

**Exception Request No.: 150**  
**Section: WMNF**  
**Town: Woodstock**  
**Highway: NH 112 (Lost River Road) (Tier 3)**  
**Station: 1085+00 to 1085+75**  
**Drawing No.: WMNF C144**  
**Survey Report Cross Reference No.: WMNF C144**  
**Exception Type: Crossing Over Existing Drainage Structure**  
**Highway Crossing**

#### Traffic Information

NHS: No

ADT: 666

Traffic Control Type: Alt 1-way

Traffic Control Duration: Traffic control duration is estimated to be 6 days for the proposed installation over the existing drainage structure. If the requested exception to install the duct bank above the drainage structure is not granted, NPT expects an additional 1-2 weeks of traffic control. Traffic control duration is estimated to be 6 days for the proposed highway crossing.

#### Summary of Justification for Exception

NPT is requesting an exception from the UAM guidelines for crossing above an existing 24-inch reinforced concrete pipe (RCP) culvert with 9 feet of cover on NH 112 (Lost River Road) at STA 1085+25±. The proposed alignment is 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 that will extend the duration of construction and traffic impacts. The attached exhibits have been provided for this location to illustrate the constraints associated with installing the duct bank below the existing RCP culvert.

In, addition, NPT is requesting an exception from the Utility Accommodation Manual (UAM) guidelines regarding the location of the cable trench in the pavement crossing NH 112, from station 1085+00 to 1085+75 of the NPT WMNF Underground Alignment.

#### Technical Discussion of Justification of Exception

##### *Crossing Over Existing Drainage Structure*

The vertical positioning of the cable trench is constrained by the depth of the existing culvert (9 feet to the top of the culvert). (See Exhibits A and B.) Crossing under the existing culvert and meeting the required 2-foot minimum separation will require a wider trench as the thermal design criteria require a greater separation of the electrical cables as depth increases. This trench width and additional offsets necessary for construction would likely require either complete road closures or 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. We estimate that these construction alternatives will add 1-2 weeks to the traffic impacts. Finally, NPT estimates the increase in cost associated with crossing underneath the culvert would be approximately \$130,000 for this 200 foot section. (See Exhibit C). Road closures are not needed for the proposed installation, which thereby minimizes traffic impacts and attendant safety issues.

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 for the 24-inch culvert crossing section). (See cost estimate attached in Exhibit C.) Also, traffic impacts would be increased for a trenchless installation due to the addition of trenchless work areas and the extended duration of installation.

#### *Alignment in Pavement (Road Crossing)*

In the original permit design, there was a road crossing proposed at station 1078+00, just south of the adjacent HDD installation. NPT is proposing to eliminate the road crossing at station 1078+00 to keep the duct bank on the east side of the road where there is more favorable terrain. A change in the proposed crossing location also allows avoidance of the wetlands on the west side of NH 112 in this area.

The duct bank alignment south of the culvert crossing at station 1085+25 on the east side of the road is constrained by the existing guardrail and existing drainage system that runs behind the guardrail, as shown in Exhibit A. Due to the guardrail, which extends approximately 2,000' to the south beginning at station 1085+25, NPT proposes to have the duct bank cross the road at approximately 1085+00. The need for the crossing to the west side of the road is further supported by the location of an HDD installation at approximately 1089+50, with HDD pits located on the west side of the road.

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

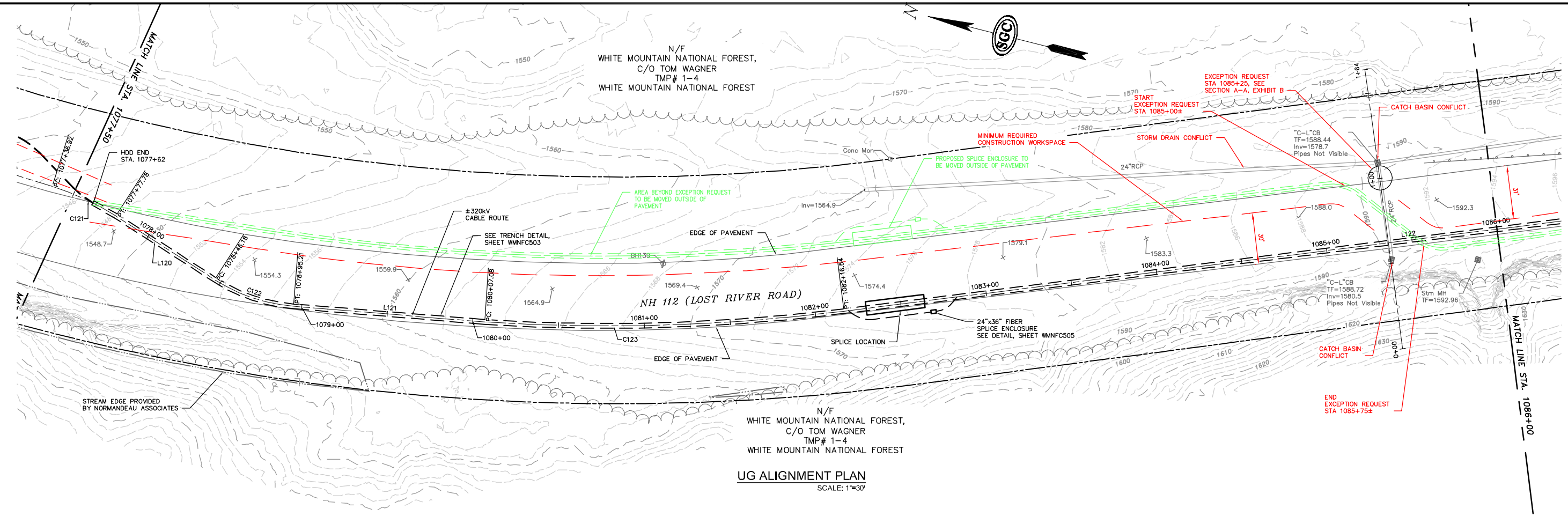
#### Impacts

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.

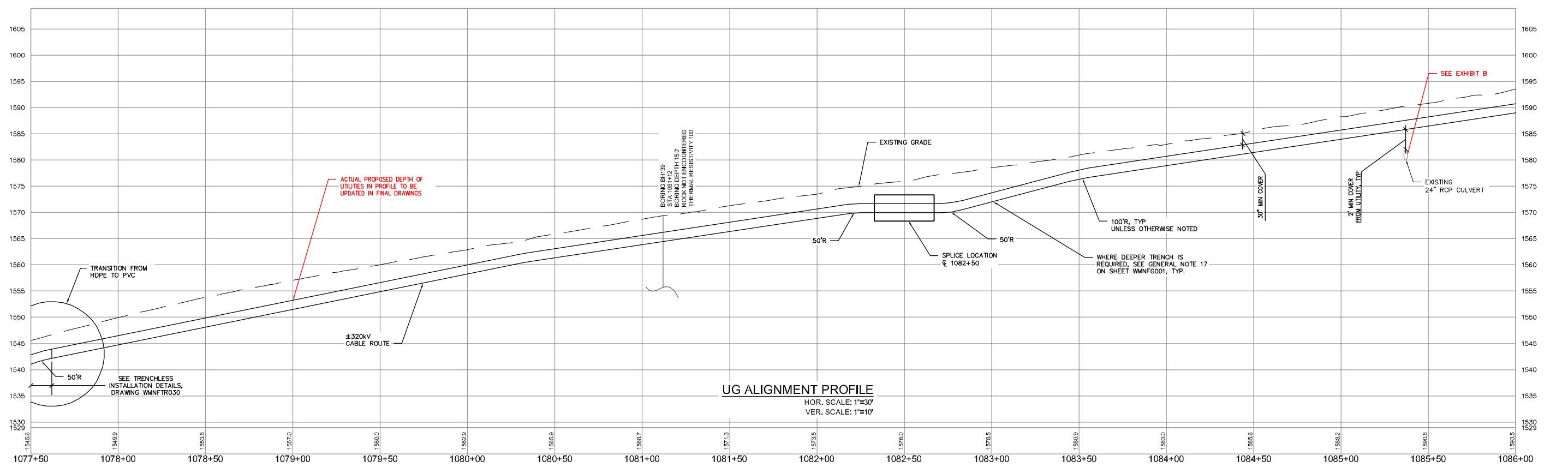
#### Supporting Documentation

See attached Exhibits A and B showing a plan, profile, and section for the proposed installation. See Exhibit C for cost estimates.

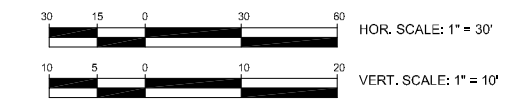
**PRELIMINARY - NOT FOR CONSTRUCTION**



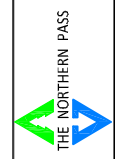
**UG ALIGNMENT PLAN**  
SCALE: 1"=30'



**UG ALIGNMENT PROFILE**  
HOR. SCALE: 1"=30'  
VER. SCALE: 1"=10'



NO.	REVISION	DATE	BY	CHKD	APPROV.
0	EXCEPTION REQUEST	07/26/17	MRR	TMH	



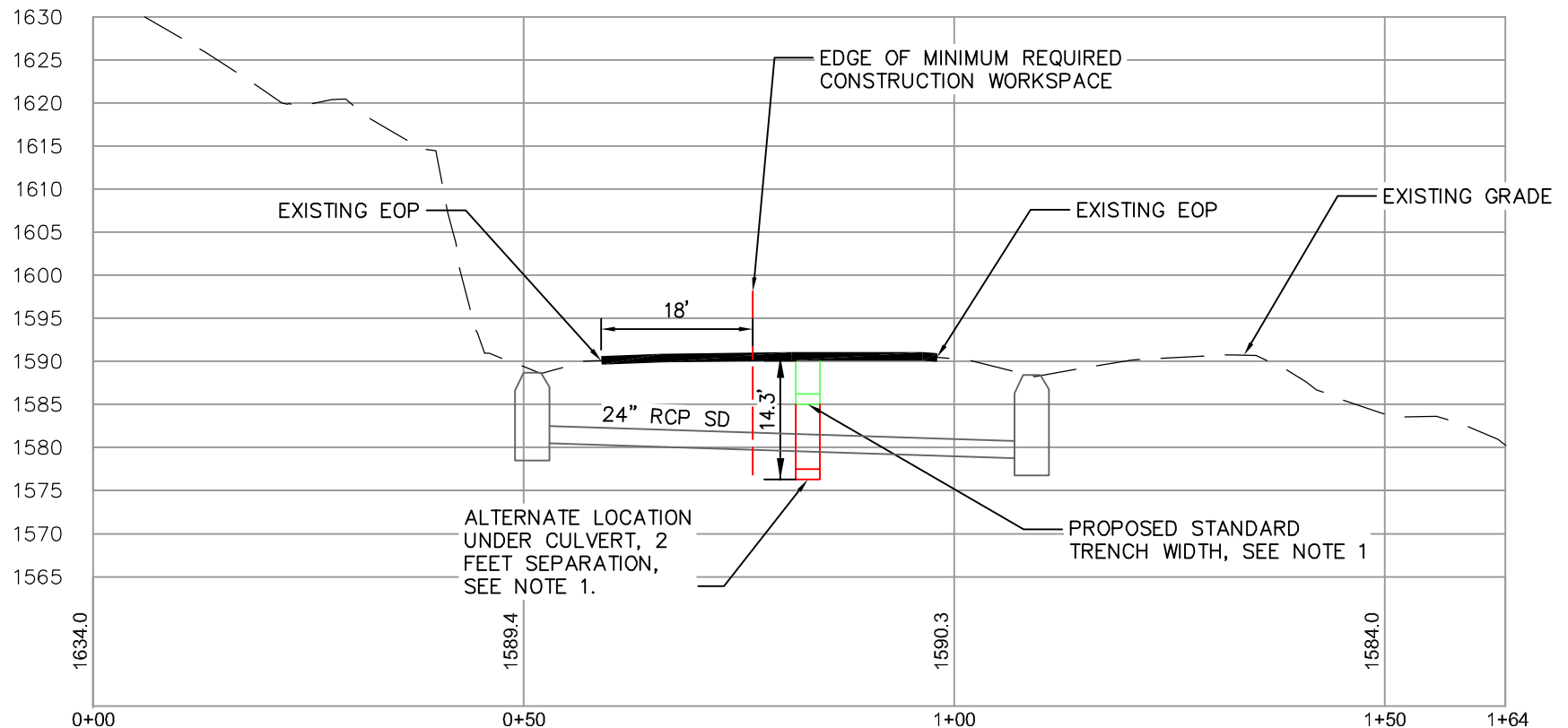
Transmission Business

EXCEPTION: UG ALIGNMENT IN PAVEMENT AND CROSSING OVER EXISTING UTILITY/DRAINAGE: NPT WMNF-UNDERGROUND ALIGNMENT WMNF SECTION-STA 1085+00 TO 1085+75± DATE: 02/2017

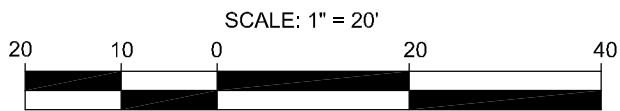
DES: MRR CHK: TMH  
DRW: MRR APR: TMH  
TOWN: WOODSTOCK

TRANSMISSION LINE: WMNF

EXHIBIT A



**SECTION A-A**  
SCALE: 1"=20'



- NOTES:  
1. TRENCH WIDTH SHOWN TO BE MAINTAINED USING TRENCH JACKS AND SHEETING.

JOB NO.: 1384001

TITLE:  
EXCEPTION 150  
CROSSING OVER EXISTING UTILITY/DRAINAGE  
NPT-WMNF UNDERGROUND ALIGNMENT  
WMNF SECTION-STA 1085+25±  
TOWN: WOODSTOCK

PREPARED FOR:  
NH DOT  
7 HAZEN DRIVE  
CONCORD, NH

REVISIONS:

NO.	DATE	EXCEPTION REQUEST
0	07/07/2017	



**SGC ENGINEERING, LLC**  
• Civil Design & Survey Engineering  
• Environmental & Regulatory Permitting  
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14 School Street, Suite 203-A, Bristol, VT 05443, Tel: 802-256-0298  
Galinda Tower 1, Suite 2478, 2700 Post Oak Boulevard, Houston, TX 77056

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

**Exhibit C - Exception 150 Cost Estimates**

**Additional Cost for Trenching Under Culvert**

Length	200'			
Max Depth	14.3'			
Min Depth	6.7'			
	Quantity	Units	Unit Price	Total
Trench Cost for Deeper Trench	200	LF	\$800.00	\$160,000.00
Deduct for Base Trench Cost	200	LF	\$150.00	<u>(\$30,000.00)</u>
Net Additional Cost				\$130,000.00

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	27.5'			
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	<u>(\$135,000.00)</u>
Deduct for Surface Restoration	900	LF	\$41.00	<u>(\$36,900.00)</u>
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.