APPENDIX F

DREDGING PLANS

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TECHNICAL MEMORANDUM

To:	Ed Glaza, P.E., Parsons	**Date:**	December 18, 2009
From:	Walter Dinicola, Kimberly Powell, P.E., John Verduin, P.E., and Ram Mohan, P.E., Ph.D., Anchor QEA, LLC	**Project:**	090139-01
Cc:			
Re:	Dredging Prism Development Onondaga Lake Cap and Dredge Area and Depth Initial Design Submittal		

When preparing an engineering design for removing dredged sediment, a major component of the design is to define the dredging prism (horizontal and vertical extents of required dredging). This memorandum describes the procedures used to define the dredging prism (see draft dredging plan drawings). The draft construction documents presented in this memorandum consist of the dredging prism for Remediation Areas A, B, C, D, and E.

A summary description of these Remediation Areas is provided below (see Drawing D-1 for remediation area locations):

- Remediation Area A – Mouth of Ninemile Creek (Sediment Management Unit [SMU] 4 and adjacent impacted areas in SMU 3 and SMU 5)
- Remediation Area B – Offshore of Wastebeds 1 through 8 (SMU 3)
- Remediation Area C – Offshore of the New York State Department of Transportation (NYSDOT) Turnaround Area and the Willis/Semet Interim Remedial Measure (IRM) barrier wall exclusive of in-lake waste deposit (ILWD) (SMU 2 exclusive of the ILWD)
- Remediation Area D – ILWD (SMU 1 and adjacent portions of SMU 2 and SMU 7 where ILWD is present)
- Remediation Area E – Southwestern end of Onondaga Lake (Lake) (SMU 6 and SMU 7 exclusive of the ILWD)

DEVELOPMENT OF DREDGE PRISM BOUNDARIES

The lateral extents of the remediation areas (including both dredging and capping) were established using data obtained from individual cores (Parsons 2007; Parsons 2008; Parsons 2009a; Parsons 2009b). Specifically, the remediation area boundaries were drawn from core to core based on the analytical results from Pre-Design Investigation (PDI) sampling locations (Phases I through V) where the sediment cleanup criteria (i.e., mean probable effects concentration quotient [PECQ] of less than 1 and a mercury concentration of less than 2.2 milligrams per kilogram [mg/kg]) were not exceeded at any depth. The Remedial Investigation (RI) sampling locations were considered in the development of the remediation area boundaries, though most of the RI data was superseded by more recent PDI data. In a few areas where the outer edge of the remediation area was not defined with a core that met the cleanup criteria, the remediation area boundary was estimated by extending it approximately 150 feet beyond the impacted core. Additional data collected as part of the Phase V PDI in the summer of 2009 has further defined the required dredge depths in the Remediation Areas. Appendix A of the Cap and Dredge Area and Depth Initial Design Submittal (IDS) provides additional details pertaining to development of the remediation area boundaries.

Volumes associated with the dredge prism were calculated using AutoDesk's Land Development Desktop (LDD) software. A three-dimensional surface was created in AutoCAD v. 2008 for both the existing bathymetry and the required dredge prism, accounting for design side slopes. These surfaces each consisted of a set of contiguous, non-overlapping triangles known as a triangulated irregular network (TIN). Using LDD, the volume between these two TINs was calculated to represent the required dredge volume. An allowable overdepth surface was developed by lowering the required dredging prism by 0.5 feet in elevation, and a total required and overdepth allowance volume was computed.

Within the remediation areas, the remedy was subdivided into three categories, two of which include dredging:

1. Dredging-to-cleanup criteria
2. Elevation-based dredging
3. Capping to isolate impacted sediments (i.e., "Capping only")

The lateral and vertical extents of the dredging prism for these two dredging categories are described below.

Dredging-to-Cleanup Criteria

In certain nearshore areas, dredging will be performed to achieve cleanup criteria, eliminating the need for capping these areas. The lateral extent of the dredging-to-cleanup criteria was delineated based on consideration of nearshore areas of high groundwater upwelling due to cap effectiveness considerations. For most dredging-to-cleanup criteria areas, the vertical extent of the dredging-to-cleanup criteria was set below the deepest depth where the cleanup criteria were exceeded based on PDI sampling data. These depths may be revised in future design submittals based on the results from future PDI data.

In Remediation Area E, south of the outlet of Harbor Brook, there are two PDI sample locations where the dredge-to-cleanup criteria dredge depth does not reach the deepest depth of an individual probable effects concentration (PEC) exceedance. The two specific PDI sample locations (as shown on Figures in Appendix A) where the dredge depth will not meet the deepest PEC exceedance are OL-VC-70027 and OL-SB-70001-VC. Both of the sample locations are in a 3-foot dredge-to-cleanup criteria area. For OL-VC-70027, after the proposed dredge-to-cleanup criteria of 3 feet is complete, there will be 7 feet of vertical sample interval that does not exceed the PEC for any chemical parameter of interest. In the sample interval between 7 feet and 10 feet below the dredge cut, the PDI sampling for mercury has a PEC of 5.5. For OL-SB-70001-VC, after the dredge-to-cleanup criteria of 3 feet is complete, there will be 10 feet of vertical sample interval that does not exceed the PEC for any chemical parameter of interest. In the sample interval between 10 feet and 13.5 feet below the dredge cut, the PDI sample for total PCBs has a PEC of 1.6, while the sample interval beneath the 10 to 13.5 feet interval does not exceed the PEC. Following dredging in this area, a minimum habitat layer of between 1.5 feet and 2 feet will be placed. Due to the relatively minor PEC exceedance and the depth of clean material above the exceedance, dredging to 3 feet in this area will be protective.

Elevation-Based Dredging

Elevation-based dredging will be performed in select areas to ensure that there is no loss of surface area after the cap is placed and/or to meet a specific post-capping elevation based on

habitat considerations. Elevation-based dredging will also be performed in Remediation Area D to achieve the 2-meter average removal and 1-meter hotspot removal. The lateral and vertical extents of elevation-based dredging areas in Remediation Area A, B, C, and E are largely driven by habitat module requirements. The Remedial Design Elements for Habitat Restoration (Parsons 2009d; Habitat Plan) identifies 11 habitat modules targeted for inclusion in the restoration of Onondaga Lake. Habitat modules are areas with specific physical characteristics suitable for various representative species. Habitat modules are defined by three basic habitat parameters: water depth, substrate type, and water energy as described in the Habitat Plan. Habitat modules presented in the Habitat Plan (including module name, target water depth, and substrate type) within the Lake are summarized below (Parsons 2009d).

- Module 1 - Deep water (20 – 30 feet water depth). Sand.
- Module 2A – Mid-water depth (7 – 20 feet). Sand/fine gravel.
- Module 2B - Mid-water depth (7 – 20 feet). Coarse gravel/cobble.
- Module 3A - Shallow water (2 – 7 feet). Sand/fine gravel. Low energy.
- Module 3B - Shallow water (2 – 7 feet). Coarse gravel/cobble. High energy.
- Module 4A - Floating aquatics wetland (1 – 3 feet). Organics/fines/sand. Very low energy.
- Module 5A - Non-persistent emergent wetland (½ – 2 feet). Organics/fines/sand. Low energy.
- Module 5B - Shoreline shallows/limited emergent wetland (½ – 2 feet). Gravel/cobble. High energy.
- Module 6A - Persistent emergent wetland (1 foot above water to 1-foot deep). Organics/fines/ sand. Low energy.
- Module 6B - On shore to shallows/limited emergent wetland (1 foot above water to 1-foot deep). Cobble/coarse gravel/sand. High energy.
- Module 7A - Mudflats/unvegetated shoreline (0.8 feet above water to 0.8-feet deep). Fines/sand substrate or cobble/gravel. High energy or fluctuating water levels.

The vertical extent of dredging (e.g., dredging elevation [E]) was computed for the elevation-based dredging areas using the equation below.

$$E = WL - T_c - WD + \Delta H$$

Each of the parameters is described below.

- **Project water level (WL)** – The project water level was set at 362.5 feet North American Vertical Datum of 1988 (NAVD 88) to meet habitat objectives focused on the sensitivity of plant communities in the nearshore areas of the Lake. This elevation of 362.5 feet NAVD 88 was selected for the design, as it represents the average Lake level during the aquatic plant growing season.
- **Estimated maximum cap thickness (T_c)** – The estimated maximum cap thickness consists of the sum of the minimum thickness for up to three layers (chemical isolation layer, erosion protection layer, and habitat layer), plus the maximum over-placement for each layer (Tables 1 through 5).
  - Chemical isolation layer thickness is comprised of a minimum mixing layer of 0.25 feet and a minimum chemical isolation layer of 1 foot.
  - Erosion protection layer thickness is sized according to the results of Appendix D of the IDS. The minimum stable particle size and thickness is typically based on the wind-induced waves during a 100-year event.
  - Habitat layer thickness is based on a minimum habitat layer for a specific water depth
  - **Target water depth (WD)** – The target water depth was set at the shallowest water depth within a habitat module. For example, Module 5A has a target water depth ranging from 0.5 to 2 feet (Table 1 through 5). The dredging elevation was developed based on the shallowest water depth, or 0.5 feet.
  - **Settlement (ΔH)** – Settlement refers to the compressing of sediments due to an increase in the stress (i.e. the added weight of a cap) on those sediments. The change in stress is a function of the thickness/load removed by initial dredging (if any) and the thickness/load of the applied cap. If the sediment is subjected to a net increase in stress/load (e.g., the increase in load resulting from the placement of the cap more than offsets the reduction in load from the removal of dredge material), some settlement could occur. The amount and rate of settlement is dependent on the compressibility and permeability of the sediments. For fine-grained sediments like those in Onondaga Lake, this settlement typically occurs over a period of several to many years and will gradually slow over time.

Appendix I of the Cap and Dredge Area and Depth IDS provides additional details of long-term settlement predictions. Although settlement was accounted for in estimating long-term, post-construction surface elevations for habitat planning, it was conservatively assumed to be zero ($\Delta H = 0$) when determining dredging elevations; this way, dredge depths could be planned deep enough to meet habitat elevation goals, without relying on predicted settlements.

Figures 1 through 5 provide example cross-sections in Remediation Areas A, B, C, D, and E, which illustrate the development of the dredging elevations due to final cap elevations.

GENERAL DREDGING PRISM DEVELOPMENT ASSUMPTIONS AND PROCEDURES

In addition to defining the lateral and vertical extents of the dredging prism, general assumptions or procedures that were globally applied during dredging prism development include:

- **Project datums** – Horizontal survey information is referenced to the New York State Plane Feet North American Datum of 1983 (NAD 83), Central Zone. All elevations are referenced to the NAVD 88.
- **Shoreline** – The project boundary along the shoreline was defined by the project water level of 362.5 feet NAVD 88.
- **Bathymetry (e.g., existing ground)** – A bathymetric survey was conducted by CR Environmental, Inc. in 2005 and is documented in *Lake Phase I Pre-design Investigation Geophysical Survey Report* (CR Environmental, Inc. 2007). This bathymetric survey formed the basis of the existing bathymetry presented in the dredging plans. The existing bathymetry will be adjusted in future designs based on pre-dredge surveys.
- **Transition between shoreline and dredging** – In areas where dredging is planned adjacent to the shoreline, the top of dredging slope (e.g., daylight slope) was set at 362.5 feet NAVD 88 (project water level). The dredging prism was designed with a 5 horizontal to 1 vertical (5H:1V) slope from the top of the dredging slope to the bottom of the dredge cut (e.g., toe of slope). A slope of 5H:1V was conservatively chosen based on available offshore vane shear test data, professional experience, and judgment in the absence of nearshore geotechnical data. Nearshore geotechnical data, including in situ vane shear testing and laboratory strength testing, was collected as

part of the Phase V PDI. Following receipt of this additional data, a slope stability analysis will be conducted to determine a final transition slope as part of the Intermediate Design. The exception is where a vertical slope was used to develop the dredging prism occurred along portions of the shoreline in Remediation Areas A, D, and E where future upland remedial design will abut the Lake remedy. The details pertaining to these exceptions are described in the area-specific descriptions.

- **Transition between dredging elevations/cuts** – A slope of 5H:1V was designed to transition between two different target dredging elevations/cuts.
- **Transition between dredging-to-cleanup criteria and elevation-based dredging areas** – In areas where the dredging-to-cleanup criteria boundary is planned to abut the elevation-based dredging boundary, the bottom of the dredging prism was set at the required elevations for each area and the slope of dredge cut was extended into the area with the shallower cut, thus addressing the contaminated sediment through removal and/or with a cap. Cross-sections 2 and 4 presented on Contract Drawings D-11 and D-12 illustrate these transitions between dredging-to-cleanup criteria and elevation-based dredging areas.
- **Transition between elevation-based dredging areas and sediments below cleanup criteria** – In areas where elevation-based dredging occurs away from the shoreline, the bottom of the dredging prism was set at the required elevation along the remediation area boundary. The slope of the dredge cut was extended into the sediment below the cleanup criteria, thus addressing the contaminated sediment through removal and/or with a cap.
- **Transition between elevation-based dredging and cap-only areas** – In areas where the elevation-based dredging boundary is planned to abut the cap-only boundary, the dredging prism was set at the required elevation within the elevation-based dredging area, and the slope of the dredge cut was extended into the cap-only area, thus addressing the contaminated sediment through removal and/or with a cap.
- **Minimum dredge cut** – A minimum dredge cut of 0.5 feet was used within the dredging prism to maintain efficient production rates and minimize low solids contents.

REMEDIATION AREA-SPECIFIC DREDGING PRISM DEVELOPMENT

In addition to the general assumptions and procedures outlined above, each remediation area contained dredging prism development nuances (e.g., dredge cut thickness in dredging-to-cleanup criteria areas, habitat considerations) that are specific to that remediation area. In light of the complex design, Tables 1 through 5 were developed in conjunction with the Habitat Work Group as a tool to guide the dredging and capping design for each remediation area. Each remediation-specific table includes:

- Targeted habitat modules
- Location inside or outside of the surf zone (as defined as the approximate depth of the breaking wave during a 100-year event [see Appendix D of the IDS])
- Proposed remediation (dredging-to-cleanup criteria, elevation-based dredging, or capping only)
- Chemical isolation components, including a mixing layer, chemical isolation layer, an assumed maximum over-placement allowance, and the total maximum layer thickness
- Erosion protection/habitat layer components, including a minimum erosion protection/habitat layer based on the results of Appendix D of the IDS, an assumed maximum over-placement allowance, and the total maximum layer thickness
- Additional habitat layer components, including a dedicated minimum habitat layer (in addition to the erosion protection layer), an assumed maximum over-placement allowance, and the total maximum layer thickness
- Assumed total maximum over-placement allowance for all layers
- Total maximum cap thickness
- Assumed minimum and maximum cap settlement after two years (used in developing a two-year, post-settlement capping surface for the Habitat Plan)
- Top of cap elevation
- Water depth from cap surface
- Dredging volume computations including total area, dredge volume based on the dredging prism, an overdredge volume estimate (assuming 6 inches across the total dredge area), and total dredge volume

An area-by-area summary of unique dredging prism components is provided below.

Remediation Area A

Remediation Area A is approximately 84 acres and is located off the mouth of Ninemile Creek (Drawings D-2 to D-3 and D-11 to D-13 show plan views and cross-sections of Remediation Area A). It is comprised of SMU 4 and adjacent impacted areas in SMU 3 and SMU 5. Remediation Area A contains all three remedies – dredging-to-cleanup criteria, elevation-based dredging, and cap only. Within Remediation Area A, there are three dredging-to-cleanup criteria areas with differing target dredge cuts:

- Areas west of Ninemile Creek have a target dredge cut ranging from 2.5 to 8 feet.
- The mouth of Ninemile Creek has a target dredge cut of 6.6 feet (2 meters).
- The area east of Ninemile Creek has a target dredge cut ranging from 1.5 to 5 feet.

Remediation Area A contains four habitat modules where elevation-based dredging occurs (Module 6A, 5A, 3A, and 2A). Target dredge elevations were assigned based on target water depths and maximum cap thickness, as shown in Table 1.

A deviation from the general dredging prism development assumptions occurs in the mouth of Ninemile Creek (see Drawing D-2). A vertical dredge cut was assumed along the Ninemile Creek mouth/channel and adjacent spits, as the sediment removal at this location will be integrated with the Ninemile Creek design.

Remediation Area B

Remediation Area B is approximately 16 acres and is located offshore of Wastebeds 1 through 8 (Drawings D-4 and D-14 show plan views and cross-sections of Remediation Area B). Remediation Area B is within SMU 3. Within Remediation Area B, there are two elevation-based dredging areas (Module 5A & 3A). The target dredge elevations are shown in Table 2.

Remediation Area C

Remediation Area C is approximately 26 acres and is located offshore of the NYSDOT Turnaround area and the Willis/Semet IRM barrier wall exclusive of ILWD (Drawings D-5 and D-15 to D-16 show plan views and cross-sections of Remediation Area C). It is comprised of the portion of SMU 2 requiring remediation exclusive of ILWD. Within Remediation Area C, there is one dredging-to-cleanup criteria area located at the southwest portion of the NYSDOT Turnaround with a target dredge cut of 4 feet.

Remediation Area C contains three habitat modules (Module 6B, 5B, and 3B) where elevation-based dredging occurs near the shoreline. Target dredge elevations were assigned based on target water depths and maximum cap thickness as shown in Table 3.

Remediation Area D

Remediation Area D is approximately 99 acres and is comprised of SMU 1 and the ILWD portions of SMUs 2 and 7 (see Drawings D-6, D-7, and D-17 to D-20). The dredging requirements in Remediation Area D are based on the ROD-required, 2-meter-average dredge cut per former SMUs 1, 2, and 7. Additional dredging (beyond the 2-meter average dredge cut) of 3.3 feet (1 meter) is proposed at 10 hot spot locations (A through J) where remaining sediment concentrations exceeded the hot spot criteria. The details pertaining to the development of the general dredge depths in each SMU and hot spot areas is presented in Appendix G of the IDS. Table 4 presents the targeted habitat modules that will be incorporated into the dredging prism.

Deviations from the general dredging prism development assumptions in Remediation Area D include:

- The top of dredging slope (i.e., daylight slope) was offset 10 feet from the Willis-Semet IRM Barrier Wall.
- A vertical dredge cut was assumed along the shoreline in SMU 1/Wastebed B where the remedy abuts the Outboard Area EE/CA removal and cap.

Remediation Area E

Remediation Area E is approximately 185 acres and is located at the southwestern end of the Lake (Drawings D-7 to D-10 and D-21 to D-27 show plan views and cross-sections of Remediation Area E). It is comprised of SMU 6 and SMU 7 exclusive of ILWD. Within Remediation Area E, the dredging-to-cleanup criteria area has a target dredge cut ranging between 3 feet and 9.9 feet. This is consistent with the depth of contamination based on PDI data, including Phase V for the vast majority of this dredge area.

Remediation Area E contains three habitat modules (Module 6B, 5B, and 3B) where elevation-based dredging occurs near the shoreline. Target dredge elevations were assigned based on target water depths and maximum cap thickness as shown in Table 5.

A fourth elevation-based dredging area is the navigation channel that extends from Onondaga Creek into Onondaga Lake (see Drawing D-8). The navigation channel is authorized by the State of New York. Based on information from the New York State Canal Corp (NYSCC), the dredge prism was developed with a water depth of 16 feet (an authorized depth of 14 feet plus 2 feet below authorized dredge depth to prevent dredge-induced damage to the cap associated with future navigational dredging), a channel width of 100 feet, and a 5H:1V side slope. An erosion protection layer consisting of 3-inch stone was assumed for two purposes: 1) the larger stone would serve as an indicator layer for future navigational dredging; and 2) to protect the side slopes inside the surf zone (e.g., approximately 7 feet). Although the bottom of the channel is outside of the surf zone, a portion of the side slopes are subjected to erosive wind-wave forces within the surf zone. Therefore, the larger stone size to resist wind-waves was applied to the entire channel.

REFERENCES

CR Environmental, Inc. 2007. *Onondaga Lake Phase I Pre-design Investigation Geophysical Survey Report*. Prepared for Honeywell.

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Parsons. 2007. *Onondaga Lake Pre-Design Investigation: Phase I Data Summary Report.* Prepared for Honeywell, Morristown, NJ. May 2007.

Parsons. 2008. *Onondaga Lake Pre-Design Investigation: Phase II Data Summary Report.* Prepared for Honeywell, Morristown, NJ. Draft August 2008.

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Parsons. 2009c. *Onondaga Lake Pre-Design Investigation: Phase V Work Plan.* Prepared for Honeywell, Morristown, New Jersey and Syracuse, New York. Draft May 2009.

Parsons. 2009d. *Draft Remedial Design Elements for Habitat Restoration*. Prepared for Honeywell, Morristown, New Jersey and Syracuse, New York. Draft June 2009.

TABLES

Table 1
Summary of Cap Thicknesses and Dredge Volume
Remediation Area A (SMU 4)

			Chemical Isolation Layer				Erosion Protection/Habitat Layer				Additional Habitat Layer						
Habitat Module	**Location of Surf Zone (3.4 feet)**	**Remediation Area**	**Mixing Layer (ft)**	**Minimum Chemical Isolation Layer (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Minimum Erosion Protection/ Habitat Layer (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Material Type**	**Minimum Additional Habitat Material (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Material Type**	**Assumed Total Maximum Over Placement (ft)**	**Total Maximum Cap Thickness (ft)**	**Calculated Average Settlement at 2 years (ft)**
1 (-20 to -30 ft)	Outside	Cap Only	0.25	0.5	0.00	0.75	1.00	0.50	1.50	Fine Sand	0.00	0.00	0.00	Medium Sand	0.50	**2.25**	1.0
2A (-7 to -20 ft)	Outside	Cap Only	0.25	1.0	0.00	1.25	1.00	0.50	1.50	F. Gravel/F. Sand	0.00	0.00	0.00	Medium Sand	0.50	**2.75**	1.1
2A (-7 to -20 ft)	Outside	Dredging to Cleanup Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA
3A (-2 to -7 ft)	Outside	Dredging to Cleanup Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA
3A (-3 to -7 ft)	Outside	Elevation-Based Dredging	0.25	1.0	0.50	1.75	0.25	0.50	0.75	Fine Gravel	1.25	0.50	1.75	Fine Gravel	1.50	**4.25**	1.3
3A (-2 to -3 ft)	Inside	Elevation-Based Dredging	0.25	1.0	0.50	1.75	0.25	0.75	1.00	Coarse Gravel	1.75	0.50	2.25	Medium Sand	1.75	**5.00**	1.4
4A (-1 to -3 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA
5A (-0.5 to -2 ft)	Inside	Elevation-Based Dredging	0.25	1.0	0.50	1.75	0.25	0.75	1.00	Coarse Gravel	1.75	0.50	2.25	Medium Sand	1.75	**5.00**	1.4
5A (-0.5 to -2 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA	NA	0.00	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA
6A (+1 to -1 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA
6A (+1 to -1 ft)	Inside	Elevation-Based Dredging	0.25	1.0	0.50	1.75	0.25	0.75	1.00	NA	1.75	0.50	2.25	Medium Sand	1.75	**5.00**	1.4

Habitat Module	**Location of Surf Zone (3.4 feet)**	**Remediation Area**	**Dredging Elevation (ft)**	**Top Cap Elevation (ft)**	**Water Depth from Cap Surface (ft)**
1 (-20 to -30 ft)	Outside	Cap Only	NA	342.50	20.0
2A (-7 to -20 ft)	Outside	Cap Only	NA	355.50	7.0
2A (-7 to -20 ft)	Outside	Dredging to Cleanup Criteria	NA	355.50	7.0
3A (-2 to -10 ft)	Outside	Dredging to Cleanup Criteria	NA	360.50	2.0
3A (-3 to -7 ft)	Outside	Elevation-Based Dredging	355.25	359.50	3.0
3A (-2 to -3 ft)	Inside	Elevation-Based Dredging	355.50	360.50	2.0
4A (-1 to -3 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA
5A (-0.5 to -2 ft)	Inside	Elevation-Based Dredging	357.00	362.00	0.5
5A (-0.5 to -2 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA
6A (+1 to -1 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA
6A (+1 to -1 ft)	Inside	Elevation-Based Dredging	357.50	362.50	0.0

Remediation Area A Dredge Volume Estimate				
Total Area (ft^2)	Total Area (acre)	Dredge Volume (cy)	OD Volume (cy)	**Total Dredge Volume (cy)**
3,638,198	83.5	103,512	19,024	**122,536**

Total				
Total Area (ft^2)	Total Area (acre)	Dredge Volume (cy)	OD Volume (cy)	**Total Dredge Volume (cy)**
17,778,780	408.1	1,800,344	94,562	**1,894,906**

Notes and Assumptions:

DREDGING

Shoreline elevation: **362.5** ft

Dredging to cleanup criteria in nearshore areas due to upwelling velocities.

Removal depths for dredging to cleanup criteria areas near Ninemile Creek: West = varies from 2.5 to 8 feet and East = 1.5 to 5 feet to meet habitat objectives.

Additional dredging in nearshore areas to meet habitat objectives.

CAPPING

Mixing layer is 0.25 feet to be conservative.

Analytical modeling indicates 50% safety buffer can be applied to the habitat layer in Remedial Areas A-1 and A-2, buffer is included in habitat layer.

Assumed thin layer cap in 6-9 meter zone.

EROSION PROTECTION

Surf zone is at 3.4 feet based on wind/wave analysis by Anchor QEA.

Erosion protection requirements are as follows (based on 50:1 slope):

- 0-3.3 feet = coarse gravel (0.13 ft stone 0.25 ft thick)
- 3.3-10 feet = fine gravel
- 10-30 feet = fine sand

Assumed potential for ice scour to 1.5 feet of water depth. Habitat layer will be a minimum of 24 inches in shallow areas that have an isolation cap.

HABITAT LAYER

The average habitat layer (value + over placement) in the dredging to cleanup criteria areas based on water depth will be as follows:

- 0-3 feet = 2 feet (plus over placement)
- 3-7 feet = 1.5 feet (plus over placement)
- >7 feet = 1 foot (plus over placement)

Assumed chemical isolation and habitat layer are the same material in Modules 1 and 2 (7-30 ft), which results in only one layer of over placement.

Grainsize for water depths 3-7 ft are based on a 100 yr wind/wave analysis by Anchor QEA.

Grainsize for water depths less than 3 ft are based on Habitat Modules and include habitat/erosion protection material that is based on a 100 yr wind/wave analysis by Anchor QEA.

OVER PLACEMENT

Assumed a 0.5 ft maximum over placement for isolation, habitat/erosion protection outside the surf zone and additional habitat material.

Assumed a 0.75 ft maximum over placement for the habitat/erosion protection inside the surf zone due to constructability issues with coarse grained material.

Assumed one layer of over placement for Modules 1 and 2.

Assumed three layers of over placement for Modules 3, 4, 5 and 6.

SETTLEMENT

Settlement estimates after 2 years (rounded to the nearest 0.25-feet) were applied to the final capping elevations in water depths greater than 3 feet as part of the habitiat plan (see Appendix E).

Average settlement after 2 years for each habitat module is presented.

No settlement was conservatively assumed for determining dredging elevations.

Table 2
Summary of Cap Thicknesses and Dredge Volume
Remediation Area B (SMU 3)

			Chemical Isolation Layer				Erosion Protection/Habitat Layer				Additional Habitat Layer						
Habitat Module	**Location of Surf Zone (3.6 feet)**	**Remediation Area**	**Mixing Layer (ft)**	**Minimum Chemical Isolation Layer (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Minimum Erosion Protection/ Habitat Layer (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Material Type**	**Minimum Additional Habitat Material (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Material Type**	**Assumed Total Maximum Over Placement (ft)**	**Total Maximum Cap Thickness (ft)**	**Calculated Average Settlement at 2 years (ft)**
1 (-20 to -30 ft)	Outside	Cap Only	0.25	1.5	0.00	1.75	1.00	0.50	1.50	Fine Sand	0.00	0.00	0.00	Medium Sand	0.50	**3.25**	1.6
2A (-10 to -20 ft)	Outside	Cap Only	0.25	1.5	0.00	1.75	1.00	0.50	1.50	Medium Sand	0.00	0.00	0.00	Medium Sand	0.50	**3.25**	1.6
2A (-7 to -10 ft)	Outside	Cap Only	0.25	1.5	0.50	2.25	1.00	0.50	1.50	F. Gravel/C. Sand	0.00	0.00	0.00	Coarse Sand	1.00	**3.75**	1.8
3A (-4 to -7 ft)	Outside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Fine Gravel	1.20	0.55	1.75	Fine Gravel	1.75	**5.00**	1.9
3A (-3 to -4 ft)	Inside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Coarse Gravel	1.20	0.55	1.75	Fine Gravel	1.75	**5.00**	1.9
3A (-2 to -3 ft)	Inside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Coarse Gravel	1.70	0.55	2.25	Fine Gravel	1.75	**5.50**	1.9
5A (-0.5 to -2 ft)	Inside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Coarse Gravel	1.70	0.55	2.25	Fine Gravel	1.75	**5.50**	1.8

Habitat Module	**Location of Surf Zone (3.6 feet)**	**Remediation Area**	**Dredging Elevation (ft)**	**Top Cap Elevation (ft)**	**Water Depth from Cap Surface (ft)**
1 (-20 to -30 ft)	Outside	Cap Only	NA	342.50	20.0
2A (-10 to -20 ft)	Outside	Cap Only	NA	352.50	10.0
2A (-7 to -10 ft)	Outside	Cap Only	NA	355.50	7.0
3A (-4 to -7 ft)	Outside	Elevation-Based Dredging	353.50	358.50	4.0
3A (-3 to -4 ft)	Inside	Elevation-Based Dredging	354.50	359.50	3.0
3A (-2 to -3 ft)	Inside	Elevation-Based Dredging	355.00	360.50	2.0
5A (-0.5 to -2 ft)	Inside	Elevation-Based Dredging	356.50	362.00	0.5

Remediation Area B Dredge Volume Estimate

Total Area (ft^2)	Total Area (acre)	Dredge Volume (cy)	OD Volume (cy)	**Total Dredge Volume (cy)**
699,662	16.1	17,269	2,329	**19,598**

Total

Total Area (ft^2)	Total Area (acre)	Dredge Volume (cy)	OD Volume (cy)	**Total Dredge Volume (cy)**
17,778,780	408.1	1,800,344	94,562	**1,894,906**

Notes and Assumptions:

DREDGING

Shoreline elevation: **362.5** ft

CAPPING

Mixing layer is 0.25 feet to be conservative.
Assumed 50% safety buffer is required for isolation layer design, buffer is included in chemical isolation layer.
Amended cap in this area will not alter specified thicknesses.

EROSION PROTECTION

Surf zone is at 3.6 feet based on wind/wave analysis by AnchorQEA.
Erosion protection requirements are as follows (based on 50:1 slope):

0-3.6 feet = coarse gravel (0.15 ft stone 0.3 ft thick)
3.7-8 ft = fine gravel
8-10 ft = coarse sand
10-15 feet = medium sand
15-30 feet = fine sand

Assumed potential for ice scour to 1.5 feet of water. No isolation caps proposed in nearshore areas in less than 1.5 feet of water.

SHORELINE STABILIZATION

Based on low water elevation of 362 ft and high water elevation of 365 ft.
Extends from 1.5 feet of water depth (360.5 ft) to 365 ft (NAVD 88) to address this issue during high and low lake level conditions.
Assumed 2 year storm event from wind/wave analysis by Anchor QEA to define water depth to address ongoing resuspension of Solvay Waste nearshore.
Assumed 100 year storm event from wind/wave analysis by Anchor QEA to define more robust grain size to address resuspenion issues.

HABITAT LAYER

Assumed chemical isolation and habitat layer are the same material in Modules 1 and 2 (10-30 ft), which results in only one layer of over placement.
Grainsize for water depths 4-7 ft are based on a 100 yr wind/wave analysis by Anchor QEA .
Grainsize for water depths less than 4 ft are based on habitat modules and include habitat/erosion protection material based on a 100 yr wind/wave analysis by Anchor QEA.

OVER PLACEMENT

Assumed a 0.5 ft maximum over placement for isolation, additional habitat, and habitat/erosion protection material in water depths of 7 ft or greater.
Assumed a 0.7 ft maximum over placement for habitat/erosion protection material in modules 3A and 5A due to constructability issues with coarse grained material.
Assumed one layer of over placement for Modules 1 and 2A (10-30 ft).
Assumed two layers of over placement for Module 2A (7-10 ft).
Assumed three layers of over placement for Module 3A (2-7 ft).

SETTLEMENT

Settlement estimates after 2 years (rounded to the nearest 0.25-feet) were applied to the final capping elevations in water depths greater than 3 feet as part of the habitiat plan (see Appendix E).
Average settlement after 2 years for each habitat module is presented.
No settlement was conservatively assumed for determining dredging elevations.

Table 3
Summary of Cap Thicknesses and Dredge Volume
Remediation Area C (SMU 2)

			Chemical Isolation Layer				Erosion Protection/Habitat Layer				Additional Habitat Layer						
Habitat Module	**Location of Surf Zone (4.2 feet)**	**Remediation Area**	**Mixing Layer (ft)**	**Minimum Chemical Isolation Layer (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Minimum Erosion Protection/ Habitat Layer (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Material Type**	**Minimum Additional Habitat Material (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Material Type**	**Assumed Total Maximum Over Placement (ft)**	**Total Maximum Cap Thickness (ft)**	**Calculated Average Settlement at 2 years (ft)**
1 (-20 to -30 ft)	Outside	Cap Only	0.25	1.5	0.00	1.75	1.00	0.50	1.50	Fine Sand	0.00	0.00	0.00	Medium Sand	0.50	**3.25**	1.1
2A (-10 to -20 ft)	Outside	Cap Only	0.25	1.5	0.00	1.75	1.00	0.50	1.50	Medium Sand	0.00	0.00	0.00	Medium Sand	0.50	**3.25**	1.1
2A (-7 to -20 ft)	Outside	Dredging to Cleanup Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA
2A (-7 to -10 ft)	Outside	Cap Only	0.25	1.5	0.50	2.25	1.00	0.50	1.50	Fine Gravel	0.00	0.00	0.00	Fine Gravel	1.00	**3.75**	1.2
3B (-4 to -7 ft)	Outside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Fine Gravel	1.20	0.55	1.75	Fine Gravel	1.75	**5.00**	1.2
3B (-3 to -4 ft)	Inside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Coarse Gravel	1.20	0.55	1.75	Fine Gravel	1.75	**5.00**	1.2
3B (-2 to -3 ft)	Inside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Coarse Gravel	1.70	0.55	2.25	Fine Gravel	1.75	**5.50**	1.1
3B (-2 to -7 ft)	In/Out	Dredging to Cleanup Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA
5B (-0.5-2 ft)	Inside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Coarse Gravel	1.70	0.55	2.25	Fine Gravel	1.75	**5.50**	1.1
5B (-0.5-2 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA
6B (+1 to -1 ft)	Inside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Coarse Gravel	1.70	0.55	2.25	Fine Gravel	1.75	**5.50**	1.1
6B (+1 to -1 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA

Habitat Module	**Location of Surf Zone (4.2 feet)**	**Remediation Area**	**Dredging Elevation (ft)**	**Top Cap Elevation (ft)**	**Water Depth from Cap Surface (ft)**
1 (-20 to -30 ft)	Outside	Cap Only	NA	342.50	20.0
2A (-10 to -20 ft)	Outside	Cap Only	NA	352.50	10.0
2A (-7 to -20 ft)	Outside	Dredging to Cleanup Criteria	NA	NA	NA
2A (-7 to -10 ft)	Outside	Cap Only	NA	355.50	7.0
3B (-4 to -7 ft)	Outside	Elevation-Based Dredging	353.50	358.50	4.0
3B (-3 to -4 ft)	Inside	Elevation-Based Dredging	354.50	359.50	3.0
3B (-2 to -3 ft)	Inside	Elevation-Based Dredging	355.00	360.50	2.0
3B (-2 to -7 ft)	In/Out	Dredging to Cleanup Criteria	NA	NA	NA
5B (-0.5-2 ft)	Inside	Elevation-Based Dredging	356.50	362.00	0.5
5B (-0.5-2 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA
6B (+1 to -1 ft)	Inside	Elevation-Based Dredging	357.00	362.50	0.0
6B (+1 to -1 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA

Remediation Area C Dredge Volume Estimate

Total Area (ft^2)	Total Area (acre)	Dredge Volume (cy)	OD Volume (cy)	**Total Dredge Volume (cy)**
1,112,745	25.5	29,007	5,621	**34,628**

Total

Total Area (ft^2)	Total Area (acre)	Dredge Volume (cy)	OD Volume (cy)	**Total Dredge Volume (cy)**
17,778,780	408.1	1,800,344	94,562	**1,894,906**

Notes and Assumptions:

DREDGING

Shoreline elevation: **362.5** ft

Dredging to cleanup criteria in nearshore areas due to upwelling velocities and depth of contamination.

Removal depths for dredging to cleanup criteria near DOT turn around area are 4 feet.

Dredging in shallow water areas off Semet wall to provide adequate water depth for placement of an isolation cap.

CAPPING

Assumed 50% safety buffer is required for isolation layer design, buffer is included in chemical isolation layer.

Mixing layer is 0.25 feet to be conservative.

EROSION PROTECTION

This area was assumed to be high energy based on the results of the wind/wave analysis from Anchor QEA.

Surf zone is at 4.2 feet based on wind/wave analysis by Anchor QEA.

Erosion protection requirements are as follows (based on 50:1 slope):

- 0-4.2 feet = coarse gravel (0.16 ft stone 0.3 ft thick)
- 4.2-10 feet = fine gravel
- 10-20 feet = medium sand
- 20-30 feet = fine sand

Assumed potential for ice scour to 1.5 feet of water depth. No isolation caps in nearshore areas in less than 1.5 feet of water.

HABITAT LAYER

The average habitat layer (value + over placement) in the dredging to cleanup criteria areas based on water depth will be as follows:

- 0-3 feet = 2 feet (plus over placement)
- 3-7 feet = 1.5 feet (plus over placement)
- >7 feet = 1 foot (plus over placement)

Assumed chemical isolation and habitat layer are the same material in Modules 1 and 2 (10-30 ft), which results in only one layer of over placement.

Grainsize for water depths 4-7 ft are based on a 100 yr wind/wave analysis by Anchor QEA.

Grainsize for water depths less than 4 ft are based on habitat modules and include erosion protection/habitat material based on a 100 yr wind/wave analysis by Anchor QEA.

OVER PLACEMENT

Assumed a 0.5 ft maximum over placement for isolation, habitat/erosion protection in water depths greater than 7 ft and additional habitat material.

Assumed a 0.7 ft maximum over placement for habitat/erosion protection material in water depths shallower than 7 ft due to constructability issues with coarse grained material.

Assumed one layer of over placement for Modules 1 and 2 (10-30 ft).

Assumed two layers of over placement for Module 2 (7-10 ft).

Assumed three layers of over placement for Modules 3, 5 and 6.

SETTLEMENT

Settlement estimates after 2 years (rounded to the nearest 0.25-feet) were applied to the final capping elevations in water depths greater than 3 feet as part of the habitiat plan (see Appendix E).

Average settlement after 2 years for each habitat module is presented.

No settlement was conservatively assumed for determining dredging elevations.

Table 4
Summary of Cap Thicknesses and Dredge Volume
Remediation Area D (SMU 7, 1 2[ILWD])

			Chemical Isolation Layer				Erosion Protection/Habitat Layer				Additional Habitat Layer						
Habitat Module	**Location of Surf Zone (4.2 feet)**	**Remediation Area**	**Mixing Layer (ft)**	**Minimum Chemical Isolation Layer (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Minimum Erosion Protection/ Habitat Layer (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Material Type**	**Minimum Additional Habitat Material (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Material Type**	**Assumed Total Maximum Over Placement (ft)**	**Total Maximum Cap Thickness (ft)**	**Calculated Average Settlement at 2 years (ft)**
1 (-20 to -30 ft)	Outside	Cap Only	0.25	1.5	0.00	1.75	1.00	0.50	1.50	Fine Sand	0.00	0.00	0.00	Medium Sand	0.50	**3.25**	NA
2A (-10 to -20 ft)	Outside	Cap Only	0.25	1.5	0.00	1.75	1.00	0.50	1.50	Medium Sand	0.00	0.00	0.00	Medium Sand	0.50	**3.25**	NA
2A (-7 to -10 ft)	Outside	Cap Only	0.25	1.5	0.50	2.25	1.00	0.50	1.50	Fine Gravel	0.00	0.00	0.00	Fine Gravel	1.00	**3.75**	NA
3B (-4 to -7 ft)	Outside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Fine Gravel	1.20	0.55	1.75	Fine Gravel	1.75	**5.00**	NA
3B (-3 to -4 ft)	Inside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Coarse Gravel	1.20	0.55	1.75	Fine Gravel	1.75	**5.00**	NA
3B (-2 to -3 ft)	Inside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Coarse Gravel	1.70	0.55	2.25	Fine Gravel	1.75	**5.50**	NA
5B (-0.5 to -2 ft)	Inside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Coarse Gravel	1.70	0.55	2.25	Fine Gravel	1.75	**5.50**	NA
6B (+1 to -1 ft)	Inside	Elevation-Based Dredging	0.25	1.5	0.50	2.25	0.30	0.70	1.00	Coarse Gravel	1.70	0.55	2.25	Fine Gravel	1.75	**5.50**	NA

Habitat Module	**Location of Surf Zone (4.2 feet)**	**Remediation Area**	**Dredging Elevation (ft)**	**Top Cap Elevation (ft)**	**Water Depth from Cap Surface (ft)**
1 (-20 to -30 ft)	Outside	Cap Only	NA	342.50	20.0
2A (-10 to -20 ft)	Outside	Cap Only	NA	352.50	10.0
2A (-7 to -10 ft)	Outside	Cap Only	NA	355.50	7.0
3B (-4 to -7 ft)	Outside	Elevation-Based Dredging	TBD	358.50	4.0
3B (-3 to -4 ft)	Inside	Elevation-Based Dredging	TBD	359.50	3.0
3B (-2 to -3 ft)	Inside	Elevation-Based Dredging	TBD	360.50	2.0
5B (-0.5 to -2 ft)	Inside	Elevation-Based Dredging	TBD	362.00	0.5
6B (+1 to -1 ft)	Inside	Elevation-Based Dredging	TBD	362.50	0.0

Remediation Area D Dredge Volume Estimate				
Total Area (ft^2)	Total Area (acre)	Dredge Volume (cy)	OD Volume (cy)	**Total Dredge Volume (cy)**
4,289,726	98.5	1,147,341	0	**1,147,341**

Total				
Total Area (ft^2)	Total Area (acre)	Dredge Volume (cy)	OD Volume (cy)	**Total Dredge Volume (cy)**
17,778,780	408.1	1,800,344	94,562	**1,894,906**

Notes and Assumptions:

DREDGING

Shoreline elevation: **362.5** ft

ILWD Removal approach to address average 2 meters plus hotspots.

CAPPING

Assumed 50% safety buffer is required for isolation layer design, buffer is included in chemical isolation layer.
Mixing layer is 0.25 feet to be conservative.
Amended cap in this area will not alter specified thicknesses.

EROSION PROTECTION

Surf zone is at 4.2 feet based on wind/wave analysis conducted by Anchor QEA.
ILWD assumed to be high energy based on wind/wave analysis conducted by Anchor QEA.
Erosion protection requirements are as follows (based on 50:1 slope):

0-4.2 feet = coarse gravel (0.17 ft stone 0.3 ft thick)
4.2-10 ft = fine gravel
10-20 feet = medium sand
20-30 feet = fine sand

Assumed potential for ice scour to 1.5 feet of water depth. No isolation caps in nearshore areas in less than 1.5 feet of water.
Assumed 5:1 slope for backfill off western portion of the Willis IRM Barrier wall.

HABITAT LAYER

Assumed chemical isolation and habitat layer are the same material in Modules 1 and 2 (10-30 ft), which results in only one layer of over placement .
Grainsize for water depths 4-7 ft are based on a 100 yr wind/wave analysis by Anchor QEA .
Grainsize for water depths less than 4 ft are based on habitat modules and include habitat/erosion protection material based on a 100 yr wind/wave analysis by Anchor QEA.

OVER PLACEMENT

Assumed a 0.5 ft maximum over placement for isolation habitat/erosion protection outside the surf zone and additional habitat material.
Assumed a 0.7 ft maximum over placement for habitat/erosion protection material inside the surf zone due to constructability issues with coarse grained material.
Assumed one layer of over placement for Modules 1 and 2 (10-30 ft).
Assumed two layers of over placement for Module 2 (7-10 ft).
Assumed three layers of over placement for Modules 3, 5 and 6.

SETTLEMENT

Settlement was estimated using a range of a cap thicknesses and dredge cut depths (see Figure 16, Appendix E).
No settlement was conservatively assumed for determining dredging elevations.

Table 5
Summary of Cap Thicknesses and Dredge Volume
Remediation Area E (SMU 6/7)

			Chemical Isolation Layer				Erosion Protection/Habitat Layer				Additional Habitat Layer						
Habitat Module	**Location of Surf Zone (6.7 feet)**	**Remediation Area**	**Mixing Layer (ft)**	**Minimum Chemical Isolation Layer (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Minimum Erosion Protection/ Habitat Layer (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Material Type**	**Minimum Additional Habitat Material (ft)**	**Assumed Maximum Over-Placement (ft)**	**Maximum Total Layer Thickness (ft)**	**Material Type**	**Assumed Total Maximum Over Placement (ft)**	**Total Maximum Cap Thickness (ft)**	**Calculated Average Settlement at 2 years (ft)**
1 (-20 to -30 ft)	Outside	Cap Only	0.25	0.5	0.00	0.75	1.00	0.50	1.50	Medium Sand	0.00	0.00	0.00	Medium Sand	0.50	**2.25**	1.6
2A (-10 to -20 ft)	Outside	Cap Only	0.25	1.0	0.50	1.75	1.00	0.50	1.50	Fine Gravel	0.00	0.00	0.00	Fine Gravel	1.00	**3.25**	2.0
2A (Nav Channel) (-10 to -20 ft)	Outside	Elevation-Based Dredging	0.25	1.0	0.50	1.75	1.00	0.50	1.50	Cobbles	0.00	0.00	0.00	NA	1.00	**3.25**	2.0
2B (-7 to -10 ft)	Outside	Cap Only	0.25	1.0	0.50	1.75	1.00	0.50	1.50	Coarse Gravel	0.00	0.00	0.00	Coarse Gravel	1.00	**3.25**	2.0
3B (-3 to -7 ft)	Inside	Elevation-Based Dredging	0.25	1.0	0.50	1.75	0.50	1.00	1.50	Cobbles	1.00	0.50	1.50	Crse Grvl/Cobble	2.00	**4.75**	1.7
3B (-2 to -3 ft)	Inside	Elevation-Based Dredging	0.25	1.0	0.50	1.75	0.50	1.00	1.50	Cobbles	1.50	0.50	2.00	Crse Grvl/Cobble	2.00	**5.25**	1.6
3B (-2 to -7 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA
5B (-0.5 to -2 ft)	Inside	Elevation-Based Dredging	0.25	1.0	0.50	1.75	0.50	1.00	1.50	Cobbles	1.50	0.50	2.00	Crse Grvl/Cobble	2.00	**5.25**	1.4
5B (-0.5 to -2 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA
6B (+1 to -1 ft)	Inside	Elevation-Based Dredging	0.25	1.0	0.50	1.75	0.50	1.00	1.50	Cobbles	1.50	0.50	2.00	Crse Grvl/Cobble	2.00	**5.25**	1.5
6B (+1 to -1 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**NA**	NA

Habitat Module	**Location of Surf Zone (6.7 feet)**	**Remediation Area**	**Dredging Elevation (ft)**	**Top Cap Elevation (ft)**	**Water Depth from Cap Surface (ft)**
1 (-20 to -30 ft)	Outside	Cap Only	NA	342.50	20.0
2A (-10 to -20 ft)	Outside	Cap Only	NA	352.50	10.0
2A (Nav Channel) (-10 to -20 ft)	Outside	Elevation-Based Dredging	343.25	347.50	16.0
2B (-7 to -10 ft)	Outside	Cap Only	NA	355.50	7.0
3B (-3 to -7 ft)	Inside	Elevation-Based Dredging	354.75	359.50	3.0
3B (-2 to -3 ft)	Inside	Elevation-Based Dredging	355.25	360.50	2.0
3B (-2 to -7 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA
5B (-0.5 to -2 ft)	Inside	Elevation-Based Dredging	356.75	362.00	0.5
5B (-0.5 to -2 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA
6B (+1 to -1 ft)	Inside	Elevation-Based Dredging	357.25	362.50	0.0
6B (+1 to -1 ft)	Inside	Dredging to Cleanup Criteria	NA	NA	NA

Remediation Area E Dredge Volume Estimate				
Total Area (ft^2)	Total Area (acre)	Dredge Volume (cy)	OD Volume (cy)	**Total Dredge Volume (cy)**
8,038,449	184.5	503,215	67,587	**570,802**

Total				
Total Area (ft^2)	Total Area (acre)	Dredge Volume (cy)	OD Volume (cy)	**Total Dredge Volume (cy)**
17,778,780	408.1	1,800,344	94,562	**1,894,906**

Notes and Assumptions:

DREDGING

Shoreline elevation: **362.5** ft

Dredging to cleanup criteria in nearshore areas due to upwelling velocities.

Nearshore dredging extends beyond the end of the IRM barrier wall to counter potential edge effects.

Removal depths for dredging to cleanup criteria areas nearshore varies from 3 to 9.9 feet.

Additional dredging in shallow water depths outside dredging to cleanup criteria areas to meet objectives for habitat and navigation.

Removals to ~ 16 feet water depth (343.25 feet NAVD 88) may be required in navigational channel to meet post remedy 14 ft water depth (elevation 347.5 ft) assuming a ~3 foot thick cap in this area.

Assumed the channel is 100 feet wide at the bottom with a 5H:1V slope back to the cap surface.

CAPPING

Analytical modeling indicates 50% safety buffer can be applied to the habitat layer, buffer is included in the habitat layer.

Mixing layer is 0.25 feet to be conservative.

EROSION PROTECTION

Surf zone is at 6.8 feet based on wind/wave analysis by Anchor QEA.

Erosion protection requirements are as follows (based on 50:1 slope):

- 0-6.8 feet = cobbles (0.25 ft stone 0.5 ft thick)
- 6.8-10 ft = coarse gravel
- 10-20 feet = fine gravel
- 20-30 feet = medium sand

Assumed potential for ice scour to 1.5 feet of water depth. No isolation caps in nearshore areas in less than 1.5 feet of water.

Coarser grained material may be required at the mouth of Harbor Brook based on tributary analysis.

Coarser grained material will be placed in the navigation channel at the mouth of Onondaga Creek to: 1) serve as an indicator layer for future navigation dredging; and 2) protect the side slopes inside of the surf zone.

HABITAT LAYER

The average habitat layer (value + over placement) in the dredging to cleanup criteria areas based on water depth will be as follows:

- 0-3 feet = 2 feet (plus over placement)
- 3-7 feet = 1.5 feet (plus over placement)
- >7 feet = 1 foot (plus over placement)

Assumed only habitat/erosion protection layer in the navigation channel.

Grainsize for water depths less than 7 ft are based on habitat modules and include habitat/erosion protection material based on a 100 yr wind/wave analysis by Anchor QEA.

OVER PLACEMENT

Assumed a 0.5 ft maximum over placement for isolation, habitat/erosion protection in waters deeper than 7 ft and additional habitat material.

Assumed a 1.0 ft maximum over placement for erosion protection/habitat material in waters shallower than 7 ft due to constructability issues with coarse grained material.

Assumed one layer of over placement for Module 1.

Assumed two layers of over placement for Module 2 (7-20 ft).

Assumed three layers of over placement for Modules 3, 5 and 6.

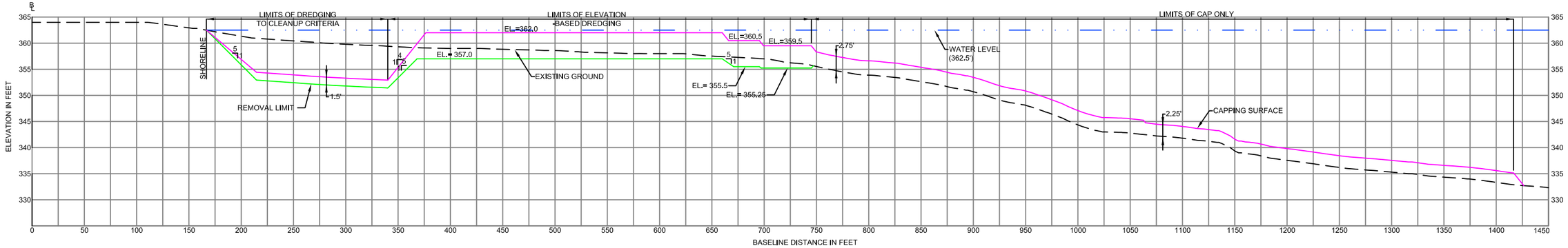
SETTLEMENT

Settlement estimates after 2 years (rounded to the nearest 0.25-feet) were applied to the final capping elevations in water depths greater than 3 feet as part of the habitiat plan (see Appendix E).

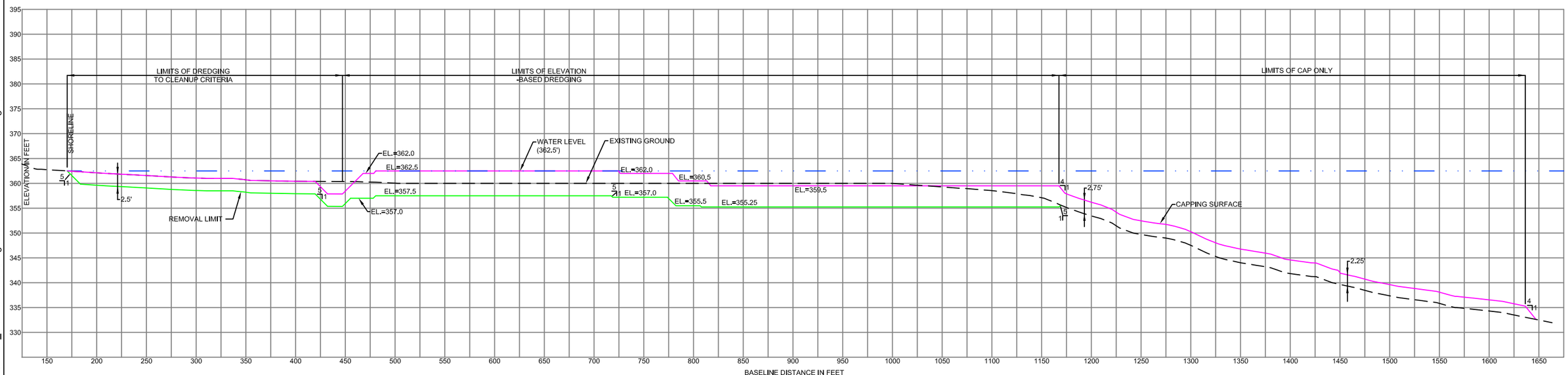
Average settlement after 2 years for each habitat module is presented.

No settlement was conservatively assumed for determining dredging elevations.

FIGURES



REMEDIATION AREA A
SECTION 2



REMEDIATION AREA A
SECTION 4

NOTES:

1. BATHYMETRIC SURVEY PERFORMED BY CR ENVIRONMENTAL, INC. FOR HONEYWELL IN 2005.
2. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. SURVEY FEET.
3. HORIZONTAL DATUM: NEW YORK STATE PLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83), U.S. SURVEY FEET.
4. BASEMAP PROVIDED TO ANCHOR QEA BY PARSONS IN SEPTEMBER 2008.
5. WATER LEVEL 362.5 FT NAVD 88 IS THE AVERAGE LAKE LEVEL DURING AQUATIC PLANT GROWING SEASON.
6. EXAMPLE CROSS SECTIONS ARE DEPICTED ON DRAWING D-2.
7. NO SETTLEMENT INCLUDED IN CAPPING ELEVATION - ACTUAL POST CAPPING ELEVATION WILL BE LOWER FOLLOWING SETTLEMENT.
8. CAP THICKNESS DEPICTED ABOVE ARE BASED ON MAXIMUM CAP THICKNESS.

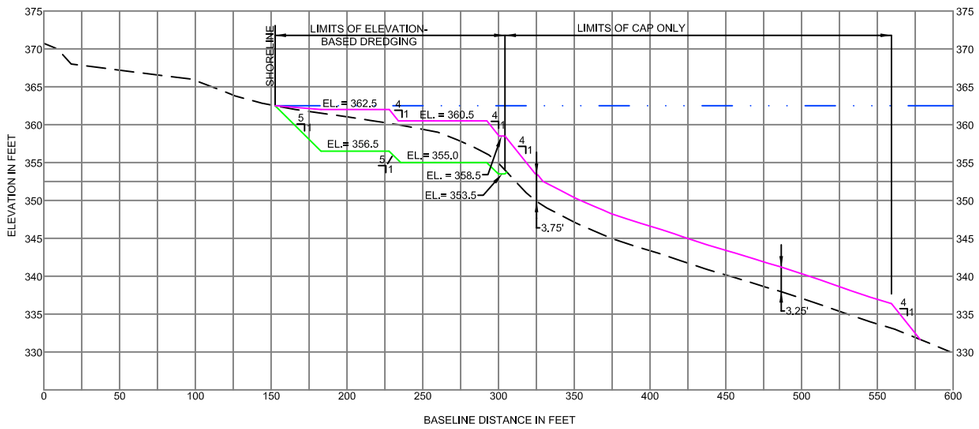
SCALE: 1" = 100' HORIZONTAL
0 100
Scale in Feet

SCALE 1" = 20' VERTICAL
0 20
Scale in Feet

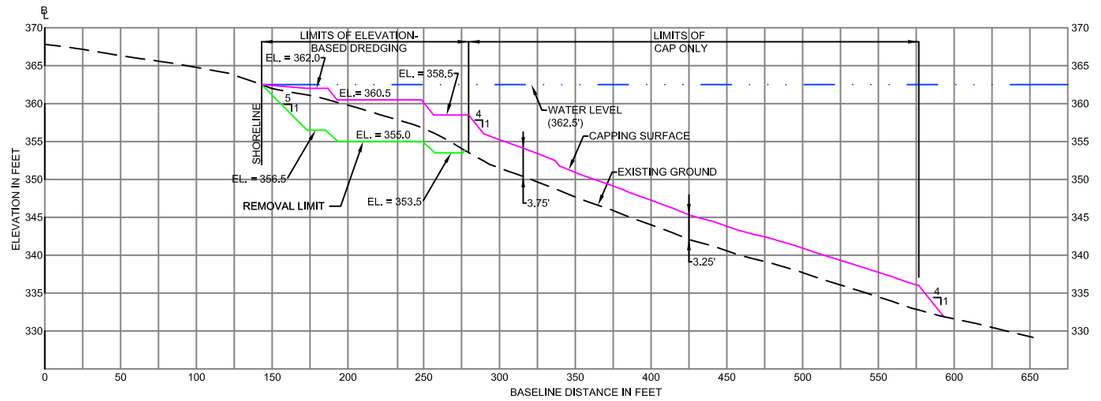
Nov 30, 2009 11:08am ghowell E:\010139-ONONDAGA_LAKE\01013902\Figures\01013902-RP-01-C01.dwg FIG-1

ANCHOR QEA

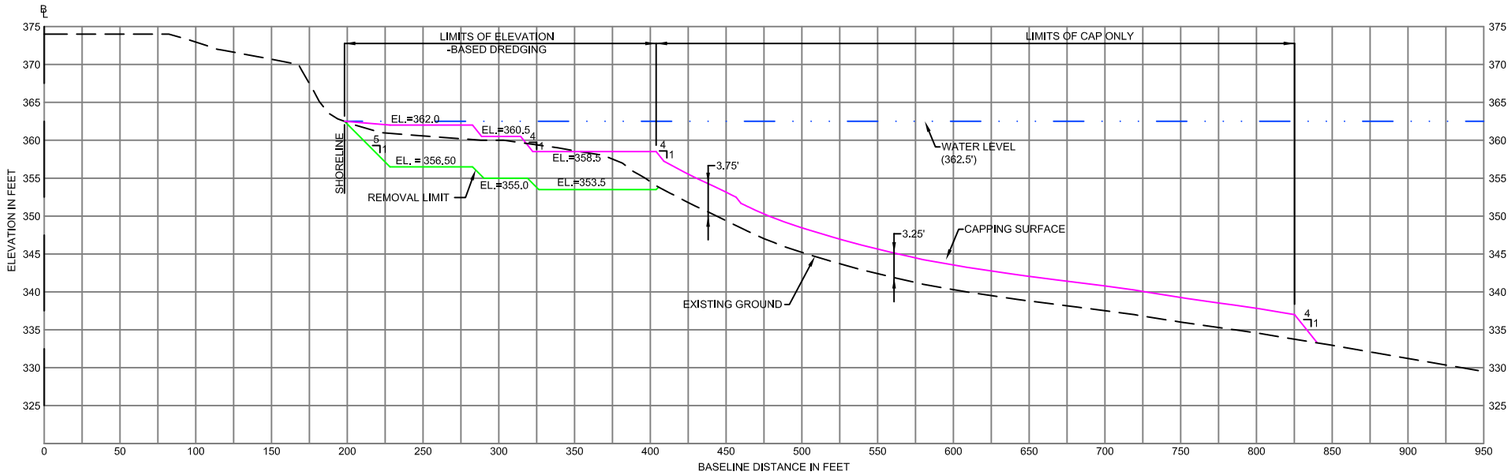
Figure 1
Onondaga Lake
Example Capping Cross Sections - Remediation Area A



REMEDIATION AREA B
SECTION 9



REMEDIATION AREA C
SECTION 11



REMEDIATION AREA C
SECTION 14

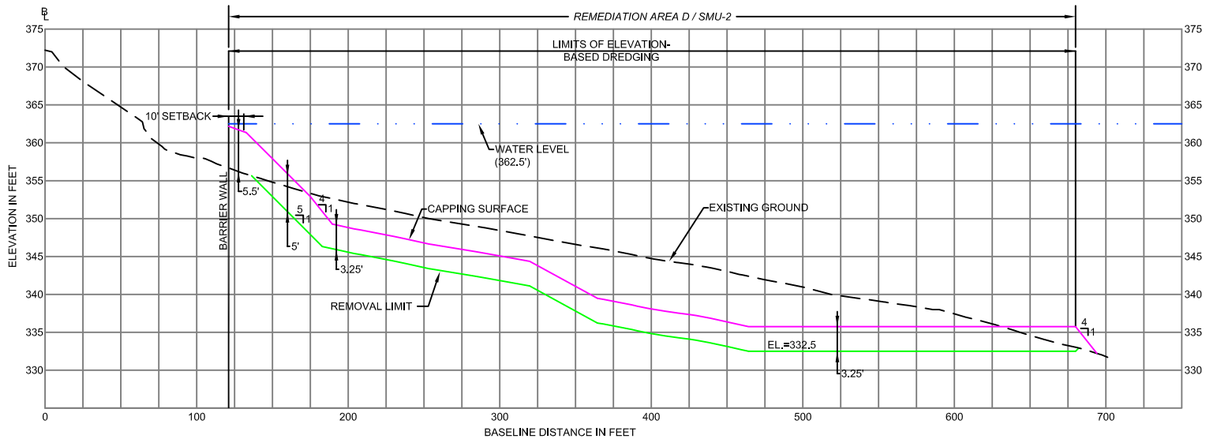
NOTES:
1. BATHYMETRIC SURVEY PERFORMED BY CR ENVIRONMENTAL, INC. FOR HONEYWELL IN 2005.
2. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. SURVEY FEET.
3. HORIZONTAL DATUM: NEW YORK STATE PLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83), U.S. SURVEY FEET.
4. BASEMAP PROVIDED TO ANCHOR QEA BY PARSONS IN SEPTEMBER 2008.
5. WATER LEVEL 362.5 FT NAVD 88 IS THE AVERAGE LAKE LEVEL DURING AQUATIC PLANT GROWING SEASON.
6. EXAMPLE CROSS SECTIONS ARE DEPICTED ON DRAWING D-2.
7. NO SETTLEMENT INCLUDED IN CAPPING ELEVATION - ACTUAL POST CAPPING ELEVATION WILL BE LOWER FOLLOWING SETTLEMENT.
8. CAP THICKNESS DEPICTED ABOVE ARE BASED ON MAXIMUM CAP THICKNESS.

SCALE: 1" = 100' HORIZONTAL
0 100
Scale in Feet

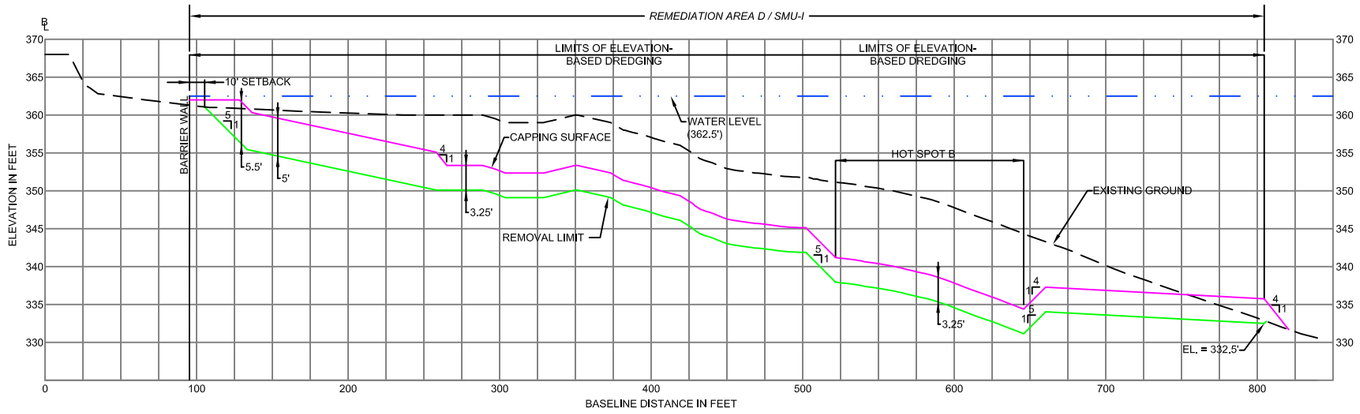
SCALE 1" = 20' VERTICAL
0 20
Scale in Feet

ANCHOR QEA

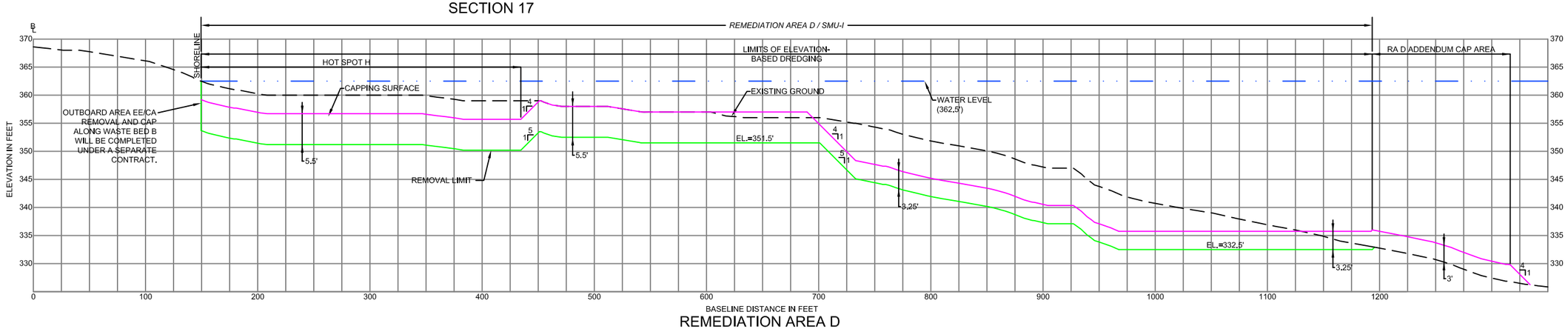
Figure 2
Onondaga Lake
Example Capping Cross Sections - Remediation Area-B and Remediation Area C



REMEDIATION AREA D
SECTION 16



REMEDIATION AREA D
SECTION 17



REMEDIATION AREA D
SECTION 19

NOTES:

1. BATHYMETRIC SURVEY PERFORMED BY CR ENVIRONMENTAL, INC. FOR HONEYWELL IN 2005.
2. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. SURVEY FEET.
3. HORIZONTAL DATUM: NEW YORK STATE PLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83), U.S. SURVEY FEET.
4. BASEMAP PROVIDED TO ANCHOR QEA BY PARSONS IN SEPTEMBER 2008.
5. WATER LEVEL 362.5 FT NAVD 88 IS THE AVERAGE LAKE LEVEL DURING AQUATIC PLANT GROWING SEASON.
6. EXAMPLE CROSS SECTIONS ARE DEPICTED ON DRAWING D-2.
7. NO SETTLEMENT INCLUDED IN CAPPING ELEVATION - ACTUAL POST CAPPING ELEVATION WILL BE LOWER FOLLOWING SETTLEMENT.
8. CAP THICKNESS DEPICTED ABOVE ARE BASED ON MAXIMUM CAP THICKNESS.

SCALE: 1" = 100' HORIZONTAL

0 100

Scale in Feet

SCALE 1" = 20' VERTICAL

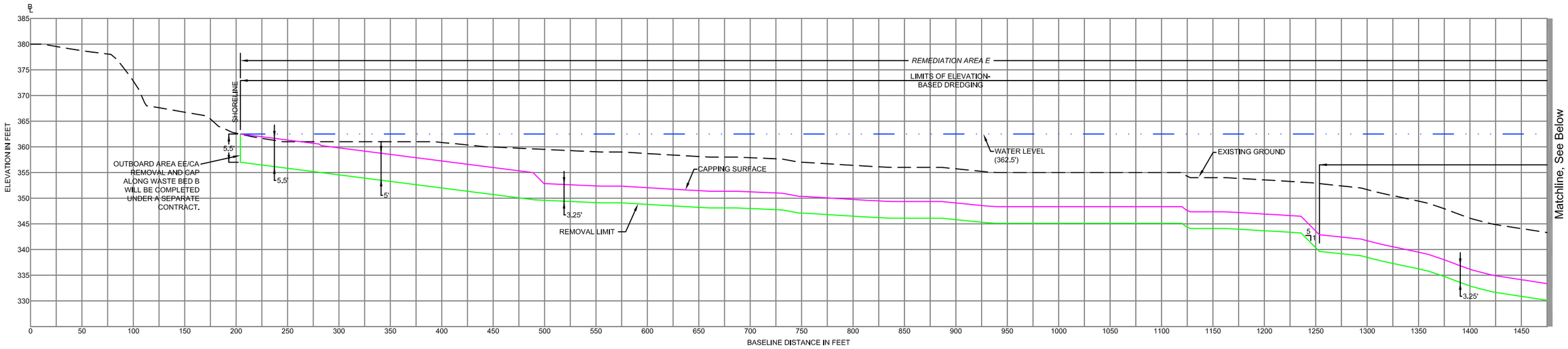
0 20

Scale in Feet

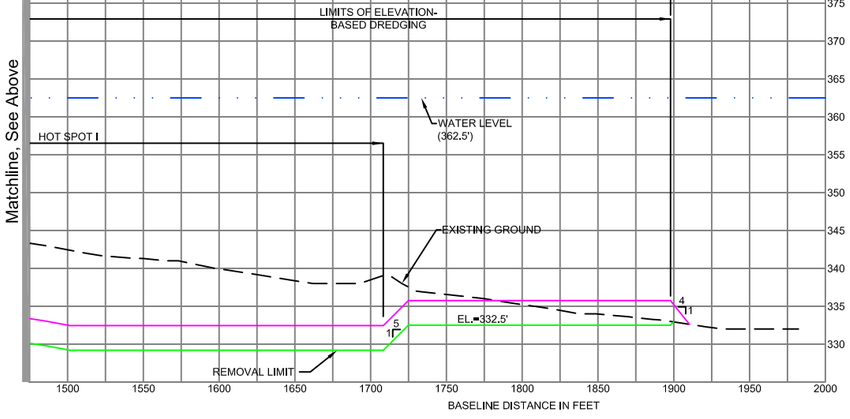
Nov 30, 2009 11:12am ghowell E:\010139-ONONDAGA_LAKE\01013902\Figures\01013902-RP-01-C01.dwg FIG-3

ANCHOR QEA

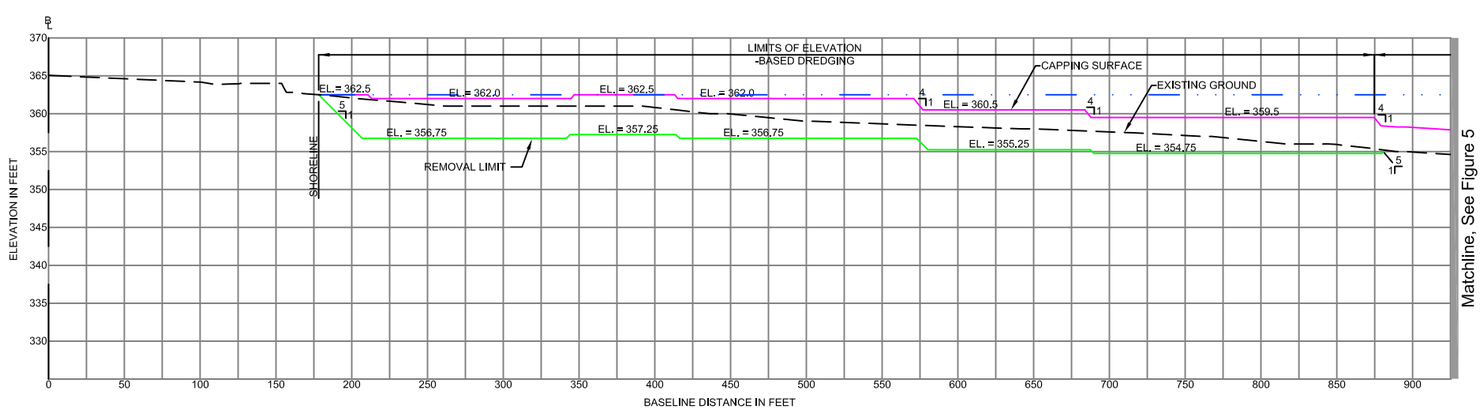
Figure 3
Onondaga Lake
Example Capping Cross Sections - Remediation Area D



REMEDIATION AREA D
SECTION 21



REMEDIATION AREA D
SECTION 21



REMEDIATION AREA E
SECTION 23

NOTES:
1. BATHYMETRIC SURVEY PERFORMED BY CR ENVIRONMENTAL, INC. FOR HONEYWELL IN 2005.
2. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. SURVEY FEET.
3. HORIZONTAL DATUM: NEW YORK STATE PLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83), U.S. SURVEY FEET.
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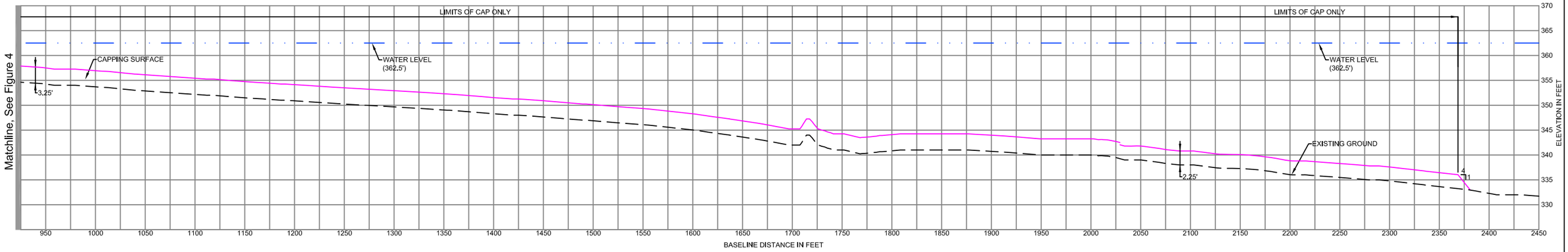
0 100
Scale in Feet

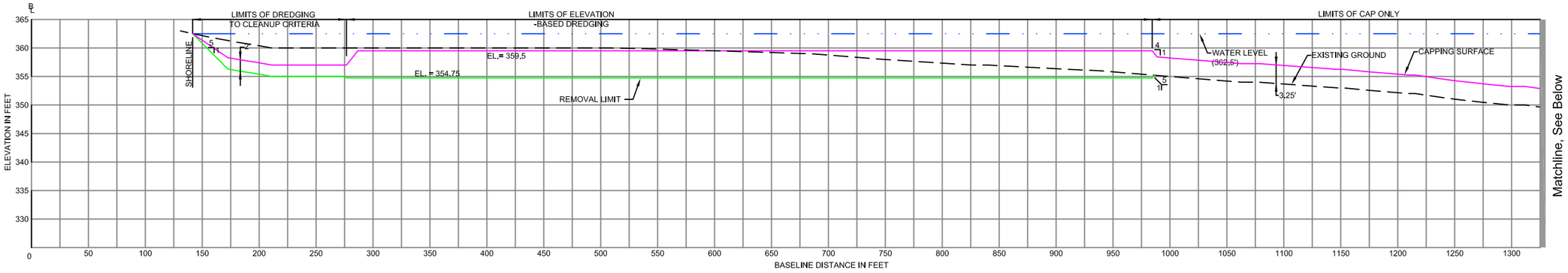
SCALE 1" = 20' VERTICAL
0 20
Scale in Feet

ANCHOR QEA

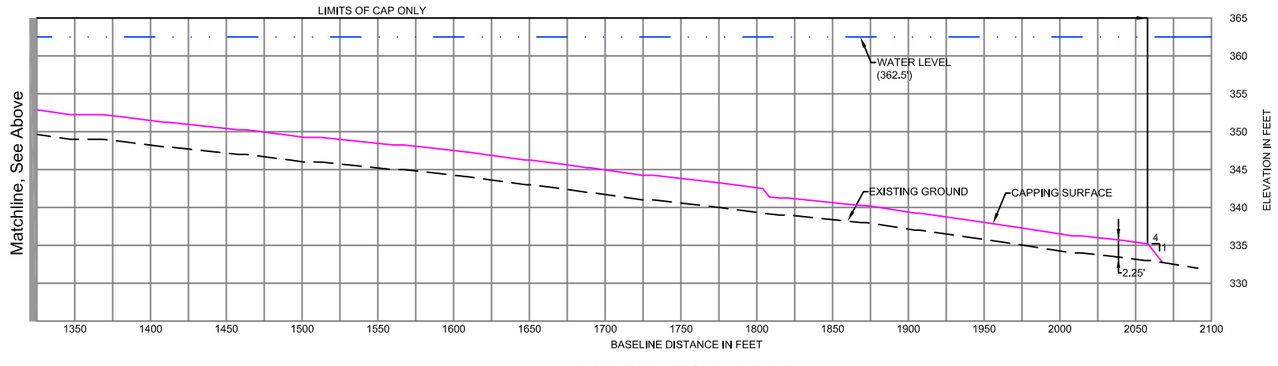
Figure 4
Onondaga Lake
Example Capping Cross Sections - Remediation Area-D and Remediation Area E



REMEDIATION AREA E
SECTION 23



REMEDIATION AREA E
SECTION 27



REMEDIATION AREA E
SECTION 27

NOTES:

1. BATHYMETRIC SURVEY PERFORMED BY CR ENVIRONMENTAL, INC. FOR HONEYWELL IN 2005.
2. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. SURVEY FEET.
3. HORIZONTAL DATUM: NEW YORK STATE PLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83), U.S. SURVEY FEET.
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SCALE: 1" = 100' HORIZONTAL

0 100

Scale in Feet

SCALE 1" = 20' VERTICAL

0 20

Scale in Feet

Nov 30, 2009 11:14am ghowell E:\010139-ONONDAGA_LAKE\010139O2\Figures\010139O2-RP-01-C01.dwg FIG-5

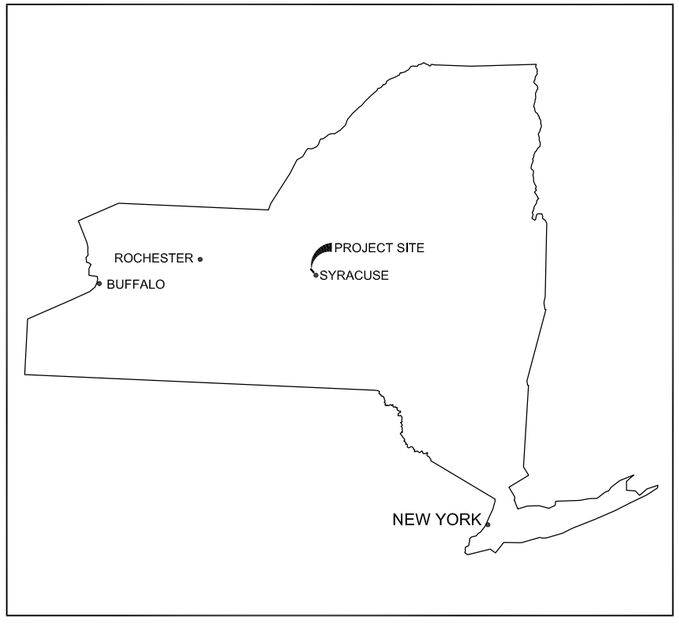
ANCHOR QEA

Figure 5
Onondaga Lake
Example Capping Cross Sections - Remediation Area E

DRAWINGS

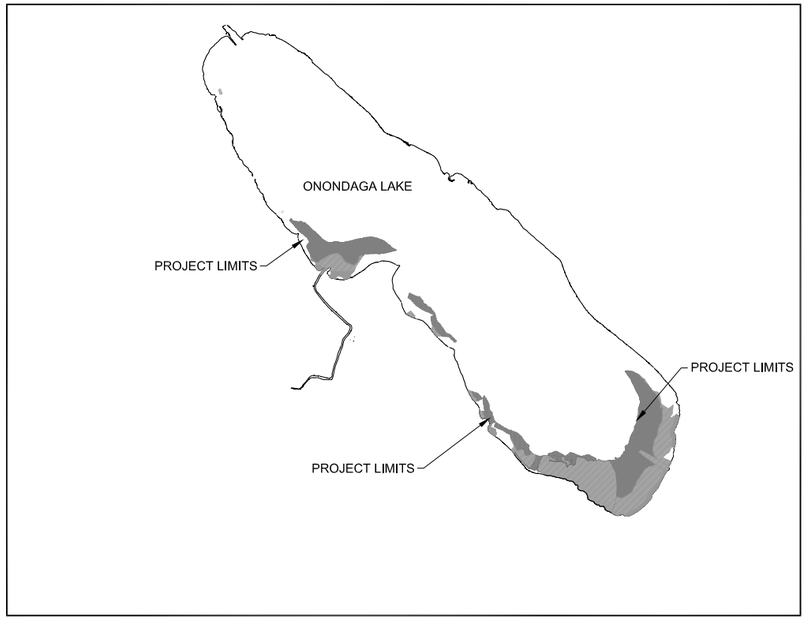
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL DREDGING PLAN

STATE MAP



NOT TO SCALE

VICINITY MAP



0 4000 8000
SCALE IN FEET

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ANCHOR QEA
290 Elwood Davis Road, Suite 230 | Liverpool, NY 13088 | (315) 453-9009

Honeywell

ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

COVER SHEET

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

DESIGNED BY: W, DINICOLA, K, POWELL
DRAWN BY: G, HOWELL
CHECKED BY: R, MOHAN
APPROVED BY: J, VERDUIN
SCALE: AS SHOWN
DATE: DECEMEBER 18, 2009

D

SHEET NO. 1 OF 29

DRAWING INDEX

SHEET SEQUENCE	SHEET NO.	SHEET TITLE
EXISTING CONDITIONS		
G		COVER SHEET - LEGEND (NOT INCLUDED)
G-IDX		SHEET INDEX - GENERAL NOTES (NOT INCLUDED)
G-1		KEY MAP (NOT INCLUDED)
G-2		REMEDIATION AREA A - EXISTING CONDITIONS (NOT INCLUDED)
G-3		REMEDIATION AREA A - EXISTING CONDITIONS (NOT INCLUDED)
G-4		REMEDIATION AREA B - EXISTING CONDITIONS (NOT INCLUDED)
G-5		REMEDIATION AREA C - EXISTING CONDITIONS (NOT INCLUDED)
G-6		REMEDIATION AREA D - EXISTING CONDITIONS (NOT INCLUDED)
G-7		REMEDIATION AREA D & E - EXISTING CONDITIONS (NOT INCLUDED)
G-8		REMEDIATION AREA E - EXISTING CONDITIONS (NOT INCLUDED)
G-9		REMEDIATION AREA E - EXISTING CONDITIONS (NOT INCLUDED)
G-10		REMEDIATION AREA E - EXISTING CONDITIONS (NOT INCLUDED)
PROPOSED DREDGING		
D	1	COVER SHEET
D-IDX	2	DREDGING PLAN SHEET INDEX - GENERAL NOTES - LEGEND
D-1	3	DREDGING PLAN KEY MAP
D-2	4	REMEDIATION AREA A - DREDGING PLAN
D-3	5	REMEDIATION AREA A - DREDGING PLAN
D-4	6	REMEDIATION AREA B - DREDGING PLAN
D-5	7	REMEDIATION AREA C - DREDGING PLAN
D-6	8	REMEDIATION AREA D - DREDGING PLAN
D-7	9	REMEDIATION AREA D & E - DREDGING PLAN
D-8	10	REMEDIATION AREA E - DREDGING PLAN
D-9	11	REMEDIATION AREA E - DREDGING PLAN
D-10	12	REMEDIATION AREA E - DREDGING PLAN
D-11	13	REMEDIATION AREA A - DREDGING CROSS SECTIONS 1, 2, & 3
D-12	14	REMEDIATION AREA A - DREDGING CROSS SECTIONS 4 & 5
D-13	15	REMEDIATION AREA A - DREDGING CROSS SECTIONS 6 & 7
D-14	16	REMEDIATION AREA B - DREDGING CROSS SECTIONS 8 & 9
D-15	17	REMEDIATION AREA C - DREDGING CROSS SECTIONS 10, 11, & 12
D-16	18	REMEDIATION AREA C - DREDGING CROSS SECTIONS 13 & 14
D-17	19	REMEDIATION AREA D - DREDGING CROSS SECTIONS 15 & 16
D-18	20	REMEDIATION AREA D - DREDGING CROSS SECTIONS 17 & 18
D-19	21	REMEDIATION AREA D - DREDGING CROSS SECTIONS 19 & 20
D-20	22	REMEDIATION AREA D - DREDGING CROSS SECTIONS 21 & 22
D-21	23	REMEDIATION AREA E - DREDGING CROSS SECTIONS 23
D-22	24	REMEDIATION AREA E - DREDGING CROSS SECTIONS 24 & 25
D-23	25	REMEDIATION AREA E - DREDGING CROSS SECTIONS 25, 26, & 27
D-24	26	REMEDIATION AREA E - DREDGING CROSS SECTIONS 27, 28, & 29
D-25	27	REMEDIATION AREA E - DREDGING CROSS SECTIONS 29, 30, 31, & 32
D-26	28	REMEDIATION AREA E - DREDGING CROSS SECTIONS 32, 33, & 34
D-27	29	REMEDIATION AREA E - DREDGING CROSS SECTIONS 35 & 36
PROPOSED CAPPING		
C		COVER SHEET
C-IDX		CAPPING PLAN SHEET INDEX - GENERAL NOTES - LEGEND (NOT INCLUDED)
C-1		CAPPING PLAN KEY MAP (NOT INCLUDED)
C-2		REMEDIATION AREA A - CAPPING PLAN (NOT INCLUDED)
C-3		REMEDIATION AREA A - CAPPING PLAN (NOT INCLUDED)
C-4		REMEDIATION AREA B - CAPPING PLAN (NOT INCLUDED)
C-5		REMEDIATION AREA C - CAPPING PLAN (NOT INCLUDED)
C-6		REMEDIATION AREA D - CAPPING PLAN (NOT INCLUDED)
C-7		REMEDIATION AREA D & E - CAPPING PLAN (NOT INCLUDED)
C-8		REMEDIATION AREA E - CAPPING PLAN (NOT INCLUDED)
C-9		REMEDIATION AREA E - CAPPING PLAN (NOT INCLUDED)
C-10		REMEDIATION AREA E - CAPPING PLAN (NOT INCLUDED)

LEGEND

- LIMITS OF DREDGING TO CLEANUP CRITERIA
- LIMITS OF ELEVATION-BASED DREDGING
- LIMITS OF CAP ONLY
- CROSS SECTION LOCATION AND DESIGNATION (2 / D-11)
  - CROSS SECTION IDENTIFICATION
  - SHEET WHERE CROSS SECTION IS LOCATED
- PROJECT BASELINE
- EXISTING RAILROAD
- EXISTING CONTOUR
- 360 PROPOSED CONTOUR
- EXISTING ASPHALT ROAD

GENERAL NOTES

1. BATHYMETRIC SURVEY PERFORMED BY CR ENVIRONMENTAL, INC. FOR HONEYWELL IN 2005.
2. GROUND SURFACE CONTOURS ARE 2 FEET. BATHYMETRY CONTOURS ARE 1 FOOT.
3. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. SURVEY FEET.
4. HORIZONTAL DATUM: NEW YORK STATE PLANE, CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83), U.S. SURVEY FEET.
5. BASEMAP PROVIDED TO ANCHOR QEA BY PARSONS IN SEPTEMBER 2008.
6. ALL LOCATIONS AND FEATURES ARE APPROXIMATE.
7. WATER LEVEL 362.5 FT NAVD 88 IS THE AVERAGE LAKE LEVEL DURING AQUATIC PLANT GROWING SEASON.

DRAFT DOCUMENT
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AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY

ANCHOR QEA
290 Elwood Davis Road, Suite 230 | Liverpool, NY 13088 | (315) 453-9009

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

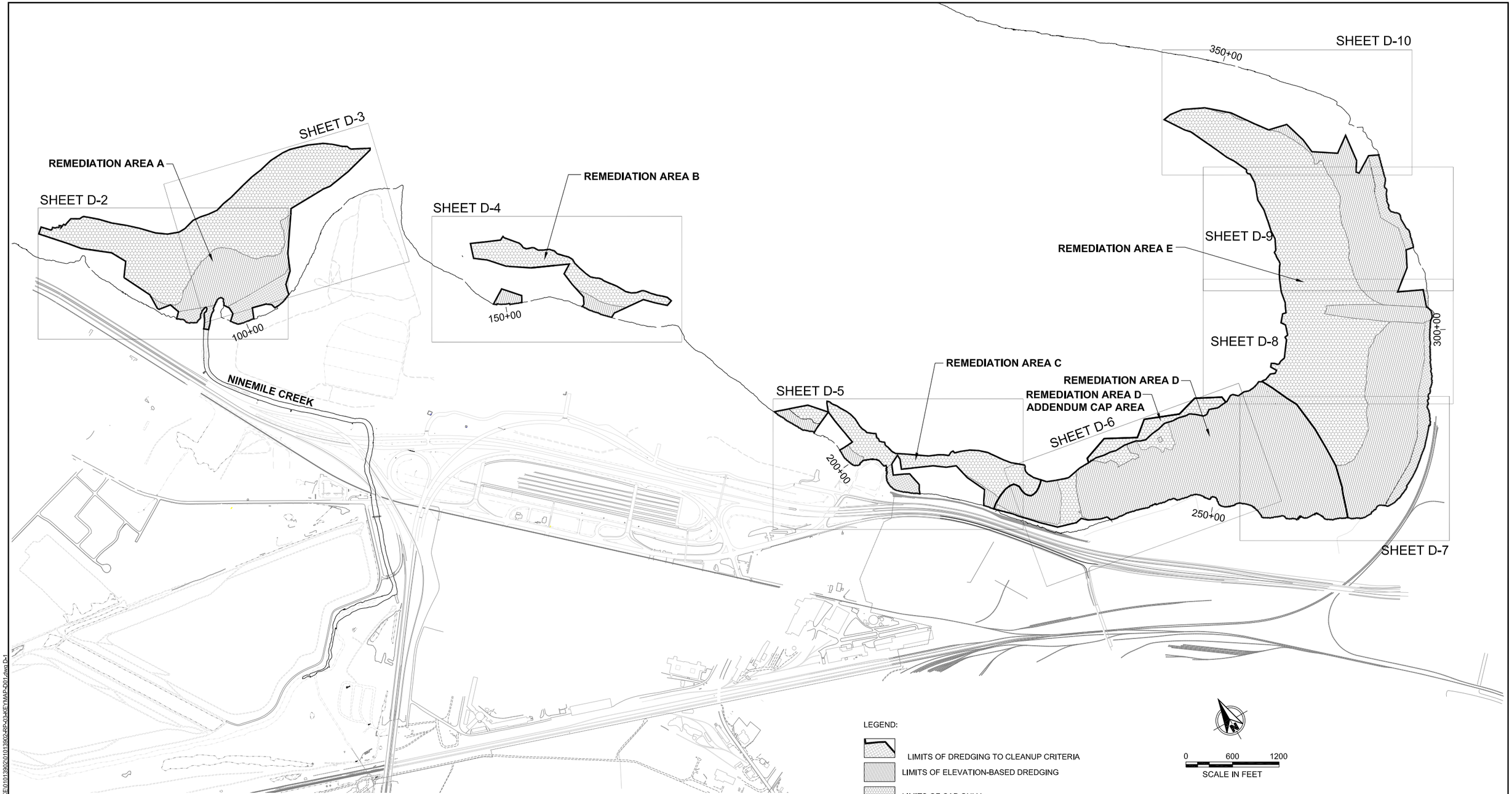
DESIGNED BY: K. POWELL / W. DINICOLA
DRAWN BY: G. HOWELL
CHECKED BY: R. MOHAN
APPROVED BY: J. VERDUIN
SCALE: AS NOTED
DATE: DECEMBER 18, 2009

ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

DREDGING PLAN SHEET INDEX - GENERAL NOTES - LEGEND

D-IDX

SHEET NO. 2 OF 29



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ANCHOR QEA
290 Elwood Davis Road, Suite 230 | Liverpool, NY 13088 | (315) 453-9009

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DRAWN BY: G. HOWELL
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APPROVED BY: J. VERDUIN
SCALE: AS NOTED
DATE: DECEMBER 18, 2009

ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

DREDGING PLAN KEY MAP

D-1

SHEET NO. 3 OF 29

Nov 25, 2009 9:51am ghowell E:\010139-ONONDAGA LAKE\010139\2010\13902-RPT\KEYMAP-D01.dwg D-1

BASELINE COORDINATES		
POINT #	NORTHING	EASTING
10	1127492.95	913367.24
11	1127468.12	913423.79
12	1127438.40	913478.17
13	1127390.50	913541.03
14	1127343.59	913607.66
15	1127327.54	913650.58
16	1127308.76	913738.81
17	1127057.25	913810.15
18	1127031.43	913820.75
19	1126969.22	913856.12
20	1126547.12	914098.07
21	1126383.54	914205.09
22	1126327.06	914237.91
23	1126161.61	914323.24
24	1125765.91	914691.22
25	1125660.21	914796.29
26	1125631.87	914872.98
27	1125549.04	915096.34
28	1125518.76	915189.19
29	1125450.26	915689.54
30	1125497.41	915925.41

LEGEND:

- LIMITS OF DREDGING TO CLEANUP CRITERIA
- LIMITS OF ELEVATION-BASED DREDGING
- LIMITS OF CAP ONLY
- 4 / D-12 — CROSS SECTION LOCATION AND DESIGNATION
- PROJECT BASELINE
- EXISTING CONTOUR
- 360 — PROPOSED CONTOUR
- SHORELINE (ELEV. 362.5)
- REMEDIATION AREA BOUNDARY

0 100 200
SCALE IN FEET

NOTE:
SEE SHEET D-IDX FOR GENERAL NOTES AND LEGEND.

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290 Elwood Davis Road, Suite 230 | Liverpool, NY 13088 | (315) 453-9009

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: K. POWELL / W. DINICOLA
DRAWN BY: G. HOWELL
CHECKED BY: R. MOHAN
APPROVED BY: J. VERDUIN
SCALE: AS NOTED
DATE: DECEMBER 18, 2009

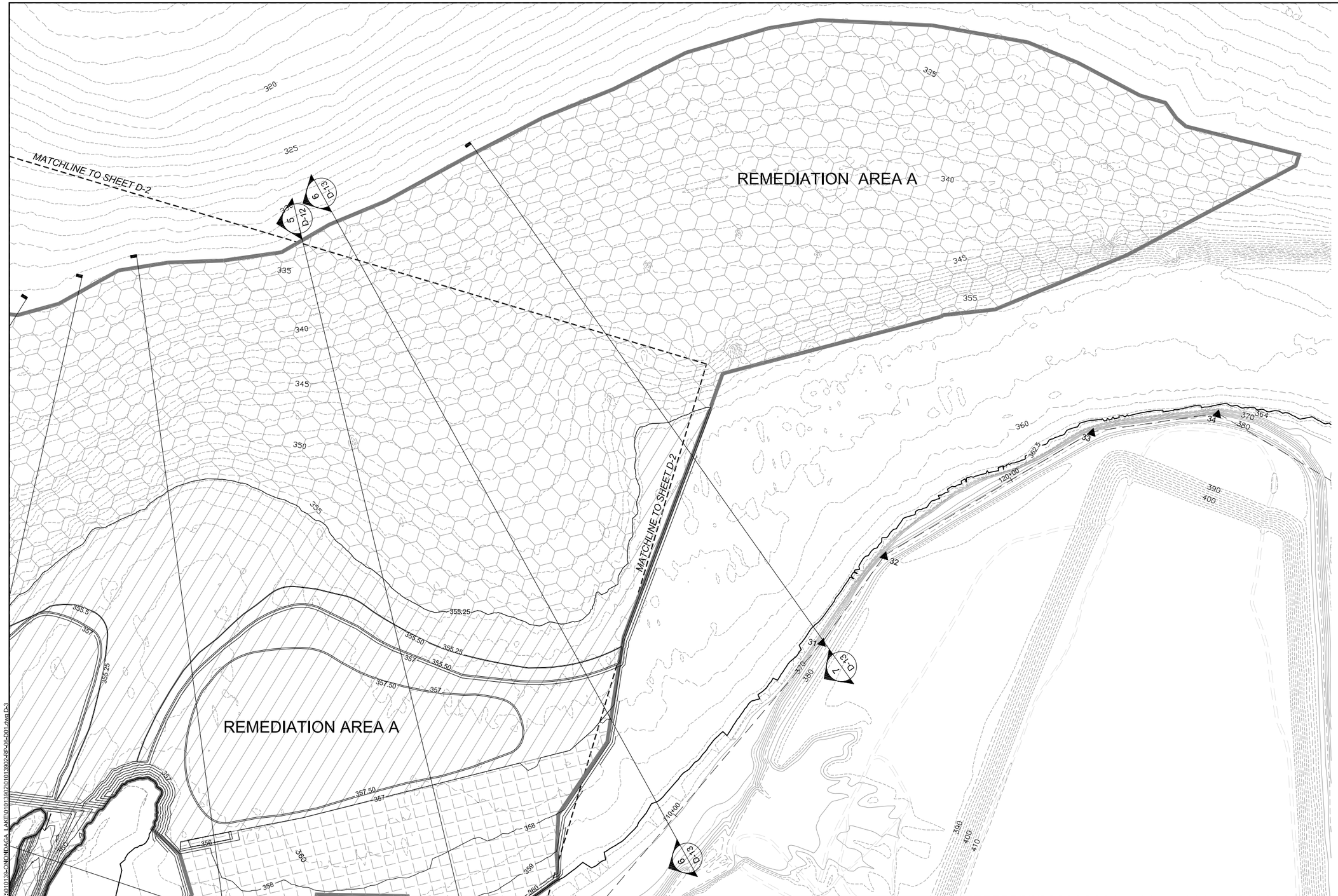
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA A DREDGING PLAN

D-2

SHEET NO. 4 OF 29

Nov 25, 2009 10:18am ghowell E:\010139-ONONDAGA_LAKE\010139D2\010139D2-RP-06-D01.dwg D-2



LEGEND:

- LIMITS OF DREDGING TO CLEANUP CRITERIA
- LIMITS OF ELEVATION-BASED DREDGING
- LIMITS OF CAP ONLY
- PROJECT BASELINE
- EXISTING CONTOUR
- 360 PROPOSED CONTOUR
- SHORELINE (ELEV. 362.5)
- REMEDIATION AREA BOUNDARY
- 7 / D-13 CROSS SECTION LOCATION AND DESIGNATION

BASELINE COORDINATES		
POINT #	NORTHING	EASTING
31	1125954.21	916546.71
32	1126099.20	916714.31
33	1126248.59	917192.76
34	1126225.44	917455.07
35	1126005.07	917682.29

0 100 200
SCALE IN FEET

NOTE:
SEE SHEET D-IDX FOR GENERAL NOTES AND LEGEND.

DRAFT DOCUMENT
DO NOT QUOTE OR CITE. THIS DOCUMENT HAS NOT BEEN REVIEWED OR APPROVED AND IS SUBJECT TO CHANGE IN WHOLE OR IN PART. PRELIMINARY DRAFT – NOT FOR CONSTRUCTION SETTLEMENT CONFIDENTIAL – NOT INTENDED FOR PUBLIC REVIEW.

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REVISIONS				
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APPROVED BY: J. VERDUIN
SCALE: AS NOTED
DATE: DECEMBER 18, 2009

ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA A DREDGING PLAN

D-3

SHEET NO. 5 OF 29

F:\010139-ONONDAGA LAKE\010139020\010139002-RP-06-D01.dwg D-3
Nov 25, 2009 10:21am ghowell

REMEDIATION AREA B

MATCHLINE SEE SHEET D-3

MATCHLINE SEE SHEET D-5

LEGEND:

- LIMITS OF DREDGING TO CLEANUP CRITERIA
- LIMITS OF ELEVATION-BASED DREDGING
- LIMITS OF CAP ONLY
- PROJECT BASELINE
- EXISTING CONTOUR
- 360 PROPOSED CONTOUR
- SHORELINE (ELEV. 362.5)
- REMEDIATION AREA BOUNDARY
- 9 / D-14 CROSS SECTION LOCATION AND DESIGNATION

BASELINE COORDINATES		
POINT #	NORTHING	EASTING
37	1124532.22	917891.34
38	1124367.03	917953.14
39	1124197.49	918040.46
40	1124049.00	918179.57
41	1123815.69	918798.22
42	1123558.00	919027.06
43	1123310.62	919232.89
44	1123172.82	919353.40
45	1122939.28	919630.35

0 100 200
SCALE IN FEET

NOTE:
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REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: K. POWELL / W. DINICOLA
DRAWN BY: G. HOWELL
CHECKED BY: R. MOHAN
APPROVED BY: J. VERDUIN
SCALE: AS NOTED
DATE: DECEMBER 18, 2009

ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA B DREDGING PLAN

D-4

SHEET NO. 6 OF 29

Nov 25, 2009 10:22am ghowell
E:\010139-ONONDAGA_LAKE\010139020\010139024\RP-05-D01.dwg D-4

REMEDIATION AREA C

REMEDIATION AREA C

REMEDIATION AREA C

THE REMEDIAL DESIGN WILL BE UPDATED IN THIS AREA AS PART OF THE INTERMEDIATE DESIGN BASED ON THE ONGOING ENGINEERING ANALYSIS.

MATCHLINE TO SHEET D-6

RA D

LEGEND:

- LIMITS OF DREDGING TO CLEANUP CRITERIA
- LIMITS OF ELEVATION-BASED DREDGING
- LIMITS OF CAP ONLY
- DESIGN REVISION AREA
- PROJECT BASELINE
- EXISTING CONTOUR
- 360 PROPOSED CONTOUR
- SHORELINE (ELEV. 362.5)
- REMEDIATION AREA BOUNDARY
- SMU BOUNDARY
- 12 / D-15 CROSS SECTION LOCATION AND DESIGNATION

0 100 200
SCALE IN FEET

BASELINE COORDINATES		
POINT #	NORTHING	EASTING
47	1120707.84	920743.92
48	1120402.55	920928.54
49	1120267.40	920985.49
50	1120068.88	921006.40
51	1119910.79	921141.78
52	1119569.61	921234.20
53	1119305.95	921570.01
54	1119120.28	921808.34
55	1118832.22	922080.90
56	1118480.68	922428.62

NOTE:
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1423 BROADWAY, SUITE 300
290 Elwood Davis Road, Suite 230 | Liverpool, NY 13088 | (315) 453-9009

REVISIONS				
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DESIGNED BY: K. POWELL / W. DINICOLA
DRAWN BY: G. HOWELL
CHECKED BY: R. MOHAN
APPROVED BY: J. VERDUIN
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DATE: DECEMBER 18, 2009

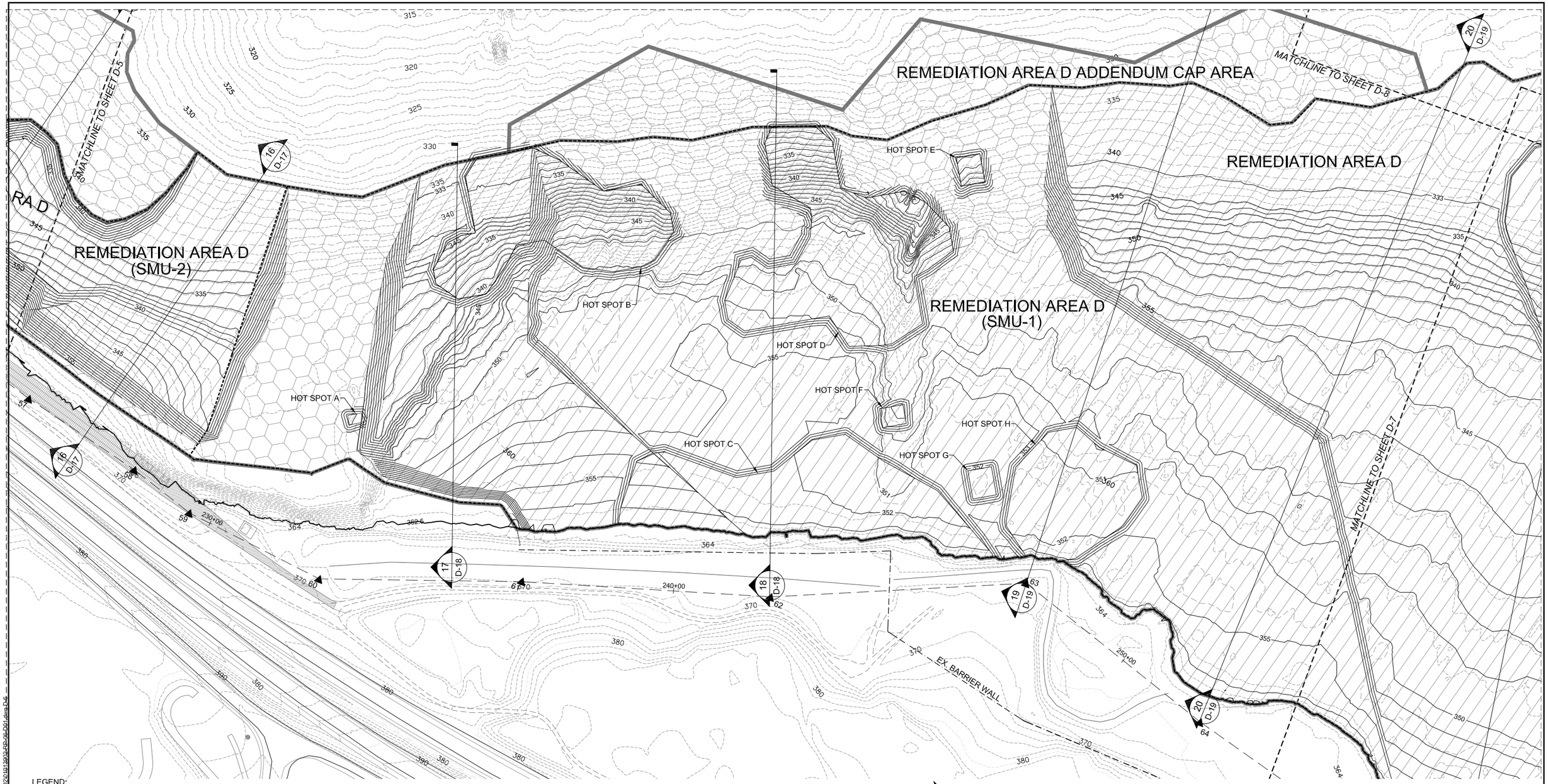
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA C DREDGING PLAN

D-5

SHEET NO. 7 OF 29

E:\010139-ONONDAGA_LAKE\010139\2010139D-RPA-D01.dwg D-5
Nov 25, 2009 10:25am dhowell



LEGEND:

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- LIMITS OF ELEVATION-BASED DREDGING
- LIMITS OF CAP ONLY
- PROJECT BASELINE
- EXISTING CONTOUR
- 360 PROPOSED CONTOUR
- SHORELINE (ELEV. 362.5)
- REMEDIATION AREA BOUNDARY
- SMU BOUNDARY
- 17 D-18 CROSS SECTION LOCATION AND DESIGNATION

▲ BASELINE COORDINATES

POINT #	NORTHING	EASTING
57	1118244.53	922652.79
58	1118059.21	922844.66
59	1117950.41	922942.52
60	1117767.00	923186.16
61	1117687.29	923604.10
62	1117565.62	924111.49
63	1117500.71	924643.80
64	1117151.06	924952.28

0 100 200
SCALE IN FEET

NOTE:
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ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA D DREDGING PLAN

D-6

SHEET NO. 8 OF 29

RA-D
(SMU-7)

MATCHLINE TO SHEET D-8

MATCHLINE TO SHEET D-6

HOT SPOT I

RA-D
(SMU-7)

REMEDIATION AREA E

HOT SPOT I

REMEDIATION AREA D
(SMU-1)

HOT SPOT J

MATCHLINE TO SHEET D-6

EX. BARRIER WALL

EX. BARRIER WALL

26
D-23

25
D-22

24
D-22

23
D-21

22
D-20

21
D-20

LEGEND:

- LIMITS OF DREDGING TO CLEANUP CRITERIA
- LIMITS OF ELEVATION-BASED DREDGING
- LIMITS OF CAP ONLY
- PROJECT BASELINE
- EXISTING CONTOUR
- 360 PROPOSED CONTOUR
- SHORELINE (ELEV. 362.5)
- REMEDIATION AREA BOUNDARY
- BARRIER WALL
- SMU BOUNDARY
- 7 / D-13 CROSS SECTION LOCATION AND DESIGNATION

BASELINE COORDINATES		
POINT #	NORTHING	EASTING
65	1116762.43	925336.95
66	1116635.52	925448.67
67	1116345.82	925904.96
68	1116117.81	926327.44
69	1116112.62	926889.51
70	1116216.95	927304.39
71	1116494.16	927600.25
72	1116827.31	927868.29

0 100 200
SCALE IN FEET

NOTE:
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ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREAS D AND E DREDGING PLAN

D-7

MATCHLINE TO SHEET D-9

MATCHLINE TO SHEET D-9

REMEDIATION AREA E

REMEDIATION AREA D
(SMU-1)

RA-D
(SMU-7)

MATCHLINE TO SHEET D-6

MATCHLINE TO SHEET D-7

320 325 330 335 340 350 355 360 365

343.25 345 350

354.75 354.76

300+00 280+00

29 D-24
30 D-25
36 D-27
28 D-24
74
75
27 D-23
73
26 D-23
24 D-22
25 D-22
23 D-21
22 D-20
21 D-20
20 D-19

334

LEGEND:

- LIMITS OF DREDGING TO CLEANUP CRITERIA
- LIMITS OF ELEVATION-BASED DREDGING
- LIMITS OF CAP ONLY
- PROJECT BASELINE
- EXISTING CONTOUR
- 360 PROPOSED CONTOUR
- SHORELINE (ELEV. 362.5)
- REMEDIATION AREA BOUNDARY
- SMU BOUNDARY
- 17 D-18 CROSS SECTION LOCATION AND DESIGNATION

BASELINE COORDINATES		
POINT #	NORTHING	EASTING
73	1117307.31	928159.49
74	1117742.79	928403.32

0 100 200
SCALE IN FEET

NOTE:
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ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA E DREDGING PLAN

D-8

SHEET NO. 10 OF 29

May 25, 2009 10:40am dhowell E:\010139-ONONDAGA_LAKE\010139\2010139\02-RP-05\D01.dwg D-8

MATCHLINE TO SHEET D-10

MATCHLINE TO SHEET D-10

REMEDIATION AREA E

THE REMOVAL ALONG THE SYW-12 AREA WILL BE COMPLETED UNDER A SEPARATE CONTRACT.

34 D-26

33 D-26

32 D-25

31 D-25

30 D-25

76

75

MATCHLINE TO SHEET D-8

MATCHLINE TO SHEET D-8

LEGEND:

- LIMITS OF DREDGING TO CLEANUP CRITERIA
- LIMITS OF ELEVATION-BASED DREDGING
- LIMITS OF CAP ONLY
- PROJECT BASELINE
- EXISTING CONTOUR
- 360 PROPOSED CONTOUR
- SHORELINE (ELEV. 362.5)
- REMEDIATION AREA BOUNDARY
- 17 / D-18 CROSS SECTION LOCATION AND DESIGNATION

BASELINE COORDINATES		
POINT #	NORTHING	EASTING
75	1118312.71	928695.16
76	1119093.48	928833.28

0 100 200
SCALE IN FEET

NOTE:
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DATE: DECEMBER 18, 2009

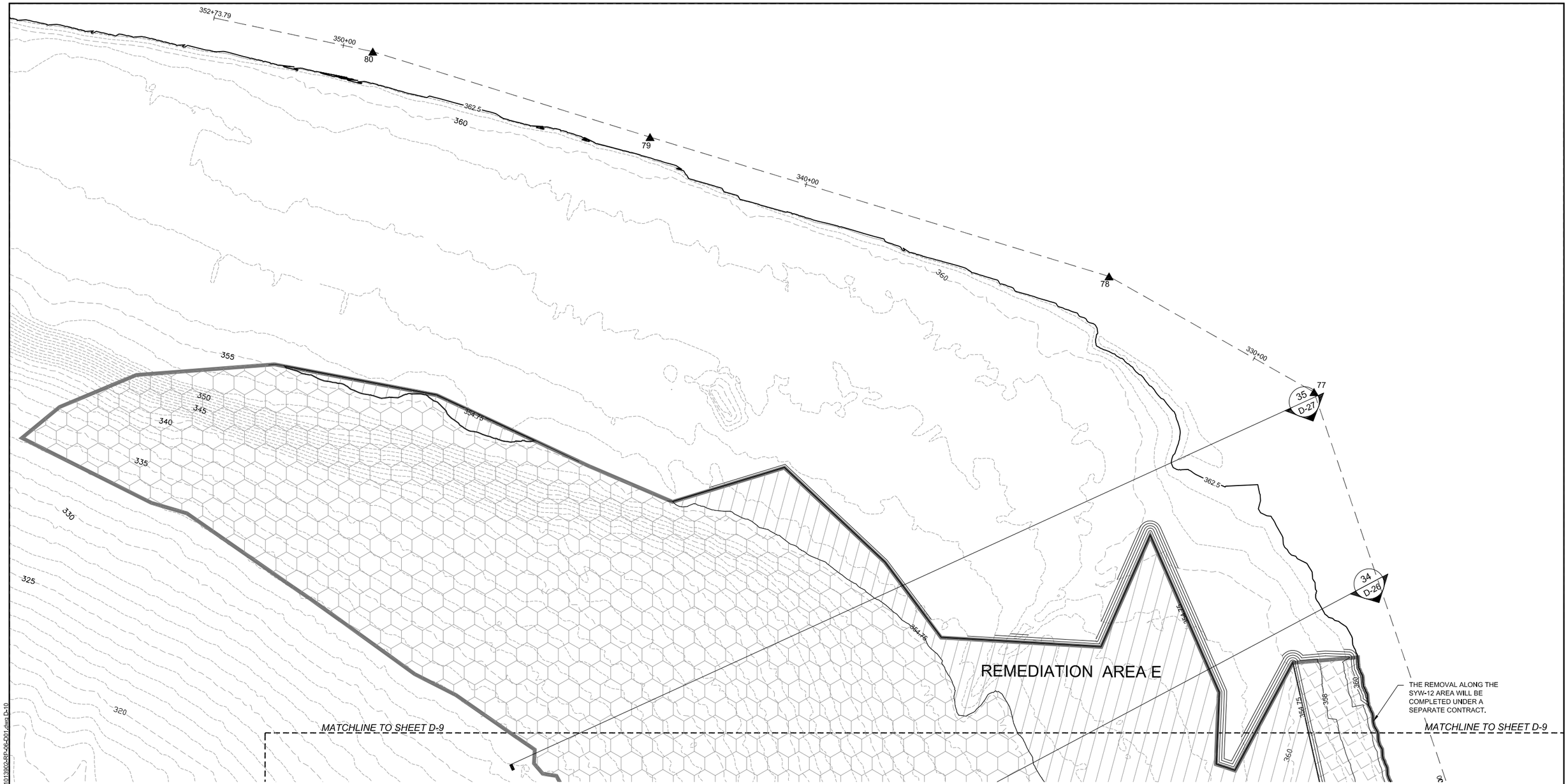
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA E DREDGING PLAN

D-9

SHEET NO. 11 OF 29

May 25, 2009 10:43am dhowell E:\010139-ONONDAGA_LAKE\010139\2010139\02-RP-05\D01.dwg D-9



LEGEND:

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- LIMITS OF ELEVATION-BASED DREDGING
- LIMITS OF CAP ONLY
- PROJECT BASELINE
- EXISTING CONTOUR
- 360 PROPOSED CONTOUR
- SHORELINE (ELEV. 362.5)
- REMEDIATION AREA BOUNDARY
- 17 / D-18 CROSS SECTION LOCATION AND DESIGNATION

▲ BASELINE COORDINATES

POINT #	NORTHING	EASTING
77	1120660.79	929144.85
78	1121080.15	928897.09
79	1121804.72	928218.36
80	1122244.70	927809.83

0 100 200
SCALE IN FEET

NOTE:
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APPROVED BY: J. VERDUIN
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DATE: DECEMBER 18, 2009

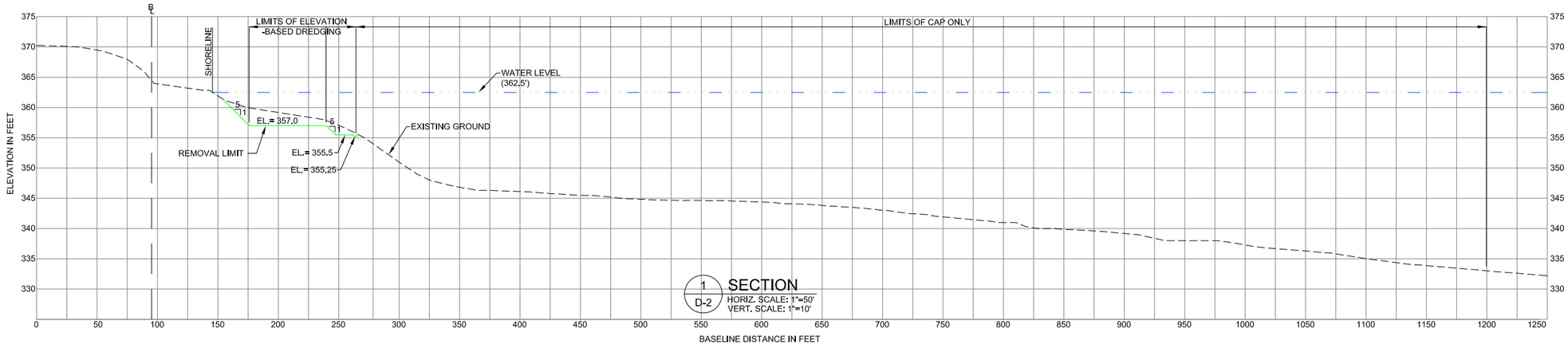
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

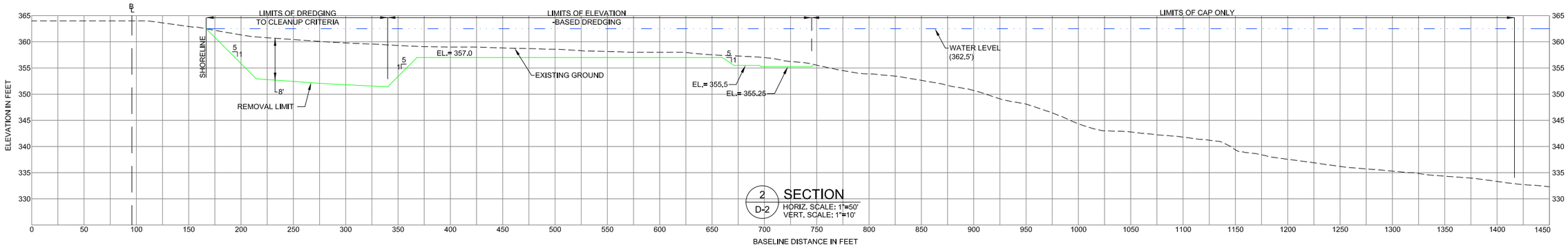
REMEDIATION AREA E DREDGING PLAN

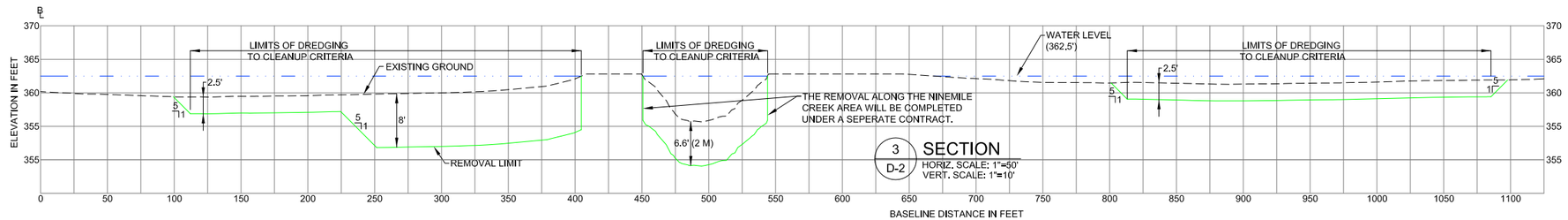
D-10

SHEET NO. 12 OF 29

Nov 25, 2009 10:48am ghowell E:\010139-ONONDAGA LAKE\010139\2010\139202\010139202-RP-06-D01.dwg D-10







NOTES:
1. SEE SHEET D-IDX FOR GENERAL NOTES AND LEGEND.
2. WATER LEVEL 362.5 FT NAVD 88 IS THE AVERAGE LAKE LEVEL DURING AQUATIC PLANT GROWING SEASON.

DRAFT DOCUMENT

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SCALE: AS NOTED
DATE: DECEMBER 18, 2009

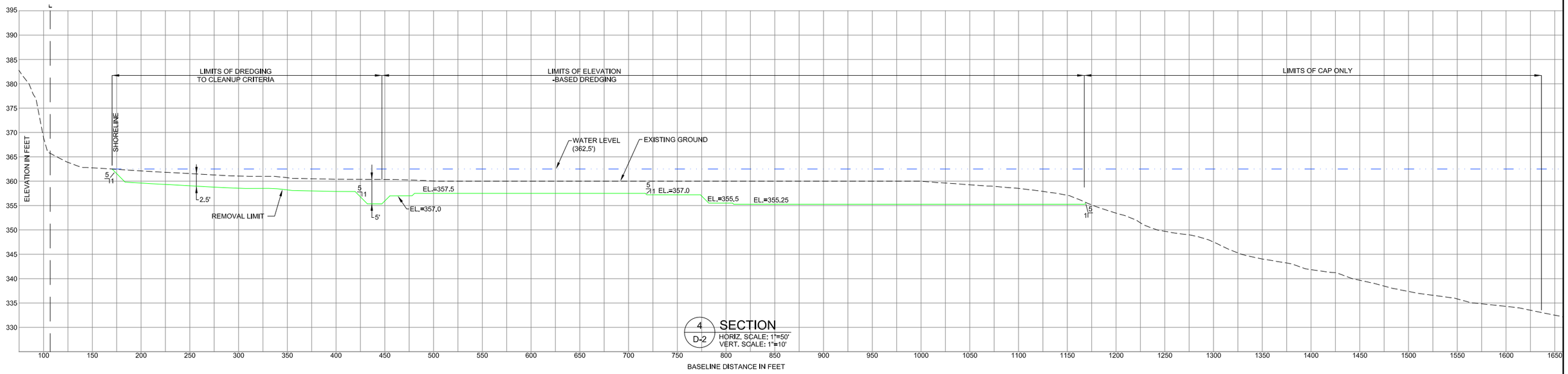
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA A
DREDGING CROSS SECTIONS 1, 2, & 3

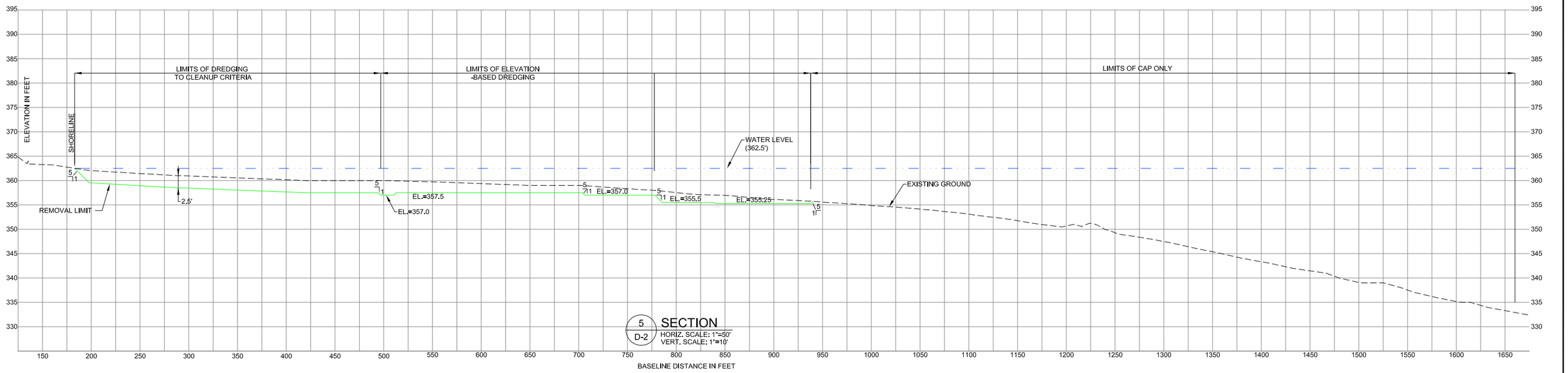
D-11

SHEET NO. 13 OF 29

Nov 24, 2009 12:10pm ahowell E:\010139-ONONDAGA_LAKE\010139020\010139024\RP-07-D02.dwg D-11



4 / D-2 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



5 / D-2 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

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ANCHOR QEA
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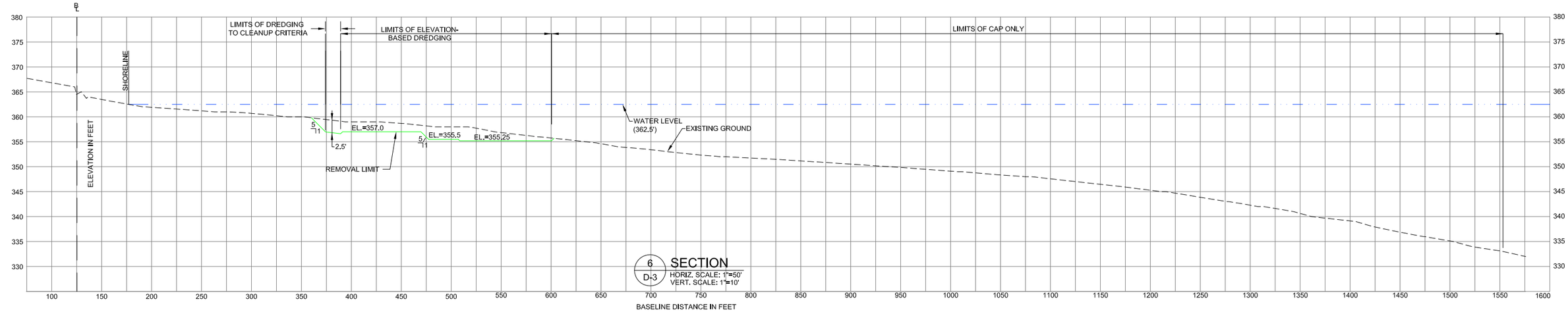
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA A
DREDGING CROSS SECTIONS 4 & 5

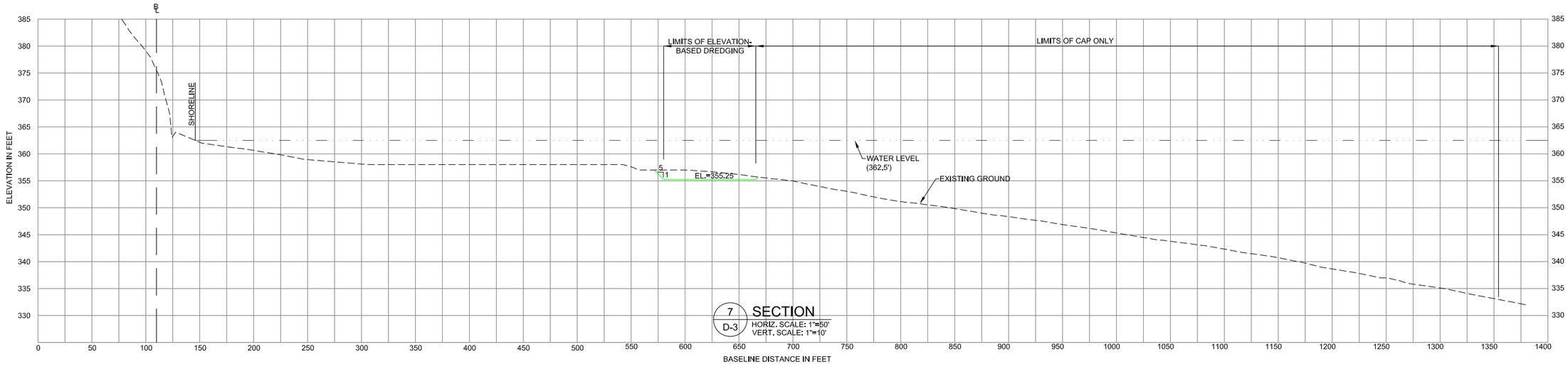
D-12

SHEET NO. 14 OF 29

May 24, 2009 10:29am dhowell E:\010139-ONONDAGA_LAKE\010139020101390\2-RP-07-D02.dwg D-12



6 D-3 **SECTION**
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



7 D-3 **SECTION**
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

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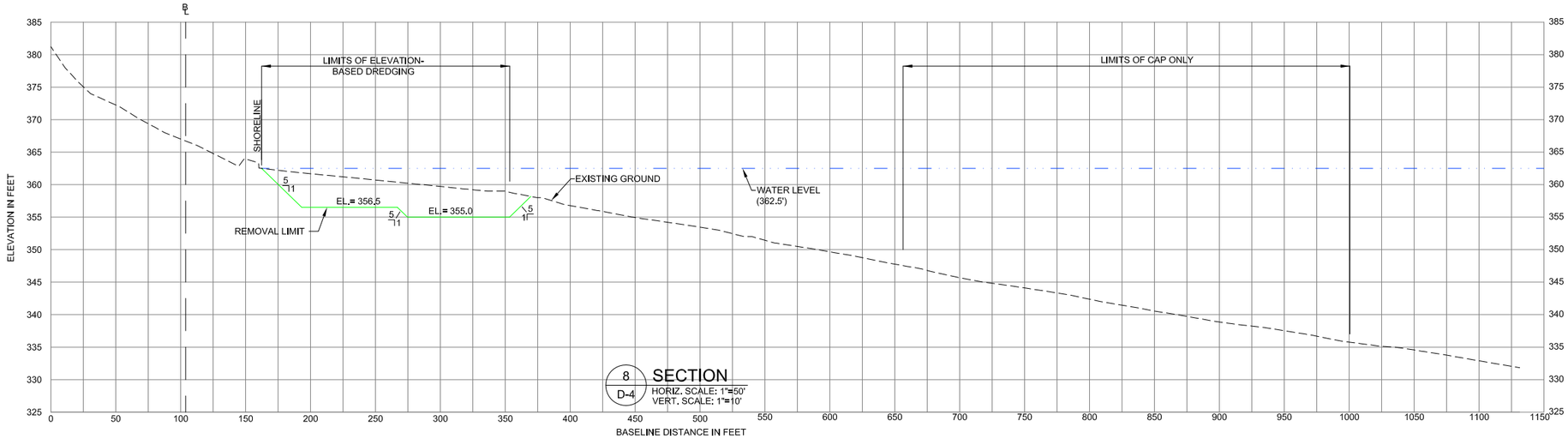
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

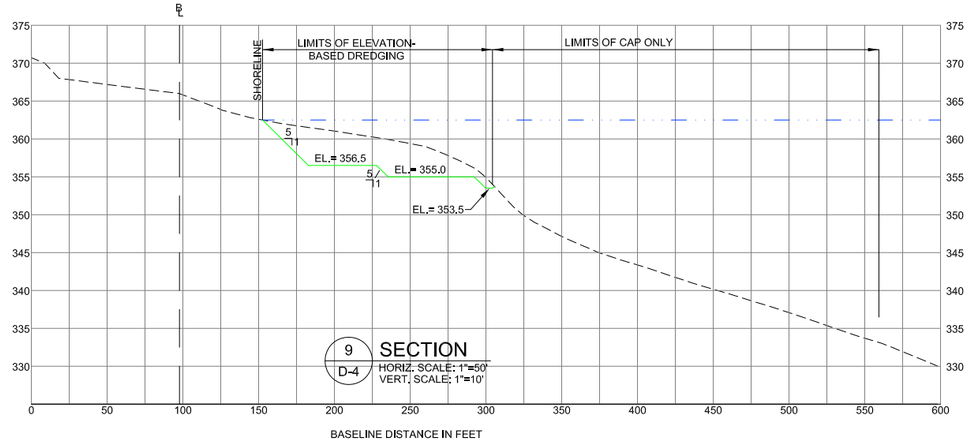
REMEDIATION AREA A DREDGING CROSS SECTIONS 6 & 7

D-13

SHEET NO. 15 OF 29



8 / D-4 **SECTION**
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



9 / D-4 **SECTION**
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

NOTES:
1. SEE SHEET D-IDX FOR GENERAL NOTES AND LEGEND.
2. WATER LEVEL 362.5 FT NAVD 88 IS THE AVERAGE LAKE LEVEL DURING AQUATIC PLANT GROWING SEASON.

DRAFT DOCUMENT

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ANCHOR QEA
290 Elwood Davis Road, Suite 230 | Liverpool, NY 13088 | (315) 453-9009

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

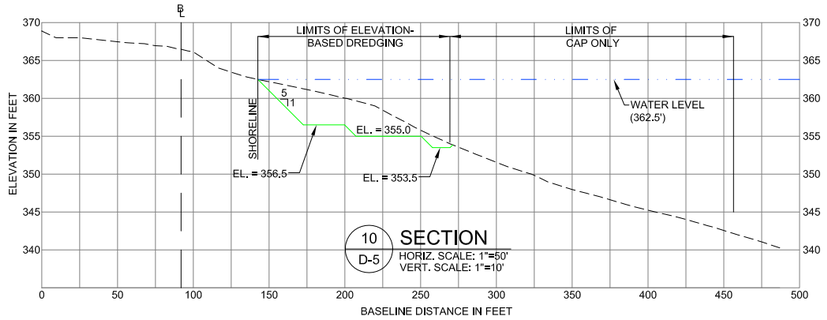
DESIGNED BY: K. POWELL / W. DINICOLA
DRAWN BY: G. HOWELL
CHECKED BY: R. MOHAN
APPROVED BY: J. VERDUIN
SCALE: AS NOTED
DATE: DECEMBER 18, 2009

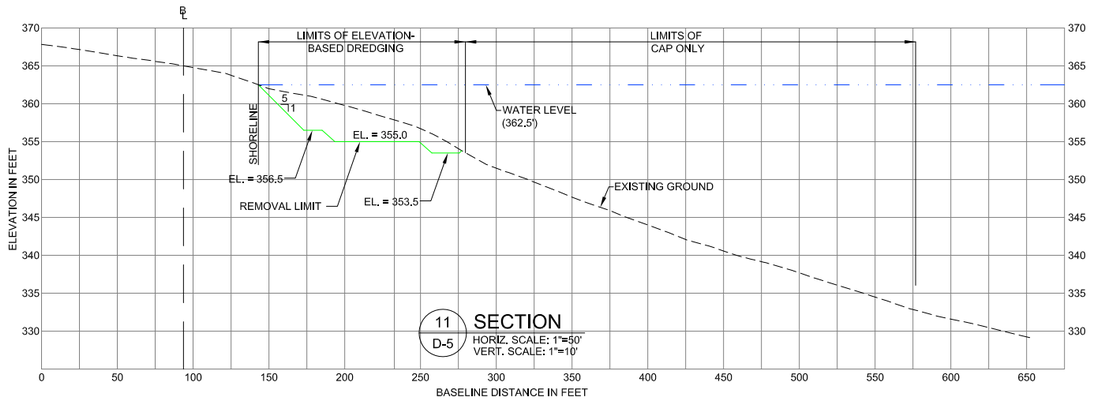
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

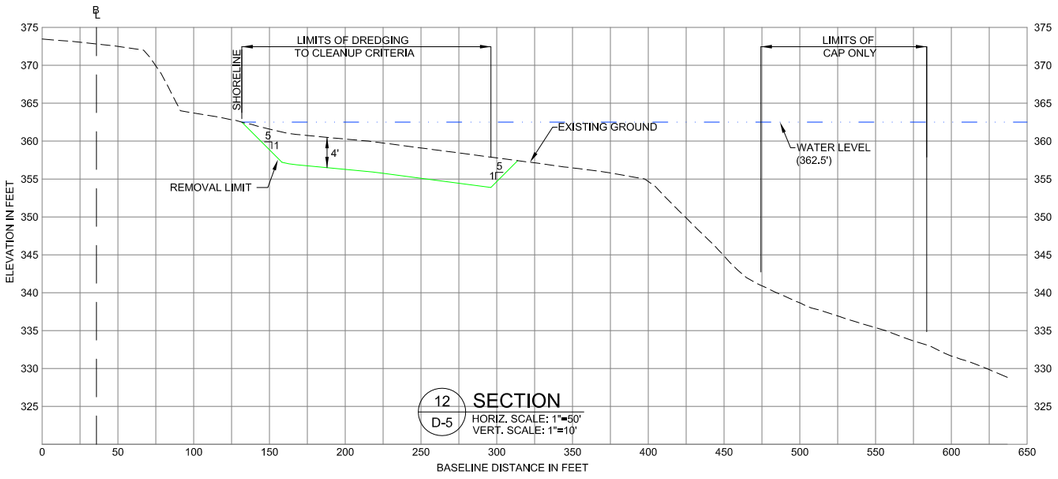
REMEDIATION AREA B DREDGING CROSS SECTIONS 8 & 9

D-14

SHEET NO. 16 OF 29







NOTES:
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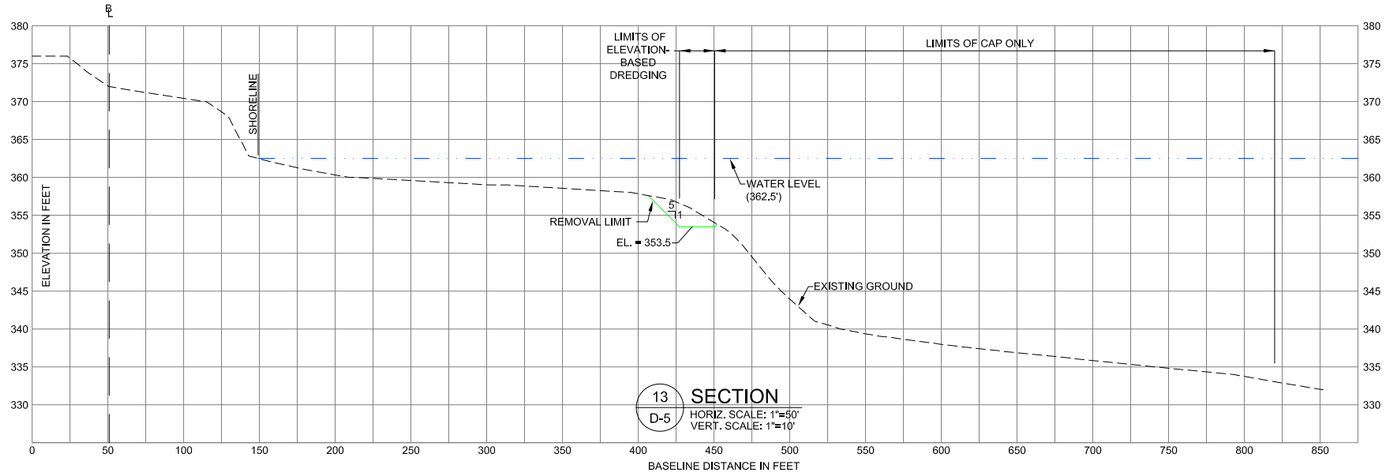
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

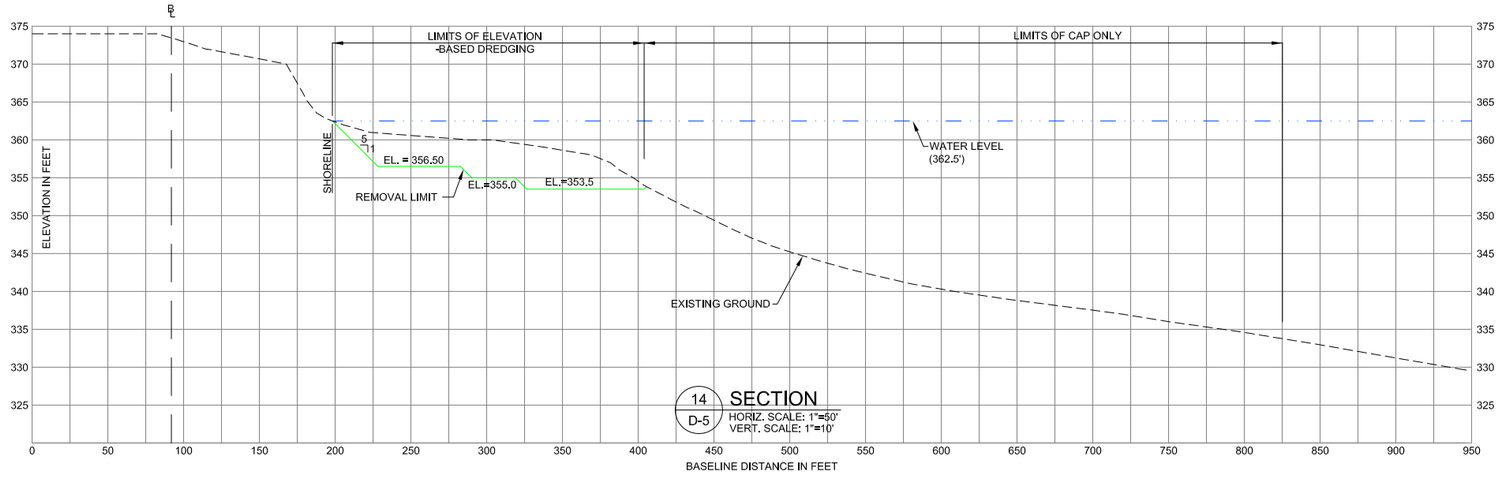
REMEDIATION AREA C
DREDGING CROSS SECTIONS 10, 11, & 12

D-15

SHEET NO. 17 OF 29



13 SECTION
D-5 HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



14 SECTION
D-5 HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

NOTES:
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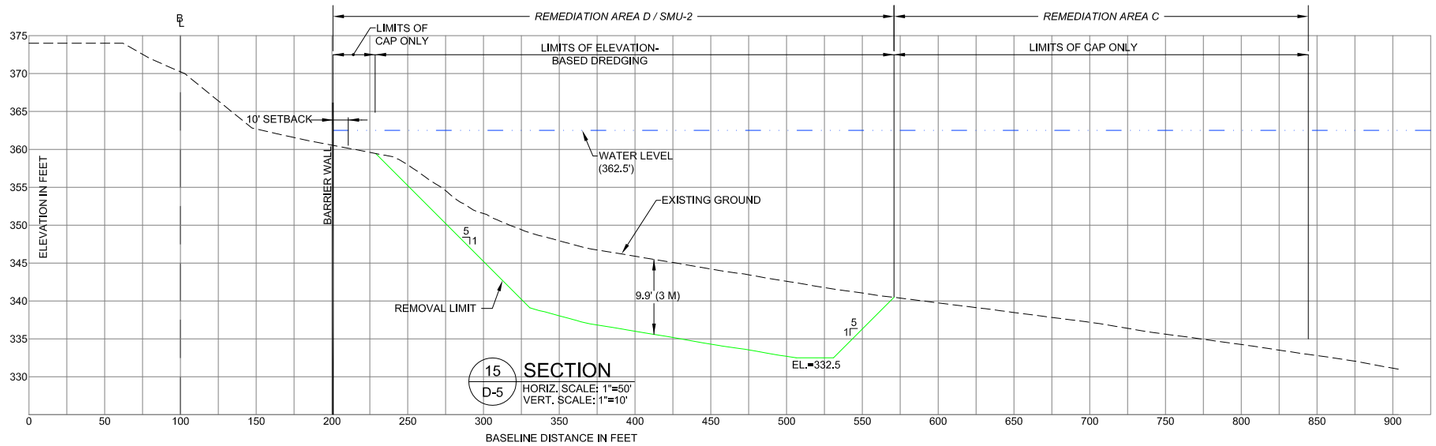
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA C
DREDGING CROSS SECTIONS 13 & 14

D-16

SHEET NO. 18 OF 29



15 / D-5 SECTION
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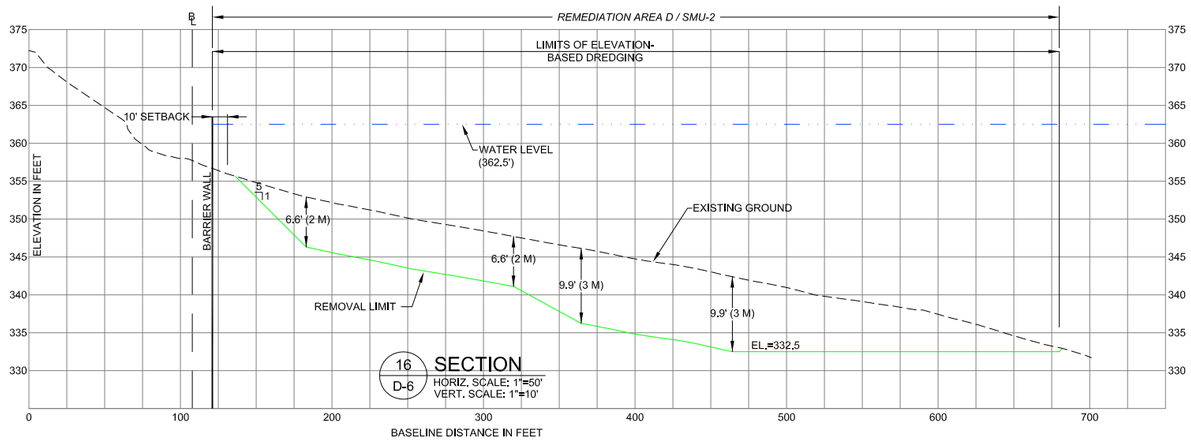
VERT. SCALE: 1"=10'



16 / D-6 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

NOTES:
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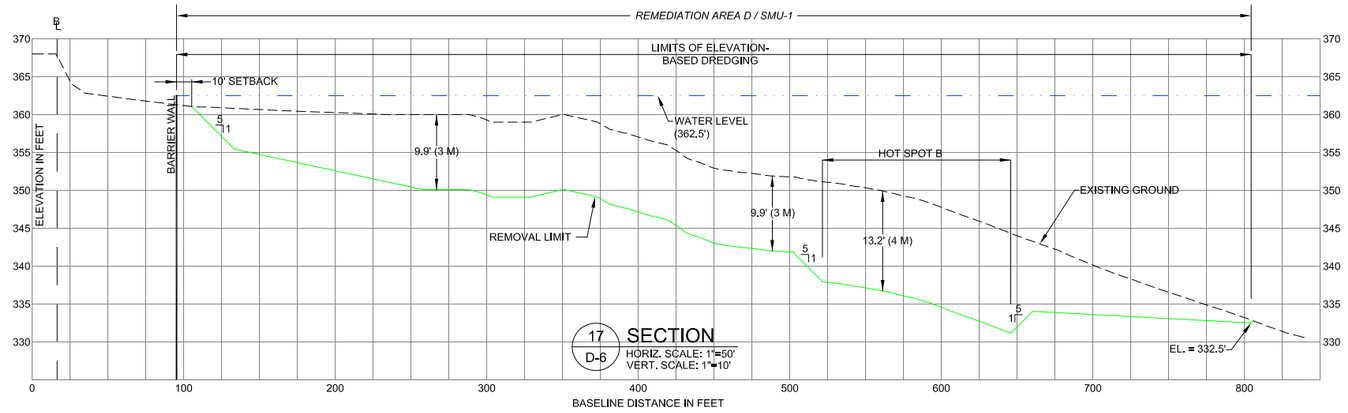
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA D
DREDGING CROSS SECTIONS 15 & 16

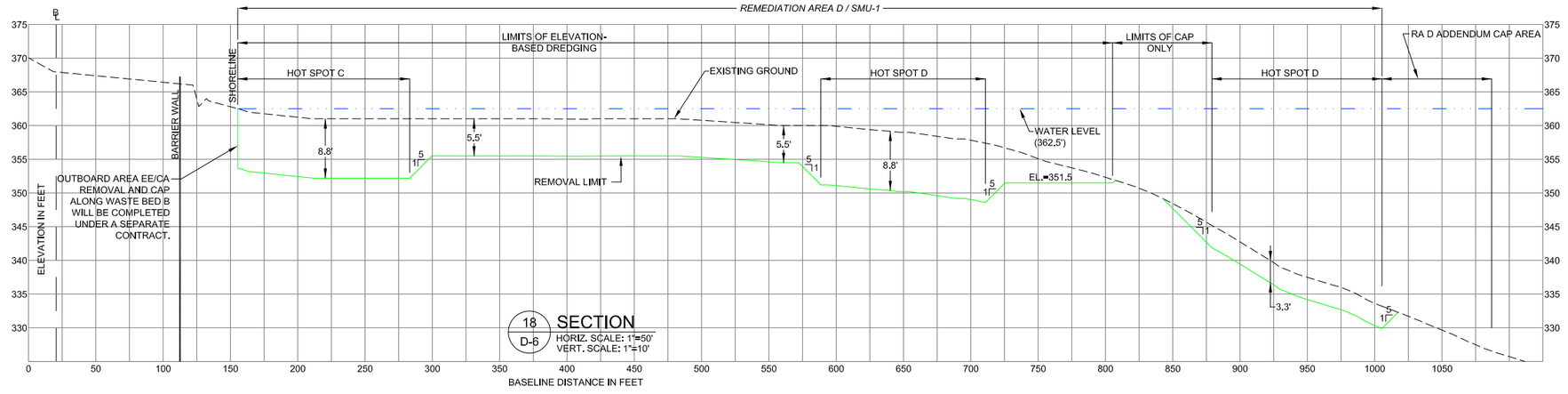
D-17

SHEET NO. 19 OF 29

Nov 24, 2009 10:48am ohowell E:\010139-ONONDAGA_LAKE\010139020\010139024-RP-07-D02.dwg D-17



17 D-6 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



18 D-6 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

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APPROVED BY: J. VERDUIN
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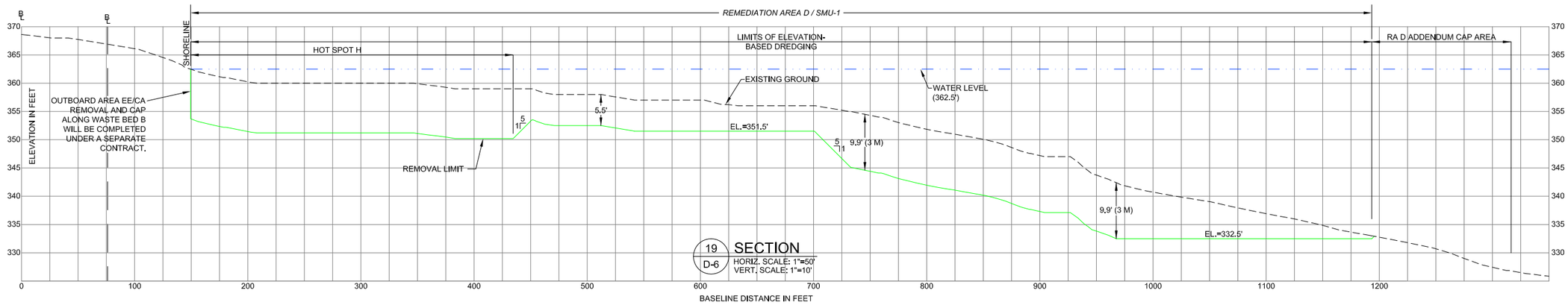
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

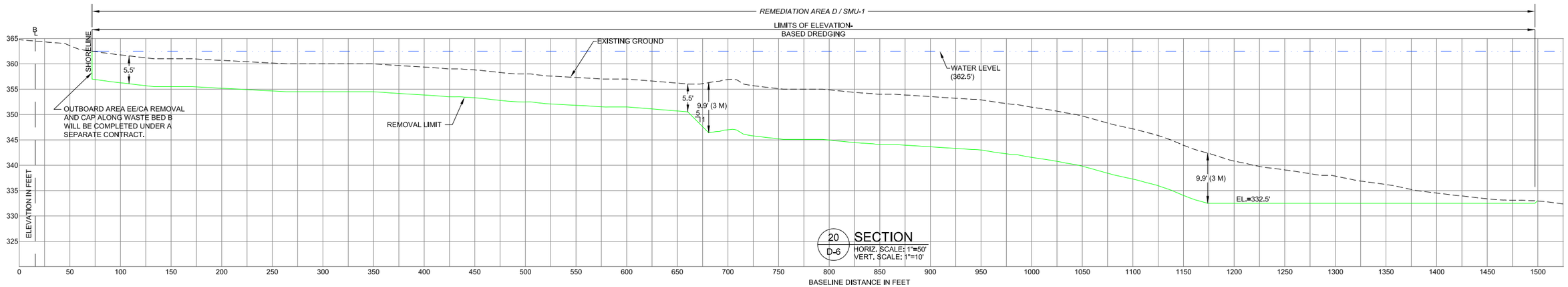
REMEDIATION AREA D
DREDGING CROSS SECTIONS 17 & 18

D-18

SHEET NO. 20 OF 29



19 / D-6 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



20 / D-6 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

NOTES:
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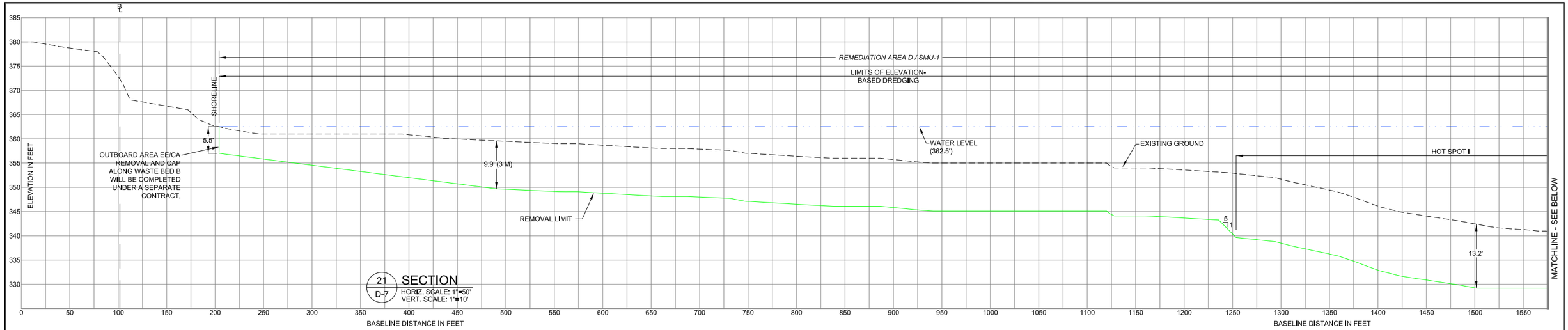
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

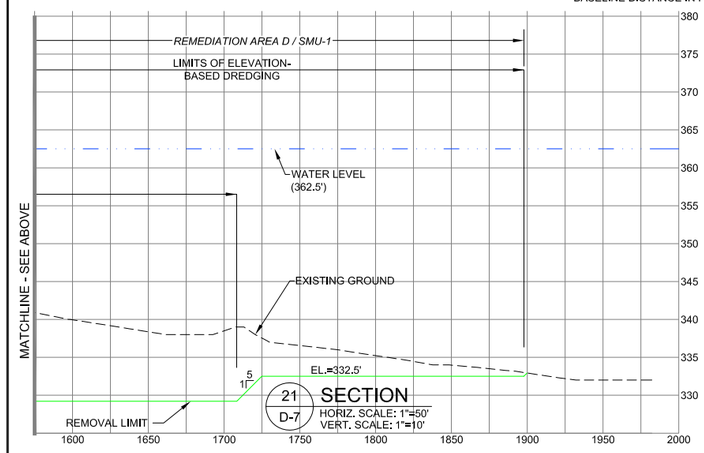
REMEDIATION AREA D
DREDGING CROSS SECTIONS 19 & 20

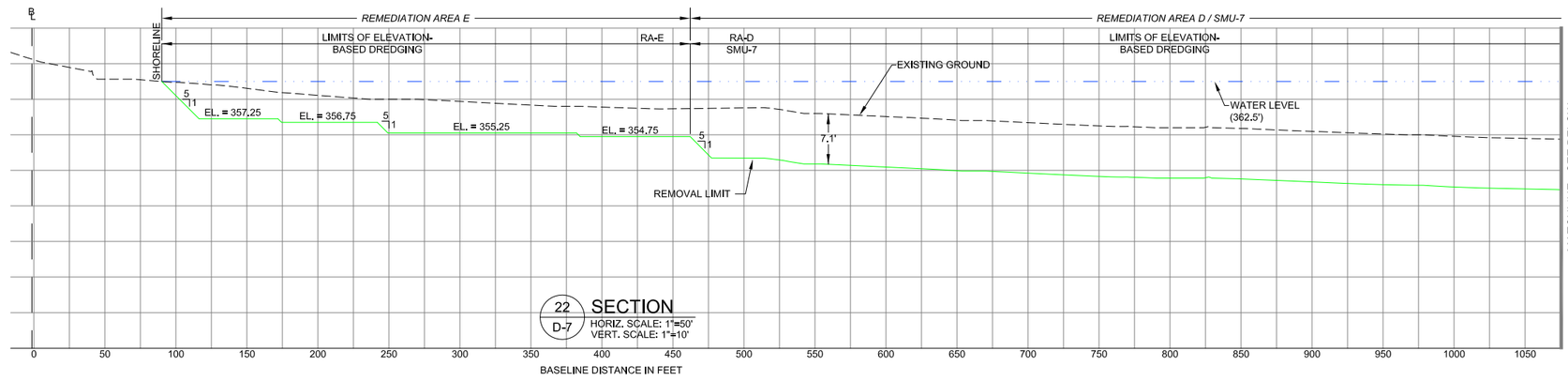
D-19

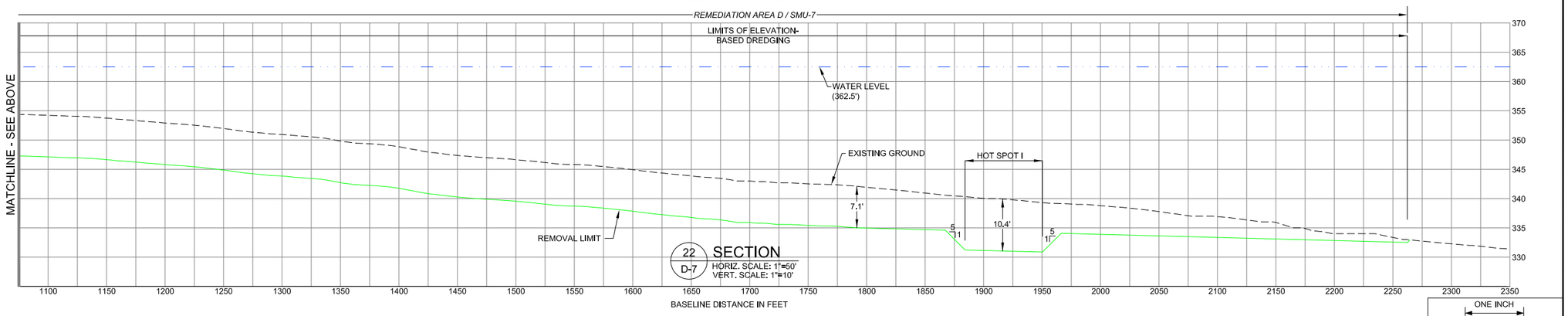
SHEET NO. 21 OF 29

Nov 24, 2009 10:51am dhowell F:\010139-ONONDAGA_LAKE\010139020\010139021RP-07-D02.dwg D-19









NOTES:
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DRAWN BY: G. HOWELL
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SCALE: AS NOTED
DATE: DECEMBER 18, 2009

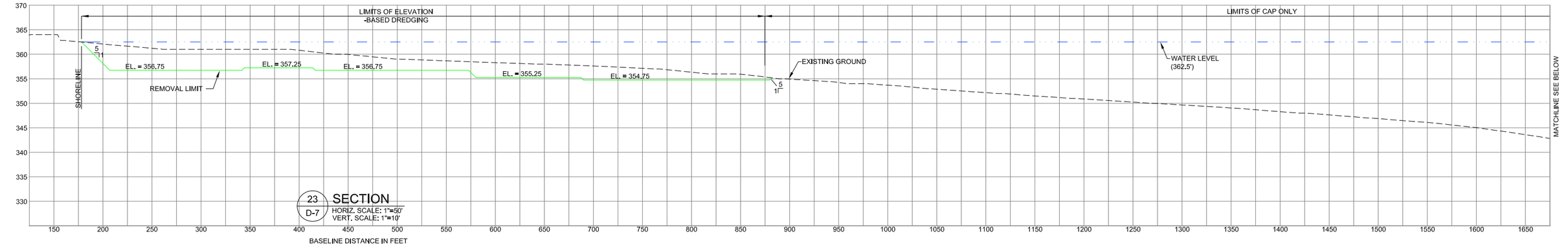
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA D
DREDGING CROSS SECTIONS 21 & 22

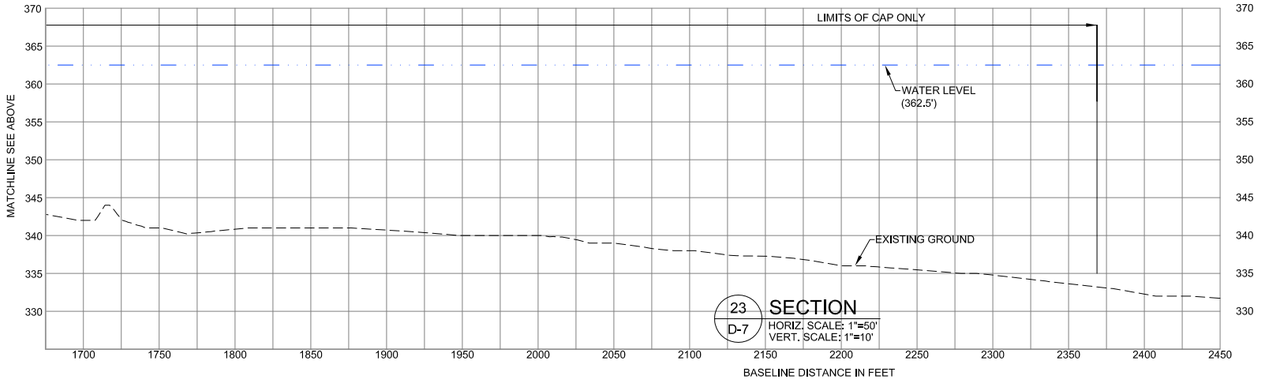
D-20

SHEET NO. 22 OF 29

Nov 24, 2009 10:57am dhowell E:\010139-ONONDAGA_LAKE\010139D2\010139D2-RP-07-D202.dwg D-20



23 / D-7 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



23 / D-7 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

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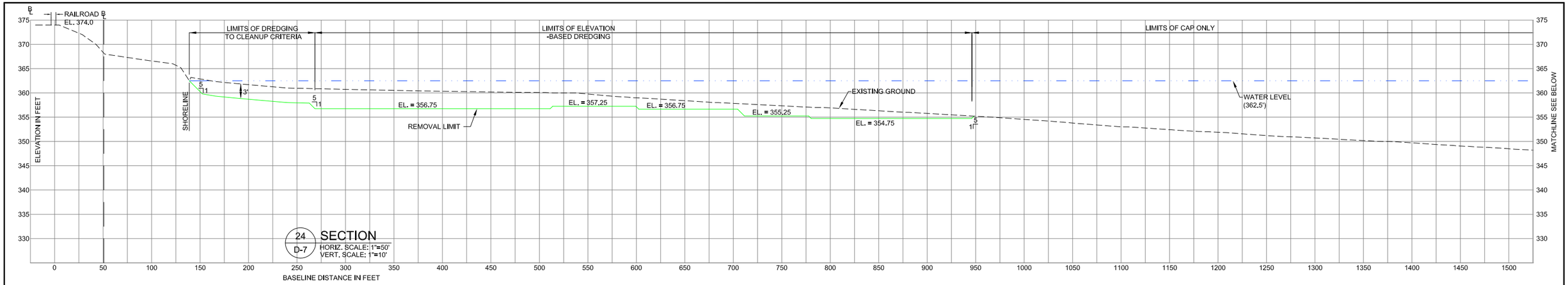
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA E
DREDGING CROSS SECTION 23

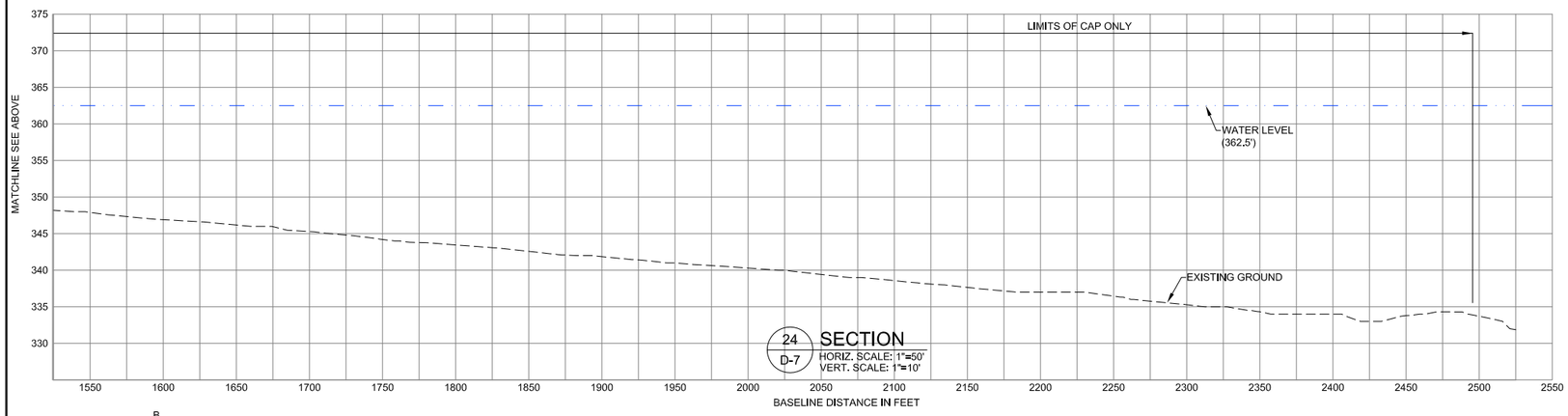
D-21

SHEET NO. 23 OF 29

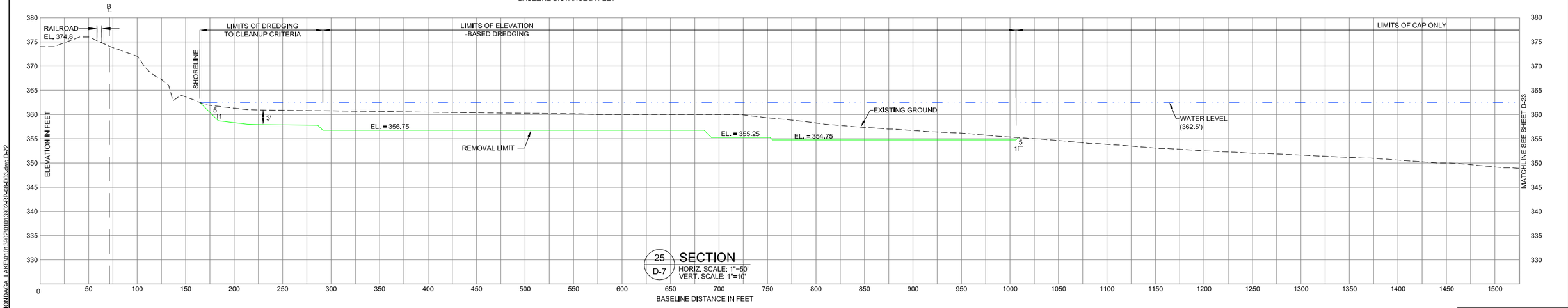
Nov 24, 2009 10:58am ghowell E:\010139-ONONDAGA LAKE\010139002\010139002-RP-08-D03.dwg D-21



24 / D-7 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



24 / D-7 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



25 / D-7 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

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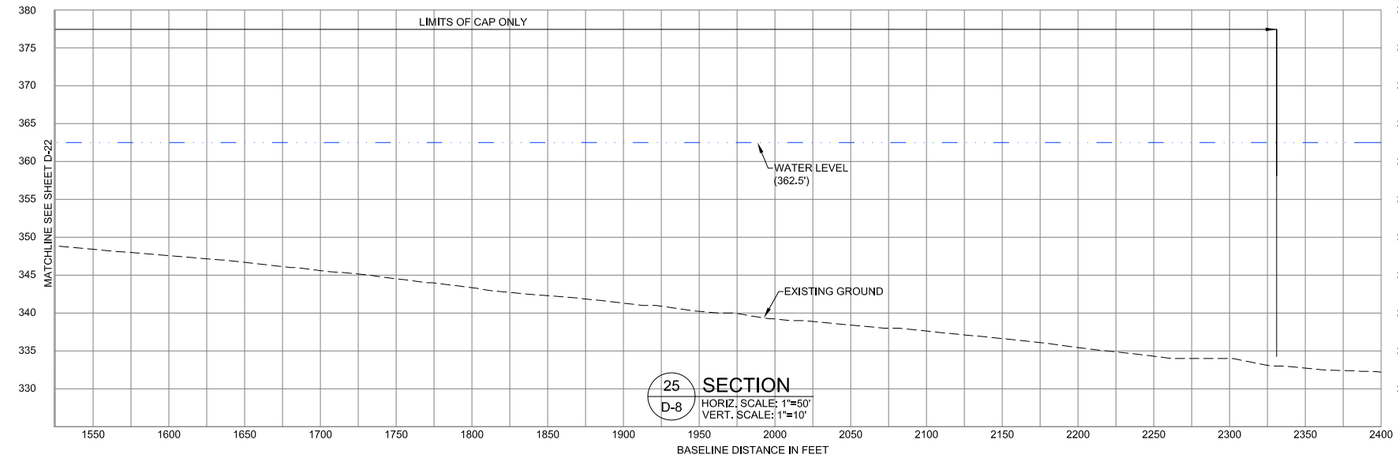
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

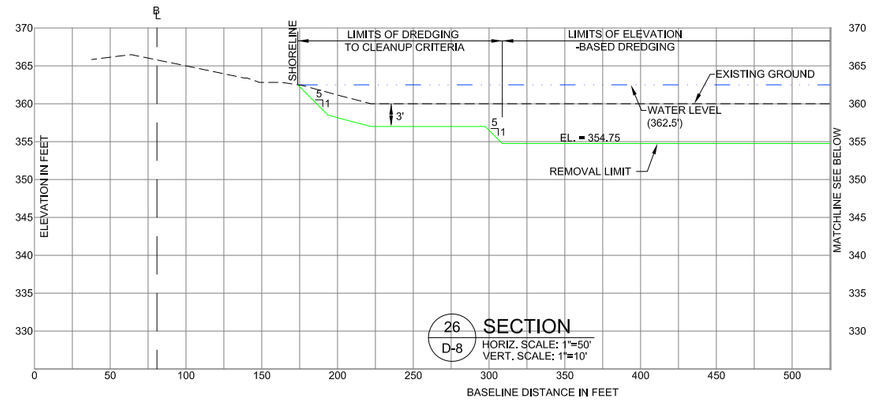
REMEDIATION AREA E
DREDGING CROSS SECTIONS 24 & 25

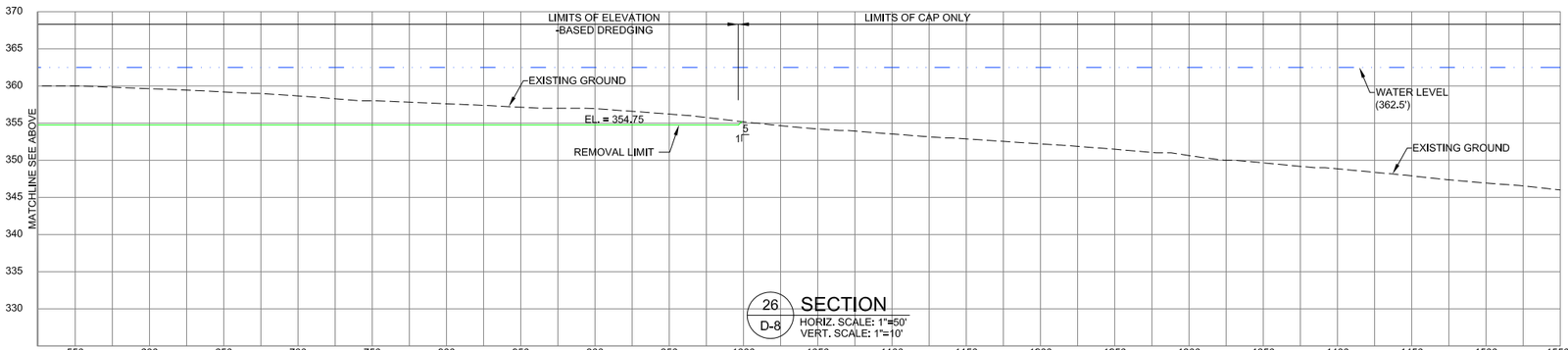
D-22

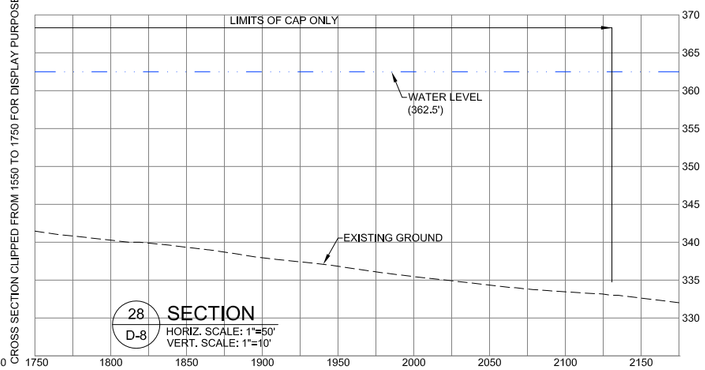
SHEET NO. 24 OF 29

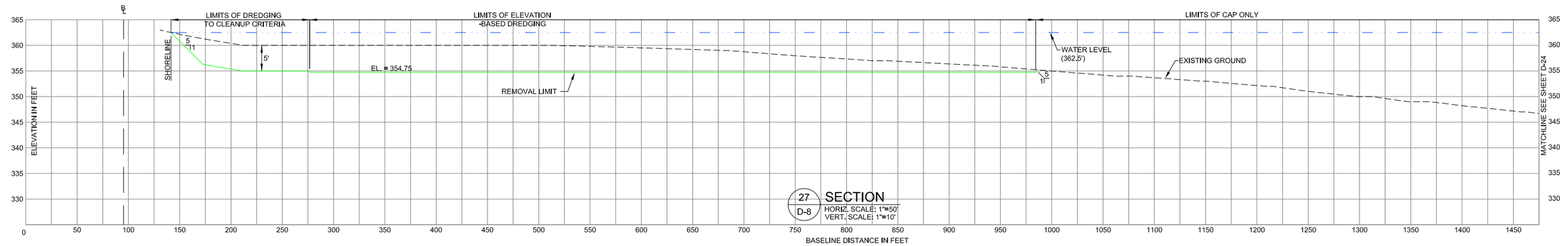
Nov 24, 2009 11:20am ghowell E:\010139-ONONDAGA LAKE\010139020101390248-RP-09-D03.dwg D-22











NOTES:
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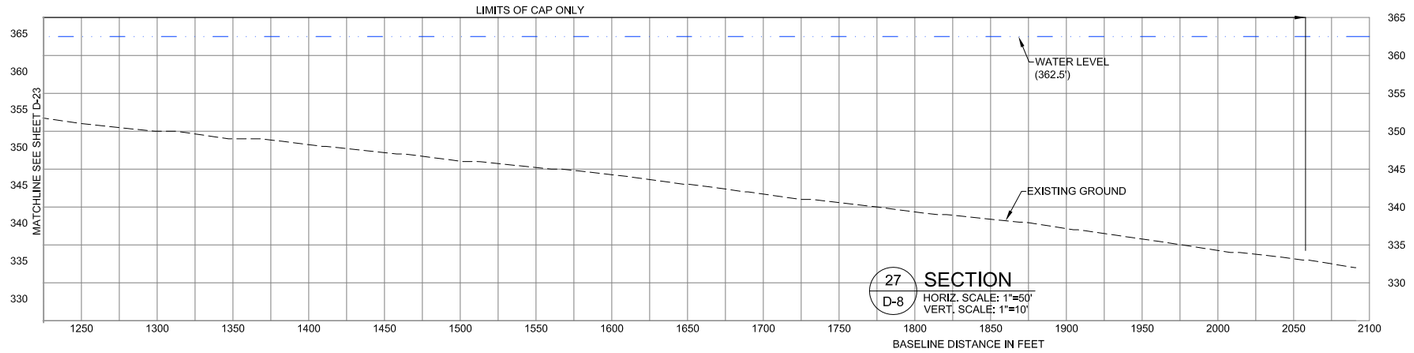
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA E
DREDGING CROSS SECTIONS 25, 26, & 27

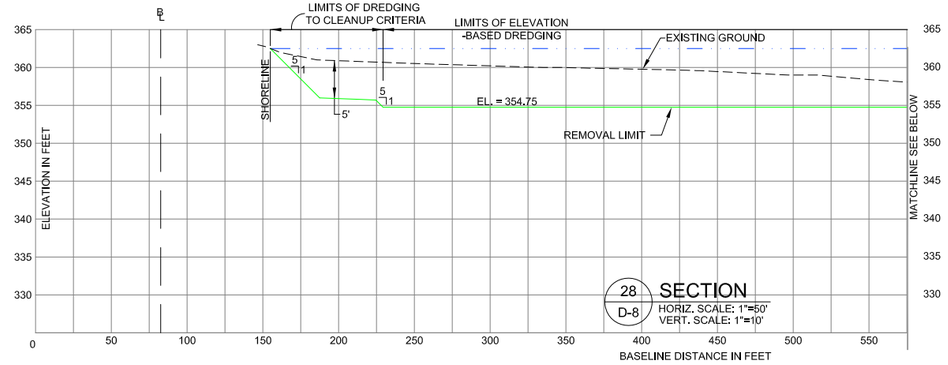
D-23

SHEET NO. 25 OF 29

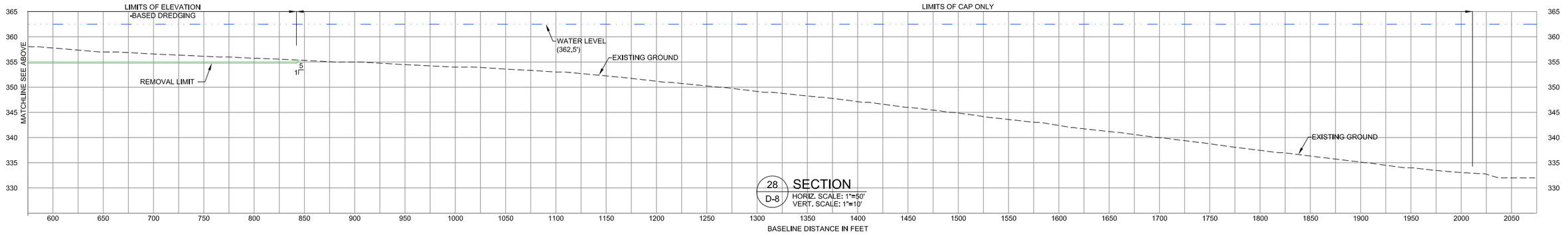
Nov 24, 2009 11:01am dhowell E:\010139-ONONDAGA_LAKE\010139\2010139026-RPD\D-D03.dwg D-23



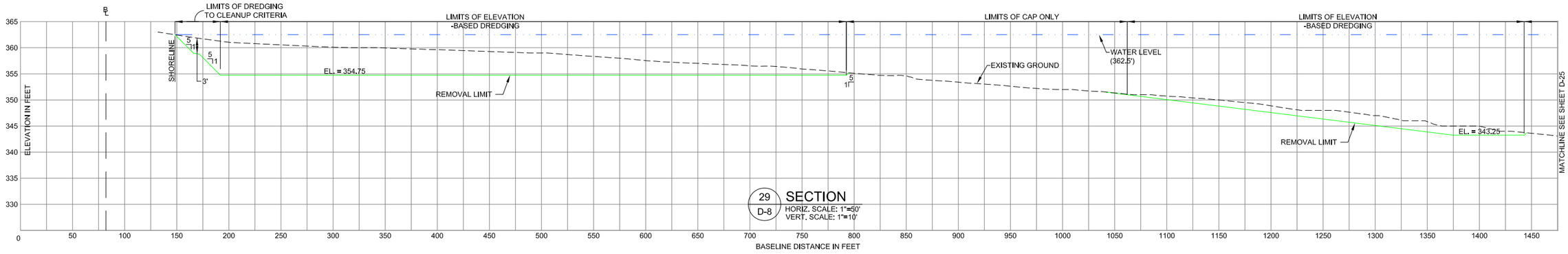
27 D-8 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



28 D-8 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



28 D-8 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



29 D-8 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

NOTES:
1. SEE SHEET D-IDX FOR GENERAL NOTES AND LEGEND.
2. WATER LEVEL 362.5 FT NAVD 88 IS THE AVERAGE LAKE LEVEL DURING AQUATIC PLANT GROWING SEASON.

DRAFT DOCUMENT

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ONE INCH
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ANCHOR QEA
290 Elwood Davis Road, Suite 230 | Liverpool, NY 13088 | (315) 453-9009

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: K. POWELL / W. DINICOLA
DRAWN BY: G. HOWELL
CHECKED BY: R. MOHAN
APPROVED BY: J. VERDUIN
SCALE: AS NOTED
DATE: DECEMBER 18, 2009

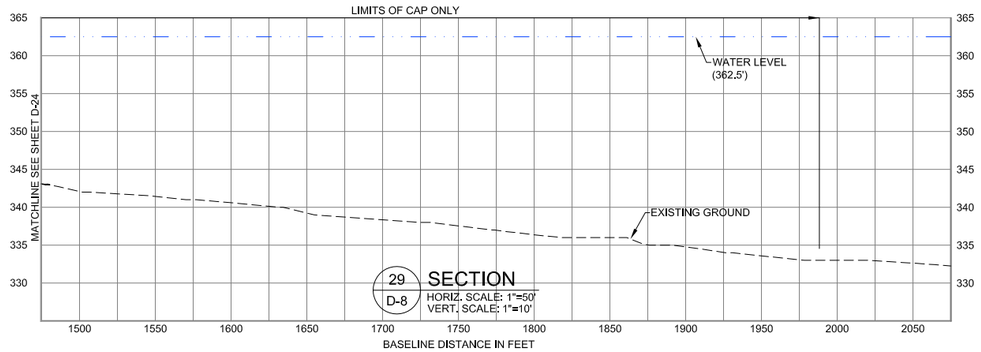
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA E
DREDGING CROSS SECTIONS 27, 28, & 29

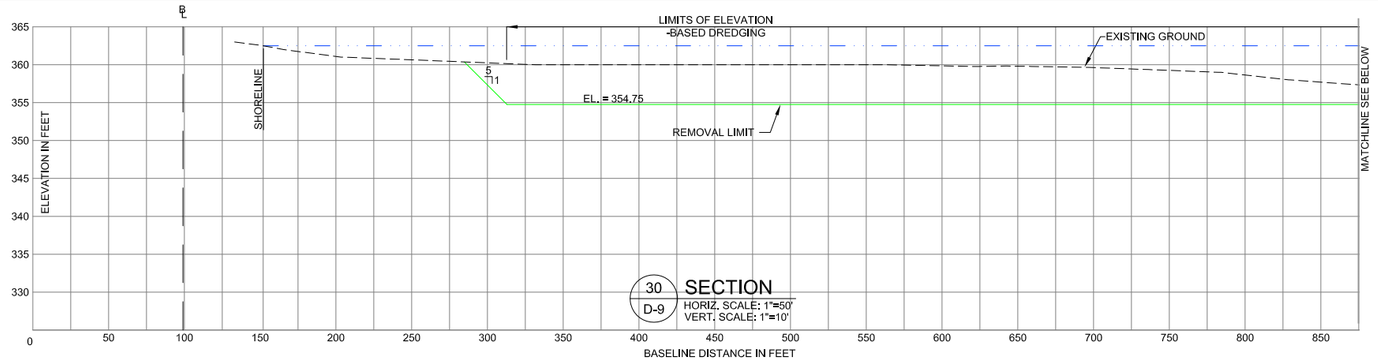
D-24

SHEET NO. 26 OF 29

Nov 24, 2009 11:01am ehowell E:\010139-ONONDAGA_LAKE\010139\02\010139024\R-08-D03.dwg D-24



29 / D-8 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



30 / D-9 SECTION
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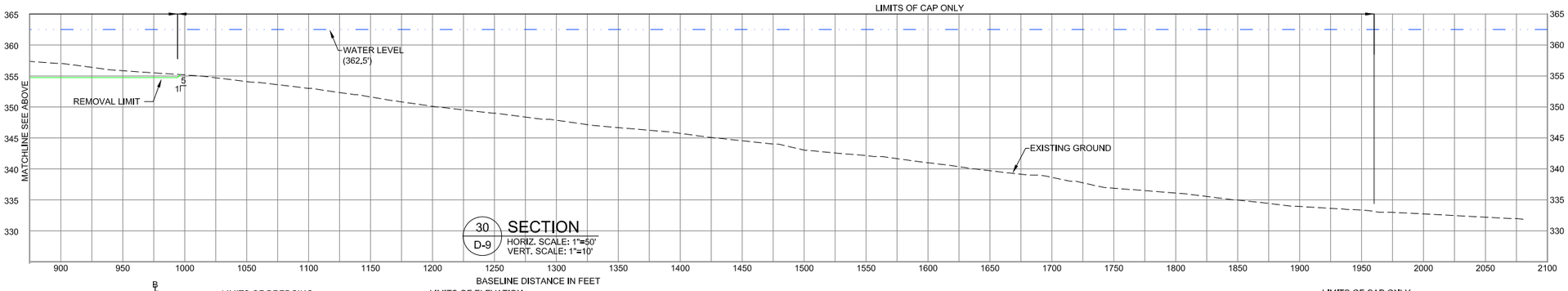
VERT. SCALE: 1"=10'



30 / D-9 SECTION
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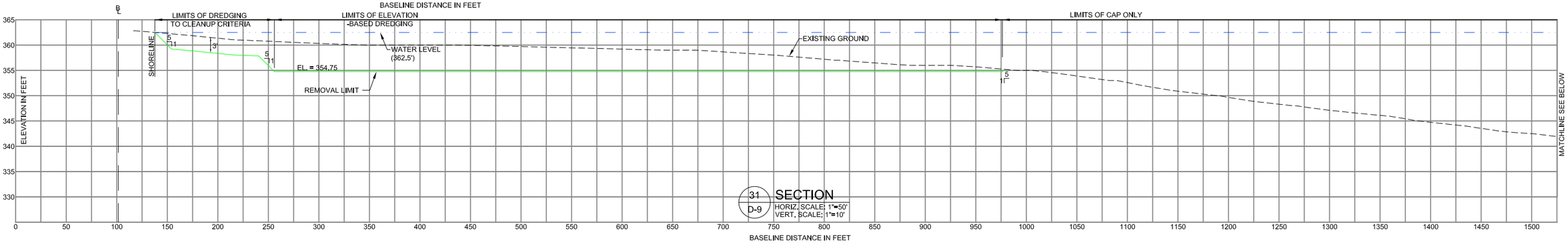
VERT. SCALE: 1"=10'



31 / D-9 SECTION
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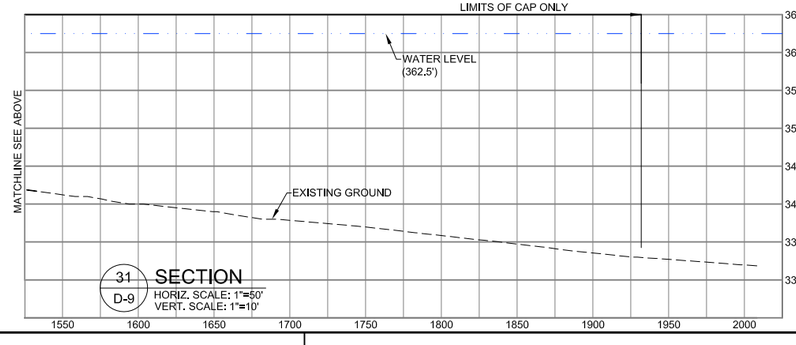
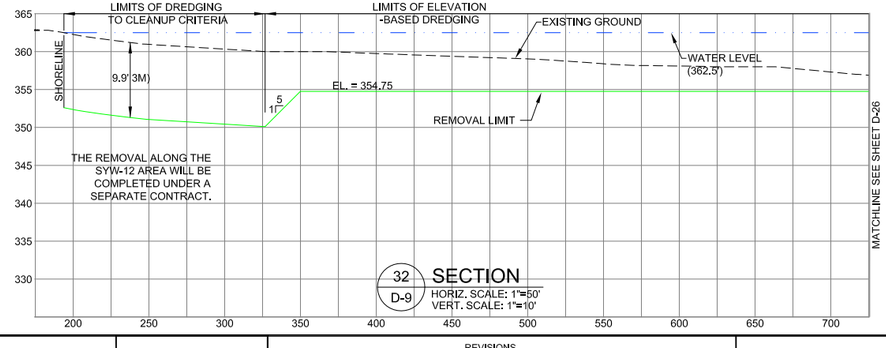
VERT. SCALE: 1"=10'



31 / D-9 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



32 / D-9 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

NOTES:
1. SEE SHEET D-IDX FOR GENERAL NOTES AND LEGEND.
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APPROVED BY: J. VERDUIN
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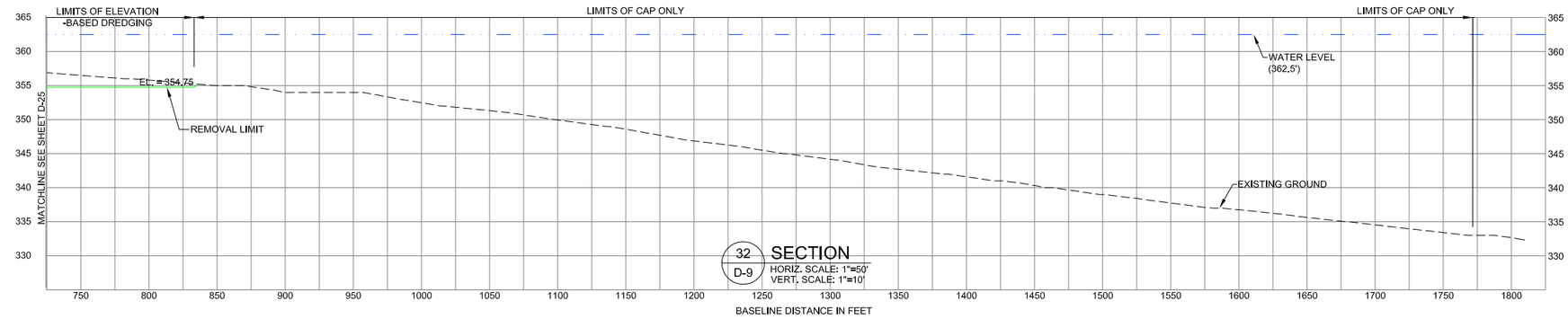
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA E
DREDGING CROSS SECTIONS 29, 30, 31, & 32

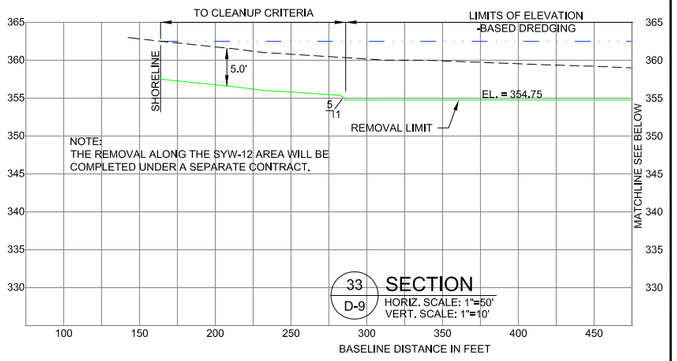
D-25

SHEET NO. 26 OF 29

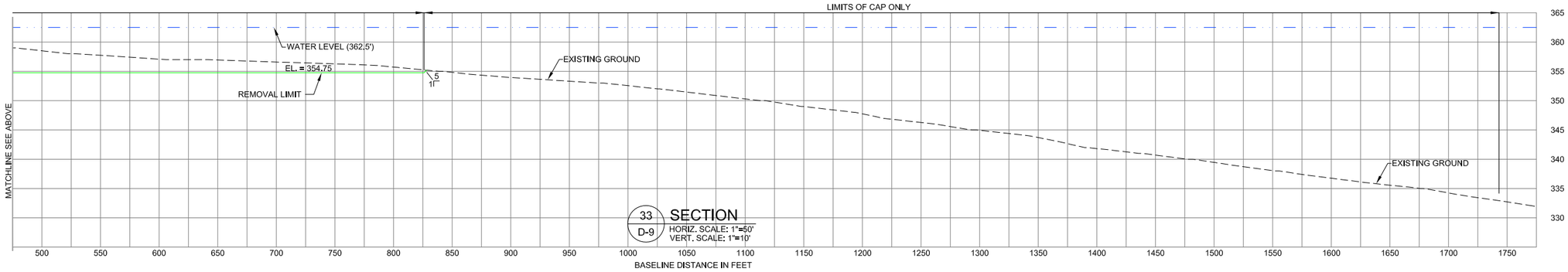
Nov 24, 2009 11:05am dhowell E:\010139-ONONDAGA_LAKE\010139D2\010139D2-RP-08-P03.dwg D-25



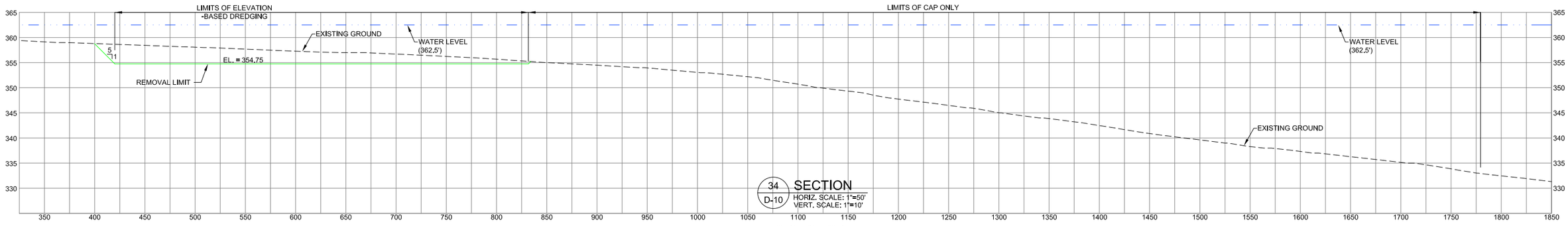
32 / D-9 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



33 / D-9 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



33 / D-9 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



34 / D-10 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

NOTES:
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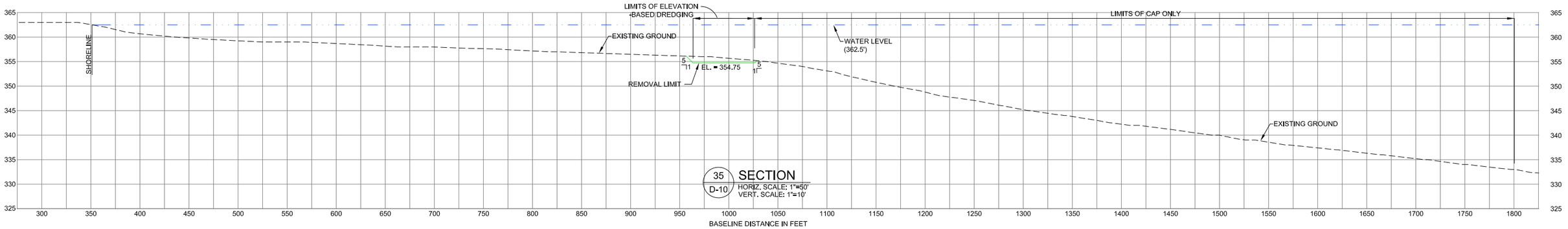
ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

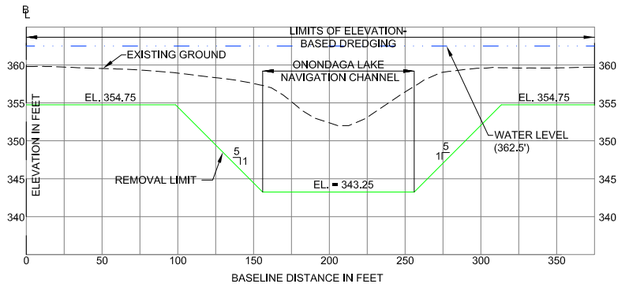
REMEDIATION AREA E
DREDGING CROSS SECTIONS 32, 33, & 34

D-26

Nov 24, 2009 11:08am dhowell E:\010139-ONONDAGA LAKE\010139\2010139026-RPD\D-D03.dwg D-26



35 / D-10 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'



36 / D-8 SECTION
HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=10'

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ONONDAGA LAKE CAP AND DREDGE AREA AND DEPTH INITIAL DESIGN SUBMITTAL

REMEDIATION AREA E
DREDGING CROSS SECTIONS 35 & 36

D-27

SHEET NO. 29 OF 29