Exception Request No.: 93 (Rev 1)
Section: WBR3
Town: Woodstock
Highway: US 3 (Tier 2)
Station: 1564+40 to 1574+90±
Drawing No.: WBR3 C110-111
Survey Report Reference No.: WBR3 C106 to C107
Exception Type: Alignment in Pavement
Crossing over Existing Drainage

Traffic Information

NHS: No
ADT:1691
Traffic Control Type: Alt 1-way
Traffic Control Duration: Traffic control duration is estimated to be 9 days for the proposed installation. If the requested exceptions for the alignment in pavement is not granted, NPT expects an additional 25 days of work requiring traffic control. If the requested exception to cross over the drainage structure is not granted, NPT expects an additional 1-2 weeks of work requiring traffic control to install the duct bank below the drainage structure.

Summary of Justification for Exception

NPT is requesting an exception from the UAM guidelines for the location of the cable trench in the pavement on US 3, Daniel Webster Highway from station 1564+40 to 1574+90 of the NPT WBR3 Underground Alignment. (See Exhibit A.) Due to limited ROW space outside the pavement and adjacent to the existing utilities and guardrails, construction outside the paved area is not practicable because NPT does not have the necessary property rights to construct outside the NHDOT ROW on private property.

In addition, NPT's exception request in this area includes a crossing above a 48-inch box culvert with 11 feet of cover. The proposed alignment will be set over the existing culvert to avoid road closures or other significant traffic impacts, unreasonable costs associated with a deeper excavation and increased construction width which will extend the duration of construction and traffic impacts.

Technical Discussion of Justification of Exception

Alignment in Pavement
The roadway alignment at this location is constrained by stormwater infrastructure, guardrail system and an overhead distribution line on the western side of US 3, preventing construction of the duct bank outside the pavement.

From 1564+50 to 1570+50 there is a guardrail with steep slopes and an overhead distribution line located behind the guardrail. In addition to the steep slopes, the presence of overhead distribution line, even if relocated, will not allow sufficient space to construct the duct bank, when considering a 5-foot offset from the guardrail. In addition, the steep slopes behind the guardrail, combined with NHDOT's requested offset of 5-feet from the existing guardrails, would result in significant constructability issues,

including the need for benching into the side slope to create a level and safe working area. The modified side slopes would extend beyond the ROW limits. See Exhibit B.

At the request of the DOT, NPT also evaluated an option to remove the guardrail and a portion of the roadway to allow NPT to construct the duct bank in the slope without extending past the right of way limits. Considerable amounts of materials would have to be removed and transported to another site for temporary storage in order to bench into the slope. These materials would then have to be transported back to the site to restore the site after the duct bank was completed. (See Exhibit C.) This option would significantly increase the time necessary in the NH DOT ROW required to construct the duct bank and would be more costly, having a net increase of $375,310 including the cost of material transport and new guardrail installation. (See Exhibit E). (Note: This marginal cost estimate does not factor in the potential that native materials cannot be used during reburial because more expensive, select materials may be needed to address cable thermal issues.) In addition, traffic impacts would be significantly greater for this option (as compared to the proposed installation) due to the additional work for the benching activities.

Additionally, NPT has liability concerns regarding DOT's request that NPT install new guardrails after completion of its work. Unlike NHDOT, if NPT were to install new guardrails, NPT would not have the benefit of immunity protections afforded to NHDOT under New Hampshire law. See N.H. R.S.A. § 230:80. Therefore, even in cases where NPT deemed the cost of the "guardrail replacement option" to be a reasonable project cost for a particular location, NPT could not agree to have any role in work to replace the guardrails unless NHDOT were willing to agree to defend, indemnify, and hold harmless NPT against any and all claims related in any manner to, or arising out of, the installation of the new guardrails. If NHDOT were not willing to provide such protection to NPT, then NPT would be willing, in the alternative, to reimburse NHDOT for the cost NHDOT and/or its contractors incur to replace any guardrails removed during our work, but NPT could not have any role in such work. However, NPT is not requesting the "guardrail replacement option" at this location, where it deems the additional traffic impacts and cost of this work to be prohibitive.

NPT also evaluated placing the cable trench alignment on the eastern side of the road in this area, however there are similar construction constraints as on the western side of the road, including guardrail and slope issues and a water main that runs parallel to the edge of pavement.

In addition, moving the alignment to the western side of the road would require two additional highway crossings. These road crossings would involve disturbance to approximately 100 feet of paved roadway. NPT submits that any benefits of moving to the opposite side of the road are negated by the additional traffic impacts and additional delays associated with the construction of the road crossings.

Excavation limits and work areas are shown on the attached drawings (Exhibits A, B, and C). During construction, one lane will remain open to traffic at all times.

Crossing over Existing Drainage Structure

The proposed alignment is set within the pavement and over a 48-inch Box culvert to avoid road closures or other significant traffic impacts, unreasonable costs associated with a deeper excavation and increased construction width which will extend the duration of construction and traffic impacts, as further described below.

48-inch Box Culvert

NPT's exception request includes crossing above an existing 48-inch Box culvert on US 3, Daniel Webster Highway at STA 1565+50±. There is 11 feet of cover over the culvert. The attached Exhibits A and D have been provided for this location to illustrate the constraints associated with installing the ductbank below the existing culvert.

The vertical positioning of the cable trench is constrained by the 11-foot depth of the existing culvert. Crossing under the 48-inch box culvert to meet the required 2-foot minimum separation will require a greater separation of the conduits and cable to accommodate thermal design criteria for the electric cables resulting from the additional depth. The trench width and additional offsets necessary for deeper construction would likely result in significant traffic impacts, including extended duration of construction within roadway to allow for sheeting installation and removal and extensive excavation due to the depth and width of the trench. These construction alternatives will add one to two weeks to the traffic impacts at this location. Finally, the increase in cost associated with crossing underneath the 48-inch box culvert would be approximately $200,000. See Exhibit E for cost estimates.

We have also evaluated a trenchless option to pass under the culvert. The trenchless installation will be unreasonably costly (a net estimated increase of $2,069,100 to cross under the culvert). (See cost estimate attached in Exhibit E). Also, traffic impacts would be increased for a trenchless installation due to the addition of trenchless work areas and the extended duration of installation.

Impacts

Alignment in Pavement

The design, as proposed, will not adversely affect the design, construction, stability, traffic, safety, environmental commitments, maintenance, or operation of the highway. The alignment has been located 5-feet off the edge of the existing utilities, to avoid future conflicts with repairs or replacement. The installation of the ductbank and pavement restoration will be designed and constructed in accordance with conditions outlined in the NHDOT's April 3, 2017 letter to the New Hampshire Site Evaluation Committee. The installation's proposed depth meets NHDOT's criteria relating to the structural box to minimize any potential conflicts with maintenance and future highway projects. A traffic control plan has been submitted to the NHDOT for this design and complies with the Manual on Uniform Traffic Control Devices.

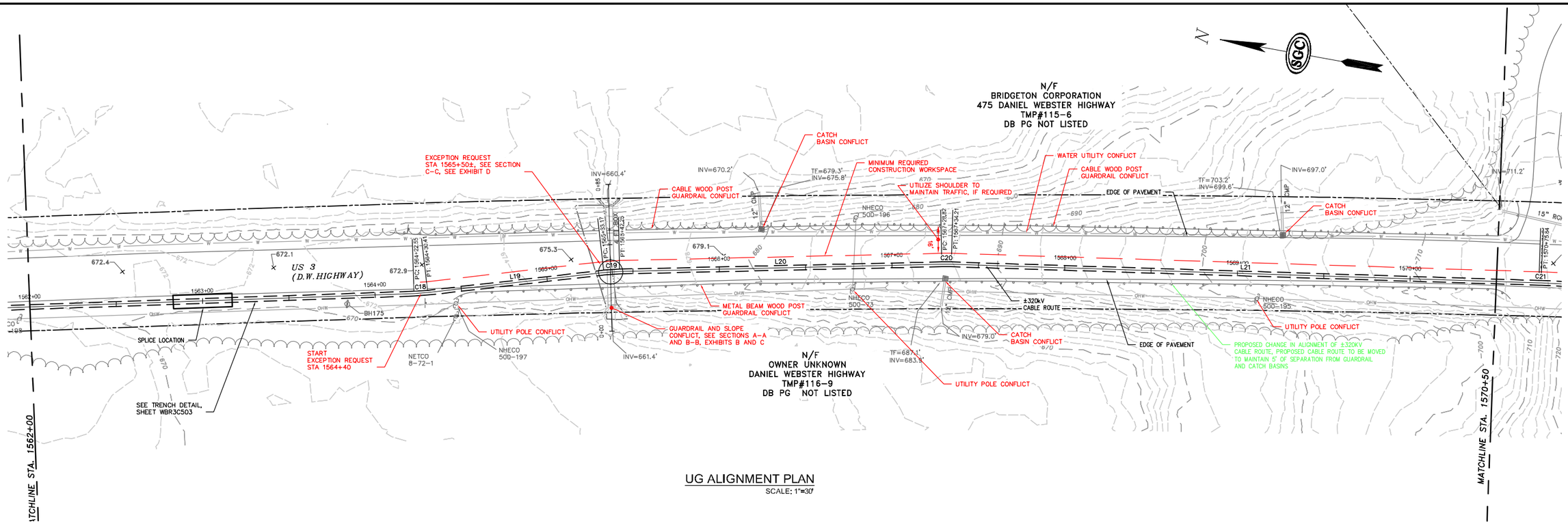
Crossing Over Existing Drainage Structure

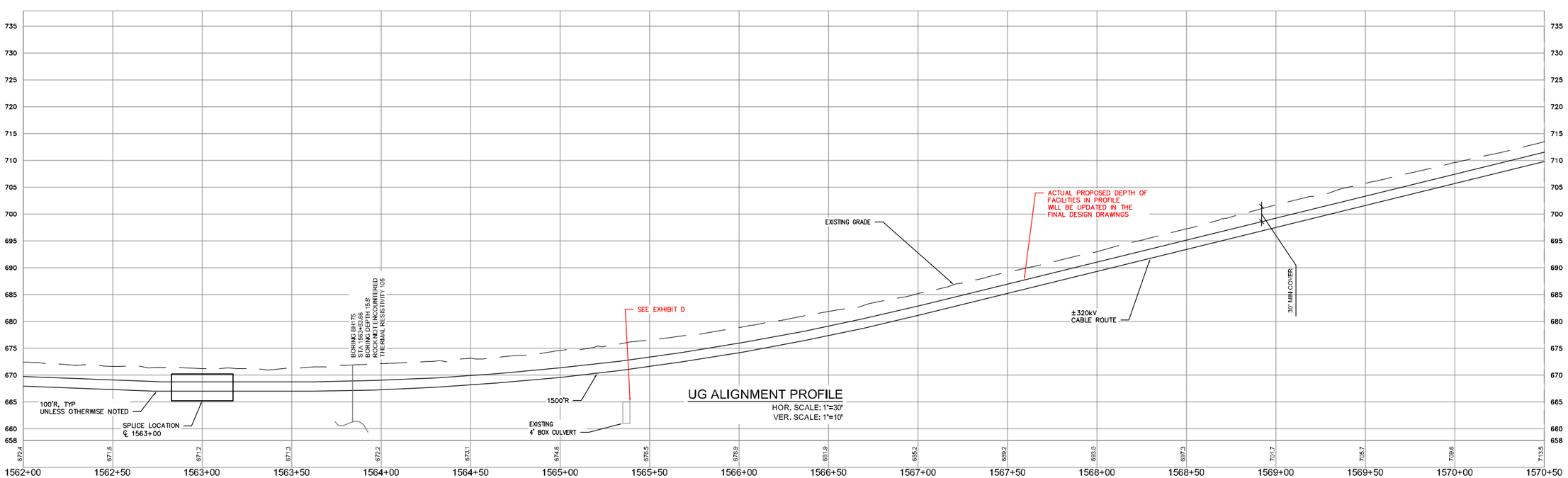
At all locations where the new duct bank is constructed over an existing drainage structure or utility, NPT will encase the facility in a concrete duct bank reinforced with rebar for a length to exceed a 2:1 slope from the bottom/center of the drainage structure (or utility) to the surface. At a minimum, this will involve a 20-foot reinforced section on each side of the crossing to form a self-sustaining bridge that will allow for excavation under the duct bank for purposes of future maintenance of existing utilities or drainage structures. This reinforced concrete duct bank shall be designed by a Professional Engineer licensed in the State of New Hampshire. In connection with future maintenance activities, especially related to the culvert, NPT will provide any and all required support, including but not limited to, providing crews to assist while work is being conducted in the vicinity of the culvert.

Supporting Documentation

Alignment in Pavement
See attached Exhibits A, B, and C showing a plan, profile and sections.

Crossing Over Existing Drainage Structure
See attached Exhibits A and D showing a plan, profile and section for the proposed installation, and Exhibit E for cost estimates.





PRELIMINARY - NOT FOR CONSTRUCTION

NO.	REVISION	DATE	DRWN	CHKD	APPRV.
0	EXCEPTION REQUEST	06/21/17	TDD	MRR	TMH

SGC Engineering, LLC

PAR Electrical Contractors, Inc.

THE NORTHERN PASS

Transmission Business

EXCEPTION 93-ALIGNMENT IN PAVEMENT AND CROSSING OVER EXISTING UTILITY/DRAINAGE: NPT WBR3-UNDERGROUND ALIGNMENT
WBR3 SECTION-STA 1564+40 TO STA 1574+90

DATE: 06/2017

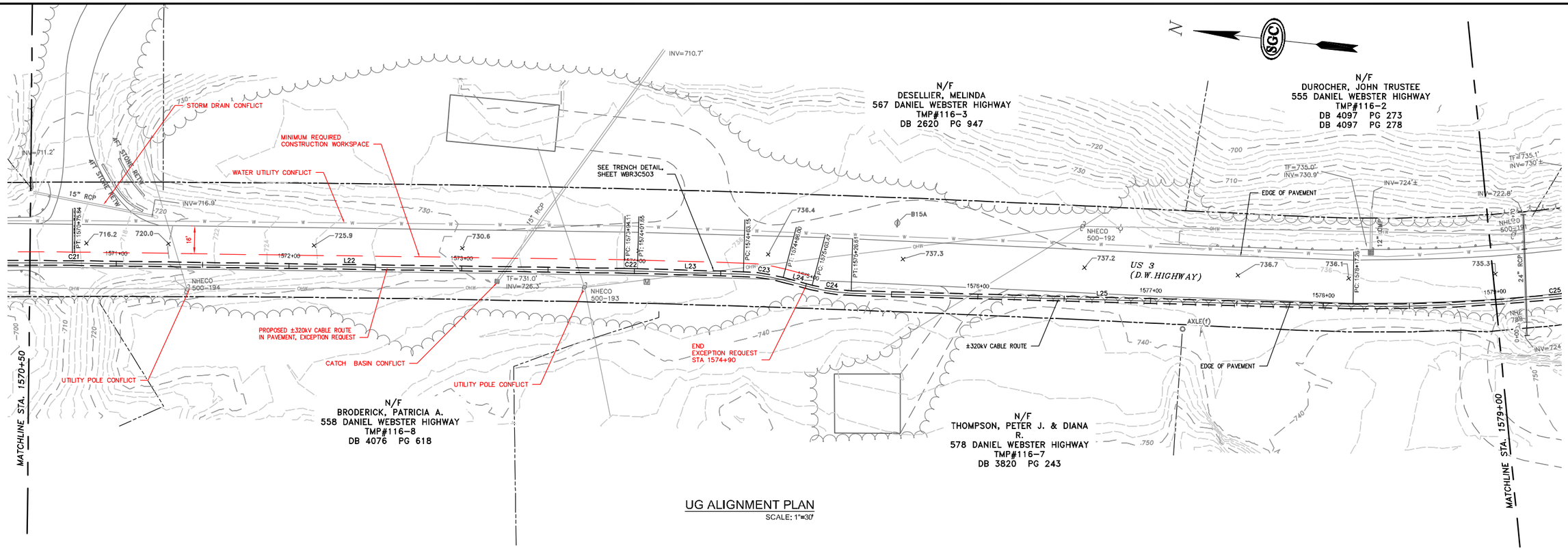
SCALE:

DES: MRR CHK: TDD
DRW: BGC APR: TMH

TOWN: WOODSTOCK

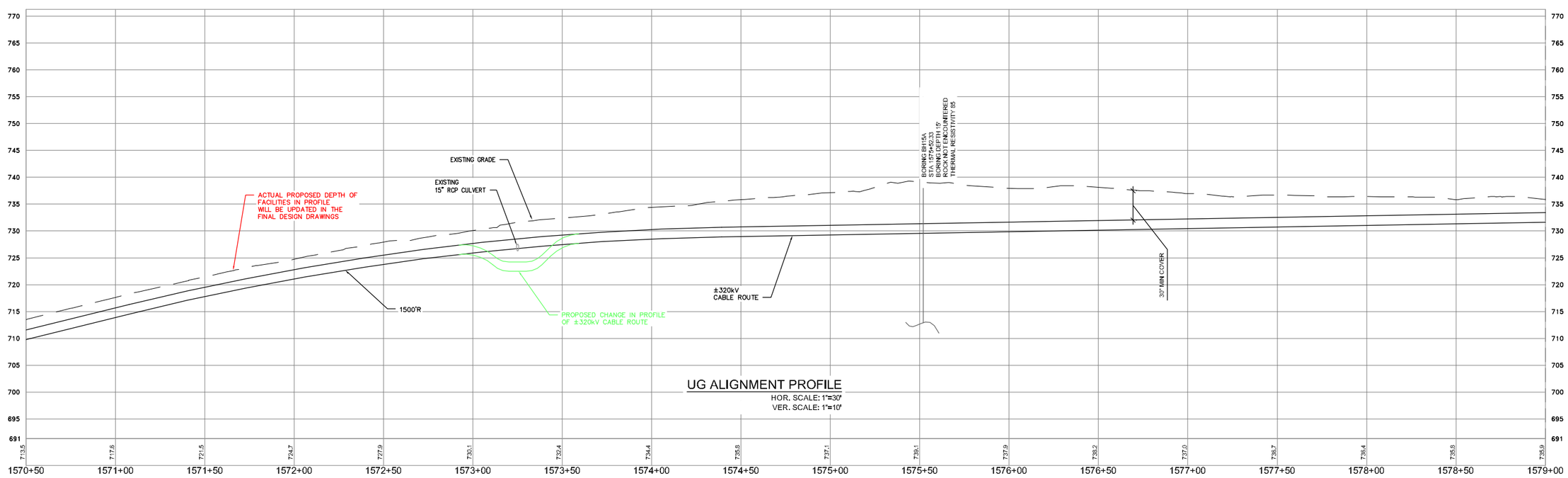
TRANSMISSION LINE: WBR3

EXHIBIT A.1



UG ALIGNMENT PLAN

SCALE: 1"=30'



UG ALIGNMENT PROFILE

HOR. SCALE: 1"=30'
VER. SCALE: 1"=10'

30 15 0 30 60 HOR. SCALE: 1" = 30'

10 5 0 10 20 VERT. SCALE: 1" = 10'

PRELIMINARY - NOT FOR CONSTRUCTION

NO.	REVISION	DATE	DRWN	CHKD	APPRV.
0	EXCEPTION REQUEST	06/21/17	TDD	MRR	TMH

SGC Engineering, LLC
a Lloyd's Register Company

PAR ELECTRICAL CONTRACTORS, INC.

THE NORTHERN PASS
Transmission Business

EXCEPTION 93-ALIGNMENT IN PAVEMENT AND CROSSING OVER EXISTING UTILITY/DRAINAGE: NPT WBR3-UNDERGROUND ALIGNMENT
WBR3 SECTION-STA. 1564+40 TO STA 1574+90

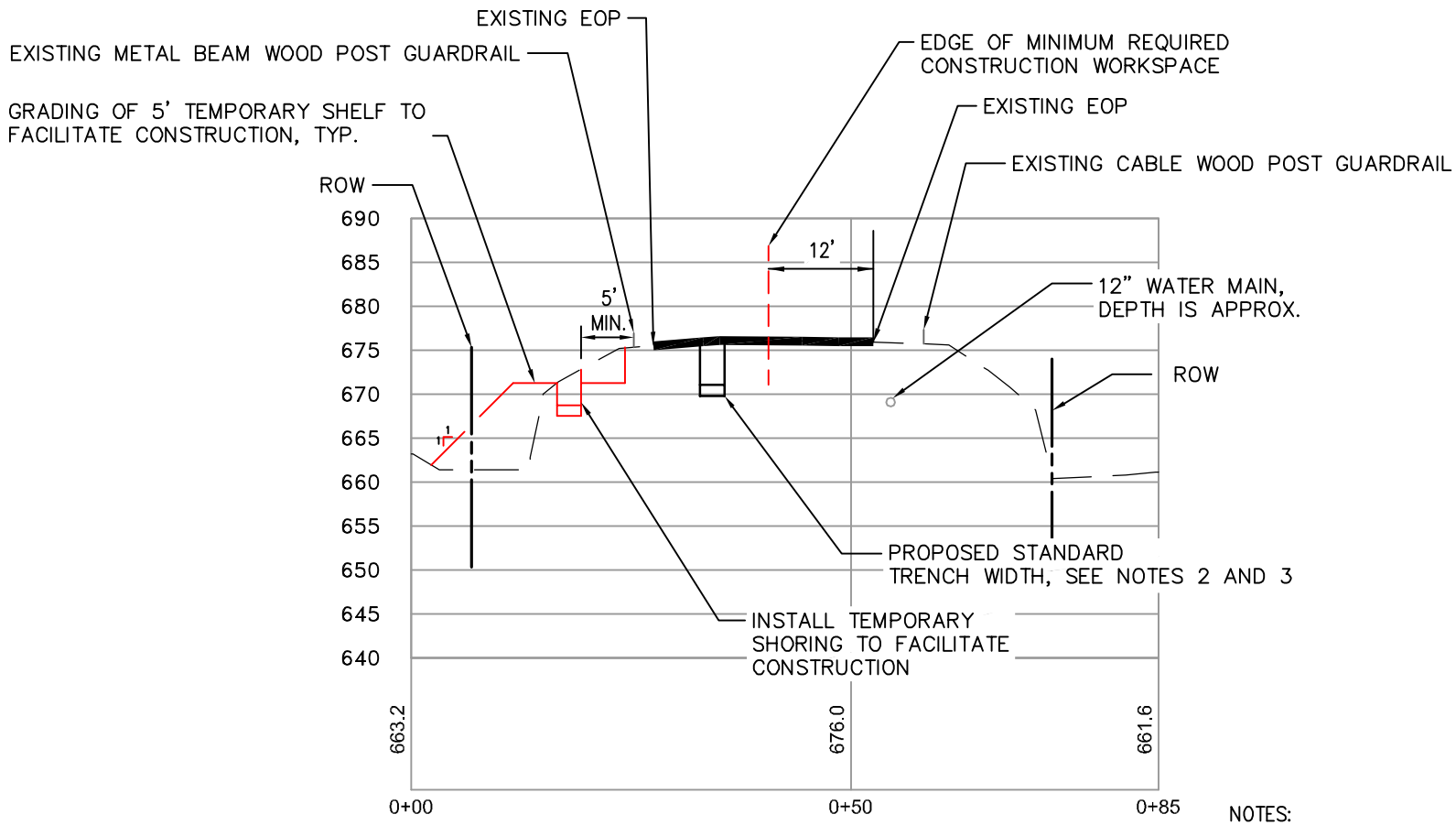
DATE: 06/2017
SCALE:

DES: MRR CHK: TDD
DRW: BGC APR: TMH

TOWN: WOODSTOCK

TRANSMISSION LINE: WBR3

EXHIBIT A.2



NOTES:

1. THE TRENCH LOCATION SHOWN IN RED IS NOT PROPOSED AND IS INTENDED TO DEMONSTRATE CONSTRUCTABILITY ISSUES.
2. TRENCH WIDTH SHOWN TO BE MAINTAINED USING TRENCH JACKS AND SHEETING.
3. PROPOSED CABLE ROUTE TO BE MOVED CLOSER TO EDGE OF PAVEMENT AND MAINTAIN 5 FEET OF SEPARATION FROM THE GUARDRAIL. CHANGE IN ALIGNMENT WILL PROVIDE ADDITIONAL ROOM FOR WORKSPACE AND MAINTENANCE OF TRAFFIC.

SCALE: 1" = 20'

20 10 0 20 40

SECTION A-A

SCALE: 1"=20'

JOB NO.: 1384001

TITLE:

EXCEPTION 93-ALIGNMENT IN PAVEMENT AND CROSSING OVER EXISTING UTILITY/DRAINAGE: NPT-WBR3 UNDERGROUND ALIGNMENT
WBR3 SECTION-STA 1564+40 TO 1574+90±
TOWN: WOODSTOCK

PREPARED FOR:

NH DOT
7 HAZEN DRIVE
CONCORD, NH

EXHIBIT NO.: B	DATE: 05/2017	DRAWN: BGC	SCALE: 1" = 20'

REVISIONS:

NO.	DATE	EXCEPTION REQUEST
0	05/23/2017	

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• Electrical Power Systems Engineering
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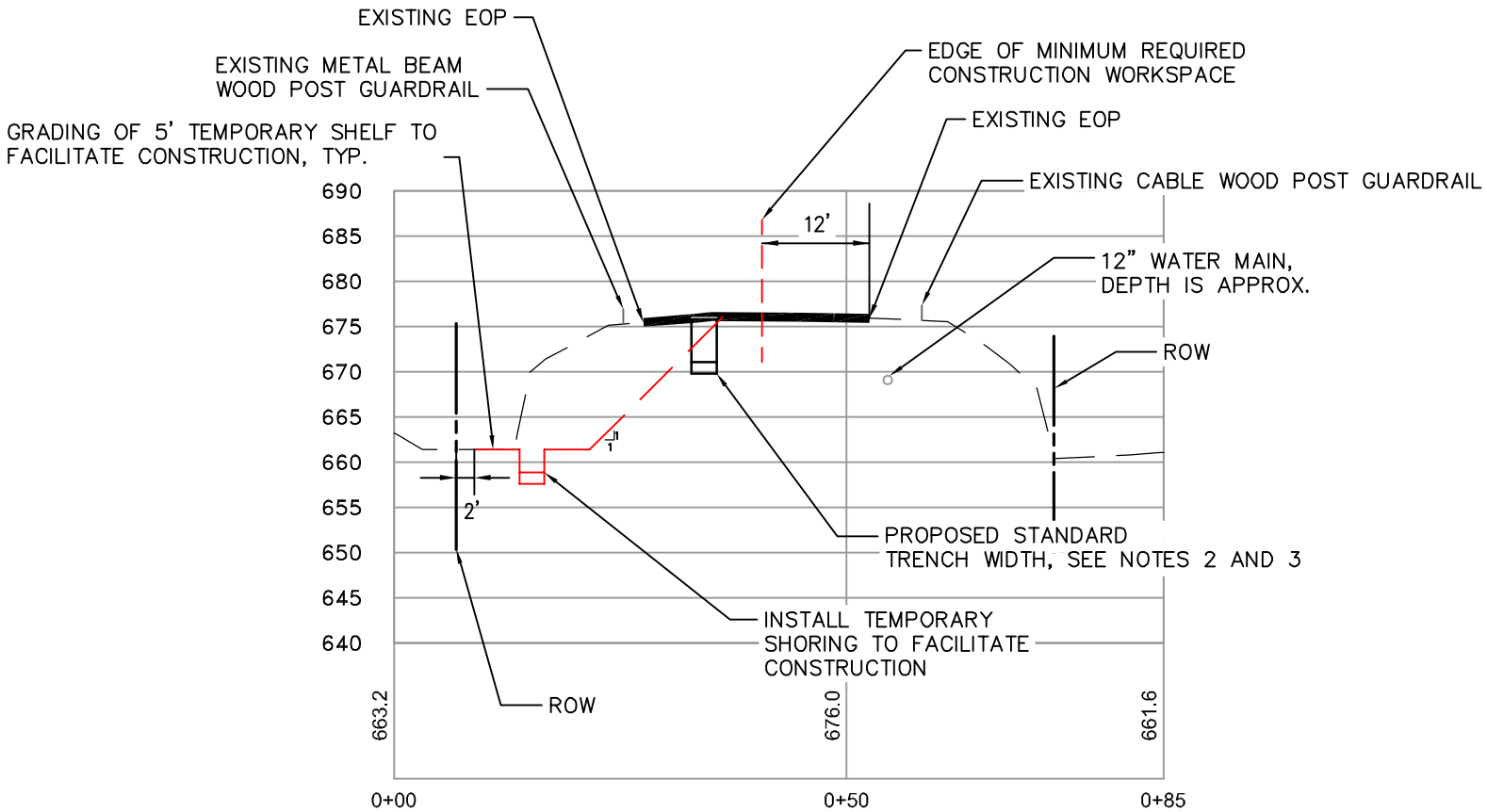
14 School Street, Suite 203-B, Bristol, VT 05443, Tel: 802-735-0258
Galleria Tower 1, Suite 2478, 2700 Post Oak Boulevard, Houston, TX 77056



GUARDRAIL SECTIONS

START STATION	END STATION	LENGTH (FT)
1564+50	1570+50	600

ALTERNATE LOCATION CUT VOLUME EVALUATION:

1. GUARDRAIL LENGTH: 600 FT
2. APPROX. CUT AREA: 180 SF
3. APPROX. CUT VOLUME: 108,000 CF (4,000 CY)

SCALE: 1" = 20'

20 10 0 20 40

SECTION B-B

SCALE: 1"=20'

NOTES:

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JOB NO.: 1384001

TITLE:

EXCEPTION 93-ALIGNMENT IN PAVEMENT AND CROSSING OVER EXISTING UTILITY/DRAINAGE: NPT-WBR3 UNDERGROUND ALIGNMENT
WBR3 SECTION-STA 1564+40 TO 1574+90±
TOWN: WOODSTOCK

PREPARED FOR:

NH DOT
7 HAZEN DRIVE
CONCORD, NH

REVISIONS:

NO.	DATE	EXCEPTION REQUEST
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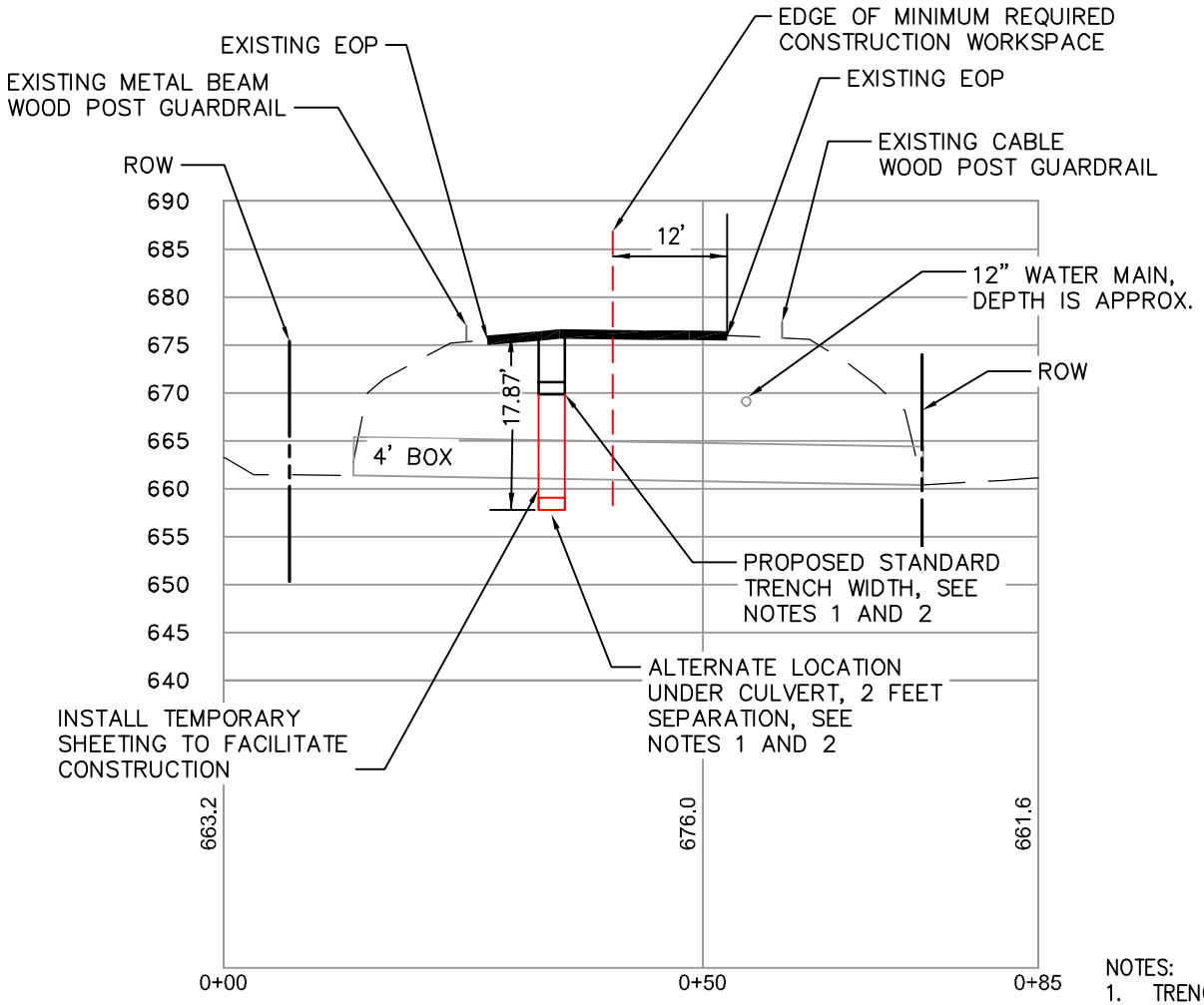
Galleria Tower 1, Suite 2478 2700 Post Oak Boulevard Houston, TX 77056

EXHIBIT NO.: C	DATE: 05/2017	DRAWN: BGC	SCALE: 1" = 20'



NOTES:

1. TRENCH WIDTH SHOWN TO BE MAINTAINED USING TRENCH JACKS AND SHEETING.
2. PROPOSED CABLE ROUTE TO BE MOVED CLOSER TO EDGE OF PAVEMENT AND MAINTAIN 5 FEET OF SEPARATION FROM THE GUARDRAIL. CHANGE IN ALIGNMENT WILL PROVIDE ADDITIONAL ROOM FOR WORKSPACE AND MAINTENANCE OF TRAFFIC.

SECTION C-C

SCALE: 1"=20'

SCALE: 1" = 20'

20 10 0 20 40

JOB NO.: 1384001

TITLE:

EXCEPTION 93-CROSSING OVER DRAINAGE STRUCTURE
NPT-WBR3 UNDERGROUND ALIGNMENT
WBR3 SECTION-STA 1565+50±
TOWN: WOODSTOCK

PREPARED FOR:

NH DOT
7 HAZEN DRIVE
CONCORD, NH

EXHIBIT NO.: D	DATE: 05/2017	DRAWN: BGC	SCALE: 1" = 20'

REVISIONS:

NO.	DATE	EXCEPTION REQUEST
0	05/23/2017	

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Exhibit E - Exception 93 Cost Estimates

Additional Cost for Removing Guardrail and Benching into slope

Length	600			
Cut Volume	4000			
	Quantity	Units	Unit Price	Total
Material Removal, Hauling & Replacement	4000	CY	$36.44	$145,760.00
Guardrail	600	LF	$49.25	$29,550.00
Special Considerations for Constructibility	1	LS	$200,000.00	$200,000.00
Net Additional Cost				$375,310.00

1. Cost assumes rock excavation not required.
2. Cost assumes off site storage available within 20 miles

Additional Cost for Trenching Under 48" Box Culvert

Length	200			
Max Depth	17.87			
Min Depth	6.7'			
	Quantity	Units	Unit Price	Total
Trench Cost for Deeper Trench	200	LF	$1,150.00	$230,000.00
Deduct for Base Trench Cost	200	LF	$150.00	($30,000.00)
Net Additional Cost				$200,000.00

1. Cost assumes rock excavation not required.
2. Costs based on contractual unit pricing for the project.
3. 200 foot minimum length required for the trenching installation is required to accommodate the gradual slope necessary to accommodate the minimum bend.

Additional Cost for Installing HDD Under Culvert

Length	900			
Max Depth	23'			
Min Depth	6.7'			
	Quantity	Units	Unit Price	Total
HDD (2-8" Bores)	900	LF	$2,490.00	$2,241,000.00
Deduct for Base Trench Cost	900	LF	$150.00	($135,000.00)
Deduct for Surface Restoration	900	LF	$41.00	($36,900.00)
Net Additional Cost				$2,069,100.00

1. Cost assumes rock excavation not required.
2. Costs based on contractual unit pricing for the project.
3. 900 foot minimum length required for HDD installation to accommodate minimum bending requirements.