

Exception Request No.: 31 (Rev 1)
Section: WBR3
Town: Campton
Highway: US 3 (Tier 2)
Station: 2243+75 to 2253+50
Drawing No.: WBR3 C190 and C191
Survey Report Cross Reference No.: WBR3 C186 and C187
Exception Type: Crossing Over Existing Drainage Structures
Road Crossings

Traffic Information

NHS: No
ADT: 1300
Traffic Control Type: Alt 1-way
Traffic Control Duration: Traffic control duration is estimated to be 12 days for the proposed installation. If the requested exception to install the duct bank above the 24-inch corrugated metal pipe (CMP) drainage structure is not granted, NPT expects an additional 1-2 weeks of traffic control.

Summary of Justification for Exception

NPT is requesting an exception from the UAM guidelines for crossing above an existing 24-inch corrugated metal pipe (CMP) culvert on US 3, Daniel Webster Highway at station 2244+75±. (See Exhibit A). There is 21 feet of cover over the culvert. Additionally, NPT is requesting an exception from the UAM guidelines for crossing above an existing 32-inch CMP culvert on US 3 at station 2248+75±. (See Exhibit A). There is 28 feet of cover over the culvert. The proposed alignment in this area will be set outside the pavement. The alignment is proposed over the existing drainage structures to avoid significant traffic impacts, unreasonable costs associated with a deeper excavation, and increased construction width which 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 ductbank below the existing culverts. In order to keep the duct bank alignment outside of pavement, NPT is requesting an exception from the UAM guidelines for crossing US 3 in two places.

Technical Discussion of Justification of Exception

Road Crossings

NPT is requesting an exception from the UAM guidelines for the location of the cable trench in pavement crossing US 3, Daniel Webster Highway, from approximately station 2243+75 to 2244+25 and again from approximately station 2252+90 to 2253+50 of the NPT WBR3 Underground Alignment. The positioning of the alignment is constrained by guardrails on the east side of US 3. (See Exhibit A.) As part of NPT's Presidential Permit process and NPT's request for a special use authorization from the United States Forest Service, the federal agencies have prepared a draft Environmental Impact Statement ("draft EIS"), and are on the verge of issuing a final EIS that is necessary to support issuance of all federal permits. The draft EIS analyzed an area of impact within 20 feet from the edge of pavement on each side of the road. This study area limits the design area available to NPT. The federal agencies may only issue authorizations consistent with the analysis conducted in the National Environmental Policy Act (NEPA) process (e.g., the draft and final EIS), and therefore NPT must plan to install any facilities and conduct

any work within this study area. Routing the alignment behind the guard rail would have impacts outside the study area. By crossing to the west side NPT is able to keep the alignment out of pavement to the greatest extent possible where the guardrail conflict exists.

Crossing Over Existing Drainage Structures

The proposed alignment is set outside the pavement and over three existing drainage structures to avoid road closures or other significant traffic impacts, unreasonable costs associated with deeper excavations, and increased construction width that will extend the duration of construction and traffic impacts, as further described below.

24-inch CMP Culvert

NPT's exception request includes crossing above an existing 24-inch RCP culvert on US 3, Daniel Webster Highway at STA 2244+75±. There is 21 feet of cover over the culvert. The attached Exhibits A and B have been provided for this location to illustrate the constraints associated with installing the duct bank below the existing RCP culvert.

32-inch CMP Culvert

NPT's exception request includes crossing above an existing 32-inch CMP culvert on US 3 at station 2248+75±. There is 28 feet of cover over the culvert. The attached Exhibits A and C have been provided for this location to illustrate the constraints associated with installing the duct bank below the existing CMP culvert.

The vertical positioning of the cable trench is constrained by the depth of the existing culverts. (See Exhibits A, B, and C.) Crossing under the culverts 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. We estimate that these construction alternatives will add one to two weeks to the traffic impacts for the 24-inch CMP culvert. Finally, we estimate the increase in cost associated with crossing underneath the 24-inch CMP culvert would be approximately \$314,000 for the 200 foot section. (See Exhibit D.) Road closures are not needed for the proposed installation.

Crossing under the existing 32-inch CMP culvert to meet the required 2-foot minimum separation will require a trench in excess of 32 feet deep. Additionally, a wider trench to maintain the greater separation of the conduits and cable would be required to accommodate the thermal design criteria for the electric cables resulting from the additional depth. The sheer depth and width of such a trench poses significant safety hazards and would require extraordinary work methods, in addition to complete road closure for 6-8 weeks. For safety reasons, NPT does not consider trenching under this culvert to be a practical, feasible, or viable option, nor does not believe NHDOT would agree to an extended road closure at this location. As a result, the only viable alternative at this location (other than the proposed exception request) would be trenchless construction using an HDD installation. (Note: NPT has provided Exhibit C showing an "open cut" trench approximately 32 feet deep for illustrative purposes only; it does not consider the use of open cut construction for a trench of that depth to be a feasible option).

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

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

Impacts

Road Crossings

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 guardrail, to avoid future conflicts with guardrail repairs or replacement or disruption to the existing guardrail system. 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 Structures

At all locations where the new ductbank is constructed over an existing drainage structure or utility, NPT will encase the facility in a concrete ductbank 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.

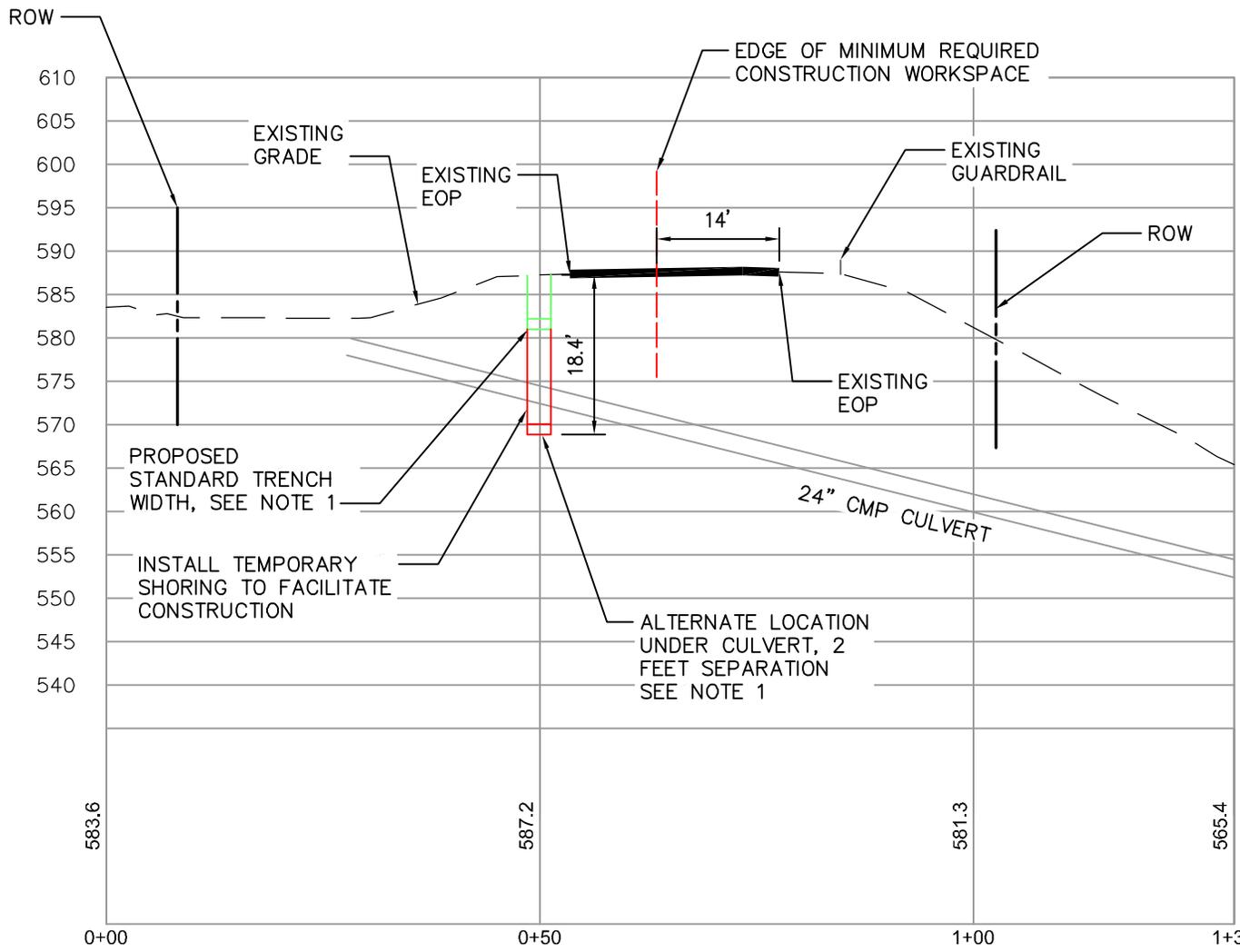
Supporting Documentation

Road Crossings

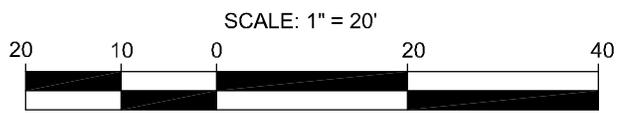
See attached Exhibit A showing a plan and profile for the proposed installation.

Crossing Over Existing Drainage Structure

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



SECTION A-A
SCALE: 1"=20'



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

JOB NO.: 1384001

TITLE:
EXCEPTION 31 - CROSSING OVER EXISTING UTILITY/DRAINAGE
NPT-WBR3 UNDERGROUND ALIGNMENT
WBR3 SECTION-STA 2244+75±
TOWN: CAMPTON

PREPARED FOR:
NH DOT
7 HAZEN DRIVE
CONCORD, NH

REVISIONS:

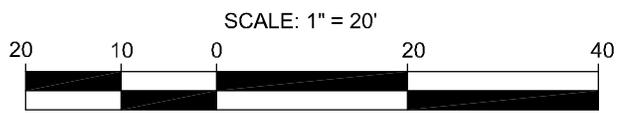
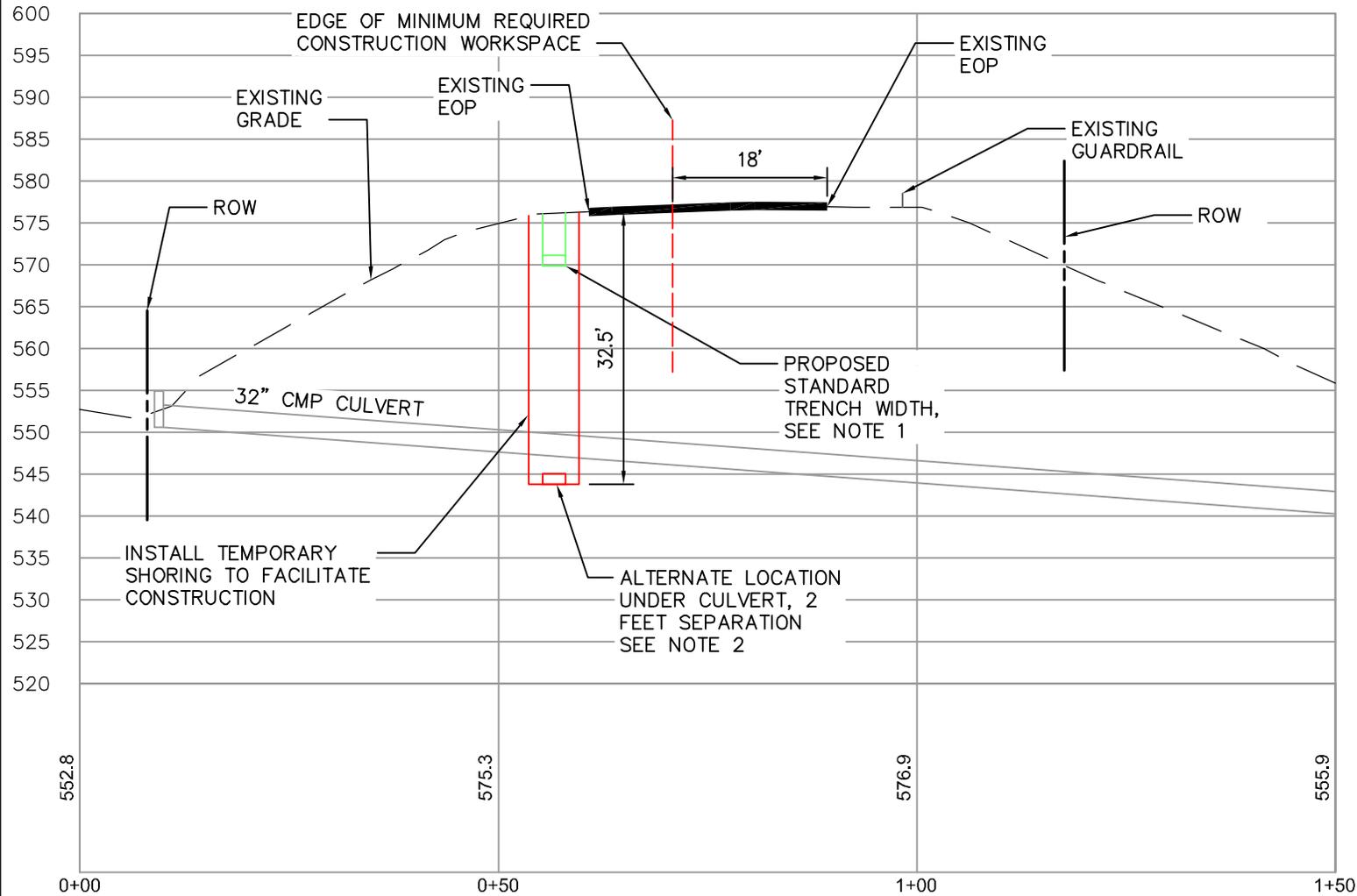
NO.	DATE	EXCEPTION REQUEST
0	05/16/2017	
1	06/19/2017	UPDATE EXCEPTION REQUEST



SGC ENGINEERING, LLC
• Civil Design & Survey Engineering
• Environmental & Regulatory Permitting
• Electrical Power Systems Engineering

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14 School Street, Suite 203-A, Bristol, VT 05443, Tel: 802-259-9298
Galata Tower 1, Suite 2473, 2700 Post Oak Boulevard, Houston, TX 77056

EXHIBIT NO.: B DATE: 06/2017 DRAWN: CHP SCALE: 1" = 20'



SECTION B-B
SCALE: 1"=20'

- NOTE:
1. TRENCH WIDTH SHOWN TO BE MAINTAINED USING TRENCH JACKS AND SHEETING
 2. TRENCH WIDTH SHOWN TO BE MAINTAINED USING TRENCH BOXES.

JOB NO.: 1384001

TITLE:
EXCEPTION 31 - CROSSING OVER EXISTING UTILITY/DRAINAGE
NPT-WBR3 UNDERGROUND ALIGNMENT
WBR3 SECTION-STA 2248+75±
TOWN: CAMPTON

PREPARED FOR:
NH DOT
7 HAZEN DRIVE
CONCORD, NH

REVISIONS:

NO.	DATE	EXCEPTION REQUEST
0	05/16/2017	
1	06/19/2017	UPDATE EXCEPTION REQUEST



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 Galleria Tower 1, Suite 2478 2700 Post Oak Boulevard Houston, TX 77056

EXHIBIT NO.: C DATE: 06/2017 DRAWN: CHP SCALE: 1" = 20'

Exhibit D - Exception 31 Cost Estimates

Additional Cost for Trenching Under 24" CMP Culvert

Length	200'			
Max Depth	27.2			
Min Depth	6.7'			
	Quantity	Units	Unit Price	Total
Trench Cost for Deeper Trench	200	LF	\$1,720.00	\$344,000.00
Deduct for Base Trench Cost	200	LF	\$150.00	(<u>\$30,000.00</u>)
Net Additional Cost				\$314,000.00

Additional Cost for Trenching Under 32" CMP Culvert

Length	200'			
Max Depth	34.92			
Min Depth	6.7'			
	Quantity	Units	Unit Price	Total
Trench Cost for Deeper Trench	200	LF	\$3,100.00	\$620,000.00
Deduct for Base Trench Cost	200	LF	\$150.00	(<u>\$30,000.00</u>)
Net Additional Cost				\$590,000.00

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 Two Culverts

Length	900'			
Max Depth	40'			
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.