Enclosure

Responses to Comments on Emission Estimates in the General Air Conformity Analysis Report

Responses to Comments on Emission Estimates
BNP-2011-180, General Air Conformity Analysis Report,
October 7, 2011

Reference: PADEP-2011-209, email from C. Trostle, PADEP, to B. Wise, PPL, "Comments on Emission Estimates, November 4, 2001.

General Responses

A. The term topsoil as used in the fuel usage report refers to actual topsoil, glacial till, and fractured shale that may be removed from a given location on-site.

B. All cut/fill is to be placed on-site primarily using large earthmoving machines rather than dump trucks.

C. Non-direct emissions are limited to maintenance areas only per 40 CFR 93.152.

D. All off-site transport is assumed to be by highway. This sets a conservative upper bound should rail or barge transport be considered in the future.

Specific Responses

1. The Report needs to have a map/aerial view of the project site that has a scale that denotes distance and identifies areas of the individual tasks where the soil will be moved on site. This allows us to get some sense of the amount of hours that dump trucks will operate. Dump trucks used for soil excavating projects like this project are a source for large amounts of emissions. It would be good for us have some idea of dump truck activities.

   Response
   See attachment 1 for a drawing that shows the Project Boundary and the on-site Limit of Disturbance. Scale is 1 inch = 500 ft. This drawing along with the Attachment 2, Appendix A, Excess Earthwork Reduction Evaluation Areas drawing provides a good overview of where soil will be moved on-site. With respect to the use of dump trucks, see General Response B above.

2. Please indicate the volume of topsoil each type of dump truck can carry. This will give us some idea of how many trips are needed by comparing to the volume of topsoil removed. The Report states at one point that a truck with 80 ton capacity will be used but the mass of earth indicator doesn't allow us to use the cubic yards of topsoil information to determine truck trips.

   Response
   The scrapers listed in the Non-road Construction Equipment section are identified as Cat 631G and Cat 637G vehicles. Each vehicle has a rated load of 34 cyd or 82,200 pounds. Semi trailer dumpers which are on-road vehicles typically have 20 cyd capacity and are limited to a GVW of 80,000 lbs.

The bulking factors are provided in Attachment 3. They are:
a. Sand and gravel during transportation is 1.20 to 1.27 (average 1.23) (for Fuel Usage Report only.)
b. Weathered rock is 1.25 (for aggregate surfacing).
c. Competent rock is 1.55 (for aggregate surfacing).

3. Please describe from where and to where the topsoil will be transported on site.

Response
Attachment 2 is the Pennoni Excess Cut Report, Rev 2 (6/16/11) which served as the basis document for the S&L Fuel Usage Report. This report includes the necessary descriptions of what is being moved and where it is being placed. Attachment 3 is the S&L Conceptual Grading and Earthwork Report, (SL-009459) of August 31, 2011. It provides a break out of Top Soil, Competent Rock and Weathered Rock and provides bulking factors for each. An explanation was provided during a conference call with the PADEP as to how to read the Construction Fuel Consumption Information Table that provided the type of vehicles and hours of operation for each defined task per year.

4. It appears that a small amount of emissions for this project will be generated outside of the Scranton-Wilkes-Barre area, but in other ozone maintenance areas. The report should estimate the amount of emissions that will occur in those other areas and make a statement that the emissions do not exceed the *de minimis* thresholds for those areas.

Response
See Attachment 4.

5. I spot checked total emissions for year 2 of the project when NOx emissions are greatest. The total emissions that I estimate by adding the various sources were larger than the total emissions cited in the Report. Please check all years to ensure that emissions totals are accurate. I got 104.8 tons of NOx for year 2 and the Report indicated 102 tons.

Response
See Response 7.

6. The activity levels of highway vehicles that you used on site (F-250, F-650, and MP6's) seem to be greatly underestimated in Table B-4. For instance, F-250s and F-650s seem to be operating at least 121,212 hours in the Fuel Consumption Study, but in years 1-7 in Table B-4, the total use for these vehicles is 30,841 hours. A similar underestimation seems to be occurring with Mack MP6 trucks. It would be helpful to see how emissions are generated for on-site highway vehicles just like we can see how emissions from nonroad vehicles are generated.

Response
See Response 7.

7. If hours that highway vehicles operate are significantly lower than I believe and are as stated in Table B-4, please explain better how total operating hours were obtained.

Response to Comments 5, 6, and 7
During the aforementioned conference call AECOM explained where to find the appropriate values in the report. There was confusion with double-counting involving Safety-related Emissions and Total Emissions (safety-related and non safety-related).

A summary of operating hours for the on-site highway trucks in response to question #6 is provided below. It shows the values which are in Table B-4 in the General Air Conformity Applicability Analysis.

	On-road onsite highway truck operating hours								
	Ford F-250 and F-650			Mack MP6			Total		
	annual	idle	run	annual	idle	run	annual	idle	run
1	7,531	753	6,778	3,452	345	3,107	10,983	1,098	9,885
2	13,157	1,316	11,841	9,867	987	8,880	23,024	2,302	20,722
3	29,660	2,966	26,694	10,966	1,097	9,869	40,626	4,063	36,563
4	32,545	3,255	29,291	8,059	806	7,253	40,604	4,060	36,544
5	23,522	2,352	21,170	5,372	537	4,835	28,894	2,889	26,005
6	8,573	857	7,716	1,073	107	966	9,646	965	8,681
7	6,925	693	6,233	1,158	116	1,042	8,083	808	7,275
Total	121,913	12,191	109,722	39,947	3,995	35,952	161,860	16,186	145,674

Estimates of fuel-burning equipment (non-road and on-road) needed to construct the proposed BBNPP were provided by Sargent and Lundy ("S&L"). As part of its Construction Vehicle Fuel Consumption Summary (Attachment 1 and provided in the General Air Conformity Analysis Report) S&L provided equipment types and model numbers, horsepower ratings, and estimated quantities of gasoline and diesel fuel usage. The fuel usage estimates are based on information in the Combined Operating License application (COLA), available preliminary design information and also from assumed nuclear project non-road equipment usage based on experience, construction sequencing, forecast construction durations, estimated site construction support, and projected material and equipment deliveries based on current preliminary plant construction quantities and information.

8. Tell us why certain tasks do not require dump trucks. This project moves a lot of topsoil. By my count, 13 million cubic yards are being removed and 12.2 million cubic yards are being placed, but for many of the individual tasks within the overall project, no dump trucks are being used to remove the topsoil. Would think for rock removal and disposal that the project task would need some type of dump truck to move debris.

   Response
   Since all earthmoving is occurring within the Project Boundary, large earthmoving machines will be used in lieu of multiple dump trucks. (See Table 1 – Summary of Earthwork Quantities in Attachment 3 for breakdown of materials being excavated.) Total excavation is shown to be 8,842,200 cyd.

9. The Report did not include emissions of equipment that are less than 50 horsepower. These emissions could be significant. The Report will need to make an estimate of

these emissions and include the emissions in the total. It would be better to estimate project emissions higher rather than lower for purposes of placing the emissions in the SIP.

Response
The 50 HP exemption in the S&L Construction Vehicle Fuel Consumption Report is from the Calvert Cliffs Nuclear Power Plant (CCNPP), another US EPR reactor, General Air Conformity Analysis Report prepared by AECOM. Based on a sample of fuel consumption for equipment less than 50 Hp at the CCNPP site, it was determined that fuel consumption was negligible when compared with all other equipment on-site during construction. AECOM then included the 50 Hp exemption in the BBNPP General Air Conformity Analysis Report.

10. I see that a switchyard is being constructed. I assume that is for locomotive operations. Are there any locomotive emissions that should be included?

Response
There are no locomotive switchyards being constructed. All switchyards identified in the General Air Conformity Analysis Report are electrical switchyards. For the purpose of this analysis all off-site deliveries are assumed to be by truck. On-site off loading and transport equipment were included. While a rail spur is being extended to the BBNPP site the use of truck delivery of heavy equipment instead of rail during this analysis is considered more conservative in terms of total emissions.

11. It would speed our review if you could include a disk that includes the spreadsheets when you send the Final Report. This allows us to check emission estimates quickly.

Response
The report you have received is considered final. PPL would prefer not to provide the spreadsheets in Excel format as values could be inadvertently changed, and it is our responsibility to maintain control of these documents.

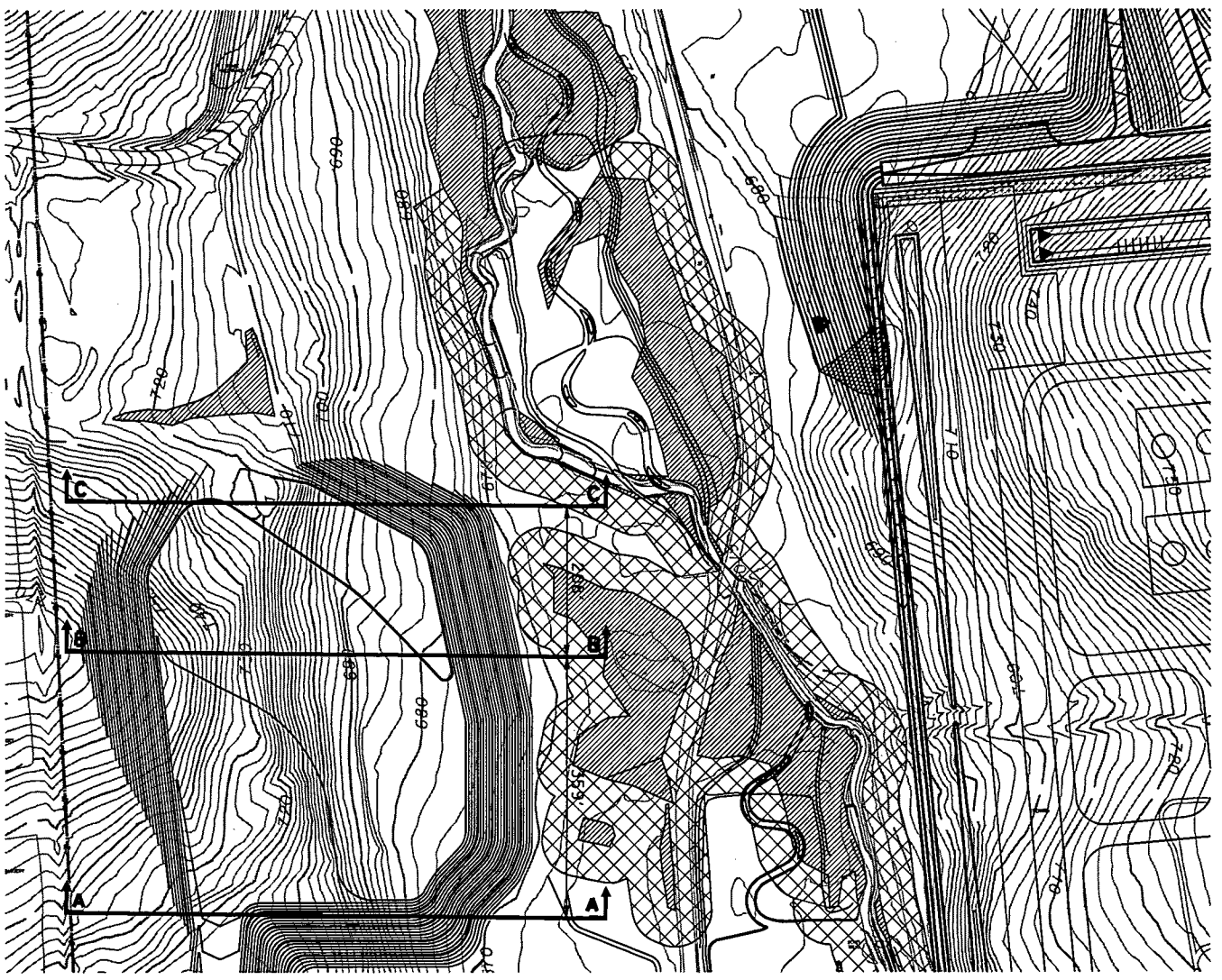
Attachments:

1. Drawing No. LOD, "Limit of Disturbance" prepared by Pennoni Assoc., 8/25/2011.

2. Pennoni Assoc., "Excess Earthwork Reduction Report, Bell Bend Nuclear Power Plant, Salem Township, Luzerne County, PA", Rpt No. PPLS0902-1500-01, June 6, 2011.

3. Sargent & Lundy, "Conceptual Grading and Earthwork Report, Bell Bend Nuclear Power Plant, Unistar Nuclear energy, Non Safety-Related", Rpt No. SL-009459, Rev 9., August 31, 2011.

4. Response to Comment 4. Statement regarding the amount of emissions in surrounding ozone maintenance areas based on off-site road travel that was extracted from the current model results.



NOTE:
SEE FIGURE 5.2 FOR SECTIONS A-A, B-B, AND C-C AND FIGURE 5.3 FOR SECTIONS D-D AND E-E

Pennoni
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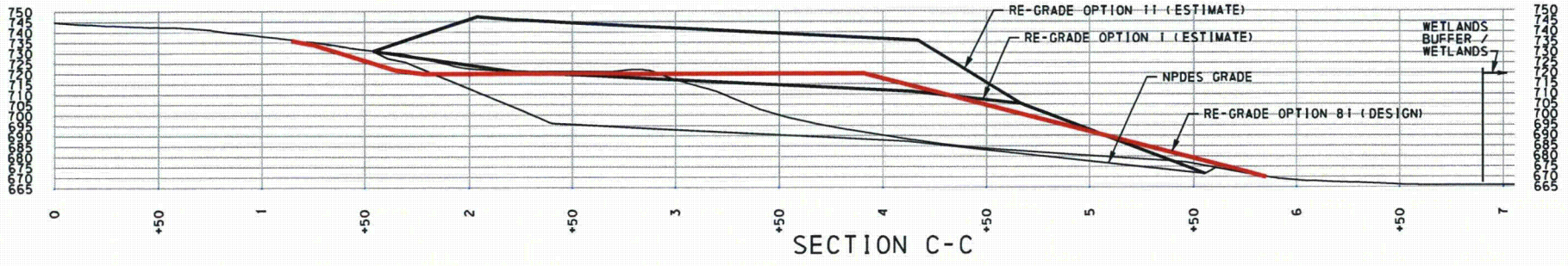
100 N. Wilkes-Barre Blvd.
Wilkes-Barre, PA 18702

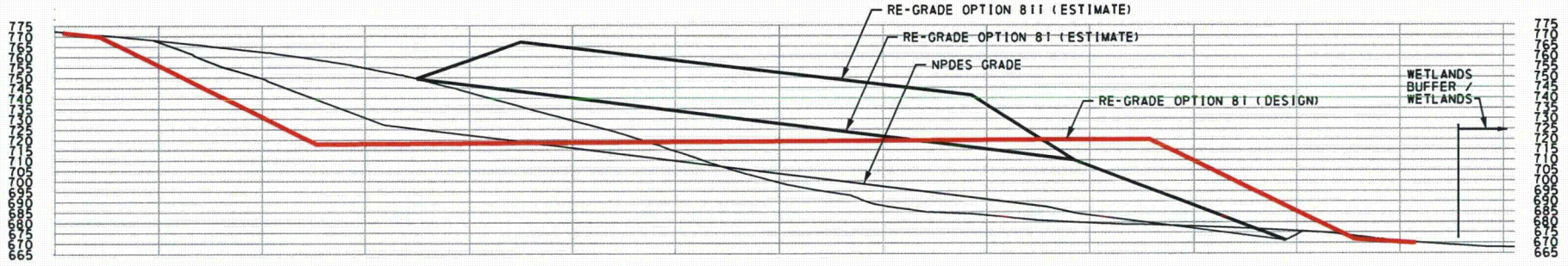
8i. WEST STOCKPILE LAYOUT PLAN (DESIGN)

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

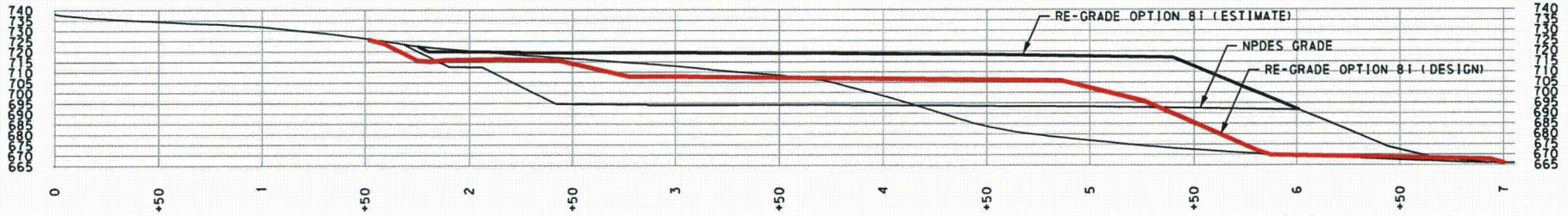
DRAWN BY: WCK	HORZ. SCALE: 1"=150' VERT. SCALE: N/A
CHECKED BY: LGB	DATE: 04/2011
JOB No. PPLS 0902	**FIGURE 5.1**



SECTION C-C



SECTION B-B



SECTION A-A

LEGEND

EXISTING GRADE

NPDES GRADE

PROPOSED RE-GRADE OPTION

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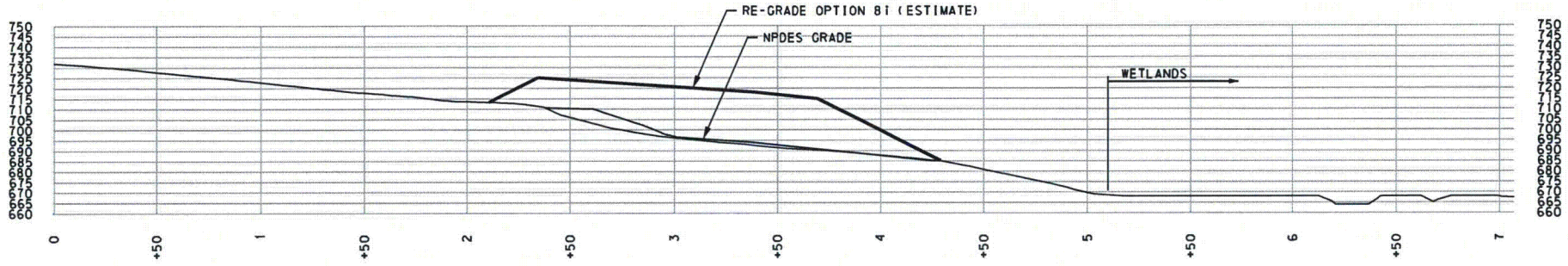
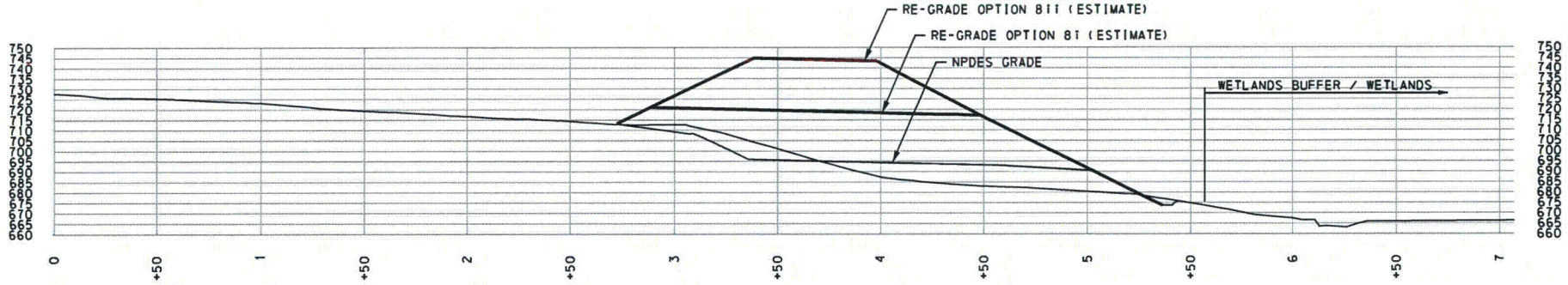
8i. WEST STOCKPILE AREA SECTIONS A-A, B-B, & C-C

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: 1"=50' VERT. SCALE: 1"=50'	DATE: 04/2011
CHECKED BY: LGB		
JOB No. PPLS 0902		FIGURE 5.2



SECTION E-E



SECTION D-D

LEGEND

- EXISTING GRADE
- NPDES GRADE
- PROPOSED RE-GRADE OPTION

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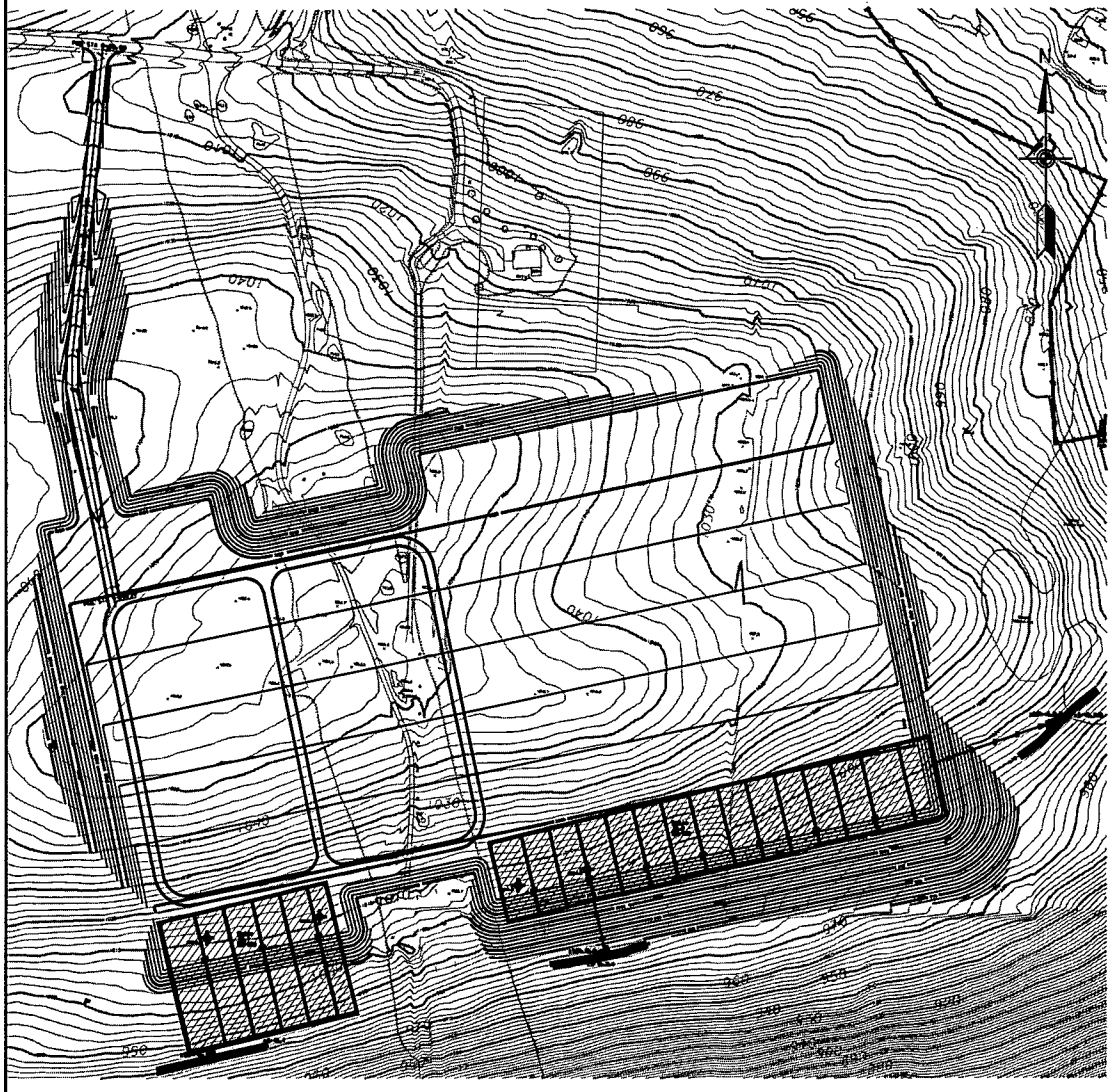
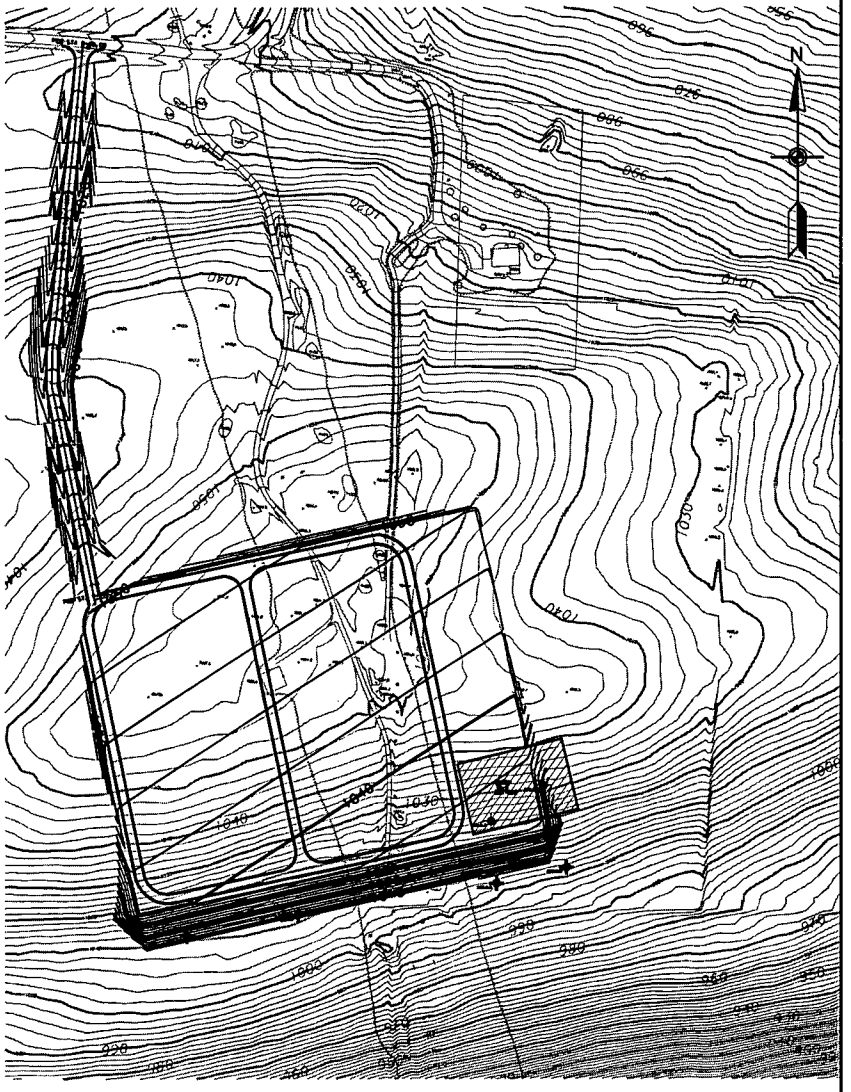
8i. WEST STOCKPILE AREA SECTIONS D-D & E-E

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: 1"=50'	DATE: 04/2011
CHECKED BY: LGB	VERT. SCALE: 1"=50'	
JOB No. PPLS 0902		**FIGURE 5.3**



November 2010 NPDES Grading - Net Earthwork = 436,301CY Excess Material



April 2011 Grading - Net Earthwork = 0 (Balanced)

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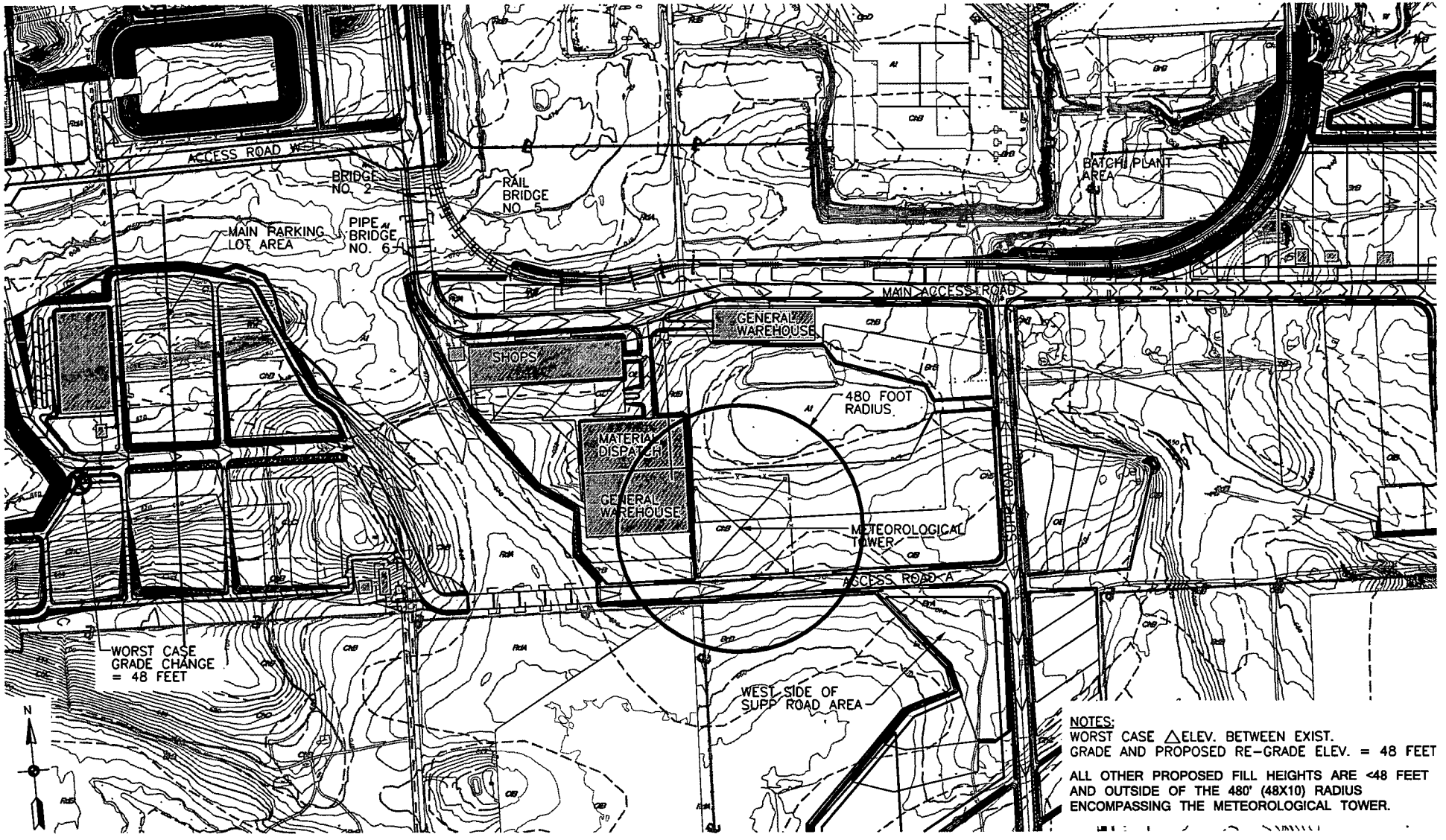
2. NEW 500kV SWITCH YARD DESIGN PROGRESSION

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: 1"=200' VERT. SCALE: N/A	DATE: 04/2011
CHECKED BY: LGB		
JOB No. PPLS 0902	**FIGURE 6.0**	

APPENDIX E
Meteorological Tower Wind Obstruction



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METEOROLOGICAL TOWER WIND OBSTRUCTION

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: 1"=350'	DATE: 06/2011
CHECKED BY: LGB	VERT. SCALE: N/A	
JOB No. PPLS 0902		**FIGURE 7.0**

Conceptual Grading and Earthwork Report
Bell Bend Nuclear Power Plant
UniStar Nuclear Energy

Non Safety-Related

Report No. SL-009450
Revision 9
Project No. 12198-434

August 31, 2011

Approval Page

Conceptual Grading and Earthwork Report

Report No. SL-009450

Non Safety-Related

Revision Summary	Issue Date
Rev. 0	Client Comments (03/31/08)
Rev. 1	Client Comments (04/07/08)
Rev. 2	Client Comments (05/05/08)
Rev. 3	Client Comments (06/13/2008)
Rev. 4	Client Comments (08/18/2008)
Rev. 5	Client Comments (02/26/2010)
Rev. 6	Owners Acceptance Review (04/23/2010)
	Revised Pages 1-12, Figure 003, and Attachment 003
Rev. 7	For Use (06/11/2010), All Text and Attachments
Rev. 8A	Owners Acceptance Review (07/14/2010)
	Revised Pages 6, 7, and 12, Figures 001, 002, and
	003, and Attachment 003, Page 1
Rev. 8	For Use (07/28/2010), All Text and Attachments
Rev. 9A	Owners Acceptance Review (08/15/2011) All Pages Revised
Rev. 9	For Use (08/31/2011). Revised Pages 1-7, 13-15.

Prepared By: Doug Dahlberg Date: 8/31/11

Reviewed By: James Perry Date: 8/31/11

Approved By: Doug Dahlberg Date: 8/31/11

Table of Contents

1. PURPOSE/OBJECTIVE

The proposed Bell Bend Nuclear Power Plant, located in Luzerne County, Pennsylvania, is owned by PPL. PPL is proposing to construct a new US Evolutionary Pressurized Water Reactor (US EPR) at the site. UniStar has the contract to develop the project. The purpose of this report is to develop a conceptual earthwork & grading design for the site, and to provide results of calculations for the quantities of cut and fill. This conceptual grading design will support the Combined Construction and Operating License Application (COLA), and it will be the basis for detailed design.

2. BACKGROUND

Critical Site Development Changes

For Revision 5 of this report the power block was moved 972 feet north and 300 feet west of its former proposed location to avoid Walker Run (stream) and any Exceptional Value (EV) wetlands. AREVA's response to RFI-SL-BBNPP-155 was used to layout new plant facilities to avoid existing wetlands on the site. The new location of the centerline of the reactor is N 340,123, E 2,405,131 (NAD 83). Refer to References 1 and 2. The second objective of Revision 5 was to balance the site earthwork with respect to cut and fill from grading activities and excess cut from over-excavation of the power block. In order to achieve the second objective plant grades were established at the following elevations:

- Plant Grade Elevation = 739'
- Reactor Building / Turbine Building Finish Floor Elevation = 740'
- ESWEMS Pond Top of Dike Elevation = 739'
- Switchyard Elevation = 736'
- CW Cooling Tower Basin Elevation = 720'

In order to achieve these grades retaining walls were required on the southwestern end of the power block, the southeastern end of the power block, and the southern end of the Essential Service Water Emergency Makeup System (ESWEMS) Pond.

Upon subsequent review the walls on the western edge of the power block and south of the ESWEMS Pond were determined to be safety-related due to their proximity to related structures and the probable failure plane of those walls during an earthquake.

The objective of Revision 6 is to eliminate the need for safety-related walls and calculate quantities due to the change in plant grade. The following elevations were established based on the probable failure planes:

- Plant Grade Elevation = 719'
- Reactor Building / Turbine Building Finish Floor Elevation = 720'
- ESWEMS Pond Top of Dike Elevation = 700'
- Switchyard Elevation = 710'
- CW Cooling Tower Basin Elevation = 700'

Calculation 2010-10165 (Reference 7) confirmed the retaining walls associated with the lower plant elevation were no longer safety related.

Adjustment to the new elevations resulted in and excess soil cut of more than 6,000,000 cubic yards.

Revision 8 incorporates the relocation of the Protected Area security fencing based on the July 1, 2010 letter UN No. BB-PM-2010-008.

Revision 9A of the report adjusts the earthwork quantities to account for the over excavation quantities and accommodate all excess fill placement on site. Revision 9A also incorporates earthwork for areas where detailed topography was not previously available.

Quantity Estimate Area Breakdown

There are eight distinct site development areas associated with the plant. The areas are:

1. The **Intake Area** next to the river, which includes the water intake structure and the fill to raise the structure so that it will not flood, the blowdown pipe, a relocated ditch, and a temporary dredge pond. The dredge pond will be removed after the dredging is complete and the area restored.

2. The **New 500kv Switchyard Area** northeast of the plant.

3. The **Northeast Laydown Area** east of US Highway 11.

4. The **Power Block Area** including the switchyard, cooling towers, ESWEMS pond, water treatment area, combined wastewater pond, several construction buildings, and construction laydown areas.

5. The **Main Parking Lot Area** including construction and permanent parking lots located east of Walker Run. This area will hold about 3300 cars during construction. After construction is completed a portion will be paved to hold about 2000 cars for permanent parking, plus some open space. It will also hold a building for PPL's use as an office building during field construction and operations.

6. The **SUPP Road/Main Access Road and Construction Areas** including the meteorological tower, numerous construction and permanent buildings, the batch plant and large laydown areas. Also included is the laydown and topsoil stockpile areas along the main entrance road and eastern quarry.

7. The **South Laydown Area** south of US Highway 11.

8. The **West Stockpile Area** west of Walker Run and west of North Market Street. This area includes construction and permanent buildings, parking for about 400 cars, a construction laydown area, and a topsoil disposal area.

The breakdown of these areas match the areas in the Pennoni Associates, Inc. Report provided via response to RFI SL-BBNPP-208. Refer to Figure 006 for delineation of the subject areas.

PPL specified that the cooling towers north of the power block be 20 feet lower than the power block so the condensers in the plant can be drained by gravity. Placement of the cooling towers lower than the power block and the selected elevation of the nuclear island causes the earthwork to be out of balance in the power block area. The excavation quantity will be higher than the fill quantity for this area in order to provide the required elevations. Although earthwork is typically balanced, it cannot be done in this area with this constraint.

Bridge Requirements

To keep from affecting wetlands, bridges are required to cross Walker Run and the wetlands south and east of the creek. Seven bridges are required and shown on the Site Utilization Plot Plan (SUPP) (Ref. 1 and 2). The bridges are:

Bridge No. 1 A 60 foot wide, 508 foot long, four lane bridge on the main access road into the parking lot. This bridge has four 12 foot wide lanes, two 4.5 foot wide shoulders, and two 1.5 foot curb and guardrail edges.

Bridge No. 2 A 60 foot wide, 408 foot long heavy duty bridge on the main access road across the wetlands leading to the power block. This bridge is part of a heavy haul path and must be designed for very heavy loads. This bridge has four 12 foot wide lanes, two 4.5 foot wide shoulders, and two 1.5 foot curb and guardrail edges.

Bridge No. 3 A 60 foot wide, 408 foot long bridge from the parking area to the power block. This bridge has four 12 foot wide lanes, two 4.5 foot wide shoulders, and two 1.5 foot curb and guardrail edges. The bridge will be used by construction workers walking from the parking lot to the plant site. Ultimately, it will be used by permanent employees walking to the plant site.

Bridge No. 4 A 60 foot wide, 400 foot long bridge across Walker Run that ties the area west of North Market Street to the plant. This bridge has four 12 foot wide lanes, two 4.5 foot wide shoulders, and two 1.5 foot curb and guardrail edges. This bridge only needs to be about 180 feet long, but LandStudies suggests remediating a portion of Walker Run, and extending the length of this bridge to 400 feet long.

Bridge No. 5 A 435 foot long, 28 foot wide railroad bridge next to Bridge No. 2, used to bring the railroad track to the power block. This bridge will be designed to carry heavy equipment to the plant site.

Bridge No. 6 A 25 foot wide, 408 foot long pipe bridge next to Bridge No. 2, used to carry pipes from the river to the power block. These pipes include a raw water makeup line, a circulating water makeup line, a blowdown line/deicing line (common line), and electrical ducts.

Bridge No. 7 A 10 foot wide, 360 foot long pipe bridge across the wetlands near Bridge No. 3 from the power block area to the parking, used to carry potable water to the plant, electricity to the parking area buildings, and a sanitary sewer from the plant to the main sewer in US Highway 11.

Retaining Wall Requirements

The plant also requires the use of retaining walls. As can be seen from the SUPP (Ref. 1 and 2), there is not enough room to fit the plant and equipment on the property and still not disturb the wetlands. Consequently the following three walls (wall 2 was not needed after lowering the site) are required. :

Location 1 Located on the west side of the power block adjacent to Walker Run.

Location 2 Eliminated due to lowering of site elevations.

Location 3 Located on the south side of the main access road to the plant.

Location 4 Located south of the cooling towers to make up 20 feet of grade difference between the nuclear island and the towers.

Presently these walls are shown as a heavy line on the SUPP and the grading and drainage drawings. Walls 1 and 3 are proposed to be terraced. All walls are not safety related.

Additional retaining walls, not near the power block, were incorporated in the Pennoni Report (response to RFI SL-BBNPP-208) to accommodate placement of the excess fill and wetland avoidance.

3. ASSUMPTIONS

Based on geotechnical report (Ref 5), the existing soils that will be encountered are sands, gravel, and rock. The rock is shale and is crushable. The sand, gravel, and rock may be stable in fill at a slope of 2 horizontal to 1 vertical (2:1) but is not of sufficient quality to be used as safety-related structural fill. Therefore, all of the peripheral grading slopes, whether in cut or fill, are shown at a range of 2:1 to 3:1. Also, all of the drainage ditches will have 2:1 to 3:1 seeded side slopes. It may be possible to slope some of the cut slopes at 1.5:1 or even at 1:1 if they are in rock, during final design. However, the slopes are shown at 2:1 to 3:1 until more is known about the rock and soils. Excess cut from the power block is considered in the quantity calculations and is placed on site. At the railroad culvert crossing near the concrete batch plant, 1:1 sidelslope will be used and stabilized with concrete.

Most of the plant roadways will have longitudinal slopes between 0% and 3%. The main access road has a maximum slope of 4%. The west access road from the plant to North Market Street, has a slope of 6% because it is not long enough for a flatter slope. Slopes up to 6% are acceptable by the American Association of State Highway and Transportation Officials (AASHTO). The grading shown in Ref. 3 attempts to limit road slopes to meet this criterion. Slight modifications to the road slopes will likely occur during final design as grade are adjusted, but will remain within the proposed ranges.

The following additional assumptions were made for earthwork:

- Based on the geotechnical report (Ref. 5 and Attachment 3) there is an average of 9 inches of topsoil in the areas to be disturbed. However, much of the areas are wooded and clearing and grubbing will remove some topsoil prior to stripping, estimated at 3 inches. Therefore a thickness of 6 inches is used as an average thickness for all calculations including topsoil stripping and placement, and temporary aggregate surfacing in laydown areas. Topsoil will not be stripped in topsoil stockpile areas prior to additional topsoil placement.
- All topsoil will be removed from areas requiring regrading.
- Topsoil will not be removed under existing transmission lines unless areas are to be regraded.
- No existing solid or hazardous landfill areas within the site.
- From the borings in the power block area, it was determined that the top 12 to 25 feet of the in-place material is sand and gravel, The rock below the soils is a shale that is ripable and crushable. The crushed rock is suitable for fill or backfill material and construction laydown area surfacing. It is assumed that the selected contractor will bring machinery on the site that will crush rock to sizes adequate for fill or temporary laydown area surfacing. Therefore, it is assumed that no cut will be wasted.

- Consistent with the Pennoni Report, existing in-place densities are assumed to be equal to the overall average compacted on-site densities in the stockpile areas.
- Overall excavation volumes provided by Pennoni include competent rock and weathered rock.
- Overall placement volumes provided by Pennoni include engineered fill, cohesive soils, and safety-related concrete.
- Overall placement and excavation volumes provided by Pennoni are calculated from current surface to finished surface. Therefore stripping of topsoil and placement of aggregate and topsoil are independent of the placement and excavation quantities.
- Bulking factor for sand and gravel during transportation is 1.2 to 1.27 (1.23 average) (for fuel usage report only). Response to RFI SL-BBNPP-169.
- Bulking factor for weathered rock is 1.25 (for aggregate surfacing). Response to RFI SL-BBNPP-169.
- Bulking factor for competent rock is 1.55 (for aggregate surfacing). Response to RFI SL-BBNPP-169.
- Incidental quantities include pipe excavation and placement, slurry walls, road aggregate, foundation excavation after grading is complete, non safety-related foundations, infiltration bed rock volumes, and pavement.
- Grades in the meteorological tower area remain unchanged.
- Maximum stable slopes are 2:1.
- Potential rock slopes steeper that 2:1 are not considered at this time but may be possible in some areas.
- Estimated compaction from insitu soils (sands and gravel per geotechnical report) to recompacted locations on site: reduction by 5% volume calculated in this report.
- In-place topsoil volumes remain the same for placement without compactive effort in both stockpile and surfacing areas.

4. DESIGN INPUTS

Following inputs are used for this conceptual design:

- S&L Drawing Number SK-12198-400-001, Rev. 4, "Reduced Scale Site Utilization Plot Plan".
- S&L Drawing Number SK-12198-400-002, Rev. 4, "Site Utilization Plot Plan", Sheets 1, 2, 3 and 4.
- S&L Drawing Number SK-12198-400-015, Sheets 1 through 14, "Grading and Drainage Plan".

- Topographic Mapping, Peters Consultants, November 2007, January 2008, and April 2010.
- S&L Civil Design Guideline (CDG-018), "Plant Site Grading".
- S&L Civil Design Standard (SDS-06.0), "Plan Site Drainage and Erosion Control"

Sources of quantity data and information provided in responses to RFIs SL-BBNPP-xxx are summarized as follows:

169 – Rock, Weathered Rock, and Soil Bulking Factors

170 – Over Excavation Quantities for Nuclear Island (engineered fill)

173 – Over Excavation Quantities Cooling Towers and ESWEMS Pond cohesive fill)

175 – Confirmation of Latest Geotechnical Information

176 – Competent and Weathered Rock

177 – Slurry Wall Volume (considered incidental)

178 – Pump House Excavation (considered incidental)

189 – Imported Sand Source for Concrete

190 – Safety-Related Concrete

191 – Cohesive Soil Volumes

196 – On site Soil Disposal Areas

197 – Overall Earthwork Quantities Excavation and Placement

198 – Infiltration Basin Locations

207 – Revised Storm Sewer Layout in Nuclear Island Area

208 – Revised Grades for On Site Soil Stockpiles

This Report compiles the aforementioned quantities and supplements with the following:

- Topsoil Stripping, Placement, and Stockpiling
- Permanent Aggregate Placement
- Temporary Aggregate Placement (laydown areas)
- Potential Temporary Aggregate Removal and Topsoil Restoration
- Rock Compaction
- Soil Compaction

5. METHODOLOGY AND ACCEPTANCE CRITERIA

As previously noted, excavation and fill volumes provided via RFIs are summarized in this report. Table 1 presents a compilation of those quantities and the addition of topsoil and aggregate removal and placement, and application of compaction factors.

Civil Design Guideline (CDG-018) was used for layout of the plant roads and area grading, along with client-specified requirements for the power block and cooling tower areas. CDG-018 provides guidance for maximum road grades, minimum area slopes for drainage, and considerations for earthwork calculations. The grading criteria were incorporated into the Pennoni Report volumes for calculation of the total earthwork quantities.

The topsoil and aggregate volumes are calculated using Autocad area measuring function, thicknesses provided by geotechnical information or as stated in the assumptions and inputs above, and checked independently using the Autocad area function. Values from the Pennoni Report were verified using direct scaling.

6. CALCULATIONS

Specific detailed understandings for each of the site development areas are summarized as follows:

1. Intake Area

Topsoil Removal
Entire area to be disturbed will be stripped of topsoil including the intake structure and dredge spoil pond, regraded areas, and areas for temporary and permanent erosion control features.

Permanent Topsoil Placement
Entire area used for dredge spoil pond and surrounding regraded areas will receive permanent topsoil restoration.

Permanent Aggregate Placement
Incidental.

Potential Aggregate Removal
NA – no defined laydown area.

Potential Topsoil Restoration
Incidental.

2. New 500kV Switchyard Area

Topsoil Removal
Entire area to be disturbed will be stripped of topsoil include the switchyard, parking, access road, regraded areas, and areas for temporary and permanent erosion control features.

Permanent Topsoil Placement
Side slopes and landscape areas.

Permanent Aggregate Placement
Entire switchyard.

Potential Aggregate Removal
Laydown area.

Potential Topsoil Restoration
Laydown area.

4. Northeast Laydown Area

Topsoil Removal
The area to be regraded will be stripped of topsoil along with areas for temporary and permanent erosion control features.

Permanent Topsoil Placement
Regraded area (for agricultural reuse).

Permanent Aggregate Placement
NA

Potential Aggregate Removal
Special condition: area will be restored for agricultural use.

Potential Topsoil Restoration
Special condition: area will be restored for agricultural use.

5. Power Block Area

Topsoil Removal
Entire area to be disturbed will be stripped of topsoil include the nuclear island, cooling towers, ESWEMS pond, water treatment facilities, switchyard, access roads, regraded areas, laydown areas, and areas for temporary and permanent erosion control features.

Permanent Topsoil Placement
Side slopes and landscape areas

Permanent Aggregate Placement
Switchyard area unpaved areas in the nuclear island

Potential Aggregate Removal
Laydown areas

Potential Topsoil Restoration
Laydown areas

6. Main Parking Lot Area

Topsoil Removal
Entire area to be disturbed will be stripped of topsoil include parking, access roads, regraded areas, laydown areas, and areas for temporary and permanent erosion control features.

Permanent Topsoil Placement
Side slopes and landscape areas.

Permanent Aggregate Placement
Parking area.

Potential Aggregate Removal
Laydown area.

Potential Topsoil Restoration
Laydown area.

6. SUPP Road/Lower Main Access Road and Construction Areas

Topsoil Removal
Entire area to be disturbed will be stripped of topsoil include access roads, regraded areas, laydown areas, concrete batchplant, meteorological tower, and areas for temporary and permanent erosion control features.

Permanent Topsoil Placement
Side slopes and landscape areas.

Permanent Aggregate Placement
Building parking areas.

Potential Aggregate Removal
Laydown areas and batch plant.

Potential Topsoil Restoration
Laydown areas and batch plant.

7. South Laydown Area

Topsoil Removal
Entire area to be disturbed will be stripped of topsoil including stockpile areas, laydown areas, and areas for temporary and permanent erosion control features.

Permanent Topsoil Placement
Side slopes and landscape areas.

Permanent Aggregate Placement
Access roads.

Potential Aggregate Removal
Laydown areas.

Potential Topsoil Restoration
Laydown Areas.

8. West Stockpile Area

Topsoil Removal
Entire area to be disturbed will be stripped of topsoil including soil stockpile areas, laydown areas, parking lots, and areas for temporary and permanent erosion control features.

Permanent Topsoil Placement
Side slopes and landscape areas.

Permanent Aggregate Placement
Parking areas.

Potential Aggregate Removal
Laydown areas.

Potential Topsoil Restoration
Laydown Areas.

A summary of these quantities and quantities provided via the aforementioned RFIs is presented in Table 1. Expansion and compaction factors mentioned in assumptions are used as follows:

The volume of weathered rock excavated from the power block area will be increased by factor of 1.25 and placed in construction laydown areas as permanent or temporary surfacing. The volume of competent rock excavated from the power block area will be increased by a factor of 1.55 and placed in construction laydown areas as permanent or temporary surfacing. Note that geotechnical information provided by Rizzo indicates the rock will likely crush under expected traffic and may need to be supplemented with additional aggregate from on site or from off site sources. The excavated rock is not considered satisfactory for road bed aggregate or other permanent structural uses.

Soil totals excavated from all areas will be placed in soils stockpiles and decreased by a factor of 1.05 (reduction to 95% or the original volumes).

Note that as additional geotechnical information becomes available for the stockpile areas, quantities may need to be slightly adjusted.

Acceptance criteria consist of confirmation and checking of the above aggregate and topsoil quantities. Acceptance criteria for the rock and sand/gravel quantities is based on the prior acceptance by PPL and UniStar of the referenced reports. Acceptable range for earthwork quantity estimates is within the range of 3 to 5 % due to rounding, variability in estimate methods, and varied compaction rates.

As noted, removal of aggregate and placement of topsoil in construction laydown areas is subject to decisions made after site completion. Some areas will likely be revegetated and others left aggregate surfaced for additional parking and equipment storage.

Road bed aggregate is included as a single quantity using an average thickness of 12 inches and the widths shown on the drawings.

7. EVALUATION AND RESULTS

The following quantities are a summation of the earthwork balances as presented in Table 1:

Topsoil	
Removal	**409,700 cy**
Permanent Initial Placement	**116,500 cy**
Balance To Be Stockpiled If No Further Restoration	**293,200 cy**
Potential Topsoil Restoration	**148,000 cy**
Balance To Be Stockpiled With Full Restoration	**145,200 cy**

Aggregate Surfacing	
Permanent Initial Placement (from off site)	**70,000 cy**
Temporary Placement (from on site rock)	**148,000 cy**
Available Competent Rock On Site (with 1.55 bulking)	**96,100 cy**
Available Weathered Rock On Site (with 1.25 bulking)	**123,700 cy**
Available Rock Volume After Temporary Placement (for laydown surfacing repair and other use)	**71,800 cy**
Aggregate Road Bedding	
Permanent Road Bedding	**50,000 cy**
Potential Restoration	
Temporary Aggregate/Soil Removal/Reuse	**148,000 cy**
Topsoil Restoration	**148,000 cy**
Soil Excavation	
Competent Rock (include in total)	**62,000 cy**
Weathered Rock (include in total)	**99,000 cy**
Total Excavation	**8,842,200 cy**
Volume after Placement Compaction (0.95)	**8,400,100 cy**
Soil Placement	
Cohesive Fill (include in total)	**359,000 cy**
Safety Related Concrete (included in total)	**200,000 cy**
Total Placement	**8,722,300 cy**
Balance of Earthwork Excess Cut	**322,210 cy**

The resulting values indicate that after compaction, there may be a shortage of approximately 300,000 cy of soil to achieve the grades shown. This is acceptable as the soil spoil fill grading is not required. Note that the balance of excess cut is within 3.5 percent of the overall quantities. Quantity estimates in this range of variability is expected.

8. LIMITATIONS

This conceptual evaluation is made to support the COLA and to provide the basis for the detailed design. Verification of the inputs, assumptions, and limitations shall be performed during the

detailed design stage as more detailed information becomes available and after more soil borings are performed in the areas outside the power block.

9. CONCLUSIONS

The conceptual site grading meets all the design requirements of the S&L Civil Design Guideline (CDG-018), "Plant Site Grading" and S&L Civil Design Standard (SDS-06.0), "Plan Site Drainage and Erosion Control" to the greatest extent possible, considering the design constraints of the power block and cooling tower site elevations, itemized inputs and assumptions. The slopes of the roads meet AASHTO Standards. Upon receipt of detailed geotechnical information and during final design of the site, elevations of the site and quantities will be adjusted as necessary to refine the earthwork quantities.

10. REFERENCES

1. S&L Drawing No. SK-12198-400-001, Rev. 4, "Reduced Scale Site Utilization Plot Plan"
2. S&L Drawing No. SK-12198-400-002, Rev. 4 "Site Utilization Plot Plan", Sheets 1-4
3. S&L Drawing No. SK-12198-400-015, Rev. 6, "Grading and Drainage", Sheets 1 thru 12
4. AASHTO – Policy on Geometric Design of Highways and Streets, 5th Edition.
5. Paul C. Rizzo Associates, Inc., Consultants, Response to RFI SL-BBNPP-132, Approved for Use by UniStar, August 20, 2010 (Final Boring Logs)
6. Paul C. Rizzo Associates, Inc., Consultants, Response to RFI SL-BBNPP-149, Approved for Use by UniStar, August 31, 2010 (Excavation Plans)
7. Slope Stability Analyses, S&L letter number SL-BBNPP-781 dated 10/8/2010 issued 2010-10165 Revision 0 for Use.

11. TABLES, ATTACHMENTS AND FIGURES (note, previous Attachments and Figures no longer applicable to this report revision have been deleted and listed as VOID)

Table 1 – SUMMARY OF EARTHWORK QUANTITIES
Attachment 001 - S&L Letter Number SL-BBNPP-541, Meeting Notes – BBNPP Plot Plan Meeting.
Attachment 002A - Response to RFI No. SL-BBNPP-101-R1 dated January 22, 2010 (VOID)
Attachment 002B - Response to RFI No. SLBBNPP-126, dated June 02, 2010.
Attachment 003 - Civil 3D Computer Output Data Pages, Areas A, B, and C (VOID)
Figure 001, Sketch from Benjamin Ehrhart of LandStudies (VOID)
Figure 002, Breakup of Areas for Earthwork Calculations (VOID)
Figure 003, Power Block Elevations (VOID)
Figure 004, Parking Lot Elevations (VOID)
Figure 005, Construction Laydown Area Elevations (VOID)
Figure 006, Topsoil Stripping Areas
Figure 007, Permanent Aggregate Placement Areas
Figure 008, Temporary Aggregate Placement Areas and Potential Topsoil Restoration Areas

TABLE 1
SUMMARY OF EARTHWORK QUANTITIES

Area Designation	Description	Site Preparation: Topsoil Removal	Site Preparation: Initial Topsoil Restoration	Site Preparation: Topsoil Stockpile Placement	Excavation: Competent Rock	Excavation: Weathered Rock	Excavation: Soil	Placement: Safety Related Cohesive Soils (from off site)	Placement: Safety Related Concrete (from off site)	Placement: General Fill (from on site)	Placement: Permanent Aggregate (from off site)	Potential Post Construction Restoration: Temporary Aggregate Placement and Aggregate Removal	Potential Post Construction Restoration: Potential Topsoil Placement
1	INTAKE AREA	6,200	4,800	1,400	0	0	0	0	0	43,100	0	0	0
2	SWITCHYARD	19,900	11,200	8,700	0	0	131,900	0	0	0	4,900	4,700	4,700
3	NORTHEAST LAYDOWN	6,100	6,100	0	0	0	0	0	0	0	0	0	0
4	POWER BLOCK (INCLUDES GIS SWITCHYARD, COOLING TOWERS AND NORTH CENTRAL LAYDOWN)	139,400	21,200	118,200	62,000 *	99,000 *	7,925,300	359,000 *	200,000 *	1,622,000	35,400	35,100	35,100
5	PARKING	37,000	4,300	32,700	0	0	234,000	0	0	1,149,300	24,000	1,700	1,700
6	SUPP ROAD (INCLUDES QUARRY, BATCHPLANT, CENTRAL LAYDOWN)	136,300	26,100	110,200	0	0	296,400	0	0	2,292,400	2,800	81,500	81,500
7	SOUTH LAYDOWN	51,500	35,700	15,800	0	0	115,600	0	0	3,102,100	2,900	12,500	12,500
8	WEST LAYDOWN	13,300	7,100	6,200	0		139,000	0	0	513,400	0	12,500	12,500
	Totals	409,700	116,500	293,200	62,000 *	99,000 *	8,842,200	359,000 *	200,000 *	8,722,300	70,000	148,000	148,000

		Bulking X 1.55 =	Bulking X 1.25 =	Soil Bulking (for haul only)
Topsoil Remaining Without Final Restoration in Stockpiles	293,200	Available Rock	96,100	123,700	X 1.23 =
Topsoil Remaining With Final Restoration in Stockpiles	145,200		Rock Total	219,800	10,875,900
					Reduction for Placement Compaction X 0.95=
					8,400,100

Road Bed Aggregate	50,000 (from off site)
Balance of Remaining Rock (uncompacted)	71,800

Fill Shortage with Compaction	322,200

All Quantities in Cubic Yards Rounded to Nearest 100
Included in total Excavation and Placement Volumes *

Robert A. Hameetman, P.E. (IL)
Senior Project Manager
312-269-6482
312-269-2028 – fax
Robert.a.hameetman@sargentlundy.com

Date: December 23, 2009
Project No. 12198-415
Letter No. SLL-BBNPP-542
File No. 2.02

UniStar Nuclear
Bell Bend Nuclear Power Plant

Meeting Notes, Rev. 1 – BBNPP Plot Plan Meeting

Mrs. Katie Woodring
Administrative Assistant
PPL Nuclear Development
38 Bomboy Lane, Suite 2
Berwick, PA 18603

Dear Mrs. Woodring:

Attached are the revised meeting notes and action items from the December 16, 2009 Meeting to review LandStudies comments on the BBNPP Plot Plan for the relocated powerblock.

If you have any questions, please contact me at 312.269.6482.

Yours very truly,

R. A. Hameetman
Senior Project Manager

RAH:
Copies:
All Attendees
V. Kelly
S. Geier

Meeting Notes UniStar Bell Bend Nuclear Power Plant Storm Water Management – Rev. 1 Enhancements to the SUPP Meeting Held Dec. 16, 2009 Sargent & Lundy Offices

Participants:

Michael Detamore	)	Pennsylvania Power and Light
David Sullivan	)	UniStar Nuclear
Dimitri Lutchenkov	)	
Dave Klinch (attended by phone)		
Benjamin Ehrhart	)	LandStudies
Joe Mullen (attended by phone)	)	Pennoni Associates
Robert Hameetman	)	
Maury Pressburger	)	
Homer Taylor	)	Sargent & Lundy
AK Chatterji	)	
Ronald Cook	)	
Nick DiGuilio	)	
Frank Shainauskas (Part Time)	)	

The purpose of the meeting was to review LandStudies comments on the relocated Powerblock SUPP and for the project team to discuss how the SUPP could be enhanced from a Storm Water Management prospective. Topics discussions were as follows:

1. Confers Lane:
   - Confers Lane will be permanently closed from the start of the wetlands when coming from the north side and at the PPL property line when coming from the south side.
   - The right-of-way for Confers Lane is 33 to 40 feet wide. A hammerhead turnaround at the end of the road on both the north and south sides, will be utilized.
   - On the SUPP, the portion of the road that will be removed will be "dashed" and labeled "To Be Abandoned".
   - LSI has the future action to confer with the appropriate agencies to determine the final disposition of the road bed in the vicinity of the two wetland areas that exist on both sides of Confers Lane.
2. Existing Switchyard:
   - Remove the extension to the existing switchyard from the SUPP.
   - Straighten the fence on the west side. A 5th bay will be added.
   - Move the transmission lines so that they go into the existing switchyard at Bay 5.
   - The fence on the east side may be moved about 10 feet but will not be shown on the SUPP until finalized by PPL.

3. 500 kv Conceptual Transmission Line Routes and Relocated 230 kV Transmission Line route

    - PPL will confirm the conceptual routes and tower locations for 500 kV transmission system which are currently shown on the SUPP. The towers will not be in the wetlands.
    - PPL will provide S&L a routing for the line after an internal meeting with PPL EU on January 13, 2010.

4. Construction Lay down Areas (West, by North Market Street)
    - The construction laydown areas abutting the east side of N. Market St.(parking area 3 and part of parking area 1) will be used for mitigation purposes due to enhancement to Walker Run (meandering). The areas are to be labeled "Walker Run Mitigation".
    - Move the fence to the right-of-way line for N. Market St.
    - No guard house will be required.
    - The berm should be removed.
    - Span of bridge to be extended to accommodate Walker Run meandering.
    - UniStar (S. Geier) to verify acceptability from a security standpoint.

5. Teardrop Wetland
    - An 8" PVC line now connects the teardrop wetland with the wetland to the south. It has about 2 feet of cover. Pipe will likely need to be replaced.
    - Move the pump house for the ESWEMS pond a bit north and show a trench into the protected area to all sets of UHS cooling towers. A secure trench with missile protection is required for makeup water lines from the pond to each cooling tower.
    - To enable a surface connection between the teardrop wetland and the unnamed tributary, show an open trench to be installed after construction is complete. Provide about 30 feet bottom width. The open trench is to start past the secure trench from the ESWEMS pond. The crossing beneath the heavy duty haul road shall be an open bottom concrete box culvert.
    - Move the firehouse/first aid station to an open area just east of the plant entrance.
    - Maintain the hydrology to the wetland as much as possible. Some of the water from the powerblock and some from the area west of the switchyard should flow into the wetland. The State DEC is concerned with the temperature of water returned to the wetlands and the water should be treated before it is drained to the wetland. The water should first be drained through an infiltration bed.
    - The trees in the wetland will all be cleared. Part of the mitigation plan will be to plant shrubs in the wetland.
    - S&L to issue an RFI (for Rizzo) to determine maximum flow from the teardrop Wetland.

6. Temporary Ground Water Storage Pond
    - Issue an RFI to Rizzo to determine if the temporary groundwater storage pond near the teardrop wetland is required.
    - If the pond is not required, eliminate some of the wall around the teardrop wetland and slope the fill into the wetland.

7. Maintain Hydrology
    - The retaining walls should have holes so that groundwater hydrology is maintained and so that groundwater does not buildup behind the walls.

8. Dredge Pond
   - More precise sizing of the dredge pond may be useful at this time. A discussion with D. Klinch will be set in the near future to address needs.

9. Drainage
   - S&L needs to maintain the hydrology of the existing drainage areas as much as possible. It is preferred that the storm water not be drained through a pond.
   - There could be more storm water features dispersed around the site, by installing infiltration basins and bioswales. An infiltration basin has a rock cover. A bioswale has a vegetated cover.

10. Batch Plant
    - A temporary pond will be installed adjacent to the batch plant to be used during construction. After the batch plant is removed the area can be covered with topsoil and seeded. The seeded areas can be drained to the natural drainage course.

11. Earthwork Report
    - Additional data is required to complete the Earthwork Report.
    - A list of data required will be generated by the Project team and will be sent to UniStar by Jan. 15, 2010. (i.e. thickness of topsoil used, infiltration used in the design of the infiltration trenches, shrinkage and expansion of sand and gravel and rock, etc). The list of data will be issued in an RFI.
    - "Finalize" the Earthwork Report, identify the report as preliminary, and issue it by about Jan. 15, 2010.
    - Infiltration tests need to be completed where infiltration trenches are shown to be installed on the SUPP.

12. Construction Laydown area in the NE corner of the site.
    - That area contains four wetlands that should not be graded over. Show a 20 foot setback from all wetlands. A note should be added to the SUPP that Orange construction fence should be put around each wetland.

13. Grading and Drainage Drawings
    - A note should be added to the Grading and Drainage drawings that "elevations are preliminary".

14. Drawing for January 13, 2010 Meeting:
    - Provide Mike Detamore with a SUPP for the January 13, 2010 meeting. Make the changes discussed above and have the Transmission lines shown in BOLD.

Summary Actions:

S&L: 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
PPL: 3
UniStar: 4
LSI: 1

Copies;
- All Attendees
- S. Geier
- V. Kelly

UniStar NUCLEAR	REQUEST FOR INFORMATION (RFI)
Project: ☐ CCNPP ☒ BBNPP ☐ NMP3 ☐ Callaway	
UNE RFI Number:	Vendor RFI Number (if applicable): SL-BBNPP-126
Originator Organization: ☐ UNE ☐ AREVA ☐ Bechtel ☐ Rizzo ☒ Other (specify): S&L	
Originator: Douglas Dahlberg	Originator Phone Number: 312-269-2402
COLA Parts Affected (if known): ☐ FSAR ☐ ER ☐ EP ☐ TS ☐ ITAAC ☐ Other (specify):	
Sections Affected (if known):	
Requested Information: Rev. 3 of the Conceptual Grading and Drainage Drawings and the associated Conceptual Grading and Earthwork Report are scheduled to be issued 05/11/10. Rev. 2 of the Conceptual Stormwater Management Design and the associated drawings are scheduled to be issued 05/10/10. To complete the next revision of the Conceptual Grading and Drainage Drawings, associated Earthwork Report, Conceptual Stormwater Management Report, please provide the following: 1. Topsoil thicknesses For the areas noted within the Limits of Disturbance drawing, 04/12/2010, FOR USE, REV 1, # SK-12198-421-001, of the • 500kV Switchyard # 2, • Area west of Market Street, • Laydown area south of HWY 11, • Laydown area east of HWY 11.	
Date Requested: 05/05/2010	Date Required (if known): 05/14/2010
UNE Point of Contact: Federico Perdomo	
Response Provided By: ☐ UNE ☐ AREVA ☐ Bechtel ☒ Rizzo ☐ Other (specify):	
Response Document: See transmittal letter from RIZZO.	
Date Response Provided: 06/02/10	
Reviewer Name/Organization: JohnPaul Ginta / RIZZO	
Reviewer Name/Organization: William Kline / UNE (See attached)	
Reviewer Name/Organization: Dave Kinch / UNE (See attached)	
Released for Use (Name/Date): [illegible] 6/3/10	
Date Response Forwarded to Requestor: 6/4/2010	

ENGINEERS & CONSULTANTS

Paul C. Rizzo Associates, Inc.
500 Penn Center Boulevard • Penn Center East, Building 5, Suite 100 • Pittsburgh, PA 15235
Phone (412) 856-9700 • Fax (412) 856-9749
www.rizzoassoc.com

June 2, 2010
Project No. 10-4310

Mr. Steve Geier
UniStar Nuclear Development LLC
750 Pratt Street, 14th Floor
Baltimore, MD 21202

TRANSMITTAL
RFI SL-BBNPP-126
BELL BEND NUCLEAR POWER PLANT

Dear Mr. Geier:

Paul C. Rizzo Associates, Inc. has prepared the response to the above referenced RFI. Below is the estimated topsoil thicknesses for the areas requested in the RFI. This is based on the review of the aerial photo drawings located in the PPL Bell Bend offices.

- 500kV Switchyard # 2 – forested area 6-9"
- Area west of Market Street – cultivated area 6-12"
- Laydown area south of HWY 11 – forested area 6-9"
- Laydown area east of HWY 11 – cultivated area 6-12"

If you have any questions or need additional information, please do not hesitate to call me at (412) 825-2090, or e-mail me at jp.giunta@rizzoassoc.com.

Sincerely,
Paul C. Rizzo Associates, Inc.

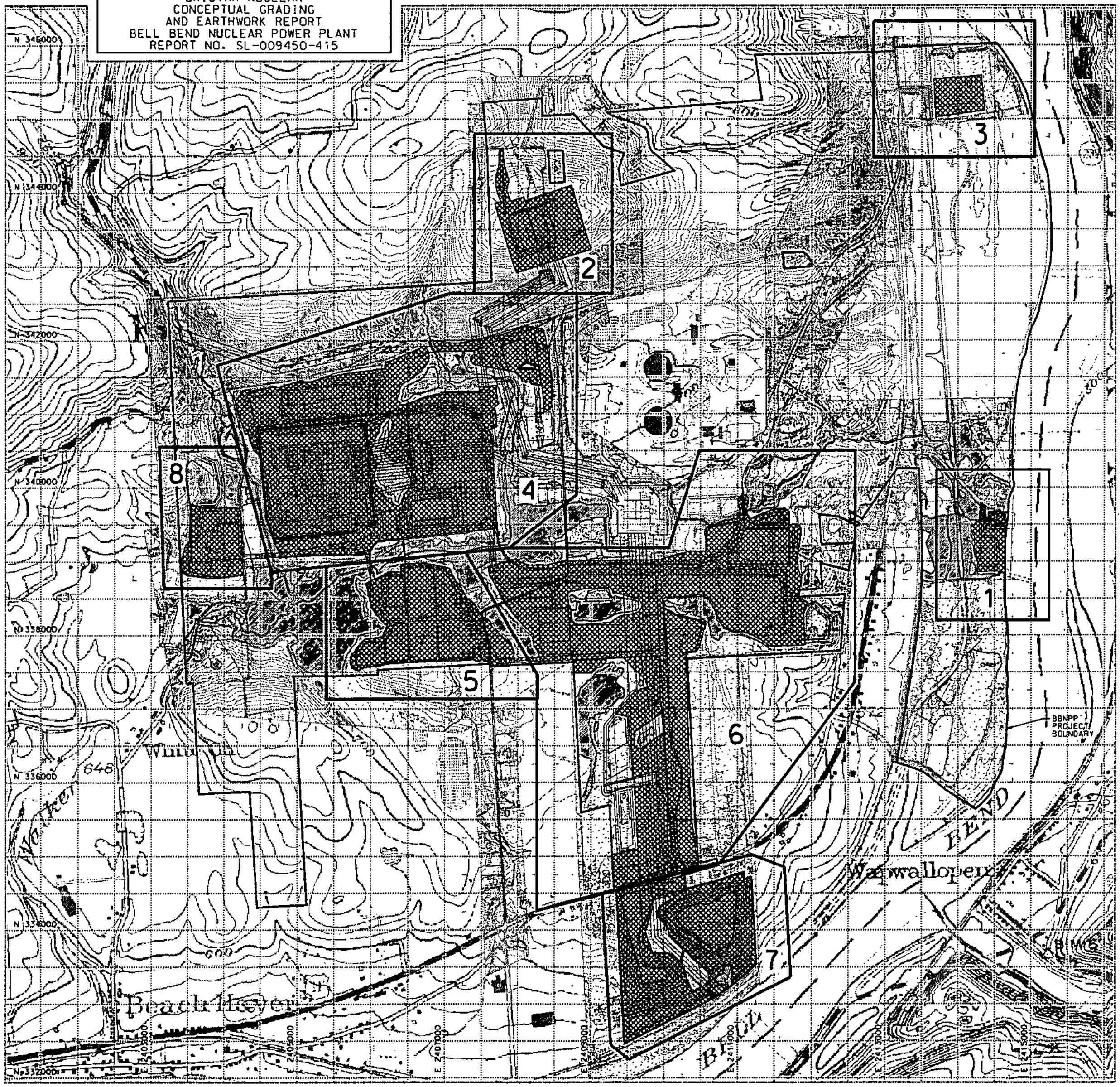
John Paul Giunta, P.E.
Project Manager

JPG/mdt/crb

Enclosures

UNISTAR NUCLEAR
CONCEPTUAL GRADING
AND EARTHWORK REPORT
BELL BEND NUCLEAR POWER PLANT
REPORT NO. SL-009450-415

PROJECT NO. 12198-434
AUG 31, 2011 REV.9
PAGE 1 OF 1



LEGEND

TOPSOIL STRIPPING

NOT FOR CONSTRUCTION

NON-SAFETY RELATED

NOTES

1. BACKGROUND LOCATION AND TOPOGRAPHY TAKEN FROM RESPONSE TO RFI'S SL-BBNPP-195, 197, AND 208.
2. INFORMATION IS PRESENTED FOR GRAPHIC PURPOSES ONLY.

REFERENCE DRAWINGS

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUBCONTRACTOR(S)) PERFORMING THE WORK.

5.33°
PLANT NORTH
TRUE NORTH

600' 0 600' 1200'
GRAPHIC SCALE

FILENAME: grad-earthwork-figure006.dgn

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE
0A	08-15-2011	N. DIGIULIO	D. DAHLBERG	—	FOR OAR
0	08-31-2011	N. DIGIULIO	D. DAHLBERG	—	FOR USE

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE

SCALE 1"=600'
PROJECT NUMBER 12198-434

TOPSOIL STRIPPING AREAS

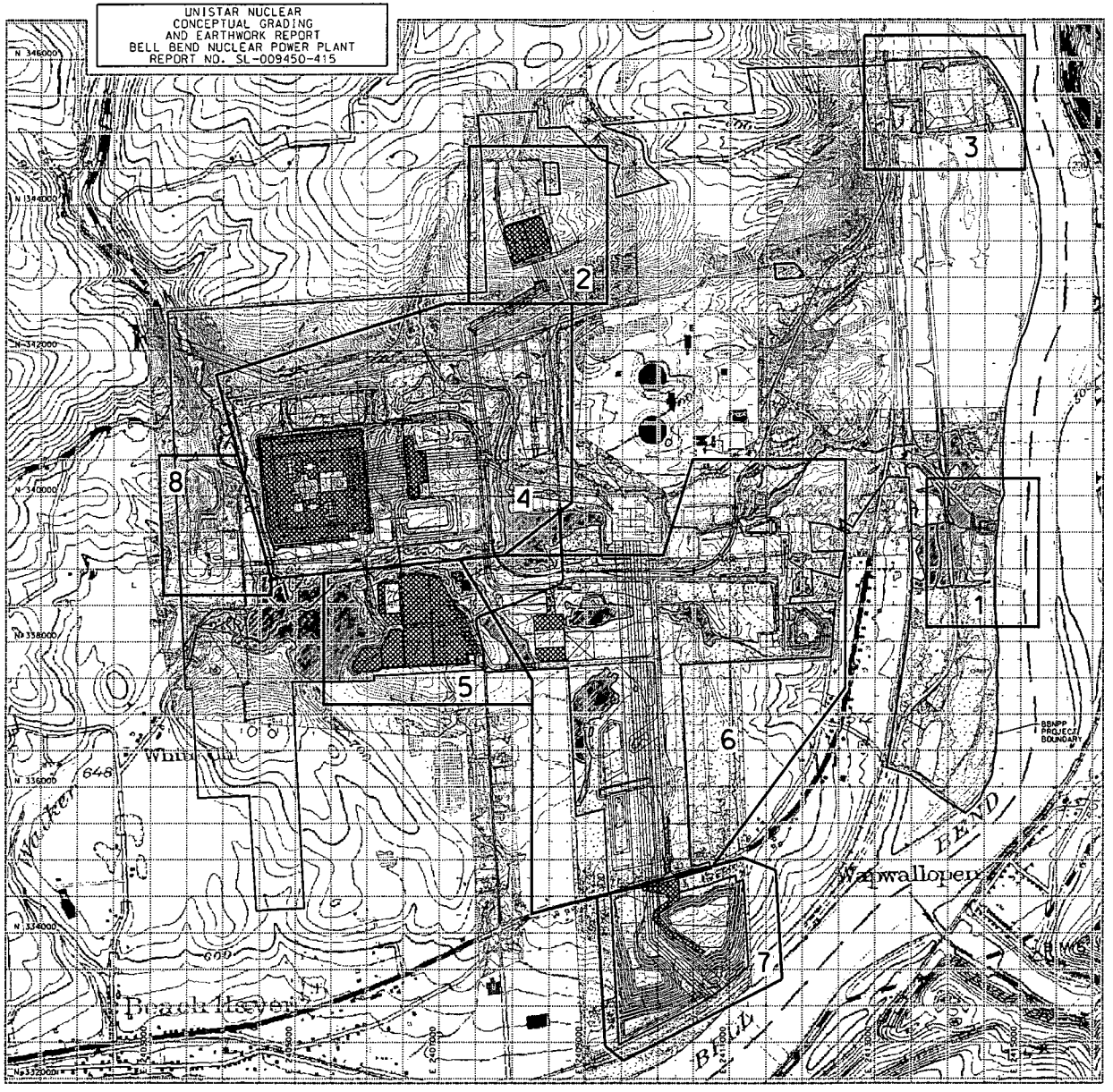
BELL BEND NUCLEAR POWER PLANT
UNISTAR NUCLEAR
PENNSYLVANIA

Sargent & Lundy

DRAWING NO. FIGURE 006 REV. 0
SHEET OF

UNISTAR NUCLEAR
CONCEPTUAL GRADING
AND EARTHWORK REPORT
BELL BEND NUCLEAR POWER PLANT
REPORT NO. SL-009450-415

PROJECT NO. 12198-434
AUG. 31, 2011 REV.9
PAGE 1 OF 1



LEGEND

PERMANENT AGGREGATE SURFACING

NOT FOR CONSTRUCTION

NON-SAFETY RELATED

NOTES

1. BACKGROUND LOCATION AND TOPOGRAPHY TAKEN FROM RESPONSE TO RFI'S SL-BBNPP-195, 197, AND 208.
2. INFORMATION IS PRESENTED FOR GRAPHIC PURPOSES ONLY.

REFERENCE DRAWINGS

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUBCONTRACTOR(S)) PERFORMING THE WORK.

PLANT NORTH
5.33°
TRUE NORTH

600' 0 600' 1200'
GRAPHIC SCALE

FILENAME: grad-earthwork-figure007.dgn

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE
0A	08-15-2011	N. DIGIULIO	D. DAHLBERG	——	FOR DAR
0	08-31-2011	N. DIGIULIO	D. DAHLBERG	——	FOR USE

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE

SCALE	1"=600'
PROJECT NUMBER	12198-434

PERMANENT AGGREGATE SURFACING AREAS

BELL BEND NUCLEAR POWER PLANT
UNISTAR NUCLEAR
PENNSYLVANIA

Sargent & Lundy

DRAWING NO.	REV.
FIGURE 007	0
SHEET	OF

UNISTAR NUCLEAR
CONCEPTUAL GRADING
AND EARTHWORK REPORT
BELL BEND NUCLEAR POWER PLANT
REPORT NO. SL-009450-415

PROJECT NO. 12198-434
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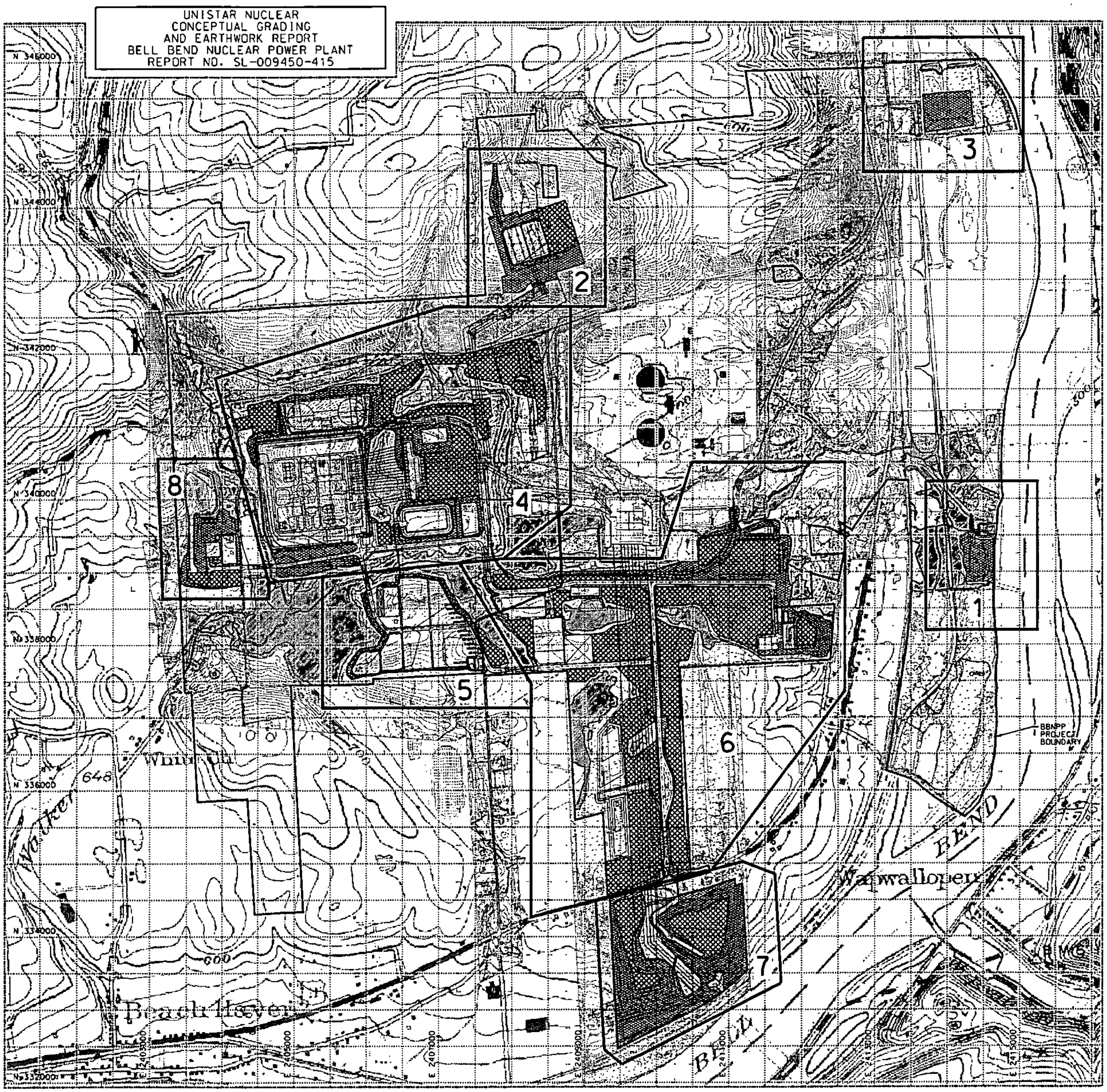
PAGE 1 OF 1



LEGEND

PERMANENT TOPSOIL PLACEMENT

TEMPORARY AGGREGATE PLACEMENT AND POTENTIAL TOPSOIL RESTORATION

NOT FOR CONSTRUCTION

NON-SAFETY RELATED

NOTES

1. BACKGROUND LOCATION AND TOPOGRAPHY TAKEN FROM RESPONSE TO RFI'S SL-BBNPP-195, 197, AND 208.
2. INFORMATION IS PRESENTED FOR GRAPHIC PURPOSES ONLY.

REFERENCE DRAWINGS

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PLANT NORTH 5.33° TRUE NORTH

600' 0 600' 1200'
GRAPHIC SCALE

FILENAME: grad-earthwork-figure008.dgn

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE
0A	08-15-2011	N. DIGIULIO	D. DAHLBERG	—	FOR OAR
0	08-31-2011	N. DIGIULIO	D. DAHLBERG	—	FOR USE

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE

SCALE 1"=600'
PROJECT NUMBER 12198-434

PERMANENT TOPSOIL PLACEMENT AND TEMPORARY AGGREGATE PLACEMENT & POTENTIAL TOPSOIL RESTORATION

BELL BEND NUCLEAR POWER PLANT
UNISTAR NUCLEAR
PENNSYLVANIA

Sargent & Lundy

DRAWING NO. FIGURE 008 REV. 0
SHEET OF

In response to Comment number 4 of PADEP's November 4th e-mail regarding project emissions outside of the Scranton-Wilkes Barre ozone maintenance area:

Indirect construction related emissions from mobile sources were further analyzed in the 8-hour ozone maintenance areas (OMA) outside the Scranton Wilkes-Barre (SWB) OMA. The Bell Bend Nuclear Power Plant (BBNPP) is located within the SWB maintenance area. This analysis considered mobile source emissions of VOC and NO_X associated with the daily construction commuter workforce, as well as commercial deliveries and truck traffic in and out of the Bell Bend construction site that are estimated to originate or pass through these other maintenance areas.

The Fuel Consumption and Traffic Studies indicated that the construction phase of the project would potentially impact two other OMAs; the Allentown-Bethlehem-Easton (ABE) OMA and Reading OMA. Specifically, approximately 16% of the construction workforce commuters would originate from Carbon County, located in the ABE OMA, and 10% of the vehicle-miles-traveled by commercial and truck traffic to and from the site would occur in the Reading OMA and/or the ABE OMA. Spreadsheets were developed to generate VOC and NO_X emissions in the Reading and ABE OMAs over the project's seven year construction period. MOVES emission factors, developed for the SWB OMA, were also used for these two areas to estimates emissions from motor vehicles.

For the commuter workforce from Carbon County (ABE OMA), mobile source emission calculations were based on the number of trips (in vehicles) that originated or passed through Carbon County (16% of the total daily construction workforce traffic to the site), the MOVES emission factor (in grams per vehicle miles), and the average round trip distance traveled (in miles) by each vehicle in Carbon County. Carbon County is just under 30 miles across diagonally; it was assumed for this analysis that the average distance traveled one way was 20 miles and round trip distance was therefore 40 miles. The most likely roads used by this commuting workforce to the Bell Bend site (the Northeast Extension and Route 93) are posted at 55 mph. For this analysis, MOVES emission factors for an average speed of 50 mph were used to account for a high percent of highway use along with a small percent of off-highway use. By multiplying the daily number of vehicles times the average distance traveled by each vehicle in Carbon County by the MOVES emissions factor in grams per vehicle-mile, VOC and NO_X emissions for Carbon County were calculated in grams per day. These values were then converted to tons per years assuming the work force traveled to the site six days per week. Emissions from vehicle startups were added to the emissions estimate assuming one startup per vehicle trip.

For commercial deliveries to the site, the Fuel Consumption and Traffic Studies judged that 10% of the vehicle-miles-traveled (VMT) by these vehicles was in either the Reading or ABE OMAs. Since no split was provided for each county individually, it was assumed here that 10% could be in either the Reading OMA or ABE OMA. Annual VMT was multiplied by the MOVES emission factor (given in grams per vehicle mile), for each year of the seven year construction period, to provide annual VOC and NO_X emissions. The MOVES emission factors were based on an average truck speed of 40 mph. Annual emission factors in grams per year were then converted to tons per year. Emissions from vehicle startups were added to the emissions estimate assuming one startup per vehicle trip.

For the ABE OMA, annual emissions were summed for both the commuter workforce and commercial/truck deliveries. For the Reading OMA, emissions were only based on commercial/truck deliveries as no construction workforce is expected from this area. The following tables summarize these results. Maximum annual emissions for any year or either OMA are 1.10 tons per year of VOC and 7.12 tons per year of NO_X. Tables showing the values derived for each of the construction years are also provided.

BBNPP Indirect construction emissions in Allentown-Bethlehem-Easton Ozone Maintenance Area

	NOx				VOC			
	Workforce Commuting	Comm. & Const. Deliveries	Total NO_X (tons)	Exceeds Conformity Threshold? (Yes/No)	Workforce Commuting	Comm. & Const. Deliveries	Total VOC (tons)	Exceeds Conformity Threshold? (Yes/No)
Year 1	0.18	0.26	**0.44**	No	0.05	0.01	**0.07**	No
Year 2	0.64	4.80	**5.45**	No	0.19	0.26	**0.45**	No
Year 3	1.99	5.13	**7.12**	No	0.52	0.28	**0.80**	No
Year 4	3.88	1.51	**5.39**	No	1.02	0.08	**1.10**	No
Year 5	3.88	0.82	**4.70**	No	1.02	0.04	**1.06**	No
Year 6	2.04	0.46	**2.50**	No	0.54	0.03	**0.56**	No
Year 7	0.41	0.44	**0.85**	No	0.11	0.02	**0.13**	No

BBNPP Indirect construction emissions in Reading Ozone Maintenance Area

	NOx				VOC			
	Workforce Commuting	Comm. & Const. Deliveries	Total NO_X (tons)	Exceeds Conformity Threshold? (Yes/No)	Workforce Commuting	Comm. & Const. Deliveries	Total VOC (tons)	Exceeds Conformity Threshold? (Yes/No)
Year 1	0	0.26	**0.26**	No	0	0.01	**0.01**	No
Year 2	0	4.80	**4.80**	No	0	0.26	**0.26**	No
Year 3	0	5.13	**5.13**	No	0	0.28	**0.28**	No
Year 4	0	1.51	**1.51**	No	0	0.08	**0.08**	No
Year 5	0	0.82	**0.82**	No	0	0.04	**0.04**	No
Year 6	0	0.46	**0.46**	No	0	0.03	**0.03**	No
Year 7	0	0.44	**0.44**	No	0	0.02	**0.02**	No

Commuter Workforce Emissions Allentown-Bethlehem-Easton (A-B-E) Ozone Maintenance Area

Year 1

	tons/running	tons/startups	tons/Year 1
VOC	0.02	0.03	0.05
NOX	0.16	0.01	0.18

Emissions from Running	Total Project Daily Vehicles (Veh/day)	Percent Vehicles From A-B-E Ozone Maintenance Area	Miles Traveled in A-B-E Ozone Maintenance Area (mi)	A-B-E Daily VMT (veh-mi/day)	Emission Factor* (grams/veh-mi)	Annual Emissions (tons/year)
VOC	115	16%	40	736	0.0926	0.02
NOx	115	16%	40	736	0.6339	0.16

*Based on average speed of 50 mph.

Emissions from startups	7-8AM EF (grams/ Vehicle-Start)	4-5PM EF (grams/ Vehicle-Start)	Mid-1AM EF (grams/ Vehicle-Start)	Avg EF (grams/ Vehicle-Start)	Vehicle Starts per Day	Startup Emissions/Day (Grams/Day)	Startup Emissions/Day (Tons/year)
VOC	3.907	2.667	3.574	3.047	19	87	0.030
NOX	1.601	1.438	1.565	1.491	19	42	0.015

Commuter Workforce Emissions Allentown-Bethlehem-Easton (A-B-E) Ozone Maintenance Area

Year 2

	tons/running	tons/startups	tons/Year 2
VOC	0.09	0.11	0.19
NOX	0.59	0.05	0.64

Emissions from Running	Total Project Daily Vehicles (Veh/day)	Percent Vehicles From A-B-E Ozone Maintenance Area	Miles Traveled in A-B-E Ozone Maintenance Area (mi)	A-B-E Daily VMT (veh-mi/day)	Emission Factor* (grams/veh-mi)	Annual Emissions (tons/year)
VOC	423	16%	40	2,707	0.0926	0.09
NOx	423	16%	40	2,707	0.6339	0.59

*Based on average speed of 50 mph.

Emissions from startups	7-8AM EF (grams/ Vehicle-Start)	4-5PM EF (grams/ Vehicle-Start)	Mid-1AM EF (grams/ Vehicle-Start)	Avg EF (grams/ Vehicle-Start)	Vehicle Starts per Day	Startup Emissions/Day (Grams/Day)	Startup Emissions/Day (Tons/year)
VOC	3.907	2.667	3.574	3.047	68	311	0.107
NOX	1.601	1.438	1.565	1.491	68	152	0.052

Commuter Workforce Emissions Allentown-Bethlehem-Easton (A-B-E) Ozone Maintenance Area

Year 3

	tons/running	tons/startups	tons/Year 3
VOC	0.27	0.25	0.52
NOX	1.87	0.12	1.99

Emissions from Running	Total Project Daily Vehicles (Veh/day)	Percent Vehicles From A-B-E Ozone Maintenance Area	Miles Traveled in A-B-E Ozone Maintenance Area (mi)	A-B-E Daily VMT (veh-mi/day)	Emission Factor* (grams/veh-mi)	Annual Emissions (tons/year)
VOC	1,500	16%	40	9,600	0.0816	0.27
NOx	1,500	16%	40	9,600	0.5637	1.87

*Based on average speed of 50 mph.

Emissions from startups	7-8AM EF (grams/ Vehicle-Start)	4-5PM EF (grams/ Vehicle-Start)	Mid-1AM EF (grams/ Vehicle-Start)	Avg EF (grams/ Vehicle-Start)	Vehicle Starts per Day	Startup Emissions/Day (Grams/Day)	Startup Emissions/Day (Tons/year)
VOC	3.907	2.667	3.574	3.047	240	731	0.252
NOX	1.601	1.438	1.565	1.491	240	358	0.123

Commuter Workforce Emissions Allentown-Bethlehem-Easton (A-B-E) Ozone Maintenance Area

Year 4

	tons/running	tons/startups	tons/Year 4
VOC	0.53	0.49	1.02
NOX	3.64	0.24	3.88

Emissions from Running	Total Project Daily Vehicles (Veh/day)	Percent Vehicles From A-B-E Ozone Maintenance Area	Miles Traveled in A-B-E Ozone Maintenance Area (mi)	A-B-E Daily VMT (veh-mi/day)	Emission Factor* (grams/veh-mi)	Annual Emissions (tons/year)
VOC	2,923	16%	40	18,707	0.0816	0.53
NOx	2,923	16%	40	18,707	0.5637	3.64

*Based on average speed of 50 mph.

Emissions from startups	7-8AM EF (grams/ Vehicle-Start)	4-5PM EF (grams/ Vehicle-Start)	Mid-1AM EF (grams/ Vehicle-Start)	Avg EF (grams/ Vehicle-Start)	Vehicle Starts per Day	Startup Emissions/Day (Grams/Day)	Startup Emissions/Day (Tons/year)
VOC	3.907	2.667	3.574	3.047	468	1426	0.492
NOX	1.601	1.438	1.565	1.491	468	698	0.241

Commuter Workforce Emissions Allentown-Bethlehem-Easton (A-B-E) Ozone Maintenance Area

Year 5

	tons/running	tons/startups	tons/Year 5
VOC	0.53	0.49	1.02
NOX	3.64	0.24	3.88

Emissions from Running	Total Project Daily Vehicles (Veh/day)	Percent Vehicles From A-B-E Ozone Maintenance Area	Miles Traveled in A-B-E Ozone Maintenance Area (mi)	A-B-E Daily VMT (veh-mi/day)	Emission Factor* (grams/veh-mi)	Annual Emissions (tons/year)
VOC	2,923	16%	40	18,707	0.0816	0.53
NOx	2,923	16%	40	18,707	0.5637	3.64

*Based on average speed of 50 mph.

Emissions from startups	7-8AM EF (grams/ Vehicle-Start)	4-5PM EF (grams/ Vehicle-Start)	Mid-1AM EF (grams/ Vehicle-Start)	Avg EF (grams/ Vehicle-Start)	Vehicle Starts per Day	Startup Emissions/Day (Grams/Day)	Startup Emissions/Day (Tons/year)
VOC	3.907	2.667	3.574	3.047	468	1426	0.492
NOX	1.601	1.438	1.565	1.491	468	698	0.241

Commuter Workforce Emissions Allentown-Bethlehem-Easton (A-B-E) Ozone Maintenance Area

Year 6

	tons/running	tons/startups	tons/Year 6
VOC	0.28	0.26	0.54
NOX	1.91	0.13	2.04

Emissions from Running	Total Project Daily Vehicles (Veh/day)	Percent Vehicles From A-B-E Ozone Maintenance Area	Miles Traveled in A-B-E Ozone Maintenance Area (mi)	A-B-E Daily VMT (veh-mi/day)	Emission Factor* (grams/veh-mi)	Annual Emissions (tons/year)
VOC	1,538	16%	40	9,843	0.0816	0.28
NOx	1,538	16%	40	9,843	0.5637	1.91

*Based on average speed of 50 mph.

Emissions from startups	7-8AM EF (grams/ Vehicle-Start)	4-5PM EF (grams/ Vehicle-Start)	Mid-1AM EF (grams/ Vehicle-Start)	Avg EF (grams/ Vehicle-Start)	Vehicle Starts per Day	Startup Emissions/Day (Grams/Day)	Startup Emissions/Day (Tons/year)
VOC	3.907	2.667	3.574	3.047	247	753	0.260
NOX	1.601	1.438	1.565	1.491	247	368	0.127

Commuter Workforce Emissions Allentown-Bethlehem-Easton (A-B-E) Ozone Maintenance Area

Year 7

	tons/running	tons/startups	tons/Year 7
VOC	0.06	0.05	0.11
NOX	0.38	0.03	0.41

Emissions from Running	Total Project Daily Vehicles (Veh/day)	Percent Vehicles From A-B-E Ozone Maintenance Area	Miles Traveled in A-B-E Ozone Maintenance Area (mi)	A-B-E Daily VMT (veh-mi/day)	Emission Factor* (grams/veh-mi)	Annual Emissions (tons/year)
VOC	308	16%	40	1,971	0.0816	0.06
NOx	308	16%	40	1,971	0.5637	0.38

*Based on average speed of 50 mph.

Emissions from startups	7-8AM EF (grams/ Vehicle-Start)	4-5PM EF (grams/ Vehicle-Start)	Mid-1AM EF (grams/ Vehicle-Start)	Avg EF (grams/ Vehicle-Start)	Vehicle Starts per Day	Startup Emissions/Day (Grams/Day)	Startup Emissions/Day (Tons/year)
VOC	3.907	2.667	3.574	3.047	50	152	0.053
NOX	1.601	1.438	1.565	1.491	50	75	0.026

Allentown-Bethlehem-Easton and Reading Ozone Maintenance Areas
Year 1

	tons/running	tons/startups	tons/Year 1
VOC	0.01	0.000	0.01
NOX	0.26	0.001	0.26

Emissions from running	Year 1 Project Annual VMT	Percent in ABE or Reading OMA	Annual VMT Ozone MA	EF (grams/ veh-mile)*	Ozone MA Annual Emissions (tons/year)
VOC	173,287	10%	17,329	0.720	0.01
NOX	173,287	10%	17,329	13.631	0.26

* Based on Avg of 40 MPH

Emissions from startups	4 AM EF (g/Veh.-Start)	Noon EF (g/Veh.-Start)	8 PM EF (g/Veh.-Start)	Avg EF (g/Veh.-Start)	Vehicle Starts per Year	Startup Emissions (Grams/Year)	Startup Emissions (Tons/year)
VOC	1.252	1.027	1.038	1.042	347	362	0.000
NOX	2.603	1.923	1.958	1.969	347	683	0.001

Allentown-Bethlehem-Easton and Reading Ozone Maintenance Areas
Year 2

	tons/running	tons/startups	tons/Year 2
VOC	**0.25**	**0.007**	**0.26**
NOX	**4.79**	**0.014**	**4.80**

Emissions from running	Year 2 Project Annual VMT	Percent in ABE or Reading OMA	Annual VMT Ozone MA	EF (grams/ veh-mile)*	Ozone MA Annual Emissions (tons/year)
VOC	3,186,186	10%	318,619	0.720	0.25
NOX	3,186,186	10%	318,619	13.631	4.79

* Based on Avg of 40 MPH

Emissions from startups	4 AM EF (g/Veh.-Start)	Noon EF (g/Veh.-Start)	8 PM EF (g/Veh.-Start)	Avg EF (g/Veh.-Start)	Vehicle Starts per Year	Startup Emissions (Grams/Year)	Startup Emissions (Tons/year)
VOC	1.252	1.027	1.038	1.042	6369	6636	0.007
NOX	2.603	1.923	1.958	1.969	6369	12544	0.014

Allentown-Bethlehem-Easton and Reading Ozone Maintenance Areas
Year 3

	tons/running	tons/startups	tons/Year 3
VOC	0.27	0.008	0.28
NOX	5.11	0.016	5.13

Emissions from running	Year 3 Project Annual VMT	Percent in ABE or Reading OMA	Annual VMT Ozone MA	EF (grams/ veh-mile)*	Ozone MA Annual Emissions (tons/year)
VOC	3,664,019	10%	366,402	0.670	0.27
NOX	3,664,019	10%	366,402	12.652	5.11

* Based on Avg of 40 MPH

Emissions from startups	4 AM EF (g/Veh.-Start)	Noon EF (g/Veh.-Start)	8 PM EF (g/Veh.-Start)	Avg EF (g/Veh.-Start)	Vehicle Starts per Year	Startup Emissions (Grams/Year)	Startup Emissions (Tons/year)
VOC	1.252	1.027	1.038	1.042	7205	7507	0.008
NOX	2.603	1.923	1.958	1.969	7205	14190	0.016

Allentown-Bethlehem-Easton and Reading Ozone Maintenance Areas
Year 4

	tons/running	tons/startups	tons/Year 4
VOC	**0.08**	**0.002**	**0.08**
NOX	**1.51**	**0.004**	**1.51**

Emissions from running	Year 4 Project Annual VMT	Percent in ABE or Reading OMA	Annual VMT Ozone MA	EF (grams/ veh-mile)*	Ozone MA Annual Emissions (tons/year)
VOC	1,082,466	10%	108,247	0.670	0.08
NOX	1,082,466	10%	108,247	12.652	1.51

* Based on Avg of 40 MPH

Emissions from startups	4 AM EF (g/Veh.-Start)	Noon EF (g/Veh.-Start)	8 PM EF (g/Veh.-Start)	Avg EF (g/Veh.-Start)	Vehicle Starts per Year	Startup Emissions (Grams/Year)	Startup Emissions (Tons/year)
VOC	1.252	1.027	1.038	1.042	1953	2035	0.002
NOX	2.603	1.923	1.958	1.969	1953	3846	0.004

Allentown-Bethlehem-Easton and Reading Ozone Maintenance Areas
Year 5

	tons/running	tons/startups	tons/Year 5
VOC	**0.04**	**0.001**	**0.04**
NOX	**0.82**	**0.002**	**0.82**

Emissions from running	Year 5 Project Annual VMT	Percent in ABE or Reading OMA	Annual VMT Ozone MA	EF (grams/ veh-mile)*	Ozone MA Annual Emissions (tons/year)
VOC	588,673	10%	58,867	0.670	0.04
NOX	588,673	10%	58,867	12.652	0.82

* Based on Avg of 40 MPH

Emissions from startups	4 AM EF (g/Veh.-Start)	Noon EF (g/Veh.-Start)	8 PM EF (g/Veh.-Start)	Avg EF (g/Veh.-Start)	Vehicle Starts per Year	Startup Emissions (Grams/Year)	Startup Emissions (Tons/year)
VOC	1.252	1.027	1.038	1.042	990	1032	0.001
NOX	2.603	1.923	1.958	1.969	990	1950	0.002

Allentown-Bethlehem-Easton and Reading Ozone Maintenance Areas
Year 6

	tons/running	tons/startups	tons/Year 6
VOC	**0.02**	**0.001**	**0.03**
NOX	**0.46**	**0.001**	**0.46**

Emissions from running	Year 6 Project Annual VMT	Percent in ABE or Reading OMA	Annual VMT Ozone MA	EF (grams/ veh-mile)*	Ozone MA Annual Emissions (tons/year)
VOC	330,650	10%	33,065	0.670	0.02
NOX	330,650	10%	33,065	12.652	0.46

* Based on Avg of 40 MPH

Emissions from startups	4 AM EF (g/Veh.-Start)	Noon EF (g/Veh.-Start)	8 PM EF (g/Veh.-Start)	Avg EF (g/Veh.-Start)	Vehicle Starts per Year	Startup Emissions (Grams/Year)	Startup Emissions (Tons/year)
VOC	1.252	1.027	1.038	1.042	601	626	0.001
NOX	2.603	1.923	1.958	1.969	601	1184	0.001

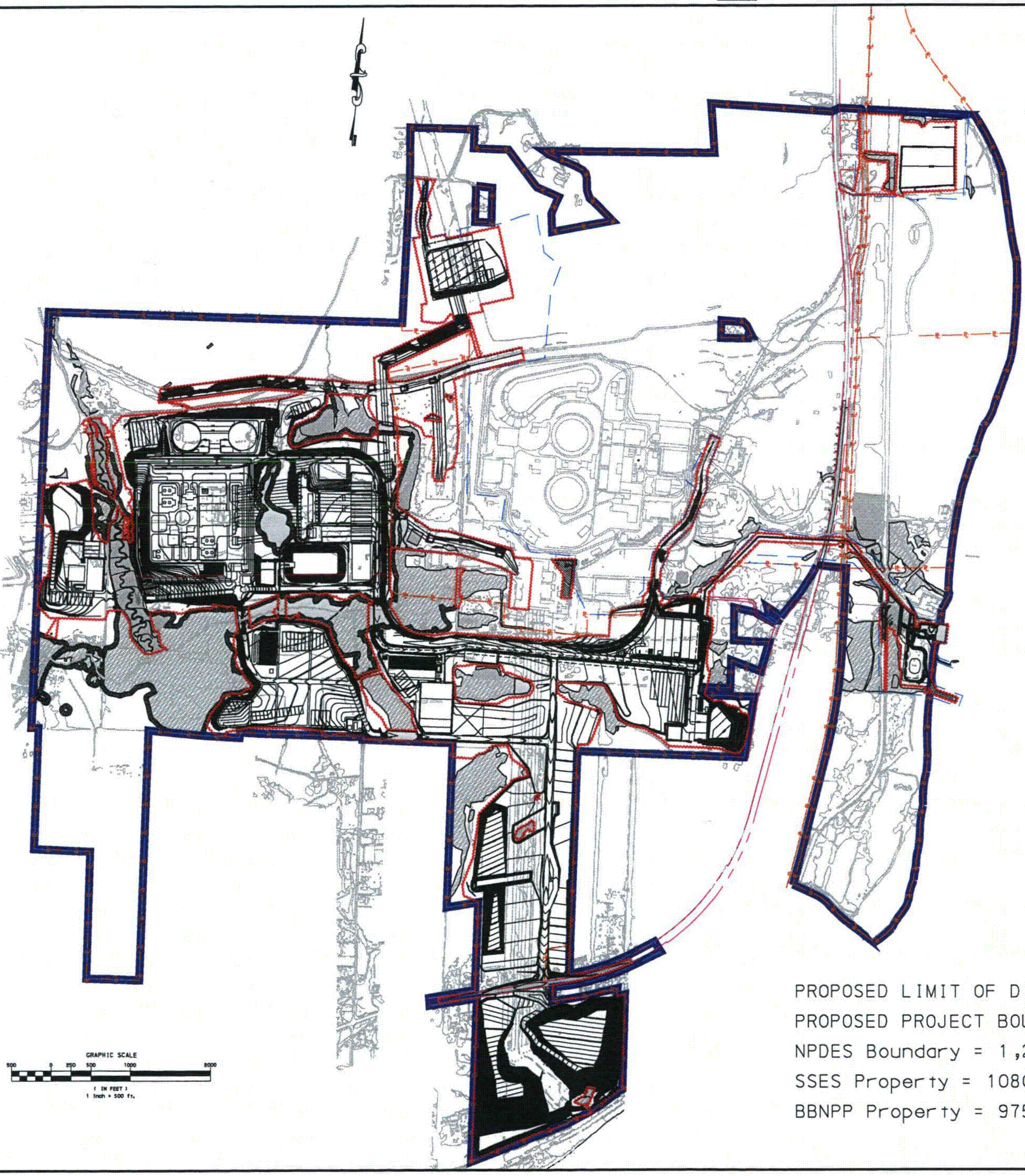
Allentown-Bethlehem-Easton and Reading Ozone Maintenance Areas
Year 7

	tons/running	tons/startups	tons/Year 7
VOC	**0.02**	**0.001**	**0.02**
NOX	**0.44**	**0.001**	**0.44**

Emissions from running	Year 7 Project Annual VMT	Percent in ABE or Reading OMA	Annual VMT Ozone MA	EF (grams/ veh-mile)*	Ozone MA Annual Emissions (tons/year)
VOC	318,132	10%	31,813	0.670	0.02
NOX	318,132	10%	31,813	12.652	0.44

* Based on Avg of 40 MPH

Emissions from startups	4 AM EF (g/Veh.-Start)	Noon EF (g/Veh.-Start)	8 PM EF (g/Veh.-Start)	Avg EF (g/Veh.-Start)	Vehicle Starts per Year	Startup Emissions (Grams/Year)	Startup Emissions (Tons/year)
VOC	1.252	1.027	1.038	1.042	600	625	0.001
NOX	2.603	1.923	1.958	1.969	600	1182	0.001



GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

PROPOSED LIMIT OF DISTURBANCE = 687Ac.
PROPOSED PROJECT BOUNDARY = 2,055Ac.
NPDES Boundary = 1,218Ac.
SSES Property = 1080Ac.
BBNPP Property = 975Ac.

LEGEND

- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED PROJECT BOUNDARY
- PROPERTY LINE
- NPDES BOUNDARY LINE
- PENNDOT LEGAL RIGHT OF WAY
- WETLANDS
- IMPACTED WETLANDS
- CREATED / ENHANCED WETLANDS
- PROPOSED BUILDING / STRUCTURE

NOTES:

1. THE NEWLY CHARACTERIZED WETLANDS FROM THE AREVA EIR 51-T011296-000, REVISION 0, DATED 7/27/11 IN RESPONSE TO RFI SL-BBNPP-193 FOR BBNPP NEW WETLANDS INFORMATION, HAVE BEEN INCLUDED IN THE LOD DRAWING WITH THE LOD ADJUSTED TO FIT THE NATIVE FILE ACCORDINGLY.
2. THE LIMIT OF DISTURBANCE, PROJECT BOUNDARY, NPDES BOUNDARY, BBNPP PROPERTY BOUNDARY AND SSES PROPERTY BOUNDARY AREAS HAVE ALL BEEN DEFINED AND ARE PRINTED ON THIS DRAWING.
3. THERE HAVE BEEN MINOR MODIFICATIONS TO THE LOD IN SEVERAL AREAS IN ORDER TO ADDRESS FINAL PCSM DESIGN AS WELL AS LCD COMMENTS AND TO INCORPORATE STORMWATER BMPS.
4. THE SSES PROPERTY BOUNDARY IS DEFINED AS SSES PROPERTY WITHIN THE PROJECT BOUNDARY.
5. THE BBNPP PROPERTY BOUNDARY IS DEFINED AS BBNPP PROPERTY WITHIN THE PROJECT BOUNDARY.
6. ALL PROPERTY BOUNDARIES INCLUDE ROAD RIGHT-OF-WAY WITHIN THE PROJECT BOUNDARY.

Pennoni

Pennoni Associates Inc.
Engineers · Surveyors · Planners · Landscape Architects

100 N. Wilkes-Barre Boulevard
Wilkes-Barre, PA 18702 (570) 824-2800

DATE	NO.	REVISIONS	BY
8/25/11	2	REV. NA/DAI COMMENTS	LGB
8/12/11	1	REV. FOR UPDATED WETLANDS	LGB
5/11/11	0	REVISION 0	LGB

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR AND OWNER MUST BE NOTIFIED OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK

BELL BEND NUCLEAR POWER PLANT
SALEM TOWNSHIP, PENNSYLVANIA
LIMIT OF DISTURBANCE
PPL BELL BEND, LLC
38 BOMBOY LANE, SUITE 2
BERWICK, PA 18603

JOB NO. PPLS0902
SHEET 1 OF 1

SCALE: AS NOTED
DRAWN BY: LGB
DATE: 08/25/2011
APPROVED: JFM
DRAWING NO. LOD

Pennoni Associates Inc.
Consulting Engineers
100 North Wilkes-Barre Blvd
Suite 409
Wilkes-Barre, PA 18702
Phone: (570) 824-2200
Fax: (570) 824-0800

Excess Earthwork Reduction Report

Bell Bend Nuclear Power Plant
Salem Township
Luzerne County, PA

For:
PPL Bell Bend, LLC
38 Bomboy Lane
Suite 2
Berwick, PA 18603

Report Number
PPLS0902-1500-01

Issue Date
March 4th, 2011

Revision Date – Rev 2
June 6th, 2011

PPLS0902

Excess Earthwork Reduction Report PPLS0902-1500-01

Table of Contents

Appendices

I. PURPOSE/OBJECTIVE

The purpose of this report is to:

1. Quantify earthwork volumes based on NPDES Grading.
2. Identify options to eliminate excess earthwork.
3. Quantify the ultimate amount of material to be exported off-site.
4. Act as a guidance document to perform the site re-grading to minimize COLA safety and environmental impacts.

II. INTRODUCTION/BACKGROUND

The initial NPDES plan grading evolved from the grading concept provided on SUPP Rev 4. The grading plan was submitted to the Luzerne Conservation District November 12th, 2010 with the assumption that all excess cut would be removed off site at a location to be determined. At a meeting held to discuss NPDES/JPA Plan integration on January 3rd, 2011, at the PPL Wallenpaupack Environmental Learning Center, Pennoni Associates (PAI) was tasked with estimating the excess earthwork volume based on the evolved grading plan submitted for NPDES. PAI was also tasked with identifying areas to reduce cut and develop on-site waste options which would decrease the excess earthwork.

The NPDES earthwork volumes and excess earthwork reduction options were presented to PPL at a meeting held on January 14th, 2011 at the PPL Allentown offices. Based on a pros/cons list developed at the meeting, viable excess earthwork reduction options were identified for PAI to progress. These options and estimated excess earthwork reduction volumes are presented in the following sections.

Excess earthwork reduction options have progressed through design and the results have been added to Section C.

III. ASSUMPTIONS AND INPUTS

The following assumptions have been made for estimation purposes:

1. Wetland impacts must remain unchanged.
2. The Meteorological Tower elevation must remain unchanged from SUPP Rev. 4.
3. Power Block over excavation is as assumed in S&L Report SL-009450 Rev. 8 dated 7/28/10, page 8, including *RFI SL-BBNPP-119*.
4. Cooling Tower over excavation is approximately 546,000 Cubic Yards and is as assumed in *RFI SL-BBNPP-173* and in *RFI SL-BBNPP-149*.
5. Subsurface excavation for the ESWEMS Pond is approximately 754,000 Cubic Yards and is as assumed in *RFI SL-BBNPP-173* and in *RFI SL-BBNPP-149*.
6. *RFI SL-BBNPP-174* was referenced for input.
7. All material is suitable for use.
8. Slopes are assumed to be stable at two to one.
9. Final surface material will come from on-site earthwork.
10. Proposed two foot (2') contours are of acceptable accuracy for the level of detail needed in this calculation.
11. The existing quarry on the southeast side of the site is or could be owned/used by PPL.

12. Subsurface Basins are entirely in cut.
13. Cut used as onsite fill will be re-compacted and any expansion at this time is negligible.
14. Power line clearance is preferred at 53 feet and a minimum of 30 feet as referenced in *PAI-RFI-001,* dated 1/20/2011.

IV. DESIGN

The site was broken into eight (8) separate locations:

1. Intake Area
2. New 500kV Switch Yard Area
3. Northeast Laydown Area
4. Power Block Area
5. Main Parking Lot Area
6. SUPP Road/Lower Main Access Road and Construction Areas
7. South Laydown Expansion Area
8. West Stock Pile Area

Please see Appendix A for a diagram of these locations.

Minimizing excess waste was examined by determining potential areas to reduce cut, and potential areas to waste fill.

Calculations were completed as approximations through surface modeling (MicroStation V8 2004 Edition – Inroads v8.5). MicroStation – Inroads creates a Triangular Irregular Network (TIN) surface model of the existing surface. The existing surface model was created using the data provided by Peters Consultants. A TIN surface model was also created through design contours for each of the eight proposed areas outlined above. A total earthwork volume is calculated by subtracting the existing from the proposed surfaces.

All of the November 2010 NPDES Grading earthwork volumes were calculated using surface modeling. All but three of the excess earthwork reduction option volumes were calculated using surface modeling. These areas include 6, 7, and 8. The volumes were calculated using the Average-End-Area Method. Please see Appendix C for these calculations.

Calculations for all of the update grading areas, as of 4/29/2011 have been completed as approximations through surface modeling.

The proposed grading changes should not affect the Meteorological Wind Analysis for the tower. See Figure 7.0, Meteorological Tower Wind Obstruction which shows that the worst case grade change of 48 feet is farther away than 480 feet or ten times the change in elevation.

V. CALCULATIONS

A. NPDES GRADING EARTHWORK BASELINE

Please refer to Appendix A for Area Locations.

1. Intake Area

The proposed grades in this area were compared to the existing surface to produce the cut and fill volumes shown in the table below. Please note that the dredge pond excavation has been ignored because that area shall be returned to existing conditions post construction.

Intake Area				
Feature	Cut (CY)	Fill (CY)	Net Earthwork (CY)	Comments
Surface Modeling	42	43060	-43018	
Total	42	43060	-43018	

2. New 500kV Switch Yard Area

The proposed grades in this area were compared to the existing surface to produce the cut and fill volumes shown below. Also factored into the total is excavation for the subsurface infiltration/detention basin. All Erosion and Sedimentation Sediment Basin excavation has been ignored because of its temporary state.

New 500kV Swtich Yard Area				
Feature	Cut (CY)	Fill (CY)	Net Earthwork (CY)	Comments
Surface Modeling	504085	130327	373758	
Basin 15.1	24177	N/A	24177	
Basin 15.2	38366	N/A	38366	
Total	566628	130327	436301	

3. Northeast Laydown Area

The proposed grades in this area were compared to the existing surface to produce the cut and fill volumes shown in the table below. This area is scheduled to be returned to existing conditions post construction. The totals have been ignored in the Results Summary Table.

Northeast Laydown Area				
Feature	Cut (CY)	Fill (CY)	Net Earthwork (CY)	Comments
Surface Modeling	2077	29922	-27845	
Total	2077	29922	-27845	

4. Power Block Area

The proposed grades in this area were compared to the existing surface to produce the cut and fill volumes shown in the table below. Also factored into the total is the excavation for the subsurface

infiltration/detention basins, ESWEMS Retention Pond Excavation (from dewatering report), and Nuclear Island/cooling tower subsurface excavation (from S&L Grading Report SL-009450 Rev 8).

Power Block Area				
Feature	Cut (CY)	Fill (CY)	Net Earthwork (CY)	Comments
Surface Modeling	6006998	1622024	4384974	
Basin 10.1	21630	N/A	21630	
Basin 10.2	21922	N/A	21922	
Basin 10.3	13012	N/A	13012	
Basin 10.4	7500	N/A	7500	
Basin 12	165137	N/A	165137	
Basin 13.1	6704	N/A	6704	
Basin 13.2	10534	N/A	10534	
EWEMS Pond Over-Excavation	754000	N/A	754000	
Cooling Tower Over-Excavation	546000	N/A	546000	
Nuclear Island Excavation	371900	N/A	371900	
Total	7925337	1622024	6303313	

5. Main Parking Lot Area

The proposed grades in this area were compared to the existing surfaced to produce the cut and fill volumes shown below. Also factored into the total is excavation for the subsurface infiltration/detention basin. All Erosion and Sedimentation Sediment Basin excavation has been ignored because of its temporary state.

Main Parking Lot Area				
Feature	Cut (CY)	Fill (CY)	Net Earthwork (CY)	Comments
Surface Modeling	216513	556745	-340232	
Basin 1	188679	N/A	188679	
Total	405192	556745	-151553	

6. SUPP Road/Lower Main Access Road and Construction Areas

The proposed grades in this area were compared to the existing surfaced to produce the cut and fill volumes shown below. Also factored into the total is excavation for the subsurface infiltration/detention basin. All Erosion and Sedimentation Sediment Basin excavation has been ignored because of its temporary state.

SUPP Road/Lower Main Access Road and Construction Areas				
Feature	Cut (CY)	Fill (CY)	Net Earthwork (CY)	Comments
Surface Modeling	242964	1237708	-994743	
Basin 3.1	10320	N/A	10320	
Basin 6	80337	N/A	80337	
Total	333621	1237708	-904086	

7. South Laydown Expansion Area

The proposed grades in this area were compared to the existing surfaced to produce the cut and fill volumes shown below. Also factored into the total is excavation for the subsurface infiltration/detention basin. All Erosion and Sedimentation Sediment Basin excavation has been ignored because of its temporary state.

South Laydown Area				
Feature	Cut (CY)	Fill (CY)	Net Earthwork (CY)	Comments
Surface Modeling	80214	159883	-79669	
Total	80214	159883	-79669	

8. West Stock Pile Area

The proposed grades in this area were compared to the existing surfaced to produce the cut and fill volumes shown below. Also factored into the total is excavation for the subsurface infiltration/detention basin. All Erosion and Sedimentation Sediment Basin excavation has been ignored because of its temporary state.

West Stock Pile Area				
Feature	Cut (CY)	Fill (CY)	Net Earthwork (CY)	Comments
Surface Modeling	256077	46972	209105	
Basin 8	10700	N/A	10700	
Basin 9	8610	N/A	8610	
Total	275387	46972	228415	

B. EXCESS EARTHWORK REDUCTION EVALUATION

Please refer to Appendix B for a Preliminary Earthwork Summary Table.

1. Intake Area
There were no excess earthwork reduction options identified at the intake area due to the minimal space and the elevation sensitivity of the features in that area.

2. New 500kV Switch Yard Area
There were no excess earthwork reduction options identified in the New 500kV Switch Yard Area. The base elevation for the yard was set by the access road connection at Thomas Road.

3. Northeast Laydown Area
There were no excess earthwork reduction options identified in the Northeast Laydown Area because the area is scheduled to be returned to existing conditions post construction.

4. Power Block Area
There were no excess earthwork reduction options identified in the Power Block Area due to limited space and the elevation sensitivity to features in this area.

5. Main Parking Lot Area
There were two options identified in the Main Parking lot area to reduce excess earthwork:

i. Re-grading the parking lot from the south side to the north side on a continuous slope of approximately 3%.
ii. Raise the north side of the parking lot with a wall approximately ten feet high and no more than 1000 feet long, while grading on a continuous slope of approximately 0.5% from the south side to the north side. Localized low points will be used to drain the parking lot efficiently.

Option ii. was selected at the Allentown meeting previously referenced. This option was selected due to its proximity to the Power Block area which is the major cut zone of the project. The re-grading of this area will require stormwater redesign, including additional infiltration testing. Please see Appendix D, Figures 1.0 and 1.2 for layout and section sketches. Please see the Table below for a summary of the earthwork adjustments.

Main Parking Lot Area				
Option	Avg. NPDES Elev.	Prop. Elev.	Net Earthwork Change (CY)	Comments
i	680.00	689.00	160,000	None
ii	680.00	696.00	1,500,000	Selected Option

6. SUPP Road/Lower Main Access Road and Construction Areas
Three areas within the SUPP Road/Lower Main Access Road and Construction Area were identified as potential excess earthwork reduction options:

i. The Existing Quarry Area on the southeast side of the site.
ii. The Batch Plant Area.
iii. The West Side of SUPP Road Area.

The section of SUPP Road from SR 0011 to the "T" intersection with Main Access Road could not be raised due to the grading under the Transmission Lines having already been maximized during the NPDES process.

i. The existing quarry on the southeast side of the site

The existing quarry on the southeast side of the site can be:

a. Filled and brought up to the gas storage yard grade for an expanded laydown area.
b. Filled and brought up to the gas storage yard grade for a Permanent Stockpile area.

Option ib. was selected to be progressed at the Allentown meeting previously referenced. Filling this area will eliminate the need for a potential wall near the gas storage yard, but will need additional stormwater design. The first option for stormwater is to attempt to use one of the previously designed Basins. PPL currently leases this property but will review the lease options. Please see Appendix C, Table 2.0 for the Average End Area Calculation and Appendix D, Figures 2.0, 2.2, and 2.3 for layout and section sketches. Please see the Table below for a summary of the earthwork adjustments.

Existing Quarry Area				
Option	Avg. NPDES Elev.	Prop. Elev.	Net Earthwork Change (CY)	Comments
ia	645.00	645.00	385,120	None
ib	645.00	670.00	460,120	Selected Option

ii. The Batch Plant area

The Batch Plant area can be raised to the rail bed elevation and the rail fill slope will be moved east. This option was selected to be progressed at the Allentown meeting previously referenced. Access to this raised batch plant area can be designed with a 3% driveway, but will eliminate the rail bottom dump opportunity. Please see Appendix D, Figure 3.0 for a layout sketch. Please see the Table below for a summary of the earthwork adjustments.

The Batch Plant Area				
Option	Avg. NPDES Elev.	Prop. Elev.	Net Earthwork Change (CY)	Comments
iia	650.00	668.00	170,000	Selected Option

iii. The area along the west side of SUPP Road

The area along the west side of SUPP Road was initially identified as a potential excess earthwork reduction option but upon receiving information on T-Line Clearances was eliminated. There still remains the possibility of using the temporary stock pile area west of the T-lines and a Permanent Spoil area. This option was selected to be progressed at the Allentown meeting previously referenced. Please see the Table below for a summary of the earthwork adjustments.

The West Side of SUPP Road Area				
Option	Avg. NPDES Elev.	Prop. Elev.	Net Earthwork Change (CY)	Comments
iiia	664.00	689.00	200,000	Selected Option

7. South Laydown Expansion Area

There were two options identified at the South Laydown Expansion Area for potential excess earthwork reduction options:

i. Expand the Laydown area within the PPL property as far south as possible.
ii. Expand the laydown area within the PPL property as far south as possible and create a permanent stock pile on top of the expanded laydown zone, maintaining the original laydown square footage.

Option ii. was selected at the Allentown meeting previously referenced, to be progressed but upon receiving information on T-Line Clearances option two was determined to be infeasible and design defaulted to option one. Please see Appendix C, Table3.0 for the Average End Area Calculation and Appendix D, Figures 4.0, 4.1, 4.2, and 4.4 for Layout and Section Sketches.

South Laydown Expansion Area				
Option	Avg. NPDES Elev.	Prop. Elev.	Net Earthwork Change (CY)	Comments
ia	642.00	655.00	1,625,000	= 2,500,000 - 875,000 (Estimated 35% reduction due to T-Line Location/Clearance)
iia	642.00	680.00	3,560,000	Not Feasable due to T-Line Clearance Requirements

8. West Stock Pile Area

There were two options identified at the West Stock Pile Area for potential excess earthwork reduction options:

i. Raise the Base elevation of the temporary stock pile area 24'.
ii. Raise the Base elevation of the temporary stock pile area 24' + an additional 25' and use as a permanent spoil area.

Option ii. was selected to be progressed at the Allentown meeting previously referenced. This option will require the access road to the stock pile to be adjusted but it is anticipated to be less than 5%. Minimal grade changes may occur in the parking area. No grade changes will occur at buildings. Staging of the topsoil stock piling may need to be addressed to allow for permanent placement of earthwork. Please see Appendix C, Table 4.0 for the Average End Area Calculation and Appendix D, Figures 5.0, 5.2, and 5.3 for layout and section sketches. Please see the Table below for a summary of the earthwork adjustments.

West Stock Pile Area				
Option	Avg. NPDES Elev.	Prop. Elev.	Net Earthwork Change (CY)	Comments
i	694.00	718.00	189,000	None
ii	694.00	743.00	309,000	Selected Option

C. EXCESS EARTHWORK REDUCTION DESIGN

Net Earthwork volumes tabulated in the tables below were derived from a more precise final design for each area as compared to the estimates provided in Section B.

1. Intake Area

There were no excess earthwork reduction options identified at the intake area due to the minimal space and the elevation sensitivity of the features in that area.

Intake Area				
Feature	**Cut (CY)**	**Fill (CY)**	**Net Earthwork (CY)**	**Comments**
Surface Modeling	42	43060	-43018	
Total	42	43060	-43018	

2. New 500kV Switch Yard Area

There were no excess earthwork reduction options identified in the 3/4/2011 EERR Rev 0. Through further design and review it was determined that the area had been sized for two transmission yards, one to be constructed as part of this project and one to be constructed at a future point in time. In an effort to reduce the limit of disturbance and eliminate additional area to be characterized, the directive was taken to provide enough space to construct one transmission yard. Through this design effort the grading was revised. This revision produced the opportunity to develop a balanced cut and fill. A summary of the earthwork can be found in the table below. Please see Appendix D, Figure 6.0 for a design progression sketch.

New 500kV Swtich Yard Area				
Feature	**Cut (CY)**	**Fill (CY)**	**Net Earthwork (CY)**	**Comments**
Surface Modeling	69398	69398	0	
Basin 15.1	24177	N/A	24177	Basin design change is pending.
Basin 15.2	38366	N/A	38366	Basin design change is pending.
Total	131941	69398	62543	Summary will assume Basin cuts are mitigated through Final Detailed Grading.

3. Northeast Laydown Area

No excess earthwork reduction options were identified in this area due to its temporary nature. The totals have been ignored in the Results Summary Table.

Northeast Laydown Area				
Feature	**Cut (CY)**	**Fill (CY)**	**Net Earthwork (CY)**	**Comments**
Surface Modeling	0	29922	-29922	
Total	0	29922	-29922	Summary will show Net Earthwork = 0 because Fill is only Temporary for Laydown.

4. Power Block Area

There were no excess earthwork reduction options identified in the Power Block Area due to limited space and the elevation sensitivity to features in this area.

Power Block Area				
Feature	**Cut (CY)**	**Fill (CY)**	**Net Earthwork (CY)**	**Comments**
Surface Modeling	6006998	1622024	4384974	
Basin 10.1	21630	N/A	21630	
Basin 10.2	21922	N/A	21922	
Basin 10.3	13012	N/A	13012	
Basin 10.4	7500	N/A	7500	
Basin 12	165137	N/A	165137	
Basin 13.1	6704	N/A	6704	
Basin 13.2	10534	N/A	10534	
EWEMS Pond Over-Excavation	754000	N/A	754000	
Cooling Tower Over-Excavation	546000	N/A	546000	
Nuclear Island Excavation	371900	N/A	371900	
Total	7925337	1622024	6303313	

5. Main Parking Lot Area

Option 5.ii was selected from the estimate options. A wall has been added along the north side of the parking lot between the outer road and the wetlands. This wall is approximately fourteen feet high and 630 feet long. Please see Appendix D, Figures 1.1 and 1.2 for layout and section sketches.

Main Parking Lot Area				
Feature	Cut (CY)	Fill (CY)	Net Earthwork (CY)	Comments
Surface Modeling	45355	1149256	-1103901	
Basin 1	188679	N/A	188679	Basin design change is pending.
Total	234034	1149256	-915222	Summary will assume new Basin cut is the same.

6. SUPP Road/Lower Main Access Road and Construction Areas

Three areas within the SUPP Road/Lower Main Access Road and Construction Area were identified as potential excess earthwork reduction options and all were progressed during design.

i. The existing quarry on the southeast side of the site

The existing quarry on the southeast side of the site was filled as planned. The increased stormwater runoff and volume will be mitigated in Basin 6.0. Due to the steep slope, benching was added for stability. Proposed fill for the Quarry totaled 437,286 CY.

ii. The Batch Plant area

The Batch Plant area was raised to the elevation of the Rail Road. Options have been identified to create an off loading location for rail cars. An access drive has also been added at about 3.0% near the west side of the batch plant. Proposed fill for the Batch Plant totaled 154,463 CY.

An additional area was identified south of the batch plant as an area to waste excess fill. The total earthwork for this location is included in the summary table below.

iii. The area along the west side of SUPP Road

The permanent stock pile locations along SUPP Road west of the Transmission Tower ROW's have been included in the summary table below. The permanent stock pile fill totaled 396,722 CY.

Please see Appendix D, Figures 2.1, 2.2, 2.3, and Figure 3.1 for layout and section sketches.

SUPP Road/Lower Main Access Road and Construction Areas				
Feature	Cut (CY)	Fill (CY)	Net Earthwork (CY)	Comments
Surface Modeling	205764	2292397	-2086633	Includes Batch Plant, Quarry, and Permanent Stock Pile fill.
Basin 3.1	10320	N/A	10320	
Basin 6	80337	N/A	80337	
Total	296421	2292397	-1995976	

7. South Laydown Expansion Area

After further examination the existing transmission line ROW and clearance requirements greatly limited the initial concept. An additional concept was designed which exceeds the original concept estimate by using a switchback access road. The switchback access road creates the opportunity to raise the area higher while maintain access at less than 4.0%. This concept avoids newly discovered wetlands in this vicinity. Please see Appendix D, Figures 4.3 -4.7 for Layout, Section Sketches, and Google Earth 3d Renderings.

South Laydown Area				
Feature	**Cut (CY)**	**Fill (CY)**	**Net Earthwork (CY)**	**Comments**
Surface Modeling	115601	3102095	-2986494	Basin design will be above ground.
Total	115601	3102095	-2986494	

8. West Stock Pile Area

The West Stock Pile Area design followed the selected estimate option closely. The net earthwork shown below includes the permanent stock pile volume. Please see Appendix D, Figures 5.1 and 5.2 for layout and section sketches.

West Stock Pile Area				
Feature	**Cut (CY)**	**Fill (CY)**	**Net Earthwork (CY)**	**Comments**
Surface Modeling	119678	513353	-393675	
Basin 8	10700	N/A	10700	
Basin 9	8610	N/A	8610	
Total	138988	513353	-374365	

VI. RESULTS

The following table summarizes the NPDES Grading earthwork numbers (November 2010), Revised Estimate Grading earthwork numbers based on selected excess earthwork reduction options, and Designed Grading earthwork numbers based on final design.

Area	Net Earthwork (CY)		
	NPDES Grading	Revised Grading Estimate	Revised Grading Design
Intake	-43,018	-43,018	-43,018
New 500kv	436,301	436,301	0
NE-Laydown	-27,845	-27,845	0
Power Block	6,303,313	6,303,313	6,303,313
Main Parking	-151,553	-1,651,553	-915,222
SUPP & Lower MAR & Construction	-904,086	-1,734,206	-1,995,976
South Laydown	-79,669	-1,704,669	-2,986,494
West Stockpile	228,415	-80,585	-374,365
Site Net	**5,761,858**	**1,497,738**	**-11,762**

VII. CONCLUSION

A. REVISED GRADING ESTIMATE (3/4/2011)

With the selected earthwork reduction options, the excess earthwork was estimated to be reduced from 5.8 million cubic yards to 1.5 million cubic yards. At this point no bulking factors were applied to the volumes (except for the Power Block over excavation from S&L). Applying a bulking factor of 1.27 to the excess earthwork that needs to be spoiled off site provides a total volume of approximately 1.8 million cubic yards. Please see "Revised Grading Estimate" calculations below. This bulking factor was determined through weighted averaging of the bulking factors and volumes provided in the Rizzo Response to Action Items 62, and RFI SL-BBNPP-170 respectively.

Revised Grading Estimate

Revised Grading Estimate (no Bulking Factor)	1,497,738			
Nuclear Island Over Exc. (with Bulking Factor)	-371,900		Bulking Factor	
Revised Grading Estimate w/ Nuclear Island Over Exc. Removed	1,125,838	x1.27	= 1,429,814	Revised Grading Estimate, No Nuclear Island (with Bulking Factor)
			+ 371,900	Add Nuclear Island back in
			1,801,714	Revised Grading Estimate Excess Earthwork

B. REVISED GRADING DESIGN(4/29/2011)

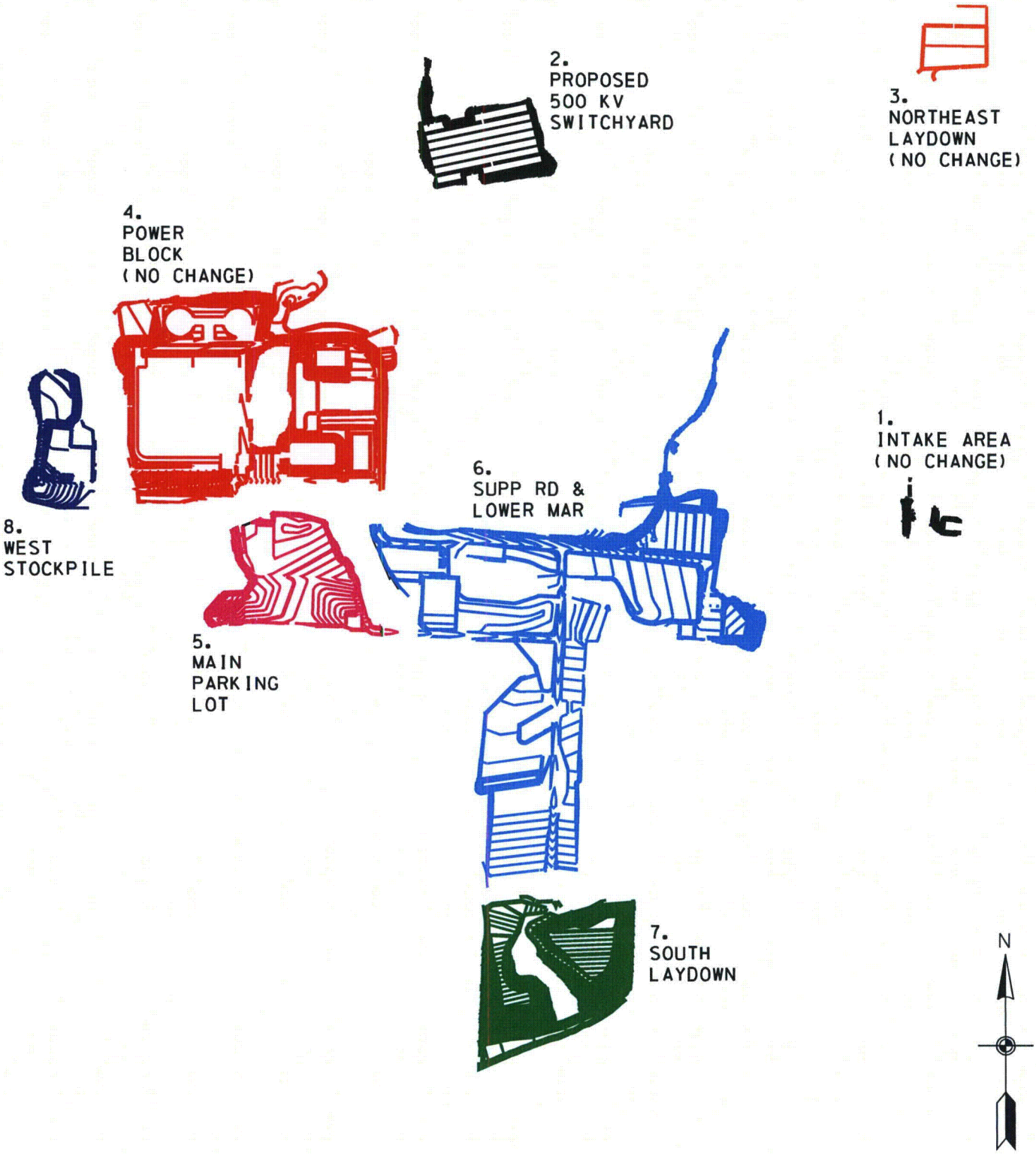
Upon design completion of the excess earthwork reduction estimates, the November 2010 excess earthwork was reduced from 5.8 million cubic yards to 0.00 cubic yards. The Results Table in section VI shows a deficit of 11,762 cubic yards. At this point no bulking factors were applied to the volumes (except for the Power Block over excavation from S&L). The excess earthwork was eliminated through the identification of additional waste locations, quantification of permanent stock piles, and a revised concept at the south laydown area. Excess earthwork reduction areas can be revised to produce a balanced site as design progresses, and assumptions become givens. Although the current calculation shows all material can be wasted on site, the option to move a currently undetermined amount of material off-site to Earth Conservancy still exists. This material could come from the Existing Quarry, West Stock Pile, South Laydown Area, or an area yet to be determined. The following table shows a possible example of potential reduction volumes, although reduction areas and volumes are not limited to the following example:

Area	Reduction Volume for Exportation	Comments
Existing Quarry	437,286 CY	Retains existing quarry condition
West Stock Pile	297,743 CY	Maintains top elevation of 720'
South Laydown Area	264,971 CY	Adjustment is variable based on need
Total	1,000,000 CY	

As detailed grading progresses and better soil knowledge becomes available the assumptions will be reviewed/revised. The report will be revised accordingly at that time.

APPENDIX A
Proposed Surface Site Locations

EXCESS EARTHWORK REDUCTION EVALUATION AREAS



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JOB No. PPLS 0902

HORZ. SCALE: N/A
VERT. SCALE: N/A
DATE: 04/22/2011

JPA PERMIT SUBMITTAL

BELL BEND NUCLEAR POWER PLANT
LUZERNE COUNTY, PENNSYLVANIA

APPLICATION BY:
PPL NUCLEAR DEVELOPMENT, LLC

EXCESS EARTHWORK REDUCTION EVALUATION AREAS

APPENDIX B
Preliminary Earthwork Total w/ Pros & Cons

PPS0902
4/22/2011

APPENDIX B
TABLE 1.0
Bell Bend Nuclear Power Plant
Preliminary Alternate Grading Summary

	Option	Net Earthwork Delta (CY)	Comments	Pros/Cons
1	Intake Area			
	No excess earthwork reduction options			
2	New 500kv Switch Yard Area			
	No excess earthwork reduction options			
3	Northeast Laydown Area			
	No excess earthwork reduction options			
4	Power Block Area			
	No excess earthwork reduction options			
5	Main Parking Lot Area			
	i. Regrade	160K	See Figure 1.0 and 1.2 (App. D)	Closer to the Major Excavation Zone (Powerblock), will alter bridge and stormwater design
and	ii Raise 10' with wall	1.5M	Wall >1000LF	
6	SUPP Road/Lower MAR and Constr. Area			
	i. Existing Quarry on southeast side of site			
	a Fill Quarry	385K	See Figure 2.0, 2.2, and 2.3 (App. D) and Table 2.0 (App. C)	Currently leased to someone, need to design stormwater - will eliminate potential wall near gas
and	b Perm Stock Pile on top	75k	Assumed 25' high	storage yard
	ii Batch plant Area			
	a Raise 18 ' to rail bed elevation	170K	See Figure 3.0 (App. D)	Need to design access, and eliminates bottom dump opportunity.
	iii Along the west side of SUPP Road			
	a1 Perm Stock pile at temp loc.	200K	Assumed 25' high	Could go higher if need be.
or	a2 Perm Stock pile at temp loc. W/ wall	300K	Length of wall =2,750	Length of wall - location of wetlands
or	b With wall at temp loc.	26K/ft with 5,500LF	15' high walls equivalent to 7a volume	Already maxed out clearance below T-lines
or	c With wall entire length	53K/ft with 7,700LF	Maintaining 680 as top elevation provides approximately 900KCy	Already maxed out clearance below T-lines
7	South Laydown Expansion			
	i Expand Laydown area			
	a Underground detention	2.5M	See Figures 4.0 and 4.1 (App. D) and Table 3.0 (App. C)	Most Flexible, but T-Lines are major concern, need to verify UG stormwater can outlet. Net Earthwork Delta reduction due to T-lines will be minimal. T-line sag elevation will only effect this option south of the last structure before crossing the river.
or	b Above ground detention	2M	See Figures 4.2 and 4.4 (App. D)	Cheaper stormwater but could cost more in loss of potential fill area.
	ii Permanent Stockpile at South Laydown			
	a Using only expansion area	560K	Assumed 25' high	T-lines, Could build up away from them though, may revisit
or	b Original design area	290K	Assumed 25' high	Needed for Laydown
or	c Entire area	1.5M	Assumed 25' high	Need original area for laydown
8	West Stock Pile Area			
	i Raise base elevation 24'	189K	See Figure 5.0, 5.2, and 5.3 (App. D) and Table 4.0 (App. C)	Need to alter access road to stock pile area, but it is anticipated to be under 5%
and	ii Perm Stock Pile on top	120K	Assumed 25' high	

Goal = 3.48+Substructure Excavation for Powerblock estimated at 2MCy+area under ESWEMS Pond(estimate 1.3M)
Goal = 6.78MCy (expansion ignored)
Options chosen to progress = 5.299MCy -- Remainder = 1.481MCy

Progress Design
Do not Progress Design

APPENDIX C
Average End Area Calculations

Table 3.0

7. South Laydown Area

Alternate Earthwork Option ia: Extend South Laydown			
Section	**Fill Area (SF)**	**Length (LF)**	**Fill Volume (CY)**
A-A	53,694		
		789	1,412,836
B-B	43,002		
		789	1,107,362
C-C	32,787		
		Total	**2,520,198**

Example Calculation (Fill volume between Sections A-A and B-B)

(53,694 + 43,002)/2 =	48,348	avg. areas
	x789	length between sections (see Figure 4.0, Appendix D)
	38,146,572	Fill Volume (CF)
	1,412,836	Fill Volume (CY)

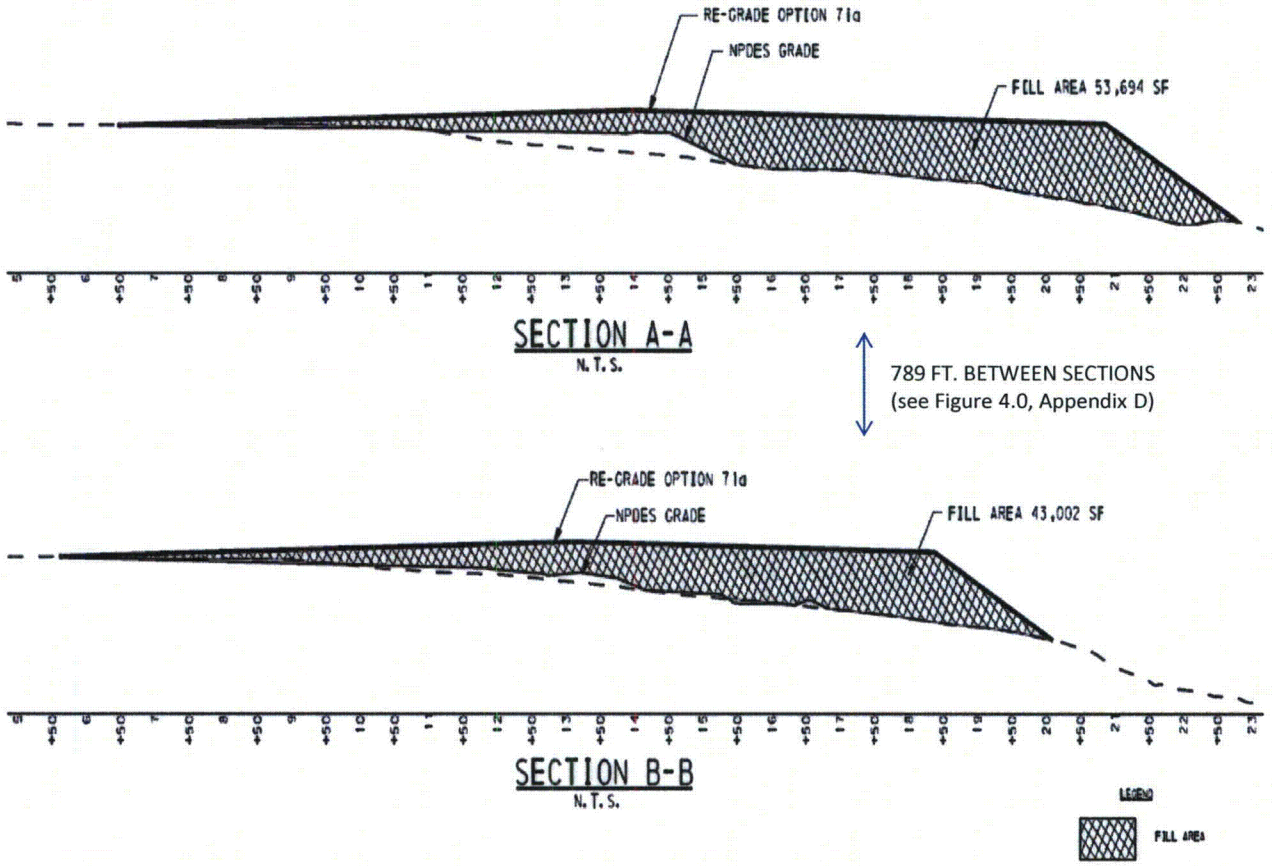


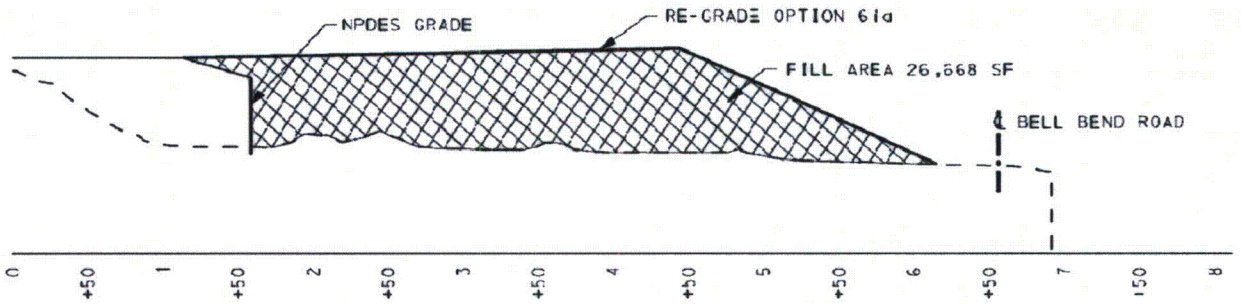
Table 2.0

6. SUPP Road / Lower MAR and Constr. Area

Alternate Earthwork Option i: Slope quarry at 2% across and 2:1 from road			
Section	**Fill Area (SF)**	**Length (LF)**	**Fill Volume (CY)**
A-A	0		
		103	30,139
B-B	15,769		
		75	43,429
C-C	15,392		
		45	35,175
D-D	26,668		
		114	116,359
E-E	28,464		
		57	58,660
F-F	27,128		
		54	41,530
G-G	14,587		
		111	59,828
H-H	14,587		
		Total	**385,120**

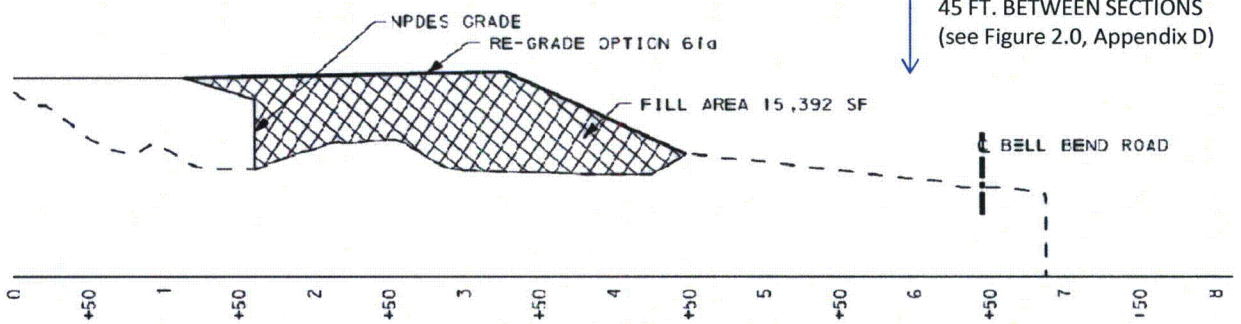
Example Calculation (Fill volume between Sections C-C and D-D)

(26,668 + 15,392)/2 =	21,030	avg. areas
	x45	length between sections (see Figure 2.0, Appendix D)
	949,715	Fill Volume (CF)
	35,175	Fill Volume (CY)



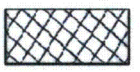
SECTION D-D
N. T. S.

45 FT. BETWEEN SECTIONS
(see Figure 2.0, Appendix D)



SECTION C-C
N. T. S.

LEGEND



FILL AREA

Table 4.0

8. West Stockpile Area

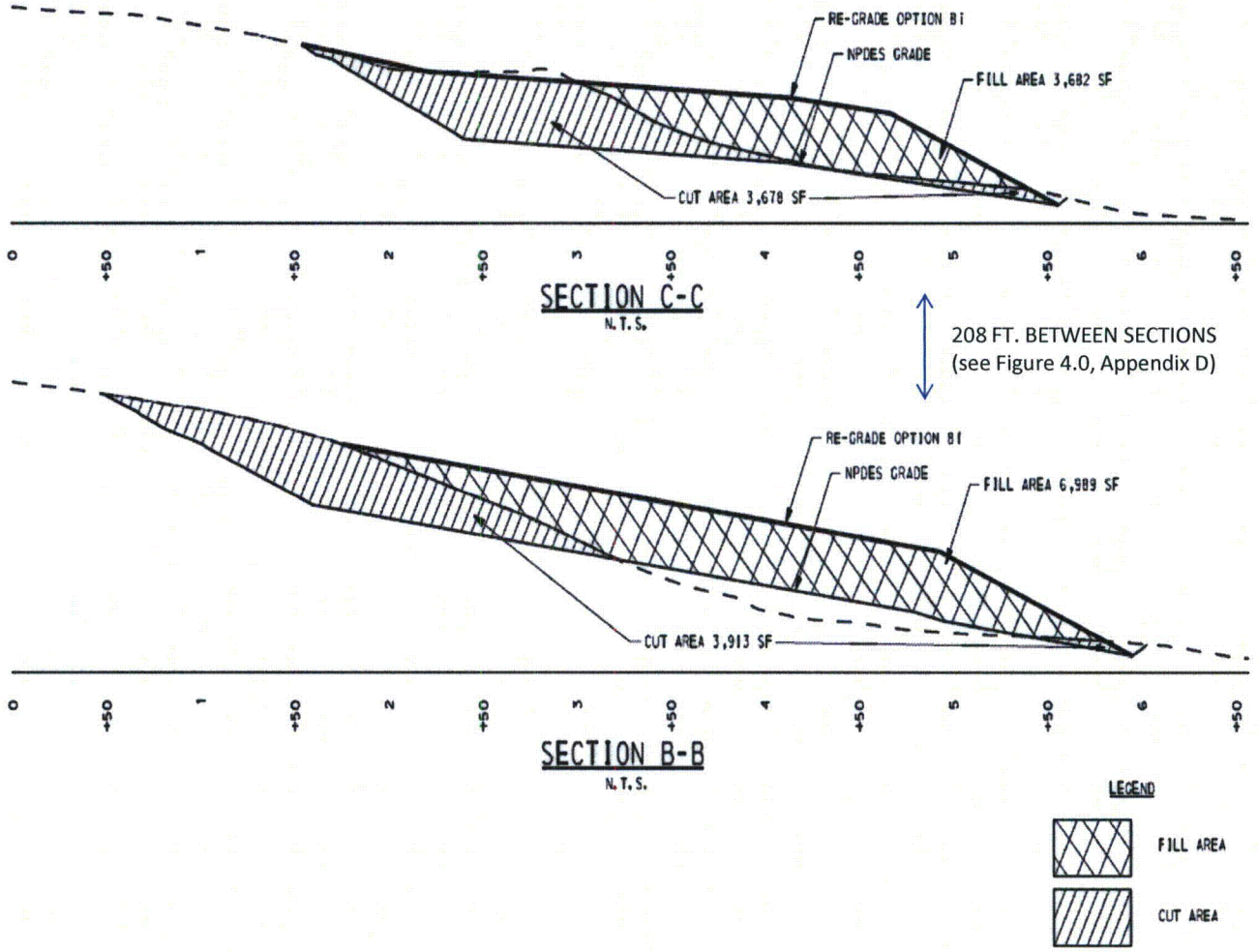
Alternate Earthwork Option i: Raise West Stockpile 24 feet					
Section	**Cut Area (SF)**	**Fill Area (SF)**	**Length (LF)**	**Cut Volume(CY)**	**Fill Volume (CY)**
A-A	3,277	5,621			
			359	47,800	49,274
B-B	3,913	6,989			
			208	29,239	17,677
C-C	3,678	3,682			
			99	7,458	8,133
D-D	390	3,432			
			376	2,716	27,019
E-E	0	3,634			
			Total	**87,213**	**102,104**

Net Earthwork Delta
189,317

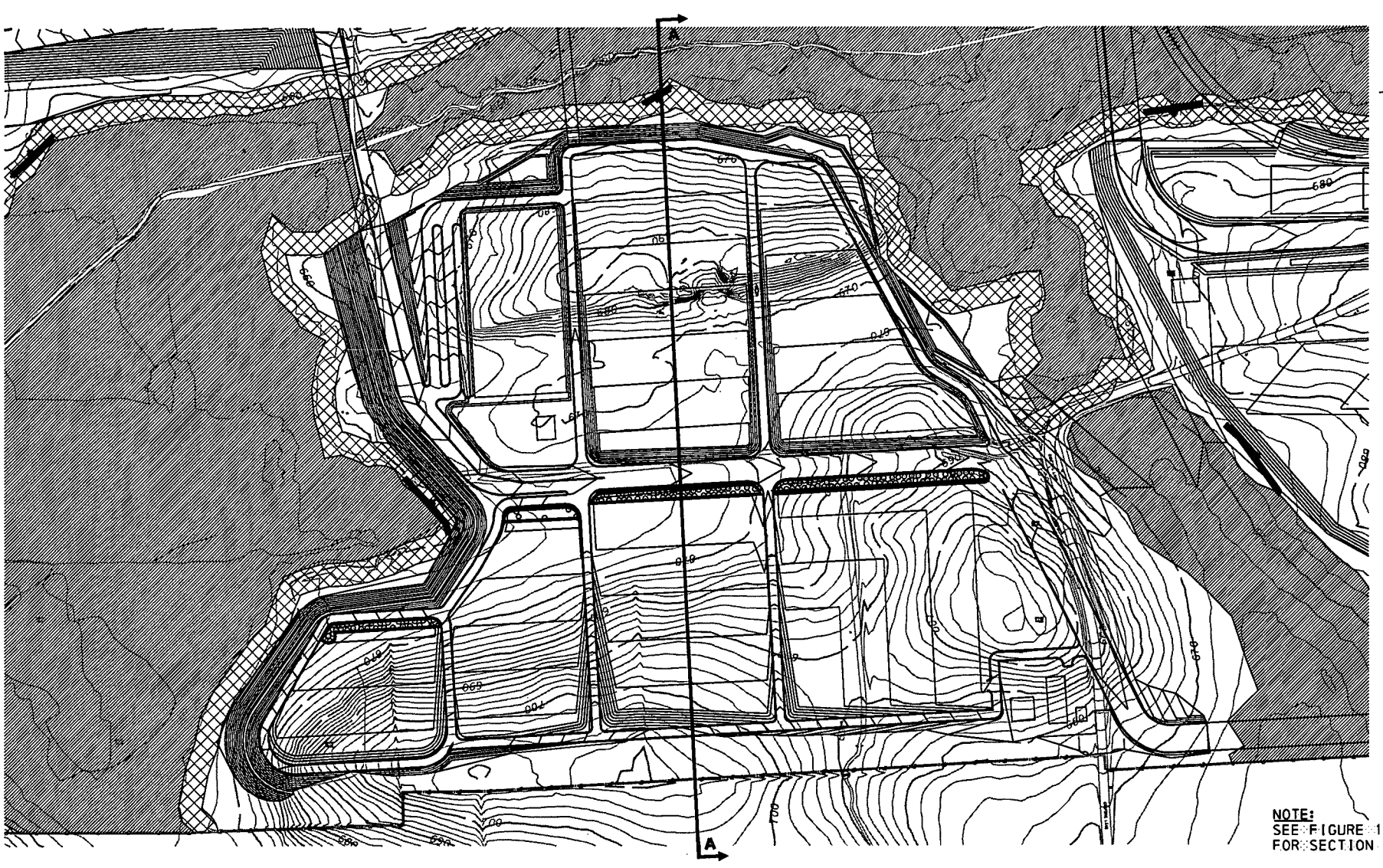
Example Calculation (Cut volume between Sections B-B and C-C)

(3,913 + 3,678)/2 =	3,796	avg. areas
	x208	length between sections (see Figure 5.0, Appendix D)
	789,464	Cut Volume (CF)
	29,239	Cut Volume (CY)

Net Earthwork Delta = Cut volume from existing to NPDES Grade + Fill volume from existing/NPDES grade to Re-Grade Option 8i.



APPENDIX D
Layout and Cross Section Figures 1.0-5.0



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5. MAIN PARKING LOT AREA PLAN (ESTIMATE)

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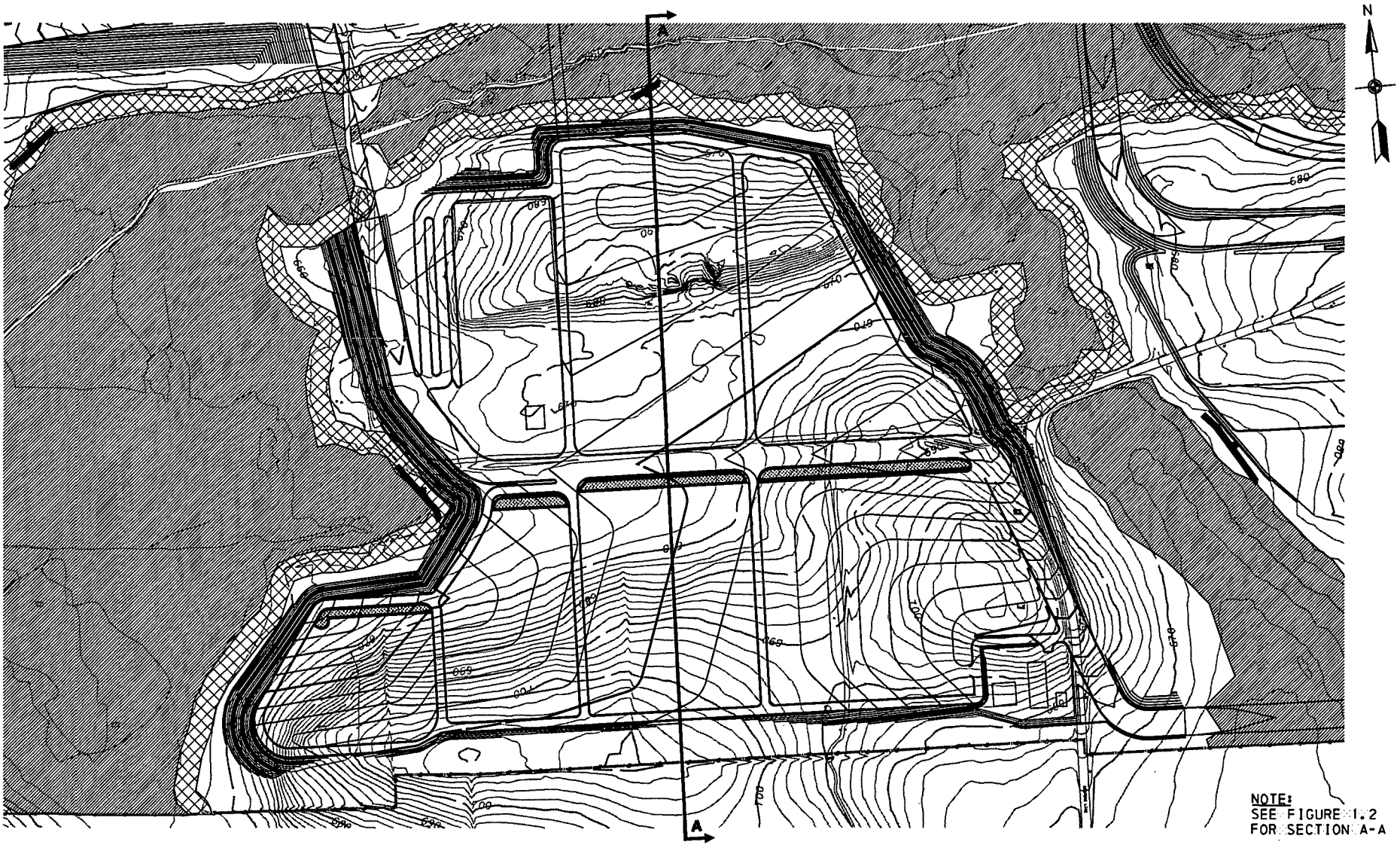
DRAWN BY: WCK	HORZ. SCALE: 1"=200'
CHECKED BY: LGB	VERT. SCALE: N/A
JOB No. PPLS 0902	DATE: 04/2011

FIGURE 1.0



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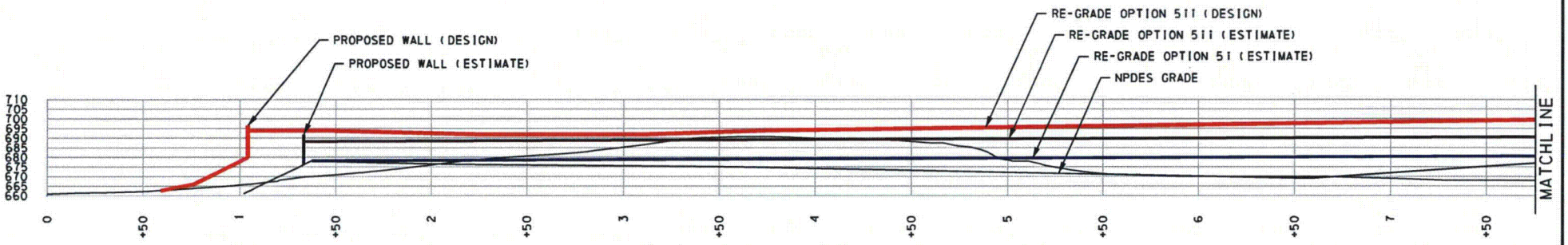
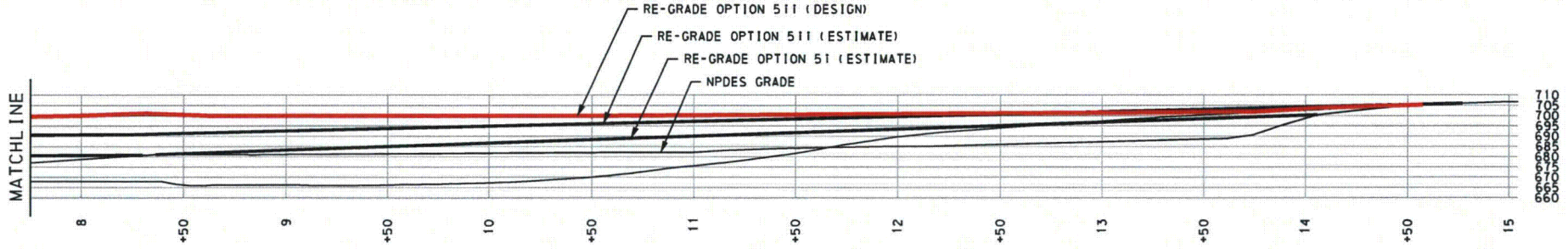
5. MAIN PARKING LOT AREA PLAN (DESIGN)

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: 1"=200'	DATE: 04/2011
CHECKED BY: LGB	VERT. SCALE: N/A	
JOB No. PPLS 0902		**FIGURE 1.1**



SECTION A-A



SECTION A-A (CONT'D.)

LEGEND

- EXISTING GRADE
- NPDES GRADE
- PROPOSED RE-GRADE ESTIMATE
- PROPOSED RE-GRADE DESIGN

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5. MAIN PARKING LOT AREA SECTION A-A

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: 1"=50'	DATE: 04/2011
CHECKED BY: LGB	VERT. SCALE: 1"=50'	
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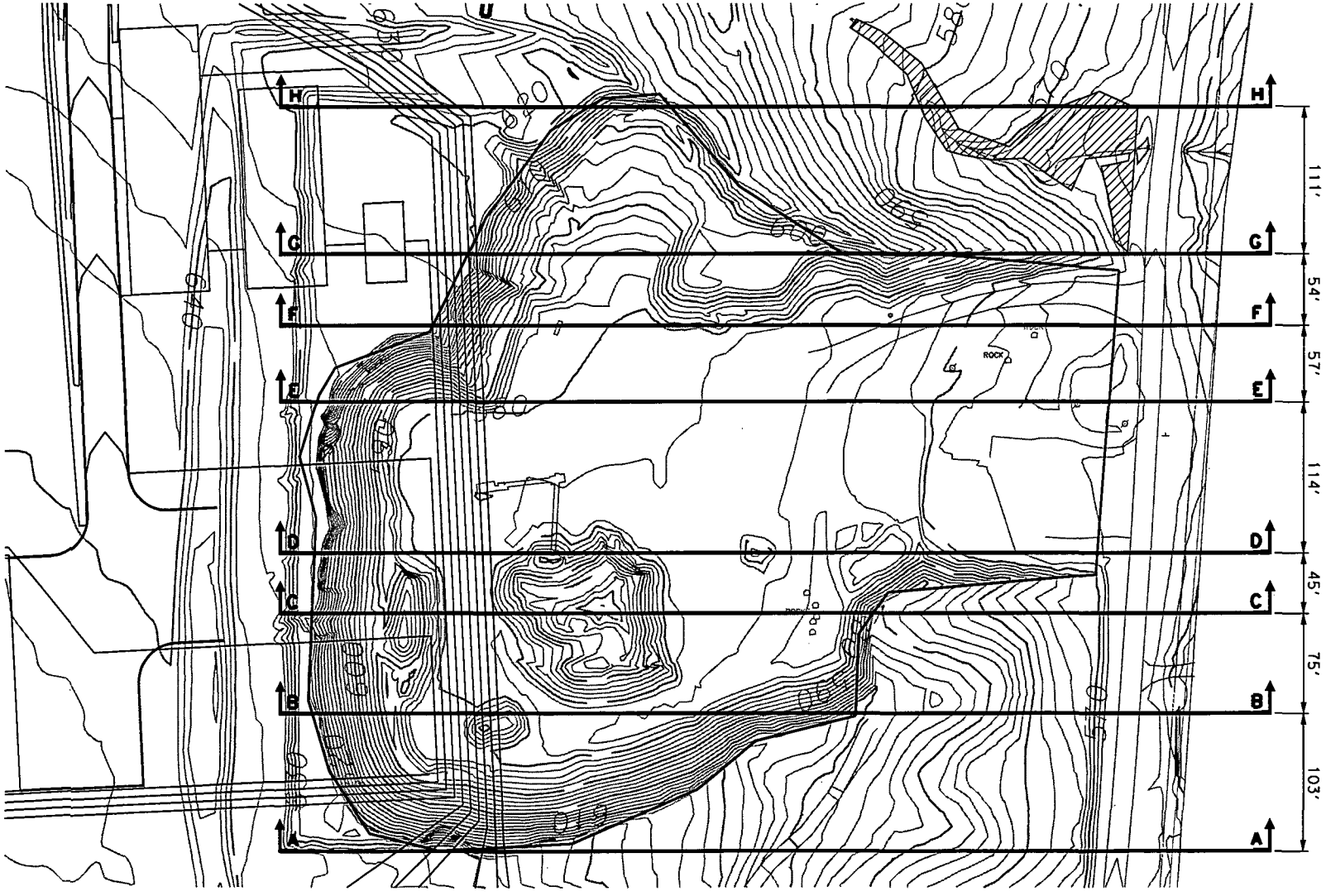

NOTE:
SEE FIGURE 2.2 FOR SECTIONS A-A THRU D-D AND FIGURE 2.3 FOR SECTIONS E-E THRU H-H

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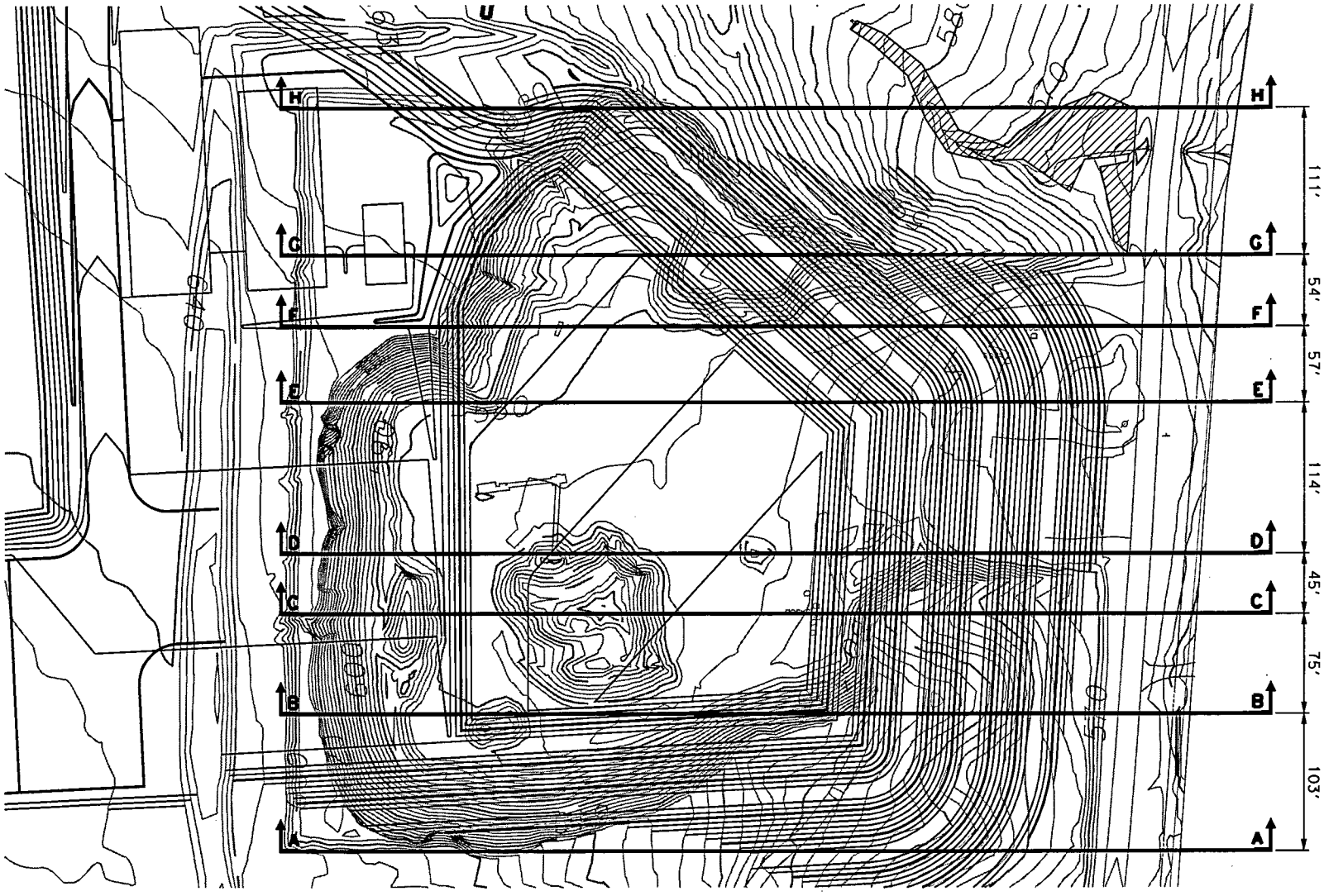
6i. QUARRY LAYOUT PLAN (ESTIMATE)

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: 1"=75' VERT. SCALE: N/A	DATE: 04/2011
CHECKED BY: LGB		
JOB No. PPLS 0902		**FIGURE 2.0**



NOTE:
SEE FIGURE 2.2 FOR SECTIONS A-A THRU D-D AND FIGURE 2.3 FOR SECTIONS E-E THRU H-H

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6i. QUARRY LAYOUT PLAN (DESIGN)

PPL BELL BEND, LLC 38 BOWBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: 1"=75' VERT. SCALE: N/A	DATE: 04/2011
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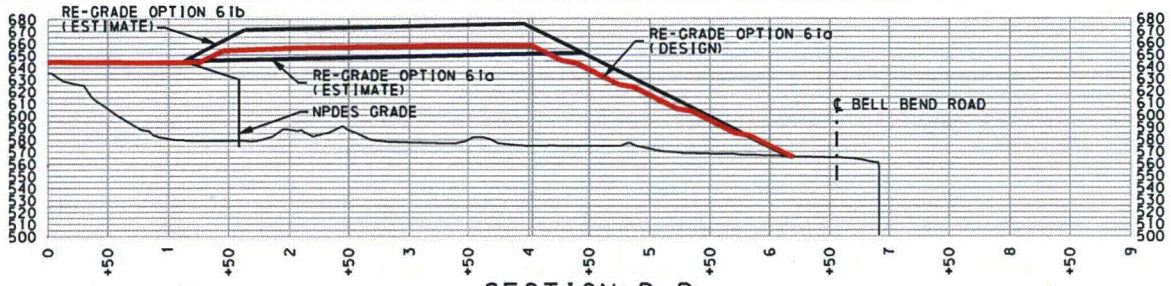
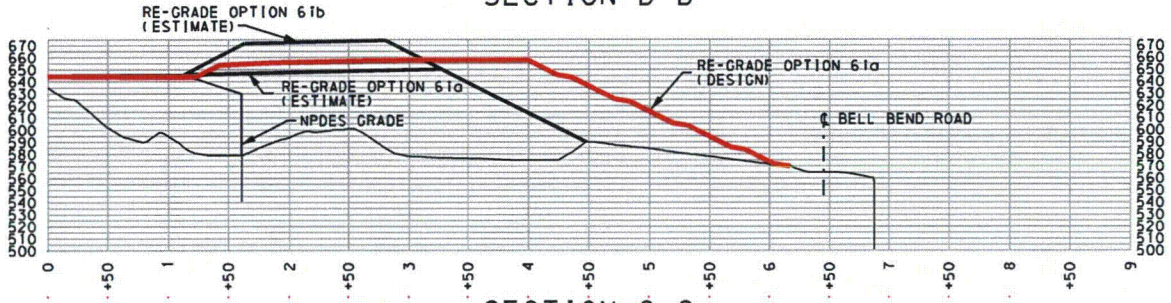
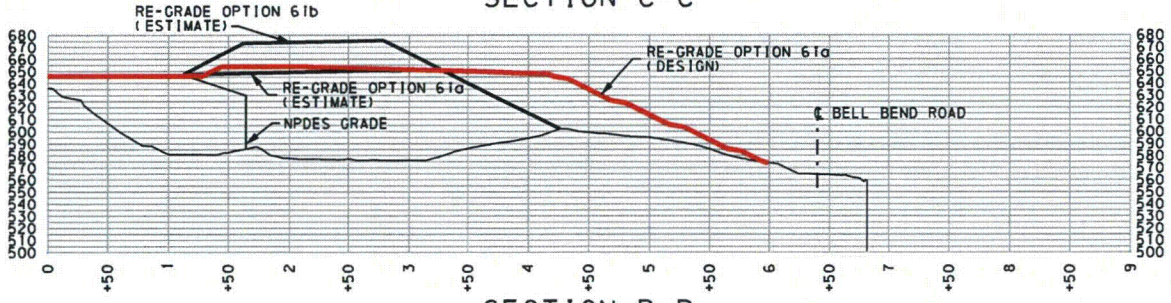


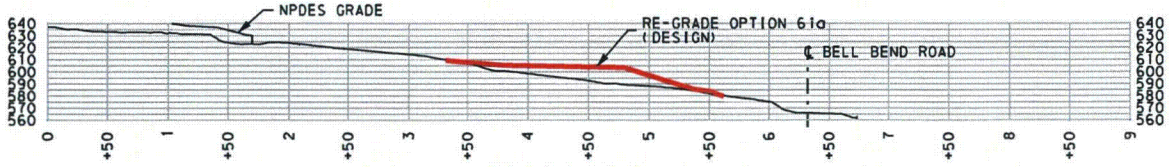
SECTION D-D



SECTION C-C



SECTION B-B



SECTION A-A

LEGEND

- EXISTING GRADE
- NPDES GRADE
- PROPOSED RE-GRADE ESTIMATE
- PROPOSED RE-GRADE DESIGN

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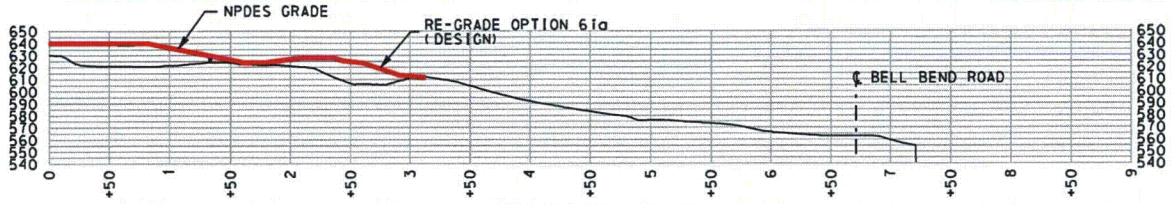
6i. QUARRY LAYOUT AREA SECTIONS A-A THRU D-D

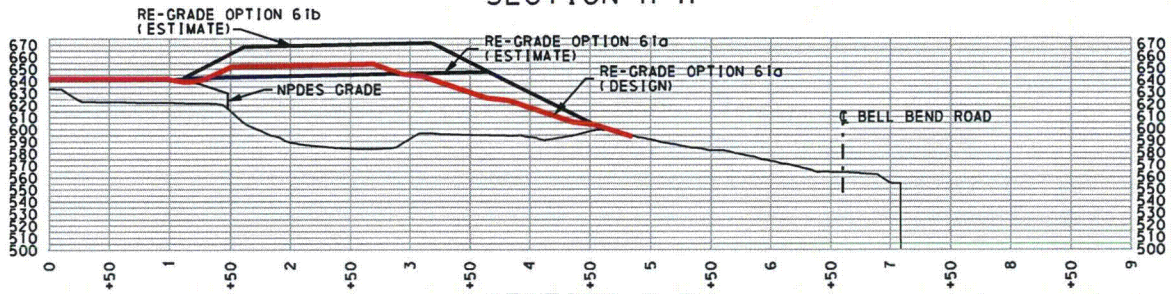
PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: 1"=100'
CHECKED BY: LGB	VERT. SCALE: 1"=100'
JOB No. PPLS 0902	DATE: 04/2011

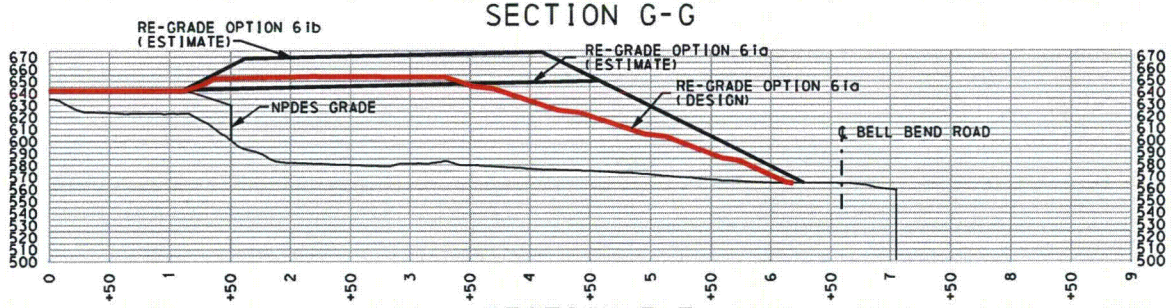
FIGURE 2.2



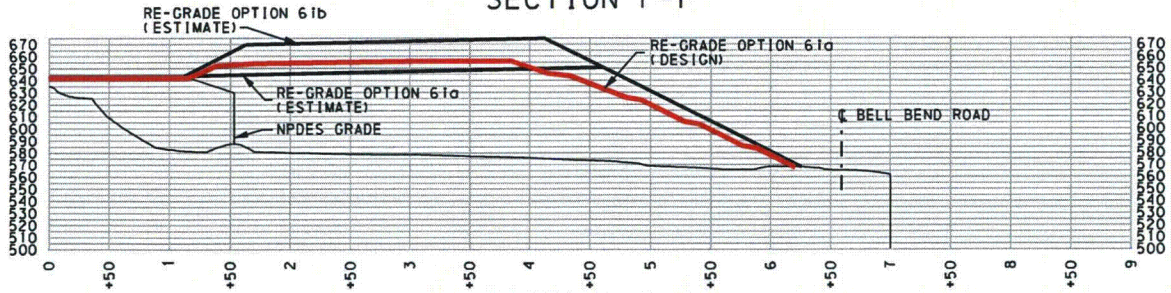
SECTION H-H



SECTION G-G



SECTION F-F



SECTION E-E

LEGEND

- EXISTING GRADE
- NPDES GRADE
- PROPOSED RE-GRADE ESTIMATE
- PROPOSED RE-GRADE DESIGN

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6i. QUARRY LAYOUT AREA SECTIONS E-E THRU H-H

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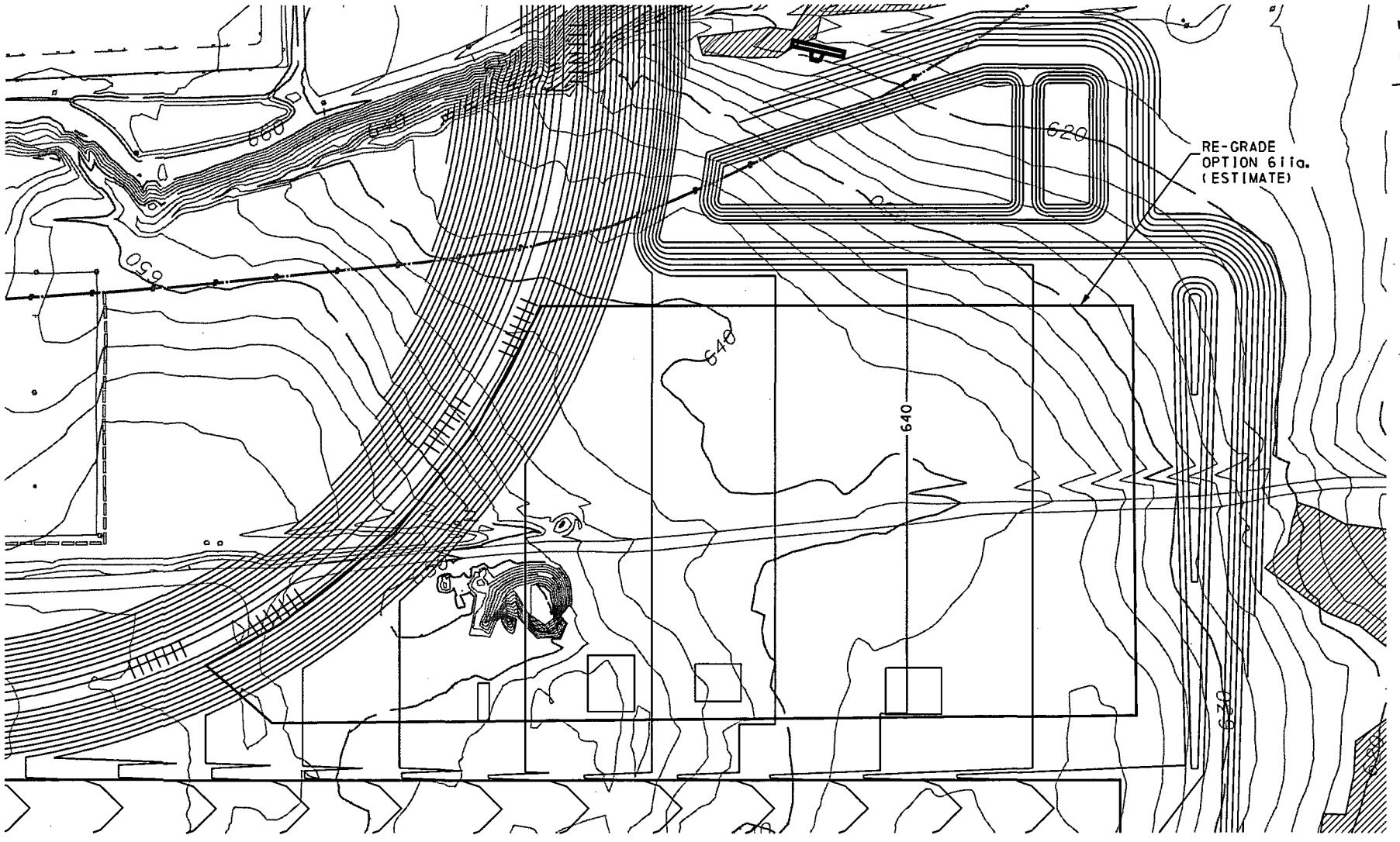
DRAWN BY: WCK	HORZ. SCALE: 1"=100'	DATE: 04/2011
CHECKED BY: LGB	VERT. SCALE: 1"=100'	
JOB No. PPLS 0902		**FIGURE 2.3**



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6ii. BATCH PLANT LAYOUT PLAN (ESTIMATE)

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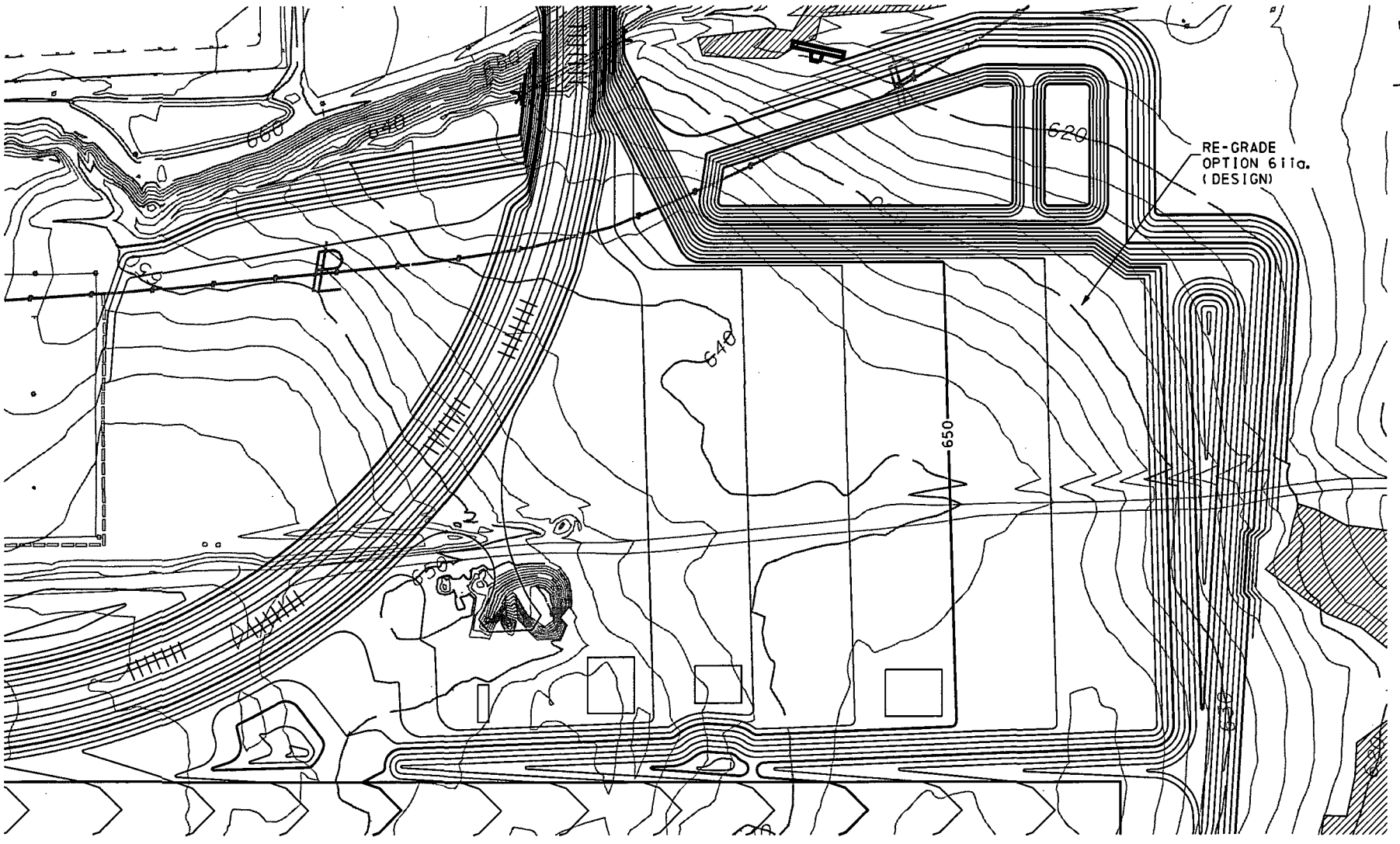
DRAWN BY: WCK	HORZ. SCALE: 1"=100'	DATE:
CHECKED BY: LGB	VERT. SCALE: N/A	04/2011
JOB No. PPLS 0902	**FIGURE 3.0**	



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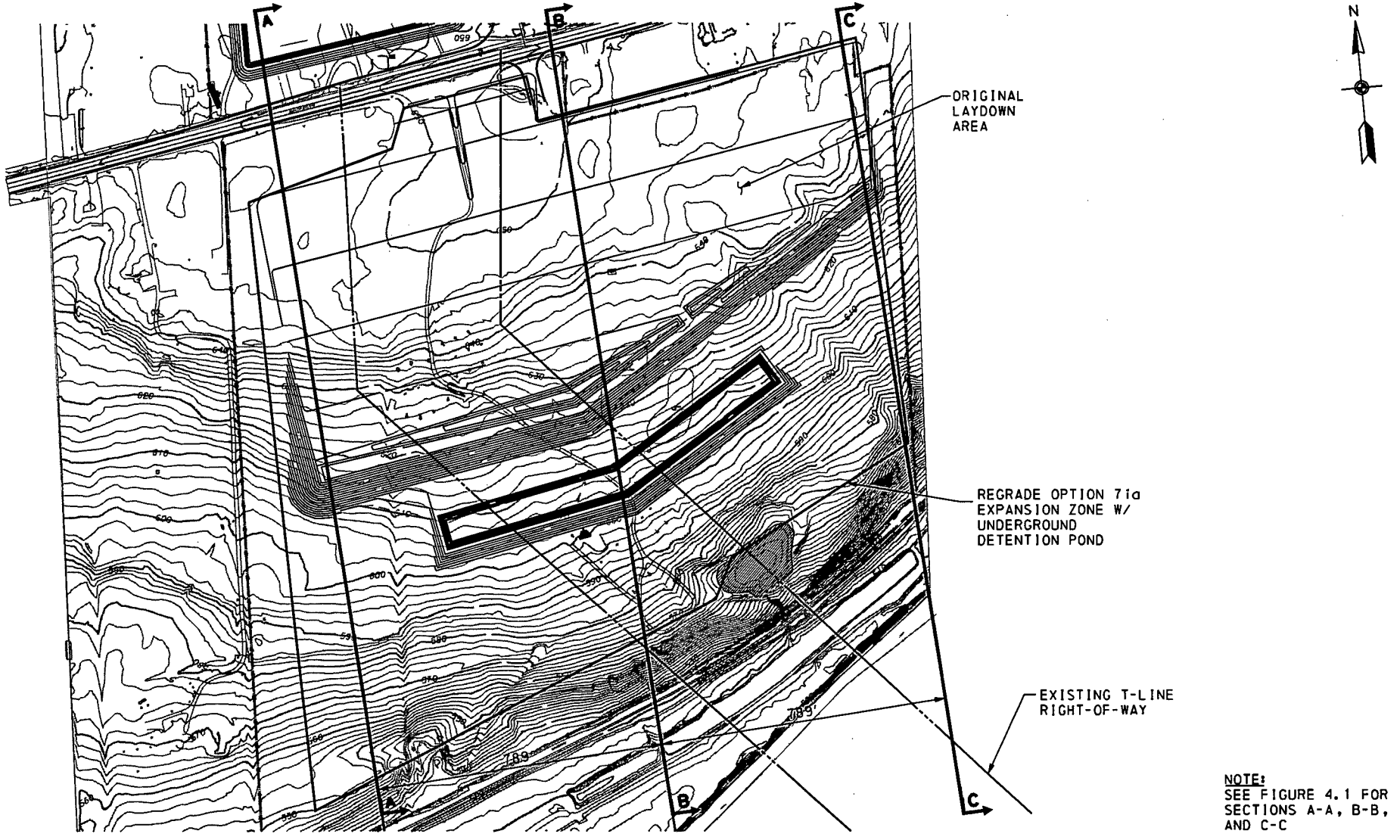
6ii. BATCH PLANT LAYOUT PLAN (DESIGN)

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: 1"=100'	DATE: 04/2011
CHECKED BY: LGB	VERT. SCALE: N/A	
JOB No. PPLS 0902		**FIGURE 3.1**



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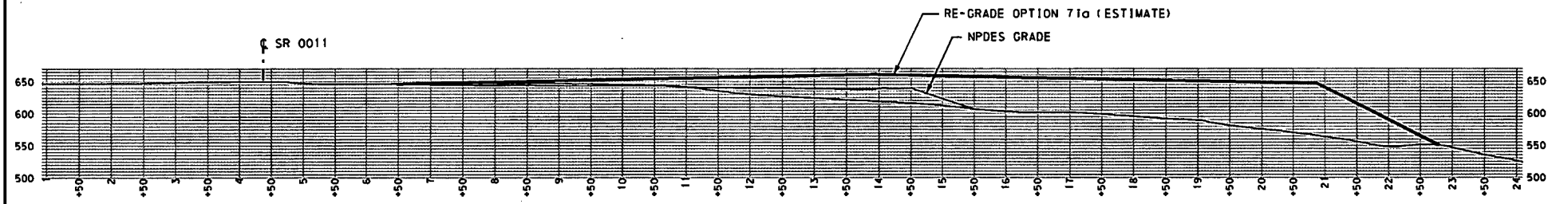
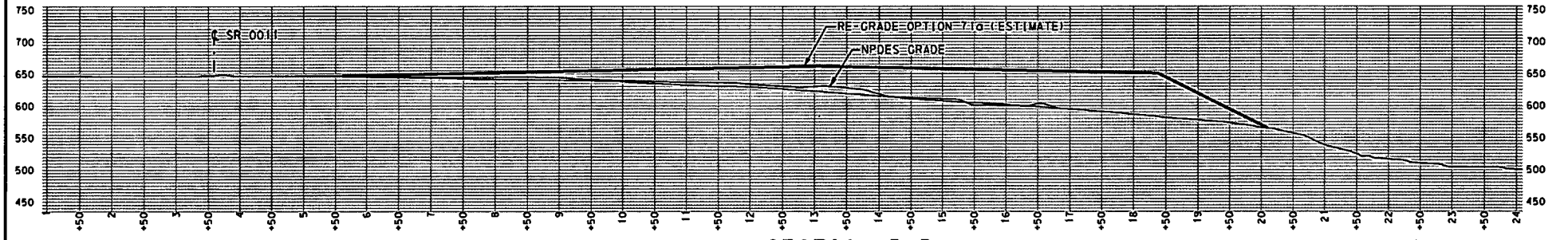
7ia. SOUTH LAYDOWN EXPANSION PLAN W/ UNDERGROUND DETENTION POND

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

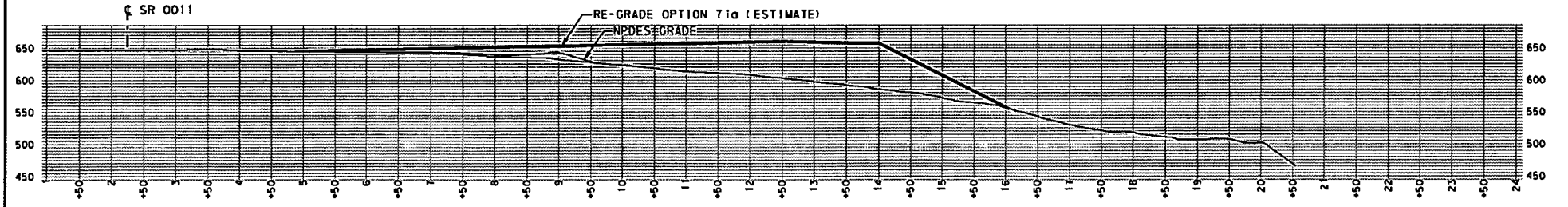
DRAWN BY: WCK	HORZ. SCALE: 1"=250' VERT. SCALE: N/A	DATE: 04/2011
CHECKED BY: LGB		
JOB No. PPLS 0902	**FIGURE 4.0**	



SECTION A-A



SECTION B-B



SECTION C-C

LEGEND

- EXISTING GRADE
- NPDES GRADE
- PROPOSED RE-GRADE ESTIMATE

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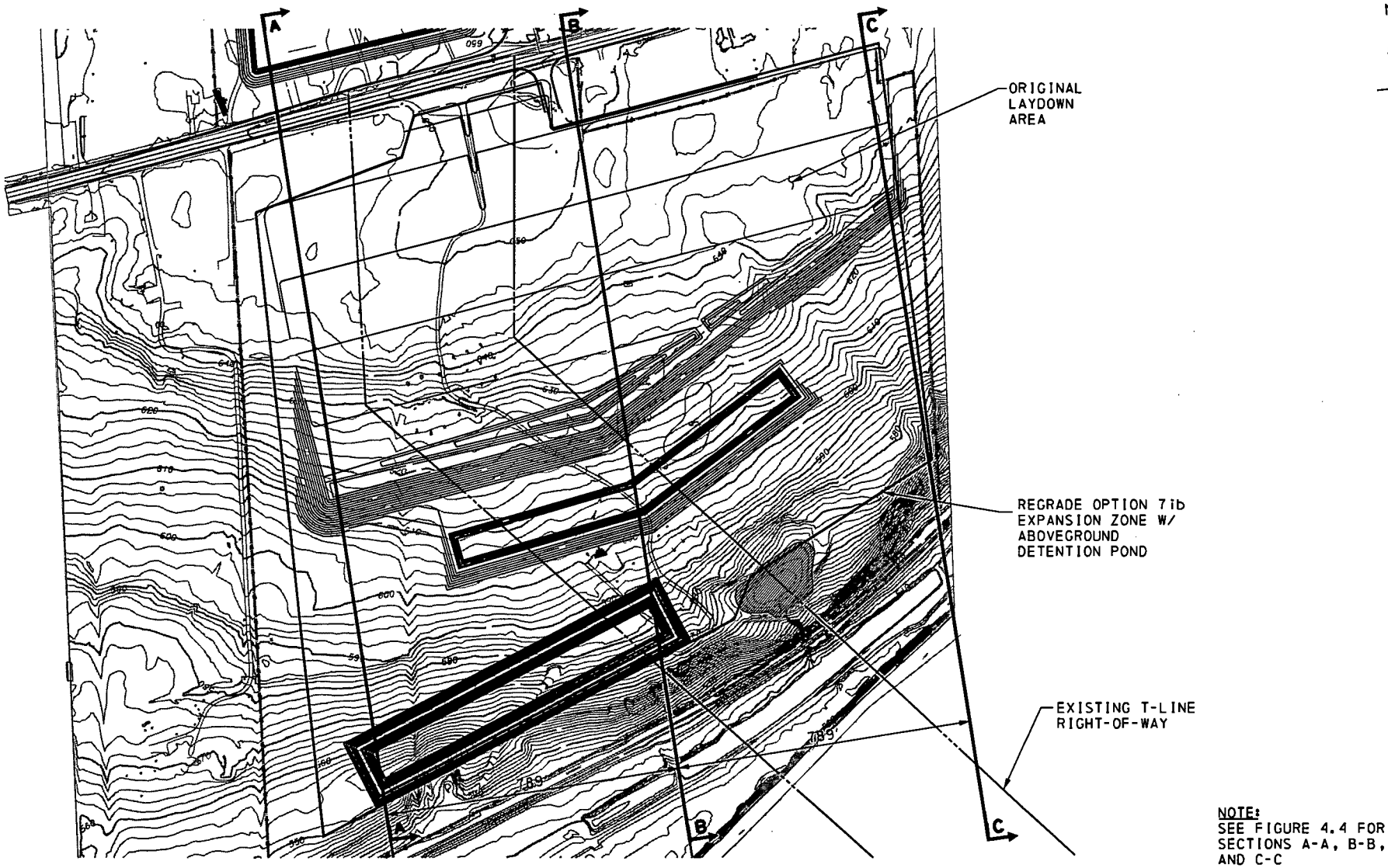
7ia. SOUTH LAYDOWN EXPANSION AREA W/ UNDERGROUND DETENTION POND SECTIONS A-A, B-B, & C-C

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: 1"=150'	DATE: 04/2011
CHECKED BY: LGB	VERT. SCALE: 1"=150'	
JOB No. PPLS 0902		**FIGURE 4.1**



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7ib. SOUTH LAYDOWN EXPANSION PLAN W/ ABOVE GROUND DETENTION (ESTIMATE)

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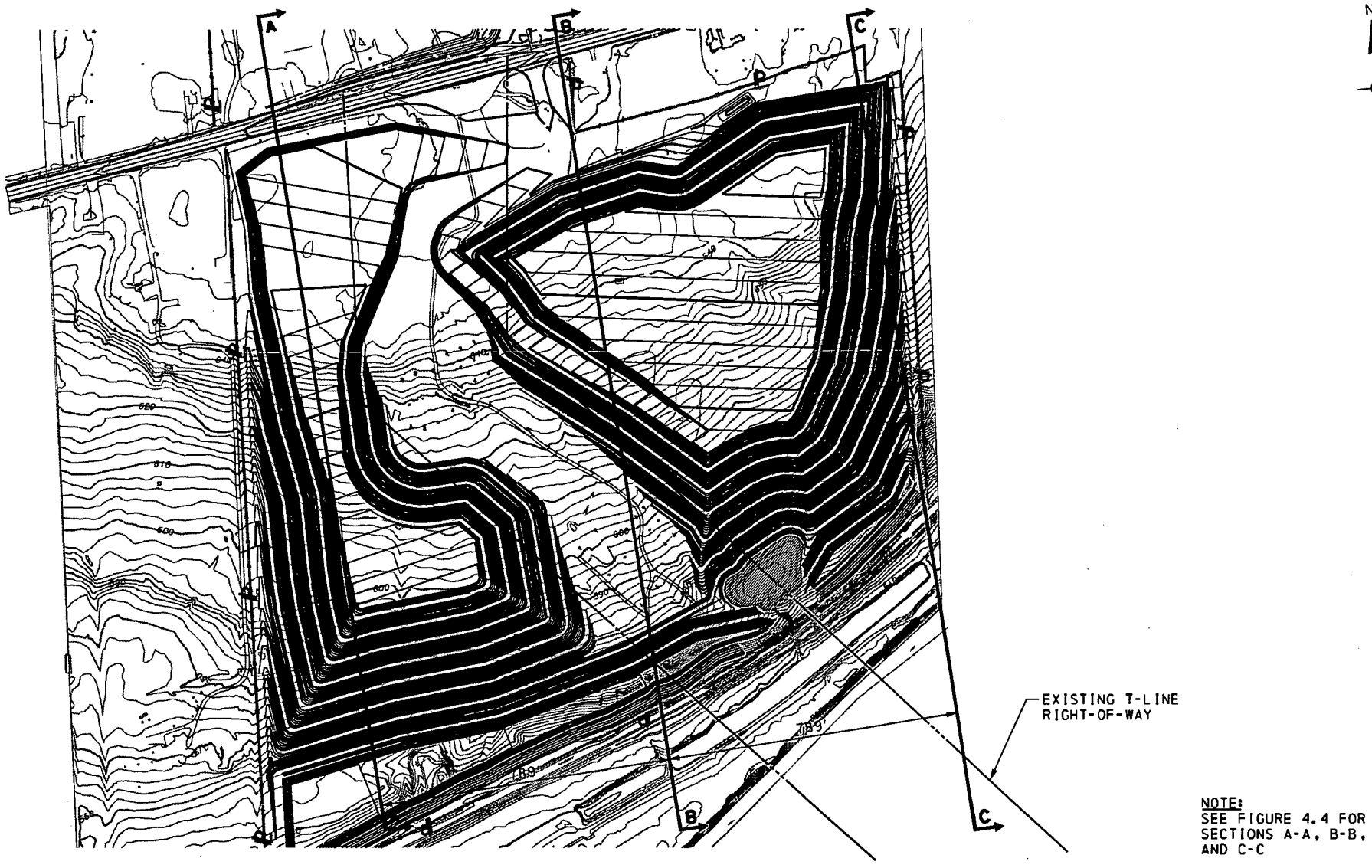
CHECKED BY: LGB	VERT. SCALE: N/A	
JOB No. PPLS 0902		**FIGURE 4.2**



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7ib. SOUTH LAYDOWN EXPANSION PLAN W/ ABOVE GROUND DETENTION (DESIGN)

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

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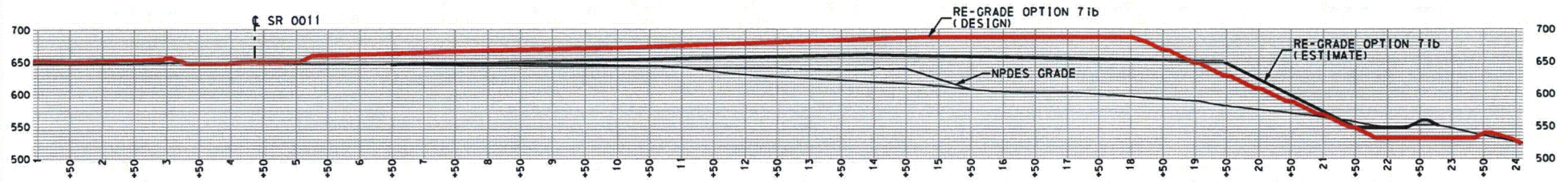
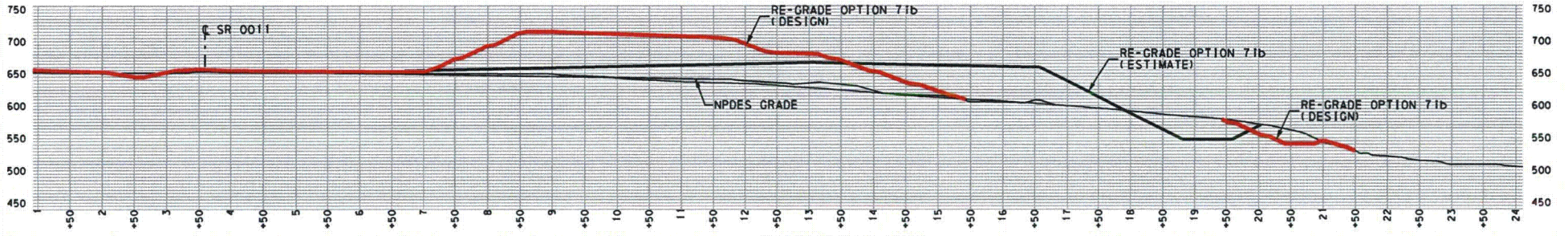
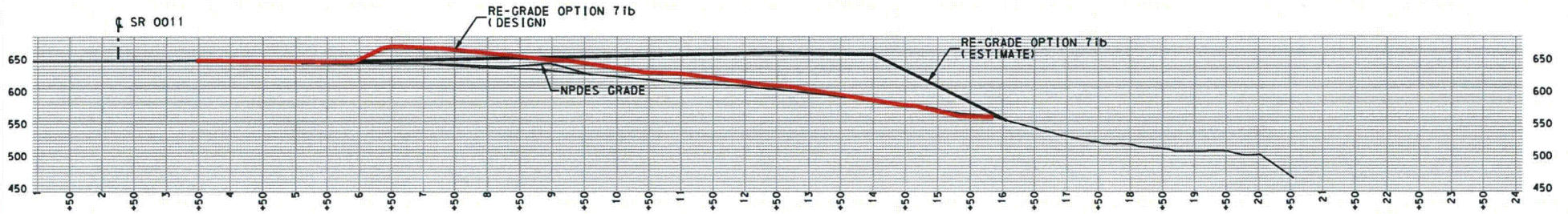
CHECKED BY: LGB	VERT. SCALE: N/A	
JOB No. PPLS 0902		**FIGURE 4.3**



SECTION A-A



SECTION B-B



SECTION C-C

LEGEND

- EXISTING GRADE
- NPDES GRADE
- PROPOSED RE-GRADE ESTIMATE
- PROPOSED RE-GRADE DESIGN

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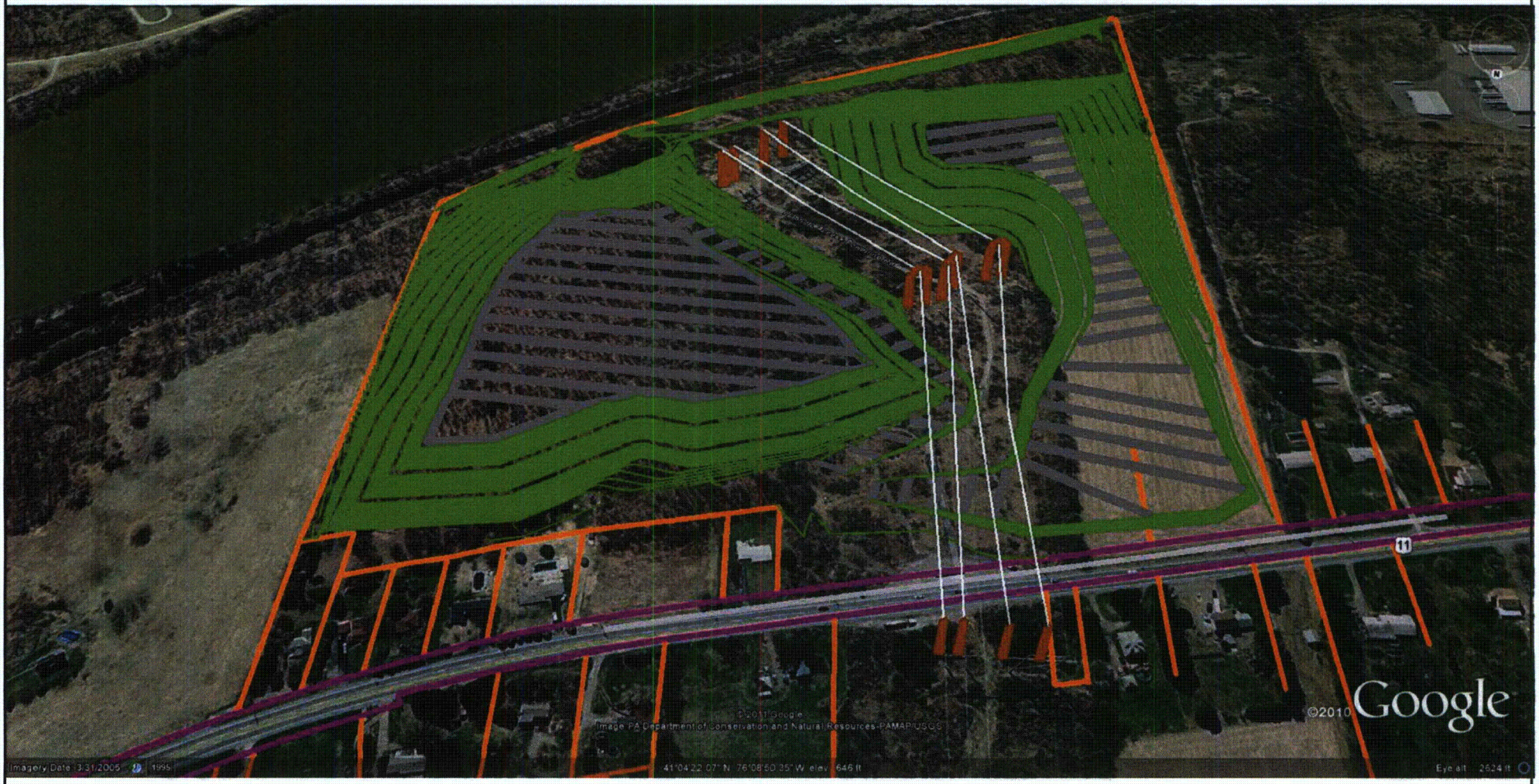
7ib. SOUTH LAYDOWN EXPANSION AREA W/ ABOVE GROUND DETENTION POND SECTIONS A-A, B-B, & C-C

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: 1"=150'	DATE: 04/2011
CHECKED BY: LGB	VERT. SCALE: 1"=150'	
JOB No. PPLS 0902		**FIGURE 4.4**



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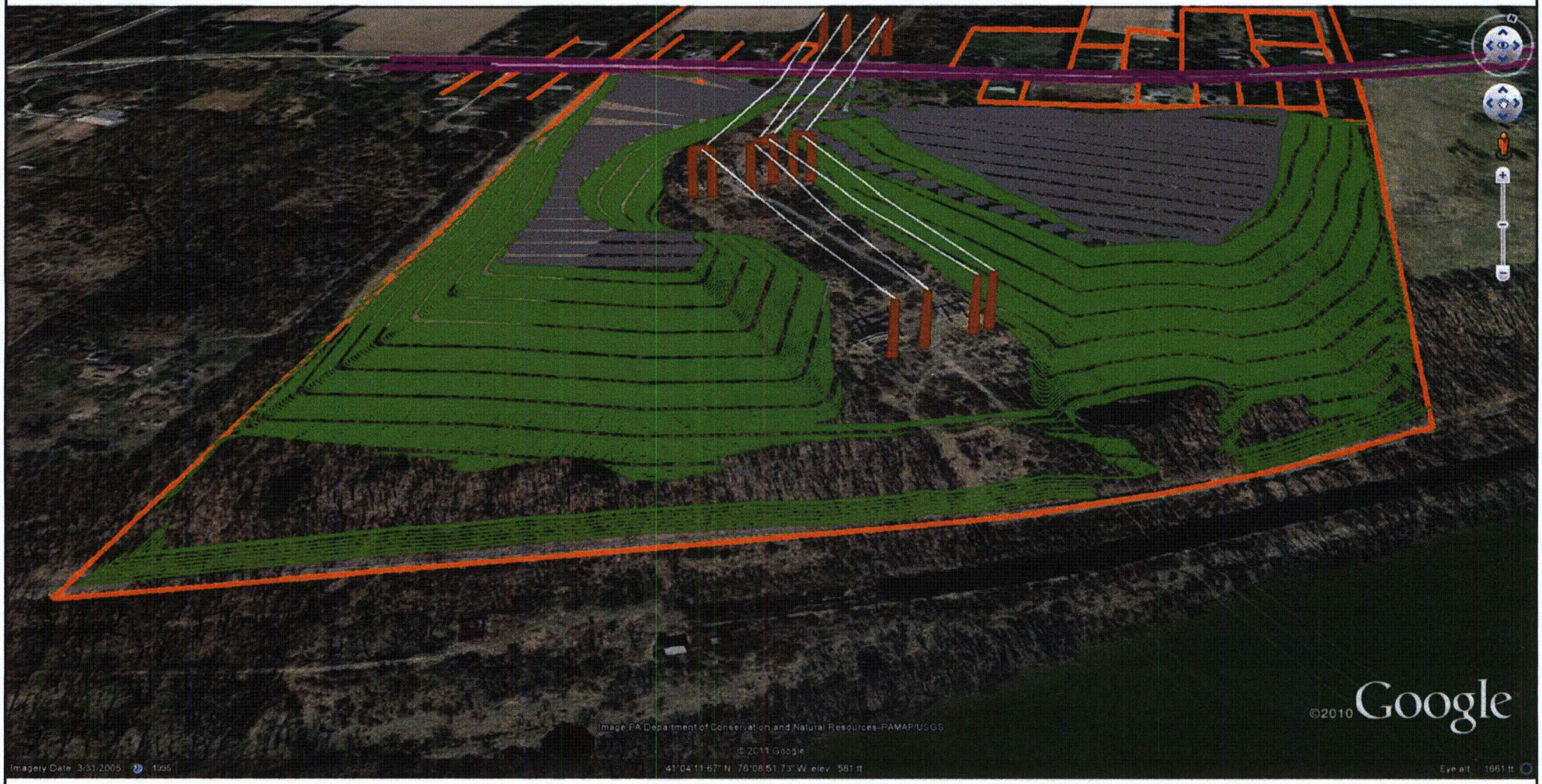
7ib. SOUTH LAYDOWN EXPANSION AREA GOOGLE EARTH 3D RENDERING

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: NA VERT. SCALE: NA	DATE: 04/2011
CHECKED BY: LGB		
JOB No. PPLS 0902	**FIGURE 4.5**	



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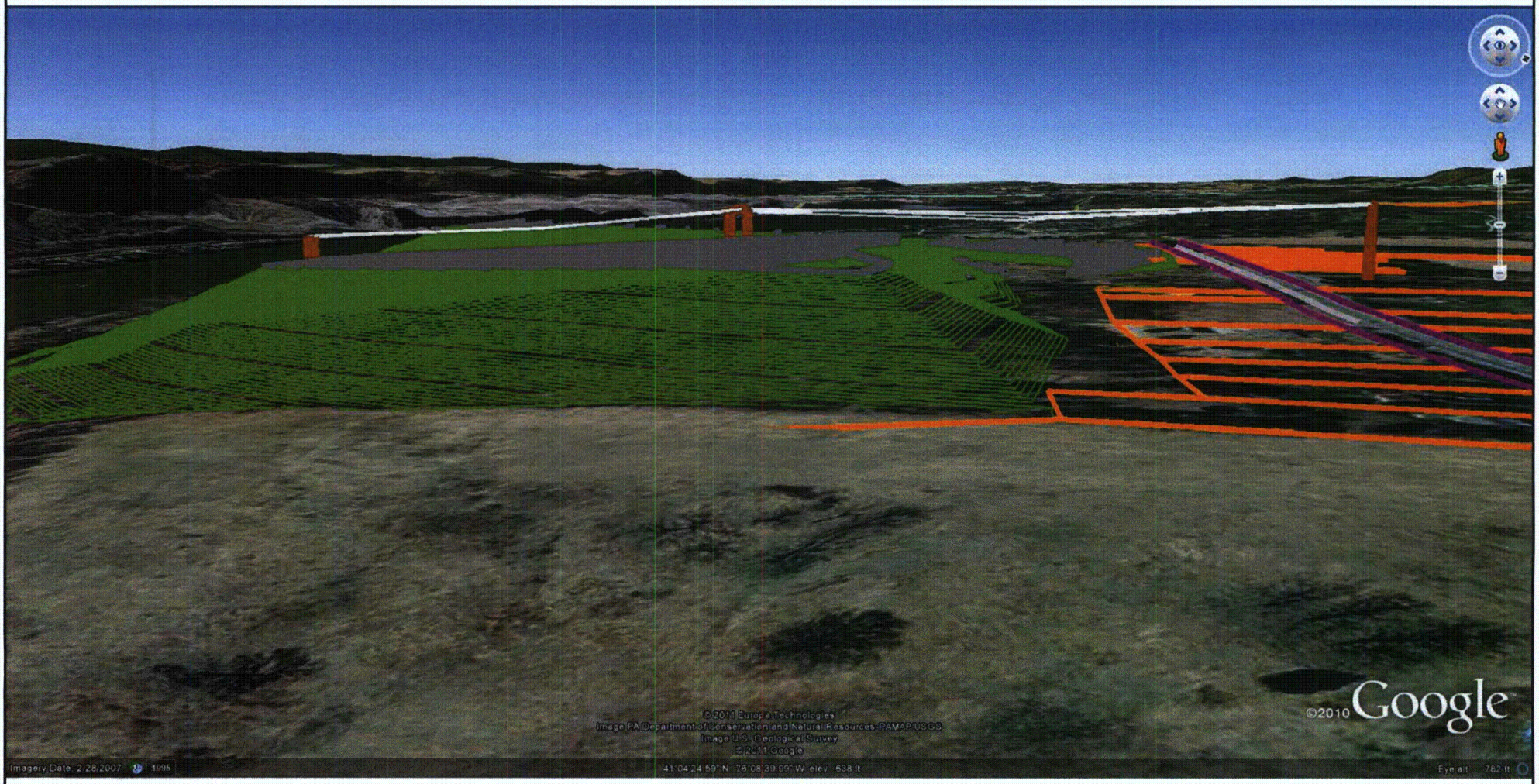
7ib. SOUTH LAYDOWN EXPANSION AREA GOOGLE EARTH 3D RENDERING

PPL BELL BEND, LLC 38 BOMBOY LANE, SUITE 2 BERWICK, PA 18603

DRAWN BY: WCK	HORZ. SCALE: NA VERT. SCALE: NA	DATE: 04/2011
CHECKED BY: LGB		
JOB No. PPLS 0902		FIGURE 4.6



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7ib. SOUTH LAYDOWN EXPANSION AREA GOOGLE EARTH 3D RENDERING

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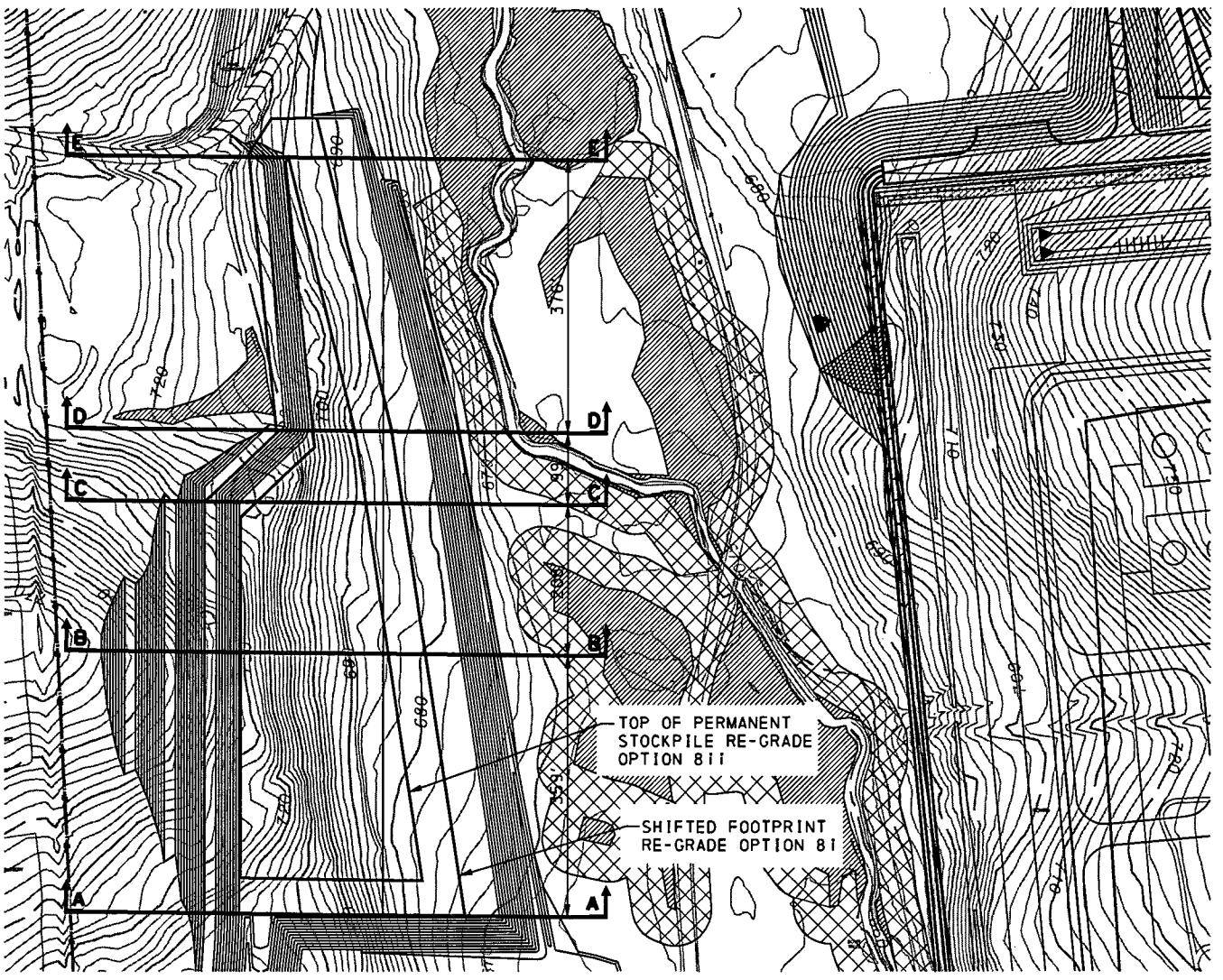
DRAWN BY: WCK	HORZ. SCALE: NA VERT. SCALE: NA	DATE: 04/2011
CHECKED BY: LGB		
JOB No. PPLS 0902		

FIGURE 4.7



NOTE:
SEE FIGURE 5.2 FOR SECTIONS A-A, B-B, AND C-C AND FIGURE 5.3 FOR SECTIONS D-D AND E-E

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8i. WEST STOCKPILE LAYOUT PLAN (ESTIMATE)

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CHECKED BY: LGB	VERT. SCALE: N/A	
JOB No. PPLS 0902		**FIGURE 5.0**