US Army Corps of Engineers
Chicago District

INDIANA HARBOR AND CANAL CONFINED DISPOSAL FACILITY

East Chicago
WATERWAY MANAGEMENT DISTRICT

GRADIENT CONTROL SYSTEM

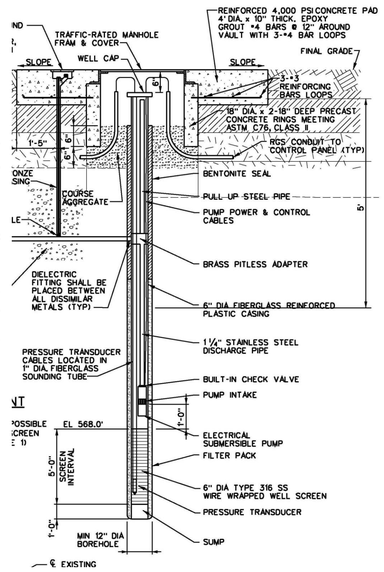
Extraction well drilling operations

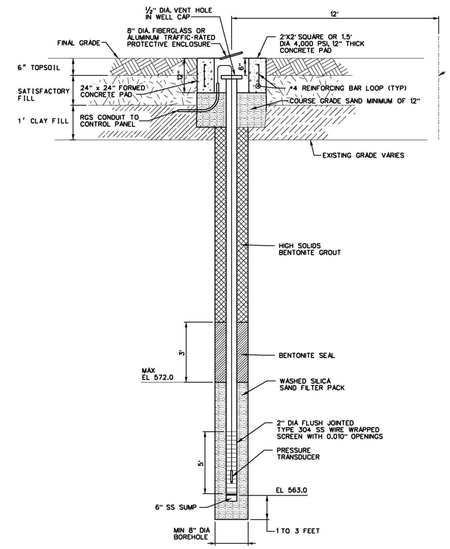
Drill rig operator drills hole for well

Well and casing after drilling

A pressure transducer installed inside well (above) "reads" the groundwater level and sends the data to the controlling computer

Extraction wells (depicted on right) are used to pump groundwater from the CDF-side of the slurry wall to lower the water table inside the site. These wells are installed in groups of four (22 groups in total). Each group is associated with a pair of monitoring wells which are used in determining when the pumps in the extraction well group should run.



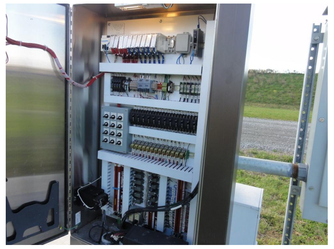


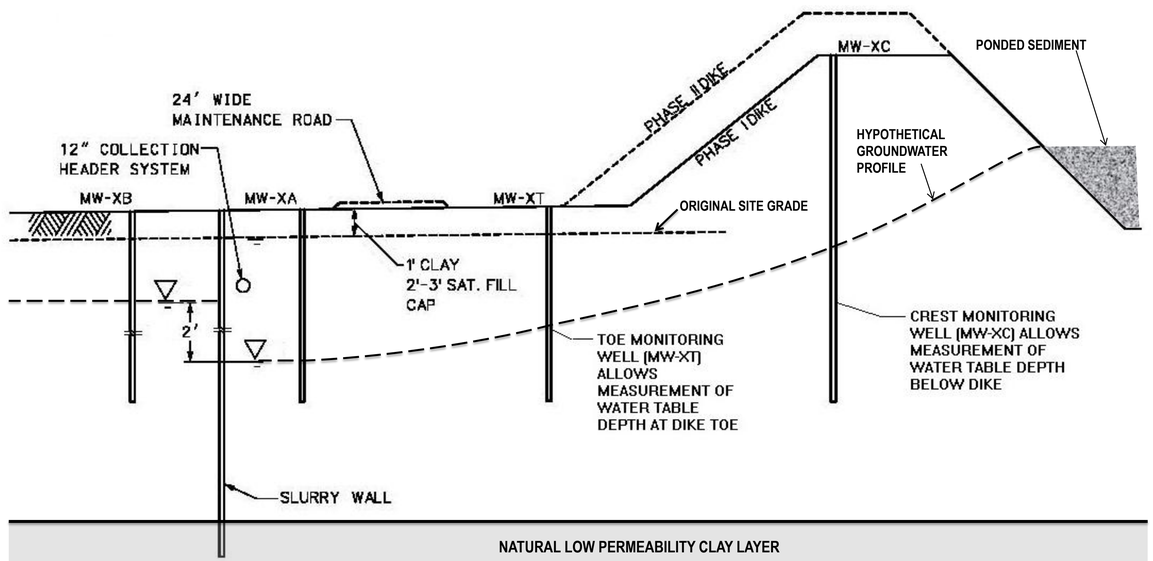
TYPICAL MONITORING WELL
FROM STA 0+00 TO STA 86+00 ALONG DITCH ALIGNMENT
SCALE: NTS

Monitoring wells (depicted on left) enable observation of groundwater levels which are automatically read by sensors (pressure transducers) and transmitted to a central computer. These wells are installed in pairs (22 pairs in total), one on each side of the slurry wall (a low-permeability barrier constructed in the ground), for each extraction well group. Groundwater levels between opposite sides of the wall are "read" by the computer and target levels trigger pumps in the associated extraction well group to operate.

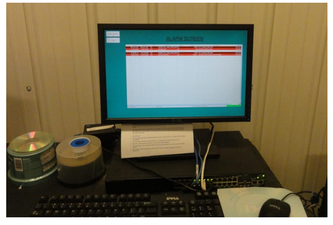
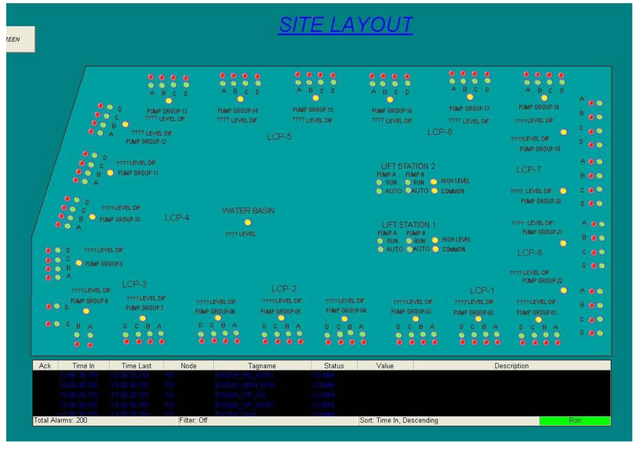
Completed extraction wells (above left) and a look under the lid (above right).

A peek inside a control panel (right)





GCS monitoring well pairs (MW-XA and MW-XB in the above illustration) allow observation of the groundwater levels on both sides of the low permeability groundwater cutoff wall (slurry wall). Extraction wells are operated to lower the water table on the interior side of the wall at least 2 feet below the level outside the wall thus establishing an inward gradient. The combination of the cutoff wall and inward gradient protects against offsite migration of groundwater. Dike monitoring wells (MW-XC and MW-XT in the illustration above), while not part of the GCS, are used along with the GCS monitoring wells for dam safety monitoring.



The extraction wells are controlled by an onsite computer (left). One of the GCS status screens is shown below.