67	23.13	0.92

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	203.2378	Q=100	100	595.01	596.24	596.19	596.61	0.035165	4.89	20.63	24.84	0.92
Main2	203.2378	Q=125	125	595.01	596.38	596.33	596.8	0.033442	5.23	24.27	26.27	0.92
Main2	203.2378	Q=150	150	595.01	596.52	596.46	596.98	0.030896	5.48	28.02	27.64	0.9
Main2	203.2378	Q=175	175	595.01	596.64	596.58	597.14	0.029698	5.74	31.42	28.83	0.9
Main2	203.2378	Q=200	200	595.01	596.75	596.69	597.29	0.028839	5.98	34.71	29.94	0.9
Main2	203.2378	Q=250	250	595.01	596.96	596.91	597.57	0.027269	6.39	41.13	31.7	0.89
Main2	203.2378	Q=300	300	595.01	597.15	597.09	597.82	0.02613	6.74	47.27	33.28	0.89
Main2	203.2378	Q=350	350	595.01	597.32	597.26	598.05	0.025114	7.04	53.26	34.5	0.89
Main2	203.2378	Q=400	400	595.01	597.49	597.43	598.27	0.024179	7.3	59.16	35.66	0.88
Main2	203.2378	Q=450	450	595.01	597.65	597.57	598.47	0.023314	7.53	64.98	36.78	0.88
Main2	203.2378	Q=500	500	595.01	597.81	597.71	598.66	0.022487	7.73	70.79	37.85	0.87
Main2	203.2378	Q=600	600	595.01	598.11	597.99	599.02	0.020852	8.04	82.48	39.82	0.86
Main2	329.9662	Q=25	25	595.86	597.06		597.1	0.004183	1.61	15.53	18.88	0.31
Main2	329.9662	Q=50	50	595.86	597.46		597.53	0.005005	2.12	23.6	21.67	0.36
Main2	329.9662	Q=75	75	595.86	597.75		597.85	0.005396	2.48	30.25	23.64	0.38
Main2	329.9662	Q=100	100	595.86	597.97		598.09	0.005682	2.82	35.63	25.03	0.4
Main2	329.9662	Q=125	125	595.86	598.16		598.31	0.005919	3.12	40.6	26.24	0.42
Main2	329.9662	Q=150	150	595.86	598.33		598.5	0.006262	3.41	44.92	27.26	0.44
Main2	329.9662	Q=175	175	595.86	598.48		598.69	0.006465	3.65	49.26	28.24	0.45
Main2	329.9662	Q=200	200	595.86	598.63		598.86	0.00665	3.88	53.39	29.14	0.46
Main2	329.9662	Q=250	250	595.86	598.88		599.16	0.007007	4.29	61.08	30.75	0.48
Main2	329.9662	Q=300	300	595.86	599.11		599.43	0.00731	4.65	68.24	31.9	0.5
Main2	329.9662	Q=350	350	595.86	599.32		599.68	0.007602	4.98	74.88	32.88	0.52
Main2	329.9662	Q=400	400	595.86	599.5	598.58	599.92	0.007882	5.29	81.11	33.79	0.53
Main2	329.9662	Q=450	450	595.86	599.68	598.75	600.13	0.008154	5.58	87	34.62	0.55
Main2	329.9662	Q=500	500	595.86	599.84	598.93	600.34	0.008387	5.85	92.71	35.41	0.56
Main2	329.9662	Q=600	600	595.86	600.12	599.24	600.71	0.008964	6.37	102.91	36.78	0.59
Main2	424.4933	Q=25	25	597	597.77		597.87	0.021227	2.51	9.96	21.21	0.65
Main2	424.4933	Q=50	50	597	598.15		598.26	0.013141	2.63	19	26.67	0.55
Main2	424.4933	Q=75	75	597	598.42		598.55	0.010512	2.84	26.75	30.28	0.51
Main2	424.4933	Q=100	100	597	598.64		598.78	0.009482	3.04	33.69	33	0.5

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	424.4933	Q=125	125	597	598.83		598.99	0.008673	3.22	40.17	34.94	0.49
Main2	424.4933	Q=150	150	597	599.01		599.18	0.008048	3.37	46.52	36.74	0.48
Main2	424.4933	Q=175	175	597	599.17		599.35	0.007597	3.5	52.57	37.85	0.48
Main2	424.4933	Q=200	200	597	599.32		599.52	0.007244	3.62	58.41	38.9	0.47
Main2	424.4933	Q=250	250	597	599.6		599.82	0.006735	3.84	69.56	40.82	0.47
Main2	424.4933	Q=300	300	597	599.86		600.09	0.006396	4.04	80.1	42.55	0.46
Main2	424.4933	Q=350	350	597	600.09		600.34	0.006147	4.21	90.18	44.06	0.46
Main2	424.4933	Q=400	400	597	600.3		600.58	0.005948	4.37	99.82	45.21	0.46
Main2	424.4933	Q=450	450	597	600.51		600.8	0.005794	4.52	109.1	46.29	0.46
Main2	424.4933	Q=500	500	597	600.7		601	0.005667	4.66	118.09	47.31	0.46
Main2	424.4933	Q=600	600	597	601.05		601.39	0.005498	4.92	135.14	49.19	0.46
Main2	566.1108	Q=25	25	597.99	598.96	598.51	598.99	0.004084	1.41	17.79	26.21	0.3
Main2	566.1108	Q=50	50	597.99	599.28	598.73	599.34	0.004902	1.87	26.71	29.61	0.35
Main2	566.1108	Q=75	75	597.99	599.51	598.91	599.59	0.005469	2.23	33.71	31.68	0.38
Main2	566.1108	Q=100	100	597.99	599.71	599.06	599.8	0.005695	2.51	40.12	33.52	0.39
Main2	566.1108	Q=125	125	597.99	599.87	599.19	599.99	0.005879	2.77	45.77	35.12	0.41
Main2	566.1108	Q=150	150	597.99	600.02	599.3	600.15	0.00608	3	50.96	36.53	0.42
Main2	566.1108	Q=175	175	597.99	600.16	599.41	600.31	0.006146	3.2	56.23	37.9	0.43
Main2	566.1108	Q=200	200	597.99	600.29	599.51	600.46	0.006165	3.37	61.42	39.19	0.44
Main2	566.1108	Q=250	250	597.99	600.53	599.69	600.74	0.00625	3.68	71.12	41.41	0.45
Main2	566.1108	Q=300	300	597.99	600.75	599.87	600.98	0.006291	3.94	80.42	43.33	0.46
Main2	566.1108	Q=350	350	597.99	600.96	600.02	601.21	0.006289	4.17	89.45	44.97	0.46
Main2	566.1108	Q=400	400	597.99	601.15	600.18	601.43	0.006218	4.36	98.47	46.34	0.47
Main2	566.1108	Q=450	450	597.99	601.34	600.32	601.64	0.006164	4.54	107.16	47.63	0.47
Main2	566.1108	Q=500	500	597.99	601.52	600.46	601.84	0.006106	4.7	115.67	48.86	0.47
Main2	566.1108	Q=600	600	597.99	601.85	600.71	602.2	0.005995	4.98	132.18	51.11	0.48
Main2	729.3753	Q=25	25	601.02	601.75	601.75	601.99	0.051796	3.94	6.34	13.31	1.01
Main2	729.3753	Q=50	50	601.02	602.04	602.04	602.39	0.044799	4.76	10.57	15.66	1
Main2	729.3753	Q=75	75	601.02	602.27	602.27	602.71	0.040451	5.31	14.33	17.32	0.99
Main2	729.3753	Q=100	100	601.02	602.47	602.47	602.97	0.036494	5.76	17.86	18.67	0.97
Main2	729.3753	Q=125	125	601.02	602.64	602.64	603.21	0.034042	6.13	21.21	19.87	0.96

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	729.3753	Q=150	150	601.02	602.8	602.8	603.42	0.032039	6.44	24.51	20.99	0.95
Main2	729.3753	Q=175	175	601.02	602.96	602.96	603.62	0.030128	6.69	27.83	22.05	0.94
Main2	729.3753	Q=200	200	601.02	603.09	603.09	603.8	0.029252	6.96	30.82	22.81	0.94
Main2	729.3753	Q=250	250	601.02	603.34	603.34	604.13	0.027592	7.4	36.73	24.26	0.93
Main2	729.3753	Q=300	300	601.02	603.57	603.57	604.43	0.026417	7.78	42.36	25.51	0.93
Main2	729.3753	Q=350	350	601.02	603.77	603.77	604.71	0.025729	8.15	47.63	26.55	0.93
Main2	729.3753	Q=400	400	601.02	603.96	603.96	604.96	0.024989	8.46	52.86	27.54	0.93
Main2	729.3753	Q=450	450	601.02	604.15	604.15	605.2	0.024272	8.73	58.03	28.48	0.92
Main2	729.3753	Q=500	500	601.02	604.31	604.31	605.42	0.02403	9.02	62.75	29.32	0.93
Main2	729.3753	Q=600	600	601.02	604.64	604.64	605.84	0.022895	9.45	72.65	30.95	0.92
Main2	807.7872	Q=25	25	601.49	602.81	602.26	602.86	0.004489	1.78	14.19	16.56	0.33
Main2	807.7872	Q=50	50	601.49	603.23	602.57	603.31	0.0051	2.36	21.74	19.17	0.37
Main2	807.7872	Q=75	75	601.49	603.53	602.8	603.65	0.005382	2.8	27.85	20.71	0.39
Main2	807.7872	Q=100	100	601.49	603.78	603.01	603.93	0.005695	3.18	33.13	21.93	0.42
Main2	807.7872	Q=125	125	601.49	604	603.18	604.18	0.005934	3.5	37.98	22.87	0.43
Main2	807.7872	Q=150	150	601.49	604.19	603.34	604.4	0.006152	3.78	42.47	23.7	0.45
Main2	807.7872	Q=175	175	601.49	604.36	603.48	604.6	0.006369	4.05	46.64	24.45	0.46
Main2	807.7872	Q=200	200	601.49	604.53	603.62	604.79	0.006529	4.28	50.7	25.15	0.47
Main2	807.7872	Q=250	250	601.49	604.82	603.89	605.14	0.006832	4.71	58.26	26.44	0.49
Main2	807.7872	Q=300	300	601.49	605.08	604.11	605.45	0.00709	5.08	65.33	27.63	0.51
Main2	807.7872	Q=350	350	601.49	605.32		605.73	0.007297	5.42	72.1	28.72	0.52
Main2	807.7872	Q=400	400	601.49	605.54		606	0.007494	5.73	78.49	29.68	0.53
Main2	807.7872	Q=450	450	601.49	605.74		606.24	0.007673	6.01	84.61	30.54	0.54
Main2	807.7872	Q=500	500	601.49	605.94		606.48	0.007808	6.27	90.62	31.35	0.55
Main2	807.7872	Q=600	600	601.49	606.29		606.9	0.008129	6.77	101.74	32.8	0.57
Main2	897.8446	Q=25	25	603.39	604.1	604.1	604.33	0.050796	3.87	6.46	13.91	1
Main2	897.8446	Q=50	50	603.39	604.38	604.38	604.72	0.044391	4.72	10.71	16.13	0.99
Main2	897.8446	Q=75	75	603.39	604.61	604.61	605.03	0.040254	5.22	14.65	17.95	0.98
Main2	897.8446	Q=100	100	603.39	604.79	604.79	605.29	0.037913	5.7	18	19.07	0.98
Main2	897.8446	Q=125	125	603.39	604.96	604.96	605.52	0.035358	6.08	21.29	20.04	0.97
Main2	897.8446	Q=150	150	603.39	605.12	605.12	605.73	0.033399	6.4	24.47	20.94	0.96

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	897.8446	Q=175	175	603.39	605.26	605.26	605.93	0.031529	6.66	27.64	21.74	0.95
Main2	897.8446	Q=200	200	603.39	605.39	605.39	606.11	0.030777	6.95	30.48	22.39	0.95
Main2	897.8446	Q=250	250	603.39	605.64	605.64	606.44	0.029007	7.4	36.17	23.64	0.95
Main2	897.8446	Q=300	300	603.39	605.86	605.86	606.74	0.027753	7.8	41.59	24.78	0.94
Main2	897.8446	Q=350	350	603.39	606.08	606.07	607.02	0.026294	8.11	47.13	25.87	0.93
Main2	897.8446	Q=400	400	603.39	606.3	606.27	607.28	0.024761	8.34	52.78	26.88	0.92
Main2	897.8446	Q=450	450	603.39	606.5	606.45	607.53	0.023608	8.57	58.25	27.83	0.91
Main2	897.8446	Q=500	500	603.39	606.69	606.62	607.76	0.022685	8.78	63.59	28.72	0.9
Main2	897.8446	Q=600	600	603.39	607.03	606.96	608.19	0.021302	9.17	73.9	30.32	0.89
Main2	1023.945	Q=25	25	603.74	605.14	604.45	605.17	0.002422	1.35	18.61	20.55	0.24
Main2	1023.945	Q=50	50	603.74	605.57	604.73	605.62	0.00269	1.82	28.19	23.8	0.27
Main2	1023.945	Q=75	75	603.74	605.89	604.95	605.96	0.00289	2.17	36.22	26.21	0.29
Main2	1023.945	Q=100	100	603.74	606.16	605.12	606.25	0.003031	2.45	43.52	28.31	0.31
Main2	1023.945	Q=125	125	603.74	606.39	605.28	606.5	0.003127	2.69	50.38	30.16	0.32
Main2	1023.945	Q=150	150	603.74	606.6	605.42	606.72	0.003209	2.89	56.82	31.65	0.33
Main2	1023.945	Q=175	175	603.74	606.78	605.56	606.92	0.003303	3.08	62.75	32.84	0.34
Main2	1023.945	Q=200	200	603.74	606.97	605.69	607.11	0.003328	3.23	68.79	33.84	0.34
Main2	1023.945	Q=250	250	603.74	607.28	605.93	607.46	0.00341	3.52	79.83	35.46	0.35
Main2	1023.945	Q=300	300	603.74	607.57	606.15	607.77	0.003471	3.77	90.24	36.93	0.36
Main2	1023.945	Q=350	350	603.74	607.83	606.34	608.05	0.003537	3.99	100.02	38.35	0.37
Main2	1023.945	Q=400	400	603.74	608.07	606.53	608.31	0.003606	4.21	109.35	39.83	0.38
Main2	1023.945	Q=450	450	603.74	608.29	606.7	608.55	0.00366	4.4	118.43	41.22	0.38
Main2	1023.945	Q=500	500	603.74	608.5	606.87	608.78	0.00371	4.58	127.2	42.52	0.39
Main2	1023.945	Q=600	600	603.74	608.9	607.17	609.21	0.003767	4.89	144.5	45.03	0.4
Main2	1141.385	Q=25	25	605.8	606.55	606.55	606.8	0.051831	3.97	6.3	13.08	1.01
Main2	1141.385	Q=50	50	605.8	606.85	606.85	607.2	0.046323	4.75	10.54	15.34	1.01
Main2	1141.385	Q=75	75	605.8	607.08	607.08	607.51	0.043296	5.25	14.27	16.91	1.01
Main2	1141.385	Q=100	100	605.8	607.27	607.27	607.77	0.041184	5.69	17.59	18.07	1.01
Main2	1141.385	Q=125	125	605.8	607.44	607.44	608.01	0.038862	6.03	20.82	19.08	1
Main2	1141.385	Q=150	150	605.8	607.6	607.6	608.22	0.037053	6.34	23.82	20.09	1
Main2	1141.385	Q=175	175	605.8	607.74	607.74	608.42	0.034998	6.62	26.78	21.17	0.98

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1141.385	Q=200	200	605.8	607.88	607.88	608.6	0.033193	6.86	29.76	22.2	0.97
Main2	1141.385	Q=250	250	605.8	608.14	608.14	608.94	0.029938	7.24	35.86	24.19	0.95
Main2	1141.385	Q=300	300	605.8	608.37	608.37	609.24	0.02827	7.61	41.53	25.89	0.94
Main2	1141.385	Q=350	350	605.8	608.58	608.58	609.51	0.026628	7.9	47.33	27.64	0.93
Main2	1141.385	Q=400	400	605.8	608.79	608.79	609.77	0.025272	8.16	53.1	29.27	0.92
Main2	1141.385	Q=450	450	605.8	608.97	608.97	610	0.024339	8.4	58.65	30.76	0.91
Main2	1141.385	Q=500	500	605.8	609.13	609.13	610.22	0.023908	8.67	63.78	32.08	0.91
Main2	1141.385	Q=600	600	605.8	609.48	609.48	610.62	0.021962	8.98	75.47	35.38	0.89
Main2	1217.475	Q=25	25	607.61	608.41	608.18	608.48	0.011847	2.03	12.34	23.41	0.49
Main2	1217.475	Q=50	50	607.61	608.71	608.4	608.81	0.01164	2.53	19.8	27.56	0.52
Main2	1217.475	Q=75	75	607.61	608.93	608.58	609.06	0.011359	2.9	26.24	30.58	0.53
Main2	1217.475	Q=100	100	607.61	609.11	608.72	609.27	0.011091	3.18	32.16	33.06	0.54
Main2	1217.475	Q=125	125	607.61	609.27	608.86	609.45	0.01078	3.44	37.61	35.06	0.54
Main2	1217.475	Q=150	150	607.61	609.42	608.98	609.62	0.010465	3.65	42.94	36.91	0.54
Main2	1217.475	Q=175	175	607.61	609.56	609.09	609.78	0.010229	3.84	48.08	38.55	0.55
Main2	1217.475	Q=200	200	607.61	609.68	609.19	609.92	0.010044	4.01	53.01	39.9	0.55
Main2	1217.475	Q=250	250	607.61	609.92	609.37	610.19	0.009652	4.29	62.71	42.43	0.55
Main2	1217.475	Q=300	300	607.61	610.14	609.55	610.44	0.009211	4.51	72.41	44.85	0.55
Main2	1217.475	Q=350	350	607.61	610.35	609.7	610.66	0.008867	4.71	81.78	46.94	0.54
Main2	1217.475	Q=400	400	607.61	610.54	609.85	610.87	0.008569	4.88	90.94	48.78	0.54
Main2	1217.475	Q=450	450	607.61	610.72	609.99	611.07	0.008244	5.02	100.08	50.24	0.54
Main2	1217.475	Q=500	500	607.61	610.9	610.12	611.26	0.007954	5.14	109.09	51.63	0.53
Main2	1217.475	Q=600	600	607.61	611.21	610.37	611.61	0.007636	5.4	125.75	54.11	0.53
Main2	1296.371	Q=25	25	611.08	611.79	611.79	612.01	0.052589	3.75	6.67	15.35	1
Main2	1296.371	Q=50	50	611.08	612.07	612.07	612.36	0.048246	4.37	11.44	19.55	1.01
Main2	1296.371	Q=75	75	611.08	612.28	612.28	612.62	0.045963	4.71	15.93	23.63	1.01
Main2	1296.371	Q=100	100	611.08	612.43	612.43	612.83	0.041619	5.08	19.88	27.46	0.99
Main2	1296.371	Q=125	125	611.08	612.59	612.59	613.01	0.035349	5.26	24.59	32.69	0.94
Main2	1296.371	Q=150	150	611.08	612.73	612.73	613.17	0.031416	5.42	29.43	36.88	0.91
Main2	1296.371	Q=175	175	611.08	612.84	612.84	613.31	0.029756	5.63	33.71	39.19	0.9
Main2	1296.371	Q=200	200	611.08	612.95	612.95	613.44	0.028285	5.8	37.94	41.12	0.88

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1296.371	Q=250	250	611.08	613.12	613.12	613.66	0.027313	6.18	45.3	43.79	0.89
Main2	1296.371	Q=300	300	611.08	613.27	613.27	613.86	0.02656	6.5	52.25	45.92	0.89
Main2	1296.371	Q=350	350	611.08	613.39	613.42	614.05	0.027321	6.91	57.82	47.55	0.91
Main2	1296.371	Q=400	400	611.08	613.49	613.55	614.22	0.029024	7.37	62.3	48.77	0.95
Main2	1296.371	Q=450	450	611.08	613.57	613.68	614.39	0.030681	7.8	66.47	49.89	0.98
Main2	1296.371	Q=500	500	611.08	613.65	613.77	614.55	0.032119	8.2	70.53	50.91	1.01
Main2	1296.371	Q=600	600	611.08	613.79	613.96	614.86	0.035513	9	77.58	52.7	1.08
Main2	1561.785	Q=25	25	617.92	618.84	618.61	618.94	0.01541	2.52	9.92	16.42	0.57
Main2	1561.785	Q=50	50	617.92	619.16	618.9	619.32	0.016281	3.15	15.86	19.73	0.62
Main2	1561.785	Q=75	75	617.92	619.38	619.12	619.6	0.016805	3.71	20.34	21.3	0.65
Main2	1561.785	Q=100	100	617.92	619.55	619.29	619.82	0.018003	4.24	23.9	22.38	0.69
Main2	1561.785	Q=125	125	617.92	619.66	619.45	620.02	0.020265	4.8	26.59	23.16	0.74
Main2	1561.785	Q=150	150	617.92	619.77	619.58	620.2	0.022429	5.31	28.99	23.85	0.79
Main2	1561.785	Q=175	175	617.92	619.87	619.72	620.37	0.02371	5.73	31.53	24.54	0.82
Main2	1561.785	Q=200	200	617.92	619.97	619.85	620.54	0.025002	6.13	33.88	25.17	0.85
Main2	1561.785	Q=250	250	617.92	620.15	620.08	620.84	0.026334	6.77	38.72	26.42	0.89
Main2	1561.785	Q=300	300	617.92	620.32	620.3	621.13	0.027565	7.35	43.19	27.5	0.93
Main2	1561.785	Q=350	350	617.92	620.5	620.5	621.39	0.027373	7.76	48.16	28.63	0.94
Main2	1561.785	Q=400	400	617.92	620.68	620.68	621.63	0.026381	8.05	53.52	29.77	0.93
Main2	1561.785	Q=450	450	617.92	620.85	620.85	621.86	0.025481	8.31	58.82	30.87	0.93
Main2	1561.785	Q=500	500	617.92	621.02	621.02	622.07	0.024857	8.56	63.9	31.87	0.93
Main2	1561.785	Q=600	600	617.92	621.33	621.33	622.47	0.0235	8.97	74.15	33.77	0.92
Main2	1679.134	Q=25	25	618.08	619.63	618.92	619.67	0.003323	1.63	15.36	15.63	0.29
Main2	1679.134	Q=50	50	618.08	620.08		620.15	0.003913	2.21	22.99	18.08	0.33
Main2	1679.134	Q=75	75	618.08	620.39		620.5	0.004389	2.68	28.91	19.65	0.36
Main2	1679.134	Q=100	100	618.08	620.66		620.8	0.004677	3.04	34.39	21	0.38
Main2	1679.134	Q=125	125	618.08	620.9		621.07	0.004875	3.35	39.53	22.19	0.4
Main2	1679.134	Q=150	150	618.08	621.11		621.31	0.005023	3.62	44.42	23.27	0.41
Main2	1679.134	Q=175	175	618.08	621.31		621.53	0.005163	3.86	49.02	24.17	0.42
Main2	1679.134	Q=200	200	618.08	621.48		621.73	0.005294	4.08	53.36	24.91	0.43
Main2	1679.134	Q=250	250	618.08	621.81		622.09	0.005487	4.47	61.63	26.09	0.44

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1679.134	Q=300	300	618.08	622.1		622.43	0.005641	4.81	69.39	27.14	0.46
Main2	1679.134	Q=350	350	618.08	622.35		622.72	0.005851	5.13	76.38	28.06	0.47
Main2	1679.134	Q=400	400	618.08	622.58		622.99	0.006103	5.45	82.72	28.86	0.49
Main2	1679.134	Q=450	450	618.08	622.78		623.23	0.006354	5.75	88.65	29.6	0.5
Main2	1679.134	Q=500	500	618.08	622.97		623.47	0.006567	6.03	94.44	30.3	0.51
Main2	1679.134	Q=600	600	618.08	623.32		623.9	0.007008	6.56	105.11	31.55	0.54
Main2	1781.324	Q=25	25	619.57	620.37	620.37	620.63	0.050999	4.03	6.2	12.45	1.01
Main2	1781.324	Q=50	50	619.57	620.8		621.06	0.02815	4.14	12.19	15.77	0.81
Main2	1781.324	Q=75	75	619.57	621.11		621.4	0.021175	4.41	17.42	17.71	0.74
Main2	1781.324	Q=100	100	619.57	621.37		621.7	0.01808	4.68	22.2	19.24	0.71
Main2	1781.324	Q=125	125	619.57	621.59		621.96	0.016301	4.93	26.74	20.58	0.69
Main2	1781.324	Q=150	150	619.57	621.8		622.19	0.015109	5.15	31.12	21.8	0.68
Main2	1781.324	Q=175	175	619.57	621.99		622.41	0.014249	5.35	35.34	22.84	0.67
Main2	1781.324	Q=200	200	619.57	622.16		622.61	0.013605	5.53	39.42	23.76	0.66
Main2	1781.324	Q=250	250	619.57	622.48		622.97	0.012648	5.84	47.26	25.23	0.65
Main2	1781.324	Q=300	300	619.57	622.77		623.3	0.011999	6.12	54.72	26.55	0.65
Main2	1781.324	Q=350	350	619.57	623.03	622.46	623.6	0.01157	6.38	61.79	27.75	0.65
Main2	1781.324	Q=400	400	619.57	623.27	622.66	623.87	0.011288	6.63	68.53	28.84	0.65
Main2	1781.324	Q=450	450	619.57	623.49	622.85	624.13	0.011085	6.86	75.01	29.85	0.65
Main2	1781.324	Q=500	500	619.57	623.7	623.04	624.37	0.010913	7.08	81.32	30.81	0.65
Main2	1781.324	Q=600	600	619.57	624.08	623.36	624.82	0.010678	7.47	93.34	32.42	0.65
Main2	1882.403	Q=25	25	621.7	622.73		622.82	0.01177	2.45	10.27	15.09	0.51
Main2	1882.403	Q=50	50	621.7	623.01		623.19	0.016214	3.43	14.83	17.31	0.63
Main2	1882.403	Q=75	75	621.7	623.2		623.47	0.019764	4.23	18.18	18.55	0.71
Main2	1882.403	Q=100	100	621.7	623.36	623.18	623.72	0.021996	4.88	21.18	19.47	0.77
Main2	1882.403	Q=125	125	621.7	623.5	623.35	623.94	0.023432	5.42	24.06	20.31	0.81
Main2	1882.403	Q=150	150	621.7	623.63	623.51	624.15	0.024613	5.89	26.74	21.07	0.84
Main2	1882.403	Q=175	175	621.7	623.76	623.65	624.34	0.025212	6.29	29.45	21.81	0.86
Main2	1882.403	Q=200	200	621.7	623.87	623.8	624.52	0.025735	6.65	32.02	22.38	0.88
Main2	1882.403	Q=250	250	621.7	624.08	624.05	624.86	0.026884	7.31	36.74	23.38	0.92
Main2	1882.403	Q=300	300	621.7	624.27	624.27	625.17	0.027378	7.85	41.38	24.32	0.94

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1882.403	Q=350	350	621.7	624.48	624.48	625.45	0.026513	8.22	46.55	25.33	0.94
Main2	1882.403	Q=400	400	621.7	624.68	624.68	625.71	0.025518	8.51	51.79	26.38	0.93
Main2	1882.403	Q=450	450	621.7	624.87	624.87	625.96	0.024876	8.8	56.76	27.35	0.93
Main2	1882.403	Q=500	500	621.7	625.06	625.06	626.19	0.023946	9.02	61.98	28.34	0.93
Main2	1882.403	Q=600	600	621.7	625.39	625.39	626.62	0.022978	9.48	71.59	30.01	0.92
Main2	2001.338	Q=25	25	622.19	623.53		623.58	0.004024	1.87	14.01	15.89	0.32
Main2	2001.338	Q=50	50	622.19	624		624.09	0.004248	2.45	22.14	18.77	0.35
Main2	2001.338	Q=75	75	622.19	624.34		624.46	0.004439	2.87	28.96	20.67	0.37
Main2	2001.338	Q=100	100	622.19	624.63		624.77	0.004562	3.2	35.07	21.93	0.38
Main2	2001.338	Q=125	125	622.19	624.87		625.04	0.004734	3.5	40.48	22.99	0.4
Main2	2001.338	Q=150	150	622.19	625.1		625.28	0.004824	3.75	45.72	23.97	0.41
Main2	2001.338	Q=175	175	622.19	625.29		625.5	0.004945	3.99	50.54	24.83	0.42
Main2	2001.338	Q=200	200	622.19	625.48		625.71	0.005011	4.19	55.3	25.66	0.43
Main2	2001.338	Q=250	250	622.19	625.82		626.09	0.005109	4.55	64.37	27.17	0.44
Main2	2001.338	Q=300	300	622.19	626.12		626.43	0.005226	4.87	72.72	28.42	0.45
Main2	2001.338	Q=350	350	622.19	626.39		626.73	0.005375	5.17	80.34	29.43	0.46
Main2	2001.338	Q=400	400	622.19	626.63		627	0.005524	5.46	87.48	30.3	0.47
Main2	2001.338	Q=450	450	622.19	626.85		627.26	0.005655	5.72	94.35	31.12	0.48
Main2	2001.338	Q=500	500	622.19	627.06		627.5	0.005792	5.97	100.86	31.87	0.49
Main2	2001.338	Q=600	600	622.19	627.44		627.94	0.006008	6.41	113.42	33.28	0.51
Main2	2076.253	Q=25	25	623.32	624.08	623.94	624.19	0.022156	2.69	9.3	18.76	0.67
Main2	2076.253	Q=50	50	623.32	624.48	624.19	624.6	0.012563	2.87	17.8	23.32	0.55
Main2	2076.253	Q=75	75	623.32	624.79	624.38	624.93	0.009388	3.06	25.65	26.42	0.5
Main2	2076.253	Q=100	100	623.32	625.06	624.54	625.22	0.007868	3.22	33.12	28.8	0.47
Main2	2076.253	Q=125	125	623.32	625.3	624.7	625.47	0.006977	3.36	40.28	30.95	0.46
Main2	2076.253	Q=150	150	623.32	625.53	624.83	625.7	0.00631	3.47	47.4	33.02	0.44
Main2	2076.253	Q=175	175	623.32	625.73	624.95	625.91	0.005844	3.58	54.31	34.88	0.43
Main2	2076.253	Q=200	200	623.32	625.92	625.07	626.11	0.005453	3.66	61.2	36.58	0.43
Main2	2076.253	Q=250	250	623.32	626.28	625.28	626.47	0.00488	3.81	74.72	39.78	0.41
Main2	2076.253	Q=300	300	623.32	626.59	625.47	626.8	0.004503	3.95	87.77	42.69	0.4
Main2	2076.253	Q=350	350	623.32	626.88	625.66	627.1	0.004247	4.08	100.32	45.3	0.4

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	2076.253	Q=400	400	623.32	627.14	625.82	627.37	0.004052	4.19	112.53	47.71	0.39
Main2	2076.253	Q=450	450	623.32	627.39	625.97	627.62	0.003887	4.3	124.59	49.99	0.39
Main2	2076.253	Q=500	500	623.32	627.62	626.12	627.86	0.00375	4.39	136.38	51.98	0.39
Main2	2076.253	Q=600	600	623.32	628.05	626.39	628.31	0.003511	4.55	159.63	55.49	0.38
Main2	2140.67	Q=25	25	626.13	626.8	626.8	627.04	0.045141	3.98	6.5	14.29	0.96
Main2	2140.67	Q=50	50	626.13	627.1	627.1	627.44	0.036204	4.8	11.27	17.55	0.93
Main2	2140.67	Q=75	75	626.13	627.33	627.33	627.74	0.033137	5.38	15.45	19.69	0.92
Main2	2140.67	Q=100	100	626.13	627.49	627.52	627.99	0.033619	5.97	18.84	21.27	0.95
Main2	2140.67	Q=125	125	626.13	627.63	627.69	628.21	0.034712	6.52	21.85	22.58	0.98
Main2	2140.67	Q=150	150	626.13	627.75	627.83	628.4	0.035631	6.99	24.62	23.48	1.01
Main2	2140.67	Q=175	175	626.13	627.86	627.97	628.59	0.036579	7.42	27.19	24.24	1.04
Main2	2140.67	Q=200	200	626.13	627.95	628.09	628.76	0.037588	7.82	29.58	24.93	1.06
Main2	2140.67	Q=250	250	626.13	628.12	628.31	629.08	0.04005	8.6	33.86	26.11	1.11
Main2	2140.67	Q=300	300	626.13	628.27	628.52	629.38	0.042293	9.3	37.8	27.15	1.16
Main2	2140.67	Q=350	350	626.13	628.4	628.71	629.66	0.044362	9.94	41.46	28.09	1.2
Main2	2140.67	Q=400	400	626.13	628.52	628.89	629.92	0.046189	10.53	44.94	28.95	1.24
Main2	2140.67	Q=450	450	626.13	628.64	629.05	630.17	0.047889	11.08	48.25	29.72	1.27
Main2	2140.67	Q=500	500	626.13	628.74	629.21	630.41	0.049653	11.6	51.3	30.33	1.3
Main2	2140.67	Q=600	600	626.13	628.93	629.48	630.87	0.052652	12.55	57.15	31.46	1.36
T2	76.18796	Q=25	25	631.75	632	632.54	637.39	3.428229	18.62	1.34	6.36	7.15
T2	76.18796	Q=50	50	631.75	632.16	632.88	638.59	2.322305	20.35	2.46	7.58	6.3
T2	76.18796	Q=75	75	631.75	632.29	633.14	639.44	1.905214	21.46	3.49	8.56	5.92
T2	76.18796	Q=100	100	631.75	632.39	633.37	640.34	1.743094	22.62	4.42	9.35	5.8
T2	76.18796	Q=125	125	631.75	632.5	633.58	640.73	1.533166	23.03	5.43	10.14	5.55
T2	76.18796	Q=150	150	631.75	632.59	633.77	641.08	1.387516	23.38	6.41	10.86	5.36
T2	76.18796	Q=175	175	631.75	632.68	633.95	641.47	1.293995	23.8	7.35	11.5	5.24
T2	76.18796	Q=200	200	631.75	632.76	634.11	641.75	1.158251	24.07	8.31	11.95	5.04
T2	76.18796	Q=250	250	631.75	632.91	634.42	642.39	0.944952	24.74	10.17	12.6	4.71
T2	76.18796	Q=300	300	631.75	633.05	634.68	642.94	0.803949	25.31	12.03	13.21	4.45
T2	76.18796	Q=350	350	631.75	633.19	634.93	643.42	0.705552	25.82	13.88	13.8	4.26
T2	76.18796	Q=400	400	631.75	633.32	635.16	643.81	0.627415	26.21	15.76	14.37	4.09

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	76.18796	Q=450	450	631.75	633.45	635.39	644.16	0.56732	26.57	17.63	14.92	3.96
T2	76.18796	Q=500	500	631.75	633.57	635.59	644.54	0.524755	26.98	19.44	15.43	3.86
T2	76.18796	Q=600	600	631.75	633.8	635.96	645.11	0.452719	27.57	23.16	16.43	3.67
T2	159.2439	Q=25	25	648.84	649.36	649.36	649.53	0.042872	3.54	8.03	23.78	0.92
T2	159.2439	Q=50	50	648.84	649.56	649.56	649.81	0.040477	4.38	13.2	27.41	0.95
T2	159.2439	Q=75	75	648.84	649.72	649.72	650.02	0.038477	4.93	17.81	30.28	0.96
T2	159.2439	Q=100	100	648.84	649.86	649.86	650.21	0.035414	5.26	22.36	32.48	0.94
T2	159.2439	Q=125	125	648.84	649.98	649.98	650.37	0.034924	5.63	26.12	33.73	0.95
T2	159.2439	Q=150	150	648.84	650.08	650.08	650.51	0.034356	5.94	29.72	34.84	0.96
T2	159.2439	Q=175	175	648.84	650.18	650.18	650.65	0.033507	6.19	33.28	35.9	0.96
T2	159.2439	Q=200	200	648.84	650.27	650.27	650.77	0.033306	6.45	36.53	36.84	0.97
T2	159.2439	Q=250	250	648.84	650.44	650.44	651.01	0.032286	6.87	42.99	38.59	0.97
T2	159.2439	Q=300	300	648.84	650.6	650.6	651.22	0.031422	7.23	49.15	40.14	0.98
T2	159.2439	Q=350	350	648.84	650.75	650.75	651.42	0.030586	7.53	55.14	41.55	0.98
T2	159.2439	Q=400	400	648.84	650.88	650.88	651.6	0.030157	7.83	60.73	42.78	0.98
T2	159.2439	Q=450	450	648.84	651.01	651.01	651.77	0.029735	8.1	66.18	43.95	0.98
T2	159.2439	Q=500	500	648.84	651.13	651.13	651.93	0.028951	8.31	71.84	45.13	0.98
T2	159.2439	Q=600	600	648.84	651.36	651.36	652.24	0.028337	8.76	82.06	47.04	0.98
T2	216.5511	Q=25	25	650.72	651.15	651.25	651.5	0.123477	4.76	5.42	19.4	1.47
T2	216.5511	Q=50	50	650.72	651.28	651.48	651.9	0.144241	6.47	8.24	22.58	1.68
T2	216.5511	Q=75	75	650.72	651.38	651.65	652.24	0.15707	7.7	10.6	24.64	1.81
T2	216.5511	Q=100	100	650.72	651.47	651.79	652.53	0.163976	8.64	12.75	26.11	1.89
T2	216.5511	Q=125	125	650.72	651.55	651.92	652.77	0.165196	9.36	14.85	27.48	1.94
T2	216.5511	Q=150	150	650.72	651.62	652.03	653	0.167173	10.01	16.8	28.68	1.98
T2	216.5511	Q=175	175	650.72	651.69	652.13	653.18	0.162864	10.46	18.89	29.92	1.98
T2	216.5511	Q=200	200	650.72	651.75	652.23	653.38	0.165028	11	20.66	30.93	2.02
T2	216.5511	Q=250	250	650.72	651.86	652.39	653.7	0.161782	11.78	24.35	32.87	2.04
T2	216.5511	Q=300	300	650.72	651.96	652.57	654.02	0.162763	12.53	27.57	33.98	2.07
T2	216.5511	Q=350	350	650.72	652.05	652.7	654.28	0.159281	13.09	30.89	35.07	2.08
T2	216.5511	Q=400	400	650.72	652.14	652.84	654.54	0.15814	13.65	33.96	36.04	2.1
T2	216.5511	Q=450	450	650.72	652.22	652.96	654.8	0.158064	14.19	36.86	36.94	2.12

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	216.5511	Q=500	500	650.72	652.3	653.09	655.03	0.156743	14.65	39.76	37.81	2.13
T2	216.5511	Q=600	600	650.72	652.45	653.32	655.43	0.15208	15.4	45.61	39.52	2.13
T2	294.5337	Q=25	25	656.15	656.67	656.67	656.86	0.043814	3.62	7.59	20.83	0.93
T2	294.5337	Q=50	50	656.15	656.9	656.9	657.16	0.038791	4.43	12.78	24.71	0.93
T2	294.5337	Q=75	75	656.15	657.08	657.08	657.4	0.035893	4.95	17.42	27.49	0.93
T2	294.5337	Q=100	100	656.15	657.23	657.23	657.59	0.034075	5.36	21.64	29.43	0.93
T2	294.5337	Q=125	125	656.15	657.35	657.35	657.77	0.03319	5.71	25.45	30.78	0.94
T2	294.5337	Q=150	150	656.15	657.47	657.47	657.92	0.032214	6.01	29.15	32.02	0.94
T2	294.5337	Q=175	175	656.15	657.57	657.57	658.07	0.032168	6.32	32.44	33.09	0.95
T2	294.5337	Q=200	200	656.15	657.68	657.68	658.2	0.031256	6.54	35.94	34.2	0.95
T2	294.5337	Q=250	250	656.15	657.86	657.86	658.45	0.030651	6.99	42.27	36.09	0.96
T2	294.5337	Q=300	300	656.15	658.03	658.03	658.68	0.029527	7.33	48.68	38	0.96
T2	294.5337	Q=350	350	656.15	658.18	658.18	658.88	0.029158	7.68	54.54	39.71	0.96
T2	294.5337	Q=400	400	656.15	658.33	658.33	659.07	0.02854	7.97	60.43	41.35	0.96
T2	294.5337	Q=450	450	656.15	658.47	658.47	659.25	0.027709	8.2	66.43	42.95	0.96
T2	294.5337	Q=500	500	656.15	658.6	658.6	659.42	0.027108	8.42	72.16	44.36	0.96
T2	294.5337	Q=600	600	656.15	658.83	658.83	659.73	0.026467	8.85	82.77	46.6	0.96
Main3	2243.763	Q=25	25	625.79	627.5	626.6	627.53	0.001585	1.28	19.87	18.09	0.2
Main3	2243.763	Q=50	50	625.79	627.97	626.92	628.02	0.002044	1.8	28.89	20.6	0.25
Main3	2243.763	Q=75	75	625.79	628.31	627.16	628.38	0.002379	2.2	36.2	22.43	0.27
Main3	2243.763	Q=100	100	625.79	627.31	627.36	627.89	0.045016	6.07	16.56	17.08	1.06
Main3	2243.763	Q=125	125	625.79	627.44	627.53	628.14	0.046878	6.71	18.83	17.78	1.1
Main3	2243.763	Q=150	150	625.79	627.57	627.7	628.37	0.0472	7.22	21.13	18.46	1.13
Main3	2243.763	Q=175	175	625.79	627.68	627.85	628.6	0.048202	7.72	23.21	19.06	1.15
Main3	2243.763	Q=200	200	625.79	627.79	628	628.8	0.048336	8.13	25.34	19.65	1.17
Main3	2243.763	Q=250	250	625.79	627.99	628.26	629.18	0.048819	8.88	29.34	20.72	1.2
Main3	2243.763	Q=300	300	625.79	628.17	628.5	629.53	0.048688	9.5	33.25	21.71	1.22
Main3	2243.763	Q=350	350	625.79	628.35	628.73	629.85	0.048472	10.04	37.04	22.63	1.24
Main3	2243.763	Q=400	400	625.79	628.49	628.93	630.15	0.049071	10.59	40.47	23.43	1.26
Main3	2243.763	Q=450	450	625.79	628.65	629.12	630.42	0.048585	11.01	44.09	24.2	1.27
Main3	2243.763	Q=500	500	625.79	628.79	629.31	630.68	0.048077	11.4	47.64	24.9	1.27

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	2243.763	Q=600	600	625.79	629.06	629.64	631.16	0.047081	12.08	54.53	26.08	1.28
Main3	2316.767	Q=25	25	628.96	629.65	629.65	629.89	0.051193	3.89	6.46	14.39	1
Main3	2316.767	Q=50	50	628.96	629.94	629.94	630.27	0.043006	4.66	10.99	17.18	0.98
Main3	2316.767	Q=75	75	628.96	630.15	630.15	630.56	0.039671	5.21	14.91	19.12	0.98
Main3	2316.767	Q=100	100	628.96	630.34	630.34	630.81	0.035857	5.63	18.61	20.43	0.96
Main3	2316.767	Q=125	125	628.96	630.5	630.5	631.03	0.033642	5.99	22.02	21.26	0.95
Main3	2316.767	Q=150	150	628.96	630.64	630.64	631.24	0.032841	6.36	25.05	21.97	0.96
Main3	2316.767	Q=175	175	628.96	630.78	630.78	631.42	0.031482	6.64	28.16	22.68	0.95
Main3	2316.767	Q=200	200	628.96	630.91	630.91	631.6	0.030741	6.92	31.04	23.32	0.95
Main3	2316.767	Q=250	250	628.96	631.15	631.15	631.93	0.029237	7.39	36.72	24.52	0.95
Main3	2316.767	Q=300	300	628.96	631.36	631.36	632.22	0.028026	7.78	42.19	25.63	0.95
Main3	2316.767	Q=350	350	628.96	631.56	631.56	632.49	0.027214	8.15	47.38	26.64	0.95
Main3	2316.767	Q=400	400	628.96	631.77	631.77	632.74	0.025869	8.41	52.88	27.67	0.94
Main3	2316.767	Q=450	450	628.96	631.94	631.94	632.98	0.025254	8.69	57.8	28.37	0.94
Main3	2316.767	Q=500	500	628.96	632.11	632.11	633.2	0.024714	8.95	62.57	28.94	0.94
Main3	2316.767	Q=600	600	628.96	632.42	632.42	633.62	0.023912	9.43	71.68	30.02	0.94
Main3	2399.65	Q=25	25	628.67	630.22	629.34	630.24	0.001351	1.24	21.18	19.8	0.19
Main3	2399.65	Q=50	50	628.67	630.67	629.63	630.71	0.001819	1.75	30.79	22.66	0.23
Main3	2399.65	Q=75	75	628.67	631	629.85	631.06	0.002139	2.14	38.53	24.26	0.26
Main3	2399.65	Q=100	100	628.67	631.26	630.05	631.35	0.002404	2.45	45.12	25.27	0.28
Main3	2399.65	Q=125	125	628.67	631.5	630.22	631.6	0.002612	2.73	51.13	26.15	0.3
Main3	2399.65	Q=150	150	628.67	631.71	630.38	631.83	0.002775	2.96	56.79	26.96	0.31
Main3	2399.65	Q=175	175	628.67	631.9	630.53	632.04	0.002927	3.18	62.03	27.69	0.32
Main3	2399.65	Q=200	200	628.67	632.08	630.68	632.24	0.003057	3.38	67.05	28.37	0.34
Main3	2399.65	Q=250	250	628.67	632.4	630.92	632.59	0.003294	3.74	76.32	29.58	0.35
Main3	2399.65	Q=300	300	628.67	632.69	631.15	632.91	0.003482	4.06	85.02	30.65	0.37
Main3	2399.65	Q=350	350	628.67	632.95	631.35	633.2	0.003645	4.34	93.21	31.61	0.38
Main3	2399.65	Q=400	400	628.67	633.19	631.54	633.47	0.00381	4.61	100.82	32.5	0.39
Main3	2399.65	Q=450	450	628.67	633.41	631.72	633.72	0.00395	4.86	108.19	33.35	0.4
Main3	2399.65	Q=500	500	628.67	633.62	631.89	633.96	0.004083	5.09	115.22	34.14	0.41
Main3	2399.65	Q=600	600	628.67	634.01	632.22	634.4	0.004302	5.51	128.77	35.61	0.43

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	2477.854	Q=25	25	631.5	632.25	632.25	632.5	0.052115	3.95	6.34	13.36	1.01
Main3	2477.854	Q=50	50	631.5	632.55	632.55	632.89	0.045654	4.67	10.71	16.16	1
Main3	2477.854	Q=75	75	631.5	632.76	632.76	633.2	0.040647	5.3	14.32	17.54	0.99
Main3	2477.854	Q=100	100	631.5	632.93	632.96	633.46	0.04023	5.91	17.32	18.61	1.01
Main3	2477.854	Q=125	125	631.5	633.06	633.13	633.71	0.041844	6.51	19.82	19.45	1.05
Main3	2477.854	Q=150	150	631.5	633.18	633.29	633.93	0.04335	7.06	22.13	20.2	1.09
Main3	2477.854	Q=175	175	631.5	633.28	633.44	634.14	0.044714	7.55	24.31	20.88	1.12
Main3	2477.854	Q=200	200	631.5	633.38	633.57	634.34	0.045933	8	26.38	21.51	1.15
Main3	2477.854	Q=250	250	631.5	633.56	633.84	634.71	0.048014	8.81	30.3	22.65	1.2
Main3	2477.854	Q=300	300	631.5	633.72	634.05	635.04	0.049392	9.5	34.06	23.69	1.23
Main3	2477.854	Q=350	350	631.5	633.87	634.26	635.35	0.050472	10.11	37.61	24.41	1.26
Main3	2477.854	Q=400	400	631.5	634.01	634.45	635.64	0.051211	10.65	41.05	25.04	1.28
Main3	2477.854	Q=450	450	631.5	634.14	634.63	635.91	0.051746	11.14	44.38	25.64	1.3
Main3	2477.854	Q=500	500	631.5	634.26	634.8	636.17	0.05251	11.62	47.51	26.19	1.33
Main3	2477.854	Q=600	600	631.5	634.49	635.13	636.66	0.053374	12.45	53.63	27.23	1.36
T3	96.21163	Q=25	25	638.2	638.81	638.99	639.41	0.170396	6.21	4.03	10.44	1.76
T3	96.21163	Q=50	50	638.2	639.05	639.3	639.88	0.142781	7.32	6.85	12.67	1.72
T3	96.21163	Q=75	75	638.2	639.22	639.55	640.29	0.129353	8.34	9.14	13.64	1.71
T3	96.21163	Q=100	100	638.2	639.37	639.77	640.65	0.120604	9.12	11.28	14.49	1.7
T3	96.21163	Q=125	125	638.2	639.51	639.96	640.96	0.114809	9.78	13.29	15.25	1.7
T3	96.21163	Q=150	150	638.2	639.63	640.14	641.24	0.110019	10.34	15.24	15.94	1.7
T3	96.21163	Q=175	175	638.2	639.75	640.3	641.5	0.106447	10.84	17.11	16.59	1.7
T3	96.21163	Q=200	200	638.2	639.86	640.45	641.74	0.103383	11.28	18.94	17.19	1.7
T3	96.21163	Q=250	250	638.2	640.06	640.72	642.17	0.09844	12.05	22.47	18.31	1.69
T3	96.21163	Q=300	300	638.2	640.23	640.97	642.57	0.096043	12.76	25.75	19.28	1.7
T3	96.21163	Q=350	350	638.2	640.39	641.2	642.95	0.094714	13.42	28.84	20.18	1.71
T3	96.21163	Q=400	400	638.2	640.53	641.41	643.3	0.094307	14.05	31.75	20.98	1.73
T3	96.21163	Q=450	450	638.2	640.66	641.61	643.65	0.094377	14.64	34.53	21.72	1.75
T3	96.21163	Q=500	500	638.2	640.79	641.81	643.95	0.093388	15.13	37.37	22.46	1.76
T3	96.21163	Q=600	600	638.2	641.01	642.13	644.56	0.094066	16.15	42.5	23.73	1.79

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T3	169.9622	Q=25	25	644.9	645.79	645.86	646.18	0.057103	5.07	5.19	9.69	1.11
T3	169.9622	Q=50	50	644.9	646.06	646.23	646.73	0.065	6.81	7.99	11.28	1.26
T3	169.9622	Q=75	75	644.9	646.26	646.52	647.17	0.070131	8.06	10.33	12.45	1.35
T3	169.9622	Q=100	100	644.9	646.42	646.77	647.56	0.074791	9.1	12.39	13.4	1.42
T3	169.9622	Q=125	125	644.9	646.55	646.98	647.91	0.078599	9.99	14.28	14.21	1.49
T3	169.9622	Q=150	150	644.9	646.67	647.16	648.24	0.082588	10.81	16	14.91	1.54
T3	169.9622	Q=175	175	644.9	646.78	647.32	648.54	0.08594	11.53	17.61	15.46	1.59
T3	169.9622	Q=200	200	644.9	646.87	647.48	648.83	0.089049	12.2	19.13	15.96	1.64
T3	169.9622	Q=250	250	644.9	647.04	647.76	649.37	0.09479	13.4	21.92	16.63	1.71
T3	169.9622	Q=300	300	644.9	647.2	648.02	649.86	0.099039	14.44	24.56	17.23	1.78
T3	169.9622	Q=350	350	644.9	647.35	648.28	650.32	0.10176	15.33	27.13	17.8	1.82
T3	169.9622	Q=400	400	644.9	647.49	648.49	650.73	0.103241	16.09	29.67	18.34	1.85
T3	169.9622	Q=450	450	644.9	647.62	648.71	651.11	0.103925	16.76	32.19	18.86	1.88
T3	169.9622	Q=500	500	644.9	647.74	648.89	651.52	0.107073	17.52	34.33	19.29	1.92
T3	169.9622	Q=600	600	644.9	647.97	649.27	652.2	0.108002	18.65	38.99	20.2	1.96
T3	272.8936	Q=25	25	654.98	655.64	655.88	656.47	0.210798	7.34	3.46	8.97	1.99
T3	272.8936	Q=50	50	654.98	655.88	656.25	657.09	0.169526	8.96	5.84	10.25	1.93
T3	272.8936	Q=75	75	654.98	656.08	656.54	657.57	0.151647	10.06	7.96	11.27	1.91
T3	272.8936	Q=100	100	654.98	656.25	656.78	657.96	0.138438	10.86	10	12.18	1.88
T3	272.8936	Q=125	125	654.98	656.41	656.99	658.29	0.129337	11.52	11.95	12.98	1.86
T3	272.8936	Q=150	150	654.98	656.55	657.19	658.58	0.120975	12.02	13.89	13.73	1.83
T3	272.8936	Q=175	175	654.98	656.69	657.37	658.84	0.114698	12.48	15.78	14.42	1.81
T3	272.8936	Q=200	200	654.98	656.81	657.53	659.08	0.10945	12.87	17.64	15.08	1.79
T3	272.8936	Q=250	250	654.98	657.05	657.82	659.5	0.101156	13.55	21.28	16.29	1.76
T3	272.8936	Q=300	300	654.98	657.26	658.09	659.88	0.095103	14.12	24.81	17.39	1.74
T3	272.8936	Q=350	350	654.98	657.45	658.33	660.21	0.090206	14.61	28.29	18.4	1.72
T3	272.8936	Q=400	400	654.98	657.63	658.57	660.53	0.087215	15.1	31.57	19.31	1.71
T3	272.8936	Q=450	450	654.98	657.78	658.75	660.84	0.085354	15.58	34.68	20.13	1.71
T3	272.8936	Q=500	500	654.98	657.97	658.95	661.05	0.079434	15.74	38.48	21.1	1.67
T3	272.8936	Q=600	600	654.98	658.26	659.29	661.54	0.075385	16.41	44.86	22.61	1.66
T3	289.157	Q=25	25	657.09	657.91	658.01	658.32	0.072373	5.18	5.07	10.86	1.22

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T3	289.157	Q=50	50	657.09	658.17	658.35	658.81	0.072081	6.67	8.16	12.86	1.3
T3	289.157	Q=75	75	657.09	658.39	658.61	659.18	0.067941	7.55	11.04	14.35	1.31
T3	289.157	Q=100	100	657.09	658.57	658.83	659.49	0.065234	8.24	13.73	15.6	1.32
T3	289.157	Q=125	125	657.09	658.72	659.03	659.76	0.06311	8.79	16.29	16.71	1.32
T3	289.157	Q=150	150	657.09	658.86	659.2	660.01	0.062968	9.35	18.58	17.64	1.34
T3	289.157	Q=175	175	657.09	658.99	659.35	660.23	0.06162	9.77	20.93	18.55	1.35
T3	289.157	Q=200	200	657.09	659.11	659.5	660.43	0.059972	10.12	23.27	19.39	1.35
T3	289.157	Q=250	250	657.09	659.3	659.76	660.82	0.061497	10.98	27.09	20.61	1.39
T3	289.157	Q=300	300	657.09	659.51	660	661.14	0.058754	11.47	31.43	21.91	1.38
T3	289.157	Q=350	350	657.09	659.67	660.2	661.46	0.059292	12.09	35.05	22.94	1.4
T3	289.157	Q=400	400	657.09	659.79	660.41	661.79	0.062299	12.83	37.94	23.74	1.45
T3	289.157	Q=450	450	657.09	659.9	660.61	662.11	0.065552	13.56	40.6	24.44	1.5
T3	289.157	Q=500	500	657.09	660.16	660.78	662.18	0.05354	13.08	47.24	26.12	1.38
T3	289.157	Q=600	600	657.09	660.42	661.05	662.64	0.05356	13.86	54.11	27.91	1.4
T3	354.6973	Q=25	25	660.8	661.57	661.57	661.82	0.040844	4.22	6.49	13.44	0.94
T3	354.6973	Q=50	50	660.8	661.85	661.88	662.23	0.039067	5.3	10.69	16.03	0.98
T3	354.6973	Q=75	75	660.8	662.06	662.11	662.55	0.039632	6.11	14.13	17.69	1.02
T3	354.6973	Q=100	100	660.8	662.23	662.31	662.82	0.039904	6.74	17.28	19.07	1.05
T3	354.6973	Q=125	125	660.8	662.38	662.49	663.05	0.040141	7.27	20.22	20.27	1.07
T3	354.6973	Q=150	150	660.8	662.52	662.64	663.26	0.039115	7.66	23.26	21.44	1.07
T3	354.6973	Q=175	175	660.8	662.65	662.79	663.45	0.039095	8.05	25.99	22.44	1.09
T3	354.6973	Q=200	200	660.8	662.76	662.91	663.63	0.039537	8.44	28.53	23.39	1.1
T3	354.6973	Q=250	250	660.8	663	663.17	663.94	0.036799	8.86	34.5	25.54	1.09
T3	354.6973	Q=300	300	660.8	663.18	663.39	664.23	0.037706	9.48	39.16	27.23	1.12
T3	354.6973	Q=350	350	660.8	663.38	663.6	664.48	0.035622	9.76	44.89	29.16	1.1
T3	354.6973	Q=400	400	660.8	663.62	663.75	664.69	0.031543	9.76	51.94	31.38	1.05
T3	354.6973	Q=450	450	660.8	663.86	663.96	664.89	0.027824	9.71	59.85	34.37	1
T3	354.6973	Q=500	500	660.8	663.79	664.11	665.17	0.038045	11.17	57.46	33.41	1.17
T3	354.6973	Q=600	600	660.8	664.1	664.41	665.52	0.035027	11.5	68.7	37.71	1.14
T3	424.3411	Q=25	25	663.63	664.32	664.31	664.52	0.036754	3.97	7.38	17.15	0.89
T3	424.3411	Q=50	50	663.63	664.57	664.57	664.87	0.036743	4.98	12.05	20.44	0.94

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T3	424.3411	Q=75	75	663.63	664.77	664.77	665.13	0.034788	5.56	16.42	23.13	0.95
T3	424.3411	Q=100	100	663.63	664.94	664.94	665.35	0.033299	6.01	20.55	25.45	0.95
T3	424.3411	Q=125	125	663.63	665.09	665.09	665.54	0.031952	6.35	24.54	27.49	0.95
T3	424.3411	Q=150	150	663.63	665.21	665.21	665.71	0.031799	6.71	28.1	29.23	0.96
T3	424.3411	Q=175	175	663.63	665.34	665.34	665.87	0.030857	6.98	31.9	31.2	0.96
T3	424.3411	Q=200	200	663.63	665.46	665.46	666.01	0.02954	7.16	35.85	33.13	0.95
T3	424.3411	Q=250	250	663.63	665.64	665.64	666.27	0.03031	7.75	42.17	36.39	0.98
T3	424.3411	Q=300	300	663.63	665.87	665.87	666.5	0.027727	7.96	50.8	41.6	0.95
T3	424.3411	Q=350	350	663.63	666.02	666.02	666.7	0.027978	8.37	57.53	45.57	0.97
T3	424.3411	Q=400	400	663.63	666.11	666.11	666.89	0.031387	9.1	61.75	48.84	1.03
T3	424.3411	Q=450	450	663.63	666.17	666.17	667.08	0.035909	9.89	64.66	50.96	1.11
T3	424.3411	Q=500	500	663.63	666.6	666.6	667.2	0.021964	8.6	92.67	76.92	0.89
T3	424.3411	Q=600	600	663.63	666.81	666.81	667.42	0.020827	8.79	110.11	85.62	0.88
Main4	2609.313	Q=25	25	633.75	634.84	634.5	634.92	0.009198	2.19	11.45	16.45	0.45
Main4	2609.313	Q=50	50	633.75	635.19	634.8	635.32	0.009731	2.92	17.51	18.67	0.5
Main4	2609.313	Q=75	75	633.75	635.44	635.01	635.63	0.010325	3.48	22.5	20.31	0.53
Main4	2609.313	Q=100	100	633.75	635.66	635.21	635.89	0.010726	3.92	27.01	21.69	0.56
Main4	2609.313	Q=125	125	633.75	635.84	635.38	636.12	0.011136	4.3	31.1	22.87	0.58
Main4	2609.313	Q=150	150	633.75	636.01	635.54	636.32	0.011479	4.64	34.93	23.91	0.6
Main4	2609.313	Q=175	175	633.75	636.16	635.69	636.51	0.011774	4.94	38.52	24.58	0.61
Main4	2609.313	Q=200	200	633.75	636.3	635.82	636.69	0.011829	5.19	42.19	25.25	0.62
Main4	2609.313	Q=250	250	633.75	636.54	636.09	637	0.012441	5.71	48.4	26.34	0.65
Main4	2609.313	Q=300	300	633.75	636.78	636.3	637.3	0.012643	6.12	54.65	27.4	0.66
Main4	2609.313	Q=350	350	633.75	636.99	636.51	637.57	0.01282	6.49	60.57	28.36	0.68
Main4	2609.313	Q=400	400	633.75	637.19	636.7	637.82	0.01296	6.82	66.26	29.26	0.69
Main4	2609.313	Q=450	450	633.75	637.37	636.88	638.06	0.01315	7.13	71.62	30.07	0.7
Main4	2609.313	Q=500	500	633.75	637.54	637.05	638.28	0.013279	7.42	76.89	30.86	0.71
Main4	2609.313	Q=600	600	633.75	637.84	637.38	638.69	0.013697	7.98	86.53	32.23	0.73
Main4	2685.641	Q=25	25	635.73	636.48	636.48	636.73	0.051656	4.02	6.21	12.61	1.01
Main4	2685.641	Q=50	50	635.73	636.79	636.79	637.14	0.046133	4.79	10.45	15.13	1.01
Main4	2685.641	Q=75	75	635.73	636.97	637.02	637.46	0.050216	5.67	13.3	16.42	1.09

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main4	2685.641	Q=100	100	635.73	637.42	637.21	637.77	0.020396	4.8	21.52	19.58	0.74
Main4	2685.641	Q=125	125	635.73	637.57	637.39	638	0.021625	5.31	24.54	20.61	0.78
Main4	2685.641	Q=150	150	635.73	637.33	637.56	638.26	0.058811	7.77	19.81	18.97	1.25
Main4	2685.641	Q=175	175	635.73	637.44	637.71	638.48	0.05892	8.24	21.95	19.73	1.27
Main4	2685.641	Q=200	200	635.73	637.55	637.85	638.69	0.059119	8.68	24	20.43	1.29
Main4	2685.641	Q=250	250	635.73	637.74	638.12	639.07	0.0589	9.42	28.01	21.74	1.31
Main4	2685.641	Q=300	300	635.73	637.92	638.35	639.4	0.057228	9.98	32.12	23.01	1.31
Main4	2685.641	Q=350	350	635.73	638.09	638.55	639.69	0.055425	10.45	36.2	24.14	1.31
Main4	2685.641	Q=400	400	635.73	638.25	638.74	639.97	0.054604	10.9	39.98	25.03	1.32
Main4	2685.641	Q=450	450	635.73	638.4	638.91	640.23	0.053455	11.29	43.75	25.77	1.32
Main4	2685.641	Q=500	500	635.73	638.54	639.08	640.47	0.052407	11.64	47.43	26.39	1.32
Main4	2685.641	Q=600	600	635.73	638.8	639.41	640.92	0.051034	12.29	54.4	27.52	1.33
Main4	2714.281	Q=25	25	637.05	637.84	637.8	638.06	0.041747	3.74	6.69	12.92	0.92
Main4	2714.281	Q=50	50	637.05	638.11	638.11	638.46	0.046133	4.79	10.45	15.13	1.01
Main4	2714.281	Q=75	75	637.05	638.34	638.34	638.78	0.04177	5.34	14.14	16.78	1
Main4	2714.281	Q=100	100	637.05	638.53	638.53	639.05	0.037495	5.78	17.59	18.14	0.98
Main4	2714.281	Q=125	125	637.05	638.71	638.71	639.29	0.034733	6.16	20.91	19.36	0.97
Main4	2714.281	Q=150	150	637.05	638.88	638.88	639.51	0.032195	6.44	24.26	20.52	0.95
Main4	2714.281	Q=175	175	637.05	639.03	639.03	639.71	0.030781	6.73	27.39	21.55	0.94
Main4	2714.281	Q=200	200	637.05	639.17	639.17	639.89	0.029567	6.98	30.47	22.51	0.94
Main4	2714.281	Q=250	250	637.05	639.44	639.44	640.23	0.027072	7.36	36.76	24.28	0.92
Main4	2714.281	Q=300	300	637.05	639.67	639.67	640.53	0.025894	7.74	42.45	25.55	0.92
Main4	2714.281	Q=350	350	637.05	639.87	639.87	640.8	0.025329	8.11	47.66	26.42	0.92
Main4	2714.281	Q=400	400	637.05	640.06	640.06	641.06	0.02468	8.42	52.81	27.26	0.92
Main4	2714.281	Q=450	450	637.05	640.23	640.23	641.3	0.024256	8.72	57.71	28.04	0.92
Main4	2714.281	Q=500	500	637.05	640.4	640.4	641.52	0.023935	9.01	62.43	28.77	0.92
Main4	2714.281	Q=600	600	637.05	640.73	640.73	641.95	0.02283	9.44	72.18	30.22	0.92
Main4	2839.712	Q=25	25	639.9	640.9		641	0.014911	2.6	9.6	14.7	0.57
Main4	2839.712	Q=50	50	639.9	641.26	640.96	641.43	0.014201	3.28	15.39	17.28	0.59
Main4	2839.712	Q=75	75	639.9	641.5		641.73	0.014953	3.9	19.7	18.93	0.63
Main4	2839.712	Q=100	100	639.9	641.69		641.99	0.015822	4.43	23.45	20.24	0.66

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main4	2839.712	Q=125	125	639.9	641.86		642.22	0.016434	4.88	26.96	21.41	0.69
Main4	2839.712	Q=150	150	639.9	642		642.42	0.017284	5.3	30.07	22.39	0.72
Main4	2839.712	Q=175	175	639.9	642.14		642.61	0.017762	5.66	33.18	23.32	0.74
Main4	2839.712	Q=200	200	639.9	642.26		642.78	0.018224	5.98	36.12	24.12	0.75
Main4	2839.712	Q=250	250	639.9	642.47	642.29	643.1	0.019405	6.61	41.34	25.34	0.79
Main4	2839.712	Q=300	300	639.9	642.67	642.52	643.39	0.020054	7.12	46.43	26.22	0.82
Main4	2839.712	Q=350	350	639.9	642.85	642.72	643.66	0.020497	7.57	51.33	27.03	0.83
Main4	2839.712	Q=400	400	639.9	643.02	642.91	643.91	0.020869	7.97	56.01	27.77	0.85
Main4	2839.712	Q=450	450	639.9	643.18	643.08	644.15	0.021165	8.34	60.54	28.48	0.87
Main4	2839.712	Q=500	500	639.9	643.34	643.25	644.38	0.021407	8.68	64.93	29.15	0.88
Main4	2839.712	Q=600	600	639.9	643.6	643.58	644.8	0.022456	9.39	72.6	30.28	0.91
Main4	2974.972	Q=25	25	641.89	642.75		642.85	0.012633	2.53	10.54	18.6	0.53
Main4	2974.972	Q=50	50	641.89	643.08		643.22	0.012384	3.23	17.3	23.26	0.56
Main4	2974.972	Q=75	75	641.89	643.34		643.51	0.011724	3.64	23.87	27.78	0.57
Main4	2974.972	Q=100	100	641.89	643.56		643.75	0.010836	3.89	30.31	30.55	0.56
Main4	2974.972	Q=125	125	641.89	643.75		643.96	0.010215	4.1	36.38	32.64	0.55
Main4	2974.972	Q=150	150	641.89	643.92	643.51	644.15	0.009625	4.25	42.21	33.89	0.55
Main4	2974.972	Q=175	175	641.89	644.08		644.32	0.00925	4.39	47.66	35.02	0.54
Main4	2974.972	Q=200	200	641.89	644.23	643.74	644.48	0.008922	4.52	52.98	36.08	0.54
Main4	2974.972	Q=250	250	641.89	644.51	643.93	644.78	0.008374	4.75	63.29	38.07	0.53
Main4	2974.972	Q=300	300	641.89	644.76	644.1	645.05	0.00795	4.94	73.04	39.5	0.53
Main4	2974.972	Q=350	350	641.89	644.99	644.26	645.3	0.007623	5.1	82.23	40.56	0.52
Main4	2974.972	Q=400	400	641.89	645.21	644.4	645.54	0.007358	5.26	91.11	41.55	0.52
Main4	2974.972	Q=450	450	641.89	645.41	644.55	645.76	0.007166	5.41	99.57	42.45	0.52
Main4	2974.972	Q=500	500	641.89	645.6	644.69	645.97	0.006959	5.53	107.98	43.24	0.52
Main4	2974.972	Q=600	600	641.89	645.98	644.93	646.37	0.006567	5.75	124.61	44.76	0.51
Main4	3119.75	Q=25	25	643.95	644.86		644.99	0.017252	2.91	8.89	14.87	0.62
Main4	3119.75	Q=50	50	643.95	645.17		645.39	0.018108	3.83	13.97	17.63	0.67
Main4	3119.75	Q=75	75	643.95	645.4		645.69	0.019241	4.52	18.19	19.78	0.72
Main4	3119.75	Q=100	100	643.95	645.56	645.42	645.94	0.021289	5.17	21.56	21.34	0.77
Main4	3119.75	Q=125	125	643.95	645.7	645.6	646.16	0.022987	5.72	24.64	22.68	0.82

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main4	3119.75	Q=150	150	643.95	645.82	645.77	646.35	0.024838	6.25	27.35	23.78	0.86
Main4	3119.75	Q=175	175	643.95	645.93	645.9	646.54	0.026224	6.7	30.01	24.79	0.89
Main4	3119.75	Q=200	200	643.95	646.04	646.04	646.71	0.027024	7.08	32.78	25.98	0.91
Main4	3119.75	Q=250	250	643.95	646.29	646.29	647.02	0.025228	7.46	39.76	28.76	0.9
Main4	3119.75	Q=300	300	643.95	646.51	646.51	647.29	0.024466	7.83	46.17	31.11	0.9
Main4	3119.75	Q=350	350	643.95	646.71	646.71	647.53	0.02334	8.09	52.86	33.47	0.89
Main4	3119.75	Q=400	400	643.95	646.88	646.88	647.75	0.023267	8.43	58.61	35.37	0.9
Main4	3119.75	Q=450	450	643.95	647.05	647.05	647.96	0.022684	8.68	64.97	37.83	0.9
Main4	3119.75	Q=500	500	643.95	647.22	647.22	648.15	0.021873	8.85	71.62	40.22	0.89
Main4	3119.75	Q=600	600	643.95	647.51	647.51	648.5	0.021178	9.25	83.88	44.49	0.89
Main4	3274.45	Q=25	25	647.14	647.92		648.05	0.023001	2.87	8.82	17.93	0.69
Main4	3274.45	Q=50	50	647.14	648.2		648.4	0.021087	3.64	14.39	21.2	0.71
Main4	3274.45	Q=75	75	647.14	648.43		648.68	0.019514	4.13	19.52	23.58	0.71
Main4	3274.45	Q=100	100	647.14	648.64		648.92	0.017651	4.43	24.63	25.28	0.69
Main4	3274.45	Q=125	125	647.14	648.83		649.13	0.016371	4.67	29.47	26.57	0.68
Main4	3274.45	Q=150	150	647.14	649		649.33	0.015277	4.87	34.19	27.64	0.67
Main4	3274.45	Q=175	175	647.14	649.16		649.51	0.014622	5.06	38.59	28.61	0.67
Main4	3274.45	Q=200	200	647.14	649.3		649.68	0.014169	5.25	42.77	29.53	0.67
Main4	3274.45	Q=250	250	647.14	649.51		649.96	0.014775	5.75	49.22	30.94	0.69
Main4	3274.45	Q=300	300	647.14	649.72		650.22	0.015013	6.15	55.58	32.27	0.71
Main4	3274.45	Q=350	350	647.14	649.89		650.45	0.015531	6.56	61.2	33.4	0.73
Main4	3274.45	Q=400	400	647.14	650.06		650.68	0.015595	6.88	67.13	34.55	0.74
Main4	3274.45	Q=450	450	647.14	650.21		650.88	0.015924	7.21	72.4	35.52	0.75
Main4	3274.45	Q=500	500	647.14	650.34		651.08	0.016471	7.55	77.06	36.33	0.77
Main4	3274.45	Q=600	600	647.14	650.59	650.32	651.44	0.017153	8.14	86.4	37.87	0.8
Main4	3341.399	Q=25	25	647.32	648.46	647.94	648.5	0.003013	1.61	17.66	23.54	0.28
Main4	3341.399	Q=50	50	647.32	648.84		648.9	0.003517	2.13	27.26	27.36	0.32
Main4	3341.399	Q=75	75	647.32	649.12		649.2	0.00381	2.5	35.34	30.15	0.34
Main4	3341.399	Q=100	100	647.32	649.35		649.44	0.004051	2.81	42.41	32.22	0.36
Main4	3341.399	Q=125	125	647.32	649.55		649.66	0.004195	3.05	49.06	33.94	0.37
Main4	3341.399	Q=150	150	647.32	649.73		649.86	0.004303	3.27	55.32	35.39	0.38

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main4	3341.399	Q=175	175	647.32	649.89		650.04	0.004385	3.45	61.31	36.76	0.39
Main4	3341.399	Q=200	200	647.32	650.05		650.2	0.004453	3.62	67.12	38.13	0.39
Main4	3341.399	Q=250	250	647.32	650.33		650.51	0.004557	3.92	78.19	40.61	0.41
Main4	3341.399	Q=300	300	647.32	650.58		650.78	0.004631	4.18	88.66	42.76	0.41
Main4	3341.399	Q=350	350	647.32	650.81		651.03	0.004679	4.4	98.7	44.62	0.42
Main4	3341.399	Q=400	400	647.32	651.02		651.26	0.004711	4.6	108.42	46.35	0.43
Main4	3341.399	Q=450	450	647.32	651.22		651.48	0.004735	4.78	117.82	47.93	0.43
Main4	3341.399	Q=500	500	647.32	651.41		651.68	0.00474	4.94	126.92	49.19	0.44
Main4	3341.399	Q=600	600	647.32	651.76		652.06	0.004741	5.22	144.46	51.5	0.44
Main4	3393.547	Q=25	25	647.89	648.56	648.64	648.91	0.089478	4.74	5.27	12.68	1.3
Main4	3393.547	Q=50	50	647.89	649.1	648.93	649.31	0.021064	3.71	13.7	17.85	0.71
Main4	3393.547	Q=75	75	647.89	649.36	649.15	649.63	0.018487	4.16	18.7	19.8	0.69
Main4	3393.547	Q=100	100	647.89	649.58	649.34	649.89	0.017557	4.56	23.14	21.38	0.7
Main4	3393.547	Q=125	125	647.89	649.77	649.51	650.12	0.017041	4.9	27.27	22.75	0.7
Main4	3393.547	Q=150	150	647.89	649.93	649.67	650.33	0.016696	5.2	31.16	23.79	0.71
Main4	3393.547	Q=175	175	647.89	650.09	649.82	650.52	0.016412	5.47	34.87	24.6	0.71
Main4	3393.547	Q=200	200	647.89	650.23	649.95	650.7	0.016181	5.71	38.42	25.29	0.71
Main4	3393.547	Q=250	250	647.89	650.48	650.19	651.02	0.016022	6.15	45	26.53	0.72
Main4	3393.547	Q=300	300	647.89	650.71	650.4	651.31	0.016011	6.56	51.09	27.62	0.74
Main4	3393.547	Q=350	350	647.89	650.91	650.6	651.57	0.016094	6.93	56.79	28.61	0.75
Main4	3393.547	Q=400	400	647.89	651.1	650.78	651.82	0.016202	7.27	62.21	29.53	0.76
Main4	3393.547	Q=450	450	647.89	651.27	650.97	652.05	0.016386	7.6	67.37	30.5	0.77
Main4	3393.547	Q=500	500	647.89	651.43	651.12	652.27	0.016608	7.92	72.27	31.39	0.78
Main4	3393.547	Q=600	600	647.89	651.72	651.45	652.68	0.016968	8.49	81.72	33.04	0.8
T5	3542.895	Q=25	25	658.11	659.01	659.09	659.43	0.0701	5.23	4.9	9.51	1.21
T5	3542.895	Q=50	50	658.11	659.28	659.47	659.98	0.072423	6.88	7.69	10.94	1.31
T5	3542.895	Q=75	75	658.11	659.53	659.76	660.38	0.063945	7.67	10.6	12.26	1.28
T5	3542.895	Q=100	100	658.11	659.74	660.01	660.72	0.058864	8.28	13.35	13.39	1.27
T5	3542.895	Q=125	125	658.11	659.92	660.23	661.02	0.05676	8.85	15.83	14.33	1.27
T5	3542.895	Q=150	150	658.11	660.09	660.42	661.28	0.054754	9.32	18.27	15.2	1.27
T5	3542.895	Q=175	175	658.11	660.23	660.59	661.53	0.053752	9.77	20.55	15.97	1.28

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T5	3542.895	Q=200	200	658.11	660.37	660.74	661.75	0.052932	10.16	22.71	16.5	1.28
T5	3542.895	Q=250	250	658.11	660.61	661.04	662.16	0.052035	10.88	26.75	17.32	1.3
T5	3542.895	Q=300	300	658.11	660.81	661.3	662.55	0.052248	11.58	30.38	18.03	1.32
T5	3542.895	Q=350	350	658.11	661.01	661.56	662.89	0.051308	12.11	34.1	18.73	1.33
T5	3542.895	Q=400	400	658.11	661.2	661.77	663.21	0.050518	12.6	37.7	19.38	1.33
T5	3542.895	Q=450	450	658.11	661.38	661.99	663.52	0.049943	13.05	41.17	19.99	1.34
T5	3542.895	Q=500	500	658.11	661.54	662.18	663.81	0.049914	13.51	44.39	20.53	1.35
T5	3542.895	Q=600	600	658.11	661.85	662.58	664.33	0.048674	14.23	51.04	21.62	1.35
T5	3618.083	Q=25	25	662.17	663.1	663.1	663.39	0.040824	4.46	5.95	10.7	0.95
T5	3618.083	Q=50	50	662.17	663.43	663.46	663.87	0.038447	5.62	9.83	12.93	0.98
T5	3618.083	Q=75	75	662.17	663.64	663.74	664.25	0.04189	6.66	12.72	14.37	1.06
T5	3618.083	Q=100	100	662.17	663.81	663.98	664.57	0.044736	7.51	15.28	15.54	1.12
T5	3618.083	Q=125	125	662.17	663.97	664.17	664.85	0.045677	8.15	17.81	16.54	1.15
T5	3618.083	Q=150	150	662.17	664.1	664.34	665.1	0.046941	8.73	20.08	17.2	1.18
T5	3618.083	Q=175	175	662.17	664.23	664.51	665.33	0.04734	9.21	22.34	17.83	1.2
T5	3618.083	Q=200	200	662.17	664.35	664.65	665.54	0.047737	9.64	24.5	18.41	1.22
T5	3618.083	Q=250	250	662.17	664.57	664.93	665.93	0.048192	10.41	28.64	19.48	1.25
T5	3618.083	Q=300	300	662.17	664.79	665.18	666.26	0.046503	10.91	33.06	20.57	1.25
T5	3618.083	Q=350	350	662.17	664.97	665.41	666.58	0.046842	11.5	36.85	21.45	1.27
T5	3618.083	Q=400	400	662.17	665.14	665.62	666.88	0.04704	12.02	40.52	22.27	1.28
T5	3618.083	Q=450	450	662.17	665.3	665.8	667.16	0.046915	12.47	44.17	23.06	1.29
T5	3618.083	Q=500	500	662.17	665.47	666	667.4	0.045439	12.76	48.21	23.85	1.29
T5	3618.083	Q=600	600	662.17	665.74	666.36	667.88	0.045729	13.55	54.9	25.12	1.31
T5	3706.806	Q=25	25	665.9	666.72	666.68	666.94	0.039023	3.76	6.8	13.5	0.9
T5	3706.806	Q=50	50	665.9	666.98	666.98	667.34	0.039887	4.9	10.68	15.78	0.96
T5	3706.806	Q=75	75	665.9	667.22	667.22	667.66	0.035309	5.48	14.66	17.75	0.95
T5	3706.806	Q=100	100	665.9	667.43	667.43	667.93	0.032135	5.9	18.48	19.32	0.93
T5	3706.806	Q=125	125	665.9	667.6	667.6	668.16	0.030778	6.29	21.92	20.55	0.93
T5	3706.806	Q=150	150	665.9	667.76	667.76	668.37	0.029282	6.6	25.36	21.71	0.93
T5	3706.806	Q=175	175	665.9	667.91	667.91	668.56	0.028444	6.9	28.57	22.68	0.93
T5	3706.806	Q=200	200	665.9	668.04	668.04	668.74	0.027781	7.16	31.66	23.51	0.93

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T5	3706.806	Q=250	250	665.9	668.29	668.29	669.06	0.026321	7.59	37.8	25.09	0.92
T5	3706.806	Q=300	300	665.9	668.49	668.49	669.36	0.026514	8.1	42.98	26.44	0.94
T5	3706.806	Q=350	350	665.9	668.71	668.71	669.63	0.025399	8.41	48.9	28.19	0.93
T5	3706.806	Q=400	400	665.9	668.91	668.91	669.87	0.024416	8.68	54.77	29.83	0.93
T5	3706.806	Q=450	450	665.9	669.1	669.1	670.1	0.023673	8.94	60.5	31.42	0.92
T5	3706.806	Q=500	500	665.9	669.24	669.24	670.32	0.024101	9.31	65.07	32.74	0.94
T5	3706.806	Q=600	600	665.9	669.6	669.6	670.72	0.022456	9.66	77.42	37.21	0.92
T4	113.4469	Q=25	25	651.98	652.57	652.68	652.98	0.102254	5.17	4.9	12.17	1.39
T4	113.4469	Q=50	50	651.98	652.74	652.99	653.54	0.130041	7.22	7.13	13.95	1.66
T4	113.4469	Q=75	75	651.98	652.88	653.23	654	0.140362	8.62	9.14	15.37	1.78
T4	113.4469	Q=100	100	651.98	653	653.43	654.38	0.144334	9.67	11.04	16.6	1.85
T4	113.4469	Q=125	125	651.98	653.1	653.6	654.73	0.147602	10.56	12.81	17.66	1.91
T4	113.4469	Q=150	150	651.98	653.2	653.76	655.01	0.145388	11.21	14.65	18.71	1.93
T4	113.4469	Q=175	175	651.98	653.29	653.89	655.29	0.145622	11.84	16.35	19.62	1.96
T4	113.4469	Q=200	200	651.98	653.38	654.02	655.53	0.143987	12.36	18.05	20.39	1.97
T4	113.4469	Q=250	250	651.98	653.53	654.24	655.97	0.142554	13.3	21.28	21.93	2
T4	113.4469	Q=300	300	651.98	653.67	654.62	656.36	0.140222	14.06	24.44	23.35	2.01
T4	113.4469	Q=350	350	651.98	653.81	654.77	656.67	0.135755	14.65	27.68	24.72	2.01
T4	113.4469	Q=400	400	651.98	653.93	654.93	656.97	0.132788	15.19	30.79	25.96	2.01
T4	113.4469	Q=450	450	651.98	654.05	655.07	657.25	0.129968	15.7	33.97	27.72	2.01
T4	113.4469	Q=500	500	651.98	654.15	655.17	657.52	0.128176	16.18	37.06	29.45	2.02
T4	113.4469	Q=600	600	651.98	654.4	655.39	658	0.12055	16.93	45.15	40.43	1.99
T4	192.0233	Q=25	25	657.33	657.98	657.98	658.22	0.046491	3.93	6.55	14.56	0.97
T4	192.0233	Q=50	50	657.33	658.27	658.27	658.61	0.037847	4.79	11.15	17.2	0.94
T4	192.0233	Q=75	75	657.33	658.49	658.49	658.91	0.03437	5.38	15.22	19.12	0.94
T4	192.0233	Q=100	100	657.33	658.68	658.68	659.16	0.032267	5.83	18.98	20.61	0.93
T4	192.0233	Q=125	125	657.33	658.85	658.85	659.38	0.030572	6.19	22.6	21.89	0.93
T4	192.0233	Q=150	150	657.33	659	659	659.58	0.029824	6.55	25.9	23	0.93
T4	192.0233	Q=175	175	657.33	659.14	659.14	659.77	0.028791	6.82	29.24	24.06	0.93
T4	192.0233	Q=200	200	657.33	659.27	659.27	659.94	0.028163	7.09	32.39	25.03	0.93
T4	192.0233	Q=250	250	657.33	659.51	659.51	660.25	0.026802	7.52	38.65	26.83	0.93

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T4	192.0233	Q=300	300	657.33	659.73	659.73	660.53	0.025812	7.89	44.59	28.29	0.92
T4	192.0233	Q=350	350	657.33	659.92	659.92	660.78	0.025418	8.26	50.03	29.5	0.93
T4	192.0233	Q=400	400	657.33	660.09	660.09	661.02	0.025007	8.58	55.33	30.62	0.93
T4	192.0233	Q=450	450	657.33	660.26	660.26	661.24	0.024546	8.86	60.59	31.68	0.93
T4	192.0233	Q=500	500	657.33	660.42	660.42	661.45	0.024064	9.11	65.8	32.71	0.93
T4	192.0233	Q=600	600	657.33	660.71	660.71	661.83	0.023661	9.61	75.46	34.52	0.94
T4	313.2001	Q=25	25	657.36	658.81	658.09	658.84	0.001778	1.47	20.35	21.99	0.22
T4	313.2001	Q=50	50	657.36	659.26	658.38	659.31	0.00213	1.95	31.13	25.51	0.26
T4	313.2001	Q=75	75	657.36	659.59	658.59	659.65	0.002383	2.31	39.93	28.03	0.28
T4	313.2001	Q=100	100	657.36	659.87	658.78	659.95	0.002538	2.59	48.08	30.35	0.29
T4	313.2001	Q=125	125	657.36	660.1	658.93	660.19	0.002696	2.84	55.33	32.28	0.31
T4	313.2001	Q=150	150	657.36	660.32	659.08	660.42	0.00278	3.03	62.52	34.1	0.32
T4	313.2001	Q=175	175	657.36	660.51	659.21	660.62	0.002879	3.22	69.14	35.73	0.33
T4	313.2001	Q=200	200	657.36	660.69	659.33	660.81	0.002959	3.39	75.53	37.23	0.33
T4	313.2001	Q=250	250	657.36	661	659.55	661.14	0.00312	3.71	87.73	40.47	0.35
T4	313.2001	Q=300	300	657.36	661.28	659.76	661.44	0.003241	3.97	99.56	43.65	0.36
T4	313.2001	Q=350	350	657.36	661.54	659.95	661.71	0.003317	4.2	110.97	46.27	0.37
T4	313.2001	Q=400	400	657.36	661.77	660.13	661.96	0.003383	4.4	121.93	48.63	0.37
T4	313.2001	Q=450	450	657.36	661.98	660.29	662.19	0.003417	4.56	132.55	50.47	0.38
T4	313.2001	Q=500	500	657.36	662.18	660.45	662.4	0.003446	4.72	142.81	52.1	0.38
T4	313.2001	Q=600	600	657.36	662.55	660.74	662.79	0.003477	4.98	162.8	55.1	0.39
T4	466.3508	Q=25	25	659.83	660.6	660.6	660.87	0.050201	4.17	6	11.64	1.01
T4	466.3508	Q=50	50	659.83	660.93	660.93	661.32	0.0386	5.05	10.2	13.73	0.96
T4	466.3508	Q=75	75	659.83	661.19	661.19	661.67	0.034433	5.68	13.95	15.35	0.95
T4	466.3508	Q=100	100	659.83	661.41	661.41	661.96	0.031722	6.15	17.51	16.75	0.93
T4	466.3508	Q=125	125	659.83	661.61	661.61	662.22	0.029732	6.53	20.96	18	0.93
T4	466.3508	Q=150	150	659.83	661.78	661.78	662.45	0.028379	6.86	24.26	19.1	0.92
T4	466.3508	Q=175	175	659.83	661.95	661.95	662.66	0.027126	7.13	27.52	20.12	0.91
T4	466.3508	Q=200	200	659.83	662.1	662.1	662.86	0.026431	7.4	30.56	20.93	0.91
T4	466.3508	Q=250	250	659.83	662.37	662.37	663.21	0.025399	7.88	36.37	22.38	0.92
T4	466.3508	Q=300	300	659.83	662.61	662.61	663.52	0.02472	8.3	41.88	23.67	0.92

Hutchinson - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T4	466.3508	Q=350	350	659.83	662.83	662.83	663.81	0.024062	8.66	47.28	24.86	0.92
T4	466.3508	Q=400	400	659.83	663.03	663.03	664.08	0.02361	9	52.47	26.02	0.92
T4	466.3508	Q=450	450	659.83	663.23	663.23	664.33	0.02309	9.29	57.69	27.18	0.92
T4	466.3508	Q=500	500	659.83	663.43	663.43	664.57	0.022225	9.49	63.23	28.36	0.91
T4	466.3508	Q=600	600	659.83	663.78	663.78	665	0.021307	9.93	73.51	30.44	0.91

MacArthur - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
MacArthur	42.173	Q=25	25	593.26	593.77	593.81	594.01	0.065383	4.13	6.67	20.47	1.12
MacArthur	42.173	Q=50	50	593.26	593.93	594.04	594.34	0.076584	5.53	10.26	24.09	1.27
MacArthur	42.173	Q=75	75	593.26	594.05	594.21	594.6	0.082929	6.52	13.3	26.73	1.37
MacArthur	42.173	Q=100	100	593.26	594.15	594.36	594.83	0.087594	7.3	16.01	28.66	1.44
MacArthur	42.173	Q=125	125	593.26	594.23	594.48	595.03	0.091335	7.97	18.48	30.18	1.49
MacArthur	42.173	Q=150	150	593.26	594.31	594.59	595.21	0.094334	8.55	20.8	31.55	1.54
MacArthur	42.173	Q=175	175	593.26	594.37	594.69	595.39	0.096712	9.06	23.02	32.79	1.57
MacArthur	42.173	Q=200	200	593.26	594.44	594.79	595.55	0.098765	9.53	25.12	33.88	1.61
MacArthur	42.173	Q=250	250	593.26	594.55	594.97	595.84	0.10187	10.35	29.13	35.82	1.66
MacArthur	42.173	Q=300	300	593.26	594.66	595.12	596.11	0.104236	11.05	32.92	37.57	1.7
MacArthur	42.173	Q=350	350	593.26	594.75	595.2	596.35	0.106292	11.69	36.54	39.26	1.74
MacArthur	42.173	Q=400	400	593.26	594.84	595.2	596.59	0.108347	12.29	40.04	41.01	1.77
MacArthur	42.173	Q=450	450	593.26	594.92	595.2	596.8	0.109972	12.82	43.43	42.61	1.8
MacArthur	42.173	Q=500	500	593.26	594.99	595.2	597.01	0.111644	13.33	46.72	44.17	1.83
MacArthur	42.173	Q=600	600	593.26	595.14	595.21	597.4	0.114807	14.29	53.37	48.25	1.88
MacArthur	106.4246	Q=25	25	599.06	599.63	599.8	600.19	0.149575	6.08	4.19	11.43	1.67
MacArthur	106.4246	Q=50	50	599.06	599.85	600.11	600.69	0.126746	7.5	7.04	13.55	1.66
MacArthur	106.4246	Q=75	75	599.06	600.02	600.35	601.08	0.119099	8.53	9.49	14.93	1.67
MacArthur	106.4246	Q=100	100	599.06	600.17	600.57	601.42	0.115271	9.35	11.71	16.08	1.69
MacArthur	106.4246	Q=125	125	599.06	600.29	600.74	601.71	0.11302	10.06	13.78	17.09	1.71
MacArthur	106.4246	Q=150	150	599.06	600.4	600.9	601.98	0.111461	10.67	15.75	17.99	1.72
MacArthur	106.4246	Q=175	175	599.06	600.51	601.04	602.23	0.110802	11.23	17.61	18.8	1.74
MacArthur	106.4246	Q=200	200	599.06	600.6	601.18	602.47	0.110491	11.74	19.37	19.43	1.76
MacArthur	106.4246	Q=250	250	599.06	600.76	601.43	602.9	0.110781	12.67	22.66	20.52	1.8
MacArthur	106.4246	Q=300	300	599.06	600.91	601.64	603.31	0.11171	13.51	25.69	21.41	1.83
MacArthur	106.4246	Q=350	350	599.06	601.04	601.85	603.68	0.112849	14.27	28.54	22.2	1.86
MacArthur	106.4246	Q=400	400	599.06	601.16	602.05	604.04	0.114004	14.97	31.26	22.93	1.89
MacArthur	106.4246	Q=450	450	599.06	601.27	602.22	604.38	0.11524	15.62	33.86	23.61	1.92
MacArthur	106.4246	Q=500	500	599.06	601.37	602.39	604.71	0.116468	16.23	36.36	24.24	1.95
MacArthur	106.4246	Q=600	600	599.06	601.57	602.71	605.33	0.118833	17.35	41.11	25.39	1.99
MacArthur	150.1035	Q=25	25	604.53	605.19	605.34	605.7	0.107465	5.89	4.5	10.93	1.47

MacArthur - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
MacArthur	150.1035	Q=50	50	604.53	605.38	605.68	606.31	0.129413	8.04	6.79	12.65	1.7
MacArthur	150.1035	Q=75	75	604.53	605.53	605.92	606.81	0.14207	9.57	8.73	13.94	1.84
MacArthur	150.1035	Q=100	100	604.53	605.65	606.13	607.25	0.151514	10.8	10.46	15.01	1.94
MacArthur	150.1035	Q=125	125	604.53	605.75	606.31	607.64	0.158272	11.83	12.08	15.92	2.02
MacArthur	150.1035	Q=150	150	604.53	605.84	606.47	608.01	0.164949	12.75	13.53	16.49	2.09
MacArthur	150.1035	Q=175	175	604.53	605.93	606.62	608.35	0.169773	13.54	14.93	16.99	2.15
MacArthur	150.1035	Q=200	200	604.53	606	606.76	608.67	0.174215	14.28	16.24	17.45	2.2
MacArthur	150.1035	Q=250	250	604.53	606.14	607.02	609.27	0.1808	15.57	18.76	18.3	2.27
MacArthur	150.1035	Q=300	300	604.53	606.27	607.25	609.81	0.185126	16.67	21.16	19.08	2.33
MacArthur	150.1035	Q=350	350	604.53	606.39	607.46	610.31	0.188398	17.64	23.45	19.8	2.38
MacArthur	150.1035	Q=400	400	604.53	606.5	607.65	610.78	0.191215	18.52	25.65	20.46	2.43
MacArthur	150.1035	Q=450	450	604.53	606.6	607.83	611.22	0.193196	19.32	27.79	21.08	2.46
MacArthur	150.1035	Q=500	500	604.53	606.7	608.02	611.63	0.194621	20.05	29.89	21.67	2.49
MacArthur	150.1035	Q=600	600	604.53	606.88	608.33	612.4	0.196555	21.34	33.94	22.78	2.54
MacArthur	171.3999	Q=25	25	608.14	608.7	609.03	609.97	0.420541	9.05	2.79	8.77	2.72
MacArthur	171.3999	Q=50	50	608.14	608.91	609.38	610.71	0.322977	10.9	4.78	10.16	2.58
MacArthur	171.3999	Q=75	75	608.14	609.07	609.66	611.31	0.29292	12.3	6.49	11.22	2.57
MacArthur	171.3999	Q=100	100	608.14	609.21	609.89	611.81	0.275807	13.4	8.08	12.12	2.56
MacArthur	171.3999	Q=125	125	608.14	609.32	610.08	612.28	0.267129	14.37	9.54	12.89	2.58
MacArthur	171.3999	Q=150	150	608.14	609.43	610.25	612.67	0.258014	15.16	10.97	13.6	2.58
MacArthur	171.3999	Q=175	175	608.14	609.53	610.42	613.03	0.24981	15.84	12.38	14.27	2.57
MacArthur	171.3999	Q=200	200	608.14	609.63	610.57	613.35	0.242747	16.44	13.75	14.89	2.57
MacArthur	171.3999	Q=250	250	608.14	609.8	610.84	613.89	0.229558	17.41	16.44	15.95	2.55
MacArthur	171.3999	Q=300	300	608.14	609.96	611.1	614.38	0.219762	18.24	18.98	16.68	2.54
MacArthur	171.3999	Q=350	350	608.14	610.1	611.33	614.8	0.210515	18.93	21.48	17.34	2.52
MacArthur	171.3999	Q=400	400	608.14	610.24	611.55	615.18	0.201819	19.52	23.96	17.98	2.5
MacArthur	171.3999	Q=450	450	608.14	610.38	611.76	615.53	0.194525	20.05	26.38	18.59	2.49
MacArthur	171.3999	Q=500	500	608.14	610.5	611.93	615.86	0.187995	20.52	28.77	19.16	2.47
MacArthur	171.3999	Q=600	600	608.14	610.74	612.27	616.46	0.177716	21.39	33.42	20.24	2.44
MacArthur	222.8917	Q=25	25	615.94	616.7	616.78	617.08	0.066787	5.14	5.23	11.13	1.19
MacArthur	222.8917	Q=50	50	615.94	616.95	617.12	617.58	0.070811	6.71	8.27	13.1	1.3

MacArthur - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
MacArthur	222.8917	Q=75	75	615.94	617.15	617.38	617.95	0.070116	7.7	10.97	14.22	1.34
MacArthur	222.8917	Q=100	100	615.94	617.32	617.59	618.27	0.068739	8.44	13.47	15.15	1.36
MacArthur	222.8917	Q=125	125	615.94	617.48	617.79	618.54	0.066346	9	15.93	16.01	1.36
MacArthur	222.8917	Q=150	150	615.94	617.62	617.96	618.79	0.064778	9.5	18.25	16.78	1.37
MacArthur	222.8917	Q=175	175	615.94	617.75	618.11	619.02	0.063536	9.95	20.48	17.49	1.37
MacArthur	222.8917	Q=200	200	615.94	617.87	618.26	619.23	0.062431	10.34	22.63	18.12	1.38
MacArthur	222.8917	Q=250	250	615.94	618.09	618.53	619.62	0.060991	11.05	26.68	19.09	1.39
MacArthur	222.8917	Q=300	300	615.94	618.29	618.77	619.97	0.059745	11.66	30.56	19.97	1.4
MacArthur	222.8917	Q=350	350	615.94	618.46	619	620.29	0.059164	12.23	34.19	20.77	1.41
MacArthur	222.8917	Q=400	400	615.94	618.62	619.2	620.6	0.059147	12.78	37.53	21.37	1.42
MacArthur	222.8917	Q=450	450	615.94	618.77	619.41	620.89	0.05912	13.27	40.76	21.92	1.44
MacArthur	222.8917	Q=500	500	615.94	618.91	619.59	621.17	0.059347	13.76	43.82	22.44	1.45
MacArthur	222.8917	Q=600	600	615.94	619.17	619.93	621.7	0.059489	14.61	49.77	23.4	1.47
MacArthur	284.8037	Q=25	25	620.46	621.13	621.2	621.49	0.076614	5.03	5.28	12.11	1.24
MacArthur	284.8037	Q=50	50	620.46	621.38	621.52	621.94	0.070401	6.31	8.57	13.72	1.27
MacArthur	284.8037	Q=75	75	620.46	621.57	621.76	622.3	0.07092	7.33	11.24	14.91	1.33
MacArthur	284.8037	Q=100	100	620.46	621.72	621.98	622.63	0.07269	8.2	13.58	15.87	1.38
MacArthur	284.8037	Q=125	125	620.46	621.84	622.17	622.92	0.076253	9.01	15.58	16.66	1.43
MacArthur	284.8037	Q=150	150	620.46	621.96	622.33	623.2	0.078567	9.7	17.51	17.38	1.48
MacArthur	284.8037	Q=175	175	620.46	622.06	622.49	623.45	0.080666	10.33	19.33	18.03	1.52
MacArthur	284.8037	Q=200	200	620.46	622.15	622.62	623.69	0.082851	10.91	21.04	18.62	1.55
MacArthur	284.8037	Q=250	250	620.46	622.32	622.88	624.13	0.086228	11.93	24.25	19.47	1.61
MacArthur	284.8037	Q=300	300	620.46	622.47	623.11	624.55	0.089912	12.87	27.13	20.14	1.67
MacArthur	284.8037	Q=350	350	620.46	622.6	623.32	624.94	0.092435	13.67	29.87	20.66	1.71
MacArthur	284.8037	Q=400	400	620.46	622.73	623.53	625.29	0.093577	14.36	32.6	21.17	1.74
MacArthur	284.8037	Q=450	450	620.46	622.85	623.71	625.64	0.094934	15.01	35.19	21.64	1.77
MacArthur	284.8037	Q=500	500	620.46	622.97	623.91	625.95	0.095335	15.57	37.79	22.11	1.79
MacArthur	284.8037	Q=600	600	620.46	623.18	624.25	626.57	0.097549	16.68	42.55	22.93	1.84
MacArthur	342.5417	Q=25	25	624.41	625.28	625.38	625.71	0.071104	5.31	4.87	9.41	1.22
MacArthur	342.5417	Q=50	50	624.41	625.53	625.75	626.29	0.081213	7.19	7.39	10.74	1.38
MacArthur	342.5417	Q=75	75	624.41	625.73	626.04	626.76	0.083474	8.41	9.67	11.82	1.45

MacArthur - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
MacArthur	342.5417	Q=100	100	624.41	625.91	626.29	627.14	0.083316	9.32	11.82	12.75	1.49
MacArthur	342.5417	Q=125	125	624.41	626.07	626.5	627.46	0.080452	9.98	14.01	13.64	1.5
MacArthur	342.5417	Q=150	150	624.41	626.22	626.7	627.75	0.078928	10.56	16.05	14.38	1.51
MacArthur	342.5417	Q=175	175	624.41	626.35	626.87	628.02	0.077493	11.07	18.01	14.98	1.51
MacArthur	342.5417	Q=200	200	624.41	626.48	627.03	628.26	0.075909	11.51	19.94	15.55	1.52
MacArthur	342.5417	Q=250	250	624.41	626.71	627.33	628.7	0.073491	12.28	23.65	16.55	1.52
MacArthur	342.5417	Q=300	300	624.41	626.93	627.59	629.07	0.070417	12.86	27.34	17.41	1.52
MacArthur	342.5417	Q=350	350	624.41	627.13	627.85	629.42	0.067786	13.37	30.94	18.21	1.51
MacArthur	342.5417	Q=400	400	624.41	627.32	628.07	629.74	0.065789	13.84	34.41	18.94	1.51
MacArthur	342.5417	Q=450	450	624.41	627.5	628.29	630.02	0.063412	14.21	37.95	19.67	1.49
MacArthur	342.5417	Q=500	500	624.41	627.66	628.48	630.31	0.062227	14.62	41.22	20.31	1.49
MacArthur	342.5417	Q=600	600	624.41	628.03	628.87	630.74	0.055671	14.95	48.97	21.76	1.44
MacArthur	404.1473	Q=25	25	628.08	628.85	628.85	629.11	0.043911	4.14	6.25	12.59	0.96
MacArthur	404.1473	Q=50	50	628.08	629.17	629.17	629.54	0.036294	5.04	10.69	15.13	0.94
MacArthur	404.1473	Q=75	75	628.08	629.42	629.42	629.87	0.03298	5.65	14.63	16.76	0.93
MacArthur	404.1473	Q=100	100	628.08	629.62	629.62	630.14	0.030913	6.12	18.26	17.96	0.93
MacArthur	404.1473	Q=125	125	628.08	629.8	629.8	630.39	0.030147	6.56	21.52	18.97	0.93
MacArthur	404.1473	Q=150	150	628.08	629.97	629.97	630.61	0.029085	6.9	24.76	19.93	0.93
MacArthur	404.1473	Q=175	175	628.08	630.12	630.12	630.81	0.028376	7.22	27.84	20.8	0.94
MacArthur	404.1473	Q=200	200	628.08	630.26	630.26	631	0.027824	7.5	30.81	21.61	0.94
MacArthur	404.1473	Q=250	250	628.08	630.53	630.53	631.34	0.026406	7.95	36.76	23.05	0.93
MacArthur	404.1473	Q=300	300	628.08	630.75	630.75	631.65	0.025784	8.38	42.16	24.14	0.94
MacArthur	404.1473	Q=350	350	628.08	630.97	630.97	631.93	0.025247	8.75	47.36	25.11	0.94
MacArthur	404.1473	Q=400	400	628.08	631.17	631.17	632.19	0.024616	9.07	52.53	26.04	0.94
MacArthur	404.1473	Q=450	450	628.08	631.35	631.35	632.43	0.02443	9.41	57.26	26.87	0.95
MacArthur	404.1473	Q=500	500	628.08	631.54	631.54	632.67	0.023676	9.63	62.42	27.74	0.94
MacArthur	404.1473	Q=600	600	628.08	631.77	631.85	633.1	0.025847	10.53	68.91	28.8	0.99
MacArthur	453.7274	Q=25	25	629.79	630.34	630.5	630.87	0.159233	5.84	4.31	12.44	1.7
MacArthur	453.7274	Q=50	50	629.79	630.49	630.8	631.5	0.194545	8.13	6.32	13.88	1.99
MacArthur	453.7274	Q=75	75	629.79	630.63	631.03	631.98	0.194034	9.48	8.28	15.16	2.06
MacArthur	453.7274	Q=100	100	629.79	630.74	631.22	632.37	0.190075	10.48	10.14	16.26	2.1

MacArthur - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
MacArthur	453.7274	Q=125	125	629.79	630.85	631.39	632.71	0.185622	11.28	11.93	17.26	2.12
MacArthur	453.7274	Q=150	150	629.79	630.95	631.54	632.99	0.177148	11.87	13.75	18.12	2.11
MacArthur	453.7274	Q=175	175	629.79	631.04	631.68	633.25	0.172698	12.43	15.43	18.71	2.11
MacArthur	453.7274	Q=200	200	629.79	631.13	631.81	633.5	0.168901	12.93	17.04	19.27	2.12
MacArthur	453.7274	Q=250	250	629.79	631.29	632.05	633.92	0.159864	13.73	20.27	20.33	2.1
MacArthur	453.7274	Q=300	300	629.79	631.44	632.28	634.29	0.152803	14.41	23.35	21.18	2.09
MacArthur	453.7274	Q=350	350	629.79	631.58	632.47	634.63	0.146765	15	26.34	21.95	2.08
MacArthur	453.7274	Q=400	400	629.79	631.71	632.66	634.94	0.141275	15.5	29.28	22.69	2.07
MacArthur	453.7274	Q=450	450	629.79	631.83	632.84	635.25	0.137844	16.01	32.05	23.36	2.07
MacArthur	453.7274	Q=500	500	629.79	631.96	633.01	635.5	0.132195	16.37	35	24.05	2.05
MacArthur	453.7274	Q=600	600	629.79	632.18	633.33	635.99	0.124955	17.1	40.56	25.31	2.03
MacArthur	500.0295	Q=25	25	633.11	633.96	633.96	634.24	0.041084	4.39	6.11	11.47	0.95
MacArthur	500.0295	Q=50	50	633.11	634.31	634.31	634.7	0.033949	5.29	10.58	14.1	0.93
MacArthur	500.0295	Q=75	75	633.11	634.57	634.57	635.04	0.031503	5.93	14.44	15.71	0.93
MacArthur	500.0295	Q=100	100	633.11	634.79	634.79	635.33	0.029948	6.43	18.02	17.05	0.93
MacArthur	500.0295	Q=125	125	633.11	634.99	634.99	635.58	0.028657	6.83	21.44	18.12	0.93
MacArthur	500.0295	Q=150	150	633.11	635.15	635.15	635.81	0.028345	7.22	24.51	19.03	0.94
MacArthur	500.0295	Q=175	175	633.11	635.31	635.31	636.02	0.027623	7.54	27.61	19.91	0.94
MacArthur	500.0295	Q=200	200	633.11	635.46	635.46	636.21	0.026917	7.81	30.67	20.74	0.94
MacArthur	500.0295	Q=250	250	633.11	635.72	635.72	636.56	0.026191	8.32	36.35	22.17	0.94
MacArthur	500.0295	Q=300	300	633.11	635.97	635.97	636.88	0.025507	8.74	41.84	23.41	0.94
MacArthur	500.0295	Q=350	350	633.11	636.19	636.19	637.17	0.024941	9.12	47.13	24.54	0.95
MacArthur	500.0295	Q=400	400	633.11	636.39	636.39	637.43	0.024549	9.46	52.21	25.58	0.95
MacArthur	500.0295	Q=450	450	633.11	636.6	636.6	637.68	0.023699	9.71	57.6	26.64	0.94
MacArthur	500.0295	Q=500	500	633.11	636.76	636.76	637.92	0.023821	10.06	62.08	27.49	0.95
MacArthur	500.0295	Q=600	600	633.11	637.1	637.1	638.35	0.023215	10.56	71.58	29.21	0.95

Scotts - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	14.19694	Q=25	25	584.75	585.23	585.23	585.39	0.044609	3.44	8.23	26.44	0.92
Main2	14.19694	Q=50	50	584.75	585.43	585.43	585.65	0.038701	4.13	14.21	33.01	0.92
Main2	14.19694	Q=75	75	584.75	585.57	585.59	585.85	0.039871	4.77	18.95	38.01	0.96
Main2	14.19694	Q=100	100	584.75	585.67	585.71	586.01	0.042066	5.34	23.22	43.6	1.01
Main2	14.19694	Q=125	125	584.75	585.76	585.84	586.16	0.044771	5.86	27.11	49.13	1.06
Main2	14.19694	Q=150	150	584.75	585.82	585.93	586.28	0.047578	6.31	30.39	51.55	1.1
Main2	14.19694	Q=175	175	584.75	585.88	586	586.39	0.050459	6.74	33.35	53.53	1.14
Main2	14.19694	Q=200	200	584.75	585.93	586.08	586.5	0.053109	7.13	36.14	55.29	1.18
Main2	14.19694	Q=250	250	584.75	586.02	586.21	586.69	0.0578	7.83	41.27	58.09	1.25
Main2	14.19694	Q=300	300	584.75	586.1	586.32	586.87	0.061596	8.44	46.14	60.79	1.31
Main2	14.19694	Q=350	350	584.75	586.17	586.42	587.04	0.064737	8.98	50.77	63.24	1.35
Main2	14.19694	Q=400	400	584.75	586.24	586.51	587.2	0.067352	9.47	55.22	65.49	1.39
Main2	14.19694	Q=450	450	584.75	586.31	586.72	587.34	0.069559	9.91	59.59	67.85	1.42
Main2	14.19694	Q=500	500	584.75	586.37	586.79	587.48	0.071206	10.31	64.08	70.72	1.45
Main2	14.19694	Q=600	600	584.75	586.5	586.91	587.73	0.073927	11.06	73.31	78	1.5
Main2	136.1487	Q=25	25	593.46	594.11	594.21	594.49	0.10005	4.96	5.04	12.3	1.37
Main2	136.1487	Q=50	50	593.46	594.36	594.51	594.9	0.092233	5.9	8.48	15	1.38
Main2	136.1487	Q=75	75	593.46	594.54	594.72	595.22	0.08797	6.6	11.37	16.72	1.4
Main2	136.1487	Q=100	100	593.46	594.68	594.91	595.51	0.084089	7.3	13.79	17.62	1.41
Main2	136.1487	Q=125	125	593.46	594.82	595.08	595.76	0.079269	7.83	16.21	18.48	1.4
Main2	136.1487	Q=150	150	593.46	594.94	595.24	595.99	0.075269	8.27	18.57	19.28	1.39
Main2	136.1487	Q=175	175	593.46	595.06	595.38	596.2	0.07169	8.64	20.89	20.04	1.38
Main2	136.1487	Q=200	200	593.46	595.17	595.52	596.4	0.068919	8.98	23.15	20.75	1.38
Main2	136.1487	Q=250	250	593.46	595.37	595.78	596.75	0.06506	9.59	27.46	22.05	1.37
Main2	136.1487	Q=300	300	593.46	595.55	596	597.08	0.0628	10.15	31.5	23.19	1.37
Main2	136.1487	Q=350	350	593.46	595.71	596.2	597.38	0.061412	10.66	35.33	24.23	1.38
Main2	136.1487	Q=400	400	593.46	595.86	596.38	597.66	0.060583	11.13	38.95	25.05	1.38
Main2	136.1487	Q=450	450	593.46	595.99	596.57	597.93	0.060165	11.58	42.36	25.66	1.39
Main2	136.1487	Q=500	500	593.46	596.12	596.73	598.19	0.060096	12.02	45.58	26.23	1.41
Main2	136.1487	Q=600	600	593.46	596.34	597.06	598.68	0.060507	12.85	51.61	27.26	1.43
Main2	215.235	Q=25	25	599.03	599.87	599.88	600.15	0.053582	4.26	5.87	11.22	1.04

Scotts - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	215.235	Q=50	50	599.03	600.15	600.22	600.6	0.057683	5.37	9.32	13.24	1.13
Main2	215.235	Q=75	75	599.03	600.36	600.46	600.95	0.06042	6.12	12.25	14.75	1.18
Main2	215.235	Q=100	100	599.03	600.52	600.68	601.25	0.062929	6.84	14.64	15.7	1.24
Main2	215.235	Q=125	125	599.03	600.65	600.86	601.53	0.067092	7.54	16.65	16.43	1.3
Main2	215.235	Q=150	150	599.03	600.75	601.02	601.79	0.07152	8.19	18.44	17.06	1.36
Main2	215.235	Q=175	175	599.03	600.84	601.17	602.05	0.075781	8.83	20.01	17.52	1.41
Main2	215.235	Q=200	200	599.03	600.92	601.32	602.3	0.079875	9.45	21.41	17.88	1.46
Main2	215.235	Q=250	250	599.03	601.07	601.59	602.79	0.087408	10.6	24.01	18.53	1.56
Main2	215.235	Q=300	300	599.03	601.19	601.83	603.27	0.094362	11.65	26.37	19.11	1.64
Main2	215.235	Q=350	350	599.03	601.3	602.06	603.73	0.100653	12.61	28.57	19.63	1.72
Main2	215.235	Q=400	400	599.03	601.41	602.27	604.18	0.106469	13.5	30.65	20.1	1.78
Main2	215.235	Q=450	450	599.03	601.51	602.49	604.62	0.111834	14.33	32.63	20.55	1.84
Main2	215.235	Q=500	500	599.03	601.6	602.66	605.05	0.116543	15.11	34.54	20.97	1.9
Main2	215.235	Q=600	600	599.03	601.77	603.01	605.87	0.124932	16.53	38.19	21.75	1.99
Main	369.6301	Q=25	25	611.96	612.79	612.79	613.06	0.047819	4.21	6	11.37	0.99
Main	369.6301	Q=50	50	611.96	613.07	613.12	613.51	0.051056	5.37	9.53	13.52	1.08
Main	369.6301	Q=75	75	611.96	613.29	613.37	613.87	0.049336	6.2	12.56	14.8	1.1
Main	369.6301	Q=100	100	611.96	613.41	613.59	614.2	0.057332	7.24	14.46	15.54	1.22
Main	369.6301	Q=125	125	611.96	613.5	613.79	614.53	0.069389	8.36	15.76	16.02	1.35
Main	369.6301	Q=150	150	611.96	613.61	613.96	614.82	0.071989	9.05	17.62	16.69	1.4
Main	369.6301	Q=175	175	611.96	613.72	614.12	615.07	0.072985	9.62	19.49	17.34	1.43
Main	369.6301	Q=200	200	611.96	613.82	614.27	615.31	0.073257	10.11	21.35	17.96	1.45
Main	369.6301	Q=250	250	611.96	614.02	614.55	615.74	0.073185	10.95	24.92	18.93	1.48
Main	369.6301	Q=300	300	611.96	614.2	614.79	616.11	0.071759	11.61	28.49	19.85	1.49
Main	369.6301	Q=350	350	611.96	614.37	615.02	616.46	0.070883	12.21	31.89	20.7	1.5
Main	369.6301	Q=400	400	611.96	614.54	615.22	616.76	0.068723	12.67	35.42	21.54	1.5
Main	369.6301	Q=450	450	611.96	614.68	615.42	617.05	0.067873	13.14	38.66	22.22	1.5
Main	369.6301	Q=500	500	611.96	614.84	615.61	617.31	0.066004	13.5	42.05	22.82	1.5
Main	369.6301	Q=600	600	611.96	615.11	615.94	617.81	0.063475	14.18	48.49	23.92	1.49
Main	524.9301	Q=25	25	618.99	619.82	619.8	620.07	0.042608	4	6.3	11.76	0.94
Main	524.9301	Q=50	50	618.99	620.12	620.12	620.51	0.040058	5.07	10.16	13.8	0.97

Scotts - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	524.9301	Q=75	75	618.99	620.33	620.38	620.87	0.041311	5.97	13.19	15.1	1.02
Main	524.9301	Q=100	100	618.99	620.56	620.6	621.16	0.03588	6.35	16.85	16.53	0.99
Main	524.9301	Q=125	125	618.99	620.8	620.81	621.41	0.030382	6.53	20.87	17.97	0.93
Main	524.9301	Q=150	150	618.99	620.97	620.98	621.64	0.029191	6.87	24.04	18.89	0.93
Main	524.9301	Q=175	175	618.99	621.12	621.13	621.85	0.02854	7.2	27.01	19.69	0.93
Main	524.9301	Q=200	200	618.99	621.26	621.28	622.05	0.028125	7.51	29.83	20.42	0.94
Main	524.9301	Q=250	250	618.99	621.52	621.55	622.41	0.027635	8.06	35.14	21.61	0.95
Main	524.9301	Q=300	300	618.99	621.74	621.79	622.73	0.027567	8.57	40.01	22.58	0.96
Main	524.9301	Q=350	350	618.99	621.94	622.02	623.02	0.027376	9.01	44.74	23.49	0.97
Main	524.9301	Q=400	400	618.99	622.12	622.22	623.3	0.027717	9.47	48.98	24.27	0.99
Main	524.9301	Q=450	450	618.99	622.3	622.41	623.56	0.027651	9.84	53.31	25.04	1
Main	524.9301	Q=500	500	618.99	622.45	622.62	623.81	0.028068	10.25	57.18	25.71	1.01
Main	524.9301	Q=600	600	618.99	622.74	622.94	624.27	0.02852	10.94	64.75	26.9	1.04
Main	632.7556	Q=25	25	622.61	623.59		623.81	0.028658	3.75	6.82	10.99	0.79
Main	632.7556	Q=50	50	622.61	623.91	623.86	624.28	0.030764	4.99	10.56	12.7	0.88
Main	632.7556	Q=75	75	622.61	624.11	624.14	624.65	0.035836	6.09	13.23	13.79	0.97
Main	632.7556	Q=100	100	622.61	624.28	624.37	624.98	0.039139	6.95	15.67	14.72	1.04
Main	632.7556	Q=125	125	622.61	624.43	624.59	625.27	0.041495	7.67	17.96	15.52	1.09
Main	632.7556	Q=150	150	622.61	624.56	624.77	625.54	0.043734	8.31	20.05	16.17	1.14
Main	632.7556	Q=175	175	622.61	624.69	624.94	625.79	0.045466	8.88	22.03	16.65	1.17
Main	632.7556	Q=200	200	622.61	624.8	625.1	626.02	0.046536	9.37	24	17.1	1.2
Main	632.7556	Q=250	250	622.61	625	625.38	626.45	0.04912	10.3	27.54	17.9	1.25
Main	632.7556	Q=300	300	622.61	625.19	625.65	626.84	0.050518	11.06	31.01	18.64	1.29
Main	632.7556	Q=350	350	622.61	625.36	625.89	627.22	0.052395	11.8	34.15	19.29	1.33
Main	632.7556	Q=400	400	622.61	625.53	626.13	627.55	0.052536	12.36	37.51	19.96	1.34
Main	632.7556	Q=450	450	622.61	625.67	626.34	627.88	0.053995	12.98	40.4	20.52	1.37
Main	632.7556	Q=500	500	622.61	625.83	626.53	628.17	0.053914	13.44	43.58	21.12	1.38
Main	632.7556	Q=600	600	622.61	626.09	626.89	628.74	0.05486	14.37	49.36	22.17	1.42
Main	731.4028	Q=25	25	625.96	626.94	626.92	627.22	0.042167	4.23	5.96	10.08	0.94
Main	731.4028	Q=50	50	625.96	627.28	627.28	627.72	0.038697	5.39	9.57	11.44	0.97
Main	731.4028	Q=75	75	625.96	627.57	627.57	628.12	0.034432	6.06	13.04	12.58	0.96

Scotts - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	731.4028	Q=100	100	625.96	627.82	627.82	628.45	0.031617	6.57	16.32	13.54	0.95
Main	731.4028	Q=125	125	625.96	628.03	628.03	628.75	0.030128	7.02	19.34	14.3	0.94
Main	731.4028	Q=150	150	625.96	628.24	628.24	629.02	0.02871	7.38	22.31	15.01	0.94
Main	731.4028	Q=175	175	625.96	628.42	628.42	629.26	0.0278	7.72	25.13	15.65	0.94
Main	731.4028	Q=200	200	625.96	628.59	628.59	629.49	0.027085	8.02	27.85	16.24	0.94
Main	731.4028	Q=250	250	625.96	628.91	628.91	629.91	0.025674	8.53	33.23	17.36	0.93
Main	731.4028	Q=300	300	625.96	629.2	629.2	630.29	0.024796	8.98	38.31	18.36	0.93
Main	731.4028	Q=350	350	625.96	629.47	629.47	630.63	0.023613	9.32	43.55	19.33	0.93
Main	731.4028	Q=400	400	625.96	629.7	629.7	630.95	0.023473	9.74	48.05	20.12	0.93
Main	731.4028	Q=450	450	625.96	629.95	629.95	631.25	0.022519	10	53.12	20.97	0.92
Main	731.4028	Q=500	500	625.96	630.15	630.15	631.53	0.022315	10.33	57.51	21.62	0.93
Main	731.4028	Q=600	600	625.96	630.57	630.57	632.05	0.021363	10.81	66.67	22.91	0.92
Main	847.8009	Q=25	25	630.27	631.14	631.05	631.34	0.030115	3.58	7.02	11.66	0.8
Main	847.8009	Q=50	50	630.27	631.45	631.38	631.79	0.031607	4.69	10.89	13.59	0.87
Main	847.8009	Q=75	75	630.27	631.54	631.65	632.16	0.051215	6.36	12.13	14.14	1.13
Main	847.8009	Q=100	100	630.27	631.69	631.87	632.49	0.055953	7.29	14.29	15.04	1.2
Main	847.8009	Q=125	125	630.27	631.81	632.08	632.8	0.060429	8.12	16.21	15.8	1.27
Main	847.8009	Q=150	150	630.27	631.93	632.26	633.08	0.062438	8.77	18.18	16.54	1.31
Main	847.8009	Q=175	175	630.27	632.04	632.43	633.34	0.064869	9.39	19.97	17.19	1.36
Main	847.8009	Q=200	200	630.27	632.14	632.58	633.59	0.06666	9.95	21.73	17.8	1.39
Main	847.8009	Q=250	250	630.27	632.33	632.85	634.04	0.068882	10.89	25.16	18.94	1.44
Main	847.8009	Q=300	300	630.27	632.49	633.09	634.46	0.071608	11.76	28.26	19.87	1.49
Main	847.8009	Q=350	350	630.27	632.64	633.32	634.82	0.07232	12.44	31.44	20.7	1.51
Main	847.8009	Q=400	400	630.27	632.79	633.52	635.15	0.072258	13.02	34.57	21.29	1.53
Main	847.8009	Q=450	450	630.27	632.92	633.71	635.48	0.073399	13.62	37.36	21.8	1.56
Main	847.8009	Q=500	500	630.27	633.07	633.92	635.76	0.072075	14.03	40.51	22.36	1.56
Main	847.8009	Q=600	600	630.27	633.31	634.23	636.3	0.071545	14.89	46.21	23.34	1.58
Main	940.9814	Q=25	25	634.35	635.21	635.21	635.48	0.050145	4.2	5.96	11.22	1.01
Main	940.9814	Q=50	50	634.35	635.54	635.54	635.93	0.043146	5.03	10.05	13.32	1
Main	940.9814	Q=75	75	634.35	635.79	635.79	636.28	0.038456	5.68	13.51	14.48	0.98
Main	940.9814	Q=100	100	634.35	636.01	636.01	636.59	0.035088	6.17	16.8	15.49	0.97

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	940.9814	Q=125	125	634.35	636.21	636.21	636.86	0.032306	6.54	20.05	16.42	0.95
Main	940.9814	Q=150	150	634.35	636.39	636.39	637.1	0.030973	6.91	23.02	17.22	0.95
Main	940.9814	Q=175	175	634.35	636.56	636.56	637.32	0.029484	7.2	26.02	18	0.94
Main	940.9814	Q=200	200	634.35	636.72	636.72	637.53	0.028468	7.48	28.88	18.73	0.94
Main	940.9814	Q=250	250	634.35	637	637	637.91	0.026915	7.97	34.47	20.2	0.94
Main	940.9814	Q=300	300	634.35	637.28	637.28	638.25	0.025246	8.32	40.15	21.54	0.92
Main	940.9814	Q=350	350	634.35	637.51	637.51	638.56	0.024392	8.69	45.38	22.63	0.92
Main	940.9814	Q=400	400	634.35	637.73	637.73	638.85	0.023747	9.02	50.43	23.63	0.92
Main	940.9814	Q=450	450	634.35	637.95	637.95	639.12	0.022733	9.26	55.77	24.65	0.91
Main	940.9814	Q=500	500	634.35	638.13	638.13	639.37	0.022655	9.58	60.27	25.47	0.92
Main	940.9814	Q=600	600	634.35	638.5	638.5	639.83	0.021738	10.05	69.87	27.13	0.92
Main	1022.328	Q=25	25	635.98	637.1	636.82	637.21	0.011649	2.77	9.55	13.68	0.53
Main	1022.328	Q=50	50	635.98	637.47	637.16	637.66	0.012396	3.63	15.09	16.05	0.58
Main	1022.328	Q=75	75	635.98	637.74	637.42	638	0.013004	4.26	19.72	17.71	0.61
Main	1022.328	Q=100	100	635.98	637.97	637.64	638.28	0.013408	4.75	23.91	19.05	0.64
Main	1022.328	Q=125	125	635.98	638.17	637.83	638.53	0.013854	5.18	27.71	20.19	0.66
Main	1022.328	Q=150	150	635.98	638.35	638	638.75	0.013989	5.53	31.47	21.25	0.67
Main	1022.328	Q=175	175	635.98	638.52	638.16	638.96	0.014027	5.83	35.14	22.24	0.68
Main	1022.328	Q=200	200	635.98	638.66	638.31	639.15	0.01423	6.12	38.49	23.07	0.69
Main	1022.328	Q=250	250	635.98	638.95	638.59	639.5	0.01419	6.58	45.23	24.53	0.7
Main	1022.328	Q=300	300	635.98	639.19	638.82	639.8	0.014342	7.01	51.37	25.74	0.72
Main	1022.328	Q=350	350	635.98	639.42	639.05	640.09	0.014294	7.36	57.45	26.84	0.73
Main	1022.328	Q=400	400	635.98	639.64	639.24	640.36	0.014212	7.66	63.38	27.87	0.73
Main	1022.328	Q=450	450	635.98	639.83	639.45	640.6	0.014322	7.98	68.82	28.78	0.74
Main	1022.328	Q=500	500	635.98	640.04	639.62	640.84	0.014062	8.2	74.76	29.74	0.74
Main	1022.328	Q=600	600	635.98	640.39	639.94	641.27	0.01399	8.68	85.57	31.53	0.75
T1	89.92623	Q=25	25	613.28	613.65	614.06	615.64	0.82432	11.33	2.21	7.57	3.7
T1	89.92623	Q=50	50	613.28	613.85	614.38	616.48	0.67954	13.02	3.84	9.21	3.55
T1	89.92623	Q=75	75	613.28	614	614.65	617.06	0.607811	14.05	5.34	10.5	3.47
T1	89.92623	Q=100	100	613.28	614.13	614.88	617.46	0.545165	14.64	6.83	11.63	3.36
T1	89.92623	Q=125	125	613.28	614.25	615.08	617.84	0.464089	15.21	8.24	12.24	3.2

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	89.92623	Q=150	150	613.28	614.37	615.26	618.14	0.397754	15.6	9.71	12.81	3.04
T1	89.92623	Q=175	175	613.28	614.48	615.44	618.4	0.349913	15.94	11.17	13.36	2.91
T1	89.92623	Q=200	200	613.28	614.59	615.59	618.62	0.313205	16.22	12.64	13.89	2.8
T1	89.92623	Q=250	250	613.28	614.79	615.89	619.04	0.26282	16.73	15.55	14.88	2.65
T1	89.92623	Q=300	300	613.28	614.98	616.14	619.4	0.23	17.19	18.42	15.79	2.53
T1	89.92623	Q=350	350	613.28	615.15	616.38	619.73	0.206104	17.57	21.26	16.65	2.45
T1	89.92623	Q=400	400	613.28	615.32	616.6	620.03	0.188174	17.93	24.08	17.46	2.38
T1	89.92623	Q=450	450	613.28	615.47	616.8	620.3	0.174192	18.25	26.87	18.22	2.32
T1	89.92623	Q=500	500	613.28	615.62	617.01	620.57	0.163499	18.57	29.6	18.94	2.27
T1	89.92623	Q=600	600	613.28	615.9	617.36	621.05	0.146409	19.1	35	20.12	2.2
T1	110.6536	Q=25	25	617.32	618.1	618.1	618.37	0.047282	4.12	6.13	11.91	0.98
T1	110.6536	Q=50	50	617.32	618.42	618.42	618.81	0.038969	5.04	10.31	14.29	0.96
T1	110.6536	Q=75	75	617.32	618.68	618.68	619.15	0.033738	5.6	14.29	16.21	0.94
T1	110.6536	Q=100	100	617.32	618.9	618.9	619.43	0.031316	6.07	17.94	17.79	0.93
T1	110.6536	Q=125	125	617.32	619.1	619.1	619.68	0.028868	6.4	21.64	19.25	0.91
T1	110.6536	Q=150	150	617.32	619.26	619.26	619.9	0.027888	6.74	24.92	20.22	0.91
T1	110.6536	Q=175	175	617.32	619.42	619.42	620.1	0.027151	7.04	28.06	21.01	0.91
T1	110.6536	Q=200	200	617.32	619.55	619.55	620.28	0.026741	7.33	30.98	21.61	0.92
T1	110.6536	Q=250	250	617.32	619.8	619.8	620.63	0.026023	7.83	36.58	22.72	0.92
T1	110.6536	Q=300	300	617.32	620.03	620.03	620.94	0.025548	8.27	41.85	23.71	0.93
T1	110.6536	Q=350	350	617.32	620.25	620.25	621.22	0.024926	8.64	47.06	24.66	0.93
T1	110.6536	Q=400	400	617.32	620.45	620.45	621.49	0.024476	8.98	52.05	25.53	0.93
T1	110.6536	Q=450	450	617.32	620.63	620.63	621.74	0.024123	9.3	56.88	26.35	0.94
T1	110.6536	Q=500	500	617.32	620.82	620.82	621.97	0.023379	9.53	61.99	27.18	0.93
T1	110.6536	Q=600	600	617.32	621.14	621.14	622.41	0.02312	10.09	70.9	28.61	0.94

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	125.4321	Q=25	25	590.92	591.44	591.44	591.62	0.057101	3.35	7.47	21.7	1.01
Main	125.4321	Q=50	50	590.92	591.65	591.65	591.9	0.051441	3.98	12.56	26.01	1.01
Main	125.4321	Q=75	75	590.92	591.82	591.82	592.12	0.047361	4.37	17.15	28.98	1
Main	125.4321	Q=100	100	590.92	591.96	591.96	592.3	0.045726	4.72	21.2	31.14	1.01
Main	125.4321	Q=125	125	590.92	592.07	592.07	592.46	0.043998	5	24.99	32.65	1.01
Main	125.4321	Q=150	150	590.92	592.18	592.18	592.61	0.042779	5.27	28.44	33.84	1.01
Main	125.4321	Q=175	175	590.92	592.28	592.28	592.75	0.041162	5.5	31.84	34.86	1.01
Main	125.4321	Q=200	200	590.92	592.37	592.37	592.88	0.039859	5.71	35.13	35.83	1
Main	125.4321	Q=250	250	590.92	592.54	592.54	593.11	0.038003	6.07	41.4	37.61	1
Main	125.4321	Q=300	300	590.92	592.69	592.69	593.33	0.035856	6.41	47.24	38.85	0.99
Main	125.4321	Q=350	350	590.92	592.84	592.84	593.53	0.034093	6.71	52.93	40.03	0.99
Main	125.4321	Q=400	400	590.92	592.97	592.97	593.72	0.032852	6.99	58.36	41.13	0.98
Main	125.4321	Q=450	450	590.92	593.11	593.11	593.9	0.031389	7.21	63.94	42.22	0.97
Main	125.4321	Q=500	500	590.92	593.23	593.23	594.07	0.030245	7.42	69.33	43.15	0.97
Main	125.4321	Q=600	600	590.92	593.46	593.46	594.39	0.028837	7.84	79.4	44.75	0.96
Main	299.4641	Q=25	25	593.3	594.21	593.87	594.26	0.006906	1.7	14.71	24.2	0.38
Main	299.4641	Q=50	50	593.3	594.53		594.6	0.007442	2.19	22.82	27.71	0.42
Main	299.4641	Q=75	75	593.3	594.75		594.86	0.007765	2.57	29.38	30.13	0.44
Main	299.4641	Q=100	100	593.3	594.93		595.06	0.008002	2.91	34.99	31.96	0.46
Main	299.4641	Q=125	125	593.3	595.09		595.25	0.008229	3.2	40.14	33.56	0.48
Main	299.4641	Q=150	150	593.3	595.23		595.41	0.008389	3.45	45.03	34.91	0.49
Main	299.4641	Q=175	175	593.3	595.36		595.56	0.008613	3.68	49.5	36.01	0.51
Main	299.4641	Q=200	200	593.3	595.48		595.71	0.008737	3.89	53.92	37.05	0.52
Main	299.4641	Q=250	250	593.3	595.69		595.96	0.009081	4.28	61.95	38.74	0.54
Main	299.4641	Q=300	300	593.3	595.88		596.19	0.009412	4.62	69.31	40.07	0.55
Main	299.4641	Q=350	350	593.3	596.05		596.41	0.009663	4.93	76.34	41.29	0.57
Main	299.4641	Q=400	400	593.3	596.21		596.61	0.00988	5.21	83.06	42.48	0.58
Main	299.4641	Q=450	450	593.3	596.35	595.72	596.79	0.010177	5.49	89.19	43.54	0.6
Main	299.4641	Q=500	500	593.3	596.49	595.86	596.96	0.010451	5.75	95.08	44.53	0.61
Main	299.4641	Q=600	600	593.3	596.75		597.29	0.010741	6.19	106.94	46.47	0.63
Main	541.8721	Q=25	25	595.82	596.45		596.51	0.012943	1.99	12.54	26.02	0.51

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	541.8721	Q=50	50	595.82	596.74		596.83	0.011612	2.45	20.42	28.67	0.51
Main	541.8721	Q=75	75	595.82	596.97		597.08	0.011026	2.75	27.23	30.78	0.52
Main	541.8721	Q=100	100	595.82	597.16		597.3	0.010715	3.01	33.27	32.42	0.52
Main	541.8721	Q=125	125	595.82	597.32		597.48	0.010358	3.25	38.51	33.33	0.53
Main	541.8721	Q=150	150	595.82	597.46		597.65	0.010143	3.48	43.4	34.15	0.53
Main	541.8721	Q=175	175	595.82	597.6		597.81	0.00995	3.67	48.1	34.92	0.53
Main	541.8721	Q=200	200	595.82	597.73		597.95	0.00976	3.85	52.68	35.66	0.54
Main	541.8721	Q=250	250	595.82	597.96		598.23	0.00957	4.17	61.17	36.99	0.54
Main	541.8721	Q=300	300	595.82	598.18		598.48	0.009391	4.45	69.28	38.21	0.55
Main	541.8721	Q=350	350	595.82	598.37		598.71	0.009288	4.7	76.92	39.33	0.55
Main	541.8721	Q=400	400	595.82	598.56		598.92	0.009218	4.94	84.22	40.35	0.56
Main	541.8721	Q=450	450	595.82	598.73		599.13	0.009123	5.15	91.37	41.19	0.56
Main	541.8721	Q=500	500	595.82	598.89		599.32	0.009102	5.35	98.07	41.95	0.57
Main	541.8721	Q=600	600	595.82	599.2		599.68	0.00904	5.71	111.02	43.38	0.57
Main	714.9465	Q=25	25	596.88	597.85	597.45	597.89	0.00536	1.55	16.08	24.99	0.34
Main	714.9465	Q=50	50	596.88	598.17		598.23	0.005942	2.04	24.59	28.33	0.38
Main	714.9465	Q=75	75	596.88	598.4		598.49	0.006166	2.41	31.47	30.31	0.4
Main	714.9465	Q=100	100	596.88	598.59		598.71	0.006345	2.72	37.51	31.89	0.42
Main	714.9465	Q=125	125	596.88	598.76		598.9	0.006571	3	42.92	33.25	0.43
Main	714.9465	Q=150	150	596.88	598.91		599.07	0.006756	3.24	47.94	34.1	0.45
Main	714.9465	Q=175	175	596.88	599.05		599.23	0.006874	3.45	52.76	34.87	0.46
Main	714.9465	Q=200	200	596.88	599.18		599.38	0.007038	3.66	57.19	35.57	0.47
Main	714.9465	Q=250	250	596.88	599.42		599.65	0.007176	4	65.91	36.9	0.48
Main	714.9465	Q=300	300	596.88	599.63		599.91	0.007294	4.3	74.05	38.1	0.49
Main	714.9465	Q=350	350	596.88	599.83		600.14	0.007381	4.57	81.79	39.08	0.5
Main	714.9465	Q=400	400	596.88	600.02		600.36	0.007453	4.81	89.18	40	0.51
Main	714.9465	Q=450	450	596.88	600.2		600.56	0.007527	5.04	96.26	40.91	0.52
Main	714.9465	Q=500	500	596.88	600.36		600.76	0.007581	5.25	103.15	41.78	0.53
Main	714.9465	Q=600	600	596.88	600.67		601.12	0.007668	5.62	116.36	43.4	0.54
Main	890.4772	Q=25	25	599.43	600.01	600.01	600.19	0.057784	3.35	7.46	21.82	1.01
Main	890.4772	Q=50	50	599.43	600.27	600.23	600.47	0.040618	3.64	13.73	27.21	0.9

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	890.4772	Q=75	75	599.43	600.45	600.38	600.69	0.034876	3.96	18.96	29.6	0.87
Main	890.4772	Q=100	100	599.43	600.62	600.52	600.88	0.030871	4.16	24.04	31.76	0.84
Main	890.4772	Q=125	125	599.43	600.75		601.05	0.027911	4.38	28.55	32.9	0.82
Main	890.4772	Q=150	150	599.43	600.88		601.21	0.025734	4.6	32.74	33.68	0.81
Main	890.4772	Q=175	175	599.43	601		601.35	0.024138	4.79	36.76	34.42	0.8
Main	890.4772	Q=200	200	599.43	601.11		601.49	0.023178	4.99	40.49	35.09	0.79
Main	890.4772	Q=250	250	599.43	601.31		601.75	0.021472	5.32	47.8	36.36	0.78
Main	890.4772	Q=300	300	599.43	601.5		601.98	0.020247	5.61	54.77	37.54	0.78
Main	890.4772	Q=350	350	599.43	601.67		602.2	0.019345	5.87	61.44	38.63	0.77
Main	890.4772	Q=400	400	599.43	601.84		602.4	0.018626	6.11	67.89	39.65	0.77
Main	890.4772	Q=450	450	599.43	602		602.6	0.018008	6.32	74.17	40.51	0.76
Main	890.4772	Q=500	500	599.43	602.14		602.78	0.017496	6.52	80.26	41.3	0.76
Main	890.4772	Q=600	600	599.43	602.42		603.13	0.016688	6.87	91.99	42.77	0.76
Main	1073.472	Q=25	25	601.41	602.23	601.86	602.26	0.004619	1.37	18.22	30.6	0.31
Main	1073.472	Q=50	50	601.41	602.52	602.05	602.57	0.005285	1.81	27.67	33.99	0.35
Main	1073.472	Q=75	75	601.41	602.74	602.2	602.81	0.005617	2.12	35.36	36.23	0.38
Main	1073.472	Q=100	100	601.41	602.91	602.33	603	0.005889	2.41	41.6	37.49	0.39
Main	1073.472	Q=125	125	601.41	603.05	602.44	603.17	0.006166	2.67	47.16	38.58	0.41
Main	1073.472	Q=150	150	601.41	603.19	602.55	603.32	0.006404	2.91	52.32	39.57	0.43
Main	1073.472	Q=175	175	601.41	603.31	602.65	603.46	0.006596	3.11	57.21	40.48	0.44
Main	1073.472	Q=200	200	601.41	603.43	602.74	603.59	0.006723	3.3	61.99	41.36	0.45
Main	1073.472	Q=250	250	601.41	603.64	602.9	603.84	0.006961	3.63	70.91	42.93	0.47
Main	1073.472	Q=300	300	601.41	603.83	603.05	604.06	0.007137	3.92	79.27	44.05	0.48
Main	1073.472	Q=350	350	601.41	604.01	603.2	604.27	0.007275	4.18	87.18	45.01	0.49
Main	1073.472	Q=400	400	601.41	604.17	603.34	604.47	0.007387	4.42	94.73	45.9	0.5
Main	1073.472	Q=450	450	601.41	604.33	603.46	604.65	0.007487	4.64	101.96	46.74	0.51
Main	1073.472	Q=500	500	601.41	604.48	603.59	604.83	0.007569	4.84	108.95	47.54	0.52
Main	1073.472	Q=600	600	601.41	604.76	603.83	605.16	0.0077	5.21	122.35	49.03	0.53
Main	1257.84	Q=25	25	604.85	605.41	605.41	605.59	0.056618	3.44	7.27	20.2	1.01
Main	1257.84	Q=50	50	604.85	605.63	605.63	605.9	0.048185	4.16	12.08	23.05	1
Main	1257.84	Q=75	75	604.85	605.8	605.8	606.14	0.044407	4.67	16.24	25.03	0.99

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	1257.84	Q=100	100	604.85	605.96	605.96	606.34	0.041364	5.03	20.22	26.78	0.99
Main	1257.84	Q=125	125	604.85	606.08	606.08	606.53	0.039348	5.38	23.74	27.98	0.98
Main	1257.84	Q=150	150	604.85	606.2	606.2	606.69	0.037227	5.68	27.16	28.95	0.98
Main	1257.84	Q=175	175	604.85	606.32	606.32	606.85	0.035554	5.94	30.46	29.86	0.97
Main	1257.84	Q=200	200	604.85	606.42	606.42	607	0.034217	6.17	33.67	30.71	0.97
Main	1257.84	Q=250	250	604.85	606.62	606.62	607.27	0.032116	6.59	39.86	32.3	0.96
Main	1257.84	Q=300	300	604.85	606.8	606.8	607.51	0.030562	6.94	45.8	33.76	0.95
Main	1257.84	Q=350	350	604.85	606.97	606.97	607.74	0.02922	7.24	51.62	35.12	0.95
Main	1257.84	Q=400	400	604.85	607.13	607.13	607.95	0.027969	7.5	57.36	36.25	0.94
Main	1257.84	Q=450	450	604.85	607.28	607.28	608.14	0.027123	7.75	62.77	37.16	0.94
Main	1257.84	Q=500	500	604.85	607.41	607.41	608.33	0.026812	8.02	67.69	37.96	0.94
Main	1257.84	Q=600	600	604.85	607.66	607.66	608.68	0.02591	8.47	77.55	39.52	0.94
Main	1376.476	Q=25	25	606.24	607.16	606.8	607.19	0.005828	1.46	17.12	31.14	0.35
Main	1376.476	Q=50	50	606.24	607.46	607.01	607.51	0.006148	1.83	27.3	36.8	0.37
Main	1376.476	Q=75	75	606.24	607.67	607.17	607.74	0.006298	2.11	35.56	39.78	0.39
Main	1376.476	Q=100	100	606.24	607.85	607.3	607.94	0.006367	2.34	42.79	41.63	0.4
Main	1376.476	Q=125	125	606.24	608.01	607.42	608.11	0.006387	2.54	49.44	43.01	0.41
Main	1376.476	Q=150	150	606.24	608.15	607.52	608.26	0.00646	2.72	55.55	44.24	0.42
Main	1376.476	Q=175	175	606.24	608.28	607.61	608.41	0.006505	2.87	61.39	45.39	0.43
Main	1376.476	Q=200	200	606.24	608.4	607.7	608.54	0.006541	3.01	66.95	46.43	0.43
Main	1376.476	Q=250	250	606.24	608.61	607.85	608.78	0.006502	3.28	77.04	47.78	0.44
Main	1376.476	Q=300	300	606.24	608.81	608	609	0.006508	3.53	86.38	48.99	0.45
Main	1376.476	Q=350	350	606.24	609	608.13	609.21	0.006411	3.73	95.75	50.18	0.45
Main	1376.476	Q=400	400	606.24	609.16	608.26	609.4	0.006423	3.93	104.24	51.15	0.46
Main	1376.476	Q=450	450	606.24	609.32	608.38	609.58	0.006411	4.11	112.53	52.05	0.47
Main	1376.476	Q=500	500	606.24	609.48	608.49	609.76	0.006359	4.27	120.8	52.93	0.47
Main	1376.476	Q=600	600	606.24	609.77	608.69	610.09	0.006297	4.56	136.44	54.35	0.47
Main	1587.326	Q=25	25	611.39	611.78	611.78	611.93	0.060136	3.09	8.1	27.68	1.01
Main	1587.326	Q=50	50	611.39	611.96	611.96	612.18	0.051347	3.73	13.43	31.25	0.99
Main	1587.326	Q=75	75	611.39	612.11	612.11	612.38	0.046828	4.18	18.05	33.69	0.99
Main	1587.326	Q=100	100	611.39	612.22	612.22	612.55	0.044387	4.6	22	35.11	0.99

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	1587.326	Q=125	125	611.39	612.33	612.33	612.7	0.041257	4.91	25.93	36.39	0.98
Main	1587.326	Q=150	150	611.39	612.43	612.43	612.84	0.039434	5.2	29.58	37.55	0.98
Main	1587.326	Q=175	175	611.39	612.53	612.53	612.97	0.037078	5.41	33.34	38.63	0.96
Main	1587.326	Q=200	200	611.39	612.61	612.61	613.09	0.036054	5.64	36.67	39.31	0.96
Main	1587.326	Q=250	250	611.39	612.77	612.77	613.32	0.034275	6.04	43.09	40.58	0.96
Main	1587.326	Q=300	300	611.39	612.92	612.92	613.53	0.032636	6.37	49.32	41.77	0.96
Main	1587.326	Q=350	350	611.39	613.06	613.06	613.72	0.03169	6.69	55.08	42.77	0.96
Main	1587.326	Q=400	400	611.39	613.19	613.19	613.91	0.030736	6.96	60.73	43.65	0.96
Main	1587.326	Q=450	450	611.39	613.31	613.31	614.08	0.03003	7.22	66.12	44.48	0.96
Main	1587.326	Q=500	500	611.39	613.43	613.43	614.24	0.029438	7.46	71.35	45.26	0.96
Main	1587.326	Q=600	600	611.39	613.64	613.65	614.55	0.029094	7.95	80.83	46.71	0.97
Main	1660.688	Q=25	25	614.02	614.44		614.51	0.022911	2.02	12.4	38.96	0.63
Main	1660.688	Q=50	50	614.02	614.6		614.71	0.024681	2.64	18.97	42.14	0.69
Main	1660.688	Q=75	75	614.02	614.73		614.88	0.025789	3.08	24.37	44.48	0.73
Main	1660.688	Q=100	100	614.02	614.83	614.72	615.02	0.02607	3.46	28.96	45.75	0.76
Main	1660.688	Q=125	125	614.02	614.91	614.8	615.14	0.027289	3.83	32.77	46.75	0.79
Main	1660.688	Q=150	150	614.02	614.99	614.89	615.26	0.027781	4.14	36.52	47.71	0.81
Main	1660.688	Q=175	175	614.02	615.06	614.97	615.37	0.028752	4.45	39.81	48.54	0.84
Main	1660.688	Q=200	200	614.02	615.13	615.04	615.47	0.029004	4.7	43.21	49.38	0.85
Main	1660.688	Q=250	250	614.02	615.26	615.18	615.66	0.029524	5.15	49.55	50.9	0.88
Main	1660.688	Q=300	300	614.02	615.37	615.31	615.84	0.030294	5.57	55.27	52.21	0.9
Main	1660.688	Q=350	350	614.02	615.48	615.43	616.01	0.030371	5.92	61.02	53.27	0.92
Main	1660.688	Q=400	400	614.02	615.58	615.55	616.17	0.030636	6.24	66.34	54.08	0.93
Main	1660.688	Q=450	450	614.02	615.67	615.65	616.31	0.030863	6.54	71.44	54.85	0.94
Main	1660.688	Q=500	500	614.02	615.76	615.75	616.46	0.030626	6.79	76.7	55.64	0.95
Main	1660.688	Q=600	600	614.02	615.95	615.95	616.73	0.029942	7.22	87.02	57.14	0.96
T1	126.7273	Q=25	25	615.17	616.15		616.22	0.008494	2.11	12.1	18.83	0.44
T1	126.7273	Q=50	50	615.17	616.47		616.59	0.009386	2.83	18.54	21.53	0.49
T1	126.7273	Q=75	75	615.17	616.71		616.87	0.01002	3.36	23.92	23.55	0.52
T1	126.7273	Q=100	100	615.17	616.9		617.11	0.010726	3.81	28.49	24.99	0.55
T1	126.7273	Q=125	125	615.17	617.07		617.32	0.011061	4.16	32.88	26.12	0.57

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	126.7273	Q=150	150	615.17	617.21		617.5	0.011549	4.5	36.76	27.08	0.59
T1	126.7273	Q=175	175	615.17	617.35		617.67	0.011823	4.79	40.58	28	0.61
T1	126.7273	Q=200	200	615.17	617.47	617.06	617.83	0.012252	5.08	44	28.79	0.63
T1	126.7273	Q=250	250	615.17	617.69	617.28	618.12	0.012926	5.58	50.48	30.23	0.65
T1	126.7273	Q=300	300	615.17	617.89	617.48	618.38	0.013417	6.02	56.59	31.34	0.68
T1	126.7273	Q=350	350	615.17	618.06		618.62	0.014019	6.43	62.07	32.3	0.7
T1	126.7273	Q=400	400	615.17	618.22		618.84	0.014592	6.82	67.24	33.26	0.72
T1	126.7273	Q=450	450	615.17	618.37		619.05	0.015022	7.17	72.34	34.18	0.74
T1	126.7273	Q=500	500	615.17	618.51		619.25	0.015563	7.52	76.98	35	0.76
T1	126.7273	Q=600	600	615.17	618.75	618.46	619.61	0.016665	8.18	85.54	36.46	0.79
T1	271.1582	Q=25	25	617.27	617.97	617.85	618.08	0.021519	2.58	9.81	22.07	0.65
T1	271.1582	Q=50	50	617.27	618.25	618.08	618.4	0.017451	3.15	16.68	26.9	0.64
T1	271.1582	Q=75	75	617.27	618.48	618.26	618.66	0.015499	3.52	23.06	30.69	0.62
T1	271.1582	Q=100	100	617.27	618.67	618.41	618.87	0.01408	3.77	29.12	32.87	0.61
T1	271.1582	Q=125	125	617.27	618.83	618.55	619.06	0.013192	3.99	34.76	34.6	0.61
T1	271.1582	Q=150	150	617.27	618.99	618.66	619.23	0.012365	4.16	40.31	36.03	0.6
T1	271.1582	Q=175	175	617.27	619.13	618.78	619.39	0.011835	4.32	45.52	37.3	0.59
T1	271.1582	Q=200	200	617.27	619.27	618.87	619.54	0.01131	4.46	50.71	38.53	0.59
T1	271.1582	Q=250	250	617.27	619.52	619.06	619.81	0.010545	4.7	60.65	40.76	0.58
T1	271.1582	Q=300	300	617.27	619.75	619.22	620.06	0.010022	4.91	70.1	42.78	0.58
T1	271.1582	Q=350	350	617.27	619.96	619.37	620.29	0.009546	5.09	79.37	44.53	0.57
T1	271.1582	Q=400	400	617.27	620.16	619.51	620.51	0.009132	5.24	88.33	45.83	0.57
T1	271.1582	Q=450	450	617.27	620.34	619.65	620.71	0.008812	5.39	96.95	47.01	0.56
T1	271.1582	Q=500	500	617.27	620.52	619.78	620.91	0.008518	5.51	105.47	48.15	0.56
T1	271.1582	Q=600	600	617.27	620.86	620.02	621.27	0.008063	5.75	121.91	50.29	0.55
T1	437.7179	Q=25	25	621.35	621.74	621.98	622.67	0.449374	7.74	3.23	12.54	2.69
T1	437.7179	Q=50	50	621.35	621.94	622.26	623.05	0.278745	8.49	5.95	14.83	2.3
T1	437.7179	Q=75	75	621.35	622.08	622.46	623.42	0.24618	9.34	8.19	16.48	2.25
T1	437.7179	Q=100	100	621.35	622.2	622.64	623.72	0.227651	9.98	10.28	17.89	2.22
T1	437.7179	Q=125	125	621.35	622.32	622.79	623.95	0.209404	10.41	12.39	19.18	2.17
T1	437.7179	Q=150	150	621.35	622.4	622.94	624.23	0.20204	11.04	14.09	20.01	2.17

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	437.7179	Q=175	175	621.35	622.49	623.07	624.49	0.19464	11.58	15.79	20.8	2.17
T1	437.7179	Q=200	200	621.35	622.56	623.2	624.75	0.192815	12.13	17.29	21.39	2.19
T1	437.7179	Q=250	250	621.35	622.69	623.42	625.21	0.188271	13.08	20.23	22.44	2.21
T1	437.7179	Q=300	300	621.35	622.8	623.63	625.68	0.190462	14.04	22.78	23.31	2.26
T1	437.7179	Q=350	350	621.35	622.92	623.81	626.04	0.183435	14.68	25.62	24.25	2.25
T1	437.7179	Q=400	400	621.35	623.03	623.98	626.42	0.181748	15.37	28.16	25.06	2.27
T1	437.7179	Q=450	450	621.35	623.13	624.14	626.75	0.177879	15.92	30.77	25.86	2.27
T1	437.7179	Q=500	500	621.35	623.22	624.29	627.08	0.176853	16.5	33.17	26.58	2.29
T1	437.7179	Q=600	600	621.35	623.4	624.59	627.65	0.171476	17.43	38.05	27.86	2.29
T1	547.3176	Q=25	25	635.52	636.11	636.15	636.38	0.056905	4.17	6.24	15.4	1.06
T1	547.3176	Q=50	50	635.52	636.3	636.43	636.78	0.069915	5.75	9.33	17.75	1.24
T1	547.3176	Q=75	75	635.52	636.45	636.64	637.11	0.074257	6.78	12.11	19.59	1.32
T1	547.3176	Q=100	100	635.52	636.57	636.81	637.38	0.077434	7.6	14.59	20.86	1.38
T1	547.3176	Q=125	125	635.52	636.67	636.96	637.64	0.081647	8.35	16.72	21.73	1.45
T1	547.3176	Q=150	150	635.52	636.77	637.1	637.86	0.082957	8.94	18.88	22.57	1.48
T1	547.3176	Q=175	175	635.52	636.86	637.23	638.08	0.084555	9.48	20.88	23.32	1.51
T1	547.3176	Q=200	200	635.52	636.94	637.36	638.26	0.08435	9.91	22.95	24.07	1.53
T1	547.3176	Q=250	250	635.52	637.1	637.57	638.61	0.084261	10.69	26.85	25.44	1.56
T1	547.3176	Q=300	300	635.52	637.26	637.76	638.9	0.081546	11.24	30.89	26.77	1.56
T1	547.3176	Q=350	350	635.52	637.38	637.95	639.21	0.08298	11.91	34.25	27.84	1.59
T1	547.3176	Q=400	400	635.52	637.5	638.11	639.47	0.082176	12.4	37.71	28.65	1.6
T1	547.3176	Q=450	450	635.52	637.61	638.26	639.73	0.082605	12.91	40.85	29.31	1.62
T1	547.3176	Q=500	500	635.52	637.72	638.42	639.95	0.081684	13.31	44.12	29.99	1.62
T1	547.3176	Q=600	600	635.52	637.91	638.7	640.41	0.082085	14.15	50	31.17	1.65
T1	669.2314	Q=25	25	641.67	642.28	642.28	642.49	0.044491	3.79	7.04	17.6	0.95
T1	669.2314	Q=50	50	641.67	642.54	642.54	642.83	0.036829	4.56	12.15	21.34	0.92
T1	669.2314	Q=75	75	641.67	642.73	642.73	643.09	0.034572	5.14	16.49	23.64	0.93
T1	669.2314	Q=100	100	641.67	642.9	642.9	643.31	0.032979	5.58	20.53	25.6	0.93
T1	669.2314	Q=125	125	641.67	643.05	643.05	643.5	0.031191	5.91	24.52	27.35	0.92
T1	669.2314	Q=150	150	641.67	643.18	643.18	643.67	0.030419	6.22	28.12	28.63	0.93
T1	669.2314	Q=175	175	641.67	643.3	643.3	643.83	0.029545	6.48	31.64	29.76	0.93

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	669.2314	Q=200	200	641.67	643.4	643.4	643.98	0.029184	6.74	34.86	30.59	0.93
T1	669.2314	Q=250	250	641.67	643.6	643.6	644.24	0.028443	7.18	41.08	32.14	0.94
T1	669.2314	Q=300	300	641.67	643.77	643.77	644.49	0.02855	7.63	46.61	33.5	0.95
T1	669.2314	Q=350	350	641.67	643.95	643.95	644.71	0.027532	7.94	52.72	35.21	0.95
T1	669.2314	Q=400	400	641.67	644.1	644.1	644.92	0.027231	8.26	58.26	36.71	0.96
T1	669.2314	Q=450	450	641.67	644.26	644.26	645.12	0.026592	8.52	64.01	38.29	0.95
T1	669.2314	Q=500	500	641.67	644.4	644.4	645.3	0.026281	8.78	69.41	39.72	0.96
T1	669.2314	Q=600	600	641.67	644.67	644.67	645.64	0.025127	9.18	80.67	42.64	0.95
T1	821.2376	Q=25	25	644.87	645.64	645.43	645.72	0.012292	2.31	11.44	22.5	0.52
T1	821.2376	Q=50	50	644.87	645.9	645.67	646.03	0.013439	3.06	17.88	26.23	0.57
T1	821.2376	Q=75	75	644.87	646.1	645.86	646.28	0.013913	3.57	23.41	28.68	0.6
T1	821.2376	Q=100	100	644.87	646.27	646.01	646.48	0.014131	3.96	28.46	30.66	0.62
T1	821.2376	Q=125	125	644.87	646.41	646.15	646.66	0.014586	4.32	32.87	32.07	0.64
T1	821.2376	Q=150	150	644.87	646.54	646.28	646.82	0.014777	4.61	37.15	33.37	0.66
T1	821.2376	Q=175	175	644.87	646.66	646.39	646.97	0.015013	4.88	41.13	34.46	0.67
T1	821.2376	Q=200	200	644.87	646.77	646.49	647.11	0.015053	5.11	45.1	35.52	0.68
T1	821.2376	Q=250	250	644.87	646.98	646.69	647.37	0.01521	5.52	52.54	37.42	0.69
T1	821.2376	Q=300	300	644.87	647.17	646.86	647.6	0.015102	5.86	59.83	39.09	0.7
T1	821.2376	Q=350	350	644.87	647.33	647.02	647.81	0.015349	6.2	66.27	40.46	0.72
T1	821.2376	Q=400	400	644.87	647.49	647.17	648.01	0.01535	6.47	72.78	41.8	0.73
T1	821.2376	Q=450	450	644.87	647.63	647.31	648.19	0.015536	6.76	78.71	42.92	0.74
T1	821.2376	Q=500	500	644.87	647.76	647.44	648.37	0.015581	7	84.67	44.02	0.74
T1	821.2376	Q=600	600	644.87	648	647.68	648.69	0.01599	7.5	95.43	45.98	0.76
T2	1779.238	Q=25	25	615.08	615.94		615.98	0.007703	1.7	14.74	26.41	0.4
T2	1779.238	Q=50	50	615.08	616.21		616.29	0.008343	2.24	22.56	30.26	0.44
T2	1779.238	Q=75	75	615.08	616.42		616.52	0.008564	2.64	29.02	32.65	0.47
T2	1779.238	Q=100	100	615.08	616.58		616.72	0.00903	3	34.46	34.37	0.49
T2	1779.238	Q=125	125	615.08	616.73		616.89	0.009179	3.28	39.73	35.62	0.5
T2	1779.238	Q=150	150	615.08	616.86		617.05	0.00941	3.53	44.48	36.71	0.52
T2	1779.238	Q=175	175	615.08	616.98		617.19	0.009527	3.76	49.11	37.74	0.53
T2	1779.238	Q=200	200	615.08	617.1		617.33	0.009673	3.97	53.45	38.68	0.54

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1779.238	Q=250	250	615.08	617.3		617.58	0.010004	4.35	61.45	40.36	0.56
T2	1779.238	Q=300	300	615.08	617.48		617.8	0.010292	4.69	68.89	41.82	0.58
T2	1779.238	Q=350	350	615.08	617.65	617.09	618.01	0.010573	5	75.83	43.12	0.59
T2	1779.238	Q=400	400	615.08	617.8		618.2	0.010756	5.28	82.62	44.36	0.6
T2	1779.238	Q=450	450	615.08	617.94		618.38	0.010969	5.54	89	45.49	0.61
T2	1779.238	Q=500	500	615.08	618.07		618.54	0.011296	5.81	94.76	46.48	0.63
T2	1779.238	Q=600	600	615.08	618.3		618.85	0.011765	6.27	106	48.23	0.65
T2	1969.928	Q=25	25	617.96	618.49	618.42	618.61	0.030941	2.73	9.17	22.91	0.76
T2	1969.928	Q=50	50	617.96	618.73		618.91	0.026176	3.39	14.88	25.06	0.75
T2	1969.928	Q=75	75	617.96	618.91		619.15	0.024713	3.9	19.59	26.53	0.76
T2	1969.928	Q=100	100	617.96	619.08		619.36	0.023151	4.27	24.09	27.86	0.76
T2	1969.928	Q=125	125	617.96	619.22		619.54	0.022543	4.62	28.12	29	0.77
T2	1969.928	Q=150	150	617.96	619.35		619.71	0.021947	4.91	32	30.06	0.77
T2	1969.928	Q=175	175	617.96	619.47		619.87	0.021665	5.18	35.61	31.01	0.78
T2	1969.928	Q=200	200	617.96	619.58		620.02	0.021334	5.41	39.13	31.81	0.78
T2	1969.928	Q=250	250	617.96	619.79		620.29	0.020678	5.82	45.86	32.91	0.79
T2	1969.928	Q=300	300	617.96	619.98		620.53	0.020029	6.16	52.34	33.94	0.79
T2	1969.928	Q=350	350	617.96	620.15		620.76	0.019829	6.49	58.21	34.85	0.8
T2	1969.928	Q=400	400	617.96	620.32	620.1	620.97	0.01963	6.79	63.89	35.7	0.8
T2	1969.928	Q=450	450	617.96	620.47	620.25	621.18	0.019424	7.06	69.41	36.51	0.81
T2	1969.928	Q=500	500	617.96	620.62	620.39	621.37	0.019111	7.3	74.94	37.31	0.81
T2	1969.928	Q=600	600	617.96	620.89	620.65	621.73	0.018787	7.75	85.3	38.76	0.82
T2	2119.134	Q=25	25	621.29	621.98	621.82	622.06	0.017814	2.32	10.78	22.91	0.59
T2	2119.134	Q=50	50	621.29	622.2	622.03	622.35	0.020393	3.1	16.23	25.51	0.67
T2	2119.134	Q=75	75	621.29	622.37	622.21	622.58	0.021489	3.66	20.81	27.31	0.71
T2	2119.134	Q=100	100	621.29	622.51		622.77	0.02251	4.15	24.63	28.45	0.75
T2	2119.134	Q=125	125	621.29	622.63		622.95	0.02306	4.55	28.22	29.48	0.77
T2	2119.134	Q=150	150	621.29	622.75		623.11	0.02352	4.91	31.57	30.25	0.79
T2	2119.134	Q=175	175	621.29	622.85	622.71	623.26	0.023775	5.23	34.79	30.97	0.81
T2	2119.134	Q=200	200	621.29	622.95	622.82	623.41	0.024079	5.52	37.82	31.64	0.82
T2	2119.134	Q=250	250	621.29	623.12	623.01	623.67	0.024709	6.05	43.47	32.84	0.85

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	2119.134	Q=300	300	621.29	623.28	623.19	623.91	0.025403	6.53	48.63	33.9	0.88
T2	2119.134	Q=350	350	621.29	623.43	623.35	624.13	0.025588	6.93	53.8	34.93	0.89
T2	2119.134	Q=400	400	621.29	623.57	623.51	624.34	0.025727	7.29	58.74	35.75	0.91
T2	2119.134	Q=450	450	621.29	623.7	623.66	624.54	0.025862	7.62	63.48	36.51	0.92
T2	2119.134	Q=500	500	621.29	623.82	623.8	624.73	0.026106	7.94	67.94	37.2	0.93
T2	2119.134	Q=600	600	621.29	624.05	624.05	625.08	0.026191	8.49	76.73	38.37	0.95
T2	2263.472	Q=25	25	624.01	624.74		624.84	0.020851	2.56	9.76	19.87	0.64
T2	2263.472	Q=50	50	624.01	625.03	624.84	625.18	0.018871	3.12	16.04	23.09	0.65
T2	2263.472	Q=75	75	624.01	625.24		625.44	0.018296	3.58	21.15	25.14	0.67
T2	2263.472	Q=100	100	624.01	625.42	625.18	625.66	0.017932	3.96	25.72	26.77	0.68
T2	2263.472	Q=125	125	624.01	625.57	625.32	625.85	0.017617	4.29	29.91	28.11	0.69
T2	2263.472	Q=150	150	624.01	625.71	625.44	626.03	0.017495	4.59	33.8	29.13	0.7
T2	2263.472	Q=175	175	624.01	625.83	625.57	626.19	0.017405	4.86	37.51	30.06	0.71
T2	2263.472	Q=200	200	624.01	625.95	625.68	626.34	0.017254	5.1	41.14	30.94	0.71
T2	2263.472	Q=250	250	624.01	626.17	625.89	626.62	0.017017	5.51	48.06	32.55	0.72
T2	2263.472	Q=300	300	624.01	626.37	626.07	626.88	0.016745	5.86	54.73	34.03	0.73
T2	2263.472	Q=350	350	624.01	626.55	626.25	627.11	0.016672	6.19	60.91	35.22	0.74
T2	2263.472	Q=400	400	624.01	626.71	626.41	627.32	0.016694	6.5	66.71	36.19	0.75
T2	2263.472	Q=450	450	624.01	626.87	626.57	627.53	0.016574	6.76	72.5	37.12	0.75
T2	2263.472	Q=500	500	624.01	627.02	626.71	627.72	0.016438	7	78.15	37.9	0.76
T2	2263.472	Q=600	600	624.01	627.29	626.98	628.08	0.016408	7.46	88.64	39.31	0.77
T2	2455.146	Q=25	25	628.66	629.32	629.23	629.44	0.027971	2.79	8.98	20.65	0.74
T2	2455.146	Q=50	50	628.66	629.53	629.46	629.75	0.0307	3.77	13.5	22.84	0.82
T2	2455.146	Q=75	75	628.66	629.7	629.64	630	0.031724	4.45	17.41	24.57	0.87
T2	2455.146	Q=100	100	628.66	629.73	629.8	630.22	0.049379	5.69	18.2	24.9	1.09
T2	2455.146	Q=125	125	628.66	629.9	629.94	630.4	0.039534	5.78	22.76	26.75	1
T2	2455.146	Q=150	150	628.66	630	630.07	630.58	0.041513	6.28	25.32	27.62	1.04
T2	2455.146	Q=175	175	628.66	630.09	630.2	630.75	0.042606	6.7	27.86	28.42	1.07
T2	2455.146	Q=200	200	628.66	630.19	630.3	630.9	0.04128	6.96	30.82	29.17	1.07
T2	2455.146	Q=250	250	628.66	630.38	630.5	631.17	0.038912	7.4	36.54	30.31	1.06
T2	2455.146	Q=300	300	628.66	630.56	630.68	631.42	0.0374	7.8	41.87	31.33	1.06

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	2455.146	Q=350	350	628.66	630.72	630.84	631.66	0.036349	8.17	46.91	32.27	1.06
T2	2455.146	Q=400	400	628.66	630.86	631.01	631.88	0.035675	8.51	51.68	33.13	1.06
T2	2455.146	Q=450	450	628.66	631	631.15	632.08	0.035155	8.83	56.27	33.94	1.07
T2	2455.146	Q=500	500	628.66	631.13	631.29	632.28	0.034545	9.12	60.8	34.67	1.07
T2	2455.146	Q=600	600	628.66	631.38	631.57	632.65	0.033558	9.63	69.53	36.03	1.07
T2	2632.44	Q=25	25	635.84	636.42	636.42	636.6	0.056825	3.4	7.34	20.73	1.01
T2	2632.44	Q=50	50	635.84	636.64	636.64	636.89	0.050787	4.05	12.36	24.74	1.01
T2	2632.44	Q=75	75	635.84	636.8	636.8	637.12	0.047113	4.51	16.66	27.24	1.01
T2	2632.44	Q=100	100	635.84	636.94	636.94	637.31	0.043912	4.9	20.5	28.79	1
T2	2632.44	Q=125	125	635.84	637.06	637.06	637.49	0.040827	5.24	24.13	29.91	0.99
T2	2632.44	Q=150	150	635.84	637.18	637.18	637.65	0.038172	5.51	27.69	30.97	0.98
T2	2632.44	Q=175	175	635.84	637.28	637.28	637.8	0.037033	5.8	30.89	31.89	0.98
T2	2632.44	Q=200	200	635.84	637.36	637.39	637.94	0.038073	6.15	33.4	32.6	1.01
T2	2632.44	Q=250	250	635.84	637.5	637.57	638.2	0.040293	6.82	37.91	33.34	1.05
T2	2632.44	Q=300	300	635.84	637.62	637.74	638.45	0.041967	7.4	42.13	33.98	1.09
T2	2632.44	Q=350	350	635.84	637.74	637.9	638.68	0.043297	7.92	46.11	34.58	1.12
T2	2632.44	Q=400	400	635.84	637.85	638.04	638.9	0.044056	8.37	50.03	35.16	1.15
T2	2632.44	Q=450	450	635.84	637.96	638.19	639.11	0.04467	8.78	53.8	35.71	1.17
T2	2632.44	Q=500	500	635.84	638.06	638.32	639.31	0.045474	9.19	57.31	36.22	1.19
T2	2632.44	Q=600	600	635.84	638.24	638.57	639.69	0.04691	9.93	63.97	37.15	1.22
T2	2793.836	Q=25	25	642	642.54		642.63	0.026449	2.42	10.34	27.61	0.69
T2	2793.836	Q=50	50	642	642.73		642.89	0.028262	3.2	15.68	29.74	0.76
T2	2793.836	Q=75	75	642	642.87		643.09	0.029751	3.82	19.85	30.82	0.81
T2	2793.836	Q=100	100	642	642.98	642.91	643.27	0.031347	4.34	23.4	31.71	0.86
T2	2793.836	Q=125	125	642	643.07	643.03	643.43	0.033404	4.83	26.43	32.45	0.9
T2	2793.836	Q=150	150	642	643.16	643.13	643.58	0.035415	5.28	29.14	33.1	0.94
T2	2793.836	Q=175	175	642	643.24	643.24	643.73	0.036346	5.65	31.91	33.74	0.97
T2	2793.836	Q=200	200	642	643.33	643.33	643.86	0.03534	5.89	35.1	34.48	0.97
T2	2793.836	Q=250	250	642	643.51	643.51	644.11	0.03328	6.29	41.4	35.88	0.96
T2	2793.836	Q=300	300	642	643.68	643.68	644.33	0.031841	6.65	47.3	36.82	0.96
T2	2793.836	Q=350	350	642	643.83	643.83	644.54	0.030764	6.97	52.88	37.52	0.96

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	2793.836	Q=400	400	642	643.96	643.96	644.74	0.030106	7.27	58.1	38.16	0.96
T2	2793.836	Q=450	450	642	644.09	644.09	644.93	0.029515	7.55	63.15	38.77	0.96
T2	2793.836	Q=500	500	642	644.22	644.22	645.11	0.028856	7.8	68.16	39.37	0.96
T2	2793.836	Q=600	600	642	644.47	644.47	645.45	0.027605	8.23	77.96	40.51	0.96
T2	2954.626	Q=25	25	646.51	647.13	647.08	647.27	0.031348	3.07	8.62	22.45	0.79
T2	2954.626	Q=50	50	646.51	647.35	647.3	647.57	0.029579	3.87	14.14	26.3	0.82
T2	2954.626	Q=75	75	646.51	647.53	647.47	647.8	0.028464	4.4	18.98	29.06	0.83
T2	2954.626	Q=100	100	646.51	647.68	647.63	647.99	0.027253	4.79	23.54	31.24	0.83
T2	2954.626	Q=125	125	646.51	647.82	647.75	648.16	0.025883	5.08	27.92	32.64	0.83
T2	2954.626	Q=150	150	646.51	647.94	647.86	648.32	0.024659	5.31	32.14	33.74	0.82
T2	2954.626	Q=175	175	646.51	648.06	647.97	648.46	0.024104	5.55	35.97	34.71	0.83
T2	2954.626	Q=200	200	646.51	648.15	648.06	648.59	0.024634	5.85	39.11	35.49	0.84
T2	2954.626	Q=250	250	646.51	648.3	648.24	648.83	0.025825	6.4	44.83	36.86	0.88
T2	2954.626	Q=300	300	646.51	648.3	648.41	649.07	0.037538	7.71	44.68	36.83	1.06
T2	2954.626	Q=350	350	646.51	648.44	648.55	649.27	0.036422	8.03	50.07	37.77	1.06
T2	2954.626	Q=400	400	646.51	648.58	648.69	649.47	0.035691	8.34	55.13	38.59	1.06
T2	2954.626	Q=450	450	646.51	648.7	648.82	649.65	0.034917	8.61	60.11	39.38	1.06
T2	2954.626	Q=500	500	646.51	648.83	648.95	649.82	0.033955	8.83	65.14	40.16	1.06
T2	2954.626	Q=600	600	646.51	649.06	649.19	650.15	0.032722	9.28	74.61	41.59	1.05
T2	3141.384	Q=25	25	652.99	653.52	653.49	653.67	0.037741	3.07	8.45	24.65	0.84
T2	3141.384	Q=50	50	652.99	653.71	653.71	653.94	0.039422	4.01	13.48	29.81	0.92
T2	3141.384	Q=75	75	652.99	653.87	653.87	654.15	0.036294	4.5	18.41	32.9	0.91
T2	3141.384	Q=100	100	652.99	654	654	654.33	0.034824	4.9	22.84	35.2	0.92
T2	3141.384	Q=125	125	652.99	654.11	654.11	654.48	0.033385	5.22	27.09	37.23	0.92
T2	3141.384	Q=150	150	652.99	654.21	654.21	654.62	0.032954	5.53	30.94	39.04	0.93
T2	3141.384	Q=175	175	652.99	654.32	654.32	654.75	0.031595	5.74	35.06	41.14	0.92
T2	3141.384	Q=200	200	652.99	654.41	654.41	654.87	0.031027	5.97	38.83	42.95	0.93
T2	3141.384	Q=250	250	652.99	654.58	654.58	655.09	0.02934	6.3	46.34	45.49	0.92
T2	3141.384	Q=300	300	652.99	654.71	654.72	655.28	0.02967	6.71	52.4	47.12	0.94
T2	3141.384	Q=350	350	652.99	654.82	654.85	655.46	0.03019	7.1	57.99	48.58	0.96
T2	3141.384	Q=400	400	652.99	654.93	654.97	655.62	0.030584	7.44	63.33	49.84	0.97

Bartlett - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	3141.384	Q=450	450	652.99	655.03	655.09	655.78	0.03098	7.76	68.34	50.76	0.99
T2	3141.384	Q=500	500	652.99	655.12	655.19	655.93	0.031616	8.08	72.94	51.6	1.01
T2	3141.384	Q=600	600	652.99	655.29	655.4	656.21	0.032359	8.64	81.98	53.21	1.03
T2	3274.116	Q=25	25	657.78	658.46	658.43	658.65	0.037069	3.66	7.3	16.92	0.87
T2	3274.116	Q=50	50	657.78	658.63	658.7	659.02	0.051816	5.23	10.53	19.5	1.08
T2	3274.116	Q=75	75	657.78	658.79	658.91	659.31	0.054018	6.1	13.84	21.73	1.14
T2	3274.116	Q=100	100	657.78	658.93	659.08	659.55	0.054689	6.75	16.88	23.22	1.18
T2	3274.116	Q=125	125	657.78	659.04	659.22	659.76	0.056753	7.36	19.49	24.35	1.22
T2	3274.116	Q=150	150	657.78	659.14	659.35	659.95	0.05697	7.83	22.11	25.28	1.24
T2	3274.116	Q=175	175	657.78	659.24	659.47	660.13	0.057471	8.26	24.55	26.11	1.26
T2	3274.116	Q=200	200	657.78	659.33	659.59	660.29	0.057842	8.66	26.89	26.89	1.28
T2	3274.116	Q=250	250	657.78	659.49	659.8	660.6	0.058394	9.35	31.35	28.3	1.31
T2	3274.116	Q=300	300	657.78	659.63	659.99	660.88	0.059181	9.97	35.48	29.55	1.34
T2	3274.116	Q=350	350	657.78	659.77	660.16	661.13	0.059232	10.48	39.52	30.62	1.36
T2	3274.116	Q=400	400	657.78	659.89	660.31	661.37	0.05953	10.97	43.33	31.6	1.37
T2	3274.116	Q=450	450	657.78	660	660.48	661.6	0.059859	11.42	46.99	32.51	1.39
T2	3274.116	Q=500	500	657.78	660.12	660.62	661.8	0.059259	11.78	50.8	33.41	1.4
T2	3274.116	Q=600	600	657.78	660.32	660.88	662.2	0.059549	12.51	57.7	34.99	1.42
T2	3401.314	Q=25	25	663.5	664.05	664.05	664.24	0.042948	3.67	7.52	20.61	0.93
T2	3401.314	Q=50	50	663.5	664.29	664.29	664.55	0.036882	4.42	12.92	24.84	0.92
T2	3401.314	Q=75	75	663.5	664.46	664.46	664.78	0.034963	4.96	17.42	27	0.92
T2	3401.314	Q=100	100	663.5	664.6	664.6	664.98	0.034174	5.42	21.43	28.79	0.94
T2	3401.314	Q=125	125	663.5	664.74	664.74	665.16	0.032749	5.75	25.41	30.46	0.94
T2	3401.314	Q=150	150	663.5	664.85	664.85	665.31	0.032245	6.08	29	31.77	0.94
T2	3401.314	Q=175	175	663.5	664.96	664.96	665.46	0.031589	6.35	32.5	32.92	0.95
T2	3401.314	Q=200	200	663.5	665.06	665.06	665.6	0.031073	6.59	35.87	34	0.95
T2	3401.314	Q=250	250	663.5	665.25	665.25	665.84	0.030199	7.03	42.35	35.98	0.95
T2	3401.314	Q=300	300	663.5	665.42	665.42	666.07	0.029359	7.39	48.62	37.79	0.96
T2	3401.314	Q=350	350	663.5	665.57	665.57	666.28	0.028735	7.71	54.6	39.4	0.96
T2	3401.314	Q=400	400	663.5	665.72	665.72	666.47	0.028105	7.99	60.45	40.87	0.96
T2	3401.314	Q=450	450	663.5	665.86	665.86	666.65	0.027487	8.23	66.2	42.24	0.96

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	3401.314	Q=500	500	663.5	665.98	665.98	666.82	0.027304	8.5	71.49	43.45	0.96
T2	3401.314	Q=600	600	663.5	666.22	666.22	667.13	0.026322	8.9	82.43	45.85	0.96

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	61.61042	Q=25	25	618.39	618.88	618.88	619.05	0.05738	3.32	7.52	22.21	1.01
Main	61.61042	Q=50	50	618.39	619.09	619.09	619.33	0.051272	3.97	12.61	26.21	1.01
Main	61.61042	Q=75	75	618.39	619.25	619.25	619.55	0.047166	4.44	16.93	28.47	1
Main	61.61042	Q=100	100	618.39	619.38	619.38	619.74	0.044207	4.84	20.78	29.93	1
Main	61.61042	Q=125	125	618.39	619.5	619.5	619.91	0.041035	5.17	24.46	31	0.99
Main	61.61042	Q=150	150	618.39	619.61	619.61	620.07	0.038784	5.45	27.96	31.99	0.98
Main	61.61042	Q=175	175	618.39	619.72	619.72	620.21	0.036598	5.69	31.46	32.94	0.97
Main	61.61042	Q=200	200	618.39	619.81	619.81	620.35	0.035605	5.94	34.61	33.78	0.97
Main	61.61042	Q=250	250	618.39	620	620	620.6	0.03336	6.34	40.93	35.37	0.96
Main	61.61042	Q=300	300	618.39	620.17	620.17	620.83	0.031491	6.67	47.06	36.62	0.96
Main	61.61042	Q=350	350	618.39	620.32	620.32	621.05	0.030394	6.98	52.73	37.58	0.95
Main	61.61042	Q=400	400	618.39	620.46	620.46	621.24	0.029554	7.28	58.15	38.49	0.95
Main	61.61042	Q=450	450	618.39	620.6	620.6	621.43	0.028783	7.54	63.46	39.35	0.95
Main	61.61042	Q=500	500	618.39	620.73	620.73	621.61	0.027996	7.77	68.72	40.19	0.95
Main	61.61042	Q=600	600	618.39	620.97	620.97	621.95	0.026988	8.21	78.63	41.72	0.95
Main	194.3417	Q=25	25	620.21	620.97	620.7	621	0.006494	1.49	17.17	36.82	0.36
Main	194.3417	Q=50	50	620.21	621.21	620.87	621.27	0.006729	1.96	26.48	39.14	0.39
Main	194.3417	Q=75	75	620.21	621.41		621.48	0.006821	2.29	34.24	40.98	0.41
Main	194.3417	Q=100	100	620.21	621.57		621.66	0.007017	2.57	40.89	42.5	0.43
Main	194.3417	Q=125	125	620.21	621.71		621.82	0.007161	2.82	46.99	43.79	0.44
Main	194.3417	Q=150	150	620.21	621.84		621.97	0.007215	3.02	52.76	44.66	0.45
Main	194.3417	Q=175	175	620.21	621.95		622.1	0.007333	3.21	58.02	45.44	0.46
Main	194.3417	Q=200	200	620.21	622.07		622.23	0.007334	3.37	63.29	46.2	0.47
Main	194.3417	Q=250	250	620.21	622.28		622.47	0.007413	3.67	72.97	47.58	0.48
Main	194.3417	Q=300	300	620.21	622.46		622.68	0.007513	3.94	81.9	48.81	0.49
Main	194.3417	Q=350	350	620.21	622.64		622.88	0.00754	4.18	90.55	49.94	0.5
Main	194.3417	Q=400	400	620.21	622.8		623.07	0.007551	4.39	98.79	50.76	0.5
Main	194.3417	Q=450	450	620.21	622.95		623.25	0.007581	4.58	106.6	51.52	0.51
Main	194.3417	Q=500	500	620.21	623.1		623.42	0.007613	4.77	114.09	52.25	0.52
Main	194.3417	Q=600	600	620.21	623.37		623.73	0.007638	5.1	128.53	53.59	0.53
Main	370.6444	Q=25	25	619.65	621.34	620.33	621.35	0.000951	1.07	24.54	21.55	0.16

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	370.6444	Q=50	50	619.65	621.72	620.62	621.76	0.001527	1.6	33.39	23.91	0.21
Main	370.6444	Q=75	75	619.65	622.01	620.84	622.07	0.001962	2.01	40.49	25.65	0.25
Main	370.6444	Q=100	100	619.65	622.24	621.03	622.32	0.002328	2.35	46.6	27.02	0.28
Main	370.6444	Q=125	125	619.65	622.44	621.2	622.54	0.002639	2.65	52.14	28.12	0.3
Main	370.6444	Q=150	150	619.65	622.62	621.34	622.74	0.002919	2.92	57.18	29.06	0.32
Main	370.6444	Q=175	175	619.65	622.78	621.49	622.92	0.003172	3.17	61.85	29.79	0.33
Main	370.6444	Q=200	200	619.65	622.92	621.62	623.08	0.003405	3.39	66.24	30.45	0.35
Main	370.6444	Q=250	250	619.65	623.19	621.86	623.38	0.00382	3.81	74.38	31.65	0.38
Main	370.6444	Q=300	300	619.65	623.42	622.08	623.66	0.004183	4.18	81.9	32.72	0.4
Main	370.6444	Q=350	350	619.65	623.63	622.29	623.9	0.00451	4.51	88.91	33.68	0.42
Main	370.6444	Q=400	400	619.65	623.82	622.48	624.13	0.004812	4.82	95.49	34.56	0.43
Main	370.6444	Q=450	450	619.65	624	622.67	624.35	0.005103	5.12	101.67	35.37	0.45
Main	370.6444	Q=500	500	619.65	624.17	622.83	624.55	0.005358	5.39	107.69	36.13	0.46
Main	370.6444	Q=600	600	619.65	624.48	623.14	624.93	0.005826	5.9	119.09	37.64	0.49
Main	524.7333	Q=25	25	621.78	622.57	622.57	622.83	0.051052	4.03	6.21	12.46	1.01
Main	524.7333	Q=50	50	621.78	622.88	622.88	623.24	0.045147	4.84	10.36	14.79	1
Main	524.7333	Q=75	75	621.78	623.12	623.12	623.56	0.040409	5.36	14.13	16.3	0.99
Main	524.7333	Q=100	100	621.78	623.32	623.32	623.84	0.038236	5.79	17.56	17.56	0.99
Main	524.7333	Q=125	125	621.78	623.5	623.5	624.08	0.036902	6.16	20.72	18.61	0.99
Main	524.7333	Q=150	150	621.78	623.65	623.65	624.3	0.034998	6.51	23.68	19.34	0.98
Main	524.7333	Q=175	175	621.78	623.8	623.8	624.5	0.033344	6.8	26.59	20.04	0.97
Main	524.7333	Q=200	200	621.78	623.94	623.94	624.69	0.032083	7.07	29.41	20.69	0.97
Main	524.7333	Q=250	250	621.78	624.17	624.2	625.05	0.031824	7.68	34.21	21.69	0.99
Main	524.7333	Q=300	300	621.78	624.34	624.43	625.37	0.033573	8.35	37.97	22.36	1.03
Main	524.7333	Q=350	350	621.78	624.48	624.65	625.68	0.03583	9.03	41.21	22.92	1.07
Main	524.7333	Q=400	400	621.78	624.66	624.86	625.96	0.034973	9.41	45.49	23.64	1.08
Main	524.7333	Q=450	450	621.78	624.84	625.04	626.22	0.034021	9.74	49.76	24.34	1.07
Main	524.7333	Q=500	500	621.78	625.02	625.24	626.47	0.032949	10.02	54.08	25.02	1.07
Main	524.7333	Q=600	600	621.78	625.31	625.57	626.93	0.032519	10.66	61.62	26.17	1.08
Main	659.5291	Q=25	25	625.69	626.69	626.49	626.82	0.019208	2.97	8.41	12.7	0.64
Main	659.5291	Q=50	50	625.69	627.03	626.82	627.26	0.020978	3.81	13.15	14.85	0.71

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Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	659.5291	Q=75	75	625.69	627.27	627.07	627.58	0.022659	4.48	16.85	16.25	0.76
Main	659.5291	Q=100	100	625.69	627.45	627.28	627.85	0.023759	5.09	19.92	17.21	0.8
Main	659.5291	Q=125	125	625.69	627.62	627.46	628.1	0.024526	5.6	22.8	18.06	0.82
Main	659.5291	Q=150	150	625.69	627.75	627.63	628.32	0.025687	6.1	25.34	18.78	0.86
Main	659.5291	Q=175	175	625.69	627.88	627.79	628.53	0.026873	6.56	27.68	19.42	0.89
Main	659.5291	Q=200	200	625.69	627.99	627.94	628.73	0.027957	6.98	29.9	20.01	0.92
Main	659.5291	Q=250	250	625.69	628.22	628.22	629.09	0.028557	7.64	34.6	21.2	0.94
Main	659.5291	Q=300	300	625.69	628.47	628.47	629.42	0.027094	8.03	40.02	22.49	0.94
Main	659.5291	Q=350	350	625.69	628.71	628.71	629.72	0.025384	8.32	45.64	23.73	0.92
Main	659.5291	Q=400	400	625.69	628.88	628.91	630	0.02594	8.78	49.77	24.49	0.94
Main	659.5291	Q=450	450	625.69	629.03	629.11	630.26	0.02664	9.24	53.59	25.16	0.96
Main	659.5291	Q=500	500	625.69	629.17	629.31	630.51	0.02752	9.69	57.08	25.76	0.99
Main	659.5291	Q=600	600	625.69	629.46	629.64	630.97	0.027822	10.36	64.74	27.03	1.01
Main	876.4223	Q=25	25	631.21	632.03		632.23	0.03345	3.52	7.11	13.06	0.83
Main	876.4223	Q=50	50	631.21	632.35	632.26	632.65	0.029582	4.45	11.48	14.87	0.84
Main	876.4223	Q=75	75	631.21	632.6	632.51	632.99	0.027376	5.07	15.42	16.32	0.84
Main	876.4223	Q=100	100	631.21	632.81	632.73	633.28	0.02623	5.58	19.02	17.54	0.85
Main	876.4223	Q=125	125	631.21	633	632.91	633.53	0.025502	6	22.39	18.62	0.86
Main	876.4223	Q=150	150	631.21	633.18	633.09	633.76	0.024499	6.33	25.77	19.6	0.86
Main	876.4223	Q=175	175	631.21	633.35	633.25	633.97	0.02338	6.58	29.16	20.45	0.85
Main	876.4223	Q=200	200	631.21	633.5	633.39	634.16	0.022538	6.82	32.44	21.25	0.84
Main	876.4223	Q=250	250	631.21	633.77	633.66	634.52	0.022115	7.33	38.22	22.61	0.85
Main	876.4223	Q=300	300	631.21	633.97	633.9	634.83	0.023117	7.92	42.82	23.63	0.89
Main	876.4223	Q=350	350	631.21	634.13	634.12	635.12	0.024536	8.52	46.79	24.47	0.92
Main	876.4223	Q=400	400	631.21	634.34	634.34	635.39	0.023951	8.85	51.94	25.53	0.92
Main	876.4223	Q=450	450	631.21	634.54	634.54	635.64	0.023227	9.12	57.16	26.56	0.92
Main	876.4223	Q=500	500	631.21	634.73	634.73	635.88	0.022346	9.32	62.49	27.45	0.91
Main	876.4223	Q=600	600	631.21	635.06	635.06	636.32	0.021888	9.83	71.7	28.81	0.92
Main	1063.56	Q=25	25	634.21	635.47	635.12	635.58	0.011105	2.67	9.44	11.62	0.51
Main	1063.56	Q=50	50	634.21	635.87	635.48	636.06	0.012323	3.53	14.54	13.7	0.57
Main	1063.56	Q=75	75	634.21	636.16	635.76	636.43	0.01312	4.2	18.69	15.12	0.6

Van Horne - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	1063.56	Q=100	100	634.21	636.4	636.01	636.73	0.013632	4.73	22.49	16.31	0.63
Main	1063.56	Q=125	125	634.21	636.61	636.21	637.01	0.014008	5.18	26.05	17.35	0.65
Main	1063.56	Q=150	150	634.21	636.79	636.41	637.25	0.014547	5.6	29.25	18.24	0.68
Main	1063.56	Q=175	175	634.21	636.95	636.59	637.46	0.015183	5.99	32.14	18.94	0.7
Main	1063.56	Q=200	200	634.21	637.09	636.76	637.67	0.015727	6.35	34.91	19.56	0.72
Main	1063.56	Q=250	250	634.21	637.37	637.06	638.04	0.016166	6.93	40.57	20.78	0.74
Main	1063.56	Q=300	300	634.21	637.65	637.33	638.39	0.01586	7.33	46.56	21.88	0.75
Main	1063.56	Q=350	350	634.21	637.93	637.57	638.72	0.01531	7.63	52.68	22.89	0.74
Main	1063.56	Q=400	400	634.21	638.13	637.81	639	0.015777	8.06	57.38	23.63	0.76
Main	1063.56	Q=450	450	634.21	638.31	638.01	639.27	0.016277	8.47	61.77	24.31	0.78
Main	1063.56	Q=500	500	634.21	638.47	638.21	639.51	0.01695	8.9	65.69	24.9	0.8
Main	1063.56	Q=600	600	634.21	638.79	638.58	639.99	0.017645	9.58	73.88	26.08	0.83

Schenck - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	50.9263	Q=25	25	586.6	587.07	587.45	588.93	0.753386	10.96	2.28	7.67	3.54
Main	50.9263	Q=50	50	586.6	587.19	587.8	590.77	1.052675	15.18	3.29	8.72	4.35
Main	50.9263	Q=75	75	586.6	587.28	588.06	592.35	1.23214	18.07	4.15	9.51	4.82
Main	50.9263	Q=100	100	586.6	587.37	588.28	593.58	1.292067	19.99	5	10.23	5.03
Main	50.9263	Q=125	125	586.6	587.45	588.48	594.49	1.232732	21.29	5.88	10.82	5.02
Main	50.9263	Q=150	150	586.6	587.53	588.66	595.26	1.178185	22.32	6.76	11.38	4.99
Main	50.9263	Q=175	175	586.6	587.6	588.82	596.01	1.147943	23.31	7.57	11.87	5
Main	50.9263	Q=200	200	586.6	587.68	588.98	596.52	1.089359	23.94	8.46	12.39	4.93
Main	50.9263	Q=250	250	586.6	587.82	589.24	597.28	0.982593	24.84	10.26	13.37	4.79
Main	50.9263	Q=300	300	586.6	587.94	589.5	597.92	0.893968	25.58	12.03	14.22	4.65
Main	50.9263	Q=350	350	586.6	588.06	589.73	598.57	0.808613	26.32	13.73	14.85	4.51
Main	50.9263	Q=400	400	586.6	588.17	589.95	599.12	0.739791	26.94	15.45	15.45	4.39
Main	50.9263	Q=450	450	586.6	588.28	590.16	599.6	0.683524	27.48	17.16	16.03	4.28
Main	50.9263	Q=500	500	586.6	588.38	590.54	600.15	0.648265	28.11	18.76	16.55	4.22
Main	50.9263	Q=600	600	586.6	588.58	590.93	600.85	0.569888	28.88	22.21	17.62	4.05
Main	192.4857	Q=25	25	605.8	606.59	606.59	606.84	0.04948	4.07	6.16	12.26	1
Main	192.4857	Q=50	50	605.8	606.89	606.89	607.28	0.040971	4.99	10.27	14.34	0.98
Main	192.4857	Q=75	75	605.8	607.15	607.15	607.61	0.03581	5.58	14.06	15.89	0.96
Main	192.4857	Q=100	100	605.8	607.36	607.36	607.9	0.032632	6.03	17.65	17.23	0.94
Main	192.4857	Q=125	125	605.8	607.55	607.55	608.15	0.030843	6.43	21.01	18.4	0.94
Main	192.4857	Q=150	150	605.8	607.72	607.72	608.38	0.029406	6.76	24.27	19.46	0.93
Main	192.4857	Q=175	175	605.8	607.89	607.89	608.59	0.027865	7.02	27.57	20.44	0.92
Main	192.4857	Q=200	200	605.8	608.03	608.03	608.78	0.027103	7.29	30.57	21.12	0.92
Main	192.4857	Q=250	250	605.8	608.29	608.29	609.13	0.026247	7.79	36.13	22.21	0.92
Main	192.4857	Q=300	300	605.8	608.52	608.52	609.44	0.025615	8.22	41.41	23.2	0.93
Main	192.4857	Q=350	350	605.8	608.74	608.74	609.73	0.024933	8.59	46.59	24.13	0.93
Main	192.4857	Q=400	400	605.8	608.94	608.94	610	0.024424	8.93	51.56	24.99	0.93
Main	192.4857	Q=450	450	605.8	609.13	609.13	610.26	0.024034	9.25	56.36	25.8	0.93
Main	192.4857	Q=500	500	605.8	609.33	609.33	610.5	0.023181	9.47	61.52	26.63	0.93
Main	192.4857	Q=600	600	605.8	609.65	609.65	610.95	0.02289	10.03	70.4	28.06	0.94
Main	269.8349	Q=25	25	607.97	608.98	608.78	609.1	0.019067	2.88	8.69	13.74	0.64

Schenck - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	269.8349	Q=50	50	607.97	609.28	609.09	609.51	0.021275	3.82	13.2	15.6	0.71
Main	269.8349	Q=75	75	607.97	609.51	609.33	609.82	0.023113	4.51	16.89	16.94	0.77
Main	269.8349	Q=100	100	607.97	609.7	609.54	610.09	0.024494	5.07	20.17	18.05	0.8
Main	269.8349	Q=125	125	607.97	609.85	609.72	610.33	0.025457	5.59	23.03	18.97	0.84
Main	269.8349	Q=150	150	607.97	609.99	609.88	610.54	0.026439	6.07	25.66	19.77	0.87
Main	269.8349	Q=175	175	607.97	610.1	610.03	610.74	0.027781	6.53	27.99	20.46	0.9
Main	269.8349	Q=200	200	607.97	610.08	610.18	610.95	0.038419	7.6	27.46	20.31	1.05
Main	269.8349	Q=250	250	607.97	610.29	610.45	611.31	0.038481	8.26	31.94	21.54	1.08
Main	269.8349	Q=300	300	607.97	610.49	610.68	611.64	0.038284	8.82	36.25	22.51	1.09
Main	269.8349	Q=350	350	607.97	610.67	610.9	611.94	0.038012	9.31	40.43	23.41	1.1
Main	269.8349	Q=400	400	607.97	610.84	611.11	612.22	0.037927	9.76	44.4	24.23	1.12
Main	269.8349	Q=450	450	607.97	610.99	611.3	612.48	0.037814	10.17	48.26	25.01	1.13
Main	269.8349	Q=500	500	607.97	611.14	611.49	612.73	0.037531	10.53	52.11	25.76	1.13
Main	269.8349	Q=600	600	607.97	611.42	611.81	613.2	0.037486	11.23	59.3	27.08	1.15
Main	367.8869	Q=25	25	611.47	612.2	612.2	612.44	0.051858	3.86	6.48	14.09	1
Main	367.8869	Q=50	50	611.47	612.48	612.48	612.82	0.045446	4.67	10.76	16.83	1
Main	367.8869	Q=75	75	611.47	612.7	612.7	613.12	0.039193	5.23	14.66	18.6	0.97
Main	367.8869	Q=100	100	611.47	612.89	612.89	613.38	0.035301	5.65	18.39	20.16	0.95
Main	367.8869	Q=125	125	611.47	613.06	613.06	613.6	0.032983	6.02	21.91	21.52	0.95
Main	367.8869	Q=150	150	611.47	613.22	613.22	613.81	0.031152	6.32	25.35	22.77	0.94
Main	367.8869	Q=175	175	611.47	613.36	613.36	613.99	0.029617	6.58	28.73	23.94	0.93
Main	367.8869	Q=200	200	611.47	613.5	613.5	614.17	0.028094	6.78	32.15	24.94	0.92
Main	367.8869	Q=250	250	611.47	613.73	613.73	614.48	0.027186	7.25	37.95	26.06	0.92
Main	367.8869	Q=300	300	611.47	613.93	613.93	614.76	0.026494	7.67	43.45	27.07	0.93
Main	367.8869	Q=350	350	611.47	614.12	614.12	615.02	0.025954	8.03	48.7	28	0.93
Main	367.8869	Q=400	400	611.47	614.31	614.31	615.26	0.025418	8.36	53.82	28.89	0.93
Main	367.8869	Q=450	450	611.47	614.48	614.48	615.49	0.024814	8.63	58.92	29.74	0.93
Main	367.8869	Q=500	500	611.47	614.64	614.64	615.71	0.02444	8.91	63.76	30.52	0.93
Main	367.8869	Q=600	600	611.47	614.95	614.95	616.12	0.023428	9.35	73.55	32.07	0.93
Main	481.9059	Q=25	25	613.43	614.51	614.18	614.59	0.009515	2.2	11.39	16.54	0.46
Main	481.9059	Q=50	50	613.43	614.85	614.47	614.98	0.010277	2.93	17.37	18.83	0.51

Schenck - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	481.9059	Q=75	75	613.43	615.09	614.69	615.28	0.010993	3.5	22.19	20.41	0.55
Main	481.9059	Q=100	100	613.43	615.3	614.88	615.53	0.011569	3.96	26.48	21.71	0.57
Main	481.9059	Q=125	125	613.43	615.48	615.05	615.76	0.011975	4.35	30.49	22.87	0.6
Main	481.9059	Q=150	150	613.43	615.63	615.21	615.96	0.012414	4.71	34.16	23.87	0.62
Main	481.9059	Q=175	175	613.43	615.78	615.35	616.15	0.012775	5.02	37.63	24.67	0.63
Main	481.9059	Q=200	200	613.43	615.9	615.49	616.31	0.013301	5.34	40.71	25.35	0.65
Main	481.9059	Q=250	250	613.43	616.15	615.74	616.63	0.013646	5.83	47.13	26.61	0.67
Main	481.9059	Q=300	300	613.43	616.37	615.96	616.92	0.014005	6.27	53.06	27.73	0.69
Main	481.9059	Q=350	350	613.43	615.74	616.17	617.29	0.055243	10.3	36.62	24.44	1.31
Main	481.9059	Q=400	400	613.43	615.87	616.36	617.58	0.05604	10.86	39.98	25.2	1.34
Main	481.9059	Q=450	450	613.43	616.01	616.54	617.85	0.056089	11.33	43.38	25.88	1.35
Main	481.9059	Q=500	500	613.43	616.12	616.71	618.12	0.057104	11.83	46.4	26.47	1.37
Main	481.9059	Q=600	600	613.43	616.36	617.04	618.6	0.056738	12.58	52.83	27.68	1.39
Main	571.6713	Q=25	25	616.56	617.34	617.34	617.6	0.049776	4.13	6.07	11.98	1
Main	571.6713	Q=50	50	616.56	617.66	617.66	618.05	0.039275	5.04	10.24	14.08	0.96
Main	571.6713	Q=75	75	616.56	617.92	617.92	618.39	0.034456	5.63	14.09	15.76	0.94
Main	571.6713	Q=100	100	616.56	618.14	618.14	618.68	0.031552	6.09	17.73	17.21	0.93
Main	571.6713	Q=125	125	616.56	618.33	618.33	618.93	0.030069	6.49	21.09	18.44	0.93
Main	571.6713	Q=150	150	616.56	618.51	618.51	619.16	0.028264	6.78	24.52	19.52	0.92
Main	571.6713	Q=175	175	616.56	618.66	618.66	619.37	0.02741	7.09	27.64	20.34	0.92
Main	571.6713	Q=200	200	616.56	618.81	618.81	619.56	0.026764	7.36	30.62	21.03	0.92
Main	571.6713	Q=250	250	616.56	619.07	619.07	619.91	0.025894	7.86	36.25	22.23	0.92
Main	571.6713	Q=300	300	616.56	619.3	619.3	620.22	0.025299	8.29	41.58	23.31	0.93
Main	571.6713	Q=350	350	616.56	619.52	619.52	620.51	0.02464	8.66	46.83	24.32	0.93
Main	571.6713	Q=400	400	616.56	619.73	619.73	620.78	0.023942	8.97	52.03	25.29	0.93
Main	571.6713	Q=450	450	616.56	619.92	619.92	621.04	0.023765	9.31	56.75	26.13	0.93
Main	571.6713	Q=500	500	616.56	620.11	620.11	621.27	0.023006	9.54	61.93	27.05	0.93
Main	571.6713	Q=600	600	616.56	620.44	620.44	621.72	0.022619	10.08	71.08	28.63	0.93
Main	699.0435	Q=25	25	620.38	621.39	621.21	621.53	0.020822	3.02	8.28	13.01	0.67
Main	699.0435	Q=50	50	620.38	621.71	621.54	621.95	0.024377	3.89	12.86	15.57	0.75
Main	699.0435	Q=75	75	620.38	621.93	621.78	622.26	0.026651	4.57	16.46	17.18	0.81

Schenck - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	699.0435	Q=100	100	620.38	622.09	621.99	622.52	0.028565	5.23	19.29	18.09	0.86
Main	699.0435	Q=125	125	620.38	622.24	622.16	622.75	0.029749	5.78	21.98	18.91	0.9
Main	699.0435	Q=150	150	620.38	622.21	622.32	622.99	0.04664	7.12	21.38	18.73	1.12
Main	699.0435	Q=175	175	620.38	622.31	622.47	623.21	0.0479	7.62	23.44	19.34	1.15
Main	699.0435	Q=200	200	620.38	622.41	622.62	623.41	0.048943	8.08	25.42	19.92	1.17
Main	699.0435	Q=250	250	620.38	622.6	622.88	623.8	0.050492	8.88	29.21	20.96	1.22
Main	699.0435	Q=300	300	620.38	622.79	623.12	624.13	0.049114	9.43	33.38	22.06	1.22
Main	699.0435	Q=350	350	620.38	622.98	623.35	624.44	0.047749	9.9	37.49	23.09	1.22
Main	699.0435	Q=400	400	620.38	623.13	623.54	624.73	0.047547	10.38	41.19	23.93	1.24
Main	699.0435	Q=450	450	620.38	623.28	623.74	625.01	0.047722	10.84	44.65	24.6	1.25
Main	699.0435	Q=500	500	620.38	623.42	623.92	625.26	0.047505	11.25	48.13	25.23	1.26
Main	699.0435	Q=600	600	620.38	623.65	624.23	625.76	0.048679	12.1	54.19	26.17	1.3
Main	796.7723	Q=25	25	623.93	624.7	624.7	624.96	0.050169	4.11	6.1	12.16	1
Main	796.7723	Q=50	50	623.93	625.01	625.01	625.4	0.039825	5.03	10.24	14.09	0.97
Main	796.7723	Q=75	75	623.93	625.27	625.27	625.74	0.034946	5.62	14.04	15.65	0.95
Main	796.7723	Q=100	100	623.93	625.48	625.48	626.03	0.032283	6.1	17.57	16.98	0.94
Main	796.7723	Q=125	125	623.93	625.68	625.68	626.29	0.03038	6.49	20.96	18.16	0.93
Main	796.7723	Q=150	150	623.93	625.86	625.86	626.52	0.028603	6.79	24.34	19.26	0.92
Main	796.7723	Q=175	175	623.93	626.01	626.01	626.72	0.027835	7.1	27.4	20.09	0.92
Main	796.7723	Q=200	200	623.93	626.16	626.16	626.92	0.027106	7.38	30.39	20.86	0.92
Main	796.7723	Q=250	250	623.93	626.43	626.43	627.27	0.02599	7.86	36.14	22.27	0.92
Main	796.7723	Q=300	300	623.93	626.64	626.67	627.59	0.026103	8.37	41.11	23.41	0.94
Main	796.7723	Q=350	350	623.93	626.84	626.89	627.88	0.026384	8.85	45.74	24.43	0.96
Main	796.7723	Q=400	400	623.93	627.03	627.1	628.15	0.026232	9.24	50.46	25.43	0.96
Main	796.7723	Q=450	450	623.93	627.21	627.29	628.4	0.025719	9.55	55.34	26.43	0.97
Main	796.7723	Q=500	500	623.93	627.39	627.49	628.64	0.025452	9.86	59.96	27.33	0.97
Main	796.7723	Q=600	600	623.93	627.75	627.81	629.07	0.023829	10.24	70.12	29.19	0.95
Main	914.2125	Q=25	25	627.93	628.65		628.76	0.022502	2.69	9.31	19.06	0.67
Main	914.2125	Q=50	50	627.93	628.89		629.09	0.02532	3.56	14.21	21.79	0.75
Main	914.2125	Q=75	75	627.93	629.07		629.34	0.026866	4.21	18.19	23.58	0.8
Main	914.2125	Q=100	100	627.93	629.21	629.12	629.56	0.027744	4.75	21.72	24.97	0.84

Schenck - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	914.2125	Q=125	125	627.93	629.34	629.27	629.75	0.028426	5.21	24.99	26.11	0.86
Main	914.2125	Q=150	150	627.93	629.45	629.4	629.93	0.029307	5.64	27.95	27.04	0.89
Main	914.2125	Q=175	175	627.93	629.56	629.52	630.09	0.029399	5.97	30.98	27.96	0.91
Main	914.2125	Q=200	200	627.93	629.66	629.64	630.25	0.029714	6.3	33.8	28.79	0.92
Main	914.2125	Q=250	250	627.93	629.85	629.85	630.53	0.029717	6.83	39.38	30.36	0.94
Main	914.2125	Q=300	300	627.93	630.04	630.04	630.79	0.028389	7.19	45.38	31.95	0.94
Main	914.2125	Q=350	350	627.93	630.23	630.23	631.02	0.026962	7.47	51.42	33.34	0.93
Main	914.2125	Q=400	400	627.93	630.39	630.39	631.24	0.026175	7.75	56.98	34.43	0.92
Main	914.2125	Q=450	450	627.93	630.54	630.54	631.44	0.025905	8.05	62.06	35.4	0.93
Main	914.2125	Q=500	500	627.93	630.68	630.68	631.64	0.025423	8.3	67.22	36.36	0.93
Main	914.2125	Q=600	600	627.93	630.91	630.95	632	0.026068	8.92	75.69	37.87	0.96
Main	1004.907	Q=25	25	629.78	630.73		630.88	0.023804	3.16	7.92	12.9	0.71
Main	1004.907	Q=50	50	629.78	631.07	630.9	631.31	0.023311	3.92	12.81	15.4	0.74
Main	1004.907	Q=75	75	629.78	631.31	631.14	631.63	0.023649	4.56	16.67	16.92	0.77
Main	1004.907	Q=100	100	629.78	631.5	631.34	631.9	0.023909	5.12	20.03	18.03	0.8
Main	1004.907	Q=125	125	629.78	631.67	631.53	632.14	0.02426	5.6	23.12	18.99	0.82
Main	1004.907	Q=150	150	629.78	631.82	631.69	632.37	0.024429	6.01	26.09	19.87	0.84
Main	1004.907	Q=175	175	629.78	631.95	631.85	632.57	0.025072	6.42	28.74	20.62	0.86
Main	1004.907	Q=200	200	629.78	631.86	632	632.78	0.039689	7.79	26.91	20.1	1.08
Main	1004.907	Q=250	250	629.78	632.06	632.27	633.15	0.040967	8.55	31.03	21.25	1.11
Main	1004.907	Q=300	300	629.78	632.25	632.51	633.48	0.041045	9.15	35.2	22.33	1.13
Main	1004.907	Q=350	350	629.78	632.42	632.73	633.8	0.041606	9.71	39.03	23.27	1.16
Main	1004.907	Q=400	400	629.78	632.58	632.94	634.09	0.041926	10.21	42.78	24.15	1.17
Main	1004.907	Q=450	450	629.78	632.73	633.13	634.35	0.041746	10.63	46.58	25.01	1.18
Main	1004.907	Q=500	500	629.78	632.87	633.32	634.61	0.042131	11.07	50.04	25.72	1.2
Main	1004.907	Q=600	600	629.78	633.13	633.64	635.09	0.042509	11.83	56.83	27.06	1.23
Main	1120.9	Q=25	25	633.68	634.43	634.43	634.69	0.047387	4.12	6.2	12.41	0.98
Main	1120.9	Q=50	50	633.68	634.75	634.75	635.13	0.038288	5.02	10.48	14.79	0.96
Main	1120.9	Q=75	75	633.68	635	635	635.46	0.034151	5.62	14.4	16.68	0.94
Main	1120.9	Q=100	100	633.68	635.21	635.21	635.74	0.031199	6.05	18.17	18.14	0.93
Main	1120.9	Q=125	125	633.68	635.4	635.4	635.98	0.029956	6.45	21.54	19.26	0.93

Schenck - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	1120.9	Q=150	150	633.68	635.57	635.57	636.2	0.028212	6.74	25.01	20.32	0.92
Main	1120.9	Q=175	175	633.68	635.71	635.71	636.4	0.027913	7.08	27.98	21.06	0.92
Main	1120.9	Q=200	200	633.68	635.85	635.85	636.58	0.027376	7.37	30.94	21.78	0.93
Main	1120.9	Q=250	250	633.68	636.11	636.11	636.92	0.026164	7.83	36.81	23.14	0.93
Main	1120.9	Q=300	300	633.68	636.34	636.34	637.23	0.025711	8.27	42.15	24.31	0.93
Main	1120.9	Q=350	350	633.68	636.56	636.56	637.51	0.024962	8.63	47.54	25.43	0.93
Main	1120.9	Q=400	400	633.68	636.76	636.76	637.77	0.024341	8.94	52.75	26.42	0.93
Main	1120.9	Q=450	450	633.68	636.94	636.94	638.02	0.024075	9.26	57.6	27.29	0.94
Main	1120.9	Q=500	500	633.68	637.12	637.12	638.25	0.023537	9.52	62.6	28.16	0.93
Main	1120.9	Q=600	600	633.68	637.45	637.45	638.67	0.022661	9.97	72.25	29.64	0.93
Main	1227.28	Q=25	25	636.08	637.04		637.16	0.013575	2.71	9.56	15.06	0.56
Main	1227.28	Q=50	50	636.08	637.37		637.56	0.014956	3.61	14.78	17.47	0.62
Main	1227.28	Q=75	75	636.08	637.6		637.87	0.01596	4.27	19.11	19.05	0.66
Main	1227.28	Q=100	100	636.08	637.79		638.12	0.016846	4.81	22.89	20.2	0.7
Main	1227.28	Q=125	125	636.08	637.97		638.36	0.017135	5.23	26.58	21.26	0.71
Main	1227.28	Q=150	150	636.08	638.12		638.56	0.017838	5.65	29.78	22.14	0.74
Main	1227.28	Q=175	175	636.08	638.27	638.04	638.76	0.017804	5.96	33.22	23.03	0.75
Main	1227.28	Q=200	200	636.08	638.41	638.18	638.94	0.017993	6.26	36.36	23.79	0.76
Main	1227.28	Q=250	250	636.08	638.64	638.44	639.26	0.018688	6.84	42.04	25.16	0.79
Main	1227.28	Q=300	300	636.08	638.86	638.66	639.56	0.018777	7.29	47.81	26.51	0.8
Main	1227.28	Q=350	350	636.08	639.06	638.87	639.83	0.019021	7.71	53.17	27.7	0.82
Main	1227.28	Q=400	400	636.08	639.24	639.07	640.08	0.019301	8.1	58.25	28.78	0.83
Main	1227.28	Q=450	450	636.08	639.41	639.25	640.32	0.019352	8.43	63.38	29.83	0.84
Main	1227.28	Q=500	500	636.08	639.57	639.44	640.54	0.019602	8.76	68.1	30.77	0.85
Main	1227.28	Q=600	600	636.08	639.51	639.77	640.98	0.030355	10.78	66.32	30.42	1.06
Main	1316.166	Q=25	25	638.01	638.87	638.83	639.09	0.039007	3.82	6.61	12.35	0.9
Main	1316.166	Q=50	50	638.01	639.19	639.14	639.52	0.033902	4.64	11.04	14.57	0.89
Main	1316.166	Q=75	75	638.01	639.44	639.39	639.86	0.031685	5.31	14.7	15.8	0.9
Main	1316.166	Q=100	100	638.01	639.64	639.6	640.15	0.030407	5.85	18.05	16.85	0.91
Main	1316.166	Q=125	125	638.01	639.81	639.79	640.4	0.030415	6.35	20.98	17.71	0.93
Main	1316.166	Q=150	150	638.01	639.98	639.96	640.64	0.029608	6.73	23.97	18.46	0.93

Schenck - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	1316.166	Q=175	175	638.01	640.12	640.12	640.85	0.029567	7.12	26.64	19.07	0.95
Main	1316.166	Q=200	200	638.01	640.27	640.27	641.05	0.028625	7.39	29.52	19.71	0.94
Main	1316.166	Q=250	250	638.01	640.54	640.54	641.41	0.027296	7.88	35.02	20.88	0.94
Main	1316.166	Q=300	300	638.01	640.78	640.78	641.74	0.026233	8.3	40.32	21.94	0.94
Main	1316.166	Q=350	350	638.01	641.02	641.02	642.05	0.025273	8.66	45.51	22.91	0.94
Main	1316.166	Q=400	400	638.01	641.23	641.23	642.33	0.024677	9	50.43	23.8	0.94
Main	1316.166	Q=450	450	638.01	641.43	641.43	642.59	0.024155	9.31	55.23	24.64	0.94
Main	1316.166	Q=500	500	638.01	641.63	641.63	642.84	0.02328	9.54	60.32	25.5	0.93
Main	1316.166	Q=600	600	638.01	641.97	641.97	643.31	0.02272	10.08	69.35	27.02	0.93
Main	1381.339	Q=25	25	639.72	640.7	640.52	640.84	0.019287	3.03	8.45	13.54	0.65
Main	1381.339	Q=50	50	639.72	641.01	640.84	641.25	0.021183	4.05	12.87	15.39	0.72
Main	1381.339	Q=75	75	639.72	641.24	641.08	641.58	0.022125	4.78	16.63	16.77	0.77
Main	1381.339	Q=100	100	639.72	641.44	641.3	641.86	0.02288	5.37	20	17.87	0.8
Main	1381.339	Q=125	125	639.72	641.62	641.49	642.11	0.022575	5.8	23.42	18.86	0.81
Main	1381.339	Q=150	150	639.72	641.78	641.66	642.33	0.022829	6.22	26.47	19.7	0.83
Main	1381.339	Q=175	175	639.72	641.94	641.81	642.54	0.022647	6.55	29.56	20.52	0.84
Main	1381.339	Q=200	200	639.72	641.8	641.96	642.75	0.039326	8.2	26.77	19.78	1.09
Main	1381.339	Q=250	250	639.72	642.02	642.23	643.12	0.038872	8.85	31.41	21	1.11
Main	1381.339	Q=300	300	639.72	642.23	642.47	643.45	0.038313	9.39	35.9	22.07	1.12
Main	1381.339	Q=350	350	639.72	642.43	642.7	643.75	0.037399	9.83	40.38	23.09	1.12
Main	1381.339	Q=400	400	639.72	642.62	642.9	644.02	0.036616	10.22	44.74	24.04	1.12
Main	1381.339	Q=450	450	639.72	642.79	643.1	644.28	0.035952	10.57	49	24.94	1.12
Main	1381.339	Q=500	500	639.72	642.95	643.29	644.53	0.035415	10.91	53.13	25.78	1.13
Main	1381.339	Q=600	600	639.72	643.26	643.62	644.97	0.03443	11.49	61.18	27.26	1.13
Main	1454.166	Q=25	25	642.73	643.36	643.36	643.58	0.046126	3.86	6.73	15.68	0.96
Main	1454.166	Q=50	50	642.73	643.63	643.63	643.96	0.038234	4.71	11.44	18.62	0.94
Main	1454.166	Q=75	75	642.73	643.85	643.85	644.24	0.034296	5.25	15.68	20.47	0.93
Main	1454.166	Q=100	100	642.73	644.02	644.02	644.48	0.032767	5.72	19.37	21.62	0.93
Main	1454.166	Q=125	125	642.73	644.18	644.18	644.69	0.031888	6.13	22.77	22.63	0.94
Main	1454.166	Q=150	150	642.73	644.32	644.32	644.89	0.0309	6.46	26.09	23.57	0.94
Main	1454.166	Q=175	175	642.73	644.45	644.45	645.07	0.030145	6.76	29.26	24.44	0.94

Schenck - Pre-Development

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	1454.166	Q=200	200	642.73	644.58	644.58	645.24	0.029241	7.01	32.44	25.28	0.94
Main	1454.166	Q=250	250	642.73	644.81	644.81	645.54	0.028006	7.46	38.46	26.79	0.94
Main	1454.166	Q=300	300	642.73	645.02	645.02	645.82	0.027229	7.87	44.07	27.95	0.94
Main	1454.166	Q=350	350	642.73	645.2	645.2	646.07	0.026678	8.23	49.39	28.98	0.95
Main	1454.166	Q=400	400	642.73	645.38	645.38	646.31	0.026223	8.56	54.54	29.95	0.95
Main	1454.166	Q=450	450	642.73	645.54	645.54	646.53	0.025782	8.85	59.57	30.86	0.95
Main	1454.166	Q=500	500	642.73	645.7	645.7	646.74	0.025285	9.11	64.58	31.74	0.95
Main	1454.166	Q=600	600	642.73	646	646	647.13	0.02462	9.6	74.13	33.36	0.95

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	40.13637	Q=95.35	95.35	579.96	581.23	581.23	581.67	0.030168	5.36	17.95	20.95	0.99
Main-1	40.13637	Q=4	4	579.96	580.22	580.22	580.31	0.052865	2.36	1.69	9.74	1
Main-1	40.13637	Q=8	8	579.96	580.33	580.33	580.45	0.047418	2.76	2.9	12.13	1
Main-1	40.13637	Q=16	16	579.96	580.48	580.48	580.65	0.041952	3.35	4.78	13.68	1
Main-1	40.13637	Q=24	24	579.96	580.59	580.59	580.81	0.040159	3.75	6.39	14.88	1.01
Main-1	40.13637	Q=32	32	579.96	580.69	580.69	580.94	0.03828	4.04	7.92	15.93	1.01
Main-1	40.13637	Q=40	40	579.96	580.78	580.78	581.06	0.036971	4.27	9.37	16.86	1.01
Main-1	40.13637	Q=80	80	579.96	581.12	581.12	581.52	0.031761	5.12	15.7	20.03	1
Main-1	40.13637	Q=120	120	579.96	581.39	581.39	581.89	0.02844	5.69	21.37	22.27	0.98
Main-1	40.13637	Q=160	160	579.96	581.61	581.61	582.19	0.025741	6.16	26.56	24	0.96
Main-1	40.13637	Q=240	240	579.96	582	582	582.7	0.022312	6.86	36.46	27	0.94
Main-1	40.13637	Q=320	320	579.96	582.33	582.33	583.13	0.020177	7.37	45.87	29.57	0.92
Main-1	40.13637	Q=400	400	579.96	582.62	582.62	583.5	0.019053	7.82	54.55	31.72	0.91
Main-1	40.13637	Q=440	440	579.96	582.74	582.74	583.67	0.018638	8.03	58.7	32.67	0.91
Main-1	40.13637	Q=480	480	579.96	582.88	582.88	583.83	0.018005	8.18	63.11	33.66	0.91
Main-1	117.9774	Q=95.35	95.35	581.29	582.82	582.53	583.06	0.011649	3.96	24.59	23.48	0.64
Main-1	117.9774	Q=4	4	581.29	581.67	581.54	581.7	0.009043	1.27	3.15	12.17	0.44
Main-1	117.9774	Q=8	8	581.29	581.81	581.65	581.85	0.009494	1.6	5	14.19	0.48
Main-1	117.9774	Q=16	16	581.29	582	581.8	582.06	0.0102	2.03	7.88	16.49	0.52
Main-1	117.9774	Q=24	24	581.29	582.14	581.91	582.23	0.010327	2.32	10.37	18.13	0.54
Main-1	117.9774	Q=32	32	581.29	582.25	582.01	582.36	0.010549	2.58	12.45	19.16	0.56
Main-1	117.9774	Q=40	40	581.29	582.35	582.1	582.47	0.010814	2.8	14.34	20.06	0.57
Main-1	117.9774	Q=80	80	581.29	582.71	582.43	582.92	0.011461	3.68	22.08	22.78	0.63
Main-1	117.9774	Q=120	120	581.29	582.97	582.68	583.26	0.012061	4.37	28.23	24.46	0.67
Main-1	117.9774	Q=160	160	581.29	583.19	582.91	583.55	0.012546	4.92	33.66	25.86	0.7
Main-1	117.9774	Q=240	240	581.29	583.53	583.29	584.04	0.013524	5.85	43.03	28.11	0.75
Main-1	117.9774	Q=320	320	581.29	583.81	583.61	584.45	0.014393	6.62	51.16	29.91	0.79
Main-1	117.9774	Q=400	400	581.29	583.67	583.9	584.86	0.029215	9	46.83	28.97	1.11
Main-1	117.9774	Q=440	440	581.29	583.77	584.03	585.04	0.029184	9.31	49.97	29.66	1.12
Main-1	117.9774	Q=480	480	581.29	583.88	584.16	585.22	0.029156	9.6	53.02	30.28	1.13

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main-1	67.45072	Q=95.35	94.6	585.2	586.39	586.55	587.04	0.024292	6.49	14.58	18.73	1.3
Main-1	67.45072	Q=4	2.5	585.2	585.45	585.45	585.52	0.025268	2.12	1.18	8.41	1
Main-1	67.45072	Q=8	5	585.2	585.53	585.53	585.63	0.022231	2.54	1.97	9.76	0.99
Main-1	67.45072	Q=16	10	585.2	585.66	585.66	585.8	0.019821	3.04	3.29	11.36	1
Main-1	67.45072	Q=24	15	585.2	585.74	585.75	585.93	0.021218	3.53	4.26	12.4	1.06
Main-1	67.45072	Q=32	20	585.2	585.81	585.84	586.04	0.0214	3.85	5.19	13.33	1.09
Main-1	67.45072	Q=40	25	585.2	585.87	585.91	586.14	0.021981	4.15	6.03	14.1	1.12
Main-1	67.45072	Q=80	50	585.2	586.1	586.19	586.53	0.023436	5.26	9.51	16.32	1.21
Main-1	67.45072	Q=120	75	585.2	586.27	586.4	586.84	0.024029	6.01	12.47	17.82	1.27
Main-1	67.45072	Q=160	100	585.2	586.42	586.58	587.1	0.024091	6.58	15.2	18.99	1.3
Main-1	67.45072	Q=240	150	585.2	586.67	586.89	587.53	0.023919	7.42	20.23	20.96	1.33
Main-1	67.45072	Q=320	200	585.2	586.89	587.15	587.89	0.02381	8.06	24.82	22.6	1.35
Main-1	67.45072	Q=400	250	585.2	587.12	587.38	588.18	0.021268	8.25	30.29	24.4	1.31
Main-1	67.45072	Q=440	275	585.2	587.22	587.48	588.31	0.020419	8.36	32.9	25.22	1.29
Main-1	67.45072	Q=480	300	585.2	587.33	587.58	588.43	0.019587	8.44	35.55	26.02	1.27
Main-1	163.866	Q=95.35	94.6	587.46	588.76	588.76	589.17	0.019779	5.15	18.38	22.77	1.01
Main-1	163.866	Q=4	2.5	587.46	587.73	587.7	587.78	0.021787	1.79	1.4	9.14	0.81
Main-1	163.866	Q=8	5	587.46	587.8	587.79	587.89	0.024772	2.34	2.14	10.3	0.9
Main-1	163.866	Q=16	10	587.46	587.91	587.91	588.05	0.02792	3.02	3.32	11.92	1.01
Main-1	163.866	Q=24	15	587.46	588.01	588.01	588.17	0.025572	3.3	4.55	13.4	1
Main-1	163.866	Q=32	20	587.46	588.08	588.08	588.28	0.025227	3.56	5.61	14.54	1.01
Main-1	163.866	Q=40	25	587.46	588.15	588.15	588.37	0.024364	3.75	6.66	15.54	1.01
Main-1	163.866	Q=80	50	587.46	588.42	588.42	588.72	0.021861	4.43	11.29	18.95	1.01
Main-1	163.866	Q=120	75	587.46	588.62	588.62	588.99	0.020434	4.86	15.44	21.41	1.01
Main-1	163.866	Q=160	100	587.46	588.79	588.79	589.21	0.01962	5.22	19.16	23.09	1.01
Main-1	163.866	Q=240	150	587.46	589.07	589.07	589.59	0.018419	5.77	26.01	25.71	1.01
Main-1	163.866	Q=320	200	587.46	589.31	589.31	589.9	0.017636	6.16	32.45	28.08	1.01
Main-1	163.866	Q=400	250	587.46	589.45	589.52	590.18	0.019604	6.84	36.55	29.28	1.08
Main-1	163.866	Q=440	275	587.46	589.51	589.61	590.31	0.020726	7.18	38.32	29.77	1.11
Main-1	163.866	Q=480	300	587.46	589.57	589.7	590.44	0.02173	7.49	40.07	30.25	1.15

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main-1	269.0372	Q=95.35	94.6	588.63	590.43		590.83	0.012914	5.06	18.7	16.95	0.85
Main-1	269.0372	Q=4	2.5	588.63	589.05		589.08	0.008094	1.45	1.73	7.37	0.53
Main-1	269.0372	Q=8	5	588.63	589.19	589.06	589.24	0.00781	1.79	2.8	8.43	0.55
Main-1	269.0372	Q=16	10	588.63	589.37		589.45	0.007772	2.22	4.51	9.73	0.57
Main-1	269.0372	Q=24	15	588.63	589.51		589.61	0.008304	2.57	5.85	10.64	0.61
Main-1	269.0372	Q=32	20	588.63	589.61	589.42	589.74	0.008727	2.84	7.04	11.39	0.64
Main-1	269.0372	Q=40	25	588.63	589.71	589.51	589.85	0.009129	3.08	8.12	12.03	0.66
Main-1	269.0372	Q=80	50	588.63	590.05		590.29	0.010731	3.96	12.61	14.39	0.75
Main-1	269.0372	Q=120	75	588.63	590.28		590.62	0.012065	4.62	16.23	16.04	0.81
Main-1	269.0372	Q=160	100	588.63	590.47	590.34	590.89	0.013127	5.17	19.33	17.14	0.86
Main-1	269.0372	Q=240	150	588.63	590.76	590.69	591.34	0.014892	6.1	24.59	18.67	0.94
Main-1	269.0372	Q=320	200	588.63	591	590.99	591.73	0.016417	6.86	29.15	19.9	1
Main-1	269.0372	Q=400	250	588.63	591.25	591.25	592.08	0.016293	7.29	34.28	21.2	1.01
Main-1	269.0372	Q=440	275	588.63	591.37	591.37	592.23	0.016006	7.44	36.95	21.84	1.01
Main-1	269.0372	Q=480	300	588.63	591.49	591.49	592.38	0.015877	7.6	39.46	22.43	1.01
Main-1	355.8186	Q=95.35	94.6	589.27	591.29		591.41	0.003741	2.69	35.12	26.81	0.41
Main-1	355.8186	Q=4	2.5	589.27	589.65		589.66	0.005658	1.04	2.4	10.55	0.38
Main-1	355.8186	Q=8	5	589.27	589.78		589.8	0.005536	1.27	3.93	12.52	0.4
Main-1	355.8186	Q=16	10	589.27	589.96		590	0.005349	1.54	6.5	15.15	0.41
Main-1	355.8186	Q=24	15	589.27	590.11		590.16	0.004878	1.68	8.91	16.94	0.41
Main-1	355.8186	Q=32	20	589.27	590.23		590.28	0.004738	1.82	11	18.23	0.41
Main-1	355.8186	Q=40	25	589.27	590.34		590.4	0.004537	1.92	13.01	19.19	0.41
Main-1	355.8186	Q=80	50	589.27	590.76		590.84	0.00403	2.28	21.94	22.83	0.41
Main-1	355.8186	Q=120	75	589.27	591.08		591.18	0.003844	2.54	29.55	25.21	0.41
Main-1	355.8186	Q=160	100	589.27	591.35		591.46	0.00371	2.74	36.54	27.16	0.42
Main-1	355.8186	Q=240	150	589.27	591.78		591.93	0.003422	3.08	48.93	29.83	0.41
Main-1	355.8186	Q=320	200	589.27	592.14		592.32	0.003166	3.37	60.11	31.71	0.41
Main-1	355.8186	Q=400	250	589.27	592.45		592.66	0.003059	3.63	70.18	33.32	0.41
Main-1	355.8186	Q=440	275	589.27	592.59		592.81	0.00303	3.75	74.92	34.05	0.42
Main-1	355.8186	Q=480	300	589.27	592.73		592.96	0.002998	3.87	79.6	34.75	0.42

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	424.0896	Q=95.35	94.6	589.71	591.57		591.7	0.004695	2.88	32.81	26.87	0.46
Main-1	424.0896	Q=4	2.5	589.71	590.05		590.06	0.005845	1.02	2.44	11.25	0.39
Main-1	424.0896	Q=8	5	589.71	590.17		590.19	0.006052	1.29	3.88	12.97	0.42
Main-1	424.0896	Q=16	10	589.71	590.34		590.38	0.005865	1.58	6.32	15.14	0.43
Main-1	424.0896	Q=24	15	589.71	590.47		590.52	0.005818	1.78	8.42	16.77	0.44
Main-1	424.0896	Q=32	20	589.71	590.58		590.64	0.005749	1.93	10.36	18.15	0.45
Main-1	424.0896	Q=40	25	589.71	590.68		590.75	0.005605	2.04	12.26	19.41	0.45
Main-1	424.0896	Q=80	50	589.71	591.06		591.16	0.005165	2.46	20.32	22.73	0.46
Main-1	424.0896	Q=120	75	589.71	591.36		591.48	0.004875	2.73	27.5	25.2	0.46
Main-1	424.0896	Q=160	100	589.71	591.62		591.75	0.004674	2.93	34.18	27.28	0.46
Main-1	424.0896	Q=240	150	589.71	592.03		592.2	0.004461	3.24	46.24	30.62	0.46
Main-1	424.0896	Q=320	200	589.71	592.38		592.57	0.004197	3.5	57.27	33.14	0.46
Main-1	424.0896	Q=400	250	589.71	592.68		592.89	0.003891	3.74	67.44	35.13	0.46
Main-1	424.0896	Q=440	275	589.71	592.82		593.04	0.003786	3.85	72.31	36.04	0.46
Main-1	424.0896	Q=480	300	589.71	592.95		593.19	0.00369	3.95	77.15	36.93	0.45
Main-1	617.451	Q=95.35	94.6	589.87	592.16	591.1	592.22	0.00168	1.95	48.58	33.14	0.28
Main-1	617.451	Q=4	2.5	589.87	590.39	590.08	590.39	0.0008	0.51	4.95	14.78	0.15
Main-1	617.451	Q=8	5	589.87	590.55	590.16	590.56	0.000921	0.66	7.6	16.97	0.17
Main-1	617.451	Q=16	10	589.87	590.78	590.27	590.79	0.001068	0.86	11.66	19.52	0.2
Main-1	617.451	Q=24	15	589.87	590.94	590.37	590.96	0.001173	1	15	21.39	0.21
Main-1	617.451	Q=32	20	589.87	591.07	590.44	591.09	0.00126	1.11	17.94	22.91	0.22
Main-1	617.451	Q=40	25	589.87	591.19	590.5	591.21	0.001316	1.21	20.7	24.2	0.23
Main-1	617.451	Q=80	50	589.87	591.62	590.76	591.66	0.001524	1.56	32.03	28.39	0.26
Main-1	617.451	Q=120	75	589.87	591.94	590.96	591.99	0.001628	1.8	41.66	31.26	0.27
Main-1	617.451	Q=160	100	589.87	592.21	591.13	592.27	0.001694	1.98	50.39	33.62	0.29
Main-1	617.451	Q=240	150	589.87	592.64	591.41	592.72	0.001753	2.3	65.41	37.27	0.3
Main-1	617.451	Q=320	200	589.87	592.98	591.64	593.08	0.001775	2.56	78.76	40.18	0.31
Main-1	617.451	Q=400	250	589.87	593.27	591.85	593.39	0.001782	2.8	90.78	42.07	0.32
Main-1	617.451	Q=440	275	589.87	593.41	591.94	593.54	0.001783	2.9	96.54	42.87	0.32
Main-1	617.451	Q=480	300	589.87	593.54	592.03	593.68	0.001781	3	102.2	43.63	0.32

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main-1	751.7308	Q=95.35	94.6	591.99	593.45	593.45	593.94	0.013844	5.62	16.84	17.46	1.01
Main-1	751.7308	Q=4	2.5	591.99	592.23	592.23	592.31	0.024162	2.29	1.09	6.68	1
Main-1	751.7308	Q=8	5	591.99	592.33	592.33	592.45	0.0215	2.72	1.84	8	1
Main-1	751.7308	Q=16	10	591.99	592.48	592.48	592.64	0.019605	3.21	3.12	9.85	1
Main-1	751.7308	Q=24	15	591.99	592.58	592.58	592.78	0.018671	3.55	4.23	11.07	1.01
Main-1	751.7308	Q=32	20	591.99	592.67	592.67	592.9	0.017846	3.81	5.25	11.9	1.01
Main-1	751.7308	Q=40	25	591.99	592.75	592.75	593	0.017016	4.01	6.24	12.65	1.01
Main-1	751.7308	Q=80	50	591.99	593.05	593.05	593.41	0.015369	4.8	10.41	14.85	1.01
Main-1	751.7308	Q=120	75	591.99	593.29	593.29	593.73	0.014354	5.31	14.13	16.41	1.01
Main-1	751.7308	Q=160	100	591.99	593.49	593.49	594	0.013709	5.69	17.57	17.73	1.01
Main-1	751.7308	Q=240	150	591.99	593.8	593.82	594.45	0.013162	6.45	23.33	19.59	1.02
Main-1	751.7308	Q=320	200	591.99	594.04	594.11	594.83	0.013465	7.18	28.12	20.98	1.06
Main-1	751.7308	Q=400	250	591.99	594.25	594.36	595.18	0.013641	7.77	32.66	22.21	1.08
Main-1	751.7308	Q=440	275	591.99	594.34	594.47	595.34	0.01385	8.06	34.72	22.75	1.1
Main-1	751.7308	Q=480	300	591.99	594.42	594.58	595.5	0.014033	8.37	36.58	23.14	1.12
Main-1	885.8018	Q=95.35	88.81	594.43	595.65	595.89	596.5	0.030732	7.43	11.95	14.81	1.46
Main-1	885.8018	Q=4	2.5	594.43	594.59	594.66	594.84	0.118651	4.01	0.62	5.44	2.09
Main-1	885.8018	Q=8	5	594.43	594.79	594.77	594.89	0.015664	2.51	1.99	7.68	0.87
Main-1	885.8018	Q=16	10	594.43	594.89	594.92	595.09	0.025639	3.66	2.74	8.66	1.15
Main-1	885.8018	Q=24	15	594.43	594.97	595.03	595.25	0.028435	4.26	3.52	9.59	1.24
Main-1	885.8018	Q=32	20	594.43	595.05	595.13	595.38	0.028393	4.61	4.34	10.46	1.26
Main-1	885.8018	Q=40	25	594.43	595.12	595.21	595.5	0.029011	4.95	5.05	11.09	1.29
Main-1	885.8018	Q=80	50	594.43	595.37	595.53	595.96	0.030375	6.2	8.07	13.08	1.39
Main-1	885.8018	Q=120	75	594.43	595.55	595.77	596.33	0.03087	7.07	10.61	14.23	1.44
Main-1	885.8018	Q=160	100	594.43	595.72	595.98	596.64	0.030598	7.69	13	15.24	1.47
Main-1	885.8018	Q=240	150	594.43	596	596.33	597.14	0.029676	8.58	17.49	16.97	1.49
Main-1	885.8018	Q=320	200	594.43	596.23	596.61	597.56	0.029368	9.28	21.55	18.39	1.51
Main-1	885.8018	Q=400	250	594.43	596.4	596.86	597.97	0.029729	10.03	24.94	19.33	1.55
Main-1	885.8018	Q=440	275	594.43	596.49	596.97	598.15	0.029481	10.34	26.64	19.76	1.55
Main-1	885.8018	Q=480	300	594.43	596.57	597.09	598.33	0.02933	10.63	28.28	20.15	1.56

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	998.6823	Q=95.35	88.81	597.59	598.85	598.85	599.28	0.019683	5.22	17.02	20.54	1.01
Main-1	998.6823	Q=4	2.5	597.59	597.82	597.82	597.89	0.034822	2.1	1.19	8.75	1
Main-1	998.6823	Q=8	5	597.59	597.91	597.91	598.01	0.030473	2.52	1.99	10	1
Main-1	998.6823	Q=16	10	597.59	598.03	598.03	598.17	0.028975	3.08	3.25	11.66	1.03
Main-1	998.6823	Q=24	15	597.59	598.13	598.13	598.3	0.025488	3.32	4.52	13.1	1
Main-1	998.6823	Q=32	20	597.59	598.2	598.2	598.4	0.025073	3.59	5.57	14.2	1.01
Main-1	998.6823	Q=40	25	597.59	598.28	598.28	598.5	0.024045	3.77	6.63	15.22	1.01
Main-1	998.6823	Q=80	50	597.59	598.54	598.54	598.86	0.021597	4.51	11.07	17.86	1.01
Main-1	998.6823	Q=120	75	597.59	598.75	598.75	599.14	0.02021	5	14.99	19.67	1.01
Main-1	998.6823	Q=160	100	597.59	598.93	598.93	599.38	0.019262	5.37	18.64	21.22	1.01
Main-1	998.6823	Q=240	150	597.59	599.23	599.23	599.77	0.018009	5.91	25.4	23.81	1.01
Main-1	998.6823	Q=320	200	597.59	599.47	599.47	600.11	0.01688	6.43	31.19	25.46	1
Main-1	998.6823	Q=400	250	597.59	599.68	599.68	600.41	0.015485	6.84	36.89	26.84	0.99
Main-1	998.6823	Q=440	275	597.59	599.78	599.78	600.55	0.015019	7.04	39.6	27.48	0.98
Main-1	998.6823	Q=480	300	597.59	599.88	599.88	600.68	0.014529	7.2	42.36	28.11	0.98
Main-1	1083.475	Q=95.35	88.81	597.74	599.55	598.87	599.65	0.001683	2.56	35.61	28.53	0.38
Main-1	1083.475	Q=4	2.5	597.74	598.15	597.95	598.15	0.001059	0.65	3.83	14.79	0.23
Main-1	1083.475	Q=8	5	597.74	598.28	598.02	598.29	0.00115	0.84	5.97	16.9	0.25
Main-1	1083.475	Q=16	10	597.74	598.46	598.13	598.48	0.001259	1.08	9.22	18.93	0.27
Main-1	1083.475	Q=24	15	597.74	598.59	598.21	598.62	0.001375	1.27	11.8	20.4	0.29
Main-1	1083.475	Q=32	20	597.74	598.71	598.28	598.74	0.001443	1.41	14.16	21.66	0.31
Main-1	1083.475	Q=40	25	597.74	598.8	598.34	598.84	0.00149	1.53	16.36	22.77	0.32
Main-1	1083.475	Q=80	50	597.74	599.16	598.58	599.22	0.001599	2.01	24.99	25.74	0.35
Main-1	1083.475	Q=120	75	597.74	599.42	598.78	599.51	0.001657	2.39	32.04	27.63	0.37
Main-1	1083.475	Q=160	100	597.74	599.64	598.94	599.75	0.001717	2.7	38.27	29.19	0.39
Main-1	1083.475	Q=240	150	597.74	600.01		600.16	0.001794	3.19	49.51	31.82	0.41
Main-1	1083.475	Q=320	200	597.74	600.32		600.51	0.001849	3.58	59.57	33.49	0.43
Main-1	1083.475	Q=400	250	597.74	600.59		600.81	0.001896	3.91	68.76	34.83	0.44
Main-1	1083.475	Q=440	275	597.74	600.71		600.95	0.001913	4.06	73.17	35.46	0.45
Main-1	1083.475	Q=480	300	597.74	600.83		601.09	0.001929	4.21	77.43	36.06	0.45

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	1180.775	Q=95.35	88.81	598.58	599.76	599.76	600.15	0.014871	5	17.78	23.48	1.01
Main-1	1180.775	Q=4	2.5	598.58	598.78	598.79	598.86	0.033413	2.26	1.11	8.88	1.13
Main-1	1180.775	Q=8	5	598.58	598.84	598.87	598.97	0.038966	2.94	1.7	10.3	1.27
Main-1	1180.775	Q=16	10	598.58	598.93	598.98	599.14	0.040977	3.72	2.69	11.87	1.38
Main-1	1180.775	Q=24	15	598.58	599	599.08	599.28	0.041496	4.24	3.54	12.97	1.43
Main-1	1180.775	Q=32	20	598.58	599.05	599.15	599.39	0.042442	4.66	4.29	13.86	1.48
Main-1	1180.775	Q=40	25	598.58	599.1	599.22	599.49	0.042957	5	5	14.64	1.51
Main-1	1180.775	Q=80	50	598.58	599.48	599.48	599.77	0.016211	4.33	11.55	20.19	1.01
Main-1	1180.775	Q=120	75	598.58	599.67	599.67	600.02	0.015238	4.79	15.65	22.41	1.01
Main-1	1180.775	Q=160	100	598.58	599.84	599.84	600.24	0.01435	5.11	19.58	24.35	1
Main-1	1180.775	Q=240	150	598.58	600.16	600.1	600.61	0.011064	5.36	28.08	27.83	0.92
Main-1	1180.775	Q=320	200	598.58	600.46	600.33	600.93	0.008661	5.51	36.8	30.71	0.85
Main-1	1180.775	Q=400	250	598.58	600.72	600.52	601.22	0.007297	5.7	45.06	32.89	0.8
Main-1	1180.775	Q=440	275	598.58	600.84	600.62	601.35	0.006811	5.79	49.12	33.78	0.78
Main-1	1180.775	Q=480	300	598.58	600.96	600.71	601.48	0.006425	5.88	53.09	34.62	0.77
T1	116.1027	Q=95.35	28.51	605.86	606.79	606.79	607.1	0.021495	4.48	6.41	10.75	1
T1	116.1027	Q=4	1	605.86	606.04	606.04	606.1	0.052491	1.96	0.51	5.59	1.15
T1	116.1027	Q=8	2	605.86	606.11	606.11	606.18	0.033917	2.21	0.91	5.99	1
T1	116.1027	Q=16	4	605.86	606.2	606.2	606.31	0.029681	2.71	1.47	6.4	1
T1	116.1027	Q=24	6	605.86	606.27	606.27	606.42	0.028547	3.09	1.94	6.72	1.01
T1	116.1027	Q=32	8	605.86	606.33	606.33	606.51	0.026945	3.34	2.4	7.04	1.01
T1	116.1027	Q=40	10	605.86	606.4	606.4	606.59	0.02605	3.51	2.85	7.54	1.01
T1	116.1027	Q=80	20	605.86	606.63	606.63	606.9	0.023526	4.11	4.87	9.5	1.01
T1	116.1027	Q=120	30	605.86	606.81	606.81	607.13	0.021117	4.52	6.68	10.96	0.99
T1	116.1027	Q=160	40	605.86	606.96	606.96	607.32	0.019614	4.82	8.42	12.2	0.98
T1	116.1027	Q=240	60	605.86	607.2	607.2	607.63	0.017524	5.34	11.56	14.02	0.96
T1	116.1027	Q=320	80	605.86	607.4	607.4	607.9	0.015878	5.77	14.48	15.4	0.95
T1	116.1027	Q=400	100	605.86	607.58	607.58	608.13	0.01465	6.1	17.35	16.65	0.93
T1	116.1027	Q=440	110	605.86	607.66	607.66	608.23	0.014127	6.24	18.77	17.23	0.92
T1	116.1027	Q=480	120	605.86	607.75	607.75	608.33	0.013507	6.34	20.27	17.83	0.91

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	179.5178	Q=95.35	28.51	605.86	607.43	606.8	607.5	0.002831	2.1	13.84	13.93	0.35
T1	179.5178	Q=4	1	605.86	606.26	606	606.27	0.000836	0.49	2.02	6.31	0.15
T1	179.5178	Q=8	2	605.86	606.39	606.07	606.4	0.001205	0.7	2.85	6.92	0.19
T1	179.5178	Q=16	4	605.86	606.57	606.17	606.59	0.001598	0.95	4.23	8.05	0.23
T1	179.5178	Q=24	6	605.86	606.71	606.24	606.73	0.001872	1.11	5.41	9.14	0.25
T1	179.5178	Q=32	8	605.86	606.82	606.31	606.84	0.002092	1.24	6.45	10	0.27
T1	179.5178	Q=40	10	605.86	606.91	606.38	606.94	0.002199	1.35	7.4	10.64	0.28
T1	179.5178	Q=80	20	605.86	607.24	606.63	607.29	0.002625	1.8	11.24	12.81	0.33
T1	179.5178	Q=120	30	605.86	607.46	606.83	607.53	0.002865	2.15	14.25	14.1	0.35
T1	179.5178	Q=160	40	605.86	607.65	606.98	607.74	0.003007	2.43	16.97	15.14	0.37
T1	179.5178	Q=240	60	605.86	607.94	607.24	608.07	0.003285	2.9	21.68	16.8	0.4
T1	179.5178	Q=320	80	605.86	608.19	607.44	608.34	0.003475	3.27	25.93	18.16	0.42
T1	179.5178	Q=400	100	605.86	608.39	607.63	608.58	0.003652	3.59	29.72	19.09	0.44
T1	179.5178	Q=440	110	605.86	608.48	607.72	608.68	0.003726	3.73	31.51	19.5	0.44
T1	179.5178	Q=480	120	605.86	608.57	607.8	608.78	0.003811	3.87	33.19	19.87	0.45
T1	279.4417	Q=95.35	28.51	608.07	609.1	609.1	609.43	0.027092	4.62	6.22	9.67	0.99
T1	279.4417	Q=4	1	608.07	608.3	608.3	608.36	0.048139	1.91	0.52	4.57	0.99
T1	279.4417	Q=8	2	608.07	608.38	608.38	608.45	0.035798	2.16	0.93	5.38	0.92
T1	279.4417	Q=16	4	608.07	608.46	608.46	608.59	0.039163	2.84	1.41	5.75	1.01
T1	279.4417	Q=24	6	608.07	608.54	608.54	608.7	0.03672	3.2	1.88	6.08	1.01
T1	279.4417	Q=32	8	608.07	608.61	608.61	608.8	0.034636	3.45	2.32	6.37	1.01
T1	279.4417	Q=40	10	608.07	608.68	608.68	608.89	0.03358	3.65	2.74	6.76	1.01
T1	279.4417	Q=80	20	608.07	608.94	608.94	609.22	0.029031	4.26	4.71	8.48	0.99
T1	279.4417	Q=120	30	608.07	609.13	609.13	609.47	0.026639	4.66	6.49	9.87	0.98
T1	279.4417	Q=160	40	608.07	609.28	609.28	609.67	0.025025	5.06	8.03	10.71	0.98
T1	279.4417	Q=240	60	608.07	609.54	609.54	610.02	0.021482	5.63	10.99	11.96	0.95
T1	279.4417	Q=320	80	608.07	609.76	609.76	610.31	0.019498	6.07	13.76	13.02	0.93
T1	279.4417	Q=400	100	608.07	609.93	609.96	610.57	0.01977	6.6	15.93	13.79	0.96
T1	279.4417	Q=440	110	608.07	609.99	610.05	610.69	0.020181	6.88	16.88	14.12	0.98
T1	279.4417	Q=480	120	608.07	610.07	610.14	610.8	0.020123	7.09	17.94	14.46	0.98

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	349.1169	Q=95.35	28.51	609.57	610.69	610.57	610.9	0.016719	3.66	7.81	11.91	0.78
T1	349.1169	Q=4	1	609.57	609.81		609.83	0.011888	1.26	0.79	4.47	0.53
T1	349.1169	Q=8	2	609.57	609.89		609.93	0.014103	1.68	1.19	5	0.6
T1	349.1169	Q=16	4	609.57	610.03		610.1	0.013516	2.04	1.96	5.89	0.62
T1	349.1169	Q=24	6	609.57	610.13		610.22	0.014124	2.32	2.58	6.6	0.65
T1	349.1169	Q=32	8	609.57	610.22		610.32	0.014735	2.52	3.17	7.41	0.68
T1	349.1169	Q=40	10	609.57	610.29	610.16	610.4	0.015011	2.66	3.75	8.19	0.69
T1	349.1169	Q=80	20	609.57	610.55	610.42	610.71	0.016242	3.24	6.18	10.77	0.75
T1	349.1169	Q=120	30	609.57	610.71	610.59	610.93	0.016805	3.74	8.05	12.02	0.79
T1	349.1169	Q=160	40	609.57	610.84	610.73	611.11	0.016968	4.2	9.62	12.73	0.81
T1	349.1169	Q=240	60	609.57	611.03	610.97	611.42	0.018551	5.05	12.16	13.8	0.88
T1	349.1169	Q=320	80	609.57	611.19	611.18	611.68	0.01976	5.74	14.41	14.68	0.93
T1	349.1169	Q=400	100	609.57	611.35	611.35	611.92	0.019009	6.15	16.96	15.62	0.93
T1	349.1169	Q=440	110	609.57	611.44	611.44	612.03	0.018162	6.27	18.37	16.11	0.92
T1	349.1169	Q=480	120	609.57	611.52	611.52	612.13	0.017932	6.45	19.58	16.52	0.92
T1	413.2939	Q=95.35	28.51	609.84	611.29	610.84	611.4	0.004432	2.68	11.24	12.68	0.44
T1	413.2939	Q=4	1	609.84	610.22	610.08	610.23	0.003625	0.78	1.28	6.16	0.3
T1	413.2939	Q=8	2	609.84	610.33	610.15	610.35	0.003555	0.98	2.05	6.84	0.32
T1	413.2939	Q=16	4	609.84	610.49	610.24	610.52	0.003791	1.26	3.18	7.59	0.34
T1	413.2939	Q=24	6	609.84	610.62	610.32	610.65	0.003809	1.43	4.19	8.21	0.35
T1	413.2939	Q=32	8	609.84	610.72	610.38	610.76	0.003895	1.59	5.03	8.83	0.37
T1	413.2939	Q=40	10	609.84	610.8	610.44	610.85	0.003933	1.74	5.77	9.37	0.38
T1	413.2939	Q=80	20	609.84	611.11	610.68	611.19	0.004166	2.31	8.99	11.43	0.41
T1	413.2939	Q=120	30	609.84	611.32	610.87	611.43	0.004466	2.73	11.61	12.88	0.44
T1	413.2939	Q=160	40	609.84	611.5	611.03	611.64	0.00466	3.06	14	14.06	0.46
T1	413.2939	Q=240	60	609.84	611.8	611.3	611.97	0.004773	3.53	18.42	15.6	0.48
T1	413.2939	Q=320	80	609.84	612.05	611.53	612.26	0.004762	3.87	22.53	16.88	0.49
T1	413.2939	Q=400	100	609.84	612.26	611.71	612.5	0.004858	4.19	26.15	17.89	0.51
T1	413.2939	Q=440	110	609.84	612.35	611.79	612.61	0.004949	4.34	27.76	18.26	0.51
T1	413.2939	Q=480	120	609.84	611.36	611.87	612.98	0.062893	10.48	12.14	13.15	1.66

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	504.1011	Q=95.35	28.51	612.9	613.89	613.95	614.32	0.027693	5.25	5.46	8.79	1.14
T1	504.1011	Q=4	1	612.9	613.16	613.16	613.23	0.035326	2.05	0.49	3.72	1
T1	504.1011	Q=8	2	612.9	613.24	613.24	613.33	0.034692	2.42	0.83	4.84	1.03
T1	504.1011	Q=16	4	612.9	613.35	613.35	613.47	0.030221	2.79	1.43	6.11	1.01
T1	504.1011	Q=24	6	612.9	613.43	613.43	613.58	0.027097	3.09	1.94	6.51	1
T1	504.1011	Q=32	8	612.9	613.47	613.49	613.67	0.03221	3.6	2.22	6.73	1.1
T1	504.1011	Q=40	10	612.9	613.55	613.55	613.76	0.027325	3.66	2.73	7.1	1.04
T1	504.1011	Q=80	20	612.9	613.75	613.79	614.09	0.029033	4.64	4.31	8.15	1.13
T1	504.1011	Q=120	30	612.9	613.92	613.98	614.35	0.026534	5.28	5.72	8.93	1.12
T1	504.1011	Q=160	40	612.9	614.06	614.14	614.58	0.024473	5.77	7.07	9.61	1.11
T1	504.1011	Q=240	60	612.9	614.32	614.43	614.96	0.021796	6.5	9.66	10.79	1.1
T1	504.1011	Q=320	80	612.9	614.54	614.66	615.28	0.02004	7.05	12.14	11.82	1.09
T1	504.1011	Q=400	100	612.9	614.74	614.87	615.55	0.018704	7.48	14.56	12.74	1.07
T1	504.1011	Q=440	110	612.9	614.83	614.97	615.68	0.018204	7.67	15.73	13.16	1.07
T1	504.1011	Q=480	120	612.9	614.91	615.06	615.8	0.017763	7.85	16.9	13.56	1.07
T1	590.9022	Q=95.35	28.51	615.37	616.22	616.24	616.54	0.023598	4.51	6.38	11.88	1.04
T1	590.9022	Q=4	1	615.37	615.54	615.52	615.58	0.021291	1.53	0.65	5.3	0.77
T1	590.9022	Q=8	2	615.37	615.61	615.58	615.67	0.021449	1.94	1.03	5.89	0.82
T1	590.9022	Q=16	4	615.37	615.7	615.68	615.79	0.023731	2.52	1.59	6.57	0.9
T1	590.9022	Q=24	6	615.37	615.76	615.76	615.9	0.026186	2.96	2.02	7.06	0.98
T1	590.9022	Q=32	8	615.37	615.82	615.82	615.98	0.026888	3.27	2.45	7.5	1.01
T1	590.9022	Q=40	10	615.37	615.88	615.88	616.06	0.025816	3.45	2.9	7.95	1.01
T1	590.9022	Q=80	20	615.37	616.11	616.11	616.35	0.023404	3.93	5.09	10.84	1
T1	590.9022	Q=120	30	615.37	616.23	616.26	616.57	0.024587	4.66	6.5	11.97	1.07
T1	590.9022	Q=160	40	615.37	616.33	616.4	616.76	0.025706	5.28	7.74	12.84	1.12
T1	590.9022	Q=240	60	615.37	616.49	616.64	617.1	0.028174	6.34	9.88	14.21	1.21
T1	590.9022	Q=320	80	615.37	616.62	616.83	617.4	0.030074	7.2	11.8	15.34	1.28
T1	590.9022	Q=400	100	615.37	616.73	617.01	617.67	0.031711	7.95	13.57	16.31	1.34
T1	590.9022	Q=440	110	615.37	616.78	617.09	617.79	0.032387	8.28	14.41	16.76	1.36
T1	590.9022	Q=480	120	615.37	616.83	617.17	617.91	0.033046	8.6	15.23	17.18	1.39

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	653.1824	Q=95.35	28.51	617.59	618.3	618.53	619.05	0.072426	6.94	4.11	8.39	1.75
T1	653.1824	Q=4	1	617.59	617.78	617.81	617.87	0.068609	2.35	0.43	4.38	1.33
T1	653.1824	Q=8	2	617.59	617.83	617.88	617.97	0.085406	3.03	0.66	5.45	1.53
T1	653.1824	Q=16	4	617.59	617.9	617.96	618.11	0.08069	3.61	1.11	6.71	1.57
T1	653.1824	Q=24	6	617.59	617.96	618.03	618.22	0.075632	4.11	1.46	6.93	1.58
T1	653.1824	Q=32	8	617.59	618	618.09	618.32	0.074547	4.54	1.76	7.11	1.61
T1	653.1824	Q=40	10	617.59	618.04	618.15	618.41	0.073362	4.88	2.05	7.28	1.62
T1	653.1824	Q=80	20	617.59	618.2	618.38	618.78	0.069639	6.09	3.28	7.97	1.67
T1	653.1824	Q=120	30	617.59	618.33	618.56	619.07	0.067808	6.91	4.34	8.54	1.7
T1	653.1824	Q=160	40	617.59	618.43	618.72	619.34	0.066478	7.65	5.25	9.3	1.73
T1	653.1824	Q=240	60	617.59	618.6	618.99	619.81	0.064079	8.87	6.94	10.55	1.78
T1	653.1824	Q=320	80	617.59	618.75	619.22	620.2	0.062422	9.81	8.54	11.6	1.8
T1	653.1824	Q=400	100	617.59	618.87	619.4	620.54	0.060815	10.56	10.09	12.54	1.82
T1	653.1824	Q=440	110	617.59	618.93	619.49	620.7	0.060461	10.91	10.83	12.96	1.83
T1	653.1824	Q=480	120	617.59	618.99	619.56	620.85	0.060021	11.24	11.56	13.37	1.84
T1A	60.92559	Q=95.35	8.7	624.31	624.89	625	625.29	0.180094	5.05	1.72	5.01	1.52
T1A	60.92559	Q=4	0.5	624.31	624.5	624.53	624.59	0.215839	2.39	0.21	2.17	1.36
T1A	60.92559	Q=8	1	624.31	624.59	624.6	624.67	0.11317	2.23	0.45	3.18	1.05
T1A	60.92559	Q=16	2	624.31	624.66	624.69	624.79	0.129301	2.83	0.71	3.88	1.17
T1A	60.92559	Q=24	3	624.31	624.71	624.75	624.89	0.151833	3.38	0.89	4.18	1.3
T1A	60.92559	Q=32	4	624.31	624.75	624.81	624.97	0.15695	3.73	1.07	4.47	1.34
T1A	60.92559	Q=40	5	624.31	624.79	624.85	625.04	0.163137	4.07	1.23	4.61	1.39
T1A	60.92559	Q=80	10	624.31	624.92	625.05	625.36	0.185405	5.33	1.88	5.13	1.55
T1A	60.92559	Q=120	15	624.31	625.02	625.2	625.62	0.197485	6.18	2.43	5.54	1.65
T1A	60.92559	Q=160	20	624.31	625.11	625.34	625.84	0.205342	6.83	2.93	5.89	1.71
T1A	60.92559	Q=240	30	624.31	625.25	625.56	626.21	0.217317	7.86	3.82	6.46	1.8
T1A	60.92559	Q=320	40	624.31	625.37	625.75	626.54	0.227924	8.69	4.61	6.93	1.88
T1A	60.92559	Q=400	50	624.31	625.43	625.92	626.99	0.279223	10.03	4.99	7.29	2.1
T1A	60.92559	Q=440	55	624.31	625.45	626	627.23	0.309785	10.72	5.14	7.42	2.22
T1A	60.92559	Q=480	60	624.31	625.47	626.06	627.45	0.330688	11.28	5.34	7.59	2.3

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1A	109.6149	Q=95.35	8.7	630.05	630.59	630.59	630.84	0.07829	3.99	2.18	4.49	1.01
T1A	109.6149	Q=4	0.5	630.05	630.15	630.15	630.18	0.071003	1.37	0.36	3.76	0.78
T1A	109.6149	Q=8	1	630.05	630.18	630.18	630.25	0.115875	2.08	0.48	3.81	1.03
T1A	109.6149	Q=16	2	630.05	630.26	630.26	630.36	0.101962	2.59	0.77	3.94	1.03
T1A	109.6149	Q=24	3	630.05	630.32	630.32	630.45	0.08907	2.87	1.04	4.05	1
T1A	109.6149	Q=32	4	630.05	630.38	630.38	630.53	0.086736	3.16	1.27	4.14	1.01
T1A	109.6149	Q=40	5	630.05	630.43	630.43	630.61	0.08421	3.38	1.48	4.22	1.01
T1A	109.6149	Q=80	10	630.05	630.64	630.64	630.91	0.076623	4.15	2.41	4.57	1.01
T1A	109.6149	Q=120	15	630.05	630.81	630.81	631.15	0.073173	4.65	3.22	4.85	1.01
T1A	109.6149	Q=160	20	630.05	630.96	630.96	631.36	0.071222	5.04	3.97	5.1	1.01
T1A	109.6149	Q=240	30	630.05	631.22	631.22	631.71	0.068058	5.6	5.36	5.53	1
T1A	109.6149	Q=320	40	630.05	631.45	631.45	632.01	0.065528	6.04	6.63	6.02	1
T1A	109.6149	Q=400	50	630.05	631.67	631.67	632.27	0.055824	6.28	8.09	7.25	0.95
T1A	109.6149	Q=440	55	630.05	631.78	631.78	632.39	0.051243	6.33	8.92	7.86	0.92
T1A	109.6149	Q=480	60	630.05	631.87	631.87	632.5	0.048163	6.41	9.71	8.4	0.9
T1A	175.2342	Q=95.35	8.7	634.87	635.26	635.47	635.99	0.453766	6.83	1.27	4.57	2.28
T1A	175.2342	Q=4	0.5	634.87	635.02	635.05	635.08	0.1983	1.97	0.25	3.3	1.25
T1A	175.2342	Q=8	1	634.87	635.06	635.09	635.16	0.263543	2.6	0.38	4.06	1.49
T1A	175.2342	Q=16	2	634.87	635.1	635.16	635.3	0.329411	3.57	0.56	4.33	1.75
T1A	175.2342	Q=24	3	634.87	635.13	635.22	635.41	0.352078	4.25	0.71	4.38	1.86
T1A	175.2342	Q=32	4	634.87	635.16	635.27	635.52	0.370805	4.81	0.83	4.42	1.96
T1A	175.2342	Q=40	5	634.87	635.19	635.32	635.63	0.390015	5.31	0.94	4.46	2.04
T1A	175.2342	Q=80	10	634.87	635.29	635.51	636.08	0.447109	7.15	1.4	4.6	2.29
T1A	175.2342	Q=120	15	634.87	635.37	635.68	636.46	0.468667	8.39	1.79	4.73	2.4
T1A	175.2342	Q=160	20	634.87	635.44	635.82	636.82	0.488623	9.41	2.13	4.83	2.5
T1A	175.2342	Q=240	30	634.87	635.4	636.06	639.19	1.506095	15.63	1.92	4.77	4.34
T1A	175.2342	Q=320	40	634.87	635.48	636.29	640.21	1.555855	17.46	2.29	4.88	4.49
T1A	175.2342	Q=400	50	634.87	635.58	636.52	640.49	1.306515	17.77	2.81	5.03	4.19
T1A	175.2342	Q=440	55	634.87	635.63	636.62	640.69	1.244879	18.05	3.05	5.1	4.12
T1A	175.2342	Q=480	60	634.87	635.67	636.73	640.92	1.207685	18.39	3.26	5.16	4.08

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1A	256.649	Q=95.35	8.7	647.65	648.39	648.39	648.66	0.077335	4.17	2.09	3.85	1
T1A	256.649	Q=4	0.5	647.65	647.84	647.84	647.9	0.127883	1.85	0.27	2.76	1.04
T1A	256.649	Q=8	1	647.65	647.91	647.91	647.98	0.104633	2.24	0.45	2.91	1.01
T1A	256.649	Q=16	2	647.65	648	648	648.12	0.091829	2.73	0.73	3.13	1
T1A	256.649	Q=24	3	647.65	648.07	648.07	648.22	0.088565	3.09	0.97	3.3	1.01
T1A	256.649	Q=32	4	647.65	648.14	648.14	648.32	0.086165	3.38	1.18	3.42	1.01
T1A	256.649	Q=40	5	647.65	648.2	648.2	648.4	0.083858	3.6	1.39	3.52	1.01
T1A	256.649	Q=80	10	647.65	648.44	648.44	648.73	0.077595	4.36	2.29	3.94	1.01
T1A	256.649	Q=120	15	647.65	648.63	648.63	649	0.075006	4.86	3.09	4.28	1.01
T1A	256.649	Q=160	20	647.65	648.8	648.8	649.22	0.073117	5.22	3.83	4.57	1.01
T1A	256.649	Q=240	30	647.65	649.2	649.2	649.56	0.041934	4.98	6.47	9.37	0.8
T1A	256.649	Q=320	40	647.65	649.4	649.4	649.78	0.037465	5.22	8.49	10.79	0.78
T1A	256.649	Q=400	50	647.65	649.53	649.53	649.96	0.038011	5.59	10.01	11.74	0.8
T1A	256.649	Q=440	55	647.65	649.6	649.6	650.04	0.03767	5.73	10.79	12.2	0.8
T1A	256.649	Q=480	60	647.65	649.66	649.66	650.12	0.037	5.83	11.6	12.66	0.8
T1A	318.1733	Q=95.35	8.7	651.18	651.92	651.81	652.08	0.041857	3.24	2.68	4.61	0.75
T1A	318.1733	Q=4	0.5	651.18	651.39	651.34	651.4	0.032089	1.08	0.46	3.72	0.54
T1A	318.1733	Q=8	1	651.18	651.45	651.39	651.48	0.035404	1.45	0.69	3.82	0.6
T1A	318.1733	Q=16	2	651.18	651.54	651.47	651.6	0.038077	1.91	1.05	3.98	0.65
T1A	318.1733	Q=24	3	651.18	651.61	651.54	651.69	0.038873	2.21	1.35	4.1	0.68
T1A	318.1733	Q=32	4	651.18	651.68	651.59	651.77	0.039292	2.45	1.63	4.21	0.7
T1A	318.1733	Q=40	5	651.18	651.74	651.64	651.85	0.040061	2.66	1.88	4.31	0.71
T1A	318.1733	Q=80	10	651.18	651.98	651.86	652.16	0.041561	3.38	2.96	4.71	0.75
T1A	318.1733	Q=120	15	651.18	652.17	652.03	652.4	0.042116	3.85	3.9	5.04	0.77
T1A	318.1733	Q=160	20	651.18	652.04	652.18	652.62	0.123732	6.11	3.27	4.82	1.31
T1A	318.1733	Q=240	30	651.18	652.15	652.45	653.13	0.185417	7.96	3.77	4.99	1.61
T1A	318.1733	Q=320	40	651.18	652.21	652.75	653.68	0.25543	9.71	4.12	5.11	1.91
T1A	318.1733	Q=400	50	651.18	652.35	652.95	654	0.250737	10.31	4.85	5.34	1.91
T1A	318.1733	Q=440	55	651.18	652.42	653.02	654.16	0.249071	10.61	5.19	5.61	1.91
T1A	318.1733	Q=480	60	651.18	652.48	653.09	654.3	0.237406	10.83	5.57	6.31	1.89

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1A	361.2753	Q=95.35	8.7	655.31	655.9	655.9	656.15	0.079872	4.04	2.16	4.33	1.01
T1A	361.2753	Q=4	0.5	655.31	655.44	655.44	655.48	0.138539	1.68	0.3	3.72	1.05
T1A	361.2753	Q=8	1	655.31	655.49	655.49	655.55	0.10805	2.04	0.49	3.79	1
T1A	361.2753	Q=16	2	655.31	655.56	655.56	655.66	0.095966	2.55	0.79	3.89	1
T1A	361.2753	Q=24	3	655.31	655.63	655.63	655.76	0.09187	2.91	1.03	3.97	1.01
T1A	361.2753	Q=32	4	655.31	655.68	655.68	655.84	0.087788	3.18	1.26	4.05	1.01
T1A	361.2753	Q=40	5	655.31	655.74	655.74	655.91	0.084037	3.39	1.47	4.12	1
T1A	361.2753	Q=80	10	655.31	655.95	655.95	656.22	0.078647	4.2	2.38	4.4	1.01
T1A	361.2753	Q=120	15	655.31	656.12	656.12	656.47	0.075804	4.73	3.17	4.63	1.01
T1A	361.2753	Q=160	20	655.31	656.28	656.28	656.69	0.073651	5.13	3.9	4.83	1.01
T1A	361.2753	Q=240	30	655.31	656.61	656.61	657.04	0.052357	5.29	5.88	7.99	0.88
T1A	361.2753	Q=320	40	655.31	656.87	656.87	657.27	0.039139	5.26	8.37	11	0.79
T1A	361.2753	Q=400	50	655.31	657.03	657.03	657.45	0.036774	5.49	10.26	12.62	0.78
T1A	361.2753	Q=440	55	655.31	657.11	657.11	657.53	0.035462	5.56	11.22	13.37	0.77
T1A	361.2753	Q=480	60	655.31	657.17	657.17	657.6	0.035067	5.67	12.06	13.96	0.77
T1B	744.3112	Q=95.35	15.81	619.46	620.7	620.39	620.88	0.025782	3.37	4.7	4.89	0.61
T1B	744.3112	Q=4	0.5	619.46	619.75	619.64	619.76	0.009134	0.75	0.66	3.57	0.31
T1B	744.3112	Q=8	1	619.46	619.84	619.71	619.86	0.010161	1	1	3.7	0.34
T1B	744.3112	Q=16	2	619.46	619.97	619.78	620	0.012041	1.35	1.48	3.88	0.38
T1B	744.3112	Q=24	3	619.46	620.07	619.84	620.11	0.01343	1.6	1.87	4.01	0.41
T1B	744.3112	Q=32	4	619.46	620.16	619.9	620.21	0.014047	1.79	2.24	4.14	0.43
T1B	744.3112	Q=40	5	619.46	620.23		620.29	0.015046	1.97	2.54	4.24	0.45
T1B	744.3112	Q=80	10	619.46	620.51		620.62	0.018798	2.63	3.8	4.63	0.51
T1B	744.3112	Q=120	15	619.46	620.68		620.85	0.024756	3.27	4.59	4.86	0.59
T1B	744.3112	Q=160	20	619.46	620.79		621.03	0.031982	3.89	5.15	5.02	0.68
T1B	744.3112	Q=240	30	619.46	620.95	620.8	621.34	0.048112	5.05	5.95	5.23	0.83
T1B	744.3112	Q=320	40	619.46	621.04	621.04	621.64	0.069571	6.24	6.41	5.35	1.01
T1B	744.3112	Q=400	50	619.46	621.25	621.25	621.92	0.068492	6.6	7.58	5.65	1
T1B	744.3112	Q=440	55	619.46	621.35	621.35	622.06	0.068209	6.76	8.14	5.78	1
T1B	744.3112	Q=480	60	619.46	621.44	621.44	622.18	0.068214	6.92	8.67	5.91	1.01

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	810.6002	Q=95.35	15.81	621.61	623.02	622.54	623.17	0.021213	3.18	4.98	4.23	0.52
T1B	810.6002	Q=4	0.5	621.61	621.82		621.83	0.014865	0.9	0.55	3.16	0.38
T1B	810.6002	Q=8	1	621.61	621.9		621.93	0.017242	1.22	0.82	3.24	0.43
T1B	810.6002	Q=16	2	621.61	622.05		622.08	0.016811	1.54	1.3	3.37	0.44
T1B	810.6002	Q=24	3	621.61	622.16	621.95	622.21	0.017351	1.79	1.68	3.47	0.45
T1B	810.6002	Q=32	4	621.61	622.25		622.31	0.01809	1.99	2.01	3.55	0.47
T1B	810.6002	Q=40	5	621.61	622.34		622.41	0.018372	2.15	2.33	3.63	0.47
T1B	810.6002	Q=80	10	621.61	622.69	622.32	622.81	0.019975	2.73	3.66	3.94	0.5
T1B	810.6002	Q=120	15	621.61	622.97	622.51	623.13	0.021061	3.12	4.8	4.19	0.51
T1B	810.6002	Q=160	20	621.61	623.21	622.69	623.4	0.021959	3.43	5.83	4.41	0.53
T1B	810.6002	Q=240	30	621.61	623.62	622.99	623.86	0.023313	3.9	7.69	4.77	0.54
T1B	810.6002	Q=320	40	621.61	623.96	623.26	624.24	0.024552	4.28	9.35	5.07	0.55
T1B	810.6002	Q=400	50	621.61	624.25	623.49	624.58	0.025633	4.59	10.89	5.33	0.57
T1B	810.6002	Q=440	55	621.61	624.38	623.6	624.73	0.026226	4.75	11.59	5.51	0.57
T1B	810.6002	Q=480	60	621.61	624.49	623.71	624.87	0.026305	4.92	12.26	6.55	0.58
T1B	879.0649	Q=95.35	15.81	622.29	623.5	623.04	623.58	0.002731	2.3	6.87	7.11	0.41
T1B	879.0649	Q=4	0.5	622.29	622.52	622.46	622.53	0.007373	1	0.5	4.39	0.52
T1B	879.0649	Q=8	1	622.29	622.59	622.52	622.61	0.006528	1.14	0.88	5.78	0.51
T1B	879.0649	Q=16	2	622.29	622.68	622.6	622.71	0.00568	1.39	1.44	6.18	0.51
T1B	879.0649	Q=24	3	622.29	622.53	622.65	622.96	0.184303	5.22	0.57	4.7	2.63
T1B	879.0649	Q=32	4	622.29	622.83	622.68	622.88	0.004557	1.68	2.38	6.35	0.48
T1B	879.0649	Q=40	5	622.29	622.9	622.73	622.95	0.004298	1.79	2.79	6.43	0.48
T1B	879.0649	Q=80	10	622.29	623.2	622.89	623.27	0.003264	2.09	4.78	6.77	0.44
T1B	879.0649	Q=120	15	622.29	623.46	623.02	623.54	0.002787	2.28	6.59	7.07	0.42
T1B	879.0649	Q=160	20	622.29	623.7	623.14	623.79	0.002517	2.41	8.29	7.34	0.4
T1B	879.0649	Q=240	30	622.29	624.12	623.34	624.22	0.002217	2.62	11.46	7.82	0.38
T1B	879.0649	Q=320	40	622.29	624.48	623.53	624.6	0.00208	2.79	14.35	8.23	0.37
T1B	879.0649	Q=400	50	622.29	624.8	623.7	624.93	0.001976	2.93	17.06	8.96	0.37
T1B	879.0649	Q=440	55	622.29	624.94	623.77	625.08	0.00192	3.01	18.37	9.6	0.36
T1B	879.0649	Q=480	60	622.29	625.06	623.85	625.21	0.001882	3.1	19.61	10.27	0.36

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	943.7003	Q=95.35	13.1	625.83	626.38	626.6	627.14	0.079408	7.01	1.87	4.92	2.01
T1B	943.7003	Q=4	0.5	625.83	626	626.02	626.08	0.062531	2.33	0.21	2.59	1.43
T1B	943.7003	Q=8	1	625.83	626.04	626.09	626.17	0.066061	2.83	0.35	3.33	1.53
T1B	943.7003	Q=16	2	625.83	626.1	626.16	626.3	0.079039	3.6	0.56	4.18	1.74
T1B	943.7003	Q=24	3	625.83	626.21	626.22	626.34	0.023956	2.84	1.06	4.55	1.04
T1B	943.7003	Q=32	4	625.83	626.21	626.27	626.44	0.046079	3.88	1.03	4.53	1.43
T1B	943.7003	Q=40	5	625.83	626.23	626.32	626.52	0.050584	4.32	1.16	4.61	1.52
T1B	943.7003	Q=80	10	625.83	626.31	626.5	626.96	0.083513	6.47	1.55	4.85	2.02
T1B	943.7003	Q=120	15	625.83	626.42	626.66	627.25	0.077627	7.31	2.05	4.95	2
T1B	943.7003	Q=160	20	625.83	626.52	626.8	627.48	0.071205	7.86	2.54	5.02	1.95
T1B	943.7003	Q=240	30	625.83	626.69	627.05	627.87	0.063473	8.7	3.45	5.14	1.87
T1B	943.7003	Q=320	40	625.83	626.86	627.26	628.2	0.057874	9.28	4.31	5.25	1.8
T1B	943.7003	Q=400	50	625.83	627.01	627.46	628.49	0.054465	9.76	5.12	5.35	1.76
T1B	943.7003	Q=440	55	625.83	627.09	627.55	628.63	0.053296	9.98	5.51	5.4	1.74
T1B	943.7003	Q=480	60	625.83	627.16	627.64	628.77	0.052247	10.18	5.89	5.45	1.72
T1B	1005.909	Q=95.35	13.1	628.45	629.17	629.2	629.53	0.021911	4.79	2.73	4.36	1.07
T1B	1005.909	Q=4	0.5	628.45	628.57	628.58	628.61	0.028395	1.59	0.31	3.7	0.96
T1B	1005.909	Q=8	1	628.45	628.62	628.62	628.68	0.027247	2.05	0.49	3.75	1
T1B	1005.909	Q=16	2	628.45	628.7	628.7	628.8	0.024101	2.56	0.78	3.83	1
T1B	1005.909	Q=24	3	628.45	628.67	628.76	628.98	0.089195	4.48	0.67	3.8	1.88
T1B	1005.909	Q=32	4	628.45	628.77	628.82	628.99	0.036616	3.76	1.06	3.91	1.27
T1B	1005.909	Q=40	5	628.45	628.82	628.87	629.06	0.033425	3.96	1.26	3.97	1.24
T1B	1005.909	Q=80	10	628.45	629.07	629.08	629.36	0.021559	4.36	2.29	4.25	1.05
T1B	1005.909	Q=120	15	628.45	629.23	629.26	629.62	0.021966	5.01	2.99	4.43	1.07
T1B	1005.909	Q=160	20	628.45	629.36	629.42	629.85	0.022888	5.57	3.59	4.57	1.11
T1B	1005.909	Q=240	30	628.45	629.59	629.69	630.23	0.02436	6.44	4.66	4.83	1.15
T1B	1005.909	Q=320	40	628.45	629.78	629.93	630.58	0.026074	7.18	5.57	5.03	1.2
T1B	1005.909	Q=400	50	628.45	629.94	630.14	630.88	0.027357	7.79	6.42	5.21	1.24
T1B	1005.909	Q=440	55	628.45	630.02	630.24	631.03	0.027927	8.06	6.83	5.3	1.25
T1B	1005.909	Q=480	60	628.45	630.09	630.33	631.16	0.028451	8.31	7.22	5.38	1.26

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	1072.597	Q=95.35	13.1	630.99	631.48	631.73	632.35	0.095088	7.47	1.75	4.63	2.14
T1B	1072.597	Q=4	0.5	630.99	631.14	631.16	631.2	0.056445	2.05	0.24	3.26	1.32
T1B	1072.597	Q=8	1	630.99	631.16	631.22	631.32	0.119771	3.23	0.31	3.68	1.96
T1B	1072.597	Q=16	2	630.99	631.22	631.28	631.41	0.082078	3.53	0.57	4.4	1.74
T1B	1072.597	Q=24	3	630.99	631.25	631.34	631.53	0.090779	4.26	0.7	4.42	1.88
T1B	1072.597	Q=32	4	630.99	631.28	631.39	631.64	0.095273	4.82	0.83	4.45	1.97
T1B	1072.597	Q=40	5	630.99	631.3	631.43	631.74	0.097991	5.29	0.95	4.47	2.03
T1B	1072.597	Q=80	10	630.99	631.42	631.63	632.14	0.096688	6.81	1.47	4.58	2.12
T1B	1072.597	Q=120	15	630.99	631.52	631.79	632.47	0.094867	7.83	1.92	4.67	2.15
T1B	1072.597	Q=160	20	630.99	631.61	631.94	632.73	0.089892	8.51	2.35	4.75	2.13
T1B	1072.597	Q=240	30	630.99	631.78	632.19	633.16	0.079924	9.4	3.19	4.91	2.05
T1B	1072.597	Q=320	40	630.99	631.96	632.41	633.47	0.069849	9.88	4.05	5.06	1.95
T1B	1072.597	Q=400	50	630.99	632.12	632.61	633.75	0.063491	10.26	4.87	5.21	1.87
T1B	1072.597	Q=440	55	630.99	632.19	632.71	633.88	0.060952	10.42	5.28	5.28	1.84
T1B	1072.597	Q=480	60	630.99	632.27	632.8	634	0.058796	10.57	5.68	5.35	1.81
T1B	1142.837	Q=95.35	13.1	633.9	634.61	634.61	634.9	0.018392	4.32	3.03	5.31	1.01
T1B	1142.837	Q=4	0.5	633.9	634.05	634.05	634.09	0.031407	1.59	0.31	4.06	1.01
T1B	1142.837	Q=8	1	633.9	634.11	634.11	634.16	0.02	1.74	0.57	4.58	0.87
T1B	1142.837	Q=16	2	633.9	634.17	634.17	634.26	0.023903	2.4	0.83	4.66	1
T1B	1142.837	Q=24	3	633.9	634.23	634.23	634.34	0.022181	2.72	1.1	4.74	1
T1B	1142.837	Q=32	4	633.9	634.28	634.28	634.41	0.021191	2.98	1.34	4.82	1
T1B	1142.837	Q=40	5	633.9	634.32	634.32	634.48	0.020478	3.2	1.56	4.89	1
T1B	1142.837	Q=80	10	633.9	634.51	634.51	634.76	0.018961	3.98	2.51	5.17	1.01
T1B	1142.837	Q=120	15	633.9	634.67	634.67	634.98	0.017876	4.48	3.35	5.4	1
T1B	1142.837	Q=160	20	633.9	634.8	634.8	635.17	0.017428	4.88	4.1	5.6	1.01
T1B	1142.837	Q=240	30	633.9	635.03	635.04	635.51	0.017268	5.53	5.43	5.95	1.02
T1B	1142.837	Q=320	40	633.9	635.22	635.25	635.8	0.018057	6.13	6.53	6.21	1.05
T1B	1142.837	Q=400	50	633.9	635.37	635.44	636.06	0.018743	6.64	7.53	6.45	1.08
T1B	1142.837	Q=440	55	633.9	635.45	635.53	636.18	0.019059	6.87	8.01	6.56	1.09
T1B	1142.837	Q=480	60	633.9	635.52	635.61	636.3	0.01935	7.08	8.48	6.66	1.11

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	1240.974	Q=95.35	13.1	637.25	637.62	637.89	638.66	0.161539	8.15	1.61	5.89	2.75
T1B	1240.974	Q=4	0.5	637.25	637.37	637.39	637.45	0.096435	2.32	0.22	3.67	1.69
T1B	1240.974	Q=8	1	637.25	637.39	637.44	637.56	0.151959	3.27	0.31	4.37	2.18
T1B	1240.974	Q=16	2	637.25	637.42	637.5	637.71	0.17801	4.29	0.47	4.98	2.47
T1B	1240.974	Q=24	3	637.25	637.45	637.55	637.84	0.185639	4.98	0.6	5.29	2.6
T1B	1240.974	Q=32	4	637.25	637.47	637.59	637.95	0.191307	5.53	0.72	5.56	2.7
T1B	1240.974	Q=40	5	637.25	637.49	637.63	638.03	0.185778	5.89	0.85	5.77	2.71
T1B	1240.974	Q=80	10	637.25	637.58	637.8	638.45	0.169686	7.47	1.34	5.85	2.75
T1B	1240.974	Q=120	15	637.25	637.65	637.94	638.76	0.154259	8.45	1.78	5.92	2.72
T1B	1240.974	Q=160	20	637.25	637.72	638.06	639.03	0.142747	9.17	2.18	5.98	2.68
T1B	1240.974	Q=240	30	637.25	637.84	638.28	639.49	0.129203	10.3	2.91	6.09	2.63
T1B	1240.974	Q=320	40	637.25	637.95	638.46	639.89	0.120792	11.16	3.58	6.2	2.59
T1B	1240.974	Q=400	50	637.25	638.05	638.64	640.24	0.115054	11.88	4.21	6.29	2.56
T1B	1240.974	Q=440	55	637.25	638.1	638.72	640.41	0.112886	12.2	4.51	6.33	2.55
T1B	1240.974	Q=480	60	637.25	638.14	638.8	640.58	0.111644	12.52	4.79	6.38	2.54
T1B	1317.998	Q=95.35	13.1	641.58	642.27	642.31	642.66	0.024715	5.02	2.61	4.11	1.11
T1B	1317.998	Q=4	0.5	641.58	641.67	641.67	641.72	0.035852	1.71	0.29	3.67	1.06
T1B	1317.998	Q=8	1	641.58	641.72	641.73	641.79	0.02805	2.07	0.48	3.71	1.01
T1B	1317.998	Q=16	2	641.58	641.8	641.8	641.9	0.025849	2.62	0.76	3.76	1.02
T1B	1317.998	Q=24	3	641.58	641.86	641.87	642	0.025124	3.01	1	3.81	1.04
T1B	1317.998	Q=32	4	641.58	641.91	641.92	642.08	0.02458	3.32	1.2	3.85	1.05
T1B	1317.998	Q=40	5	641.58	641.96	641.97	642.16	0.024776	3.61	1.39	3.88	1.06
T1B	1317.998	Q=80	10	641.58	642.16	642.2	642.49	0.024678	4.58	2.18	4.03	1.1
T1B	1317.998	Q=120	15	641.58	642.32	642.38	642.75	0.025056	5.27	2.85	4.15	1.12
T1B	1317.998	Q=160	20	641.58	642.47	642.54	642.99	0.025458	5.8	3.45	4.25	1.14
T1B	1317.998	Q=240	30	641.58	642.72	642.82	643.4	0.025835	6.6	4.54	4.44	1.15
T1B	1317.998	Q=320	40	641.58	642.94	643.07	643.75	0.02612	7.21	5.55	4.6	1.16
T1B	1317.998	Q=400	50	641.58	643.15	643.29	644.06	0.026138	7.68	6.51	4.75	1.16
T1B	1317.998	Q=440	55	641.58	643.24	643.39	644.21	0.026093	7.88	6.98	4.82	1.15
T1B	1317.998	Q=480	60	641.58	643.34	643.5	644.35	0.025832	8.04	7.46	4.9	1.15

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	1379.684	Q=95.35	13.1	643.68	644.29	644.49	644.95	0.056818	6.53	2.01	4.48	1.72
T1B	1379.684	Q=4	0.5	643.68	643.86	643.87	643.92	0.041468	1.99	0.25	2.86	1.18
T1B	1379.684	Q=8	1	643.68	643.9	643.93	644	0.046961	2.48	0.4	3.58	1.31
T1B	1379.684	Q=16	2	643.68	643.96	644	644.13	0.052669	3.27	0.61	3.89	1.45
T1B	1379.684	Q=24	3	643.68	644	644.07	644.23	0.054859	3.82	0.78	4.04	1.53
T1B	1379.684	Q=32	4	643.68	644.04	644.12	644.32	0.056823	4.3	0.93	4.1	1.59
T1B	1379.684	Q=40	5	643.68	644.07	644.17	644.41	0.05625	4.64	1.08	4.15	1.61
T1B	1379.684	Q=80	10	643.68	644.22	644.38	644.77	0.056782	5.95	1.68	4.37	1.69
T1B	1379.684	Q=120	15	643.68	644.33	644.55	645.05	0.055482	6.78	2.21	4.55	1.71
T1B	1379.684	Q=160	20	643.68	644.44	644.7	645.29	0.054093	7.39	2.7	4.72	1.72
T1B	1379.684	Q=240	30	643.68	644.63	644.95	645.69	0.051301	8.26	3.63	5.01	1.71
T1B	1379.684	Q=320	40	643.68	644.8	645.18	646.03	0.049645	8.93	4.48	5.26	1.7
T1B	1379.684	Q=400	50	643.68	644.95	645.38	646.33	0.04808	9.43	5.3	5.5	1.69
T1B	1379.684	Q=440	55	643.68	645.02	645.47	646.47	0.047453	9.66	5.7	5.61	1.69
T1B	1379.684	Q=480	60	643.68	645.09	645.56	646.6	0.046838	9.86	6.09	5.71	1.68
T1B	1420.161	Q=95.35	13.1	645.4	646.15	646.15	646.46	0.025358	4.47	2.93	4.73	1
T1B	1420.161	Q=4	0.5	645.4	645.56	645.56	645.6	0.041815	1.61	0.31	3.85	1
T1B	1420.161	Q=8	1	645.4	645.61	645.61	645.67	0.03632	1.98	0.51	4.11	1
T1B	1420.161	Q=16	2	645.4	645.68	645.68	645.77	0.032167	2.48	0.81	4.19	1
T1B	1420.161	Q=24	3	645.4	645.74	645.74	645.86	0.030516	2.83	1.06	4.26	1
T1B	1420.161	Q=32	4	645.4	645.79	645.79	645.94	0.029018	3.1	1.29	4.32	1
T1B	1420.161	Q=40	5	645.4	645.84	645.84	646.01	0.028653	3.34	1.5	4.37	1.01
T1B	1420.161	Q=80	10	645.4	646.04	646.04	646.31	0.026594	4.15	2.41	4.6	1.01
T1B	1420.161	Q=120	15	645.4	646.21	646.21	646.55	0.025388	4.68	3.21	4.79	1.01
T1B	1420.161	Q=160	20	645.4	646.36	646.36	646.76	0.024808	5.09	3.93	4.96	1.01
T1B	1420.161	Q=240	30	645.4	646.62	646.62	647.13	0.024232	5.72	5.25	5.24	1.01
T1B	1420.161	Q=320	40	645.4	646.85	646.85	647.44	0.023832	6.19	6.46	5.5	1.01
T1B	1420.161	Q=400	50	645.4	647.05	647.05	647.72	0.02365	6.58	7.6	5.72	1.01
T1B	1420.161	Q=440	55	645.4	647.14	647.14	647.85	0.023569	6.75	8.15	5.83	1.01
T1B	1420.161	Q=480	60	645.4	647.24	647.24	647.97	0.023331	6.89	8.71	5.94	1

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	1484.14	Q=95.35	13.1	645.59	646.82	646.25	646.88	0.002725	1.99	6.59	6.33	0.34
T1B	1484.14	Q=4	0.5	645.59	645.87	645.74	645.87	0.001501	0.51	0.97	5.42	0.21
T1B	1484.14	Q=8	1	645.59	645.95	645.79	645.96	0.001632	0.69	1.46	5.5	0.23
T1B	1484.14	Q=16	2	645.59	646.08	645.85	646.09	0.001883	0.93	2.16	5.62	0.26
T1B	1484.14	Q=24	3	645.59	646.18	645.9	646.2	0.002003	1.09	2.74	5.72	0.28
T1B	1484.14	Q=32	4	645.59	646.27	645.94	646.29	0.002161	1.24	3.23	5.8	0.29
T1B	1484.14	Q=40	5	645.59	646.34	645.98	646.37	0.002259	1.36	3.68	5.87	0.3
T1B	1484.14	Q=80	10	645.59	646.66	646.16	646.71	0.002593	1.79	5.57	6.17	0.33
T1B	1484.14	Q=120	15	645.59	646.91	646.3	646.98	0.002789	2.09	7.17	6.42	0.35
T1B	1484.14	Q=160	20	645.59	647.13	646.43	647.21	0.00296	2.33	8.57	6.62	0.36
T1B	1484.14	Q=240	30	645.59	647.49	646.66	647.61	0.003229	2.71	11.06	6.97	0.38
T1B	1484.14	Q=320	40	645.59	647.81	646.86	647.95	0.003433	3.01	13.3	7.27	0.39
T1B	1484.14	Q=400	50	645.59	648.08	647.04	648.25	0.003616	3.26	15.34	7.53	0.4
T1B	1484.14	Q=440	55	645.59	648.21	647.12	648.39	0.003696	3.37	16.31	7.65	0.41
T1B	1484.14	Q=480	60	645.59	648.33	647.2	648.52	0.003777	3.48	17.25	7.77	0.41
T1B	1530.33	Q=95.35	13.1	647.44	648.11	648.11	648.4	0.025404	4.27	3.07	5.47	1.01
T1B	1530.33	Q=4	0.5	647.44	647.59	647.59	647.62	0.032082	1.39	0.36	4.6	0.87
T1B	1530.33	Q=8	1	647.44	647.63	647.63	647.68	0.037823	1.88	0.53	4.86	1
T1B	1530.33	Q=16	2	647.44	647.69	647.69	647.78	0.032947	2.33	0.86	5.01	1
T1B	1530.33	Q=24	3	647.44	647.74	647.74	647.85	0.032914	2.72	1.1	5.07	1.03
T1B	1530.33	Q=32	4	647.44	647.79	647.79	647.92	0.029826	2.94	1.36	5.12	1
T1B	1530.33	Q=40	5	647.44	647.83	647.83	647.99	0.029011	3.16	1.58	5.17	1.01
T1B	1530.33	Q=80	10	647.44	648.02	648.02	648.26	0.025768	3.91	2.56	5.37	1
T1B	1530.33	Q=120	15	647.44	648.17	648.17	648.48	0.025063	4.46	3.37	5.53	1.01
T1B	1530.33	Q=160	20	647.44	648.3	648.3	648.67	0.024434	4.87	4.11	5.67	1.01
T1B	1530.33	Q=240	30	647.44	648.53	648.53	649	0.023566	5.48	5.47	5.93	1.01
T1B	1530.33	Q=320	40	647.44	648.74	648.74	649.29	0.023103	5.96	6.71	6.15	1.01
T1B	1530.33	Q=400	50	647.44	648.92	648.92	649.55	0.022885	6.36	7.87	6.35	1.01
T1B	1530.33	Q=440	55	647.44	649.01	649.01	649.67	0.022802	6.53	8.42	6.45	1.01
T1B	1530.33	Q=480	60	647.44	649.1	649.1	649.79	0.022706	6.69	8.97	6.54	1.01

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	1572.278	Q=95.35	13.1	647.84	648.88	648.62	649.04	0.009927	3.24	4.04	4.66	0.61
T1B	1572.278	Q=4	0.5	647.84	648.09	648.02	648.1	0.005855	0.86	0.58	4.15	0.4
T1B	1572.278	Q=8	1	647.84	648.17	648.08	648.19	0.005748	1.11	0.9	4.2	0.42
T1B	1572.278	Q=16	2	647.84	648.27	648.14	648.31	0.006414	1.48	1.35	4.27	0.46
T1B	1572.278	Q=24	3	647.84	648.36	648.2	648.41	0.006821	1.74	1.72	4.32	0.49
T1B	1572.278	Q=32	4	647.84	648.43	648.26	648.49	0.007546	1.99	2.01	4.37	0.52
T1B	1572.278	Q=40	5	647.84	648.49	648.3	648.57	0.007666	2.16	2.31	4.41	0.53
T1B	1572.278	Q=80	10	647.84	648.75	648.51	648.88	0.009297	2.91	3.44	4.58	0.59
T1B	1572.278	Q=120	15	647.84	648.95	648.68	649.13	0.010307	3.43	4.38	4.71	0.63
T1B	1572.278	Q=160	20	647.84	649.12	648.83	649.35	0.011095	3.84	5.21	4.83	0.65
T1B	1572.278	Q=240	30	647.84	649.41	649.1	649.73	0.012731	4.54	6.61	5.01	0.7
T1B	1572.278	Q=320	40	647.84	649.65	649.34	650.05	0.014105	5.11	7.83	5.17	0.73
T1B	1572.278	Q=400	50	647.84	649.86	649.55	650.34	0.01533	5.6	8.94	5.31	0.76
T1B	1572.278	Q=440	55	647.84	649.95	649.65	650.48	0.015918	5.82	9.45	5.37	0.77
T1B	1572.278	Q=480	60	647.84	650.04	649.74	650.61	0.016509	6.04	9.94	5.43	0.79
T1B	1613.01	Q=95.35	13.1	647.86	649.19	648.56	649.26	0.003139	2.17	6.04	5.27	0.36
T1B	1613.01	Q=4	0.5	647.86	648.17	647.98	648.17	0.000717	0.44	1.14	4.37	0.15
T1B	1613.01	Q=8	1	647.86	648.27	648.02	648.27	0.00102	0.63	1.58	4.45	0.19
T1B	1613.01	Q=16	2	647.86	648.4	648.09	648.42	0.001473	0.91	2.19	4.58	0.23
T1B	1613.01	Q=24	3	647.86	648.51	648.15	648.53	0.001748	1.11	2.7	4.67	0.26
T1B	1613.01	Q=32	4	647.86	648.61	648.2	648.63	0.001989	1.28	3.14	4.76	0.28
T1B	1613.01	Q=40	5	647.86	648.69	648.25	648.72	0.002164	1.41	3.54	4.83	0.29
T1B	1613.01	Q=80	10	647.86	649.02	648.46	649.08	0.002854	1.93	5.18	5.12	0.34
T1B	1613.01	Q=120	15	647.86	649.28	648.62	649.36	0.003297	2.3	6.54	5.35	0.37
T1B	1613.01	Q=160	20	647.86	649.5	648.77	649.6	0.003634	2.58	7.74	5.55	0.39
T1B	1613.01	Q=240	30	647.86	649.88	649.03	650.02	0.004147	3.03	9.89	5.88	0.41
T1B	1613.01	Q=320	40	647.86	650.2	649.26	650.38	0.004517	3.38	11.83	6.17	0.43
T1B	1613.01	Q=400	50	647.86	650.48	649.46	650.69	0.004801	3.67	13.64	6.42	0.44
T1B	1613.01	Q=440	55	647.86	650.62	649.55	650.84	0.004922	3.79	14.5	6.54	0.45
T1B	1613.01	Q=480	60	647.86	650.74	649.65	650.98	0.004964	3.92	15.34	7.12	0.45

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	1664.997	Q=95.35	13.1	649.99	650.75	650.75	651.04	0.025059	4.36	3.01	5.16	1.01
T1B	1664.997	Q=4	0.5	649.99	650.17	650.17	650.22	0.040496	1.71	0.29	3.24	1
T1B	1664.997	Q=8	1	649.99	650.22	650.22	650.29	0.041793	2.06	0.49	4.18	1.06
T1B	1664.997	Q=16	2	649.99	650.3	650.3	650.39	0.032305	2.41	0.83	4.58	1
T1B	1664.997	Q=24	3	649.99	650.36	650.36	650.47	0.029973	2.74	1.09	4.65	1
T1B	1664.997	Q=32	4	649.99	650.4	650.4	650.55	0.029587	3.03	1.32	4.72	1.01
T1B	1664.997	Q=40	5	649.99	650.45	650.45	650.61	0.027748	3.22	1.55	4.78	1
T1B	1664.997	Q=80	10	649.99	650.64	650.64	650.89	0.025895	4.02	2.49	5.03	1.01
T1B	1664.997	Q=120	15	649.99	650.8	650.8	651.12	0.024819	4.54	3.3	5.24	1.01
T1B	1664.997	Q=160	20	649.99	650.94	650.94	651.32	0.024053	4.94	4.05	5.42	1.01
T1B	1664.997	Q=240	30	649.99	651.18	651.18	651.66	0.023388	5.56	5.4	5.74	1.01
T1B	1664.997	Q=320	40	649.99	651.4	651.4	651.96	0.022839	6.01	6.65	6.02	1.01
T1B	1664.997	Q=400	50	649.99	651.59	651.59	652.22	0.022528	6.39	7.83	6.27	1.01
T1B	1664.997	Q=440	55	649.99	651.68	651.68	652.35	0.022448	6.56	8.39	6.39	1.01
T1B	1664.997	Q=480	60	649.99	651.76	651.77	652.46	0.022307	6.71	8.95	6.5	1.01
Main2	1312.838	Q=95.35	56.6	599.52	600.52	600.63	601.12	0.021959	6.24	9.07	11.04	1.21
Main2	1312.838	Q=4	1.5	599.52	599.77	599.65	599.78	0.00218	0.82	1.82	8.45	0.31
Main2	1312.838	Q=8	3	599.52	599.88	599.71	599.9	0.00233	1.09	2.76	8.83	0.34
Main2	1312.838	Q=16	6	599.52	600.04	599.81	600.07	0.00253	1.43	4.2	9.38	0.38
Main2	1312.838	Q=24	9	599.52	600.16	599.89	600.2	0.002699	1.68	5.35	9.8	0.4
Main2	1312.838	Q=32	12	599.52	600.26	599.95	600.32	0.002814	1.88	6.38	10.16	0.42
Main2	1312.838	Q=40	15	599.52	600.01	600.02	600.24	0.018745	3.78	3.97	9.3	1.02
Main2	1312.838	Q=80	30	599.52	600.23	600.28	600.61	0.020789	4.97	6.04	10.04	1.13
Main2	1312.838	Q=120	45	599.52	600.4	600.49	600.92	0.02171	5.77	7.8	10.63	1.19
Main2	1312.838	Q=160	60	599.52	600.55	600.67	601.18	0.022002	6.36	9.43	11.16	1.22
Main2	1312.838	Q=240	90	599.52	600.8	600.99	601.63	0.022638	7.3	12.32	12.02	1.27
Main2	1312.838	Q=320	120	599.52	601.02	601.25	602.01	0.022744	7.99	15.02	12.78	1.3
Main2	1312.838	Q=400	150	599.52	601.21	601.49	602.34	0.022665	8.53	17.58	13.46	1.32
Main2	1312.838	Q=440	165	599.52	601.3	601.6	602.5	0.022589	8.77	18.82	13.78	1.32
Main2	1312.838	Q=480	180	599.52	601.38	601.71	602.65	0.022763	9.02	19.96	14.06	1.33

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1403.425	Q=95.35	56.6	601.26	602.3	602.3	602.76	0.014774	5.39	10.5	11.81	1.01
Main2	1403.425	Q=4	1.5	601.26	601.39	601.36	601.42	0.01253	1.37	1.1	8.86	0.69
Main2	1403.425	Q=8	3	601.26	601.45	601.42	601.5	0.014953	1.89	1.59	9.04	0.79
Main2	1403.425	Q=16	6	601.26	601.53	601.51	601.63	0.016597	2.53	2.37	9.32	0.89
Main2	1403.425	Q=24	9	601.26	601.6	601.59	601.74	0.017282	2.98	3.02	9.54	0.93
Main2	1403.425	Q=32	12	601.26	601.66	601.65	601.84	0.01812	3.37	3.57	9.72	0.98
Main2	1403.425	Q=40	15	601.26	601.71	601.71	601.92	0.018469	3.67	4.09	9.9	1.01
Main2	1403.425	Q=80	30	601.26	601.96	601.96	602.28	0.01621	4.49	6.68	10.71	1
Main2	1403.425	Q=120	45	601.26	602.17	602.17	602.56	0.015198	5.05	8.92	11.37	1
Main2	1403.425	Q=160	60	601.26	602.34	602.34	602.81	0.014628	5.48	10.96	11.93	1.01
Main2	1403.425	Q=240	90	601.26	602.65	602.65	603.23	0.013742	6.1	14.75	12.92	1.01
Main2	1403.425	Q=320	120	601.26	602.91	602.91	603.58	0.013211	6.58	18.25	13.77	1.01
Main2	1403.425	Q=400	150	601.26	603.14	603.14	603.9	0.012788	6.95	21.57	14.53	1.01
Main2	1403.425	Q=440	165	601.26	603.25	603.25	604.04	0.012627	7.12	23.17	14.88	1.01
Main2	1403.425	Q=480	180	601.26	603.36	603.36	604.18	0.012412	7.26	24.78	15.23	1
Main2	1460.474	Q=95.35	56.6	601.41	602.99		603.17	0.003928	3.38	16.72	13.97	0.55
Main2	1460.474	Q=4	1.5	601.41	601.67	601.54	601.68	0.002197	0.82	1.82	8.54	0.31
Main2	1460.474	Q=8	3	601.41	601.78		601.79	0.002431	1.1	2.74	8.97	0.35
Main2	1460.474	Q=16	6	601.41	601.92		601.96	0.002787	1.46	4.1	9.57	0.39
Main2	1460.474	Q=24	9	601.41	602.04		602.08	0.002964	1.72	5.24	10.05	0.42
Main2	1460.474	Q=32	12	601.41	602.14		602.2	0.003084	1.92	6.26	10.46	0.44
Main2	1460.474	Q=40	15	601.41	602.23		602.29	0.00319	2.09	7.19	10.82	0.45
Main2	1460.474	Q=80	30	601.41	602.56		602.68	0.003611	2.71	11.06	12.2	0.5
Main2	1460.474	Q=120	45	601.41	602.82		602.98	0.003813	3.13	14.38	13.27	0.53
Main2	1460.474	Q=160	60	601.41	603.04		603.23	0.003955	3.45	17.38	14.16	0.55
Main2	1460.474	Q=240	90	601.41	603.41	602.87	603.65	0.004053	3.94	22.99	19.37	0.57
Main2	1460.474	Q=320	120	601.41	603.72	603.13	603.98	0.003641	4.18	31.48	32.28	0.56
Main2	1460.474	Q=400	150	601.41	604.01	603.36	604.26	0.00299	4.19	41.51	36.98	0.52
Main2	1460.474	Q=440	165	601.41	604.15	603.58	604.39	0.00271	4.17	46.75	38.79	0.5
Main2	1460.474	Q=480	180	601.41	604.28	603.73	604.51	0.002474	4.14	51.99	40.41	0.48

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main2	1529.53	Q=95.35	56.6	601.87	603.28	602.86	603.45	0.003978	3.28	17.24	15.33	0.55
Main2	1529.53	Q=4	1.5	601.87	602.03	602.04	602.08	0.025144	1.81	0.83	7.53	0.96
Main2	1529.53	Q=8	3	601.87	602.11	602.1	602.17	0.018006	1.96	1.53	9.53	0.86
Main2	1529.53	Q=16	6	601.87	602.24	602.19	602.31	0.011276	2.03	2.95	12.25	0.73
Main2	1529.53	Q=24	9	601.87	602.34	602.26	602.41	0.008347	2.16	4.17	12.54	0.66
Main2	1529.53	Q=32	12	601.87	602.43	602.31	602.51	0.006962	2.27	5.28	12.81	0.62
Main2	1529.53	Q=40	15	601.87	602.51	602.36	602.6	0.006151	2.37	6.32	13.04	0.6
Main2	1529.53	Q=80	30	601.87	602.84	602.57	602.96	0.004633	2.78	10.8	14.02	0.56
Main2	1529.53	Q=120	45	601.87	603.1	602.75	603.25	0.004167	3.09	14.58	14.8	0.55
Main2	1529.53	Q=160	60	601.87	603.33	602.9	603.5	0.003938	3.34	17.98	15.47	0.55
Main2	1529.53	Q=240	90	601.87	602.72	603.16	604.21	0.068503	9.79	9.2	13.68	2.1
Main2	1529.53	Q=320	120	601.87	602.86	603.4	604.69	0.068884	10.85	11.06	14.08	2.16
Main2	1529.53	Q=400	150	601.87	602.98	603.61	605.11	0.068379	11.7	12.82	14.45	2.19
Main2	1529.53	Q=440	165	601.87	603.04	603.7	605.32	0.068858	12.11	13.62	14.61	2.21
Main2	1529.53	Q=480	180	601.87	603.08	603.8	605.55	0.070858	12.6	14.29	14.74	2.26
Main2	1682.002	Q=95.35	56.6	605.68	607.2	607.2	607.76	0.014701	5.98	9.47	8.66	1.01
Main2	1682.002	Q=4	1.5	605.68	605.86	605.86	605.94	0.025351	2.21	0.68	4.5	1
Main2	1682.002	Q=8	3	605.68	605.95	605.95	606.07	0.022648	2.74	1.1	4.78	1.01
Main2	1682.002	Q=16	6	605.68	606.09	606.09	606.27	0.01997	3.34	1.8	5.21	1
Main2	1682.002	Q=24	9	605.68	606.21	606.21	606.43	0.01883	3.75	2.4	5.56	1.01
Main2	1682.002	Q=32	12	605.68	606.3	606.3	606.56	0.018067	4.06	2.96	5.87	1.01
Main2	1682.002	Q=40	15	605.68	606.39	606.39	606.68	0.017471	4.3	3.49	6.14	1.01
Main2	1682.002	Q=80	30	605.68	606.75	606.75	607.15	0.015877	5.13	5.85	7.24	1.01
Main2	1682.002	Q=120	45	605.68	607.02	607.02	607.52	0.015149	5.67	7.94	8.09	1.01
Main2	1682.002	Q=160	60	605.68	607.25	607.25	607.82	0.014589	6.06	9.9	8.81	1.01
Main2	1682.002	Q=240	90	605.68	607.64	607.64	608.32	0.013896	6.65	13.54	10.01	1.01
Main2	1682.002	Q=320	120	605.68	607.96	607.96	608.74	0.013411	7.08	16.94	11.02	1.01
Main2	1682.002	Q=400	150	605.68	608.24	608.24	609.1	0.013105	7.45	20.14	11.89	1.01
Main2	1682.002	Q=440	165	605.68	608.36	608.36	609.27	0.012802	7.62	21.66	12.46	1
Main2	1682.002	Q=480	180	605.68	608.48	608.49	609.43	0.012481	7.8	23.16	13.07	1

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main2	1780.912	Q=95.35	56.6	607.35	608.54	608.65	609.17	0.02042	6.35	8.91	9.85	1.18
Main2	1780.912	Q=4	1.5	607.35	607.61	607.58	607.65	0.012604	1.56	0.96	6.45	0.71
Main2	1780.912	Q=8	3	607.35	607.69	607.65	607.75	0.013146	1.96	1.53	7.51	0.76
Main2	1780.912	Q=16	6	607.35	607.8	607.76	607.9	0.013664	2.56	2.34	7.8	0.82
Main2	1780.912	Q=24	9	607.35	607.88	607.84	608.02	0.013907	2.99	3.01	8.04	0.86
Main2	1780.912	Q=32	12	607.35	607.82	607.92	608.17	0.042596	4.74	2.53	7.87	1.47
Main2	1780.912	Q=40	15	607.35	608.03	607.99	608.23	0.013978	3.59	4.18	8.43	0.9
Main2	1780.912	Q=80	30	607.35	608.22	608.27	608.63	0.019954	5.12	5.86	8.96	1.11
Main2	1780.912	Q=120	45	607.35	608.41	608.5	608.95	0.02039	5.9	7.63	9.48	1.16
Main2	1780.912	Q=160	60	607.35	608.58	608.69	609.23	0.020418	6.47	9.27	9.95	1.18
Main2	1780.912	Q=240	90	607.35	608.86	609.03	609.71	0.020544	7.36	12.22	10.73	1.22
Main2	1780.912	Q=320	120	607.35	609.11	609.32	610.11	0.020378	8.01	14.97	11.41	1.23
Main2	1780.912	Q=400	150	607.35	609.33	609.58	610.47	0.020257	8.54	17.56	12.02	1.25
Main2	1780.912	Q=440	165	607.35	609.47	609.7	610.61	0.018905	8.57	19.25	12.4	1.21
Main2	1780.912	Q=480	180	607.35	609.65	609.82	610.74	0.016423	8.36	21.53	12.89	1.14
Main2	1860.551	Q=95.35	56.6	608.67	610.06	610.14	610.68	0.017913	6.35	8.91	8.72	1.11
Main2	1860.551	Q=4	1.5	608.67	608.84	608.83	608.9	0.019935	2.02	0.74	4.68	0.89
Main2	1860.551	Q=8	3	608.67	608.93	608.92	609.03	0.019686	2.59	1.16	4.97	0.94
Main2	1860.551	Q=16	6	608.67	609.05	609.05	609.22	0.019846	3.3	1.82	5.39	1
Main2	1860.551	Q=24	9	608.67	609.16	609.16	609.38	0.018867	3.71	2.43	5.75	1.01
Main2	1860.551	Q=32	12	608.67	609.26	609.26	609.51	0.018006	4.01	2.99	6.07	1.01
Main2	1860.551	Q=40	15	608.67	609.34	609.34	609.62	0.017397	4.25	3.53	6.35	1
Main2	1860.551	Q=80	30	608.67	609.67	609.69	610.09	0.0168	5.18	5.79	7.44	1.03
Main2	1860.551	Q=120	45	608.67	609.91	609.96	610.45	0.017408	5.9	7.63	8.22	1.08
Main2	1860.551	Q=160	60	608.67	610.1	610.19	610.75	0.017985	6.47	9.28	8.86	1.11
Main2	1860.551	Q=240	90	608.67	610.43	610.56	611.25	0.01841	7.29	12.34	9.94	1.15
Main2	1860.551	Q=320	120	608.67	610.69	610.88	611.67	0.018753	7.93	15.12	10.83	1.18
Main2	1860.551	Q=400	150	608.67	610.91	611.15	612.04	0.019409	8.53	17.59	11.56	1.22
Main2	1860.551	Q=440	165	608.67	610.98	611.27	612.24	0.021042	9.01	18.32	11.76	1.27
Main2	1860.551	Q=480	180	608.67	610.95	611.41	612.5	0.026025	9.97	18.06	11.69	1.41

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1941.272	Q=95.35	56.6	609.94	611.45	611.45	611.99	0.014641	5.92	9.56	8.9	1.01
Main2	1941.272	Q=4	1.5	609.94	610.16	610.12	610.21	0.013191	1.79	0.84	4.64	0.74
Main2	1941.272	Q=8	3	609.94	610.26	610.22	610.34	0.013469	2.31	1.3	4.96	0.79
Main2	1941.272	Q=16	6	609.94	610.4	610.35	610.53	0.013472	2.92	2.06	5.44	0.84
Main2	1941.272	Q=24	9	609.94	610.51	610.47	610.69	0.014152	3.39	2.66	5.8	0.88
Main2	1941.272	Q=32	12	609.94	610.6	610.56	610.82	0.014682	3.76	3.19	6.09	0.91
Main2	1941.272	Q=40	15	609.94	610.68	610.65	610.93	0.014912	4.05	3.7	6.37	0.94
Main2	1941.272	Q=80	30	609.94	611	611	611.4	0.015896	5.1	5.89	7.41	1.01
Main2	1941.272	Q=120	45	609.94	611.27	611.27	611.76	0.015051	5.61	8.02	8.31	1.01
Main2	1941.272	Q=160	60	609.94	611.49	611.49	612.05	0.014535	6	9.99	9.06	1.01
Main2	1941.272	Q=240	90	609.94	611.88	611.88	612.55	0.013818	6.58	13.68	10.32	1.01
Main2	1941.272	Q=320	120	609.94	612.19	612.19	612.96	0.013373	7.02	17.1	11.36	1.01
Main2	1941.272	Q=400	150	609.94	612.47	612.47	613.31	0.0128	7.37	20.39	13.18	1
Main2	1941.272	Q=440	165	609.94	612.65	612.65	613.47	0.01083	7.27	23.3	18.43	0.94
Main2	1941.272	Q=480	180	609.94	612.95	612.95	613.59	0.007199	6.55	30.99	30.87	0.78
Main2	2038.465	Q=95.35	56.6	611.2	612.66		612.93	0.006432	4.16	13.6	11.9	0.69
Main2	2038.465	Q=4	1.5	611.2	611.38	611.34	611.41	0.011709	1.42	1.05	7.64	0.68
Main2	2038.465	Q=8	3	611.2	611.46		611.51	0.010829	1.81	1.66	7.9	0.69
Main2	2038.465	Q=16	6	611.2	611.58		611.66	0.010052	2.28	2.63	8.3	0.71
Main2	2038.465	Q=24	9	611.2	611.68		611.78	0.008981	2.54	3.54	8.66	0.7
Main2	2038.465	Q=32	12	611.2	611.77	611.66	611.89	0.008443	2.76	4.36	8.96	0.7
Main2	2038.465	Q=40	15	611.2	611.86	611.73	611.99	0.008082	2.93	5.11	9.24	0.69
Main2	2038.465	Q=80	30	611.2	612.21		612.4	0.006949	3.51	8.55	10.4	0.68
Main2	2038.465	Q=120	45	611.2	612.48		612.72	0.006667	3.93	11.45	11.29	0.69
Main2	2038.465	Q=160	60	611.2	612.71		612.99	0.006464	4.24	14.14	12.05	0.69
Main2	2038.465	Q=240	90	611.2	613.1		613.44	0.006151	4.7	19.14	13.36	0.69
Main2	2038.465	Q=320	120	611.2	613.43	613.01	613.83	0.005993	5.06	23.72	14.45	0.7
Main2	2038.465	Q=400	150	611.2	613.72	613.25	614.16	0.005892	5.35	28.02	15.4	0.7
Main2	2038.465	Q=440	165	611.2	613.79	613.37	614.29	0.006318	5.66	29.17	16.16	0.73
Main2	2038.465	Q=480	180	611.2	613.22	613.48	614.38	0.019485	8.66	20.8	13.76	1.24

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	2125.413	Q=95.35	56.6	611.59	613.33	613.17	613.83	0.015571	5.7	9.94	7.25	0.86
Main2	2125.413	Q=4	1.5	611.59	612.01	611.88	612.03	0.00468	1.1	1.37	5.78	0.4
Main2	2125.413	Q=8	3	611.59	612.12	611.98	612.16	0.005358	1.48	2.02	5.9	0.45
Main2	2125.413	Q=16	6	611.59	612.28		612.34	0.006359	2.01	2.98	6.08	0.51
Main2	2125.413	Q=24	9	611.59	612.4		612.49	0.007407	2.44	3.69	6.21	0.56
Main2	2125.413	Q=32	12	611.59	612.49		612.61	0.008338	2.8	4.29	6.32	0.6
Main2	2125.413	Q=40	15	611.59	612.58		612.73	0.008912	3.08	4.86	6.42	0.62
Main2	2125.413	Q=80	30	611.59	612.92		613.2	0.011695	4.24	7.08	6.79	0.73
Main2	2125.413	Q=120	45	611.59	613.17		613.57	0.013868	5.1	8.82	7.07	0.81
Main2	2125.413	Q=160	60	611.59	613.37	613.23	613.9	0.015974	5.85	10.26	7.3	0.87
Main2	2125.413	Q=240	90	611.59	613.67	613.65	614.47	0.020487	7.2	12.51	7.63	0.99
Main2	2125.413	Q=320	120	611.59	614.02	614.02	614.98	0.020972	7.88	15.23	8.02	1.01
Main2	2125.413	Q=400	150	611.59	614.6	614.6	615.39	0.012696	7.25	22.22	16.45	0.82
Main2	2125.413	Q=440	165	611.59	614.77	614.77	615.54	0.011545	7.23	25.2	18.4	0.79
Main2	2125.413	Q=480	180	611.59	614.9	614.9	615.67	0.011032	7.3	27.72	19.77	0.77
Main2	2235.308	Q=95.35	56.6	613.04	614.66		614.87	0.006108	3.68	15.36	12.17	0.58
Main2	2235.308	Q=4	1.5	613.04	613.23	613.23	613.29	0.036481	1.96	0.77	6.42	1
Main2	2235.308	Q=8	3	613.04	613.3	613.3	613.39	0.032278	2.35	1.28	7.4	1
Main2	2235.308	Q=16	6	613.04	613.43	613.41	613.53	0.021397	2.53	2.37	9.02	0.87
Main2	2235.308	Q=24	9	613.04	613.54	613.48	613.65	0.016022	2.69	3.35	9.29	0.79
Main2	2235.308	Q=32	12	613.04	613.63	613.55	613.76	0.013447	2.82	4.25	9.54	0.75
Main2	2235.308	Q=40	15	613.04	613.72		613.86	0.012012	2.95	5.09	9.76	0.72
Main2	2235.308	Q=80	30	613.04	614.11		614.28	0.008261	3.32	9.04	10.75	0.64
Main2	2235.308	Q=120	45	613.04	614.43		614.63	0.006855	3.56	12.63	11.58	0.6
Main2	2235.308	Q=160	60	613.04	614.72		614.94	0.005937	3.72	16.15	12.33	0.57
Main2	2235.308	Q=240	90	613.04	615.25		615.49	0.004809	3.91	23.03	13.69	0.53
Main2	2235.308	Q=320	120	613.04	615.69		615.95	0.00433	4.1	29.29	14.82	0.51
Main2	2235.308	Q=400	150	613.04	615.93		616.25	0.004868	4.55	32.94	15.44	0.55
Main2	2235.308	Q=440	165	613.04	616.04		616.39	0.005133	4.77	34.6	15.72	0.57
Main2	2235.308	Q=480	180	613.04	616.14		616.53	0.005356	4.96	36.27	15.99	0.58

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main2	2330.407	Q=95.35	56.6	614.22	615.43	615.41	615.88	0.01876	5.44	10.41	10.81	0.98
Main2	2330.407	Q=4	1.5	614.22	614.49	614.42	614.51	0.006436	1.04	1.44	8.44	0.44
Main2	2330.407	Q=8	3	614.22	614.58	614.48	614.61	0.006748	1.38	2.18	8.66	0.48
Main2	2330.407	Q=16	6	614.22	614.69		614.75	0.008344	1.91	3.15	8.94	0.57
Main2	2330.407	Q=24	9	614.22	614.77		614.85	0.010118	2.35	3.83	9.13	0.64
Main2	2330.407	Q=32	12	614.22	614.83		614.94	0.01172	2.73	4.39	9.29	0.7
Main2	2330.407	Q=40	15	614.22	614.88		615.03	0.012711	3.04	4.94	9.43	0.74
Main2	2330.407	Q=80	30	614.22	615.11		615.39	0.016302	4.2	7.15	10.01	0.87
Main2	2330.407	Q=120	45	614.22	615.3	615.26	615.68	0.017991	4.97	9.05	10.48	0.94
Main2	2330.407	Q=160	60	614.22	615.46	615.45	615.94	0.018841	5.55	10.81	10.9	0.98
Main2	2330.407	Q=240	90	614.22	615.79	615.77	616.39	0.017732	6.19	14.54	11.74	0.98
Main2	2330.407	Q=320	120	614.22	616.13	616.05	616.77	0.015485	6.45	18.6	12.59	0.94
Main2	2330.407	Q=400	150	614.22	616.41	616.3	617.11	0.014562	6.75	22.21	13.3	0.92
Main2	2330.407	Q=440	165	614.22	616.53	616.42	617.27	0.014288	6.9	23.92	13.62	0.92
Main2	2330.407	Q=480	180	614.22	616.65	616.53	617.42	0.014069	7.04	25.58	13.92	0.92
Main2	2401.954	Q=95.35	56.6	614.98	616.48	616.14	616.73	0.007853	4.05	13.99	11.6	0.65
Main2	2401.954	Q=4	1.5	614.98	615.18	615.15	615.21	0.016975	1.41	1.07	8.29	0.69
Main2	2401.954	Q=8	3	614.98	615.26	615.21	615.3	0.014783	1.76	1.71	8.48	0.69
Main2	2401.954	Q=16	6	614.98	615.38	615.3	615.45	0.012101	2.14	2.8	8.8	0.67
Main2	2401.954	Q=24	9	614.98	615.5	615.38	615.58	0.010321	2.37	3.8	9.09	0.64
Main2	2401.954	Q=32	12	614.98	615.59	615.45	615.69	0.00947	2.55	4.7	9.34	0.63
Main2	2401.954	Q=40	15	614.98	615.68	615.52	615.79	0.009126	2.73	5.49	9.55	0.63
Main2	2401.954	Q=80	30	614.98	616.02	615.78	616.2	0.008227	3.35	8.97	10.44	0.64
Main2	2401.954	Q=120	45	614.98	616.3	615.99	616.52	0.007943	3.78	11.92	11.13	0.64
Main2	2401.954	Q=160	60	614.98	616.53	616.18	616.79	0.007852	4.12	14.56	11.72	0.65
Main2	2401.954	Q=240	90	614.98	616.89	616.51	617.24	0.008174	4.73	19.02	12.65	0.68
Main2	2401.954	Q=320	120	614.98	617.18	616.79	617.61	0.008785	5.29	22.69	13.37	0.72
Main2	2401.954	Q=400	150	614.98	616.66	617.04	618	0.036163	9.27	16.18	12.07	1.41
Main2	2401.954	Q=440	165	614.98	616.75	617.15	618.18	0.036471	9.58	17.23	12.29	1.43
Main2	2401.954	Q=480	180	614.98	616.83	617.26	618.34	0.036764	9.86	18.25	12.5	1.44

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	2500.483	Q=95.35	56.6	617.24	618.58	618.58	619.13	0.020275	5.95	9.52	8.7	1
Main2	2500.483	Q=4	1.5	617.24	617.41	617.4	617.47	0.032434	1.91	0.79	6.25	0.95
Main2	2500.483	Q=8	3	617.24	617.48	617.48	617.58	0.032189	2.48	1.21	6.39	1.01
Main2	2500.483	Q=16	6	617.24	617.59	617.59	617.74	0.028281	3.09	1.94	6.62	1
Main2	2500.483	Q=24	9	617.24	617.69	617.69	617.88	0.026564	3.51	2.57	6.82	1.01
Main2	2500.483	Q=32	12	617.24	617.77	617.77	618	0.025284	3.83	3.14	6.99	1.01
Main2	2500.483	Q=40	15	617.24	617.84	617.84	618.1	0.024348	4.09	3.67	7.15	1.01
Main2	2500.483	Q=80	30	617.24	618.16	618.16	618.54	0.021956	4.99	6.01	7.81	1
Main2	2500.483	Q=120	45	617.24	618.41	618.41	618.89	0.020871	5.59	8.05	8.34	1
Main2	2500.483	Q=160	60	617.24	618.63	618.63	619.2	0.020152	6.04	9.93	8.8	1
Main2	2500.483	Q=240	90	617.24	619	619	619.71	0.01948	6.74	13.35	9.58	1.01
Main2	2500.483	Q=320	120	617.24	619.32	619.32	620.14	0.018921	7.25	16.55	10.26	1.01
Main2	2500.483	Q=400	150	617.24	619.61	619.61	620.52	0.018516	7.67	19.57	10.86	1.01
Main2	2500.483	Q=440	165	617.24	619.74	619.74	620.7	0.018336	7.84	21.04	11.14	1.01
Main2	2500.483	Q=480	180	617.24	619.87	619.87	620.87	0.018187	8.01	22.47	11.41	1.01
Main2	2652.687	Q=95.35	56.6	619.11	620.88	620.51	621.24	0.00989	4.77	11.86	7.87	0.69
Main2	2652.687	Q=4	1.5	619.11	619.36	619.27	619.38	0.006658	1.19	1.26	6.06	0.46
Main2	2652.687	Q=8	3	619.11	619.47		619.51	0.00669	1.55	1.94	6.19	0.49
Main2	2652.687	Q=16	6	619.11	619.63		619.7	0.007279	2.05	2.93	6.38	0.53
Main2	2652.687	Q=24	9	619.11	619.76		619.85	0.007605	2.4	3.75	6.53	0.56
Main2	2652.687	Q=32	12	619.11	619.87		619.98	0.007903	2.68	4.47	6.66	0.58
Main2	2652.687	Q=40	15	619.11	619.97		620.1	0.008141	2.92	5.13	6.78	0.59
Main2	2652.687	Q=80	30	619.11	620.36	620.06	620.59	0.008922	3.79	7.92	7.25	0.64
Main2	2652.687	Q=120	45	619.11	620.68	620.33	620.98	0.009497	4.39	10.25	7.62	0.67
Main2	2652.687	Q=160	60	619.11	620.94	620.56	621.31	0.00999	4.88	12.31	7.94	0.69
Main2	2652.687	Q=240	90	619.11	621.39	620.97	621.88	0.01069	5.62	16.02	8.48	0.72
Main2	2652.687	Q=320	120	619.11	621.76	621.33	622.37	0.011435	6.24	19.23	8.92	0.75
Main2	2652.687	Q=400	150	619.11	622.08	621.65	622.79	0.01214	6.79	22.11	9.51	0.77
Main2	2652.687	Q=440	165	619.11	622.2	621.8	622.98	0.01234	7.08	23.45	11.68	0.79
Main2	2652.687	Q=480	180	619.11	622.32	621.95	623.16	0.012509	7.35	24.95	13.71	0.8

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	2702.534	Q=95.35	56.6	619.26	621.36	620.39	621.46	0.002179	2.58	21.92	13.4	0.36
Main2	2702.534	Q=4	1.5	619.26	619.53	619.37	619.54	0.001953	0.73	2.06	8.33	0.26
Main2	2702.534	Q=8	3	619.26	619.67	619.44	619.68	0.001926	0.94	3.2	8.7	0.27
Main2	2702.534	Q=16	6	619.26	619.85	619.54	619.88	0.002084	1.23	4.87	9.22	0.3
Main2	2702.534	Q=24	9	619.26	620	619.62	620.03	0.002158	1.44	6.27	9.63	0.31
Main2	2702.534	Q=32	12	619.26	620.13	619.69	620.17	0.002179	1.59	7.56	10	0.32
Main2	2702.534	Q=40	15	619.26	620.25	619.75	620.3	0.002195	1.71	8.75	10.32	0.33
Main2	2702.534	Q=80	30	619.26	620.73	620.02	620.8	0.002213	2.14	13.99	11.65	0.34
Main2	2702.534	Q=120	45	619.26	621.11	620.24	621.2	0.002199	2.42	18.59	12.7	0.35
Main2	2702.534	Q=160	60	619.26	621.43	620.43	621.54	0.002173	2.62	22.87	13.6	0.36
Main2	2702.534	Q=240	90	619.26	621.99	620.75	622.12	0.002106	2.91	30.89	15.15	0.36
Main2	2702.534	Q=320	120	619.26	622.46	621.03	622.6	0.001851	3.06	41.49	27.79	0.35
Main2	2702.534	Q=400	150	619.26	622.88	621.28	623.01	0.001506	3.07	54.34	33.45	0.32
Main2	2702.534	Q=440	165	619.26	623.07	621.4	623.2	0.001379	3.07	60.9	35.95	0.31
Main2	2702.534	Q=480	180	619.26	623.24	621.51	623.37	0.001271	3.06	67.37	37.39	0.3
Main2	2753.631	Q=95.35	56.6	620.75	621.77	621.85	622.34	0.026287	6.03	9.38	10.81	1.14
Main2	2753.631	Q=4	1.5	620.75	620.86	620.88	620.93	0.057423	2.03	0.74	8.2	1.2
Main2	2753.631	Q=8	3	620.75	620.91	620.93	621.02	0.059753	2.7	1.11	8.33	1.3
Main2	2753.631	Q=16	6	620.75	620.98	621.03	621.17	0.060815	3.54	1.7	8.53	1.4
Main2	2753.631	Q=24	9	620.75	621.03	621.11	621.3	0.061938	4.14	2.17	8.69	1.46
Main2	2753.631	Q=32	12	620.75	621.08	621.17	621.41	0.063319	4.65	2.58	8.83	1.51
Main2	2753.631	Q=40	15	620.75	621.23	621.24	621.45	0.025597	3.78	3.97	9.27	1.02
Main2	2753.631	Q=80	30	620.75	621.46	621.5	621.83	0.026211	4.87	6.16	9.92	1.09
Main2	2753.631	Q=120	45	620.75	621.65	621.71	622.13	0.026189	5.58	8.06	10.46	1.12
Main2	2753.631	Q=160	60	620.75	621.81	621.89	622.39	0.026174	6.14	9.77	10.92	1.14
Main2	2753.631	Q=240	90	620.75	622.08	622.21	622.84	0.025905	6.97	12.91	11.71	1.17
Main2	2753.631	Q=320	120	620.75	622.32	622.48	623.22	0.025621	7.6	15.8	12.4	1.19
Main2	2753.631	Q=400	150	620.75	622.54	622.73	623.55	0.025122	8.08	18.57	13.03	1.19
Main2	2753.631	Q=440	165	620.75	622.62	622.85	623.72	0.025894	8.4	19.65	13.26	1.22
Main2	2753.631	Q=480	180	620.75	622.74	622.95	623.86	0.024717	8.48	21.23	13.6	1.2

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	132.1173	Q=95.35	13	627.96	628.65	628.65	628.86	0.018624	3.63	3.58	8.95	1.01
T2	132.1173	Q=4	0.5	627.96	628.15	628.15	628.2	0.028714	1.74	0.29	3.03	0.99
T2	132.1173	Q=8	1	627.96	628.21	628.21	628.27	0.026247	2	0.5	4	0.99
T2	132.1173	Q=16	2	627.96	628.29	628.29	628.37	0.024697	2.32	0.86	5.24	1.01
T2	132.1173	Q=24	3	627.96	628.35	628.35	628.44	0.023312	2.51	1.19	6.17	1.01
T2	132.1173	Q=32	4	627.96	628.4	628.4	628.5	0.02185	2.64	1.51	6.93	1
T2	132.1173	Q=40	5	627.96	628.43	628.43	628.56	0.022076	2.84	1.76	7.31	1.02
T2	132.1173	Q=80	10	627.96	628.58	628.58	628.76	0.019425	3.4	2.94	8.41	1.01
T2	132.1173	Q=120	15	627.96	628.7	628.7	628.92	0.018162	3.76	3.99	9.28	1.01
T2	132.1173	Q=160	20	627.96	628.8	628.8	629.05	0.017388	4.04	4.95	10.01	1.01
T2	132.1173	Q=240	30	627.96	628.97	628.97	629.27	0.01632	4.44	6.75	11.26	1.01
T2	132.1173	Q=320	40	627.96	629.11	629.11	629.46	0.015904	4.78	8.37	12.27	1.02
T2	132.1173	Q=400	50	627.96	629.19	629.24	629.63	0.017711	5.28	9.46	12.91	1.09
T2	132.1173	Q=440	55	627.96	629.23	629.29	629.7	0.018577	5.52	9.96	13.19	1.12
T2	132.1173	Q=480	60	627.96	629.27	629.35	629.78	0.019464	5.75	10.44	13.45	1.15
T2	199.0991	Q=95.35	13	628.98	629.69	629.62	629.85	0.012044	3.26	3.99	8.34	0.83
T2	199.0991	Q=4	0.5	628.98	629.2	629.15	629.21	0.009357	1.08	0.46	4.29	0.58
T2	199.0991	Q=8	1	628.98	629.26	629.22	629.28	0.00983	1.31	0.76	5.51	0.62
T2	199.0991	Q=16	2	628.98	629.34	629.28	629.38	0.009971	1.57	1.28	7.13	0.65
T2	199.0991	Q=24	3	628.98	629.39	629.34	629.44	0.010346	1.83	1.64	7.41	0.69
T2	199.0991	Q=32	4	628.98	629.43		629.49	0.010591	2.05	1.95	7.54	0.71
T2	199.0991	Q=40	5	628.98	629.47		629.54	0.010631	2.23	2.24	7.66	0.73
T2	199.0991	Q=80	10	628.98	629.62	629.55	629.75	0.011374	2.92	3.42	8.13	0.79
T2	199.0991	Q=120	15	628.98	629.73	629.67	629.91	0.012151	3.44	4.37	8.48	0.84
T2	199.0991	Q=160	20	628.98	629.82	629.77	630.06	0.013028	3.88	5.16	8.77	0.89
T2	199.0991	Q=240	30	628.98	629.98	629.95	630.3	0.014411	4.59	6.54	9.25	0.96
T2	199.0991	Q=320	40	628.98	630.11	630.11	630.52	0.015087	5.11	7.83	9.67	1
T2	199.0991	Q=400	50	628.98	630.25	630.25	630.71	0.01471	5.44	9.19	10.1	1
T2	199.0991	Q=440	55	628.98	630.31	630.31	630.8	0.014705	5.6	9.82	10.29	1.01
T2	199.0991	Q=480	60	628.98	630.38	630.38	630.88	0.014333	5.7	10.52	10.5	1

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
T2	269.4769	Q=95.35	13	630.06	630.67	630.65	630.84	0.016307	3.36	3.87	9.91	0.95
T2	269.4769	Q=4	0.5	630.06	630.22	630.21	630.25	0.02671	1.47	0.34	4.39	0.93
T2	269.4769	Q=8	1	630.06	630.27	630.26	630.31	0.023977	1.68	0.6	5.82	0.92
T2	269.4769	Q=16	2	630.06	630.32	630.32	630.39	0.022629	2.05	0.98	6.74	0.95
T2	269.4769	Q=24	3	630.06	630.37	630.37	630.45	0.020931	2.28	1.31	7.28	0.95
T2	269.4769	Q=32	4	630.06	630.41	630.41	630.51	0.020647	2.49	1.61	7.72	0.96
T2	269.4769	Q=40	5	630.06	630.45	630.44	630.56	0.020431	2.66	1.88	8.1	0.97
T2	269.4769	Q=80	10	630.06	630.59	630.58	630.75	0.017868	3.18	3.15	9.38	0.97
T2	269.4769	Q=120	15	630.06	630.71	630.69	630.9	0.01592	3.49	4.3	10.21	0.95
T2	269.4769	Q=160	20	630.06	630.81	630.78	631.02	0.014815	3.72	5.37	10.92	0.94
T2	269.4769	Q=240	30	630.06	631	630.94	631.24	0.012277	3.94	7.61	12.28	0.88
T2	269.4769	Q=320	40	630.06	631.17	631.08	631.43	0.010926	4.12	9.71	13.43	0.85
T2	269.4769	Q=400	50	630.06	631.3	631.2	631.59	0.010389	4.32	11.58	14.36	0.85
T2	269.4769	Q=440	55	630.06	631.37	631.25	631.66	0.01004	4.38	12.54	14.79	0.84
T2	269.4769	Q=480	60	630.06	631.43	631.3	631.74	0.009784	4.46	13.46	15.19	0.83
T2	353.0578	Q=95.35	13	632.05	632.73	632.65	632.87	0.04023	2.97	4.38	9.28	0.76
T2	353.0578	Q=4	0.5	632.05	632.27	632.21	632.28	0.021969	0.83	0.6	5.51	0.45
T2	353.0578	Q=8	1	632.05	632.32	632.26	632.34	0.024603	1.06	0.95	6.63	0.49
T2	353.0578	Q=16	2	632.05	632.4	632.32	632.43	0.026047	1.34	1.49	7.61	0.53
T2	353.0578	Q=24	3	632.05	632.45	632.37	632.49	0.02859	1.57	1.91	8.29	0.57
T2	353.0578	Q=32	4	632.05	632.5	632.41	632.55	0.029028	1.75	2.29	8.5	0.59
T2	353.0578	Q=40	5	632.05	632.54	632.45	632.59	0.02932	1.9	2.63	8.63	0.61
T2	353.0578	Q=80	10	632.05	632.68	632.58	632.78	0.03477	2.58	3.88	9.1	0.7
T2	353.0578	Q=120	15	632.05	632.77	632.69	632.93	0.041653	3.15	4.76	9.42	0.78
T2	353.0578	Q=160	20	632.05	632.85	632.79	633.06	0.047498	3.63	5.5	9.68	0.85
T2	353.0578	Q=240	30	632.05	632.95	632.95	633.28	0.064651	4.62	6.5	10.02	1.01
T2	353.0578	Q=320	40	632.05	633.1	633.1	633.49	0.061686	5	8	10.5	1.01
T2	353.0578	Q=400	50	632.05	633.23	633.23	633.67	0.059521	5.31	9.42	10.95	1.01
T2	353.0578	Q=440	55	632.05	633.29	633.29	633.75	0.058685	5.44	10.1	11.15	1.01
T2	353.0578	Q=480	60	632.05	633.35	633.35	633.83	0.057898	5.57	10.77	11.35	1.01

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	445.2593	Q=95.35	13	633.83	634.48	634.4	634.6	0.010751	2.77	4.69	11.75	0.77
T2	445.2593	Q=4	0.5	633.83	633.98	633.97	634	0.016054	1.19	0.42	5.05	0.73
T2	445.2593	Q=8	1	633.83	634.03	634	634.06	0.014471	1.44	0.69	5.79	0.74
T2	445.2593	Q=16	2	633.83	634.1	634.07	634.15	0.013876	1.76	1.14	6.83	0.76
T2	445.2593	Q=24	3	633.83	634.16	634.11	634.22	0.013135	1.94	1.54	7.66	0.76
T2	445.2593	Q=32	4	633.83	634.2	634.16	634.27	0.012957	2.1	1.9	8.33	0.77
T2	445.2593	Q=40	5	633.83	634.24	634.2	634.32	0.012898	2.23	2.24	8.9	0.78
T2	445.2593	Q=80	10	633.83	634.4	634.33	634.51	0.011681	2.65	3.78	10.79	0.79
T2	445.2593	Q=120	15	633.83	634.52	634.44	634.65	0.010534	2.86	5.24	12.28	0.77
T2	445.2593	Q=160	20	633.83	634.63	634.53	634.77	0.009772	3.02	6.62	13.54	0.76
T2	445.2593	Q=240	30	633.83	634.81	634.68	634.98	0.008356	3.24	9.25	15.08	0.73
T2	445.2593	Q=320	40	633.83	634.66	634.8	635.16	0.032061	5.63	7.1	13.89	1.39
T2	445.2593	Q=400	50	633.83	634.74	634.9	635.32	0.032635	6.08	8.22	14.53	1.42
T2	445.2593	Q=440	55	633.83	634.78	634.95	635.39	0.032868	6.28	8.76	14.82	1.44
T2	445.2593	Q=480	60	633.83	634.81	635	635.46	0.033128	6.47	9.27	15.09	1.45
T2	530.8471	Q=95.35	13	637.66	638.22	638.22	638.4	0.075827	3.39	3.83	10.84	1.01
T2	530.8471	Q=4	0.5	637.66	637.79	637.79	637.83	0.142603	1.57	0.32	4.63	1.05
T2	530.8471	Q=8	1	637.66	637.83	637.83	637.89	0.114627	1.82	0.55	5.39	1.01
T2	530.8471	Q=16	2	637.66	637.9	637.9	637.97	0.099755	2.15	0.93	6.47	1
T2	530.8471	Q=24	3	637.66	637.95	637.95	638.03	0.09614	2.38	1.26	7.26	1.01
T2	530.8471	Q=32	4	637.66	637.99	637.99	638.09	0.091747	2.54	1.57	7.94	1.01
T2	530.8471	Q=40	5	637.66	638.03	638.03	638.13	0.086716	2.65	1.89	8.57	1
T2	530.8471	Q=80	10	637.66	638.16	638.16	638.31	0.08193	3.21	3.12	10.19	1.02
T2	530.8471	Q=120	15	637.66	638.26	638.26	638.45	0.074642	3.53	4.25	11.2	1.01
T2	530.8471	Q=160	20	637.66	638.35	638.35	638.57	0.071685	3.8	5.26	12.03	1.01
T2	530.8471	Q=240	30	637.66	638.5	638.5	638.77	0.066671	4.18	7.18	13.46	1.01
T2	530.8471	Q=320	40	637.66	638.62	638.62	638.94	0.063837	4.52	8.86	14.26	1.01
T2	530.8471	Q=400	50	637.66	638.73	638.73	639.08	0.061292	4.79	10.44	14.92	1.01
T2	530.8471	Q=440	55	637.66	638.78	638.78	639.15	0.060649	4.92	11.18	15.22	1.01
T2	530.8471	Q=480	60	637.66	638.83	638.83	639.22	0.059647	5.03	11.94	15.52	1.01

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
T2	643.2175	Q=95.35	13	638.88	639.83	639.61	639.92	0.005378	2.48	5.24	9.02	0.57
T2	643.2175	Q=4	0.5	638.88	639.06	639.06	639.12	0.034805	1.87	0.27	2.9	1.09
T2	643.2175	Q=8	1	638.88	639.23	639.13	639.25	0.004306	1.03	0.97	5.32	0.43
T2	643.2175	Q=16	2	638.88	639.33	639.21	639.35	0.004536	1.33	1.51	5.92	0.46
T2	643.2175	Q=24	3	638.88	639.4	639.27	639.44	0.004607	1.52	1.98	6.39	0.48
T2	643.2175	Q=32	4	638.88	639.46	639.31	639.51	0.004769	1.68	2.38	6.78	0.5
T2	643.2175	Q=40	5	638.88	639.52	639.35	639.57	0.004898	1.82	2.75	7.11	0.51
T2	643.2175	Q=80	10	638.88	639.73	639.52	639.81	0.005173	2.27	4.4	8.43	0.55
T2	643.2175	Q=120	15	638.88	639.88	639.66	639.99	0.005505	2.6	5.76	9.37	0.59
T2	643.2175	Q=160	20	638.88	640.01	639.77	640.14	0.005696	2.86	6.99	10.14	0.61
T2	643.2175	Q=240	30	638.88	640.21	639.96	640.38	0.006003	3.28	9.14	11.15	0.64
T2	643.2175	Q=320	40	638.88	640.38	640.11	640.58	0.006269	3.62	11.04	11.98	0.66
T2	643.2175	Q=400	50	638.88	640.52	640.24	640.75	0.00649	3.91	12.8	12.69	0.69
T2	643.2175	Q=440	55	638.88	640.08	640.31	640.87	0.032955	7.16	7.68	10.47	1.47
T2	643.2175	Q=480	60	638.88	640.13	640.37	640.96	0.032522	7.31	8.21	10.72	1.47
T2	742.6647	Q=95.35	13	642.67	643.27	643.37	643.62	0.037479	4.72	2.75	7.85	1.41
T2	742.6647	Q=4	0.5	642.67	642.84	642.86	642.9	0.051183	2.11	0.24	2.86	1.3
T2	742.6647	Q=8	1	642.67	642.89	642.91	642.98	0.041481	2.32	0.43	3.86	1.23
T2	742.6647	Q=16	2	642.67	642.96	642.99	643.07	0.037228	2.66	0.75	5.06	1.22
T2	742.6647	Q=24	3	642.67	643.01	643.04	643.15	0.03623	3.01	1	5.48	1.24
T2	742.6647	Q=32	4	642.67	643.04	643.09	643.22	0.0394	3.39	1.18	5.78	1.32
T2	742.6647	Q=40	5	642.67	643.08	643.13	643.28	0.036878	3.55	1.41	6.12	1.3
T2	742.6647	Q=80	10	642.67	643.21	643.29	643.51	0.03709	4.37	2.29	7.3	1.37
T2	742.6647	Q=120	15	642.67	643.31	643.42	643.69	0.037742	4.93	3.04	8.18	1.42
T2	742.6647	Q=160	20	642.67	643.39	643.52	643.84	0.038174	5.36	3.73	8.9	1.46
T2	742.6647	Q=240	30	642.67	643.51	643.69	644.1	0.039863	6.14	4.88	9.8	1.53
T2	742.6647	Q=320	40	642.67	643.62	643.83	644.33	0.041326	6.77	5.91	10.51	1.59
T2	742.6647	Q=400	50	642.67	643.7	643.96	644.53	0.042315	7.29	6.86	11.13	1.63
T2	742.6647	Q=440	55	642.67	643.74	644.02	644.62	0.042964	7.53	7.31	11.4	1.66
T2	742.6647	Q=480	60	642.67	643.78	644.07	644.72	0.04369	7.76	7.73	11.66	1.68

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	801.236	Q=95.35	13	646.21	646.58	646.78	647.29	0.115065	6.77	1.92	7.44	2.35
T2	801.236	Q=4	0.5	646.21	646.3	646.31	646.36	0.068652	1.91	0.26	4.63	1.41
T2	801.236	Q=8	1	646.21	646.33	646.36	646.44	0.091025	2.69	0.37	4.86	1.71
T2	801.236	Q=16	2	646.21	646.36	646.43	646.57	0.108454	3.63	0.55	5.23	1.97
T2	801.236	Q=24	3	646.21	646.39	646.48	646.67	0.114967	4.25	0.71	5.52	2.09
T2	801.236	Q=32	4	646.21	646.43	646.52	646.73	0.099434	4.45	0.9	5.87	2.01
T2	801.236	Q=40	5	646.21	646.44	646.56	646.83	0.113284	5	1	6.04	2.17
T2	801.236	Q=80	10	646.21	646.53	646.71	647.14	0.115404	6.26	1.6	6.98	2.31
T2	801.236	Q=120	15	646.21	646.61	646.83	647.38	0.114758	7.06	2.13	7.72	2.37
T2	801.236	Q=160	20	646.21	646.67	646.93	647.58	0.115244	7.69	2.6	8.33	2.42
T2	801.236	Q=240	30	646.21	646.77	647.08	647.88	0.107868	8.43	3.56	9.43	2.42
T2	801.236	Q=320	40	646.21	646.86	647.21	648.12	0.102903	8.98	4.45	10.36	2.41
T2	801.236	Q=400	50	646.21	646.94	647.33	648.32	0.099251	9.42	5.31	11.17	2.41
T2	801.236	Q=440	55	646.21	646.98	647.38	648.42	0.097081	9.63	5.71	11.44	2.4
T2	801.236	Q=480	60	646.21	647.01	647.43	648.51	0.09458	9.81	6.12	11.67	2.39
T2	844.97	Q=95.35	13	648.16	648.81	648.81	649.01	0.018756	3.6	3.61	9.21	1.01
T2	844.97	Q=4	0.5	648.16	648.33	648.33	648.38	0.033149	1.76	0.28	3.29	1.05
T2	844.97	Q=8	1	648.16	648.39	648.39	648.45	0.02773	1.95	0.51	4.42	1.01
T2	844.97	Q=16	2	648.16	648.47	648.47	648.54	0.024407	2.21	0.9	5.86	0.99
T2	844.97	Q=24	3	648.16	648.52	648.52	648.61	0.022977	2.41	1.24	6.78	0.99
T2	844.97	Q=32	4	648.16	648.56	648.56	648.67	0.024527	2.71	1.48	7.11	1.05
T2	844.97	Q=40	5	648.16	648.6	648.6	648.72	0.022055	2.8	1.78	7.52	1.01
T2	844.97	Q=80	10	648.16	648.74	648.74	648.92	0.019712	3.35	2.98	8.81	1.02
T2	844.97	Q=120	15	648.16	648.86	648.86	649.07	0.018205	3.74	4.01	9.46	1.01
T2	844.97	Q=160	20	648.16	648.96	648.96	649.21	0.017035	4.01	4.99	10.04	1
T2	844.97	Q=240	30	648.16	649.12	649.12	649.43	0.016226	4.48	6.7	10.98	1.01
T2	844.97	Q=320	40	648.16	649.26	649.26	649.62	0.015508	4.81	8.32	11.79	1.01
T2	844.97	Q=400	50	648.16	649.39	649.39	649.79	0.015036	5.08	9.83	12.51	1.01
T2	844.97	Q=440	55	648.16	649.44	649.44	649.86	0.014766	5.2	10.59	12.86	1.01
T2	844.97	Q=480	60	648.16	649.5	649.5	649.94	0.014629	5.31	11.3	13.17	1.01

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	892.3795	Q=95.35	13	648.5	648.96	649.24	650.21	0.234056	8.97	1.45	6.26	3.29
T2	892.3795	Q=4	0.5	648.5	648.62	648.7	649.08	0.546858	5.46	0.09	1.57	3.99
T2	892.3795	Q=8	1	648.5	648.67	648.77	649.04	0.250006	4.84	0.21	2.36	2.89
T2	892.3795	Q=16	2	648.5	648.72	648.85	649.26	0.264158	5.88	0.34	3.03	3.09
T2	892.3795	Q=24	3	648.5	648.76	648.91	649.44	0.275868	6.61	0.45	3.5	3.24
T2	892.3795	Q=32	4	648.5	648.79	648.96	649.55	0.262446	6.97	0.57	3.94	3.22
T2	892.3795	Q=40	5	648.5	648.82	649.01	649.66	0.260187	7.35	0.68	4.29	3.25
T2	892.3795	Q=80	10	648.5	648.92	649.17	650.04	0.241846	8.5	1.18	5.64	3.28
T2	892.3795	Q=120	15	648.5	648.99	649.28	650.31	0.22932	9.23	1.63	6.63	3.28
T2	892.3795	Q=160	20	648.5	649.05	649.38	650.53	0.219031	9.77	2.05	7.39	3.27
T2	892.3795	Q=240	30	648.5	649.15	649.54	650.88	0.193143	10.55	2.84	8.31	3.18
T2	892.3795	Q=320	40	648.5	649.24	649.69	651.16	0.175999	11.12	3.6	9.05	3.11
T2	892.3795	Q=400	50	648.5	649.32	649.82	651.4	0.15786	11.58	4.32	9.4	3.01
T2	892.3795	Q=440	55	648.5	649.35	649.88	651.51	0.150587	11.77	4.67	9.56	2.97
T2	892.3795	Q=480	60	648.5	649.39	649.94	651.61	0.144239	11.95	5.02	9.72	2.93
T2	933.8324	Q=95.35	13	651.37	652.01	652.01	652.21	0.018758	3.61	3.6	9.13	1.01
T2	933.8324	Q=4	0.5	651.37	651.55	651.55	651.59	0.021335	1.47	0.34	3.67	0.85
T2	933.8324	Q=8	1	651.37	651.6	651.6	651.66	0.027639	1.93	0.52	4.53	1.01
T2	933.8324	Q=16	2	651.37	651.67	651.67	651.75	0.025215	2.22	0.9	5.98	1.01
T2	933.8324	Q=24	3	651.37	651.73	651.73	651.81	0.023259	2.39	1.25	7	1
T2	933.8324	Q=32	4	651.37	651.76	651.76	651.87	0.022826	2.61	1.53	7.4	1.01
T2	933.8324	Q=40	5	651.37	651.8	651.8	651.92	0.021992	2.77	1.81	7.77	1.01
T2	933.8324	Q=80	10	651.37	651.94	651.94	652.11	0.019667	3.35	2.99	8.84	1.01
T2	933.8324	Q=120	15	651.37	652.05	652.05	652.27	0.018278	3.76	3.99	9.31	1.01
T2	933.8324	Q=160	20	651.37	652.15	652.15	652.41	0.017196	4.07	4.92	9.73	1.01
T2	933.8324	Q=240	30	651.37	652.31	652.31	652.64	0.016201	4.56	6.58	10.43	1.01
T2	933.8324	Q=320	40	651.37	652.46	652.46	652.83	0.015239	4.9	8.17	11.07	1
T2	933.8324	Q=400	50	651.37	652.59	652.59	653.01	0.014754	5.19	9.63	11.62	1
T2	933.8324	Q=440	55	651.37	652.65	652.65	653.09	0.014798	5.35	10.28	11.85	1.01
T2	933.8324	Q=480	60	651.37	652.7	652.71	653.17	0.01459	5.47	10.97	12.1	1.01

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
T2	992.9296	Q=95.35	13	651.91	652.75	652.53	652.83	0.006332	2.16	6.01	11.56	0.53
T2	992.9296	Q=4	0.5	651.91	652.16	652.07	652.16	0.005396	0.77	0.65	5.32	0.39
T2	992.9296	Q=8	1	651.91	652.23	652.13	652.24	0.00499	0.89	1.13	7	0.39
T2	992.9296	Q=16	2	651.91	652.32	652.2	652.34	0.005195	1.13	1.78	7.9	0.42
T2	992.9296	Q=24	3	651.91	652.38	652.25	652.41	0.005385	1.3	2.3	8.45	0.44
T2	992.9296	Q=32	4	651.91	652.44	652.29	652.47	0.005554	1.44	2.77	8.9	0.46
T2	992.9296	Q=40	5	651.91	652.49	652.32	652.52	0.00562	1.56	3.21	9.31	0.47
T2	992.9296	Q=80	10	651.91	652.67	652.47	652.73	0.006152	1.98	5.04	10.84	0.51
T2	992.9296	Q=120	15	651.91	652.81	652.58	652.88	0.006413	2.27	6.62	12	0.54
T2	992.9296	Q=160	20	651.91	652.92	652.67	653.02	0.006574	2.48	8.06	12.97	0.55
T2	992.9296	Q=240	30	651.91	653.12	652.83	653.24	0.006592	2.78	10.78	14.63	0.57
T2	992.9296	Q=320	40	651.91	653.28	652.97	653.42	0.006421	3.04	13.18	15.79	0.58
T2	992.9296	Q=400	50	651.91	653.41	653.09	653.58	0.006236	3.27	15.38	16.67	0.58
T2	992.9296	Q=440	55	651.91	653.48	653.14	653.65	0.006063	3.37	16.49	17.05	0.58
T2	992.9296	Q=480	60	651.91	652.89	653.19	653.85	0.068838	7.86	7.63	12.69	1.79
T2	1066.659	Q=95.35	8.6	654.69	655.22	655.22	655.39	0.027071	3.28	2.62	8.06	1.01
T2	1066.659	Q=4	0.5	654.69	654.85	654.85	654.9	0.049499	1.75	0.29	3.55	1.09
T2	1066.659	Q=8	1	654.69	654.91	654.91	654.96	0.038419	1.89	0.53	4.83	1.01
T2	1066.659	Q=16	2	654.69	654.98	654.98	655.05	0.03319	2.21	0.9	5.87	0.99
T2	1066.659	Q=24	3	654.69	655.03	655.03	655.12	0.031051	2.48	1.21	6.32	1
T2	1066.659	Q=32	4	654.69	655.07	655.07	655.18	0.031213	2.72	1.47	6.67	1.02
T2	1066.659	Q=40	5	654.69	655.11	655.11	655.24	0.029262	2.86	1.75	7.04	1.01
T2	1066.659	Q=80	10	654.69	655.27	655.27	655.44	0.025623	3.36	2.97	8.44	1
T2	1066.659	Q=120	15	654.69	655.38	655.38	655.6	0.024664	3.73	4.02	9.48	1.01
T2	1066.659	Q=160	20	654.69	655.48	655.48	655.73	0.023806	4.01	4.99	10.28	1.01
T2	1066.659	Q=240	30	654.69	655.65	655.65	655.95	0.022309	4.41	6.81	11.56	1.01
T2	1066.659	Q=320	40	654.69	655.79	655.79	656.13	0.021532	4.72	8.48	12.62	1.01
T2	1066.659	Q=400	50	654.69	655.82	655.91	656.31	0.029741	5.64	8.86	12.85	1.2
T2	1066.659	Q=440	55	654.69	655.95	655.97	656.36	0.021688	5.17	10.64	13.87	1.04
T2	1066.659	Q=480	60	654.69	656.01	656.02	656.43	0.020547	5.19	11.56	14.37	1.02

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1139.289	Q=95.35	8.6	657.37	657.72	657.9	658.31	0.148907	6.14	1.4	6.03	2.25
T2	1139.289	Q=4	0.5	657.37	657.48	657.5	657.57	0.138318	2.33	0.21	3.76	1.72
T2	1139.289	Q=8	1	657.37	657.52	657.56	657.63	0.092651	2.62	0.38	4.15	1.52
T2	1139.289	Q=16	2	657.37	657.57	657.63	657.75	0.094936	3.34	0.6	4.62	1.63
T2	1139.289	Q=24	3	657.37	657.6	657.68	657.87	0.129222	4.22	0.71	4.84	1.94
T2	1139.289	Q=32	4	657.37	657.63	657.73	657.95	0.119243	4.5	0.89	5.17	1.92
T2	1139.289	Q=40	5	657.37	657.65	657.78	658.05	0.134147	5.03	0.99	5.36	2.06
T2	1139.289	Q=80	10	657.37	657.75	657.94	658.38	0.144338	6.35	1.57	6.3	2.24
T2	1139.289	Q=120	15	657.37	657.83	658.06	658.64	0.150737	7.26	2.07	6.99	2.35
T2	1139.289	Q=160	20	657.37	657.9	658.17	658.84	0.146302	7.79	2.57	7.64	2.37
T2	1139.289	Q=240	30	657.37	658.01	658.33	659.16	0.141811	8.61	3.48	8.69	2.4
T2	1139.289	Q=320	40	657.37	658.1	658.47	659.43	0.139959	9.26	4.32	9.55	2.43
T2	1139.289	Q=400	50	657.37	658.18	658.59	659.65	0.136265	9.74	5.13	10.32	2.43
T2	1139.289	Q=440	55	657.37	658.22	658.64	659.75	0.134466	9.94	5.53	10.68	2.43
T2	1139.289	Q=480	60	657.37	658.26	658.7	659.85	0.132015	10.13	5.92	10.94	2.43
T2	1192	Q=95.35	8.6	660.51	660.97	660.97	661.13	0.02655	3.14	2.74	8.85	1
T2	1192	Q=4	0.5	660.51	660.64	660.64	660.67	0.032304	1.31	0.38	5.37	0.86
T2	1192	Q=8	1	660.51	660.67	660.67	660.72	0.040335	1.8	0.56	5.7	1.02
T2	1192	Q=16	2	660.51	660.73	660.73	660.81	0.039128	2.26	0.88	6.28	1.06
T2	1192	Q=24	3	660.51	660.78	660.78	660.87	0.031542	2.41	1.25	6.86	1
T2	1192	Q=32	4	660.51	660.82	660.82	660.93	0.032555	2.67	1.5	7.23	1.03
T2	1192	Q=40	5	660.51	660.86	660.86	660.98	0.029852	2.78	1.8	7.66	1.01
T2	1192	Q=80	10	660.51	661.01	661.01	661.18	0.026562	3.29	3.04	9.2	1.01
T2	1192	Q=120	15	660.51	661.12	661.12	661.32	0.024411	3.6	4.16	10.28	1
T2	1192	Q=160	20	660.51	661.21	661.21	661.45	0.023712	3.91	5.12	10.95	1.01
T2	1192	Q=240	30	660.51	661.37	661.37	661.66	0.022232	4.32	6.94	12.13	1.01
T2	1192	Q=320	40	660.51	661.5	661.51	661.84	0.0213	4.64	8.63	13.11	1.01
T2	1192	Q=400	50	660.51	661.62	661.62	661.99	0.020597	4.92	10.17	13.79	1.01
T2	1192	Q=440	55	660.51	661.67	661.68	662.07	0.020319	5.04	10.92	14.1	1.01
T2	1192	Q=480	60	660.51	661.72	661.73	662.14	0.020066	5.15	11.65	14.41	1.01

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1259.899	Q=95.35	8.6	662.04	662.49	662.53	662.69	0.04135	3.62	2.38	8.69	1.22
T2	1259.899	Q=4	0.5	662.04	662.22	662.19	662.24	0.01749	1.12	0.45	4.98	0.66
T2	1259.899	Q=8	1	662.04	662.28	662.23	662.3	0.015118	1.29	0.78	6.31	0.65
T2	1259.899	Q=16	2	662.04	662.34	662.31	662.39	0.015382	1.63	1.22	7.06	0.69
T2	1259.899	Q=24	3	662.04	662.39	662.35	662.45	0.017677	1.95	1.54	7.54	0.76
T2	1259.899	Q=32	4	662.04	662.43	662.39	662.5	0.017239	2.11	1.89	8.04	0.77
T2	1259.899	Q=40	5	662.04	662.46	662.42	662.55	0.018507	2.32	2.15	8.4	0.81
T2	1259.899	Q=80	10	662.04	662.52	662.56	662.74	0.042684	3.83	2.61	8.99	1.25
T2	1259.899	Q=120	15	662.04	662.6	662.67	662.9	0.043844	4.42	3.39	9.58	1.31
T2	1259.899	Q=160	20	662.04	662.67	662.77	663.04	0.045377	4.91	4.07	10.05	1.36
T2	1259.899	Q=240	30	662.04	662.78	662.93	663.29	0.048806	5.73	5.24	10.81	1.45
T2	1259.899	Q=320	40	662.04	662.88	663.06	663.5	0.049748	6.31	6.34	11.49	1.5
T2	1259.899	Q=400	50	662.04	662.97	663.18	663.68	0.050121	6.77	7.39	12.1	1.53
T2	1259.899	Q=440	55	662.04	663.01	663.23	663.76	0.05029	6.97	7.89	12.38	1.54
T2	1259.899	Q=480	60	662.04	663.05	663.29	663.85	0.050432	7.16	8.38	12.65	1.55
T2	1323.272	Q=95.35	8.6	664.13	664.62	664.62	664.78	0.026716	3.17	2.71	8.71	1
T2	1323.272	Q=4	0.5	664.13	664.27	664.27	664.31	0.042585	1.51	0.33	4.62	0.99
T2	1323.272	Q=8	1	664.13	664.31	664.31	664.37	0.044372	1.9	0.53	5.39	1.07
T2	1323.272	Q=16	2	664.13	664.38	664.38	664.45	0.033698	2.19	0.91	6.11	1
T2	1323.272	Q=24	3	664.13	664.43	664.43	664.52	0.031605	2.44	1.23	6.64	1
T2	1323.272	Q=32	4	664.13	664.47	664.47	664.58	0.030719	2.65	1.51	7.08	1.01
T2	1323.272	Q=40	5	664.13	664.51	664.51	664.63	0.028861	2.77	1.8	7.51	1
T2	1323.272	Q=80	10	664.13	664.66	664.66	664.83	0.025947	3.28	3.05	9.11	1
T2	1323.272	Q=120	15	664.13	664.77	664.77	664.98	0.025113	3.64	4.12	10.22	1.01
T2	1323.272	Q=160	20	664.13	664.86	664.86	665.1	0.023897	3.93	5.09	10.87	1.01
T2	1323.272	Q=240	30	664.13	665.02	665.02	665.31	0.02207	4.33	6.93	11.99	1
T2	1323.272	Q=320	40	664.13	665.15	665.15	665.49	0.021377	4.67	8.57	12.92	1.01
T2	1323.272	Q=400	50	664.13	665.27	665.27	665.65	0.020704	4.94	10.13	13.7	1.01
T2	1323.272	Q=440	55	664.13	665.33	665.33	665.72	0.020273	5.04	10.9	14.02	1.01
T2	1323.272	Q=480	60	664.13	665.38	665.38	665.79	0.020082	5.16	11.62	14.32	1.01

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1388.66	Q=95.35	8.6	665.38	665.91	665.82	665.99	0.01336	2.33	3.69	11.24	0.72
T2	1388.66	Q=4	0.5	665.38	665.53	665.5	665.55	0.010627	0.91	0.55	5.71	0.52
T2	1388.66	Q=8	1	665.38	665.59		665.61	0.010331	1.13	0.88	6.52	0.54
T2	1388.66	Q=16	2	665.38	665.66	665.6	665.69	0.012022	1.48	1.35	7.52	0.61
T2	1388.66	Q=24	3	665.38	665.71	665.64	665.75	0.012566	1.69	1.77	8.31	0.65
T2	1388.66	Q=32	4	665.38	665.75	665.69	665.81	0.012665	1.84	2.17	8.99	0.66
T2	1388.66	Q=40	5	665.38	665.79	665.72	665.85	0.013077	1.99	2.52	9.55	0.68
T2	1388.66	Q=80	10	665.38	665.94		666.03	0.013599	2.44	4.1	11.76	0.73
T2	1388.66	Q=120	15	665.38	666.05	665.96	666.17	0.013571	2.77	5.41	12.82	0.75
T2	1388.66	Q=160	20	665.38	666.13		666.28	0.013974	3.08	6.49	13.38	0.78
T2	1388.66	Q=240	30	665.38	666.27	666.18	666.47	0.014358	3.55	8.45	14.35	0.81
T2	1388.66	Q=320	40	665.38	666.4	666.3	666.63	0.014088	3.86	10.35	15.23	0.83
T2	1388.66	Q=400	50	665.38	666.51	666.41	666.77	0.01418	4.15	12.05	15.97	0.84
T2	1388.66	Q=440	55	665.38	666.55	666.46	666.84	0.014506	4.31	12.77	16.28	0.86
T2	1388.66	Q=480	60	665.38	666.43	666.51	666.91	0.027992	5.55	10.81	15.43	1.17
T2	1458.658	Q=95.35	8.6	666.26	666.98	666.94	667.12	0.019373	3.03	2.84	7.58	0.87
T2	1458.658	Q=4	0.5	666.26	666.51		666.54	0.019752	1.47	0.34	2.76	0.73
T2	1458.658	Q=8	1	666.26	666.58	666.55	666.63	0.021349	1.79	0.56	3.53	0.8
T2	1458.658	Q=16	2	666.26	666.68	666.64	666.74	0.018884	2.04	0.98	4.68	0.78
T2	1458.658	Q=24	3	666.26	666.75	666.71	666.83	0.018644	2.24	1.34	5.46	0.8
T2	1458.658	Q=32	4	666.26	666.8	666.76	666.9	0.019025	2.43	1.65	6.06	0.82
T2	1458.658	Q=40	5	666.26	666.85	666.81	666.95	0.019038	2.58	1.93	6.49	0.83
T2	1458.658	Q=80	10	666.26	667.02	666.98	667.17	0.019238	3.16	3.17	7.93	0.88
T2	1458.658	Q=120	15	666.26	667.13	667.1	667.34	0.020497	3.65	4.11	8.64	0.93
T2	1458.658	Q=160	20	666.26	667.24	667.21	667.48	0.020617	3.99	5.02	9.28	0.95
T2	1458.658	Q=240	30	666.26	667.39	667.39	667.72	0.021659	4.56	6.58	10.28	1
T2	1458.658	Q=320	40	666.26	667.54	667.54	667.92	0.021121	4.9	8.16	11.2	1.01
T2	1458.658	Q=400	50	666.26	667.68	667.68	668.09	0.020339	5.15	9.72	12.05	1.01
T2	1458.658	Q=440	55	666.26	667.74	667.74	668.17	0.020115	5.26	10.45	12.43	1.01
T2	1458.658	Q=480	60	666.26	667.79	667.79	668.24	0.019863	5.36	11.19	12.79	1.01

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1525.701	Q=95.35	8.6	668.14	668.53	668.61	668.8	0.059174	4.16	2.07	8.01	1.44
T2	1525.701	Q=4	0.5	668.14	668.26	668.25	668.29	0.036007	1.43	0.35	4.7	0.92
T2	1525.701	Q=8	1	668.14	668.24	668.29	668.45	0.308235	3.65	0.27	4.49	2.6
T2	1525.701	Q=16	2	668.14	668.34	668.36	668.44	0.048448	2.5	0.8	5.75	1.18
T2	1525.701	Q=24	3	668.14	668.38	668.41	668.51	0.052609	2.92	1.03	6.22	1.27
T2	1525.701	Q=32	4	668.14	668.42	668.46	668.57	0.053019	3.2	1.25	6.64	1.3
T2	1525.701	Q=40	5	668.14	668.44	668.49	668.63	0.055071	3.47	1.44	6.99	1.34
T2	1525.701	Q=80	10	668.14	668.55	668.64	668.85	0.060844	4.39	2.28	8.33	1.48
T2	1525.701	Q=120	15	668.14	668.65	668.75	669.01	0.05809	4.84	3.1	9.46	1.49
T2	1525.701	Q=160	20	668.14	668.72	668.84	669.14	0.055345	5.14	3.89	10.43	1.48
T2	1525.701	Q=240	30	668.14	668.85	669	669.35	0.050976	5.67	5.29	11.51	1.47
T2	1525.701	Q=320	40	668.14	668.96	669.12	669.53	0.048397	6.08	6.58	12.37	1.47
T2	1525.701	Q=400	50	668.14	669.05	669.24	669.7	0.047157	6.47	7.72	12.95	1.48
T2	1525.701	Q=440	55	668.14	669.09	669.29	669.78	0.047219	6.67	8.24	13.21	1.49
T2	1525.701	Q=480	60	668.14	669.13	669.34	669.85	0.046471	6.82	8.8	13.47	1.49
T2	1580.077	Q=95.35	8.6	670.23	670.78	670.78	670.93	0.02767	3.16	2.72	9.04	1.01
T2	1580.077	Q=4	0.5	670.23	670.4	670.4	670.45	0.040352	1.67	0.3	3.44	1
T2	1580.077	Q=8	1	670.23	670.46	670.46	670.52	0.036767	1.92	0.52	4.54	1
T2	1580.077	Q=16	2	670.23	670.53	670.53	670.61	0.033358	2.22	0.9	5.83	1
T2	1580.077	Q=24	3	670.23	670.58	670.58	670.68	0.03126	2.45	1.23	6.54	1
T2	1580.077	Q=32	4	670.23	670.63	670.63	670.74	0.030764	2.64	1.51	7.1	1.01
T2	1580.077	Q=40	5	670.23	670.67	670.67	670.79	0.029559	2.78	1.8	7.63	1.01
T2	1580.077	Q=80	10	670.23	670.81	670.81	670.98	0.026938	3.28	3.05	9.34	1.01
T2	1580.077	Q=120	15	670.23	670.91	670.92	671.13	0.027583	3.75	4	10.19	1.06
T2	1580.077	Q=160	20	670.23	670.99	671.02	671.25	0.028545	4.14	4.83	10.88	1.1
T2	1580.077	Q=240	30	670.23	671.12	671.17	671.47	0.030259	4.77	6.3	11.99	1.16
T2	1580.077	Q=320	40	670.23	671.22	671.31	671.65	0.031491	5.25	7.62	12.92	1.2
T2	1580.077	Q=400	50	670.23	671.32	671.42	671.81	0.031714	5.61	8.92	13.77	1.23
T2	1580.077	Q=440	55	670.23	671.36	671.47	671.88	0.031713	5.79	9.5	14.07	1.24
T2	1580.077	Q=480	60	670.23	671.4	671.52	671.96	0.032208	6	10.01	14.31	1.26

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1639.996	Q=95.35	8.6	671.87	672.38	672.37	672.52	0.025706	3.04	2.83	9.42	0.98
T2	1639.996	Q=4	0.5	671.87	672.05	672.03	672.08	0.019597	1.21	0.41	4.47	0.7
T2	1639.996	Q=8	1	671.87	672.11	672.08	672.14	0.020945	1.48	0.68	5.73	0.76
T2	1639.996	Q=16	2	671.87	672.17		672.22	0.02227	1.81	1.1	7.21	0.81
T2	1639.996	Q=24	3	671.87	672.22	672.2	672.28	0.023399	2.09	1.44	7.86	0.86
T2	1639.996	Q=32	4	671.87	672.25	672.24	672.34	0.023255	2.29	1.75	8.29	0.88
T2	1639.996	Q=40	5	671.87	672.29	672.27	672.38	0.024004	2.49	2.01	8.58	0.91
T2	1639.996	Q=80	10	671.87	672.41	672.4	672.57	0.026357	3.21	3.11	9.69	1
T2	1639.996	Q=120	15	671.87	672.51	672.51	672.71	0.025307	3.59	4.17	10.66	1.01
T2	1639.996	Q=160	20	671.87	672.6	672.6	672.83	0.024519	3.87	5.16	11.48	1.02
T2	1639.996	Q=240	30	671.87	672.76	672.76	673.04	0.022694	4.24	7.07	12.93	1.01
T2	1639.996	Q=320	40	671.87	672.89	672.89	673.2	0.021656	4.53	8.83	14.13	1.01
T2	1639.996	Q=400	50	671.87	673	673	673.35	0.020967	4.76	10.49	15.18	1.01
T2	1639.996	Q=440	55	671.87	673.05	673.05	673.42	0.020612	4.86	11.31	15.67	1.01
T2	1639.996	Q=480	60	671.87	673.1	673.1	673.48	0.02026	4.96	12.1	16.09	1.01
T2	1688.42	Q=95.35	8.6	672.28	673	672.8	673.05	0.005855	1.82	4.72	11.12	0.49
T2	1688.42	Q=4	0.5	672.28	672.51	672.44	672.52	0.005146	0.75	0.67	5.47	0.38
T2	1688.42	Q=8	1	672.28	672.58	672.49	672.59	0.005213	0.94	1.07	6.28	0.4
T2	1688.42	Q=16	2	672.28	672.67	672.55	672.69	0.005448	1.17	1.71	7.4	0.43
T2	1688.42	Q=24	3	672.28	672.74	672.6	672.77	0.005445	1.32	2.28	8.27	0.44
T2	1688.42	Q=32	4	672.28	672.8	672.65	672.83	0.005711	1.45	2.75	8.93	0.46
T2	1688.42	Q=40	5	672.28	672.85	672.68	672.89	0.005828	1.56	3.21	9.52	0.47
T2	1688.42	Q=80	10	672.28	673.04	672.83	673.1	0.005789	1.89	5.28	11.66	0.5
T2	1688.42	Q=120	15	672.28	673.18	672.94	673.25	0.005923	2.16	6.94	12.88	0.52
T2	1688.42	Q=160	20	672.28	673.28	673.04	673.37	0.006087	2.41	8.32	13.58	0.54
T2	1688.42	Q=240	30	672.28	673.46	673.19	673.58	0.006375	2.8	10.78	14.75	0.57
T2	1688.42	Q=320	40	672.28	673.6	673.31	673.75	0.00662	3.12	12.98	15.72	0.59
T2	1688.42	Q=400	50	672.28	673.73	673.43	673.9	0.006783	3.38	15.04	16.58	0.61
T2	1688.42	Q=440	55	672.28	673.78	673.48	673.97	0.006863	3.51	15.95	16.88	0.62
T2	1688.42	Q=480	60	672.28	673.27	673.53	674.11	0.057185	7.33	8.2	13.52	1.64

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1733.616	Q=95.35	8.6	675.87	676.18	676.4	677.14	0.325559	7.88	1.09	5.83	3.21
T2	1733.616	Q=4	0.5	675.87	675.97	676.03	676.22	0.503251	4.01	0.12	2.56	3.2
T2	1733.616	Q=8	1	675.87	676.01	676.07	676.22	0.2545	3.69	0.27	3.78	2.43
T2	1733.616	Q=16	2	675.87	676.04	676.14	676.44	0.346596	5.04	0.4	4.36	2.95
T2	1733.616	Q=24	3	675.87	676.07	676.19	676.6	0.3632	5.87	0.51	4.64	3.11
T2	1733.616	Q=32	4	675.87	676.09	676.24	676.73	0.360286	6.43	0.62	4.89	3.17
T2	1733.616	Q=40	5	675.87	676.11	676.28	676.84	0.352383	6.85	0.73	5.12	3.2
T2	1733.616	Q=80	10	675.87	676.2	676.44	677.22	0.308226	8.09	1.24	6.1	3.17
T2	1733.616	Q=120	15	675.87	676.28	676.56	677.47	0.27467	8.75	1.71	6.89	3.09
T2	1733.616	Q=160	20	675.87	676.34	676.65	677.66	0.253579	9.23	2.17	7.57	3.04
T2	1733.616	Q=240	30	675.87	676.45	676.82	677.98	0.227501	9.93	3.02	8.71	2.97
T2	1733.616	Q=320	40	675.87	676.54	676.96	678.21	0.203383	10.39	3.85	9.53	2.88
T2	1733.616	Q=400	50	675.87	676.62	677.07	678.4	0.183309	10.71	4.67	10.18	2.79
T2	1733.616	Q=440	55	675.87	676.66	677.13	678.48	0.174958	10.84	5.07	10.5	2.75
T2	1733.616	Q=480	60	675.87	676.69	677.18	678.58	0.171175	11.03	5.44	10.77	2.74
T2	1766.048	Q=95.35	8.6	678.83	679.24	679.24	679.37	0.027577	2.95	2.92	10.76	1
T2	1766.048	Q=4	0.5	678.83	678.93	678.93	678.96	0.03304	1.29	0.39	5.66	0.87
T2	1766.048	Q=8	1	678.83	678.96	678.96	679.01	0.042263	1.77	0.56	6.16	1.03
T2	1766.048	Q=16	2	678.83	679.02	679.02	679.09	0.035042	2.08	0.96	7.14	1
T2	1766.048	Q=24	3	678.83	679.07	679.07	679.15	0.0325	2.3	1.3	7.9	1
T2	1766.048	Q=32	4	678.83	679.1	679.1	679.2	0.031049	2.47	1.62	8.54	1
T2	1766.048	Q=40	5	678.83	679.14	679.14	679.24	0.030019	2.6	1.92	9.1	1
T2	1766.048	Q=80	10	678.83	679.27	679.27	679.42	0.027392	3.06	3.26	11.28	1
T2	1766.048	Q=120	15	678.83	679.37	679.37	679.55	0.0261	3.37	4.45	12.82	1.01
T2	1766.048	Q=160	20	678.83	679.45	679.45	679.65	0.025	3.62	5.53	13.92	1.01
T2	1766.048	Q=240	30	678.83	679.59	679.59	679.83	0.023152	3.95	7.6	15.81	1
T2	1766.048	Q=320	40	678.83	679.7	679.7	679.98	0.022221	4.21	9.49	17.35	1
T2	1766.048	Q=400	50	678.83	679.8	679.8	680.11	0.021537	4.43	11.29	18.71	1
T2	1766.048	Q=440	55	678.83	679.84	679.84	680.17	0.021428	4.56	12.06	19.45	1.01
T2	1766.048	Q=480	60	678.83	679.89	679.89	680.22	0.020654	4.64	12.96	20.33	1

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	2938.618	Q=95.35	27.9	626.38	627.34	627.34	627.69	0.035479	4.74	5.89	8.48	1
Main3	2938.618	Q=4	0.75	626.38	626.54	626.53	626.57	0.03312	1.39	0.54	4.82	0.73
Main3	2938.618	Q=8	1.5	626.38	626.62	626.58	626.66	0.025962	1.65	0.91	5.18	0.69
Main3	2938.618	Q=16	3	626.38	626.69	626.66	626.77	0.033499	2.28	1.31	5.54	0.83
Main3	2938.618	Q=24	4.5	626.38	626.75	626.73	626.87	0.039772	2.77	1.62	5.8	0.92
Main3	2938.618	Q=32	6	626.38	626.8	626.79	626.95	0.042697	3.12	1.92	6.05	0.98
Main3	2938.618	Q=40	7.5	626.38	626.84	626.84	627.02	0.043818	3.39	2.21	6.28	1.01
Main3	2938.618	Q=80	15	626.38	627.06	627.06	627.32	0.039053	4.05	3.71	7.34	1
Main3	2938.618	Q=120	22.5	626.38	627.23	627.23	627.55	0.037207	4.5	5	8.11	1.01
Main3	2938.618	Q=160	30	626.38	627.37	627.37	627.74	0.035627	4.85	6.18	8.59	1.01
Main3	2938.618	Q=240	45	626.38	627.61	627.61	628.06	0.033683	5.39	8.35	9.41	1.01
Main3	2938.618	Q=320	60	626.38	627.82	627.82	628.34	0.032178	5.78	10.38	10.12	1.01
Main3	2938.618	Q=400	75	626.38	628	628	628.58	0.031536	6.12	12.25	10.73	1.01
Main3	2938.618	Q=440	92.5	626.38	628.19	628.19	628.84	0.030693	6.44	14.36	11.39	1.01
Main3	2938.618	Q=480	90	626.38	628.17	628.17	628.8	0.030833	6.4	14.06	11.29	1.01
Main3	3050.464	Q=95.35	27.9	630.02	630.76	630.71	630.96	0.024388	3.67	7.77	15.02	0.83
Main3	3050.464	Q=4	0.75	630.02	630.14		630.16	0.022067	1.07	0.7	6.9	0.59
Main3	3050.464	Q=8	1.5	630.02	630.2		630.23	0.020337	1.3	1.15	7.88	0.6
Main3	3050.464	Q=16	3	630.02	630.28		630.32	0.021803	1.66	1.81	9.13	0.65
Main3	3050.464	Q=24	4.5	630.02	630.34		630.39	0.022428	1.89	2.39	10.09	0.68
Main3	3050.464	Q=32	6	630.02	630.39		630.45	0.022768	2.06	2.91	10.9	0.7
Main3	3050.464	Q=40	7.5	630.02	630.43		630.5	0.02321	2.21	3.39	11.58	0.72
Main3	3050.464	Q=80	15	630.02	630.58		630.71	0.024086	2.88	5.24	13.24	0.78
Main3	3050.464	Q=120	22.5	630.02	630.69	630.63	630.86	0.024163	3.38	6.78	14.35	0.81
Main3	3050.464	Q=160	30	630.02	630.78	630.73	631	0.024176	3.76	8.17	15.29	0.84
Main3	3050.464	Q=240	45	630.02	630.94	630.91	631.22	0.023952	4.35	10.72	16.86	0.86
Main3	3050.464	Q=320	60	630.02	631.07	631.06	631.41	0.023671	4.79	13.04	18.18	0.88
Main3	3050.464	Q=400	75	630.02	631.2	631.18	631.58	0.022955	5.13	15.32	19.39	0.89
Main3	3050.464	Q=440	92.5	630.02	631.32	631.32	631.75	0.022312	5.45	17.82	20.53	0.89
Main3	3050.464	Q=480	90	630.02	631.3	631.3	631.73	0.022387	5.41	17.48	20.39	0.89

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	3443.73		Culvert									
Main3	3836.993	Q=95.35	27.9	647.68	651.09	648.4	651.09	0.000022	0.48	65.27	28.3	0.05
Main3	3836.993	Q=4	0.75	647.68	648.68	647.79	648.68	0.000003	0.07	10.59	14.82	0.01
Main3	3836.993	Q=8	1.5	647.68	648.82	647.83	648.82	0.000007	0.12	12.79	16.15	0.02
Main3	3836.993	Q=16	3	647.68	649.04	647.91	649.04	0.000014	0.18	16.58	18.1	0.03
Main3	3836.993	Q=24	4.5	647.68	649.22	647.96	649.22	0.000017	0.23	20.02	19.57	0.04
Main3	3836.993	Q=32	6	647.68	649.39	648	649.39	0.00002	0.27	23.28	20.87	0.04
Main3	3836.993	Q=40	7.5	647.68	649.53	648.04	649.53	0.000021	0.3	26.43	21.63	0.04
Main3	3836.993	Q=80	15	647.68	650.16	648.19	650.17	0.000024	0.4	40.91	24.34	0.05
Main3	3836.993	Q=120	22.5	647.68	650.71	648.32	650.71	0.000023	0.46	54.9	26.69	0.05
Main3	3836.993	Q=160	30	647.68	651.23	648.43	651.24	0.000021	0.49	69.45	28.91	0.05
Main3	3836.993	Q=240	45	647.68	652.33	648.61	652.33	0.000015	0.51	103.35	32.89	0.04
Main3	3836.993	Q=320	60	647.68	653.64	648.77	653.64	0.00001	0.48	149.41	37.58	0.04
Main3	3836.993	Q=400	75	647.68	655.47	648.9	655.47	0.000005	0.41	222.97	43.34	0.03
Main3	3836.993	Q=440	92.5	647.68	665.05	649.04	665.05	0	0.15	902.43	98.23	0.01
Main3	3836.993	Q=480	90	647.68	665.02	649.02	665.02	0	0.14	899.48	98.06	0.01
Main3	3915.821	Q=95.35	27.9	648.8	651.09		651.1	0.00013	0.85	35.58	25.14	0.11
Main3	3915.821	Q=4	0.75	648.8	648.95	648.95	648.99	0.031111	1.58	0.47	6.13	1
Main3	3915.821	Q=8	1.5	648.8	649	649	649.05	0.028216	1.89	0.79	7.28	1.01
Main3	3915.821	Q=16	3	648.8	649.07	649.07	649.14	0.024159	2.26	1.33	8.36	1
Main3	3915.821	Q=24	4.5	648.8	649.19	649.12	649.25	0.008105	1.82	2.48	9.47	0.63
Main3	3915.821	Q=32	6	648.8	649.37	649.16	649.4	0.002855	1.4	4.28	10.98	0.4
Main3	3915.821	Q=40	7.5	648.8	649.52	649.2	649.55	0.001637	1.24	6.05	12.29	0.31
Main3	3915.821	Q=80	15	648.8	650.16	649.37	650.17	0.000417	0.97	15.62	17.72	0.17
Main3	3915.821	Q=120	22.5	648.8	650.71	649.5	650.72	0.000192	0.89	26.62	22.29	0.13
Main3	3915.821	Q=160	30	648.8	651.23		651.24	0.000114	0.84	39.33	26.21	0.1
Main3	3915.821	Q=240	45	648.8	652.33		652.34	0.000047	0.72	72.35	33.6	0.07
Main3	3915.821	Q=320	60	648.8	653.64		653.64	0.00002	0.6	120.45	39.97	0.05
Main3	3915.821	Q=400	75	648.8	655.47		655.47	0.000008	0.46	202.78	49.89	0.03
Main3	3915.821	Q=440	92.5	648.8	665.05		665.05	0	0.14	892.7	94.7	0.01

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	3915.821	Q=480	90	648.8	665.02		665.02	0	0.14	889.84	94.55	0.01
Main3	4000.72	Q=95.35	27.9	650.1	650.95	650.94	651.22	0.015398	4.23	6.6	11.38	0.98
Main3	4000.72	Q=4	0.75	650.1	650.3	650.27	650.32	0.009343	1.08	0.69	6.47	0.58
Main3	4000.72	Q=8	1.5	650.1	650.36	650.31	650.39	0.010021	1.38	1.09	7.35	0.63
Main3	4000.72	Q=16	3	650.1	650.43	650.39	650.48	0.011027	1.82	1.65	7.94	0.7
Main3	4000.72	Q=24	4.5	650.1	650.46	650.46	650.55	0.017842	2.45	1.84	8.09	0.91
Main3	4000.72	Q=32	6	650.1	650.49	650.49	650.62	0.020784	2.85	2.11	8.32	1
Main3	4000.72	Q=40	7.5	650.1	650.53	650.53	650.68	0.021249	3.09	2.42	8.57	1.03
Main3	4000.72	Q=80	15	650.1	650.71	650.71	650.92	0.018199	3.69	4.06	9.77	1.01
Main3	4000.72	Q=120	22.5	650.1	650.85	650.85	651.11	0.017036	4.1	5.49	10.71	1.01
Main3	4000.72	Q=160	30	650.1	651.15	650.96	651.32	0.006807	3.31	9.09	12.79	0.68
Main3	4000.72	Q=240	45	650.1	652.32	651.16	652.36	0.000527	1.73	29.23	21.79	0.22
Main3	4000.72	Q=320	60	650.1	653.63		653.65	0.000114	1.14	63.35	29.64	0.11
Main3	4000.72	Q=400	75	650.1	655.47		655.47	0.000027	0.75	126.34	38.81	0.06
Main3	4000.72	Q=440	92.5	650.1	665.05		665.05	0	0.19	688.26	77.38	0.01
Main3	4000.72	Q=480	90	650.1	665.02		665.02	0	0.18	685.93	77.26	0.01
Main3	4131.901	Q=95.35	27.9	651.32	651.99	652.34	653.18	0.088806	8.76	3.18	6.71	2.24
Main3	4131.901	Q=4	0.75	651.32	651.53	651.5	651.56	0.009373	1.23	0.61	4.65	0.6
Main3	4131.901	Q=8	1.5	651.32	651.61	651.55	651.64	0.009105	1.56	0.96	4.98	0.63
Main3	4131.901	Q=16	3	651.32	651.57	651.64	651.8	0.068643	3.83	0.78	4.82	1.67
Main3	4131.901	Q=24	4.5	651.32	651.83	651.71	651.9	0.006653	2.03	2.21	6.02	0.59
Main3	4131.901	Q=32	6	651.32	651.65	651.77	652.05	0.078077	5.09	1.18	5.18	1.88
Main3	4131.901	Q=40	7.5	651.32	651.68	651.83	652.16	0.081895	5.58	1.34	5.32	1.96
Main3	4131.901	Q=80	15	651.32	651.81	652.06	652.63	0.090885	7.27	2.06	5.9	2.17
Main3	4131.901	Q=120	22.5	651.32	651.92	652.23	652.97	0.089388	8.22	2.74	6.4	2.21
Main3	4131.901	Q=160	30	651.32	652.01	652.38	653.25	0.088046	8.93	3.36	6.82	2.24
Main3	4131.901	Q=240	45	651.32	652.17	652.63	653.73	0.086751	10.03	4.49	7.54	2.29
Main3	4131.901	Q=320	60	651.32	653.57	652.82	653.73	0.002131	3.24	19.62	14.4	0.43
Main3	4131.901	Q=400	75	651.32	655.46	653	655.49	0.000196	1.59	56.95	24.73	0.15
Main3	4131.901	Q=440	92.5	651.32	665.05		665.05	0.000001	0.2	686.36	102.39	0.01

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	4131.901	Q=480	90	651.32	665.02		665.02	0.000001	0.2	683.29	102.28	0.01
Main3	4236.668	Q=95.35	27.9	655.12	656.21	656.21	656.57	0.016048	4.84	5.76	8.06	1.01
Main3	4236.668	Q=4	0.75	655.12	655.32	655.32	655.37	0.029401	1.84	0.41	4	1.01
Main3	4236.668	Q=8	1.5	655.12	655.38	655.38	655.46	0.024783	2.24	0.67	4.29	1
Main3	4236.668	Q=16	3	655.12	655.48	655.48	655.59	0.022239	2.74	1.09	4.72	1
Main3	4236.668	Q=24	4.5	655.12	655.55	655.55	655.7	0.020948	3.07	1.46	5.06	1.01
Main3	4236.668	Q=32	6	655.12	655.62	655.62	655.79	0.02015	3.33	1.8	5.36	1.01
Main3	4236.668	Q=40	7.5	655.12	655.68	655.68	655.87	0.019369	3.52	2.13	5.64	1.01
Main3	4236.668	Q=80	15	655.12	655.91	655.91	656.18	0.01719	4.16	3.61	6.73	1
Main3	4236.668	Q=120	22.5	655.12	656.09	656.09	656.42	0.016501	4.6	4.89	7.55	1.01
Main3	4236.668	Q=160	30	655.12	656.25	656.25	656.62	0.015848	4.92	6.1	8.25	1.01
Main3	4236.668	Q=240	45	655.12	656.49	656.49	656.95	0.014904	5.45	8.26	9.35	1.01
Main3	4236.668	Q=320	60	655.12	656.7	656.7	657.24	0.013306	5.91	10.28	10.27	0.99
Main3	4236.668	Q=400	75	655.12	656.89	656.89	657.49	0.012165	6.27	12.29	11.12	0.97
Main3	4236.668	Q=440	92.5	655.12	665.05		665.05	0.000005	0.46	298.54	68.66	0.03
Main3	4236.668	Q=480	90	655.12	665.02		665.02	0.000005	0.45	296.48	68.4	0.03
Main3	4346.191	Q=95.35	27.9	655.46	656.87	656.24	656.91	0.001145	1.72	16.53	17.8	0.3
Main3	4346.191	Q=4	0.75	655.46	655.74	655.61	655.74	0.001197	0.54	1.39	7.85	0.23
Main3	4346.191	Q=8	1.5	655.46	655.83	655.65	655.84	0.001312	0.69	2.19	9.22	0.25
Main3	4346.191	Q=16	3	655.46	655.96	655.73	655.97	0.001325	0.86	3.48	10.47	0.26
Main3	4346.191	Q=24	4.5	655.46	656.07	655.78	656.08	0.001305	0.97	4.63	11.46	0.27
Main3	4346.191	Q=32	6	655.46	656.15	655.83	656.17	0.00135	1.07	5.59	12.22	0.28
Main3	4346.191	Q=40	7.5	655.46	656.23	655.87	656.25	0.00131	1.13	6.61	12.99	0.28
Main3	4346.191	Q=80	15	655.46	656.52	656.03	656.55	0.001266	1.39	10.78	15.53	0.29
Main3	4346.191	Q=120	22.5	655.46	656.73	656.16	656.77	0.001188	1.6	14.19	16.82	0.29
Main3	4346.191	Q=160	30	655.46	656.92	656.27	656.96	0.00113	1.77	17.42	18.18	0.3
Main3	4346.191	Q=240	45	655.46	657.22	656.45	657.29	0.001073	2.03	23.38	20.57	0.3
Main3	4346.191	Q=320	60	655.46	657.49	656.6	657.56	0.001027	2.22	29.06	22.61	0.3
Main3	4346.191	Q=400	75	655.46	657.72	656.73	657.8	0.000988	2.38	34.58	24.45	0.3
Main3	4346.191	Q=440	92.5	655.46	665.05		665.05	0.000002	0.3	407.99	73.48	0.02

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	4346.191	Q=480	90	655.46	665.02		665.02	0.000002	0.3	405.78	73.35	0.02
Main3	4506.758	Q=95.35	27.9	659.71	660.58	660.58	660.92	0.015183	4.68	5.99	9.26	0.99
Main3	4506.758	Q=4	0.75	659.71	659.8	659.8	659.85	0.039047	1.84	0.41	4.94	1.13
Main3	4506.758	Q=8	1.5	659.71	659.86	659.86	659.93	0.026352	2.1	0.71	5.27	1.01
Main3	4506.758	Q=16	3	659.71	659.94	659.94	660.04	0.022773	2.57	1.17	5.72	1
Main3	4506.758	Q=24	4.5	659.71	660.01	660.01	660.13	0.021214	2.88	1.56	6.08	1
Main3	4506.758	Q=32	6	659.71	660.06	660.06	660.22	0.020392	3.13	1.92	6.39	1.01
Main3	4506.758	Q=40	7.5	659.71	660.12	660.12	660.29	0.019256	3.3	2.27	6.69	1
Main3	4506.758	Q=80	15	659.71	660.32	660.32	660.57	0.017667	3.98	3.77	7.82	1.01
Main3	4506.758	Q=120	22.5	659.71	660.49	660.49	660.79	0.016264	4.4	5.12	8.68	1
Main3	4506.758	Q=160	30	659.71	660.62	660.62	660.97	0.014908	4.79	6.31	9.47	0.99
Main3	4506.758	Q=240	45	659.71	660.86	660.86	661.29	0.012595	5.32	8.76	10.98	0.95
Main3	4506.758	Q=320	60	659.71	661.06	661.06	661.55	0.011287	5.72	11.13	12.14	0.93
Main3	4506.758	Q=400	75	659.71	661.24	661.24	661.78	0.010637	6.09	13.31	13.05	0.93
Main3	4506.758	Q=440	92.5	659.71	665.04		665.06	0.000071	1.21	97.97	30.27	0.09
Main3	4506.758	Q=480	90	659.71	665.01		665.03	0.000069	1.19	97.07	30.16	0.09
Main3	4601.489	Q=95.35	27.9	660.03	661.38	660.98	661.49	0.002945	2.6	10.87	12.34	0.46
Main3	4601.489	Q=4	0.75	660.03	660.38	660.25	660.39	0.002132	0.71	1.05	6	0.3
Main3	4601.489	Q=8	1.5	660.03	660.47	660.32	660.48	0.002461	0.9	1.68	7.56	0.34
Main3	4601.489	Q=16	3	660.03	660.59	660.4	660.61	0.002624	1.15	2.61	8.5	0.36
Main3	4601.489	Q=24	4.5	660.03	660.67	660.47	660.7	0.002702	1.34	3.37	8.9	0.38
Main3	4601.489	Q=32	6	660.03	660.75	660.52	660.78	0.002741	1.48	4.05	9.24	0.39
Main3	4601.489	Q=40	7.5	660.03	660.81	660.57	660.85	0.00283	1.61	4.65	9.54	0.41
Main3	4601.489	Q=80	15	660.03	661.08	660.74	661.14	0.002888	2.04	7.35	10.8	0.43
Main3	4601.489	Q=120	22.5	660.03	661.27	660.89	661.36	0.002897	2.38	9.52	11.78	0.45
Main3	4601.489	Q=160	30	660.03	661.43	661.01	661.54	0.00295	2.68	11.4	12.55	0.47
Main3	4601.489	Q=240	45	660.03	661.68	661.21	661.84	0.003036	3.16	14.81	13.85	0.49
Main3	4601.489	Q=320	60	660.03	661.9	661.39	662.09	0.003093	3.54	17.93	14.95	0.51
Main3	4601.489	Q=400	75	660.03	662.09	661.56	662.31	0.003134	3.86	20.88	16.02	0.52
Main3	4601.489	Q=440	92.5	660.03	665.04		665.06	0.000084	1.24	93.89	32.72	0.1

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	4601.489	Q=480	90	660.03	665.01		665.03	0.000082	1.22	92.91	32.54	0.1
Main3	4701.448	Q=95.35	13	662.91	663.42	663.43	663.62	0.021542	3.6	3.61	10.28	1.07
Main3	4701.448	Q=4	0.75	662.91	663.05	663.05	663.09	0.03781	1.72	0.44	5.79	1.1
Main3	4701.448	Q=8	1.5	662.91	663.1	663.1	663.16	0.027218	1.94	0.77	6.68	1
Main3	4701.448	Q=16	3	662.91	663.17	663.17	663.25	0.024247	2.31	1.3	7.87	1
Main3	4701.448	Q=24	4.5	662.91	663.23	663.23	663.33	0.022358	2.54	1.77	8.81	1
Main3	4701.448	Q=32	6	662.91	663.27	663.27	663.39	0.021857	2.77	2.16	9.23	1.01
Main3	4701.448	Q=40	7.5	662.91	663.31	663.31	663.45	0.020363	2.93	2.56	9.53	1
Main3	4701.448	Q=80	15	662.91	663.45	663.47	663.68	0.022725	3.84	3.9	10.48	1.11
Main3	4701.448	Q=120	22.5	662.91	663.55	663.6	663.86	0.024533	4.5	5	11.2	1.19
Main3	4701.448	Q=160	30	662.91	663.63	663.71	664.03	0.026134	5.08	5.91	11.73	1.25
Main3	4701.448	Q=240	45	662.91	663.77	663.9	664.32	0.027339	5.97	7.59	12.66	1.32
Main3	4701.448	Q=320	60	662.91	663.88	664.07	664.58	0.028055	6.73	9.04	13.41	1.38
Main3	4701.448	Q=400	75	662.91	663.99	664.22	664.8	0.02748	7.3	10.53	14.15	1.4
Main3	4701.448	Q=440	92.5	662.91	664.94	664.38	665.14	0.00275	3.81	27.11	20.73	0.5
Main3	4701.448	Q=480	90	662.91	664.91	664.35	665.11	0.002768	3.78	26.51	20.53	0.5
Main3	4838.243	Q=95.35	13	665.75	666.3	666.3	666.47	0.020993	3.47	4.1	12.54	0.94
Main3	4838.243	Q=4	0.75	665.75	665.95	665.92	665.97	0.013321	1.08	0.69	6.76	0.59
Main3	4838.243	Q=8	1.5	665.75	666	665.97	666.03	0.016657	1.46	1.04	7.94	0.69
Main3	4838.243	Q=16	3	665.75	666.07	666.04	666.12	0.018474	1.93	1.59	9.19	0.77
Main3	4838.243	Q=24	4.5	665.75	666.11	666.09	666.19	0.019928	2.31	2.03	9.85	0.83
Main3	4838.243	Q=32	6	665.75	666.15	666.14	666.25	0.020334	2.59	2.44	10.44	0.86
Main3	4838.243	Q=40	7.5	665.75	666.18	666.18	666.31	0.022068	2.89	2.76	10.88	0.91
Main3	4838.243	Q=80	15	665.75	666.34	666.34	666.52	0.020024	3.6	4.61	13.12	0.93
Main3	4838.243	Q=120	22.5	665.75	666.46	666.46	666.68	0.018553	4.05	6.31	14.77	0.93
Main3	4838.243	Q=160	30	665.75	666.56	666.56	666.82	0.017441	4.38	7.92	16.16	0.93
Main3	4838.243	Q=240	45	665.75	666.73	666.73	667.04	0.016204	4.89	10.91	18.47	0.93
Main3	4838.243	Q=320	60	665.75	666.88	666.88	667.23	0.015118	5.25	13.79	20.39	0.92
Main3	4838.243	Q=400	75	665.75	667	667	667.39	0.014818	5.61	16.33	21.75	0.93
Main3	4838.243	Q=440	92.5	665.75	667.03	667.13	667.57	0.020173	6.66	17	22.09	1.09

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	4838.243	Q=480	90	665.75	667.11	667.11	667.53	0.014461	5.89	18.8	22.99	0.93
Main3	4927.736	Q=95.35	13	667.41	667.89	668.02	668.33	0.080875	5.32	2.48	9.13	1.73
Main3	4927.736	Q=4	0.75	667.41	667.53	667.6	667.83	0.432503	4.36	0.17	2.78	3.09
Main3	4927.736	Q=8	1.5	667.41	667.69	667.68	667.74	0.021988	1.7	0.88	6.3	0.8
Main3	4927.736	Q=16	3	667.41	667.72	667.75	667.84	0.054146	2.83	1.06	6.9	1.27
Main3	4927.736	Q=24	4.5	667.41	667.76	667.81	667.93	0.059688	3.27	1.38	7.78	1.37
Main3	4927.736	Q=32	6	667.41	667.79	667.85	668.01	0.06608	3.72	1.61	8.21	1.47
Main3	4927.736	Q=40	7.5	667.41	667.82	667.89	668.08	0.069884	4.1	1.84	8.56	1.53
Main3	4927.736	Q=80	15	667.41	667.91	668.06	668.41	0.084639	5.71	2.67	9.3	1.79
Main3	4927.736	Q=120	22.5	667.41	668	668.2	668.66	0.082232	6.62	3.51	9.99	1.84
Main3	4927.736	Q=160	30	667.41	668.08	668.32	668.87	0.0776	7.25	4.33	10.62	1.84
Main3	4927.736	Q=240	45	667.41	668.22	668.52	669.19	0.069154	8.13	5.93	11.75	1.81
Main3	4927.736	Q=320	60	667.41	668.34	668.7	669.46	0.06337	8.79	7.45	12.73	1.79
Main3	4927.736	Q=400	75	667.41	668.45	668.84	669.68	0.059125	9.31	8.91	13.62	1.77
Main3	4927.736	Q=440	92.5	667.41	668.57	668.99	669.92	0.055836	9.84	10.55	14.53	1.76
Main3	4927.736	Q=480	90	667.41	668.56	668.97	669.89	0.056099	9.76	10.33	14.41	1.76
Main3	4965.437	Q=95.35	13	669.08	669.6	669.6	669.78	0.021685	3.49	3.91	11.39	0.95
Main3	4965.437	Q=4	0.75	669.08	669.19	669.19	669.24	0.050577	1.77	0.42	5.33	1.1
Main3	4965.437	Q=8	1.5	669.08	669.25	669.25	669.31	0.036777	1.98	0.76	6.32	1.01
Main3	4965.437	Q=16	3	669.08	669.33	669.33	669.41	0.032867	2.34	1.28	7.62	1.01
Main3	4965.437	Q=24	4.5	669.08	669.38	669.38	669.49	0.030031	2.56	1.76	8.7	0.99
Main3	4965.437	Q=32	6	669.08	669.43	669.43	669.55	0.027427	2.79	2.17	9.31	0.98
Main3	4965.437	Q=40	7.5	669.08	669.47	669.47	669.61	0.026272	3	2.54	9.79	0.98
Main3	4965.437	Q=80	15	669.08	669.64	669.64	669.84	0.020337	3.61	4.41	11.93	0.94
Main3	4965.437	Q=120	22.5	669.08	669.77	669.77	670.01	0.018378	4.04	6.06	13.27	0.93
Main3	4965.437	Q=160	30	669.08	669.88	669.88	670.15	0.017476	4.41	7.52	14.13	0.93
Main3	4965.437	Q=240	45	669.08	670.06	670.06	670.4	0.01633	4.97	10.21	15.59	0.93
Main3	4965.437	Q=320	60	669.08	670.21	670.21	670.61	0.015493	5.39	12.73	16.85	0.93
Main3	4965.437	Q=400	75	669.08	670.35	670.35	670.79	0.014826	5.74	15.15	17.96	0.93
Main3	4965.437	Q=440	92.5	669.08	670.5	670.5	670.98	0.013965	6.04	17.96	19.12	0.92

McCormick Ravine - Post-Development - Storage-Discharge

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	4965.437	Q=480	90	669.08	670.48	670.48	670.95	0.014147	6.01	17.54	18.98	0.93

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-2	275.2498	Q=95.35	0.75	587.72	587.83	587.83	587.86	0.056316	1.34	0.56	7.88	0.89
Main-2	275.2498	Q=4	1.5	587.72	587.86	587.86	587.91	0.075668	1.93	0.78	7.9	1.08
Main-2	275.2498	Q=8	3	587.72	587.92	587.92	588	0.055562	2.3	1.3	7.96	1
Main-2	275.2498	Q=16	6	587.72	588.02	588.02	588.15	0.048947	2.89	2.08	8.04	1
Main-2	275.2498	Q=24	9	587.72	588.1	588.1	588.27	0.04504	3.29	2.74	8.11	1
Main-2	275.2498	Q=32	12	587.72	588.17	588.17	588.37	0.043118	3.61	3.32	8.17	1
Main-2	275.2498	Q=40	15	587.72	588.24	588.24	588.47	0.041541	3.88	3.86	8.23	1
Main-2	275.2498	Q=80	30	587.72	588.51	588.51	588.88	0.038317	4.87	6.16	8.47	1.01
Main-2	275.2498	Q=120	45	587.72	588.74	588.74	589.22	0.036479	5.53	8.14	8.66	1
Main-2	275.2498	Q=160	60	587.72	588.95	588.95	589.52	0.035646	6.05	9.91	8.84	1.01
Main-2	275.2498	Q=240	90	587.72	589.31	589.31	590.03	0.034447	6.84	13.15	9.15	1.01
Main-2	275.2498	Q=320	120	587.72	589.62	589.62	590.49	0.033948	7.46	16.08	9.41	1.01
Main-2	275.2498	Q=400	150	587.72	590.4	590.44	590.79	0.011227	5.41	35.91	56.85	0.61
Main-2	275.2498	Q=440	165	587.72	590.43	590.51	590.86	0.012245	5.7	37.92	57.92	0.64
Main-2	275.2498	Q=480	180	587.72	590.47	590.57	590.93	0.013103	5.96	40.01	58.97	0.66
Main-2	371.9637	Q=95.35	0.75	589.33	589.51	589.43	589.52	0.008318	0.84	0.89	5.93	0.38
Main-2	371.9637	Q=4	1.5	589.33	589.6	589.48	589.61	0.007631	1.06	1.41	6.14	0.39
Main-2	371.9637	Q=8	3	589.33	589.71	589.56	589.74	0.00877	1.43	2.09	6.39	0.44
Main-2	371.9637	Q=16	6	589.33	589.87	589.68	589.93	0.009576	1.88	3.19	6.78	0.48
Main-2	371.9637	Q=24	9	589.33	590	589.78	590.08	0.010153	2.21	4.08	7.08	0.51
Main-2	371.9637	Q=32	12	589.33	590.11	589.86	590.21	0.01052	2.46	4.89	7.35	0.53
Main-2	371.9637	Q=40	15	589.33	590.21	589.94	590.32	0.010897	2.67	5.61	7.57	0.55
Main-2	371.9637	Q=80	30	589.33	590.6	590.26	590.78	0.011828	3.42	8.77	8.5	0.59
Main-2	371.9637	Q=120	45	589.33	590.91	590.51	591.15	0.012337	3.92	11.48	9.22	0.62
Main-2	371.9637	Q=160	60	589.33	591.17	590.73	591.46	0.01262	4.3	13.97	9.83	0.64
Main-2	371.9637	Q=240	90	589.33	591.59	591.11	591.97	0.012847	4.91	18.46	13.06	0.66
Main-2	371.9637	Q=320	120	589.33	591.92	591.43	592.35	0.012034	5.33	24.04	21.12	0.65
Main-2	371.9637	Q=400	150	589.33	591.67	591.88	592.61	0.030451	7.79	19.59	14.93	1.02
Main-2	371.9637	Q=440	165	589.33	591.78	592.07	592.77	0.030076	8.03	21.28	17.34	1.02
Main-2	371.9637	Q=480	180	589.33	591.87	592.22	592.91	0.029792	8.26	23.03	19.74	1.03
T1	181.0388	Q=95.35	0.25	598.08	598.22	598.22	598.25	0.054936	1.33	0.19	2.62	0.88

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	181.0388	Q=4	0.5	598.08	598.25	598.25	598.3	0.081826	1.84	0.27	3.16	1.1
T1	181.0388	Q=8	1	598.08	598.32	598.32	598.38	0.060311	1.95	0.51	4.33	1
T1	181.0388	Q=16	2	598.08	598.39	598.39	598.47	0.054777	2.23	0.9	5.72	1
T1	181.0388	Q=24	3	598.08	598.44	598.44	598.54	0.054787	2.52	1.19	6.35	1.03
T1	181.0388	Q=32	4	598.08	598.49	598.49	598.6	0.05024	2.68	1.49	6.81	1.01
T1	181.0388	Q=40	5	598.08	598.53	598.53	598.65	0.049236	2.85	1.76	7.19	1.01
T1	181.0388	Q=80	10	598.08	598.68	598.68	598.86	0.043675	3.42	2.93	8.29	1.01
T1	181.0388	Q=120	15	598.08	598.79	598.79	599.02	0.041359	3.82	3.93	9	1.02
T1	181.0388	Q=160	20	598.08	598.87	598.9	599.16	0.044623	4.29	4.66	9.49	1.08
T1	181.0388	Q=240	30	598.08	599.03	599.07	599.39	0.0423	4.76	6.3	10.51	1.08
T1	181.0388	Q=320	40	598.08	599.18	599.22	599.58	0.040452	5.1	7.84	11.38	1.08
T1	181.0388	Q=400	50	598.08	599.31	599.34	599.75	0.037995	5.32	9.4	12.19	1.07
T1	181.0388	Q=440	55	598.08	599.36	599.4	599.82	0.037485	5.44	10.11	12.55	1.07
T1	181.0388	Q=480	60	598.08	599.42	599.46	599.9	0.037059	5.55	10.81	12.89	1.07
T1	285.9061	Q=95.35	0.25	602.56	602.68		602.69	0.034473	0.97	0.26	4.07	0.68
T1	285.9061	Q=4	0.5	602.56	602.72	602.7	602.74	0.026355	1.14	0.44	4.43	0.64
T1	285.9061	Q=8	1	602.56	602.77		602.8	0.032043	1.54	0.65	4.81	0.74
T1	285.9061	Q=16	2	602.56	602.84		602.9	0.034516	1.99	1.01	5.4	0.81
T1	285.9061	Q=24	3	602.56	602.89	602.87	602.97	0.034479	2.26	1.33	5.88	0.84
T1	285.9061	Q=32	4	602.56	602.94	602.91	603.04	0.037082	2.53	1.58	6.23	0.88
T1	285.9061	Q=40	5	602.56	602.98	602.96	603.09	0.037796	2.72	1.84	6.56	0.91
T1	285.9061	Q=80	10	602.56	603.12	603.12	603.31	0.042613	3.48	2.88	7.77	1.01
T1	285.9061	Q=120	15	602.56	603.22	603.25	603.48	0.049711	4.12	3.64	8.56	1.11
T1	285.9061	Q=160	20	602.56	603.34	603.36	603.61	0.041663	4.18	4.78	9.61	1.04
T1	285.9061	Q=240	30	602.56	603.49	603.53	603.84	0.043936	4.76	6.31	10.86	1.1
T1	285.9061	Q=320	40	602.56	603.61	603.67	604.03	0.045899	5.22	7.67	11.86	1.14
T1	285.9061	Q=400	50	602.56	603.69	603.79	604.21	0.048993	5.76	8.69	12.36	1.2
T1	285.9061	Q=440	55	602.56	603.74	603.84	604.29	0.049724	5.98	9.22	12.61	1.22
T1	285.9061	Q=480	60	602.56	603.77	603.89	604.37	0.050371	6.21	9.69	12.77	1.24
T1	381.2896	Q=95.35	0.25	606.32	606.48	606.47	606.5	0.046981	1.31	0.19	2.43	0.82
T1	381.2896	Q=4	0.5	606.32	606.51	606.51	606.56	0.06509	1.76	0.28	2.97	1

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	381.2896	Q=8	1	606.32	606.58	606.57	606.64	0.052191	1.92	0.52	4.01	0.94
T1	381.2896	Q=16	2	606.32	606.66	606.65	606.74	0.047685	2.21	0.91	5.29	0.94
T1	381.2896	Q=24	3	606.32	606.72	606.71	606.81	0.047871	2.45	1.22	6.15	0.97
T1	381.2896	Q=32	4	606.32	606.77	606.76	606.87	0.044155	2.55	1.57	6.96	0.95
T1	381.2896	Q=40	5	606.32	606.81	606.8	606.92	0.042956	2.69	1.86	7.46	0.95
T1	381.2896	Q=80	10	606.32	606.96	606.95	607.12	0.03783	3.21	3.12	8.71	0.95
T1	381.2896	Q=120	15	606.32	607.06	607.06	607.28	0.04101	3.78	3.97	9.18	1.01
T1	381.2896	Q=160	20	606.32	607.16	607.16	607.42	0.038445	4.07	4.91	9.67	1.01
T1	381.2896	Q=240	30	606.32	607.33	607.33	607.65	0.036566	4.56	6.58	10.48	1.01
T1	381.2896	Q=320	40	606.32	607.47	607.47	607.84	0.035117	4.92	8.14	11.18	1.02
T1	381.2896	Q=400	50	606.32	607.6	607.6	608.02	0.033565	5.18	9.65	11.82	1.01
T1	381.2896	Q=440	55	606.32	607.66	607.67	608.1	0.033197	5.31	10.36	12.11	1.01
T1	381.2896	Q=480	60	606.32	607.72	607.72	608.17	0.032737	5.42	11.07	12.39	1.01
T1	478.169	Q=95.35	0.25	610.46	610.62	610.61	610.64	0.038807	1.19	0.21	2.65	0.75
T1	478.169	Q=4	0.5	610.46	610.68	610.65	610.7	0.030194	1.29	0.39	3.61	0.69
T1	478.169	Q=8	1	610.46	610.73	610.71	610.77	0.035411	1.63	0.61	4.54	0.78
T1	478.169	Q=16	2	610.46	610.69	610.78	611.03	0.37844	4.71	0.42	3.78	2.47
T1	478.169	Q=24	3	610.46	610.86	610.84	610.94	0.038207	2.24	1.34	6.52	0.87
T1	478.169	Q=32	4	610.46	610.87	610.88	611	0.060087	2.86	1.4	6.58	1.09
T1	478.169	Q=40	5	610.46	610.9	610.92	611.05	0.063644	3.14	1.59	6.78	1.14
T1	478.169	Q=80	10	610.46	611.02	611.07	611.28	0.071436	4.09	2.44	7.62	1.27
T1	478.169	Q=120	15	610.46	611.11	611.2	611.45	0.074964	4.72	3.18	8.27	1.34
T1	478.169	Q=160	20	610.46	611.18	611.3	611.61	0.079111	5.25	3.81	8.79	1.41
T1	478.169	Q=240	30	610.46	611.31	611.47	611.88	0.080338	6.04	4.97	9.38	1.46
T1	478.169	Q=320	40	610.46	611.42	611.62	612.11	0.081707	6.66	6.01	9.87	1.5
T1	478.169	Q=400	50	610.46	611.51	611.75	612.31	0.083011	7.18	6.96	10.3	1.54
T1	478.169	Q=440	55	610.46	611.56	611.82	612.41	0.082793	7.39	7.44	10.51	1.55
T1	478.169	Q=480	60	610.46	611.6	611.88	612.5	0.082968	7.6	7.89	10.71	1.56
T1	589.8321	Q=95.35	0.25	616.67	616.81	616.81	616.85	0.072239	1.52	0.16	2.29	1
T1	589.8321	Q=4	0.5	616.67	616.86	616.86	616.91	0.074353	1.83	0.27	2.95	1.06
T1	589.8321	Q=8	1	616.67	616.92	616.92	616.98	0.065378	2.08	0.48	3.92	1.04

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	589.8321	Q=16	2	616.67	617	617	617.08	0.056859	2.35	0.85	5.14	1.02
T1	589.8321	Q=24	3	616.67	617.05	617.06	617.16	0.052926	2.63	1.14	5.56	1.02
T1	589.8321	Q=32	4	616.67	617.1	617.1	617.22	0.051575	2.85	1.4	5.9	1.03
T1	589.8321	Q=40	5	616.67	617.14	617.15	617.28	0.048965	3	1.66	6.23	1.02
T1	589.8321	Q=80	10	616.67	617.31	617.31	617.5	0.04446	3.57	2.8	7.48	1.03
T1	589.8321	Q=120	15	616.67	617.43	617.44	617.67	0.042617	3.95	3.8	8.43	1.04
T1	589.8321	Q=160	20	616.67	617.54	617.55	617.81	0.040727	4.21	4.75	9.24	1.04
T1	589.8321	Q=240	30	616.67	617.71	617.73	618.05	0.03983	4.67	6.43	10.53	1.05
T1	589.8321	Q=320	40	616.67	617.84	617.87	618.24	0.038899	5.09	7.87	11.27	1.07
T1	589.8321	Q=400	50	616.67	617.95	618	618.42	0.038102	5.46	9.18	11.81	1.08
T1	589.8321	Q=440	55	616.67	618.01	618.05	618.5	0.038033	5.64	9.8	12.05	1.08
T1	589.8321	Q=480	60	616.67	618.06	618.11	618.58	0.037821	5.79	10.41	12.29	1.09
T1	696.9404	Q=95.35	0.25	623.05	623.17		623.19	0.049386	1.12	0.22	3.72	0.81
T1	696.9404	Q=4	0.5	623.05	623.21	623.19	623.23	0.048132	1.32	0.38	4.85	0.83
T1	696.9404	Q=8	1	623.05	623.24	623.25	623.29	0.053431	1.74	0.58	5.26	0.93
T1	696.9404	Q=16	2	623.05	623.3	623.3	623.38	0.060988	2.31	0.87	5.7	1.04
T1	696.9404	Q=24	3	623.05	623.34	623.35	623.45	0.0658	2.71	1.11	6.04	1.12
T1	696.9404	Q=32	4	623.05	623.37	623.4	623.52	0.06766	3.01	1.33	6.34	1.16
T1	696.9404	Q=40	5	623.05	623.4	623.44	623.57	0.071877	3.3	1.51	6.58	1.21
T1	696.9404	Q=80	10	623.05	623.52	623.59	623.8	0.081011	4.27	2.34	7.56	1.35
T1	696.9404	Q=120	15	623.05	623.61	623.72	623.99	0.085849	4.92	3.05	8.3	1.43
T1	696.9404	Q=160	20	623.05	623.68	623.82	624.15	0.091801	5.48	3.65	8.88	1.5
T1	696.9404	Q=240	30	623.05	623.8	623.99	624.41	0.095137	6.23	4.82	9.91	1.57
T1	696.9404	Q=320	40	623.05	623.9	624.12	624.63	0.09921	6.87	5.82	10.69	1.64
T1	696.9404	Q=400	50	623.05	623.98	624.25	624.86	0.103714	7.54	6.63	11.08	1.7
T1	696.9404	Q=440	55	623.05	624.01	624.31	624.96	0.104455	7.82	7.05	11.28	1.72
T1	696.9404	Q=480	60	623.05	624.05	624.36	625.06	0.10592	8.1	7.43	11.46	1.75
T1	761.1885	Q=95.35	0.25	626.79	626.85	626.85	626.87	0.067478	1.19	0.21	4.07	0.92
T1	761.1885	Q=4	0.5	626.79	626.88	626.88	626.91	0.051606	1.41	0.36	4.36	0.87
T1	761.1885	Q=8	1	626.79	626.92	626.92	626.98	0.061693	1.9	0.53	4.67	1
T1	761.1885	Q=16	2	626.79	626.99	626.99	627.07	0.054309	2.31	0.87	5.24	1

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	761.1885	Q=24	3	626.79	627.05	627.05	627.15	0.050735	2.57	1.17	5.7	1
T1	761.1885	Q=32	4	626.79	627.09	627.09	627.21	0.0495	2.79	1.44	6.08	1.01
T1	761.1885	Q=40	5	626.79	627.13	627.13	627.27	0.047037	2.93	1.71	6.44	1
T1	761.1885	Q=80	10	626.79	627.3	627.3	627.49	0.042503	3.47	2.88	7.81	1.01
T1	761.1885	Q=120	15	626.79	627.43	627.43	627.65	0.040364	3.82	3.93	8.86	1.01
T1	761.1885	Q=160	20	626.79	627.53	627.53	627.79	0.03803	4.04	4.95	9.76	1
T1	761.1885	Q=240	30	626.79	627.71	627.71	628.01	0.036402	4.44	6.76	11.2	1.01
T1	761.1885	Q=320	40	626.79	627.85	627.85	628.2	0.034808	4.78	8.37	12.15	1.01
T1	761.1885	Q=400	50	626.79	627.97	627.97	628.36	0.032835	5.05	9.92	12.86	1
T1	761.1885	Q=440	55	626.79	628.02	628.02	628.44	0.032251	5.21	10.6	13.1	1
T1	761.1885	Q=480	60	626.79	628.07	628.07	628.52	0.031517	5.35	11.27	13.28	1
T1	870.2839	Q=95.35	0.25	631.25	631.4	631.38	631.42	0.028472	1	0.25	3.26	0.64
T1	870.2839	Q=4	0.5	631.25	631.44	631.42	631.47	0.034629	1.28	0.39	4.08	0.73
T1	870.2839	Q=8	1	631.25	631.5	631.47	631.54	0.030313	1.45	0.69	5.43	0.72
T1	870.2839	Q=16	2	631.25	631.57	631.54	631.62	0.033149	1.8	1.11	6.78	0.78
T1	870.2839	Q=24	3	631.25	631.56	631.59	631.69	0.090254	2.88	1.04	6.65	1.28
T1	870.2839	Q=32	4	631.25	631.59	631.64	631.75	0.095182	3.21	1.25	7.02	1.34
T1	870.2839	Q=40	5	631.25	631.62	631.67	631.81	0.101981	3.52	1.42	7.32	1.41
T1	870.2839	Q=80	10	631.25	631.72	631.81	632.03	0.112156	4.48	2.23	8.59	1.55
T1	870.2839	Q=120	15	631.25	631.79	631.92	632.22	0.12053	5.27	2.85	9.2	1.66
T1	870.2839	Q=160	20	631.25	631.84	632.01	632.4	0.131127	6.01	3.34	9.59	1.77
T1	870.2839	Q=240	30	631.25	631.93	632.17	632.73	0.147946	7.21	4.2	10.23	1.93
T1	870.2839	Q=320	40	631.25	632	632.31	633.02	0.158377	8.13	4.98	10.78	2.04
T1	870.2839	Q=400	50	631.25	632.07	632.43	633.28	0.166356	8.9	5.69	11.26	2.13
T1	870.2839	Q=440	55	631.25	632.1	632.48	633.39	0.166166	9.18	6.08	11.51	2.14
T1	870.2839	Q=480	60	631.25	632.13	632.54	633.51	0.169316	9.51	6.41	11.73	2.18
T1	938.0349	Q=95.35	0.25	635.84	635.96	635.96	635.97	0.038309	1.01	0.25	4.04	0.71
T1	938.0349	Q=4	0.5	635.84	635.97	635.97	636.01	0.073511	1.58	0.32	4.24	1.02
T1	938.0349	Q=8	1	635.84	636.01	636.01	636.08	0.077251	2.03	0.49	4.71	1.11
T1	938.0349	Q=16	2	635.84	636.09	636.09	636.17	0.054694	2.25	0.89	5.62	1
T1	938.0349	Q=24	3	635.84	636.14	636.14	636.24	0.051868	2.49	1.2	6.25	1

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	938.0349	Q=32	4	635.84	636.19	636.19	636.3	0.049837	2.68	1.49	6.78	1
T1	938.0349	Q=40	5	635.84	636.23	636.23	636.35	0.047294	2.8	1.79	7.28	1
T1	938.0349	Q=80	10	635.84	636.38	636.38	636.55	0.043952	3.31	3.02	9.08	1.01
T1	938.0349	Q=120	15	635.84	636.49	636.49	636.7	0.04127	3.63	4.13	10.33	1.01
T1	938.0349	Q=160	20	635.84	636.59	636.59	636.83	0.038587	3.93	5.11	11.06	1
T1	938.0349	Q=240	30	635.84	636.75	636.75	637.04	0.03466	4.33	6.99	12.34	0.99
T1	938.0349	Q=320	40	635.84	636.88	636.88	637.21	0.032141	4.63	8.75	13.42	0.98
T1	938.0349	Q=400	50	635.84	636.99	636.99	637.37	0.030306	4.96	10.27	14.01	0.97
T1	938.0349	Q=440	55	635.84	637.04	637.04	637.44	0.029925	5.13	10.96	14.26	0.97
T1	938.0349	Q=480	60	635.84	637.09	637.09	637.51	0.029135	5.25	11.69	14.53	0.97
T1	1017.8	Q=95.35	0.25	636.49	636.7	636.61	636.7	0.004007	0.5	0.5	4.3	0.26
T1	1017.8	Q=4	0.5	636.49	636.77	636.65	636.77	0.003537	0.61	0.83	4.75	0.26
T1	1017.8	Q=8	1	636.49	636.86	636.69	636.87	0.003677	0.77	1.3	5.34	0.28
T1	1017.8	Q=16	2	636.49	636.99	636.77	637	0.00414	1	2.01	6.12	0.31
T1	1017.8	Q=24	3	636.49	637.08	636.83	637.1	0.004473	1.15	2.6	6.7	0.33
T1	1017.8	Q=32	4	636.49	637.16	636.88	637.18	0.004668	1.28	3.14	7.19	0.34
T1	1017.8	Q=40	5	636.49	637.22	636.92	637.25	0.004797	1.37	3.64	7.62	0.35
T1	1017.8	Q=80	10	636.49	637.45	637.1	637.5	0.005373	1.81	5.6	9.46	0.39
T1	1017.8	Q=120	15	636.49	637.61	637.24	637.68	0.005726	2.15	7.19	10.72	0.42
T1	1017.8	Q=160	20	636.49	637.74	637.36	637.83	0.00602	2.43	8.62	11.74	0.44
T1	1017.8	Q=240	30	636.49	637.94	637.55	638.06	0.006501	2.87	11.12	12.81	0.47
T1	1017.8	Q=320	40	636.49	638.11	637.71	638.26	0.006839	3.22	13.3	13.45	0.49
T1	1017.8	Q=400	50	636.49	637.49	637.86	638.61	0.109644	8.5	5.98	9.78	1.78
T1	1017.8	Q=440	55	636.49	637.53	637.91	638.73	0.111236	8.85	6.35	10.07	1.81
T1	1017.8	Q=480	60	636.49	637.57	637.97	638.85	0.112378	9.18	6.71	10.36	1.84
T1	1141.493	Q=95.35	0.25	642.89	643.01	643.01	643.04	0.077161	1.41	0.18	2.93	1.01
T1	1141.493	Q=4	0.5	642.89	643.04	643.04	643.09	0.083122	1.72	0.29	3.75	1.09
T1	1141.493	Q=8	1	642.89	643.1	643.1	643.15	0.062251	1.84	0.54	5.13	1
T1	1141.493	Q=16	2	642.89	643.17	643.17	643.24	0.05523	2.16	0.93	6.34	0.99
T1	1141.493	Q=24	3	642.89	643.22	643.22	643.31	0.050685	2.42	1.24	6.85	0.99
T1	1141.493	Q=32	4	642.89	643.26	643.26	643.36	0.047749	2.61	1.54	7.29	0.98

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	1141.493	Q=40	5	642.89	643.29	643.29	643.41	0.045823	2.77	1.82	7.68	0.98
T1	1141.493	Q=80	10	642.89	643.44	643.44	643.61	0.041022	3.31	3.06	9.22	0.99
T1	1141.493	Q=120	15	642.89	643.55	643.55	643.76	0.037696	3.73	4.09	10.04	0.98
T1	1141.493	Q=160	20	642.89	643.64	643.64	643.89	0.034451	4.05	5.06	10.66	0.97
T1	1141.493	Q=240	30	642.89	643.81	643.81	644.11	0.030233	4.53	6.89	11.75	0.95
T1	1141.493	Q=320	40	642.89	643.94	643.94	644.3	0.027717	4.89	8.6	12.68	0.94
T1	1141.493	Q=400	50	642.89	644.07	644.07	644.46	0.025897	5.18	10.23	13.5	0.93
T1	1141.493	Q=440	55	642.89	644.13	644.13	644.53	0.025339	5.32	10.99	13.88	0.93
T1	1141.493	Q=480	60	642.89	644.18	644.18	644.61	0.024856	5.45	11.75	14.23	0.93
T1	1239.776	Q=95.35	0.25	643.85	644.04	643.96	644.05	0.003837	0.43	0.58	5.95	0.24
T1	1239.776	Q=4	0.5	643.85	644.1	643.99	644.1	0.003735	0.54	0.93	6.79	0.26
T1	1239.776	Q=8	1	643.85	644.17	644.04	644.18	0.004064	0.7	1.44	7.77	0.28
T1	1239.776	Q=16	2	643.85	644.27	644.1	644.28	0.004281	0.9	2.26	9.03	0.3
T1	1239.776	Q=24	3	643.85	644.34	644.15	644.35	0.004396	1.06	2.9	9.59	0.32
T1	1239.776	Q=32	4	643.85	644.39	644.19	644.41	0.004493	1.19	3.46	10.07	0.33
T1	1239.776	Q=40	5	643.85	644.44	644.22	644.47	0.004588	1.3	3.98	10.48	0.34
T1	1239.776	Q=80	10	643.85	644.64	644.36	644.68	0.00486	1.7	6.18	12.1	0.38
T1	1239.776	Q=120	15	643.85	644.78	644.46	644.84	0.005048	1.99	8.03	13.31	0.4
T1	1239.776	Q=160	20	643.85	644.9	644.56	644.97	0.005219	2.22	9.66	14.25	0.41
T1	1239.776	Q=240	30	643.85	645.09	644.71	645.19	0.005451	2.59	12.56	15.67	0.44
T1	1239.776	Q=320	40	643.85	645.26	644.85	645.37	0.005574	2.87	15.18	16.76	0.45
T1	1239.776	Q=400	50	643.85	645.39	644.96	645.53	0.00572	3.11	17.54	17.59	0.46
T1	1239.776	Q=440	55	643.85	645.46	645.02	645.6	0.00574	3.21	18.7	17.99	0.47
T1	1239.776	Q=480	60	643.85	645.52	645.07	645.67	0.005783	3.31	19.8	18.36	0.47
T1	1369.564	Q=95.35	0.25	649.15	649.23	649.23	649.24	0.049255	1.03	0.24	4.57	0.79
T1	1369.564	Q=4	0.5	649.15	649.25	649.25	649.28	0.074665	1.48	0.34	5.06	1.01
T1	1369.564	Q=8	1	649.15	649.3	649.3	649.34	0.044423	1.52	0.66	6.43	0.84
T1	1369.564	Q=16	2	649.15	649.35	649.35	649.41	0.058299	2.04	0.98	7.57	1
T1	1369.564	Q=24	3	649.15	649.39	649.39	649.47	0.054896	2.23	1.35	8.68	1
T1	1369.564	Q=32	4	649.15	649.43	649.43	649.52	0.052453	2.37	1.69	9.6	1
T1	1369.564	Q=40	5	649.15	649.46	649.46	649.56	0.051125	2.49	2.01	10.39	1

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	1369.564	Q=80	10	649.15	649.58	649.58	649.72	0.04347	3.03	3.33	12.22	0.99
T1	1369.564	Q=120	15	649.15	649.67	649.67	649.85	0.037897	3.4	4.51	13.38	0.96
T1	1369.564	Q=160	20	649.15	649.75	649.75	649.96	0.034601	3.68	5.62	14.38	0.95
T1	1369.564	Q=240	30	649.15	649.89	649.89	650.14	0.029878	4.07	7.75	16.13	0.92
T1	1369.564	Q=320	40	649.15	650	650	650.29	0.027944	4.41	9.64	17.54	0.92
T1	1369.564	Q=400	50	649.15	650.11	650.11	650.42	0.026069	4.66	11.51	18.84	0.91
T1	1369.564	Q=440	55	649.15	650.16	650.16	650.48	0.025231	4.76	12.43	19.39	0.9
T1	1369.564	Q=480	60	649.15	650.2	650.2	650.53	0.025045	4.89	13.22	19.75	0.9
T1	1533.785	Q=95.35	0.25	652.78	652.89	652.85	652.89	0.012556	0.62	0.41	5.94	0.42
T1	1533.785	Q=4	0.5	652.78	652.93	652.9	652.94	0.010526	0.73	0.69	6.88	0.41
T1	1533.785	Q=8	1	652.78	652.98	652.92	652.99	0.013276	0.98	1.02	7.87	0.48
T1	1533.785	Q=16	2	652.78	653.06	652.97	653.08	0.011654	1.14	1.75	9.66	0.47
T1	1533.785	Q=24	3	652.78	653.11	653.03	653.14	0.012009	1.32	2.28	10.57	0.49
T1	1533.785	Q=32	4	652.78	653.15	653.05	653.19	0.012247	1.47	2.74	11.2	0.51
T1	1533.785	Q=40	5	652.78	653.19	653.08	653.23	0.012446	1.59	3.17	11.76	0.53
T1	1533.785	Q=80	10	652.78	653.33	653.2	653.4	0.013658	2.06	4.95	13.85	0.58
T1	1533.785	Q=120	15	652.78	653.42	653.3	653.51	0.014752	2.46	6.26	14.91	0.62
T1	1533.785	Q=160	20	652.78	653.5	653.38	653.61	0.015615	2.79	7.42	15.78	0.66
T1	1533.785	Q=240	30	652.78	653.62	653.51	653.78	0.017431	3.35	9.37	17.15	0.72
T1	1533.785	Q=320	40	652.78	653.72	653.62	653.93	0.018424	3.78	11.16	18.23	0.76
T1	1533.785	Q=400	50	652.78	653.8	653.73	654.05	0.019707	4.18	12.68	19.04	0.79
T1	1533.785	Q=440	55	652.78	653.84	653.77	654.11	0.02034	4.36	13.38	19.41	0.81
T1	1533.785	Q=480	60	652.78	653.88	653.82	654.17	0.02046	4.51	14.17	19.81	0.82
T1	1636.531	Q=95.35	0.25	655.86	655.95	655.95	655.96	0.041043	0.82	0.31	7.19	0.7
T1	1636.531	Q=4	0.5	655.86	655.96	655.96	655.98	0.084248	1.29	0.39	7.92	1.02
T1	1636.531	Q=8	1	655.86	655.98	655.98	656.03	0.112642	1.84	0.55	8.54	1.25
T1	1636.531	Q=16	2	655.86	656.03	656.03	656.09	0.052672	1.9	1.09	10.05	0.94
T1	1636.531	Q=24	3	655.86	656.07	656.07	656.14	0.047263	2.13	1.47	10.99	0.93
T1	1636.531	Q=32	4	655.86	656.1	656.1	656.18	0.043659	2.31	1.83	11.81	0.92
T1	1636.531	Q=40	5	655.86	656.13	656.13	656.22	0.040997	2.45	2.17	12.54	0.92
T1	1636.531	Q=80	10	655.86	656.24	656.24	656.36	0.034157	2.92	3.7	15.36	0.89

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	1636.531	Q=120	15	655.86	656.32	656.32	656.46	0.032327	3.27	4.97	16.9	0.9
T1	1636.531	Q=160	20	655.86	656.38	656.38	656.55	0.031094	3.54	6.11	17.91	0.91
T1	1636.531	Q=240	30	655.86	656.5	656.5	656.71	0.02873	3.93	8.25	19.67	0.9
T1	1636.531	Q=320	40	655.86	656.6	656.6	656.84	0.026821	4.22	10.28	21.21	0.9
T1	1636.531	Q=400	50	655.86	656.68	656.68	656.95	0.02578	4.47	12.15	22.51	0.9
T1	1636.531	Q=440	55	655.86	656.72	656.72	657	0.025773	4.6	12.97	23.02	0.9
T1	1636.531	Q=480	60	655.86	656.75	656.75	657.05	0.02539	4.71	13.83	23.56	0.9
T1	1702.895	Q=95.35	0.25	656.02	656.24	656.13	656.25	0.001536	0.3	0.83	7.45	0.16
T1	1702.895	Q=4	0.5	656.02	656.3	656.15	656.31	0.00154	0.38	1.32	8.62	0.17
T1	1702.895	Q=8	1	656.02	656.38	656.21	656.38	0.001666	0.51	1.99	9.6	0.19
T1	1702.895	Q=16	2	656.02	656.47	656.26	656.47	0.002116	0.72	2.9	10.77	0.22
T1	1702.895	Q=24	3	656.02	656.54	656.31	656.55	0.002324	0.85	3.69	11.69	0.24
T1	1702.895	Q=32	4	656.02	656.6	656.34	656.61	0.002429	0.96	4.41	12.48	0.25
T1	1702.895	Q=40	5	656.02	656.64	656.37	656.66	0.00262	1.06	5.01	13.09	0.27
T1	1702.895	Q=80	10	656.02	656.83	656.5	656.85	0.003122	1.43	7.6	15.47	0.3
T1	1702.895	Q=120	15	656.02	656.96	656.6	657	0.003431	1.68	9.76	17.08	0.33
T1	1702.895	Q=160	20	656.02	657.06	656.69	657.11	0.003662	1.89	11.65	18.3	0.35
T1	1702.895	Q=240	30	656.02	657.23	656.83	657.3	0.004077	2.23	14.91	20.24	0.38
T1	1702.895	Q=320	40	656.02	657.37	656.95	657.45	0.004461	2.52	17.69	21.75	0.4
T1	1702.895	Q=400	50	656.02	657.48	657.05	657.58	0.00473	2.76	20.29	23.08	0.42
T1	1702.895	Q=440	55	656.02	657.54	657.09	657.65	0.004767	2.85	21.67	23.79	0.42
T1	1702.895	Q=480	60	656.02	657.58	657.14	657.7	0.004985	2.97	22.71	24.38	0.44
T2	509.5519	Q=95.35	0.5	592.61	592.68	592.68	592.71	0.148293	1.34	0.37	7.1	1.03
T2	509.5519	Q=4	1	592.61	592.71	592.71	592.76	0.162821	1.72	0.58	8.1	1.13
T2	509.5519	Q=8	2	592.61	592.76	592.76	592.82	0.108735	2	1	8.16	1.01
T2	509.5519	Q=16	4	592.61	592.83	592.83	592.93	0.0945	2.51	1.6	8.23	1
T2	509.5519	Q=24	6	592.61	592.9	592.9	593.02	0.086382	2.85	2.1	8.3	1
T2	509.5519	Q=32	8	592.61	592.95	592.95	593.1	0.083483	3.15	2.54	8.35	1.01
T2	509.5519	Q=40	10	592.61	593	593	593.18	0.079526	3.38	2.96	8.4	1
T2	509.5519	Q=80	20	592.61	593.24	593.21	593.49	0.058996	3.98	5.03	8.64	0.92
T2	509.5519	Q=120	30	592.61	593.48		593.75	0.045256	4.23	7.1	8.88	0.83

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	509.5519	Q=160	40	592.61	593.69		594	0.038438	4.44	9.02	9.85	0.79
T2	509.5519	Q=240	60	592.61	594.1	594.1	594.28	0.017685	3.78	19.69	52.71	0.56
T2	509.5519	Q=320	80	592.61	594.18	594.18	594.39	0.019592	4.14	24.1	54.07	0.6
T2	509.5519	Q=400	100	592.61	594.43	594.26	594.54	0.008455	3.02	38.24	57.71	0.4
T2	509.5519	Q=440	110	592.61	594.45	594.28	594.58	0.009473	3.22	39.22	57.87	0.43
T2	509.5519	Q=480	120	592.61	594.47	594.3	594.61	0.010095	3.35	40.68	58.11	0.44
T2	607.4537	Q=95.35	0.5	593.15	593.38	593.22	593.39	0.002202	0.4	1.25	6.1	0.16
T2	607.4537	Q=4	1	593.15	593.49	593.27	593.49	0.002389	0.52	1.91	6.53	0.17
T2	607.4537	Q=8	2	593.15	593.63	593.33	593.64	0.002817	0.7	2.85	7.09	0.19
T2	607.4537	Q=16	4	593.15	593.82	593.42	593.83	0.00325	0.93	4.38	9.61	0.22
T2	607.4537	Q=24	6	593.15	593.94	593.49	593.96	0.003424	1.09	5.78	13.01	0.23
T2	607.4537	Q=32	8	593.15	594.03	593.56	594.06	0.003498	1.2	7.1	15	0.24
T2	607.4537	Q=40	10	593.15	594.11	593.62	594.13	0.003566	1.29	8.28	16.26	0.25
T2	607.4537	Q=80	20	593.15	594.39	593.9	594.42	0.003645	1.57	13.37	20.28	0.26
T2	607.4537	Q=120	30	593.15	594.59	594.08	594.64	0.003614	1.75	17.77	23.1	0.27
T2	607.4537	Q=160	40	593.15	594.77	594.2	594.82	0.003428	1.85	22.01	25.03	0.27
T2	607.4537	Q=240	60	593.15	594.96	594.38	595.04	0.004164	2.22	27.04	26.76	0.3
T2	607.4537	Q=320	80	593.15	595.13	594.53	595.23	0.004612	2.48	31.69	28.27	0.32
T2	607.4537	Q=400	100	593.15	595.26	594.67	595.39	0.005141	2.75	35.5	29.45	0.34
T2	607.4537	Q=440	110	593.15	595.34	594.73	595.47	0.005147	2.82	37.84	30.15	0.34
T2	607.4537	Q=480	120	593.15	595.39	594.78	595.53	0.005462	2.95	39.34	30.59	0.36
T2	731.9712	Q=95.35	0.5	595.47	595.58	595.58	595.62	0.119077	1.67	0.3	3.42	1
T2	731.9712	Q=4	1	595.47	595.63	595.63	595.7	0.106742	2.06	0.49	3.74	1.01
T2	731.9712	Q=8	2	595.47	595.71	595.71	595.81	0.094221	2.49	0.8	4.22	1
T2	731.9712	Q=16	4	595.47	595.83	595.83	595.97	0.081762	2.96	1.35	5.1	0.99
T2	731.9712	Q=24	6	595.47	595.94	595.94	596.08	0.059484	3.11	1.99	7.14	0.89
T2	731.9712	Q=32	8	595.47	596.02	596.02	596.17	0.049259	3.22	2.63	8.87	0.84
T2	731.9712	Q=40	10	595.47	596.08	596.08	596.24	0.043679	3.31	3.24	10.25	0.81
T2	731.9712	Q=80	20	595.47	596.27	596.27	596.48	0.040706	3.91	5.4	12.75	0.82
T2	731.9712	Q=120	30	595.47	596.41	596.41	596.67	0.037136	4.22	7.32	14.23	0.81
T2	731.9712	Q=160	40	595.47	596.53	596.53	596.83	0.034374	4.44	9.13	15.49	0.79

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	731.9712	Q=240	60	595.47	596.73	596.73	597.09	0.031299	4.79	12.43	17.55	0.78
T2	731.9712	Q=320	80	595.47	596.9	596.9	597.31	0.029212	5.06	15.49	19.21	0.77
T2	731.9712	Q=400	100	595.47	597.04	597.04	597.5	0.027449	5.26	18.4	20.53	0.76
T2	731.9712	Q=440	110	595.47	597.11	597.11	597.59	0.027029	5.36	19.72	21.03	0.76
T2	731.9712	Q=480	120	595.47	597.17	597.17	597.68	0.026303	5.44	21.1	21.51	0.75
T2	827.6824	Q=95.35	0.5	598.3	598.48	598.41	598.48	0.013168	0.65	0.77	7.02	0.35
T2	827.6824	Q=4	1	598.3	598.54		598.55	0.013635	0.81	1.24	8.33	0.37
T2	827.6824	Q=8	2	598.3	598.62		598.63	0.014119	1.02	1.95	9.47	0.4
T2	827.6824	Q=16	4	598.3	598.73		598.75	0.014573	1.3	3.08	10.7	0.43
T2	827.6824	Q=24	6	598.3	598.8		598.84	0.016755	1.55	3.88	11.49	0.47
T2	827.6824	Q=32	8	598.3	598.86		598.91	0.018554	1.75	4.57	12.14	0.5
T2	827.6824	Q=40	10	598.3	598.91		598.97	0.019877	1.92	5.21	12.71	0.53
T2	827.6824	Q=80	20	598.3	599.13		599.22	0.02106	2.41	8.29	15.05	0.57
T2	827.6824	Q=120	30	598.3	599.27		599.4	0.022381	2.86	10.52	16.07	0.61
T2	827.6824	Q=160	40	598.3	599.39		599.55	0.023664	3.26	12.38	16.81	0.64
T2	827.6824	Q=240	60	598.3	599.57		599.8	0.025821	3.91	15.59	18.02	0.69
T2	827.6824	Q=320	80	598.3	599.72		600.02	0.027377	4.43	18.41	19.02	0.73
T2	827.6824	Q=400	100	598.3	599.85		600.21	0.029308	4.91	20.82	19.83	0.77
T2	827.6824	Q=440	110	598.3	599.91		600.3	0.029824	5.11	22.03	20.23	0.78
T2	827.6824	Q=480	120	598.3	599.96	599.85	600.39	0.030816	5.33	23.07	20.56	0.8
T2	950.5703	Q=95.35	0.5	598.98	599.23	599.1	599.23	0.003544	0.41	1.22	8.32	0.19
T2	950.5703	Q=4	1	598.98	599.31	599.14	599.31	0.003488	0.51	1.96	9.51	0.2
T2	950.5703	Q=8	2	598.98	599.42	599.2	599.42	0.003726	0.65	3.06	10.75	0.22
T2	950.5703	Q=16	4	598.98	599.57	599.28	599.58	0.003907	0.82	4.87	12.51	0.23
T2	950.5703	Q=24	6	598.98	599.7	599.34	599.71	0.003891	0.92	6.49	13.91	0.24
T2	950.5703	Q=32	8	598.98	599.8	599.39	599.81	0.003858	1.01	7.92	14.78	0.24
T2	950.5703	Q=40	10	598.98	599.88	599.43	599.9	0.003907	1.09	9.2	15.5	0.25
T2	950.5703	Q=80	20	598.98	600.18	599.62	600.21	0.004194	1.41	14.24	17.86	0.27
T2	950.5703	Q=120	30	598.98	600.41	599.76	600.45	0.004379	1.64	18.42	19.55	0.29
T2	950.5703	Q=160	40	598.98	600.59	599.88	600.64	0.004537	1.83	22.13	20.94	0.3
T2	950.5703	Q=240	60	598.98	600.88	600.07	600.95	0.004685	2.12	28.64	23.1	0.31

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	950.5703	Q=320	80	598.98	601.12	600.24	601.21	0.004758	2.37	34.28	24.63	0.32
T2	950.5703	Q=400	100	598.98	601.33	600.39	601.43	0.004774	2.57	39.54	25.76	0.33
T2	950.5703	Q=440	110	598.98	601.42	600.46	601.53	0.004789	2.66	42.01	26.27	0.33
T2	950.5703	Q=480	120	598.98	601.52	600.53	601.63	0.004784	2.74	44.47	26.77	0.34
T2	1061.56	Q=95.35	0.5	600.95	601.09	601.09	601.13	0.151783	1.64	0.3	4.33	1.09
T2	1061.56	Q=4	1	600.95	601.14	601.14	601.19	0.113815	1.75	0.57	5.93	1
T2	1061.56	Q=8	2	600.95	601.2	601.2	601.27	0.103663	2.02	0.99	7.76	1
T2	1061.56	Q=16	4	600.95	601.28	601.28	601.37	0.091341	2.44	1.64	8.82	0.99
T2	1061.56	Q=24	6	600.95	601.34	601.34	601.46	0.085666	2.73	2.2	9.49	1
T2	1061.56	Q=32	8	600.95	601.39	601.39	601.53	0.083178	2.96	2.7	10.05	1.01
T2	1061.56	Q=40	10	600.95	601.44	601.44	601.59	0.080773	3.15	3.18	10.55	1.01
T2	1061.56	Q=80	20	600.95	601.63	601.63	601.84	0.072113	3.74	5.35	12.61	1.01
T2	1061.56	Q=120	30	600.95	601.77	601.77	602.04	0.06748	4.11	7.31	14.2	1.01
T2	1061.56	Q=160	40	600.95	601.9	601.9	602.19	0.064544	4.37	9.14	15.63	1.01
T2	1061.56	Q=240	60	600.95	602.1	602.1	602.45	0.060951	4.77	12.57	18.06	1.01
T2	1061.56	Q=320	80	600.95	602.26	602.26	602.67	0.057557	5.14	15.59	19.56	1
T2	1061.56	Q=400	100	600.95	602.41	602.41	602.86	0.053508	5.38	18.65	20.98	0.99
T2	1061.56	Q=440	110	600.95	602.48	602.48	602.95	0.052903	5.52	20.02	21.58	0.99
T2	1061.56	Q=480	120	600.95	602.53	602.53	603.03	0.052219	5.68	21.22	21.98	0.99
T2	1216.334	Q=95.35	0.5	602.2	602.53	602.37	602.53	0.002939	0.41	1.22	7.13	0.18
T2	1216.334	Q=4	1	602.2	602.62	602.42	602.63	0.003153	0.52	1.92	8.31	0.19
T2	1216.334	Q=8	2	602.2	602.75	602.49	602.76	0.003332	0.65	3.09	10.04	0.21
T2	1216.334	Q=16	4	602.2	602.92	602.58	602.93	0.0036	0.8	4.97	12.4	0.22
T2	1216.334	Q=24	6	602.2	603.04	602.65	603.05	0.00374	0.91	6.61	14.12	0.23
T2	1216.334	Q=32	8	602.2	603.14	602.7	603.16	0.003835	0.99	8.1	15.53	0.24
T2	1216.334	Q=40	10	602.2	603.24	602.75	603.26	0.00396	1.02	9.76	18.18	0.25
T2	1216.334	Q=80	20	602.2	603.52	602.95	603.55	0.004172	1.27	15.91	24.57	0.27
T2	1216.334	Q=120	30	602.2	603.72	603.1	603.75	0.004254	1.45	20.95	27.59	0.28
T2	1216.334	Q=160	40	602.2	603.87	603.23	603.91	0.00432	1.59	25.33	29.09	0.28
T2	1216.334	Q=240	60	602.2	604.11	603.42	604.17	0.004339	1.85	32.6	31.19	0.3
T2	1216.334	Q=320	80	602.2	604.31	603.57	604.38	0.004385	2.06	39.02	32.94	0.3

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1216.334	Q=400	100	602.2	604.49	603.7	604.56	0.004451	2.24	44.83	34.44	0.31
T2	1216.334	Q=440	110	602.2	604.56	603.75	604.65	0.004473	2.32	47.61	35.17	0.32
T2	1216.334	Q=480	120	602.2	604.64	603.8	604.73	0.00448	2.39	50.35	35.88	0.32
T2	1295.347	Q=95.35	0.5	603.89	604	604	604.03	0.135716	1.35	0.37	6.51	1
T2	1295.347	Q=4	1	603.89	604.03	604.03	604.08	0.157887	1.73	0.58	7.88	1.12
T2	1295.347	Q=8	2	603.89	604.08	604.08	604.15	0.124188	2.03	0.99	8.81	1.07
T2	1295.347	Q=16	4	603.89	604.16	604.16	604.24	0.097489	2.34	1.71	10.25	1.01
T2	1295.347	Q=24	6	603.89	604.22	604.22	604.32	0.088444	2.56	2.34	11.36	1
T2	1295.347	Q=32	8	603.89	604.26	604.26	604.38	0.08446	2.75	2.91	12.28	1
T2	1295.347	Q=40	10	603.89	604.31	604.31	604.44	0.081879	2.91	3.44	13.08	1
T2	1295.347	Q=80	20	603.89	604.47	604.47	604.65	0.075373	3.46	5.79	15.91	1.01
T2	1295.347	Q=120	30	603.89	604.59	604.59	604.82	0.070414	3.82	7.85	17.6	1.01
T2	1295.347	Q=160	40	603.89	604.69	604.69	604.96	0.066255	4.11	9.73	18.68	1
T2	1295.347	Q=240	60	603.89	604.86	604.86	605.19	0.062776	4.59	13.08	20.46	1.01
T2	1295.347	Q=320	80	603.89	605.01	605.01	605.39	0.059627	4.92	16.26	22.01	1.01
T2	1295.347	Q=400	100	603.89	605.14	605.14	605.56	0.057607	5.21	19.2	23.22	1.01
T2	1295.347	Q=440	110	603.89	605.2	605.2	605.65	0.056747	5.35	20.57	23.64	1.01
T2	1295.347	Q=480	120	603.89	605.26	605.26	605.72	0.055878	5.47	21.93	24.06	1.01
T2	1394.651	Q=95.35	0.5	606.2	606.4	606.31	606.4	0.009563	0.63	0.8	5.99	0.3
T2	1394.651	Q=4	1	606.2	606.47	606.35	606.48	0.009337	0.77	1.3	7.08	0.32
T2	1394.651	Q=8	2	606.2	606.57	606.42	606.59	0.010147	0.97	2.06	8.47	0.35
T2	1394.651	Q=16	4	606.2	606.7	606.51	606.73	0.011133	1.22	3.29	10.3	0.38
T2	1394.651	Q=24	6	606.2	606.8	606.58	606.83	0.011669	1.4	4.28	11.22	0.4
T2	1394.651	Q=32	8	606.2	606.87	606.64	606.91	0.011991	1.54	5.19	12	0.41
T2	1394.651	Q=40	10	606.2	606.94	606.69	606.98	0.012272	1.66	6.02	12.68	0.42
T2	1394.651	Q=80	20	606.2	607.19	606.88	607.26	0.013144	2.11	9.48	14.63	0.46
T2	1394.651	Q=120	30	606.2	607.38	607.03	607.47	0.013873	2.43	12.35	16.02	0.49
T2	1394.651	Q=160	40	606.2	607.54	607.15	607.65	0.014487	2.68	14.9	17.16	0.51
T2	1394.651	Q=240	60	606.2	607.79	607.36	607.93	0.015379	3.08	19.46	19.02	0.54
T2	1394.651	Q=320	80	606.2	607.98	607.54	608.16	0.01595	3.45	23.22	20.08	0.56
T2	1394.651	Q=400	100	606.2	608.14	607.7	608.36	0.016396	3.78	26.56	20.97	0.58

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1394.651	Q=440	110	606.2	608.21	607.77	608.45	0.016681	3.94	28.04	21.33	0.59
T2	1394.651	Q=480	120	606.2	608.28	607.83	608.54	0.016895	4.09	29.49	21.69	0.6
T2	1530.396	Q=95.35	0.5	609.88	610.06	610.06	610.09	0.092967	1.5	0.33	3.76	0.89
T2	1530.396	Q=4	1	609.88	610.1	610.1	610.16	0.108823	1.89	0.53	4.73	1
T2	1530.396	Q=8	2	609.88	610.18	610.18	610.25	0.099072	2.17	0.92	6.24	1
T2	1530.396	Q=16	4	609.88	610.27	610.27	610.37	0.089518	2.53	1.58	7.89	1
T2	1530.396	Q=24	6	609.88	610.33	610.33	610.46	0.086884	2.87	2.09	8.39	1.02
T2	1530.396	Q=32	8	609.88	610.39	610.39	610.54	0.082226	3.11	2.58	8.83	1.01
T2	1530.396	Q=40	10	609.88	610.44	610.44	610.61	0.076371	3.26	3.07	9.26	1
T2	1530.396	Q=80	20	609.88	610.64	610.64	610.88	0.070213	3.93	5.08	10.82	1.01
T2	1530.396	Q=120	30	609.88	610.8	610.8	611.09	0.065703	4.34	6.92	12.07	1.01
T2	1530.396	Q=160	40	609.88	610.94	610.94	611.27	0.061387	4.6	8.69	13.16	1
T2	1530.396	Q=240	60	609.88	611.19	611.16	611.57	0.054507	4.95	12.13	15.06	0.97
T2	1530.396	Q=320	80	609.88	611.38	611.35	611.81	0.051043	5.27	15.2	16.44	0.96
T2	1530.396	Q=400	100	609.88	611.52	611.5	612.03	0.049369	5.7	17.6	17.03	0.97
T2	1530.396	Q=440	110	609.88	611.59	611.57	612.13	0.048262	5.88	18.8	17.32	0.97
T2	1530.396	Q=480	120	609.88	611.66	611.64	612.23	0.047669	6.06	19.93	17.59	0.97
T2	1543.127	Q=95.35	0.5	610.07	610.37		610.38	0.009849	0.7	0.72	4.74	0.31
T2	1543.127	Q=4	1	610.07	610.46		610.47	0.01047	0.85	1.18	6.07	0.34
T2	1543.127	Q=8	2	610.07	610.56		610.58	0.012029	1.06	1.88	7.61	0.38
T2	1543.127	Q=16	4	610.07	610.69		610.72	0.012701	1.37	2.92	8.39	0.41
T2	1543.127	Q=24	6	610.07	610.79		610.83	0.013612	1.61	3.74	8.88	0.44
T2	1543.127	Q=32	8	610.07	610.86		610.91	0.014419	1.8	4.45	9.29	0.46
T2	1543.127	Q=40	10	610.07	610.93		610.99	0.015392	1.97	5.06	9.63	0.48
T2	1543.127	Q=80	20	610.07	611.19		611.29	0.017875	2.58	7.76	11	0.54
T2	1543.127	Q=120	30	610.07	611.38		611.52	0.019738	3.01	9.96	12	0.58
T2	1543.127	Q=160	40	610.07	611.54	611.23	611.71	0.021378	3.37	11.87	12.8	0.62
T2	1543.127	Q=240	60	610.07	611.77	611.48	612.02	0.024584	3.98	15.09	14.05	0.68
T2	1543.127	Q=320	80	610.07	611.97	611.69	612.28	0.027208	4.47	17.9	15.06	0.72
T2	1543.127	Q=400	100	610.07	612.13	611.87	612.5	0.028684	4.91	20.38	15.94	0.75
T2	1543.127	Q=440	110	610.07	612.2	611.96	612.6	0.029317	5.13	21.48	16.34	0.77

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1543.127	Q=480	120	610.07	612.26	612.04	612.7	0.029841	5.34	22.56	16.73	0.78
T2	1626.466	Q=95.35	0.5	610.25	610.62	610.4	610.62	0.001317	0.33	1.51	6.73	0.12
T2	1626.466	Q=4	1	610.25	610.73	610.45	610.74	0.001484	0.42	2.36	7.93	0.14
T2	1626.466	Q=8	2	610.25	610.88	610.52	610.88	0.001801	0.55	3.63	9.43	0.16
T2	1626.466	Q=16	4	610.25	611.07	610.61	611.07	0.002037	0.73	5.51	10.75	0.18
T2	1626.466	Q=24	6	610.25	611.2	610.69	611.21	0.00226	0.86	7	11.63	0.19
T2	1626.466	Q=32	8	610.25	611.3	610.75	611.32	0.002463	0.98	8.26	12.33	0.2
T2	1626.466	Q=40	10	610.25	611.4	610.81	611.42	0.002558	1.06	9.51	12.99	0.21
T2	1626.466	Q=80	20	610.25	611.75	611.02	611.78	0.002879	1.4	14.4	14.93	0.24
T2	1626.466	Q=120	30	610.25	612.01	611.18	612.05	0.003003	1.65	18.44	16.19	0.25
T2	1626.466	Q=160	40	610.25	612.22	611.33	612.27	0.003131	1.85	21.94	17.21	0.26
T2	1626.466	Q=240	60	610.25	612.56	611.55	612.63	0.003313	2.17	28.07	18.7	0.28
T2	1626.466	Q=320	80	610.25	612.84	611.74	612.93	0.00344	2.43	33.46	19.78	0.29
T2	1626.466	Q=400	100	610.25	613.08	611.91	613.19	0.003566	2.64	38.29	20.7	0.3
T2	1626.466	Q=440	110	610.25	613.19	611.99	613.3	0.003623	2.74	40.56	21.12	0.3
T2	1626.466	Q=480	120	610.25	613.29	612.07	613.42	0.003674	2.84	42.76	21.52	0.31
T2	1737.211	Q=95.35	0.5	612.73	612.92	612.92	612.98	0.120311	1.81	0.28	2.84	1.02
T2	1737.211	Q=4	1	612.73	612.99	612.99	613.05	0.104455	2.04	0.49	3.78	1
T2	1737.211	Q=8	2	612.73	613.07	613.07	613.16	0.09937	2.38	0.84	4.95	1.02
T2	1737.211	Q=16	4	612.73	613.18	613.18	613.29	0.089189	2.72	1.47	6.55	1.01
T2	1737.211	Q=24	6	612.73	613.26	613.26	613.39	0.081421	2.97	2.02	7.35	1
T2	1737.211	Q=32	8	612.73	613.32	613.32	613.48	0.08083	3.24	2.47	7.79	1.01
T2	1737.211	Q=40	10	612.73	613.38	613.38	613.56	0.07523	3.39	2.95	8.23	1
T2	1737.211	Q=80	20	612.73	613.59	613.59	613.86	0.069029	4.16	4.81	9.16	1.01
T2	1737.211	Q=120	30	612.73	613.76	613.76	614.1	0.064127	4.65	6.45	9.78	1.01
T2	1737.211	Q=160	40	612.73	613.92	613.92	614.3	0.060353	5	8	10.33	1
T2	1737.211	Q=240	60	612.73	614.17	614.17	614.66	0.057577	5.58	10.74	11.24	1.01
T2	1737.211	Q=320	80	612.73	614.38	614.38	614.96	0.053683	6.09	13.17	11.94	1
T2	1737.211	Q=400	100	612.73	614.58	614.58	615.22	0.048621	6.45	15.63	12.6	0.98
T2	1737.211	Q=440	110	612.73	614.67	614.67	615.35	0.046892	6.62	16.8	12.91	0.97
T2	1737.211	Q=480	120	612.73	614.76	614.76	615.47	0.045374	6.77	17.96	13.2	0.97

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1820.971	Q=95.35	0.5	613.49	613.77	613.64	613.77	0.003148	0.41	1.22	7.53	0.18
T2	1820.971	Q=4	1	613.49	613.86	613.67	613.86	0.003277	0.51	1.95	8.94	0.19
T2	1820.971	Q=8	2	613.49	613.98	613.73	613.98	0.003386	0.64	3.1	10.3	0.21
T2	1820.971	Q=16	4	613.49	614.14	613.82	614.15	0.003589	0.82	4.9	11.9	0.22
T2	1820.971	Q=24	6	613.49	614.26		614.27	0.003785	0.94	6.39	13.07	0.24
T2	1820.971	Q=32	8	613.49	614.36		614.38	0.003874	1.03	7.77	14.07	0.24
T2	1820.971	Q=40	10	613.49	614.44		614.46	0.003984	1.12	8.91	14.69	0.25
T2	1820.971	Q=80	20	613.49	614.75		614.79	0.004181	1.45	13.92	17.02	0.27
T2	1820.971	Q=120	30	613.49	614.99		615.03	0.004263	1.67	18.1	18.62	0.29
T2	1820.971	Q=160	40	613.49	615.18		615.23	0.004265	1.87	21.72	19.7	0.29
T2	1820.971	Q=240	60	613.49	615.5		615.57	0.004166	2.15	28.42	21.57	0.3
T2	1820.971	Q=320	80	613.49	615.77		615.85	0.004114	2.37	34.39	22.89	0.31
T2	1820.971	Q=400	100	613.49	616		616.1	0.004081	2.56	39.84	23.92	0.31
T2	1820.971	Q=440	110	613.49	616.11		616.22	0.004056	2.64	42.47	24.4	0.31
T2	1820.971	Q=480	120	613.49	616.22	615.11	616.33	0.00403	2.71	45.04	24.86	0.32
T2	1942.739	Q=95.35	0.5	614.89	615.08	615.08	615.13	0.116875	1.75	0.29	3.03	1
T2	1942.739	Q=4	1	614.89	615.14	615.14	615.2	0.104975	2	0.5	4.01	0.99
T2	1942.739	Q=8	2	614.89	615.22	615.22	615.3	0.099905	2.33	0.86	5.24	1.02
T2	1942.739	Q=16	4	614.89	615.33	615.33	615.43	0.087131	2.63	1.52	6.98	0.99
T2	1942.739	Q=24	6	614.89	615.41	615.4	615.53	0.071744	2.74	2.19	8.22	0.93
T2	1942.739	Q=32	8	614.89	615.48	615.45	615.61	0.060366	2.91	2.75	8.47	0.89
T2	1942.739	Q=40	10	614.89	615.54		615.69	0.052368	3.04	3.3	8.66	0.85
T2	1942.739	Q=80	20	614.89	615.79		616	0.039584	3.66	5.54	9.41	0.8
T2	1942.739	Q=120	30	614.89	615.98		616.24	0.035612	4.13	7.4	9.99	0.8
T2	1942.739	Q=160	40	614.89	616.13	616.04	616.45	0.035533	4.59	8.89	10.43	0.82
T2	1942.739	Q=240	60	614.89	616.37	616.3	616.8	0.035839	5.34	11.5	11.16	0.85
T2	1942.739	Q=320	80	614.89	616.57	616.52	617.1	0.036429	5.95	13.77	11.76	0.88
T2	1942.739	Q=400	100	614.89	616.74	616.72	617.37	0.037035	6.47	15.84	12.28	0.9
T2	1942.739	Q=440	110	614.89	616.82	616.81	617.49	0.037415	6.71	16.81	12.52	0.91
T2	1942.739	Q=480	120	614.89	616.9	616.9	617.61	0.037181	6.91	17.83	12.76	0.92

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1997.813	Q=95.35	0.5	615.31	615.59	615.43	615.59	0.002813	0.41	1.22	6.94	0.17
T2	1997.813	Q=4	1	615.31	615.68	615.49	615.69	0.002939	0.51	1.94	8.14	0.19
T2	1997.813	Q=8	2	615.31	615.81	615.54	615.82	0.003185	0.65	3.09	9.74	0.2
T2	1997.813	Q=16	4	615.31	615.97	615.63	615.98	0.003472	0.84	4.77	11.1	0.22
T2	1997.813	Q=24	6	615.31	616.09	615.7	616.1	0.003781	0.99	6.08	11.97	0.24
T2	1997.813	Q=32	8	615.31	616.17	615.76	616.19	0.004147	1.12	7.16	12.64	0.26
T2	1997.813	Q=40	10	615.31	616.25	615.81	616.28	0.004376	1.23	8.19	13.24	0.27
T2	1997.813	Q=80	20	615.31	616.55	616.01	616.59	0.004669	1.63	12.41	14.89	0.29
T2	1997.813	Q=120	30	615.31	616.78	616.17	616.84	0.004828	1.91	15.95	16.14	0.31
T2	1997.813	Q=160	40	615.31	616.98	616.29	617.05	0.004829	2.12	19.24	17.23	0.32
T2	1997.813	Q=240	60	615.31	617.31	616.51	617.4	0.00474	2.43	25.24	18.91	0.33
T2	1997.813	Q=320	80	615.31	617.59	616.69	617.7	0.00462	2.65	30.78	20.34	0.33
T2	1997.813	Q=400	100	615.31	617.84	616.86	617.96	0.004488	2.83	36.02	21.51	0.33
T2	1997.813	Q=440	110	615.31	617.96	616.94	618.09	0.004417	2.9	38.56	22.01	0.33
T2	1997.813	Q=480	120	615.31	618.07	617.01	618.2	0.004367	2.97	40.99	22.48	0.33
T2	2072.624	Q=95.35	0.5	618.23	618.44	618.44	618.49	0.112845	1.84	0.27	2.58	1
T2	2072.624	Q=4	1	618.23	618.51	618.51	618.58	0.10594	2.14	0.47	3.39	1.01
T2	2072.624	Q=8	2	618.23	618.6	618.6	618.69	0.093658	2.43	0.82	4.49	1
T2	2072.624	Q=16	4	618.23	618.71	618.71	618.83	0.084983	2.78	1.44	5.94	1
T2	2072.624	Q=24	6	618.23	618.79	618.79	618.94	0.081789	3.11	1.93	6.67	1.01
T2	2072.624	Q=32	8	618.23	618.86	618.86	619.03	0.07581	3.34	2.41	7.22	1
T2	2072.624	Q=40	10	618.23	618.92	618.92	619.11	0.072619	3.53	2.85	7.69	1
T2	2072.624	Q=80	20	618.23	619.15	619.15	619.42	0.059663	4.18	4.83	9.25	0.97
T2	2072.624	Q=120	30	618.23	619.33	619.33	619.66	0.052418	4.67	6.52	10.13	0.94
T2	2072.624	Q=160	40	618.23	619.48	619.48	619.86	0.047209	5.01	8.13	10.89	0.92
T2	2072.624	Q=240	60	618.23	619.73	619.73	620.2	0.041636	5.54	11.05	12.17	0.9
T2	2072.624	Q=320	80	618.23	619.95	619.95	620.48	0.038232	5.94	13.76	13.24	0.89
T2	2072.624	Q=400	100	618.23	620.14	620.14	620.72	0.035573	6.24	16.36	14.19	0.88
T2	2072.624	Q=440	110	618.23	620.22	620.22	620.83	0.034763	6.39	17.57	14.61	0.88
T2	2072.624	Q=480	120	618.23	620.3	620.3	620.94	0.034024	6.52	18.74	14.92	0.87
T2	2163.506	Q=95.35	0.5	619.95	620.18	620.09	620.19	0.007317	0.57	0.87	6.15	0.27

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	2163.506	Q=4	1	619.95	620.26	620.13	620.27	0.007406	0.72	1.39	7.05	0.29
T2	2163.506	Q=8	2	619.95	620.37	620.18	620.38	0.007622	0.9	2.23	8.3	0.3
T2	2163.506	Q=16	4	619.95	620.52	620.27	620.54	0.007913	1.11	3.61	10.01	0.33
T2	2163.506	Q=24	6	619.95	620.63	620.35	620.65	0.008012	1.26	4.75	10.9	0.34
T2	2163.506	Q=32	8	619.95	620.72	620.41	620.75	0.00825	1.4	5.73	11.58	0.35
T2	2163.506	Q=40	10	619.95	620.79	620.46	620.83	0.008367	1.5	6.66	12.19	0.36
T2	2163.506	Q=80	20	619.95	621.09	620.66	621.14	0.008928	1.89	10.57	14.37	0.39
T2	2163.506	Q=120	30	619.95	621.29	620.82	621.37	0.009308	2.21	13.62	15.44	0.41
T2	2163.506	Q=160	40	619.95	621.46	620.95	621.56	0.009588	2.46	16.36	16.34	0.42
T2	2163.506	Q=240	60	619.95	621.75	621.17	621.87	0.009994	2.85	21.2	17.8	0.45
T2	2163.506	Q=320	80	619.95	621.97	621.35	622.13	0.010132	3.2	25.27	18.72	0.46
T2	2163.506	Q=400	100	619.95	622.16	621.51	622.35	0.010312	3.5	28.96	19.52	0.48
T2	2163.506	Q=440	110	619.95	622.25	621.59	622.46	0.010358	3.63	30.74	19.9	0.48
T2	2163.506	Q=480	120	619.95	622.34	621.67	622.56	0.010395	3.76	32.48	20.26	0.49
T2	2258.038	Q=95.35	0.5	622.01	622.2	622.2	622.25	0.117837	1.77	0.28	2.97	1.01
T2	2258.038	Q=4	1	622.01	622.26	622.26	622.33	0.104622	2.01	0.5	3.93	0.99
T2	2258.038	Q=8	2	622.01	622.34	622.34	622.43	0.103724	2.38	0.84	5.11	1.03
T2	2258.038	Q=16	4	622.01	622.45	622.45	622.56	0.089878	2.69	1.49	6.76	1.01
T2	2258.038	Q=24	6	622.01	622.52	622.52	622.66	0.078103	2.96	2.03	7.48	0.98
T2	2258.038	Q=32	8	622.01	622.58	622.58	622.75	0.073988	3.26	2.47	7.82	0.99
T2	2258.038	Q=40	10	622.01	622.64	622.64	622.82	0.068498	3.47	2.91	8.14	0.97
T2	2258.038	Q=80	20	622.01	622.86	622.86	623.12	0.054673	4.18	4.88	9.43	0.94
T2	2258.038	Q=120	30	622.01	623.04	623.04	623.36	0.048159	4.64	6.62	10.44	0.92
T2	2258.038	Q=160	40	622.01	623.18	623.18	623.55	0.044182	4.98	8.23	11.29	0.9
T2	2258.038	Q=240	60	622.01	623.43	623.43	623.88	0.039123	5.47	11.21	12.72	0.88
T2	2258.038	Q=320	80	622.01	623.64	623.64	624.15	0.035988	5.84	13.97	13.92	0.87
T2	2258.038	Q=400	100	622.01	623.82	623.82	624.39	0.033728	6.13	16.59	14.94	0.86
T2	2258.038	Q=440	110	622.01	623.91	623.91	624.49	0.032701	6.25	17.87	15.36	0.85
T2	2258.038	Q=480	120	622.01	623.98	623.98	624.6	0.032	6.38	19.07	15.74	0.85
T2	2368.82	Q=95.35	0.5	626.05	626.23		626.24	0.017156	0.78	0.64	5.47	0.4
T2	2368.82	Q=4	1	626.05	626.29		626.3	0.017937	0.98	1.02	6.34	0.43

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	2368.82	Q=8	2	626.05	626.38		626.4	0.018017	1.2	1.66	7.59	0.45
T2	2368.82	Q=16	4	626.05	626.5		626.54	0.019089	1.49	2.68	9.23	0.49
T2	2368.82	Q=24	6	626.05	626.59		626.63	0.020389	1.71	3.51	10.39	0.52
T2	2368.82	Q=32	8	626.05	626.66		626.71	0.021032	1.87	4.29	11.35	0.54
T2	2368.82	Q=40	10	626.05	626.72		626.78	0.021783	2.01	4.98	12.16	0.55
T2	2368.82	Q=80	20	626.05	626.91		627.02	0.024362	2.7	7.45	13.43	0.62
T2	2368.82	Q=120	30	626.05	627.05	626.89	627.21	0.026077	3.22	9.41	14.18	0.67
T2	2368.82	Q=160	40	626.05	627.17		627.37	0.027473	3.65	11.11	14.81	0.7
T2	2368.82	Q=240	60	626.05	627.36		627.65	0.029786	4.36	14.03	15.82	0.75
T2	2368.82	Q=320	80	626.05	627.52	627.4	627.88	0.031639	4.93	16.57	16.66	0.8
T2	2368.82	Q=400	100	626.05	627.65	627.57	628.09	0.033176	5.42	18.86	17.37	0.83
T2	2368.82	Q=440	110	626.05	627.71	627.64	628.19	0.034033	5.66	19.9	17.69	0.85
T2	2368.82	Q=480	120	626.05	627.77	627.71	628.28	0.03465	5.87	20.94	18	0.86
T2	2451.901	Q=95.35	0.5	627	627.28	627.17	627.28	0.009528	0.65	0.77	5.53	0.31
T2	2451.901	Q=4	1	627	627.35	627.24	627.36	0.009634	0.82	1.22	6.18	0.32
T2	2451.901	Q=8	2	627	627.46	627.29	627.48	0.009614	1.04	1.92	6.66	0.34
T2	2451.901	Q=16	4	627	627.61		627.64	0.009817	1.35	2.97	7.04	0.37
T2	2451.901	Q=24	6	627	627.74		627.77	0.009936	1.56	3.85	7.34	0.38
T2	2451.901	Q=32	8	627	627.84		627.89	0.010127	1.73	4.63	7.59	0.39
T2	2451.901	Q=40	10	627	627.93		627.99	0.010195	1.88	5.34	8.03	0.4
T2	2451.901	Q=80	20	627	628.25		628.34	0.011256	2.49	8.16	9.81	0.44
T2	2451.901	Q=120	30	627	628.48		628.61	0.011731	2.92	10.56	11.23	0.47
T2	2451.901	Q=160	40	627	628.66		628.82	0.012016	3.25	12.75	12.39	0.49
T2	2451.901	Q=240	60	627	628.96		629.16	0.012416	3.76	16.66	14.21	0.51
T2	2451.901	Q=320	80	627	629.2		629.45	0.012401	4.11	20.26	15.44	0.52
T2	2451.901	Q=400	100	627	629.4		629.69	0.012493	4.41	23.51	16.47	0.53
T2	2451.901	Q=440	110	627	629.5		629.8	0.012468	4.53	25.11	16.94	0.53
T2	2451.901	Q=480	120	627	629.58		629.9	0.012563	4.66	26.57	17.36	0.54
T2	2526.197	Q=95.35	0.5	627.27	627.55	627.39	627.55	0.001795	0.31	1.59	9.66	0.14
T2	2526.197	Q=4	1	627.27	627.63	627.42	627.64	0.001866	0.4	2.51	11.06	0.15
T2	2526.197	Q=8	2	627.27	627.75	627.48	627.76	0.002049	0.51	3.94	12.87	0.16

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	2526.197	Q=16	4	627.27	627.92	627.56	627.93	0.002037	0.64	6.29	14.91	0.17
T2	2526.197	Q=24	6	627.27	628.05	627.61	628.06	0.001999	0.73	8.29	16.21	0.18
T2	2526.197	Q=32	8	627.27	628.16	627.66	628.17	0.00198	0.8	10.1	17.3	0.18
T2	2526.197	Q=40	10	627.27	628.25	627.7	628.26	0.001947	0.86	11.75	18.12	0.18
T2	2526.197	Q=80	20	627.27	628.61	627.87	628.62	0.001819	1.09	18.64	20.74	0.19
T2	2526.197	Q=120	30	627.27	628.87	628	628.89	0.001801	1.26	24.31	22.62	0.19
T2	2526.197	Q=160	40	627.27	629.08	628.12	629.11	0.001807	1.39	29.29	24.11	0.2
T2	2526.197	Q=240	60	627.27	629.42	628.3	629.46	0.00184	1.61	37.99	26.45	0.21
T2	2526.197	Q=320	80	627.27	629.7	628.46	629.75	0.001878	1.78	45.64	28.32	0.21
T2	2526.197	Q=400	100	627.27	629.94	628.6	630	0.001905	1.93	52.67	29.93	0.22
T2	2526.197	Q=440	110	627.27	630.06	628.67	630.12	0.001915	1.99	56.03	30.67	0.22
T2	2526.197	Q=480	120	627.27	630.16	628.73	630.22	0.001924	2.05	59.22	31.23	0.22
T2	2628.187	Q=95.35	0.5	631.37	631.55	631.55	631.59	0.118222	1.69	0.3	3.35	1
T2	2628.187	Q=4	1	631.37	631.6	631.6	631.66	0.10707	1.93	0.52	4.43	1
T2	2628.187	Q=8	2	631.37	631.68	631.68	631.76	0.099807	2.24	0.89	5.81	1.01
T2	2628.187	Q=16	4	631.37	631.77	631.77	631.88	0.085854	2.6	1.54	7.28	0.99
T2	2628.187	Q=24	6	631.37	631.85	631.85	631.97	0.078611	2.88	2.1	8.16	0.98
T2	2628.187	Q=32	8	631.37	631.9	631.9	632.05	0.079037	3.16	2.54	8.75	1
T2	2628.187	Q=40	10	631.37	631.95	631.95	632.12	0.070627	3.33	3.03	9.13	0.98
T2	2628.187	Q=80	20	631.37	632.16	632.16	632.41	0.056349	4.02	5.06	10.57	0.94
T2	2628.187	Q=120	30	631.37	632.32	632.32	632.62	0.049474	4.45	6.87	11.7	0.92
T2	2628.187	Q=160	40	631.37	632.46	632.46	632.8	0.045187	4.77	8.54	12.66	0.9
T2	2628.187	Q=240	60	631.37	632.69	632.69	633.11	0.03999	5.25	11.63	14.26	0.88
T2	2628.187	Q=320	80	631.37	632.88	632.88	633.36	0.036698	5.6	14.51	15.61	0.87
T2	2628.187	Q=400	100	631.37	633.05	633.05	633.58	0.034363	5.88	17.18	16.54	0.86
T2	2628.187	Q=440	110	631.37	633.12	633.12	633.68	0.033525	6	18.43	16.91	0.85
T2	2628.187	Q=480	120	631.37	633.2	633.2	633.78	0.032544	6.1	19.7	17.23	0.85
T2	2778.977	Q=95.35	0.5	634.19	634.38		634.39	0.0072	0.59	0.85	5.69	0.27
T2	2778.977	Q=4	1	634.19	634.46		634.47	0.007414	0.75	1.33	6.27	0.29
T2	2778.977	Q=8	2	634.19	634.58		634.59	0.007635	0.95	2.1	7.1	0.31
T2	2778.977	Q=16	4	634.19	634.74		634.76	0.00814	1.2	3.32	8.25	0.33

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	2778.977	Q=24	6	634.19	634.86		634.89	0.008471	1.38	4.36	9.12	0.35
T2	2778.977	Q=32	8	634.19	634.96		634.99	0.008548	1.5	5.33	9.86	0.36
T2	2778.977	Q=40	10	634.19	635.04		635.08	0.008953	1.62	6.16	10.44	0.37
T2	2778.977	Q=80	20	634.19	635.32		635.4	0.009938	2.14	9.38	12.1	0.42
T2	2778.977	Q=120	30	634.19	635.52		635.62	0.010579	2.55	11.91	13.14	0.44
T2	2778.977	Q=160	40	634.19	635.69		635.82	0.011101	2.89	14.13	13.99	0.47
T2	2778.977	Q=240	60	634.19	635.95	635.47	636.13	0.011885	3.42	18.04	15.37	0.5
T2	2778.977	Q=320	80	634.19	636.17	635.68	636.39	0.012522	3.85	21.46	16.48	0.52
T2	2778.977	Q=400	100	634.19	636.35	635.86	636.61	0.013081	4.21	24.55	17.43	0.54
T2	2778.977	Q=440	110	634.19	636.43	635.95	636.72	0.013303	4.37	26.02	17.86	0.55
T2	2778.977	Q=480	120	634.19	636.51	636.03	636.81	0.013563	4.53	27.41	18.26	0.56
T2	2908.227	Q=95.35	0.5	634.23	634.68	634.41	634.68	0.001088	0.32	1.57	6.42	0.11
T2	2908.227	Q=4	1	634.23	634.8	634.48	634.8	0.001291	0.41	2.41	7.48	0.13
T2	2908.227	Q=8	2	634.23	634.95	634.56	634.96	0.001494	0.54	3.69	8.69	0.15
T2	2908.227	Q=16	4	634.23	635.17	634.66	635.17	0.001645	0.71	5.68	10.01	0.16
T2	2908.227	Q=24	6	634.23	635.31	634.74	635.33	0.001817	0.84	7.24	10.93	0.17
T2	2908.227	Q=32	8	634.23	635.44	634.8	635.45	0.001942	0.94	8.63	11.69	0.18
T2	2908.227	Q=40	10	634.23	635.55	634.86	635.56	0.002026	1.02	9.93	12.35	0.19
T2	2908.227	Q=80	20	634.23	635.93		635.96	0.002364	1.33	15.12	14.58	0.21
T2	2908.227	Q=120	30	634.23	636.19		636.23	0.002596	1.59	19.02	15.75	0.23
T2	2908.227	Q=160	40	634.23	636.4		636.45	0.002772	1.8	22.44	16.7	0.25
T2	2908.227	Q=240	60	634.23	636.75		636.82	0.002977	2.11	28.53	18.05	0.26
T2	2908.227	Q=320	80	634.23	637.03		637.12	0.00316	2.38	33.78	19.1	0.28
T2	2908.227	Q=400	100	634.23	637.27		637.38	0.003328	2.61	38.47	20	0.29
T2	2908.227	Q=440	110	634.23	637.38		637.5	0.003393	2.71	40.71	20.41	0.29
T2	2908.227	Q=480	120	634.23	637.49		637.61	0.003456	2.81	42.87	20.8	0.3
T2	3036.213	Q=95.35	0.5	635.78	635.94	635.94	635.98	0.120779	1.62	0.31	3.78	1
T2	3036.213	Q=4	1	635.78	635.99	635.99	636.05	0.135893	2.01	0.5	4.8	1.1
T2	3036.213	Q=8	2	635.78	636.06	636.06	636.14	0.098707	2.21	0.9	5.94	1
T2	3036.213	Q=16	4	635.78	636.16	636.16	636.26	0.087894	2.6	1.54	7.25	1
T2	3036.213	Q=24	6	635.78	636.23	636.23	636.36	0.082873	2.85	2.1	8.25	1

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	3036.213	Q=32	8	635.78	636.28	636.28	636.44	0.084887	3.15	2.54	8.77	1.03
T2	3036.213	Q=40	10	635.78	636.34	636.34	636.51	0.078735	3.29	3.04	9.22	1.01
T2	3036.213	Q=80	20	635.78	636.63		636.8	0.043115	3.31	6.05	11.59	0.81
T2	3036.213	Q=120	30	635.78	636.89		637.05	0.027777	3.2	9.38	13.67	0.68
T2	3036.213	Q=160	40	635.78	637.1		637.26	0.021689	3.26	12.32	14.97	0.62
T2	3036.213	Q=240	60	635.78	637.43		637.61	0.016726	3.41	17.74	17.12	0.57
T2	3036.213	Q=320	80	635.78	637.7		637.9	0.01397	3.6	22.56	18.56	0.54
T2	3036.213	Q=400	100	635.78	637.94		638.15	0.012384	3.76	27.09	19.8	0.52
T2	3036.213	Q=440	110	635.78	638.05		638.27	0.011816	3.83	29.27	20.37	0.51
T2	3036.213	Q=480	120	635.78	638.15		638.38	0.011343	3.9	31.4	20.91	0.51
T2	3146.448	Q=95.35	0.5	637.4	637.69	637.56	637.69	0.005711	0.51	0.98	6.79	0.24
T2	3146.448	Q=4	1	637.4	637.77	637.61	637.78	0.005617	0.63	1.59	8	0.25
T2	3146.448	Q=8	2	637.4	637.87	637.68	637.88	0.006114	0.82	2.45	8.87	0.27
T2	3146.448	Q=16	4	637.4	638.02	637.77	638.04	0.006438	1.04	3.85	10.06	0.3
T2	3146.448	Q=24	6	637.4	638.13	637.83	638.15	0.006651	1.19	5.03	10.96	0.31
T2	3146.448	Q=32	8	637.4	638.23	637.89	638.26	0.006702	1.3	6.14	11.74	0.32
T2	3146.448	Q=40	10	637.4	638.31	637.94	638.34	0.006923	1.41	7.1	12.38	0.33
T2	3146.448	Q=80	20	637.4	638.58	638.14	638.63	0.008673	1.86	10.74	14.55	0.38
T2	3146.448	Q=120	30	637.4	638.75		638.83	0.010526	2.25	13.33	15.85	0.43
T2	3146.448	Q=160	40	637.4	638.88		638.98	0.011696	2.61	15.39	16.52	0.46
T2	3146.448	Q=240	60	637.4	639.09		639.25	0.0133	3.17	19.09	17.67	0.51
T2	3146.448	Q=320	80	637.4	639.27		639.47	0.014584	3.65	22.29	18.6	0.55
T2	3146.448	Q=400	100	637.4	639.43		639.68	0.015182	4.01	25.43	19.47	0.57
T2	3146.448	Q=440	110	637.4	639.51	639.06	639.77	0.015447	4.18	26.9	19.87	0.58
T2	3146.448	Q=480	120	637.4	639.58	639.14	639.86	0.015829	4.35	28.25	20.22	0.59
T2	3251.178	Q=95.35	0.5	639.67	639.84	639.84	639.88	0.12068	1.63	0.31	3.73	1
T2	3251.178	Q=4	1	639.67	639.89	639.89	639.94	0.109362	1.86	0.54	4.92	0.99
T2	3251.178	Q=8	2	639.67	639.96	639.96	640.03	0.100991	2.15	0.93	6.48	1
T2	3251.178	Q=16	4	639.67	640.05	640.05	640.14	0.090087	2.51	1.59	8.07	0.99
T2	3251.178	Q=24	6	639.67	640.11	640.11	640.23	0.083989	2.82	2.13	8.55	0.99
T2	3251.178	Q=32	8	639.67	640.16	640.16	640.31	0.08481	3.15	2.54	8.57	1.02

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	3251.178	Q=40	10	639.67	640.21	640.21	640.38	0.079703	3.37	2.97	8.6	1.01
T2	3251.178	Q=80	20	639.67	640.41	640.41	640.69	0.071054	4.21	4.75	8.72	1.01
T2	3251.178	Q=120	30	639.67	640.66	640.58	640.95	0.049276	4.35	6.9	8.85	0.87
T2	3251.178	Q=160	40	639.67	640.85	640.73	641.19	0.044046	4.65	8.61	9.36	0.84
T2	3251.178	Q=240	60	639.67	641.14	641.05	641.56	0.039812	5.25	11.68	12.04	0.83
T2	3251.178	Q=320	80	639.67	641.37	641.32	641.85	0.03703	5.67	14.69	14.29	0.82
T2	3251.178	Q=400	100	639.67	641.55	641.54	642.08	0.035897	6.03	17.45	16.19	0.83
T2	3251.178	Q=440	110	639.67	641.63	641.63	642.18	0.035185	6.17	18.84	17.07	0.82
T2	3251.178	Q=480	120	639.67	641.71	641.71	642.28	0.034378	6.28	20.23	17.9	0.82
T2	3331.656	Q=95.35	0.5	640.14	640.28	640.28	640.31	0.128835	1.5	0.33	4.83	1
T2	3331.656	Q=4	1	640.14	640.54	640.32	640.54	0.002415	0.48	2.06	8.14	0.17
T2	3331.656	Q=8	2	640.14	640.67	640.37	640.67	0.002653	0.62	3.24	9.55	0.19
T2	3331.656	Q=16	4	640.14	640.83	640.47	640.84	0.003021	0.82	4.88	10.74	0.21
T2	3331.656	Q=24	6	640.14	640.95	640.54	640.97	0.003254	0.97	6.25	11.63	0.23
T2	3331.656	Q=32	8	640.14	641.05	640.6	641.07	0.003401	1.08	7.48	12.39	0.24
T2	3331.656	Q=40	10	640.14	641.15	640.65	641.17	0.003471	1.17	8.65	13.06	0.24
T2	3331.656	Q=80	20	640.14	641.47	640.85	641.51	0.003746	1.53	13.22	15.11	0.27
T2	3331.656	Q=120	30	640.14	641.7	641.01	641.75	0.004029	1.81	16.8	16.48	0.29
T2	3331.656	Q=160	40	640.14	641.9	641.15	641.96	0.004078	2.01	20.22	17.66	0.29
T2	3331.656	Q=240	60	640.14	642.24	641.36	642.32	0.004015	2.3	26.47	19.27	0.3
T2	3331.656	Q=320	80	640.14	642.5	641.56	642.6	0.004077	2.54	31.82	20.56	0.31
T2	3331.656	Q=400	100	640.14	642.73	641.72	642.85	0.004174	2.75	36.61	21.64	0.32
T2	3331.656	Q=440	110	640.14	642.83	641.8	642.95	0.004266	2.86	38.72	22.08	0.33
T2	3331.656	Q=480	120	640.14	642.92	641.88	643.06	0.00433	2.96	40.81	22.49	0.33
T2	3442.407	Q=95.35	0.5	643.48	643.65		643.66	0.013114	0.62	0.81	7.99	0.34
T2	3442.407	Q=4	1	643.48	643.62	643.62	643.67	0.139099	1.74	0.58	7.06	1.07
T2	3442.407	Q=8	2	643.48	643.67	643.67	643.74	0.127005	2.06	0.97	8.55	1.08
T2	3442.407	Q=16	4	643.48	643.75	643.75	643.84	0.095632	2.33	1.71	10.18	1
T2	3442.407	Q=24	6	643.48	643.81	643.81	643.91	0.088193	2.58	2.33	11.21	1
T2	3442.407	Q=32	8	643.48	643.86	643.86	643.98	0.084211	2.77	2.89	12.08	1
T2	3442.407	Q=40	10	643.48	643.9	643.9	644.03	0.082845	2.94	3.4	12.82	1.01

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	3442.407	Q=80	20	643.48	644.06	644.06	644.25	0.075711	3.47	5.76	15.78	1.01
T2	3442.407	Q=120	30	643.48	644.19	644.19	644.42	0.065043	3.86	7.82	17.63	0.98
T2	3442.407	Q=160	40	643.48	644.29	644.29	644.56	0.057159	4.14	9.8	19.05	0.95
T2	3442.407	Q=240	60	643.48	644.47	644.47	644.79	0.04952	4.59	13.38	21.47	0.93
T2	3442.407	Q=320	80	643.48	644.62	644.62	644.98	0.044284	4.9	16.83	23.88	0.9
T2	3442.407	Q=400	100	643.48	644.75	644.75	645.15	0.040864	5.15	20.11	25.96	0.89
T2	3442.407	Q=440	110	643.48	644.82	644.82	645.22	0.038715	5.22	21.84	26.95	0.87
T2	3442.407	Q=480	120	643.48	644.87	644.87	645.29	0.038472	5.36	23.19	27.56	0.88
T2	3578.809	Q=95.35	0.5	646.15	646.31	646.27	646.32	0.032251	0.95	0.53	5.28	0.53
T2	3578.809	Q=4	1	646.15	646.44	646.31	646.45	0.007775	0.75	1.34	6.65	0.29
T2	3578.809	Q=8	2	646.15	646.56	646.38	646.57	0.008105	0.94	2.13	7.76	0.31
T2	3578.809	Q=16	4	646.15	646.7	646.47	646.72	0.009015	1.19	3.36	9.21	0.35
T2	3578.809	Q=24	6	646.15	646.81	646.54	646.84	0.009394	1.36	4.43	10.31	0.36
T2	3578.809	Q=32	8	646.15	646.89	646.6	646.93	0.009652	1.5	5.34	11.02	0.38
T2	3578.809	Q=40	10	646.15	646.97	646.66	647.01	0.009814	1.63	6.16	11.5	0.39
T2	3578.809	Q=80	20	646.15	647.24	646.87	647.31	0.010511	2.12	9.52	13.16	0.42
T2	3578.809	Q=120	30	646.15	647.42	647.03	647.52	0.011385	2.53	11.98	14.03	0.46
T2	3578.809	Q=160	40	646.15	647.56	647.16	647.69	0.012269	2.89	14.06	14.73	0.49
T2	3578.809	Q=240	60	646.15	647.8	647.39	647.98	0.013526	3.46	17.71	15.87	0.53
T2	3578.809	Q=320	80	646.15	647.99	647.58	648.22	0.014745	3.94	20.77	16.78	0.56
T2	3578.809	Q=400	100	646.15	648.15	647.76	648.43	0.015845	4.37	23.49	17.54	0.59
T2	3578.809	Q=440	110	646.15	648.22	647.83	648.53	0.016527	4.58	24.67	17.86	0.61
T2	3578.809	Q=480	120	646.15	648.29	647.91	648.62	0.016814	4.74	25.98	18.21	0.62
T2	3648.852	Q=95.35	0.5	647.89	648.03		648.04	0.019324	0.8	0.63	5.64	0.42
T2	3648.852	Q=4	1	647.89	648.01	648.01	648.07	0.134147	1.91	0.52	5.42	1.08
T2	3648.852	Q=8	2	647.89	648.08	648.08	648.16	0.110137	2.25	0.89	6.15	1.05
T2	3648.852	Q=16	4	647.89	648.17	648.17	648.28	0.08855	2.6	1.54	7.27	1
T2	3648.852	Q=24	6	647.89	648.24	648.24	648.37	0.0844	2.89	2.08	8.09	1.01
T2	3648.852	Q=32	8	647.89	648.31	648.31	648.45	0.079091	3.07	2.6	8.81	1
T2	3648.852	Q=40	10	647.89	648.36	648.36	648.52	0.07505	3.21	3.11	9.46	0.99
T2	3648.852	Q=80	20	647.89	648.59	648.56	648.79	0.058022	3.61	5.54	11.88	0.92

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	3648.852	Q=120	30	647.89	648.76	648.71	649	0.04666	3.94	7.68	13.04	0.87
T2	3648.852	Q=160	40	647.89	648.9	648.84	649.17	0.041773	4.25	9.55	13.91	0.85
T2	3648.852	Q=240	60	647.89	649.14	649.06	649.47	0.035376	4.68	13.09	15.42	0.82
T2	3648.852	Q=320	80	647.89	649.35	649.25	649.72	0.031623	5.01	16.4	16.71	0.8
T2	3648.852	Q=400	100	647.89	649.52	649.41	649.94	0.029207	5.27	19.5	17.84	0.78
T2	3648.852	Q=440	110	647.89	649.61	649.48	650.04	0.028094	5.38	21.03	18.37	0.78
T2	3648.852	Q=480	120	647.89	649.69		650.14	0.027198	5.48	22.53	18.87	0.77
T2	3759.27	Q=95.35	0.5	650.15	650.37	650.32	650.38	0.023309	0.86	0.58	5.26	0.46
T2	3759.27	Q=4	1	650.15	650.49	650.36	650.49	0.008621	0.79	1.28	6.59	0.31
T2	3759.27	Q=8	2	650.15	650.58	650.43	650.6	0.009203	1.02	1.98	7.48	0.34
T2	3759.27	Q=16	4	650.15	650.72	650.52	650.75	0.010118	1.31	3.07	8.68	0.37
T2	3759.27	Q=24	6	650.15	650.82	650.59	650.86	0.010456	1.49	4.01	9.59	0.39
T2	3759.27	Q=32	8	650.15	650.9	650.66	650.94	0.010774	1.68	4.76	10.11	0.41
T2	3759.27	Q=40	10	650.15	650.96	650.71	651.02	0.011079	1.84	5.44	10.54	0.42
T2	3759.27	Q=80	20	650.15	651.21	650.92	651.3	0.012553	2.45	8.18	12.13	0.47
T2	3759.27	Q=120	30	650.15	651.37	651.09	651.51	0.014171	2.94	10.27	13.21	0.52
T2	3759.27	Q=160	40	650.15	651.51	651.23	651.68	0.015166	3.31	12.15	14.12	0.55
T2	3759.27	Q=240	60	650.15	651.72	651.47	651.96	0.017024	3.93	15.25	15.2	0.6
T2	3759.27	Q=320	80	650.15	651.89	651.66	652.21	0.018552	4.44	17.91	16.02	0.63
T2	3759.27	Q=400	100	650.15	652.04	651.83	652.42	0.019886	4.88	20.28	16.73	0.67
T2	3759.27	Q=440	110	650.15	652.1	651.91	652.52	0.020575	5.09	21.35	17.04	0.68
T2	3759.27	Q=480	120	650.15	652.16	651.99	652.61	0.021178	5.29	22.41	17.34	0.7
T2	3960.516	Q=95.35	0.5	653.37	653.56	653.47	653.56	0.011384	0.67	0.74	5.79	0.33
T2	3960.516	Q=4	1	653.37	653.57		653.59	0.03493	1.23	0.82	5.95	0.58
T2	3960.516	Q=8	2	653.37	653.66		653.69	0.03016	1.44	1.39	7.12	0.57
T2	3960.516	Q=16	4	653.37	653.78		653.83	0.025648	1.66	2.41	8.83	0.56
T2	3960.516	Q=24	6	653.37	653.88		653.93	0.024424	1.83	3.28	10.04	0.56
T2	3960.516	Q=32	8	653.37	653.95		654.01	0.023101	1.99	4.03	10.7	0.56
T2	3960.516	Q=40	10	653.37	654.01		654.08	0.02219	2.12	4.74	11.29	0.56
T2	3960.516	Q=80	20	653.37	654.27		654.37	0.018967	2.56	7.89	13.47	0.56
T2	3960.516	Q=120	30	653.37	654.46		654.58	0.016898	2.87	10.63	14.94	0.55

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	3960.516	Q=160	40	653.37	654.62		654.76	0.015793	3.12	13.12	16.15	0.55
T2	3960.516	Q=240	60	653.37	654.88	654.55	655.06	0.014392	3.48	17.67	18.11	0.54
T2	3960.516	Q=320	80	653.37	655.11	654.73	655.32	0.013406	3.73	21.83	19.41	0.54
T2	3960.516	Q=400	100	653.37	655.3	654.89	655.54	0.012742	3.95	25.71	20.54	0.53
T2	3960.516	Q=440	110	653.37	655.39	654.96	655.64	0.012442	4.04	27.59	21.07	0.53
T2	3960.516	Q=480	120	653.37	655.48	655.03	655.74	0.012196	4.12	29.42	21.57	0.53
T2	4078.035	Q=95.35	0.5	656.15	656.36	656.35	656.4	0.081311	1.56	0.32	3.05	0.85
T2	4078.035	Q=4	1	656.15	656.51	656.41	656.53	0.018657	1.07	0.94	5.22	0.44
T2	4078.035	Q=8	2	656.15	656.6	656.49	656.63	0.021024	1.33	1.5	6.62	0.49
T2	4078.035	Q=16	4	656.15	656.71	656.6	656.76	0.024181	1.76	2.28	7.75	0.56
T2	4078.035	Q=24	6	656.15	656.79	656.68	656.86	0.025258	2.09	2.91	8.34	0.59
T2	4078.035	Q=32	8	656.15	656.85	656.74	656.94	0.026794	2.37	3.44	8.81	0.62
T2	4078.035	Q=40	10	656.15	656.9	656.79	657.01	0.027857	2.6	3.92	9.22	0.65
T2	4078.035	Q=80	20	656.15	657.1	657.02	657.28	0.033148	3.52	5.84	10.69	0.74
T2	4078.035	Q=120	30	656.15	657.22	657.19	657.49	0.038922	4.26	7.24	11.65	0.83
T2	4078.035	Q=160	40	656.15	657.33	657.33	657.67	0.042629	4.84	8.51	12.45	0.88
T2	4078.035	Q=240	60	656.15	657.56	657.56	657.98	0.037944	5.3	11.63	14.23	0.87
T2	4078.035	Q=320	80	656.15	657.75	657.75	658.23	0.034988	5.64	14.51	15.63	0.85
T2	4078.035	Q=400	100	656.15	657.92	657.92	658.45	0.032695	5.89	17.26	16.81	0.84
T2	4078.035	Q=440	110	656.15	658	658	658.55	0.031515	5.99	18.63	17.3	0.83
T2	4078.035	Q=480	120	656.15	658.07	658.07	658.64	0.031257	6.13	19.8	17.71	0.84
T2	4182.388	Q=95.35	0.5	658.43	658.72	658.61	658.73	0.010224	0.69	0.73	5.06	0.32
T2	4182.388	Q=4	1	658.43	658.75	658.67	658.77	0.024767	1.14	0.88	5.55	0.5
T2	4182.388	Q=8	2	658.43	658.85	658.75	658.88	0.021905	1.29	1.55	7.37	0.5
T2	4182.388	Q=16	4	658.43	658.98	658.85	659.01	0.019424	1.57	2.56	8.67	0.5
T2	4182.388	Q=24	6	658.43	659.06	658.92	659.11	0.018686	1.81	3.34	9.14	0.51
T2	4182.388	Q=32	8	658.43	659.14	658.97	659.2	0.018027	2	4.04	9.56	0.51
T2	4182.388	Q=40	10	658.43	659.21	659.03	659.28	0.017501	2.16	4.7	9.93	0.52
T2	4182.388	Q=80	20	658.43	659.47	659.23	659.58	0.015913	2.7	7.57	11.4	0.53
T2	4182.388	Q=120	30	658.43	659.69	659.4	659.82	0.014764	3.03	10.1	12.55	0.53
T2	4182.388	Q=160	40	658.43	659.86	659.54	660.02	0.014163	3.3	12.37	13.51	0.53

Janes Ravine - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	4182.388	Q=240	60	658.43	660.1	659.78	660.33	0.015245	3.87	15.79	14.83	0.57
T2	4182.388	Q=320	80	658.43	660.29	659.99	660.58	0.016216	4.34	18.7	15.73	0.6
T2	4182.388	Q=400	100	658.43	660.45	660.16	660.79	0.017201	4.75	21.24	16.38	0.63
T2	4182.388	Q=440	110	658.43	660.52	660.24	660.9	0.017584	4.94	22.44	16.65	0.64
T2	4182.388	Q=480	120	658.43	660.6	660.32	661	0.01778	5.09	23.67	16.92	0.65

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	10.52001	Q=5.0	5	592.29	592.6	592.6	592.71	0.050067	2.67	1.87	8.59	1.01
Main	10.52001	Q=10.0	10	592.29	592.74	592.74	592.89	0.044808	3.12	3.2	10.68	1
Main	10.52001	Q=15.0	15	592.29	592.85	592.85	593.03	0.041466	3.41	4.4	12.08	1
Main	10.52001	Q=25.0	25	592.29	593	593	593.24	0.03896	3.95	6.33	13.31	1.01
Main	10.52001	Q=50.0	50	592.29	593.29	593.29	593.64	0.034598	4.74	10.54	15.34	1.01
Main	10.52001	Q=75.0	75	592.29	593.52	593.52	593.95	0.032506	5.26	14.27	16.94	1.01
Main	10.52001	Q=100.0	100	592.29	593.72	593.72	594.21	0.031089	5.64	17.74	18.3	1.01
Main	10.52001	Q=125.0	125	592.29	593.89	593.89	594.44	0.030086	5.96	20.99	19.49	1.01
Main	10.52001	Q=150.0	150	592.29	594.04	594.04	594.65	0.028842	6.25	24.04	20.54	1.01
Main	10.52001	Q=175.0	175	592.29	594.18	594.18	594.84	0.027292	6.53	26.9	21.24	1
Main	10.52001	Q=200.0	200	592.29	594.31	594.31	595.02	0.025977	6.78	29.73	21.9	0.99
Main	10.52001	Q=250.0	250	592.29	594.56	594.56	595.36	0.023929	7.22	35.23	23.14	0.97
Main	10.52001	Q=300.0	300	592.29	594.78	594.78	595.66	0.022367	7.58	40.59	24.29	0.96
Main	10.52001	Q=350.0	350	592.29	594.99	594.99	595.94	0.021195	7.9	45.76	25.35	0.95
Main	10.52001	Q=400.0	400	592.29	595.19	595.19	596.19	0.020172	8.17	50.88	26.35	0.94
Main	71.56719	Q=5.0	5	592.82	593.38	593.16	593.4	0.004714	1.12	4.46	12.79	0.33
Main	71.56719	Q=10.0	10	592.82	593.57	593.28	593.6	0.005003	1.41	7.11	15.12	0.36
Main	71.56719	Q=15.0	15	592.82	593.71	593.38	593.75	0.005284	1.61	9.31	16.82	0.38
Main	71.56719	Q=25.0	25	592.82	593.91	593.53	593.97	0.005529	1.92	13.02	19.36	0.41
Main	71.56719	Q=50.0	50	592.82	594.26	593.81	594.36	0.005575	2.49	20.58	23.44	0.43
Main	71.56719	Q=75.0	75	592.82	594.53	594.02	594.65	0.005471	2.87	27.19	26.3	0.45
Main	71.56719	Q=100.0	100	592.82	594.75	594.2	594.9	0.00538	3.17	33.33	28.69	0.45
Main	71.56719	Q=125.0	125	592.82	594.95	594.36	595.12	0.005271	3.41	39.2	30.84	0.46
Main	71.56719	Q=150.0	150	592.82	595.13	594.49	595.31	0.005175	3.61	44.85	32.78	0.46
Main	71.56719	Q=175.0	175	592.82	595.29	594.63	595.49	0.005098	3.78	50.27	34.55	0.47
Main	71.56719	Q=200.0	200	592.82	595.44	594.74	595.66	0.004973	3.92	55.76	36.24	0.47
Main	71.56719	Q=250.0	250	592.82	595.73	594.96	595.97	0.004732	4.15	66.51	39.17	0.46
Main	71.56719	Q=300.0	300	592.82	595.99	595.16	596.24	0.004499	4.32	77.05	41.63	0.46
Main	71.56719	Q=350.0	350	592.82	596.23	595.33	596.5	0.004276	4.46	87.43	43.74	0.45
Main	71.56719	Q=400.0	400	592.82	596.46	595.5	596.74	0.004083	4.57	97.65	45.71	0.45
T1	97.69851	Q=5.0	1	598.82	598.91	598.93	598.99	0.070434	2.31	0.43	5.87	1.5

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	97.69851	Q=10.0	2	598.82	598.94	598.98	599.09	0.080519	3.05	0.66	6.46	1.69
T1	97.69851	Q=15.0	3	598.82	598.97	599.03	599.18	0.09612	3.7	0.81	6.84	1.89
T1	97.69851	Q=25.0	5	598.82	599.01	599.11	599.33	0.107967	4.53	1.1	7.51	2.08
T1	97.69851	Q=50.0	10	598.82	599.09	599.24	599.61	0.120283	5.8	1.72	8.76	2.3
T1	97.69851	Q=75.0	15	598.82	599.13	599.33	599.88	0.144083	6.96	2.16	9.53	2.58
T1	97.69851	Q=100.0	20	598.82	599.18	599.42	600.07	0.143728	7.55	2.65	10.34	2.63
T1	97.69851	Q=125.0	25	598.82	599.21	599.49	600.31	0.163266	8.42	2.97	10.84	2.83
T1	97.69851	Q=150.0	30	598.82	599.25	599.56	600.5	0.167882	8.98	3.34	11.29	2.91
T1	97.69851	Q=175.0	35	598.82	599.28	599.62	600.67	0.168513	9.45	3.7	11.62	2.95
T1	97.69851	Q=200.0	40	598.82	599.32	599.68	600.72	0.151367	9.51	4.2	12.05	2.84
T1	97.69851	Q=250.0	50	598.82	599.39	599.78	600.87	0.130939	9.75	5.13	12.71	2.7
T1	97.69851	Q=300.0	60	598.82	599.46	599.88	601	0.116777	9.94	6.03	13.3	2.6
T1	97.69851	Q=350.0	70	598.82	599.53	599.97	601.12	0.106969	10.13	6.91	13.85	2.53
T1	97.69851	Q=400.0	80	598.82	599.59	600.05	601.24	0.099911	10.32	7.75	14.36	2.47
T1	196.2559	Q=5.0	1	603.03	603.16	603.16	603.2	0.029082	1.74	0.58	6.17	1
T1	196.2559	Q=10.0	2	603.03	603.21	603.21	603.28	0.026616	2.12	0.95	7.04	1.02
T1	196.2559	Q=15.0	3	603.03	603.26	603.26	603.34	0.023844	2.31	1.3	7.77	1
T1	196.2559	Q=25.0	5	603.03	603.33	603.33	603.44	0.022104	2.63	1.9	8.9	1
T1	196.2559	Q=50.0	10	603.03	603.46	603.46	603.62	0.020191	3.13	3.19	10.83	1.01
T1	196.2559	Q=75.0	15	603.03	603.57	603.57	603.75	0.017768	3.45	4.37	12.05	0.99
T1	196.2559	Q=100.0	20	603.03	603.64	603.64	603.87	0.017363	3.8	5.33	12.86	1
T1	196.2559	Q=125.0	25	603.03	603.72	603.72	603.97	0.015707	4.03	6.36	13.56	0.98
T1	196.2559	Q=150.0	30	603.03	603.79	603.79	604.07	0.01498	4.26	7.29	14.16	0.98
T1	196.2559	Q=175.0	35	603.03	603.85	603.85	604.15	0.014448	4.47	8.18	14.72	0.97
T1	196.2559	Q=200.0	40	603.03	603.89	603.91	604.24	0.015079	4.76	8.82	15.11	1.01
T1	196.2559	Q=250.0	50	603.03	603.98	604.02	604.39	0.015916	5.27	10.09	15.85	1.05
T1	196.2559	Q=300.0	60	603.03	604.05	604.13	604.54	0.016681	5.73	11.27	16.5	1.09
T1	196.2559	Q=350.0	70	603.03	604.11	604.23	604.67	0.017345	6.14	12.38	17.1	1.13
T1	196.2559	Q=400.0	80	603.03	604.18	604.31	604.8	0.017901	6.51	13.45	17.66	1.16
T1	274.1962	Q=5.0	1	604.84	604.96	605.05	605.42	0.498709	5.45	0.18	2.98	3.87
T1	274.1962	Q=10.0	2	604.84	605.01	605.12	605.47	0.309349	5.41	0.37	4.22	3.23

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	274.1962	Q=15.0	3	604.84	605.04	605.17	605.68	0.372688	6.43	0.47	4.75	3.61
T1	274.1962	Q=25.0	5	604.84	605.08	605.24	605.95	0.398719	7.49	0.67	5.68	3.85
T1	274.1962	Q=50.0	10	604.84	605.14	605.38	606.5	0.44331	9.38	1.07	7.01	4.24
T1	274.1962	Q=75.0	15	604.84	605.19	605.48	606.86	0.424527	10.37	1.45	7.91	4.27
T1	274.1962	Q=100.0	20	604.84	605.23	605.57	607.2	0.41327	11.27	1.78	8.39	4.32
T1	274.1962	Q=125.0	25	604.84	605.27	605.65	607.46	0.38881	11.88	2.1	8.76	4.27
T1	274.1962	Q=150.0	30	604.84	605.3	605.72	607.72	0.376769	12.48	2.4	9.09	4.28
T1	274.1962	Q=175.0	35	604.84	605.33	605.79	607.96	0.368177	13.01	2.69	9.39	4.28
T1	274.1962	Q=200.0	40	604.84	605.36	605.85	608.21	0.366336	13.55	2.95	9.66	4.32
T1	274.1962	Q=250.0	50	604.84	605.42	605.96	608.53	0.339651	14.15	3.53	10.22	4.24
T1	274.1962	Q=300.0	60	604.84	605.47	606.06	608.82	0.322028	14.69	4.09	10.73	4.19
T1	274.1962	Q=350.0	70	604.84	605.52	606.15	609.08	0.307368	15.13	4.63	11.2	4.15
T1	274.1962	Q=400.0	80	604.84	605.57	606.23	609.29	0.293315	15.49	5.16	11.66	4.1
T1	363.1963	Q=5.0	1	610.69	610.9	610.9	610.94	0.022556	1.65	0.6	5.75	0.9
T1	363.1963	Q=10.0	2	610.69	610.95	610.95	611.02	0.025601	2.15	0.93	6.56	1.01
T1	363.1963	Q=15.0	3	610.69	611	611	611.09	0.023432	2.36	1.27	7.31	1
T1	363.1963	Q=25.0	5	610.69	611.07	611.07	611.19	0.02209	2.68	1.87	8.46	1.01
T1	363.1963	Q=50.0	10	610.69	611.21	611.21	611.37	0.019451	3.13	3.19	10.45	1
T1	363.1963	Q=75.0	15	610.69	611.31	611.31	611.51	0.018424	3.53	4.26	11.41	1.01
T1	363.1963	Q=100.0	20	610.69	611.4	611.4	611.62	0.017293	3.8	5.3	12.28	1
T1	363.1963	Q=125.0	25	610.69	611.48	611.48	611.73	0.016647	4.03	6.28	13.03	1
T1	363.1963	Q=150.0	30	610.69	611.54	611.54	611.82	0.015862	4.27	7.15	13.5	1
T1	363.1963	Q=175.0	35	610.69	611.61	611.61	611.91	0.015115	4.47	8.01	13.93	0.99
T1	363.1963	Q=200.0	40	610.69	611.67	611.67	612	0.014234	4.62	8.91	14.37	0.98
T1	363.1963	Q=250.0	50	610.69	611.78	611.78	612.15	0.013511	4.96	10.5	15.11	0.97
T1	363.1963	Q=300.0	60	610.69	611.88	611.88	612.29	0.012816	5.23	12.08	15.82	0.97
T1	363.1963	Q=350.0	70	610.69	611.98	611.98	612.42	0.012234	5.46	13.64	16.48	0.96
T1	363.1963	Q=400.0	80	610.69	612.06	612.06	612.54	0.011821	5.68	15.13	17.09	0.96
Main2	203.2378	Q=5.0	4	594.01	594.33	594.31	594.46	0.018947	2.91	1.38	4.55	0.93
Main2	203.2378	Q=10.0	8	594.01	594.5	594.48	594.71	0.018042	3.67	2.18	4.73	0.95
Main2	203.2378	Q=15.0	12	594.01	594.64	594.63	594.92	0.018097	4.22	2.84	4.86	0.97

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	203.2378	Q=25.0	20	594.01	594.87	594.87	595.26	0.018536	5.04	3.97	5.09	1.01
Main2	203.2378	Q=50.0	40	594.01	595.43	595.43	595.79	0.009474	5.11	9.45	14.78	0.78
Main2	203.2378	Q=75.0	60	594.01	595.71	595.71	596.09	0.00855	5.51	14.17	18.95	0.76
Main2	203.2378	Q=100.0	80	594.01	595.9	595.9	596.32	0.008574	5.94	18	21.36	0.78
Main2	203.2378	Q=125.0	100	594.01	596.05	596.05	596.51	0.008821	6.35	21.3	22.9	0.8
Main2	203.2378	Q=150.0	120	594.01	596.18	596.18	596.68	0.008974	6.7	24.43	24.28	0.82
Main2	203.2378	Q=175.0	140	594.01	596.31	596.31	596.83	0.00889	6.94	27.67	25.61	0.82
Main2	203.2378	Q=200.0	160	594.01	596.41	596.41	596.97	0.00914	7.25	30.35	26.62	0.84
Main2	203.2378	Q=250.0	200	594.01	596.62	596.62	597.22	0.009034	7.64	36.18	28.7	0.85
Main2	203.2378	Q=300.0	240	594.01	596.8	596.8	597.45	0.009177	8.05	41.31	30.37	0.86
Main2	203.2378	Q=350.0	280	594.01	596.95	596.95	597.65	0.009389	8.44	45.95	31.62	0.88
Main2	203.2378	Q=400.0	320	594.01	597.05	597.1	597.85	0.010148	8.99	49.3	32.49	0.92
Main2	329.9662	Q=5.0	4	594.86	595.39	595.2	595.44	0.004115	1.75	2.28	4.96	0.46
Main2	329.9662	Q=10.0	8	594.86	595.64	595.36	595.72	0.004362	2.27	3.53	5.22	0.49
Main2	329.9662	Q=15.0	12	594.86	595.84	595.5	595.94	0.004485	2.61	4.59	5.42	0.5
Main2	329.9662	Q=25.0	20	594.86	596.14	595.74	596.28	0.004369	3.11	6.91	10.14	0.52
Main2	329.9662	Q=50.0	40	594.86	596.48	596.28	596.73	0.005917	4.31	11	14.08	0.63
Main2	329.9662	Q=75.0	60	594.86	596.71	596.59	597.05	0.006775	5.09	14.6	16.44	0.69
Main2	329.9662	Q=100.0	80	594.86	596.91	596.81	597.3	0.00713	5.62	17.99	17.83	0.72
Main2	329.9662	Q=125.0	100	594.86	597.08	596.98	597.52	0.007343	6.04	21.17	19.04	0.74
Main2	329.9662	Q=150.0	120	594.86	597.23	597.14	597.72	0.00759	6.43	24.06	20.07	0.76
Main2	329.9662	Q=175.0	140	594.86	597.35	597.28	597.89	0.007955	6.83	26.6	20.94	0.79
Main2	329.9662	Q=200.0	160	594.86	597.48	597.4	598.06	0.008028	7.11	29.36	21.85	0.8
Main2	329.9662	Q=250.0	200	594.86	597.69	597.64	598.35	0.008522	7.72	34	23.25	0.83
Main2	329.9662	Q=300.0	240	594.86	597.87	597.85	598.61	0.008839	8.23	38.47	24.43	0.86
Main2	329.9662	Q=350.0	280	594.86	598.04	598.04	598.85	0.009099	8.67	42.71	25.5	0.88
Main2	329.9662	Q=400.0	320	594.86	598.22	598.22	599.07	0.00911	9	47.18	26.57	0.89
Main2	424.4933	Q=5.0	4	595.96	596.34	596.34	596.5	0.023386	3.19	1.25	4.03	1.01
Main2	424.4933	Q=10.0	8	595.96	596.53	596.53	596.77	0.021575	3.99	2.01	4.09	1
Main2	424.4933	Q=15.0	12	595.96	596.68	596.68	597	0.020947	4.53	2.65	4.14	1
Main2	424.4933	Q=25.0	20	595.96	596.94	596.94	597.39	0.021495	5.4	3.7	4.22	1.02

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	424.4933	Q=50.0	40	595.96	597.57	597.57	597.9	0.009395	5.02	10.3	17.56	0.72
Main2	424.4933	Q=75.0	60	595.96	597.82	597.82	598.15	0.0087	5.36	15.33	21.94	0.71
Main2	424.4933	Q=100.0	80	595.96	597.97	597.97	598.35	0.009527	5.92	18.76	24.12	0.76
Main2	424.4933	Q=125.0	100	595.96	598.11	598.11	598.52	0.009662	6.26	22.35	26.19	0.77
Main2	424.4933	Q=150.0	120	595.96	598.23	598.23	598.67	0.009879	6.57	25.59	27.78	0.79
Main2	424.4933	Q=175.0	140	595.96	598.34	598.34	598.81	0.010133	6.87	28.58	29.17	0.8
Main2	424.4933	Q=200.0	160	595.96	598.45	598.45	598.94	0.009967	7.03	31.9	30.64	0.8
Main2	424.4933	Q=250.0	200	595.96	598.71	598.63	599.17	0.00833	6.89	40.41	33.73	0.75
Main2	424.4933	Q=300.0	240	595.96	598.96		599.39	0.007099	6.75	49	36.23	0.7
Main2	424.4933	Q=350.0	280	595.96	599.18	598.91	599.6	0.006244	6.65	57.23	37.92	0.66
Main2	424.4933	Q=400.0	320	595.96	599.37	599.06	599.8	0.005742	6.64	64.72	39.25	0.64
Main2	566.1108	Q=5.0	4	596.99	597.51	597.26	597.53	0.003439	1.18	3.39	8.36	0.33
Main2	566.1108	Q=10.0	8	596.99	597.74	597.39	597.78	0.003377	1.45	5.51	9.72	0.34
Main2	566.1108	Q=15.0	12	596.99	597.93	597.5	597.97	0.003234	1.61	7.43	10.81	0.34
Main2	566.1108	Q=25.0	20	596.99	598.23	597.67	598.28	0.00284	1.82	11.19	15.52	0.34
Main2	566.1108	Q=50.0	40	596.99	598.58	598	598.67	0.00339	2.45	17.56	21.1	0.39
Main2	566.1108	Q=75.0	60	596.99	598.82	598.29	598.93	0.003686	2.87	22.98	24.27	0.41
Main2	566.1108	Q=100.0	80	596.99	599.03	598.49	599.16	0.003687	3.14	28.41	27.08	0.42
Main2	566.1108	Q=125.0	100	596.99	599.2	598.66	599.35	0.003778	3.38	33.09	28.83	0.44
Main2	566.1108	Q=150.0	120	596.99	599.34	598.8	599.52	0.003841	3.59	37.46	30.17	0.45
Main2	566.1108	Q=175.0	140	596.99	599.48	598.92	599.67	0.00389	3.77	41.62	31.4	0.45
Main2	566.1108	Q=200.0	160	596.99	599.59	599.04	599.8	0.004001	3.96	45.3	32.44	0.46
Main2	566.1108	Q=250.0	200	596.99	599.77	599.23	600.02	0.00445	4.39	51.15	34.13	0.49
Main2	566.1108	Q=300.0	240	596.99	599.92	599.39	600.22	0.004885	4.78	56.35	35.59	0.52
Main2	566.1108	Q=350.0	280	596.99	599.07	599.56	600.6	0.040445	10.56	29.58	27.56	1.41
Main2	566.1108	Q=400.0	320	596.99	599.17	599.7	600.83	0.041378	11.07	32.3	28.58	1.44
Main2	729.3753	Q=5.0	4	601.02	601.33	601.33	601.43	0.037557	2.46	1.65	8.85	0.97
Main2	729.3753	Q=10.0	8	601.02	601.44	601.44	601.58	0.033	3.01	2.71	10.24	0.97
Main2	729.3753	Q=15.0	12	601.02	601.53	601.53	601.7	0.02917	3.37	3.67	11.13	0.95
Main2	729.3753	Q=25.0	20	601.02	601.68	601.68	601.9	0.025422	3.89	5.38	12.56	0.94
Main2	729.3753	Q=50.0	40	601.02	601.95	601.95	602.26	0.021129	4.65	9.1	14.94	0.92

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	729.3753	Q=75.0	60	601.02	602.15	602.15	602.53	0.019413	5.18	12.28	16.45	0.91
Main2	729.3753	Q=100.0	80	601.02	602.33	602.33	602.76	0.017945	5.56	15.32	17.71	0.9
Main2	729.3753	Q=125.0	100	601.02	602.48	602.48	602.97	0.017223	5.9	18.09	18.76	0.9
Main2	729.3753	Q=150.0	120	601.02	602.62	602.62	603.15	0.016676	6.2	20.72	19.7	0.9
Main2	729.3753	Q=175.0	140	601.02	602.74	602.74	603.32	0.01616	6.45	23.29	20.58	0.9
Main2	729.3753	Q=200.0	160	601.02	602.87	602.87	603.48	0.01557	6.65	25.87	21.43	0.89
Main2	729.3753	Q=250.0	200	601.02	603.08	603.08	603.76	0.014981	7.05	30.55	22.74	0.89
Main2	729.3753	Q=300.0	240	601.02	603.27	603.27	604.02	0.014424	7.37	35.06	23.86	0.89
Main2	729.3753	Q=350.0	280	601.02	603.45	603.45	604.25	0.01393	7.64	39.45	24.89	0.89
Main2	729.3753	Q=400.0	320	601.02	603.61	603.61	604.47	0.01363	7.91	43.56	25.75	0.89
Main2	807.7872	Q=5.0	4	601.49	602.04	601.82	602.06	0.003299	1.14	3.59	10.49	0.32
Main2	807.7872	Q=10.0	8	601.49	602.2	601.94	602.24	0.003631	1.51	5.48	12	0.36
Main2	807.7872	Q=15.0	12	601.49	602.33	602.03	602.37	0.003856	1.78	7.05	13.13	0.38
Main2	807.7872	Q=25.0	20	601.49	602.52	602.19	602.59	0.004164	2.18	9.67	14.6	0.41
Main2	807.7872	Q=50.0	40	601.49	602.84	602.47	602.96	0.00473	2.87	14.79	16.8	0.46
Main2	807.7872	Q=75.0	60	601.49	603.09	602.68	603.25	0.004981	3.34	19.17	18.48	0.49
Main2	807.7872	Q=100.0	80	601.49	603.29	602.86	603.48	0.005244	3.73	22.89	19.47	0.51
Main2	807.7872	Q=125.0	100	601.49	603.46	603.02	603.69	0.00541	4.06	26.36	20.35	0.53
Main2	807.7872	Q=150.0	120	601.49	603.62	603.16	603.88	0.005549	4.34	29.6	21.13	0.54
Main2	807.7872	Q=175.0	140	601.49	603.76	603.29	604.05	0.005682	4.6	32.62	21.83	0.56
Main2	807.7872	Q=200.0	160	601.49	603.89	603.41	604.21	0.005816	4.84	35.42	22.38	0.57
Main2	807.7872	Q=250.0	200	601.49	604.12	603.63	604.5	0.006041	5.26	40.69	23.37	0.59
Main2	807.7872	Q=300.0	240	601.49	604.32	603.83	604.76	0.00624	5.64	45.58	24.26	0.61
Main2	807.7872	Q=350.0	280	601.49	604.51	604.01	605	0.006433	5.99	50.14	25.06	0.62
Main2	807.7872	Q=400.0	320	601.49	604.68	604.18	605.22	0.006591	6.3	54.51	25.8	0.64
Main2	897.8446	Q=5.0	4	603.39	603.68	603.68	603.78	0.040643	2.45	1.63	8.65	1
Main2	897.8446	Q=10.0	8	603.39	603.8	603.8	603.93	0.03639	2.9	2.76	10.64	1
Main2	897.8446	Q=15.0	12	603.39	603.88	603.88	604.05	0.033779	3.26	3.7	11.63	1
Main2	897.8446	Q=25.0	20	603.39	604.02	604.02	604.23	0.029873	3.7	5.47	13.28	0.98
Main2	897.8446	Q=50.0	40	603.39	604.28	604.28	604.59	0.024251	4.51	9.13	15.34	0.96
Main2	897.8446	Q=75.0	60	603.39	604.48	604.48	604.86	0.021596	5.05	12.38	16.93	0.94

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	897.8446	Q=100.0	80	603.39	604.66	604.66	605.09	0.019498	5.41	15.53	18.31	0.92
Main2	897.8446	Q=125.0	100	603.39	604.81	604.81	605.29	0.018732	5.78	18.25	19.15	0.92
Main2	897.8446	Q=150.0	120	603.39	604.94	604.94	605.47	0.017983	6.07	20.89	19.93	0.92
Main2	897.8446	Q=175.0	140	603.39	605.06	605.06	605.64	0.01748	6.34	23.38	20.64	0.92
Main2	897.8446	Q=200.0	160	603.39	605.19	605.19	605.8	0.016738	6.54	25.95	21.34	0.91
Main2	897.8446	Q=250.0	200	603.39	605.39	605.39	606.08	0.016135	6.97	30.51	22.4	0.91
Main2	897.8446	Q=300.0	240	603.39	605.59	605.59	606.34	0.015564	7.33	34.92	23.38	0.91
Main2	897.8446	Q=350.0	280	603.39	605.77	605.77	606.58	0.014934	7.61	39.31	24.31	0.91
Main2	897.8446	Q=400.0	320	603.39	605.93	605.93	606.81	0.014663	7.91	43.31	25.13	0.91
Main2	1023.945	Q=5.0	4	603.74	604.33	604.04	604.34	0.001593	0.81	4.97	13.17	0.22
Main2	1023.945	Q=10.0	8	603.74	604.51	604.15	604.53	0.001768	1.1	7.51	14.9	0.25
Main2	1023.945	Q=15.0	12	603.74	604.65	604.24	604.68	0.001851	1.29	9.67	16.22	0.27
Main2	1023.945	Q=25.0	20	603.74	604.86	604.37	604.9	0.002049	1.6	13.18	18.17	0.29
Main2	1023.945	Q=50.0	40	603.74	605.22	604.63	605.28	0.002289	2.11	20.32	21.17	0.33
Main2	1023.945	Q=75.0	60	603.74	605.49	604.83	605.57	0.002427	2.46	26.26	23.18	0.35
Main2	1023.945	Q=100.0	80	603.74	605.71	605.01	605.81	0.002542	2.74	31.49	24.82	0.36
Main2	1023.945	Q=125.0	100	603.74	605.9	605.15	606.02	0.002602	2.97	36.45	26.28	0.37
Main2	1023.945	Q=150.0	120	603.74	606.07	605.28	606.21	0.002655	3.18	41.1	27.63	0.38
Main2	1023.945	Q=175.0	140	603.74	606.23	605.39	606.38	0.002677	3.35	45.65	28.9	0.39
Main2	1023.945	Q=200.0	160	603.74	606.37	605.51	606.54	0.002744	3.52	49.72	29.99	0.4
Main2	1023.945	Q=250.0	200	603.74	606.64	605.71	606.83	0.002759	3.79	57.98	31.89	0.41
Main2	1023.945	Q=300.0	240	603.74	606.87	605.89	607.09	0.002779	4.01	65.61	33.36	0.41
Main2	1023.945	Q=350.0	280	603.74	607.09	606.07	607.32	0.002774	4.2	72.93	34.46	0.42
Main2	1023.945	Q=400.0	320	603.74	607.29	606.22	607.55	0.002755	4.37	80.08	35.5	0.42
Main2	1141.385	Q=5.0	4	605.8	606.13	606.13	606.22	0.03793	2.46	1.65	8.85	0.97
Main2	1141.385	Q=10.0	8	605.8	606.24	606.24	606.38	0.032677	3.03	2.7	10.09	0.97
Main2	1141.385	Q=15.0	12	605.8	606.33	606.33	606.5	0.028927	3.39	3.66	10.96	0.95
Main2	1141.385	Q=25.0	20	605.8	606.48	606.48	606.7	0.025241	3.91	5.36	12.37	0.94
Main2	1141.385	Q=50.0	40	605.8	606.75	606.75	607.06	0.020978	4.68	9.07	14.68	0.91
Main2	1141.385	Q=75.0	60	605.8	606.95	606.95	607.34	0.019411	5.22	12.2	16.06	0.91
Main2	1141.385	Q=100.0	80	605.8	607.13	607.13	607.58	0.017922	5.6	15.21	17.28	0.9

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1141.385	Q=125.0	100	605.8	607.29	607.29	607.78	0.01729	5.95	17.9	18.17	0.9
Main2	1141.385	Q=150.0	120	605.8	607.43	607.43	607.97	0.016681	6.24	20.5	18.98	0.9
Main2	1141.385	Q=175.0	140	605.8	607.55	607.55	608.14	0.016361	6.53	22.93	19.75	0.91
Main2	1141.385	Q=200.0	160	605.8	607.68	607.68	608.3	0.015851	6.76	25.47	20.7	0.9
Main2	1141.385	Q=250.0	200	605.8	607.9	607.9	608.6	0.015132	7.16	30.32	22.39	0.9
Main2	1141.385	Q=300.0	240	605.8	608.11	608.11	608.85	0.014412	7.47	35.12	23.95	0.89
Main2	1141.385	Q=350.0	280	605.8	608.29	608.29	609.09	0.014009	7.77	39.6	25.32	0.89
Main2	1141.385	Q=400.0	320	605.8	608.46	608.46	609.31	0.013657	8.03	43.99	26.64	0.89
Main2	1217.475	Q=5.0	4	607.61	607.9	607.84	607.94	0.014876	1.61	2.53	13.55	0.62
Main2	1217.475	Q=10.0	8	607.61	607.99	607.94	608.06	0.015592	2.12	3.94	15.75	0.67
Main2	1217.475	Q=15.0	12	607.61	607.93	608.01	608.19	0.08507	4.2	2.94	14.22	1.51
Main2	1217.475	Q=25.0	20	607.61	607.99	608.13	608.42	0.104108	5.41	3.85	15.63	1.73
Main2	1217.475	Q=50.0	40	607.61	608.1	608.33	608.9	0.131626	7.46	5.69	18.12	2.05
Main2	1217.475	Q=75.0	60	607.61	608.18	608.49	609.28	0.142834	8.8	7.29	19.78	2.2
Main2	1217.475	Q=100.0	80	607.61	608.26	608.62	609.56	0.139915	9.61	8.92	21.14	2.23
Main2	1217.475	Q=125.0	100	607.61	608.33	608.74	609.81	0.137881	10.29	10.42	22.16	2.26
Main2	1217.475	Q=150.0	120	607.61	608.38	608.84	610.14	0.149556	11.23	11.46	22.84	2.38
Main2	1217.475	Q=175.0	140	607.61	608.43	608.94	610.37	0.149815	11.81	12.71	23.64	2.41
Main2	1217.475	Q=200.0	160	607.61	608.49	609.03	610.54	0.142808	12.14	14.15	24.52	2.38
Main2	1217.475	Q=250.0	200	607.61	608.6	609.2	610.81	0.129957	12.64	17.01	26.14	2.33
Main2	1217.475	Q=300.0	240	607.61	608.71	609.34	611.03	0.118415	12.99	19.88	27.59	2.26
Main2	1217.475	Q=350.0	280	607.61	608.81	609.49	611.23	0.10983	13.3	22.67	28.94	2.21
Main2	1217.475	Q=400.0	320	607.61	608.9	609.61	611.44	0.104239	13.63	25.3	30.16	2.18
Main2	1296.371	Q=5.0	4	611.08	611.39	611.39	611.48	0.039713	2.47	1.65	9.45	0.99
Main2	1296.371	Q=10.0	8	611.08	611.5	611.5	611.63	0.030686	2.95	2.81	11.06	0.94
Main2	1296.371	Q=15.0	12	611.08	611.59	611.59	611.75	0.027614	3.3	3.81	12.29	0.93
Main2	1296.371	Q=25.0	20	611.08	611.72	611.72	611.93	0.024223	3.78	5.64	14.3	0.92
Main2	1296.371	Q=50.0	40	611.08	611.98	611.98	612.25	0.02016	4.47	9.74	18.1	0.89
Main2	1296.371	Q=75.0	60	611.08	612.17	612.17	612.49	0.018244	4.93	13.55	21.62	0.88
Main2	1296.371	Q=100.0	80	611.08	612.32	612.32	612.68	0.017607	5.32	16.98	24.51	0.88
Main2	1296.371	Q=125.0	100	611.08	612.45	612.45	612.85	0.016902	5.62	20.52	28.07	0.88

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1296.371	Q=150.0	120	611.08	612.6	612.6	612.99	0.014884	5.69	25.08	33.21	0.84
Main2	1296.371	Q=175.0	140	611.08	612.72	612.72	613.11	0.013883	5.79	29.08	36.59	0.83
Main2	1296.371	Q=200.0	160	611.08	612.8	612.8	613.22	0.013643	5.95	32.33	38.54	0.83
Main2	1296.371	Q=250.0	200	611.08	612.95	612.95	613.41	0.013371	6.25	38.28	41.27	0.83
Main2	1296.371	Q=300.0	240	611.08	613.08	613.08	613.58	0.01337	6.54	43.59	43.25	0.84
Main2	1296.371	Q=350.0	280	611.08	613.19	613.19	613.73	0.013306	6.79	48.63	44.82	0.85
Main2	1296.371	Q=400.0	320	611.08	613.31	613.31	613.88	0.013032	6.97	53.79	46.37	0.85
Main2	1429.08		Culvert									
Main2	1561.785	Q=5.0	4	617.31	618.64	617.63	618.65	0.000133	0.46	9.98	14.38	0.07
Main2	1561.785	Q=10.0	8	617.31	619.01	617.8	619.01	0.000153	0.58	15.87	18.22	0.08
Main2	1561.785	Q=15.0	12	617.31	619.29	617.93	619.29	0.00015	0.64	21.4	20.67	0.08
Main2	1561.785	Q=25.0	20	617.31	619.75	618.23	619.75	0.000136	0.7	31.61	23.73	0.08
Main2	1561.785	Q=50.0	40	617.31	620.64	618.59	620.64	0.000111	0.78	55.28	29.51	0.08
Main2	1561.785	Q=75.0	60	617.31	621.37	618.81	621.38	0.000092	0.82	78.49	33.96	0.07
Main2	1561.785	Q=100.0	80	617.31	622.03	618.99	622.04	0.000077	0.83	102.01	37.33	0.07
Main2	1561.785	Q=125.0	100	617.31	622.65	619.15	622.66	0.000065	0.83	126.34	40.22	0.06
Main2	1561.785	Q=150.0	120	617.31	623.27	619.29	623.28	0.000055	0.82	151.96	42.93	0.06
Main2	1561.785	Q=175.0	140	617.31	623.89	619.41	623.9	0.000047	0.81	179.54	45.67	0.06
Main2	1561.785	Q=200.0	160	617.31	624.54	619.52	624.55	0.000039	0.79	209.9	48.43	0.05
Main2	1561.785	Q=250.0	200	617.31	625.95	619.72	625.96	0.000026	0.73	282.18	54.04	0.04
Main2	1561.785	Q=300.0	240	617.31	627.74	619.91	627.75	0.000016	0.64	385.62	61.48	0.04
Main2	1561.785	Q=350.0	280	617.31	630.14	620.09	630.15	0.000008	0.53	544.19	70.38	0.03
Main2	1561.785	Q=400.0	320	617.31	633.57	620.24	633.57	0.000004	0.41	806.93	82.88	0.02
Main2	1679.134	Q=5.0	4	617.73	618.67	618.16	618.68	0.000656	0.81	5.33	9.3	0.16
Main2	1679.134	Q=10.0	8	617.73	619.03	618.32	619.04	0.000563	0.96	9.14	11.76	0.16
Main2	1679.134	Q=15.0	12	617.73	619.31	618.43	619.33	0.000502	1.05	12.7	13.67	0.15
Main2	1679.134	Q=25.0	20	617.73	619.77	618.62	619.78	0.000411	1.14	19.58	16.46	0.15
Main2	1679.134	Q=50.0	40	617.73	620.65		620.67	0.000291	1.24	36.09	20.94	0.13
Main2	1679.134	Q=75.0	60	617.73	621.37		621.4	0.000227	1.28	52.61	24.46	0.12
Main2	1679.134	Q=100.0	80	617.73	622.03		622.05	0.000182	1.29	69.51	26.89	0.11

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1679.134	Q=125.0	100	617.73	622.66		622.68	0.00015	1.28	87.02	29.15	0.1
Main2	1679.134	Q=150.0	120	617.73	623.27		623.29	0.000125	1.27	105.63	31.38	0.1
Main2	1679.134	Q=175.0	140	617.73	623.89		623.91	0.000105	1.25	125.92	33.94	0.09
Main2	1679.134	Q=200.0	160	617.73	624.54		624.56	0.000087	1.22	148.65	36.65	0.08
Main2	1679.134	Q=250.0	200	617.73	625.95		625.96	0.000057	1.12	204.39	42.3	0.07
Main2	1679.134	Q=300.0	240	617.73	627.74		627.75	0.000032	0.97	286.33	49.23	0.05
Main2	1679.134	Q=350.0	280	617.73	630.14		630.15	0.000016	0.79	416.01	59.32	0.04
Main2	1679.134	Q=400.0	320	617.73	633.57		633.57	0.000007	0.59	645.83	74.47	0.03
Main2	1781.324	Q=5.0	4	619.07	619.44	619.44	619.59	0.037829	3.06	1.31	4.49	1
Main2	1781.324	Q=10.0	8	619.07	619.61	619.61	619.84	0.034995	3.8	2.1	4.75	1.01
Main2	1781.324	Q=15.0	12	619.07	619.76	619.76	620.04	0.032083	4.25	2.83	5.3	0.99
Main2	1781.324	Q=25.0	20	619.07	620.03	620.05	620.33	0.0214	4.49	4.78	8.96	0.86
Main2	1781.324	Q=50.0	40	619.07	620.6	620.41	620.81	0.008339	3.95	11.49	14.35	0.59
Main2	1781.324	Q=75.0	60	619.07	621.38	620.65	621.47	0.002206	2.72	24.58	19.29	0.32
Main2	1781.324	Q=100.0	80	619.07	622.04	620.84	622.1	0.001088	2.28	38.61	23.09	0.24
Main2	1781.324	Q=125.0	100	619.07	622.66	621	622.72	0.000649	2.01	53.99	26.04	0.19
Main2	1781.324	Q=150.0	120	619.07	623.28	621.14	623.32	0.00043	1.82	70.85	28.86	0.16
Main2	1781.324	Q=175.0	140	619.07	623.9		623.94	0.0003	1.67	89.67	31.66	0.14
Main2	1781.324	Q=200.0	160	619.07	624.54		624.57	0.000214	1.54	110.89	34.32	0.12
Main2	1781.324	Q=250.0	200	619.07	625.95		625.97	0.000113	1.3	163.35	40.13	0.09
Main2	1781.324	Q=300.0	240	619.07	627.74		627.75	0.000055	1.06	241.65	47.36	0.06
Main2	1781.324	Q=350.0	280	619.07	630.14		630.15	0.000023	0.82	367.04	57.02	0.04
Main2	1781.324	Q=400.0	320	619.07	633.57		633.57	0.000009	0.59	586.16	70.91	0.03
Main2	1882.403	Q=5.0	4	621.45	621.87		621.94	0.015624	2.07	1.93	6.57	0.66
Main2	1882.403	Q=10.0	8	621.45	622.02		622.13	0.015805	2.7	3.06	8.58	0.71
Main2	1882.403	Q=15.0	12	621.45	622.13	622.07	622.27	0.015834	3.12	4.07	10	0.74
Main2	1882.403	Q=25.0	20	621.45	622.24	622.24	622.48	0.021148	4.09	5.26	10.99	0.88
Main2	1882.403	Q=50.0	40	621.45	622.54	622.54	622.87	0.018588	4.9	8.94	13.59	0.88
Main2	1882.403	Q=75.0	60	621.45	622.76	622.76	623.16	0.017418	5.45	12.14	15.35	0.88
Main2	1882.403	Q=100.0	80	621.45	622.95	622.95	623.4	0.016643	5.86	15.11	16.8	0.88
Main2	1882.403	Q=125.0	100	621.45	623.11	623.11	623.61	0.015763	6.16	18.01	18.05	0.87

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1882.403	Q=150.0	120	621.45	623.26	623.26	623.8	0.015279	6.43	20.64	18.89	0.87
Main2	1882.403	Q=175.0	140	621.45	623.78		624.1	0.006181	4.91	31.41	21.95	0.58
Main2	1882.403	Q=200.0	160	621.45	624.49		624.67	0.002334	3.63	48.2	25.38	0.37
Main2	1882.403	Q=250.0	200	621.45	625.93		626.01	0.000617	2.44	90.06	32.41	0.21
Main2	1882.403	Q=300.0	240	621.45	627.73		627.77	0.000191	1.71	155.2	40.11	0.12
Main2	1882.403	Q=350.0	280	621.45	630.14		630.16	0.000059	1.18	263.56	49.75	0.07
Main2	1882.403	Q=400.0	320	621.45	633.57		633.57	0.000017	0.79	458.02	63.39	0.04
Main2	2001.338	Q=5.0	4	621.94	622.55	622.28	622.57	0.00265	1.21	3.48	8.81	0.3
Main2	2001.338	Q=10.0	8	621.94	622.76	622.43	622.79	0.002744	1.55	5.56	10.77	0.32
Main2	2001.338	Q=15.0	12	621.94	622.91	622.54	622.96	0.002829	1.79	7.29	11.98	0.34
Main2	2001.338	Q=25.0	20	621.94	623.15	622.72	623.21	0.002826	2.1	10.37	13.58	0.35
Main2	2001.338	Q=50.0	40	621.94	623.55	623.03	623.64	0.003129	2.71	16.18	15.99	0.39
Main2	2001.338	Q=75.0	60	621.94	623.83	623.26	623.96	0.003349	3.15	20.98	17.73	0.41
Main2	2001.338	Q=100.0	80	621.94	624.06	623.45	624.22	0.003522	3.5	25.24	19.15	0.43
Main2	2001.338	Q=125.0	100	621.94	624.25	623.62	624.44	0.003686	3.8	29.03	20.21	0.45
Main2	2001.338	Q=150.0	120	621.94	624.43	623.77	624.64	0.003806	4.06	32.57	21.03	0.46
Main2	2001.338	Q=175.0	140	621.94	624.47		624.75	0.004758	4.6	33.54	21.23	0.52
Main2	2001.338	Q=200.0	160	621.94	624.78		625.03	0.003631	4.35	40.37	22.6	0.46
Main2	2001.338	Q=250.0	200	621.94	626		626.12	0.001127	3.1	71.06	27.9	0.27
Main2	2001.338	Q=300.0	240	621.94	627.75		627.81	0.00032	2.11	125.66	34.39	0.16
Main2	2001.338	Q=350.0	280	621.94	630.14		630.17	0.000093	1.43	218.24	42.88	0.09
Main2	2001.338	Q=400.0	320	621.94	633.57		633.58	0.000025	0.94	385.61	54.92	0.05
Main2	2076.253	Q=5.0	4	623.32	623.57	623.57	623.66	0.045333	2.33	1.71	10.68	1.03
Main2	2076.253	Q=10.0	8	623.32	623.68	623.68	623.79	0.037848	2.72	2.95	12.75	1
Main2	2076.253	Q=15.0	12	623.32	623.75	623.75	623.9	0.036567	3.05	3.94	14.11	1.01
Main2	2076.253	Q=25.0	20	623.32	623.87	623.87	624.06	0.031775	3.48	5.79	15.94	0.99
Main2	2076.253	Q=50.0	40	623.32	624.1	624.1	624.37	0.02648	4.18	9.76	19.05	0.97
Main2	2076.253	Q=75.0	60	623.32	624.26	624.28	624.6	0.025253	4.79	12.92	20.95	0.99
Main2	2076.253	Q=100.0	80	623.32	624.45	624.43	624.8	0.019336	4.89	17.09	23.01	0.9
Main2	2076.253	Q=125.0	100	623.32	624.64	624.56	624.98	0.014749	4.85	21.73	24.95	0.81
Main2	2076.253	Q=150.0	120	623.32	624.81	624.67	625.15	0.012284	4.86	26.14	26.58	0.76

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	2076.253	Q=175.0	140	623.32	624.94	624.79	625.3	0.011401	5	29.75	27.75	0.74
Main2	2076.253	Q=200.0	160	623.32	625.14	624.89	625.47	0.009077	4.85	35.19	29.42	0.67
Main2	2076.253	Q=250.0	200	623.32	626.1	625.07	626.24	0.002119	3.21	67.87	38.17	0.35
Main2	2076.253	Q=300.0	240	623.32	627.79	625.23	627.83	0.000355	1.84	145.3	53.38	0.16
Main2	2076.253	Q=350.0	280	623.32	630.16		630.18	0.000065	1.06	291.58	68.82	0.07
Main2	2076.253	Q=400.0	320	623.32	633.57		633.58	0.000013	0.62	553.19	83.61	0.03
Main2	2140.67	Q=5.0	4	625.22	625.6	625.56	625.66	0.022425	2.07	1.97	9.55	0.76
Main2	2140.67	Q=10.0	8	625.22	625.65	625.68	625.81	0.045423	3.31	2.47	10.34	1.12
Main2	2140.67	Q=15.0	12	625.22	625.72	625.76	625.94	0.046535	3.88	3.19	11.25	1.18
Main2	2140.67	Q=25.0	20	625.22	625.82	625.9	626.14	0.045992	4.65	4.5	12.61	1.23
Main2	2140.67	Q=50.0	40	625.22	626.01	626.16	626.53	0.047649	5.99	7.06	14.47	1.32
Main2	2140.67	Q=75.0	60	625.22	626.15	626.36	626.85	0.050638	7.01	9.09	15.8	1.41
Main2	2140.67	Q=100.0	80	625.22	626.26	626.53	627.13	0.053172	7.85	10.88	16.87	1.47
Main2	2140.67	Q=125.0	100	625.22	626.35	626.67	627.38	0.055336	8.57	12.5	17.8	1.53
Main2	2140.67	Q=150.0	120	625.22	626.44	626.8	627.61	0.056599	9.17	14.07	18.64	1.57
Main2	2140.67	Q=175.0	140	625.22	626.51	626.91	627.82	0.057964	9.71	15.5	19.29	1.61
Main2	2140.67	Q=200.0	160	625.22	626.58	627.02	628.03	0.059226	10.21	16.84	19.82	1.64
Main2	2140.67	Q=250.0	200	625.22	626.7	627.22	628.41	0.061496	11.1	19.32	20.57	1.7
Main2	2140.67	Q=300.0	240	625.22	626.82	627.41	628.76	0.062309	11.8	21.71	21.13	1.73
Main2	2140.67	Q=350.0	280	625.22	630.12	627.58	630.21	0.0006	2.56	118.69	37.88	0.21
Main2	2140.67	Q=400.0	320	625.22	633.56	627.74	633.59	0.000071	1.27	275.56	52.65	0.08
T2	76.18796	Q=5.0	1	631.75	631.84	631.87	631.94	0.341028	2.59	0.39	5.09	1.65
T2	76.18796	Q=10.0	2	631.75	631.83	631.94	632.3	1.647839	5.49	0.36	5.06	3.6
T2	76.18796	Q=15.0	3	631.75	631.88	631.98	632.24	0.695536	4.84	0.62	5.43	2.52
T2	76.18796	Q=25.0	5	631.75	631.9	632.06	632.6	1.084359	6.7	0.75	5.61	3.23
T2	76.18796	Q=50.0	10	631.75	631.94	632.22	633.61	1.981124	10.37	0.96	5.89	4.52
T2	76.18796	Q=75.0	15	631.75	631.97	632.35	634.67	2.695967	13.18	1.14	6.12	5.38
T2	76.18796	Q=100.0	20	631.75	632	632.45	635.52	3.013845	15.05	1.33	6.35	5.8
T2	76.18796	Q=125.0	25	631.75	632.03	632.54	636.24	3.167107	16.47	1.52	6.57	6.04
T2	76.18796	Q=150.0	30	631.75	632.06	632.62	636.75	3.116094	17.38	1.73	6.81	6.08
T2	76.18796	Q=175.0	35	631.75	632.09	632.7	637.25	3.103223	18.23	1.92	7.02	6.14

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	76.18796	Q=200.0	40	631.75	632.12	632.76	637.71	3.089777	18.98	2.11	7.22	6.19
T2	76.18796	Q=250.0	50	631.75	632.16	632.88	638.58	3.081745	20.33	2.46	7.59	6.29
T2	76.18796	Q=300.0	60	631.75	632.21	632.99	639.08	2.894408	21.03	2.85	7.97	6.19
T2	76.18796	Q=350.0	70	631.75	632.26	633.1	639.48	2.723516	21.56	3.25	8.34	6.09
T2	76.18796	Q=400.0	80	631.75	632.3	633.2	639.92	2.623561	22.14	3.61	8.67	6.04
T2	159.2439	Q=5.0	1	648.84	648.95	648.95	648.98	0.135993	1.52	0.66	10.04	1.03
T2	159.2439	Q=10.0	2	648.84	649	649	649.04	0.073321	1.55	1.3	12.96	0.82
T2	159.2439	Q=15.0	3	648.84	649.02	649.02	649.08	0.0941	1.92	1.57	13.98	0.95
T2	159.2439	Q=25.0	5	648.84	649.07	649.07	649.15	0.079572	2.2	2.3	15.92	0.92
T2	159.2439	Q=50.0	10	648.84	649.16	649.16	649.27	0.064367	2.59	3.85	18.56	0.89
T2	159.2439	Q=75.0	15	648.84	649.23	649.23	649.36	0.056307	2.84	5.23	20.48	0.86
T2	159.2439	Q=100.0	20	648.84	649.29	649.29	649.44	0.051741	3.03	6.49	22.09	0.85
T2	159.2439	Q=125.0	25	648.84	649.34	649.34	649.51	0.048342	3.19	7.69	23.5	0.84
T2	159.2439	Q=150.0	30	648.84	649.39	649.39	649.57	0.046373	3.33	8.77	24.33	0.84
T2	159.2439	Q=175.0	35	648.84	649.43	649.43	649.63	0.044371	3.44	9.82	25.09	0.83
T2	159.2439	Q=200.0	40	648.84	649.47	649.47	649.69	0.042517	3.53	10.86	25.82	0.82
T2	159.2439	Q=250.0	50	648.84	649.55	649.55	649.79	0.038981	3.68	12.91	27.22	0.8
T2	159.2439	Q=300.0	60	648.84	649.62	649.62	649.88	0.03744	3.85	14.74	28.4	0.8
T2	159.2439	Q=350.0	70	648.84	649.68	649.68	649.96	0.036237	3.99	16.49	29.48	0.8
T2	159.2439	Q=400.0	80	648.84	649.74	649.74	650.04	0.034757	4.11	18.27	30.55	0.79
T2	216.5511	Q=5.0	1	650.72	650.9	650.82	650.91	0.014912	0.72	1.39	12.08	0.37
T2	216.5511	Q=10.0	2	650.72	650.95	650.87	650.97	0.019364	0.96	2.08	14.09	0.44
T2	216.5511	Q=15.0	3	650.72	651.01	650.91	651.02	0.017407	1.05	2.86	15.96	0.43
T2	216.5511	Q=25.0	5	650.72	651.06	650.96	651.09	0.018924	1.32	3.83	17.34	0.47
T2	216.5511	Q=50.0	10	650.72	651.17	651.06	651.22	0.021188	1.77	5.76	19.81	0.53
T2	216.5511	Q=75.0	15	650.72	651.24	651.13	651.31	0.0229	2.1	7.32	21.59	0.57
T2	216.5511	Q=100.0	20	650.72	651.3	651.2	651.39	0.02423	2.36	8.68	23.04	0.6
T2	216.5511	Q=125.0	25	650.72	651.36	651.25	651.46	0.025416	2.59	9.9	24.14	0.63
T2	216.5511	Q=150.0	30	650.72	651.4	651.3	651.52	0.025874	2.77	11.08	24.98	0.64
T2	216.5511	Q=175.0	35	650.72	651.26	651.35	651.58	0.105318	4.64	7.74	22.05	1.23
T2	216.5511	Q=200.0	40	650.72	651.29	651.39	651.65	0.111887	4.96	8.28	22.62	1.28

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	216.5511	Q=250.0	50	650.72	651.33	651.46	651.78	0.121842	5.5	9.33	23.69	1.36
T2	216.5511	Q=300.0	60	650.72	651.37	651.53	651.91	0.131513	6	10.25	24.39	1.43
T2	216.5511	Q=350.0	70	650.72	651.41	651.6	652.02	0.138044	6.42	11.15	25.03	1.48
T2	216.5511	Q=400.0	80	650.72	651.44	651.66	652.14	0.146487	6.84	11.93	25.57	1.54
T2	294.5337	Q=5.0	1	656.15	656.26	656.26	656.29	0.103235	1.35	0.74	10.54	0.9
T2	294.5337	Q=10.0	2	656.15	656.3	656.3	656.34	0.113771	1.72	1.16	12.63	0.99
T2	294.5337	Q=15.0	3	656.15	656.33	656.33	656.38	0.101608	1.94	1.55	13.43	0.98
T2	294.5337	Q=25.0	5	656.15	656.37	656.37	656.45	0.088177	2.27	2.23	14.57	0.97
T2	294.5337	Q=50.0	10	656.15	656.47	656.47	656.58	0.068753	2.7	3.77	16.85	0.92
T2	294.5337	Q=75.0	15	656.15	656.54	656.54	656.68	0.062662	3.02	5.04	18.47	0.91
T2	294.5337	Q=100.0	20	656.15	656.61	656.61	656.77	0.056365	3.22	6.27	19.65	0.89
T2	294.5337	Q=125.0	25	656.15	656.66	656.66	656.84	0.053274	3.41	7.38	20.64	0.88
T2	294.5337	Q=150.0	30	656.15	656.71	656.71	656.91	0.051292	3.57	8.4	21.51	0.88
T2	294.5337	Q=175.0	35	656.15	656.76	656.76	656.97	0.048993	3.7	9.42	22.3	0.88
T2	294.5337	Q=200.0	40	656.15	656.8	656.8	657.03	0.046863	3.81	10.43	23.05	0.87
T2	294.5337	Q=250.0	50	656.15	656.88	656.88	657.14	0.044043	4.01	12.32	24.4	0.86
T2	294.5337	Q=300.0	60	656.15	656.96	656.96	657.24	0.041681	4.18	14.14	25.63	0.85
T2	294.5337	Q=350.0	70	656.15	657.02	657.02	657.32	0.040174	4.34	15.85	26.73	0.85
T2	294.5337	Q=400.0	80	656.15	657.08	657.08	657.41	0.038555	4.46	17.51	27.53	0.84
Main3	2243.763	Q=5.0	3	625.79	626.42	626.12	626.43	0.003061	0.75	4.01	9.81	0.21
Main3	2243.763	Q=10.0	6	625.79	626.65	626.22	626.66	0.003183	0.95	6.34	11.15	0.22
Main3	2243.763	Q=15.0	9	625.79	626.8	626.3	626.82	0.003406	1.12	8.07	12.01	0.24
Main3	2243.763	Q=25.0	15	625.79	627.01	626.43	627.04	0.003751	1.39	10.95	15.17	0.26
Main3	2243.763	Q=50.0	30	625.79	627.37	626.69	627.42	0.004239	1.85	16.75	17.38	0.29
Main3	2243.763	Q=75.0	45	625.79	627.62	626.88	627.69	0.004609	2.18	21.28	18.73	0.31
Main3	2243.763	Q=100.0	60	625.79	627.83	627.09	627.92	0.004832	2.43	25.32	19.85	0.33
Main3	2243.763	Q=125.0	75	625.79	628.01	627.23	628.11	0.005041	2.65	28.93	20.81	0.34
Main3	2243.763	Q=150.0	90	625.79	628.17	627.35	628.29	0.00514	2.83	32.44	21.69	0.35
Main3	2243.763	Q=175.0	105	625.79	628.32	627.46	628.46	0.005226	2.99	35.73	22.5	0.35
Main3	2243.763	Q=200.0	120	625.79	628.46	627.57	628.61	0.005296	3.14	38.88	23.24	0.36
Main3	2243.763	Q=250.0	150	625.79	628.71	627.75	628.88	0.005361	3.38	44.92	24.51	0.37

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	2243.763	Q=300.0	180	625.79	628.94	627.93	629.13	0.005403	3.58	50.55	25.54	0.38
Main3	2243.763	Q=350.0	210	625.79	630.2		630.29	0.001478	2.4	86.42	31.08	0.21
Main3	2243.763	Q=400.0	240	625.79	633.58		633.6	0.000135	1.08	214.63	44.71	0.07
Main3	2316.767	Q=5.0	3	627.57	627.92	627.92	628.01	0.091838	2.43	1.23	6.65	0.99
Main3	2316.767	Q=10.0	6	627.57	628.25		628.28	0.012759	1.51	3.97	9.88	0.42
Main3	2316.767	Q=15.0	9	627.57	628.36		628.41	0.013241	1.75	5.15	10.57	0.44
Main3	2316.767	Q=25.0	15	627.57	628.55		628.62	0.013742	2.08	7.21	11.68	0.47
Main3	2316.767	Q=50.0	30	627.57	628.88	628.51	628.99	0.014892	2.64	11.38	13.65	0.51
Main3	2316.767	Q=75.0	45	627.57	629.12	628.71	629.26	0.015513	3.02	14.89	15.01	0.53
Main3	2316.767	Q=100.0	60	627.57	629.27	628.89	629.46	0.017789	3.49	17.2	15.62	0.58
Main3	2316.767	Q=125.0	75	627.57	629.42	629.04	629.65	0.018782	3.84	19.6	16.22	0.61
Main3	2316.767	Q=150.0	90	627.57	629.56	629.16	629.83	0.019265	4.13	21.88	16.9	0.63
Main3	2316.767	Q=175.0	105	627.57	629.68	629.28	629.98	0.019995	4.44	23.82	17.61	0.65
Main3	2316.767	Q=200.0	120	627.57	629.79	629.4	630.13	0.020343	4.7	25.81	18.3	0.66
Main3	2316.767	Q=250.0	150	627.57	629.98	629.61	630.39	0.021249	5.18	29.45	19.51	0.69
Main3	2316.767	Q=300.0	180	627.57	630.14	629.81	630.62	0.022209	5.62	32.76	20.55	0.71
Main3	2316.767	Q=350.0	210	627.57	630.06	629.99	630.79	0.035446	6.9	31.06	20.03	0.89
Main3	2316.767	Q=400.0	240	627.57	633.57		633.63	0.000661	1.91	127.92	34.02	0.15
Main3	2399.65	Q=5.0	3	628.67	629.12	628.89	629.13	0.005106	0.83	3.62	11.25	0.26
Main3	2399.65	Q=10.0	6	628.67	629.2		629.23	0.01017	1.3	4.61	12.14	0.37
Main3	2399.65	Q=15.0	9	628.67	629.33	629.06	629.36	0.009921	1.46	6.17	13.44	0.38
Main3	2399.65	Q=25.0	15	628.67	629.51	629.19	629.56	0.009551	1.69	8.88	15.29	0.39
Main3	2399.65	Q=50.0	30	628.67	629.84	629.41	629.91	0.008647	2.15	14.13	17.36	0.4
Main3	2399.65	Q=75.0	45	628.67	630.09	629.58	630.18	0.008211	2.46	18.65	18.96	0.4
Main3	2399.65	Q=100.0	60	628.67	630.3	629.73	630.41	0.007813	2.69	22.86	20.34	0.4
Main3	2399.65	Q=125.0	75	628.67	630.48	629.86	630.61	0.007628	2.89	26.67	21.51	0.41
Main3	2399.65	Q=150.0	90	628.67	630.64	629.97	630.78	0.007519	3.06	30.22	22.54	0.41
Main3	2399.65	Q=175.0	105	628.67	630.78	630.09	630.94	0.00748	3.22	33.46	23.23	0.42
Main3	2399.65	Q=200.0	120	628.67	630.92	630.19	631.09	0.007368	3.35	36.69	23.89	0.42
Main3	2399.65	Q=250.0	150	628.67	631.17	630.38	631.36	0.007196	3.58	42.73	24.91	0.42
Main3	2399.65	Q=300.0	180	628.67	631.39	630.55	631.61	0.007077	3.78	48.34	25.75	0.42

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	2399.65	Q=350.0	210	628.67	631.65	630.7	631.88	0.006385	3.84	55.25	26.74	0.41
Main3	2399.65	Q=400.0	240	628.67	633.62		633.69	0.000897	2.07	115.26	34.14	0.17
Main3	2477.854	Q=5.0	3	630.36	630.74	630.74	630.83	0.091815	2.45	1.23	6.54	1
Main3	2477.854	Q=10.0	6	630.36	630.86	630.85	630.98	0.078394	2.81	2.14	8.25	0.97
Main3	2477.854	Q=15.0	9	630.36	630.94	630.94	631.09	0.076554	3.2	2.82	8.89	0.99
Main3	2477.854	Q=25.0	15	630.36	631.03	631.07	631.29	0.091012	4.06	3.71	9.53	1.12
Main3	2477.854	Q=50.0	30	630.36	631.27	631.33	631.64	0.073929	4.92	6.18	11.04	1.09
Main3	2477.854	Q=75.0	45	630.36	631.44	631.53	631.92	0.070467	5.63	8.15	12.1	1.11
Main3	2477.854	Q=100.0	60	630.36	631.6	631.7	632.15	0.06521	6.09	10.08	13.05	1.1
Main3	2477.854	Q=125.0	75	630.36	631.75	631.86	632.35	0.05741	6.31	12.18	14	1.06
Main3	2477.854	Q=150.0	90	630.36	631.89	631.99	632.52	0.052508	6.52	14.14	14.75	1.03
Main3	2477.854	Q=175.0	105	630.36	632.04	632.11	632.68	0.04578	6.56	16.37	15.5	0.98
Main3	2477.854	Q=200.0	120	630.36	632.17	632.23	632.83	0.040734	6.6	18.58	16.2	0.94
Main3	2477.854	Q=250.0	150	630.36	632.28	632.43	633.13	0.048944	7.55	20.27	16.71	1.04
Main3	2477.854	Q=300.0	180	630.36	632.43	632.62	633.39	0.048421	7.98	22.95	17.5	1.05
Main3	2477.854	Q=350.0	210	630.36	632.58	632.8	633.63	0.047946	8.36	25.51	18.2	1.06
Main3	2477.854	Q=400.0	240	630.36	633.54	632.96	633.97	0.011441	5.34	45.16	22.84	0.55
T3	96.21163	Q=5.0	1	638.2	638.31	638.37	638.48	0.632586	3.27	0.31	4.49	2.21
T3	96.21163	Q=10.0	2	638.2	638.47	638.42	638.52	0.041706	1.65	1.21	6.47	0.67
T3	96.21163	Q=15.0	3	638.2	638.51	638.47	638.58	0.052741	2.02	1.48	6.95	0.77
T3	96.21163	Q=25.0	5	638.2	638.54	638.56	638.68	0.100814	2.95	1.69	7.3	1.08
T3	96.21163	Q=50.0	10	638.2	638.65	638.71	638.89	0.129245	3.93	2.54	8.58	1.27
T3	96.21163	Q=75.0	15	638.2	638.72	638.82	639.07	0.157858	4.73	3.17	9.41	1.44
T3	96.21163	Q=100.0	20	638.2	638.77	638.92	639.23	0.183337	5.41	3.7	10.06	1.57
T3	96.21163	Q=125.0	25	638.2	638.82	638.99	639.38	0.209398	6.03	4.15	10.58	1.7
T3	96.21163	Q=150.0	30	638.2	638.88	639.06	639.48	0.199107	6.22	4.82	11.32	1.68
T3	96.21163	Q=175.0	35	638.2	638.94	639.13	639.57	0.184656	6.36	5.5	11.89	1.64
T3	96.21163	Q=200.0	40	638.2	638.99	639.19	639.65	0.171744	6.5	6.16	12.36	1.61
T3	96.21163	Q=250.0	50	638.2	639.08	639.3	639.82	0.159248	6.94	7.24	12.84	1.59
T3	96.21163	Q=300.0	60	638.2	639.15	639.41	639.99	0.154361	7.38	8.19	13.24	1.59
T3	96.21163	Q=350.0	70	638.2	639.22	639.5	640.15	0.149437	7.76	9.12	13.63	1.59

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T3	96.21163	Q=400.0	80	638.2	639.29	639.59	640.29	0.144796	8.08	10.03	14	1.59
T3	169.9622	Q=5.0	1	644.9	645.16	645.16	645.22	0.104219	2.03	0.49	3.82	1
T3	169.9622	Q=10.0	2	644.9	645.24	645.24	645.32	0.098666	2.36	0.85	5.01	1.01
T3	169.9622	Q=15.0	3	644.9	645.3	645.3	645.4	0.089952	2.53	1.19	5.93	1
T3	169.9622	Q=25.0	5	644.9	645.39	645.39	645.51	0.085704	2.87	1.75	7.06	1.01
T3	169.9622	Q=50.0	10	644.9	645.54	645.54	645.72	0.069735	3.47	2.91	8.18	0.98
T3	169.9622	Q=75.0	15	644.9	645.66	645.66	645.89	0.060584	3.87	3.94	8.89	0.95
T3	169.9622	Q=100.0	20	644.9	645.76	645.76	646.02	0.05512	4.17	4.89	9.51	0.94
T3	169.9622	Q=125.0	25	644.9	645.85	645.85	646.15	0.050956	4.41	5.8	10.06	0.92
T3	169.9622	Q=150.0	30	644.9	645.92	645.94	646.26	0.052425	4.74	6.47	10.45	0.95
T3	169.9622	Q=175.0	35	644.9	645.98	646.01	646.36	0.054748	5.08	7.06	10.78	0.98
T3	169.9622	Q=200.0	40	644.9	646.02	646.09	646.46	0.057368	5.4	7.59	11.07	1.02
T3	169.9622	Q=250.0	50	644.9	646.12	646.21	646.64	0.060012	5.91	8.66	11.63	1.06
T3	169.9622	Q=300.0	60	644.9	646.21	646.33	646.8	0.061044	6.32	9.72	12.16	1.08
T3	169.9622	Q=350.0	70	644.9	646.29	646.44	646.95	0.062257	6.7	10.7	12.63	1.11
T3	169.9622	Q=400.0	80	644.9	646.36	646.54	647.1	0.063545	7.05	11.62	13.05	1.13
T3	272.8936	Q=5.0	1	654.98	655.2	655.22	655.29	0.165778	2.33	0.43	3.83	1.23
T3	272.8936	Q=10.0	2	654.98	655.26	655.3	655.4	0.189399	2.92	0.69	4.84	1.37
T3	272.8936	Q=15.0	3	654.98	655.3	655.36	655.48	0.208669	3.35	0.9	5.54	1.47
T3	272.8936	Q=25.0	5	654.98	655.36	655.44	655.62	0.252454	4.08	1.22	6.47	1.65
T3	272.8936	Q=50.0	10	654.98	655.45	655.58	655.88	0.296997	5.25	1.9	7.86	1.87
T3	272.8936	Q=75.0	15	654.98	655.52	655.7	656.11	0.313564	6.21	2.42	8.35	1.99
T3	272.8936	Q=100.0	20	654.98	655.57	655.79	656.33	0.328104	7.04	2.86	8.61	2.09
T3	272.8936	Q=125.0	25	654.98	655.63	655.88	656.47	0.287068	7.37	3.42	8.95	2.01
T3	272.8936	Q=150.0	30	654.98	655.7	655.96	656.58	0.250999	7.58	4.01	9.28	1.93
T3	272.8936	Q=175.0	35	654.98	655.75	656.04	656.68	0.228954	7.81	4.55	9.58	1.88
T3	272.8936	Q=200.0	40	654.98	655.81	656.11	656.77	0.208503	7.97	5.11	9.87	1.82
T3	272.8936	Q=250.0	50	654.98	655.9	656.24	656.98	0.192879	8.44	6.04	10.35	1.79
T3	272.8936	Q=300.0	60	654.98	655.98	656.35	657.18	0.18809	8.94	6.85	10.75	1.8
T3	272.8936	Q=350.0	70	654.98	656.05	656.46	657.37	0.182515	9.35	7.64	11.13	1.8
T3	272.8936	Q=400.0	80	654.98	656.12	656.56	657.54	0.17684	9.71	8.42	11.48	1.8

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T3	289.157	Q=5.0	1	657.09	657.34	657.34	657.4	0.111702	2.03	0.49	4.02	1.02
T3	289.157	Q=10.0	2	657.09	657.41	657.41	657.5	0.099167	2.31	0.87	5.33	1.01
T3	289.157	Q=15.0	3	657.09	657.47	657.47	657.57	0.091526	2.48	1.21	6.3	1
T3	289.157	Q=25.0	5	657.09	657.56	657.56	657.68	0.079844	2.81	1.79	7.29	0.98
T3	289.157	Q=50.0	10	657.09	657.71	657.71	657.88	0.069261	3.34	3.03	9.03	0.97
T3	289.157	Q=75.0	15	657.09	657.82	657.82	658.03	0.06252	3.7	4.1	10.1	0.96
T3	289.157	Q=100.0	20	657.09	657.92	657.92	658.16	0.056459	3.98	5.09	10.87	0.94
T3	289.157	Q=125.0	25	657.09	657.98	658	658.27	0.058669	4.36	5.81	11.4	0.97
T3	289.157	Q=150.0	30	657.09	658.03	658.08	658.38	0.062347	4.74	6.42	11.83	1.02
T3	289.157	Q=175.0	35	657.09	658.08	658.15	658.47	0.064776	5.07	7.02	12.22	1.05
T3	289.157	Q=200.0	40	657.09	658.12	658.21	658.57	0.068378	5.4	7.52	12.51	1.09
T3	289.157	Q=250.0	50	657.09	658.21	658.33	658.73	0.068787	5.83	8.68	13.14	1.11
T3	289.157	Q=300.0	60	657.09	658.31	658.44	658.88	0.064917	6.08	9.97	13.82	1.1
T3	289.157	Q=350.0	70	657.09	658.4	658.53	659.01	0.062418	6.32	11.19	14.42	1.09
T3	289.157	Q=400.0	80	657.09	658.48	658.62	659.13	0.060645	6.53	12.34	14.97	1.09
T3	354.6973	Q=5.0	1	660.8	661.04	661	661.06	0.033292	1.14	0.88	7.02	0.56
T3	354.6973	Q=10.0	2	660.8	661.1	661.05	661.14	0.035258	1.47	1.37	8.16	0.61
T3	354.6973	Q=15.0	3	660.8	661.15	661.1	661.2	0.036758	1.69	1.79	9.02	0.65
T3	354.6973	Q=25.0	5	660.8	661.22	661.17	661.29	0.040065	2.09	2.41	9.76	0.7
T3	354.6973	Q=50.0	10	660.8	661.34	661.3	661.45	0.043766	2.78	3.64	11	0.78
T3	354.6973	Q=75.0	15	660.8	661.42	661.4	661.59	0.047483	3.3	4.61	11.89	0.84
T3	354.6973	Q=100.0	20	660.8	661.49	661.48	661.7	0.052	3.75	5.4	12.56	0.9
T3	354.6973	Q=125.0	25	660.8	661.56	661.56	661.8	0.049644	3.99	6.34	13.33	0.9
T3	354.6973	Q=150.0	30	660.8	661.63	661.63	661.89	0.046689	4.16	7.3	14.06	0.88
T3	354.6973	Q=175.0	35	660.8	661.69	661.69	661.98	0.044767	4.31	8.2	14.71	0.88
T3	354.6973	Q=200.0	40	660.8	661.75	661.75	662.05	0.042409	4.42	9.1	15.2	0.87
T3	354.6973	Q=250.0	50	660.8	661.85	661.85	662.2	0.041646	4.72	10.59	15.98	0.87
T3	354.6973	Q=300.0	60	660.8	661.92	661.95	662.33	0.04336	5.07	11.78	16.58	0.9
T3	354.6973	Q=350.0	70	660.8	661.99	662.04	662.45	0.044559	5.38	12.92	17.13	0.93
T3	354.6973	Q=400.0	80	660.8	662.05	662.12	662.56	0.045437	5.64	14.02	17.64	0.94

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T3	424.3411	Q=5.0	1	663.63	663.81	663.78	663.83	0.048335	1.25	0.8	7.93	0.66
T3	424.3411	Q=10.0	2	663.63	663.87	663.84	663.9	0.045119	1.59	1.28	9.07	0.69
T3	424.3411	Q=15.0	3	663.63	663.91	663.88	663.96	0.042865	1.8	1.69	9.96	0.7
T3	424.3411	Q=25.0	5	663.63	663.98	663.94	664.04	0.039279	2.09	2.43	11.38	0.7
T3	424.3411	Q=50.0	10	663.63	664.1	664.06	664.2	0.035747	2.54	3.97	13.89	0.71
T3	424.3411	Q=75.0	15	663.63	664.19	664.15	664.32	0.033128	2.81	5.32	15.48	0.71
T3	424.3411	Q=100.0	20	663.63	664.27	664.23	664.42	0.030268	2.97	6.61	16.55	0.69
T3	424.3411	Q=125.0	25	663.63	664.33	664.29	664.5	0.031102	3.21	7.59	17.31	0.71
T3	424.3411	Q=150.0	30	663.63	664.38	664.34	664.58	0.032581	3.45	8.42	17.94	0.74
T3	424.3411	Q=175.0	35	663.63	664.42	664.4	664.65	0.033584	3.65	9.24	18.53	0.76
T3	424.3411	Q=200.0	40	663.63	664.46	664.45	664.71	0.034683	3.85	9.99	19.06	0.78
T3	424.3411	Q=250.0	50	663.63	664.54	664.54	664.84	0.034967	4.13	11.56	20.12	0.79
T3	424.3411	Q=300.0	60	663.63	664.63	664.63	664.95	0.033168	4.29	13.31	21.24	0.78
T3	424.3411	Q=350.0	70	663.63	664.7	664.7	665.05	0.031865	4.43	14.97	22.25	0.78
T3	424.3411	Q=400.0	80	663.63	664.78	664.78	665.14	0.030719	4.55	16.61	23.24	0.77
Main4	2495.241	Q=5.0	2	631.61	631.85	631.88	631.97	0.115996	2.74	0.73	6.04	1.39
Main4	2495.241	Q=10.0	4	631.61	631.94	631.97	632.08	0.076778	2.93	1.36	7.47	1.21
Main4	2495.241	Q=15.0	6	631.61	632.01	632.04	632.17	0.066749	3.14	1.91	8.52	1.17
Main4	2495.241	Q=25.0	10	631.61	632.12	632.15	632.3	0.058065	3.44	2.9	10.15	1.13
Main4	2495.241	Q=50.0	20	631.61	632.33	632.33	632.55	0.037346	3.78	5.38	13.12	0.98
Main4	2495.241	Q=75.0	30	631.61	632.48	632.48	632.74	0.031168	4.16	7.47	15.05	0.94
Main4	2495.241	Q=100.0	40	631.61	632.6	632.6	632.9	0.028049	4.47	9.43	16.66	0.92
Main4	2495.241	Q=125.0	50	631.61	632.71	632.71	633.04	0.026431	4.74	11.24	18.02	0.91
Main4	2495.241	Q=150.0	60	631.61	632.81	632.81	633.16	0.024381	4.92	13.14	19.27	0.9
Main4	2495.241	Q=175.0	70	631.61	632.89	632.89	633.27	0.023755	5.13	14.76	20.14	0.9
Main4	2495.241	Q=200.0	80	631.61	632.97	632.97	633.37	0.02272	5.28	16.44	20.92	0.89
Main4	2495.241	Q=250.0	100	631.61	633.16	633.11	633.55	0.018565	5.31	20.51	22.23	0.82
Main4	2495.241	Q=300.0	120	631.61	633.39		633.74	0.013769	5.09	25.7	23.79	0.73
Main4	2495.241	Q=350.0	140	631.61	633.6		633.93	0.010897	4.94	30.93	25.27	0.66
Main4	2495.241	Q=400.0	160	631.61	633.86		634.15	0.008022	4.66	37.73	27.25	0.58
Main4	2604.15		Culvert									

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main4	2750.24	Q=5.0	2	639.26	639.87	639.46	639.87	0.000331	0.33	6.07	15.38	0.09
Main4	2750.24	Q=10.0	4	639.26	640.13	639.53	640.14	0.000256	0.39	10.54	18.64	0.09
Main4	2750.24	Q=15.0	6	639.26	640.34	639.59	640.34	0.000215	0.43	14.52	20.58	0.08
Main4	2750.24	Q=25.0	10	639.26	640.66	639.68	640.67	0.000176	0.48	21.75	23.3	0.08
Main4	2750.24	Q=50.0	20	639.26	641.29	639.85	641.29	0.000137	0.57	37.82	28.12	0.07
Main4	2750.24	Q=75.0	30	639.26	641.79	639.98	641.8	0.000117	0.62	53.3	33.49	0.07
Main4	2750.24	Q=100.0	40	639.26	642.24	640.09	642.24	0.000101	0.65	69.25	38.32	0.07
Main4	2750.24	Q=125.0	50	639.26	642.65	640.18	642.65	0.000088	0.66	85.91	43.48	0.07
Main4	2750.24	Q=150.0	60	639.26	643.04	640.26	643.04	0.000077	0.67	103.88	48.99	0.06
Main4	2750.24	Q=175.0	70	639.26	643.41	640.34	643.42	0.000067	0.67	123.41	55.21	0.06
Main4	2750.24	Q=200.0	80	639.26	643.78	640.42	643.79	0.000059	0.66	145.17	62.78	0.06
Main4	2750.24	Q=250.0	100	639.26	644.14	640.55	644.15	0.000062	0.72	169.13	68.42	0.06
Main4	2750.24	Q=300.0	120	639.26	644.26	640.68	644.27	0.000078	0.82	177.45	69.63	0.07
Main4	2750.24	Q=350.0	140	639.26	644.38	640.79	644.39	0.000093	0.91	185.86	70.67	0.07
Main4	2750.24	Q=400.0	160	639.26	644.49	640.89	644.5	0.000108	1	193.51	71.59	0.08
Main4	2839.712	Q=5.0	2	639.9	640.15	640.15	640.22	0.058721	2.01	0.99	7.84	1
Main4	2839.712	Q=10.0	4	639.9	640.24	640.24	640.32	0.042607	2.27	1.76	9.15	0.91
Main4	2839.712	Q=15.0	6	639.9	640.39	640.29	640.44	0.016128	1.89	3.17	10.37	0.6
Main4	2839.712	Q=25.0	10	639.9	640.71	640.39	640.74	0.00453	1.44	6.92	13.08	0.35
Main4	2839.712	Q=50.0	20	639.9	641.32	640.57	641.34	0.001399	1.24	16.37	17.67	0.22
Main4	2839.712	Q=75.0	30	639.9	641.81	640.72	641.83	0.000777	1.2	25.97	21.09	0.17
Main4	2839.712	Q=100.0	40	639.9	642.25	640.85	642.27	0.000537	1.18	35.9	24.07	0.15
Main4	2839.712	Q=125.0	50	639.9	642.66	640.96	642.68	0.000403	1.16	46.14	26.17	0.13
Main4	2839.712	Q=150.0	60	639.9	643.04		643.06	0.00032	1.15	56.57	27.86	0.12
Main4	2839.712	Q=175.0	70	639.9	643.42		643.44	0.000262	1.13	67.28	29.5	0.11
Main4	2839.712	Q=200.0	80	639.9	643.78		643.8	0.000219	1.11	78.42	31.11	0.11
Main4	2839.712	Q=250.0	100	639.9	644.15		644.17	0.00023	1.22	89.99	32.64	0.11
Main4	2839.712	Q=300.0	120	639.9	644.27		644.3	0.000292	1.4	93.96	33.14	0.12
Main4	2839.712	Q=350.0	140	639.9	644.39		644.42	0.000352	1.57	97.96	33.64	0.14
Main4	2839.712	Q=400.0	160	639.9	644.5		644.54	0.000414	1.73	101.6	34.09	0.15

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main4	2974.972	Q=5.0	2	641.89	642.23		642.24	0.006654	0.77	2.59	11.31	0.28
Main4	2974.972	Q=10.0	4	641.89	642.34		642.35	0.007534	1.02	3.94	12.98	0.31
Main4	2974.972	Q=15.0	6	641.89	642.37		642.4	0.013067	1.4	4.3	13.38	0.42
Main4	2974.972	Q=25.0	10	641.89	642.29	642.29	642.43	0.074252	2.97	3.38	12.32	0.97
Main4	2974.972	Q=50.0	20	641.89	642.46	642.46	642.66	0.063726	3.53	5.68	14.85	0.95
Main4	2974.972	Q=75.0	30	641.89	642.59	642.59	642.83	0.057562	3.91	7.63	16.44	0.94
Main4	2974.972	Q=100.0	40	641.89	642.7	642.7	642.97	0.05039	4.16	9.57	17.87	0.91
Main4	2974.972	Q=125.0	50	641.89	642.8	642.8	643.1	0.046286	4.37	11.37	19.2	0.89
Main4	2974.972	Q=150.0	60	641.89	643.05		643.25	0.020565	3.55	16.72	22.79	0.62
Main4	2974.972	Q=175.0	70	641.89	643.46		643.56	0.006494	2.5	27.32	29.29	0.37
Main4	2974.972	Q=200.0	80	641.89	643.82	643.05	643.89	0.002857	1.93	38.83	33.17	0.26
Main4	2974.972	Q=250.0	100	641.89	644.19	643.18	644.25	0.001837	1.76	51.4	35.77	0.21
Main4	2974.972	Q=300.0	120	641.89	644.32	643.3	644.39	0.002004	1.91	56.15	36.7	0.22
Main4	2974.972	Q=350.0	140	641.89	644.45	643.4	644.53	0.002109	2.03	60.97	37.63	0.23
Main4	2974.972	Q=400.0	160	641.89	644.56	643.5	644.66	0.002212	2.15	65.42	38.46	0.24
Main4	3119.75	Q=5.0	2	643.95	644.2	644.16	644.24	0.043571	1.57	1.28	7.6	0.67
Main4	3119.75	Q=10.0	4	643.95	644.32		644.37	0.033703	1.76	2.27	9.37	0.63
Main4	3119.75	Q=15.0	6	643.95	644.47		644.51	0.016385	1.58	3.81	11.16	0.47
Main4	3119.75	Q=25.0	10	643.95	644.74	644.41	644.77	0.006799	1.4	7.19	13.84	0.33
Main4	3119.75	Q=50.0	20	643.95	644.99	644.6	645.04	0.007323	1.84	10.89	16	0.36
Main4	3119.75	Q=75.0	30	643.95	645.17	644.75	645.24	0.007718	2.16	13.9	17.59	0.38
Main4	3119.75	Q=100.0	40	643.95	645.31	644.87	645.4	0.008199	2.43	16.45	18.92	0.4
Main4	3119.75	Q=125.0	50	643.95	645.43	644.97	645.54	0.008526	2.65	18.8	20.07	0.42
Main4	3119.75	Q=150.0	60	643.95	645.41	645.07	645.58	0.012876	3.23	18.51	19.93	0.51
Main4	3119.75	Q=175.0	70	643.95	645.18	645.17	645.56	0.040838	4.99	14.03	17.66	0.88
Main4	3119.75	Q=200.0	80	643.95	645.25	645.25	645.67	0.040596	5.22	15.34	18.35	0.89
Main4	3119.75	Q=250.0	100	643.95	645.4	645.4	645.87	0.037029	5.45	18.3	19.83	0.87
Main4	3119.75	Q=300.0	120	643.95	645.54	645.54	646.04	0.034343	5.64	21.15	21.16	0.85
Main4	3119.75	Q=350.0	140	643.95	645.66	645.66	646.2	0.03299	5.84	23.74	22.29	0.84
Main4	3119.75	Q=400.0	160	643.95	645.78	645.78	646.35	0.030963	5.96	26.48	23.44	0.83
Main4	3274.45	Q=5.0	2	647.14	647.46		647.48	0.012221	0.93	2.14	10.74	0.37

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main4	3274.45	Q=10.0	4	647.14	647.56		647.59	0.01412	1.21	3.31	12.55	0.41
Main4	3274.45	Q=15.0	6	647.14	647.58		647.63	0.025516	1.68	3.58	12.93	0.56
Main4	3274.45	Q=25.0	10	647.14	647.57	647.57	647.7	0.08351	2.96	3.38	12.65	1.01
Main4	3274.45	Q=50.0	20	647.14	647.73	647.73	647.92	0.075152	3.49	5.73	15.61	1.01
Main4	3274.45	Q=75.0	30	647.14	647.86	647.86	648.09	0.065175	3.88	7.77	17.24	0.98
Main4	3274.45	Q=100.0	40	647.14	647.96	647.96	648.23	0.057906	4.17	9.68	18.47	0.96
Main4	3274.45	Q=125.0	50	647.14	648.06	648.06	648.36	0.052714	4.4	11.49	19.57	0.94
Main4	3274.45	Q=150.0	60	647.14	648.25		648.49	0.029842	3.91	15.52	21.8	0.74
Main4	3274.45	Q=175.0	70	647.14	648.57		648.72	0.012046	3.05	22.88	24.71	0.49
Main4	3274.45	Q=200.0	80	647.14	648.65		648.81	0.01202	3.18	24.92	25.37	0.5
Main4	3274.45	Q=250.0	100	647.14	648.78		648.98	0.012509	3.47	28.33	26.3	0.52
Main4	3274.45	Q=300.0	120	647.14	648.9		649.13	0.012878	3.71	31.48	27.03	0.53
Main4	3274.45	Q=350.0	140	647.14	649.01		649.27	0.013103	3.93	34.51	27.71	0.54
Main4	3274.45	Q=400.0	160	647.14	649.11		649.4	0.013516	4.14	37.18	28.3	0.55
Main4	3341.399	Q=5.0	2	647.32	647.74	647.49	647.74	0.002027	0.51	3.92	13.95	0.16
Main4	3341.399	Q=10.0	4	647.32	647.88	647.56	647.88	0.002101	0.67	6.03	16.01	0.18
Main4	3341.399	Q=15.0	6	647.32	647.98	647.61	647.99	0.002228	0.79	7.67	17.45	0.19
Main4	3341.399	Q=25.0	10	647.32	648.14	647.7	648.15	0.002189	0.93	10.71	19.63	0.19
Main4	3341.399	Q=50.0	20	647.32	648.4		648.42	0.002419	1.2	16.21	22.89	0.21
Main4	3341.399	Q=75.0	30	647.32	648.58		648.61	0.002636	1.4	20.46	24.75	0.23
Main4	3341.399	Q=100.0	40	647.32	648.72		648.77	0.002794	1.56	24.16	26.21	0.24
Main4	3341.399	Q=125.0	50	647.32	648.85		648.9	0.002897	1.69	27.58	27.48	0.25
Main4	3341.399	Q=150.0	60	647.32	648.94		649	0.003199	1.85	30.07	28.36	0.26
Main4	3341.399	Q=175.0	70	647.32	649.04		649.11	0.003272	1.95	33	29.37	0.27
Main4	3341.399	Q=200.0	80	647.32	649.13		649.21	0.003329	2.04	35.82	30.3	0.28
Main4	3341.399	Q=250.0	100	647.32	649.3		649.4	0.003434	2.21	41.02	31.85	0.28
Main4	3341.399	Q=300.0	120	647.32	649.45		649.56	0.00353	2.35	45.77	33.1	0.29
Main4	3341.399	Q=350.0	140	647.32	649.59		649.71	0.003574	2.47	50.42	34.28	0.3
Main4	3341.399	Q=400.0	160	647.32	649.71		649.85	0.003612	2.58	54.81	35.27	0.3
Main4	3393.547	Q=5.0	2	647.89	648.14	648.14	648.2	0.102585	2.04	0.98	7.52	0.99
Main4	3393.547	Q=10.0	4	647.89	648.21	648.21	648.31	0.09119	2.46	1.63	8.6	1

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main4	3393.547	Q=15.0	6	647.89	648.28	648.28	648.39	0.08744	2.76	2.17	9.32	1.01
Main4	3393.547	Q=25.0	10	647.89	648.38	648.38	648.53	0.080742	3.15	3.17	10.52	1.01
Main4	3393.547	Q=50.0	20	647.89	648.64	648.57	648.79	0.045329	3.15	6.35	13.65	0.81
Main4	3393.547	Q=75.0	30	647.89	648.82	648.71	648.99	0.037495	3.31	9.06	15.81	0.77
Main4	3393.547	Q=100.0	40	647.89	648.96	648.83	649.16	0.032308	3.54	11.34	16.85	0.74
Main4	3393.547	Q=125.0	50	647.89	649.08	648.93	649.3	0.029591	3.76	13.41	17.73	0.72
Main4	3393.547	Q=150.0	60	647.89	649.19	649.02	649.43	0.028255	3.97	15.28	18.49	0.72
Main4	3393.547	Q=175.0	70	647.89	649.28	649.11	649.54	0.02718	4.15	17.07	19.19	0.72
Main4	3393.547	Q=200.0	80	647.89	649.37	649.19	649.65	0.02638	4.32	18.78	19.83	0.72
Main4	3393.547	Q=250.0	100	647.89	649.52	649.34	649.85	0.025413	4.62	21.94	20.97	0.72
Main4	3393.547	Q=300.0	120	647.89	649.66	649.48	650.02	0.025024	4.9	24.8	21.94	0.73
Main4	3393.547	Q=350.0	140	647.89	649.78	649.6	650.18	0.024569	5.13	27.57	22.85	0.73
Main4	3393.547	Q=400.0	160	647.89	649.89	649.71	650.33	0.024238	5.34	30.17	23.56	0.73
T4	113.4469	Q=5.0	1	651.98	652.19	652.12	652.21	0.006841	0.88	1.13	7.29	0.4
T4	113.4469	Q=10.0	2	651.98	652.28	652.17	652.3	0.007243	1.11	1.8	8.59	0.43
T4	113.4469	Q=15.0	3	651.98	652.34	652.22	652.37	0.007369	1.26	2.38	9.58	0.44
T4	113.4469	Q=25.0	5	651.98	652.44	652.29	652.47	0.007639	1.51	3.32	10.69	0.47
T4	113.4469	Q=50.0	10	651.98	652.3	652.42	652.7	0.141804	5.1	1.96	8.87	1.91
T4	113.4469	Q=75.0	15	651.98	652.34	652.52	652.96	0.183477	6.28	2.39	9.58	2.22
T4	113.4469	Q=100.0	20	651.98	652.39	652.61	653.15	0.193319	7	2.86	10.21	2.32
T4	113.4469	Q=125.0	25	651.98	652.43	652.68	653.36	0.208804	7.77	3.22	10.59	2.45
T4	113.4469	Q=150.0	30	651.98	652.46	652.75	653.55	0.217324	8.39	3.59	10.96	2.54
T4	113.4469	Q=175.0	35	651.98	652.49	652.82	653.73	0.224626	8.94	3.94	11.3	2.61
T4	113.4469	Q=200.0	40	651.98	652.52	652.88	653.9	0.229028	9.42	4.29	11.62	2.67
T4	113.4469	Q=250.0	50	651.98	652.58	652.99	654.22	0.239029	10.3	4.93	12.2	2.77
T4	113.4469	Q=300.0	60	651.98	652.63	653.1	654.48	0.237104	10.96	5.59	12.76	2.8
T4	113.4469	Q=350.0	70	651.98	652.68	653.2	654.74	0.232952	11.59	6.22	13.26	2.82
T4	113.4469	Q=400.0	80	651.98	652.72	653.29	654.98	0.227205	12.12	6.85	13.74	2.83
T4	192.0233	Q=5.0	1	657.33	657.46	657.46	657.5	0.05569	1.72	0.58	6.7	1.03
T4	192.0233	Q=10.0	2	657.33	657.53	657.53	657.58	0.033982	1.79	1.11	8.3	0.86
T4	192.0233	Q=15.0	3	657.33	657.56	657.56	657.63	0.043585	2.21	1.36	8.93	1

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T4	192.0233	Q=25.0	5	657.33	657.63	657.63	657.72	0.040178	2.48	2.02	10.46	1
T4	192.0233	Q=50.0	10	657.33	657.74	657.74	657.88	0.037682	3.08	3.27	12.09	1.03
T4	192.0233	Q=75.0	15	657.33	657.83	657.83	658.01	0.032048	3.39	4.5	13.22	0.99
T4	192.0233	Q=100.0	20	657.33	657.91	657.91	658.12	0.030474	3.74	5.51	13.9	0.99
T4	192.0233	Q=125.0	25	657.33	657.98	657.98	658.22	0.028617	4	6.52	14.54	0.99
T4	192.0233	Q=150.0	30	657.33	658.04	658.04	658.32	0.027339	4.24	7.48	15.14	0.99
T4	192.0233	Q=175.0	35	657.33	658.11	658.11	658.41	0.026208	4.44	8.43	15.7	0.98
T4	192.0233	Q=200.0	40	657.33	658.16	658.16	658.49	0.025322	4.63	9.36	16.23	0.98
T4	192.0233	Q=250.0	50	657.33	658.28	658.28	658.64	0.023558	4.93	11.23	17.25	0.97
T4	192.0233	Q=300.0	60	657.33	658.38	658.38	658.78	0.022547	5.21	12.99	18.15	0.97
T4	192.0233	Q=350.0	70	657.33	658.47	658.47	658.91	0.021653	5.45	14.73	18.91	0.96
T4	192.0233	Q=400.0	80	657.33	658.56	658.56	659.03	0.02089	5.67	16.45	19.63	0.96
T4	313.2001	Q=5.0	1	657.36	657.76	657.53	657.76	0.000623	0.42	2.62	10.51	0.13
T4	313.2001	Q=10.0	2	657.36	657.88	657.6	657.88	0.00079	0.58	3.94	12.12	0.16
T4	313.2001	Q=15.0	3	657.36	657.96	657.63	657.97	0.000897	0.71	5.07	13.34	0.17
T4	313.2001	Q=25.0	5	657.36	658.1	657.69	658.11	0.001049	0.89	7.01	15.04	0.2
T4	313.2001	Q=50.0	10	657.36	658.33	657.83	658.35	0.001331	1.24	10.85	17.78	0.23
T4	313.2001	Q=75.0	15	657.36	658.5	657.94	658.53	0.001559	1.5	13.9	19.27	0.26
T4	313.2001	Q=100.0	20	657.36	658.64	658.03	658.68	0.001703	1.71	16.74	20.56	0.28
T4	313.2001	Q=125.0	25	657.36	658.76	658.11	658.81	0.001827	1.89	19.31	21.62	0.29
T4	313.2001	Q=150.0	30	657.36	658.87	658.19	658.92	0.00194	2.06	21.68	22.45	0.31
T4	313.2001	Q=175.0	35	657.36	658.98	658.25	659.03	0.002001	2.19	24.08	23.27	0.31
T4	313.2001	Q=200.0	40	657.36	659.07	658.33	659.13	0.00209	2.33	26.22	23.97	0.32
T4	313.2001	Q=250.0	50	657.36	659.23	658.44	659.3	0.002263	2.58	30.14	25.2	0.34
T4	313.2001	Q=300.0	60	657.36	659.38	658.54	659.46	0.002373	2.79	34.01	26.37	0.36
T4	313.2001	Q=350.0	70	657.36	659.51	658.64	659.61	0.002479	2.98	37.64	27.41	0.37
T4	313.2001	Q=400.0	80	657.36	659.63	658.74	659.74	0.002575	3.16	41.09	28.37	0.38
T4	466.3508	Q=5.0	1	659.83	659.96	659.96	660.02	0.027966	1.9	0.53	5.31	1.06
T4	466.3508	Q=10.0	2	659.83	660.03	660.03	660.1	0.02156	2.2	0.91	6.02	1
T4	466.3508	Q=15.0	3	659.83	660.08	660.08	660.17	0.020167	2.45	1.22	6.54	1
T4	466.3508	Q=25.0	5	659.83	660.16	660.16	660.28	0.018493	2.79	1.79	7.4	1

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T4	466.3508	Q=50.0	10	659.83	660.31	660.31	660.48	0.016898	3.32	3.02	8.96	1.01
T4	466.3508	Q=75.0	15	659.83	660.43	660.43	660.63	0.015841	3.63	4.13	10.18	1.01
T4	466.3508	Q=100.0	20	659.83	660.52	660.52	660.76	0.015269	3.89	5.14	11.14	1.01
T4	466.3508	Q=125.0	25	659.83	660.6	660.6	660.87	0.014478	4.17	6.01	11.64	1.01
T4	466.3508	Q=150.0	30	659.83	660.67	660.67	660.97	0.013643	4.4	6.86	12.1	1
T4	466.3508	Q=175.0	35	659.83	660.74	660.74	661.06	0.012876	4.59	7.71	12.53	0.99
T4	466.3508	Q=200.0	40	659.83	660.8	660.8	661.15	0.012292	4.77	8.54	12.94	0.98
T4	466.3508	Q=250.0	50	659.83	660.93	660.93	661.32	0.011225	5.06	10.2	13.72	0.96
T4	466.3508	Q=300.0	60	659.83	661.04	661.04	661.47	0.010663	5.34	11.73	14.41	0.95
T4	466.3508	Q=350.0	70	659.83	661.14	661.14	661.6	0.010232	5.58	13.21	15.04	0.95
T4	466.3508	Q=400.0	80	659.83	661.23	661.23	661.73	0.009836	5.79	14.68	15.65	0.94
T5	3542.895	Q=5.0	1	658.11	658.41	658.4	658.46	0.048049	1.68	0.6	3.92	0.76
T5	3542.895	Q=10.0	2	658.11	658.49	658.47	658.56	0.056902	2.12	0.94	4.93	0.86
T5	3542.895	Q=15.0	3	658.11	658.55	658.53	658.64	0.060765	2.41	1.25	5.66	0.9
T5	3542.895	Q=25.0	5	658.11	658.63	658.63	658.76	0.072665	2.93	1.71	6.63	1.02
T5	3542.895	Q=50.0	10	658.11	658.78	658.79	658.97	0.068373	3.5	2.86	8.3	1.04
T5	3542.895	Q=75.0	15	658.11	658.9	658.91	659.13	0.055846	3.86	3.92	8.95	0.99
T5	3542.895	Q=100.0	20	658.11	658.94	659	659.28	0.073782	4.7	4.31	9.17	1.15
T5	3542.895	Q=125.0	25	658.11	659.02	659.1	659.41	0.070582	5.05	5.04	9.58	1.15
T5	3542.895	Q=150.0	30	658.11	659.09	659.18	659.53	0.068876	5.37	5.71	9.95	1.16
T5	3542.895	Q=175.0	35	658.11	659.16	659.26	659.63	0.065978	5.6	6.4	10.31	1.15
T5	3542.895	Q=200.0	40	658.11	659.22	659.33	659.73	0.063659	5.82	7.07	10.64	1.15
T5	3542.895	Q=250.0	50	658.11	659.34	659.47	659.91	0.059255	6.16	8.38	11.27	1.13
T5	3542.895	Q=300.0	60	658.11	659.45	659.58	660.07	0.056213	6.46	9.62	11.83	1.12
T5	3542.895	Q=350.0	70	658.11	659.54	659.69	660.21	0.054344	6.74	10.78	12.34	1.12
T5	3542.895	Q=400.0	80	658.11	659.64	659.79	660.35	0.052271	6.97	11.94	12.82	1.12
T5	3618.083	Q=5.0	1	662.17	662.43	662.43	662.48	0.051834	1.84	0.54	4.19	0.9
T5	3618.083	Q=10.0	2	662.17	662.51	662.5	662.58	0.050311	2.16	0.93	5.47	0.92
T5	3618.083	Q=15.0	3	662.17	662.57	662.56	662.65	0.047239	2.33	1.29	6.44	0.92
T5	3618.083	Q=25.0	5	662.17	662.66	662.64	662.76	0.04082	2.6	1.93	7.54	0.9
T5	3618.083	Q=50.0	10	662.17	662.79	662.79	662.97	0.042662	3.39	2.98	8.61	0.97

Hutchinson - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T5	3618.083	Q=75.0	15	662.17	662.87	662.9	663.13	0.050672	4.18	3.66	9.13	1.09
T5	3618.083	Q=100.0	20	662.17	662.98	663.01	663.27	0.039816	4.32	4.78	9.93	1.01
T5	3618.083	Q=125.0	25	662.17	663.05	663.1	663.39	0.041127	4.74	5.49	10.4	1.04
T5	3618.083	Q=150.0	30	662.17	663.12	663.18	663.5	0.041873	5.09	6.16	10.83	1.07
T5	3618.083	Q=175.0	35	662.17	663.17	663.25	663.61	0.043441	5.44	6.75	11.19	1.1
T5	3618.083	Q=200.0	40	662.17	663.22	663.32	663.71	0.044895	5.77	7.3	11.53	1.13
T5	3618.083	Q=250.0	50	662.17	663.3	663.45	663.89	0.047837	6.37	8.31	12.11	1.19
T5	3618.083	Q=300.0	60	662.17	663.38	663.57	664.07	0.05026	6.9	9.26	12.63	1.24
T5	3618.083	Q=350.0	70	662.17	663.45	663.67	664.22	0.051898	7.35	10.18	13.12	1.27
T5	3618.083	Q=400.0	80	662.17	663.51	663.77	664.38	0.054116	7.8	11	13.53	1.31
T5	3706.806	Q=5.0	1	665.9	666.12	666.09	666.15	0.033703	1.4	0.71	6	0.72
T5	3706.806	Q=10.0	2	665.9	666.18	666.15	666.23	0.034088	1.74	1.15	7.06	0.76
T5	3706.806	Q=15.0	3	665.9	666.23	666.2	666.29	0.035874	1.99	1.51	7.81	0.8
T5	3706.806	Q=25.0	5	665.9	666.3	666.28	666.39	0.041035	2.42	2.07	8.87	0.88
T5	3706.806	Q=50.0	10	665.9	666.43	666.41	666.57	0.038485	2.97	3.38	10.5	0.91
T5	3706.806	Q=75.0	15	665.9	666.52	666.52	666.71	0.043434	3.54	4.27	11.35	0.99
T5	3706.806	Q=100.0	20	665.9	666.6	666.6	666.83	0.040582	3.8	5.32	12.29	0.98
T5	3706.806	Q=125.0	25	665.9	666.68	666.68	666.93	0.038732	4.02	6.32	13.12	0.98
T5	3706.806	Q=150.0	30	665.9	666.75	666.75	667.02	0.037584	4.2	7.26	13.85	0.98
T5	3706.806	Q=175.0	35	665.9	666.81	666.81	667.11	0.035841	4.39	8.14	14.38	0.97
T5	3706.806	Q=200.0	40	665.9	666.87	666.87	667.19	0.034378	4.56	8.98	14.86	0.97
T5	3706.806	Q=250.0	50	665.9	666.98	666.98	667.33	0.031842	4.83	10.65	15.77	0.95
T5	3706.806	Q=300.0	60	665.9	667.08	667.08	667.46	0.029982	5.07	12.26	16.59	0.94
T5	3706.806	Q=350.0	70	665.9	667.17	667.17	667.59	0.028559	5.28	13.82	17.35	0.94
T5	3706.806	Q=400.0	80	665.9	667.26	667.26	667.7	0.027077	5.45	15.39	18.09	0.92

MacArthur - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
MacArthur	42.173	Q=1.0	1	593.26	593.37	593.37	593.41	0.104629	1.58	0.63	9.01	1.05
MacArthur	42.173	Q=2.0	2	593.26	593.42	593.42	593.47	0.086281	1.91	1.06	10.52	1.02
MacArthur	42.173	Q=4.0	4	593.26	593.49	593.49	593.56	0.063576	2.18	1.91	12.99	0.94
MacArthur	42.173	Q=6.0	6	593.26	593.54	593.54	593.63	0.058628	2.4	2.62	14.76	0.94
MacArthur	42.173	Q=8.0	8	593.26	593.58	593.58	593.68	0.058359	2.63	3.21	15.99	0.96
MacArthur	42.173	Q=10.0	10	593.26	593.62	593.62	593.73	0.053429	2.78	3.83	16.88	0.94
MacArthur	42.173	Q=15.0	15	593.26	593.68	593.69	593.83	0.056937	3.29	4.93	18.34	1
MacArthur	42.173	Q=20.0	20	593.26	593.73	593.76	593.92	0.06104	3.73	5.86	19.5	1.06
MacArthur	42.173	Q=25.0	25	593.26	593.77	593.82	594.01	0.065383	4.13	6.67	20.47	1.12
MacArthur	42.173	Q=30.0	30	593.26	593.81	593.87	594.08	0.068036	4.46	7.47	21.37	1.15
MacArthur	42.173	Q=35.0	35	593.26	593.84	593.92	594.15	0.071147	4.77	8.19	22.11	1.19
MacArthur	42.173	Q=40.0	40	593.26	593.87	593.96	594.22	0.07313	5.05	8.91	22.82	1.22
MacArthur	42.173	Q=50.0	50	593.26	593.93	594.05	594.34	0.076584	5.53	10.26	24.09	1.27
MacArthur	42.173	Q=60.0	60	593.26	593.98	594.11	594.45	0.079451	5.96	11.52	25.22	1.32
MacArthur	42.173	Q=70.0	70	593.26	594.03	594.19	594.55	0.081907	6.34	12.72	26.25	1.35
MacArthur	106.4246	Q=1.0	1	599.06	599.19	599.21	599.26	0.157536	2.18	0.46	5.44	1.32
MacArthur	106.4246	Q=2.0	2	599.06	599.23	599.27	599.36	0.182946	2.88	0.69	6.03	1.5
MacArthur	106.4246	Q=4.0	4	599.06	599.29	599.36	599.5	0.197783	3.69	1.08	6.91	1.64
MacArthur	106.4246	Q=6.0	6	599.06	599.34	599.42	599.61	0.200625	4.19	1.43	7.61	1.7
MacArthur	106.4246	Q=8.0	8	599.06	599.38	599.48	599.71	0.204392	4.59	1.74	8.18	1.75
MacArthur	106.4246	Q=10.0	10	599.06	599.41	599.53	599.78	0.201549	4.88	2.05	8.71	1.77
MacArthur	106.4246	Q=15.0	15	599.06	599.5	599.64	599.94	0.182273	5.38	2.8	9.87	1.75
MacArthur	106.4246	Q=20.0	20	599.06	599.57	599.73	600.07	0.164518	5.73	3.53	10.82	1.71
MacArthur	106.4246	Q=25.0	25	599.06	599.63	599.8	600.19	0.149575	6.08	4.19	11.43	1.67
MacArthur	106.4246	Q=30.0	30	599.06	599.68	599.87	600.31	0.142837	6.43	4.8	11.96	1.67
MacArthur	106.4246	Q=35.0	35	599.06	599.73	599.94	600.41	0.135846	6.71	5.41	12.47	1.65
MacArthur	106.4246	Q=40.0	40	599.06	599.77	600	600.51	0.132362	7	5.97	12.9	1.66
MacArthur	106.4246	Q=50.0	50	599.06	599.85	600.11	600.69	0.126746	7.5	7.04	13.55	1.66
MacArthur	106.4246	Q=60.0	60	599.06	599.93	600.22	600.86	0.123015	7.95	8.05	14.14	1.66
MacArthur	106.4246	Q=70.0	70	599.06	599.99	600.31	601.01	0.120023	8.34	9.02	14.68	1.67
MacArthur	150.1035	Q=1.0	1	604.53	604.73	604.74	604.79	0.103834	1.97	0.51	5.12	1.1

MacArthur - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
MacArthur	150.1035	Q=2.0	2	604.53	604.79	604.8	604.87	0.092241	2.24	0.89	6.79	1.09
MacArthur	150.1035	Q=4.0	4	604.53	604.87	604.89	604.99	0.086449	2.75	1.46	8.03	1.12
MacArthur	150.1035	Q=6.0	6	604.53	604.92	604.95	605.08	0.08515	3.17	1.91	8.62	1.15
MacArthur	150.1035	Q=8.0	8	604.53	604.97	605.01	605.16	0.083728	3.53	2.3	9.01	1.18
MacArthur	150.1035	Q=10.0	10	604.53	605.01	605.05	605.23	0.084344	3.86	2.65	9.34	1.21
MacArthur	150.1035	Q=15.0	15	604.53	605.08	605.16	605.4	0.090495	4.61	3.38	9.99	1.29
MacArthur	150.1035	Q=20.0	20	604.53	605.14	605.26	605.56	0.098524	5.27	3.98	10.51	1.38
MacArthur	150.1035	Q=25.0	25	604.53	605.19	605.34	605.7	0.107465	5.89	4.5	10.93	1.47
MacArthur	150.1035	Q=30.0	30	604.53	605.23	605.42	605.84	0.112694	6.39	5.01	11.33	1.53
MacArthur	150.1035	Q=35.0	35	604.53	605.27	605.49	605.97	0.119279	6.89	5.46	11.68	1.59
MacArthur	150.1035	Q=40.0	40	604.53	605.31	605.55	606.09	0.12289	7.3	5.92	12.02	1.63
MacArthur	150.1035	Q=50.0	50	604.53	605.38	605.68	606.31	0.129413	8.04	6.79	12.65	1.7
MacArthur	150.1035	Q=60.0	60	604.53	605.44	605.79	606.52	0.134972	8.7	7.59	13.2	1.76
MacArthur	150.1035	Q=70.0	70	604.53	605.5	605.88	606.72	0.140199	9.3	8.35	13.7	1.82
MacArthur	171.3999	Q=1.0	1	608.14	608.32	608.37	608.49	0.341066	3.34	0.3	3.31	1.96
MacArthur	171.3999	Q=2.0	2	608.14	608.36	608.45	608.67	0.453679	4.43	0.45	4.07	2.34
MacArthur	171.3999	Q=4.0	4	608.14	608.41	608.55	608.93	0.578506	5.77	0.69	5.05	2.74
MacArthur	171.3999	Q=6.0	6	608.14	608.45	608.62	609.14	0.647516	6.66	0.9	5.75	2.96
MacArthur	171.3999	Q=8.0	8	608.14	608.48	608.67	609.36	0.739617	7.52	1.06	6.25	3.21
MacArthur	171.3999	Q=10.0	10	608.14	608.51	608.72	609.51	0.763374	8.04	1.24	6.76	3.31
MacArthur	171.3999	Q=15.0	15	608.14	608.58	608.84	609.65	0.613931	8.29	1.81	7.99	3.07
MacArthur	171.3999	Q=20.0	20	608.14	608.64	608.94	609.84	0.510102	8.79	2.28	8.38	2.9
MacArthur	171.3999	Q=25.0	25	608.14	608.7	609.03	609.97	0.420541	9.05	2.79	8.77	2.72
MacArthur	171.3999	Q=30.0	30	608.14	608.75	609.11	610.14	0.390791	9.5	3.21	9.08	2.68
MacArthur	171.3999	Q=35.0	35	608.14	608.8	609.19	610.26	0.35014	9.75	3.68	9.42	2.59
MacArthur	171.3999	Q=40.0	40	608.14	608.84	609.25	610.42	0.341921	10.19	4.05	9.67	2.59
MacArthur	171.3999	Q=50.0	50	608.14	608.91	609.38	610.71	0.322977	10.9	4.78	10.16	2.58
MacArthur	171.3999	Q=60.0	60	608.14	608.98	609.5	610.96	0.308787	11.51	5.48	10.61	2.57
MacArthur	171.3999	Q=70.0	70	608.14	609.04	609.6	611.19	0.295439	12.02	6.18	11.03	2.56
MacArthur	222.8917	Q=1.0	1	615.94	616.15	616.15	616.21	0.083522	1.85	0.54	5.08	1
MacArthur	222.8917	Q=2.0	2	615.94	616.22	616.23	616.29	0.07227	2.18	0.92	6.21	0.99

MacArthur - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
MacArthur	222.8917	Q=4.0	4	615.94	616.31	616.31	616.42	0.064256	2.65	1.53	7.33	0.99
MacArthur	222.8917	Q=6.0	6	615.94	616.38	616.38	616.51	0.060581	2.96	2.08	8.21	1
MacArthur	222.8917	Q=8.0	8	615.94	616.44	616.44	616.59	0.056641	3.18	2.59	8.97	0.99
MacArthur	222.8917	Q=10.0	10	615.94	616.49	616.49	616.66	0.055297	3.44	3.02	9.45	1
MacArthur	222.8917	Q=15.0	15	615.94	616.57	616.6	616.82	0.058997	4.09	3.86	10.13	1.07
MacArthur	222.8917	Q=20.0	20	615.94	616.64	616.7	616.96	0.06212	4.63	4.61	10.68	1.12
MacArthur	222.8917	Q=25.0	25	615.94	616.7	616.78	617.08	0.066787	5.14	5.23	11.13	1.19
MacArthur	222.8917	Q=30.0	30	615.94	616.76	616.86	617.2	0.067911	5.52	5.89	11.58	1.21
MacArthur	222.8917	Q=35.0	35	615.94	616.81	616.94	617.31	0.071124	5.92	6.45	11.95	1.26
MacArthur	222.8917	Q=40.0	40	615.94	616.86	617	617.4	0.070755	6.2	7.08	12.36	1.27
MacArthur	222.8917	Q=50.0	50	615.94	616.95	617.12	617.58	0.070811	6.71	8.27	13.1	1.3
MacArthur	222.8917	Q=60.0	60	615.94	617.04	617.23	617.74	0.070619	7.15	9.39	13.6	1.31
MacArthur	222.8917	Q=70.0	70	615.94	617.11	617.33	617.89	0.070765	7.54	10.43	14.01	1.33
MacArthur	284.8037	Q=1.0	1	620.46	620.61	620.6	620.66	0.062636	1.68	0.61	5.61	0.88
MacArthur	284.8037	Q=2.0	2	620.46	620.67	620.67	620.74	0.071613	2.22	0.93	6.37	0.99
MacArthur	284.8037	Q=4.0	4	620.46	620.74	620.76	620.86	0.080948	2.87	1.44	7.41	1.1
MacArthur	284.8037	Q=6.0	6	620.46	620.8	620.83	620.96	0.0866	3.32	1.88	8.18	1.17
MacArthur	284.8037	Q=8.0	8	620.46	620.84	620.89	621.04	0.094229	3.72	2.24	8.78	1.25
MacArthur	284.8037	Q=10.0	10	620.46	620.88	620.94	621.11	0.097413	4.01	2.59	9.33	1.28
MacArthur	284.8037	Q=15.0	15	620.46	620.98	621.04	621.25	0.089	4.35	3.59	10.72	1.27
MacArthur	284.8037	Q=20.0	20	620.46	621.05	621.13	621.38	0.083425	4.74	4.44	11.47	1.26
MacArthur	284.8037	Q=25.0	25	620.46	621.13	621.2	621.49	0.076614	5.03	5.28	12.11	1.24
MacArthur	284.8037	Q=30.0	30	620.46	621.18	621.28	621.59	0.074824	5.34	5.99	12.47	1.25
MacArthur	284.8037	Q=35.0	35	620.46	621.24	621.34	621.68	0.070566	5.54	6.76	12.85	1.23
MacArthur	284.8037	Q=40.0	40	620.46	621.29	621.4	621.77	0.070798	5.83	7.37	13.15	1.25
MacArthur	284.8037	Q=50.0	50	620.46	621.38	621.52	621.94	0.070401	6.31	8.57	13.72	1.27
MacArthur	284.8037	Q=60.0	60	620.46	621.46	621.62	622.09	0.070474	6.75	9.68	14.23	1.3
MacArthur	284.8037	Q=70.0	70	620.46	621.54	621.72	622.23	0.070128	7.13	10.77	14.7	1.31
MacArthur	342.5417	Q=1.0	1	624.41	624.67	624.67	624.73	0.079483	2.04	0.49	3.8	1
MacArthur	342.5417	Q=2.0	2	624.41	624.75	624.75	624.84	0.071002	2.33	0.86	5.04	0.99
MacArthur	342.5417	Q=4.0	4	624.41	624.86	624.86	624.97	0.063913	2.73	1.47	6.35	0.99

MacArthur - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
MacArthur	342.5417	Q=6.0	6	624.41	624.93	624.93	625.08	0.060725	3.08	1.96	6.96	1
MacArthur	342.5417	Q=8.0	8	624.41	625	625	625.17	0.056997	3.31	2.44	7.51	1
MacArthur	342.5417	Q=10.0	10	624.41	625.05	625.06	625.24	0.055605	3.53	2.88	7.97	1
MacArthur	342.5417	Q=15.0	15	624.41	625.15	625.18	625.41	0.060931	4.16	3.69	8.71	1.08
MacArthur	342.5417	Q=20.0	20	624.41	625.22	625.28	625.56	0.064907	4.74	4.34	9.1	1.15
MacArthur	342.5417	Q=25.0	25	624.41	625.28	625.38	625.71	0.071104	5.31	4.87	9.41	1.22
MacArthur	342.5417	Q=30.0	30	624.41	625.34	625.46	625.84	0.073427	5.75	5.43	9.72	1.26
MacArthur	342.5417	Q=35.0	35	624.41	625.38	625.54	625.97	0.078916	6.23	5.87	9.96	1.32
MacArthur	342.5417	Q=40.0	40	624.41	625.44	625.61	626.08	0.079328	6.56	6.41	10.24	1.34
MacArthur	342.5417	Q=50.0	50	624.41	625.53	625.75	626.29	0.081213	7.19	7.39	10.74	1.38
MacArthur	342.5417	Q=60.0	60	624.41	625.62	625.87	626.49	0.082389	7.72	8.33	11.2	1.42
MacArthur	342.5417	Q=70.0	70	624.41	625.69	625.99	626.67	0.084089	8.22	9.19	11.6	1.45
MacArthur	404.1473	Q=1.0	1	628.08	628.29		628.32	0.044432	1.4	0.71	6.33	0.74
MacArthur	404.1473	Q=2.0	2	628.08	628.35		628.4	0.047804	1.79	1.12	7.3	0.8
MacArthur	404.1473	Q=4.0	4	628.08	628.43	628.41	628.51	0.051517	2.25	1.78	8.64	0.88
MacArthur	404.1473	Q=6.0	6	628.08	628.49	628.47	628.59	0.053705	2.65	2.27	9.16	0.93
MacArthur	404.1473	Q=8.0	8	628.08	628.53	628.53	628.67	0.05661	2.98	2.7	9.59	0.97
MacArthur	404.1473	Q=10.0	10	628.08	628.57	628.57	628.74	0.057675	3.24	3.11	9.98	1
MacArthur	404.1473	Q=15.0	15	628.08	628.68	628.68	628.88	0.051941	3.6	4.24	10.99	0.99
MacArthur	404.1473	Q=20.0	20	628.08	628.77	628.77	629	0.048406	3.92	5.23	11.81	0.98
MacArthur	404.1473	Q=25.0	25	628.08	628.85	628.85	629.11	0.043911	4.14	6.25	12.59	0.96
MacArthur	404.1473	Q=30.0	30	628.08	628.92	628.92	629.21	0.042081	4.38	7.17	13.26	0.96
MacArthur	404.1473	Q=35.0	35	628.08	629	629	629.3	0.038978	4.53	8.17	13.94	0.94
MacArthur	404.1473	Q=40.0	40	628.08	629.05	629.05	629.39	0.03836	4.73	9	14.34	0.94
MacArthur	404.1473	Q=50.0	50	628.08	629.17	629.17	629.54	0.036294	5.04	10.69	15.13	0.94
MacArthur	404.1473	Q=60.0	60	628.08	629.27	629.27	629.68	0.03481	5.32	12.3	15.84	0.94
MacArthur	404.1473	Q=70.0	70	628.08	629.37	629.37	629.81	0.033241	5.53	13.91	16.51	0.93
MacArthur	453.7274	Q=1.0	1	629.79	629.99	629.96	630.01	0.027182	1.18	0.85	6.74	0.59
MacArthur	453.7274	Q=2.0	2	629.79	630.06	630	630.1	0.025475	1.42	1.41	8.15	0.6
MacArthur	453.7274	Q=4.0	4	629.79	630.17	630.09	630.21	0.024497	1.69	2.36	10.08	0.62
MacArthur	453.7274	Q=6.0	6	629.79	630.25	630.15	630.3	0.023632	1.87	3.21	11.55	0.62

MacArthur - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
MacArthur	453.7274	Q=8.0	8	629.79	630.3	630.21	630.37	0.022828	2.07	3.88	12.11	0.63
MacArthur	453.7274	Q=10.0	10	629.79	630.35	630.25	630.43	0.022523	2.25	4.48	12.57	0.64
MacArthur	453.7274	Q=15.0	15	629.79	630.45	630.34	630.56	0.02379	2.68	5.71	13.47	0.68
MacArthur	453.7274	Q=20.0	20	629.79	630.3	630.43	630.72	0.144798	5.19	3.86	12.1	1.59
MacArthur	453.7274	Q=25.0	25	629.79	630.34	630.5	630.87	0.159233	5.84	4.31	12.44	1.7
MacArthur	453.7274	Q=30.0	30	629.79	630.37	630.57	631	0.169147	6.39	4.74	12.77	1.77
MacArthur	453.7274	Q=35.0	35	629.79	630.4	630.63	631.14	0.177185	6.88	5.16	13.07	1.84
MacArthur	453.7274	Q=40.0	40	629.79	630.43	630.69	631.26	0.183904	7.33	5.56	13.36	1.9
MacArthur	453.7274	Q=50.0	50	629.79	630.49	630.8	631.5	0.194545	8.13	6.32	13.88	1.99
MacArthur	453.7274	Q=60.0	60	629.79	630.55	630.9	631.71	0.196898	8.75	7.1	14.41	2.03
MacArthur	453.7274	Q=70.0	70	629.79	630.6	630.99	631.89	0.193534	9.23	7.91	14.93	2.05
MacArthur	500.0295	Q=1.0	1	633.11	633.32	633.32	633.38	0.10119	2.01	0.5	4.75	1.1
MacArthur	500.0295	Q=2.0	2	633.11	633.39	633.39	633.47	0.075037	2.2	0.91	6.19	1
MacArthur	500.0295	Q=4.0	4	633.11	633.49	633.49	633.59	0.062861	2.62	1.54	7.31	0.98
MacArthur	500.0295	Q=6.0	6	633.11	633.56	633.56	633.69	0.060079	2.94	2.08	8.14	0.99
MacArthur	500.0295	Q=8.0	8	633.11	633.62	633.62	633.77	0.05504	3.13	2.62	8.85	0.97
MacArthur	500.0295	Q=10.0	10	633.11	633.67	633.67	633.84	0.052557	3.36	3.06	9.23	0.97
MacArthur	500.0295	Q=15.0	15	633.11	633.78	633.78	634	0.047741	3.81	4.12	10.06	0.97
MacArthur	500.0295	Q=20.0	20	633.11	633.88	633.88	634.13	0.04388	4.13	5.14	10.8	0.96
MacArthur	500.0295	Q=25.0	25	633.11	633.96	633.96	634.24	0.041084	4.39	6.11	11.47	0.95
MacArthur	500.0295	Q=30.0	30	633.11	634.04	634.04	634.35	0.039155	4.62	7.04	12.07	0.95
MacArthur	500.0295	Q=35.0	35	633.11	634.12	634.12	634.45	0.037566	4.82	7.95	12.63	0.94
MacArthur	500.0295	Q=40.0	40	633.11	634.19	634.19	634.54	0.036187	5	8.84	13.16	0.94
MacArthur	500.0295	Q=50.0	50	633.11	634.31	634.31	634.7	0.033949	5.29	10.58	14.1	0.93
MacArthur	500.0295	Q=60.0	60	633.11	634.42	634.42	634.85	0.032647	5.56	12.19	14.79	0.92
MacArthur	500.0295	Q=70.0	70	633.11	634.52	634.52	634.98	0.032102	5.83	13.66	15.4	0.93

Scotts - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	14.19694	Q=1.0	1	588.06	588.16	588.16	588.19	0.083353	1.47	0.68	11.32	1.05
Main-1	14.19694	Q=2.0	2	588.06	588.2	588.2	588.24	0.066997	1.7	1.18	13.54	1.01
Main-1	14.19694	Q=4.0	4	588.06	588.25	588.25	588.31	0.056052	2.08	1.95	15.96	0.99
Main-1	14.19694	Q=6.0	6	588.06	588.29	588.29	588.37	0.044758	2.26	2.73	17.91	0.93
Main-1	14.19694	Q=8.0	8	588.06	588.33	588.33	588.42	0.040543	2.42	3.42	19.33	0.91
Main-1	14.19694	Q=10.0	10	588.06	588.36	588.36	588.46	0.039145	2.59	4.01	20.41	0.91
Main-1	14.19694	Q=15.0	15	588.06	588.43	588.43	588.55	0.034349	2.85	5.48	22.72	0.89
Main-1	14.19694	Q=20.0	20	588.06	588.48	588.48	588.62	0.032867	3.09	6.74	24.5	0.89
Main-1	14.19694	Q=25.0	25	588.06	588.53	588.53	588.69	0.032205	3.31	7.89	26.02	0.9
Main-1	14.19694	Q=30.0	30	588.06	588.56	588.58	588.75	0.033095	3.54	8.85	27.22	0.93
Main-1	14.19694	Q=40.0	40	588.06	588.62	588.65	588.85	0.03551	3.98	10.51	29.19	0.98
Main-1	14.19694	Q=50.0	50	588.06	588.67	588.72	588.95	0.037468	4.35	12.01	30.8	1.02
Main-1	14.19694	Q=60.0	60	588.06	588.71	588.78	589.03	0.040311	4.73	13.27	32.08	1.07
Main-1	14.19694	Q=70.0	70	588.06	588.75	588.84	589.12	0.043902	5.11	14.33	33.12	1.13
Main-1	14.19694	Q=80.0	80	588.06	588.77	588.9	589.21	0.048671	5.52	15.16	33.92	1.2
Main-1	136.1487	Q=1.0	1	593.46	593.7	593.65	593.72	0.017777	1.08	0.93	7.6	0.55
Main-1	136.1487	Q=2.0	2	593.46	593.76	593.71	593.79	0.019955	1.4	1.42	8.59	0.61
Main-1	136.1487	Q=4.0	4	593.46	593.85	593.79	593.9	0.022375	1.84	2.17	9.48	0.68
Main-1	136.1487	Q=6.0	6	593.46	593.9	593.85	593.98	0.026512	2.23	2.69	10.05	0.76
Main-1	136.1487	Q=8.0	8	593.46	593.95	593.9	594.05	0.029086	2.52	3.18	10.55	0.81
Main-1	136.1487	Q=10.0	10	593.46	593.99	593.95	594.11	0.030103	2.73	3.66	11.03	0.84
Main-1	136.1487	Q=15.0	15	593.46	594.07	594.05	594.24	0.034923	3.26	4.6	11.91	0.92
Main-1	136.1487	Q=20.0	20	593.46	594.15	594.14	594.35	0.037142	3.63	5.51	12.71	0.97
Main-1	136.1487	Q=25.0	25	593.46	594.21	594.21	594.45	0.038648	3.93	6.36	13.4	1
Main-1	136.1487	Q=30.0	30	593.46	594.28	594.28	594.54	0.038045	4.12	7.28	14.12	1.01
Main-1	136.1487	Q=40.0	40	593.46	594.4	594.4	594.7	0.036214	4.39	9.11	15.44	1.01
Main-1	136.1487	Q=50.0	50	593.46	594.51	594.51	594.84	0.035029	4.65	10.75	16.44	1.01
Main-1	136.1487	Q=60.0	60	593.46	594.59	594.59	594.97	0.033246	4.92	12.23	17.04	1
Main-1	136.1487	Q=70.0	70	593.46	594.68	594.68	595.09	0.031282	5.13	13.72	17.6	0.99
Main-1	136.1487	Q=80.0	80	593.46	594.77	594.77	595.2	0.029115	5.29	15.28	18.15	0.97
Main-1	215.235	Q=1.0	1	596.78	596.97	597	597.07	0.130858	2.52	0.4	4.07	1.42

Scotts - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	215.235	Q=2.0	2	596.78	597.03	597.08	597.18	0.148991	3.15	0.64	5.15	1.58
Main-1	215.235	Q=4.0	4	596.78	597.09	597.17	597.34	0.177319	4	1	6.47	1.79
Main-1	215.235	Q=6.0	6	596.78	597.13	597.24	597.47	0.191752	4.67	1.29	6.98	1.92
Main-1	215.235	Q=8.0	8	596.78	597.17	597.3	597.59	0.202774	5.2	1.54	7.4	2.01
Main-1	215.235	Q=10.0	10	596.78	597.19	597.34	597.71	0.223144	5.75	1.74	7.71	2.14
Main-1	215.235	Q=15.0	15	596.78	597.27	597.46	597.88	0.200202	6.24	2.4	8.68	2.09
Main-1	215.235	Q=20.0	20	596.78	597.34	597.55	598.04	0.18788	6.72	2.98	9.17	2.08
Main-1	215.235	Q=25.0	25	596.78	597.4	597.63	598.16	0.170867	7	3.57	9.62	2.02
Main-1	215.235	Q=30.0	30	596.78	597.46	597.71	598.27	0.155433	7.18	4.18	10.07	1.97
Main-1	215.235	Q=40.0	40	596.78	597.57	597.85	598.47	0.141568	7.61	5.25	10.81	1.92
Main-1	215.235	Q=50.0	50	596.78	597.66	597.97	598.64	0.131287	7.94	6.3	11.49	1.89
Main-1	215.235	Q=60.0	60	596.78	597.66	598.08	599.06	0.187734	9.5	6.31	11.5	2.26
Main-1	215.235	Q=70.0	70	596.78	597.77	598.17	599.08	0.148246	9.16	7.64	12.3	2.05
Main-1	215.235	Q=80.0	80	596.78	597.91	598.26	599.03	0.107616	8.5	9.41	13.29	1.78
T1	89.92623	Q=1.0	0.25	613.28	613.31	613.33	613.4	0.972237	2.51	0.1	4.65	3.02
T1	89.92623	Q=2.0	0.5	613.28	613.31	613.35	613.63	2.750867	4.51	0.11	4.67	5.17
T1	89.92623	Q=4.0	1	613.28	613.33	613.4	613.63	1.065663	4.4	0.23	4.88	3.6
T1	89.92623	Q=6.0	1.5	613.28	613.34	613.43	613.93	1.922395	6.17	0.24	4.91	4.88
T1	89.92623	Q=8.0	2	613.28	613.35	613.47	614.08	1.936618	6.89	0.29	4.99	5.03
T1	89.92623	Q=10.0	2.5	613.28	613.35	613.48	614.26	2.055804	7.63	0.33	5.05	5.28
T1	89.92623	Q=15.0	3.75	613.28	613.38	613.54	614.49	1.789157	8.48	0.44	5.24	5.14
T1	89.92623	Q=20.0	5	613.28	613.39	613.59	614.74	1.721615	9.29	0.54	5.39	5.18
T1	89.92623	Q=25.0	6.25	613.28	613.41	613.63	614.9	1.572424	9.77	0.64	5.55	5.07
T1	89.92623	Q=30.0	7.5	613.28	613.43	613.67	615	1.402526	10.04	0.75	5.71	4.89
T1	89.92623	Q=40.0	10	613.28	613.46	613.75	615.26	1.281009	10.76	0.93	5.97	4.81
T1	89.92623	Q=50.0	12.5	613.28	613.5	613.81	615.41	1.118508	11.09	1.13	6.25	4.6
T1	89.92623	Q=60.0	15	613.28	613.52	613.87	615.59	1.053392	11.55	1.3	6.47	4.54
T1	89.92623	Q=70.0	17.5	613.28	613.55	613.92	615.76	1.003613	11.95	1.46	6.69	4.5
T1	89.92623	Q=80.0	20	613.28	613.57	613.97	615.87	0.934067	12.17	1.64	6.91	4.4
T1	110.6536	Q=1.0	0.25	617.32	617.42	617.42	617.44	0.080712	1.26	0.2	4.04	1
T1	110.6536	Q=2.0	0.5	617.32	617.45	617.45	617.48	0.060923	1.36	0.37	5.38	0.92

Scotts - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	110.6536	Q=4.0	1	617.32	617.48	617.48	617.54	0.074855	1.86	0.54	5.72	1.07
T1	110.6536	Q=6.0	1.5	617.32	617.52	617.52	617.58	0.060089	1.99	0.75	6.13	1
T1	110.6536	Q=8.0	2	617.32	617.55	617.55	617.62	0.057548	2.16	0.92	6.44	1.01
T1	110.6536	Q=10.0	2.5	617.32	617.57	617.57	617.65	0.053987	2.28	1.1	6.73	1
T1	110.6536	Q=15.0	3.75	617.32	617.63	617.63	617.73	0.051783	2.56	1.46	7.32	1.01
T1	110.6536	Q=20.0	5	617.32	617.67	617.67	617.79	0.048257	2.73	1.83	7.86	1
T1	110.6536	Q=25.0	6.25	617.32	617.72	617.72	617.85	0.046679	2.89	2.16	8.32	1
T1	110.6536	Q=30.0	7.5	617.32	617.75	617.75	617.9	0.046458	3.05	2.46	8.71	1.01
T1	110.6536	Q=40.0	10	617.32	617.82	617.82	617.98	0.043223	3.23	3.09	9.49	1
T1	110.6536	Q=50.0	12.5	617.32	617.87	617.87	618.06	0.042678	3.45	3.63	10.05	1.01
T1	110.6536	Q=60.0	15	617.32	617.93	617.93	618.13	0.040459	3.62	4.15	10.47	1
T1	110.6536	Q=70.0	17.5	617.32	617.98	617.98	618.19	0.038405	3.75	4.68	10.87	0.99
T1	110.6536	Q=80.0	20	617.32	618.02	618.02	618.25	0.037788	3.91	5.15	11.22	0.99
Main-2	369.6301	Q=1.0	0.75	611.96	612.14	612.14	612.18	0.06946	1.72	0.44	4.95	1.02
Main-2	369.6301	Q=2.0	1.5	611.96	612.19	612.19	612.26	0.061383	2.06	0.73	5.76	1.02
Main-2	369.6301	Q=4.0	3	611.96	612.27	612.27	612.36	0.053144	2.46	1.22	6.61	1.01
Main-2	369.6301	Q=6.0	4.5	611.96	612.33	612.33	612.45	0.049926	2.73	1.65	7.27	1.01
Main-2	369.6301	Q=8.0	6	611.96	612.38	612.38	612.52	0.047843	2.93	2.04	7.83	1.01
Main-2	369.6301	Q=10.0	7.5	611.96	612.43	612.43	612.58	0.044744	3.06	2.45	8.37	1
Main-2	369.6301	Q=15.0	11.25	611.96	612.52	612.53	612.71	0.047671	3.52	3.19	9.27	1.06
Main-2	369.6301	Q=20.0	15	611.96	612.58	612.61	612.82	0.049456	3.93	3.82	9.8	1.1
Main-2	369.6301	Q=25.0	18.75	611.96	612.63	612.68	612.93	0.052794	4.34	4.33	10.19	1.16
Main-2	369.6301	Q=30.0	22.5	611.96	612.68	612.75	613.02	0.056769	4.73	4.77	10.51	1.21
Main-2	369.6301	Q=40.0	30	611.96	612.76	612.87	613.2	0.061203	5.35	5.65	11.13	1.29
Main-2	369.6301	Q=50.0	37.5	611.96	612.83	612.98	613.36	0.065467	5.88	6.43	11.65	1.35
Main-2	369.6301	Q=60.0	45	611.96	612.97	613.07	613.45	0.046953	5.57	8.18	12.74	1.18
Main-2	369.6301	Q=70.0	52.5	611.96	613	613.15	613.59	0.057031	6.25	8.51	12.93	1.3
Main-2	369.6301	Q=80.0	60	611.96	612.98	613.22	613.8	0.081118	7.35	8.26	12.78	1.55
Main-2	524.9301	Q=1.0	0.75	618.99	619.16	619.13	619.19	0.031566	1.32	0.57	5.33	0.71
Main-2	524.9301	Q=2.0	1.5	618.99	619.22	619.19	619.26	0.034536	1.71	0.88	5.89	0.78
Main-2	524.9301	Q=4.0	3	618.99	619.29	619.27	619.37	0.038755	2.23	1.35	6.67	0.87

Scotts - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-2	524.9301	Q=6.0	4.5	618.99	619.35	619.33	619.45	0.040954	2.57	1.75	7.27	0.92
Main-2	524.9301	Q=8.0	6	618.99	619.4	619.39	619.52	0.042611	2.84	2.11	7.76	0.96
Main-2	524.9301	Q=10.0	7.5	618.99	619.44	619.44	619.59	0.045543	3.11	2.41	8.16	1.01
Main-2	524.9301	Q=15.0	11.25	618.99	619.54	619.54	619.72	0.042778	3.42	3.29	9.2	1.01
Main-2	524.9301	Q=20.0	15	618.99	619.62	619.62	619.83	0.041273	3.68	4.08	10.02	1.01
Main-2	524.9301	Q=25.0	18.75	618.99	619.69	619.69	619.93	0.038879	3.89	4.83	10.64	1
Main-2	524.9301	Q=30.0	22.5	618.99	619.76	619.76	620.01	0.036515	4.04	5.59	11.23	0.99
Main-2	524.9301	Q=40.0	30	618.99	619.88	619.88	620.17	0.034174	4.34	6.98	12.24	0.98
Main-2	524.9301	Q=50.0	37.5	618.99	619.98	619.98	620.31	0.03231	4.63	8.2	12.89	0.98
Main-2	524.9301	Q=60.0	45	618.99	619.99	620.07	620.44	0.043267	5.43	8.39	12.98	1.13
Main-2	524.9301	Q=70.0	52.5	618.99	620.1	620.15	620.55	0.035995	5.44	9.82	13.64	1.06
Main-2	524.9301	Q=80.0	60	618.99	620.23	620.23	620.65	0.027372	5.25	11.71	14.48	0.95
Main-2	632.7556	Q=1.0	0.75	622.61	622.85	622.82	622.88	0.03743	1.53	0.49	4.16	0.78
Main-2	632.7556	Q=2.0	1.5	622.61	622.92	622.89	622.97	0.034159	1.76	0.85	5.49	0.79
Main-2	632.7556	Q=4.0	3	622.61	623.02		623.08	0.03083	2.02	1.48	7.16	0.78
Main-2	632.7556	Q=6.0	4.5	622.61	623.09	623.05	623.17	0.029243	2.26	2	7.84	0.79
Main-2	632.7556	Q=8.0	6	622.61	623.15	623.09	623.24	0.028295	2.43	2.46	8.41	0.79
Main-2	632.7556	Q=10.0	7.5	622.61	623.2	623.15	623.3	0.026998	2.59	2.9	8.79	0.79
Main-2	632.7556	Q=15.0	11.25	622.61	623.29	623.24	623.43	0.028274	3.05	3.7	9.29	0.84
Main-2	632.7556	Q=20.0	15	622.61	623.36	623.32	623.54	0.029199	3.42	4.42	9.71	0.87
Main-2	632.7556	Q=25.0	18.75	622.61	623.42	623.39	623.64	0.030692	3.76	5.03	10.06	0.91
Main-2	632.7556	Q=30.0	22.5	622.61	623.47	623.46	623.73	0.032694	4.09	5.56	10.34	0.95
Main-2	632.7556	Q=40.0	30	622.61	623.56	623.58	623.9	0.036769	4.74	6.42	10.79	1.03
Main-2	632.7556	Q=50.0	37.5	622.61	623.63	623.69	624.05	0.039662	5.28	7.23	11.18	1.09
Main-2	632.7556	Q=60.0	45	622.61	623.7	623.79	624.2	0.041593	5.74	8	11.55	1.13
Main-2	632.7556	Q=70.0	52.5	622.61	623.76	623.88	624.34	0.044169	6.2	8.68	11.87	1.18
Main-2	632.7556	Q=80.0	60	622.61	623.81	623.97	624.47	0.045766	6.58	9.36	12.17	1.21
Main-2	731.4028	Q=1.0	0.75	625.96	626.21		626.25	0.031211	1.46	0.51	4.08	0.72
Main-2	731.4028	Q=2.0	1.5	625.96	626.28		626.33	0.034024	1.79	0.84	5.21	0.79
Main-2	731.4028	Q=4.0	3	625.96	626.36	626.34	626.45	0.037889	2.32	1.29	5.91	0.87
Main-2	731.4028	Q=6.0	4.5	625.96	626.42	626.41	626.54	0.040399	2.69	1.67	6.38	0.93

Scotts - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-2	731.4028	Q=8.0	6	625.96	626.48	626.46	626.61	0.042146	2.99	2.01	6.77	0.97
Main-2	731.4028	Q=10.0	7.5	625.96	626.52	626.52	626.68	0.044772	3.26	2.3	7.09	1.01
Main-2	731.4028	Q=15.0	11.25	625.96	626.63	626.63	626.83	0.042107	3.6	3.13	7.93	1.01
Main-2	731.4028	Q=20.0	15	625.96	626.72	626.72	626.95	0.040365	3.87	3.87	8.6	1.01
Main-2	731.4028	Q=25.0	18.75	625.96	626.8	626.8	627.06	0.038053	4.09	4.59	9.13	1
Main-2	731.4028	Q=30.0	22.5	625.96	626.87	626.87	627.16	0.03611	4.27	5.29	9.63	0.99
Main-2	731.4028	Q=40.0	30	625.96	627	627	627.33	0.032922	4.6	6.59	10.33	0.98
Main-2	731.4028	Q=50.0	37.5	625.96	627.11	627.11	627.48	0.030603	4.9	7.76	10.79	0.97
Main-2	731.4028	Q=60.0	45	625.96	627.21	627.21	627.62	0.02929	5.18	8.85	11.18	0.96
Main-2	731.4028	Q=70.0	52.5	625.96	627.31	627.31	627.75	0.027642	5.39	9.96	11.57	0.95
Main-2	731.4028	Q=80.0	60	625.96	627.4	627.4	627.87	0.026746	5.61	10.98	11.91	0.95
Main-2	847.8009	Q=1.0	0.75	630.27	630.4		630.43	0.041802	1.42	0.53	5.42	0.8
Main-2	847.8009	Q=2.0	1.5	630.27	630.45	630.43	630.5	0.037616	1.75	0.86	5.93	0.81
Main-2	847.8009	Q=4.0	3	630.27	630.54	630.51	630.61	0.033869	2.13	1.41	6.7	0.82
Main-2	847.8009	Q=6.0	4.5	630.27	630.61	630.57	630.7	0.031854	2.38	1.89	7.31	0.82
Main-2	847.8009	Q=8.0	6	630.27	630.67	630.63	630.77	0.030644	2.57	2.34	7.82	0.83
Main-2	847.8009	Q=10.0	7.5	630.27	630.63	630.68	630.84	0.07306	3.71	2.02	7.46	1.26
Main-2	847.8009	Q=15.0	11.25	630.27	630.82	630.78	630.97	0.030476	3.09	3.64	9.17	0.86
Main-2	847.8009	Q=20.0	15	630.27	630.9	630.87	631.08	0.031442	3.39	4.42	9.89	0.89
Main-2	847.8009	Q=25.0	18.75	630.27	630.9	630.94	631.18	0.050444	4.28	4.38	9.85	1.13
Main-2	847.8009	Q=30.0	22.5	630.27	630.96	631.01	631.28	0.051909	4.55	4.94	10.34	1.16
Main-2	847.8009	Q=40.0	30	630.27	631.04	631.13	631.45	0.056177	5.13	5.85	10.97	1.23
Main-2	847.8009	Q=50.0	37.5	630.27	631.11	631.23	631.61	0.059045	5.64	6.67	11.46	1.28
Main-2	847.8009	Q=60.0	45	630.27	631.18	631.33	631.75	0.062367	6.11	7.4	11.87	1.34
Main-2	847.8009	Q=70.0	52.5	630.27	631.24	631.41	631.89	0.06288	6.45	8.19	12.31	1.36
Main-2	847.8009	Q=80.0	60	630.27	631.29	631.49	632.02	0.067228	6.91	8.75	12.59	1.42
Main-2	940.9814	Q=1.0	0.75	634.35	634.54	634.52	634.57	0.047413	1.55	0.48	4.79	0.86
Main-2	940.9814	Q=2.0	1.5	634.35	634.59	634.58	634.65	0.053279	2.04	0.74	5.29	0.96
Main-2	940.9814	Q=4.0	3	634.35	634.67	634.67	634.76	0.052465	2.53	1.19	6.09	1.01
Main-2	940.9814	Q=6.0	4.5	634.35	634.73	634.73	634.85	0.049185	2.8	1.61	6.75	1.01
Main-2	940.9814	Q=8.0	6	634.35	634.79	634.79	634.93	0.045702	2.97	2.02	7.34	1

Scotts - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-2	940.9814	Q=10.0	7.5	634.35	634.84	634.84	634.99	0.045579	3.16	2.37	7.81	1.01
Main-2	940.9814	Q=15.0	11.25	634.35	634.94	634.94	635.13	0.041994	3.45	3.27	8.88	1
Main-2	940.9814	Q=20.0	15	634.35	635.03	635.03	635.24	0.03999	3.66	4.09	9.78	1
Main-2	940.9814	Q=25.0	18.75	634.35	635.1	635.1	635.34	0.039548	3.88	4.83	10.51	1.01
Main-2	940.9814	Q=30.0	22.5	634.35	635.17	635.17	635.43	0.038473	4.08	5.51	10.97	1.01
Main-2	940.9814	Q=40.0	30	634.35	635.28	635.28	635.58	0.035862	4.4	6.83	11.7	1
Main-2	940.9814	Q=50.0	37.5	634.35	635.39	635.39	635.72	0.034052	4.66	8.09	12.35	1
Main-2	940.9814	Q=60.0	45	634.35	635.49	635.49	635.85	0.032318	4.86	9.32	12.97	0.99
Main-2	940.9814	Q=70.0	52.5	634.35	635.57	635.57	635.97	0.031882	5.09	10.4	13.47	0.99
Main-2	940.9814	Q=80.0	60	634.35	635.65	635.65	636.08	0.029976	5.26	11.53	13.84	0.98
Main-2	1022.328	Q=1.0	0.75	635.98	636.26	636.19	636.27	0.011713	0.95	0.79	5.72	0.45
Main-2	1022.328	Q=2.0	1.5	635.98	636.34	636.24	636.36	0.011079	1.14	1.32	6.99	0.46
Main-2	1022.328	Q=4.0	3	635.98	636.45	636.33	636.48	0.011254	1.39	2.15	8.51	0.49
Main-2	1022.328	Q=6.0	4.5	635.98	636.52	636.39	636.56	0.011501	1.59	2.83	9.41	0.51
Main-2	1022.328	Q=8.0	6	635.98	636.58	636.44	636.63	0.0119	1.78	3.38	9.93	0.53
Main-2	1022.328	Q=10.0	7.5	635.98	636.63	636.49	636.69	0.011889	1.92	3.93	10.41	0.54
Main-2	1022.328	Q=15.0	11.25	635.98	636.73	636.58	636.81	0.012109	2.26	5.03	11.13	0.57
Main-2	1022.328	Q=20.0	15	635.98	636.82	636.65	636.92	0.01249	2.55	5.99	11.72	0.59
Main-2	1022.328	Q=25.0	18.75	635.98	636.9	636.72	637.01	0.012473	2.77	6.92	12.26	0.6
Main-2	1022.328	Q=30.0	22.5	635.98	636.96	636.79	637.1	0.012679	2.98	7.76	12.73	0.62
Main-2	1022.328	Q=40.0	30	635.98	637.08	636.9	637.25	0.012992	3.33	9.3	13.55	0.64
Main-2	1022.328	Q=50.0	37.5	635.98	637.18	637.01	637.38	0.013335	3.64	10.69	14.25	0.66
Main-2	1022.328	Q=60.0	45	635.98	637.27	637.1	637.49	0.013659	3.91	11.97	14.81	0.68
Main-2	1022.328	Q=70.0	52.5	635.98	637.35	637.18	637.6	0.013686	4.13	13.26	15.33	0.69
Main-2	1022.328	Q=80.0	60	635.98	637.42	637.26	637.7	0.014091	4.37	14.36	15.77	0.71

Van Horne - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	0.001	Q=1.0	1	584.69	584.79	584.79	584.82	0.074159	1.45	0.69	10.57	1
Main	0.001	Q=2.0	2	584.69	584.82	584.82	584.88	0.082911	1.89	1.06	11.89	1.12
Main	0.001	Q=4.0	4	584.69	584.89	584.89	584.96	0.058525	2.08	1.93	14.52	1
Main	0.001	Q=6.0	6	584.69	584.93	584.93	585.01	0.053826	2.28	2.63	16.23	1
Main	0.001	Q=8.0	8	584.69	584.97	584.97	585.06	0.051384	2.45	3.26	17.39	1
Main	0.001	Q=10.0	10	584.69	585	585	585.11	0.049372	2.59	3.86	18.43	1
Main	0.001	Q=15.0	15	584.69	585.07	585.07	585.2	0.047044	2.87	5.23	20.59	1
Main	0.001	Q=20.0	20	584.69	585.13	585.13	585.28	0.045206	3.07	6.51	22.43	1.01
Main	0.001	Q=25.0	25	584.69	585.18	585.18	585.35	0.043937	3.26	7.67	23.69	1.01
Main	0.001	Q=30.0	30	584.69	585.23	585.23	585.41	0.042485	3.41	8.79	24.73	1.01
Main	0.001	Q=35.0	35	584.69	585.27	585.27	585.47	0.041577	3.55	9.85	25.67	1.01
Main	0.001	Q=40.0	40	584.69	585.31	585.31	585.52	0.040449	3.67	10.89	26.43	1.01
Main	0.001	Q=50.0	50	584.69	585.38	585.38	585.62	0.038986	3.89	12.84	27.75	1.01
Main	0.001	Q=60.0	60	584.69	585.45	585.45	585.71	0.037237	4.06	14.79	29.07	1
Main	0.001	Q=70.0	70	584.69	585.51	585.51	585.79	0.037051	4.23	16.54	30.39	1.01
Main	30		Culvert									
Main	61.61042	Q=1.0	1	615.39	615.88	615.48	615.88	0.000182	0.25	3.95	8.7	0.07
Main	61.61042	Q=2.0	2	615.39	616.09	615.53	616.09	0.000215	0.34	5.81	9	0.08
Main	61.61042	Q=4.0	4	615.39	616.4	615.6	616.4	0.000251	0.46	8.66	9.43	0.08
Main	61.61042	Q=6.0	6	615.39	616.65	615.66	616.65	0.00027	0.54	11.06	9.77	0.09
Main	61.61042	Q=8.0	8	615.39	616.87	615.72	616.87	0.000281	0.6	13.24	10.08	0.09
Main	61.61042	Q=10.0	10	615.39	617.07	615.76	617.08	0.000285	0.65	15.32	10.36	0.09
Main	61.61042	Q=15.0	15	615.39	617.54	615.87	617.55	0.00028	0.74	20.37	11.02	0.1
Main	61.61042	Q=20.0	20	615.39	618.22	615.97	618.23	0.000197	0.71	28.2	11.96	0.08
Main	61.61042	Q=25.0	25	615.39	619.13	616.06	619.14	0.000101	0.61	44.48	26.92	0.06
Main	61.61042	Q=30.0	30	615.39	620.25	616.14	620.25	0.000038	0.46	80.69	37.12	0.04
Main	61.61042	Q=35.0	35	615.39	621.56	616.22	621.56	0.000014	0.33	134.77	44.92	0.02
Main	61.61042	Q=40.0	40	615.39	623.07	616.29	623.07	0.000006	0.25	207.97	51.83	0.02
Main	61.61042	Q=50.0	50	615.39	626.7	616.43	626.7	0.000001	0.15	419	64.92	0.01
Main	61.61042	Q=60.0	60	615.39	631.14	616.56	631.14	0	0.1	741.89	80.19	0
Main	61.61042	Q=70.0	70	615.39	636.38	616.68	636.38	0	0.08	1214.5	99.71	0

Van Horne - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	194.3417	Q=1.0	1	617.4	617.49	617.49	617.52	0.075674	1.41	0.71	11.57	1
Main	194.3417	Q=2.0	2	617.4	617.52	617.52	617.57	0.076969	1.86	1.07	11.66	1.08
Main	194.3417	Q=4.0	4	617.4	617.58	617.58	617.66	0.05578	2.21	1.81	11.83	1
Main	194.3417	Q=6.0	6	617.4	617.63	617.63	617.73	0.05163	2.53	2.37	11.96	1
Main	194.3417	Q=8.0	8	617.4	617.67	617.67	617.79	0.048264	2.77	2.89	12.08	1
Main	194.3417	Q=10.0	10	617.4	617.71	617.71	617.85	0.046069	2.97	3.36	12.19	1
Main	194.3417	Q=15.0	15	617.4	617.8	617.8	617.98	0.043218	3.4	4.41	12.42	1
Main	194.3417	Q=20.0	20	617.4	618.26		618.32	0.005014	1.91	10.49	13.7	0.38
Main	194.3417	Q=25.0	25	617.4	619.15		619.17	0.000662	1.05	23.78	16.15	0.15
Main	194.3417	Q=30.0	30	617.4	620.25		620.26	0.00017	0.69	43.22	21.89	0.08
Main	194.3417	Q=35.0	35	617.4	621.56		621.56	0.000042	0.46	87.17	42.43	0.04
Main	194.3417	Q=40.0	40	617.4	623.07		623.07	0.000011	0.31	159.28	52.11	0.02
Main	194.3417	Q=50.0	50	617.4	626.7		626.7	0.000002	0.17	377.56	67.61	0.01
Main	194.3417	Q=60.0	60	617.4	631.14		631.14	0	0.11	714.26	83.82	0.01
Main	194.3417	Q=70.0	70	617.4	636.38		636.38	0	0.08	1198.69	102.22	0
Main	370.6444	Q=1.0	1	617.9	618.24	618.04	618.24	0.001295	0.44	2.27	9.97	0.16
Main	370.6444	Q=2.0	2	617.9	618.35	618.09	618.36	0.001416	0.57	3.53	11.33	0.18
Main	370.6444	Q=4.0	4	617.9	618.5	618.17	618.51	0.001641	0.75	5.31	12.31	0.2
Main	370.6444	Q=6.0	6	617.9	618.61	618.23	618.63	0.001761	0.9	6.68	12.38	0.22
Main	370.6444	Q=8.0	8	617.9	618.71	618.28	618.72	0.001868	1.02	7.85	12.41	0.23
Main	370.6444	Q=10.0	10	617.9	618.79	618.33	618.81	0.001961	1.12	8.89	12.43	0.23
Main	370.6444	Q=15.0	15	617.9	618.98	618.42	619	0.002137	1.34	11.17	12.49	0.25
Main	370.6444	Q=20.0	20	617.9	619	618.5	619.05	0.003446	1.74	11.52	12.5	0.32
Main	370.6444	Q=25.0	25	617.9	619.33	618.58	619.37	0.002091	1.6	15.6	12.6	0.25
Main	370.6444	Q=30.0	30	617.9	620.29	618.64	620.31	0.000503	1.08	28.01	14.09	0.13
Main	370.6444	Q=35.0	35	617.9	621.57	618.7	621.58	0.000128	0.74	51.98	22.95	0.07
Main	370.6444	Q=40.0	40	617.9	623.07		623.08	0.000038	0.51	93.06	31.13	0.04
Main	370.6444	Q=50.0	50	617.9	626.7		626.7	0.000005	0.27	236.85	48.11	0.02
Main	370.6444	Q=60.0	60	617.9	631.14		631.14	0.000001	0.16	488.67	65.04	0.01
Main	370.6444	Q=70.0	70	617.9	636.38		636.38	0	0.11	877.6	83.63	0

Van Horne - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	524.7333	Q=1.0	1	621.78	621.95	621.95	622.01	0.063827	1.84	0.54	5.21	1.01
Main	524.7333	Q=2.0	2	621.78	622.02	622.02	622.09	0.056018	2.2	0.91	6.08	1
Main	524.7333	Q=4.0	4	621.78	622.11	622.11	622.22	0.050785	2.61	1.53	7.3	1.01
Main	524.7333	Q=6.0	6	621.78	622.18	622.18	622.31	0.047729	2.87	2.09	8.25	1.01
Main	524.7333	Q=8.0	8	621.78	622.24	622.24	622.39	0.046005	3.07	2.6	9.04	1.01
Main	524.7333	Q=10.0	10	621.78	622.29	622.29	622.46	0.044612	3.23	3.09	9.72	1.01
Main	524.7333	Q=15.0	15	621.78	622.4	622.4	622.6	0.041752	3.58	4.19	10.77	1.01
Main	524.7333	Q=20.0	20	621.78	622.49	622.49	622.72	0.039956	3.84	5.21	11.66	1.01
Main	524.7333	Q=25.0	25	621.78	622.57	622.57	622.83	0.038232	4.03	6.21	12.46	1.01
Main	524.7333	Q=30.0	30	621.78	622.65	622.65	622.92	0.037395	4.21	7.13	13.16	1.01
Main	524.7333	Q=35.0	35	621.78	622.71	622.71	623.01	0.036835	4.38	7.98	13.75	1.01
Main	524.7333	Q=40.0	40	621.78	622.97	622.77	623.15	0.014869	3.43	11.74	15.36	0.68
Main	524.7333	Q=50.0	50	621.78	626.7	622.88	626.7	0.000042	0.57	101.68	31.53	0.05
Main	524.7333	Q=60.0	60	621.78	631.14		631.14	0.000004	0.27	277.15	46.86	0.02
Main	524.7333	Q=70.0	70	621.78	636.38		636.38	0.000001	0.17	570.74	64.38	0.01
Main	659.5291	Q=1.0	1	625.69	625.94	625.89	625.96	0.016747	1.12	0.9	6.69	0.54
Main	659.5291	Q=2.0	2	625.69	626.01	625.95	626.05	0.018018	1.44	1.39	7.5	0.59
Main	659.5291	Q=4.0	4	625.69	626.11	626.04	626.17	0.018919	1.81	2.2	8.66	0.63
Main	659.5291	Q=6.0	6	625.69	626.19	626.11	626.26	0.019669	2.08	2.88	9.48	0.67
Main	659.5291	Q=8.0	8	625.69	626.25	626.16	626.33	0.020123	2.31	3.46	9.86	0.69
Main	659.5291	Q=10.0	10	625.69	626.3	626.21	626.4	0.020537	2.51	3.98	10.2	0.71
Main	659.5291	Q=15.0	15	625.69	626.41	626.32	626.54	0.021516	2.91	5.15	10.92	0.75
Main	659.5291	Q=20.0	20	625.69	626.5	626.41	626.67	0.0223	3.23	6.19	11.52	0.78
Main	659.5291	Q=25.0	25	625.69	626.58	626.49	626.78	0.023077	3.5	7.14	12.04	0.8
Main	659.5291	Q=30.0	30	625.69	626.66	626.56	626.87	0.023479	3.73	8.05	12.52	0.82
Main	659.5291	Q=35.0	35	625.69	626.73	626.63	626.97	0.023805	3.92	8.92	12.96	0.83
Main	659.5291	Q=40.0	40	625.69	626.7	626.7	627.04	0.034884	4.67	8.57	12.78	1
Main	659.5291	Q=50.0	50	625.69	626.82	626.82	627.2	0.033932	4.94	10.12	13.54	1.01
Main	659.5291	Q=60.0	60	625.69	631.13	626.93	631.14	0.000043	0.62	115.94	33.81	0.05
Main	659.5291	Q=70.0	70	625.69	636.38		636.38	0.000003	0.27	341.34	51.9	0.01
Main	876.4223	Q=1.0	1	631.21	631.36		631.39	0.041497	1.47	0.68	5.69	0.75

Van Horne - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	876.4223	Q=2.0	2	631.21	631.43	631.4	631.48	0.03713	1.77	1.13	6.52	0.75
Main	876.4223	Q=4.0	4	631.21	631.54		631.61	0.03476	2.14	1.87	7.7	0.77
Main	876.4223	Q=6.0	6	631.21	631.62	631.56	631.7	0.033223	2.38	2.52	8.61	0.77
Main	876.4223	Q=8.0	8	631.21	631.68	631.62	631.79	0.032142	2.55	3.14	9.39	0.78
Main	876.4223	Q=10.0	10	631.21	631.74		631.86	0.031567	2.7	3.71	10.05	0.78
Main	876.4223	Q=15.0	15	631.21	631.87		632.01	0.029905	2.96	5.07	11.49	0.79
Main	876.4223	Q=20.0	20	631.21	631.97		632.13	0.02866	3.16	6.33	12.63	0.79
Main	876.4223	Q=25.0	25	631.21	632.05		632.23	0.027565	3.4	7.37	13.17	0.79
Main	876.4223	Q=30.0	30	631.21	632.12	632.03	632.33	0.027085	3.64	8.3	13.58	0.8
Main	876.4223	Q=35.0	35	631.21	632.19	632.1	632.42	0.026559	3.84	9.21	13.96	0.8
Main	876.4223	Q=40.0	40	631.21	632.33		632.53	0.019147	3.66	11.15	14.74	0.7
Main	876.4223	Q=50.0	50	631.21	632.44		632.68	0.019473	4.01	12.84	15.38	0.72
Main	876.4223	Q=60.0	60	631.21	632.37	632.37	632.78	0.036089	5.2	11.82	14.99	0.97
Main	876.4223	Q=70.0	70	631.21	636.38		636.38	0.000076	0.74	113.18	34.32	0.06
Main	1063.56	Q=1.0	1	634.21	634.52	634.42	634.53	0.009023	0.92	1.08	5.72	0.37
Main	1063.56	Q=2.0	2	634.21	634.62	634.48	634.64	0.009603	1.19	1.68	6.37	0.41
Main	1063.56	Q=4.0	4	634.21	634.76	634.58	634.8	0.010088	1.5	2.66	7.31	0.44
Main	1063.56	Q=6.0	6	634.21	634.87	634.66	634.92	0.010435	1.72	3.49	8.02	0.46
Main	1063.56	Q=8.0	8	634.21	634.96	634.72	635.01	0.010688	1.89	4.24	8.62	0.47
Main	1063.56	Q=10.0	10	634.21	635.04	634.78	635.1	0.01092	2.03	4.93	9.13	0.49
Main	1063.56	Q=15.0	15	634.21	635.2	634.91	635.28	0.011422	2.32	6.46	10.14	0.51
Main	1063.56	Q=20.0	20	634.21	635.32	635.03	635.42	0.011876	2.6	7.72	10.79	0.53
Main	1063.56	Q=25.0	25	634.21	635.42	635.12	635.54	0.012284	2.83	8.87	11.35	0.55
Main	1063.56	Q=30.0	30	634.21	635.52	635.2	635.66	0.012507	3.03	9.99	11.87	0.56
Main	1063.56	Q=35.0	35	634.21	635.6	635.28	635.76	0.012729	3.2	11.05	12.34	0.58
Main	1063.56	Q=40.0	40	634.21	635.61	635.35	635.82	0.016126	3.62	11.16	12.4	0.65
Main	1063.56	Q=50.0	50	634.21	635.75	635.48	635.99	0.016076	3.92	12.96	13.12	0.66
Main	1063.56	Q=60.0	60	634.21	636.01	635.61	636.22	0.010976	3.73	16.52	14.4	0.57
Main	1063.56	Q=70.0	70	634.21	636.3	635.71	636.48	0.00743	3.49	20.88	15.82	0.48

Schenck - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	50.9263	Q=1.0	1	586.6	586.73	586.8	587.02	1.182143	4.35	0.23	3.53	3
Main	50.9263	Q=2.0	2	586.6	586.79	586.86	587.06	0.674406	4.19	0.48	5.09	2.41
Main	50.9263	Q=4.0	4	586.6	586.83	586.96	587.36	0.936218	5.85	0.68	5.64	2.96
Main	50.9263	Q=6.0	6	586.6	586.85	587.03	587.66	1.157469	7.22	0.83	5.85	3.38
Main	50.9263	Q=8.0	8	586.6	586.87	587.09	587.95	1.328923	8.34	0.96	6.04	3.69
Main	50.9263	Q=10.0	10	586.6	586.89	587.15	588.21	1.436753	9.23	1.08	6.21	3.89
Main	50.9263	Q=15.0	15	586.6	586.93	587.27	588.9	1.742759	11.26	1.33	6.54	4.39
Main	50.9263	Q=20.0	20	586.6	586.97	587.37	589.48	1.896868	12.72	1.57	6.84	4.67
Main	50.9263	Q=25.0	25	586.6	586.99	587.45	590.15	2.157395	14.27	1.75	7.06	5.05
Main	50.9263	Q=30.0	30	586.6	587.03	587.53	590.57	2.155226	15.11	1.99	7.34	5.12
Main	50.9263	Q=40.0	40	586.6	587.07	587.68	591.72	2.465318	17.3	2.31	7.71	5.56
Main	50.9263	Q=50.0	50	586.6	587.11	587.8	592.66	2.620183	18.91	2.64	8.06	5.82
Main	50.9263	Q=60.0	60	586.6	587.15	587.91	593.46	2.690286	20.16	2.98	8.4	5.97
Main	50.9263	Q=70.0	70	586.6	587.28	588.01	591.82	1.487706	17.11	4.09	9.46	4.58
Main	50.9263	Q=80.0	80	586.6	587.23	588.1	594.75	2.714752	22.02	3.63	9.04	6.12
Main	192.4857	Q=1.0	1	605.8	605.97	605.97	606.02	0.048436	1.66	0.6	5.52	0.88
Main	192.4857	Q=2.0	2	605.8	606.03	606.03	606.1	0.055651	2.18	0.92	6.14	1
Main	192.4857	Q=4.0	4	605.8	606.12	606.12	606.22	0.05047	2.62	1.52	7.2	1
Main	192.4857	Q=6.0	6	605.8	606.19	606.19	606.32	0.047484	2.9	2.07	8.03	1.01
Main	192.4857	Q=8.0	8	605.8	606.25	606.25	606.4	0.045529	3.11	2.58	8.73	1.01
Main	192.4857	Q=10.0	10	605.8	606.3	606.3	606.47	0.044263	3.28	3.05	9.34	1.01
Main	192.4857	Q=15.0	15	605.8	606.42	606.42	606.61	0.041254	3.58	4.19	10.67	1.01
Main	192.4857	Q=20.0	20	605.8	606.51	606.51	606.74	0.039369	3.86	5.18	11.53	1.01
Main	192.4857	Q=25.0	25	605.8	606.59	606.59	606.84	0.037039	4.07	6.16	12.26	1
Main	192.4857	Q=30.0	30	605.8	606.66	606.66	606.94	0.036155	4.29	7.03	12.87	1
Main	192.4857	Q=40.0	40	605.8	606.78	606.78	607.12	0.0329	4.67	8.69	13.64	0.99
Main	192.4857	Q=50.0	50	605.8	606.9	606.9	607.27	0.030557	4.98	10.28	14.34	0.98
Main	192.4857	Q=60.0	60	605.8	607	607	607.42	0.028739	5.24	11.83	15	0.97
Main	192.4857	Q=70.0	70	605.8	607.02	607.1	607.56	0.036217	5.97	12.13	15.12	1.09
Main	192.4857	Q=80.0	80	605.8	607.19	607.19	607.67	0.026002	5.66	14.83	16.19	0.95
Main	269.8349	Q=1.0	1	607.97	608.22	608.17	608.24	0.019115	1.21	0.83	6.03	0.58

Schenck - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	269.8349	Q=2.0	2	607.97	608.3	608.23	608.33	0.017691	1.45	1.37	7.18	0.59
Main	269.8349	Q=4.0	4	607.97	608.41	608.33	608.46	0.018679	1.81	2.21	8.63	0.63
Main	269.8349	Q=6.0	6	607.97	608.49	608.4	608.55	0.019352	2.05	2.92	9.71	0.66
Main	269.8349	Q=8.0	8	607.97	608.54	608.46	608.62	0.019857	2.28	3.51	10.27	0.68
Main	269.8349	Q=10.0	10	607.97	608.6		608.69	0.020111	2.48	4.05	10.68	0.7
Main	269.8349	Q=15.0	15	607.97	608.7	608.61	608.83	0.021047	2.88	5.23	11.54	0.74
Main	269.8349	Q=20.0	20	607.97	608.79	608.7	608.95	0.021726	3.21	6.3	12.27	0.77
Main	269.8349	Q=25.0	25	607.97	608.87	608.78	609.06	0.022552	3.49	7.26	12.88	0.8
Main	269.8349	Q=30.0	30	607.97	608.94		609.15	0.023024	3.72	8.19	13.45	0.82
Main	269.8349	Q=40.0	40	607.97	609.05	608.98	609.32	0.024531	4.21	9.7	14.2	0.86
Main	269.8349	Q=50.0	50	607.97	609.13	609.09	609.47	0.02628	4.69	10.94	14.71	0.91
Main	269.8349	Q=60.0	60	607.97	609.21	609.2	609.61	0.027652	5.11	12.11	15.18	0.95
Main	269.8349	Q=70.0	70	607.97	609.26	609.29	609.74	0.031144	5.62	12.89	15.48	1.01
Main	269.8349	Q=80.0	80	607.97	609.28	609.38	609.88	0.037552	6.26	13.23	15.61	1.12
Main	367.8869	Q=1.0	1	609.97	610.19		610.22	0.021409	1.31	0.76	5.27	0.61
Main	367.8869	Q=2.0	2	609.97	610.27		610.31	0.023289	1.75	1.14	5.28	0.66
Main	367.8869	Q=4.0	4	609.97	610.39	610.31	610.46	0.022325	2.25	1.78	5.31	0.68
Main	367.8869	Q=6.0	6	609.97	610.49		610.59	0.022173	2.6	2.31	5.32	0.7
Main	367.8869	Q=8.0	8	609.97	610.57		610.7	0.022301	2.89	2.77	5.34	0.71
Main	367.8869	Q=10.0	10	609.97	610.65		610.8	0.022629	3.14	3.18	5.35	0.72
Main	367.8869	Q=15.0	15	609.97	610.82	610.68	611.03	0.023254	3.65	4.11	5.38	0.73
Main	367.8869	Q=20.0	20	609.97	610.97	610.81	611.23	0.02406	4.06	4.93	5.41	0.75
Main	367.8869	Q=25.0	25	609.97	611.11		611.41	0.024977	4.42	5.65	5.44	0.76
Main	367.8869	Q=30.0	30	609.97	611.23		611.58	0.025864	4.74	6.33	5.46	0.78
Main	367.8869	Q=40.0	40	609.97	611.46		611.89	0.026967	5.26	7.61	5.5	0.79
Main	367.8869	Q=50.0	50	609.97	611.67	611.44	612.18	0.027979	5.72	8.79	6.99	0.8
Main	367.8869	Q=60.0	60	609.97	611.83	611.62	612.41	0.028504	6.15	10.15	9.6	0.82
Main	367.8869	Q=70.0	70	609.97	612	612	612.6	0.026815	6.35	11.94	11.63	0.81
Main	367.8869	Q=80.0	80	609.97	612.18	612.18	612.76	0.023663	6.33	14.23	13.79	0.77
Main	481.9059	Q=1.0	1	611.93	612.18	612.11	612.21	0.014394	1.26	0.8	4.19	0.51
Main	481.9059	Q=2.0	2	611.93	612.29	612.18	612.33	0.013893	1.61	1.24	4.2	0.52

Schenck - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	481.9059	Q=4.0	4	611.93	612.44	612.3	612.51	0.014794	2.11	1.9	4.21	0.55
Main	481.9059	Q=6.0	6	611.93	612.57	612.39	612.67	0.015161	2.45	2.45	4.22	0.57
Main	481.9059	Q=8.0	8	611.93	612.69	612.47	612.81	0.015499	2.72	2.94	4.23	0.57
Main	481.9059	Q=10.0	10	611.93	612.8	612.55	612.93	0.015774	2.94	3.4	4.24	0.58
Main	481.9059	Q=15.0	15	611.93	613.05	612.72	613.22	0.01615	3.37	4.45	4.27	0.58
Main	481.9059	Q=20.0	20	611.93	613.27	612.88	613.48	0.016503	3.7	5.4	4.28	0.58
Main	481.9059	Q=25.0	25	611.93	613.48	613.02	613.72	0.016682	3.96	6.31	4.3	0.58
Main	481.9059	Q=30.0	30	611.93	613.66	613.16	613.93	0.01677	4.22	7.27	7.09	0.58
Main	481.9059	Q=40.0	40	611.93	613.92	613.4	614.23	0.015991	4.56	9.71	10.68	0.58
Main	481.9059	Q=50.0	50	611.93	614.14	613.87	614.45	0.014713	4.7	12.33	13.03	0.57
Main	481.9059	Q=60.0	60	611.93	614.32	614.08	614.63	0.013899	4.82	14.82	14.92	0.56
Main	481.9059	Q=70.0	70	611.93	614.45	614.23	614.77	0.013956	5.01	16.82	16.05	0.57
Main	481.9059	Q=80.0	80	611.93	614.53	614.36	614.89	0.015035	5.32	18.19	16.73	0.59
Main	571.6713	Q=1.0	1	615.06	615.23	615.23	615.29	0.064175	1.96	0.51	4.24	1
Main	571.6713	Q=2.0	2	615.06	615.29	615.29	615.39	0.058371	2.49	0.8	4.24	1.01
Main	571.6713	Q=4.0	4	615.06	615.41	615.41	615.56	0.053328	3.13	1.28	4.24	1.01
Main	571.6713	Q=6.0	6	615.06	615.5	615.5	615.7	0.051419	3.59	1.67	4.24	1.01
Main	571.6713	Q=8.0	8	615.06	615.58	615.58	615.83	0.049605	3.93	2.03	4.24	1
Main	571.6713	Q=10.0	10	615.06	615.66	615.66	615.94	0.050393	4.27	2.34	4.24	1.01
Main	571.6713	Q=15.0	15	615.06	615.83	615.83	616.2	0.049181	4.86	3.08	4.24	1.01
Main	571.6713	Q=20.0	20	615.06	615.99	615.99	616.43	0.049507	5.35	3.73	4.24	1.01
Main	571.6713	Q=25.0	25	615.06	616.13	616.13	616.64	0.050066	5.77	4.33	4.24	1.01
Main	571.6713	Q=30.0	30	615.06	616.26	616.26	616.84	0.050546	6.12	4.9	4.24	1
Main	571.6713	Q=40.0	40	615.06	616.5	616.5	617.21	0.052981	6.77	5.91	4.24	1.01
Main	571.6713	Q=50.0	50	615.06	616.86	616.86	617.53	0.038694	6.62	7.82	7.06	0.88
Main	571.6713	Q=60.0	60	615.06	617.1	617.21	617.76	0.033691	6.71	9.76	9.64	0.84
Main	571.6713	Q=70.0	70	615.06	617.26	617.38	617.94	0.032069	6.9	11.48	11.44	0.83
Main	571.6713	Q=80.0	80	615.06	617.38	617.51	618.08	0.031864	7.13	12.91	12.24	0.83
Main	699.0435	Q=1.0	1	619.88	620.13	620.09	620.17	0.025435	1.48	0.68	4.24	0.65
Main	699.0435	Q=2.0	2	619.88	620.22	620.16	620.28	0.026989	1.96	1.02	4.24	0.7
Main	699.0435	Q=4.0	4	619.88	620.34	620.28	620.44	0.028799	2.58	1.55	4.24	0.75

Schenck - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	699.0435	Q=6.0	6	619.88	620.44	620.37	620.58	0.02959	3.02	2	4.66	0.78
Main	699.0435	Q=8.0	8	619.88	620.53	620.46	620.7	0.030447	3.38	2.41	5.22	0.8
Main	699.0435	Q=10.0	10	619.88	620.61	620.55	620.81	0.029869	3.64	2.85	5.87	0.81
Main	699.0435	Q=15.0	15	619.88	620.76	620.74	621.02	0.029897	4.21	3.85	7.37	0.84
Main	699.0435	Q=20.0	20	619.88	620.84	620.88	621.19	0.036509	4.95	4.45	8.13	0.94
Main	699.0435	Q=25.0	25	619.88	620.98	621	621.32	0.029795	4.97	5.74	9.57	0.87
Main	699.0435	Q=30.0	30	619.88	621.07	621.1	621.44	0.029737	5.25	6.62	10.41	0.88
Main	699.0435	Q=40.0	40	619.88	621.21	621.26	621.64	0.03019	5.74	8.2	11.57	0.91
Main	699.0435	Q=50.0	50	619.88	621.32	621.4	621.82	0.031965	6.25	9.51	12.45	0.95
Main	699.0435	Q=60.0	60	619.88	621.43	621.52	621.97	0.032383	6.61	10.87	13.29	0.97
Main	699.0435	Q=70.0	70	619.88	621.51	621.63	622.12	0.033606	7	12.04	13.99	0.99
Main	699.0435	Q=80.0	80	619.88	621.6	621.73	622.24	0.03358	7.27	13.33	14.71	1
Main	796.7723	Q=1.0	1	623.43	623.58	623.57	623.64	0.052901	1.96	0.51	3.6	0.92
Main	796.7723	Q=2.0	2	623.43	623.66	623.65	623.76	0.049042	2.49	0.8	3.6	0.93
Main	796.7723	Q=4.0	4	623.43	623.8	623.78	623.95	0.045325	3.13	1.28	3.6	0.92
Main	796.7723	Q=6.0	6	623.43	623.91	623.88	624.1	0.044175	3.58	1.68	3.6	0.92
Main	796.7723	Q=8.0	8	623.43	624	623.98	624.24	0.043171	3.96	2.04	4.3	0.93
Main	796.7723	Q=10.0	10	623.43	624.1	624.1	624.36	0.038442	4.15	2.51	5.45	0.9
Main	796.7723	Q=15.0	15	623.43	624.2	624.31	624.6	0.049946	5.21	3.12	6.66	1.05
Main	796.7723	Q=20.0	20	623.43	624.32	624.45	624.77	0.047283	5.61	4.04	8.14	1.05
Main	796.7723	Q=25.0	25	623.43	624.43	624.56	624.9	0.045046	5.9	4.95	9.37	1.05
Main	796.7723	Q=30.0	30	623.43	624.51	624.66	625.02	0.045056	6.22	5.75	10.34	1.06
Main	796.7723	Q=40.0	40	623.43	624.65	624.8	625.21	0.043986	6.67	7.31	11.86	1.07
Main	796.7723	Q=50.0	50	623.43	624.78	624.92	625.35	0.040573	6.86	8.91	12.66	1.04
Main	796.7723	Q=60.0	60	623.43	624.88	625.02	625.49	0.039893	7.15	10.25	13.29	1.05
Main	796.7723	Q=70.0	70	623.43	624.98	625.12	625.62	0.038195	7.32	11.66	13.93	1.04
Main	796.7723	Q=80.0	80	623.43	625.07	625.22	625.74	0.03816	7.58	12.86	14.44	1.05
Main	914.2125	Q=1.0	1	627.43	627.61		627.64	0.023741	1.46	0.68	4.12	0.63
Main	914.2125	Q=2.0	2	627.43	627.7	627.64	627.75	0.024896	1.93	1.04	4.12	0.68
Main	914.2125	Q=4.0	4	627.43	627.83		627.93	0.026167	2.52	1.59	4.12	0.72
Main	914.2125	Q=6.0	6	627.43	627.94		628.08	0.026724	2.93	2.05	4.27	0.73

Schenck - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	914.2125	Q=8.0	8	627.43	628.03	627.94	628.2	0.026978	3.28	2.53	6.97	0.76
Main	914.2125	Q=10.0	10	627.43	628.09	628.07	628.29	0.029321	3.64	2.99	8.99	0.8
Main	914.2125	Q=15.0	15	627.43	628.25	628.25	628.44	0.022887	3.75	4.87	13.28	0.74
Main	914.2125	Q=20.0	20	627.43	628.34	628.34	628.55	0.023264	4.06	6.15	14.67	0.75
Main	914.2125	Q=25.0	25	627.43	628.42	628.42	628.65	0.023703	4.32	7.3	15.83	0.77
Main	914.2125	Q=30.0	30	627.43	628.49	628.49	628.73	0.023335	4.5	8.47	16.93	0.77
Main	914.2125	Q=40.0	40	627.43	628.61	628.61	628.87	0.023289	4.82	10.57	18.58	0.79
Main	914.2125	Q=50.0	50	627.43	628.7	628.7	629	0.024616	5.2	12.22	19.56	0.82
Main	914.2125	Q=60.0	60	627.43	628.78	628.78	629.11	0.024599	5.44	13.97	20.55	0.83
Main	914.2125	Q=70.0	70	627.43	628.86	628.86	629.21	0.025161	5.7	15.51	21.39	0.85
Main	914.2125	Q=80.0	80	627.43	628.93	628.93	629.31	0.024801	5.86	17.18	22.26	0.85
Main	1004.907	Q=1.0	1	629.78	630.01	629.97	630.04	0.02955	1.35	0.74	6.38	0.7
Main	1004.907	Q=2.0	2	629.78	630.08	630.04	630.12	0.027598	1.66	1.21	7.47	0.72
Main	1004.907	Q=4.0	4	629.78	630.18	630.13	630.24	0.024753	2.02	2	8.7	0.72
Main	1004.907	Q=6.0	6	629.78	630.25	630.19	630.33	0.023002	2.32	2.65	9.25	0.73
Main	1004.907	Q=8.0	8	629.78	630.31	630.25	630.41	0.022082	2.56	3.23	9.72	0.73
Main	1004.907	Q=10.0	10	629.78	630.37	630.3	630.48	0.02006	2.7	3.86	10.2	0.72
Main	1004.907	Q=15.0	15	629.78	630.45	630.41	630.62	0.025412	3.39	4.67	10.79	0.83
Main	1004.907	Q=20.0	20	629.78	630.54	630.5	630.75	0.025583	3.78	5.65	11.47	0.85
Main	1004.907	Q=25.0	25	629.78	630.62	630.59	630.86	0.025269	4.08	6.61	12.09	0.87
Main	1004.907	Q=30.0	30	629.78	630.69	630.67	630.96	0.025951	4.39	7.42	12.59	0.89
Main	1004.907	Q=40.0	40	629.78	630.74	630.8	631.15	0.035405	5.38	8.13	13.02	1.05
Main	1004.907	Q=50.0	50	629.78	630.83	630.92	631.32	0.037626	5.94	9.29	13.68	1.11
Main	1004.907	Q=60.0	60	629.78	630.9	631.03	631.48	0.039633	6.44	10.36	14.24	1.15
Main	1004.907	Q=70.0	70	629.78	630.97	631.13	631.63	0.041923	6.92	11.31	14.7	1.2
Main	1004.907	Q=80.0	80	629.78	631.03	631.23	631.77	0.043404	7.33	12.27	15.15	1.23
Main	1120.9	Q=1.0	1	633.68	633.86		633.9	0.037631	1.48	0.68	6.07	0.78
Main	1120.9	Q=2.0	2	633.68	633.92	633.9	633.98	0.040488	1.89	1.06	6.91	0.85
Main	1120.9	Q=4.0	4	633.68	634	633.99	634.09	0.04681	2.46	1.63	8	0.96
Main	1120.9	Q=6.0	6	633.68	634.06	634.06	634.18	0.047907	2.79	2.15	8.88	1
Main	1120.9	Q=8.0	8	633.68	634.11	634.11	634.25	0.045607	3	2.67	9.6	1

Schenck - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	1120.9	Q=10.0	10	633.68	634.16	634.16	634.32	0.043993	3.22	3.12	10.01	1
Main	1120.9	Q=15.0	15	633.68	634.26	634.26	634.46	0.039947	3.59	4.21	10.93	1
Main	1120.9	Q=20.0	20	633.68	634.36	634.36	634.59	0.037288	3.87	5.24	11.72	0.99
Main	1120.9	Q=25.0	25	633.68	634.43	634.43	634.69	0.03556	4.12	6.19	12.4	0.99
Main	1120.9	Q=30.0	30	633.68	634.51	634.51	634.79	0.033231	4.33	7.11	12.95	0.97
Main	1120.9	Q=40.0	40	633.68	634.63	634.63	634.97	0.03056	4.71	8.82	13.92	0.96
Main	1120.9	Q=50.0	50	633.68	634.75	634.75	635.13	0.028612	5.01	10.48	14.79	0.95
Main	1120.9	Q=60.0	60	633.68	634.86	634.86	635.27	0.027011	5.27	12.1	15.6	0.95
Main	1120.9	Q=70.0	70	633.68	634.96	634.96	635.4	0.02562	5.48	13.7	16.36	0.94
Main	1120.9	Q=80.0	80	633.68	635.05	635.05	635.52	0.024666	5.68	15.23	17.05	0.93
Main	1227.28	Q=1.0	1	636.08	636.28	636.22	636.3	0.015048	1.11	0.9	6.24	0.52
Main	1227.28	Q=2.0	2	636.08	636.36		636.39	0.014511	1.35	1.48	7.47	0.53
Main	1227.28	Q=4.0	4	636.08	636.48		636.52	0.013554	1.6	2.5	9.23	0.54
Main	1227.28	Q=6.0	6	636.08	636.57	636.44	636.62	0.013367	1.78	3.37	10.51	0.55
Main	1227.28	Q=8.0	8	636.08	636.64		636.7	0.013811	1.95	4.1	11.46	0.57
Main	1227.28	Q=10.0	10	636.08	636.69		636.76	0.014038	2.11	4.74	12.16	0.59
Main	1227.28	Q=15.0	15	636.08	636.8		636.89	0.014761	2.49	6.08	13.21	0.63
Main	1227.28	Q=20.0	20	636.08	636.88		637.01	0.015227	2.81	7.23	13.85	0.65
Main	1227.28	Q=25.0	25	636.08	636.96	636.81	637.11	0.015583	3.09	8.3	14.42	0.67
Main	1227.28	Q=30.0	30	636.08	637.02	636.89	637.19	0.016329	3.36	9.21	14.88	0.7
Main	1227.28	Q=40.0	40	636.08	637.14	637.01	637.35	0.017098	3.8	10.99	15.76	0.73
Main	1227.28	Q=50.0	50	636.08	637.24	637.12	637.5	0.017762	4.18	12.61	16.51	0.76
Main	1227.28	Q=60.0	60	636.08	637.33	637.22	637.63	0.018498	4.53	14.08	17.17	0.79
Main	1227.28	Q=70.0	70	636.08	637.4	637.31	637.75	0.01922	4.85	15.45	17.76	0.82
Main	1227.28	Q=80.0	80	636.08	637.48	637.4	637.86	0.019803	5.14	16.76	18.3	0.84
Main	1316.166	Q=1.0	1	638.01	638.23		638.26	0.035619	1.51	0.66	5.49	0.77
Main	1316.166	Q=2.0	2	638.01	638.29		638.35	0.037373	1.92	1.04	6.31	0.83
Main	1316.166	Q=4.0	4	638.01	638.38	638.36	638.47	0.040907	2.43	1.64	7.42	0.91
Main	1316.166	Q=6.0	6	638.01	638.45	638.44	638.57	0.04113	2.74	2.19	8.3	0.94
Main	1316.166	Q=8.0	8	638.01	638.51	638.5	638.65	0.038648	2.91	2.75	9.12	0.93
Main	1316.166	Q=10.0	10	638.01	638.57	638.55	638.71	0.038066	3.07	3.25	9.79	0.94

Schenck - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	1316.166	Q=15.0	15	638.01	638.68	638.66	638.86	0.035638	3.43	4.37	10.81	0.94
Main	1316.166	Q=20.0	20	638.01	638.76	638.75	638.98	0.034228	3.74	5.38	11.52	0.95
Main	1316.166	Q=25.0	25	638.01	638.84	638.83	639.09	0.033439	4	6.31	12.15	0.96
Main	1316.166	Q=30.0	30	638.01	638.92	638.9	639.19	0.032029	4.18	7.26	12.76	0.95
Main	1316.166	Q=40.0	40	638.01	639.06	639.03	639.36	0.030189	4.49	9.06	13.84	0.95
Main	1316.166	Q=50.0	50	638.01	639.16	639.14	639.52	0.029362	4.85	10.53	14.39	0.95
Main	1316.166	Q=60.0	60	638.01	639.26	639.24	639.66	0.028181	5.14	12	14.9	0.95
Main	1316.166	Q=70.0	70	638.01	639.35	639.34	639.79	0.027222	5.4	13.41	15.38	0.95
Main	1316.166	Q=80.0	80	638.01	639.44	639.43	639.92	0.026605	5.64	14.75	15.82	0.96
Main	1381.339	Q=1.0	1	639.72	639.96	639.91	639.98	0.020348	1.25	0.8	6.06	0.6
Main	1381.339	Q=2.0	2	639.72	640.04	639.99	640.07	0.019581	1.55	1.31	7.14	0.62
Main	1381.339	Q=4.0	4	639.72	640.15	640.07	640.2	0.018389	1.88	2.19	8.71	0.63
Main	1381.339	Q=6.0	6	639.72	640.22	640.14	640.29	0.018284	2.15	2.89	9.59	0.65
Main	1381.339	Q=8.0	8	639.72	640.28	640.2	640.37	0.018866	2.42	3.44	10.06	0.68
Main	1381.339	Q=10.0	10	639.72	640.33	640.25	640.43	0.019117	2.64	3.97	10.48	0.7
Main	1381.339	Q=15.0	15	639.72	640.44	640.35	640.58	0.01993	3.11	5.13	11.35	0.74
Main	1381.339	Q=20.0	20	639.72	640.52	640.45	640.7	0.020586	3.5	6.16	12.07	0.77
Main	1381.339	Q=25.0	25	639.72	640.6	640.53	640.81	0.020979	3.81	7.13	12.71	0.79
Main	1381.339	Q=30.0	30	639.72	640.53	640.61	640.92	0.044679	5.18	6.24	12.12	1.14
Main	1381.339	Q=40.0	40	639.72	640.63	640.75	641.11	0.046642	5.83	7.48	12.94	1.19
Main	1381.339	Q=50.0	50	639.72	640.72	640.86	641.28	0.048007	6.37	8.65	13.66	1.23
Main	1381.339	Q=60.0	60	639.72	640.79	640.96	641.45	0.050733	6.91	9.61	14.09	1.28
Main	1381.339	Q=70.0	70	639.72	640.86	641.06	641.59	0.050616	7.28	10.69	14.54	1.3
Main	1381.339	Q=80.0	80	639.72	640.93	641.15	641.73	0.050974	7.64	11.69	14.93	1.32
Main	1454.166	Q=1.0	1	642.73	642.87	642.87	642.9	0.048581	1.5	0.67	7.08	0.86
Main	1454.166	Q=2.0	2	642.73	642.91	642.91	642.97	0.059689	1.98	1.01	8.34	1
Main	1454.166	Q=4.0	4	642.73	642.99	642.99	643.07	0.053566	2.3	1.74	10.49	1
Main	1454.166	Q=6.0	6	642.73	643.05	643.05	643.15	0.050269	2.52	2.38	12.02	1
Main	1454.166	Q=8.0	8	642.73	643.09	643.09	643.21	0.047393	2.72	2.94	12.84	0.99
Main	1454.166	Q=10.0	10	642.73	643.13	643.13	643.26	0.045413	2.94	3.42	13.23	1
Main	1454.166	Q=15.0	15	642.73	643.21	643.21	643.38	0.040384	3.33	4.58	14.14	0.98

Schenck - Post-Development - Discharge-Storage

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	1454.166	Q=20.0	20	642.73	643.29	643.29	643.49	0.035954	3.59	5.73	14.98	0.96
Main	1454.166	Q=25.0	25	642.73	643.36	643.36	643.58	0.03455	3.86	6.72	15.68	0.96
Main	1454.166	Q=30.0	30	642.73	643.42	643.42	643.67	0.032218	4.04	7.77	16.37	0.95
Main	1454.166	Q=40.0	40	642.73	643.53	643.53	643.82	0.030149	4.4	9.64	17.55	0.95
Main	1454.166	Q=50.0	50	642.73	643.63	643.63	643.95	0.028543	4.7	11.43	18.61	0.94
Main	1454.166	Q=60.0	60	642.73	643.73	643.73	644.07	0.026491	4.9	13.3	19.65	0.92
Main	1454.166	Q=70.0	70	642.73	643.81	643.81	644.18	0.025897	5.13	14.88	20.22	0.93
Main	1454.166	Q=80.0	80	642.73	643.89	643.89	644.29	0.025118	5.32	16.46	20.72	0.93

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	40.13637	Q=95.35	95.35	579.96	581.23	581.23	581.67	0.030168	5.36	17.95	20.95	0.99
Main-1	40.13637	Q=4	4	579.96	580.22	580.22	580.31	0.052865	2.36	1.69	9.74	1
Main-1	40.13637	Q=8	8	579.96	580.33	580.33	580.45	0.047418	2.76	2.9	12.13	1
Main-1	40.13637	Q=16	16	579.96	580.48	580.48	580.65	0.041952	3.35	4.78	13.68	1
Main-1	40.13637	Q=24	24	579.96	580.59	580.59	580.81	0.040159	3.75	6.39	14.88	1.01
Main-1	40.13637	Q=32	32	579.96	580.69	580.69	580.94	0.03828	4.04	7.92	15.93	1.01
Main-1	40.13637	Q=40	40	579.96	580.78	580.78	581.06	0.036971	4.27	9.37	16.86	1.01
Main-1	40.13637	Q=80	80	579.96	581.12	581.12	581.52	0.031761	5.12	15.7	20.03	1
Main-1	40.13637	Q=120	120	579.96	581.39	581.39	581.89	0.02844	5.69	21.37	22.27	0.98
Main-1	40.13637	Q=160	160	579.96	581.61	581.61	582.19	0.025741	6.16	26.56	24	0.96
Main-1	40.13637	Q=240	240	579.96	582	582	582.7	0.022312	6.86	36.46	27	0.94
Main-1	40.13637	Q=320	320	579.96	582.33	582.33	583.13	0.020177	7.37	45.87	29.57	0.92
Main-1	40.13637	Q=400	400	579.96	582.62	582.62	583.5	0.019053	7.82	54.55	31.72	0.91
Main-1	40.13637	Q=440	440	579.96	582.74	582.74	583.67	0.018638	8.03	58.7	32.67	0.91
Main-1	40.13637	Q=480	480	579.96	582.88	582.88	583.83	0.018005	8.18	63.11	33.66	0.91
Main-1	117.9774	Q=95.35	95.35	581.29	582.82	582.53	583.06	0.011649	3.96	24.59	23.48	0.64
Main-1	117.9774	Q=4	4	581.29	581.67	581.54	581.7	0.009043	1.27	3.15	12.17	0.44
Main-1	117.9774	Q=8	8	581.29	581.81	581.65	581.85	0.009494	1.6	5	14.19	0.48
Main-1	117.9774	Q=16	16	581.29	582	581.8	582.06	0.010174	2.03	7.89	16.5	0.52
Main-1	117.9774	Q=24	24	581.29	582.14	581.91	582.23	0.010344	2.32	10.36	18.12	0.54
Main-1	117.9774	Q=32	32	581.29	582.25	582.01	582.36	0.010549	2.58	12.45	19.16	0.56
Main-1	117.9774	Q=40	40	581.29	582.35	582.1	582.47	0.010786	2.8	14.35	20.06	0.57
Main-1	117.9774	Q=80	80	581.29	582.71	582.43	582.92	0.011461	3.68	22.08	22.78	0.63
Main-1	117.9774	Q=120	120	581.29	582.97	582.68	583.26	0.012061	4.37	28.23	24.46	0.67
Main-1	117.9774	Q=160	160	581.29	583.19	582.91	583.55	0.012546	4.92	33.66	25.86	0.7
Main-1	117.9774	Q=240	240	581.29	583.53	583.29	584.04	0.013524	5.85	43.03	28.11	0.75
Main-1	117.9774	Q=320	320	581.29	583.81	583.61	584.45	0.014393	6.62	51.16	29.91	0.79
Main-1	117.9774	Q=400	400	581.29	583.67	583.9	584.86	0.029215	9	46.83	28.97	1.11
Main-1	117.9774	Q=440	440	581.29	583.77	584.03	585.04	0.029184	9.31	49.97	29.66	1.12
Main-1	117.9774	Q=480	480	581.29	583.88	584.16	585.22	0.029156	9.6	53.02	30.28	1.13

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main-1	67.45072	Q=95.35	94.6	585.2	586.39	586.55	587.04	0.024292	6.49	14.58	18.73	1.3
Main-1	67.45072	Q=4	2.5	585.2	585.45	585.45	585.52	0.025268	2.12	1.18	8.41	1
Main-1	67.45072	Q=8	5	585.2	585.53	585.53	585.63	0.022231	2.54	1.97	9.76	0.99
Main-1	67.45072	Q=16	10	585.2	585.66	585.66	585.8	0.019821	3.04	3.29	11.36	1
Main-1	67.45072	Q=24	15	585.2	585.74	585.75	585.93	0.021218	3.53	4.26	12.4	1.06
Main-1	67.45072	Q=32	20	585.2	585.81	585.84	586.04	0.0214	3.85	5.19	13.33	1.09
Main-1	67.45072	Q=40	25	585.2	585.87	585.91	586.14	0.021981	4.15	6.03	14.1	1.12
Main-1	67.45072	Q=80	50	585.2	586.1	586.19	586.53	0.023436	5.26	9.51	16.32	1.21
Main-1	67.45072	Q=120	75	585.2	586.27	586.4	586.84	0.024029	6.01	12.47	17.82	1.27
Main-1	67.45072	Q=160	100	585.2	586.42	586.58	587.1	0.024091	6.58	15.2	18.99	1.3
Main-1	67.45072	Q=240	150	585.2	586.67	586.89	587.53	0.023919	7.42	20.23	20.96	1.33
Main-1	67.45072	Q=320	200	585.2	586.89	587.15	587.89	0.02381	8.06	24.82	22.6	1.35
Main-1	67.45072	Q=400	250	585.2	587.12	587.38	588.18	0.021268	8.25	30.29	24.4	1.31
Main-1	67.45072	Q=440	275	585.2	587.22	587.48	588.31	0.020419	8.36	32.9	25.22	1.29
Main-1	67.45072	Q=480	300	585.2	587.33	587.58	588.43	0.019587	8.44	35.55	26.02	1.27
Main-1	163.866	Q=95.35	94.6	587.46	588.76	588.76	589.17	0.019779	5.15	18.38	22.77	1.01
Main-1	163.866	Q=4	2.5	587.46	587.73	587.7	587.78	0.021787	1.79	1.4	9.14	0.81
Main-1	163.866	Q=8	5	587.46	587.8	587.79	587.89	0.024772	2.34	2.14	10.3	0.9
Main-1	163.866	Q=16	10	587.46	587.91	587.91	588.05	0.02792	3.02	3.32	11.92	1.01
Main-1	163.866	Q=24	15	587.46	588.01	588.01	588.17	0.025572	3.3	4.55	13.4	1
Main-1	163.866	Q=32	20	587.46	588.08	588.08	588.28	0.025227	3.56	5.61	14.54	1.01
Main-1	163.866	Q=40	25	587.46	588.15	588.15	588.37	0.024364	3.75	6.66	15.54	1.01
Main-1	163.866	Q=80	50	587.46	588.42	588.42	588.72	0.021861	4.43	11.29	18.95	1.01
Main-1	163.866	Q=120	75	587.46	588.62	588.62	588.99	0.020434	4.86	15.44	21.41	1.01
Main-1	163.866	Q=160	100	587.46	588.79	588.79	589.21	0.01962	5.22	19.16	23.09	1.01
Main-1	163.866	Q=240	150	587.46	589.07	589.07	589.59	0.018419	5.77	26.01	25.71	1.01
Main-1	163.866	Q=320	200	587.46	589.31	589.31	589.9	0.017636	6.16	32.45	28.08	1.01
Main-1	163.866	Q=400	250	587.46	589.45	589.52	590.18	0.019604	6.84	36.55	29.28	1.08
Main-1	163.866	Q=440	275	587.46	589.51	589.61	590.31	0.020726	7.18	38.32	29.77	1.11
Main-1	163.866	Q=480	300	587.46	589.57	589.7	590.44	0.02173	7.49	40.07	30.25	1.15

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main-1	269.0372	Q=95.35	94.6	588.63	590.43		590.83	0.012914	5.06	18.7	16.95	0.85
Main-1	269.0372	Q=4	2.5	588.63	589.05		589.08	0.008094	1.45	1.73	7.37	0.53
Main-1	269.0372	Q=8	5	588.63	589.19	589.06	589.24	0.00781	1.79	2.8	8.43	0.55
Main-1	269.0372	Q=16	10	588.63	589.37		589.45	0.007772	2.22	4.51	9.73	0.57
Main-1	269.0372	Q=24	15	588.63	589.51		589.61	0.008304	2.57	5.85	10.64	0.61
Main-1	269.0372	Q=32	20	588.63	589.61	589.42	589.74	0.008727	2.84	7.04	11.39	0.64
Main-1	269.0372	Q=40	25	588.63	589.71	589.51	589.85	0.009129	3.08	8.12	12.03	0.66
Main-1	269.0372	Q=80	50	588.63	590.05		590.29	0.010731	3.96	12.61	14.39	0.75
Main-1	269.0372	Q=120	75	588.63	590.28		590.62	0.012065	4.62	16.23	16.04	0.81
Main-1	269.0372	Q=160	100	588.63	590.47	590.34	590.89	0.013127	5.17	19.33	17.14	0.86
Main-1	269.0372	Q=240	150	588.63	590.76	590.69	591.34	0.014892	6.1	24.59	18.67	0.94
Main-1	269.0372	Q=320	200	588.63	591	590.99	591.73	0.016417	6.86	29.15	19.9	1
Main-1	269.0372	Q=400	250	588.63	591.25	591.25	592.08	0.016293	7.29	34.28	21.2	1.01
Main-1	269.0372	Q=440	275	588.63	591.37	591.37	592.23	0.016006	7.44	36.95	21.84	1.01
Main-1	269.0372	Q=480	300	588.63	591.49	591.49	592.38	0.015877	7.6	39.46	22.43	1.01
Main-1	355.8186	Q=95.35	94.6	589.27	591.29		591.41	0.003741	2.69	35.12	26.81	0.41
Main-1	355.8186	Q=4	2.5	589.27	589.65		589.66	0.005658	1.04	2.4	10.55	0.38
Main-1	355.8186	Q=8	5	589.27	589.78		589.8	0.005536	1.27	3.93	12.52	0.4
Main-1	355.8186	Q=16	10	589.27	589.96		590	0.005349	1.54	6.5	15.15	0.41
Main-1	355.8186	Q=24	15	589.27	590.11		590.16	0.004878	1.68	8.91	16.94	0.41
Main-1	355.8186	Q=32	20	589.27	590.23		590.28	0.004738	1.82	11	18.23	0.41
Main-1	355.8186	Q=40	25	589.27	590.34		590.4	0.004537	1.92	13.01	19.19	0.41
Main-1	355.8186	Q=80	50	589.27	590.76		590.84	0.00403	2.28	21.94	22.83	0.41
Main-1	355.8186	Q=120	75	589.27	591.08		591.18	0.003844	2.54	29.55	25.21	0.41
Main-1	355.8186	Q=160	100	589.27	591.35		591.46	0.00371	2.74	36.54	27.16	0.42
Main-1	355.8186	Q=240	150	589.27	591.78		591.93	0.003422	3.08	48.93	29.83	0.41
Main-1	355.8186	Q=320	200	589.27	592.14		592.32	0.003166	3.37	60.11	31.71	0.41
Main-1	355.8186	Q=400	250	589.27	592.45		592.66	0.003059	3.63	70.18	33.32	0.41
Main-1	355.8186	Q=440	275	589.27	592.59		592.81	0.00303	3.75	74.92	34.05	0.42
Main-1	355.8186	Q=480	300	589.27	592.73		592.96	0.002998	3.87	79.6	34.75	0.42

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	424.0896	Q=95.35	94.6	589.71	591.57		591.7	0.004695	2.88	32.81	26.87	0.46
Main-1	424.0896	Q=4	2.5	589.71	590.05		590.06	0.005845	1.02	2.44	11.25	0.39
Main-1	424.0896	Q=8	5	589.71	590.17		590.19	0.006052	1.29	3.88	12.97	0.42
Main-1	424.0896	Q=16	10	589.71	590.34		590.38	0.005865	1.58	6.32	15.14	0.43
Main-1	424.0896	Q=24	15	589.71	590.47		590.52	0.005818	1.78	8.42	16.77	0.44
Main-1	424.0896	Q=32	20	589.71	590.58		590.64	0.005749	1.93	10.36	18.15	0.45
Main-1	424.0896	Q=40	25	589.71	590.68		590.75	0.005605	2.04	12.26	19.41	0.45
Main-1	424.0896	Q=80	50	589.71	591.06		591.16	0.005165	2.46	20.32	22.73	0.46
Main-1	424.0896	Q=120	75	589.71	591.36		591.48	0.004875	2.73	27.5	25.2	0.46
Main-1	424.0896	Q=160	100	589.71	591.62		591.75	0.004674	2.93	34.18	27.28	0.46
Main-1	424.0896	Q=240	150	589.71	592.03		592.2	0.004461	3.24	46.24	30.62	0.46
Main-1	424.0896	Q=320	200	589.71	592.38		592.57	0.004197	3.5	57.27	33.14	0.46
Main-1	424.0896	Q=400	250	589.71	592.68		592.89	0.003891	3.74	67.44	35.13	0.46
Main-1	424.0896	Q=440	275	589.71	592.82		593.04	0.003786	3.85	72.31	36.04	0.46
Main-1	424.0896	Q=480	300	589.71	592.95		593.19	0.00369	3.95	77.15	36.93	0.45
Main-1	617.451	Q=95.35	94.6	589.87	592.16	591.1	592.22	0.00168	1.95	48.58	33.14	0.28
Main-1	617.451	Q=4	2.5	589.87	590.39	590.08	590.39	0.0008	0.51	4.95	14.78	0.15
Main-1	617.451	Q=8	5	589.87	590.55	590.16	590.56	0.000921	0.66	7.6	16.97	0.17
Main-1	617.451	Q=16	10	589.87	590.78	590.27	590.79	0.001068	0.86	11.66	19.52	0.2
Main-1	617.451	Q=24	15	589.87	590.94	590.37	590.96	0.001173	1	15	21.39	0.21
Main-1	617.451	Q=32	20	589.87	591.07	590.44	591.09	0.00126	1.11	17.94	22.91	0.22
Main-1	617.451	Q=40	25	589.87	591.19	590.5	591.21	0.001316	1.21	20.7	24.2	0.23
Main-1	617.451	Q=80	50	589.87	591.62	590.76	591.66	0.001524	1.56	32.03	28.39	0.26
Main-1	617.451	Q=120	75	589.87	591.94	590.96	591.99	0.001628	1.8	41.66	31.26	0.27
Main-1	617.451	Q=160	100	589.87	592.21	591.13	592.27	0.001694	1.98	50.39	33.62	0.29
Main-1	617.451	Q=240	150	589.87	592.64	591.41	592.72	0.001753	2.3	65.41	37.27	0.3
Main-1	617.451	Q=320	200	589.87	592.98	591.64	593.08	0.001775	2.56	78.76	40.18	0.31
Main-1	617.451	Q=400	250	589.87	593.27	591.85	593.39	0.001782	2.8	90.78	42.07	0.32
Main-1	617.451	Q=440	275	589.87	593.41	591.94	593.54	0.001783	2.9	96.54	42.87	0.32
Main-1	617.451	Q=480	300	589.87	593.54	592.03	593.68	0.001781	3	102.2	43.63	0.32

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main-1	751.7308	Q=95.35	94.6	591.99	593.45	593.45	593.94	0.013844	5.62	16.84	17.46	1.01
Main-1	751.7308	Q=4	2.5	591.99	592.23	592.23	592.31	0.024162	2.29	1.09	6.68	1
Main-1	751.7308	Q=8	5	591.99	592.33	592.33	592.45	0.0215	2.72	1.84	8	1
Main-1	751.7308	Q=16	10	591.99	592.48	592.48	592.64	0.019605	3.21	3.12	9.85	1
Main-1	751.7308	Q=24	15	591.99	592.58	592.58	592.78	0.018671	3.55	4.23	11.07	1.01
Main-1	751.7308	Q=32	20	591.99	592.67	592.67	592.9	0.017846	3.81	5.25	11.9	1.01
Main-1	751.7308	Q=40	25	591.99	592.75	592.75	593	0.017016	4.01	6.24	12.65	1.01
Main-1	751.7308	Q=80	50	591.99	593.05	593.05	593.41	0.015369	4.8	10.41	14.85	1.01
Main-1	751.7308	Q=120	75	591.99	593.29	593.29	593.73	0.014354	5.31	14.13	16.41	1.01
Main-1	751.7308	Q=160	100	591.99	593.49	593.49	594	0.013709	5.69	17.57	17.73	1.01
Main-1	751.7308	Q=240	150	591.99	593.8	593.82	594.45	0.013162	6.45	23.33	19.59	1.02
Main-1	751.7308	Q=320	200	591.99	594.04	594.11	594.83	0.013465	7.18	28.12	20.98	1.06
Main-1	751.7308	Q=400	250	591.99	594.25	594.36	595.18	0.013641	7.77	32.66	22.21	1.08
Main-1	751.7308	Q=440	275	591.99	594.34	594.47	595.34	0.01385	8.06	34.72	22.75	1.1
Main-1	751.7308	Q=480	300	591.99	594.42	594.58	595.5	0.014033	8.37	36.58	23.14	1.12
Main-1	885.8018	Q=95.35	88.81	594.43	595.65	595.89	596.5	0.030732	7.43	11.95	14.81	1.46
Main-1	885.8018	Q=4	2.5	594.43	594.59	594.66	594.84	0.118651	4.01	0.62	5.44	2.09
Main-1	885.8018	Q=8	5	594.43	594.79	594.77	594.89	0.015664	2.51	1.99	7.68	0.87
Main-1	885.8018	Q=16	10	594.43	594.89	594.92	595.09	0.025639	3.66	2.74	8.66	1.15
Main-1	885.8018	Q=24	15	594.43	594.97	595.03	595.25	0.028435	4.26	3.52	9.59	1.24
Main-1	885.8018	Q=32	20	594.43	595.05	595.13	595.38	0.028393	4.61	4.34	10.46	1.26
Main-1	885.8018	Q=40	25	594.43	595.12	595.21	595.5	0.029011	4.95	5.05	11.09	1.29
Main-1	885.8018	Q=80	50	594.43	595.37	595.53	595.96	0.030375	6.2	8.07	13.08	1.39
Main-1	885.8018	Q=120	75	594.43	595.55	595.77	596.33	0.03087	7.07	10.61	14.23	1.44
Main-1	885.8018	Q=160	100	594.43	595.72	595.98	596.64	0.030598	7.69	13	15.24	1.47
Main-1	885.8018	Q=240	150	594.43	596	596.33	597.14	0.029676	8.58	17.49	16.97	1.49
Main-1	885.8018	Q=320	200	594.43	596.23	596.61	597.56	0.029368	9.28	21.55	18.39	1.51
Main-1	885.8018	Q=400	250	594.43	596.4	596.86	597.97	0.029729	10.03	24.94	19.33	1.55
Main-1	885.8018	Q=440	275	594.43	596.49	596.97	598.15	0.029481	10.34	26.64	19.76	1.55
Main-1	885.8018	Q=480	300	594.43	596.57	597.09	598.33	0.02933	10.63	28.28	20.15	1.56

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	998.6823	Q=95.35	88.81	597.59	598.85	598.85	599.28	0.019683	5.22	17.02	20.54	1.01
Main-1	998.6823	Q=4	2.5	597.59	597.82	597.82	597.89	0.034822	2.1	1.19	8.75	1
Main-1	998.6823	Q=8	5	597.59	597.91	597.91	598.01	0.030473	2.52	1.99	10	1
Main-1	998.6823	Q=16	10	597.59	598.03	598.03	598.17	0.028975	3.08	3.25	11.66	1.03
Main-1	998.6823	Q=24	15	597.59	598.13	598.13	598.3	0.025488	3.32	4.52	13.1	1
Main-1	998.6823	Q=32	20	597.59	598.2	598.2	598.4	0.025073	3.59	5.57	14.2	1.01
Main-1	998.6823	Q=40	25	597.59	598.28	598.28	598.5	0.024045	3.77	6.63	15.22	1.01
Main-1	998.6823	Q=80	50	597.59	598.54	598.54	598.86	0.021597	4.51	11.07	17.86	1.01
Main-1	998.6823	Q=120	75	597.59	598.75	598.75	599.14	0.02021	5	14.99	19.67	1.01
Main-1	998.6823	Q=160	100	597.59	598.93	598.93	599.38	0.019262	5.37	18.64	21.22	1.01
Main-1	998.6823	Q=240	150	597.59	599.23	599.23	599.77	0.018009	5.91	25.4	23.81	1.01
Main-1	998.6823	Q=320	200	597.59	599.47	599.47	600.11	0.01688	6.43	31.19	25.46	1
Main-1	998.6823	Q=400	250	597.59	599.68	599.68	600.41	0.015485	6.84	36.89	26.84	0.99
Main-1	998.6823	Q=440	275	597.59	599.78	599.78	600.55	0.015019	7.04	39.6	27.48	0.98
Main-1	998.6823	Q=480	300	597.59	599.88	599.88	600.68	0.014529	7.2	42.36	28.11	0.98
Main-1	1083.475	Q=95.35	88.81	597.74	599.55	598.87	599.65	0.001683	2.56	35.61	28.53	0.38
Main-1	1083.475	Q=4	2.5	597.74	598.15	597.95	598.15	0.001059	0.65	3.83	14.79	0.23
Main-1	1083.475	Q=8	5	597.74	598.28	598.02	598.29	0.00115	0.84	5.97	16.9	0.25
Main-1	1083.475	Q=16	10	597.74	598.46	598.13	598.48	0.001259	1.08	9.22	18.93	0.27
Main-1	1083.475	Q=24	15	597.74	598.59	598.21	598.62	0.001375	1.27	11.8	20.4	0.29
Main-1	1083.475	Q=32	20	597.74	598.71	598.28	598.74	0.001443	1.41	14.16	21.66	0.31
Main-1	1083.475	Q=40	25	597.74	598.8	598.34	598.84	0.00149	1.53	16.36	22.77	0.32
Main-1	1083.475	Q=80	50	597.74	599.16	598.58	599.22	0.001599	2.01	24.99	25.74	0.35
Main-1	1083.475	Q=120	75	597.74	599.42	598.78	599.51	0.001657	2.39	32.04	27.63	0.37
Main-1	1083.475	Q=160	100	597.74	599.64	598.94	599.75	0.001717	2.7	38.27	29.19	0.39
Main-1	1083.475	Q=240	150	597.74	600.01		600.16	0.001794	3.19	49.51	31.82	0.41
Main-1	1083.475	Q=320	200	597.74	600.32		600.51	0.001849	3.58	59.57	33.49	0.43
Main-1	1083.475	Q=400	250	597.74	600.59		600.81	0.001896	3.91	68.76	34.83	0.44
Main-1	1083.475	Q=440	275	597.74	600.71		600.95	0.001913	4.06	73.17	35.46	0.45
Main-1	1083.475	Q=480	300	597.74	600.83		601.09	0.001929	4.21	77.43	36.06	0.45

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	1180.775	Q=95.35	88.81	598.58	599.76	599.76	600.15	0.014871	5	17.78	23.48	1.01
Main-1	1180.775	Q=4	2.5	598.58	598.78	598.79	598.86	0.033413	2.26	1.11	8.88	1.13
Main-1	1180.775	Q=8	5	598.58	598.84	598.87	598.97	0.038966	2.94	1.7	10.3	1.27
Main-1	1180.775	Q=16	10	598.58	598.93	598.98	599.14	0.040977	3.72	2.69	11.87	1.38
Main-1	1180.775	Q=24	15	598.58	599	599.08	599.28	0.041496	4.24	3.54	12.97	1.43
Main-1	1180.775	Q=32	20	598.58	599.05	599.15	599.39	0.042442	4.66	4.29	13.86	1.48
Main-1	1180.775	Q=40	25	598.58	599.1	599.22	599.49	0.042957	5	5	14.64	1.51
Main-1	1180.775	Q=80	50	598.58	599.48	599.48	599.77	0.016211	4.33	11.55	20.19	1.01
Main-1	1180.775	Q=120	75	598.58	599.67	599.67	600.02	0.015238	4.79	15.65	22.41	1.01
Main-1	1180.775	Q=160	100	598.58	599.84	599.84	600.24	0.01435	5.11	19.58	24.35	1
Main-1	1180.775	Q=240	150	598.58	600.16	600.1	600.61	0.011064	5.36	28.08	27.83	0.92
Main-1	1180.775	Q=320	200	598.58	600.46	600.33	600.93	0.008661	5.51	36.8	30.71	0.85
Main-1	1180.775	Q=400	250	598.58	600.72	600.52	601.22	0.007297	5.7	45.06	32.89	0.8
Main-1	1180.775	Q=440	275	598.58	600.84	600.62	601.35	0.006811	5.79	49.12	33.78	0.78
Main-1	1180.775	Q=480	300	598.58	600.96	600.71	601.48	0.006425	5.88	53.09	34.62	0.77
T1	116.1027	Q=95.35	28.51	605.86	606.79	606.79	607.1	0.021495	4.48	6.41	10.75	1
T1	116.1027	Q=4	1	605.86	606.04	606.04	606.1	0.052491	1.96	0.51	5.59	1.15
T1	116.1027	Q=8	2	605.86	606.11	606.11	606.18	0.033917	2.21	0.91	5.99	1
T1	116.1027	Q=16	4	605.86	606.2	606.2	606.31	0.029681	2.71	1.47	6.4	1
T1	116.1027	Q=24	6	605.86	606.27	606.27	606.42	0.028547	3.09	1.94	6.72	1.01
T1	116.1027	Q=32	8	605.86	606.33	606.33	606.51	0.026945	3.34	2.4	7.04	1.01
T1	116.1027	Q=40	10	605.86	606.4	606.4	606.59	0.02605	3.51	2.85	7.54	1.01
T1	116.1027	Q=80	20	605.86	606.63	606.63	606.9	0.023526	4.11	4.87	9.5	1.01
T1	116.1027	Q=120	30	605.86	606.81	606.81	607.13	0.021117	4.52	6.68	10.96	0.99
T1	116.1027	Q=160	40	605.86	606.96	606.96	607.32	0.019614	4.82	8.42	12.2	0.98
T1	116.1027	Q=240	60	605.86	607.2	607.2	607.63	0.017524	5.34	11.56	14.02	0.96
T1	116.1027	Q=320	80	605.86	607.4	607.4	607.9	0.015878	5.77	14.48	15.4	0.95
T1	116.1027	Q=400	100	605.86	607.58	607.58	608.13	0.01465	6.1	17.35	16.65	0.93
T1	116.1027	Q=440	110	605.86	607.66	607.66	608.23	0.014127	6.24	18.77	17.23	0.92
T1	116.1027	Q=480	120	605.86	607.75	607.75	608.33	0.013507	6.34	20.27	17.83	0.91

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	179.5178	Q=95.35	28.51	605.86	607.43	606.8	607.5	0.002831	2.1	13.84	13.93	0.35
T1	179.5178	Q=4	1	605.86	606.26	606	606.27	0.000836	0.49	2.02	6.31	0.15
T1	179.5178	Q=8	2	605.86	606.39	606.07	606.4	0.001205	0.7	2.85	6.92	0.19
T1	179.5178	Q=16	4	605.86	606.57	606.17	606.59	0.001598	0.95	4.23	8.05	0.23
T1	179.5178	Q=24	6	605.86	606.71	606.24	606.73	0.001872	1.11	5.41	9.14	0.25
T1	179.5178	Q=32	8	605.86	606.82	606.31	606.84	0.002092	1.24	6.45	10	0.27
T1	179.5178	Q=40	10	605.86	606.91	606.38	606.94	0.002199	1.35	7.4	10.64	0.28
T1	179.5178	Q=80	20	605.86	607.24	606.63	607.29	0.002625	1.8	11.24	12.81	0.33
T1	179.5178	Q=120	30	605.86	607.46	606.83	607.53	0.002865	2.15	14.25	14.1	0.35
T1	179.5178	Q=160	40	605.86	607.65	606.98	607.74	0.003007	2.43	16.97	15.14	0.37
T1	179.5178	Q=240	60	605.86	607.94	607.24	608.07	0.003285	2.9	21.68	16.8	0.4
T1	179.5178	Q=320	80	605.86	608.19	607.44	608.34	0.003475	3.27	25.93	18.16	0.42
T1	179.5178	Q=400	100	605.86	608.39	607.63	608.58	0.003652	3.59	29.72	19.09	0.44
T1	179.5178	Q=440	110	605.86	608.48	607.72	608.68	0.003726	3.73	31.51	19.5	0.44
T1	179.5178	Q=480	120	605.86	608.57	607.8	608.78	0.003811	3.87	33.19	19.87	0.45
T1	279.4417	Q=95.35	28.51	608.07	609.1	609.1	609.43	0.027092	4.62	6.22	9.67	0.99
T1	279.4417	Q=4	1	608.07	608.3	608.3	608.36	0.048139	1.91	0.52	4.57	0.99
T1	279.4417	Q=8	2	608.07	608.38	608.38	608.45	0.035798	2.16	0.93	5.38	0.92
T1	279.4417	Q=16	4	608.07	608.46	608.46	608.59	0.039163	2.84	1.41	5.75	1.01
T1	279.4417	Q=24	6	608.07	608.54	608.54	608.7	0.03672	3.2	1.88	6.08	1.01
T1	279.4417	Q=32	8	608.07	608.61	608.61	608.8	0.034636	3.45	2.32	6.37	1.01
T1	279.4417	Q=40	10	608.07	608.68	608.68	608.89	0.03358	3.65	2.74	6.76	1.01
T1	279.4417	Q=80	20	608.07	608.94	608.94	609.22	0.029031	4.26	4.71	8.48	0.99
T1	279.4417	Q=120	30	608.07	609.13	609.13	609.47	0.026639	4.66	6.49	9.87	0.98
T1	279.4417	Q=160	40	608.07	609.28	609.28	609.67	0.025025	5.06	8.03	10.71	0.98
T1	279.4417	Q=240	60	608.07	609.54	609.54	610.02	0.021482	5.63	10.99	11.96	0.95
T1	279.4417	Q=320	80	608.07	609.76	609.76	610.31	0.019498	6.07	13.76	13.02	0.93
T1	279.4417	Q=400	100	608.07	609.93	609.96	610.57	0.01977	6.6	15.93	13.79	0.96
T1	279.4417	Q=440	110	608.07	609.99	610.05	610.69	0.020181	6.88	16.88	14.12	0.98
T1	279.4417	Q=480	120	608.07	610.07	610.14	610.8	0.020123	7.09	17.94	14.46	0.98

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	349.1169	Q=95.35	28.51	609.57	610.69	610.57	610.9	0.016719	3.66	7.81	11.91	0.78
T1	349.1169	Q=4	1	609.57	609.81		609.83	0.011888	1.26	0.79	4.47	0.53
T1	349.1169	Q=8	2	609.57	609.89		609.93	0.014103	1.68	1.19	5	0.6
T1	349.1169	Q=16	4	609.57	610.03		610.1	0.013516	2.04	1.96	5.89	0.62
T1	349.1169	Q=24	6	609.57	610.13		610.22	0.014124	2.32	2.58	6.6	0.65
T1	349.1169	Q=32	8	609.57	610.22		610.32	0.014735	2.52	3.17	7.41	0.68
T1	349.1169	Q=40	10	609.57	610.29	610.16	610.4	0.015011	2.66	3.75	8.19	0.69
T1	349.1169	Q=80	20	609.57	610.55	610.42	610.71	0.016242	3.24	6.18	10.77	0.75
T1	349.1169	Q=120	30	609.57	610.71	610.59	610.93	0.016805	3.74	8.05	12.02	0.79
T1	349.1169	Q=160	40	609.57	610.84	610.73	611.11	0.016968	4.2	9.62	12.73	0.81
T1	349.1169	Q=240	60	609.57	611.03	610.97	611.42	0.018551	5.05	12.16	13.8	0.88
T1	349.1169	Q=320	80	609.57	611.19	611.18	611.68	0.01976	5.74	14.41	14.68	0.93
T1	349.1169	Q=400	100	609.57	611.35	611.35	611.92	0.019009	6.15	16.96	15.62	0.93
T1	349.1169	Q=440	110	609.57	611.44	611.44	612.03	0.018162	6.27	18.37	16.11	0.92
T1	349.1169	Q=480	120	609.57	611.52	611.52	612.13	0.017932	6.45	19.58	16.52	0.92
T1	413.2939	Q=95.35	28.51	609.84	611.29	610.84	611.4	0.004432	2.68	11.24	12.68	0.44
T1	413.2939	Q=4	1	609.84	610.22	610.08	610.23	0.003625	0.78	1.28	6.16	0.3
T1	413.2939	Q=8	2	609.84	610.33	610.15	610.35	0.003555	0.98	2.05	6.84	0.32
T1	413.2939	Q=16	4	609.84	610.49	610.24	610.52	0.003791	1.26	3.18	7.59	0.34
T1	413.2939	Q=24	6	609.84	610.62	610.32	610.65	0.003809	1.43	4.19	8.21	0.35
T1	413.2939	Q=32	8	609.84	610.72	610.38	610.76	0.003895	1.59	5.03	8.83	0.37
T1	413.2939	Q=40	10	609.84	610.8	610.44	610.85	0.003933	1.74	5.77	9.37	0.38
T1	413.2939	Q=80	20	609.84	611.11	610.68	611.19	0.004166	2.31	8.99	11.43	0.41
T1	413.2939	Q=120	30	609.84	611.32	610.87	611.43	0.004466	2.73	11.61	12.88	0.44
T1	413.2939	Q=160	40	609.84	611.5	611.03	611.64	0.00466	3.06	14	14.06	0.46
T1	413.2939	Q=240	60	609.84	611.8	611.3	611.97	0.004773	3.53	18.42	15.6	0.48
T1	413.2939	Q=320	80	609.84	612.05	611.53	612.26	0.004762	3.87	22.53	16.88	0.49
T1	413.2939	Q=400	100	609.84	612.26	611.71	612.5	0.004858	4.19	26.15	17.89	0.51
T1	413.2939	Q=440	110	609.84	612.35	611.79	612.61	0.004949	4.34	27.76	18.26	0.51
T1	413.2939	Q=480	120	609.84	611.36	611.87	612.98	0.062893	10.48	12.14	13.15	1.66

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	504.1011	Q=95.35	28.51	612.9	613.89	613.95	614.32	0.027693	5.25	5.46	8.79	1.14
T1	504.1011	Q=4	1	612.9	613.16	613.16	613.23	0.035326	2.05	0.49	3.72	1
T1	504.1011	Q=8	2	612.9	613.24	613.24	613.33	0.034692	2.42	0.83	4.84	1.03
T1	504.1011	Q=16	4	612.9	613.35	613.35	613.47	0.030221	2.79	1.43	6.11	1.01
T1	504.1011	Q=24	6	612.9	613.43	613.43	613.58	0.027097	3.09	1.94	6.51	1
T1	504.1011	Q=32	8	612.9	613.47	613.49	613.67	0.03221	3.6	2.22	6.73	1.1
T1	504.1011	Q=40	10	612.9	613.55	613.55	613.76	0.027325	3.66	2.73	7.1	1.04
T1	504.1011	Q=80	20	612.9	613.75	613.79	614.09	0.029033	4.64	4.31	8.15	1.13
T1	504.1011	Q=120	30	612.9	613.92	613.98	614.35	0.026534	5.28	5.72	8.93	1.12
T1	504.1011	Q=160	40	612.9	614.06	614.14	614.58	0.024473	5.77	7.07	9.61	1.11
T1	504.1011	Q=240	60	612.9	614.32	614.43	614.96	0.021796	6.5	9.66	10.79	1.1
T1	504.1011	Q=320	80	612.9	614.54	614.66	615.28	0.02004	7.05	12.14	11.82	1.09
T1	504.1011	Q=400	100	612.9	614.74	614.87	615.55	0.018704	7.48	14.56	12.74	1.07
T1	504.1011	Q=440	110	612.9	614.83	614.97	615.68	0.018204	7.67	15.73	13.16	1.07
T1	504.1011	Q=480	120	612.9	614.91	615.06	615.8	0.017763	7.85	16.9	13.56	1.07
T1	590.9022	Q=95.35	28.51	615.37	616.22	616.24	616.54	0.023598	4.51	6.38	11.88	1.04
T1	590.9022	Q=4	1	615.37	615.54	615.52	615.58	0.021291	1.53	0.65	5.3	0.77
T1	590.9022	Q=8	2	615.37	615.61	615.58	615.67	0.021449	1.94	1.03	5.89	0.82
T1	590.9022	Q=16	4	615.37	615.7	615.68	615.79	0.023731	2.52	1.59	6.57	0.9
T1	590.9022	Q=24	6	615.37	615.76	615.76	615.9	0.026186	2.96	2.02	7.06	0.98
T1	590.9022	Q=32	8	615.37	615.82	615.82	615.98	0.026888	3.27	2.45	7.5	1.01
T1	590.9022	Q=40	10	615.37	615.88	615.88	616.06	0.025816	3.45	2.9	7.95	1.01
T1	590.9022	Q=80	20	615.37	616.11	616.11	616.35	0.023404	3.93	5.09	10.84	1
T1	590.9022	Q=120	30	615.37	616.23	616.26	616.57	0.024587	4.66	6.5	11.97	1.07
T1	590.9022	Q=160	40	615.37	616.33	616.4	616.76	0.025706	5.28	7.74	12.84	1.12
T1	590.9022	Q=240	60	615.37	616.49	616.64	617.1	0.028174	6.34	9.88	14.21	1.21
T1	590.9022	Q=320	80	615.37	616.62	616.83	617.4	0.030074	7.2	11.8	15.34	1.28
T1	590.9022	Q=400	100	615.37	616.73	617.01	617.67	0.031711	7.95	13.57	16.31	1.34
T1	590.9022	Q=440	110	615.37	616.78	617.09	617.79	0.032387	8.28	14.41	16.76	1.36
T1	590.9022	Q=480	120	615.37	616.83	617.17	617.91	0.033046	8.6	15.23	17.18	1.39

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1	653.1824	Q=95.35	28.51	617.59	618.3	618.53	619.05	0.072426	6.94	4.11	8.39	1.75
T1	653.1824	Q=4	1	617.59	617.78	617.81	617.87	0.068609	2.35	0.43	4.38	1.33
T1	653.1824	Q=8	2	617.59	617.83	617.88	617.97	0.085406	3.03	0.66	5.45	1.53
T1	653.1824	Q=16	4	617.59	617.9	617.96	618.11	0.08069	3.61	1.11	6.71	1.57
T1	653.1824	Q=24	6	617.59	617.96	618.03	618.22	0.075632	4.11	1.46	6.93	1.58
T1	653.1824	Q=32	8	617.59	618	618.09	618.32	0.074547	4.54	1.76	7.11	1.61
T1	653.1824	Q=40	10	617.59	618.04	618.15	618.41	0.073362	4.88	2.05	7.28	1.62
T1	653.1824	Q=80	20	617.59	618.2	618.38	618.78	0.069639	6.09	3.28	7.97	1.67
T1	653.1824	Q=120	30	617.59	618.33	618.56	619.07	0.067808	6.91	4.34	8.54	1.7
T1	653.1824	Q=160	40	617.59	618.43	618.72	619.34	0.066478	7.65	5.25	9.3	1.73
T1	653.1824	Q=240	60	617.59	618.6	618.99	619.81	0.064079	8.87	6.94	10.55	1.78
T1	653.1824	Q=320	80	617.59	618.75	619.22	620.2	0.062422	9.81	8.54	11.6	1.8
T1	653.1824	Q=400	100	617.59	618.87	619.4	620.54	0.060815	10.56	10.09	12.54	1.82
T1	653.1824	Q=440	110	617.59	618.93	619.49	620.7	0.060461	10.91	10.83	12.96	1.83
T1	653.1824	Q=480	120	617.59	618.99	619.56	620.85	0.060021	11.24	11.56	13.37	1.84
T1A	60.92559	Q=95.35	8.7	624.31	624.89	625	625.29	0.180094	5.05	1.72	5.01	1.52
T1A	60.92559	Q=4	0.5	624.31	624.5	624.53	624.59	0.215839	2.39	0.21	2.17	1.36
T1A	60.92559	Q=8	1	624.31	624.59	624.6	624.67	0.11317	2.23	0.45	3.18	1.05
T1A	60.92559	Q=16	2	624.31	624.66	624.69	624.79	0.129301	2.83	0.71	3.88	1.17
T1A	60.92559	Q=24	3	624.31	624.71	624.75	624.89	0.151833	3.38	0.89	4.18	1.3
T1A	60.92559	Q=32	4	624.31	624.75	624.81	624.97	0.15695	3.73	1.07	4.47	1.34
T1A	60.92559	Q=40	5	624.31	624.79	624.85	625.04	0.163137	4.07	1.23	4.61	1.39
T1A	60.92559	Q=80	10	624.31	624.92	625.05	625.36	0.185405	5.33	1.88	5.13	1.55
T1A	60.92559	Q=120	15	624.31	625.02	625.2	625.62	0.197485	6.18	2.43	5.54	1.65
T1A	60.92559	Q=160	20	624.31	625.11	625.34	625.84	0.205342	6.83	2.93	5.89	1.71
T1A	60.92559	Q=240	30	624.31	625.25	625.56	626.21	0.217317	7.86	3.82	6.46	1.8
T1A	60.92559	Q=320	40	624.31	625.37	625.75	626.54	0.227924	8.69	4.61	6.93	1.88
T1A	60.92559	Q=400	50	624.31	625.43	625.92	626.99	0.279223	10.03	4.99	7.29	2.1
T1A	60.92559	Q=440	55	624.31	625.45	626	627.23	0.309785	10.72	5.14	7.42	2.22
T1A	60.92559	Q=480	60	624.31	625.47	626.06	627.45	0.330688	11.28	5.34	7.59	2.3

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1A	109.6149	Q=95.35	8.7	630.05	630.59	630.59	630.84	0.07829	3.99	2.18	4.49	1.01
T1A	109.6149	Q=4	0.5	630.05	630.15	630.15	630.18	0.071003	1.37	0.36	3.76	0.78
T1A	109.6149	Q=8	1	630.05	630.18	630.18	630.25	0.115875	2.08	0.48	3.81	1.03
T1A	109.6149	Q=16	2	630.05	630.26	630.26	630.36	0.101962	2.59	0.77	3.94	1.03
T1A	109.6149	Q=24	3	630.05	630.32	630.32	630.45	0.08907	2.87	1.04	4.05	1
T1A	109.6149	Q=32	4	630.05	630.38	630.38	630.53	0.086736	3.16	1.27	4.14	1.01
T1A	109.6149	Q=40	5	630.05	630.43	630.43	630.61	0.08421	3.38	1.48	4.22	1.01
T1A	109.6149	Q=80	10	630.05	630.64	630.64	630.91	0.076623	4.15	2.41	4.57	1.01
T1A	109.6149	Q=120	15	630.05	630.81	630.81	631.15	0.073173	4.65	3.22	4.85	1.01
T1A	109.6149	Q=160	20	630.05	630.96	630.96	631.36	0.071222	5.04	3.97	5.1	1.01
T1A	109.6149	Q=240	30	630.05	631.22	631.22	631.71	0.068058	5.6	5.36	5.53	1
T1A	109.6149	Q=320	40	630.05	631.45	631.45	632.01	0.065528	6.04	6.63	6.02	1
T1A	109.6149	Q=400	50	630.05	631.67	631.67	632.27	0.055824	6.28	8.09	7.25	0.95
T1A	109.6149	Q=440	55	630.05	631.78	631.78	632.39	0.051243	6.33	8.92	7.86	0.92
T1A	109.6149	Q=480	60	630.05	631.87	631.87	632.5	0.048163	6.41	9.71	8.4	0.9
T1A	175.2342	Q=95.35	8.7	634.87	635.26	635.47	635.99	0.453766	6.83	1.27	4.57	2.28
T1A	175.2342	Q=4	0.5	634.87	635.02	635.05	635.08	0.1983	1.97	0.25	3.3	1.25
T1A	175.2342	Q=8	1	634.87	635.06	635.09	635.16	0.263543	2.6	0.38	4.06	1.49
T1A	175.2342	Q=16	2	634.87	635.1	635.16	635.3	0.329411	3.57	0.56	4.33	1.75
T1A	175.2342	Q=24	3	634.87	635.13	635.22	635.41	0.352078	4.25	0.71	4.38	1.86
T1A	175.2342	Q=32	4	634.87	635.16	635.27	635.52	0.370805	4.81	0.83	4.42	1.96
T1A	175.2342	Q=40	5	634.87	635.19	635.32	635.63	0.390015	5.31	0.94	4.46	2.04
T1A	175.2342	Q=80	10	634.87	635.29	635.51	636.08	0.447109	7.15	1.4	4.6	2.29
T1A	175.2342	Q=120	15	634.87	635.37	635.68	636.46	0.468667	8.39	1.79	4.73	2.4
T1A	175.2342	Q=160	20	634.87	635.44	635.82	636.82	0.488623	9.41	2.13	4.83	2.5
T1A	175.2342	Q=240	30	634.87	635.4	636.06	639.19	1.506095	15.63	1.92	4.77	4.34
T1A	175.2342	Q=320	40	634.87	635.48	636.29	640.21	1.555855	17.46	2.29	4.88	4.49
T1A	175.2342	Q=400	50	634.87	635.58	636.52	640.49	1.306515	17.77	2.81	5.03	4.19
T1A	175.2342	Q=440	55	634.87	635.63	636.62	640.69	1.244879	18.05	3.05	5.1	4.12
T1A	175.2342	Q=480	60	634.87	635.67	636.73	640.92	1.207685	18.39	3.26	5.16	4.08

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1A	256.649	Q=95.35	8.7	647.65	648.39	648.39	648.66	0.077335	4.17	2.09	3.85	1
T1A	256.649	Q=4	0.5	647.65	647.84	647.84	647.9	0.127883	1.85	0.27	2.76	1.04
T1A	256.649	Q=8	1	647.65	647.91	647.91	647.98	0.104633	2.24	0.45	2.91	1.01
T1A	256.649	Q=16	2	647.65	648	648	648.12	0.091829	2.73	0.73	3.13	1
T1A	256.649	Q=24	3	647.65	648.07	648.07	648.22	0.088565	3.09	0.97	3.3	1.01
T1A	256.649	Q=32	4	647.65	648.14	648.14	648.32	0.086165	3.38	1.18	3.42	1.01
T1A	256.649	Q=40	5	647.65	648.2	648.2	648.4	0.083858	3.6	1.39	3.52	1.01
T1A	256.649	Q=80	10	647.65	648.44	648.44	648.73	0.077595	4.36	2.29	3.94	1.01
T1A	256.649	Q=120	15	647.65	648.63	648.63	649	0.075006	4.86	3.09	4.28	1.01
T1A	256.649	Q=160	20	647.65	648.8	648.8	649.22	0.073117	5.22	3.83	4.57	1.01
T1A	256.649	Q=240	30	647.65	649.2	649.2	649.56	0.041934	4.98	6.47	9.37	0.8
T1A	256.649	Q=320	40	647.65	649.4	649.4	649.78	0.037465	5.22	8.49	10.79	0.78
T1A	256.649	Q=400	50	647.65	649.53	649.53	649.96	0.038011	5.59	10.01	11.74	0.8
T1A	256.649	Q=440	55	647.65	649.6	649.6	650.04	0.03767	5.73	10.79	12.2	0.8
T1A	256.649	Q=480	60	647.65	649.66	649.66	650.12	0.037	5.83	11.6	12.66	0.8
T1A	318.1733	Q=95.35	8.7	651.18	651.92	651.81	652.08	0.041857	3.24	2.68	4.61	0.75
T1A	318.1733	Q=4	0.5	651.18	651.39	651.34	651.4	0.032089	1.08	0.46	3.72	0.54
T1A	318.1733	Q=8	1	651.18	651.45	651.39	651.48	0.035404	1.45	0.69	3.82	0.6
T1A	318.1733	Q=16	2	651.18	651.54	651.47	651.6	0.038077	1.91	1.05	3.98	0.65
T1A	318.1733	Q=24	3	651.18	651.61	651.54	651.69	0.038873	2.21	1.35	4.1	0.68
T1A	318.1733	Q=32	4	651.18	651.68	651.59	651.77	0.039292	2.45	1.63	4.21	0.7
T1A	318.1733	Q=40	5	651.18	651.74	651.64	651.85	0.040061	2.66	1.88	4.31	0.71
T1A	318.1733	Q=80	10	651.18	651.98	651.86	652.16	0.041561	3.38	2.96	4.71	0.75
T1A	318.1733	Q=120	15	651.18	652.17	652.03	652.4	0.042116	3.85	3.9	5.04	0.77
T1A	318.1733	Q=160	20	651.18	652.04	652.18	652.62	0.123732	6.11	3.27	4.82	1.31
T1A	318.1733	Q=240	30	651.18	652.15	652.45	653.13	0.185417	7.96	3.77	4.99	1.61
T1A	318.1733	Q=320	40	651.18	652.21	652.75	653.68	0.25543	9.71	4.12	5.11	1.91
T1A	318.1733	Q=400	50	651.18	652.35	652.95	654	0.250737	10.31	4.85	5.34	1.91
T1A	318.1733	Q=440	55	651.18	652.42	653.02	654.16	0.249071	10.61	5.19	5.61	1.91
T1A	318.1733	Q=480	60	651.18	652.48	653.09	654.3	0.237406	10.83	5.57	6.31	1.89

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1A	361.2753	Q=95.35	8.7	655.31	655.9	655.9	656.15	0.079872	4.04	2.16	4.33	1.01
T1A	361.2753	Q=4	0.5	655.31	655.44	655.44	655.48	0.138539	1.68	0.3	3.72	1.05
T1A	361.2753	Q=8	1	655.31	655.49	655.49	655.55	0.10805	2.04	0.49	3.79	1
T1A	361.2753	Q=16	2	655.31	655.56	655.56	655.66	0.095966	2.55	0.79	3.89	1
T1A	361.2753	Q=24	3	655.31	655.63	655.63	655.76	0.09187	2.91	1.03	3.97	1.01
T1A	361.2753	Q=32	4	655.31	655.68	655.68	655.84	0.087788	3.18	1.26	4.05	1.01
T1A	361.2753	Q=40	5	655.31	655.74	655.74	655.91	0.084037	3.39	1.47	4.12	1
T1A	361.2753	Q=80	10	655.31	655.95	655.95	656.22	0.078647	4.2	2.38	4.4	1.01
T1A	361.2753	Q=120	15	655.31	656.12	656.12	656.47	0.075804	4.73	3.17	4.63	1.01
T1A	361.2753	Q=160	20	655.31	656.28	656.28	656.69	0.073651	5.13	3.9	4.83	1.01
T1A	361.2753	Q=240	30	655.31	656.61	656.61	657.04	0.052357	5.29	5.88	7.99	0.88
T1A	361.2753	Q=320	40	655.31	656.87	656.87	657.27	0.039139	5.26	8.37	11	0.79
T1A	361.2753	Q=400	50	655.31	657.03	657.03	657.45	0.036774	5.49	10.26	12.62	0.78
T1A	361.2753	Q=440	55	655.31	657.11	657.11	657.53	0.035462	5.56	11.22	13.37	0.77
T1A	361.2753	Q=480	60	655.31	657.17	657.17	657.6	0.035067	5.67	12.06	13.96	0.77
T1B	744.3112	Q=95.35	15.81	619.46	620.7	620.39	620.88	0.025782	3.37	4.7	4.89	0.61
T1B	744.3112	Q=4	0.5	619.46	619.75	619.64	619.76	0.009134	0.75	0.66	3.57	0.31
T1B	744.3112	Q=8	1	619.46	619.84	619.71	619.86	0.010161	1	1	3.7	0.34
T1B	744.3112	Q=16	2	619.46	619.97	619.78	620	0.012041	1.35	1.48	3.88	0.38
T1B	744.3112	Q=24	3	619.46	620.07	619.84	620.11	0.01343	1.6	1.87	4.01	0.41
T1B	744.3112	Q=32	4	619.46	620.16	619.9	620.21	0.014047	1.79	2.24	4.14	0.43
T1B	744.3112	Q=40	5	619.46	620.23		620.29	0.015046	1.97	2.54	4.24	0.45
T1B	744.3112	Q=80	10	619.46	620.51		620.62	0.018798	2.63	3.8	4.63	0.51
T1B	744.3112	Q=120	15	619.46	620.68		620.85	0.024756	3.27	4.59	4.86	0.59
T1B	744.3112	Q=160	20	619.46	620.79		621.03	0.031982	3.89	5.15	5.02	0.68
T1B	744.3112	Q=240	30	619.46	620.95	620.8	621.34	0.048112	5.05	5.95	5.23	0.83
T1B	744.3112	Q=320	40	619.46	621.04	621.04	621.64	0.069571	6.24	6.41	5.35	1.01
T1B	744.3112	Q=400	50	619.46	621.25	621.25	621.92	0.068492	6.6	7.58	5.65	1
T1B	744.3112	Q=440	55	619.46	621.35	621.35	622.06	0.068209	6.76	8.14	5.78	1
T1B	744.3112	Q=480	60	619.46	621.44	621.44	622.18	0.068214	6.92	8.67	5.91	1.01

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	810.6002	Q=95.35	15.81	621.61	623.02	622.54	623.17	0.021213	3.18	4.98	4.23	0.52
T1B	810.6002	Q=4	0.5	621.61	621.82		621.83	0.014865	0.9	0.55	3.16	0.38
T1B	810.6002	Q=8	1	621.61	621.9		621.93	0.017242	1.22	0.82	3.24	0.43
T1B	810.6002	Q=16	2	621.61	622.05		622.08	0.016811	1.54	1.3	3.37	0.44
T1B	810.6002	Q=24	3	621.61	622.16	621.95	622.21	0.017351	1.79	1.68	3.47	0.45
T1B	810.6002	Q=32	4	621.61	622.25		622.31	0.01809	1.99	2.01	3.55	0.47
T1B	810.6002	Q=40	5	621.61	622.34		622.41	0.018372	2.15	2.33	3.63	0.47
T1B	810.6002	Q=80	10	621.61	622.69	622.32	622.81	0.019975	2.73	3.66	3.94	0.5
T1B	810.6002	Q=120	15	621.61	622.97	622.51	623.13	0.021061	3.12	4.8	4.19	0.51
T1B	810.6002	Q=160	20	621.61	623.21	622.69	623.4	0.021959	3.43	5.83	4.41	0.53
T1B	810.6002	Q=240	30	621.61	623.62	622.99	623.86	0.023313	3.9	7.69	4.77	0.54
T1B	810.6002	Q=320	40	621.61	623.96	623.26	624.24	0.024552	4.28	9.35	5.07	0.55
T1B	810.6002	Q=400	50	621.61	624.25	623.49	624.58	0.025633	4.59	10.89	5.33	0.57
T1B	810.6002	Q=440	55	621.61	624.38	623.6	624.73	0.026226	4.75	11.59	5.51	0.57
T1B	810.6002	Q=480	60	621.61	624.49	623.71	624.87	0.026305	4.92	12.26	6.55	0.58
T1B	879.0649	Q=95.35	15.81	622.29	623.5	623.04	623.58	0.002731	2.3	6.87	7.11	0.41
T1B	879.0649	Q=4	0.5	622.29	622.52	622.46	622.53	0.007373	1	0.5	4.39	0.52
T1B	879.0649	Q=8	1	622.29	622.59	622.52	622.61	0.006528	1.14	0.88	5.78	0.51
T1B	879.0649	Q=16	2	622.29	622.68	622.6	622.71	0.00568	1.39	1.44	6.18	0.51
T1B	879.0649	Q=24	3	622.29	622.53	622.65	622.96	0.184303	5.22	0.57	4.7	2.63
T1B	879.0649	Q=32	4	622.29	622.83	622.68	622.88	0.004557	1.68	2.38	6.35	0.48
T1B	879.0649	Q=40	5	622.29	622.9	622.73	622.95	0.004298	1.79	2.79	6.43	0.48
T1B	879.0649	Q=80	10	622.29	623.2	622.89	623.27	0.003264	2.09	4.78	6.77	0.44
T1B	879.0649	Q=120	15	622.29	623.46	623.02	623.54	0.002787	2.28	6.59	7.07	0.42
T1B	879.0649	Q=160	20	622.29	623.7	623.14	623.79	0.002517	2.41	8.29	7.34	0.4
T1B	879.0649	Q=240	30	622.29	624.12	623.34	624.22	0.002217	2.62	11.46	7.82	0.38
T1B	879.0649	Q=320	40	622.29	624.48	623.53	624.6	0.00208	2.79	14.35	8.23	0.37
T1B	879.0649	Q=400	50	622.29	624.8	623.7	624.93	0.001976	2.93	17.06	8.96	0.37
T1B	879.0649	Q=440	55	622.29	624.94	623.77	625.08	0.00192	3.01	18.37	9.6	0.36
T1B	879.0649	Q=480	60	622.29	625.06	623.85	625.21	0.001882	3.1	19.61	10.27	0.36

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	943.7003	Q=95.35	13.1	625.83	626.38	626.6	627.14	0.079408	7.01	1.87	4.92	2.01
T1B	943.7003	Q=4	0.5	625.83	626	626.02	626.08	0.062531	2.33	0.21	2.59	1.43
T1B	943.7003	Q=8	1	625.83	626.04	626.09	626.17	0.066061	2.83	0.35	3.33	1.53
T1B	943.7003	Q=16	2	625.83	626.1	626.16	626.3	0.079039	3.6	0.56	4.18	1.74
T1B	943.7003	Q=24	3	625.83	626.21	626.22	626.34	0.023956	2.84	1.06	4.55	1.04
T1B	943.7003	Q=32	4	625.83	626.21	626.27	626.44	0.046079	3.88	1.03	4.53	1.43
T1B	943.7003	Q=40	5	625.83	626.23	626.32	626.52	0.050584	4.32	1.16	4.61	1.52
T1B	943.7003	Q=80	10	625.83	626.31	626.5	626.96	0.083513	6.47	1.55	4.85	2.02
T1B	943.7003	Q=120	15	625.83	626.42	626.66	627.25	0.077627	7.31	2.05	4.95	2
T1B	943.7003	Q=160	20	625.83	626.52	626.8	627.48	0.071205	7.86	2.54	5.02	1.95
T1B	943.7003	Q=240	30	625.83	626.69	627.05	627.87	0.063473	8.7	3.45	5.14	1.87
T1B	943.7003	Q=320	40	625.83	626.86	627.26	628.2	0.057874	9.28	4.31	5.25	1.8
T1B	943.7003	Q=400	50	625.83	627.01	627.46	628.49	0.054465	9.76	5.12	5.35	1.76
T1B	943.7003	Q=440	55	625.83	627.09	627.55	628.63	0.053296	9.98	5.51	5.4	1.74
T1B	943.7003	Q=480	60	625.83	627.16	627.64	628.77	0.052247	10.18	5.89	5.45	1.72
T1B	1005.909	Q=95.35	13.1	628.45	629.17	629.2	629.53	0.021911	4.79	2.73	4.36	1.07
T1B	1005.909	Q=4	0.5	628.45	628.57	628.58	628.61	0.028395	1.59	0.31	3.7	0.96
T1B	1005.909	Q=8	1	628.45	628.62	628.62	628.68	0.027247	2.05	0.49	3.75	1
T1B	1005.909	Q=16	2	628.45	628.7	628.7	628.8	0.024101	2.56	0.78	3.83	1
T1B	1005.909	Q=24	3	628.45	628.67	628.76	628.98	0.089195	4.48	0.67	3.8	1.88
T1B	1005.909	Q=32	4	628.45	628.77	628.82	628.99	0.036616	3.76	1.06	3.91	1.27
T1B	1005.909	Q=40	5	628.45	628.82	628.87	629.06	0.033425	3.96	1.26	3.97	1.24
T1B	1005.909	Q=80	10	628.45	629.07	629.08	629.36	0.021559	4.36	2.29	4.25	1.05
T1B	1005.909	Q=120	15	628.45	629.23	629.26	629.62	0.021966	5.01	2.99	4.43	1.07
T1B	1005.909	Q=160	20	628.45	629.36	629.42	629.85	0.022888	5.57	3.59	4.57	1.11
T1B	1005.909	Q=240	30	628.45	629.59	629.69	630.23	0.02436	6.44	4.66	4.83	1.15
T1B	1005.909	Q=320	40	628.45	629.78	629.93	630.58	0.026074	7.18	5.57	5.03	1.2
T1B	1005.909	Q=400	50	628.45	629.94	630.14	630.88	0.027357	7.79	6.42	5.21	1.24
T1B	1005.909	Q=440	55	628.45	630.02	630.24	631.03	0.027927	8.06	6.83	5.3	1.25
T1B	1005.909	Q=480	60	628.45	630.09	630.33	631.16	0.028451	8.31	7.22	5.38	1.26

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	1072.597	Q=95.35	13.1	630.99	631.48	631.73	632.35	0.095088	7.47	1.75	4.63	2.14
T1B	1072.597	Q=4	0.5	630.99	631.14	631.16	631.2	0.056445	2.05	0.24	3.26	1.32
T1B	1072.597	Q=8	1	630.99	631.16	631.22	631.32	0.119771	3.23	0.31	3.68	1.96
T1B	1072.597	Q=16	2	630.99	631.22	631.28	631.41	0.082078	3.53	0.57	4.4	1.74
T1B	1072.597	Q=24	3	630.99	631.25	631.34	631.53	0.090779	4.26	0.7	4.42	1.88
T1B	1072.597	Q=32	4	630.99	631.28	631.39	631.64	0.095273	4.82	0.83	4.45	1.97
T1B	1072.597	Q=40	5	630.99	631.3	631.43	631.74	0.097991	5.29	0.95	4.47	2.03
T1B	1072.597	Q=80	10	630.99	631.42	631.63	632.14	0.096688	6.81	1.47	4.58	2.12
T1B	1072.597	Q=120	15	630.99	631.52	631.79	632.47	0.094867	7.83	1.92	4.67	2.15
T1B	1072.597	Q=160	20	630.99	631.61	631.94	632.73	0.089892	8.51	2.35	4.75	2.13
T1B	1072.597	Q=240	30	630.99	631.78	632.19	633.16	0.079924	9.4	3.19	4.91	2.05
T1B	1072.597	Q=320	40	630.99	631.96	632.41	633.47	0.069849	9.88	4.05	5.06	1.95
T1B	1072.597	Q=400	50	630.99	632.12	632.61	633.75	0.063491	10.26	4.87	5.21	1.87
T1B	1072.597	Q=440	55	630.99	632.19	632.71	633.88	0.060952	10.42	5.28	5.28	1.84
T1B	1072.597	Q=480	60	630.99	632.27	632.8	634	0.058796	10.57	5.68	5.35	1.81
T1B	1142.837	Q=95.35	13.1	633.9	634.61	634.61	634.9	0.018392	4.32	3.03	5.31	1.01
T1B	1142.837	Q=4	0.5	633.9	634.05	634.05	634.09	0.031407	1.59	0.31	4.06	1.01
T1B	1142.837	Q=8	1	633.9	634.11	634.11	634.16	0.02	1.74	0.57	4.58	0.87
T1B	1142.837	Q=16	2	633.9	634.17	634.17	634.26	0.023903	2.4	0.83	4.66	1
T1B	1142.837	Q=24	3	633.9	634.23	634.23	634.34	0.022181	2.72	1.1	4.74	1
T1B	1142.837	Q=32	4	633.9	634.28	634.28	634.41	0.021191	2.98	1.34	4.82	1
T1B	1142.837	Q=40	5	633.9	634.32	634.32	634.48	0.020478	3.2	1.56	4.89	1
T1B	1142.837	Q=80	10	633.9	634.51	634.51	634.76	0.018961	3.98	2.51	5.17	1.01
T1B	1142.837	Q=120	15	633.9	634.67	634.67	634.98	0.017876	4.48	3.35	5.4	1
T1B	1142.837	Q=160	20	633.9	634.8	634.8	635.17	0.017428	4.88	4.1	5.6	1.01
T1B	1142.837	Q=240	30	633.9	635.03	635.04	635.51	0.017268	5.53	5.43	5.95	1.02
T1B	1142.837	Q=320	40	633.9	635.22	635.25	635.8	0.018057	6.13	6.53	6.21	1.05
T1B	1142.837	Q=400	50	633.9	635.37	635.44	636.06	0.018743	6.64	7.53	6.45	1.08
T1B	1142.837	Q=440	55	633.9	635.45	635.53	636.18	0.019059	6.87	8.01	6.56	1.09
T1B	1142.837	Q=480	60	633.9	635.52	635.61	636.3	0.01935	7.08	8.48	6.66	1.11

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	1240.974	Q=95.35	13.1	637.25	637.62	637.89	638.66	0.161539	8.15	1.61	5.89	2.75
T1B	1240.974	Q=4	0.5	637.25	637.37	637.39	637.45	0.096435	2.32	0.22	3.67	1.69
T1B	1240.974	Q=8	1	637.25	637.39	637.44	637.56	0.151959	3.27	0.31	4.37	2.18
T1B	1240.974	Q=16	2	637.25	637.42	637.5	637.71	0.17801	4.29	0.47	4.98	2.47
T1B	1240.974	Q=24	3	637.25	637.45	637.55	637.84	0.185639	4.98	0.6	5.29	2.6
T1B	1240.974	Q=32	4	637.25	637.47	637.59	637.95	0.191307	5.53	0.72	5.56	2.7
T1B	1240.974	Q=40	5	637.25	637.49	637.63	638.03	0.185778	5.89	0.85	5.77	2.71
T1B	1240.974	Q=80	10	637.25	637.58	637.8	638.45	0.169686	7.47	1.34	5.85	2.75
T1B	1240.974	Q=120	15	637.25	637.65	637.94	638.76	0.154259	8.45	1.78	5.92	2.72
T1B	1240.974	Q=160	20	637.25	637.72	638.06	639.03	0.142747	9.17	2.18	5.98	2.68
T1B	1240.974	Q=240	30	637.25	637.84	638.28	639.49	0.129203	10.3	2.91	6.09	2.63
T1B	1240.974	Q=320	40	637.25	637.95	638.46	639.89	0.120792	11.16	3.58	6.2	2.59
T1B	1240.974	Q=400	50	637.25	638.05	638.64	640.24	0.115054	11.88	4.21	6.29	2.56
T1B	1240.974	Q=440	55	637.25	638.1	638.72	640.41	0.112886	12.2	4.51	6.33	2.55
T1B	1240.974	Q=480	60	637.25	638.14	638.8	640.58	0.111644	12.52	4.79	6.38	2.54
T1B	1317.998	Q=95.35	13.1	641.58	642.27	642.31	642.66	0.024715	5.02	2.61	4.11	1.11
T1B	1317.998	Q=4	0.5	641.58	641.67	641.67	641.72	0.035852	1.71	0.29	3.67	1.06
T1B	1317.998	Q=8	1	641.58	641.72	641.73	641.79	0.02805	2.07	0.48	3.71	1.01
T1B	1317.998	Q=16	2	641.58	641.8	641.8	641.9	0.025849	2.62	0.76	3.76	1.02
T1B	1317.998	Q=24	3	641.58	641.86	641.87	642	0.025124	3.01	1	3.81	1.04
T1B	1317.998	Q=32	4	641.58	641.91	641.92	642.08	0.02458	3.32	1.2	3.85	1.05
T1B	1317.998	Q=40	5	641.58	641.96	641.97	642.16	0.024776	3.61	1.39	3.88	1.06
T1B	1317.998	Q=80	10	641.58	642.16	642.2	642.49	0.024678	4.58	2.18	4.03	1.1
T1B	1317.998	Q=120	15	641.58	642.32	642.38	642.75	0.025056	5.27	2.85	4.15	1.12
T1B	1317.998	Q=160	20	641.58	642.47	642.54	642.99	0.025458	5.8	3.45	4.25	1.14
T1B	1317.998	Q=240	30	641.58	642.72	642.82	643.4	0.025835	6.6	4.54	4.44	1.15
T1B	1317.998	Q=320	40	641.58	642.94	643.07	643.75	0.02612	7.21	5.55	4.6	1.16
T1B	1317.998	Q=400	50	641.58	643.15	643.29	644.06	0.026138	7.68	6.51	4.75	1.16
T1B	1317.998	Q=440	55	641.58	643.24	643.39	644.21	0.026093	7.88	6.98	4.82	1.15
T1B	1317.998	Q=480	60	641.58	643.34	643.5	644.35	0.025832	8.04	7.46	4.9	1.15

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	1379.684	Q=95.35	13.1	643.68	644.29	644.49	644.95	0.056818	6.53	2.01	4.48	1.72
T1B	1379.684	Q=4	0.5	643.68	643.86	643.87	643.92	0.041468	1.99	0.25	2.86	1.18
T1B	1379.684	Q=8	1	643.68	643.9	643.93	644	0.046961	2.48	0.4	3.58	1.31
T1B	1379.684	Q=16	2	643.68	643.96	644	644.13	0.052669	3.27	0.61	3.89	1.45
T1B	1379.684	Q=24	3	643.68	644	644.07	644.23	0.054859	3.82	0.78	4.04	1.53
T1B	1379.684	Q=32	4	643.68	644.04	644.12	644.32	0.056823	4.3	0.93	4.1	1.59
T1B	1379.684	Q=40	5	643.68	644.07	644.17	644.41	0.05625	4.64	1.08	4.15	1.61
T1B	1379.684	Q=80	10	643.68	644.22	644.38	644.77	0.056782	5.95	1.68	4.37	1.69
T1B	1379.684	Q=120	15	643.68	644.33	644.55	645.05	0.055482	6.78	2.21	4.55	1.71
T1B	1379.684	Q=160	20	643.68	644.44	644.7	645.29	0.054093	7.39	2.7	4.72	1.72
T1B	1379.684	Q=240	30	643.68	644.63	644.95	645.69	0.051301	8.26	3.63	5.01	1.71
T1B	1379.684	Q=320	40	643.68	644.8	645.18	646.03	0.049645	8.93	4.48	5.26	1.7
T1B	1379.684	Q=400	50	643.68	644.95	645.38	646.33	0.04808	9.43	5.3	5.5	1.69
T1B	1379.684	Q=440	55	643.68	645.02	645.47	646.47	0.047453	9.66	5.7	5.61	1.69
T1B	1379.684	Q=480	60	643.68	645.09	645.56	646.6	0.046838	9.86	6.09	5.71	1.68
T1B	1420.161	Q=95.35	13.1	645.4	646.15	646.15	646.46	0.025358	4.47	2.93	4.73	1
T1B	1420.161	Q=4	0.5	645.4	645.56	645.56	645.6	0.041815	1.61	0.31	3.85	1
T1B	1420.161	Q=8	1	645.4	645.61	645.61	645.67	0.03632	1.98	0.51	4.11	1
T1B	1420.161	Q=16	2	645.4	645.68	645.68	645.77	0.032167	2.48	0.81	4.19	1
T1B	1420.161	Q=24	3	645.4	645.74	645.74	645.86	0.030516	2.83	1.06	4.26	1
T1B	1420.161	Q=32	4	645.4	645.79	645.79	645.94	0.029018	3.1	1.29	4.32	1
T1B	1420.161	Q=40	5	645.4	645.84	645.84	646.01	0.028653	3.34	1.5	4.37	1.01
T1B	1420.161	Q=80	10	645.4	646.04	646.04	646.31	0.026594	4.15	2.41	4.6	1.01
T1B	1420.161	Q=120	15	645.4	646.21	646.21	646.55	0.025388	4.68	3.21	4.79	1.01
T1B	1420.161	Q=160	20	645.4	646.36	646.36	646.76	0.024808	5.09	3.93	4.96	1.01
T1B	1420.161	Q=240	30	645.4	646.62	646.62	647.13	0.024232	5.72	5.25	5.24	1.01
T1B	1420.161	Q=320	40	645.4	646.85	646.85	647.44	0.023832	6.19	6.46	5.5	1.01
T1B	1420.161	Q=400	50	645.4	647.05	647.05	647.72	0.02365	6.58	7.6	5.72	1.01
T1B	1420.161	Q=440	55	645.4	647.14	647.14	647.85	0.023569	6.75	8.15	5.83	1.01
T1B	1420.161	Q=480	60	645.4	647.24	647.24	647.97	0.023331	6.89	8.71	5.94	1

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	1484.14	Q=95.35	13.1	645.59	646.82	646.25	646.88	0.002725	1.99	6.59	6.33	0.34
T1B	1484.14	Q=4	0.5	645.59	645.87	645.74	645.87	0.001501	0.51	0.97	5.42	0.21
T1B	1484.14	Q=8	1	645.59	645.95	645.79	645.96	0.001632	0.69	1.46	5.5	0.23
T1B	1484.14	Q=16	2	645.59	646.08	645.85	646.09	0.001883	0.93	2.16	5.62	0.26
T1B	1484.14	Q=24	3	645.59	646.18	645.9	646.2	0.002003	1.09	2.74	5.72	0.28
T1B	1484.14	Q=32	4	645.59	646.27	645.94	646.29	0.002161	1.24	3.23	5.8	0.29
T1B	1484.14	Q=40	5	645.59	646.34	645.98	646.37	0.002259	1.36	3.68	5.87	0.3
T1B	1484.14	Q=80	10	645.59	646.66	646.16	646.71	0.002593	1.79	5.57	6.17	0.33
T1B	1484.14	Q=120	15	645.59	646.91	646.3	646.98	0.002789	2.09	7.17	6.42	0.35
T1B	1484.14	Q=160	20	645.59	647.13	646.43	647.21	0.00296	2.33	8.57	6.62	0.36
T1B	1484.14	Q=240	30	645.59	647.49	646.66	647.61	0.003229	2.71	11.06	6.97	0.38
T1B	1484.14	Q=320	40	645.59	647.81	646.86	647.95	0.003433	3.01	13.3	7.27	0.39
T1B	1484.14	Q=400	50	645.59	648.08	647.04	648.25	0.003616	3.26	15.34	7.53	0.4
T1B	1484.14	Q=440	55	645.59	648.21	647.12	648.39	0.003696	3.37	16.31	7.65	0.41
T1B	1484.14	Q=480	60	645.59	648.33	647.2	648.52	0.003777	3.48	17.25	7.77	0.41
T1B	1530.33	Q=95.35	13.1	647.44	648.11	648.11	648.4	0.025404	4.27	3.07	5.47	1.01
T1B	1530.33	Q=4	0.5	647.44	647.59	647.59	647.62	0.032082	1.39	0.36	4.6	0.87
T1B	1530.33	Q=8	1	647.44	647.63	647.63	647.68	0.037823	1.88	0.53	4.86	1
T1B	1530.33	Q=16	2	647.44	647.69	647.69	647.78	0.032947	2.33	0.86	5.01	1
T1B	1530.33	Q=24	3	647.44	647.74	647.74	647.85	0.032914	2.72	1.1	5.07	1.03
T1B	1530.33	Q=32	4	647.44	647.79	647.79	647.92	0.029826	2.94	1.36	5.12	1
T1B	1530.33	Q=40	5	647.44	647.83	647.83	647.99	0.029011	3.16	1.58	5.17	1.01
T1B	1530.33	Q=80	10	647.44	648.02	648.02	648.26	0.025768	3.91	2.56	5.37	1
T1B	1530.33	Q=120	15	647.44	648.17	648.17	648.48	0.025063	4.46	3.37	5.53	1.01
T1B	1530.33	Q=160	20	647.44	648.3	648.3	648.67	0.024434	4.87	4.11	5.67	1.01
T1B	1530.33	Q=240	30	647.44	648.53	648.53	649	0.023566	5.48	5.47	5.93	1.01
T1B	1530.33	Q=320	40	647.44	648.74	648.74	649.29	0.023103	5.96	6.71	6.15	1.01
T1B	1530.33	Q=400	50	647.44	648.92	648.92	649.55	0.022885	6.36	7.87	6.35	1.01
T1B	1530.33	Q=440	55	647.44	649.01	649.01	649.67	0.022802	6.53	8.42	6.45	1.01
T1B	1530.33	Q=480	60	647.44	649.1	649.1	649.79	0.022706	6.69	8.97	6.54	1.01

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	1572.278	Q=95.35	13.1	647.84	648.88	648.62	649.04	0.009927	3.24	4.04	4.66	0.61
T1B	1572.278	Q=4	0.5	647.84	648.09	648.02	648.1	0.005855	0.86	0.58	4.15	0.4
T1B	1572.278	Q=8	1	647.84	648.17	648.08	648.19	0.005748	1.11	0.9	4.2	0.42
T1B	1572.278	Q=16	2	647.84	648.27	648.14	648.31	0.006414	1.48	1.35	4.27	0.46
T1B	1572.278	Q=24	3	647.84	648.36	648.2	648.41	0.006821	1.74	1.72	4.32	0.49
T1B	1572.278	Q=32	4	647.84	648.43	648.26	648.49	0.007546	1.99	2.01	4.37	0.52
T1B	1572.278	Q=40	5	647.84	648.49	648.3	648.57	0.007666	2.16	2.31	4.41	0.53
T1B	1572.278	Q=80	10	647.84	648.75	648.51	648.88	0.009297	2.91	3.44	4.58	0.59
T1B	1572.278	Q=120	15	647.84	648.95	648.68	649.13	0.010307	3.43	4.38	4.71	0.63
T1B	1572.278	Q=160	20	647.84	649.12	648.83	649.35	0.011095	3.84	5.21	4.83	0.65
T1B	1572.278	Q=240	30	647.84	649.41	649.1	649.73	0.012731	4.54	6.61	5.01	0.7
T1B	1572.278	Q=320	40	647.84	649.65	649.34	650.05	0.014105	5.11	7.83	5.17	0.73
T1B	1572.278	Q=400	50	647.84	649.86	649.55	650.34	0.01533	5.6	8.94	5.31	0.76
T1B	1572.278	Q=440	55	647.84	649.95	649.65	650.48	0.015918	5.82	9.45	5.37	0.77
T1B	1572.278	Q=480	60	647.84	650.04	649.74	650.61	0.016509	6.04	9.94	5.43	0.79
T1B	1613.01	Q=95.35	13.1	647.86	649.19	648.56	649.26	0.003139	2.17	6.04	5.27	0.36
T1B	1613.01	Q=4	0.5	647.86	648.17	647.98	648.17	0.000717	0.44	1.14	4.37	0.15
T1B	1613.01	Q=8	1	647.86	648.27	648.02	648.27	0.00102	0.63	1.58	4.45	0.19
T1B	1613.01	Q=16	2	647.86	648.4	648.09	648.42	0.001473	0.91	2.19	4.58	0.23
T1B	1613.01	Q=24	3	647.86	648.51	648.15	648.53	0.001748	1.11	2.7	4.67	0.26
T1B	1613.01	Q=32	4	647.86	648.61	648.2	648.63	0.001989	1.28	3.14	4.76	0.28
T1B	1613.01	Q=40	5	647.86	648.69	648.25	648.72	0.002164	1.41	3.54	4.83	0.29
T1B	1613.01	Q=80	10	647.86	649.02	648.46	649.08	0.002854	1.93	5.18	5.12	0.34
T1B	1613.01	Q=120	15	647.86	649.28	648.62	649.36	0.003297	2.3	6.54	5.35	0.37
T1B	1613.01	Q=160	20	647.86	649.5	648.77	649.6	0.003634	2.58	7.74	5.55	0.39
T1B	1613.01	Q=240	30	647.86	649.88	649.03	650.02	0.004147	3.03	9.89	5.88	0.41
T1B	1613.01	Q=320	40	647.86	650.2	649.26	650.38	0.004517	3.38	11.83	6.17	0.43
T1B	1613.01	Q=400	50	647.86	650.48	649.46	650.69	0.004801	3.67	13.64	6.42	0.44
T1B	1613.01	Q=440	55	647.86	650.62	649.55	650.84	0.004922	3.79	14.5	6.54	0.45
T1B	1613.01	Q=480	60	647.86	650.74	649.65	650.98	0.004964	3.92	15.34	7.12	0.45

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T1B	1664.997	Q=95.35	13.1	649.99	650.75	650.75	651.04	0.025059	4.36	3.01	5.16	1.01
T1B	1664.997	Q=4	0.5	649.99	650.17	650.17	650.22	0.040496	1.71	0.29	3.24	1
T1B	1664.997	Q=8	1	649.99	650.22	650.22	650.29	0.041793	2.06	0.49	4.18	1.06
T1B	1664.997	Q=16	2	649.99	650.3	650.3	650.39	0.032305	2.41	0.83	4.58	1
T1B	1664.997	Q=24	3	649.99	650.36	650.36	650.47	0.029973	2.74	1.09	4.65	1
T1B	1664.997	Q=32	4	649.99	650.4	650.4	650.55	0.029587	3.03	1.32	4.72	1.01
T1B	1664.997	Q=40	5	649.99	650.45	650.45	650.61	0.027748	3.22	1.55	4.78	1
T1B	1664.997	Q=80	10	649.99	650.64	650.64	650.89	0.025895	4.02	2.49	5.03	1.01
T1B	1664.997	Q=120	15	649.99	650.8	650.8	651.12	0.024819	4.54	3.3	5.24	1.01
T1B	1664.997	Q=160	20	649.99	650.94	650.94	651.32	0.024053	4.94	4.05	5.42	1.01
T1B	1664.997	Q=240	30	649.99	651.18	651.18	651.66	0.023388	5.56	5.4	5.74	1.01
T1B	1664.997	Q=320	40	649.99	651.4	651.4	651.96	0.022839	6.01	6.65	6.02	1.01
T1B	1664.997	Q=400	50	649.99	651.59	651.59	652.22	0.022528	6.39	7.83	6.27	1.01
T1B	1664.997	Q=440	55	649.99	651.68	651.68	652.35	0.022448	6.56	8.39	6.39	1.01
T1B	1664.997	Q=480	60	649.99	651.76	651.77	652.46	0.022307	6.71	8.95	6.5	1.01
Main2	1312.838	Q=95.35	56.6	599.52	600.52	600.63	601.12	0.021959	6.24	9.07	11.04	1.21
Main2	1312.838	Q=4	1.5	599.52	599.77	599.65	599.78	0.00218	0.82	1.82	8.45	0.31
Main2	1312.838	Q=8	3	599.52	599.88	599.71	599.9	0.00233	1.09	2.76	8.83	0.34
Main2	1312.838	Q=16	6	599.52	600.04	599.81	600.07	0.00253	1.43	4.2	9.38	0.38
Main2	1312.838	Q=24	9	599.52	600.16	599.89	600.2	0.002699	1.68	5.35	9.8	0.4
Main2	1312.838	Q=32	12	599.52	600.26	599.95	600.32	0.002814	1.88	6.38	10.16	0.42
Main2	1312.838	Q=40	15	599.52	600.01	600.02	600.24	0.018745	3.78	3.97	9.3	1.02
Main2	1312.838	Q=80	30	599.52	600.23	600.28	600.61	0.020789	4.97	6.04	10.04	1.13
Main2	1312.838	Q=120	45	599.52	600.4	600.49	600.92	0.02171	5.77	7.8	10.63	1.19
Main2	1312.838	Q=160	60	599.52	600.55	600.67	601.18	0.022002	6.36	9.43	11.16	1.22
Main2	1312.838	Q=240	90	599.52	600.8	600.99	601.63	0.022638	7.3	12.32	12.02	1.27
Main2	1312.838	Q=320	120	599.52	601.02	601.25	602.01	0.022744	7.99	15.02	12.78	1.3
Main2	1312.838	Q=400	150	599.52	601.21	601.49	602.34	0.022665	8.53	17.58	13.46	1.32
Main2	1312.838	Q=440	165	599.52	601.3	601.6	602.5	0.022589	8.77	18.82	13.78	1.32
Main2	1312.838	Q=480	180	599.52	601.38	601.71	602.65	0.022763	9.02	19.96	14.06	1.33

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1403.425	Q=95.35	56.6	601.26	602.3	602.3	602.76	0.014774	5.39	10.5	11.81	1.01
Main2	1403.425	Q=4	1.5	601.26	601.39	601.36	601.42	0.01253	1.37	1.1	8.86	0.69
Main2	1403.425	Q=8	3	601.26	601.45	601.42	601.5	0.014953	1.89	1.59	9.04	0.79
Main2	1403.425	Q=16	6	601.26	601.53	601.51	601.63	0.016597	2.53	2.37	9.32	0.89
Main2	1403.425	Q=24	9	601.26	601.6	601.59	601.74	0.017282	2.98	3.02	9.54	0.93
Main2	1403.425	Q=32	12	601.26	601.66	601.65	601.84	0.01812	3.37	3.57	9.72	0.98
Main2	1403.425	Q=40	15	601.26	601.71	601.71	601.92	0.018469	3.67	4.09	9.9	1.01
Main2	1403.425	Q=80	30	601.26	601.96	601.96	602.28	0.01621	4.49	6.68	10.71	1
Main2	1403.425	Q=120	45	601.26	602.17	602.17	602.56	0.015198	5.05	8.92	11.37	1
Main2	1403.425	Q=160	60	601.26	602.34	602.34	602.81	0.014628	5.48	10.96	11.93	1.01
Main2	1403.425	Q=240	90	601.26	602.65	602.65	603.23	0.013742	6.1	14.75	12.92	1.01
Main2	1403.425	Q=320	120	601.26	602.91	602.91	603.58	0.013211	6.58	18.25	13.77	1.01
Main2	1403.425	Q=400	150	601.26	603.14	603.14	603.9	0.012788	6.95	21.57	14.53	1.01
Main2	1403.425	Q=440	165	601.26	603.25	603.25	604.04	0.012627	7.12	23.17	14.88	1.01
Main2	1403.425	Q=480	180	601.26	603.36	603.36	604.18	0.012412	7.26	24.78	15.23	1
Main2	1460.474	Q=95.35	56.6	601.41	602.99		603.17	0.003928	3.38	16.72	13.97	0.55
Main2	1460.474	Q=4	1.5	601.41	601.67	601.54	601.68	0.002197	0.82	1.82	8.54	0.31
Main2	1460.474	Q=8	3	601.41	601.78		601.79	0.002431	1.1	2.74	8.97	0.35
Main2	1460.474	Q=16	6	601.41	601.92		601.96	0.002787	1.46	4.1	9.57	0.39
Main2	1460.474	Q=24	9	601.41	602.04		602.08	0.002964	1.72	5.24	10.05	0.42
Main2	1460.474	Q=32	12	601.41	602.14		602.2	0.003084	1.92	6.26	10.46	0.44
Main2	1460.474	Q=40	15	601.41	602.23		602.29	0.00319	2.09	7.19	10.82	0.45
Main2	1460.474	Q=80	30	601.41	602.56		602.68	0.003611	2.71	11.06	12.2	0.5
Main2	1460.474	Q=120	45	601.41	602.82		602.98	0.003813	3.13	14.38	13.27	0.53
Main2	1460.474	Q=160	60	601.41	603.04		603.23	0.003955	3.45	17.38	14.16	0.55
Main2	1460.474	Q=240	90	601.41	603.41	602.87	603.65	0.004053	3.94	22.99	19.37	0.57
Main2	1460.474	Q=320	120	601.41	603.72	603.13	603.98	0.003641	4.18	31.48	32.28	0.56
Main2	1460.474	Q=400	150	601.41	604.01	603.36	604.26	0.00299	4.19	41.51	36.98	0.52
Main2	1460.474	Q=440	165	601.41	604.15	603.58	604.39	0.00271	4.17	46.75	38.79	0.5
Main2	1460.474	Q=480	180	601.41	604.28	603.73	604.51	0.002474	4.14	51.99	40.41	0.48

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1529.53	Q=95.35	56.6	601.87	603.28	602.86	603.45	0.003978	3.28	17.24	15.33	0.55
Main2	1529.53	Q=4	1.5	601.87	602.03	602.04	602.08	0.025144	1.81	0.83	7.53	0.96
Main2	1529.53	Q=8	3	601.87	602.11	602.1	602.17	0.018006	1.96	1.53	9.53	0.86
Main2	1529.53	Q=16	6	601.87	602.24	602.19	602.31	0.011276	2.03	2.95	12.25	0.73
Main2	1529.53	Q=24	9	601.87	602.34	602.26	602.41	0.008347	2.16	4.17	12.54	0.66
Main2	1529.53	Q=32	12	601.87	602.43	602.31	602.51	0.006962	2.27	5.28	12.81	0.62
Main2	1529.53	Q=40	15	601.87	602.51	602.36	602.6	0.006151	2.37	6.32	13.04	0.6
Main2	1529.53	Q=80	30	601.87	602.84	602.57	602.96	0.004633	2.78	10.8	14.02	0.56
Main2	1529.53	Q=120	45	601.87	603.1	602.75	603.25	0.004167	3.09	14.58	14.8	0.55
Main2	1529.53	Q=160	60	601.87	603.33	602.9	603.5	0.003938	3.34	17.98	15.47	0.55
Main2	1529.53	Q=240	90	601.87	602.72	603.16	604.21	0.068503	9.79	9.2	13.68	2.1
Main2	1529.53	Q=320	120	601.87	602.86	603.4	604.69	0.068884	10.85	11.06	14.08	2.16
Main2	1529.53	Q=400	150	601.87	602.98	603.61	605.11	0.068379	11.7	12.82	14.45	2.19
Main2	1529.53	Q=440	165	601.87	603.04	603.7	605.32	0.068858	12.11	13.62	14.61	2.21
Main2	1529.53	Q=480	180	601.87	603.08	603.8	605.55	0.070858	12.6	14.29	14.74	2.26
Main2	1682.002	Q=95.35	56.6	605.68	607.2	607.2	607.76	0.014701	5.98	9.47	8.66	1.01
Main2	1682.002	Q=4	1.5	605.68	605.86	605.86	605.94	0.025351	2.21	0.68	4.5	1
Main2	1682.002	Q=8	3	605.68	605.95	605.95	606.07	0.022648	2.74	1.1	4.78	1.01
Main2	1682.002	Q=16	6	605.68	606.09	606.09	606.27	0.01997	3.34	1.8	5.21	1
Main2	1682.002	Q=24	9	605.68	606.21	606.21	606.43	0.01883	3.75	2.4	5.56	1.01
Main2	1682.002	Q=32	12	605.68	606.3	606.3	606.56	0.018067	4.06	2.96	5.87	1.01
Main2	1682.002	Q=40	15	605.68	606.39	606.39	606.68	0.017471	4.3	3.49	6.14	1.01
Main2	1682.002	Q=80	30	605.68	606.75	606.75	607.15	0.015877	5.13	5.85	7.24	1.01
Main2	1682.002	Q=120	45	605.68	607.02	607.02	607.52	0.015149	5.67	7.94	8.09	1.01
Main2	1682.002	Q=160	60	605.68	607.25	607.25	607.82	0.014589	6.06	9.9	8.81	1.01
Main2	1682.002	Q=240	90	605.68	607.64	607.64	608.32	0.013896	6.65	13.54	10.01	1.01
Main2	1682.002	Q=320	120	605.68	607.96	607.96	608.74	0.013411	7.08	16.94	11.02	1.01
Main2	1682.002	Q=400	150	605.68	608.24	608.24	609.1	0.013105	7.45	20.14	11.89	1.01
Main2	1682.002	Q=440	165	605.68	608.36	608.36	609.27	0.012802	7.62	21.66	12.46	1
Main2	1682.002	Q=480	180	605.68	608.48	608.49	609.43	0.012481	7.8	23.16	13.07	1

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1780.912	Q=95.35	56.6	607.35	608.54	608.65	609.17	0.02042	6.35	8.91	9.85	1.18
Main2	1780.912	Q=4	1.5	607.35	607.61	607.58	607.65	0.012604	1.56	0.96	6.45	0.71
Main2	1780.912	Q=8	3	607.35	607.69	607.65	607.75	0.013146	1.96	1.53	7.51	0.76
Main2	1780.912	Q=16	6	607.35	607.8	607.76	607.9	0.013664	2.56	2.34	7.8	0.82
Main2	1780.912	Q=24	9	607.35	607.88	607.84	608.02	0.013907	2.99	3.01	8.04	0.86
Main2	1780.912	Q=32	12	607.35	607.82	607.92	608.17	0.042596	4.74	2.53	7.87	1.47
Main2	1780.912	Q=40	15	607.35	608.03	607.99	608.23	0.013978	3.59	4.18	8.43	0.9
Main2	1780.912	Q=80	30	607.35	608.22	608.27	608.63	0.019954	5.12	5.86	8.96	1.11
Main2	1780.912	Q=120	45	607.35	608.41	608.5	608.95	0.02039	5.9	7.63	9.48	1.16
Main2	1780.912	Q=160	60	607.35	608.58	608.69	609.23	0.020418	6.47	9.27	9.95	1.18
Main2	1780.912	Q=240	90	607.35	608.86	609.03	609.71	0.020544	7.36	12.22	10.73	1.22
Main2	1780.912	Q=320	120	607.35	609.11	609.32	610.11	0.020378	8.01	14.97	11.41	1.23
Main2	1780.912	Q=400	150	607.35	609.33	609.58	610.47	0.020257	8.54	17.56	12.02	1.25
Main2	1780.912	Q=440	165	607.35	609.47	609.7	610.61	0.018905	8.57	19.25	12.4	1.21
Main2	1780.912	Q=480	180	607.35	609.65	609.82	610.74	0.016423	8.36	21.53	12.89	1.14
Main2	1860.551	Q=95.35	56.6	608.67	610.06	610.14	610.68	0.017913	6.35	8.91	8.72	1.11
Main2	1860.551	Q=4	1.5	608.67	608.84	608.83	608.9	0.019935	2.02	0.74	4.68	0.89
Main2	1860.551	Q=8	3	608.67	608.93	608.92	609.03	0.019686	2.59	1.16	4.97	0.94
Main2	1860.551	Q=16	6	608.67	609.05	609.05	609.22	0.019846	3.3	1.82	5.39	1
Main2	1860.551	Q=24	9	608.67	609.16	609.16	609.38	0.018867	3.71	2.43	5.75	1.01
Main2	1860.551	Q=32	12	608.67	609.26	609.26	609.51	0.018006	4.01	2.99	6.07	1.01
Main2	1860.551	Q=40	15	608.67	609.34	609.34	609.62	0.017397	4.25	3.53	6.35	1
Main2	1860.551	Q=80	30	608.67	609.67	609.69	610.09	0.0168	5.18	5.79	7.44	1.03
Main2	1860.551	Q=120	45	608.67	609.91	609.96	610.45	0.017408	5.9	7.63	8.22	1.08
Main2	1860.551	Q=160	60	608.67	610.1	610.19	610.75	0.017985	6.47	9.28	8.86	1.11
Main2	1860.551	Q=240	90	608.67	610.43	610.56	611.25	0.01841	7.29	12.34	9.94	1.15
Main2	1860.551	Q=320	120	608.67	610.69	610.88	611.67	0.018753	7.93	15.12	10.83	1.18
Main2	1860.551	Q=400	150	608.67	610.91	611.15	612.04	0.019409	8.53	17.59	11.56	1.22
Main2	1860.551	Q=440	165	608.67	610.98	611.27	612.24	0.021042	9.01	18.32	11.76	1.27
Main2	1860.551	Q=480	180	608.67	610.95	611.41	612.5	0.026025	9.97	18.06	11.69	1.41

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	1941.272	Q=95.35	56.6	609.94	611.45	611.45	611.99	0.014641	5.92	9.56	8.9	1.01
Main2	1941.272	Q=4	1.5	609.94	610.16	610.12	610.21	0.013191	1.79	0.84	4.64	0.74
Main2	1941.272	Q=8	3	609.94	610.26	610.22	610.34	0.013469	2.31	1.3	4.96	0.79
Main2	1941.272	Q=16	6	609.94	610.4	610.35	610.53	0.013472	2.92	2.06	5.44	0.84
Main2	1941.272	Q=24	9	609.94	610.51	610.47	610.69	0.014152	3.39	2.66	5.8	0.88
Main2	1941.272	Q=32	12	609.94	610.6	610.56	610.82	0.014682	3.76	3.19	6.09	0.91
Main2	1941.272	Q=40	15	609.94	610.68	610.65	610.93	0.014912	4.05	3.7	6.37	0.94
Main2	1941.272	Q=80	30	609.94	611	611	611.4	0.015896	5.1	5.89	7.41	1.01
Main2	1941.272	Q=120	45	609.94	611.27	611.27	611.76	0.015051	5.61	8.02	8.31	1.01
Main2	1941.272	Q=160	60	609.94	611.49	611.49	612.05	0.014535	6	9.99	9.06	1.01
Main2	1941.272	Q=240	90	609.94	611.88	611.88	612.55	0.013818	6.58	13.68	10.32	1.01
Main2	1941.272	Q=320	120	609.94	612.19	612.19	612.96	0.013373	7.02	17.1	11.36	1.01
Main2	1941.272	Q=400	150	609.94	612.47	612.47	613.31	0.0128	7.37	20.39	13.18	1
Main2	1941.272	Q=440	165	609.94	612.65	612.65	613.47	0.01083	7.27	23.3	18.43	0.94
Main2	1941.272	Q=480	180	609.94	612.95	612.95	613.59	0.007199	6.55	30.99	30.87	0.78
Main2	2038.465	Q=95.35	56.6	611.2	612.66		612.93	0.006432	4.16	13.6	11.9	0.69
Main2	2038.465	Q=4	1.5	611.2	611.38	611.34	611.41	0.011709	1.42	1.05	7.64	0.68
Main2	2038.465	Q=8	3	611.2	611.46		611.51	0.010829	1.81	1.66	7.9	0.69
Main2	2038.465	Q=16	6	611.2	611.58		611.66	0.010052	2.28	2.63	8.3	0.71
Main2	2038.465	Q=24	9	611.2	611.68		611.78	0.008981	2.54	3.54	8.66	0.7
Main2	2038.465	Q=32	12	611.2	611.77	611.66	611.89	0.008443	2.76	4.36	8.96	0.7
Main2	2038.465	Q=40	15	611.2	611.86	611.73	611.99	0.008082	2.93	5.11	9.24	0.69
Main2	2038.465	Q=80	30	611.2	612.21		612.4	0.006949	3.51	8.55	10.4	0.68
Main2	2038.465	Q=120	45	611.2	612.48		612.72	0.006667	3.93	11.45	11.29	0.69
Main2	2038.465	Q=160	60	611.2	612.71		612.99	0.006464	4.24	14.14	12.05	0.69
Main2	2038.465	Q=240	90	611.2	613.1		613.44	0.006151	4.7	19.14	13.36	0.69
Main2	2038.465	Q=320	120	611.2	613.43	613.01	613.83	0.005993	5.06	23.72	14.45	0.7
Main2	2038.465	Q=400	150	611.2	613.72	613.25	614.16	0.005892	5.35	28.02	15.4	0.7
Main2	2038.465	Q=440	165	611.2	613.79	613.37	614.29	0.006318	5.66	29.17	16.16	0.73
Main2	2038.465	Q=480	180	611.2	613.22	613.48	614.38	0.019485	8.66	20.8	13.76	1.24

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	2125.413	Q=95.35	56.6	611.59	613.33	613.17	613.83	0.015571	5.7	9.94	7.25	0.86
Main2	2125.413	Q=4	1.5	611.59	612.01	611.88	612.03	0.00468	1.1	1.37	5.78	0.4
Main2	2125.413	Q=8	3	611.59	612.12	611.98	612.16	0.005358	1.48	2.02	5.9	0.45
Main2	2125.413	Q=16	6	611.59	612.28		612.34	0.006359	2.01	2.98	6.08	0.51
Main2	2125.413	Q=24	9	611.59	612.4		612.49	0.007407	2.44	3.69	6.21	0.56
Main2	2125.413	Q=32	12	611.59	612.49		612.61	0.008338	2.8	4.29	6.32	0.6
Main2	2125.413	Q=40	15	611.59	612.58		612.73	0.008912	3.08	4.86	6.42	0.62
Main2	2125.413	Q=80	30	611.59	612.92		613.2	0.011695	4.24	7.08	6.79	0.73
Main2	2125.413	Q=120	45	611.59	613.17		613.57	0.013868	5.1	8.82	7.07	0.81
Main2	2125.413	Q=160	60	611.59	613.37	613.23	613.9	0.015974	5.85	10.26	7.3	0.87
Main2	2125.413	Q=240	90	611.59	613.67	613.65	614.47	0.020487	7.2	12.51	7.63	0.99
Main2	2125.413	Q=320	120	611.59	614.02	614.02	614.98	0.020972	7.88	15.23	8.02	1.01
Main2	2125.413	Q=400	150	611.59	614.6	614.6	615.39	0.012696	7.25	22.22	16.45	0.82
Main2	2125.413	Q=440	165	611.59	614.77	614.77	615.54	0.011545	7.23	25.2	18.4	0.79
Main2	2125.413	Q=480	180	611.59	614.9	614.9	615.67	0.011032	7.3	27.72	19.77	0.77
Main2	2235.308	Q=95.35	56.6	613.04	614.66		614.87	0.006108	3.68	15.36	12.17	0.58
Main2	2235.308	Q=4	1.5	613.04	613.23	613.23	613.29	0.036481	1.96	0.77	6.42	1
Main2	2235.308	Q=8	3	613.04	613.3	613.3	613.39	0.032278	2.35	1.28	7.4	1
Main2	2235.308	Q=16	6	613.04	613.43	613.41	613.53	0.021397	2.53	2.37	9.02	0.87
Main2	2235.308	Q=24	9	613.04	613.54	613.48	613.65	0.016022	2.69	3.35	9.29	0.79
Main2	2235.308	Q=32	12	613.04	613.63	613.55	613.76	0.013447	2.82	4.25	9.54	0.75
Main2	2235.308	Q=40	15	613.04	613.72		613.86	0.012012	2.95	5.09	9.76	0.72
Main2	2235.308	Q=80	30	613.04	614.11		614.28	0.008261	3.32	9.04	10.75	0.64
Main2	2235.308	Q=120	45	613.04	614.43		614.63	0.006855	3.56	12.63	11.58	0.6
Main2	2235.308	Q=160	60	613.04	614.72		614.94	0.005937	3.72	16.15	12.33	0.57
Main2	2235.308	Q=240	90	613.04	615.25		615.49	0.004809	3.91	23.03	13.69	0.53
Main2	2235.308	Q=320	120	613.04	615.69		615.95	0.00433	4.1	29.29	14.82	0.51
Main2	2235.308	Q=400	150	613.04	615.93		616.25	0.004868	4.55	32.94	15.44	0.55
Main2	2235.308	Q=440	165	613.04	616.04		616.39	0.005133	4.77	34.6	15.72	0.57
Main2	2235.308	Q=480	180	613.04	616.14		616.53	0.005356	4.96	36.27	15.99	0.58

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	2330.407	Q=95.35	56.6	614.22	615.43	615.41	615.88	0.01876	5.44	10.41	10.81	0.98
Main2	2330.407	Q=4	1.5	614.22	614.49	614.42	614.51	0.006436	1.04	1.44	8.44	0.44
Main2	2330.407	Q=8	3	614.22	614.58	614.48	614.61	0.006748	1.38	2.18	8.66	0.48
Main2	2330.407	Q=16	6	614.22	614.69		614.75	0.008344	1.91	3.15	8.94	0.57
Main2	2330.407	Q=24	9	614.22	614.77		614.85	0.010118	2.35	3.83	9.13	0.64
Main2	2330.407	Q=32	12	614.22	614.83		614.94	0.01172	2.73	4.39	9.29	0.7
Main2	2330.407	Q=40	15	614.22	614.88		615.03	0.012711	3.04	4.94	9.43	0.74
Main2	2330.407	Q=80	30	614.22	615.11		615.39	0.016302	4.2	7.15	10.01	0.87
Main2	2330.407	Q=120	45	614.22	615.3	615.26	615.68	0.017991	4.97	9.05	10.48	0.94
Main2	2330.407	Q=160	60	614.22	615.46	615.45	615.94	0.018841	5.55	10.81	10.9	0.98
Main2	2330.407	Q=240	90	614.22	615.79	615.77	616.39	0.017732	6.19	14.54	11.74	0.98
Main2	2330.407	Q=320	120	614.22	616.13	616.05	616.77	0.015485	6.45	18.6	12.59	0.94
Main2	2330.407	Q=400	150	614.22	616.41	616.3	617.11	0.014562	6.75	22.21	13.3	0.92
Main2	2330.407	Q=440	165	614.22	616.53	616.42	617.27	0.014288	6.9	23.92	13.62	0.92
Main2	2330.407	Q=480	180	614.22	616.65	616.53	617.42	0.014069	7.04	25.58	13.92	0.92
Main2	2401.954	Q=95.35	56.6	614.98	616.48	616.14	616.73	0.007853	4.05	13.99	11.6	0.65
Main2	2401.954	Q=4	1.5	614.98	615.18	615.15	615.21	0.016975	1.41	1.07	8.29	0.69
Main2	2401.954	Q=8	3	614.98	615.26	615.21	615.3	0.014783	1.76	1.71	8.48	0.69
Main2	2401.954	Q=16	6	614.98	615.38	615.3	615.45	0.012101	2.14	2.8	8.8	0.67
Main2	2401.954	Q=24	9	614.98	615.5	615.38	615.58	0.010321	2.37	3.8	9.09	0.64
Main2	2401.954	Q=32	12	614.98	615.59	615.45	615.69	0.00947	2.55	4.7	9.34	0.63
Main2	2401.954	Q=40	15	614.98	615.68	615.52	615.79	0.009126	2.73	5.49	9.55	0.63
Main2	2401.954	Q=80	30	614.98	616.02	615.78	616.2	0.008227	3.35	8.97	10.44	0.64
Main2	2401.954	Q=120	45	614.98	616.3	615.99	616.52	0.007943	3.78	11.92	11.13	0.64
Main2	2401.954	Q=160	60	614.98	616.53	616.18	616.79	0.007852	4.12	14.56	11.72	0.65
Main2	2401.954	Q=240	90	614.98	616.89	616.51	617.24	0.008174	4.73	19.02	12.65	0.68
Main2	2401.954	Q=320	120	614.98	617.18	616.79	617.61	0.008785	5.29	22.69	13.37	0.72
Main2	2401.954	Q=400	150	614.98	616.67	617.04	618	0.036139	9.27	16.18	12.07	1.41
Main2	2401.954	Q=440	165	614.98	616.75	617.15	618.18	0.036476	9.58	17.23	12.29	1.43
Main2	2401.954	Q=480	180	614.98	616.83	617.26	618.34	0.036768	9.86	18.25	12.5	1.44

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	2500.483	Q=95.35	56.6	617.24	618.58	618.58	619.13	0.020275	5.95	9.52	8.7	1
Main2	2500.483	Q=4	1.5	617.24	617.41	617.4	617.47	0.032434	1.91	0.79	6.25	0.95
Main2	2500.483	Q=8	3	617.24	617.48	617.48	617.58	0.032189	2.48	1.21	6.39	1.01
Main2	2500.483	Q=16	6	617.24	617.59	617.59	617.74	0.028281	3.09	1.94	6.62	1
Main2	2500.483	Q=24	9	617.24	617.69	617.69	617.88	0.026564	3.51	2.57	6.82	1.01
Main2	2500.483	Q=32	12	617.24	617.77	617.77	618	0.025284	3.83	3.14	6.99	1.01
Main2	2500.483	Q=40	15	617.24	617.84	617.84	618.1	0.024348	4.09	3.67	7.15	1.01
Main2	2500.483	Q=80	30	617.24	618.16	618.16	618.54	0.021956	4.99	6.01	7.81	1
Main2	2500.483	Q=120	45	617.24	618.41	618.41	618.89	0.020871	5.59	8.05	8.34	1
Main2	2500.483	Q=160	60	617.24	618.63	618.63	619.2	0.020152	6.04	9.93	8.8	1
Main2	2500.483	Q=240	90	617.24	619	619	619.71	0.01948	6.74	13.35	9.58	1.01
Main2	2500.483	Q=320	120	617.24	619.32	619.32	620.14	0.018921	7.25	16.55	10.26	1.01
Main2	2500.483	Q=400	150	617.24	619.61	619.61	620.52	0.018516	7.67	19.57	10.86	1.01
Main2	2500.483	Q=440	165	617.24	619.74	619.74	620.7	0.018336	7.84	21.04	11.14	1.01
Main2	2500.483	Q=480	180	617.24	619.87	619.87	620.87	0.018187	8.01	22.47	11.41	1.01
Main2	2652.687	Q=95.35	56.6	619.11	620.88	620.51	621.24	0.00989	4.77	11.86	7.87	0.69
Main2	2652.687	Q=4	1.5	619.11	619.36	619.27	619.38	0.006658	1.19	1.26	6.06	0.46
Main2	2652.687	Q=8	3	619.11	619.47		619.51	0.00669	1.55	1.94	6.19	0.49
Main2	2652.687	Q=16	6	619.11	619.63		619.7	0.007279	2.05	2.93	6.38	0.53
Main2	2652.687	Q=24	9	619.11	619.76		619.85	0.007605	2.4	3.75	6.53	0.56
Main2	2652.687	Q=32	12	619.11	619.87		619.98	0.007903	2.68	4.47	6.66	0.58
Main2	2652.687	Q=40	15	619.11	619.97		620.1	0.008141	2.92	5.13	6.78	0.59
Main2	2652.687	Q=80	30	619.11	620.36	620.06	620.59	0.008922	3.79	7.92	7.25	0.64
Main2	2652.687	Q=120	45	619.11	620.68	620.33	620.98	0.009497	4.39	10.25	7.62	0.67
Main2	2652.687	Q=160	60	619.11	620.94	620.56	621.31	0.00999	4.88	12.31	7.94	0.69
Main2	2652.687	Q=240	90	619.11	621.39	620.97	621.88	0.01069	5.62	16.02	8.48	0.72
Main2	2652.687	Q=320	120	619.11	621.76	621.33	622.37	0.011435	6.24	19.23	8.92	0.75
Main2	2652.687	Q=400	150	619.11	622.08	621.65	622.79	0.01214	6.79	22.11	9.51	0.77
Main2	2652.687	Q=440	165	619.11	622.2	621.8	622.98	0.01234	7.08	23.45	11.68	0.79
Main2	2652.687	Q=480	180	619.11	622.32	621.95	623.16	0.012509	7.35	24.95	13.71	0.8

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main2	2702.534	Q=95.35	56.6	619.26	621.36	620.39	621.46	0.002179	2.58	21.92	13.4	0.36
Main2	2702.534	Q=4	1.5	619.26	619.53	619.37	619.54	0.001953	0.73	2.06	8.33	0.26
Main2	2702.534	Q=8	3	619.26	619.67	619.44	619.68	0.001926	0.94	3.2	8.7	0.27
Main2	2702.534	Q=16	6	619.26	619.85	619.54	619.88	0.002084	1.23	4.87	9.22	0.3
Main2	2702.534	Q=24	9	619.26	620	619.62	620.03	0.002158	1.44	6.27	9.63	0.31
Main2	2702.534	Q=32	12	619.26	620.13	619.69	620.17	0.002179	1.59	7.56	10	0.32
Main2	2702.534	Q=40	15	619.26	620.25	619.75	620.3	0.002195	1.71	8.75	10.32	0.33
Main2	2702.534	Q=80	30	619.26	620.73	620.02	620.8	0.002213	2.14	13.99	11.65	0.34
Main2	2702.534	Q=120	45	619.26	621.11	620.24	621.2	0.002199	2.42	18.59	12.7	0.35
Main2	2702.534	Q=160	60	619.26	621.43	620.43	621.54	0.002173	2.62	22.87	13.6	0.36
Main2	2702.534	Q=240	90	619.26	621.99	620.75	622.12	0.002106	2.91	30.89	15.15	0.36
Main2	2702.534	Q=320	120	619.26	622.46	621.03	622.6	0.001851	3.06	41.49	27.79	0.35
Main2	2702.534	Q=400	150	619.26	622.88	621.28	623.01	0.001506	3.07	54.34	33.45	0.32
Main2	2702.534	Q=440	165	619.26	623.07	621.4	623.2	0.001379	3.07	60.9	35.95	0.31
Main2	2702.534	Q=480	180	619.26	623.24	621.51	623.37	0.001271	3.06	67.37	37.39	0.3
Main2	2753.631	Q=95.35	56.6	620.75	621.77	621.85	622.34	0.026287	6.03	9.38	10.81	1.14
Main2	2753.631	Q=4	1.5	620.75	620.86	620.88	620.93	0.057423	2.03	0.74	8.2	1.2
Main2	2753.631	Q=8	3	620.75	620.91	620.93	621.02	0.059753	2.7	1.11	8.33	1.3
Main2	2753.631	Q=16	6	620.75	620.98	621.03	621.17	0.060815	3.54	1.7	8.53	1.4
Main2	2753.631	Q=24	9	620.75	621.03	621.11	621.3	0.061938	4.14	2.17	8.69	1.46
Main2	2753.631	Q=32	12	620.75	621.08	621.17	621.41	0.063319	4.65	2.58	8.83	1.51
Main2	2753.631	Q=40	15	620.75	621.23	621.24	621.45	0.025597	3.78	3.97	9.27	1.02
Main2	2753.631	Q=80	30	620.75	621.46	621.5	621.83	0.026211	4.87	6.16	9.92	1.09
Main2	2753.631	Q=120	45	620.75	621.65	621.71	622.13	0.026189	5.58	8.06	10.46	1.12
Main2	2753.631	Q=160	60	620.75	621.81	621.89	622.39	0.026174	6.14	9.77	10.92	1.14
Main2	2753.631	Q=240	90	620.75	622.08	622.21	622.84	0.025905	6.97	12.91	11.71	1.17
Main2	2753.631	Q=320	120	620.75	622.32	622.48	623.22	0.025621	7.6	15.8	12.4	1.19
Main2	2753.631	Q=400	150	620.75	622.54	622.73	623.55	0.025156	8.08	18.57	13.02	1.19
Main2	2753.631	Q=440	165	620.75	622.62	622.84	623.72	0.025885	8.4	19.65	13.26	1.22
Main2	2753.631	Q=480	180	620.75	622.74	622.95	623.86	0.024697	8.48	21.23	13.6	1.2

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	132.1173	Q=95.35	13	627.96	628.65	628.65	628.86	0.018624	3.63	3.58	8.95	1.01
T2	132.1173	Q=4	0.5	627.96	628.15	628.15	628.2	0.028714	1.74	0.29	3.03	0.99
T2	132.1173	Q=8	1	627.96	628.21	628.21	628.27	0.026247	2	0.5	4	0.99
T2	132.1173	Q=16	2	627.96	628.29	628.29	628.37	0.024697	2.32	0.86	5.24	1.01
T2	132.1173	Q=24	3	627.96	628.35	628.35	628.44	0.023312	2.51	1.19	6.17	1.01
T2	132.1173	Q=32	4	627.96	628.4	628.4	628.5	0.02185	2.64	1.51	6.93	1
T2	132.1173	Q=40	5	627.96	628.43	628.43	628.56	0.022076	2.84	1.76	7.31	1.02
T2	132.1173	Q=80	10	627.96	628.58	628.58	628.76	0.019425	3.4	2.94	8.41	1.01
T2	132.1173	Q=120	15	627.96	628.7	628.7	628.92	0.018162	3.76	3.99	9.28	1.01
T2	132.1173	Q=160	20	627.96	628.8	628.8	629.05	0.017388	4.04	4.95	10.01	1.01
T2	132.1173	Q=240	30	627.96	628.97	628.97	629.27	0.01632	4.44	6.75	11.26	1.01
T2	132.1173	Q=320	40	627.96	629.11	629.11	629.46	0.015904	4.78	8.37	12.27	1.02
T2	132.1173	Q=400	50	627.96	629.19	629.24	629.63	0.017711	5.28	9.46	12.91	1.09
T2	132.1173	Q=440	55	627.96	629.23	629.29	629.7	0.018577	5.52	9.96	13.19	1.12
T2	132.1173	Q=480	60	627.96	629.27	629.35	629.78	0.019464	5.75	10.44	13.45	1.15
T2	199.0991	Q=95.35	13	628.98	629.69	629.62	629.85	0.012044	3.26	3.99	8.34	0.83
T2	199.0991	Q=4	0.5	628.98	629.2	629.15	629.21	0.009357	1.08	0.46	4.29	0.58
T2	199.0991	Q=8	1	628.98	629.26	629.22	629.28	0.00983	1.31	0.76	5.51	0.62
T2	199.0991	Q=16	2	628.98	629.34	629.28	629.38	0.009971	1.57	1.28	7.13	0.65
T2	199.0991	Q=24	3	628.98	629.39	629.34	629.44	0.010346	1.83	1.64	7.41	0.69
T2	199.0991	Q=32	4	628.98	629.43		629.49	0.010591	2.05	1.95	7.54	0.71
T2	199.0991	Q=40	5	628.98	629.47		629.54	0.010631	2.23	2.24	7.66	0.73
T2	199.0991	Q=80	10	628.98	629.62	629.55	629.75	0.011374	2.92	3.42	8.13	0.79
T2	199.0991	Q=120	15	628.98	629.73	629.67	629.91	0.012151	3.44	4.37	8.48	0.84
T2	199.0991	Q=160	20	628.98	629.82	629.77	630.06	0.013028	3.88	5.16	8.77	0.89
T2	199.0991	Q=240	30	628.98	629.98	629.95	630.3	0.014411	4.59	6.54	9.25	0.96
T2	199.0991	Q=320	40	628.98	630.11	630.11	630.52	0.015087	5.11	7.83	9.67	1
T2	199.0991	Q=400	50	628.98	630.25	630.25	630.71	0.01471	5.44	9.19	10.1	1
T2	199.0991	Q=440	55	628.98	630.31	630.31	630.8	0.014705	5.6	9.82	10.29	1.01
T2	199.0991	Q=480	60	628.98	630.38	630.38	630.88	0.014333	5.7	10.52	10.5	1

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
T2	269.4769	Q=95.35	13	630.06	630.67	630.65	630.84	0.016307	3.36	3.87	9.91	0.95
T2	269.4769	Q=4	0.5	630.06	630.22	630.21	630.25	0.02671	1.47	0.34	4.39	0.93
T2	269.4769	Q=8	1	630.06	630.27	630.26	630.31	0.023977	1.68	0.6	5.82	0.92
T2	269.4769	Q=16	2	630.06	630.32	630.32	630.39	0.022629	2.05	0.98	6.74	0.95
T2	269.4769	Q=24	3	630.06	630.37	630.37	630.45	0.020931	2.28	1.31	7.28	0.95
T2	269.4769	Q=32	4	630.06	630.41	630.41	630.51	0.020647	2.49	1.61	7.72	0.96
T2	269.4769	Q=40	5	630.06	630.45	630.44	630.56	0.020431	2.66	1.88	8.1	0.97
T2	269.4769	Q=80	10	630.06	630.59	630.58	630.75	0.017868	3.18	3.15	9.38	0.97
T2	269.4769	Q=120	15	630.06	630.71	630.69	630.9	0.01592	3.49	4.3	10.21	0.95
T2	269.4769	Q=160	20	630.06	630.81	630.78	631.02	0.014815	3.72	5.37	10.92	0.94
T2	269.4769	Q=240	30	630.06	631	630.94	631.24	0.012277	3.94	7.61	12.28	0.88
T2	269.4769	Q=320	40	630.06	631.17	631.08	631.43	0.010926	4.12	9.71	13.43	0.85
T2	269.4769	Q=400	50	630.06	631.3	631.2	631.59	0.010389	4.32	11.58	14.36	0.85
T2	269.4769	Q=440	55	630.06	631.37	631.25	631.66	0.01004	4.38	12.54	14.79	0.84
T2	269.4769	Q=480	60	630.06	631.43	631.3	631.74	0.009784	4.46	13.46	15.19	0.83
T2	353.0578	Q=95.35	13	632.05	632.73	632.65	632.87	0.04023	2.97	4.38	9.28	0.76
T2	353.0578	Q=4	0.5	632.05	632.27	632.21	632.28	0.021969	0.83	0.6	5.51	0.45
T2	353.0578	Q=8	1	632.05	632.32	632.26	632.34	0.024603	1.06	0.95	6.63	0.49
T2	353.0578	Q=16	2	632.05	632.4	632.32	632.43	0.026047	1.34	1.49	7.61	0.53
T2	353.0578	Q=24	3	632.05	632.45	632.37	632.49	0.02859	1.57	1.91	8.29	0.57
T2	353.0578	Q=32	4	632.05	632.5	632.41	632.55	0.029028	1.75	2.29	8.5	0.59
T2	353.0578	Q=40	5	632.05	632.54	632.45	632.59	0.02932	1.9	2.63	8.63	0.61
T2	353.0578	Q=80	10	632.05	632.68	632.58	632.78	0.03477	2.58	3.88	9.1	0.7
T2	353.0578	Q=120	15	632.05	632.77	632.69	632.93	0.041653	3.15	4.76	9.42	0.78
T2	353.0578	Q=160	20	632.05	632.85	632.79	633.06	0.047498	3.63	5.5	9.68	0.85
T2	353.0578	Q=240	30	632.05	632.95	632.95	633.28	0.064651	4.62	6.5	10.02	1.01
T2	353.0578	Q=320	40	632.05	633.1	633.1	633.49	0.061686	5	8	10.5	1.01
T2	353.0578	Q=400	50	632.05	633.23	633.23	633.67	0.059521	5.31	9.42	10.95	1.01
T2	353.0578	Q=440	55	632.05	633.29	633.29	633.75	0.058685	5.44	10.1	11.15	1.01
T2	353.0578	Q=480	60	632.05	633.35	633.35	633.83	0.057898	5.57	10.77	11.35	1.01

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	445.2593	Q=95.35	13	633.83	634.48	634.4	634.6	0.010751	2.77	4.69	11.75	0.77
T2	445.2593	Q=4	0.5	633.83	633.98	633.97	634	0.016054	1.19	0.42	5.05	0.73
T2	445.2593	Q=8	1	633.83	634.03	634	634.06	0.014471	1.44	0.69	5.79	0.74
T2	445.2593	Q=16	2	633.83	634.1	634.07	634.15	0.013876	1.76	1.14	6.83	0.76
T2	445.2593	Q=24	3	633.83	634.16	634.11	634.22	0.013135	1.94	1.54	7.66	0.76
T2	445.2593	Q=32	4	633.83	634.2	634.16	634.27	0.012957	2.1	1.9	8.33	0.77
T2	445.2593	Q=40	5	633.83	634.24	634.2	634.32	0.012898	2.23	2.24	8.9	0.78
T2	445.2593	Q=80	10	633.83	634.4	634.33	634.51	0.011681	2.65	3.78	10.79	0.79
T2	445.2593	Q=120	15	633.83	634.52	634.44	634.65	0.010534	2.86	5.24	12.28	0.77
T2	445.2593	Q=160	20	633.83	634.63	634.53	634.77	0.009772	3.02	6.62	13.54	0.76
T2	445.2593	Q=240	30	633.83	634.81	634.68	634.98	0.008356	3.24	9.25	15.08	0.73
T2	445.2593	Q=320	40	633.83	634.66	634.8	635.16	0.032061	5.63	7.1	13.89	1.39
T2	445.2593	Q=400	50	633.83	634.74	634.9	635.32	0.032635	6.08	8.22	14.53	1.42
T2	445.2593	Q=440	55	633.83	634.78	634.95	635.39	0.032868	6.28	8.76	14.82	1.44
T2	445.2593	Q=480	60	633.83	634.81	635	635.46	0.033128	6.47	9.27	15.09	1.45
T2	530.8471	Q=95.35	13	637.66	638.22	638.22	638.4	0.075827	3.39	3.83	10.84	1.01
T2	530.8471	Q=4	0.5	637.66	637.79	637.79	637.83	0.142603	1.57	0.32	4.63	1.05
T2	530.8471	Q=8	1	637.66	637.83	637.83	637.89	0.114627	1.82	0.55	5.39	1.01
T2	530.8471	Q=16	2	637.66	637.9	637.9	637.97	0.099755	2.15	0.93	6.47	1
T2	530.8471	Q=24	3	637.66	637.95	637.95	638.03	0.09614	2.38	1.26	7.26	1.01
T2	530.8471	Q=32	4	637.66	637.99	637.99	638.09	0.091747	2.54	1.57	7.94	1.01
T2	530.8471	Q=40	5	637.66	638.03	638.03	638.13	0.086716	2.65	1.89	8.57	1
T2	530.8471	Q=80	10	637.66	638.16	638.16	638.31	0.08193	3.21	3.12	10.19	1.02
T2	530.8471	Q=120	15	637.66	638.26	638.26	638.45	0.074642	3.53	4.25	11.2	1.01
T2	530.8471	Q=160	20	637.66	638.35	638.35	638.57	0.071685	3.8	5.26	12.03	1.01
T2	530.8471	Q=240	30	637.66	638.5	638.5	638.77	0.066671	4.18	7.18	13.46	1.01
T2	530.8471	Q=320	40	637.66	638.62	638.62	638.94	0.063837	4.52	8.86	14.26	1.01
T2	530.8471	Q=400	50	637.66	638.73	638.73	639.08	0.061292	4.79	10.44	14.92	1.01
T2	530.8471	Q=440	55	637.66	638.78	638.78	639.15	0.060649	4.92	11.18	15.22	1.01
T2	530.8471	Q=480	60	637.66	638.83	638.83	639.22	0.059647	5.03	11.94	15.52	1.01

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	643.2175	Q=95.35	13	638.88	639.83	639.61	639.92	0.005378	2.48	5.24	9.02	0.57
T2	643.2175	Q=4	0.5	638.88	639.06	639.06	639.12	0.034805	1.87	0.27	2.9	1.09
T2	643.2175	Q=8	1	638.88	639.23	639.13	639.25	0.004306	1.03	0.97	5.32	0.43
T2	643.2175	Q=16	2	638.88	639.33	639.21	639.35	0.004536	1.33	1.51	5.92	0.46
T2	643.2175	Q=24	3	638.88	639.4	639.27	639.44	0.004607	1.52	1.98	6.39	0.48
T2	643.2175	Q=32	4	638.88	639.46	639.31	639.51	0.004769	1.68	2.38	6.78	0.5
T2	643.2175	Q=40	5	638.88	639.52	639.35	639.57	0.004898	1.82	2.75	7.11	0.51
T2	643.2175	Q=80	10	638.88	639.73	639.52	639.81	0.005173	2.27	4.4	8.43	0.55
T2	643.2175	Q=120	15	638.88	639.88	639.66	639.99	0.005505	2.6	5.76	9.37	0.59
T2	643.2175	Q=160	20	638.88	640.01	639.77	640.14	0.005696	2.86	6.99	10.14	0.61
T2	643.2175	Q=240	30	638.88	640.21	639.96	640.38	0.006003	3.28	9.14	11.15	0.64
T2	643.2175	Q=320	40	638.88	640.38	640.11	640.58	0.006269	3.62	11.04	11.98	0.66
T2	643.2175	Q=400	50	638.88	640.52	640.24	640.75	0.00649	3.91	12.8	12.69	0.69
T2	643.2175	Q=440	55	638.88	640.08	640.31	640.87	0.032955	7.16	7.68	10.47	1.47
T2	643.2175	Q=480	60	638.88	640.13	640.37	640.96	0.032522	7.31	8.21	10.72	1.47
T2	742.6647	Q=95.35	13	642.67	643.27	643.37	643.62	0.037479	4.72	2.75	7.85	1.41
T2	742.6647	Q=4	0.5	642.67	642.84	642.86	642.9	0.051183	2.11	0.24	2.86	1.3
T2	742.6647	Q=8	1	642.67	642.89	642.91	642.98	0.041481	2.32	0.43	3.86	1.23
T2	742.6647	Q=16	2	642.67	642.96	642.99	643.07	0.037228	2.66	0.75	5.06	1.22
T2	742.6647	Q=24	3	642.67	643.01	643.04	643.15	0.03623	3.01	1	5.48	1.24
T2	742.6647	Q=32	4	642.67	643.04	643.09	643.22	0.0394	3.39	1.18	5.78	1.32
T2	742.6647	Q=40	5	642.67	643.08	643.13	643.28	0.036878	3.55	1.41	6.12	1.3
T2	742.6647	Q=80	10	642.67	643.21	643.29	643.51	0.03709	4.37	2.29	7.3	1.37
T2	742.6647	Q=120	15	642.67	643.31	643.42	643.69	0.037742	4.93	3.04	8.18	1.42
T2	742.6647	Q=160	20	642.67	643.39	643.52	643.84	0.038174	5.36	3.73	8.9	1.46
T2	742.6647	Q=240	30	642.67	643.51	643.69	644.1	0.039863	6.14	4.88	9.8	1.53
T2	742.6647	Q=320	40	642.67	643.62	643.83	644.33	0.041326	6.77	5.91	10.51	1.59
T2	742.6647	Q=400	50	642.67	643.7	643.96	644.53	0.042315	7.29	6.86	11.13	1.63
T2	742.6647	Q=440	55	642.67	643.74	644.02	644.62	0.042964	7.53	7.31	11.4	1.66
T2	742.6647	Q=480	60	642.67	643.78	644.07	644.72	0.04369	7.76	7.73	11.66	1.68

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	801.236	Q=95.35	13	646.21	646.58	646.78	647.29	0.115065	6.77	1.92	7.44	2.35
T2	801.236	Q=4	0.5	646.21	646.3	646.31	646.36	0.068652	1.91	0.26	4.63	1.41
T2	801.236	Q=8	1	646.21	646.33	646.36	646.44	0.091025	2.69	0.37	4.86	1.71
T2	801.236	Q=16	2	646.21	646.36	646.43	646.57	0.108454	3.63	0.55	5.23	1.97
T2	801.236	Q=24	3	646.21	646.39	646.48	646.67	0.114967	4.25	0.71	5.52	2.09
T2	801.236	Q=32	4	646.21	646.43	646.52	646.73	0.099434	4.45	0.9	5.87	2.01
T2	801.236	Q=40	5	646.21	646.44	646.56	646.83	0.113284	5	1	6.04	2.17
T2	801.236	Q=80	10	646.21	646.53	646.71	647.14	0.115404	6.26	1.6	6.98	2.31
T2	801.236	Q=120	15	646.21	646.61	646.83	647.38	0.114758	7.06	2.13	7.72	2.37
T2	801.236	Q=160	20	646.21	646.67	646.93	647.58	0.115244	7.69	2.6	8.33	2.42
T2	801.236	Q=240	30	646.21	646.77	647.08	647.88	0.107868	8.43	3.56	9.43	2.42
T2	801.236	Q=320	40	646.21	646.86	647.21	648.12	0.102903	8.98	4.45	10.36	2.41
T2	801.236	Q=400	50	646.21	646.94	647.33	648.32	0.099251	9.42	5.31	11.17	2.41
T2	801.236	Q=440	55	646.21	646.98	647.38	648.42	0.097081	9.63	5.71	11.44	2.4
T2	801.236	Q=480	60	646.21	647.01	647.43	648.51	0.09458	9.81	6.12	11.67	2.39
T2	844.97	Q=95.35	13	648.16	648.81	648.81	649.01	0.018756	3.6	3.61	9.21	1.01
T2	844.97	Q=4	0.5	648.16	648.33	648.33	648.38	0.033149	1.76	0.28	3.29	1.05
T2	844.97	Q=8	1	648.16	648.39	648.39	648.45	0.02773	1.95	0.51	4.42	1.01
T2	844.97	Q=16	2	648.16	648.47	648.47	648.54	0.024407	2.21	0.9	5.86	0.99
T2	844.97	Q=24	3	648.16	648.52	648.52	648.61	0.022977	2.41	1.24	6.78	0.99
T2	844.97	Q=32	4	648.16	648.56	648.56	648.67	0.024527	2.71	1.48	7.11	1.05
T2	844.97	Q=40	5	648.16	648.6	648.6	648.72	0.022055	2.8	1.78	7.52	1.01
T2	844.97	Q=80	10	648.16	648.74	648.74	648.92	0.019712	3.35	2.98	8.81	1.02
T2	844.97	Q=120	15	648.16	648.86	648.86	649.07	0.018205	3.74	4.01	9.46	1.01
T2	844.97	Q=160	20	648.16	648.96	648.96	649.21	0.017035	4.01	4.99	10.04	1
T2	844.97	Q=240	30	648.16	649.12	649.12	649.43	0.016226	4.48	6.7	10.98	1.01
T2	844.97	Q=320	40	648.16	649.26	649.26	649.62	0.015508	4.81	8.32	11.79	1.01
T2	844.97	Q=400	50	648.16	649.39	649.39	649.79	0.015036	5.08	9.83	12.51	1.01
T2	844.97	Q=440	55	648.16	649.44	649.44	649.86	0.014766	5.2	10.59	12.86	1.01
T2	844.97	Q=480	60	648.16	649.5	649.5	649.94	0.014629	5.31	11.3	13.17	1.01

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	892.3795	Q=95.35	13	648.5	648.96	649.24	650.21	0.234056	8.97	1.45	6.26	3.29
T2	892.3795	Q=4	0.5	648.5	648.62	648.7	649.08	0.546858	5.46	0.09	1.57	3.99
T2	892.3795	Q=8	1	648.5	648.67	648.77	649.04	0.250006	4.84	0.21	2.36	2.89
T2	892.3795	Q=16	2	648.5	648.72	648.85	649.26	0.264158	5.88	0.34	3.03	3.09
T2	892.3795	Q=24	3	648.5	648.76	648.91	649.44	0.275868	6.61	0.45	3.5	3.24
T2	892.3795	Q=32	4	648.5	648.79	648.96	649.55	0.262446	6.97	0.57	3.94	3.22
T2	892.3795	Q=40	5	648.5	648.82	649.01	649.66	0.260187	7.35	0.68	4.29	3.25
T2	892.3795	Q=80	10	648.5	648.92	649.17	650.04	0.241846	8.5	1.18	5.64	3.28
T2	892.3795	Q=120	15	648.5	648.99	649.28	650.31	0.22932	9.23	1.63	6.63	3.28
T2	892.3795	Q=160	20	648.5	649.05	649.38	650.53	0.219031	9.77	2.05	7.39	3.27
T2	892.3795	Q=240	30	648.5	649.15	649.54	650.88	0.193143	10.55	2.84	8.31	3.18
T2	892.3795	Q=320	40	648.5	649.24	649.69	651.16	0.175999	11.12	3.6	9.05	3.11
T2	892.3795	Q=400	50	648.5	649.32	649.82	651.4	0.15786	11.58	4.32	9.4	3.01
T2	892.3795	Q=440	55	648.5	649.35	649.88	651.51	0.150587	11.77	4.67	9.56	2.97
T2	892.3795	Q=480	60	648.5	649.39	649.94	651.61	0.144239	11.95	5.02	9.72	2.93
T2	933.8324	Q=95.35	13	651.37	652.01	652.01	652.21	0.018758	3.61	3.6	9.13	1.01
T2	933.8324	Q=4	0.5	651.37	651.55	651.55	651.59	0.021335	1.47	0.34	3.67	0.85
T2	933.8324	Q=8	1	651.37	651.6	651.6	651.66	0.027639	1.93	0.52	4.53	1.01
T2	933.8324	Q=16	2	651.37	651.67	651.67	651.75	0.025215	2.22	0.9	5.98	1.01
T2	933.8324	Q=24	3	651.37	651.73	651.73	651.81	0.023259	2.39	1.25	7	1
T2	933.8324	Q=32	4	651.37	651.76	651.76	651.87	0.022826	2.61	1.53	7.4	1.01
T2	933.8324	Q=40	5	651.37	651.8	651.8	651.92	0.021992	2.77	1.81	7.77	1.01
T2	933.8324	Q=80	10	651.37	651.94	651.94	652.11	0.019667	3.35	2.99	8.84	1.01
T2	933.8324	Q=120	15	651.37	652.05	652.05	652.27	0.018278	3.76	3.99	9.31	1.01
T2	933.8324	Q=160	20	651.37	652.15	652.15	652.41	0.017196	4.07	4.92	9.73	1.01
T2	933.8324	Q=240	30	651.37	652.31	652.31	652.64	0.016201	4.56	6.58	10.43	1.01
T2	933.8324	Q=320	40	651.37	652.46	652.46	652.83	0.015239	4.9	8.17	11.07	1
T2	933.8324	Q=400	50	651.37	652.59	652.59	653.01	0.014754	5.19	9.63	11.62	1
T2	933.8324	Q=440	55	651.37	652.65	652.65	653.09	0.014798	5.35	10.28	11.85	1.01
T2	933.8324	Q=480	60	651.37	652.7	652.71	653.17	0.01459	5.47	10.97	12.1	1.01

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	992.9296	Q=95.35	13	651.91	652.75	652.53	652.83	0.006332	2.16	6.01	11.56	0.53
T2	992.9296	Q=4	0.5	651.91	652.16	652.07	652.16	0.005396	0.77	0.65	5.32	0.39
T2	992.9296	Q=8	1	651.91	652.23	652.13	652.24	0.00499	0.89	1.13	7	0.39
T2	992.9296	Q=16	2	651.91	652.32	652.2	652.34	0.005195	1.13	1.78	7.9	0.42
T2	992.9296	Q=24	3	651.91	652.38	652.25	652.41	0.005385	1.3	2.3	8.45	0.44
T2	992.9296	Q=32	4	651.91	652.44	652.29	652.47	0.005554	1.44	2.77	8.9	0.46
T2	992.9296	Q=40	5	651.91	652.49	652.32	652.52	0.00562	1.56	3.21	9.31	0.47
T2	992.9296	Q=80	10	651.91	652.67	652.47	652.73	0.006152	1.98	5.04	10.84	0.51
T2	992.9296	Q=120	15	651.91	652.81	652.58	652.88	0.006413	2.27	6.62	12	0.54
T2	992.9296	Q=160	20	651.91	652.92	652.67	653.02	0.006574	2.48	8.06	12.97	0.55
T2	992.9296	Q=240	30	651.91	653.12	652.83	653.24	0.006592	2.78	10.78	14.63	0.57
T2	992.9296	Q=320	40	651.91	653.28	652.97	653.42	0.006421	3.04	13.18	15.79	0.58
T2	992.9296	Q=400	50	651.91	653.41	653.09	653.58	0.006236	3.27	15.38	16.67	0.58
T2	992.9296	Q=440	55	651.91	653.48	653.14	653.65	0.006063	3.37	16.49	17.05	0.58
T2	992.9296	Q=480	60	651.91	652.89	653.19	653.85	0.068838	7.86	7.63	12.69	1.79
T2	1066.659	Q=95.35	8.6	654.69	655.22	655.22	655.39	0.027071	3.28	2.62	8.06	1.01
T2	1066.659	Q=4	0.5	654.69	654.85	654.85	654.9	0.049499	1.75	0.29	3.55	1.09
T2	1066.659	Q=8	1	654.69	654.91	654.91	654.96	0.038419	1.89	0.53	4.83	1.01
T2	1066.659	Q=16	2	654.69	654.98	654.98	655.05	0.03319	2.21	0.9	5.87	0.99
T2	1066.659	Q=24	3	654.69	655.03	655.03	655.12	0.031051	2.48	1.21	6.32	1
T2	1066.659	Q=32	4	654.69	655.07	655.07	655.18	0.031213	2.72	1.47	6.67	1.02
T2	1066.659	Q=40	5	654.69	655.11	655.11	655.24	0.029262	2.86	1.75	7.04	1.01
T2	1066.659	Q=80	10	654.69	655.27	655.27	655.44	0.025623	3.36	2.97	8.44	1
T2	1066.659	Q=120	15	654.69	655.38	655.38	655.6	0.024664	3.73	4.02	9.48	1.01
T2	1066.659	Q=160	20	654.69	655.48	655.48	655.73	0.023806	4.01	4.99	10.28	1.01
T2	1066.659	Q=240	30	654.69	655.65	655.65	655.95	0.022309	4.41	6.81	11.56	1.01
T2	1066.659	Q=320	40	654.69	655.79	655.79	656.13	0.021532	4.72	8.48	12.62	1.01
T2	1066.659	Q=400	50	654.69	655.82	655.91	656.31	0.029741	5.64	8.86	12.85	1.2
T2	1066.659	Q=440	55	654.69	655.95	655.97	656.36	0.021688	5.17	10.64	13.87	1.04
T2	1066.659	Q=480	60	654.69	656.01	656.02	656.43	0.020547	5.19	11.56	14.37	1.02

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1139.289	Q=95.35	8.6	657.37	657.72	657.9	658.31	0.148907	6.14	1.4	6.03	2.25
T2	1139.289	Q=4	0.5	657.37	657.48	657.5	657.57	0.138318	2.33	0.21	3.76	1.72
T2	1139.289	Q=8	1	657.37	657.52	657.56	657.63	0.092651	2.62	0.38	4.15	1.52
T2	1139.289	Q=16	2	657.37	657.57	657.63	657.75	0.094936	3.34	0.6	4.62	1.63
T2	1139.289	Q=24	3	657.37	657.6	657.68	657.87	0.129222	4.22	0.71	4.84	1.94
T2	1139.289	Q=32	4	657.37	657.63	657.73	657.95	0.119243	4.5	0.89	5.17	1.92
T2	1139.289	Q=40	5	657.37	657.65	657.78	658.05	0.134147	5.03	0.99	5.36	2.06
T2	1139.289	Q=80	10	657.37	657.75	657.94	658.38	0.144338	6.35	1.57	6.3	2.24
T2	1139.289	Q=120	15	657.37	657.83	658.06	658.64	0.150737	7.26	2.07	6.99	2.35
T2	1139.289	Q=160	20	657.37	657.9	658.17	658.84	0.146302	7.79	2.57	7.64	2.37
T2	1139.289	Q=240	30	657.37	658.01	658.33	659.16	0.141811	8.61	3.48	8.69	2.4
T2	1139.289	Q=320	40	657.37	658.1	658.47	659.43	0.139959	9.26	4.32	9.55	2.43
T2	1139.289	Q=400	50	657.37	658.18	658.59	659.65	0.136265	9.74	5.13	10.32	2.43
T2	1139.289	Q=440	55	657.37	658.22	658.64	659.75	0.134466	9.94	5.53	10.68	2.43
T2	1139.289	Q=480	60	657.37	658.26	658.7	659.85	0.132015	10.13	5.92	10.94	2.43
T2	1192	Q=95.35	8.6	660.51	660.97	660.97	661.13	0.02655	3.14	2.74	8.85	1
T2	1192	Q=4	0.5	660.51	660.64	660.64	660.67	0.032304	1.31	0.38	5.37	0.86
T2	1192	Q=8	1	660.51	660.67	660.67	660.72	0.040335	1.8	0.56	5.7	1.02
T2	1192	Q=16	2	660.51	660.73	660.73	660.81	0.039128	2.26	0.88	6.28	1.06
T2	1192	Q=24	3	660.51	660.78	660.78	660.87	0.031542	2.41	1.25	6.86	1
T2	1192	Q=32	4	660.51	660.82	660.82	660.93	0.032555	2.67	1.5	7.23	1.03
T2	1192	Q=40	5	660.51	660.86	660.86	660.98	0.029852	2.78	1.8	7.66	1.01
T2	1192	Q=80	10	660.51	661.01	661.01	661.18	0.026562	3.29	3.04	9.2	1.01
T2	1192	Q=120	15	660.51	661.12	661.12	661.32	0.024411	3.6	4.16	10.28	1
T2	1192	Q=160	20	660.51	661.21	661.21	661.45	0.023712	3.91	5.12	10.95	1.01
T2	1192	Q=240	30	660.51	661.37	661.37	661.66	0.022232	4.32	6.94	12.13	1.01
T2	1192	Q=320	40	660.51	661.5	661.51	661.84	0.0213	4.64	8.63	13.11	1.01
T2	1192	Q=400	50	660.51	661.62	661.62	661.99	0.020597	4.92	10.17	13.79	1.01
T2	1192	Q=440	55	660.51	661.67	661.68	662.07	0.020319	5.04	10.92	14.1	1.01
T2	1192	Q=480	60	660.51	661.72	661.73	662.14	0.020066	5.15	11.65	14.41	1.01

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1259.899	Q=95.35	8.6	662.04	662.49	662.53	662.69	0.04135	3.62	2.38	8.69	1.22
T2	1259.899	Q=4	0.5	662.04	662.22	662.19	662.24	0.01749	1.12	0.45	4.98	0.66
T2	1259.899	Q=8	1	662.04	662.28	662.23	662.3	0.015118	1.29	0.78	6.31	0.65
T2	1259.899	Q=16	2	662.04	662.34	662.31	662.39	0.015382	1.63	1.22	7.06	0.69
T2	1259.899	Q=24	3	662.04	662.39	662.35	662.45	0.017677	1.95	1.54	7.54	0.76
T2	1259.899	Q=32	4	662.04	662.43	662.39	662.5	0.017239	2.11	1.89	8.04	0.77
T2	1259.899	Q=40	5	662.04	662.46	662.42	662.55	0.018507	2.32	2.15	8.4	0.81
T2	1259.899	Q=80	10	662.04	662.52	662.56	662.74	0.042684	3.83	2.61	8.99	1.25
T2	1259.899	Q=120	15	662.04	662.6	662.67	662.9	0.043844	4.42	3.39	9.58	1.31
T2	1259.899	Q=160	20	662.04	662.67	662.77	663.04	0.045377	4.91	4.07	10.05	1.36
T2	1259.899	Q=240	30	662.04	662.78	662.93	663.29	0.048806	5.73	5.24	10.81	1.45
T2	1259.899	Q=320	40	662.04	662.88	663.06	663.5	0.049748	6.31	6.34	11.49	1.5
T2	1259.899	Q=400	50	662.04	662.97	663.18	663.68	0.050121	6.77	7.39	12.1	1.53
T2	1259.899	Q=440	55	662.04	663.01	663.23	663.76	0.05029	6.97	7.89	12.38	1.54
T2	1259.899	Q=480	60	662.04	663.05	663.29	663.85	0.050432	7.16	8.38	12.65	1.55
T2	1323.272	Q=95.35	8.6	664.13	664.62	664.62	664.78	0.026716	3.17	2.71	8.71	1
T2	1323.272	Q=4	0.5	664.13	664.27	664.27	664.31	0.042585	1.51	0.33	4.62	0.99
T2	1323.272	Q=8	1	664.13	664.31	664.31	664.37	0.044372	1.9	0.53	5.39	1.07
T2	1323.272	Q=16	2	664.13	664.38	664.38	664.45	0.033698	2.19	0.91	6.11	1
T2	1323.272	Q=24	3	664.13	664.43	664.43	664.52	0.031605	2.44	1.23	6.64	1
T2	1323.272	Q=32	4	664.13	664.47	664.47	664.58	0.030719	2.65	1.51	7.08	1.01
T2	1323.272	Q=40	5	664.13	664.51	664.51	664.63	0.028861	2.77	1.8	7.51	1
T2	1323.272	Q=80	10	664.13	664.66	664.66	664.83	0.025947	3.28	3.05	9.11	1
T2	1323.272	Q=120	15	664.13	664.77	664.77	664.98	0.025113	3.64	4.12	10.22	1.01
T2	1323.272	Q=160	20	664.13	664.86	664.86	665.1	0.023897	3.93	5.09	10.87	1.01
T2	1323.272	Q=240	30	664.13	665.02	665.02	665.31	0.02207	4.33	6.93	11.99	1
T2	1323.272	Q=320	40	664.13	665.15	665.15	665.49	0.021377	4.67	8.57	12.92	1.01
T2	1323.272	Q=400	50	664.13	665.27	665.27	665.65	0.020704	4.94	10.13	13.7	1.01
T2	1323.272	Q=440	55	664.13	665.33	665.33	665.72	0.020273	5.04	10.9	14.02	1.01
T2	1323.272	Q=480	60	664.13	665.38	665.38	665.79	0.020082	5.16	11.62	14.32	1.01

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1388.66	Q=95.35	8.6	665.38	665.91	665.82	665.99	0.01336	2.33	3.69	11.24	0.72
T2	1388.66	Q=4	0.5	665.38	665.53	665.5	665.55	0.010627	0.91	0.55	5.71	0.52
T2	1388.66	Q=8	1	665.38	665.59		665.61	0.010331	1.13	0.88	6.52	0.54
T2	1388.66	Q=16	2	665.38	665.66	665.6	665.69	0.012022	1.48	1.35	7.52	0.61
T2	1388.66	Q=24	3	665.38	665.71	665.64	665.75	0.012566	1.69	1.77	8.31	0.65
T2	1388.66	Q=32	4	665.38	665.75	665.69	665.81	0.012665	1.84	2.17	8.99	0.66
T2	1388.66	Q=40	5	665.38	665.79	665.72	665.85	0.013077	1.99	2.52	9.55	0.68
T2	1388.66	Q=80	10	665.38	665.94		666.03	0.013599	2.44	4.1	11.76	0.73
T2	1388.66	Q=120	15	665.38	666.05	665.96	666.17	0.013571	2.77	5.41	12.82	0.75
T2	1388.66	Q=160	20	665.38	666.13		666.28	0.013974	3.08	6.49	13.38	0.78
T2	1388.66	Q=240	30	665.38	666.27	666.18	666.47	0.014358	3.55	8.45	14.35	0.81
T2	1388.66	Q=320	40	665.38	666.4	666.3	666.63	0.014088	3.86	10.35	15.23	0.83
T2	1388.66	Q=400	50	665.38	666.51	666.41	666.77	0.01418	4.15	12.05	15.97	0.84
T2	1388.66	Q=440	55	665.38	666.55	666.46	666.84	0.014506	4.31	12.77	16.28	0.86
T2	1388.66	Q=480	60	665.38	666.43	666.51	666.91	0.027992	5.55	10.81	15.43	1.17
T2	1458.658	Q=95.35	8.6	666.26	666.98	666.94	667.12	0.019373	3.03	2.84	7.58	0.87
T2	1458.658	Q=4	0.5	666.26	666.51		666.54	0.019752	1.47	0.34	2.76	0.73
T2	1458.658	Q=8	1	666.26	666.58	666.55	666.63	0.021349	1.79	0.56	3.53	0.8
T2	1458.658	Q=16	2	666.26	666.68	666.64	666.74	0.018884	2.04	0.98	4.68	0.78
T2	1458.658	Q=24	3	666.26	666.75	666.71	666.83	0.018644	2.24	1.34	5.46	0.8
T2	1458.658	Q=32	4	666.26	666.8	666.76	666.9	0.019025	2.43	1.65	6.06	0.82
T2	1458.658	Q=40	5	666.26	666.85	666.81	666.95	0.019038	2.58	1.93	6.49	0.83
T2	1458.658	Q=80	10	666.26	667.02	666.98	667.17	0.019238	3.16	3.17	7.93	0.88
T2	1458.658	Q=120	15	666.26	667.13	667.1	667.34	0.020497	3.65	4.11	8.64	0.93
T2	1458.658	Q=160	20	666.26	667.24	667.21	667.48	0.020617	3.99	5.02	9.28	0.95
T2	1458.658	Q=240	30	666.26	667.39	667.39	667.72	0.021659	4.56	6.58	10.28	1
T2	1458.658	Q=320	40	666.26	667.54	667.54	667.92	0.021121	4.9	8.16	11.2	1.01
T2	1458.658	Q=400	50	666.26	667.68	667.68	668.09	0.020339	5.15	9.72	12.05	1.01
T2	1458.658	Q=440	55	666.26	667.74	667.74	668.17	0.020115	5.26	10.45	12.43	1.01
T2	1458.658	Q=480	60	666.26	667.79	667.79	668.24	0.019863	5.36	11.19	12.79	1.01

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1525.701	Q=95.35	8.6	668.14	668.53	668.61	668.8	0.059174	4.16	2.07	8.01	1.44
T2	1525.701	Q=4	0.5	668.14	668.26	668.25	668.29	0.036007	1.43	0.35	4.7	0.92
T2	1525.701	Q=8	1	668.14	668.24	668.29	668.45	0.308235	3.65	0.27	4.49	2.6
T2	1525.701	Q=16	2	668.14	668.34	668.36	668.44	0.048448	2.5	0.8	5.75	1.18
T2	1525.701	Q=24	3	668.14	668.38	668.41	668.51	0.052609	2.92	1.03	6.22	1.27
T2	1525.701	Q=32	4	668.14	668.42	668.46	668.57	0.053019	3.2	1.25	6.64	1.3
T2	1525.701	Q=40	5	668.14	668.44	668.49	668.63	0.055071	3.47	1.44	6.99	1.34
T2	1525.701	Q=80	10	668.14	668.58	668.64	668.82	0.044584	3.93	2.55	8.71	1.28
T2	1525.701	Q=120	15	668.14	668.65	668.75	669.01	0.05809	4.84	3.1	9.46	1.49
T2	1525.701	Q=160	20	668.14	668.72	668.84	669.14	0.055345	5.14	3.89	10.43	1.48
T2	1525.701	Q=240	30	668.14	668.85	669	669.35	0.050976	5.67	5.29	11.51	1.47
T2	1525.701	Q=320	40	668.14	668.96	669.12	669.53	0.048397	6.08	6.58	12.37	1.47
T2	1525.701	Q=400	50	668.14	669.05	669.24	669.7	0.047157	6.47	7.72	12.95	1.48
T2	1525.701	Q=440	55	668.14	669.07	669.29	669.8	0.051201	6.86	8.02	13.1	1.55
T2	1525.701	Q=480	60	668.14	669.13	669.34	669.86	0.04778	6.89	8.71	13.43	1.51
T2	1580.077	Q=95.35	8.6	670.23	670.78	670.78	670.93	0.02767	3.16	2.72	9.04	1.01
T2	1580.077	Q=4	0.5	670.23	670.4	670.4	670.45	0.040352	1.67	0.3	3.44	1
T2	1580.077	Q=8	1	670.23	670.46	670.46	670.52	0.036767	1.92	0.52	4.54	1
T2	1580.077	Q=16	2	670.23	670.53	670.53	670.61	0.033358	2.22	0.9	5.83	1
T2	1580.077	Q=24	3	670.23	670.58	670.58	670.68	0.03126	2.45	1.23	6.54	1
T2	1580.077	Q=32	4	670.23	670.63	670.63	670.74	0.030764	2.64	1.51	7.1	1.01
T2	1580.077	Q=40	5	670.23	670.67	670.67	670.79	0.029559	2.78	1.8	7.63	1.01
T2	1580.077	Q=80	10	670.23	670.78	670.81	670.98	0.035205	3.6	2.78	9.09	1.15
T2	1580.077	Q=120	15	670.23	670.91	670.92	671.13	0.027583	3.75	4	10.19	1.06
T2	1580.077	Q=160	20	670.23	670.99	671.02	671.25	0.028545	4.14	4.83	10.88	1.1
T2	1580.077	Q=240	30	670.23	671.12	671.17	671.47	0.030259	4.77	6.3	11.99	1.16
T2	1580.077	Q=320	40	670.23	671.22	671.31	671.65	0.031491	5.25	7.62	12.92	1.2
T2	1580.077	Q=400	50	670.23	671.32	671.42	671.81	0.031714	5.61	8.92	13.77	1.23
T2	1580.077	Q=440	55	670.23	671.38	671.47	671.87	0.028776	5.61	9.81	14.22	1.18
T2	1580.077	Q=480	60	670.23	671.41	671.52	671.95	0.031078	5.93	10.13	14.37	1.24

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1639.996	Q=95.35	8.6	671.87	672.38	672.37	672.52	0.025706	3.04	2.83	9.42	0.98
T2	1639.996	Q=4	0.5	671.87	672.05	672.03	672.08	0.019597	1.21	0.41	4.47	0.7
T2	1639.996	Q=8	1	671.87	672.11	672.08	672.14	0.020945	1.48	0.68	5.73	0.76
T2	1639.996	Q=16	2	671.87	672.17	672.15	672.22	0.02227	1.81	1.1	7.21	0.81
T2	1639.996	Q=24	3	671.87	672.22	672.2	672.28	0.023399	2.09	1.44	7.86	0.86
T2	1639.996	Q=32	4	671.87	672.25	672.24	672.34	0.023255	2.29	1.75	8.29	0.88
T2	1639.996	Q=40	5	671.87	672.29	672.27	672.38	0.024004	2.49	2.01	8.58	0.91
T2	1639.996	Q=80	10	671.87	672.4	672.4	672.57	0.027011	3.24	3.08	9.67	1.01
T2	1639.996	Q=120	15	671.87	672.51	672.51	672.71	0.025307	3.59	4.17	10.66	1.01
T2	1639.996	Q=160	20	671.87	672.6	672.6	672.83	0.024519	3.87	5.16	11.48	1.02
T2	1639.996	Q=240	30	671.87	672.76	672.76	673.04	0.022694	4.24	7.07	12.93	1.01
T2	1639.996	Q=320	40	671.87	672.89	672.89	673.2	0.021656	4.53	8.83	14.13	1.01
T2	1639.996	Q=400	50	671.87	673	673	673.35	0.020967	4.76	10.49	15.18	1.01
T2	1639.996	Q=440	55	671.87	673.02	673.05	673.42	0.023121	5.07	10.85	15.4	1.06
T2	1639.996	Q=480	60	671.87	673.1	673.1	673.48	0.020816	5	12	16.05	1.02
T2	1688.42	Q=95.35	8.6	672.28	672.49	672.8	676.1	2.525	15.24	0.56	5.23	8.18
T2	1688.42	Q=4	0.5	672.28	672.34	672.44	674.86	10.80931	12.74	0.04	1.42	13.49
T2	1688.42	Q=8	1	672.28	672.36	672.49	674.26	4.65558	11.05	0.09	2.15	9.49
T2	1688.42	Q=16	2	672.28	672.39	672.55	675	4.483697	12.96	0.15	2.81	9.74
T2	1688.42	Q=24	3	672.28	672.41	672.6	675.32	3.961565	13.69	0.22	3.35	9.43
T2	1688.42	Q=32	4	672.28	672.43	672.65	675.53	3.558824	14.13	0.28	3.8	9.13
T2	1688.42	Q=40	5	672.28	672.44	672.68	675.69	3.258996	14.46	0.35	4.2	8.88
T2	1688.42	Q=80	10	672.28	672.51	672.83	676.19	2.245803	15.4	0.65	5.42	7.84
T2	1688.42	Q=120	15	672.28	672.56	672.94	676.49	1.68563	15.92	0.94	6.04	7.1
T2	1688.42	Q=160	20	672.28	672.6	673.04	676.74	1.399588	16.32	1.23	6.57	6.66
T2	1688.42	Q=240	30	672.28	672.68	673.19	677.12	1.097035	16.91	1.77	7.51	6.13
T2	1688.42	Q=320	40	672.28	672.75	673.31	677.39	0.923023	17.28	2.31	8.33	5.78
T2	1688.42	Q=400	50	672.28	672.81	673.43	677.59	0.808934	17.55	2.85	9.06	5.52
T2	1688.42	Q=440	55	672.28	672.84	673.48	677.68	0.763025	17.65	3.12	9.41	5.4
T2	1688.42	Q=480	60	672.28	672.87	673.53	677.8	0.732493	17.83	3.37	9.71	5.34

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
T2	1766.048	Q=95.35	8.6	678.83	679.24	679.24	679.37	0.027577	2.95	2.92	10.76	1
T2	1766.048	Q=4	0.5	678.83	678.93	678.93	678.96	0.03304	1.29	0.39	5.66	0.87
T2	1766.048	Q=8	1	678.83	678.96	678.96	679.01	0.042263	1.77	0.56	6.16	1.03
T2	1766.048	Q=16	2	678.83	679.02	679.02	679.09	0.035042	2.08	0.96	7.14	1
T2	1766.048	Q=24	3	678.83	679.07	679.07	679.15	0.0325	2.3	1.3	7.9	1
T2	1766.048	Q=32	4	678.83	679.1	679.1	679.2	0.031049	2.47	1.62	8.54	1
T2	1766.048	Q=40	5	678.83	679.14	679.14	679.24	0.030019	2.6	1.92	9.1	1
T2	1766.048	Q=80	10	678.83	679.27	679.27	679.42	0.027392	3.06	3.26	11.28	1
T2	1766.048	Q=120	15	678.83	679.37	679.37	679.55	0.0261	3.37	4.45	12.82	1.01
T2	1766.048	Q=160	20	678.83	679.45	679.45	679.65	0.025	3.62	5.53	13.92	1.01
T2	1766.048	Q=240	30	678.83	679.59	679.59	679.83	0.023152	3.95	7.6	15.81	1
T2	1766.048	Q=320	40	678.83	679.7	679.7	679.98	0.022221	4.21	9.49	17.35	1
T2	1766.048	Q=400	50	678.83	679.8	679.8	680.11	0.021537	4.43	11.29	18.71	1
T2	1766.048	Q=440	55	678.83	679.84	679.84	680.17	0.021428	4.56	12.06	19.45	1.01
T2	1766.048	Q=480	60	678.83	679.89	679.89	680.22	0.020654	4.64	12.96	20.33	1
Main3	2938.618	Q=95.35	27.9	626.38	627.34	627.34	627.69	0.035479	4.74	5.89	8.48	1
Main3	2938.618	Q=4	0.75	626.38	626.54	626.53	626.57	0.03312	1.39	0.54	4.82	0.73
Main3	2938.618	Q=8	1.5	626.38	626.62	626.58	626.66	0.025962	1.65	0.91	5.18	0.69
Main3	2938.618	Q=16	3	626.38	626.69	626.66	626.77	0.033499	2.28	1.31	5.54	0.83
Main3	2938.618	Q=24	4.5	626.38	626.75	626.73	626.87	0.039772	2.77	1.62	5.8	0.92
Main3	2938.618	Q=32	6	626.38	626.8	626.79	626.95	0.042697	3.12	1.92	6.05	0.98
Main3	2938.618	Q=40	7.5	626.38	626.84	626.84	627.02	0.043818	3.39	2.21	6.28	1.01
Main3	2938.618	Q=80	15	626.38	627.06	627.06	627.32	0.039053	4.05	3.71	7.34	1
Main3	2938.618	Q=120	22.5	626.38	627.23	627.23	627.55	0.037207	4.5	5	8.11	1.01
Main3	2938.618	Q=160	30	626.38	627.37	627.37	627.74	0.035627	4.85	6.18	8.59	1.01
Main3	2938.618	Q=240	45	626.38	627.61	627.61	628.06	0.033683	5.39	8.35	9.41	1.01
Main3	2938.618	Q=320	60	626.38	627.82	627.82	628.34	0.032178	5.78	10.38	10.12	1.01
Main3	2938.618	Q=400	75	626.38	628	628.01	628.58	0.031536	6.12	12.25	10.73	1.01
Main3	2938.618	Q=440	92.5	626.38	628.19	628.19	628.84	0.030693	6.44	14.36	11.39	1.01
Main3	2938.618	Q=480	90	626.38	628.17	628.17	628.8	0.030833	6.4	14.06	11.29	1.01

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	3050.464	Q=95.35	27.9	630.02	630.76	630.71	630.96	0.024388	3.67	7.77	15.02	0.83
Main3	3050.464	Q=4	0.75	630.02	630.14		630.16	0.022067	1.07	0.7	6.9	0.59
Main3	3050.464	Q=8	1.5	630.02	630.2		630.23	0.020337	1.3	1.15	7.88	0.6
Main3	3050.464	Q=16	3	630.02	630.28		630.32	0.021803	1.66	1.81	9.13	0.65
Main3	3050.464	Q=24	4.5	630.02	630.34		630.39	0.022428	1.89	2.39	10.09	0.68
Main3	3050.464	Q=32	6	630.02	630.39	630.32	630.45	0.022768	2.06	2.91	10.9	0.7
Main3	3050.464	Q=40	7.5	630.02	630.43	630.36	630.5	0.02321	2.21	3.39	11.58	0.72
Main3	3050.464	Q=80	15	630.02	630.58	630.51	630.71	0.024086	2.88	5.24	13.24	0.78
Main3	3050.464	Q=120	22.5	630.02	630.69	630.63	630.86	0.024163	3.38	6.78	14.35	0.81
Main3	3050.464	Q=160	30	630.02	630.78	630.73	631	0.024176	3.76	8.17	15.29	0.84
Main3	3050.464	Q=240	45	630.02	630.86	630.91	631.23	0.035473	4.93	9.41	16.07	1.03
Main3	3050.464	Q=320	60	630.02	630.96	631.06	631.43	0.038481	5.61	11.09	17.08	1.1
Main3	3050.464	Q=400	75	630.02	631.04	631.18	631.62	0.042816	6.29	12.42	17.84	1.18
Main3	3050.464	Q=440	92.5	630.02	631.11	631.32	631.84	0.048831	7.06	13.68	18.53	1.27
Main3	3050.464	Q=480	90	630.02	631.1	631.3	631.81	0.048087	6.96	13.5	18.43	1.26
Main3	3836.993	Q=95.35	27.9	647.68	648.4	648.4	648.67	0.016473	4.13	6.76	12.77	1
Main3	3836.993	Q=4	0.75	647.68	647.8	647.79	647.83	0.02289	1.39	0.54	6.72	0.87
Main3	3836.993	Q=8	1.5	647.68	647.85	647.83	647.89	0.024909	1.79	0.84	7.67	0.95
Main3	3836.993	Q=16	3	647.68	647.91	647.91	647.98	0.023112	2.15	1.4	9.15	0.97
Main3	3836.993	Q=24	4.5	647.68	647.96	647.96	648.05	0.022467	2.47	1.83	9.49	0.99
Main3	3836.993	Q=32	6	647.68	648	648	648.11	0.021543	2.7	2.23	9.8	1
Main3	3836.993	Q=40	7.5	647.68	648.04	648.04	648.17	0.02061	2.87	2.61	10.08	1
Main3	3836.993	Q=80	15	647.68	648.19	648.19	648.38	0.018524	3.51	4.27	11.23	1
Main3	3836.993	Q=120	22.5	647.68	648.32	648.32	648.56	0.017442	3.93	5.73	12.15	1.01
Main3	3836.993	Q=160	30	647.68	648.43	648.43	648.7	0.016629	4.23	7.08	12.95	1.01
Main3	3836.993	Q=240	45	647.68	648.61	648.61	648.95	0.015571	4.69	9.6	14.32	1.01
Main3	3836.993	Q=320	60	647.68	648.77	648.77	649.16	0.014784	5.04	11.91	15.6	1.01
Main3	3836.993	Q=400	75	647.68	648.9	648.9	649.34	0.013847	5.32	14.18	16.99	1
Main3	3836.993	Q=440	92.5	647.68	649.04	649.04	649.54	0.012862	5.65	16.62	18.12	0.98
Main3	3836.993	Q=480	90	647.68	649.02	649.02	649.51	0.012971	5.6	16.28	17.97	0.98

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main3	3915.821	Q=95.35	27.9	648.8	649.61	649.58	649.85	0.013799	3.88	7.19	13.07	0.92
Main3	3915.821	Q=4	0.75	648.8	648.98	648.95	649	0.01044	1.09	0.69	6.93	0.61
Main3	3915.821	Q=8	1.5	648.8	649.04	649	649.07	0.009895	1.32	1.14	8.16	0.62
Main3	3915.821	Q=16	3	648.8	649.11	649.07	649.16	0.010388	1.72	1.75	8.78	0.68
Main3	3915.821	Q=24	4.5	648.8	649.17	649.12	649.23	0.010668	1.99	2.26	9.27	0.71
Main3	3915.821	Q=32	6	648.8	649.22	649.16	649.29	0.010942	2.21	2.71	9.68	0.74
Main3	3915.821	Q=40	7.5	648.8	649.26	649.2	649.35	0.011241	2.4	3.12	10.04	0.76
Main3	3915.821	Q=80	15	648.8	649.42	649.37	649.57	0.012208	3.08	4.87	11.44	0.83
Main3	3915.821	Q=120	22.5	648.8	649.4	649.5	649.77	0.032325	4.88	4.61	11.24	1.34
Main3	3915.821	Q=160	30	648.8	649.64	649.6	649.89	0.013569	3.94	7.62	13.34	0.92
Main3	3915.821	Q=240	45	648.8	649.75	649.8	650.13	0.018572	4.95	9.08	14.26	1.09
Main3	3915.821	Q=320	60	648.8	649.86	649.94	650.35	0.021168	5.64	10.64	15.17	1.19
Main3	3915.821	Q=400	75	648.8	649.94	650.08	650.56	0.023823	6.31	11.89	15.86	1.27
Main3	3915.821	Q=440	92.5	648.8	650.03	650.22	650.78	0.025829	6.97	13.31	16.59	1.35
Main3	3915.821	Q=480	90	648.8	650.01	650.2	650.75	0.025677	6.89	13.1	16.48	1.34
Main3	4000.72	Q=95.35	27.9	650.1	650.94	650.94	651.22	0.016184	4.3	6.49	11.32	1
Main3	4000.72	Q=4	0.75	650.1	650.27	650.27	650.31	0.023124	1.47	0.51	5.88	0.88
Main3	4000.72	Q=8	1.5	650.1	650.32	650.31	650.37	0.026591	1.93	0.78	6.67	0.99
Main3	4000.72	Q=16	3	650.1	650.39	650.39	650.47	0.024489	2.35	1.28	7.61	1.01
Main3	4000.72	Q=24	4.5	650.1	650.46	650.46	650.55	0.017842	2.45	1.84	8.09	0.91
Main3	4000.72	Q=32	6	650.1	650.49	650.49	650.62	0.020784	2.85	2.11	8.32	1
Main3	4000.72	Q=40	7.5	650.1	650.53	650.53	650.68	0.021249	3.09	2.42	8.57	1.03
Main3	4000.72	Q=80	15	650.1	650.71	650.71	650.92	0.018199	3.69	4.06	9.77	1.01
Main3	4000.72	Q=120	22.5	650.1	650.85	650.85	651.11	0.017036	4.1	5.49	10.71	1.01
Main3	4000.72	Q=160	30	650.1	650.96	650.96	651.27	0.016343	4.41	6.8	11.5	1.01
Main3	4000.72	Q=240	45	650.1	651.16	651.16	651.53	0.014917	4.92	9.17	12.83	1
Main3	4000.72	Q=320	60	650.1	651.33	651.33	651.76	0.013389	5.33	11.41	14.01	0.98
Main3	4000.72	Q=400	75	650.1	651.48	651.48	651.97	0.012151	5.64	13.7	15.28	0.96
Main3	4000.72	Q=440	92.5	650.1	651.65	651.65	652.18	0.011127	5.94	16.34	16.63	0.94
Main3	4000.72	Q=480	90	650.1	651.63	651.63	652.15	0.011216	5.9	15.98	16.45	0.94

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	4131.901	Q=95.35	27.9	651.32	651.99	652.34	653.18	0.088806	8.76	3.18	6.71	2.24
Main3	4131.901	Q=4	0.75	651.32	651.56	651.5	651.58	0.005296	1.02	0.73	4.77	0.46
Main3	4131.901	Q=8	1.5	651.32	651.64	651.55	651.67	0.00514	1.29	1.16	5.16	0.48
Main3	4131.901	Q=16	3	651.32	651.76	651.64	651.81	0.005489	1.67	1.8	5.69	0.52
Main3	4131.901	Q=24	4.5	651.32	651.83	651.71	651.9	0.006653	2.03	2.21	6.02	0.59
Main3	4131.901	Q=32	6	651.32	651.65	651.77	652.05	0.078077	5.09	1.18	5.18	1.88
Main3	4131.901	Q=40	7.5	651.32	651.68	651.83	652.16	0.081895	5.58	1.34	5.32	1.96
Main3	4131.901	Q=80	15	651.32	651.81	652.06	652.63	0.090885	7.27	2.06	5.9	2.17
Main3	4131.901	Q=120	22.5	651.32	651.92	652.23	652.97	0.089388	8.22	2.74	6.4	2.21
Main3	4131.901	Q=160	30	651.32	652.01	652.38	653.25	0.088046	8.93	3.36	6.82	2.24
Main3	4131.901	Q=240	45	651.32	652.17	652.63	653.73	0.086751	10.03	4.49	7.54	2.29
Main3	4131.901	Q=320	60	651.32	652.29	652.82	654.2	0.0915	11.12	5.4	8.07	2.4
Main3	4131.901	Q=400	75	651.32	652.4	653	654.59	0.092185	11.88	6.31	8.57	2.44
Main3	4131.901	Q=440	92.5	651.32	652.51	653.19	655	0.093595	12.67	7.3	9.07	2.49
Main3	4131.901	Q=480	90	651.32	652.49	653.17	654.95	0.093803	12.59	7.15	9	2.49
Main3	4236.668	Q=95.35	27.9	655.12	656.21	656.21	656.57	0.016025	4.84	5.76	8.06	1.01
Main3	4236.668	Q=4	0.75	655.12	655.32	655.32	655.37	0.029401	1.84	0.41	4	1.01
Main3	4236.668	Q=8	1.5	655.12	655.38	655.38	655.46	0.024783	2.24	0.67	4.29	1
Main3	4236.668	Q=16	3	655.12	655.48	655.48	655.59	0.022239	2.74	1.09	4.72	1
Main3	4236.668	Q=24	4.5	655.12	655.55	655.55	655.7	0.020948	3.07	1.46	5.06	1.01
Main3	4236.668	Q=32	6	655.12	655.62	655.62	655.79	0.02015	3.33	1.8	5.36	1.01
Main3	4236.668	Q=40	7.5	655.12	655.68	655.68	655.87	0.019369	3.52	2.13	5.64	1.01
Main3	4236.668	Q=80	15	655.12	655.91	655.91	656.18	0.01719	4.16	3.61	6.73	1
Main3	4236.668	Q=120	22.5	655.12	656.09	656.09	656.42	0.016501	4.6	4.89	7.55	1.01
Main3	4236.668	Q=160	30	655.12	656.25	656.25	656.62	0.015881	4.92	6.09	8.25	1.01
Main3	4236.668	Q=240	45	655.12	656.49	656.49	656.95	0.014891	5.45	8.26	9.35	1.01
Main3	4236.668	Q=320	60	655.12	656.7	656.7	657.24	0.013212	5.89	10.3	10.29	0.98
Main3	4236.668	Q=400	75	655.12	656.89	656.89	657.49	0.012165	6.27	12.29	11.12	0.97
Main3	4236.668	Q=440	92.5	655.12	657.09	657.09	657.75	0.011057	6.59	14.68	12.16	0.95
Main3	4236.668	Q=480	90	655.12	657.07	657.07	657.72	0.011148	6.54	14.36	12.03	0.95

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main3	4346.191	Q=95.35	27.9	655.46	656.87	656.24	656.91	0.001145	1.72	16.53	17.8	0.3
Main3	4346.191	Q=4	0.75	655.46	655.74	655.61	655.74	0.00123	0.54	1.38	7.82	0.23
Main3	4346.191	Q=8	1.5	655.46	655.83	655.65	655.84	0.00127	0.68	2.21	9.25	0.24
Main3	4346.191	Q=16	3	655.46	655.97	655.73	655.98	0.001291	0.85	3.51	10.5	0.26
Main3	4346.191	Q=24	4.5	655.46	656.07	655.78	656.08	0.001305	0.97	4.63	11.46	0.27
Main3	4346.191	Q=32	6	655.46	656.15	655.83	656.17	0.00135	1.07	5.59	12.22	0.28
Main3	4346.191	Q=40	7.5	655.46	656.23	655.87	656.25	0.001311	1.14	6.61	12.99	0.28
Main3	4346.191	Q=80	15	655.46	656.52	656.03	656.55	0.001266	1.39	10.78	15.53	0.29
Main3	4346.191	Q=120	22.5	655.46	656.73	656.16	656.77	0.001189	1.6	14.19	16.82	0.29
Main3	4346.191	Q=160	30	655.46	656.92	656.27	656.96	0.001132	1.77	17.41	18.18	0.3
Main3	4346.191	Q=240	45	655.46	657.22	656.45	657.28	0.00108	2.03	23.32	20.55	0.3
Main3	4346.191	Q=320	60	655.46	657.49	656.6	657.56	0.00103	2.22	29.03	22.6	0.3
Main3	4346.191	Q=400	75	655.46	657.72	656.73	657.8	0.000989	2.38	34.56	24.45	0.3
Main3	4346.191	Q=440	92.5	655.46	657.97	656.87	658.06	0.000951	2.53	40.79	26.26	0.3
Main3	4346.191	Q=480	90	655.46	657.93	656.85	658.02	0.000956	2.51	39.92	26.02	0.3
Main3	4506.758	Q=95.35	27.9	659.71	660.58	660.58	660.92	0.015183	4.68	5.99	9.26	0.99
Main3	4506.758	Q=4	0.75	659.71	659.8	659.8	659.85	0.039047	1.84	0.41	4.94	1.13
Main3	4506.758	Q=8	1.5	659.71	659.86	659.86	659.93	0.026352	2.1	0.71	5.27	1.01
Main3	4506.758	Q=16	3	659.71	659.94	659.94	660.04	0.022773	2.57	1.17	5.72	1
Main3	4506.758	Q=24	4.5	659.71	660.01	660.01	660.13	0.021214	2.88	1.56	6.08	1
Main3	4506.758	Q=32	6	659.71	660.06	660.06	660.22	0.020392	3.13	1.92	6.39	1.01
Main3	4506.758	Q=40	7.5	659.71	660.12	660.12	660.29	0.019256	3.3	2.27	6.69	1
Main3	4506.758	Q=80	15	659.71	660.32	660.32	660.57	0.017667	3.98	3.77	7.82	1.01
Main3	4506.758	Q=120	22.5	659.71	660.49	660.49	660.79	0.016264	4.4	5.12	8.68	1
Main3	4506.758	Q=160	30	659.71	660.62	660.62	660.97	0.014908	4.79	6.31	9.47	0.99
Main3	4506.758	Q=240	45	659.71	660.86	660.86	661.29	0.012595	5.32	8.76	10.98	0.95
Main3	4506.758	Q=320	60	659.71	661.06	661.06	661.55	0.011287	5.72	11.13	12.14	0.93
Main3	4506.758	Q=400	75	659.71	661.24	661.24	661.78	0.010637	6.09	13.31	13.05	0.93
Main3	4506.758	Q=440	92.5	659.71	661.42	661.42	662.02	0.009953	6.43	15.84	14.04	0.92
Main3	4506.758	Q=480	90	659.71	661.4	661.4	661.99	0.010048	6.39	15.48	13.91	0.92

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	4601.489	Q=95.35	27.9	660.03	661.38	660.98	661.49	0.002945	2.6	10.87	12.34	0.46
Main3	4601.489	Q=4	0.75	660.03	660.38	660.25	660.39	0.002132	0.71	1.05	6	0.3
Main3	4601.489	Q=8	1.5	660.03	660.47	660.32	660.48	0.002461	0.9	1.68	7.56	0.34
Main3	4601.489	Q=16	3	660.03	660.59	660.4	660.61	0.002624	1.15	2.61	8.5	0.36
Main3	4601.489	Q=24	4.5	660.03	660.67	660.47	660.7	0.002702	1.34	3.37	8.9	0.38
Main3	4601.489	Q=32	6	660.03	660.75	660.52	660.78	0.002741	1.48	4.05	9.24	0.39
Main3	4601.489	Q=40	7.5	660.03	660.81	660.57	660.85	0.00283	1.61	4.65	9.54	0.41
Main3	4601.489	Q=80	15	660.03	661.08	660.74	661.14	0.002888	2.04	7.35	10.8	0.43
Main3	4601.489	Q=120	22.5	660.03	661.27	660.89	661.36	0.002897	2.38	9.52	11.78	0.45
Main3	4601.489	Q=160	30	660.03	661.43	661.01	661.54	0.00295	2.68	11.4	12.55	0.47
Main3	4601.489	Q=240	45	660.03	661.68	661.21	661.84	0.003036	3.16	14.81	13.85	0.49
Main3	4601.489	Q=320	60	660.03	661.9	661.39	662.09	0.003093	3.54	17.93	14.95	0.51
Main3	4601.489	Q=400	75	660.03	662.09	661.56	662.31	0.003134	3.86	20.88	16.02	0.52
Main3	4601.489	Q=440	92.5	660.03	662.29	661.74	662.54	0.00319	4.19	24.13	17.25	0.54
Main3	4601.489	Q=480	90	660.03	662.26	661.71	662.51	0.00318	4.14	23.68	17.09	0.54
Main3	4701.448	Q=95.35	13	662.91	663.42	663.43	663.62	0.021542	3.6	3.61	10.28	1.07
Main3	4701.448	Q=4	0.75	662.91	663.05	663.05	663.09	0.03781	1.72	0.44	5.79	1.1
Main3	4701.448	Q=8	1.5	662.91	663.1	663.1	663.16	0.027218	1.94	0.77	6.68	1
Main3	4701.448	Q=16	3	662.91	663.17	663.17	663.25	0.024247	2.31	1.3	7.87	1
Main3	4701.448	Q=24	4.5	662.91	663.23	663.23	663.33	0.022358	2.54	1.77	8.81	1
Main3	4701.448	Q=32	6	662.91	663.27	663.27	663.39	0.021857	2.77	2.16	9.23	1.01
Main3	4701.448	Q=40	7.5	662.91	663.31	663.31	663.45	0.020363	2.93	2.56	9.53	1
Main3	4701.448	Q=80	15	662.91	663.45	663.47	663.68	0.022725	3.84	3.9	10.48	1.11
Main3	4701.448	Q=120	22.5	662.91	663.55	663.6	663.86	0.024533	4.5	5	11.2	1.19
Main3	4701.448	Q=160	30	662.91	663.63	663.71	664.03	0.026134	5.08	5.91	11.73	1.25
Main3	4701.448	Q=240	45	662.91	663.77	663.9	664.32	0.027339	5.97	7.59	12.66	1.32
Main3	4701.448	Q=320	60	662.91	663.88	664.07	664.58	0.028055	6.73	9.04	13.41	1.38
Main3	4701.448	Q=400	75	662.91	663.99	664.22	664.8	0.02748	7.3	10.53	14.15	1.4
Main3	4701.448	Q=440	92.5	662.91	664.18	664.38	664.96	0.020024	7.17	13.48	15.5	1.23
Main3	4701.448	Q=480	90	662.91	664.09	664.35	665.01	0.026915	7.78	11.97	14.83	1.41

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	4838.243	Q=95.35	13	665.75	666.3	666.3	666.47	0.020993	3.47	4.1	12.54	0.94
Main3	4838.243	Q=4	0.75	665.75	665.95	665.92	665.97	0.013321	1.08	0.69	6.76	0.59
Main3	4838.243	Q=8	1.5	665.75	666	665.97	666.03	0.016657	1.46	1.04	7.94	0.69
Main3	4838.243	Q=16	3	665.75	666.07	666.04	666.12	0.018474	1.93	1.59	9.19	0.77
Main3	4838.243	Q=24	4.5	665.75	666.11	666.09	666.19	0.019928	2.31	2.03	9.85	0.83
Main3	4838.243	Q=32	6	665.75	666.15	666.14	666.25	0.020334	2.59	2.44	10.44	0.86
Main3	4838.243	Q=40	7.5	665.75	666.18	666.18	666.31	0.022068	2.89	2.76	10.88	0.91
Main3	4838.243	Q=80	15	665.75	666.34	666.34	666.52	0.020024	3.6	4.61	13.12	0.93
Main3	4838.243	Q=120	22.5	665.75	666.46	666.46	666.68	0.018553	4.05	6.31	14.77	0.93
Main3	4838.243	Q=160	30	665.75	666.56	666.56	666.82	0.017441	4.38	7.92	16.16	0.93
Main3	4838.243	Q=240	45	665.75	666.73	666.73	667.04	0.016204	4.89	10.91	18.47	0.93
Main3	4838.243	Q=320	60	665.75	666.88	666.88	667.23	0.015118	5.25	13.79	20.39	0.92
Main3	4838.243	Q=400	75	665.75	667	667	667.39	0.014818	5.61	16.33	21.75	0.93
Main3	4838.243	Q=440	92.5	665.75	667.03	667.13	667.57	0.020173	6.66	17	22.09	1.09
Main3	4838.243	Q=480	90	665.75	667.11	667.11	667.53	0.014461	5.89	18.8	22.99	0.93
Main3	4927.736	Q=95.35	13	667.41	667.89	668.02	668.33	0.080875	5.32	2.48	9.13	1.73
Main3	4927.736	Q=4	0.75	667.41	667.53	667.6	667.83	0.432503	4.36	0.17	2.78	3.09
Main3	4927.736	Q=8	1.5	667.41	667.69	667.68	667.74	0.021988	1.7	0.88	6.3	0.8
Main3	4927.736	Q=16	3	667.41	667.72	667.75	667.84	0.054146	2.83	1.06	6.9	1.27
Main3	4927.736	Q=24	4.5	667.41	667.76	667.81	667.93	0.059688	3.27	1.38	7.78	1.37
Main3	4927.736	Q=32	6	667.41	667.79	667.85	668.01	0.06608	3.72	1.61	8.21	1.47
Main3	4927.736	Q=40	7.5	667.41	667.82	667.89	668.08	0.069884	4.1	1.84	8.56	1.53
Main3	4927.736	Q=80	15	667.41	667.91	668.06	668.41	0.084639	5.71	2.67	9.3	1.79
Main3	4927.736	Q=120	22.5	667.41	668	668.2	668.66	0.082232	6.62	3.51	9.99	1.84
Main3	4927.736	Q=160	30	667.41	668.08	668.32	668.87	0.0776	7.25	4.33	10.62	1.84
Main3	4927.736	Q=240	45	667.41	668.22	668.52	669.19	0.069154	8.13	5.93	11.75	1.81
Main3	4927.736	Q=320	60	667.41	668.34	668.7	669.46	0.06337	8.79	7.45	12.73	1.79
Main3	4927.736	Q=400	75	667.41	668.45	668.84	669.68	0.059125	9.31	8.91	13.62	1.77
Main3	4927.736	Q=440	92.5	667.41	668.57	668.99	669.92	0.055836	9.84	10.55	14.53	1.76
Main3	4927.736	Q=480	90	667.41	668.56	668.97	669.89	0.056099	9.76	10.33	14.41	1.76

McCormick Ravine - Post-Development - Culvert Removed

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main3	4965.437	Q=95.35	13	669.08	669.6	669.6	669.78	0.021685	3.49	3.91	11.39	0.95
Main3	4965.437	Q=4	0.75	669.08	669.19	669.19	669.24	0.050577	1.77	0.42	5.33	1.1
Main3	4965.437	Q=8	1.5	669.08	669.25	669.25	669.31	0.036777	1.98	0.76	6.32	1.01
Main3	4965.437	Q=16	3	669.08	669.33	669.33	669.41	0.032867	2.34	1.28	7.62	1.01
Main3	4965.437	Q=24	4.5	669.08	669.38	669.38	669.49	0.030031	2.56	1.76	8.7	0.99
Main3	4965.437	Q=32	6	669.08	669.43	669.43	669.55	0.027427	2.79	2.17	9.31	0.98
Main3	4965.437	Q=40	7.5	669.08	669.47	669.47	669.61	0.026272	3	2.54	9.79	0.98
Main3	4965.437	Q=80	15	669.08	669.64	669.64	669.84	0.020337	3.61	4.41	11.93	0.94
Main3	4965.437	Q=120	22.5	669.08	669.77	669.77	670.01	0.018378	4.04	6.06	13.27	0.93
Main3	4965.437	Q=160	30	669.08	669.88	669.88	670.15	0.017476	4.41	7.52	14.13	0.93
Main3	4965.437	Q=240	45	669.08	670.06	670.06	670.4	0.01633	4.97	10.21	15.59	0.93
Main3	4965.437	Q=320	60	669.08	670.21	670.21	670.61	0.015493	5.39	12.73	16.85	0.93
Main3	4965.437	Q=400	75	669.08	670.35	670.35	670.79	0.014826	5.74	15.15	17.96	0.93
Main3	4965.437	Q=440	92.5	669.08	670.5	670.5	670.98	0.013965	6.04	17.96	19.12	0.92
Main3	4965.437	Q=480	90	669.08	670.48	670.48	670.95	0.014147	6.01	17.54	18.98	0.93

McCormick Ravine - Post-Development - 100yr24hr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	40.13637	100yr24h	161.2	579.96	581.62	581.62	582.2	0.025666	6.18	26.72	24.05	0.96
Main-1	117.9774	100yr24h	161.2	581.29	583.19	582.91	583.56	0.012521	4.93	33.85	25.91	0.7
Main-1	67.45072	100yr24h	119	585.2	586.52	586.71	587.27	0.024079	6.94	17.16	19.78	1.31
Main-1	163.866	100yr24h	119	587.46	588.9	588.9	589.37	0.019109	5.45	21.82	24.14	1.01
Main-1	269.0372	100yr24h	119	588.63	590.59	590.48	591.07	0.013951	5.57	21.37	17.75	0.89
Main-1	355.8186	100yr24h	119	589.27	591.52		591.65	0.003591	2.87	41.46	28.31	0.42
Main-1	424.0896	100yr24h	119	589.71	591.79		591.93	0.004587	3.06	38.93	28.66	0.46
Main-1	617.451	100yr24h	119	589.87	592.39	591.24	592.46	0.001732	2.1	56.56	35.18	0.29
Main-1	751.7308	100yr24h	99.99	591.99	593.49	593.49	594	0.013713	5.69	17.57	17.73	1.01
Main-1	885.8018	100yr24h	99.99	594.43	595.72	595.98	596.64	0.030636	7.7	12.99	15.24	1.47
Main-1	998.6823	100yr24h	99.99	597.59	598.93	598.93	599.38	0.019292	5.37	18.62	21.21	1.01
Main-1	1083.475	100yr24h	99.99	597.74	599.64	598.94	599.75	0.001716	2.7	38.27	29.19	0.39
Main-1	1180.775	100yr24h	99.99	598.58	599.84	599.84	600.24	0.014317	5.1	19.59	24.35	1
T1	116.1027	100yr24h	21.69	605.86	606.67	606.67	606.94	0.023059	4.19	5.18	9.76	1.01
T1	179.5178	100yr24h	21.69	605.86	607.28	606.67	607.33	0.002711	1.87	11.77	13.08	0.33
T1	279.4417	100yr24h	21.69	608.07	608.97	608.97	609.27	0.029138	4.37	4.98	8.7	1
T1	349.1169	100yr24h	21.69	609.57	610.58	610.45	610.75	0.016085	3.31	6.55	11.04	0.75
T1	413.2939	100yr24h	21.69	609.84	611.15	610.71	611.23	0.004234	2.39	9.45	11.7	0.42
T1	504.1011	100yr24h	21.69	612.9	613.8	613.83	614.13	0.026894	4.66	4.65	8.35	1.09
T1	590.9022	100yr24h	21.69	615.37	616.08	616.14	616.4	0.032039	4.5	4.82	10.54	1.17
T1	653.1824	100yr24h	21.69	617.59	618.21	618.41	618.85	0.074903	6.42	3.38	8.02	1.74
T1A	60.92559	100yr24h	6	624.31	624.82	624.9	625.11	0.16792	4.37	1.37	4.73	1.43
T1A	109.6149	100yr24h	6	630.05	630.47	630.47	630.67	0.082553	3.58	1.68	4.3	1.01
T1A	175.2342	100yr24h	6	634.87	635.21	635.36	635.73	0.409559	5.77	1.04	4.49	2.11
T1A	256.649	100yr24h	6	647.65	648.25	648.25	648.47	0.081696	3.78	1.59	3.62	1.01
T1A	318.1733	100yr24h	6	651.18	651.79	651.69	651.92	0.040436	2.84	2.11	4.4	0.72
T1A	361.2753	100yr24h	6	655.31	655.78	655.78	655.98	0.082604	3.6	1.67	4.18	1
T1B	744.3112	100yr24h	16.09	619.46	620.71		620.89	0.026194	3.4	4.73	4.9	0.61

McCormick Ravine - Post-Development - 100yr24hr

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
T1B	810.6002	100yr24h	16.09	621.61	623.03	622.55	623.19	0.021245	3.19	5.04	4.24	0.52
T1B	879.0649	100yr24h	16.09	622.29	623.52	623.05	623.6	0.002712	2.31	6.97	7.13	0.41
T1B	943.7003	100yr24h	16.09	625.83	626.45	626.69	627.28	0.073323	7.35	2.19	4.97	1.95
T1B	1005.909	100yr24h	16.09	628.45	629.25	629.3	629.67	0.022911	5.2	3.09	4.45	1.1
T1B	1072.597	100yr24h	10.7	630.99	631.43	631.65	632.19	0.096638	6.98	1.53	4.59	2.13
T1B	1142.837	100yr24h	10.7	633.9	634.53	634.53	634.79	0.018856	4.07	2.63	5.2	1.01
T1B	1240.974	100yr24h	10.7	637.25	637.59	637.82	638.5	0.17092	7.68	1.39	5.86	2.78
T1B	1317.998	100yr24h	10.7	641.58	642.19	642.22	642.53	0.024416	4.67	2.29	4.05	1.09
T1B	1379.684	100yr24h	10.7	643.68	644.23	644.41	644.81	0.057923	6.13	1.74	4.39	1.72
T1B	1420.161	100yr24h	10.7	645.4	646.07	646.07	646.35	0.025701	4.2	2.55	4.63	1
T1B	1484.14	100yr24h	10.7	645.59	646.7	646.18	646.75	0.002638	1.84	5.8	6.21	0.34
T1B	1530.33	100yr24h	10.7	647.44	648.03	648.03	648.29	0.026789	4.05	2.64	5.39	1.02
T1B	1572.278	100yr24h	10.7	647.84	648.78	648.54	648.92	0.009262	2.97	3.6	4.6	0.59
T1B	1613.01	100yr24h	10.7	647.86	649.06	648.48	649.12	0.002899	1.98	5.39	5.16	0.34
T1B	1664.997	100yr24h	10.7	649.99	650.67	650.67	650.93	0.025744	4.11	2.61	5.06	1.01
Main2	1312.838	100yr24h	76.8	599.52	600.69	600.86	601.44	0.022519	6.94	11.07	11.66	1.25
Main2	1403.425	100yr24h	76.8	601.26	602.52	602.52	603.05	0.014063	5.85	13.13	12.51	1.01
Main2	1460.474	100yr24h	76.8	601.41	603.26	602.74	603.47	0.004055	3.74	20.53	15.05	0.56
Main2	1529.53	100yr24h	76.8	601.87	602.66	603.05	603.98	0.067672	9.21	8.34	13.49	2.07
Main2	1682.002	100yr24h	76.8	605.68	607.48	607.48	608.12	0.014167	6.41	11.98	9.52	1.01
Main2	1780.912	100yr24h	76.8	607.35	608.75	608.89	609.51	0.020417	7	10.98	10.41	1.2
Main2	1860.551	100yr24h	76.8	608.67	610.29	610.41	611.04	0.018262	6.96	11.03	9.49	1.14
Main2	1941.272	100yr24h	76.8	609.94	611.72	611.72	612.34	0.014084	6.35	12.1	9.8	1.01
Main2	2038.465	100yr24h	76.8	611.2	612.93		613.25	0.006282	4.52	16.98	12.81	0.69
Main2	2125.413	100yr24h	76.8	611.59	613.55	613.47	614.23	0.018412	6.62	11.61	7.5	0.94
Main2	2235.308	100yr24h	76.8	613.04	615.03		615.25	0.005232	3.84	20.01	13.11	0.55
Main2	2330.407	100yr24h	76.8	614.22	615.65	615.63	616.2	0.018488	5.97	12.86	11.37	0.99
Main2	2401.954	100yr24h	76.8	614.98	616.75	616.37	617.06	0.007944	4.47	17.2	12.28	0.67
Main2	2500.483	100yr24h	76.8	617.24	618.84	618.84	619.49	0.019763	6.46	11.88	9.25	1.01
Main2	2652.687	100yr24h	76.8	619.11	621.21	620.8	621.65	0.010351	5.31	14.47	8.26	0.71
Main2	2702.534	100yr24h	76.8	619.26	621.76	620.62	621.88	0.002132	2.8	27.45	14.5	0.36

McCormick Ravine - Post-Development - 100yr24hr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main2	2753.631	.00yr24h	76.8	620.75	621.98	622.08	622.65	0.0254	6.58	11.66	11.4	1.15
T2	132.1173	.00yr24h	25.32	627.96	628.89	628.89	629.18	0.016765	4.27	5.93	10.7	1.01
T2	199.0991	.00yr24h	25.32	628.98	629.91	629.87	630.19	0.01399	4.29	5.9	9.03	0.94
T2	269.4769	.00yr24h	25.32	630.06	630.92	630.87	631.15	0.013158	3.84	6.59	11.68	0.9
T2	353.0578	.00yr24h	25.32	632.05	632.9	632.88	633.18	0.058078	4.21	6.02	9.85	0.95
T2	445.2593	.00yr24h	25.32	633.83	634.73	634.61	634.88	0.008958	3.15	8.03	14.42	0.74
T2	530.8471	.00yr24h	25.32	637.66	638.43	638.43	638.68	0.068867	4.02	6.3	12.82	1.01
T2	643.2175	.00yr24h	25.32	638.88	640.12	639.88	640.27	0.005882	3.1	8.16	10.7	0.63
T2	742.6647	.00yr24h	25.32	642.67	643.46	643.61	643.98	0.039187	5.8	4.36	9.42	1.5
T2	801.236	.00yr24h	25.32	646.21	646.73	647.01	647.75	0.110732	8.11	3.12	8.95	2.42
T2	844.97	.00yr24h	25.32	648.16	649.05	649.05	649.33	0.016593	4.28	5.91	10.56	1.01
T2	892.3795	.00yr24h	15	648.5	648.99	649.28	650.31	0.22932	9.23	1.63	6.63	3.28
T2	933.8324	.00yr24h	15	651.37	652.05	652.05	652.27	0.018278	3.76	3.99	9.31	1.01
T2	992.9296	.00yr24h	15	651.91	652.81	652.58	652.89	0.006316	2.25	6.66	12.03	0.53
T2	1066.659	.00yr24h	15	654.69	655.38	655.38	655.6	0.024664	3.73	4.02	9.48	1.01
T2	1139.289	.00yr24h	15	657.37	657.83	658.06	658.64	0.150737	7.26	2.07	6.99	2.35
T2	1192	.00yr24h	15	660.51	661.12	661.12	661.32	0.024411	3.6	4.16	10.28	1
T2	1259.899	.00yr24h	15	662.04	662.6	662.67	662.9	0.043844	4.42	3.39	9.58	1.31
T2	1323.272	.00yr24h	15	664.13	664.77	664.77	664.98	0.025113	3.64	4.12	10.22	1.01
T2	1388.66	.00yr24h	15	665.38	666.05	665.96	666.17	0.013571	2.77	5.41	12.82	0.75
T2	1458.658	.00yr24h	15	666.26	667.13	667.1	667.34	0.020497	3.65	4.11	8.64	0.93
T2	1525.701	.00yr24h	15	668.14	668.65	668.75	669.01	0.05809	4.84	3.1	9.46	1.49
T2	1580.077	.00yr24h	15	670.23	670.91	670.92	671.13	0.027583	3.75	4	10.19	1.06
T2	1639.996	.00yr24h	15	671.87	672.51	672.51	672.71	0.025307	3.59	4.17	10.66	1.01
T2	1688.42	.00yr24h	15	672.28	673.18	672.94	673.25	0.005923	2.16	6.94	12.88	0.52
T2	1733.616	.00yr24h	11.8	675.87	676.23	676.49	677.32	0.295073	8.37	1.41	6.4	3.14
T2	1766.048	.00yr24h	11.8	678.83	679.31	679.31	679.47	0.026828	3.18	3.71	11.9	1.01
Main3	2938.618	.00yr24h	33.5	626.38	627.43	627.43	627.82	0.035058	5	6.71	8.8	1.01
Main3	3050.464	.00yr24h	33.5	630.02	630.82	630.78	631.05	0.024171	3.92	8.79	15.68	0.84
Main3	3443.73		Culvert									

McCormick Ravine - Post-Development - 100yr24hr

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main3	3836.993	100yr24h	33.5	647.68	651.48	648.47	651.48	0.00002	0.5	76.63	29.81	0.05
Main3	3915.821	100yr24h	29.5	648.8	651.48		651.49	0.000071	0.71	46	28.02	0.08
Main3	4000.72	100yr24h	29.5	650.1	651.44	650.95	651.53	0.002124	2.31	13.14	14.97	0.4
Main3	4131.901	100yr24h	29.5	651.32	652.01	652.37	653.23	0.087891	8.88	3.32	6.8	2.24
Main3	4236.668	100yr24h	29.5	655.12	656.24	656.24	656.61	0.015886	4.9	6.02	8.21	1.01
Main3	4346.191	100yr24h	29.5	655.46	656.91	656.27	656.95	0.001132	1.76	17.21	18.1	0.3
Main3	4506.758	100yr24h	29.5	659.71	660.61	660.61	660.96	0.014752	4.74	6.27	9.44	0.98
Main3	4601.489	100yr24h	29.5	660.03	661.41	661	661.52	0.002964	2.67	11.25	12.5	0.47
Main3	4701.448	100yr24h	29.5	662.91	663.63	663.71	664.02	0.025355	5	5.9	11.73	1.23
Main3	4838.243	100yr24h	28.69	665.75	666.55	666.55	666.8	0.017565	4.32	7.66	15.94	0.93
Main3	4927.736	100yr24h	28.69	667.41	668.06	668.3	668.83	0.078454	7.15	4.19	10.51	1.84
Main3	4965.437	100yr24h	28.69	669.08	669.86	669.86	670.13	0.01762	4.35	7.27	13.99	0.93

Janes Ravine - Post-Development - 100yr24hr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-2	275.2498	.00yr24h	50.1	587.72	588.82	588.82	589.32	0.036187	5.72	8.76	8.72	1.01
Main-2	371.9637	.00yr24h	50.1	589.33	591	590.59	591.26	0.012439	4.06	12.35	9.44	0.62
T1	181.0388	.00yr24h	14.9	598.08	598.79	598.79	599.01	0.041775	3.83	3.89	8.98	1.02
T1	285.9061	.00yr24h	14.9	602.56	603.21	603.25	603.48	0.050058	4.12	3.62	8.53	1.12
T1	381.2896	.00yr24h	14.9	606.32	607.06	607.06	607.28	0.040968	3.77	3.95	9.17	1.01
T1	478.169	.00yr24h	14.9	610.46	611.11	611.19	611.45	0.074994	4.71	3.16	8.26	1.34
T1	589.8321	.00yr24h	14.9	616.67	617.43	617.44	617.67	0.042611	3.94	3.78	8.41	1.04
T1	696.9404	.00yr24h	14.9	623.05	623.61	623.71	623.98	0.085833	4.91	3.04	8.28	1.43
T1	761.1885	.00yr24h	14.9	626.79	627.42	627.42	627.65	0.040364	3.81	3.91	8.84	1.01
T1	870.2839	.00yr24h	14.9	631.25	631.79	631.92	632.21	0.118711	5.24	2.85	9.2	1.65
T1	938.0349	.00yr24h	14.9	635.84	636.49	636.49	636.7	0.041707	3.64	4.1	10.31	1.01
T1	1017.8	.00yr24h	14.9	636.49	637.61	637.24	637.68	0.005714	2.15	7.16	10.7	0.42
T1	1141.493	.00yr24h	14.9	642.89	643.55	643.55	643.76	0.037727	3.73	4.07	10.03	0.98
T1	1239.776	.00yr24h	14.9	643.85	644.78	644.46	644.84	0.005043	1.98	7.99	13.28	0.4
T1	1369.564	.00yr24h	14.9	649.15	649.67	649.67	649.85	0.038065	3.39	4.49	13.36	0.97
T1	1533.785	.00yr24h	14.9	652.78	653.42	653.3	653.51	0.014687	2.45	6.24	14.89	0.62
T1	1636.531	.00yr24h	14.9	655.86	656.32	656.32	656.46	0.032356	3.27	4.95	16.88	0.9
T1	1702.895	.00yr24h	14.9	656.02	656.95	656.6	656.99	0.003424	1.68	9.72	17.05	0.33
T2	509.5519	.00yr24h	26.3	592.61	593.43		593.67	0.042308	3.95	6.66	8.83	0.8
T2	607.4537	.00yr24h	26.3	593.15	594.51	594.03	594.56	0.003742	1.71	16.02	22.03	0.27
T2	731.9712	.00yr24h	26.3	595.47	596.36	596.36	596.61	0.037728	4.09	6.66	13.74	0.8
T2	827.6824	.00yr24h	26.3	598.3	599.22		599.34	0.022158	2.71	9.73	15.74	0.6
T2	950.5703	.00yr24h	26.3	598.98	600.33	599.71	600.37	0.004283	1.56	16.98	18.99	0.28
T2	1061.56	.00yr24h	26.3	600.95	601.73	601.73	601.97	0.067419	3.95	6.65	13.69	1
T2	1216.334	.00yr24h	26.3	602.2	603.65	603.05	603.68	0.004245	1.39	19.15	26.94	0.27
T2	1295.347	.00yr24h	26.3	603.89	604.55	604.55	604.76	0.071777	3.69	7.13	17.12	1.01
T2	1394.651	.00yr24h	26.3	606.2	607.32	606.98	607.4	0.013644	2.32	11.33	15.54	0.48
T2	1530.396	.00yr24h	26.3	609.88	610.75	610.75	611.02	0.067285	4.21	6.25	11.63	1.01
T2	1543.127	.00yr24h	26.3	610.07	611.32		611.44	0.019088	2.86	9.18	11.65	0.57
T2	1626.466	.00yr24h	26.3	610.25	611.92	611.13	611.96	0.002954	1.56	17.03	15.76	0.24
T2	1737.211	.00yr24h	26.3	612.73	613.7	613.7	614.01	0.066045	4.5	5.85	9.56	1.01

Janes Ravine - Post-Development - 100yr24hr

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
T2	1820.971	.00yr24h	26.3	613.49	614.91		614.95	0.004254	1.59	16.68	18.18	0.28
T2	1942.739	.00yr24h	26.3	614.89	615.92		616.16	0.035633	3.93	6.8	9.81	0.79
T2	1997.813	.00yr24h	26.3	615.31	616.7	616.11	616.75	0.004815	1.82	14.66	15.7	0.31
T2	2072.624	.00yr24h	26.3	618.23	619.26	619.26	619.58	0.054918	4.51	5.91	9.81	0.95
T2	2163.506	.00yr24h	26.3	619.95	621.22	620.77	621.29	0.009181	2.1	12.54	15.07	0.4
T2	2258.038	.00yr24h	26.3	622.01	622.98	622.98	623.28	0.050145	4.48	6	10.09	0.92
T2	2368.82	.00yr24h	26.3	626.05	627		627.14	0.025632	3.05	8.71	13.92	0.65
T2	2451.901	.00yr24h	26.3	627	628.4		628.52	0.011586	2.78	9.71	10.75	0.46
T2	2526.197	.00yr24h	26.3	627.27	628.78	627.96	628.8	0.001803	1.2	22.31	22	0.19
T2	2628.187	.00yr24h	26.3	631.37	632.27	632.27	632.55	0.051574	4.31	6.22	11.31	0.92
T2	2778.977	.00yr24h	26.3	634.19	635.46		635.55	0.010362	2.41	11.01	12.78	0.43
T2	2908.227	.00yr24h	26.3	634.23	636.1		636.13	0.002529	1.5	17.62	15.34	0.23
T2	3036.213	.00yr24h	26.3	635.78	636.81		636.96	0.031278	3.19	8.24	13.04	0.71
T2	3146.448	.00yr24h	26.3	637.4	638.69		638.76	0.009917	2.11	12.46	15.47	0.41
T2	3251.178	.00yr24h	26.3	639.67	640.57	640.52	640.86	0.054186	4.27	6.15	8.8	0.9
T2	3331.656	.00yr24h	26.3	640.14	641.62	640.95	641.66	0.003972	1.72	15.49	15.99	0.28
T2	3442.407	.00yr24h	26.3	643.48	644.14	644.14	644.36	0.069375	3.74	7.06	17.05	1
T2	3578.809	.00yr24h	26.3	646.15	647.36	646.97	647.45	0.011014	2.39	11.14	13.74	0.45
T2	3648.852	.00yr24h	26.3	647.89	648.7	648.66	648.93	0.050733	3.84	6.89	12.65	0.89
T2	3759.27	.00yr24h	26.3	650.15	651.32	651.03	651.44	0.01351	2.76	9.56	12.86	0.5
T2	3960.516	.00yr24h	26.3	653.37	654.39		654.51	0.017629	2.78	9.63	14.42	0.55
T2	4078.035	.00yr24h	26.3	656.15	657.18	657.13	657.42	0.036577	4	6.77	11.34	0.8
T2	4182.388	.00yr24h	26.3	658.43	659.61	659.34	659.74	0.015145	2.92	9.19	12.15	0.53

MacArthur Ravine - Post-Development - 100yr24hr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
MacArthur	42.173	100yr24hr	5.2	593.26	593.51	593.51	593.6	0.067212	2.41	2.25	13.87	0.99
MacArthur	106.4246	100yr24hr	5.2	599.06	599.32	599.4	599.57	0.194955	3.97	1.31	7.37	1.66
MacArthur	150.1035	100yr24hr	5.2	604.53	604.9	604.92	605.04	0.08702	3.02	1.74	8.44	1.15
MacArthur	171.3999	100yr24hr	5.2	608.14	608.44	608.59	609.04	0.584544	6.18	0.84	5.56	2.8
MacArthur	222.8917	100yr24hr	5.2	615.94	616.35	616.36	616.48	0.063448	2.87	1.85	7.85	1.01
MacArthur	284.8037	100yr24hr	5.2	620.46	620.78	620.8	620.92	0.082059	3.12	1.73	7.93	1.13
MacArthur	342.5417	100yr24hr	5.2	624.41	624.9	624.9	625.04	0.063416	2.98	1.75	6.71	1.01
MacArthur	404.1473	100yr24hr	5.2	628.08	628.47	628.46	628.56	0.051924	2.49	2.09	8.98	0.9
MacArthur	453.7274	100yr24hr	5.2	629.79	630.22	630.13	630.27	0.024121	1.81	2.87	10.99	0.62
MacArthur	500.0295	100yr24hr	5.2	633.11	633.53	633.53	633.65	0.059545	2.8	1.89	7.85	0.98

Scotts Ravine - Post-Development - 100yr24hr (In-Ravine Pipe)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	14.19694	avine Pip	84.5	581.06	581.82	581.91	582.21	0.038846	5.2	17.05	35.99	1.08
Main-1	136.1487	avine Pip	52.5	591.06	591.86	592.47	594.66	0.45022	13.44	3.9	7.84	3.36
T1	89.92623	avine Pip	42	613.28	613.76	614.29	616.72	0.694213	13.81	3.04	8.45	4.05
T1	110.6536	avine Pip	42	617.32	618.33	618.33	618.67	0.02988	4.73	9.04	13.62	0.95
Main-2	369.6301	avine Pip	10.5	617.26	617.5	617.56	617.78	0.198732	4.53	2.6	28.5	1.93
Main-2	395.513*	avine Pip	10.5	618.43	618.71	618.74	618.83	0.063154	2.99	3.86	29.55	1.13
Main-2	421.396*	avine Pip	10.5	619.6	619.91	619.92	619.99	0.033314	2.38	4.75	30.33	0.84
Main-2	447.280*	avine Pip	10.5	620.77	621.05	621.08	621.17	0.064413	3.03	3.82	29.17	1.14
Main-2	473.163*	avine Pip	10.5	621.95	622.26	622.27	622.34	0.032556	2.36	4.78	30.25	0.83
Main-2	499.046*	avine Pip	10.5	623.12	623.4	623.43	623.53	0.067293	3.08	3.78	29.75	1.17
Main-2	524.9301	avine Pip	10.5	624.29	624.6	624.6	624.68	0.031255	2.31	4.87	30.97	0.82
Main-2	632.7556	avine Pip	10.5	627.91	628.22	628.24	628.33	0.043842	2.78	4.04	24.71	0.97
Main-2	731.4028	avine Pip	10.5	631.26	631.6	631.6	631.68	0.027033	2.33	4.66	24.06	0.77
Main-2	847.8009	avine Pip	10.5	635.57	635.85	635.89	635.97	0.062572	2.98	3.92	31.1	1.13
Main-2	940.9814	avine Pip	10.5	639.65	639.96	639.96	640.03	0.032147	2.26	4.95	32.37	0.82
Main-2	1022.328	avine Pip	10.5	641.28	641.63	641.6	641.67	0.014015	1.69	6.56	37.79	0.56

Scotts Ravine - Post-Development - Ravine Only

Reach	**River Sta**	**Profile**	**Q Total (cfs)**	**Min Ch El (ft)**	**W.S. Elev (ft)**	**Crit W.S. (ft)**	**E.G. Elev (ft)**	**E.G. Slope (ft/ft)**	**Vel Chnl (ft/s)**	**Flow Area (sq ft)**	**Top Width (ft)**	**Froude # Chl**
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main-1	14.19694	Ravine Flows Onl	6.75	581.06	581.28	581.31	581.4	0.07677	2.79	2.47	17.29	1.2
Main-1	136.1487	Ravine Flows Onl	6.75	591.06	591.46	591.47	591.59	0.050379	2.87	2.35	9.68	1.03
Main-1	215.235	Ravine Flows Onl	6.75	597.69	598.06	598.17	598.4	0.174807	4.69	1.44	7.24	1.85
T1	89.92623	Ravine Flows Onl	0.1	613.28	613.31	613.31	613.32	0.104643	0.89	0.11	4.68	1.01
T1	110.6536	Ravine Flows Onl	0.1	617.32	617.4	617.4	617.41	0.036158	0.74	0.14	3.33	0.65
Main-2	369.6301	Ravine Flows Onl	5	611.96	612.35	612.35	612.47	0.047559	2.77	1.8	7.49	1
Main-2	395.513*	Ravine Flows Onl	5	613.13	613.53	613.52	613.64	0.043312	2.69	1.86	7.52	0.95
Main-2	421.396*	Ravine Flows Onl	5	614.3	614.69	614.68	614.81	0.047503	2.79	1.8	7.4	1
Main-2	447.280*	Ravine Flows Onl	5	615.47	615.86	615.85	615.97	0.043145	2.7	1.85	7.44	0.95
Main-2	473.163*	Ravine Flows Onl	5	616.65	617.02	617.02	617.14	0.047249	2.78	1.8	7.38	0.99
Main-2	499.046*	Ravine Flows Onl	5	617.82	618.2	618.19	618.31	0.043597	2.71	1.84	7.42	0.96
Main-2	524.9301	Ravine Flows Onl	5	618.99	619.36	619.35	619.48	0.046705	2.78	1.8	7.34	0.99
Main-2	632.7556	Ravine Flows Onl	5	622.61	623.12	623.06	623.2	0.026533	2.25	2.22	8.12	0.76
Main-2	731.4028	Ravine Flows Onl	5	625.96	626.43	626.43	626.56	0.045298	2.89	1.73	6.44	0.99
Main-2	847.8009	Ravine Flows Onl	5	630.27	630.64	630.59	630.73	0.028861	2.38	2.1	7.56	0.79
Main-2	940.9814	Ravine Flows Onl	5	634.35	634.75	634.75	634.88	0.048192	2.87	1.74	6.95	1.01
Main-2	1022.328	Ravine Flows Onl	5	635.98	636.54	636.41	636.58	0.011662	1.66	3.02	9.59	0.52

Van Horne Ravine - Post-Development - 100yr24hr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	0.001	100yr24hr	25	584.69	585.18	585.18	585.35	0.043937	3.26	7.67	23.69	1.01
Main	30		Culvert									
Main	61.61042	100yr24hr	25	615.39	619.13	616.06	619.14	0.000101	0.61	44.48	26.92	0.06
Main	194.3417	100yr24hr	25	617.4	619.15		619.17	0.000662	1.05	23.78	16.15	0.15
Main	370.6444	100yr24hr	25	617.9	619.33	618.58	619.37	0.002091	1.6	15.6	12.6	0.25
Main	524.7333	100yr24hr	25	621.78	622.57	622.57	622.83	0.038232	4.03	6.21	12.46	1.01
Main	659.5291	100yr24hr	25	625.69	626.58	626.49	626.78	0.023077	3.5	7.14	12.04	0.8
Main	876.4223	100yr24hr	25	631.21	632.05		632.23	0.027565	3.4	7.37	13.17	0.79
Main	1063.56	100yr24hr	25	634.21	635.42	635.12	635.54	0.012284	2.83	8.87	11.35	0.55

Schenck Ravine - Post-Development - 100yr24hr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	50.9263	100yr24hr	12.2	586.6	586.91	587.2	588.51	1.558384	10.13	1.2	6.37	4.11
Main	192.4857	100yr24hr	12.2	605.8	606.35	606.35	606.54	0.042963	3.43	3.56	9.95	1.01
Main	269.8349	100yr24hr	12.2	607.97	608.65		608.76	0.02049	2.67	4.59	11.08	0.72
Main	367.8869	100yr24hr	12.2	609.97	610.73		610.9	0.023249	3.4	3.59	5.37	0.73
Main	481.9059	100yr24hr	12.2	611.93	612.91	612.63	613.07	0.015784	3.14	3.89	4.25	0.58
Main	571.6713	100yr24hr	12.2	615.06	615.74	615.74	616.06	0.049158	4.54	2.69	4.24	1
Main	699.0435	100yr24hr	12.2	619.88	620.68	620.64	620.91	0.030192	3.93	3.28	6.56	0.83
Main	796.7723	100yr24hr	12.2	623.43	624.14	624.2	624.47	0.046196	4.73	2.73	5.91	1
Main	914.2125	100yr24hr	12.2	627.43	628.18	628.18	628.36	0.024795	3.65	3.91	11.63	0.75
Main	1004.907	100yr24hr	12.2	629.78	630.4	630.35	630.54	0.023346	3.05	4.18	10.44	0.78
Main	1120.9	100yr24hr	12.2	633.68	634.21	634.21	634.39	0.041912	3.4	3.61	10.43	1
Main	1227.28	100yr24hr	12.2	636.08	636.75	636.6	636.83	0.014398	2.28	5.38	12.8	0.61
Main	1316.166	100yr24hr	12.2	638.01	638.62	638.6	638.78	0.036479	3.22	3.79	10.37	0.94
Main	1381.339	100yr24hr	12.2	639.72	640.38	640.29	640.5	0.019684	2.87	4.48	10.87	0.72
Main	1454.166	100yr24hr	12.2	642.73	643.17	643.17	643.32	0.041694	3.1	3.98	13.68	0.98

Appendix J.

HEC-RAS WATER SURFACE PROFILES

McCormick/Janes Ravines
Scotts Ravine
Schenck Ravine

Appendix K.

RECOMMENDED PLAN DESIGN CALCULATION SHEETS

McCormick/Janes Ravine
Scotts/Hutchinson Ravine
Bartlett Ravine
Schenck Ravine
Coastal

US Army Corps of Engineers Chicago District	PROJECT TITLE: Fort Sheridan 506	COMPUTED BY: JAF	DATE:	SHEET: 1 of 3	
	STRUCTURE TITLE: McCormick Ravine	CHECKED BY:	DATE:	CONTRACT NO:	

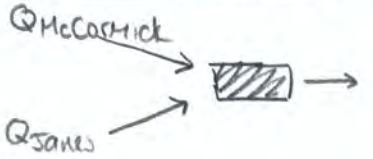
Option #4: No Attenuation, Stabilize Approaches to Mouth

* After site visit on 01DEC2011, observed extreme downcutting in Janes Ravine and increased downcutting in McCormick Ravine.

* Mouth of Janes Ravine originally perched behind the failed junction box. It eventually flanked the structure, allowing the ravine to seek a stable grade. To prevent this process from undermining the existing restoration work, will place riffles from the confluence upstream 210 feet

* Remaining 30" pipe & structures in McCormick are preventing some downcutting but are also conveying some of the runoff/groundwater flow despite numerous breaks. After removing the structures in the confluence, the 30" pipes are broken & the channel is graded from the confluence upstream 596 feet. Riffles will be used to prevent further downcutting.

Estimated Discharges



$Q_{McCormick} = 119.0$ cfs
$Q_{Janes} = 50.1$ cfs
} peak velocities along each reach

Riffles in McCormick

* Terminate project just D/S of sewer outfall at cul-de-sac (XS 617.451 in HEC-RAS Model)
* Elevation drop = 590.11 − 580.88 ≈ 9.2 ft

$$S_o = \frac{9.2\text{ ft}}{596\text{ ft}} = 0.0155$$

* Use results from HEC-RAS model to estimate stable S_f given flowrate.

$$S_f = \frac{0.44\text{ ft}}{67.92\text{ ft}} = 0.0065$$

$$H = (0.0155 - 0.0065)(596\text{ ft}) = 5.364\text{ ft}$$

$$\frac{H}{h} = \frac{5.364\text{ ft}}{1\text{ ft}} = 5.36 \rightarrow \text{use (6) 1 ft structures}$$

US Army Corps of Engineers Chicago District	PROJECT TITLE: Fort Sheridan 506	COMPUTED BY: JAF	DATE:	SHEET: 2 of 3	
	STRUCTURE TITLE: McCormick Ravine	CHECKED BY:	DATE:	CONTRACT NO:	

* Estimate Stone Size

$V_d = 1.2V = 1.2(8\,ft/s) = 9.6\,ft/s$

$C = (2)(0.375)(1.0)(1.0)(2.0) = 1.5$

$$D_{30} = (1.5)\left[(0.78)\left(\frac{9.6\,ft/s}{\sqrt{(1)(32.2\,ft/s^2)(2\,ft)}}\right)\right]^{2.5} = 1.26\,ft$$

* Estimate spacing

$$\text{spacing} = \frac{596\,ft}{6} = 99\,ft$$

Riffles in Janes Ravine

* Terminate project just D/S of downcutting in tributary
* Elevation drop = 593.15 − 580.89 ≈ 12.3 ft

$$S_o = \frac{12.3\,ft}{210\,ft} = 0.059$$

* Use results from HEC-RAS model to estimate stable S_f given flowrate.

$$S_f = \frac{0.56\,ft}{98.45\,ft} = 0.01$$

$H = (0.059 - 0.01)(210\,ft) = 10.29\,ft$

$\frac{H}{h} = \frac{10.29\,ft}{1\,ft} = 10.29 \rightarrow$ Use (11) 1 ft structures

* Estimate stone size

$V_d = 1.2V = 1.2(5.3\,ft/s) = 6.4\,ft/s$

$C = (2)(0.375)(1.0)(1.0)(1.4\,ft) = 1.05$

$$D_{30} = (1.05)\left[(0.78)\left(\frac{6.4\,ft/s}{\sqrt{(1)(32.2\,ft/s^2)(1.4\,ft)}}\right)\right]^{2.5} = 0.5\,ft$$

* Estimate spacing

$$\text{spacing} = \frac{210\,ft}{11} = 19\,ft$$

US Army Corps of Engineers Chicago District	PROJECT TITLE: Fort Sheridan 506	COMPUTED BY: JAF	DATE:	SHEET: 3 of 3	
	STRUCTURE TITLE: McCormick Ravine	CHECKED BY:	DATE:	CONTRACT NO:	

Provide Plunge Pool at Confluence

* Use plunge pool to provide mechanism to combine flows from two ravines & change direction of flow from Jones Ravine

Approximate approach conditions:

$V_o = 8\,ft/s$

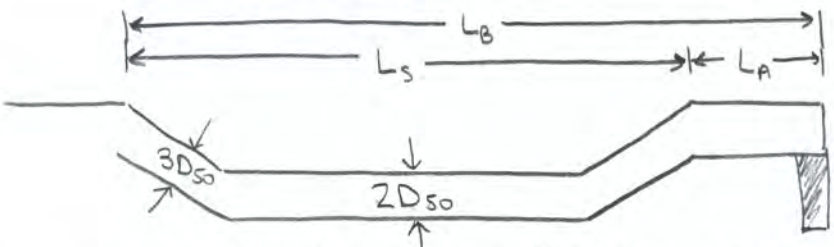
$Y_e = 2\,ft$

From HEC-14, Equation 10.1,

$$\frac{h_s}{Y_e} = 0.36\left(\frac{D_{50}}{Y_e}\right)^{-0.55}\left(\frac{V_o}{\sqrt{gY_e}}\right) - C_o$$

For $h_s = 3\,ft$, $Y_e = 2\,ft$, $V_o = 8\,ft/s$

use $D_{50} = 0.25\,ft$.



$L_S = 10h_s = 30\,ft$

$L_A = 5h_s = 15\,ft$

$L_B = 15h_s = 45\,ft$

$$W_B = W_o + 2(L_B/3) = 8ft + 2(45ft/3) = 38\,ft$$

Note: Likely restricted by width of ravine; go from toe to toe, but angle apron inwards to direct flow towards ℄ of channel.

Use $W_B = 30\,ft$

Check velocity D/S of plunge pool

$$S_o \approx \frac{580.88 - 578.33}{170\,ft} = 0.015$$

$$Q = \frac{1.49}{n} A R_h^{2/3} S_o^{1/2} \quad \text{where} \quad \begin{array}{l} A = BY = (30\,ft)Y \\ P = B + 2Y = (30\,ft) + 2Y \\ R_h = A/P \end{array}$$

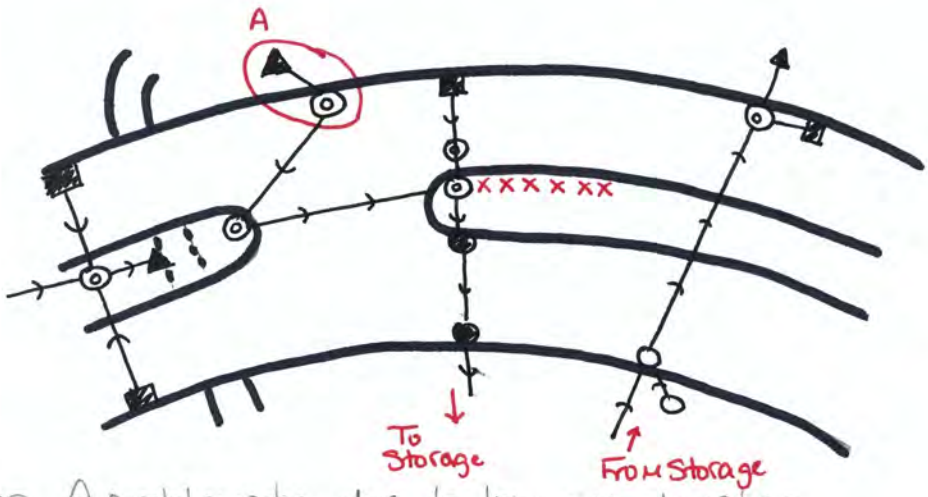
$$V = Q/A = \frac{116.2\,ft^3/s}{29.82\,ft^2} = 3.89\,\frac{ft}{s}$$

slightly high, but should be okay. Inlet shoals during storm events, & renourishing the channel.

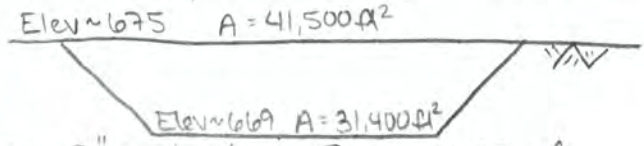
US Army Corps of Engineers Chicago District	PROJECT TITLE: Fort Sheridan 506	COMPUTED BY: JAF	DATE:	SHEET: 1 of 1	
	STRUCTURE TITLE: Hutchinson Ravine	CHECKED BY:	DATE:	CONTRACT NO:	

Hutchinson Realignment

* Replace P76 & raise to 1% slope
  - ↳ US INV = 670.39
  - ↳ Length = 36 × 0.005 = 0.16 ft
  - ↳ DS INV = 670.21
* Replace J76 w/ shallower structure
* Add structure in island across intersection & truncate/replace P78
* Run sewer across street & around/through trees
* Terminate pipe in the field to the south
* Place storage in field, then reroute back to original outfall



* Location A problematic due to low rim elevation
* Initial estimate of required storage volume



→ Using 12" restrictor, Q_{max} = 4.92 cfs
→ Uses 74% of the available volume

* For underground storage:
  - → Need $\forall$ = 218,700 ft³
  - → Use (11) 5' × 10' × 400' structures
  - → If 12" outlet, Q_{max} = 4.68 cfs
  - → Uses 82% of the available volume

* Need to field verify that existing apron is capable of resisting this attenuated flow.

Design Requirements

- Maintain connectivity to the shoreline for fish access to the ravine
- Once rubble check-dam at the mouth of the ravine is removed, mitigate headcutting potential using engineered structures
- Mitigate for downcutting from excessive channel velocities

Design Assumptions

- Flow from the existing sewer outfall is not attenuated
- Final channel grading will be comparable to the existing condition
- Rubble check dam at the mouth of the ravine has been rem oved
- Channel vegetation is fully established - increased channel roughness is reflected in the hydraulic model
- Safety factors for stone sizing include a 60% increase to the loading (i.e. velocity) and a 20%

Design Flow Rates

The steady flow data used in the HEC-RAS data was developed using the output of a SWMM model of the ravine and tributary storm sewer network. Simulations were run for 6-, 12-, 24-, 48-, and 72-hour durations of the 2-, 25-, and 100-year rainfall events. These return periods were selected based upon the data requirements for the design of the various measures considered for this project.

The cumulative rainfall distributations were developed using Huff rainfall distributions, Lake County Stormwater Commission specified rainfall depths, and a reduction factor to convert the distributions from point to areal. The peak outflows at three nodes - the head of the ravine, the confluence of the main channel and southern tributary, and the confluence ofthe main channel and the northern tributary - are considered critical for each of the modeled events.

To present a reasonably conservative design, the discharge from the ravine's subbasins are applied to the inlet of the subbasin (i.e. at the upstream cross-section) rather than the outlet.

NOTE:

During the feasibility phase of the project, the proposed design was not tested under a full battery of flow conditions. Once the project enters design phase, the design will be checked against a range of durations and return periods to ensure features are designed to a limiting condition.

For the purposes of feasiblity level design, only the applicable critical duration event was considered.

	100-year			25-year			2-year		
	Ravine Head	Trib	D/S of Conf	Ravine Head	Trib	D/S of Conf	Ravine Head	Trib	D/S of Conf
6-hour									
12-hour									
24-hour									
48-hour									
72-hour									

Inlet Design at the Head of Ravine

The existing storm sewer outfall at the head of the ravine discharges directly to the floor of the ravine. To control scour hole development an engineered stone basin is provided at the outfall (based design

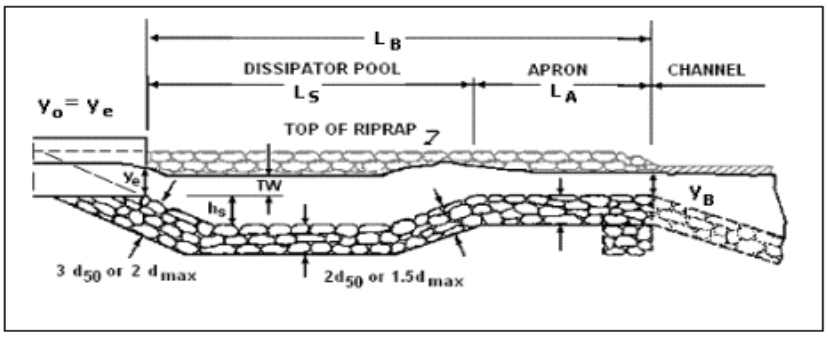
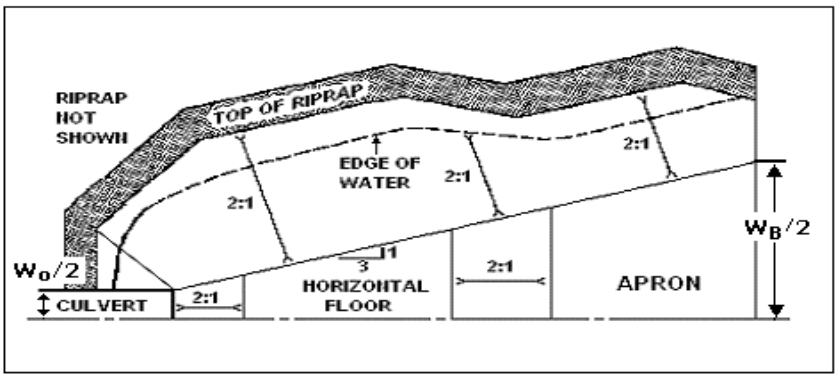


Figure 10.2. Half Plan of Riprap Basin



Compute the culvert outlet velocity, V_o, and depth, y_o.

The culvert outlet velocity for the critical duration 100-year event is determined based on the SWMM modeling results. To determine the design velocity, V_d, a 60% increase is applied.

V_o = 12.2 ft/s

V_d = 19.5 ft/s

The equivalent depth at the outlet of the culvert is determined by :

$$y_e = \sqrt{\left(\frac{A}{2}\right)}$$

D =	2.5	ft	where D is the pipe diameter
d =	1.89	ft	where d is the brink depth of a circular culvert
A =	3.98	ft^2	where A is the equivalent area
y_e =	1.41	ft	where y_e is the equivalent depth

Select a D_{50} stone size and perform required checks

A value for D50 is selected based on locally available riprap.

$$\frac{h_s}{y_e} = 0.86\left(\frac{D_{50}}{y_e}\right)^{-0.55}\left(\frac{V_o}{\sqrt{g \cdot y_e}}\right)$$

$$\frac{h_s}{y_e} = 0.86\left(\frac{D_{50}}{y_e}\right)^{-0.55}\left(\frac{V_o}{\sqrt{g \cdot y_e}}\right)$$

$C_o = 2.0$	$TW/y_e < 0.75$
$C_o = 4.0(TW/y_e) - 1.0$	$0.75 < TW/y_e < 1.0$
$C_o = 3.0$	$1.0 < TW/y_e$

D_{50} =	0.8	ft	TW =	1.00 ft
C_o =	2.0		TW/y_e =	0.71 ft
h_s/y_e =	1.4			
h_s =	1.98	ft		

Checks

D_{50}/y_e =	0.567	OKAY!	(greater than or equal to 0.1?)
h_s/D_{50} =	2.4739	OKAY!	(greater than or equal to 2.0?)

Applying a 25% increase in diameter for rounded stone,

D_{50} = 1.00 ft W50 = 86.3938

Determine the length of the dissipation pool, total basin length, and basin width

Length of Dissipator Pool, L_s

$L_s = 10 \cdot h_s =$ 19.8 ft

Apron Length, L_A

$L_A = 5 \cdot h_s =$ 9.9 ft

Total Basin Length, L_s

$L_B = 15 \cdot h_s =$ 29.7 ft

Basin Width at Exit, W_B

$W_B = W_o+[2\cdot(L_B/3)]=$ 16 ft

Verify that exit velocity of basin is within acceptable limits

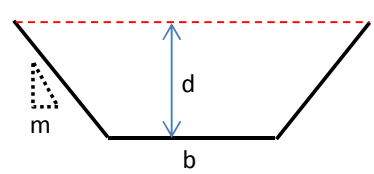
Dsgn Peak Dis =	27	cfs			
y_c =	0.44	ft			
Side Slope, z =	2				
Q^2/g =	22.6	ft^5		(A)/(B) =	22.64 ft^5
$[y_c\cdot(W_B+z\cdot y_c)]^3$ =	401.838	ft^6	(A)	A_c =	7.38 ft^2
$(W_B+2\cdot z\cdot y_c)$ =	17.7492	ft	(B)	V_c =	3.66 ft/s

Design of Typical Ravine Channel

Downstream of the apron, the channel gradually transitions from the flared end to an engineered channel. The channel is designed to convey the 25-year critical duration event within its banks under normal flow conditions. More extreme events will be conveyed along the overbank portion of the channel.

Only a single profile will be specified, so the peak discharge at the mouth of the ravine is selected as the representative design discharge. It is acknowledged that this will result in a channel that is unlikely to exceed its banks in the upstream limits of the ravine and is an accepted consequence of this simplification.

$Q_{25,tar}$ =	46.6	cfs	Manning's n, n =	0.065	
$Q_{25,des}$ =	49.8	cfs	Base Width, b =	5.0	ft
			Side Slope, m =	3.0	
V_{des} =	2.45	ft/s	Dsgn Channel Slope, S_o =	0.02	ft/ft
			Channel Depth, d =	1.9	ft
			Area, A =	20.33	ft^2
			Wetted Permiter, P =	17.0167	ft
			Hydraulic Radius, R_h =	1.19471	ft



Inlet Design at the Head of Tributary

The existing storm sewer outfall at the head of the ravine discharges directly to the floor of the ravine. To control scour hole development an engineered stone basin is provided at the outfall

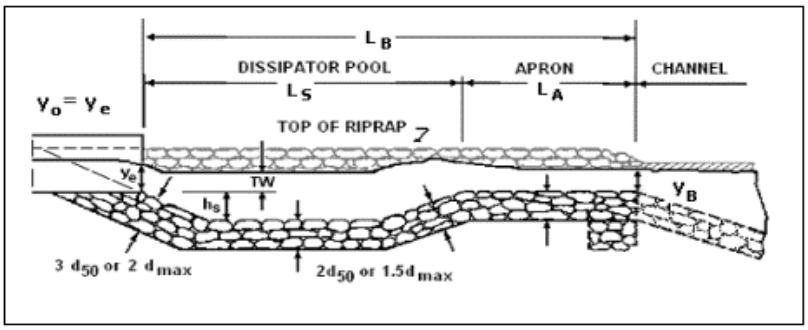
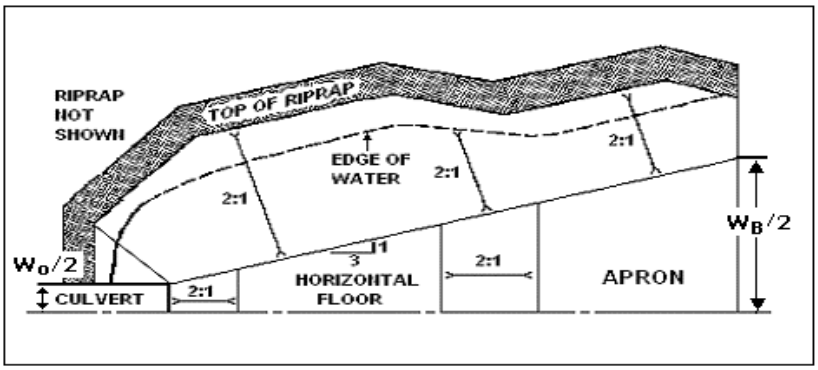


Figure 10.2. Half Plan of Riprap Basin



Compute the culvert outlet velocity, V_o, and depth, y_o.

The culvert outlet velocity for the critical duration 100-year event is determined based on the SWMM modeling results. To determine the design velocity, V_d, a 60% increase is applied.

V_o =	9.7	ft/s
V_d =	15.5	ft/s

The equivalent depth at the outlet of the culvert is determined by :

$$y_e = \sqrt{\left(\frac{A}{2}\right)}$$

D =	3.0	ft	where D is the pipe diameter
d =	1.43	ft	where d is the brink depth of a circular culvert
A =	3.32	ft^2	where A is the equivalent area
y_e =	1.29	ft	where y_e is the equivalent depth

Select a D_{50} stone size and perform required checks

A value for D50 is selected based on locally available riprap.

$$\frac{h_s}{y_e} = 0.86\left(\frac{D_{50}}{y_e}\right)^{-0.55}\left(\frac{V_o}{\sqrt{g \cdot y_e}}\right)$$

$C_o = 2.0$	$TW/y_e < 0.75$
$C_o = 4.0(TW/y_e) - 1.0$	$0.75 < TW/y_e < 1.0$
$C_o = 3.0$	$1.0 < TW/y_e$

D_{50} = 0.6 ft

C_o = 2.1

h_s/y_e = 1.05

h_s = 1.36 ft

TW = 1.00 ft

TW/y_e = 0.78 ft

Checks

D_{50}/y_e = 0.47 OKAY! (greater than or equal to 0.1?)

h_s/D_{50} = 2.26 OKAY! (greater than or equal to 2.0?)

Applying a 25% increase in diameter for rounded stone,

D_{50} = 0.75 ft

Determine the length of the dissipation pool, total basin length, and basin width

Length of Dissipator Pool, L_s

$L_s = 10 \cdot h_s$ = 13.6 ft

Apron Length, L_A

$L_A = 5 \cdot h_s$ = 6.8 ft

Total Basin Length, L_s

$L_B = 15 \cdot h_s$ = 20.4 ft

Basin Width at Exit, W_B

$W_B = W_o+[2\cdot(L_B/3)]$= 17 ft

Verify that exit velocity of basin is within acceptable limits

Dsgn Peak Dis = 33.5 cfs

y_c = 0.48 ft

Side Slope, z = 3

Q^2/g = 34.9 ft^5

$[y_c\cdot(W_B+z\cdot y_c)]^3$ = 692.84 ft^6 (A)

$(W_B+2\cdot z\cdot y_c)$ = 19.879 ft (B)

(A)/(B) = 34.85 ft^5

A_c = 8.85 ft^2

V_c = 3.79 ft/s

Design of Typical Ravine Channel

Downstream of the apron, the channel gradually transitions from the flared end to an engineered channel. The channel is designed to convey the 25-year critical duration event within its banks under normal flow conditions. More extreme events will be conveyed along the overbank portion of the channel.

Only a single profile will be specified, so the peak discharge at the mouth of the ravine is selected as the representative design discharge. It is acknowledged that this will result in a channel that is unlikely to exceed its banks in the upstream limits of the ravine and is an accepted consequence of

$Q_{25,tar}$ = 20.6 cfs

$Q_{25,des}$ = 26.1 cfs

V_{des} = 2.39 ft/s

Manning's n, n = 0.065

Base Width, b = 5.0 ft

Side Slope, m = 3.0

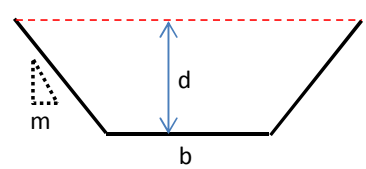
Dsgn Channel Slope, S_o = 0.03 ft/ft

Channel Depth, d = 1.25 ft

Area, A = 10.94 ft^2

Wetted Permiter, P = 12.91 ft

Hydraulic Radius, R_h = 0.847 ft



Reinforcement of Channel from XS 940 to XS 369

Based on the results of the HEC-RAS model, the existing channel slope between cross-sections 727 and 512 would result in a channel velocity sufficiently large enough to potentially induce channel incision. Construct a series of step-pools with a reduced slope between structures to further reduce the velocity.

Estimate the required step height for the step-pools:

Initial Slope, S_o =	0.04	ft/ft	Required Drop, H =	10	ft	Req. # of Step-Pools =	9.28
Final Slope, S_f =	0.02	ft/ft	Allowable Step, h =	1.1	ft	Specified # of Step-Pools =	11
Distance, L =	567	ft					

Estimate the pool length and maximum scour depth:

$$\frac{L_2}{L_3} = 0.409 + 4.211\frac{H}{L_3} + 87.341\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

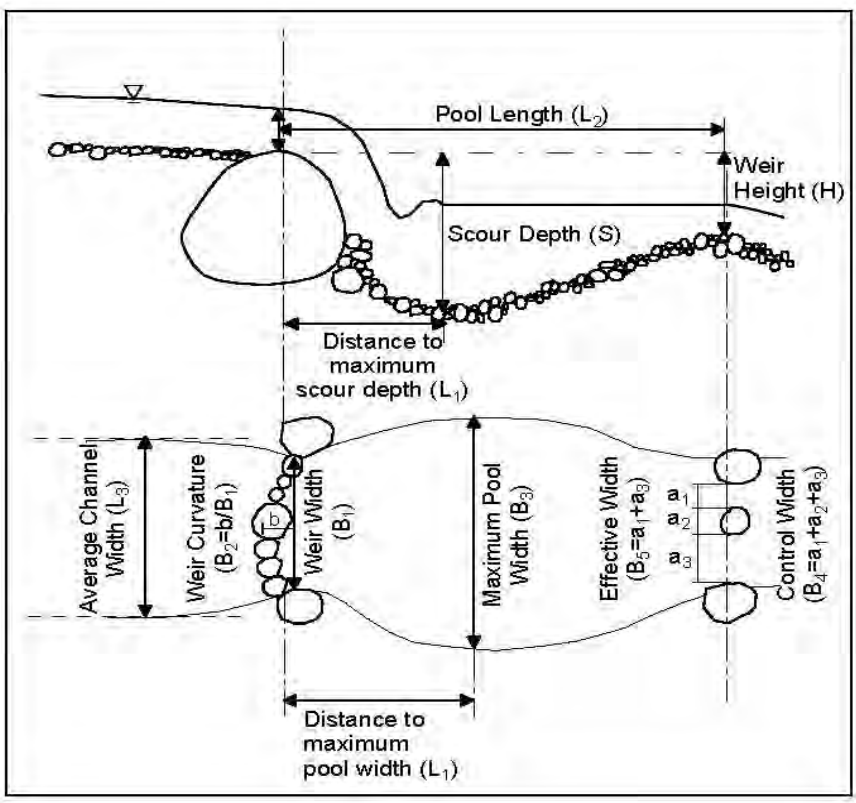
$$\frac{S}{L_3} = -0.0118 + 1.394\frac{H}{L_3} + 5.514\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

$$B_3 = 1.2 \cdot B_1$$

$$B_5 = 0.92 \cdot B_1$$

$$D_{30} = \frac{1.95 \cdot S^{0.555} \cdot q^{2/3}}{g^{1/3}}$$

H = Weir Height
S = Scour Depth
L_1 = Distance to maximum scour depth
L_2 = Pool Length
L_3 = Average Channel Width
B_1 = Weir Width
B_2 = Weir Curvature
B_3 = Maximum Pool Width
B_4 = Control Width



H =	1.1	ft	H (metric) =	0.34	m
Q_{25} =	30	cfs	Q_{25} (metric) =	0.85	cms
q_{25} =	9.38	cfs/ft	q_{25} (metric)=	0.7	cms/m

g =	32.2	ft/s^2	g =	9.81	m/s^2
Avg Chnl Width, L_3 =	5	ft	Avg Chnl Width (metric) =	1.52	m
S_f =	0.02	ft/ft	S_f =	0.02	m/m
Weir Width, B_1 =	4	ft	Weir Width (metric) =	1.22	m
Max Pool Wdth, B_3 =	4.8	ft	Max Pool Width (metric) =	1.46	m
Effective Wdth, B_5 =	3.68	ft	Effective Width (metric) =	1.12	m
Pool Length, L_2 =	7.7	ft	Pool Length (metric) =	2.35	m
Max Scour Dpth, S =	1.5	ft	Max Scour Depth (metric) =	0.47	m

Does the design meeting the spacing and drop requirement?

Required Drop =	21.5	ft	Total Structure Length =	84.8	ft
Step-Pool Drop =	12.1	ft	Length Less Structures =	482	ft
Drop from Slope =	9.64	ft	Crest Spacing =	51.5	ft
Total Drop =	21.7	ft	End-to-End Spacing =	43.8	ft
	OKAY!				

Determine the required stone size:

Q_{100} =	27	cfs	D_{30} =	0.34	ft
$1.6*Q_{100}$ =	43.2	cfs	$1.2*D_{30}$ =	0.41	ft
q_{100} =	10.8	cfs/ft			

Reinforcement of Channel from XS 369 to Confluence

Based on the results of the HEC-RAS model, the existing channel slope between cross-sections 727 and 512 would result in a channel velocity sufficiently large enough to potentially induce channel incision. Construct a series of step-pools with a reduced slope between structures to further reduce the velocity.

Estimate the required step height for the step-pools:

Initial Slope, S_o =	0.09	ft/ft	Required Drop, H =	11	ft	Req. # of Step-Pools =	9.37
Final Slope, S_f =	0.02	ft/ft	Allowable Step, h =	1.2	ft	Specified # of Step-Pools =	11
Distance, L =	154	ft					

Estimate the pool length and maximum scour depth:

$$\frac{L_2}{L_3} = 0.409 + 4.211\frac{H}{L_3} + 87.341\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

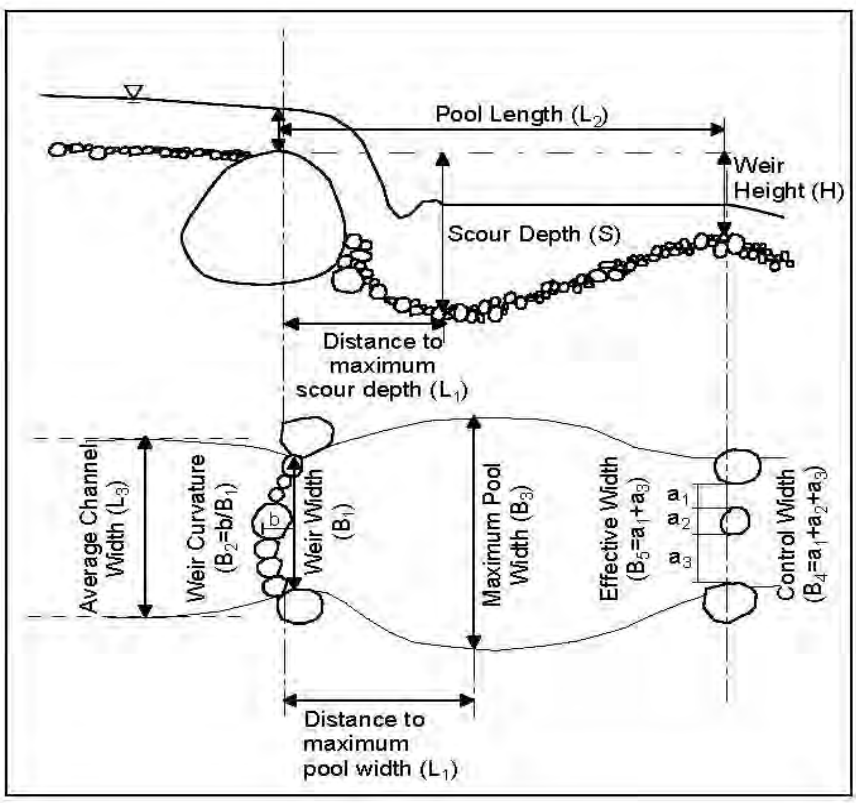
$$\frac{S}{L_3} = -0.0118 + 1.394\frac{H}{L_3} + 5.514\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

$$B_3 = 1.2 \cdot B_1$$

$$B_5 = 0.92 \cdot B_1$$

$$D_{30} = \frac{1.95 \cdot S^{0.555} \cdot q^{2/3}}{g^{1/3}}$$

H = Weir Height
S = Scour Depth
L_1 = Distance to maximum scour depth
L_2 = Pool Length
L_3 = Average Channel Width
B_1 = Weir Width
B_2 = Weir Curvature
B_3 = Maximum Pool Width
B_4 = Control Width



H =	1.15	ft	H (metric) =	0.35	m
Q_{25} =	30	cfs	Q_{25} (metric) =	0.85	cms
q_{25} =	9.38	cfs/ft	q_{25} (metric)=	0.7	cms/m

g =	32.2	ft/s^2	g =	9.81	m/s^2
Avg Chnl Width, L_3 =	5	ft	Avg Chnl Width (metric) =	1.52	m
S_f =	0.02	ft/ft	S_f =	0.02	m/m
Weir Width, B_1 =	4	ft	Weir Width (metric) =	1.22	m
Max Pool Wdth, B_3 =	4.8	ft	Max Pool Width (metric) =	1.46	m
Effective Wdth, B_5 =	3.68	ft	Effective Width (metric) =	1.12	m
Pool Length, L_2 =	7.9	ft	Pool Length (metric) =	2.41	m
Max Scour Dpth, S =	1.6	ft	Max Scour Depth (metric) =	0.49	m

Does the design meeting the spacing and drop requirement?

Required Drop =	13.9	ft	Total Structure Length =	87.1	ft
Step-Pool Drop =	12.7	ft	Length Less Structures =	66.9	ft
Drop from Slope =	1.34	ft	Crest Spacing =	14	ft
Total Drop =	14	ft	End-to-End Spacing =	6.08	ft
	OKAY!				

Determine the required stone size:

Q_{100} =	27	cfs	D_{30} =	0.34	ft
$1.6*Q_{100}$ =	43.2	cfs	$1.2*D_{30}$ =	0.41	ft
q_{100} =	10.8	cfs/ft			

Reinforcement of Channel from Confluence to Mouth

Based on the results of the HEC-RAS model, the existing channel slope between cross-sections 224 to 200 feet above the mouth of the ravine would result in a channel velocity sufficiently large enough to potentially induce channel incision. Construct a series of step-pools with a reduced slope between structures to further reduce the velocity.

Estimate the required step height for the step-pools:

Initial Slope, S_o =	0.11	ft/ft	Required Drop, H =	18	ft	Req. # of Step-Pools =	14.1
Final Slope, S_f =	0.03	ft/ft	Allowable Step, h =	1.3	ft	Specified # of Step-Pools =	18
Distance, L =	212	ft/ft					

Estimate the pool length and maximum scour depth:

$$\frac{L_2}{L_3} = 0.409 + 4.211\frac{H}{L_3} + 87.341\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

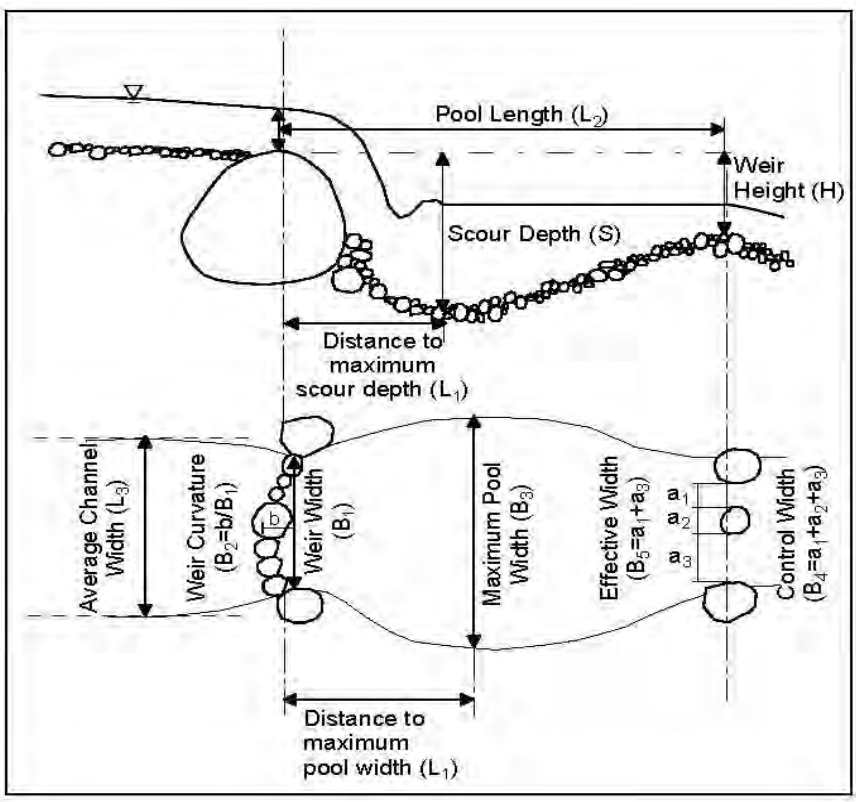
$$\frac{S}{L_3} = -0.0118 + 1.394\frac{H}{L_3} + 5.514\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

$$B_3 = 1.2 \cdot B_1$$

$$B_5 = 0.92 \cdot B_1$$

$$D_{30} = \frac{1.95 \cdot S^{0.555} \cdot q^{2/3}}{g^{1/3}}$$

H = Weir Height
S = Scour Depth
L_1 = Distance to maximum scour depth
L_2 = Pool Length
L_3 = Average Channel Width
B_1 = Weir Width
B_2 = Weir Curvature
B_3 = Maximum Pool Width
B_4 = Control Width



H =	1.25	ft	H (metric) =	0.38	m
Q_{25} =	47	cfs	Q_{25} (metric) =	1.33	cms
q_{25} =	14.7	cfs/ft	q_{25} (metric)=	1.09	cms/m

g =	32.2	ft/s^2	g =	9.81	m/s^2
Avg Chnl Width, L_3 =	5	ft	Avg Chnl Width (metric) =	1.52	m
S_f =	0.03	ft/ft	S_f =	0.03	m/m
Weir Width, B_1 =	4	ft	Weir Width (metric) =	1.22	m
Max Pool Wdth, B_3 =	4.8	ft	Max Pool Width (metric) =	1.46	m
Effective Wdth, B_5 =	3.68	ft	Effective Width (metric) =	1.12	m
Pool Length, L_2 =	9.7	ft	Pool Length (metric) =	2.97	m
Max Scour Dpth, S =	1.8	ft	Max Scour Depth (metric) =	0.56	m

Does the design meeting the spacing and drop requirement?

Required Drop =	24	ft	Total Structure Length =	175	ft
Step-Pool Drop =	22.5	ft	Length Less Structures =	36.8	ft
Drop from Slope =	1.47	ft	Crest Spacing =	11.8	ft
Total Drop =	24	ft	End-to-End Spacing =	2.04	ft
	OKAY!				

Determine the required stone size:

Q_{100} =	75	cfs	D_{30} =	0.85	ft
$1.6*Q_{100}$ =	120	cfs	$1.2*D_{30}$ =	1.01	ft
q_{100} =	30	cfs/ft			

Reinforcement of Channel for the Tributary

Based on the results of the HEC-RAS model, the existing channel slope along the final slope to the mouth of the ravine would result in a channel velocity sufficiently large enough to potentially induce channel incision. Construct a series of step-pools with a reduced slope between structures to further reduce the velocity.

Estimate the required step height for the step-pools:

Initial Slope, S_o =	0.15	ft/ft	Required Drop, H =	11	ft	Req. # of Step-Pools =	5.55
Final Slope, S_f =	0.03	ft/ft	Allowable Step, h =	2	ft	Specified # of Step-Pools =	1
Distance, L =	91	ft/ft					

Estimate the pool length and maximum scour depth:

$$\frac{L_2}{L_3} = 0.409 + 4.211\frac{H}{L_3} + 87.341\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

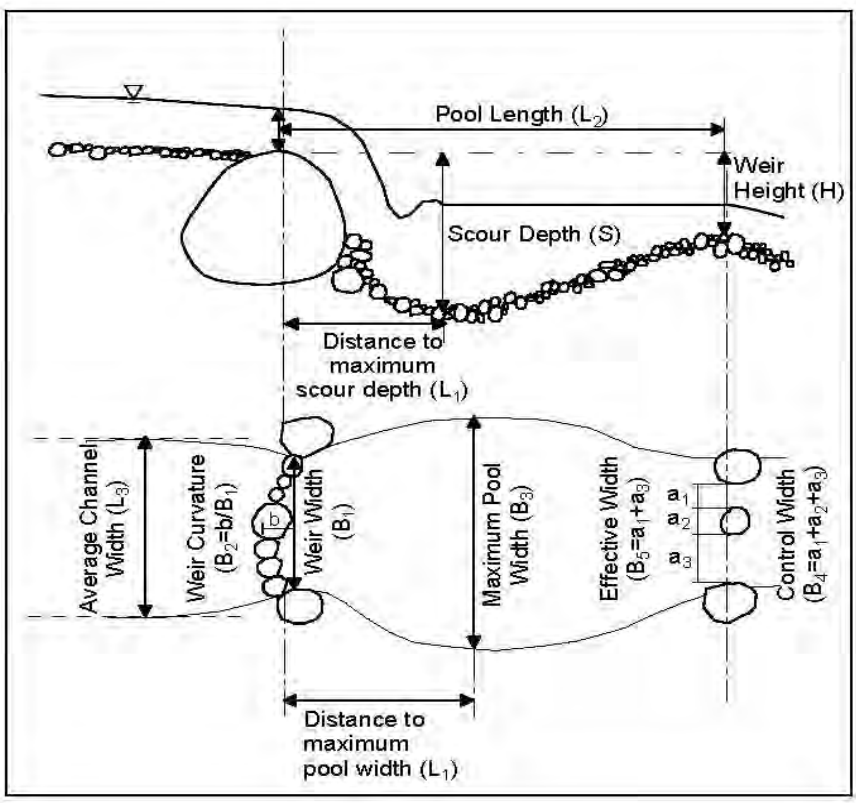
$$\frac{S}{L_3} = -0.0118 + 1.394\frac{H}{L_3} + 5.514\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

$$B_3 = 1.2 \cdot B_1$$

$$B_5 = 0.92 \cdot B_1$$

$$D_{30} = \frac{1.95 \cdot S^{0.555} \cdot q^{2/3}}{g^{1/3}}$$

H = Weir Height
S = Scour Depth
L_1 = Distance to maximum scour depth
L_2 = Pool Length
L_3 = Average Channel Width
B_1 = Weir Width
B_2 = Weir Curvature
B_3 = Maximum Pool Width
B_4 = Control Width



H =	2	ft	H (metric) =	0.61	m
Q_{25} =	24	cfs	Q_{25} (metric) =	0.68	cms
q_{25} =	2.31	cfs/ft	q_{25} (metric)=	0.17	cms/m

g =	32.2	ft/s^2	g =	9.81	m/s^2
Avg Chnl Width, L_3 =	16	ft	Avg Chnl Width (metric) =	4.88	m
S_f =	0.03	ft/ft	S_f =	0.03	m/m
Weir Width, B_1 =	13	ft	Weir Width (metric) =	3.96	m
Max Pool Wdth, B_3 =	15.6	ft	Max Pool Width (metric) =	4.75	m
Effective Wdth, B_5 =	12	ft	Effective Width (metric) =	3.65	m
Pool Length, L_2 =	15.2	ft	Pool Length (metric) =	4.63	m
Max Scour Dpth, S =	2.6	ft	Max Scour Depth (metric) =	0.8	m

Does the design meeting the spacing and drop requirement?

Required Drop =	13.8	ft	Total Structure Length =	15.2	ft
Step-Pool Drop =	2	ft	Length Less Structures =	75.8	ft
Drop from Slope =	2.27	ft	Crest Spacing =	91	ft
Total Drop =	4.27	ft	End-to-End Spacing =	75.8	ft
	NO!				

Determine the required stone size:

Q_{100} =	36	cfs	D_{30} =	0.24	ft
$1.6*Q_{100}$ =	57.6	cfs	$1.2*D_{30}$ =	0.35	ft
q_{100} =	4.43	cfs/ft			

Reinforcement of Channel for the Tributary

Based on the results of the HEC-RAS model, the existing channel slope along the final slope to the mouth of the ravine would result in a channel velocity sufficiently large enough to potentially induce channel incision. Construct a series of step-pools with a reduced slope between structures to further reduce the velocity.

Estimate the required step height for the step-pools:

Initial Slope, S_o =	0.15	ft/ft	Required Drop, H =	11	ft	Req. # of Step-Pools =	5.55
Final Slope, S_f =	0.03	ft/ft	Allowable Step, h =	2	ft	Specified # of Step-Pools =	1
Distance, L =	91	ft/ft					

Estimate the pool length and maximum scour depth:

$$\frac{L_2}{L_3} = 0.409 + 4.211\frac{H}{L_3} + 87.341\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

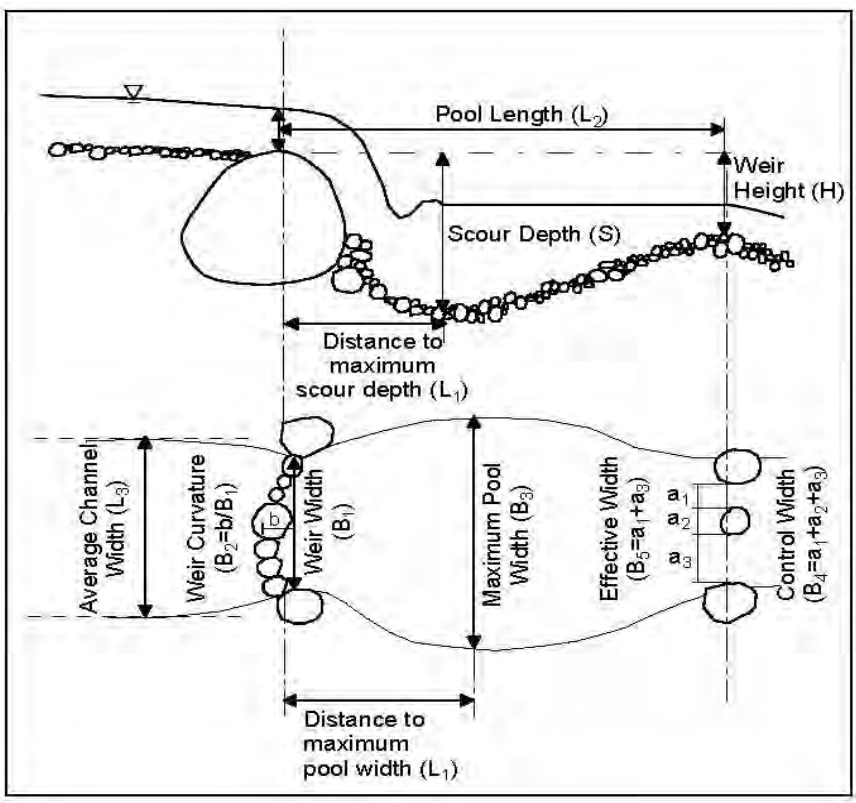
$$\frac{S}{L_3} = -0.0118 + 1.394\frac{H}{L_3} + 5.514\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

$$B_3 = 1.2 \cdot B_1$$

$$B_5 = 0.92 \cdot B_1$$

$$D_{30} = \frac{1.95 \cdot S^{0.555} \cdot q^{2/3}}{g^{1/3}}$$

H = Weir Height
S = Scour Depth
L_1 = Distance to maximum scour depth
L_2 = Pool Length
L_3 = Average Channel Width
B_1 = Weir Width
B_2 = Weir Curvature
B_3 = Maximum Pool Width
B_4 = Control Width



H =	2	ft	H (metric) =	0.61	m
Q_{25} =	24	cfs	Q_{25} (metric) =	0.68	cms
q_{25} =	3	cfs/ft	q_{25} (metric)=	0.22	cms/m

g =	32.2	ft/s^2	g =	9.81	m/s^2
Avg Chnl Width, L_3 =	13	ft	Avg Chnl Width (metric) =	3.96	m
S_f =	0.03	ft/ft	S_f =	0.03	m/m
Weir Width, B_1 =	10	ft	Weir Width (metric) =	3.05	m
Max Pool Wdth, B_3 =	12	ft	Max Pool Width (metric) =	3.66	m
Effective Wdth, B_5 =	9.2	ft	Effective Width (metric) =	2.8	m
Pool Length, L_2 =	14.0	ft	Pool Length (metric) =	4.28	m
Max Scour Dpth, S =	2.7	ft	Max Scour Depth (metric) =	0.81	m

Does the design meeting the spacing and drop requirement?

Required Drop =	13.8	ft	Total Structure Length =	14	ft
Step-Pool Drop =	2	ft	Length Less Structures =	77	ft
Drop from Slope =	2.31	ft	Crest Spacing =	91	ft
Total Drop =	4.31	ft	End-to-End Spacing =	77	ft
	NO!				

Determine the required stone size:

Q_{100} =	36	cfs	D_{30} =	0.28	ft
$1.6*Q_{100}$ =	57.6	cfs	$1.2*D_{30}$ =	0.42	ft
q_{100} =	5.76	cfs/ft			

Reinforcement of Channel for the Tributary

Based on the results of the HEC-RAS model, the existing channel slope along the final slope to the mouth of the ravine would result in a channel velocity sufficiently large enough to potentially induce channel incision. Construct a series of step-pools with a reduced slope between structures to further reduce the velocity.

Estimate the required step height for the step-pools:

Initial Slope, S_o =	0.15	ft/ft	Required Drop, H =	11	ft	Req. # of Step-Pools =	5.55
Final Slope, S_f =	0.03	ft/ft	Allowable Step, h =	2	ft	Specified # of Step-Pools =	1
Distance, L =	91	ft/ft					

Estimate the pool length and maximum scour depth:

$$\frac{L_2}{L_3} = 0.409 + 4.211\frac{H}{L_3} + 87.341\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

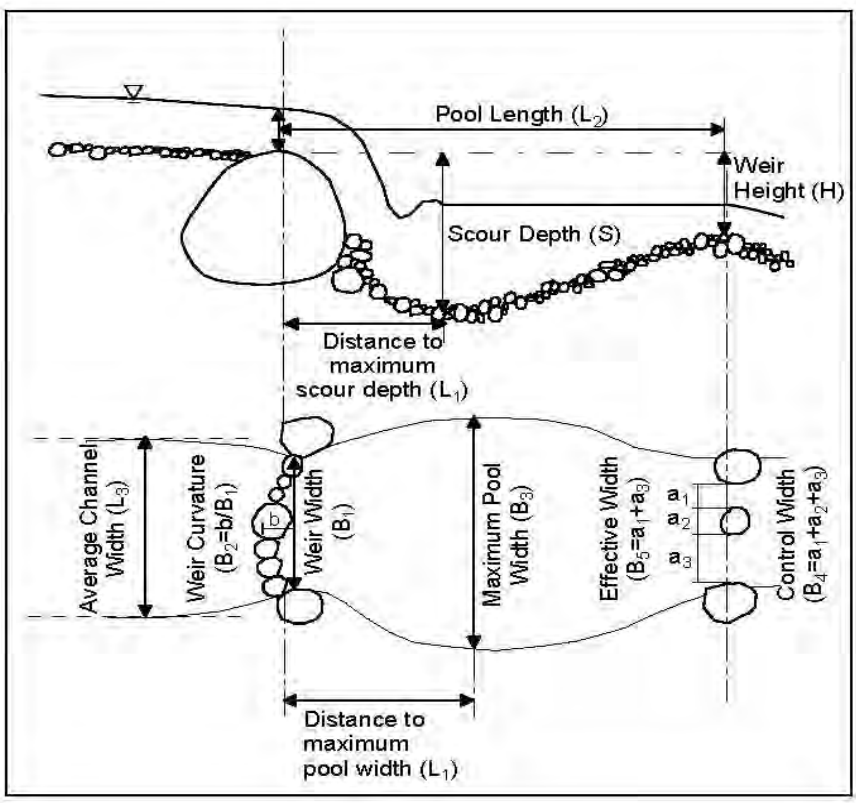
$$\frac{S}{L_3} = -0.0118 + 1.394\frac{H}{L_3} + 5.514\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

$$B_3 = 1.2 \cdot B_1$$

$$B_5 = 0.92 \cdot B_1$$

$$D_{30} = \frac{1.95 \cdot S^{0.555} \cdot q^{2/3}}{g^{1/3}}$$

H = Weir Height
S = Scour Depth
L_1 = Distance to maximum scour depth
L_2 = Pool Length
L_3 = Average Channel Width
B_1 = Weir Width
B_2 = Weir Curvature
B_3 = Maximum Pool Width
B_4 = Control Width



H =	2	ft	H (metric) =	0.61	m
Q_{25} =	24	cfs	Q_{25} (metric) =	0.68	cms
q_{25} =	4.29	cfs/ft	q_{25} (metric)=	0.32	cms/m

g =	32.2	ft/s^2	g =	9.81	m/s^2
Avg Chnl Width, L_3 =	10	ft	Avg Chnl Width (metric) =	3.05	m
S_f =	0.03	ft/ft	S_f =	0.03	m/m
Weir Width, B_1 =	7	ft	Weir Width (metric) =	2.13	m
Max Pool Wdth, B_3 =	8.4	ft	Max Pool Width (metric) =	2.56	m
Effective Wdth, B_5 =	6.44	ft	Effective Width (metric) =	1.96	m
Pool Length, L_2 =	13.0	ft	Pool Length (metric) =	3.97	m
Max Scour Dpth, S =	2.7	ft	Max Scour Depth (metric) =	0.82	m

Does the design meeting the spacing and drop requirement?

Required Drop =	13.8	ft	Total Structure Length =	13	ft
Step-Pool Drop =	2	ft	Length Less Structures =	78	ft
Drop from Slope =	2.34	ft	Crest Spacing =	91	ft
Total Drop =	4.34	ft	End-to-End Spacing =	78	ft
	NO!				

Determine the required stone size:

Q_{100} =	36	cfs	D_{30} =	0.36	ft
$1.6*Q_{100}$ =	57.6	cfs	$1.2*D_{30}$ =	0.54	ft
q_{100} =	8.23	cfs/ft			

Reinforcement of Channel for the Tributary

Based on the results of the HEC-RAS model, the existing channel slope along the final slope to the mouth of the ravine would result in a channel velocity sufficiently large enough to potentially induce channel incision. Construct a series of step-pools with a reduced slope between structures to further reduce the velocity.

Estimate the required step height for the step-pools:

Initial Slope, S_o =	0.15	ft/ft	Required Drop, H =	11	ft	Req. # of Step-Pools =	5.55
Final Slope, S_f =	0.03	ft/ft	Allowable Step, h =	2	ft	Specified # of Step-Pools =	1
Distance, L =	91	ft/ft					

Estimate the pool length and maximum scour depth:

$$\frac{L_2}{L_3} = 0.409 + 4.211\frac{H}{L_3} + 87.341\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

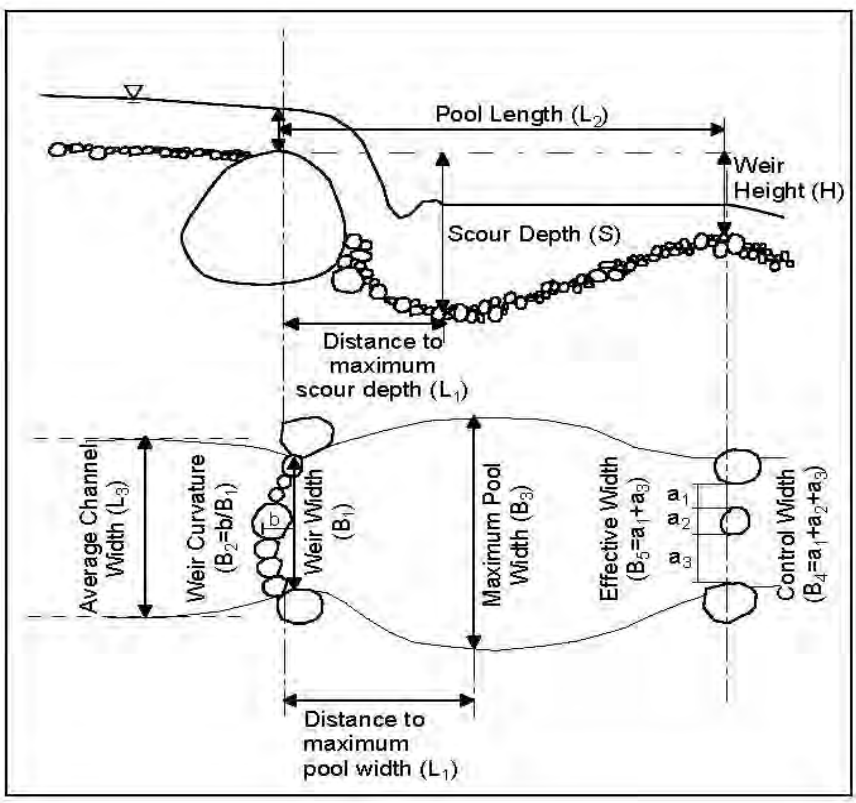
$$\frac{S}{L_3} = -0.0118 + 1.394\frac{H}{L_3} + 5.514\frac{S_o q_{25}}{\sqrt{g(L_3)^{3/2}}}$$

$$B_3 = 1.2 \cdot B_1$$

$$B_5 = 0.92 \cdot B_1$$

$$D_{30} = \frac{1.95 \cdot S^{0.555} \cdot q^{2/3}}{g^{1/3}}$$

H = Weir Height
S = Scour Depth
L_1 = Distance to maximum scour depth
L_2 = Pool Length
L_3 = Average Channel Width
B_1 = Weir Width
B_2 = Weir Curvature
B_3 = Maximum Pool Width
B_4 = Control Width



H =	2	ft	H (metric) =	0.61	m
Q_{25} =	24	cfs	Q_{25} (metric) =	0.68	cms
q_{25} =	7.5	cfs/ft	q_{25} (metric)=	0.56	cms/m

g =	32.2	ft/s^2	g =	9.81	m/s^2
Avg Chnl Width, L_3 =	7	ft	Avg Chnl Width (metric) =	2.13	m
S_f =	0.03	ft/ft	S_f =	0.03	m/m
Weir Width, B_1 =	4	ft	Weir Width (metric) =	1.22	m
Max Pool Wdth, B_3 =	4.8	ft	Max Pool Width (metric) =	1.46	m
Effective Wdth, B_5 =	3.68	ft	Effective Width (metric) =	1.12	m
Pool Length, L_2 =	12.3	ft	Pool Length (metric) =	3.76	m
Max Scour Dpth, S =	2.8	ft	Max Scour Depth (metric) =	0.84	m

Does the design meeting the spacing and drop requirement?

Required Drop =	13.8	ft	Total Structure Length =	12.3	ft
Step-Pool Drop =	2	ft	Length Less Structures =	78.7	ft
Drop from Slope =	2.36	ft	Crest Spacing =	91	ft
Total Drop =	4.36	ft	End-to-End Spacing =	78.7	ft
	NO!				

Determine the required stone size:

Q_{100} =	36	cfs	D_{30} =	0.52	ft
$1.6*Q_{100}$ =	57.6	cfs	$1.2*D_{30}$ =	0.78	ft
q_{100} =	14.4	cfs/ft			

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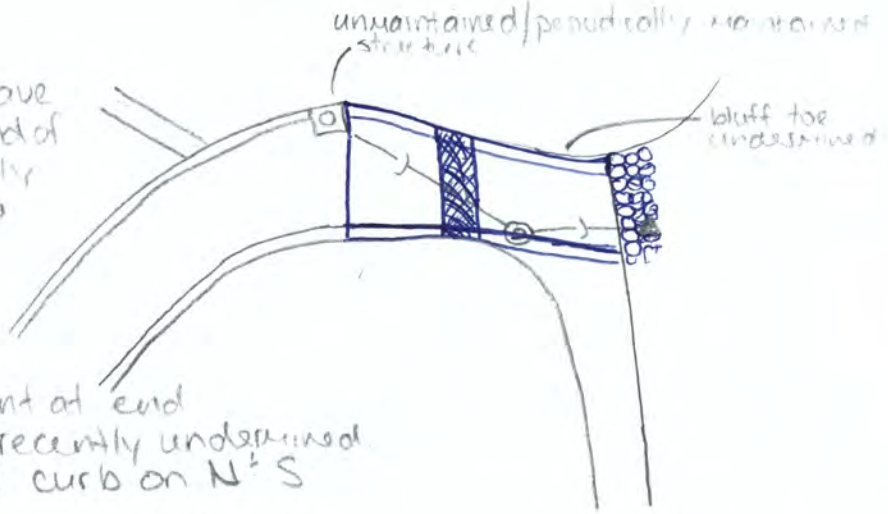
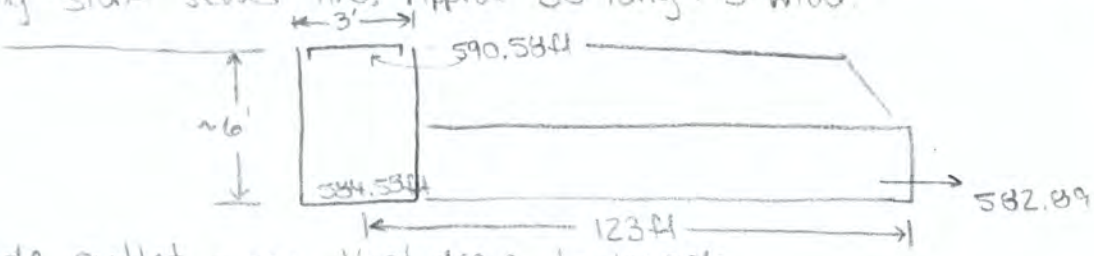
Mouth of Ravine



* During site visits, have found structure at end of north gutter constantly blocked, causing flow to bypass. Runs along edge of street, undermining toe of bluff to north & running over pavement at end of ravine. Pavement recently undermined.
* Install vertical faced curb on N & S sides of pavement.
* Over ~30ft stretch, transition from c/g to shallow v-shaped pavement , beginning at the N structure
  ↳ Note: Length will be controlled by what is necessary to incorporate S. gutter
* Install grated inlet from curb to curb over trench that intersects existing storm sewer line. Approx 35' long & 3' wide.



* Provide outlet pipes that drain to beach.
  ↳ Assume flow at 0.8D & D = 2.5ft

$$Q = \frac{1.49}{n} A R_h^{2/3} S_o^{1/2} \qquad n = 0.013 \qquad R_h = 0.7605ft$$

$$A = 4.21 ft^2$$

$$= \frac{1.49}{0.013}(4.21ft^2)(0.7605ft)^{2/3}(0.014)^{1/2}$$

$$= 47.5 cfs$$

$Q_{max} = 100.9 cfs \rightarrow$ need (3) pipes

* Provide riprap armor on slope downstream of grate

$$q = \frac{101 cfs}{20ft} = 5.05 \frac{ft^2}{s} \rightarrow q_c = 6.32 ft^2/s$$

$$D_{30} = \frac{1.95(0.2)^{0.555}(6.5 ft^2/s)^{2/3}}{(32.2)^{1/3}} = 0.9ft$$

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Size Plunge Pool at Base of Slope/Outfall

- Assume pipe flows at 0.8D
- For $d/D = 0.8$, $A/D^2 = 0.6736 \Rightarrow A = 0.6736(2.5ft)^2 = 4.206\ ft^2$

Estimate velocity: $V = \frac{Q}{A} = \frac{47.5 ft^3/s}{4.21 ft^2} = 11.28 \frac{ft}{s}$

From HEC-14 Equation 10.1,

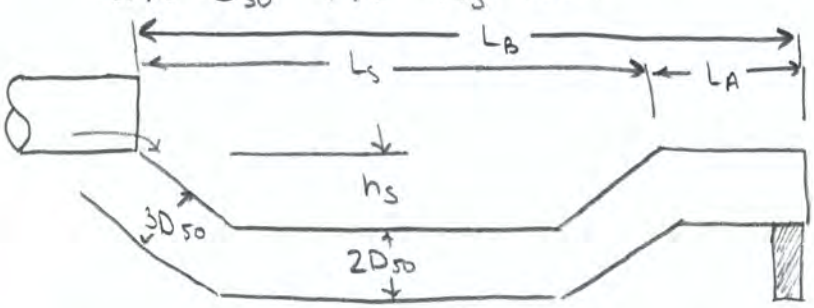
$$\frac{h_s}{Y_e} = 0.86 \left(\frac{D_{50}}{Y_e}\right)^{-0.55} \left(\frac{V_o}{\sqrt{gY_e}}\right) - C_o$$

$Y_e \sim 2ft$

$h_s \sim 2ft$

$$\frac{h_s}{Y_e} = 0.86 \left(\frac{D_{50}}{Y_e}\right)^{-0.55} \left(\frac{V_o}{\sqrt{gY_e}}\right) - C_o$$

use $D_{50} = 1ft$ $h_s = 2ft$.



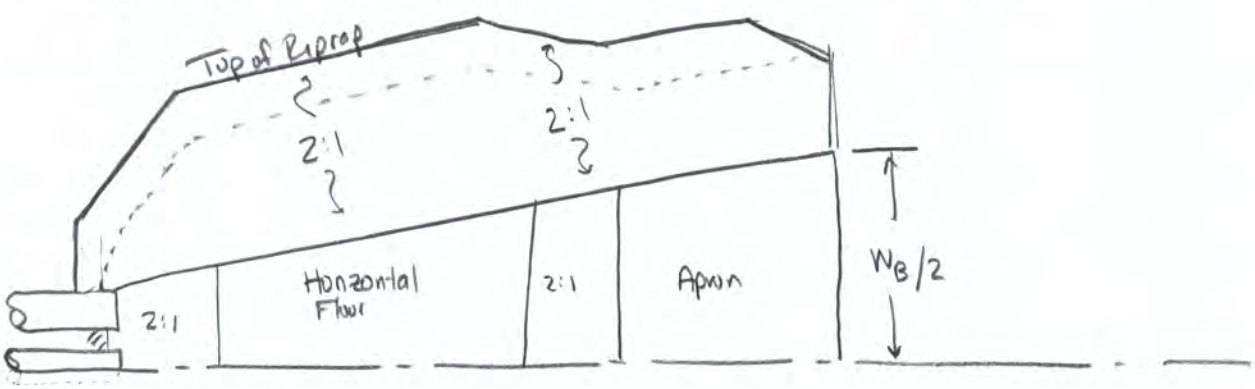
$L_S = 10h_s = 20ft$

$L_A = 5h_s = 10ft$

$L_B = 15h_s = 30ft$

Since using (3) 2.5ft diameter pipes, assume spacing of D/2; total width = 12.5ft.

$$W_B = W_o + 2(L_B/3) = 12.5ft + 2\left(\frac{30ft}{3}\right) = 32.5ft.$$



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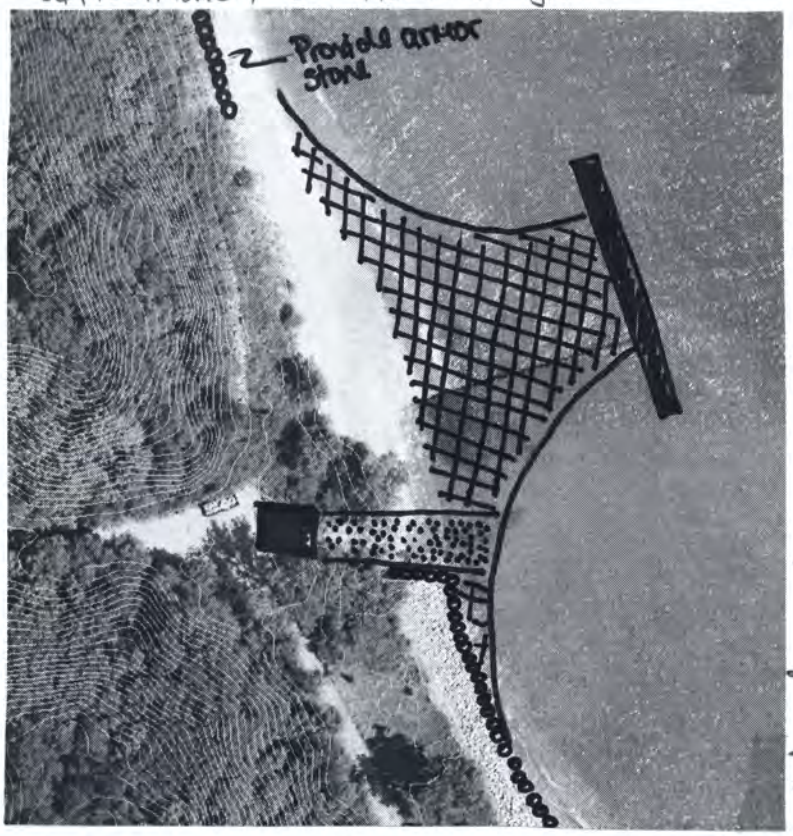
Integrate Into Shoreline Measures

* Use variation of Measure DE, Bartlett Ravine
* Remove groin north of Bartlett Ravine
* Locate midpoint of central nearshore breakwater of system DE approximately 54' north of groin.



* As before, structure is approximately 250 ft long and 130 ft offshore.
* Assume that stable shoreline configuration consistent w/ calculation sheet 7
* Field verify that existing stone south of mouth is adequate based on sizings shown in calculation sheet 13.
  - $D_{50} = 1.2$ ft
  - $W_{50} = 285^{\#}$
  - $d_s = 2.5$ ft
* Provide 80 ft of stone at toe of berm per calculation sheet 13.
* Locate plunge pool at mouth of ravine
* Provide channel to lake.

* Stabilize designated banks using stone, tree trunks, root wads, etc. out to waterline. It's expected that the outlet will periodically silt in, but will open up during the next storm event. Bank stabilization will reduce the likelihood of the channel undermining the southern revetment

Estimate velocity from end of plunge pool to waterline

Elev outfall = 582.89 ft
Elev. MWL = 578.33 ft

$$S_o = \frac{582.89 - 578.33}{120\text{ft}} = 0.038$$

$$Q = \frac{1.49}{n} A R_h^{2/3} S_o^{1/2}$$ where $A = By = (45\text{ft})y$, $P = B + 2y = (45\text{ft}) + 2y$, $R_h = A/P$

$$V = Q/A$$

$V_{S_o = 0.038} = 5.35 \frac{ft}{s}$ → Will likely erode channel. Estimate required slope

$V_{S_o = 0.009} = 3.47 \frac{ft}{s}$ → Use $S_o = 0.009$

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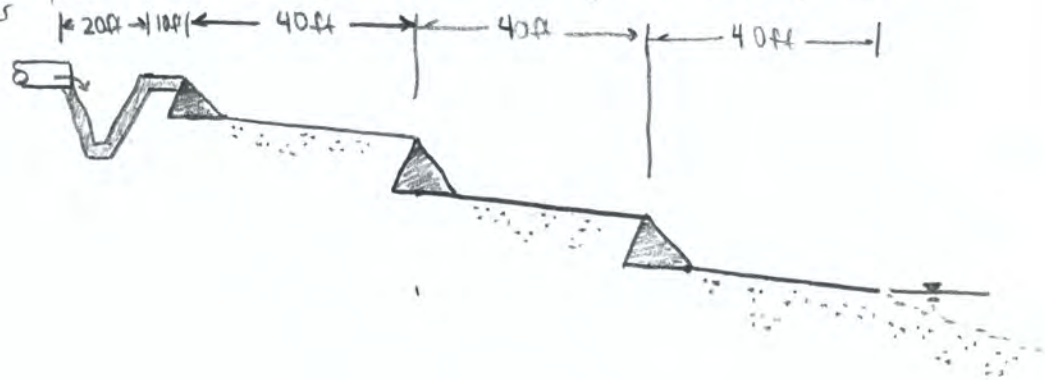
If multiple drop structures used,

$H = (0.038 - 0.009)(120ft) = 3.48ft$

Use (3) riffles total, (1) 12" riffle immediately downstream of plunge pod and (2) 1.25ft riffles spaced every 40ft thereafter



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** REFINED OPTIONS BASED ON LOCAL SPONSOR FEEDBACK **

Ravine Head - Option #4

* Assumptions:
  - Assume place structure in 'Pipe 13' of SWMM model
  - Need to provide approximately 43,200 ft³ of storage
  - From HMS, allowable discharge = 1.2 cfs (2yr-12hr)
  - Locate structure on Openlands property

* Structure Configuration:
  - Shorten 'Pipe 12' by 32' (to property line) from 105'
  - New D/S elevation for 'Pipe 12' set to 650.57
  - Shorten 'Pipe 13' by 24' to 51'
  - New U/S elevation for 'Pipe 13' set to 648.37
  - Provide 4" outlet connected to existing 18" sewer pipe w/ 6" overflow

* Outfall Loading Summary using 100yr-24hr event

  Bridge
  $Q_{max} = 1.45$ cfs
  $V_{max} = 12.28$ cfs

  S. of Homes
  $Q_{max} = 2.22$ cfs
  $V_{max} = 9.08$ ft/s

* Design Stone Apron for Outfall at Head of Ravine

Estimate Required Stone Size

· Size based on peak velocity

$$V_d = 1.2V = 1.2(12.28\,ft/s) = 14.74\,ft/s$$

· From HEC-14, Eqn D.3

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left[\frac{(14.74\,ft/s)^2}{2(32.2\,ft/s^2)}\right] = 1.41\,ft \sim 17''$$

· Size based on cumulative peak flows

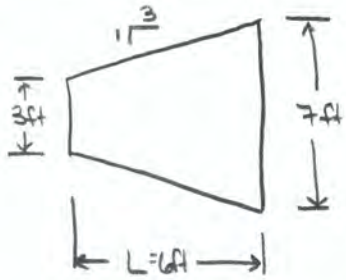
$$Q_d = 1.2(Q_B + Q_{SOH}) = 1.2(3.67\,cfs) = 4.4\,cfs$$

· From HEC-14, Eqn. D.5

$$D_{50} = 0.2D\left[\frac{Q}{\sqrt{g}\,D^{2.5}}\right]^{4/3}\left(\frac{D}{TW}\right) = 0.02D\left[\frac{Q}{D^{2.5}}\right]^{4/3}\left(\frac{D}{0.4D}\right)$$

$$= 0.02(1.5\,ft)\left[\frac{4.4\,cfs}{(1.5\,ft)^{2.5}}\right]^{4/3}\left(\frac{1}{0.4}\right) = 0.14\,ft$$

- Use $D_{50L} = 1.4$ ft
  $W_{50L} = 452$ lbs
- Thickness = D_{100} or $1.5D_{50L} \sim 2.8$ ft
- Calculate length using HEC-14 standard



→ Design Riffle Placement Downstream of Head Outfall

From HEC-HMS model for 100yr-24hr. event
$Q_{outfall} = 4.4$ cfs
$Q_{ravine} = 7.1$ cfs
$Q_{peak} = 10.5$ cfs.

Assume peak discharge occurs at upstream limit for conservative design

- Channel velocities from XS1120 to 431 warrant use of riffles
- Channel incision warrants use to head

Current Slope $= \frac{23}{639} = 0.036$ Target Slope $= \frac{612.4 - 605.8}{430.93 - 141.6} = \frac{6.6}{289.4} = 0.023$

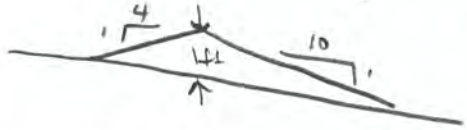
Note: Assumption of target slope is that, for a given flow the velocity found at a XS can be replicated in adjacent XS's if the slope & channel configuration are matched.

From EMSR-4-XX,

$H = (S_o - S_f)X = (0.036 - 0.023)(639\text{ft}) = 8.3\text{ft}$

No. of structures $= \frac{H}{h} = \frac{8.3\text{ft}}{1\text{ft}} = 8.3 \sim 9$ structures

Required spacing $= \frac{639\text{ft}}{9} = 71$ ft



Estimated width ~ 10-15'

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* Estimated stone size
  Target design velocity is 3.0 ft/s. This will be refined during design phase once riffles have been integrated into HEC-RAS model

$$V_d = 1.6V = 1.6(3.0\,ft/s) = 4.8\,ft/s$$

$$D_{50} = C\left[\left(\frac{\gamma_w}{\gamma_s-\gamma_w}\right)^{0.5}\left(\frac{V}{\sqrt{K_1 g d}}\right)\right]^{2.5} = 0.469\left[\left(\frac{62.4}{165-62.4}\right)^{0.5}\left(\frac{4.8}{\sqrt{32.2\cdot 0.5}}\right)\right]^{2.5}$$

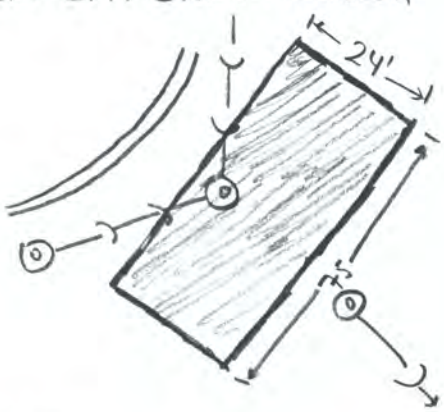
$$= 0.469\left[(0.78)(1.20)\right]^{2.5} = 0.40\,ft$$

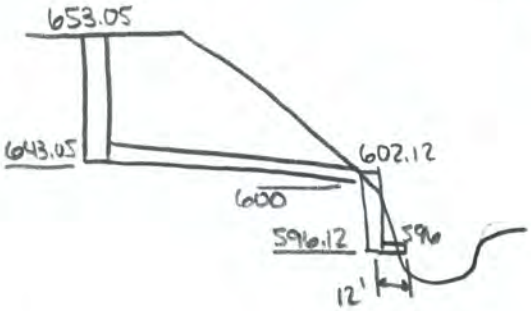
* Use an additional (4) to raise the channel bed from the mouth to XS 182

Sewer at Mouth of Ravine

* Size for 100-year 24-hour event
  $Q_{allowable} = 3.3\,cfs$

From EPA-SWMM model,





* Provide 8'D × 24' × 7.5' storage volume
* Provide 6" primary outlet
* Provide 12" overflow 2.5' from top
  ↳ highest reached was +7.3' while overflow invert is at +7.5'
* Provide manhole immediately outside
* $Q_{max-d} = 2.60\,cfs$
  $V_{max-d} = 4.95\,ft/s$
* Locate structure at bottom to dissipate energy
* Locate near start of stone weirs

Size stone for armoring of outfall

$$V_d = 1.6V = 1.6(5\,ft/s) = 8\,ft/s$$

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left(\frac{8\,ft/s^2}{2\cdot 32.2\,ft/s^2}\right)$$

$$= 0.5\,ft$$

* Position stone apron up opposite slope two feet (slope protection)
  Apron width 3' minimum

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Design Stone Weirs at Mouth

Assumptions:

* Begin weirs at XS192 → length ~ 183 ft.
* Elev. drop = 605.56 - 582.77 = 22.8
* Length btwn structures ~ 8 ft.

This system has not been completely modeled in HEC-RAS. Should it be selected by LS as a viable option, this will be completed. Based on preliminary modeling of the first three structures from the top,

$V_{max} = 2.2\ ft/s$
$d_{max} = 0.75\ ft$

Estimate required stone size:

- Use $V_d = 2.0(V_{max}) = 4.4\ ft/s \sim 5\ ft/s$
- $C = 2(0.375)(1.25)(1)(1)(0.75) = 0.703$

From EM-1110-2-1601 Eqn. 3.3

$$D_{30} = 0.703\left[(0.78)\left(\frac{5\ ft/s}{\sqrt{(32.2\ ft/s^2)(0.75\ ft)}}\right)\right]^{2.5} = 0.394\ ft$$

* For conservative design due to critical nature of this element, use $D_{30} = 0.5\ ft$

Estimate toe scour,

Channel width ~ 3 ft
$D_{MNC} = 0.75\ ft$
$D_{MXB} = 1.14\, D_{MNC}\left(1.72 + \frac{0.0084W}{D_{MNC}}\right)$

$$= 1.14(0.75\ ft)\left(1.72 + \frac{0.0084(3\ ft)}{0.75\ ft}\right) = 1.5\ ft$$

Scour depth = $D_{MXB} - D_{MNC} = 1.5\ ft - 0.75\ ft = 0.75\ ft$.

Total Rock Weir Height

* Assume height above bed = 0.5 ft
* Minimum embedment = 0.9 ft.
* Use 18" base stone to prevent piping & increase stability

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Rock Weir Geometry

Crest Width = $2D_{50} \sim 1.25$ ft.

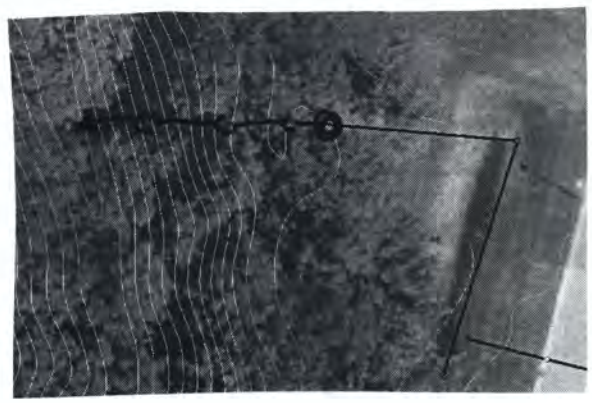
$$R = \text{rock weir radius} = \frac{L^2}{8M} + \frac{M}{2} = \frac{(3ft^2)}{8(1.90)} + \frac{1.90}{2} = 1.5ft$$

where L = chord length = 3 ft
$M = 3D_{50} = 1.9$ ft

* Provide bank stabilization up ravine slope 3' on either side
* Last weir tapess at 1:10

Design Reconfiguration for Mid-Reach "Water Quality Feature"

* Approx. 450' d/s of ravine head, feature diverts storm sewer discharge to top of slope



* Current structure uses outlet control to develop any storage volume. Introduce 2" concrete rings
* Approximately 60' from the existing structure, a new basin will be provided.
* From this basin, a new 12" pipe will carry discharge to the floor of the ravine
* Pipe will be run approx. parallel to existing ravine slope
* From SWMM model, the peak velocity for the 100-year 24-hour event is 1.88 ft/s. Existing riffles sized to resist this flow, so placement of riffle at out is recommended.

Remediation of Failed Structure at Lift Station

* Downstream of the water quality, a lift station was found with a failed curb & gutter and inlet. The tributary area is not large, so suggest repairing curb & gutter and inlet.
* Place inlet invert at ravine's floor & discharge onto stone apron in direction of flow
* Size stone same as riffles to resist in stream velocities; outlet velocities will be quite small

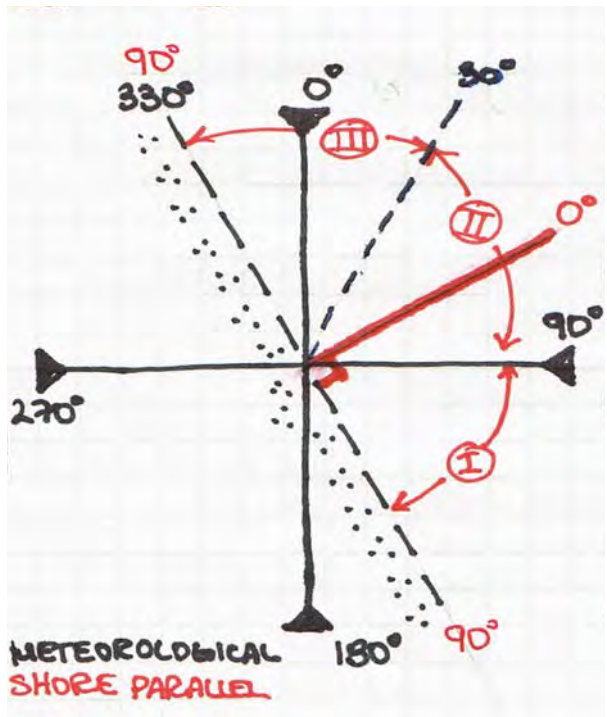
Estimate Lake Bottom Condition for FS-Level Typical Breakwater

From a 2010 bathymetric survey, most structures are located in -3.5' LWD water. when placed 75 feet offshore. IGLD85 zero = 577.5ft, so the toe of the structure will be at 571.06ft IGLD85. Converting to meters, the toe will be at will be at 174.97m IGLD85.

Develop Design Wave Height Conditions

An analysis based on the new Wave Information Study Lake Michigan 31-year hindcast effort and procedures used by Resio and Vincent (1976) was conducted at site WIS ST94027. The location of the extremes was based on the original Resio and Vincent (1976) Station 33 and accompanying shoreline orientation of 240-degrees (documented in Table E4 of the report).

The meteorological direction convention used in the analysis is illustrated in the figure to the right. Waves from the North come from 0-degrees while waves from the East come from 90-degrees.



• Angle Class I: Mean wave approach angle greater than 30-degrees to right of normal to shore (90- to 150-degrees)
• Angle Class II: Mean wave approach angle within 30-degrees to either side of normal to shore (30-degrees to 90-degrees)
• Angle Class III: Mean wave approach angle greater than 30-degrees to left of normal to shore (330- to 30-degrees)

Analysis of the extreme wave heights yielded the following relationships for the respective angle classes:
Angle Class I: $H_{mo}(m) = 1.5950+0.32990 \cdot \ln[\text{Return Period (years)}]$
Angle Class II: $H_{mo}(m) = 2.1802+0.53953 \cdot \ln[\text{Return Period (years)}]$
Angle Class III: $H_{mo}(m) = 2.9447+0.66038 \cdot \ln[\text{Return Period (years)}]$

To ensure a conservative design, the maximum wave period for the extreme analysis of each angle class will be assumed.

Angle Class I: $T_s = 6.93s$
Angle Class II: $T_s = 8.39s$
Angle Class III: $T_s = 12.29s$

Develop Design Lake Level Condiitons

An analysis on the Calumet Harbor lake level data from 1903 to 2010 was performed by Jeff Melby of ERDC . The results of this work included extraction of still-water levels and surge heights for a range of return periods. Using the total lake level value for each return period, a regression equation was developed to estimate two additional return periods not included in the analysis. This equation is as follows:

[Total Water Level] = 581.33 + 0.5245·ln[Return Period]

This data is presented in the table below.

Return Period	Elevation (ft, IGLD85) SWL+Surge
50-year	583.3
25-year	583.1
20-year	582.9
15-year	582.8
10-year	582.6
5-year	582.1

The breakwater design is to economically designed considering both initial construction and future maitenance expenses. Combinations of design wave heights and lake levels will be considered to determine the controlling combination for a given exceedance probability of events. From theese values a total project cost can be estimated.

		Lake Level				
		5-year	**10-year**	**15-year**	**20-year**	**50-year**
		0.2	**0.1**	**0.07**	**0.05**	**0.02**
H_{mo} (ft) **5-year**	**0.2**	25	50	75	100	250
10-year	**0.1**	50	100	150	200	500
15-year	**0.067**	75	150	225	300	750
20-year	**0.05**	100	200	300	400	1000
50-year	**0.02**	250	500	750	1000	2500

		Angle Class I		Angle Class II		Angle Class III	
	H:LL	H_{mo} (ft)	LL (ft)	H_{mo} (ft)	LL (ft)	H_{mo} (ft)	LL (ft)
200-yr	20:10	8.48	582.6	12.46	582.6	16.15	582.6
200-yr	10:20	7.73	582.9	11.23	582.9	14.65	582.9
150-yr	15:10	8.16	582.6	11.95	582.6	15.53	582.6
150-yr	10:15	7.73	582.8	11.23	582.8	14.65	582.8
100-yr	20:5	8.48	582.1	12.46	582.1	16.15	582.1
100-yr	5:20	6.97	582.9	10.00	582.9	13.15	582.9
100-yr	10:10	7.73	582.6	11.23	582.6	14.65	582.6
75-yr	15:5	8.16	582.1	11.95	582.1	15.53	582.1
75-yr	5:15	6.97	582.8	10.00	582.8	13.15	582.8
50-yr	10:5	7.73	582.1	11.23	582.1	14.65	582.1
50-yr	5:10	6.97	582.6	10.00	582.6	13.15	582.6
25-yr	5:5	6.97	582.1	10.00	582.1	13.15	582.1

Wave Transformation - Deepwater to Nearshore

			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		H:LL	WSE	Elev @ Toe	d	H_{mo}	d/H_{mo}	T_p	L_o	α_o	d/L_o
			(ft)	(ft)	(ft)	(ft)	-	(s)	(ft)	(degrees)	-
Angle Class I	200-yr	20:10	582.6	573	9.6	8.48	1.13	6.93	245.812	48.3	0.039
	200-yr	10:20	582.9	573	9.9	7.73	1.28	6.93	245.812	48.3	0.040
	150-yr	15:10	582.6	573	9.6	8.16	1.18	6.93	245.812	48.3	0.039
	150-yr	10:15	582.8	573	9.8	7.73	1.27	6.93	245.812	48.3	0.040
	100-yr	20:5	582.1	573	9.1	8.48	1.07	6.93	245.812	48.3	0.037
	100-yr	5:20	582.9	573	9.9	6.97	1.42	6.93	245.812	48.3	0.040
	100-yr	10:10	582.6	573	9.6	7.73	1.24	6.93	245.812	48.3	0.039
	75-yr	15:5	582.1	573	9.1	8.16	1.11	6.93	245.812	48.3	0.037
	75-yr	5:15	582.8	573	9.8	6.97	1.41	6.93	245.812	48.3	0.040
	50-yr	10:5	582.1	573	9.1	7.73	1.18	6.93	245.812	48.3	0.037
	50-yr	5:10	582.6	573	9.6	6.97	1.38	6.93	245.812	48.3	0.039
	25-yr	5:5	582.1	573	9.1	6.97	1.30	6.93	245.812	48.3	0.037
Angle Class II	200-yr	20:10	582.6	573	9.6	12.46	0.77	8.39	360.297	0.7	0.027
	200-yr	10:20	582.9	573	9.9	11.23	0.88	8.39	360.297	0.7	0.027
	150-yr	15:10	582.6	573	9.6	11.95	0.80	8.39	360.297	0.7	0.027
	150-yr	10:15	582.8	573	9.8	11.23	0.87	8.39	360.297	0.7	0.027
	100-yr	20:5	582.1	573	9.1	12.46	0.73	8.39	360.297	0.7	0.025
	100-yr	5:20	582.9	573	9.9	10.00	0.99	8.39	360.297	0.7	0.027
	100-yr	10:10	582.6	573	9.6	11.23	0.85	8.39	360.297	0.7	0.027
	75-yr	15:5	582.1	573	9.1	11.95	0.76	8.39	360.297	0.7	0.025
	75-yr	5:15	582.8	573	9.8	10.00	0.98	8.39	360.297	0.7	0.027
	50-yr	10:5	582.1	573	9.1	11.23	0.81	8.39	360.297	0.7	0.025
	50-yr	5:10	582.6	573	9.6	10.00	0.96	8.39	360.297	0.7	0.027
	25-yr	5:5	582.1	573	9.1	10.00	0.91	8.39	360.297	0.7	0.025
Angle Class III	200-yr	20:10	582.6	573	9.6	16.15	0.59	12.29	773.108	39.6	0.012
	200-yr	10:20	582.9	573	9.9	14.65	0.68	12.29	773.108	39.6	0.013
	150-yr	15:10	582.6	573	9.6	15.53	0.62	12.29	773.108	39.6	0.012
	150-yr	10:15	582.8	573	9.8	14.65	0.67	12.29	773.108	39.6	0.013
	100-yr	20:5	582.1	573	9.1	16.15	0.56	12.29	773.108	39.6	0.012
	100-yr	5:20	582.9	573	9.9	13.15	0.75	12.29	773.108	39.6	0.013
	100-yr	10:10	582.6	573	9.6	14.65	0.66	12.29	773.108	39.6	0.012
	75-yr	15:5	582.1	573	9.1	15.53	0.59	12.29	773.108	39.6	0.012
	75-yr	5:15	582.8	573	9.8	13.15	0.75	12.29	773.108	39.6	0.013
	50-yr	10:5	582.1	573	9.1	14.65	0.62	12.29	773.108	39.6	0.012
	50-yr	5:10	582.6	573	9.6	13.15	0.73	12.29	773.108	39.6	0.012
	25-yr	5:5	582.1	573	9.1	13.15	0.69	12.29	773.108	39.6	0.012

			(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
		H:LL	y_o	C	L	k	s_{max}	K_r	K_s	H_o'	d/H_o'
			-	(ft/s)	(ft)	(ft^{-1})	-	-	-	(ft)	-
Angle Class I	200-yr	20:10	0.2454	16.864	116.87	0.0538	25	0.84	1.0693	7.12	1.35
	200-yr	10:20	0.2531	17.103	118.52	0.053	25	0.84	1.0632	6.49	1.53
	150-yr	15:10	0.2454	16.864	116.87	0.0538	25	0.84	1.0693	6.86	1.40
	150-yr	10:15	0.2505	17.024	117.97	0.0533	25	0.84	1.0652	6.49	1.51
	100-yr	20:5	0.2326	16.455	114.03	0.0551	25	0.84	1.0802	7.12	1.28
	100-yr	5:20	0.2531	17.103	118.52	0.053	25	0.84	1.0632	5.86	1.69
	100-yr	10:10	0.2454	16.864	116.87	0.0538	25	0.84	1.0693	6.49	1.48
	75-yr	15:5	0.2326	16.455	114.03	0.0551	25	0.84	1.0802	6.86	1.33
	75-yr	5:15	0.2505	17.024	117.97	0.0533	25	0.84	1.0652	5.86	1.67
	50-yr	10:5	0.2326	16.455	114.03	0.0551	25	0.84	1.0802	6.49	1.40
	50-yr	5:10	0.2454	16.864	116.87	0.0538	25	0.84	1.0693	5.86	1.64
	25-yr	5:5	0.2326	16.455	114.03	0.0551	25	0.84	1.0802	5.86	1.55
Angle Class II	200-yr	20:10	0.1674	17.089	143.38	0.0438	25	0.96	1.1534	11.96	0.80
	200-yr	10:20	0.1726	17.339	145.47	0.0432	25	0.96	1.1461	10.78	0.92
	150-yr	15:10	0.1674	17.089	143.38	0.0438	25	0.96	1.1534	11.47	0.84
	150-yr	10:15	0.1709	17.256	144.78	0.0434	25	0.96	1.1485	10.78	0.91
	100-yr	20:5	0.1587	16.663	139.8	0.0449	25	0.96	1.1663	11.96	0.76
	100-yr	5:20	0.1726	17.339	145.47	0.0432	25	0.96	1.1461	9.60	1.03
	100-yr	10:10	0.1674	17.089	143.38	0.0438	25	0.96	1.1534	10.78	0.89
	75-yr	15:5	0.1587	16.663	139.8	0.0449	25	0.96	1.1663	11.47	0.79
	75-yr	5:15	0.1709	17.256	144.78	0.0434	25	0.96	1.1485	9.60	1.02
	50-yr	10:5	0.1587	16.663	139.8	0.0449	25	0.96	1.1663	10.78	0.84
	50-yr	5:10	0.1674	17.089	143.38	0.0438	25	0.96	1.1534	9.60	1.00
	25-yr	5:5	0.1587	16.663	139.8	0.0449	25	0.96	1.1663	9.60	0.95
Angle Class III	200-yr	20:10	0.078	17.349	213.22	0.0295	25	0.8	1.3646	12.92	0.74
	200-yr	10:20	0.0805	17.61	216.43	0.029	25	0.8	1.355	11.72	0.84
	150-yr	15:10	0.078	17.349	213.22	0.0295	25	0.8	1.3646	12.42	0.77
	150-yr	10:15	0.0796	17.524	215.37	0.0292	25	0.8	1.3582	11.72	0.84
	100-yr	20:5	0.074	16.902	207.73	0.0302	25	0.8	1.3816	12.92	0.70
	100-yr	5:20	0.0805	17.61	216.43	0.029	25	0.8	1.355	10.52	0.94
	100-yr	10:10	0.078	17.349	213.22	0.0295	25	0.8	1.3646	11.72	0.82
	75-yr	15:5	0.074	16.902	207.73	0.0302	25	0.8	1.3816	12.42	0.73
	75-yr	5:15	0.0796	17.524	215.37	0.0292	25	0.8	1.3582	10.52	0.93
	50-yr	10:5	0.074	16.902	207.73	0.0302	25	0.8	1.3816	11.72	0.78
	50-yr	5:10	0.078	17.349	213.22	0.0295	25	0.8	1.3646	10.52	0.91
	25-yr	5:5	0.074	16.902	207.73	0.0302	25	0.8	1.3816	10.52	0.87

			(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(29)	(30)
		H:LL	H_o'/L_o	m	β_o	β_1	β_{max}	$H_{1/3}$				$H_{s,des}$	α_p
			-	(ft/ft)	-	-	-	(ft)	(ft)	(ft)	(ft)	(ft)	(degrees)
Angle Class I	200-yr	20:10	0.029	0.013	0.111	0.549	0.922	6.06	6.57	7.62	6.06	6.06	20
	200-yr	10:20	0.026	0.013	0.115	0.549	0.947	6.18	6.15	6.90	6.15	6.15	20
	150-yr	15:10	0.028	0.013	0.112	0.549	0.932	6.04	6.39	7.33	6.04	6.04	20
	150-yr	10:15	0.026	0.013	0.115	0.549	0.947	6.13	6.15	6.91	6.13	6.13	20
	100-yr	20:5	0.029	0.013	0.111	0.549	0.922	5.79	6.56	7.69	5.79	5.79	20
	100-yr	5:20	0.024	0.013	0.119	0.549	0.976	6.14	5.72	6.23	5.72	5.72	20
	100-yr	10:10	0.026	0.013	0.115	0.549	0.947	6.02	6.15	6.94	6.02	6.02	20
	75-yr	15:5	0.028	0.013	0.112	0.549	0.932	5.77	6.39	7.41	5.77	5.77	20
	75-yr	5:15	0.024	0.013	0.119	0.549	0.976	6.08	5.72	6.24	5.72	5.72	20
	50-yr	10:5	0.026	0.013	0.115	0.549	0.947	5.74	6.15	7.01	5.74	5.74	20
	50-yr	5:10	0.024	0.013	0.119	0.549	0.976	5.97	5.72	6.27	5.72	5.72	20
	25-yr	5:5	0.024	0.013	0.119	0.549	0.976	5.70	5.72	6.33	5.70	5.70	20
Angle Class II	200-yr	20:10	0.033	0.013	0.105	0.549	0.920	6.53	11.00	13.79	6.53	6.53	0
	200-yr	10:20	0.030	0.013	0.109	0.549	0.920	6.62	9.92	12.35	6.62	6.62	0
	150-yr	15:10	0.032	0.013	0.107	0.549	0.920	6.50	10.55	13.23	6.50	6.50	0
	150-yr	10:15	0.030	0.013	0.109	0.549	0.920	6.56	9.92	12.38	6.56	6.56	0
	100-yr	20:5	0.033	0.013	0.105	0.549	0.920	6.26	11.00	13.95	6.26	6.26	0
	100-yr	5:20	0.027	0.013	0.114	0.549	0.945	6.53	9.07	11.00	6.53	6.53	0
	100-yr	10:10	0.030	0.013	0.109	0.549	0.920	6.45	9.92	12.43	6.45	6.45	0
	75-yr	15:5	0.032	0.013	0.107	0.549	0.920	6.22	10.55	13.38	6.22	6.22	0
	75-yr	5:15	0.027	0.013	0.114	0.549	0.945	6.48	9.07	11.03	6.48	6.48	0
	50-yr	10:5	0.030	0.013	0.109	0.549	0.920	6.18	9.92	12.57	6.18	6.18	0
	50-yr	5:10	0.027	0.013	0.114	0.549	0.945	6.37	9.07	11.07	6.37	6.37	0
	25-yr	5:5	0.027	0.013	0.114	0.549	0.945	6.10	9.07	11.20	6.10	6.10	0
Angle Class III	200-yr	20:10	0.017	0.013	0.137	0.549	1.081	7.04	13.97	17.63	7.04	7.04	9
	200-yr	10:20	0.015	0.013	0.142	0.549	1.113	7.10	13.04	15.88	7.10	7.10	9
	150-yr	15:10	0.016	0.013	0.139	0.549	1.094	6.99	13.59	16.95	6.99	6.99	9
	150-yr	10:15	0.015	0.013	0.142	0.549	1.113	7.04	13.04	15.92	7.04	7.04	9
	100-yr	20:5	0.017	0.013	0.137	0.549	1.081	6.76	13.97	17.85	6.76	6.76	9
	100-yr	5:20	0.014	0.013	0.148	0.549	1.148	6.99	12.07	14.25	6.99	6.99	9
	100-yr	10:10	0.015	0.013	0.142	0.549	1.113	6.93	13.04	15.99	6.93	6.93	9
	75-yr	15:5	0.016	0.013	0.139	0.549	1.094	6.72	13.59	17.16	6.72	6.72	9
	75-yr	5:15	0.014	0.013	0.148	0.549	1.148	6.93	12.07	14.29	6.93	6.93	9
	50-yr	10:5	0.015	0.013	0.142	0.549	1.113	6.66	13.04	16.19	6.66	6.66	9
	50-yr	5:10	0.014	0.013	0.148	0.549	1.148	6.83	12.07	14.35	6.83	6.83	9
	25-yr	5:5	0.014	0.013	0.148	0.549	1.148	6.55	12.07	14.53	6.55	6.55	9

Summary of the Wave Transformation Columns

Column (1): Design Water Surface Elevation , WSE

From analysis of Calumet Harbor gage data

Column (2): Lake Bed Elevation at Toe of the Structure

Estimated based on proposed location and bathymetric survey conducted in 2010

Column (3): Depth Relative to Toe of Structure, d

= [Column (1)] - [Column (2)]

Column (4): Spectral Significant Wave Height, H_{mo}

From hindcast analysis for recently completed WIS

Column (5): Ratio of Depth to Spectral Significant Wave Height

$$\frac{d}{H_{mo}} = \frac{Column_3}{Column_4}$$

Column (6): Peak Wave Period, T_p

From hindcast analysis for recently completed WIS

Column (7): Deep Water Wave Length, L_o

$$L_o = \frac{g}{2\pi} T^2$$

Column (8): Deep Water Wave Angle, α_o

Hindcast analysis for the site included a list of the top ten wave events for each angle class. The values for the design approach direction are the average approach direction of these ten events for each angle class. Directions were translated from meteorological direction to an angle relative to shore parallel (i.e. 0° is shore parallel).

Column (9): Ratio of Depth to Deep Water Wave Length

$$\frac{d}{L_o} = \frac{Column_3}{Column_7}$$

Column (10): Hunt's Approximation Parameter, y_o

$$y_o \equiv \frac{2\pi d}{L_o}$$

Column (11): Wave Celerity, C

$$\frac{C^2}{gd} = \left[y_o + \left(1 + 0.6522 y_o + 0.4622 y_o^2 + 0.0864 y_o^4 + 0.0675 y_o^5\right)^{-1} \right]^{-1}$$

Column (12): Wave Length, L

L = C·T

Column (13): Wave Number, k

$$k = \frac{2\pi}{L}$$

Column (14): Spreading Parameter, s_{max}

Using Figure 2.13 from Goda (2010), s_{max} varies between approximately 17 and 47. Assume that s_{max} equals 25.

Column (15): Refraction Coefficient, K_r

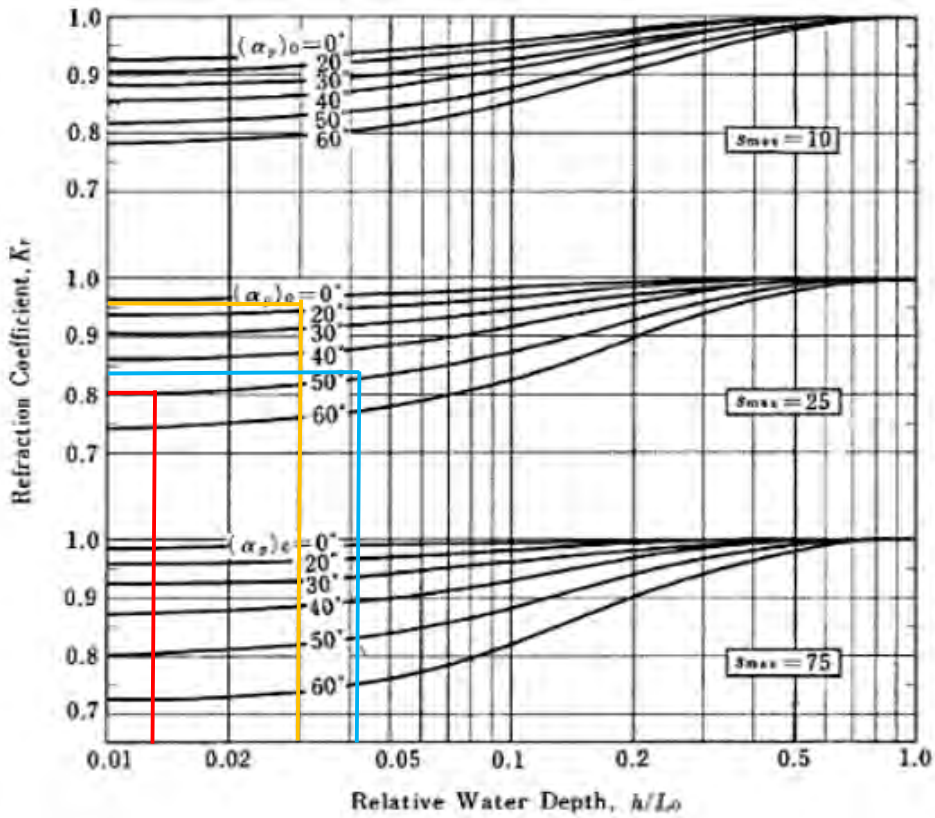


Fig. 3.10 Refraction coefficient of random sea waves on a coast with straight, parallel depth-contours.[17]

Column (16): Shoaling Coefficient, K_s

$$K_s = \left[\left(1 + \frac{2kd}{\sinh(2kd)}\right)\tanh(kd)\right]^{-1/2}$$

Column (17): Equivalent Deep Water Wave Height, H_o'

$$H_o' = H_o \cdot K_r = Column_5 \times Column_11$$

Column (18): Ratio of Depth to Equivalent Wave Height

$$\frac{d}{H_o'} = \frac{Column_3}{Column_17}$$

Column (19): Ratio of Equivalent Deep Water Wave Height to Deep Water Wavelength

$$\frac{H_o'}{L_o} = \frac{Column_17}{Column_7}$$

Column (20): Beach Slope, m

Estimated based on proposed location and bathymetric survey conducted in 2010

Column (21): Coefficient for approximate estimation of wave height within surf zone, β_o

$$\beta_o = 0.028\left(\frac{H_o'}{L_o}\right)^{-0.38} \exp\left(20 \cdot \tan^{1.5}\theta\right)$$

Column (22): Coefficient for approximate estimation of wave height within surf zone, β_1

$$\beta_1 = 0.52 \exp\left[4.2 \tan\theta\right]$$

Column (23): Coefficient for approximate estimation of wave height within surf zone, β_{max}

$$\beta_{\max} = \max\left\{0.92, 0.32\left(\frac{H_o'}{L_o}\right)^{-0.29} \exp\left[2.4 \tan\theta\right]\right\}$$

Column (24): Significant Wave Height within Surf Zone, Calculation #1

$$H_{1/3} = \beta_o H_o' + \beta_1 d$$

Column (25): Significant Wave Height within Surf Zone, Calculation #2

$$H_{1/3} = \beta_{\max} H_o'$$

Column (26): Significant Wave Height within Surf Zone, Calculation #3

$$H_{1/3} = K_s H_o'$$

Column (27): Signifcant Wave Height within Surf Zone

Significant wave height within the surf zone is the minimum of the three values previously

Column (28): Depth-Limited Wave Height at Toe of Breakwater

$$H_{sb} = 0.56 \cdot d_b \cdot \exp\left[3.5 \cdot m\right]$$

Column (29): Design Significant Wave Height

Design signifcant wave height is the minimum of the signficant wave height developed through

Column (30): Approach Angle after Refraction, α_p

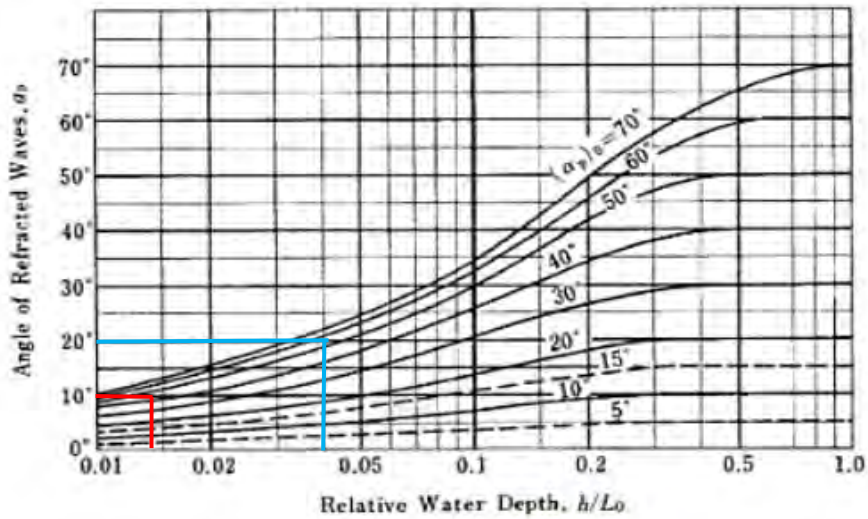


Fig. 3.11 Variation of predominant direction of random sea waves due to refraction on a coast with straight, parallel depth-contours.

Design Wave Parameters

		H:LL	(1) H_s (ft)	(2) H_s (m)	(3) T_p (s)	(4) T_m (s)	(5) α_p (deg)
Angle Class I	200-yr	20:10	6.06	1.85	6.93	5.68	20
	200-yr	10:20	6.15	1.87	6.93	5.68	20
	150-yr	15:10	6.04	1.84	6.93	5.68	20
	150-yr	10:15	6.13	1.87	6.93	5.68	20
	100-yr	20:5	5.79	1.76	6.93	5.68	20
	100-yr	5:20	5.72	1.74	6.93	5.68	20
	100-yr	10:10	6.02	1.83	6.93	5.68	20
	75-yr	15:5	5.77	1.76	6.93	5.68	20
	75-yr	5:15	5.72	1.74	6.93	5.68	20
	50-yr	10:5	5.74	1.75	6.93	5.68	20
	50-yr	5:10	5.72	1.74	6.93	5.68	20
	25-yr	5:5	5.70	1.74	6.93	5.68	20
Angle Class II	200-yr	20:10	6.53	1.99	8.39	6.88	0
	200-yr	10:20	6.62	2.02	8.39	6.88	0
	150-yr	15:10	6.50	1.98	8.39	6.88	0
	150-yr	10:15	6.56	2.00	8.39	6.88	0
	100-yr	20:5	6.26	1.91	8.39	6.88	0
	100-yr	5:20	6.53	1.99	8.39	6.88	0
	100-yr	10:10	6.45	1.97	8.39	6.88	0
	75-yr	15:5	6.22	1.90	8.39	6.88	0
	75-yr	5:15	6.48	1.98	8.39	6.88	0
	50-yr	10:5	6.18	1.88	8.39	6.88	0
	50-yr	5:10	6.37	1.94	8.39	6.88	0
	25-yr	5:5	6.10	1.86	8.39	6.88	0
Angle Class III	200-yr	20:10	7.04	2.14	12.29	10.08	9
	200-yr	10:20	7.10	2.16	12.29	10.08	9
	150-yr	15:10	6.99	2.13	12.29	10.08	9
	150-yr	10:15	7.04	2.15	12.29	10.08	9
	100-yr	20:5	6.76	2.06	12.29	10.08	9
	100-yr	5:20	6.99	2.13	12.29	10.08	9
	100-yr	10:10	6.93	2.11	12.29	10.08	9
	75-yr	15:5	6.72	2.05	12.29	10.08	9
	75-yr	5:15	6.93	2.11	12.29	10.08	9
	50-yr	10:5	6.66	2.03	12.29	10.08	9
	50-yr	5:10	6.83	2.08	12.29	10.08	9
	25-yr	5:5	6.55	2.00	12.29	10.08	9

Assumed Contstants

Density of Stone =	2650	kg/m^3
	165	lb/ft^3
Density of Water =	1000	kg/m^3
	62.4	lb/ft^3
Gravity, g =	9.81	m/s^2
$\Delta = S_r - 1 =$	1.65	

Assumed Design Parameters

Nominal Damage, S_a =	2	No Damage
Permeability, P_b =	0.4	Coarse Core Layers (Std)
No. of Waves, N_w =	7500	waves

Assumed Partial Safety Factors

	Surging	Plunging	
σ'_{FHs} =	0.05		(Assumes HQ Wave Data)
P_f =	0.4		
γ_H =	1	1	
γ_Z =	1.08	1.08	

Required Crest Elevation - Based on Maximum Observed Overtopping at Forest Park, Lake Forest

			(6)	(7)	(8)	(9)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
		H:LL	L_{om}	L_{op}	s_{om}	s_{op}	tan α	ξ_{op}	γ_r	γ_b	γ_h	γ_β	R_c		q
			(m)	(m)	-	-	-	-	-	-	-	-	(m)	(ft)	(m^3/s/m)
Angle Class I	200-yr	20:10	50.42	74.98	0.037	0.025	0.500	3.185	0.55	1	1	0.970	0.43	1.40	0.510
	200-yr	10:20	50.42	74.98	0.037	0.025	0.500	3.163	0.55	1	1	0.970	0.34	1.10	0.671
	150-yr	15:10	50.42	74.98	0.037	0.025	0.500	3.190	0.55	1	1	0.970	0.43	1.40	0.506
	150-yr	10:15	50.42	74.98	0.037	0.025	0.500	3.168	0.55	1	1	0.970	0.37	1.20	0.615
	100-yr	20:5	50.42	74.98	0.035	0.024	0.500	3.260	0.55	1	1	0.970	0.58	1.90	0.296
	100-yr	5:20	50.42	74.98	0.035	0.023	0.500	3.280	0.55	1	1	0.970	0.34	1.10	0.564
	100-yr	10:10	50.42	74.98	0.036	0.024	0.500	3.197	0.55	1	1	0.970	0.43	1.40	0.500
	75-yr	15:5	50.42	74.98	0.035	0.023	0.500	3.265	0.55	1	1	0.970	0.58	1.90	0.293
	75-yr	5:15	50.42	74.98	0.035	0.023	0.500	3.280	0.55	1	1	0.970	0.37	1.20	0.518
	50-yr	10:5	50.42	74.98	0.035	0.023	0.500	3.273	0.55	1	1	0.970	0.58	1.90	0.289
	50-yr	5:10	50.42	74.98	0.035	0.023	0.500	3.280	0.55	1	1	0.970	0.43	1.40	0.437
	25-yr	5:5	50.42	74.98	0.034	0.023	0.500	3.286	0.55	1	1	0.970	0.58	1.90	0.282
Angle Class II	200-yr	20:10	73.90	109.90	0.027	0.018	0.500	3.715	0.55	1	1	1.000	0.43	1.40	0.638
	200-yr	10:20	73.90	109.90	0.027	0.018	0.500	3.691	0.55	1	1	1.000	0.34	1.10	0.818
	150-yr	15:10	73.90	109.90	0.027	0.018	0.500	3.725	0.55	1	1	1.000	0.43	1.40	0.631
	150-yr	10:15	73.90	109.90	0.027	0.018	0.500	3.706	0.55	1	1	1.000	0.37	1.20	0.746
	100-yr	20:5	73.90	109.90	0.026	0.017	0.500	3.796	0.55	1	1	1.000	0.58	1.90	0.392
	100-yr	5:20	73.90	109.90	0.027	0.018	0.500	3.714	0.55	1	1	1.000	0.34	1.10	0.795
	100-yr	10:10	73.90	109.90	0.027	0.018	0.500	3.738	0.55	1	1	1.000	0.43	1.40	0.619
	75-yr	15:5	73.90	109.90	0.026	0.017	0.500	3.806	0.55	1	1	1.000	0.58	1.90	0.387
	75-yr	5:15	73.90	109.90	0.027	0.018	0.500	3.730	0.55	1	1	1.000	0.37	1.20	0.725
	50-yr	10:5	73.90	109.90	0.025	0.017	0.500	3.820	0.55	1	1	1.000	0.58	1.90	0.378
	50-yr	5:10	73.90	109.90	0.026	0.018	0.500	3.762	0.55	1	1	1.000	0.43	1.40	0.600
	25-yr	5:5	73.90	109.90	0.025	0.017	0.500	3.846	0.55	1	1	1.000	0.58	1.90	0.363
Angle Class III	200-yr	20:10	158.57	235.83	0.014	0.009	0.500	5.243	0.55	1	1	1.000	0.43	1.40	0.768
	200-yr	10:20	158.57	235.83	0.014	0.009	0.500	5.220	0.55	1	1	1.000	0.34	1.10	0.958
	150-yr	15:10	158.57	235.83	0.013	0.009	0.500	5.259	0.55	1	1	1.000	0.43	1.40	0.757
	150-yr	10:15	158.57	235.83	0.014	0.009	0.500	5.241	0.55	1	1	1.000	0.37	1.20	0.880
	100-yr	20:5	158.57	235.83	0.013	0.009	0.500	5.348	0.55	1	1	1.000	0.58	1.90	0.491
	100-yr	5:20	158.57	235.83	0.013	0.009	0.500	5.260	0.55	1	1	1.000	0.34	1.10	0.926
	100-yr	10:10	158.57	235.83	0.013	0.009	0.500	5.282	0.55	1	1	1.000	0.43	1.40	0.741
	75-yr	15:5	158.57	235.83	0.013	0.009	0.500	5.365	0.55	1	1	1.000	0.58	1.90	0.482
	75-yr	5:15	158.57	235.83	0.013	0.009	0.500	5.281	0.55	1	1	1.000	0.37	1.20	0.850
	50-yr	10:5	158.57	235.83	0.013	0.009	0.500	5.390	0.55	1	1	1.000	0.58	1.90	0.470
	50-yr	5:10	158.57	235.83	0.013	0.009	0.500	5.324	0.55	1	1	1.000	0.43	1.40	0.713
	25-yr	5:5	158.57	235.83	0.013	0.008	0.500	5.434	0.55	1	1	1.000	0.58	1.90	0.449

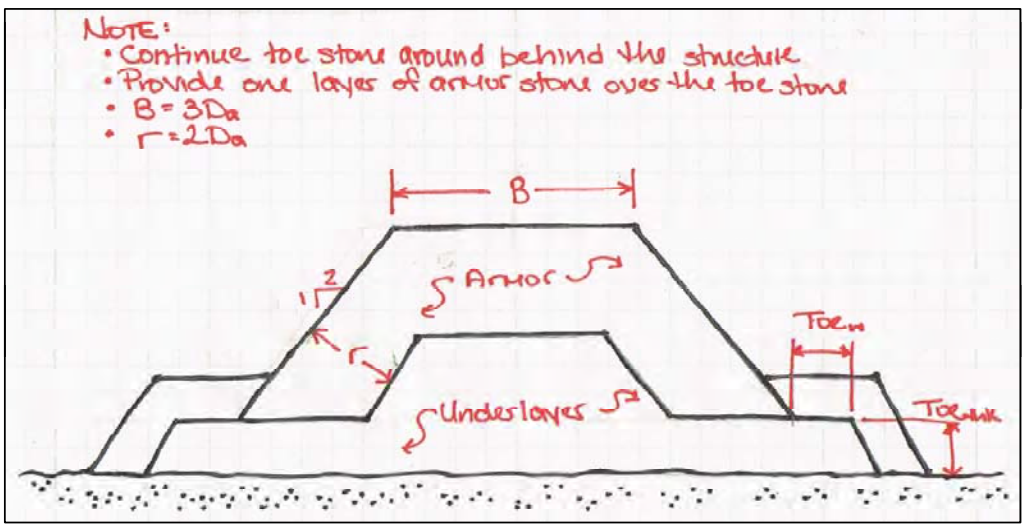
Breakwater Design

		H:LL	(20) $H_{0.1}$ (ft)	(21) K_D -	(22) M_{50} (ton)	(23) D_{50} (ft)	(24) B (ft)	(25) r (ft)	(26) Toe_W (ft)	(27) Toe_{thk} (ft)
Angle Class I	200-yr	20:10	7.70	2.00	2.1	2.9	8.82	5.88	2.94	1.96
	200-yr	10:20	7.81	2.00	2.2	3.0	8.94	5.96	2.98	1.99
	150-yr	15:10	7.67	2.00	2.1	2.9	8.79	5.86	2.93	1.95
	150-yr	10:15	7.78	2.00	2.2	3.0	8.91	5.94	2.97	1.98
	100-yr	20:5	7.35	2.00	1.8	2.8	8.42	5.61	2.81	1.87
	100-yr	5:20	7.26	2.00	1.8	2.8	8.32	5.54	2.77	1.85
	100-yr	10:10	7.64	2.00	2.0	2.9	8.75	5.83	2.92	1.94
	75-yr	15:5	7.33	2.00	1.8	2.8	8.39	5.59	2.80	1.86
	75-yr	5:15	7.26	2.00	1.8	2.8	8.32	5.54	2.77	1.85
	50-yr	10:5	7.29	2.00	1.8	2.8	8.35	5.57	2.78	1.86
	50-yr	5:10	7.26	2.00	1.8	2.8	8.32	5.54	2.77	1.85
	25-yr	5:5	7.23	2.00	1.7	2.8	8.29	5.52	2.76	1.84
Angle Class II	200-yr	20:10	8.29	2.00	2.6	3.2	9.50	6.33	3.17	2.11
	200-yr	10:20	8.40	2.00	2.7	3.2	9.62	6.42	3.21	2.14
	150-yr	15:10	8.25	1.60	3.2	3.4	10.18	6.79	3.39	2.26
	150-yr	10:15	8.33	2.00	2.7	3.2	9.54	6.36	3.18	2.12
	100-yr	20:5	7.94	2.00	2.3	3.0	9.10	6.07	3.03	2.02
	100-yr	5:20	8.30	2.00	2.6	3.2	9.51	6.34	3.17	2.11
	100-yr	10:10	8.19	2.00	2.5	3.1	9.39	6.26	3.13	2.09
	75-yr	15:5	7.90	2.00	2.3	3.0	9.05	6.04	3.02	2.01
	75-yr	5:15	8.23	2.00	2.6	3.1	9.43	6.28	3.14	2.09
	50-yr	10:5	7.85	1.60	2.8	3.2	9.68	6.45	3.23	2.15
	50-yr	5:10	8.09	2.00	2.4	3.1	9.27	6.18	3.09	2.06
	25-yr	5:5	7.74	2.00	2.1	3.0	8.87	5.91	2.96	1.97
Angle Class III	200-yr	20:10	8.94	2.00	3.3	3.4	10.24	6.82	3.41	2.27
	200-yr	10:20	9.01	2.00	3.4	3.4	10.32	6.88	3.44	2.29
	150-yr	15:10	8.88	2.00	3.2	3.4	10.17	6.78	3.39	2.26
	150-yr	10:15	8.94	2.00	3.3	3.4	10.24	6.83	3.41	2.28
	100-yr	20:5	8.59	2.00	2.9	3.3	9.84	6.56	3.28	2.19
	100-yr	5:20	8.88	2.00	3.2	3.4	10.17	6.78	3.39	2.26
	100-yr	10:10	8.80	2.00	3.1	3.4	10.08	6.72	3.36	2.24
	75-yr	15:5	8.53	2.00	2.9	3.3	9.77	6.52	3.26	2.17
	75-yr	5:15	8.81	2.00	3.1	3.4	10.09	6.73	3.36	2.24
	50-yr	10:5	8.46	2.00	2.8	3.2	9.69	6.46	3.23	2.15
	50-yr	5:10	8.67	2.00	3.0	3.3	9.93	6.62	3.31	2.21
	25-yr	5:5	8.32	2.00	2.6	3.2	9.53	6.35	3.18	2.12

Summary of Design Conditions for Return Period Events

The preceding pages considered a variety of conditions that, when combined, translate to a given recurrance interval. The optimum design for a given recurrance interval was established to assuming a combination of the highest crest elevation and largest stone size for a given interval. These combinations are summarized

Return Period	Crest Elev. (ft)	Total Ht. (ft)	D_{50} (ft)	B (ft)	r (ft)	Toe_W (ft)	Toe_{thk} (ft)
200-yr	584.0	11.0	3.4	10.2	6.8	3.4	2.27
150-yr	584.0	11.0	3.4	10.2	6.8	3.4	2.27
100-yr	584.0	11.0	3.4	10.2	6.8	3.4	2.27
75-yr	584.0	11.0	3.4	10.2	6.8	3.4	2.27
50-yr	584.0	11.0	3.3	9.9	6.6	3.3	2.20
25-yr	584.0	11.0	3.2	9.6	6.4	3.2	2.13



Summary of the Structure Design Columns

Column (1): Significant Wave Height at the Toe of the Breakwater, H_s

From "Wave Transformation" worksheet, Column (29)

Column (2): Significant Wave Height at the Toe of the Breakwater, H_s converted to meters

= [Column (1)] x 0.3048

Column (3): Wave Period Associated with the Spectral Peak in Deep Water, T_p

From "Wave Transformation" worksheet, Column (6)

Column (4): Mean Wave Period, T_m

= [Column (3)] x 0.82

Column (5): Ratio of Depth to Spectral Significant Wave Height

From "Wave Transformation" worksheet, Column (30)

Column (6): Mean Deep Water Wave Length, L_{om}

$$L_{om} = \frac{g}{2\pi} T_m^{\ 2}$$

Column (7): Peak Deep Water Wave Length, L_{op}

$$L_{op} = \frac{g}{2\pi} T_p^{\ 2}$$

Column (8): Mean Deep Water Wave Steepness, s_{om}

$$s_{om} = \frac{H_s}{L_{om}}$$

Column (9): Peak Deep Water Wave Steepness, s_{op}

$$s_{op} = \frac{H_s}{L_{op}}$$

Column (10): Mean Deep Water Wave Steepness, s_m (Using untruncated wave height)

$$s_m = \frac{H_{s-des}}{L_{om}}$$

Column (11): tan α

Tangent of the angle of the structure

Column (12): Surf Similarity Parameter (Based on Peak Deep Water Wave Steepness), ξ_{op}

$$\xi_{op} = \frac{\tan\theta}{\sqrt{s_{op}}}$$

Column (13): Surface Roughness Recution Factor, γ_r

From Table VI-5-3, 2 or more layers of rock, $\gamma_r = 0.50$

Column (14): Berm Influence Factor, γ_b

From Equations VI-5-8 and VI-5-9. Assumed to equal 1 (i.e. no berm)

Column (15): Influence of Shallow Water on Runup, γ_h

$$\gamma_h = \frac{H_{2\%}}{1.4H_s}$$

Column (16): Influence of Angle of Attack on Runup, γ_β

	$\gamma_\beta = 1.0$	for	$0° \le \beta \le 10°$
Long-crest ed waves	$\gamma_\beta = \cos(\beta - 10°)$	for	$10° \le \beta \le 63°$
	$\gamma_\beta = 0.6$	for	$\beta > 63°$
Short-crested waves	$\gamma_\beta = 1 - 0.0022\beta$		

Column (17): Wave Runup on the Structure, R_c

Value is found using Excel's SOLVER such that the overtopping rate is equivalent to that of maximum observed overtopping rate (based on the same overtopping formulation) at the Forest Park breakwater system in Lake Forest, Illinois

Column (18): Wave Runup on the Structure, R_c converted to meters

= [Column (17)] x 0.3048

Column (19): Overtopping Rate, q (Based on Formula by van der Meer and Janssen, 1995)

Since $\xi_{op} > 2$ for all conditions considered,

$$\frac{q}{\sqrt{gH_s^3}} = 0.2\exp\left(-2.6\frac{R_c}{H_s}\frac{1}{\gamma_r\gamma_b\gamma_h\gamma_\beta}\right) \qquad \text{Eqn. VI-5-25}$$

Column (20): Critical Value, Surf Similarity Parameter, ξ_{mc}

$$\xi_{mc} = \left[6.2P_b^{0.31}\sqrt{\tan\theta}\right]^{\frac{1}{(P_b+0.5)}}$$

Column (21): Surf Similarity Parameter, ξ_m

$$\xi_m = \frac{\tan\theta}{\sqrt{s_m}}$$

Column (22): van der Meer Formulation for Stone Sizing (Plunging Breakers)

$$= 6.2P_b^{0.18}\left(\frac{S_a}{\sqrt{N_w}}\right)^{0.2}\xi^{-0.5}$$

Column (23): van der Meer Formulation for Stone Sizing (Surging Breakers)

$$= 1.0P_b^{-0.13}\left(\frac{S_a}{\sqrt{N_w}}\right)^{0.2}\xi_m^{P_b}\sqrt{\cot\theta}$$

Column (24): Significant Wave Height within Surf Zone, NO TRUNCATION, $H_{s\text{-}des}$

From "Wave Transformation" worksheet, Column (27)

Column (25): Armor Stone Diameter, D_a

$$D_a = \frac{H_{s-des}}{\Delta[Column(22) \cdot or \cdot Column(23)]}$$

Column (26): Armor Stone Diameter, D_a converted to feet

= [Column (25)] x 0.3048

Column (27): van der Meer Reduction Factor Coefficient, R_p*

$$R_p^* = \left(\frac{R_c}{H_{s-des}}\right)\left(\frac{s_{op}}{2\pi}\right)^{0.5}$$

Column (28): van der Meer Reduction Factor, r

$$r = \left[1.25 - 4.8R_p^*\right]^{-1}$$

Column (29): Armor Stone Diameter with Reduction Factor, D_a'

$D_a' = r \cdot D_a$

Column (30): Armor Stone Diameter with Reduction Factor, D_a' converted to feet

= [Column (29)] x 0.3048

Column (31): Crest Width, B

$B = 3 \cdot D_a$

Column (32): Primary Armor Thickness, r

$r = 2 \cdot D_a$

Column (33): Stone Toe Bench Width, Toe_w

$$Toe_w = \frac{r}{2}$$

Column (34): Stone Toe Bench Thickness, Toe_{thk}

$$Toe_{thk} = \frac{2}{3} Toe_w$$

Revetment Sizing

Design Event

Use 20yr. HW & 10yr. wave

At the shoreline, $H_s = 0.5M \sim 1.64 ft$

Use safety factor of 1.5 $\rightarrow H_{s,d} = 2.5 ft$

Stone Sizing

$$W_{50} = \frac{\gamma_s H_d^3}{K_D\left(\frac{\gamma_s}{\gamma_w}-1\right)^3 \cot\theta} = \frac{(165\,lb/ft^3)(2.5ft)^3}{2.1\left[\frac{165\,lb/ft^3}{62.4\,lb/ft^3}-1\right]^3(1)} = 276\,lb$$

$$D_{50} = \left(\frac{276\,lb}{165\,lb/ft^3}\right)^{1/3} = 1.2\,ft.$$

Wave Overtopping

Target $q = 0.05$ (no damage condition)

$$S_{op} = \frac{2\pi H_s}{g(T_p^2)} = \frac{2\pi(2.5ft)}{(32.2\frac{ft}{s^2})(12.2s)^2} = 0.0033$$

$$\varepsilon_{op} = \frac{\tan\alpha}{\sqrt{S_{op}}} = \frac{1}{\sqrt{0.0033}} = 17.41$$

$$\gamma_r \gamma_b \gamma_h \gamma_\beta = 0.5$$

$$\frac{q}{\sqrt{gH_s^3}} = a\exp\left(-b\frac{R_c}{H_s}\frac{1}{\gamma_r\gamma_b\gamma_h\gamma_\beta}\right)$$

$$\frac{0.05}{\sqrt{(32.2\frac{ft}{s^2})(2.5ft)^3}} = 0.013\exp\left(-2.6\frac{R_c}{(2.5ft)}\frac{1}{0.5}\right)$$

$$0.1715 = \exp(-0.5R_c)$$

$$R_c = 3.53\,ft$$

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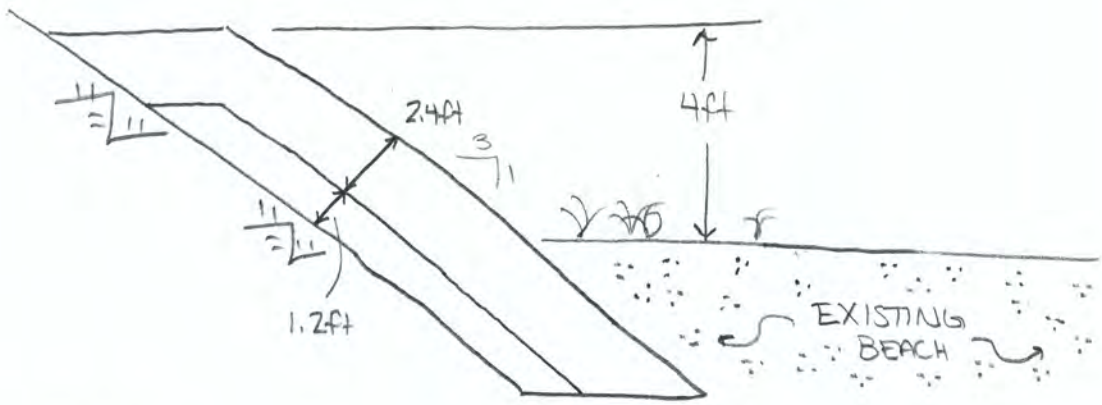
Typical Profile



Armor Layer:

$D_{50} = 1.2\,ft$

$W_{50} = (1.2\,ft)^3(165\,lb/ft^3) = 285^{\#}$

Underlayment

$\frac{W_{50}}{10} = \frac{285^{\#}}{10} \sim 29^{\#}$

$D_{50} = \left(\frac{29^{\#}}{165\,lb/ft^3}\right)^{1/3} = 0.6\,ft$

* Use H_D as estimated scour depth $\rightarrow d_s = 2.5\,ft$

Total height of structure = 6.5ft

Appendix L.

PLAN FORMULATION MEASURES DESIGN CALCULATION SHEETS

McCormick/Janes Ravine
MacArthur Ravine
Scotts/Hutchinson Ravine
Bartlett Ravine
Van Horne Ravine
Schenck Ravine

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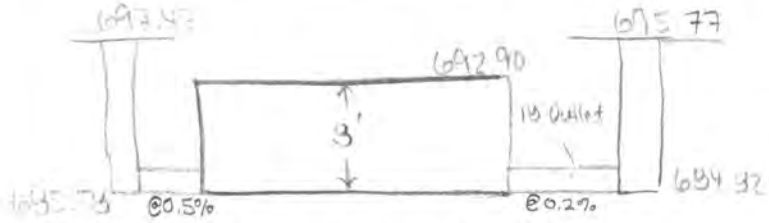
Option #1: In-Ravine Pipe

* Must provide storage to alleviate flooding at the head of the southern leg of the southern tributary

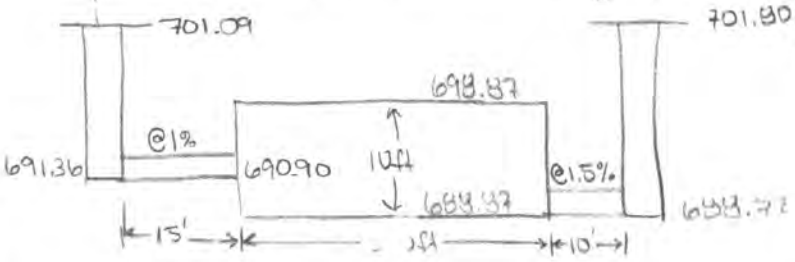
Storage Leg P7/P8



* For 100-year event, only 63% of storage used, it should be adequate
* Use (3) 8'×10' - 400ft box culvert

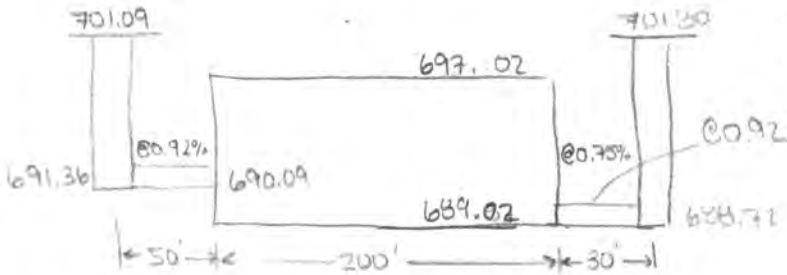
Storage Along Leg P14 + P13

- Box at P7/P8 causes charging of the line, need supplementary storage



* Use (2) 8'×10' - 570ft box culvert

Storage Along Leg P12



* Use (2) 8'×10' - 200' box culvert
* Use 6" outlet connected to existing 10" line
* @0.92% → 100-year 24-hour used 60% volume

Treatment at Outlet of Pipe

* Terminate pipe prior to confluence of Janes & McCormick Ravine, ~ 375ft U/S of the mouth.

$Q_{max} = 78.5$ cfs $\quad Q_d = 1.2Q = 94.2$ cfs
$V_{max} = 7.12$ ft/s $\quad V_d = 1.2V = 8.54$ ft/s
$t = 120$ min (75-79 cfs)
$D = 4.5$ ft, $d_{max} = 2.6$ ft. $\frac{d}{D} = 0.58 \rightarrow \frac{R_h}{D} = 0.2728 \rightarrow R_h = 1.228$ ft.

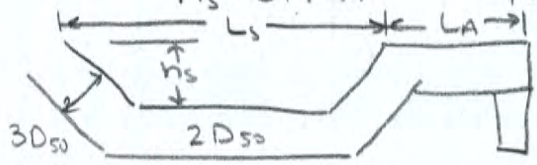
From HEC-14, Scour Hole Dimension Estimation
$h_s = 4.7$ ft $\quad L_s = 40.2$ ft
$W = 18.9$ ft $\quad L_{max} = 16.1$ ft.

From HEC-14, Eqn. 10.1 & 10.3

$$\frac{h_s}{Y_e} = 0.86\left(\frac{D_{50}}{Y_e}\right)^{-0.55}\left(\frac{V_o}{\sqrt{gY_e}}\right) - C_o$$

where $h_s = 4.7$ ft $\quad g = 32.2$ ft/s²
$Y_e = 2.6$ ft $\quad C_o = 2.08$
$V_o = 8.54$ ft/s

Use $D_{50} = 0.25$ ft $\quad \frac{D_{50}}{Y_e} = 0.10$ OK! $\quad \frac{h_s}{D_{50}} = 2.79 \geq 2$ OK!
$h_s = 0.7$ ft.



$L_s = 10h_s = 7$ ft or $3W_o = 13.5$ ft
$L_A = 5h_s = 3.5$ or $W_o = 4.5$ ft.
$L_B = 15h_s = 10.5$ ft or $4W_o = 18$ ft

* Provide Channel Transition.

$d_{max} = 1.5$ ft
$V_{max} = 7$ ft/s

* Calculate needed Stone Size in Channel

$$K_1 = \sqrt{1 - \frac{\sin^2 45}{\sin^2 40}} = 0.62$$

$$D_{30} = (2)(0.375)(1.0)(1.0)(1.5)\left[(0.78)\left(\frac{7\text{ ft/s}}{\sqrt{0.62 \cdot 32.12 \cdot 1.5}}\right)\right]^{2.5}$$
$= 1.2$ ft.

Use 18" thickness for 50 feet.

* Continue 8' wide trapezoidal armored channel to outlet

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Provide Stone Riffles after Ape

* Assume that we still have plunge pool + tapes to 8' wide channel
* Estimate velocity as 8 ft/s
* Elevation drop = 589.58 - 580.88 = 8.7 ft

$S_o = \frac{8.7ft}{441.80} = 0.0196 \qquad S_f = 0.01$

$H = (0.0196 - 0.01)(441.8) = 4.28ft$

$\frac{H}{h} = \frac{4.28ft}{0.5ft} = 8.56 \rightarrow$ use (9) 6" structures spaced every 49 ft.

* Estimate stone size

$V_d = 1.2V = 9.6 ft/s$

$C = (2)(0.375)(1)(1)(1.0) = 0.75$

$D_{30} = (0.75)\left[(0.78)\left(\frac{9.6ft/s}{\sqrt{(32.2\frac{ft}{s^2})(1)}}\right)\right]^{2.5} = 1.5ft.$

* Estimate Elevation at the Confluence:

$589.58 - (0.01)(217.38) - (4)(0.5) = 585.40$

Provide Stone Riffles for Janes Ravine

* 592.21 - 585.41 = 6.8 ft.
* Assume 1% slope = (217ft)(0.01) = 2.17 feet
* H = 4.63 feet
* Use 9" drop btwn structures

$\frac{H}{h} = \frac{4.63 feet}{0.75ft} = 6.2 \rightarrow$ use 6 structures

Spacing $\frac{217ft}{6} = 36ft.$

* Estimate Stone Size.

$V = 5.3\frac{ft}{s} \quad V_d = 1.2V = 6.4 ft/s$

$C = 1.125$

$D_{30} = 1.125\left[(0.78)(0.95)\right]^{2.5} = 0.53ft.$

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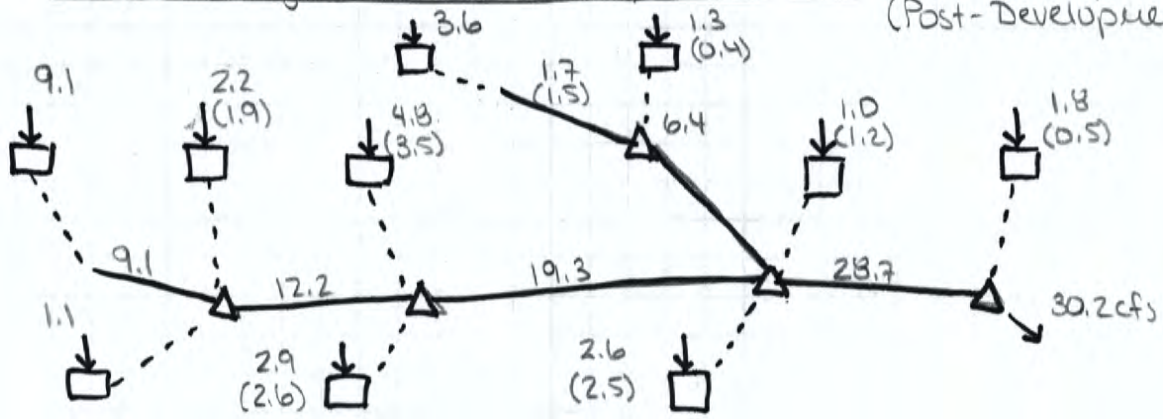
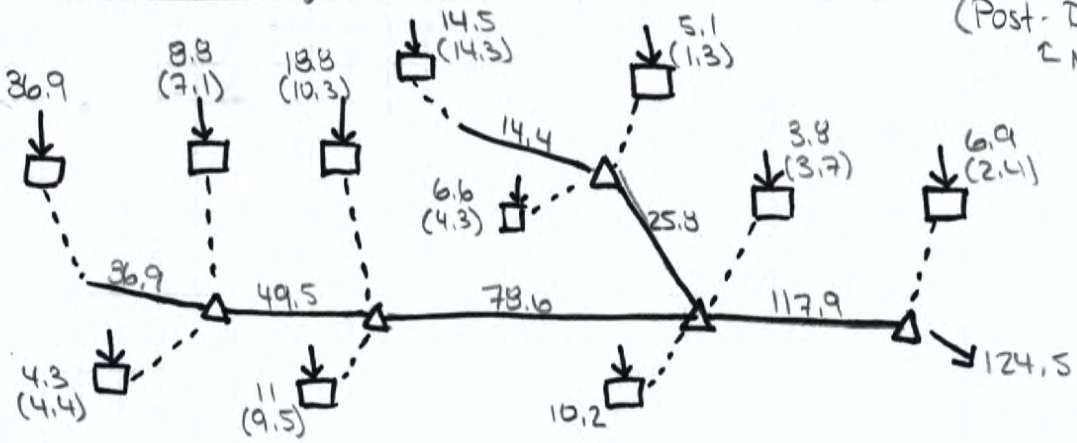
Option #2: Attenuation & Ravine Reinforcement

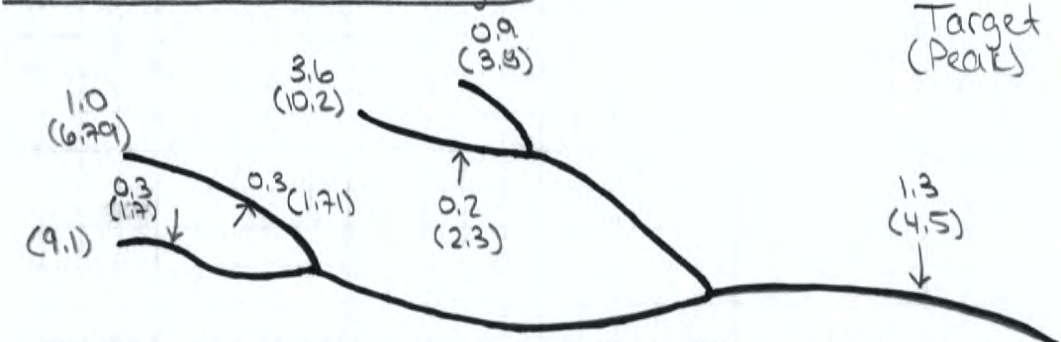
Peak Discharges from HMS Model (2-yr. 12-hr) Pre-Development (Post-Development)



Peak Discharges from HMS Model (100-yr. 24-hr.) Pre-Development (Post-Development)
← No Sewer Flow



Allowable Peak Discharges



← Target discharges represent the allowable discharges from the storm sewer systems. They are the difference between existing subbasin discharge and pre-developed condition. Where multiple storm sewers are involved, the ratios of drainage areas are used to distribute flow quantities.

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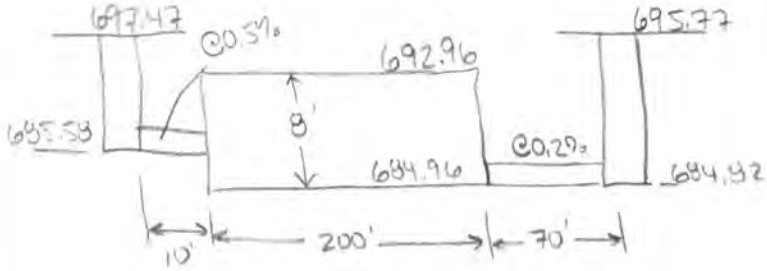
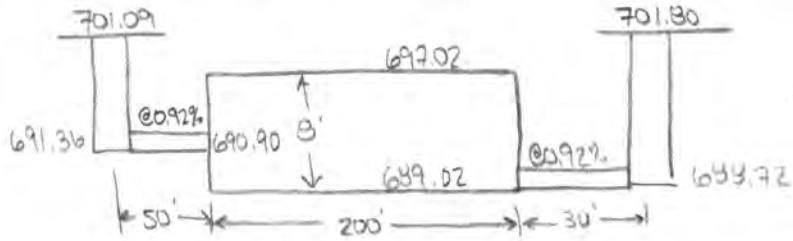
Head - South Leg of South Trib

Storage Along Leg P7/P8 (HsLsT-1)

* Box culverts (3) 8'x10' - 200' + 4" outlet (no O.F.)

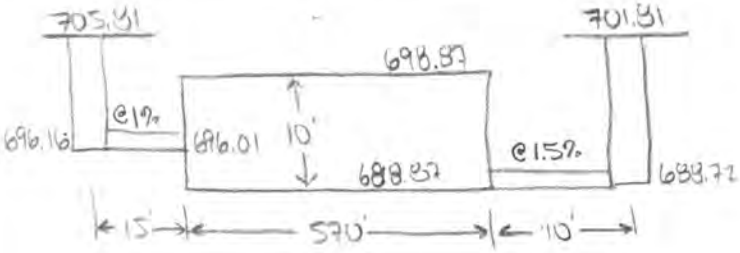


Storage Along Leg P12 (HsLsT-2)



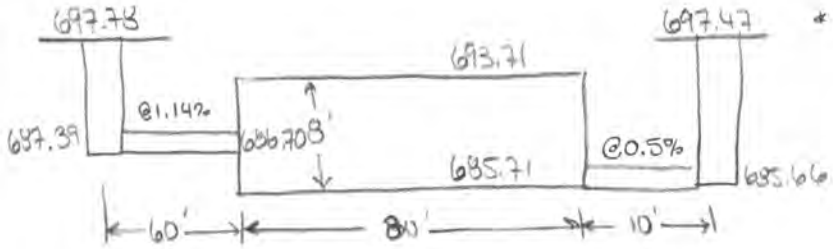
* Use (3) 8'x10' box culverts
* Use 6" outlet connected to existing 10" line (no OF)
* Covers over the san. sewer

Storage Along Leg P13 + P14 (HsLsT-3)



* Use (3) 8'x10' box culverts
* Use 6" outlet connected to existing 10" line (no OF)

Storage Along Leg P3/P4 (HsLsT-4)



* Use (1) 8'x10' box culverts
* Use 8" outlet (No OF)

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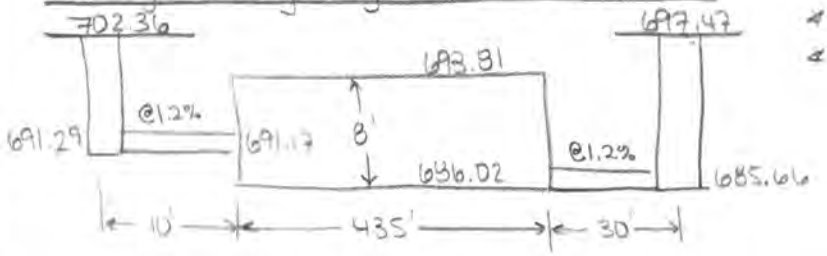
Storage Along Leg P5/P6 (HsLsT-5)

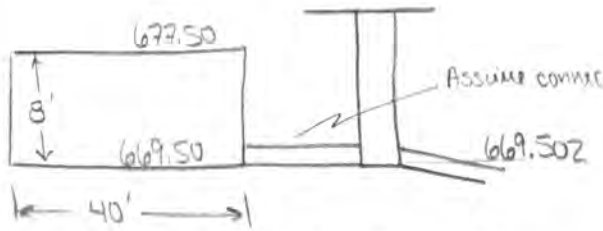


* Use (2) 8'×10' box culverts
* Use 10" outlet (no OF)

Q_{max} = 13 cfs for 3hrs } 100-year 24-hr
V_{max} = 7.1 ft/s

Q_{max} = 5 cfs for 1.5hrs } 2-year 12-hr
V_{max} = 5.7 ft/s

Subbasin - South Leg of South Tributary



* Use (1) 8'×10'-40' box culverts
* Use 4" outlet

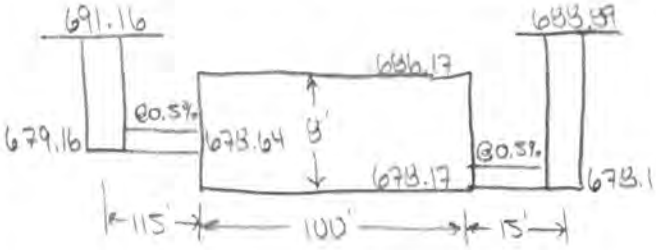
Assume connection extremely short & slope negligible

Q_{max} = 1.1 cfs for 3hrs } 100-year 24hr
V_{max} = 9.9 ft/s

Q_{max} = 0.51 cfs for 1.5hrs } 2yr 12-hr
V_{max} = 8.11 ft/s

Head - North Leg of South Tributary

Storage Along West Leg P7 (HnLsT)



* Use (2) 8'×10'-100' box culverts

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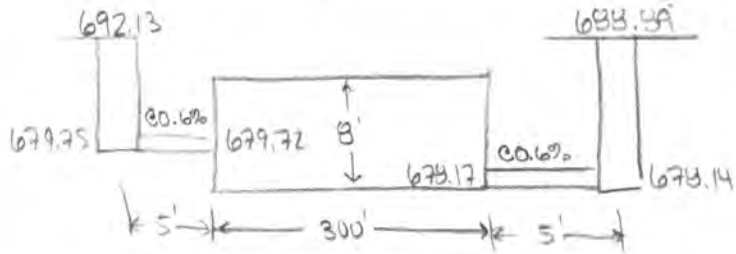
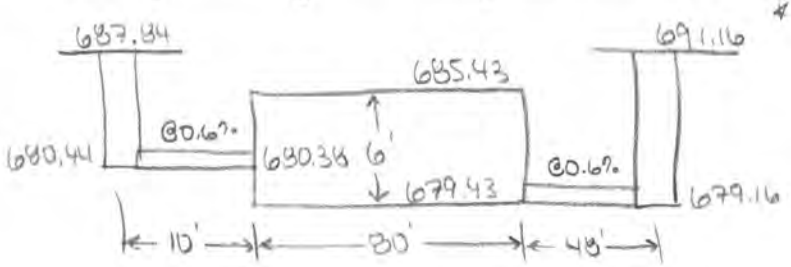
Storage Along East Leg P2 - HnLsT



* Use (2) 8'×10' - 300' box culverts

Storage Along West Leg P6 - HnLsT

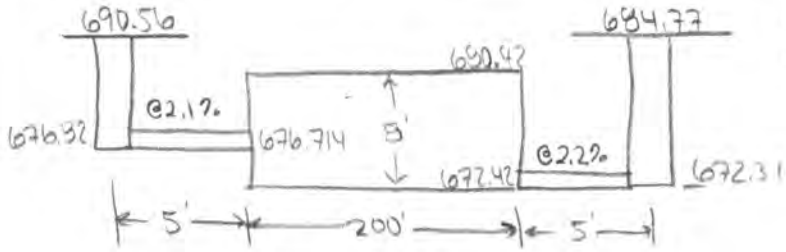


* Use (1) 6'×8' - 80' box culverts

Q_{MAX} = 3.2 cfs, V_{MAX} = 3.3 ft/s } 100yr. 24hr.

Q_{MAX} = 1.8 cfs for 2.5hrs, V_{MAX} = 2.8 ft/s } 2yr 12hr

Subbasin - North Leg of South Tributary



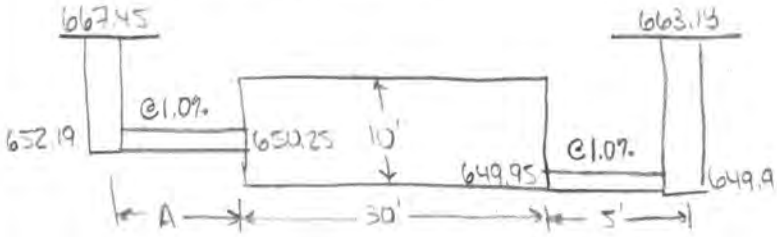
* Use (2) 8'×10' - 200' box culvert
* Install 6" reducer in structure on slope

Q_{MAX} = 1.80 cfs for 3 hrs, V_{MAX} = 10.82 ft/s } 100yr 24hr

Q_{MAX} = 1 cfs for 1.5hrs, V_{MAX} = 8.9 ft/s } 2yr 12hr

Subbasin - South Leg of North Tributary

Storage Along West Leg



* Use (2) 8'×10' box culvert. 30' long
* Install second structure on other side of tree along A

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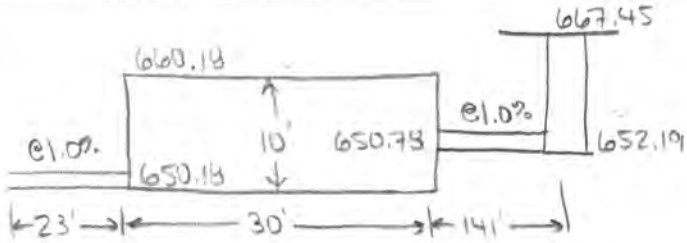


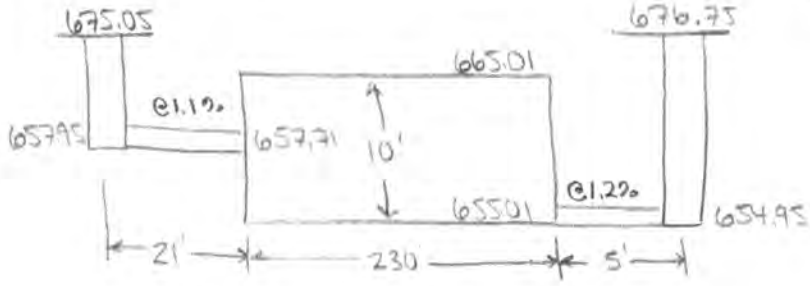
* Use 4" outflow w/ 6" overflow set 7' above base
* Install 4" reducer in structure on slope

Q_{max} = 2.71 cfs for 2.5hrs } 100yr 24hr. Q_{max} = 1.0 cfs for 1.5hrs } 2yr 12hr.
V_{max} = 16.4 ft/s V_{max} = 12.2 ft/s

Head - South Leg of North Tributary

Storage Along P6 - HsLnT

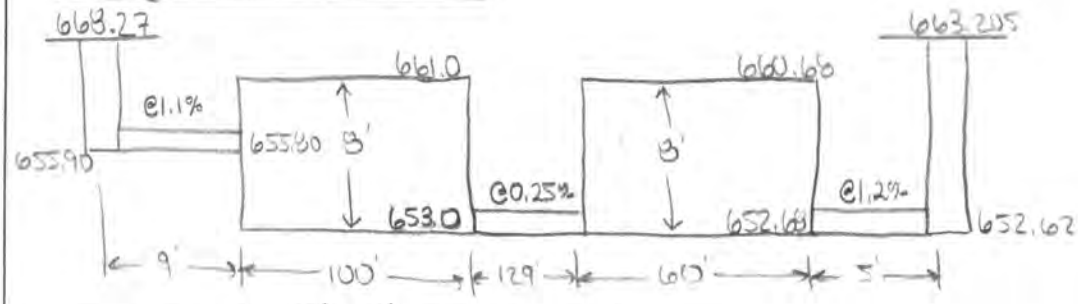
* Use (5) 3'×10' - 230' box culverts



Q_{max} = 8.61 cfs for t = 3.5hrs } 100yr. 24hr. Q_{max} = 3.6 cfs for 2hr. } 2yr. 12hr.
V_{max} = 7.08 ft/s V_{max} = 5.9 ft/s

Head - North Leg of North Tributary

Storage in P2 - HnLnT



* Use (4) 3'×10' box culverts

Q_{max} = 2.5 cfs for 3hrs } 100yr 24hr. Q_{max} = 1.2 cfs for 3hrs } 2yr 12hr.
V_{max} = 6.22 ft/s V_{max} = 5.2 ft/s

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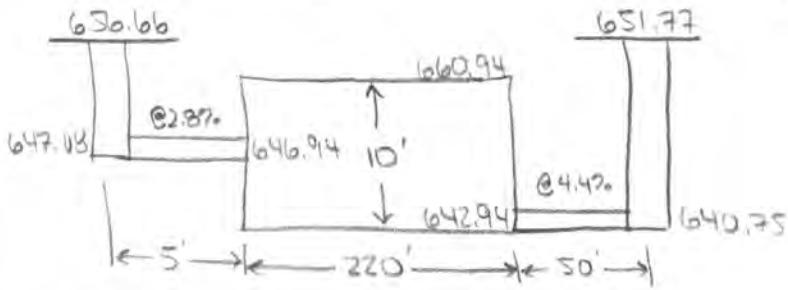
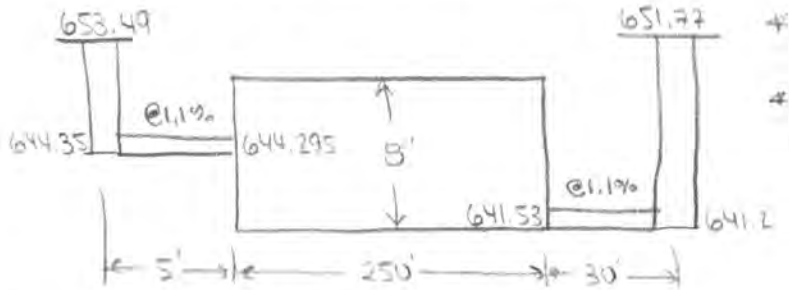
Near Head

Storage in Leg P12

* Use (2) 8'×10'-220' box culverts

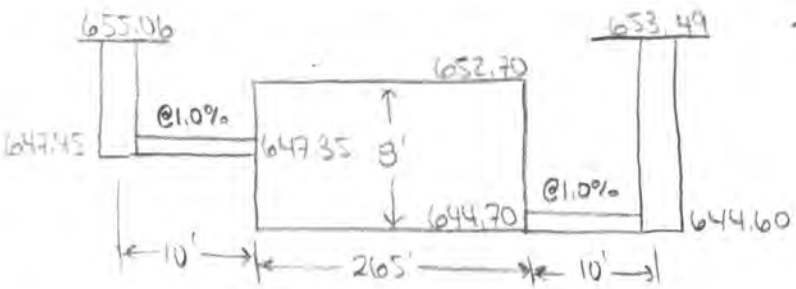


Storage in Leg P7 - Near Head



* Use (2) 8'×8'-250' box culverts
* Would need to be installed over the sanitary sewer

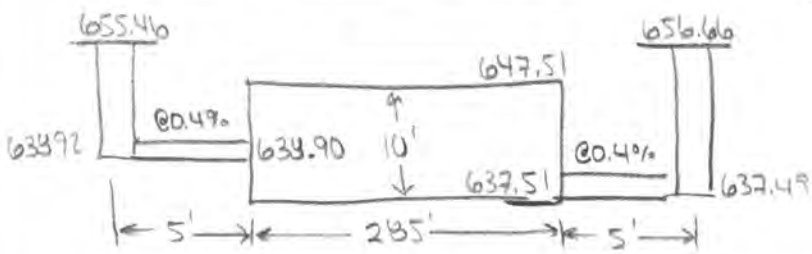
Storage in Leg P6 - Near Head



* Use (2) 8'×8'-265' box culverts

Storage in P15 - Near Head

* Use (2) 8'×10'-235' box culverts



Qmax: 3.4 cfs for 2.5 hr } 100yr-24hr.
Vmax: 17 ft/s

Qmax: 1.7 cfs for 1.5 hr } 2yr. 12hr.
Vmax: 14 ft/s

South Leg of South Tributary

Riprap Apron at Mouth:

* Based on Velocity:

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left[\frac{7.1\,ft^2/s^2}{2\cdot 32.2\,ft/s^2}\right] = 0.32\,ft$$

* Based on Flow:

$$D_{50} = 0.02D\left(\frac{Q}{D^{2.5}}\right)\left(\frac{D}{TW}\right) = 0.02(1.5ft)\left[\frac{13\,cfs}{1.5ft^{2.5}}\right]\left(\frac{1}{0.4}\right) = 0.6\,ft.$$

* Existing apron should be adequate.

Riffle Spacing

* Used to raise channel invert
* Place (2) riffles spaced every 150 ft., 12" high
* Set first at outfall of SLST subbasin
* width ~ 5 to 10 ft
* Estimate stone size:

$$V_d = 1.6V = 1.6(3.5\,ft/s) = 5.6\,ft/s$$

$$D_{30} = 0.6\left[(0.78)\left(\frac{5.6}{\sqrt{32.2\cdot 0.1}}\right)\right]^{2.5} = 0.3\,ft$$

Plunge Pool at Mouth of SSLST

$Q_{max} = 1.1\,cfs$ for 180 min

From HEC-14, Eqn. 10.1 & 10.3

$$\frac{h_s}{Y_e} = 0.86\left(\frac{D_{50}}{Y_e}\right)^{-0.55}\left(\frac{V_o}{\sqrt{gY_e}}\right) - C_o$$

Step 1) Compute culvert outlet velocity, V_o & Y_o

Step 2) Select riprap size D_{50} & h_s/Y_e

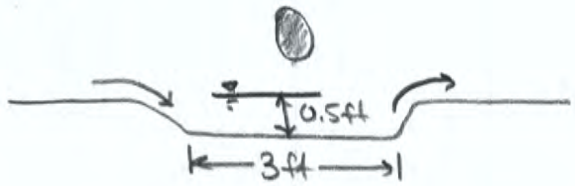
→ Verify $\frac{h_s}{D_{50}} \geq 2$ & $\frac{D_{50}}{Y_e} \geq 0.1$

Step 3) Determine $L_s = 10h_s$

$L_B = 15h_s$

W_B

* Use depth = 0.5 ft
  width = 3 ft.
  Length = 6.7 ft
  D_{50} = 0.3 ft



Riffle Spacing

For 4000 to 4236 & 4236 to 4506, need to raise invert 1.5 feet

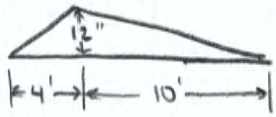
→ Add riffles at 4131 & 4346

→ Height = 1.5 ft.

$V_d = 1.6V = 1.6(5.0\frac{ft}{s}) = 8\frac{ft}{s}$

$$D_{30} = 0.6\left[(0.78)\left(\frac{8.0\frac{ft}{s}}{\sqrt{32.2\,ft/s^2}}\right)\right]^{2.5} = 0.8\,ft.$$

* Excavate backfilled dump in ravine
* Place grade control riffle at 4506



Use $D_{30} = 0.8$ ft.

For 3915 to 2938

$$S_o = \frac{647.68 - 630.02}{898.37 - 111.85} = 0.0225 \qquad S_f = 0.01$$

$H = (0.0225 - 0.01)(1058.97\,ft) \approx 14\,ft$

Use (14) 12" riffles spaced every 75 feet using $D_{30} = 0.8$ ft stone.

North Leg of South Tributary

Plunge Pool at Mouth

Q = 8.6 cfs for t = 3.5 hrs.

Use same method as before,

depth = 0.5 ft

width = 5 ft.

$D_{50} = 0.5$ ft.

$L_a = 2.5$ ft

$L_s = 5$ ft.

Riffles

* XS 1688 to 1259

$$S_{target} = \frac{6666.26 - 6665.38}{1326.54 - 1256.54} = 0.013 \qquad S_o = 0.03$$

$H = (0.03 - 0.013)(181.5) = 3.25$ ft.

Use 4 structures dropping 10" per riffle.

$D_{30} = 0.3$ ft

Space every 45 feet

* XS1259 to 643

$S_f = 0.02$ $\quad H = (0.037 - 0.02)(548.8\,ft) = 9.33\,ft$

$S_o = 0.037$

Use (10) 12" riffles spaced every 55 feet

Use $D_{30} = 0.5$ ft.

Mid-Reach Outfall

* Armor the base of the outfall structure; need to reinforce the existing headwall structure

$S_o = 0.23$

$q = \frac{2.71\,cfs}{3.5\,ft} = 0.78\,\frac{cfs}{ft}$

$$D_{30} = \frac{1.95\,(0.23)^{0.555}\,(0.78)^{2/3}}{(32.2\,ft/s^2)^{1/3}} = 0.3\,ft.$$

* Assume thickness = 0.6 ft
* Extend riprap to the toe of the riffle & up several feet of the opposite side.

End of South Tributary

$\Sigma Q = 56.6$ cfs

Riffles

$S_f = 0.005$

$S_o = 0.013$

$H = (0.013 - 0.005)(1440.8) = 11.53$ ft.

Use (12) 12" structures spaced every 120 feet

$d = 1.5\,ft \quad V_d = 1.6V = 1.6(6\,ft/s) = 9.6\,ft/s$

$C = (2)(0.375)(1.5\,ft) = 1.125$

$$D_{30} = 1.125\left[(0.78)\left(\frac{9.6\,ft/s}{\sqrt{32.2 \cdot 1.5}}\right)\right]^{2.5} = 1.4\,ft$$

South Leg of North Tributary

Plunge Pool at the Head

Q = 8.6 cfs for 3.5 hrs.

From HEC-14, Eqn. 10.1 & 10.3

① $V_o = 7.1$ ft/s $y_o = 0.82$ ft.

② $D_{50\,min} = 0.25$ ft.

$\frac{D_{50}}{y_e} = 0.305$ OK! $\frac{h_s}{D_{50}} = 4$ OK!

③ $h_s = 1.0$ ft.

$L_s = 1$ ft

$L_B = 1.5$ ft.

* Use depth = 0.5 ft

width = 5 ft.

Length = 4 ft.

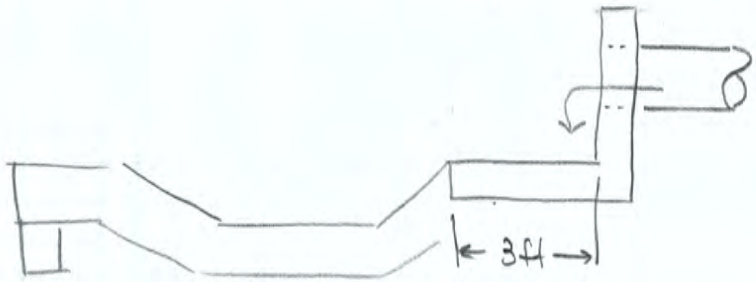
D_{50} * 0.5 ft.

$L_a = 5h_s = 5$ ft.

$W_o = 2.75$ ft.

$$D_{50} = \frac{0.692}{2.65-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{1.65}\left(\frac{7.1\,\frac{ft}{s}^2}{2 \cdot 32.2\,\frac{ft}{s^2}}\right) = 0.33$$

* Pour new headwall & apron



Riffles

XS 1665 to 879

$S_f = \frac{621.61 - 619.46}{66.29} = 0.0324 \Rightarrow$ Use $S_f = 0.02$

$S_o = 0.0455$

$H = (0.0455 - 0.02)(920.7 - 134.75) = 20.04$ ft

Use 18" drops $\rightarrow \frac{20\text{ft}}{1.5\text{ft}} \Rightarrow$ use 14 structures

Spacing $= \frac{920.7 - 134.8}{14} = 56$ ft

* Assume $D_{30} = 0.5$ ft.

Mid-Reach Outfall

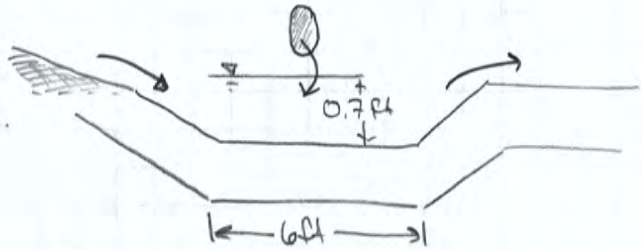
$Q = 15.81$ cfs for $t = 420$ min

From HEC-14, Eqn. 10.1 & 10.3

① $V_o = 17 \frac{ft}{s}$ $\quad Y_e = 0.22$ ft.

② $\frac{h_s}{D_{50}} = 4$ OK $\quad \frac{D_{50}}{Y_e} = 1.136$ OK

Use depth = 0.7 ft
width = 6 ft
length = 6.5 ft
D_{50} = 0.25 ft.



North Leg of North Tributary

$Q_{max} = 2.5$ cfs

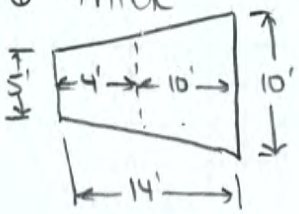
* Keep existing outfall structure
* Place riprap apron at the end

$$D_{50} = \frac{0.692}{1.65}\left(\frac{6.22^2}{2 \cdot 32.2}\right) = 0.25 \text{ ft}$$

$$D_{50} = 0.02(1.75)\left[\frac{2.5}{1.75^{2.5}}\right]^{4/3}\left(\frac{1}{0.4}\right) = 0.05 \text{ ft}$$

Use 3" stone 6" thick

* Install as 12" riffle



Riffles

$S_o = 0.1032$

$S_f = 0.05$

$H = (0.1032 - 0.05)(360.35) = 19.2$ ft → use 18" structures (need 13 structures)

$X = \frac{360.35}{13} = 27$ feet.

$V = 4$ ft/s $\quad d = 0.5$ ft.

$D_{30} = 0.3$ ft.

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End of North Tributary

$Q_{tot} = (15.81) + (8.7) + (4) = 28.51$ cfs

Riffles

$S_o = 0.033$
$S_f = 0.013$ $\quad H = (0.033 - 0.013)(653.2) = 13$ ft

Use (13) 12" riffles

$X = \frac{L}{H} = \frac{653.2 ft}{13} = 50.2$ ft

$V = 5$ ft/s $\quad d = 1$ ft

$D_{30} = 0.5$ ft

Main Reach

$Q_{start} = 56.6 + 28.51 + 3.7 = 88.81$ cfs
Out-Head = 3.37 cfs
$Q_{out} = 88.81 + 3.37 - 2.4 = 94.6$ cfs

Riffles

XS 1180 to 751

$S_o = 0.023$
$S_f = 0.0054$ $\quad H = (0.023 - 0.0054)(1113.32 - 684.28 + 75.2) = 8.87$ ft ~ 9 ft

Use 12" riffles $\quad X = \frac{L}{H} = \frac{504.24 ft}{9} = 56$ ft

$V = 5 \frac{ft}{s}$ $\quad d = 1.2$ ft

$D_{30} = 0.4$ ft

Plunge Pool (Mid-Reach)

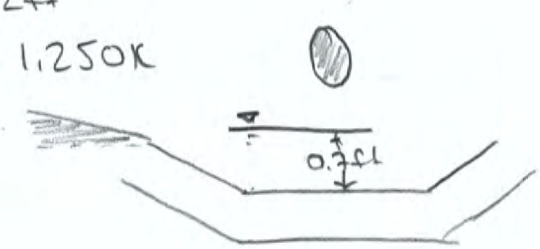
$Q = 3.32$ cfs for $t = 240$ min

From HEC-14, Eqn. 10.1 & 10.3

① $V_o = 17 \frac{ft}{s}$ $\quad Y_e = 0.2$ ft

② $\frac{h_s}{D_{50}} = 4$ OK $\quad \frac{D_{50}}{Y_e} = 1.250$ OK

* use depth = 0.7 ft
width = 6 ft
length = 6.5 ft
$D_{50} = 0.4$ ft



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Riffles

XS751.73 to 269.03

$S_o = 0.0126$ $\quad H = (0.0126 - 0.0054)(751.73) = 5.41 \sim 6$

$S_f = 0.0054$

$X = \frac{L}{H} = \frac{751.73}{6} = 125.3\ ft$

Use (6) 12" riffles spaced every 125.3 ft.

$V = 5\frac{ft}{s}$ $\quad d = 1.2ft$

$D_{30} = 0.4ft$

Confluence Treatment

$\frac{4ft}{0.2} = 20ft$

$Q_{tot} = (70cfs) + (94.6\ cfs) = 164.6\ cfs$

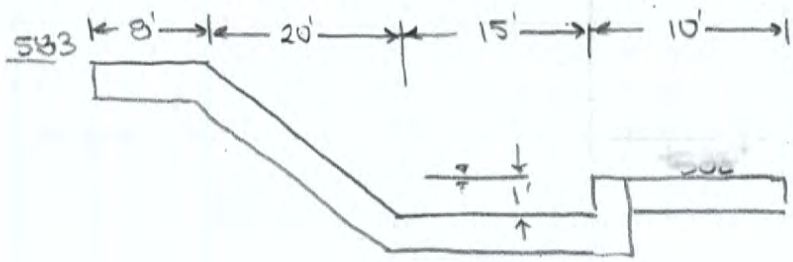
$q = \frac{164.6\ cfs}{10ft} = 16.5\ \frac{cfs}{ft}$

$q_{conc} = 1.25q = 20.7\ \frac{cfs}{ft}$

$$D_{30} = \frac{1.95\, S^{0.555}\, q^{2/3}}{g^{1/3}} = \frac{1.95\,(0.2)^{0.555}\,(20.7\ \frac{cfs}{ft})^{2/3}}{(32.2\ ft/s^2)^{1/3}} = 1.9\ ft.$$

Thickness $= 1.5D_{50} = 3ft$

Apron at Bottom → use 15' apron w/ 1' sill



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Janes Ravine

$S_o = 0.0373$
$S_f = 0.01$

$H = (0.0373 - 0.01)(214.32) = 5.85ft \sim 6ft.$

Use (6) 12" structures

Spacing $\frac{214.32}{6} = 35.7ft.$

$D_{30} = 0.4ft.$

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Option #3: Mouth Treatment Only

* Remove the existing structures at confluence and replace with steeper armored slope.
* Reinforce approaches w/ riffles.

Short Armored Slope

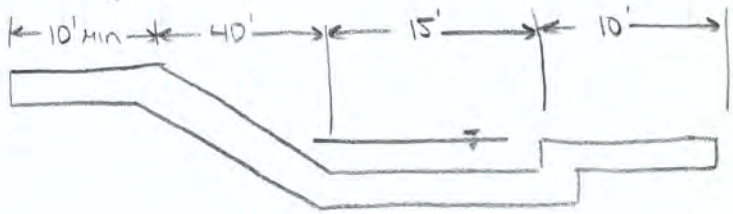
* Approximately 4ft drop (need to verify w/ field survey)
* Use 10% slope

$\frac{4ft}{0.10} = 40ft$ $\qquad Q_{tot} = 161$ cfs

$q = \frac{161 \text{ cfs}}{10ft} = 16.1 \frac{ft^2}{s}$ $\qquad q_{conc} = 1.25q = 1.25(16.1 \frac{ft^2}{s}) = 20.2 \ ft^2/s$

$$D_{30} = \frac{1.95 S^{0.555} q^{2/3}}{g^{1/3}} = \frac{1.95(0.10)^{0.555}(20.2 ft^2/s)^{2/3}}{(32.2 ft/s^2)^{1/3}} = 1.3 ft$$

Thickness $= 2D_{30} = 3ft$



McCormick - Riffles

For XS 424 to 163.9

$S_o = 0.012$

$S_f = 0.005$ $\qquad H = (0.012 - 0.005)(260ft) = 1.82ft$

Use (2) 1 ft riffle

$V = 7 \frac{ft}{s}$ $\quad V_d = 1.6V = 1.6(7 ft/s) = 11.2 \frac{ft}{s}$

$d = 1.5ft$ $\quad C = 2(1.0)(1.0)(0.375)(1.5) = 1.125$

$$D_{30} = (1.125)\left[(0.79)\left(\frac{11.2}{\sqrt{(32.2 \cdot 1.5)}}\right)\right]^{2.5} = 1.99ft \sim 2ft$$

Spacing $= \frac{260ft}{2} = 130ft$

For XS 163.9 to Confluence

$S_o = 0.025$ $\qquad H = (0.025 - 0.005)(97ft) = 1.94ft$

$S_f = 0.005$ $\qquad$ Use (2) 1ft riffle

Spacing $= \frac{97ft}{2} = 48.5ft$

$V = 7 ft/s$ $\quad V_d = 11.2 \frac{ft}{s}$

$d = 2ft \qquad C = (2)(0.375)(2ft) = 1.5$

$$D_{30} = (1.5)\left[(0.78)\left(\frac{11.2 ft/s}{\sqrt{32.2 \frac{ft}{s^2} \cdot 2ft}}\right)\right]^{2.5} = 1.85 ft$$

<u>Jones - Riffles</u>

- New Tributary
  - cut side slopes back ... 2:1 slope
  - install armor stone at head of cut
    - ↳ train flow to center of channel
    - ↳ provide small plunge pool at bottom

For XS 607 to Confluence

$S_o = 0.02$
$S_f = 0.006$

$H = (0.02 - 0.006)(415ft) = 5.81 ft$

$\frac{H}{h} = \frac{5.81 ft}{0.5 ft} = 11.62 \rightarrow$ Use (12) 6" structures

$\text{Spacing} = \frac{415 ft}{12} = 34.6 ft$

$V = 5.5 \frac{ft}{s} \qquad V_d = 1.6V = 1.6(5.5 ft/s) = 8.8 \frac{ft}{s}$

$C = 1.125$

$$D_{30} = (1.125)\left[(0.78)\left(\frac{8.8 ft/s}{\sqrt{32.2 \frac{ft}{s^2} \cdot 1.5 ft}}\right)\right]^{2.5} = 1.09 ft$$

$\approx 1.1 ft$

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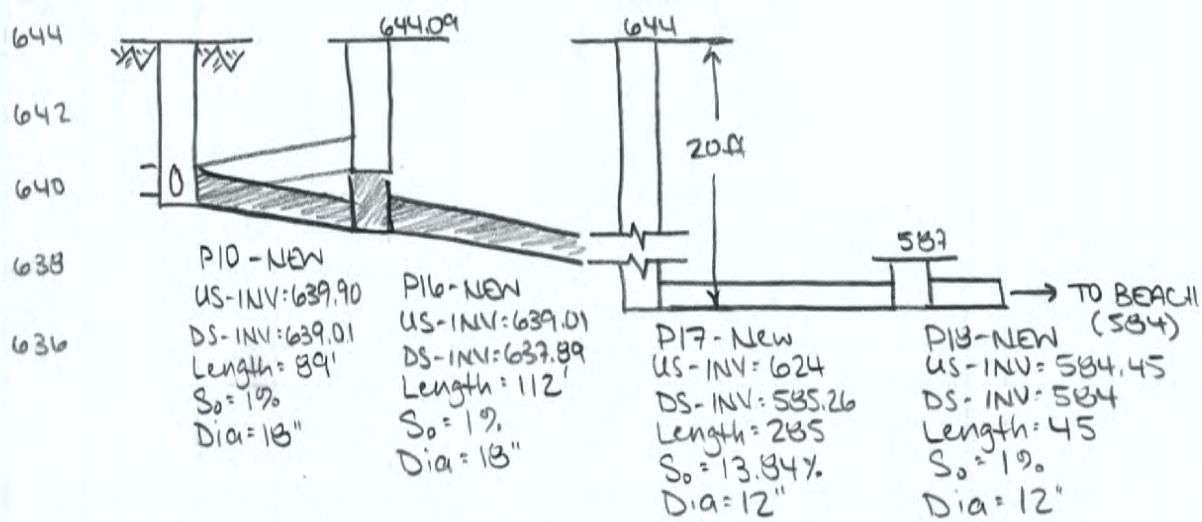
Option #1: Intercept Sewer & Redirect

* Intercept sewer & push pipe down bluff face
  - ↳ Catch at J4
  - ↳ Replace P10 w/ 18" line (versus 12") & reverse slope
  - ↳ Drop J5 to intersect P10-NEW
  - ↳ Push pipe down bluff face



* Use J16-NEW to align pipe w/ existing ROW
* Drop 20ft at J16 to reduce pipe slope & velocity
* Push pipe to J17-NEW
  - ↳ need to avoid property line of house on beach
  - ↳ need to avoid damage to property
  - ↳ intercept pushed pipe at this structure
  - ↳ allow 1ft. difference so we don't blast the outlet pipe from the structure
* Run pipe to outlet on beach at existing riprap revetment
* Resultant Discharges:

Ravine Outlet	Beach Outlet
Q_{max} = 0.56 cfs	Q_{max} = 2.95 cfs
V_{max} = 4.4 ft/s	V_{max} = 4.51 ft/s

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Provide Stone Aprons Aftes Outlets

Ravine Outlet

$S_o \sim \frac{2ft}{23.9ft} \sim 8.4\%$ $\quad q = \frac{0.56\ cfs}{1.5ft} = 0.373\ \frac{ft^2}{s} \Rightarrow q_c = 1.25q = 0.47\ \frac{ft^2}{s}$

$$D_{30} = \frac{1.95 S_o^{0.555} q^{2/3}}{g^{1/3}} = \frac{1.95(0.084)^{0.555}(0.47\ \frac{ft^2}{s})^{2/3}}{(32.2\ \frac{ft}{s^2})^{1/3}} = 1.2\ ft$$

* Provide armor along first 6D of length → 9ft.

Beach Outlet

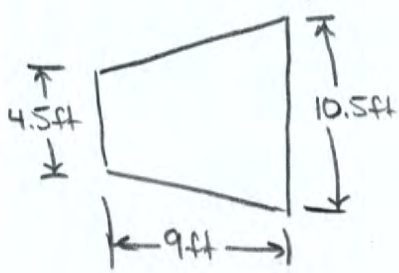
$Q_d = 1.2Q = 3.54\ cfs$

$V_d = 1.2V = 5.4\ ft/s$

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left(\frac{5.4\ \frac{ft}{s}^2}{2 \cdot 32.2\ \frac{ft}{s^2}}\right) = 1.5ft.$$

$$D_{50} = 0.02D\left(\frac{Q}{D^{2.5}}\right)^{4/3}\left(\frac{1}{0.4}\right)$$

$$= 0.02(1ft)\left(\frac{3.54\ cfs}{(1ft)^{2.5}}\right)^{4/3}\left(\frac{1}{0.4}\right) = 0.2ft$$



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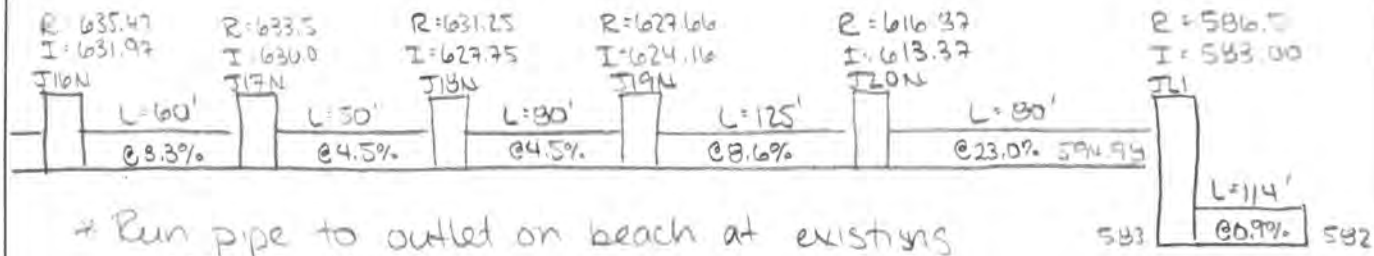
Option #2: In-Ravine Pipe

* Replace existing outfall w/ structure & run in-ravine pipe to mouth. Install plunge pool at the outlet
  - ↳ Catch at OUT I
  - ↳ Replace w/ structure (INV = 631.97 / RIM = 633.97)
  - ↳ Replace pipes in following sequence



* Run pipe to outlet on beach at existing riprap revetment
* Remove & replace stones to make gap
* Need to install blanket to dissipate wave energy.

Resultant Discharge

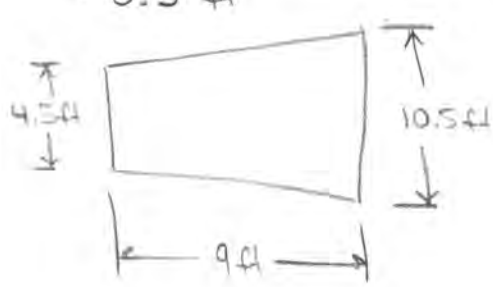
$Q = 5.2$ cfs $\quad Q_d = 6.3$ cfs

$V = 4.7$ ft/s $\quad V_d = 5.64$ ft/s

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left(\frac{5.64\,\frac{ft}{s}^2}{2\cdot 32.2\,\frac{ft}{s^2}}\right) = 0.2\text{ ft}$$

$$D_{50} = 0.02D\left(\frac{Q}{D^{2.5}}\right)^{4/3}\left(\frac{1}{0.4}\right) = 0.02\,(1.5\text{ ft})\left(\frac{6.3\text{ cfs}}{1.5\text{ ft}^{2.5}}\right)^{4/3}\left(\frac{1}{0.4}\right)$$

$$= 0.5\text{ ft}$$



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Option #3: Riprap / Riffles

$Q_{max} = 5.2$ cfs

$V_{max} = 6.2$ ft/s $\qquad V_d = 1.2V = 7.4$ ft/s

$$D_{30} = (0.225)\left[(0.78)\left(\frac{7.4\,ft/s}{\sqrt{(32.2\,ft/s^2)(0.3\,ft)}}\right)\right]^{2.5} = 1.06\text{ ft}$$

$S_o \approx \frac{50'}{542} = 0.092 \qquad S_f = 0.02$ (assume)

$H = (0.092 - 0.02)(542) = 39.16$

$\frac{H}{h} = \frac{39.16}{0.5} = 78.32 \rightarrow$ need (79) 6" structures

Spacing $= \frac{542\text{ ft}}{79\text{ ft}} = 6.9$ ft.

If use 12" structures,

$\frac{H}{h} = \frac{39.16\text{ ft}}{1\text{ ft}} = 39.16 \rightarrow$ need (40) 12" structures

Spacing $= \frac{542\text{ ft}}{40} = 13.6$ ft.

Note:

For given configuration, the riffles will overlap!

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Option #1: Single Wet-Bottom Detention Pond

North Sewer Line

* Break into sewer line at P51 near gap in trees
  - ↳ Approx. invert = 647.57
  - ↳ Set Rim elev = street
* Install sewer line at 1% slope until it clears the tree line
  - ↳ 24" diameter
  - ↳ Approx. 130 ft. long
* Route to detention storage

East Sewer Line

* Leave alone

South Sewer Line

* Consider in-street storage
  - ↳ Not realistic. Not enough depth to develop head necessary to only use storage space available w/in the ROW
* Consider rerouting flow through existing cul-de-sac lines
  - ↳ Replace P35, P33, P34, P19
  - ↳ Replace J39, J46, J47
  - ↳ Push pipe down slope
  - ↳ A lot of modifications for very little benefit!
* → Consider intercepting outfall at outlet & bypass the ravine
  - ↳ Add intercept structure @ 75 feet from J40
  - ↳ Push pipe down bluff
  - ↳ $Q_{max} = 20.63$ cfs $Q_d = 1.2Q = 24.76$ cfs
    $V_{max} = 18.63$ cfs $V_d = 1.2V = 22.4$ ft/s
  - ↳ Size apron for Outlet

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left(\frac{22.4\,\frac{ft}{s}^2}{2\cdot 32.2\,\frac{ft}{s^2}}\right) = 3.3\text{ ft.}$$

$$D_{50} = 0.02D\left(\frac{Q}{D^{2.5}}\right)^{4/3}\left(\frac{1}{0.4}\right) = 0.02(2.5\text{ ft})\left(\frac{24.8\text{ cfs}}{2.5^{2.5}}\right)^{4/3}\left(\frac{1}{0.4}\right)$$

$$= 0.43\text{ ft}$$

Thickness = 4.8 ft.

Detention Pond Design

* Max depth = 6 ft.
* Allow small area for Hutchinson flow to filter into pond
* Only 65% storage-volume used in 100-year event
* Provide (2) beehive grates as overflow.
* Provide 6" primary outlet

Elev	Area (ft²)
644	60,000
646	80,000
647	120,000
650	300,000

US INV = 642.36 $S_o \sim 1\%$
DS INV = 637.61 Dia = 30"
Length = 475 ft.

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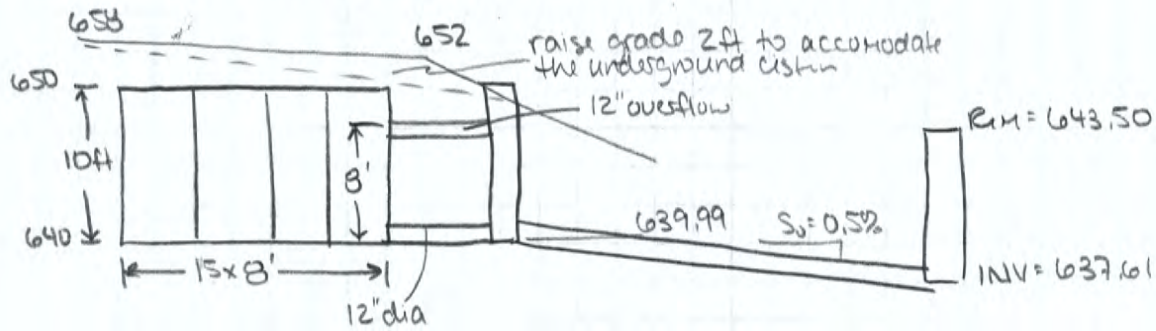
Option #2: Underground Cistern

* Use same sewer intersection methods as suggested for Option #1

Detention Pond Cross-Section



* Need to provide 960,000 ft³ of storage.
  → Need (15) 8'×10' box culverts 750' long
  → Uses 96% of storage for 100-year 24-hour event
  → Q_{peak} = 5.9 cfs
* Can relocate based on golf course.

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Plunge Pool at Head of Ravine

$Q_{max} = 4.63\ cfs \rightarrow Q_d = 1.2Q = 5.6\ cfs$
$t = 2\ hrs\ (4.3\text{-}4.6\ cfs)$

Estimated Scour Hole Dimensions

$h = 2.1\ ft$
$W = 6.67\ ft$
$L = 8.15\ ft$
$L_{max} = 3.3\ ft$

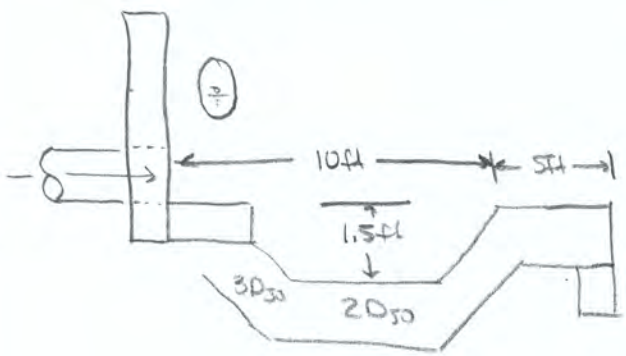
Estimate D_{50}

$$\frac{h_s}{Y_e} = 0.36\left(\frac{D_{50}}{Y_e}\right)^{-0.55}\left(\frac{V_o}{\sqrt{gY_e}}\right) - C_o$$

Use $h_s = 1.5\ ft$, $Y_e = 0.7\ ft$, $D_{50} = 0.5\ ft$

$\frac{D_{50}}{Y_e} > 0.1$? OK! $\quad \frac{h_s}{D_{50}} \geq 2$? OK!

$L_S = 10h_s = 10\ ft$
$L_A = 5h_s = 5\ ft.$



Check velocity at end of apron

$$\frac{Q^2}{g} = \frac{A_c^3}{T_c} = \frac{[Y_c(W_B + 2Y_c)]^3}{W_B + 4Y_c}$$

$$\frac{(4.63\ ft^3/s)^2}{32.2\ ft/s} = \frac{[Y_c(5ft + 2Y_c)]^3}{5ft + 4Y_c}$$

Solving for Y_c, $Y_c = 0.29\ ft$

$A_c = Y_c(W_B + 2Y_c) = 1.59\ ft^2$

$V = \frac{Q}{A} = \frac{4.63\ ft^3/s}{1.59\ ft^2} = 2.92\ ft/s$ okay!

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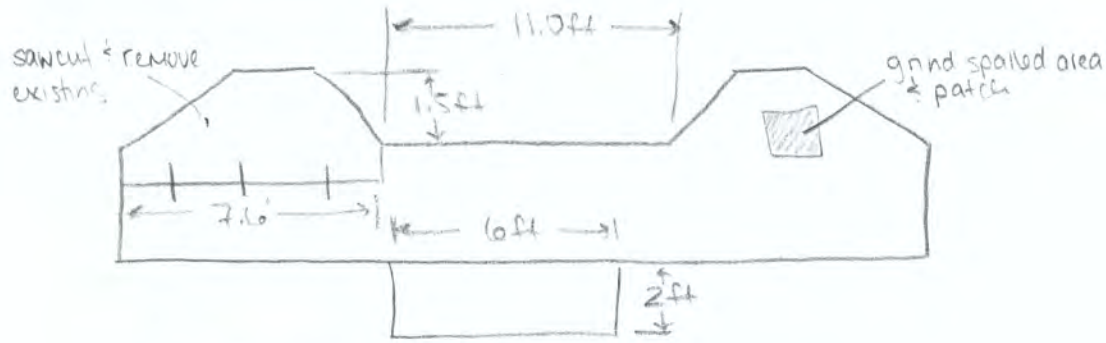
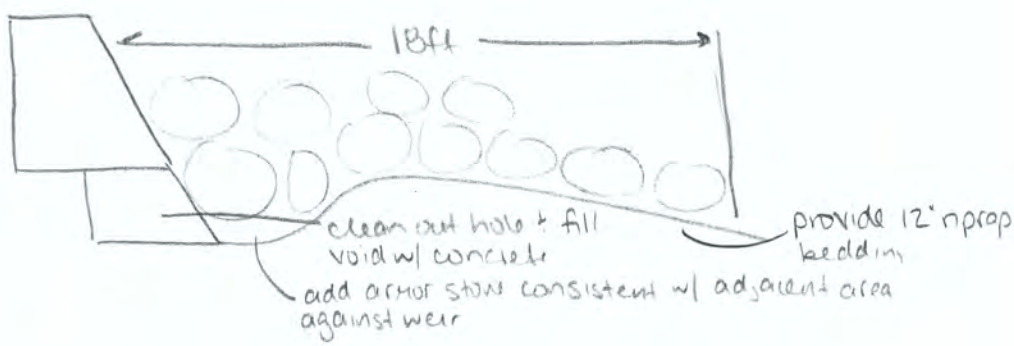
Check Dam Modification

If Repair





If Remove

$$S_o = \frac{599.48 - 581.06}{223.515} = 0.0824$$ ← slope if dam removed, elevations from field survey

$$S_f = \frac{625.96 - 619.35}{762.47 - 556.01} = 0.032$$ ← slope btwn XS's in RAS w/ same Q but acceptable V

$$H = (0.0824 - 0.032)(223.52\,ft) = 11.27\,ft$$

$$\frac{H}{h} = \frac{11.27\,ft}{1\,ft} = 11.27 \rightarrow \text{use (12) 12" structures}$$

$$\text{Spacing} = \frac{223.5\,ft}{12} = 18.6\,ft$$

Estimate stone size:

$$V_d = 1.6V = 1.6(6.3\,ft/s) = 10\,ft/s$$

$$D_{30} = (2)(0.375)(1)(1)(11.0\,ft)\left[(0.78)\left(\frac{10.0\,ft/s}{\sqrt{32.2\,\frac{ft}{s^2}\cdot 1\,ft}}\right)\right]^{2.5}$$

$$= 1.7\,ft$$

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Option #3: Detention Basin, No Rerouted Pipe

Note: Same design as Option #1, but no rerouted pipe from tributary. Need to check size for armoring of the tributary.

If Riprap as is

* Size based on velocity

$V = 13\,ft/s \qquad V_d = 1.2V = 15.6\,ft/s$

$$D_{30} = (2)(0.375)(1)(1)(0.4\,ft)\left[(0.78)\left(\frac{15.6\,ft/s}{\sqrt{32.2\,ft/s^2 \cdot 0.4}}\right)\right]^{2.5} = 6.4\,ft$$

* Size for flow

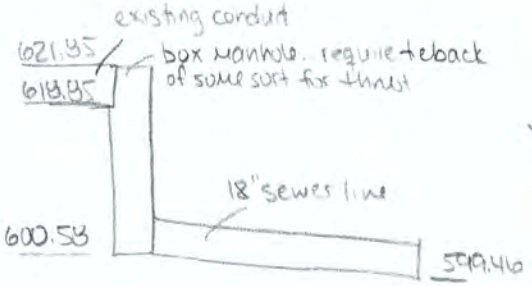
$$q = \frac{30\,cfs}{6\,ft} = 5\,\frac{ft^2}{s} \longrightarrow q_c = 1.25q = 6.25\,\frac{ft^2}{s}$$

$$D_{30} = \frac{1.95\,S^{0.555}\,q^{2/3}}{g^{1/3}} = \frac{1.95(0.161)^{0.555}(6.25\,ft^2/s)^{2/3}}{(32.2\,ft/s^2)^{1/3}} = 0.754\,ft$$

* Would need to provide plunge pool at base of chute

If Drop Tributary Bed

$Q = 23\,cfs$
$Q_d = 1.2Q = 27.6\,cfs$
$H = 618.85 - 599.46 = 19.4\,ft$
$dist = 110.134\,ft$
$S_o = 16.1\%$
$S_f = 1\%$
$H_{req} = 1.1\,ft.$



* Box structure needs to accomodate 3' diameter pipe at top
* Will it need teback to resist momentum?
* Drop to 600.58
* Run 18" dia. pipe
* Daylight pipe prior to confluence
* Provide plunge pool at outlet

$D = 1.5\,ft \qquad R_h = 0.75\,ft \qquad d_{max} = 1.5\,ft$

$A = \frac{\pi D^2}{4} = 1.77\,ft^2 \rightarrow Y_e = \left(\frac{A}{2}\right)^{1/2} = 0.94\,ft$

$h_s = 1\,ft$

$L_s = 10h_s = 10\,ft$

$L_{s,min} = 3W_o = 4.5\,ft$

$L_B = 15h_s = 15\,ft$

$L_{B,min} = 4\,ft$

$W_B = W_o + 2(L_B/3) = 1.5\,ft + 2(4/3) = 4.2\,ft$

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From HEC-14, Eqn. 10.1-10.3

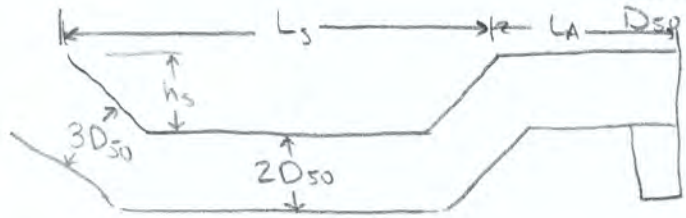
$$\frac{h_s}{Y_e} = 0.86\left(\frac{D_{50}}{Y_e}\right)^{-0.55}\left(\frac{V_0}{\sqrt{gY_e}}\right) - C_0$$

where $h_s = 1ft$, $Y_e = 0.94ft$, $V_0 = 14ft/s$, $g = 32.2 ft/s^2$, $C_0 \approx 2$

use $D_{50} = 0.5ft$, $h_s = 1.03ft$

$\frac{D_{50}}{Y_e} = 0.532 > 0.1$ OK!

$\frac{h_s}{D_{50}} = 2.06 > 2$ OK!



Check velocity at end of apron,

$$\frac{Q^2}{g} = \frac{A_c^3}{T_c} = \frac{[Y_c(W_B+2Y_c)]^3}{W_B+4Y_c} \Rightarrow \frac{(23\frac{ft^3}{s})^2}{32.2\frac{ft}{s^2}} = \frac{[Y_c(4.2ft+2Y_c)]^3}{4.2ft+4Y_c}$$

Solving for Y_c, $Y_c = 0.85ft$

$A_c = Y_c(W_B+2Y_c) = 5.02ft^2$

$V = \frac{Q}{A} = \frac{23\frac{ft^3}{s}}{5.02ft^2} = 4.62\frac{ft}{s}$

* Limited by width, so consider either routing all the way to the beach or armoring downstream channel

Option # 4: In-Ravine Pipe - Rerouted at Tributary

* Use proposed design provided by local sponsors for this measure.
* Tie outfall from properties to the north into in-ravine pipe.
* Terminate pipe at confluence

From HEC-14, Scour Hole Dimension, Equation 5.2

$$A = \frac{\pi D^2}{4} = \frac{\pi (3ft^2)}{4} = 7.07ft^2 \Rightarrow y_e = \left(\frac{A}{2}\right)^{1/2} = \left(\frac{7.07ft^2}{2}\right)^{1/2} = 1.88ft$$

$h_s = 3ft \quad L = 30ft$

Estimate D_{50}

$$\frac{h_s}{y_e} = 0.86\left(\frac{D_{50}}{y_e}\right)^{-0.55}\left(\frac{V_o}{\sqrt{gy_e}}\right) - C_o$$

where, $h_s = 3ft$
$y_e = 1.88ft$
$V_o = 17ft/s \quad V_d = 1.6V_o = 27\frac{ft}{s}$
$g = 32.2ft/s^2$
$C_o \approx 2$

Use $D_{50} = 1.35ft$
$h_s = 2.97ft$

$\frac{D_{50}}{y_e} = 0.718 > 0.1$ OK! $\quad \frac{h_s}{D_{50}} = 2.2 > 2$ OK!

Riffle Design (Assuming Check Dam Removed)

$S_o = 0.0824$ (see p. 5)

$$S_f = \frac{625.96 - 619.35}{762.47 - 556.01} = 0.032$$

$H = (0.0824 - 0.032)(223.52ft) = 11.27ft$

$\frac{H}{h} = \frac{11.27}{1ft} = 11.27 \rightarrow$ Use (12) 12" structures

Spacing $= \frac{223.52ft}{12} = 18.6ft$

Estimate stone size:

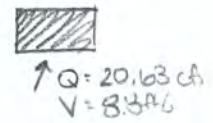
$V_d = 1.6V = 1.6(6.3ft/s) = 10ft/s$

$$D_{30} = 2(0.375)(1)(1)(1.0ft)\left[0.78\left(\frac{10ft/s}{\sqrt{32.2 \cdot 1.0}}\right)\right]^{2.5} = 1.7ft$$

$\approx 1.7ft$

Option #5: In-Ravine Pipe - Flow Through Tributary

* Use proposed design provided by local sponsors for this measure
* Tie outfall from properties to the north to in-ravine pipe
* Terminate pipe at confluence ... provide plunge pools in both reaches.



From HEC-14, Scour Hole Dimension, Equation 5.2

$$A = \frac{\pi D^2}{4} = \frac{\pi (3ft)^2}{4} = 7.07 ft^2 \Rightarrow Y_e = \left(\frac{A}{2}\right)^{1/2} = \left(\frac{7.07 ft}{2}\right)^{1/2} = 1.88 ft$$

$h_s = 3 ft$ $L = 25.6 ft$ (Main)
$h_s = 2.75 ft$ $L = 23.4 ft$ (Tributary)

$$\frac{h_s}{Y_e} = 0.86 \left(\frac{D_{50}}{Y_e}\right)^{-0.55} \left(\frac{V_o}{\sqrt{gY_e}}\right) - C_o$$

where, $h_s = 3 ft$ $Y_e = 1.88 ft$ $V_o = 17 \frac{ft}{s}$ $V_d = 1.6 V_o = 1.6(17 \frac{ft}{s}) = 27 ft/s$
$g = 32.2 \frac{ft}{s^2}$ $C_o \approx 2$

Use $D_{50} = 1.35 ft$
$h_s = 2.97 ft$

$\frac{D_{50}}{Y_e} = 0.718 > 0.1$ ✓ $\frac{h_s}{D_{50}} = 2.2 > 2$ ✓

Downstream Riffle Design, Assumes Dam Removal

$S_o = 0.0824$
$S_f = 0.02$

$H = (0.0824 - 0.02)(223.52 ft) = 13.94 ft$

$\frac{H}{h} = \frac{13.94 ft}{1.2 ft} = 11.6 \rightarrow$ use (12) 1.2 ft structures

Spacing $= \frac{223.52 ft}{12} = 18.6 ft$

Estimate Stone Size:

$V_d = 1.6V = 1.6(5 \frac{ft}{s}) = 8.0 \frac{ft}{s}$

$$D_{30} \approx 2(0.375)(1)(1)(0.50 ft)\left[(0.78)\left(\frac{8.0 \frac{ft}{s}}{\sqrt{32.2 \frac{ft}{s^2} \cdot 0.50}}\right)\right]^{2.5} = 1.13 ft$$

$\approx 1.25 ft$

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Option #6: Single Detention Basin - Outlet to Ravine Head

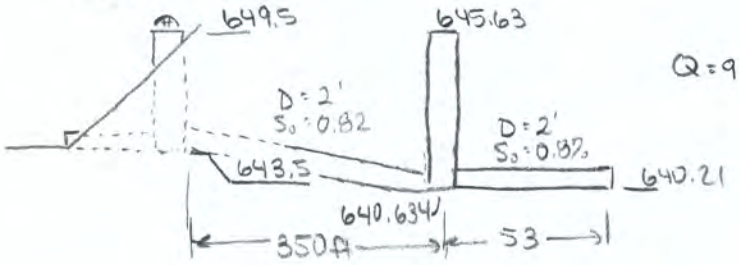
North Sewer Line
* Use same alteration as option #1

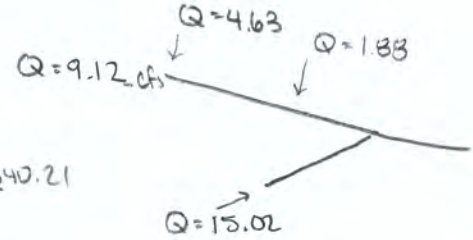
East Sewer Line
* Leave alone

South Sewer Line
* Use same alteration as option #1
* Assume no pushed pipe at tributary

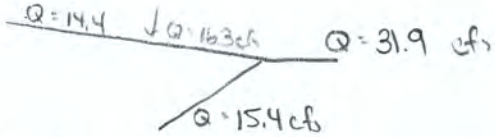
Detention Pond Design
* Maximum depth = 6ft
* Assume Hutchinson Ravine routed to basin
* Provide two (2) beehive grates as overflow
* Provide 12" primary outlet
* Only 98% storage volume used in 100yr 24hr event

Elev	Area (ft^2)
644	60,000
646	80,000
647	120,000
650	310,000





Run the outflow hydrographs from SWMM into HEC-HMS model. Use peak flows from HEC-HMS as input to SWMM models.



Plunge Pool at Head of Ravine
Q_{max} = 14.4 cfs
t = 4.5 hrs

Estimate Scour Hole Depth
h = 2.4ft
W = 19.11 ft
L = 30.98 ft
L_{max} = 12.4ft

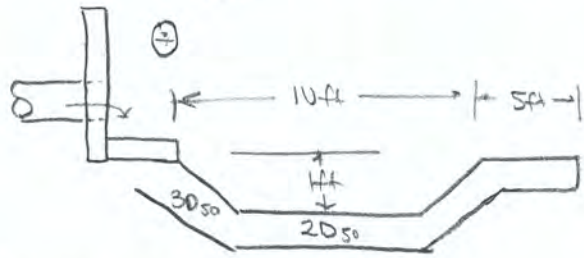
Estimate D_{50}

$$\frac{h_s}{Y_e} = 0.86\left(\frac{D_{50}}{Y_e}\right)^{-0.55}\left(\frac{V_o}{\sqrt{gY_e}}\right) - C_o$$

Use $h_s = 1ft$, $D_{50} = 0.5ft$

$\frac{D_{50}}{Y_e} = 0.98 > 0.1$ okay ✓ $\quad \frac{h_s}{D_{50}} = 2 \geq 2$ okay ✓

$L_S = 10h_s = 10ft$
$L_B = 1.5h_s = 15ft$
$L_A = 5h_s = 5ft$
use $W_B = 5ft$



Check velocity at end of apron

$$\frac{Q^2}{g} = \frac{A_c^3}{T_c} = \frac{[Y_c(W_B + 2Y_c)]^3}{W_B + 4Y_c}$$

$$\frac{(14.44cfs)^2}{(32.2ft/s^2)} = \frac{[Y_c(5ft + 2Y_c)]^3}{5ft + 4Y_c}$$ Solving for Y_c, $Y_c = 0.59ft$

$A_c = Y_c(W_B + 2Y_c) = 3.65ft^2$

$V = \frac{Q}{A} = \frac{14.4cfs}{3.65ft^2} = 3.98\frac{ft}{s}$

Riffles Downstream of Plunge Pool

From HEC-RAS model, use $S_f = 0.03$
$S_o \approx 0.04$

$H = (0.04 - 0.03)(650ft) = 6.5ft$

Use (13) 6" riffles spaced every 50 ft.

Estimate stone size:
$V_d = 1.6V = 1.6(4ft/s) = 6.4ft/s$

$$D_{30} = (2)(0.375)(1)(1)(0.77ft)\left[(0.75)\left(\frac{6.4ft/s}{\sqrt{(32.2\frac{ft}{s^2})(0.77ft)}}\right)\right]^{2.5} = 0.6ft$$

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Riffles Along Dropped Reach

* Different routing used than shown in sheet 4, so redo calculations.

$S_o = 0.083$

$S_f = 0.024$

$H = (0.083 - 0.024)(223.5\,ft) = 13.2\,ft.$

$\frac{H}{h} = \frac{13.2\,ft}{1.5\,ft} = 8.8\,ft \rightarrow$ use 9 structures 1.5 ft. high.

$\text{Spacing} = \frac{223.5\,ft}{9} = 24.8\,ft$

Estimate stone size:

$V_d = 1.6V = 1.6(4.0\,ft/s) = 6.4\,ft/s$

$$D_{30} = (2)(0.375)(1)(1)(1.2\,ft)\left[(0.78)\left(\frac{6.4\,ft/s}{\sqrt{32.2\,\frac{ft}{s^2}\cdot 1.2\,ft}}\right)\right]^{2.5}$$

$= 0.52\,ft \rightarrow$ use $D_{30} = 0.75\,ft$

As before, protect last riffle from undermining by placing check dam as toe/scour protection.

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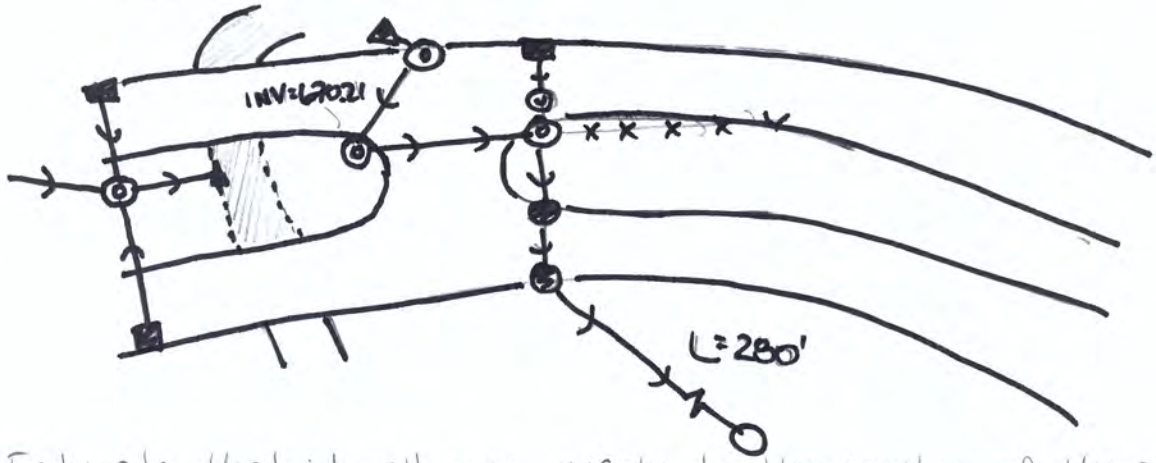
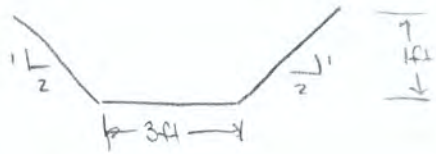
Hutchinson Realignment

* Replace P76 & raise to 1% slope
  - ↳ US INV = 670.39
  - ↳ Length = 36 × 0.005 = 0.16 ft
  - ↳ DS INV = 670.21
* Replace J76 w/ MUCH shallowes structure
* Add structure in island across intersection & truncate/replace P78
* Run sewer across street & around/through trees
* Meander sewer through trees & park until can do straight run
* Run sewer straight until approx 2-3' of cover remaining
  - ↳ Daylight sewer outfall & use swale to continue diversion to detention basin



* Estimate that it will run nearly to the center of the parade grounds until able to daylight.

* Swale: U/S elev = 663.03
  D/S elev = 654.02
  Length = 400 ft
  $V_{max\text{-}allow}$ = 2.5 ft/s



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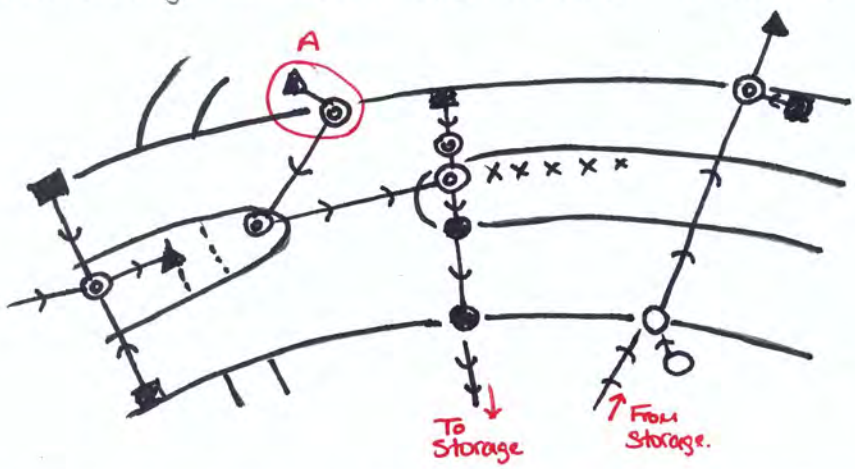
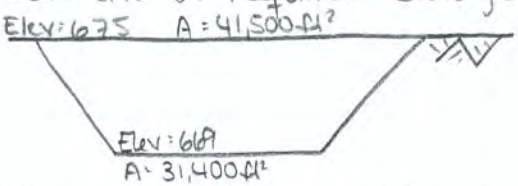
Hutchinson - Option #2: Detention Basin by Entrance

* This measure uses the same realignment detailed in Hutchinson Option #1, but terminates in the field to the south.
* Place storage in field, then reroute back to original outfall



* Location A problematic due to low rim elevation
* Initial estimate of required storage volume



* Using 12" restrictor, Q_{max} = 4.92 cfs
* Uses 74% of the available volume

For Underground Storage:

Need $\forall$ = 218,700 ft³
Use 5'×10' structure 400' long
↳ volume: 20,000 ft³ each
↳ Need 11

If using 12" outlet, Q_{max} = 4.68 cfs
Uses 82% of available volume

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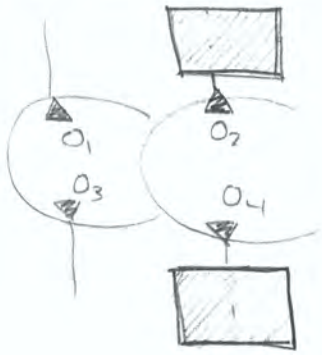
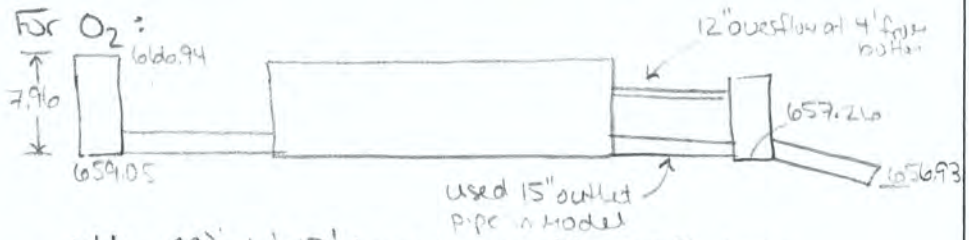
Detention Pond Modification #1



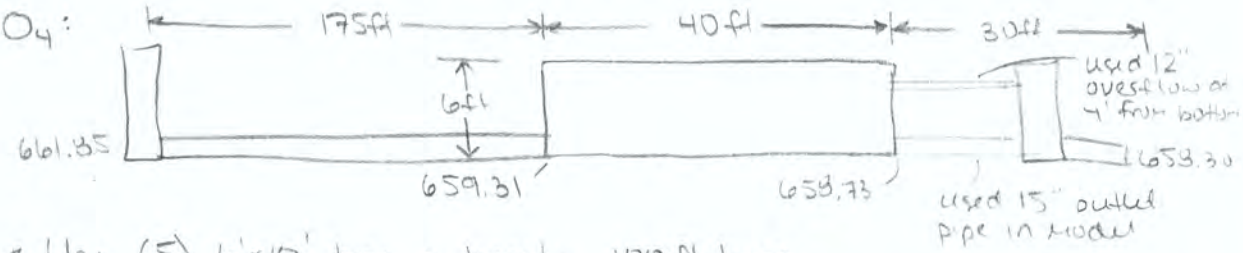
For O_1 & O_4: Consider abandoning?

For O_2:



* Use (3) 6'×10' box culverts 100ft long
* Uses 81% of the proposed storage volume
* $Q_{max\text{-}out}$ = 15 cfs

For O_4:



* Use (5) 6'×10' box culverts 100ft long
* Uses 82% of the proposed storage volume
* $Q_{max\text{-}out}$ = 10.63 cfs

Note: These are inadequate to provide sufficient storage to mitigate the overall discharge from the detention ponds.

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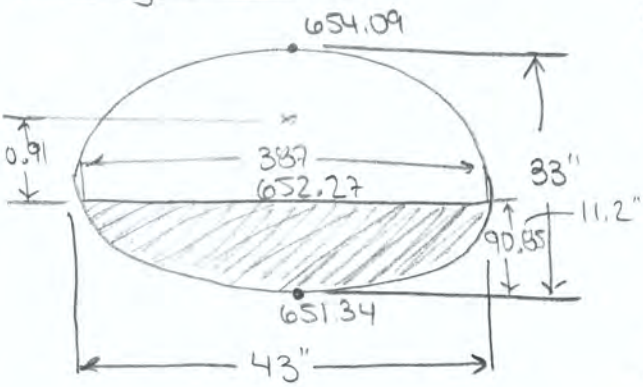
Sizing of Weirs



$A_{tot} = 7.74\ ft^2$
$A_{block} = 2.23\ ft^2$ } $A_{onf} = 5.5\ ft^2$

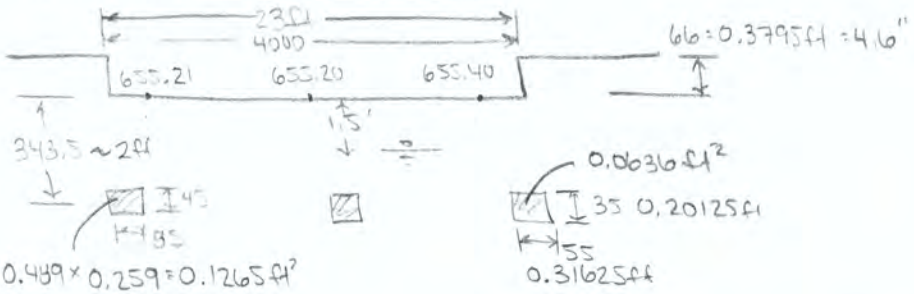
Weir

$Q = 1.92 L H^{3/2}$
$= 1.92 (6.67\ ft) H^{3/2}$
$= 12.81\ ft\ H^{3/2}$

Orfice

$Q = 0.62 (2 \times 5.5\ ft^2) \sqrt{2 \cdot 32.2 \frac{ft}{s^2} \cdot H}$
$= 54.73\ H^{1/2}$

Detention Basin #1 Weir



h	Q_{onf}
0	0
0.1	0.2
0.5	0.445
0.75	0.545
1.0	0.629
1.25	0.704
1.50	0.77
1.75	0.833
2.00	0.89

h	Q_w
0	0
0.1	1.8
0.2	5.1
0.3	9.4
0.4	14.7
1.3	126.15
2.3	387.7

H	Q_o	Q_w	Q_{tot}
0	0	-	0
0.1	0.2	-	0.2
0.5	0.445	-	0.445
0.75	0.545	-	0.545
1.0	0.629	-	0.629
1.5	0.77	-	0.77
2.0	0.89	0	0.89
2.1	0.912	1.8	2.71
2.2	0.934	5.1	6.034
2.3	0.955	9.4	10.36
2.4	0.975	14.7	15.675
3.3	1.14	126.15	127.29
4.3	1.31	387.7	389.01

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Detention Pond Modification #2: Enlarge Detention #1

Increase Storage Volume

	Original	Modified +1	Modified +2
0	15835	20410	34410
1.5	16331	20906.5	34907
1.8	17161	21737	35737
2.3	18555	23311	37311
3.3	20005	25942	39942
4.3	24229	30166	44166
5.3	31752	37689	51689
	$Q_1 = 31.11$ cfs	$Q_1 = 31.1$ cfs	$Q_1 = 31.08$ cfs
	$Q_2 = 35.5$ cfs	$Q_2 = 35.5$ cfs	$Q_2 = 35.43$ cfs

Note: Increasing the storage volume of the facility upstream does not significantly improve the overall discharge.

Detention Pond Modification #3: Reduce Weir Length Btwn Basins

* Try 1/3 current length

$Q = 1.92LH^{3/2} = 1.92(7ft)H^{3/2}$

h	Q
0	0
0.1	0.425
0.2	1.202
0.3	2.208
0.4	3.4
0.5	24.44
1.3	126.98
2.3	273.22

H	Q_{tot}
0	0
0.1	0.2
0.5	0.45
1.0	0.63
2	0.89
2.1	1.32
2.2	2.14
2.3	3.163
2.4	4.38
2.5	29.44
3.3	128.12
4.3	274.53

* Reduce opening of culverts by 0.5.

ORIGINAL

$Q_{max} = 35.46$ for 15 min

33-35.5 for 1.5 hrs.

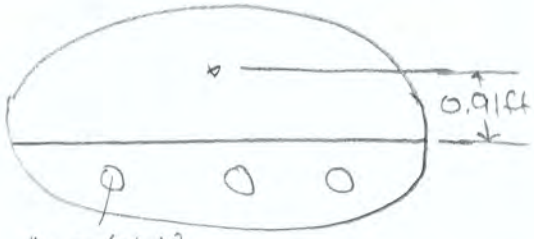
MOD

$Q_{max} = 34.55$ for 15 min

33-35 for 1.75 hrs.

Note: Reducing weir openings might delay the peak, but functionally only increases storage volume utilized while NOT significantly reducing the peak discharge.

Detention Pond Modification #4: Modify Weirs to Include Orifice



$A = \frac{\pi (2/12)^2}{4} = 0.022\,ft^2$

Weir

$Q = 12.31\,ft\ H^{3/2}$

Orifice #1

$Q = 0.62(2 \times 5.5\,ft^2)\sqrt{2(32.2\,\frac{ft}{s^2})H}$

Orifice #2

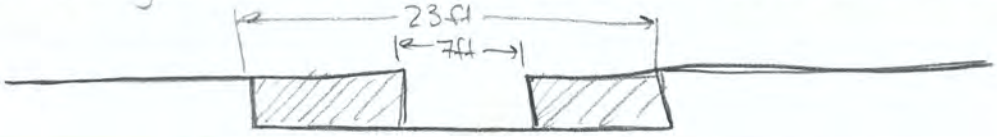
$Q = 6 \times 0.62(0.022\,ft^2)\sqrt{2(32.2\,\frac{ft}{s^2})H}$

Note: Not enough to make significant impact!

Detention Pond Modification #5: Modify Culvert Inlet

* Provide 12" orifice into culvert

* Alter configuration of weirs between Basins #1 & #2



Note: Flow backs up until stage such that ~30cfs reached. Can block outlet to reduce discharge, but not enough storage to contain resulting volume

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Detention Pond Modification #6: Drop Structure at Head

From SWMM model,

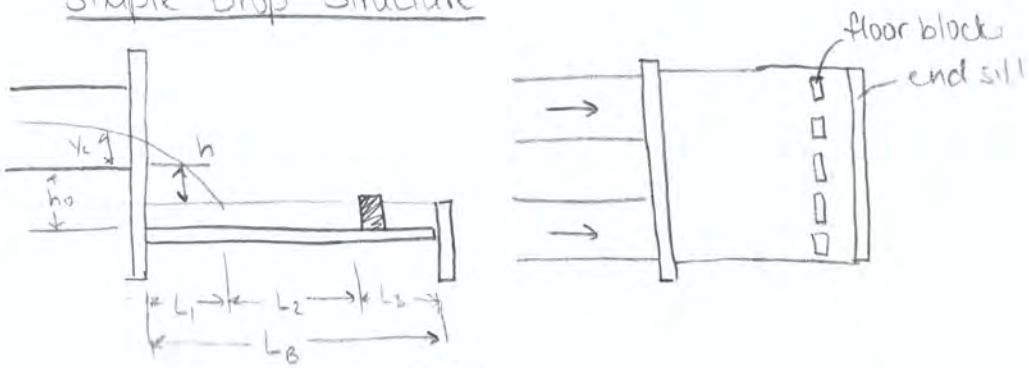
$Q_{max} = 35.46$ cfs for $t = 1.5$ hrs.

$$q = \frac{35.46 \text{ cfs}}{7.2 \text{ ft}} = 4.95 \frac{ft^2}{s}$$

From HEC-14, Section 11

$$N_d = \frac{q^2}{g h_0^3} = \frac{(4.95 \, ft^2/s)^2}{(32.2 \frac{ft}{s^2})(6 ft)^3} = 0.0035$$

Simple Drop Structure



$$y_c = \left(\frac{q^2}{g}\right)^{1/2} = \left[\frac{(4.95 \, ft^2/s)^2}{(32.2 \, ft/s^2)}\right]^{1/2} = 0.87 ft$$

$y_3 = 2.15 y_c = 2.15(0.87 ft) = 1.87 ft$

$h_2 = -(h - y_0) \approx -(5.13 - 0.87) = -4.26 ft$

$h_0 = h_2 - y_3 = (-4.26 ft) - (1.87 ft) = -6.13 ft$

Solve for Basin Length

$$L_f = \left(-0.406 + \sqrt{3.195 - 4.368 \frac{h_0}{y_c}}\right) y_c = \left(-0.406 + \sqrt{3.195 - 4.368\left(\frac{-6.13}{0.87}\right)}\right)(0.87) = 4.74'$$

$$L_t = \left(-0.406 + \sqrt{3.195 - 4.368\left(\frac{h_2}{y_c}\right)}\right) y_c = \left[-0.406 + \sqrt{3.195 - 4.368\left(\frac{-4.26}{0.87}\right)}\right](0.87 ft) = 3.96 ft$$

$$L_s = \frac{\left[0.691 + 0.228\left(\frac{L_t}{y_c}\right)^2 - \left(\frac{h_0}{y_c}\right)\right] y_c}{0.185 + 0.456\left(L_t / y_c\right)} = 4.8 ft$$

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$$L_1 = \frac{L_f + L_s}{2} = \frac{(4.74\,ft) + (4.8\,ft)}{2} = 4.8\,ft$$

$$L_2 = 0.8\,y_c = 0.8(0.87\,ft) = 0.7\,ft$$

$$L_3 \geq 1.75\,y_c = 1.75(0.87\,ft) = 1.53\,ft$$

$$L_B \sum L_i = (4.8\,ft) + (0.7\,ft) + (1.6\,ft) = 7.1\,ft \rightarrow \text{use } 8\,ft$$

<u>Basin Blocks & End Sill</u>

Block Height $= 0.8\,y_c = 0.7\,ft$

Block Width = Block Spacing $= 0.4\,y_c = 0.35\,ft \sim 0.4\,ft.$

End Sill Height $= 0.4\,y_c = 0.4\,ft$

<u>Design Basin Entrance & Exit</u>

Sidewall Height above Tailwater Elevation $= 3y_c$

$= 2.64\,ft$

$\approx 32''$

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Riffle Sizing

For XS 821 to 669: Not Needed ($S_o \approx 0.022$)
For XS 669 to 547:

$$H = (0.051 - 0.022)(669 - 547) = 3.5\,ft$$

Use 6" riffles $\frac{H}{n} = \frac{3.5}{0.5} = 7.0 \rightarrow$ need 7 structures

$$V_d = 1.6V = 1.6(5\,ft/s) = 8\,ft/s$$

$$D_{30} = C\left[(0.78)\left(\frac{V}{\sqrt{K_1 g d}}\right)\right]^{2.5} = 0.525\left[0.78\left(\frac{8\,ft/s}{\sqrt{32.2\,ft/s^2 \cdot 0.7'}}\right)\right]^{2.5}$$

$$= 1.1\,ft$$

$$\text{Spacing} = \frac{669 - 547}{7} = 17\,ft.$$

For XS 547 - 437:

$$H = (0.127 - 0.022)(111.9) = 11.75\,ft$$

Use 12" riffles $\frac{H}{n} = \frac{11.75}{1} = 1.75 \rightarrow$ need 12 structures.

$$V_d = 1.6V = 1.6(5\,ft/s) = 8\,ft/s$$

$$D_{30} = 0.45\left[(0.78)\left(\frac{8.0\,ft/s}{\sqrt{32.2\,ft/s^2 \cdot 0.6'}}\right)\right]^{2.5} = 1.56\,ft$$

$$\text{Spacing} = \frac{111.9\,ft}{12} = 9.3\,ft$$

For XS 437 to 271:

$$H = (0.026 - 0.022)(165.8) = 0.67\,ft$$

Use 6" riffles $\frac{H}{n} = \frac{0.67}{0.5} = 1.34 \rightarrow$ need 2 structures

$$V_d = 1.6V = 1.6(3.6\,ft/s) = 5.8\,ft/s$$

$$D_{30} = 0.6\left[(0.78)\left(\frac{5.8\,ft/s}{\sqrt{32.2\,ft/s^2 \cdot 0.8'}}\right)\right]^{2.5} = 0.5\,ft.$$

$$\text{Spacing} = \frac{165.8\,ft}{2} = 83\,ft.$$

* Assume All Riffle Widths = 25 feet
* Replace existing checkdam w/ 1' stone riffle using D_{50} = 1' stones.
* Consider replacing inlet to storm sewer (specifically the trash grate)

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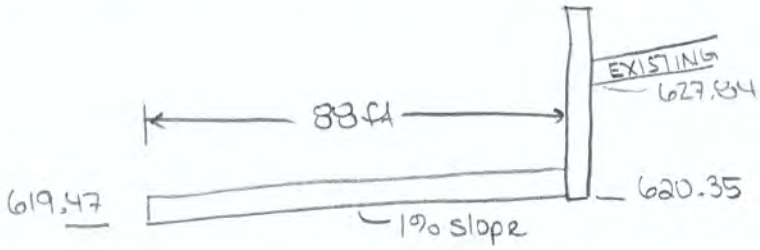
North Tributary

* Remove existing headwall & advance ~70ft towards main stretch
* Backfill behind new headwall
* Add new manhole at outfall & length of 24" pipe to discharge directly to main reach



* Include Plunge Pool at Confluence

$Q_{MAX} = (4.16\,cfs) + (43.8\,cfs) = 48\,cfs$

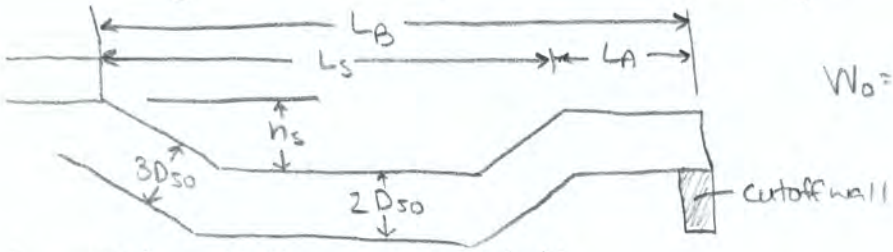
$V_{MAX} = 5.43\,\frac{ft}{s} \rightarrow V_d = 1.6V = 8.7\,ft/s$

$Y_e = 0.61\,ft$

$h_s \sim 1\,ft.$

$$\frac{h_s}{Y_e} = 0.86\left(\frac{D_{50}}{Y_e}\right)^{-0.55}\left(\frac{V_0}{\sqrt{gY_e}}\right) - C_0$$

use $D_{50} = 0.5\,ft$, $h_s = 1\,ft.$ $\Big\}$ $\frac{D_{50}}{Y_e} > 0.1$? OK! & $\frac{h_s}{D_{50}} = 2 \geq 2$ OK!



$W_0 = 2ft$

$L_S = 10h_s = 10ft$ or $3W_0 = 6ft$

$L_A = 5h_s = 5ft$ or $W_0 = 2ft$

$L_B = 15h_s = 15ft$ or $4W_0 = 8ft$

Storm Sewer Near Mouth of Ravine

* Remove existing rubish & debris
* From SWMM Model
  $Q_{max} = 3.41$ cfs

Option #1: Cobble Chute

From EM-1110-2-1601, Eqn. 3-5

$$q = \frac{3.41\ cfs}{2\ ft} = 1.7\ \frac{ft^2}{s} \Rightarrow q_d = 1.25q = 2.14\ \frac{ft^2}{s}$$

$$S_o = \frac{628 - 596.5}{185} = 0.17$$

$$D_{30} = \frac{1.95\, S_o^{0.555}\, q^{2/3}}{g^{1/3}} = \frac{1.95(0.17)^{0.555}(2.14\ ft^2/s)^{2/3}}{(32.2\ ft/s^2)^{1/3}} = 0.4\ ft$$

Use 6" stone w/ thickness = 9"

Option #2: In-Ravine Pipe

From SWMM model,

* Install structure at outfall
* Install 180' of 18" pipe to concrete chute near ravine floor
* Cover w/ 1' stone & 1' clean backfill

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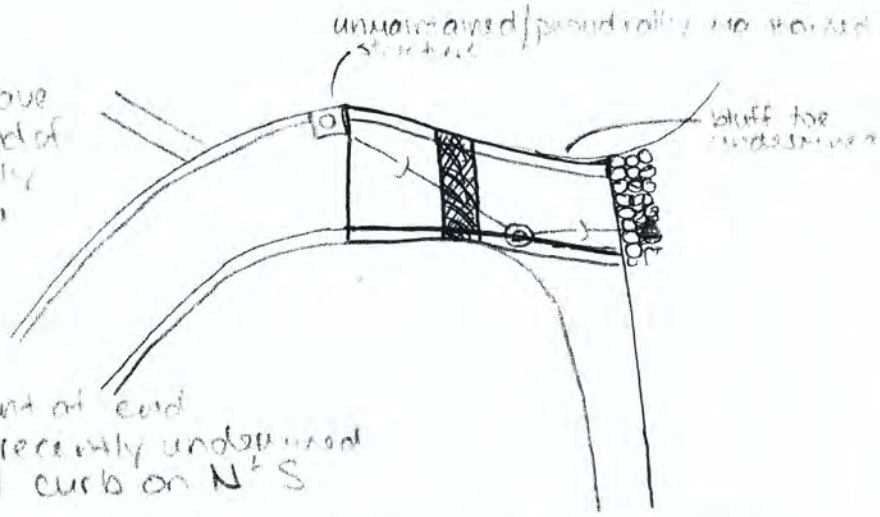
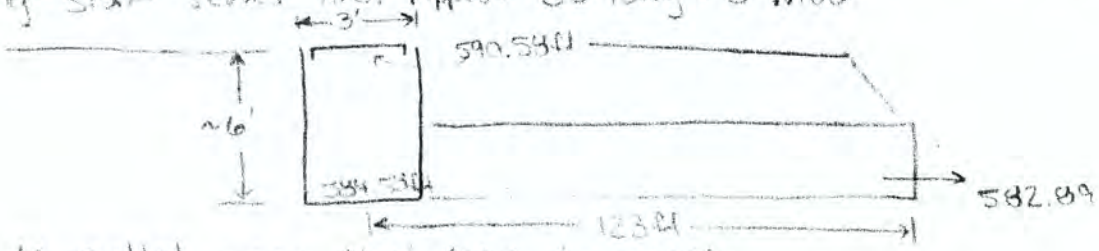
Mouth of Ravine



* During site visit, have found structure at end of north gutter completely blocked, causing flow to bypass. Runs along edge of street, undermining toe of bluff to north & running over pavement at end of ravine. Pavement recently undermined
* Install vertical faced curb on N & S sides of pavement.
* Over ~30ft stretch, transition from c/g to shallow v-shaped pavement, beginning at the N structure
  ↳ Note: Length will be controlled by what is necessary to incorporate S. gutter
* Install grated inlet from curb to curb over trench that intersects existing storm sewer line. Approx 35' long & 3' wide



* Provide outlet pipes that drain to creek
  (assume flow at 0.8D & D = 2.5ft)

$Q = \frac{1.49}{n} A R_h^{2/3} S_o^{1/2}$ $n = 0.013$ $R_h = 0.760$ ft

$A = 4.21$ ft²

$= \frac{1.49}{0.013}(4.21\text{ft}^2)(0.760\text{ft})^{2/3}(0.014)^{1/2}$

$= 47.5$ cfs

$Q_{max} = 100.9$ cfs → need (3) pipe

* Provide riprap aprons on side downstream of grate

$q = \frac{101\text{ cfs}}{20\text{ft}} = 5.05 \frac{\text{ft}^2}{\text{s}}$ → q_c 6.32 ft²/s

$D_{50} = \frac{1.95(0.2)^{0.333}(6.5\text{ft}^2/\text{s})^{2/3}}{(32.2)^{1/3}} = 0.9\text{ft}$

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Size Plunge Pool at Base of Slope/Outfall

- Assume pipe flows at 0.3D
- For $d/D = 0.3$, $A/D^2 = 0.67316 \Rightarrow A = 0.67316(2.5ft)^2 = 4.206\ ft^2$

Estimate velocity: $V = \frac{Q}{A} = \frac{47.5\ ft^3/s}{4.21\ ft^2} = 11.28\ \frac{ft}{s}$

From HEC-14 Equation 10.1,

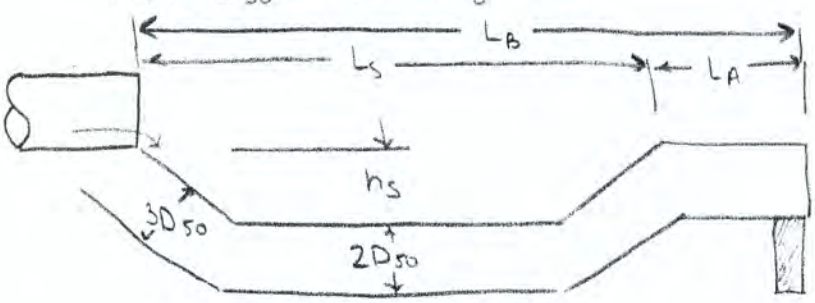
$$\frac{h_s}{Y_e} = 0.36\left(\frac{D_{50}}{Y_e}\right)^{-0.55}\left(\frac{V_o}{\sqrt{gY_e}}\right) - C_o$$

$Y_e \sim 2ft$

$h_s \sim 2ft$

$$\frac{h_s}{Y_e} = 0.36\left(\frac{D_{50}}{Y_e}\right)^{-0.55}\left(\frac{V_o}{\sqrt{gY_e}}\right) - C_o$$

use $D_{50} = 1ft$ $h_s = 2ft$



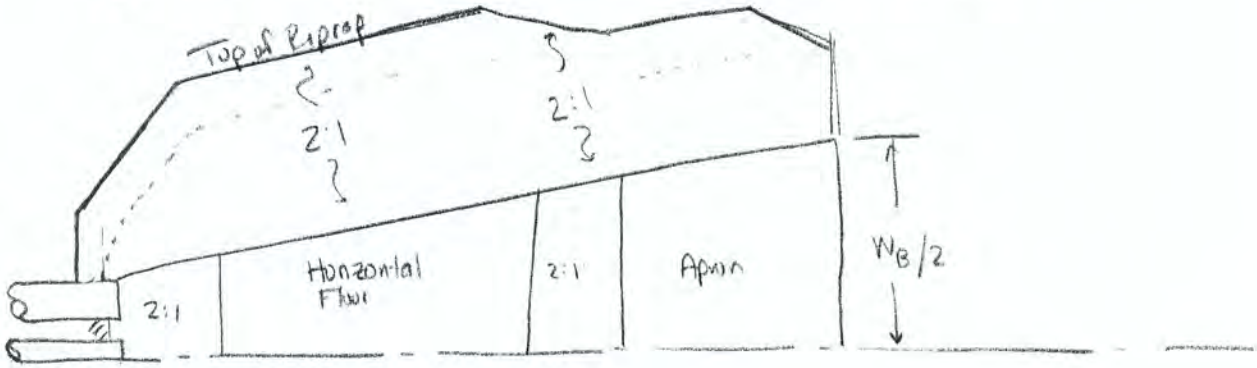
$L_S = 10h_s = 20ft$

$L_A = 5h_s = 10ft$

$L_B = 15h_s = 30ft$

Since using (3) 2.5ft diameter pipes, assume spacing of D/2; total width = 12.5ft

$W_B = W_o + 2(L_B/3) = 12.5ft + 2\left(\frac{30ft}{3}\right) = 32.5ft$



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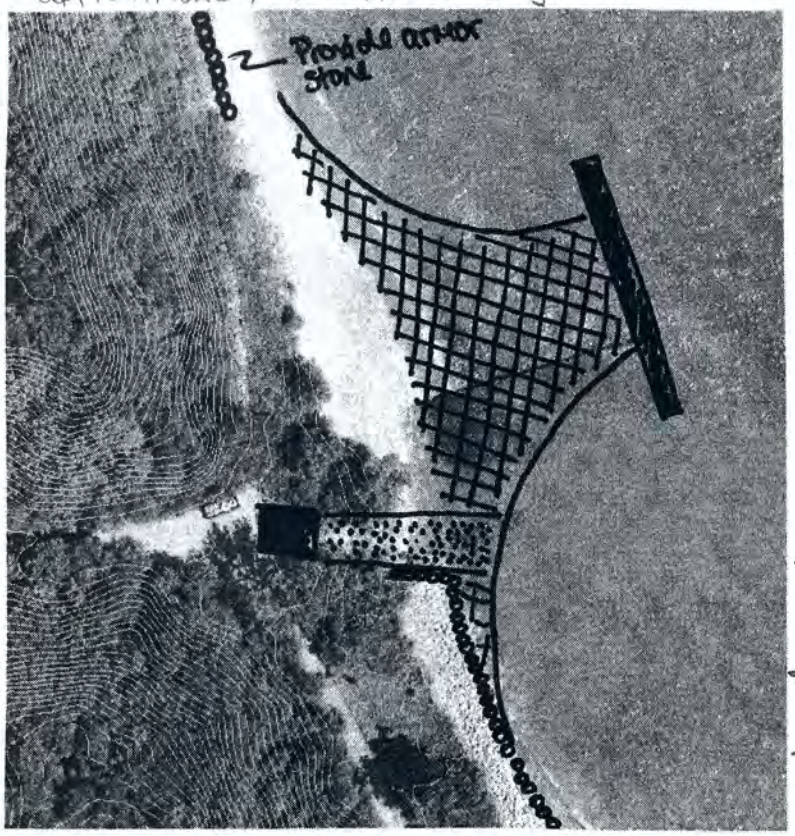
Integrate Into Shoreline Measures

* Use variation of Measure DE, Bartlett Ravine
* Remove groin north of Bartlett Ravine
* Locate midpoint of central nearshore breakwater of system DE approximately 54' north of groin.



* As before, structure is approximately 250 ft long and 130 ft offshore.
* Assume that stable shoreline configuration consistent w/ calculation sheet 7
* Field verify that existing stone south of mouth is adequate based on sizings shown in calculation sheet 13.
  - $D_{50} = 1.2$ ft
  - $W_{50} = 285^{\#}$
  - $d_s = 2.5$ ft
* Provide 80 ft of stone at toe of berm per calculation sheet 13.
* Locate plunge pool at mouth of ravine
* Provide channel to lake.

* Stabilize designated banks using stone, tree trunks, root wads, etc. out to waterline. It is expected that the outlet will periodically silt in, but will open up during the next storm event. Bank stabilization will reduce the likelihood of the channel undermining the southern revetment

Estimate velocity from end of plunge pool to waterline

Elev outfall = 582.89 ft
Elev MWL = 578.33 ft

$S_o = \frac{582.89 - 578.33}{120 \text{ ft}} = 0.038$

$Q = \frac{1.49}{n} A R_h^{2/3} S_o^{1/2}$ where $A = By = (45\text{ft})y$

$P = B + 2y = (45\text{ft}) + 2y$

$V = Q/A$ $\quad R_h = A/P$

$V_{S_o = 0.038} = 5.35 \frac{ft}{s}$ → Will likely erode channel. Estimate required slope

$V_{S_o = 0.009} = 3.47 \frac{ft}{s}$ → Use $S_o = 0.009$

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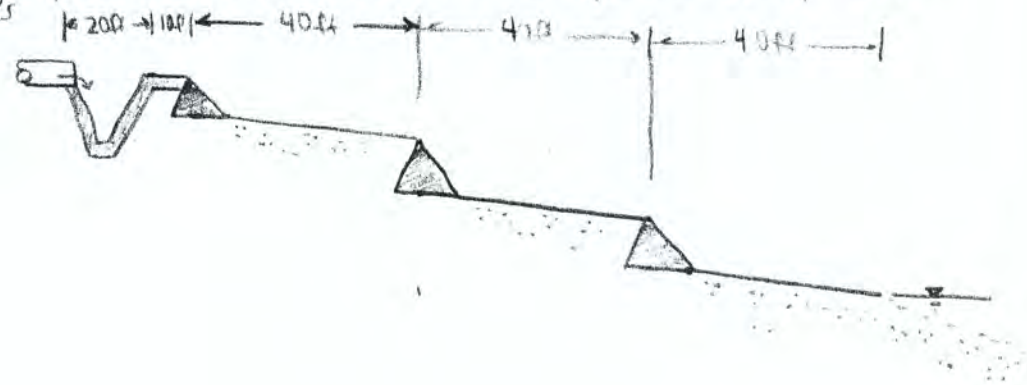
If multiple drop structures used,

$H = (0.038 - 0.009)(120ft) = 3.48ft$

Use (3) riffles total, (1) 12" riffle immediately downstream of plunge pool and (2) 1.25ft riffles spaced every 40ft thereafter



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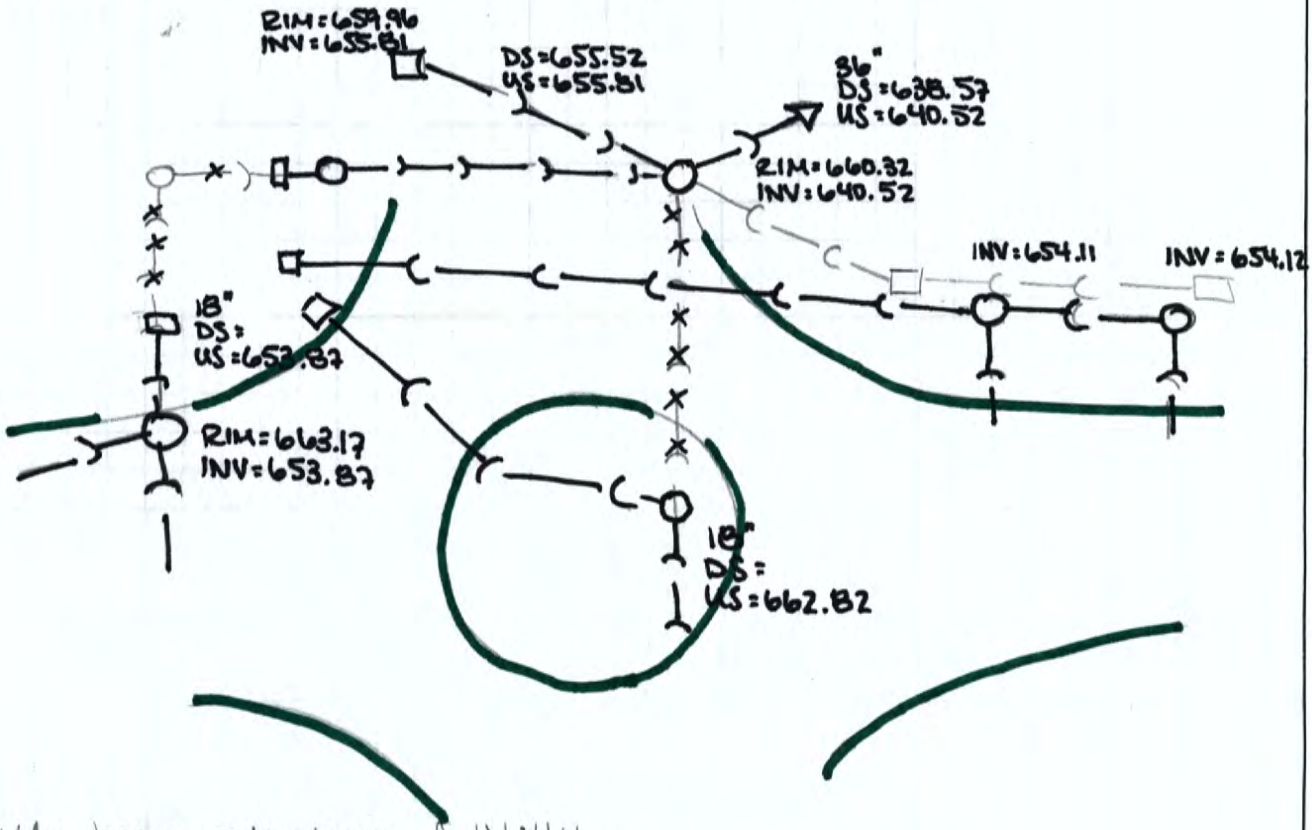
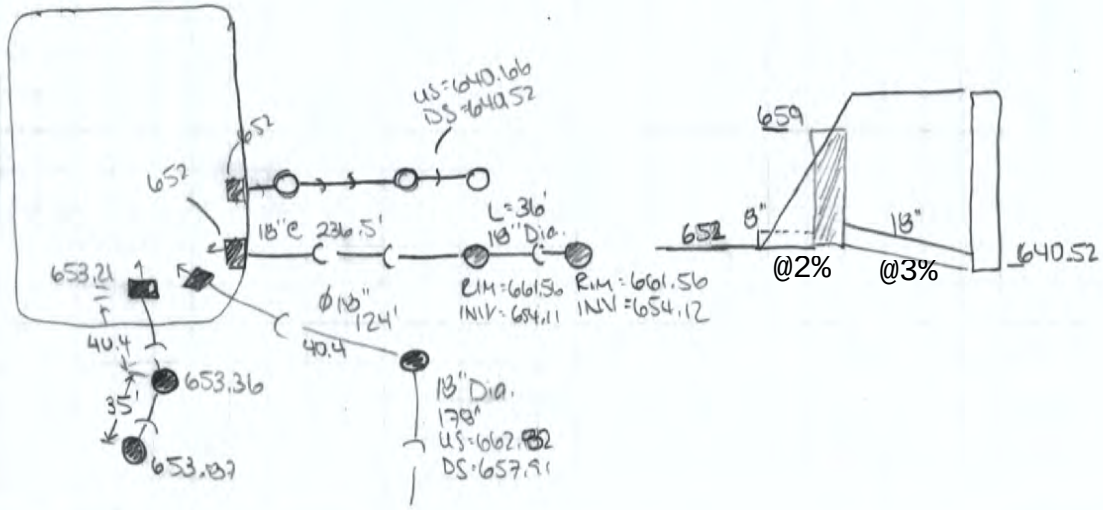
Option #1: Detention Storage at Head of Ravine

* Allowable Discharge : Target = 2 cfs
  Allowable = 7 cfs
* Need to realign storm sewers through the basin



* Use basin side-slopes of 1V:4H
* Use 1% slope for outlet pipe ~110 feet length



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For Current + Approx. 50% Undeveloped Area

	Elev	Area
0	648	17,573
4	652	23,250
8	656	40,176
12	660	55,300

* Uses 90% of storage volume
* Max depth: 11.20 ft.
* Provide beehive grate at top of structure for overflow.

For Current Only

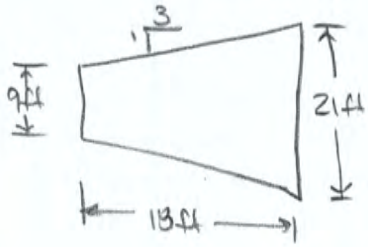
0	652	10,600
4	656	15,070
8	660	20,800

* Uses 77% of storage volume
* Max depth: 6.6ft.

Plunge Pool at Head of Ravine

$V_{max} = 8\frac{ft}{s} \rightarrow V_d = 1.2\,V_{max} = 9.6\frac{ft}{s} \sim 10\frac{ft}{s}$

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left(\frac{10\frac{ft}{s}^2}{2\cdot 32.2\frac{ft}{s^2}}\right) = 0.65\,ft.$$



Thickness $= 1.5\,D_{50} = 1.0\,ft.$

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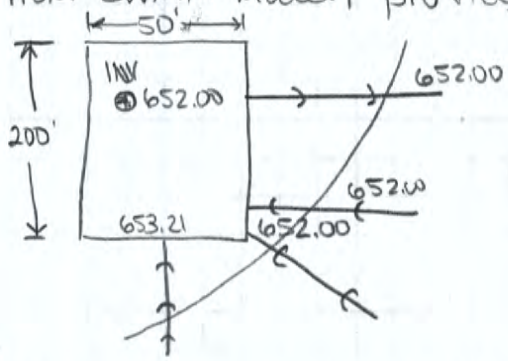
Option #2: Underground Detention Storage

Allowable Discharge: Target = 2cfs
Allowable = 7cfs.

From SWMM model, provide (5) 8'×10' structures 200' long



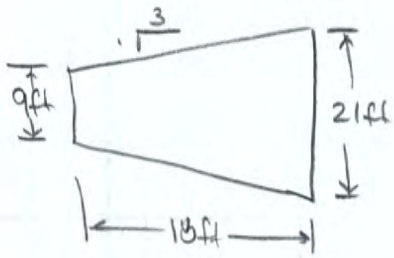
$Q_{max} = 4.47$ cfs
$Q_d = 1.2Q = 5.4$ cfs

$V_{max} = 8 \frac{ft}{s}$
$V_d = 1.2V = 9.6 \frac{ft}{s} \sim 10 \frac{ft}{s}$

Plunge pool at head of ravine

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left(\frac{10\frac{ft}{s}^2}{2 \cdot 32.2\frac{ft}{s^2}}\right) = 0.65 ft$$

$$D_{50} = 0.02D\left(\frac{Q}{D^{2.5}}\right)^{4/3}\left(\frac{1}{0.4}\right) = 0.02(3ft)\left(\frac{5.4}{3^{2.5}}\right)^{4/3}\left(\frac{1}{0.4}\right) = 0.04 ft.$$



Thickness $= 1.5D_{50} = 1ft.$

Note: Design does not take into account additional development

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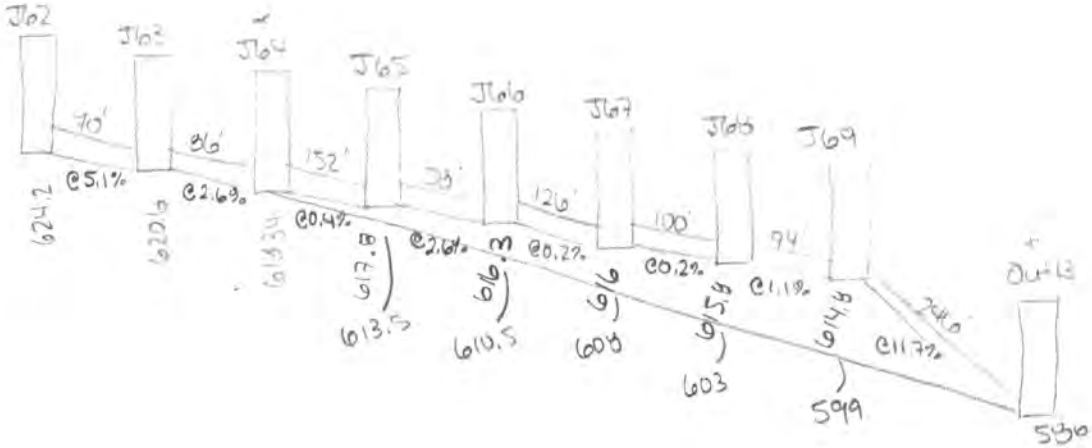
Option #3: In-Ravine Pipe

* Eliminate the existing detention basin by adding structure(s) pipe & backfilling. Enlarge its connection from 6" to 24"
* At head of ravine, drop crown of pipe to existing grade; assume any filling will be done to repair incision
* Since only single outfall, tie in w/ new structure; must be sure to bury it in the head slope
* At mouth of ravine:
  - Connect the sewer to the existing culvert under the slope (use single large structure). Provide a beehive grate at the structure to drain the ravine. Allow minor ponding.
  - Excavate the mouth. Cut the floor to reduce the severity of the drop at the end... use riffles to transition & reduce the slope. Armor the beach at the mouth
  - Excavate the mouth. Leave floor as is, but still tie pipe to existing culvert. Build cascade down face instead



Riffle Design

For XS1063 to 370

* use riffles to reduce velocity by raising channel bed

→ Current = $\frac{631.2 - 617.90}{1113.6 - 607.8} = 0.026$

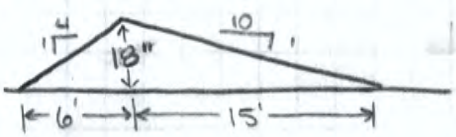
→ Try $S_f = 0.017$

$H = (S_o - S_f)X = (0.026 - 0.017)(730) = 6.57\,ft \sim 6.6\,ft.$

No. of structures $= \frac{H}{h} = \frac{6.6\,ft}{0.5} = 13.2$ (use 14)

Required Spacing $= \frac{730\,ft}{14} = 52\,ft$

Estimated as 15' wide



Estimate Stone Size

$V_d = 1.6(3\,ft/s) = 4.8\,ft/s$

$C = 0.6$

$d = 0.5\,ft$

$$D_{30} = C\left[\left(\frac{\gamma_w}{\gamma_s - \gamma_w}\right)^{0.5}\left(\frac{V}{\sqrt{K_1 g d}}\right)\right]^{2.5} = 0.875\left[(0.78)\left(\frac{4.8\,ft/s}{\sqrt{(32.2\,ft/s^2)(0.5\,ft)}}\right)\right]^{2.5}$$

$= 0.32\,ft$

Note: The following options are measured relative to mouth, so some overlap may occur w/ the above riffles. Where this occurs, the riffle below supersede those above.

If Fill Excavated & Ravine Floor Dropped

$S_f = 0.008$

$S_o = \frac{621.53 - 584.69}{790} = \frac{36.84}{790} = 0.047$

$H = (S_o - S_f)X = (0.047 - 0.008)(790) = 30.52\,ft.$

Use (31) 12" riffles

Spacing $= \frac{790}{31} = 26\,ft.$

Assume width = 10ft.

If Fill Excavated & Ravine Floor NOT dropped (Sloped at Culvert)

$S_f = 0.008$

$S_o = \frac{620 - 584.69}{240\ ft} = 0.147$

$H = (S_f - S_o)X = (0.147 - 0.008)(240ft) = 33.4ft.$

* If using 12' riffles, would need 34 structures at 7.1 foot spacing... consider alternative configuration
* Try stone weirs.

Estimate Required stone size

* Use $V = 5ft/s \rightarrow V_d = 1.6V = 8ft/s$
* $C = 0.375$ (from Schenck analysis)
* $D_{30} = 0.375\left[(0.78)\left(\frac{8\frac{ft}{s}}{\sqrt{32.2\frac{ft}{s^2} \cdot 0.5ft}}\right)\right]^{2.5} = 1.13ft$

Estimate Toe Scour

* channel width ~ 3ft
* $D_{MNC} = 0.5ft$
* $D_{MXB} = 1.14 D_{MNC}\left(1.72 + \frac{0.0084W}{D_{MNC}}\right)$

$= 1.14(1ft)\left(1.72 + \frac{0.0084 \cdot 3ft}{1ft}\right) = 1.4ft$

* Scour depth $= D_{MXB} - D_{MNC} = 1.4 - 0.5 = 0.9ft.$

Total Rock Weir Height

* Assume height above bed = 0.5ft
* Minimum embedment = 0.9 ft
* Use 18" base stone to prevent piping & increase stability

Rock Weir Geometry

Crest Width $= 2D_{50} \sim 1.5ft$
$R = 1.625ft.$

* Provide bank stabilization up ravine slope 3' either side
* Last weir tapers at 1:10

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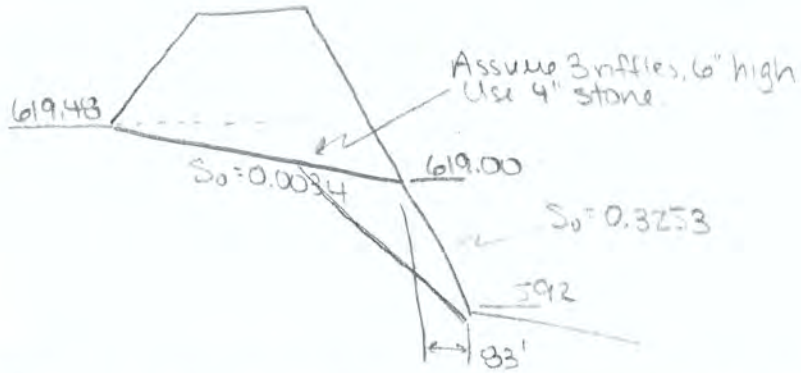
If Fill Excavated & Ravine Floor NOT dropped (Earth Plug Only)



Using straight chute, from EM1110-2-1601, Eqn. 3-5 (Steep Slope Riprap)

$$D_{30} = \frac{1.95 S_o^{0.555} q^{2/3}}{g^{1/3}} = \frac{1.95(0.3253)(3.7\frac{ft^2}{s})^{2/3}}{(32.2\ ft/s^2)^{1/3}} = 0.79\ ft$$

$\approx 1\ ft$

Note: This value exceeds the permissible slope for this equation's applicability. Stone would therefore need to be grouted in place

If Tunnel Pushed & Ravine Floor NOT dropped (Sloped at Culvert)

* Use Stone Weir design (weirs go in tunnel)

If Tunnel Pushed & Ravine Floor NOT dropped (Earth Plug Only)

* Use Grouted Cobble Chute

No Plug Removal & Shallow Slope w/ Excavation

* Riffle height & spacing will depend on depth of excavation
* Assume depth = 10 ft & height = 12" w/ 50 ft spacing
  ∴ 500 ft long excavation (need 10 riffle)
* Stabilize slopes of side/rear walls (1V:3H or 1V:4H ?)
* Assume D_{50} = 6" stone
* Assume width = 10 ft
* Situate toe of last riffle at mouth of culvert

No Plug Removal & Steep Slope w/ Wing Walls

* Assume depth = 10 ft
* Estimate q ... assume width = 5'

$$q = \frac{Q}{b} = \frac{18.5\ cfs}{5\ ft} = 3.7\ \frac{ft^2}{s}$$

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From EM 1110-2-1601, Eqn. 3-5 (Steep Slope Riprap)

$$D_{30} = \frac{1.95S^{0.555}q^{2/3}}{g^{1/3}} = \frac{1.95(0.2)^{0.555}\left(3.7\frac{ft^2}{s}\right)^{2/3}}{\left(32.2\frac{ft}{s^2}\right)^{1/3}} = 0.6\,ft.$$

From EM 1110-2-1601, Eqn. 3-3 (Basic Stone Sizing)

$V_{max} = 3\frac{ft}{s}$ $\quad V_d = 1.6V = 4.8\frac{ft}{s}$

$$D_{30} = C\left[\left(\frac{\gamma_w}{\gamma_s-\gamma_w}\right)^{1/2}\frac{V}{\sqrt{Kgd}}\right]^{2.5} = 1.25\left[(0.78)\frac{4.8\frac{ft}{s}}{\sqrt{(32.2)(1ft)}}\right]^{2.5} = 0.44\,ft$$

Thickness $= 2D_{30} = 2(0.6ft) = 1.2ft.$

+ Provide headwall & wingwall around the culvert inlet

<u>No Plug Removal & Tunnel Installed to Toe of Bluff</u>

Assume tunnel width = 5ft

$Q = 18.5cfs \therefore q = 1.6\left(\frac{Q}{b}\right) = 1.6\left(\frac{18.5cfs}{5ft}\right) = 5.92\,ft^2/s$

$S_0 = \frac{619.48-584}{265} = 0.133$

From EM 1110-2-1601 Eqn. 3-5 (Steep slope riprap)

$$D_{30} = \frac{1.95S^{0.555}q^{2/3}}{g^{1/3}} = \frac{1.95(0.133)^{0.555}(5.92\,ft^2/s)}{(32.2\,ft/s^2)^{1/3}} = 0.65\,ft$$

From EM-1110-2-1601, Eqn. 3-3 (Basic Stone Sizing)

Using Manning's equation, $D = 5'$, $Q = 18.5\,cfs$, $S_0 = 0.133$, $n = 0.033$

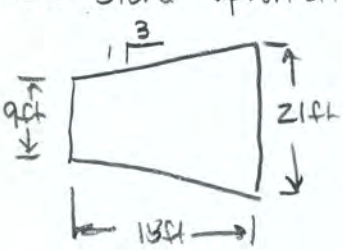
$d_N = 2.35ft$, $A_N = 3.022\,ft^2$ $V_N = 2.04\,ft/s$

$V_d = 1.6V_N = 1.6(2.04\,ft/s) = 3.2\,ft/s$

$$D_{30} = C\left[\left(\frac{\gamma_w}{\gamma_s-\gamma_w}\right)^{1/2}\frac{V}{\sqrt{Kgd}}\right]^{2.5} = 1.25\left[(0.78)\frac{3.2\frac{ft}{s}}{\sqrt{(32.2\frac{ft}{s^2})(2.35ft)}}\right]^{2.5}$$

$= 0.06\,ft.$

Provide stone apron at base, $D_{50} = 0.65ft$ & thickness = 1 ft



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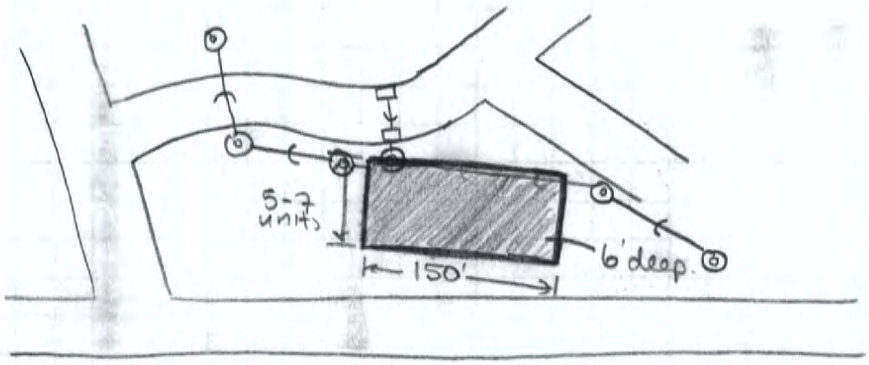
Ravine Head - Option #1

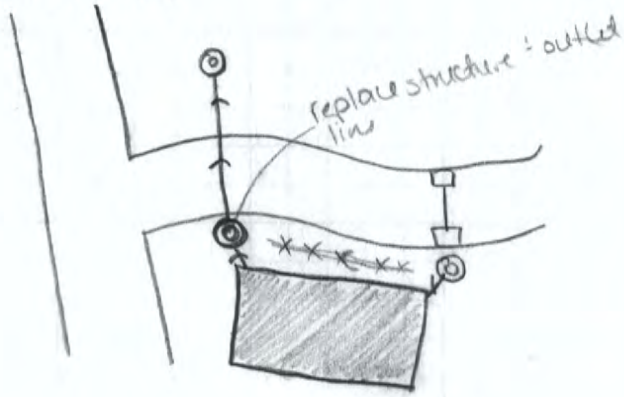
* Assumptions:
  - Assume place structure in 'Pipe 8' of SWMM model
  - Need to provide ~49,200 ft³ of storage
  - From HMS, allowable discharge = 1.2 cfs (2yr-12hr.)
  - If using box culverts, 200' × 10' × 6', would need (4) → 48,000 ft³
    150' × 10' × 6', would need (5) → 45,000 ft³

* Pipe 7 shortened to 100' & outlet invert adjusted to 652.17
* Pipe 7 & 10 routed through storage vault (Pipe 10 kept same)
* Junction 11 relocated to immediately adjacent to prior location
  ↳ 4" outlet connected to base
  ↳ 12" overflow provided ~1' below top (@ 657.73 - 1.0')



Ravine Head - Option #2

* Use (7) 8×10 culverts 90' long set on end
* Replace outlet structure; set invert to 644.9
  ↳ 4" outlet at base
  ↳ 12" outlet 2ft. below top
* Uses 79% of volume during 100-year 24-hour event



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Plunge Pool at Head for Option #1 or #2

* Find peak velocity from each line (100yr · 6hr)
  → Bridge = 11.52 ft/s
  → Remed. Outfall = 7.18 ft/s

* Find total peak flow for outlet
  → Bridge = 1.42 cfs
  → Remed Outfall = 2.02 cfs

* Size based on Velocity
  $V_d = 1.2V = 1.2(11.52\,ft/s) = 13.8\,ft/s$

  From HEC-14, Eqn. D.3

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left[\frac{(13.8\,ft/s)^2}{2(32.2\,\frac{ft}{s^2})}\right] = 1.25\,ft \sim 15''$$

* Size based on Flow
  $Q_d = 1.2Q = 1.2(3.5\,cfs) = 4.2\,cfs$

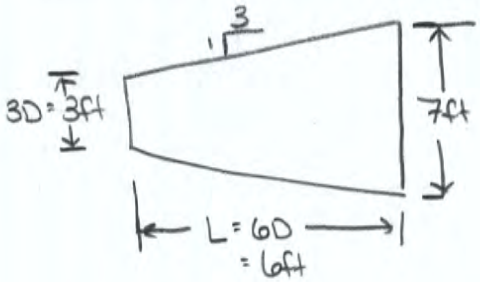
  From HEC-14, Eqn. D.5

$$D_{50} = 0.2D\left[\frac{Q}{\sqrt{g}\,D^{2.5}}\right]^{4/3}\left(\frac{D}{TW}\right) = 0.02D\left[\frac{Q}{D^{2.5}}\right]^{4/3}\left(\frac{D}{0.4D}\right)$$

$$= 0.02(1.5ft)\left[\frac{(4.2\,cfs)}{(1.5ft)^{2.5}}\right]^{4/3}\left(\frac{1}{0.4}\right) = 0.13\,ft$$

→ Use $D_{50L} = 1.25\,ft$
$W_{50L} = 322\,lbs$

* Thickness = D_{100} or $1.5D_{50\text{-}u} \sim 2.5\,ft$
* Calculate length using HEC-14 standard



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Riffle Placement

* Channel velocities from XS 1120 to 481 warrant use of riffles
* Channel incision warrants use to head

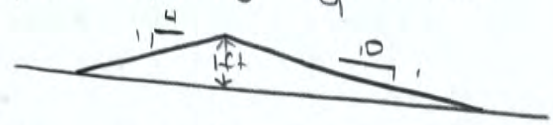
Current Slope ~ $\frac{23}{639} = 0.036$ / Target Slope $= \frac{612.4 - 605.8}{430.93 - 141.6} = \frac{6.6}{289.4} = 0.023$

From EMSR-4-XX,

$H = (S_o - S_f)X = (0.036 - 0.023)(639) = 8.3\,ft.$

No. of structures $= \frac{H}{h} = \frac{8.3\,ft}{1\,ft} = 8.3 \rightarrow$ use 9

Required Spacing $= \frac{639}{9} = 71\,ft.$



Width ~ 10-15'

* Estimated stone size

$V_d = 1.6V = (1.6)(3.0\,ft/s) = 4.8\,ft/s$

$$D_{30} = C\left[\left(\frac{\gamma_w}{\gamma_s - \gamma_w}\right)^{0.5}\left(\frac{V}{\sqrt{K_1 g d}}\right)\right]^{2.5} = 0.375\left[\left(\frac{62.4}{165 - 62.4}\right)^{0.5}\left(\frac{4.8}{\sqrt{32.2\,0.5}}\right)\right]^{2.5}$$

$$= 0.375\left[(0.78)(1.20)\right]^{2.5} = 0.32\,ft.$$

* Use an additional (4) to raise the channel bed from the mouth to XS 182

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Design of Stone Weirs at Mouth

Assumptions:

* Begin weirs at XS 192 → length ~ 183 ft
* Elev. drop = 605.56 - 582.77 = 22.8 ft.
* Length btwn structures ~ 8 ft.

Estimate Required Stone Size

* Use $V = 5\ ft/s \rightarrow V_d = 1.6V = 1.6(5\ ft/s) = 8\ ft/s$
* $C = 2(0.3)(1.25)(1)(1)(0.5) = 0.375$

From EM-1110-2-1601 Eqn. 3-3

$$D_{30} = 0.375\left[(0.78)\left(\frac{8\ ft/s}{\sqrt{32.2\frac{ft}{s^2}(0.5ft)}}\right)\right]^{2.5} = 1.13\ ft$$

Estimate Toe Scour

Channel Width ~ 3 ft.

$D_{MNC} = 0.5ft$

$$D_{MXB} = 1.14 D_{MNC}\left(1.72 + \frac{0.0084W}{D_{MNC}}\right)$$

$$= 1.14(1ft)\left(1.72 + \frac{0.0084(3ft)}{(1ft)}\right) = 1.4ft$$

Scour Depth = $D_{MXB} - D_{MNC} = 1.4 - 0.5 = 0.9ft$.

Total Rock Weir Height

* Assume height above bed = 0.5 ft } use 3' thickness
* Minimum embedment = 0.9 ft
* Use 18" base stone to prevent piping & increase stability

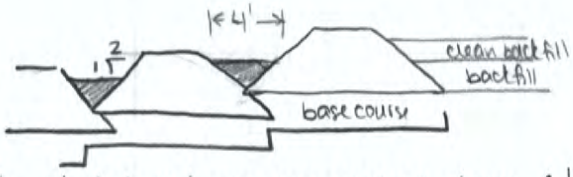
Rock Weir Geometry

Crest Width = $2D_{50} \sim 1.5ft$

$$R = \text{rock weir radius} = \frac{L^2}{8M} + \frac{M}{2} = \frac{(3ft)^2}{8(2.25)} + \frac{2.25}{2} = 1.625ft$$

where L = chord length = 3 ft

$M = 3D_{50} = 2.25ft$



* Provide bank stabilization up ravine slope 3' either side
* Last weir tapers at 1:10

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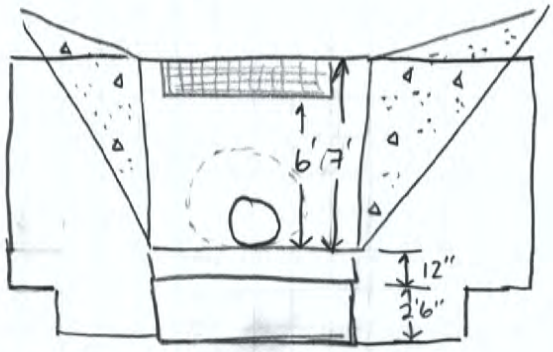
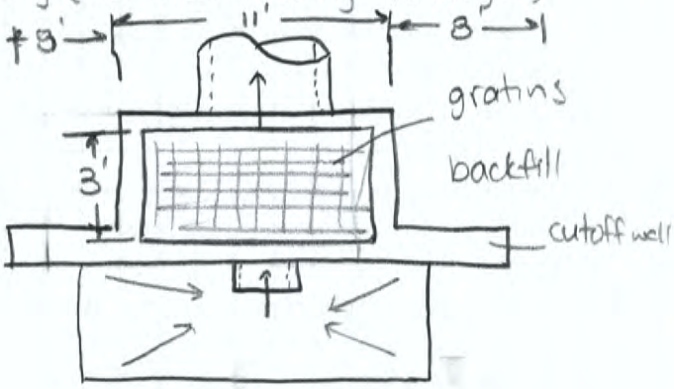
Ravine Head - Option #3

In-Ravine Pipe...

→ Use similar design as to what Greenguard had proposed for Scotts
- ↳ add plunge pool at head & armor first 100 feet
- ↳ use junction box at meeting (12" inlet leading to larger)





Detention Feature

→ Intercept outlet pipe of feature & install new discharge pipe down slope
- Cut back a couple feet & run parallel w/ ravine wall intercept at bottom w/ second structure
- Directionally drill new line from basin structure directly down.

Riprap at Head of Ravine

*Size based on velocity

$V_{max} = 12\,ft/s \quad V_d = 1.2(12\,ft/s) = 14.4\,ft/s \sim 15\,ft/s$

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left[\frac{(15\,ft/s)^2}{2(32.2\,ft/s^2)}\right] = 1.46\,ft$$

use $D_{50} = 1.5\,ft$

*Size based on flow

$Q = 4.2\,cfs \quad Q_d = 1.2Q = 5\,cfs$

$$D_{30} = 0.02D\left[\frac{Q}{D^{2.5}}\right]^{4/3}\left(\frac{D}{0.4D}\right)$$

$$= 0.02(1.5\,ft)\left[\frac{5\,cfs}{(1.5\,ft)^{2.5}}\right]^{4/3}\left(\frac{1}{0.4}\right) = 0.2\,ft$$

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Stone Apron at Outfall

* Size Based on velocity

$V = 12.5\,ft/s \quad V_d = 1.2V = 15\,ft/s$

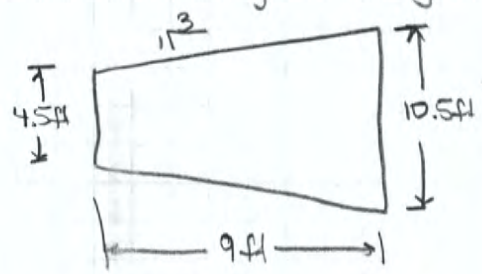
From HEC-14, Eqn. D.3

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left(\frac{15\,\frac{ft}{s}^2}{2 \cdot 32.2\,\frac{ft}{s^2}}\right) = 1.5\,ft.$$

→ Use $D_{50L} = 1.5\,ft$

$W_{50L} = 560^{\#}$

* Thickness = D_{100} or $1.5D_{50} \sim 3.75\,ft$
* Calculate length using HEC-14 standard



Note: This option discharges directly to the beach! The stone weirs would still be necessary to protect the slope from eroding & exposing the pipe.

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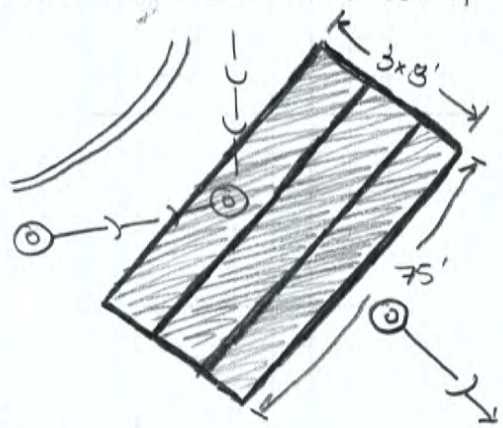
Sewer at Mouth of Ravine

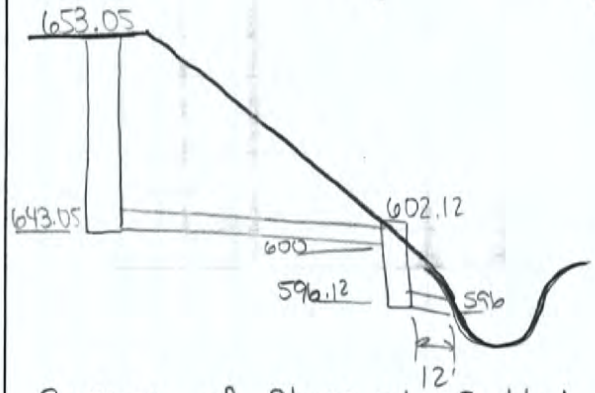
* Size for 100-year, 24-hour event

$Q_{max} = 3.3$ cfs

From EPA SWMM model,



* Provide (3) 3'×10' box culverts, 75' long
* 60" primary outlet
* 12" overflow 2.5' from top
  ↳ highest reached was +7.3' while were placing at +7.5'
* Provide manhole immediately outside
* $Q_{max\text{-}d} = 2.60$ cfs



* Locate structure at bottom to dissipate energy
* Locate at or near start of stone weir.

Sizing of Stone at Outlet

$$V_d = 1.6V = 1.6(5\,ft/s) = 8\,ft/s$$

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\cdot\left(\frac{8\,ft/s^2}{2\cdot 32.2\,ft/s^2}\right) = 0.5\,ft$$

* Position stone apron up opposite side two feet (slope protection)
  Apron width at least 3' if at stone weir.

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Sewer at Mouth of Ravine

From SWMM model, $Q_{max} = 5.5$ cfs

* Assume that existing manhole removed & replaced w/ new one
* New INV = 628.05
  New RIM = 653.05
* Pipe slope needed ~ $\frac{628 - 594}{265} = 26.7\%$

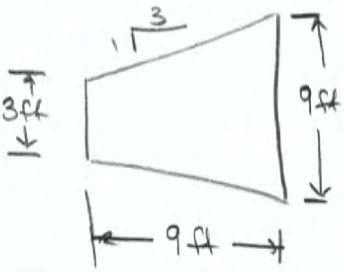
Riprap after outlet

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left(\frac{15\,\frac{ft}{s}^2}{2 \cdot 32.2\,\frac{ft}{s^2}}\right) = 1.5\,ft$$

$$D_{50} = 0.02D\left(\frac{Q}{D^{2.5}}\right)^{4/3}\left(\frac{1}{0.4}\right)$$

↳ adjust for subcritical flow $D_{adj} = \frac{D + y_n}{2} = \frac{1 + 0.3747}{2} = 0.69$ ft.

$$= 0.02(0.69)\left[\frac{5.5\,cfs}{(0.69)^{2.5}}\right]^{4/3}\left(\frac{1}{0.4}\right) = 1.14\,ft.$$



Thickness = 1.5D = 2.25 ft.

Note: This design discharges to beach. Per local sponsors, the option is not desirable if others are available.

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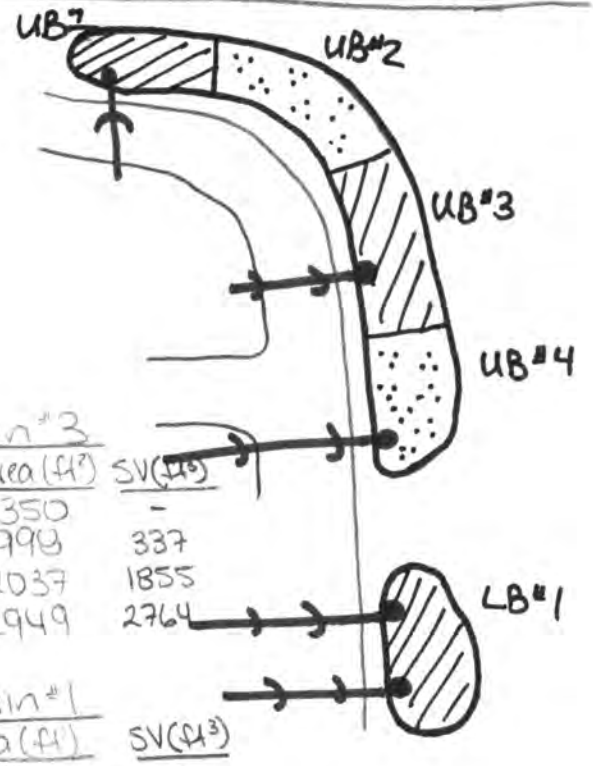
Inner Basin - Eroded Slope : Swale Compartmentalization

* Estimate Storage Volumes



Upper Basin #1

Elev	Area (ft²)	SV (ft³)
654	579	–
655	1,606	1,093
656	2,985	3,388
656.5	3,573	3,935
657	4,255	3,597

Upper Basin #2

Elev	Area (ft²)	SV (ft³)
649.5	266	–
650	1004	318
651	2225	1932
651.5	2351	2884

Upper Basin #3

Elev	Area (ft²)	SV (ft³)
649.5	350	–
650	998	337
651	2037	1855
651.5	2949	2764

Upper Basin #4

Elev	Area (ft²)	SV (ft³)
649.5	221	–
650	854	269
650.5	1454	846
651	2104	1467

Lower Basin #1

Elev	Area (ft²)	SV (ft³)
650	518	–
650.5	1030	387
651	1560	10355
651.5	1975	1531
652	2426	1984
652.5	2947	2444

From "Rock Ramp Design Guidelines", US Dept of Interior Technical Service Center 9/2007

$V_i = 0.232\sqrt{g \cdot D_{10} \cdot S_0}$ where V_i = interstitial velocity

→ refine later w/ $V_i = n_p \left(S_0 g \frac{D_{50}}{K'}\right)^{1/2}$

For now assume D_{50} = 8" stone → 49#
W_{15L} = 15 lb → 6" stone

Estimate Interstitial Velocity

$D_{10} \sim 6"$
$S_0 \sim 0.009$

$V_i = 0.232\sqrt{(32.2\ ft/s^2)(6\ in)(0.009)}$
$= 0.31\ ft/s$

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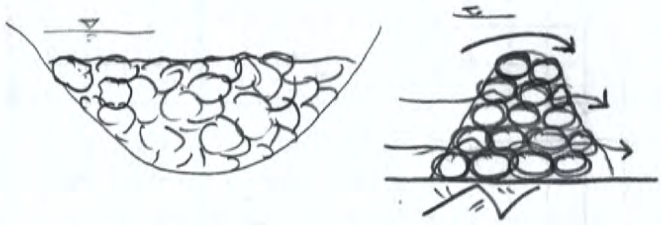
* Estimate flow over weir.

$$Q_{weir} = 0.433\sqrt{2g}\left(\frac{d_1}{d_1+h}\right)^{1/2} L H^{3/2}$$

$$= 0.433\sqrt{2(32.2\tfrac{ft}{s^2})}\left(\frac{1.25ft}{2.25ft}\right)^{1/2}(15.5ft)(0.25)^{1/2}$$

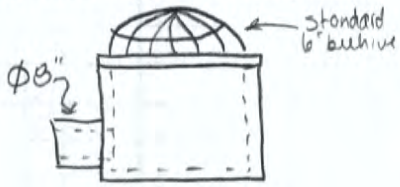
for example

$$= 6.36 \text{ cfs.}$$



H	A	Q_{int}	Q_{weir}	Q_{tot}
0	-	0	-	0
0.5	3.6	1.1	-	1.1
1.0	9.32	2.9	-	2.9
1.25	12.99	3.95	5.02	8.97
1.5	16.46	5.04	14.75	19.8

New Outlet Structure



H	Q_{out}	Q_{grate}	Q_{tot}
0	0	-	0
0.75	1.121	-	1.121
1.0	1.418	-	1.418
1.5	1.876	-	1.876
1.75	2.067	2.96	5.027
2.0	2.242	4.50	6.742
2.5	2.556	5.38	7.935

Provide Stone Apron at the Outlet

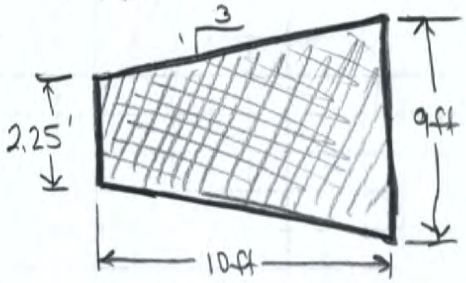
$Q_{max} = 5$ cfs $\rightarrow Q_d = 1.2 \cdot 5$ cfs $= 6$ cfs

$V_{max} = 16$ ft/s $\rightarrow V_d = 1.2 \cdot 16$ ft/s $= 19.2$ ft/s

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left(\frac{19.2\tfrac{ft}{s}^2}{2\cdot 32.2\tfrac{ft}{s^2}}\right) = 2.4ft$$

$$D_{50} = 0.02D\left(\frac{Q}{D^{2.5}}\right)^{4/3}\left(\frac{1}{0.4}\right) = 0.02(0.75ft)\left[\frac{6cfs}{(0.75)^{2.5}}\right]^{4/3}\left(\frac{1}{0.4}\right)$$

$$= 1ft.$$



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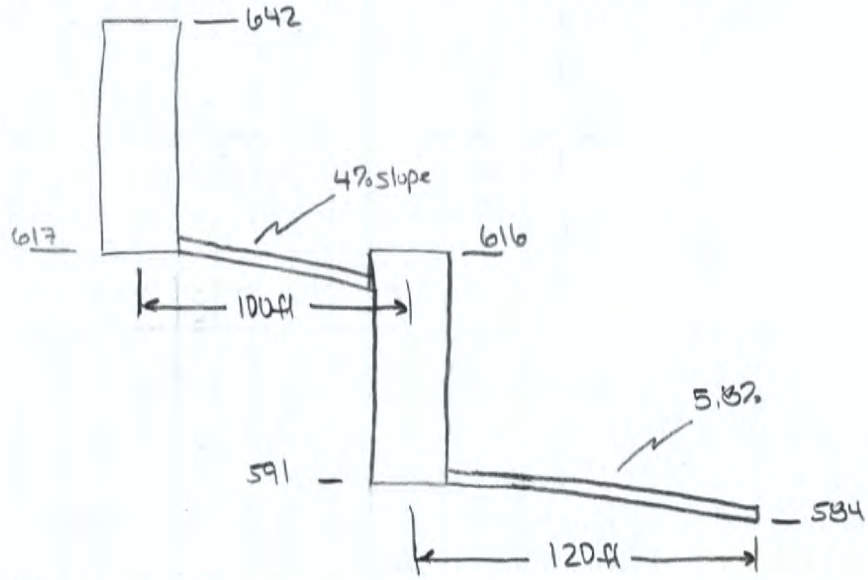
Inner Basin - Eroded Slope: Multiple Drop Structures

* Add two shallow basins to intersect existing pipes leading to outfall.
* Place new structure at point above existing outfalls (Elev ~ 642)
* Run PVC sewer pipe to new structure.
* Drop first structure 25ft (to 617)
* Run 12" pipe @ 4% slope for 100 ft.
* Install second structure at end of pipe.
* Run 12" pipe @ 5.8% slope to outfall



Riprap Apron

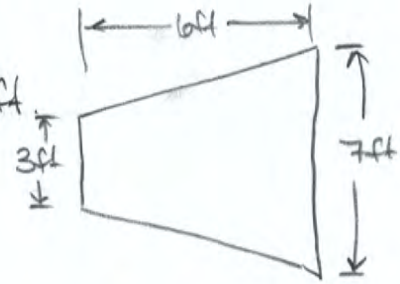
$Q_d = 1.2Q = 1.2(5cfs) = 6cfs \qquad V_d = 1.2V = 1.2(10.7\frac{ft}{s}) = 12.8\frac{ft}{s}$

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left[\frac{(12.8\,ft/s)^2}{2\cdot 32.2\,ft/s^2}\right] = 1.07\,ft$$

$$D_{50} = 0.2D\left(\frac{Q}{\sqrt{g}\,D^{2.5}}\right)^{4/3}\left(\frac{1}{0.4}\right) = 0.02\,(1ft)\left[\frac{6\,cfs}{1^{2.5}}\right]^{4/3}\left(\frac{1}{0.4}\right) = 0.55\,ft.$$

Use $D_{50} = 1.07ft$

Thickness $= 1.5D_{50} = 1.6ft$



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Inner Basin - Eroded Slope : Baffled Chute Design

* Add two small structures to intersect existing pipes leading to outfall
* Discharge to shallow slope chute before entering baffles

Calculate Normal Flow Conditions in Box/Chute

For $Q_d = 2Q = 2(5cfs) = 10cfs$, $B = 2ft$ $S_o = 0.3$

$y_n = 0.13ft$ $V_n = 39.5 ft/s$

* Baffles Necessary!

Verify Approach Conditions

For $Q_d = 10cfs$, $B = 2ft$, $S_o = 0.005$

$y_{n,box} = 0.98$ $V_{n,box} = 5.1 \frac{ft}{s}$

Verify that $V_c > V_n$...

$q = \frac{Q}{B} = \frac{10cfs}{2ft} = 5 \frac{cfs}{ft} \rightarrow V_c = (9q)^{1/3} = 5.44 \frac{ft}{s}$

$V_c > V_n$ & $Q << 60cfs$... baffled chute acceptable.

Estimate Discharge Velocity

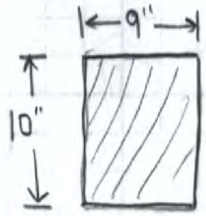
+ Will be no more than 1/3 critical velocity.

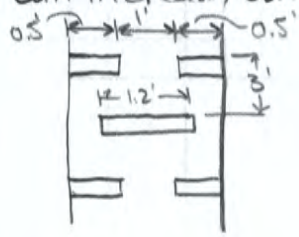
$\frac{1}{3} V_c = 1.8 \frac{ft}{s} << 10 \frac{ft}{s}$

Size Baffle Structure

$y_c = \frac{q}{V_c} = \frac{5 \frac{cfs}{ft}}{5.44 \frac{ft}{s}} = 0.92ft \sim 1ft.$

Baffle Height: $H = 0.8 y_c = 0.8(1ft) = 0.8ft$
Baffle Width: $W = 1.5H = 1.5(0.8ft) = 1.2ft.$
Baffle Spacing $= W = 1.5H = 1.2ft.$
Row Spacing $= 2H = 2(0.8ft) = 1.6ft$
↑ can increase, but to no more than 6ft (use 3ft)





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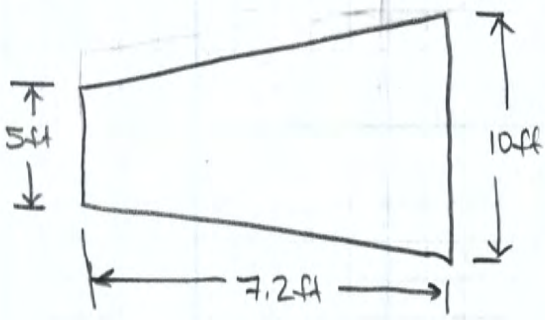
Size Riprap Apron

$$D_{50} = \frac{0.692}{S-1}\left(\frac{V^2}{2g}\right) = \frac{0.692}{2.65-1}\left(\frac{2\frac{ft}{s}^2}{2 \cdot 32.2\frac{ft}{s^2}}\right) = 0.03\,ft.$$

$$D_{50} = 0.02D\left(\frac{Q}{D^{2.5}}\right)^{4/3}\left(\frac{1}{0.4}\right) = 0.02(1)\left[\frac{10}{1^{2.5}}\right]^{4/3}\left(\frac{1}{0.4}\right)$$

$$= 1\,ft.$$

Thickness = 1.75 feet ← D_{100} controls