APPENDIX D

Effluent Disposal Site Screening

Memorandum

To: Steve Pedersen, John Potts

CC: Blake Martin

From: Mel Higgins

Date: March 20, 2012

Re: Orleans Wastewater Outfall Alternatives Site Screening

For the Orleans Wastewater site screening analysis, proposed wastewater outfall sites and proposed treatment plant sites were evaluated for environmental, human and hydrogeologic constraints.

As a separate analysis, the location of proposed wastewater infrastructure for the centralized and decentralized sewer area was investigated for potential problem work areas (i.e. areas in shallow depth to groundwater, till, bedrock, or end morain).

Below is an overview of the results of both analysis.

The following proposed outfall sites were screened for their ability to receive wastewater outflow:

Outfall Site 112
Outfall Site 321
Outfall Site 322
Outfall Site 172
Outfall Site 173
Outfall Site 181

The following parameters were mapped in GIS to determine any site constraints:

Environmental Constraints
Areas of Critical Environmental Concern (ACECs)
NHESP Certified Vernal Pools
NHESP Priority Habitats
NHESP Estimated Habitats
Wetlands
Perennial Streams
100-Year Flood Zone

Human Constraints
Interim Wellhead Protection Area (IWPAs)
Zone IIs
Surface Water Protection Areas
Solid Waste Facilities (active, closed and inactive)
21E Sites
Public Water Supplies

HydroGeologic Constraints
Soils
Surficial Geology
Shallow Depth-To-Water (mapped as 20- off of wetlands edge)
Topography

Below are the items of note for each of the proposed outfall sites:

Outfall Site 112
- Shallow depth-to-water is within 300' of property boundary
- Soils (Carver-Hinesberg loamy coarse sands) have a very rapid permeability (>20 inches/hour or > 40 feet/day)
- 2% slope on parcel
- Parcel size is 92,000 square feet. Assuming 5 gal/day/sf => 460,000 gpd

Outfall Site 321
- Soils: two different types.
    - (Carver-Hinesberg loamy coarse sands) have a very rapid permeability (>20 inches/hour or > 40 feet/day)
    - (Nantucket sandy loam) has a moderately slow (0.2 – 0.0 inches/hour) to slow (0.06 – 0.20 inches/hour). "The moderately slow or slow permeability in the substratum … are limitations on sites for septic system absorption fields" (USDA Soil Survey)
- ~ 4% slope on parcel (steeper grade to the north, flatter to the south
- Parcel area = 292,500 sf. Assuming 3 gal/day/sf => 877,500 gpd

Outfall Site 322
- Wetlands ~ 125' from property boundary
- NHESP Habitat ~ 140' from property boundary
- ACECs ~ 200' from property boundary
- Soils: two different types.
    - (Carver-Hinesberg loamy coarse sands) have a very rapid permeability (>20 inches/hour or > 40 feet/day)
- (Carver coarse sand) has very rapid permeability(>20 inches/hour or > 40 feet/day) in substratum
- Greater change in topography compared to other two proposed outfall sites (8% slope)
- Parcel area = 156,000 sf. Assuming 5 gal/day/sf => 780,000 gpd

Outfall Site 172
- NHESP Habitat ~ 500' from property boundary
- Zone II in southern part of parcel
- Soils:
    - (Carver coarse sand) has very rapid permeability(>20 inches/hour or > 40 feet/day) in substratum
- Relatively flat (<2 % slope)
- Parcel area = 176,000 sf. Assuming 5 gal/day/sf => 880,000 gpd

Outfall Site 173
- Soils:
  - (Carver coarse sand) has very rapid permeability(>20 inches/hour or > 40 feet/day) in substratum
- 11% slope
- Parcel area = 211,000 sf. Assuming 5 gal/day/sf => 1,055,000 gpd

Outfall Site 181
- Wetlands ~ 50' from property boundary
- ACECs cover entire site
- 100-year flood zone stops at western property boundary
- Shallow depth to groundwater ~30 feet from west parcel boundary
- Soils:
  - (Carver coarse sand) has very rapid permeability(>20 inches/hour or > 40 feet/day) in substratum
- 8% slope on mid – south part of parcel, 3% slope on mid – northern part of parcel
- Parcel area = 267,700 sf. Assuming 5 gal/day/sf => 1,338,500 gpd

The following proposed treatment plant sites were screened for environmental and human constraints:

Treatment Plant Site 111
Treatment Plant Site 163

Below are the items of note for each of the proposed treatment plant sites:

Treatment Plant Site 111
- ACECs are in the southern part of the site

Treatment Plant Site 163
- Site is completely within Zone II

SEWER LINE PROBLEM AREAS

Problem areas included surficial geology mapped as:
- till, bedrock or end morain
- Shallow water table (mapped as 20' off of wetlands edge)

For Centralized Area:
- No till, bedrock or end morrain mapped in the area
- Total length of sewer line in "shallow water table" = 3,173 linear feet
  - Force main = 331 lf
  - Low pressure = 2,170 lf
  - Gravity = 672 lf

For Decentralized Area:
- No till, bedrock or end morrain mapped in the area
- Total length of sewer line in "shallow water table" = 4,610 linear feet
  - Force main = 577 lf
  - Low pressure = 2,692 lf
  - Gravity = 302 lf
  - Effluent disposal = 1,039 lf