Whatcom County Jail Site at LaBounty Road–Shallow Subsurface Water Monitoring for Wetland Mitigation

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Purpose

This technical memorandum describes a workplan to install piezometers to monitor shallow subsurface water elevations within the proposed wetland mitigation area at the proposed Whatcom County Jail site on LaBounty Road in Ferndale, WA. The subsurface water information is necessary as documentation to the permitting agencies as a basis for the potential wetland construction grading depths and hydrology to support wetland creation. The permitting agencies typically require at least one year of groundwater monitoring data that shows the high water level observed during the early growing season (typically in March or April) along with the drawdown that usually occurs during summer. In order to develop a credible mitigation plan for the project, it will be important to install the piezometers as soon as possible in April 2014. Figure 1 shows the existing conditions onsite.

Four proposed shallow subsurface piezometer locations are shown Figure 2, and are described in Table 1. The conceptual wetland mitigation plan from the Supplemental Draft Environmental Impact Statement (SDEIS) (Whatcom County Planning & Development Services. 2013) was used as a basemap in Figure 2. The conceptual wetland mitigation plan is considered preliminary and subject to change depending on the results of the shallow subsurface monitoring and subsequent preliminary design.

The depth to subsurface water is currently unknown at the project site, particularly in the upland areas. Seasonal depths to shallow subsurface water are assumed to be between 0 and 4 feet below ground surface (bgs) during the wet season, and greater than 4 feet bgs in the dry season.

TABLE 1
Description of Shallow Subsurface Water Monitoring Locations (Piezometers) within the Proposed Wetland Area Onsite

Piezometer ID	Description
P1	Install in Wetland A to establish seasonal hydrology in this reference wetland.
P2	Install in wetland proposed to be created – North central area.
P3	Install in wetland proposed to be created – Eastern area.
P4	Install in wetland proposed to be created – Southwestern area.

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Piezometer Construction and Installation

Soil characteristics onsite were generally described in the SDEIS (Whatcom County Planning & Development Services 2013), and indicate that a thin layer of silty sand or sand may overlay organic silt within the proposed wetland mitigation area in the northwestern portion of the property.

Hand augering will be utilized to install the shallow subsurface piezometers to a total depth of approximately 4 feet bgs. General soil characterization will be performed on the soil that is removed from each hole. For documentation, photographs will be taken of the soil removed from each hole. Sample location, depth, date, and time will be recorded and included in the photograph with the respective soil sample.

The piezometers will be constructed of the following materials:

- 1-inch diameter minimum, flush threaded, schedule 40 PVC casing and screen. The screen section will consist of 3-feet of machine slotted PVC well screen (10-slot) with end cap.
- Bentonite pellets: Commercially packaged, medium sized or ¾-inch high-swell bentonite chips/pellets.
- Sand pack: Commercially packaged 10/20 silica sand.
- Locking well cap.

Because the piezometers are less than 10 feet in depth and may not extend to the groundwater table, their installation is exempt from the requirements of Chapter 173-160 WAC – Minimum Standards for Construction and Maintenance of Wells.

The piezometers will be constructed as follows:

- Install 3-foot screen with end cap and casing to 4 feet below ground surface, with approximately 2 feet of stick up above ground surface.
- The sand pack will extend from the bottom of the boring to 0.5 feet above the top of the slotted portion of the screen assembly. The sand pack will be installed with frequent soundings to verify that sand has not bridged in the hole.
- Hydrated bentonite chips/pellets will be placed in a thickness of 0.5 feet above the sand pack, extending upward to the ground surface. If the bentonite chip/pellet seal is above the static water level, water will be added to hydrate the bentonite.
- Protective steel posts will be placed around each piezometer for protection and visual identification.
- A locking well cap will be placed at the top of the casing to seal the piezometer.

Following installation, the piezometers will be surveyed by a professional land surveyor to provide top of casing and ground surface elevation, and horizontal coordinates.

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Data Loggers

CH2M HILL will procure and install Solinst® Leveloggers® (or equivalent) in each piezometer to record water level fluctuations. During installation, the depth to water will be measured and recorded in the field note book at the time of deployment of the data logger. The length of the wire or rope used to hang the data logger within the casing will be measured from the surveyed point at the top of the casing to the recording line on the data logger, and recorded in the field note book. The Leveloggers will be programmed to record water level data at 60 minute intervals.

Barometric pressure data is necessary to calibrate the piezometer data. Typically a separate datalogger is purchased to record barometric pressure. In this case, barometric pressure data will be obtained from a barologger owned by the Port of Bellingham that CH2M HILL is currently using for a wetland mitigation project for the Port of Bellingham.

The data from each datalogger will be downloaded at least every 6 months, or sooner, as needed to guide the wetland mitigation design schedule.

References

Whatcom County Planning & Development Services. 2013. Supplemental Draft Environmental Impact Statement, Whatcom County Adult Corrections Facilities and Sheriff's Headquarters (A Supplement to the Draft Environmental Impact Statement issued October 2010). September 13, 2013.

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