Anchor Point SEPA Checklist

Appendix C

Ecological Land Services

January 5, 2017

Mr. Dan Matlock
Pacific Groundwater Group
2377 Eastlake Avenue East
Seattle, WA 98102

RE: Potential Impacts to Wetland Hydrology from Pumping Groundwater Using Vertical Wells or Ranney Collectors – Anchor Point Site – Kelso, Washington

Dear Mr. Matlock,

Ecological Land Services, Inc. (ELS) was tasked with evaluating the potential impacts to on-site and nearby off-site wetland areas from pumping 30 million gallons per day (mgd) using a series of vertical wells or Ranney type collectors at the Anchor Point site in Kelso, Washington.

If vertical wells are used, up to 15 wells will be installed at depths shallower than 250 feet below ground surface (bgs). If Ranney type collectors are used, up to three will be used to achieve the 30 mgd volume of groundwater. All wells will be located in close proximity to Carrols Channel, which will maximize hydraulic connections with the Columbia River and minimize drawdown within the groundwater flow system.

As part of a water rights application and permitting process, ELS worked in conjunction with Pacific Groundwater Group (PGG) to identify potential impacts to wetlands from drawdown of the shallow groundwater table. The investigation then identified potential mitigation measures to assure hydrology within on-site and nearby off-site wetlands will be maintained. Eight wetland areas were identified and investigated (Figure 2).

ELS has worked at the Anchor Point site since the mid-1990's conducting field investigations, identifying critical areas, and assisting with local, state and federal permitting. Project work was focused on obtaining permits for the ongoing sand & gravel extraction operation as well as assisting with feasibility studies for various potential users of the property. For this study ELS relied on past information gathered at the property and nearby areas as well as a recent (December 2016) pedestrian survey of the eight wetlands described in this report.

Wetland Area 1

Wetland Area 1 is a large wetland complex characterized by open water, emergent, shrub-shrub, and forested vegetative components. The area is bordered by BNSF to the north, dredge spoils to the west, and Wetland Area 6 to the south (Figure 2).

Potential Impact

According to PGG, the water table beneath Wetland Area 1 could experience drawdowns from 6 to 8 feet if vertical wells are pumped or 5 to 6 feet if Ranney type collectors are pumped. In reality, actual surface water loss due to drawdowns of the localized water table are expected to be minimal because the mapped soils that underlie the wetlands have low permeability and algal/vegetative mats that restrict downward migration of surface water.

Mitigation Measures

PGG estimates that hydrology in Wetland Area 1 could be maintained by suppling a maximum 67 gallons per minute (gpm) directly into the system via a supply pipe from the production wells. In addition to supplying water to the wetland, hydrology can also be maintained with physical controls including weirs, standpipes, and culvert modifications. We recommend the establishment/modification of an elevation controlled culvert in the outlet ditch within the northwest portion of Wetland Area 1. Baseline monitoring of surface water levels in the wetland will be necessary to determine an appropriate water flow rate schedule based on maintaining existing conditions. The goal is to maintain historic water levels while not increasing water levels to a depth that will negatively impact the wetland system. Other sources of water that could be introduced into Wetland Area 1 would include clean storm water or treated waste water generated at the site once the site is developed. In summary, any impact to wetland hydrology in Wetland Area 1 can be mitigated by implementing the following measures (1) introducing water into the system from supply wells, (2) physically controlling the depth of surface water with culverts, and (3) discharging clean storm water or treated waste water into the system once the site has been developed. If these measures are implemented in a thoughtful manner, there should be no long-term impacts to the wetland system from localized drawdown of the shallow ground water table from the supply wells extracting up to 30 mgd.

Wetland Area 2

Wetland Area 2 is a small (<5 acres), confined wetland surrounded by elevated rail grade fills and characterized by open water, emergent, and shrub-shrub vegetation (Figure 2).

Potential Impact

According to PGG, the water table beneath Wetland Area 2 could experience drawdowns of 7.5 feet if vertical wells are pumped or 5 feet if Ranney type collectors are pumped. As with Wetland Area 1, actual surface water loss due to drawdowns of the localized water table are expected to be minimal because the mapped soils that underlie the wetlands have low permeability and algal/vegetative mats that restrict downward migration of surface water.

Mitigation Measures

PGG estimates that hydrology in Wetland Area 2 could be maintained by suppling a maximum 10 gpm directly into the system via a supply pipe from the production wells. Supplying water to Wetland 2 is not feasible given that (1) BNSF owns Wetland Area 2 and the property south of Wetland 2 and (2) extending a pipe to Wetland Area 2 would be cost prohibitive as it would have to be trenched under active BNSF tracks. It is very unlikely BNSF would grant easement across their property for a water supply pipe to Wetland Area 2. In summary, the actual surface water loss due to drawdowns of the localized water table are expected to be minimal because the soils that underlie the wetlands have low

permeability and algal/vegetative mats that restrict downward migration of surface water. It is also likely that Wetland Area 2 is hydraulically connected to Wetland Area 1 via permeable rail grade fill. With the addition of water to Wetland Area 1, it is highly likely that Wetland Area 2 will also receive subsurface inflow through the permeable rail grade fill. It is our opinion that hydrology conditions within Wetland Area 2 will not be significantly impacted from localized drawdown of the shallow ground water table from the supply wells extracting up to 30 mgd.

Wetland Area 3

Wetland Area 3 is comprised of two remnant "finger" sloughs surrounded by dredge spoils, rail grade fill, and Interstate 5 fill. The North Finger flows to the southeast eventually discharging to Owl Creek on a seasonal basis. The South Finger flows to the north where it seasonally discharges into the Coweeman River. This wetland is characterized by open water, emergent, and shrub-shrub vegetation (Figure 2).

Potential Impact

According to PGG, the water table beneath Wetland Area 3 could experience drawdowns of 6 feet if vertical wells are pumped or 4 feet if Ranney type collectors are pumped. In reality, actual surface water loss due to drawdowns of the localized water table are expected to be minimal because the mapped soils that underlie the wetlands have low permeability and algal/vegetative mats that restrict downward migration of surface water.

Mitigation Measures

PGG estimates that hydrology in Wetland Area 3 could be maintained by suppling a maximum 20 gpm directly into the system via a supply pipe from the production wells. Supplying water to Wetland 3 is not feasible given that (1) BNSF/WSDOT/Others own Wetland Area 3 as well as the property south of Wetland Area 3, (2) the two "fingers" are not connected which could then require two points of entry for mitigation water instead of one, and (3) extending a pipe to Wetland Area 3 would be cost prohibitive as it would have to be trenched under active BNSF tracks. It is very unlikely BNSF would grant easement across their property for a water supply pipe to Wetland Area 3. In summary, the actual surface water loss due to drawdowns of the localized water table are expected to be minimal because the soils that underlie the wetlands have low permeability and algal/vegetative mats that restrict downward migration of surface water. With the addition of water to Wetland Area 1, it is highly likely that Wetland Area 3 will also receive subsurface inflow through the permeable rail grade fill. It is our opinion that hydrology conditions within Wetland Area 3 will not be significantly impacted from localized drawdown of the shallow ground water table from the supply wells extracting up to 30 mgd.

Wetland Area 4

Wetland Area 4 is located south of Wetland Area 3 and is bordered by rail grade fill to the west, Interstate 5 fill to the east, dredge spoils to the north, and wetland/upland open space to the south. Surface water from the north finger of Wetland Area 3 enters Wetland Area 4 eventually discharging to Owl Creek on a seasonal basis. Wetland Area 5 may also drain or infiltrate water under or through the I-5 fill materials into Wetland Area 4 (see below). This wetland is characterized by open water, emergent, and shrub-shrub vegetation (Figure 2).

Potential Impact

According to PGG, the water table beneath Wetland Area 4 could experience drawdowns of 5 to 6 feet if vertical wells are pumped or 4 feet if Ranney type collectors are pumped. In reality, actual surface water loss due to drawdowns of the localized water table are expected to be minimal because the mapped soils that underlie the wetlands have low permeability and algal/vegetative mats that restrict downward migration of surface water.

Mitigation Measures

PGG estimates that hydrology in Wetland Area 4 could be maintained by suppling a maximum 13 gpm directly into the system via a supply pipe from the production wells. Supplying water to Wetland Area 4 is not feasible given that (1) Segale Properties owns Wetland Area 4 as well as the property south of Wetland Area 4 and (2) extending a pipe to Wetland Area 4 would be cost prohibitive as it would have to be trenched under active BNSF tracks. It is very unlikely BNSF would grant easement across their property for a water supply pipe to Wetland Area 4. In summary, the actual surface water loss due to drawdowns of the localized water table are expected to be minimal because the soils that underlie the wetlands have low permeability and algal/vegetative mats that restrict downward migration of surface water. With the addition of water to Wetland Area 6, it is highly likely that Wetland Area 4 will also receive subsurface inflow through the permeable rail grade fill. It is our opinion that hydrology conditions within Wetland Area 4 will not be significantly impacted from localized drawdown of the shallow ground water table from the supply wells extracting up to 30 mgd.

Wetland Area 5

Wetland Area 5 is located east of Interstate 5 and bordered by Interstate 5 grade fill to the west, fill to the north (U-Neek RV Sales), and Old Pacific Hwy to the east. Two or three seasonal drainages to the east directly discharge water into Wetland Area 5 while there does not appear to be any permanent or seasonal surface water outlet to the system. ELS was not able to identify any culverts beneath Interstate 5 but there remains the possibility that culverts under Interstate 5 drain water from Wetland Area 5 into Wetland 4 and the Owl Creek drainage. This wetland is characterized by open water, emergent, and shrub-shrub vegetation (Figure 2).

Potential Impact

According to PGG, the water table beneath Wetland Area 5 would experience around 4 feet of drawdown if vertical wells or Ranney type collectors are pumped. In reality, actual surface water loss due to drawdowns of the localized water table are expected to be minimal because the mapped soils that underlie the wetlands have low permeability and algal/vegetative mats that restrict downward migration of surface water. In addition, surface water inflows from upland areas that lie to the east will act to minimize any significant water level fluctuations in this wetland area.

Mitigation Measures

PGG estimates that hydrology in Wetland Area 5 could be maintained by suppling a maximum 24 gpm directly into the system via a supply pipe from the production wells. Supplying water to Wetland Area 5 is not feasible given the distance from the production wells and the high cost of extending a pipeline through numerous land ownerships and complex infrastructure. In summary, the actual surface water loss due to drawdowns of the localized water table are expected to be minimal because the soils that underlie the wetlands have low permeability and algal/vegetative mats that restrict downward

migration of surface water. In addition, surface water inflows from upland areas that lie to the east will act to minimize any significant water level fluctuations. It is our opinion that hydrology conditions within Wetland Area 5 will not be significantly impacted from localized drawdown of the shallow ground water table from the supply wells extracting up to 30 mgd.

Wetland Area 6

Wetland Area 6 is a large wetland complex characterized by open water, emergent, shrub-shrub, and forested vegetative components. The area is bordered by Wetland Area 1 to the north, dredge spoils to the west, BNSF rail grade fill to the east, and elevated road fill (Anchor Point Access Road) to the south (Figure 2).

Potential Impact

According to PGG, the water table beneath Wetland Area 6 could experience drawdowns from 4 to 7 feet if vertical wells are pumped or 3 to 4 feet if Ranney type collectors are pumped. In reality, actual surface water loss due to drawdowns of the localized water table are expected to be minimal because the mapped soils that underlie the wetlands have low permeability and algal/vegetative mats that restrict downward migration of surface water.

Mitigation Measures

PGG estimates that hydrology in Wetland Area 6 could be maintained by suppling a maximum 19 gpm directly into the system via a supply pipe from the production wells. In addition to supplying water to the wetland, hydrology can also be maintained with physical controls including weirs, standpipes, and culvert modifications. We recommend the establishment/modification of an elevation controlled culvert under the Anchor Point Access Road. Baseline monitoring of surface water levels in the wetland will be necessary to determine an appropriate water flow rate schedule based on maintaining existing conditions. The goal is to maintain historic water levels while not increasing water levels to a depth that will negatively impact the wetland system. Other sources of water that could be introduced into Wetland Area 6 would include clean storm water or treated waste water generated at the site once the site is developed. In summary, any impact to wetland hydrology in Wetland Area 6 can be mitigated by implementing the following measures (1) introducing water into the system from supply wells, (2) physically controlling the depth of surface water with culverts, and (3) discharging clean storm water or treated waste water into the system once the site has been developed. If these measures are implemented in a thoughtful manner, there should be no long-term impacts to the wetland system from localized drawdown of the shallow ground water table from the supply wells extracting up to 30 mgd.

Wetland Area 7

Wetland Area 7 is a large wetland complex characterized by open water (minor amount), emergent, shrub-shrub, and forested vegetative components. The area is bordered by Anchor Point Access Road to the north, dredge spoils to the west, BNSF rail grade fill to the east, and Carrolls Channel to the south (Figure 2).

Potential Impact

According to PGG, the water table beneath Wetland Area 7 could experience drawdowns from 1 to 5 feet if vertical wells are pumped or 1 to 4 feet if Ranney type collectors are pumped. In reality, actual

surface water loss due to drawdowns of the localized water table are expected to be minimal because the mapped soils that underlie the wetlands have low permeability and algal/vegetative mats that restrict downward migration of surface water.

Mitigation Measures

PGG estimates that hydrology in Wetland Area 7 could be maintained by suppling a maximum 4 gpm directly into the system via a supply pipe from the production wells. Baseline monitoring of surface water levels in the wetland will be necessary to determine an appropriate water flow rate schedule based on maintaining existing conditions. The goal is to maintain historic water levels while not increasing water levels to a depth that will negatively impact the wetland system. Other sources of water that could be introduced into Wetland Area 7 would include clean storm water or treated waste water generated at the site once the site is developed. In summary, any impact to wetland hydrology in Wetland Area 7 can be mitigated by implementing the following measures (1) introducing water into the system from supply wells and (2) discharging clean storm water or treated waste water into the system once the site has been developed. If these measures are implemented in a thoughtful manner, there should be no long-term impacts to the wetland system from localized drawdown of the shallow ground water table from the supply wells extracting up to 30 mgd.

Wetland Area 8 (near OC1 & OC2)

Wetland Area 8 is a large wetland complex characterized by open water, emergent, shrub-shrub, and forested vegetative components. The wetland area is adjacent to Owl Creek from Interstate 5 to the confluence of Owl Creek and Carrolls Channel (Figure 2).

Potential Impact

According to PGG, the water table beneath Wetland Area 8 could experience drawdowns from 1 to 3 feet if vertical wells are pumped or 1 to 2 feet if Ranney type collectors are pumped. In reality, actual surface water loss due to drawdowns of the localized water table are expected to be minimal because the mapped soils that underlie the wetlands have low permeability and algal/vegetative mats that restrict downward migration of surface water.

Mitigation Measures

PGG estimates that hydrology in Wetland Area 8 could be maintained by suppling a maximum 0.4 gpm directly into the system via a supply pipe from the production wells. In addition to supplying water to the wetland, hydrology can also be maintained with physical controls including weirs, standpipes, and culvert modifications landward of the ordinary high water mark (OHWM) of Owl Creek. Baseline monitoring of surface water levels in the wetland will be necessary to determine an appropriate water flow rate schedule based on maintaining existing conditions. The goal is to maintain historic water levels while not increasing water levels to a depth that will negatively impact the wetland system. Other sources of water that could be introduced into Wetland Area 8 would include clean storm water or treated waste water generated at the site once the site is developed. In summary, any impact to wetland hydrology in Wetland 8 can be mitigated by implementing the following measures (1) introducing water into the system from supply wells, (2) physically controlling the depth of surface water with culverts, and (3) discharging clean storm water or treated waste water into the system once the site has been developed. In addition, surface water inflows from upland areas that lie to the east of Interstate 5 via the watershed of owl Creek will act to minimize any significant water level

fluctuations. With the addition of water to Wetland Areas 6 & 7, it is highly likely that Wetland Area 8 will also receive some minor overland surface flow. It is our opinion that hydrology conditions within Wetland Area 8 will not be significantly impacted from localized drawdown of the shallow ground water table from the supply wells extracting up to 30 mgd.

Summary

Groundwater modeling indicates that localized drawdown of 1 to 8 feet might occur to the shallow groundwater table depending on the distance from the pumping source and whether vertical wells or Ranney type collectors are used. A concern is the potential impact on the hydrology of nearby wetlands when the groundwater table beneath the wetlands is drawn down due to pumping. With physical controls and artificially introducing water into the wetland systems, significant impact on wetland hydrology from groundwater withdrawal is expected to be negligible. This assumption is based on (1) mapped soils beneath the wetland areas are alluvial deposits with low permeability and (2) the wetland areas have well established algal/vegetative mats that further restrict downward migration of surface water. This conclusion is based on soil mapping conducted by ELS, information from PGG, and mapped soil information from U.S.D.A. Natural Resource Conservation Service (NRCS).

The following measures could be utilized in Wetland Areas 1, 6, & 7 to mitigate for any loss of wetland hydrology from groundwater pumping: (1) introducing water into the system from supply wells, (2) physically controlling the depth of surface water with culverts, and (3) discharging clean storm water or treated waste water into the system once the site has been developed. If these measures are implemented in a thoughtful manner, there should be no long-term impacts to the wetland areas from localized drawdown of the shallow ground water table from the supply wells extracting up to 30 mgd.

Sincerely,

Timothy J. Haderly
Senior Ecologist/Principal

Attachment: Figure 2 – Anchor Point Vicinity Map Showing Modeled Wetland Area

References

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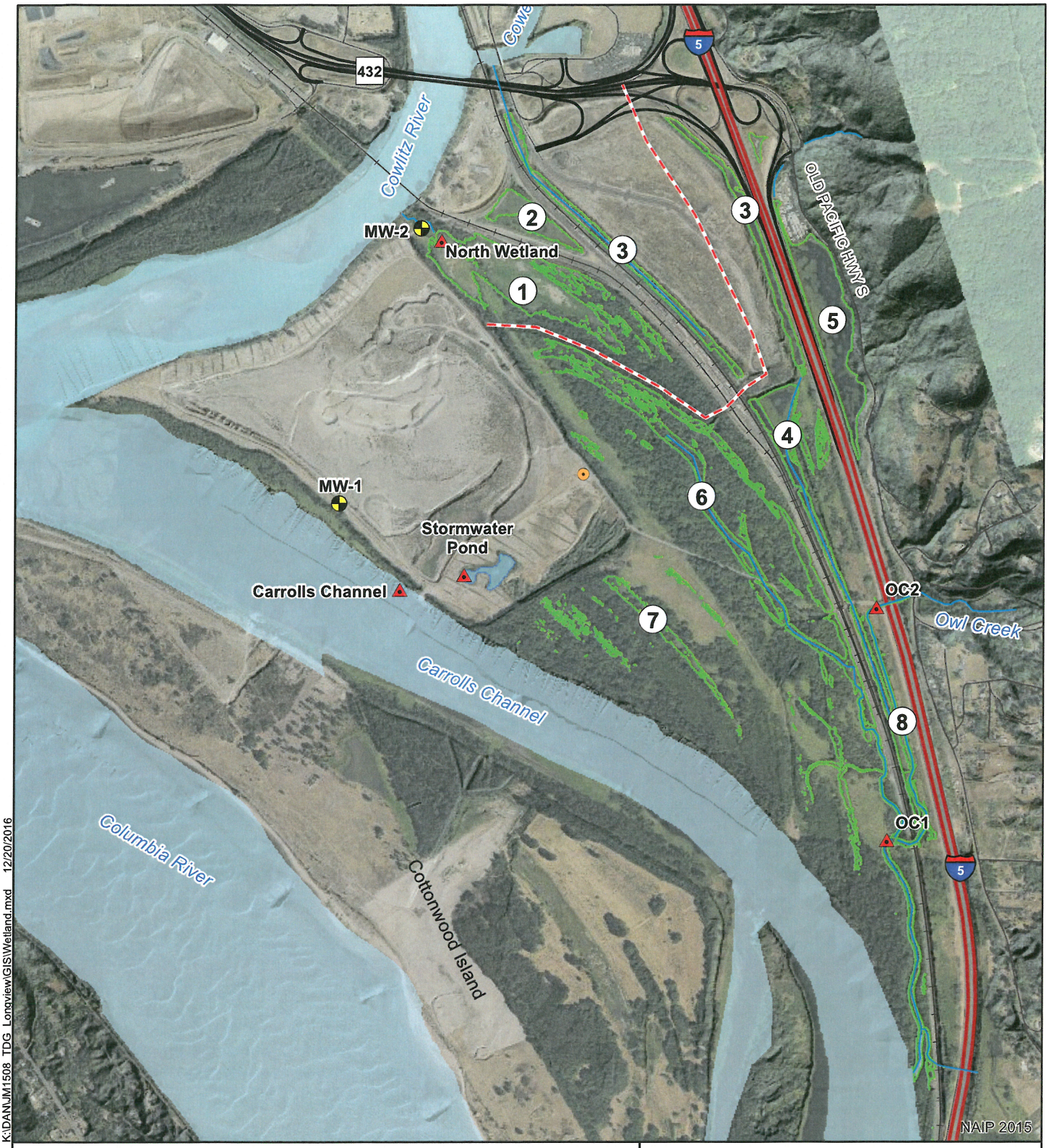

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Groundwater Monitoring Well

Surface Water Monitoring Station

Winters Well

4 Modeled Wetland Area

Estimated Surface Water Divide

N

0 Feet 1,500

Figure 2

Anchor Point Vicinity Map Showing Modeled Wetland Areas

PgG