

**Exception Request No.: 146**  
**Section: WMNF**  
**Town: Easton/Woodstock**  
**Highway: NH 112 (TIER 3)**  
**Station: 1014+50± to 1022+86±**  
**Drawing No.: WMNF027-1 and WMNF027-2; WMNFC136 - C137**  
**Survey Report Reference No.: WMNFC136 - C137**  
**Exception Type: HDD Pits Within Pavement**  
**HDD Alignment Passing Under Pavement**

#### Traffic Information

NHS: No  
ADT: 666  
Traffic Control Type: Alt 1-way  
Traffic Control Duration: Traffic control duration for the proposed installation is estimated to be approximately 4-6 weeks.

#### Summary of Justification for Exception

NPT is requesting an exception from the UAM guidelines regarding the location of HDD entry and exit pits relative to the existing pavement limits. HDD 027 extends from approximately Station 1014+50 to 1022+86, and is required to allow installation of the duct below Underhill Brook. This location involves two separate bores. Each HDD installation requires two entry pits and two exit pits. Given the dimensions of the pits, the need to maintain separation between the two bores and separation from the outer edge of the EIS Study Area (as defined below), and the limited space available off the paved roadway at this location, one of the entry pits must be in the paved roadway.

NPT is also requesting an exception from the UAM guidelines to allow the location of the HDD 027 bore paths beneath the pavement. The HDD bore paths will have no impact on the NHDOT highway structural box.

#### Technical Discussion of Justification of Exception

##### *HDD Pit Within Pavement*

Each of the bores requires an entry pit and an exit pit (4 pits total). These pits will be approximately 4 feet x 4 feet in plan dimension (each). The HDD bores must be separated by approximately 20 feet at their maximum depth (50± feet for this HDD) to minimize the risk of interference during drilling, and to accommodate thermal design criteria of the electric cables. The HDD entry and exit points at grade are approximately 10 feet apart, and at least 10 feet from the outer edge the EIS Study Area (as defined below) (for equipment access). (Note: Because the typical degree of accuracy with HDD is +/- 5-feet, the bore paths have been designed to maintain minimum separation of approximately 10 feet from each other.)

The alignment of the cable system adjacent to the entry location is on the east side of the roadway. The proposed HDD entry location is located on the east side of due to the availability of work space in this area. (See photograph #1 of entry location in Exhibit A and Sheet WMNF027-1). Use of the same side of the road as the alignment for the entry location avoids the need for an open-trench road crossing (and

NHDOT exception approval for such a crossing). The opposite side of the road is not a feasible location for the HDD entry because of the existing slope and river on the west side of NH 112.

The proposed HDD exit site is located on the east side of the roadway (see photograph #2 of exit location in Exhibit A and Sheet WMNF027-1). The opposite side of the road is not a feasible location for the HDD exit because of the existing slope on the west side.

One of the entry pits is located in the pavement because NPT must plan to install any facilities and conduct any work within 20 feet of the edge of pavement, consistent with the study area for the draft Environmental Impact Statement prepared by the U.S. Department of Energy (DOE) for purposes of reviewing NPT's application to DOE for a Presidential Permit and NPT's request for a special use authorization from the United States Forest Service. Specifically, 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 (the "EIS Study Area"). 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 with the EIS Study Area.

One of the entry pits cannot be located to avoid the paved area because of the following constraints, combined with the need to conduct all work within the EIS study area: (i) the center of the 2 entry pits (and the 2 exit pits) must be approximately 10 feet apart at grade; (ii) the 4 foot by 4 foot dimension of each pit; (iii) the need to start the bore at least 10 feet from outer edge of the EIS Study Area; and (iv) the need for a level work area for the drill equipment. Consequently, NPT needs approximately 30 feet of level, stable, non-vegetated work space at the location of the entry pits and approximately 25 feet of work space at exit pits.

In summary, given the constraints at this HDD installation, NPT is seeking an exception to allow one of the HDD exit pits to be located within the paved area.

Note: Where the entry and/or exit pits are located in the paved area, the alignment transitions back to the area off the paved roadway over as short an area as possible, consistent with physical constraints at the location, the bending radius of the cable, and the bending radius of the HDD pipe. The precise distance between the location of the pit(s) in the road and the point where the alignment leaves the paved road is location-specific and cannot be stated with technically-accurate specificity until final engineering plans are completed. Under typical conditions, where one entry pit or one exit pit is located within the pavement approximately 5 feet from the edge of the road and there are no physical constraints at the location, the transition back to the unpaved area will occur within approximately 50 linear feet of the pit.

#### *HDD Alignment Passing Under Pavement*

In portions of the alignment, one or both of the bore paths are located beneath the pavement, as shown in drawing WMNF027-1 attached. Due to the geometry of the HDD bore, it is not possible to avoid drilling beneath the pavement at this location.

The HDD bores must be separated by approximately 20 feet at their approximate maximum depth (50 feet) to minimize the risk of interference during drilling, and to accommodate thermal design criteria of the electric cables. (Note: because the typical degree of accuracy with HDD is +/- 5-feet, the bore paths have been designed to maintain minimum separation of approximately 10 feet from each other.) Each of the bores requires an entry pit and an exit pit (4 pits total).

Given the geometry of the bore for this HDD installation, NPT is seeking an exception to allow portions of the underground bores underneath the pavement.

The depth of installation and trenchless construction method eliminate risk of settlement differential, pavement distress, or frost heaving that could adversely impact winter maintenance activities or the drivability of the roadway. Similarly, pavement matching concerns do not exist because there is no disturbance to the pavement. Moreover, the trenchless design in each of the requested exception locations is below all existing utilities and drainage structures, thereby eliminating potential for any impacts upon future maintenance activities or operations.

### Impacts

The design, as proposed, will not adversely affect the design, construction, stability, traffic, safety, environmental commitments, maintenance, or operation of the roadway. The installation of the duct bank 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 proposed depth of the installation 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.

As to the portions of the HDD alignment under the NHDOT structural box, the proposed trenchless construction techniques will not impact the structural components of the highway, the frost zone, or other utilities, and therefore the proposed design will not adversely affect the design, construction, stability, traffic, safety, environmental commitments, maintenance, or operation of the highway.

The surface workspace limits required for the HDD are shown on sheet WMNF027-2. The workspace shown will allow at least one lane of traffic flow through the site at all times. This is in keeping with the submitted traffic control plan.

### Supporting Documentation

See photographs in Exhibit A. See attached drawing WMNF027-1 showing the proposed HDD design geometry in plan and profile, and drawing WMNF027-2 for the required workspace. Also included for reference is Exhibit B for the underground alignment sections adjacent to the entry and exit pits of the HDD installation.

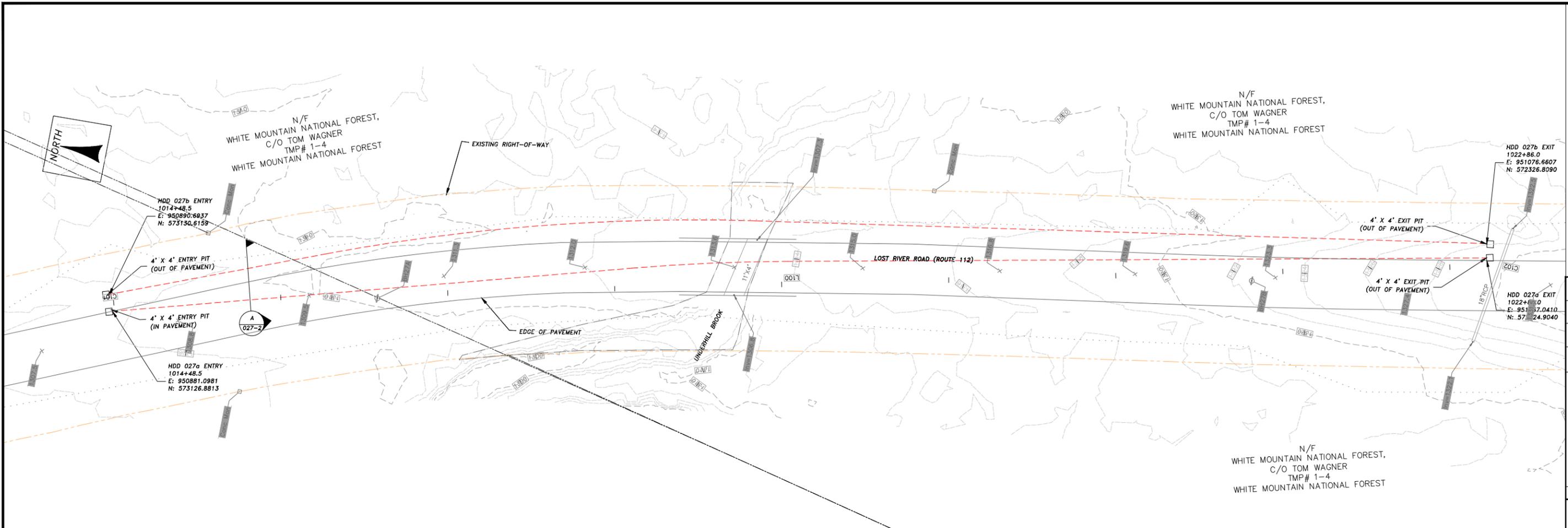
Exception Request No.: 146  
Exhibit A



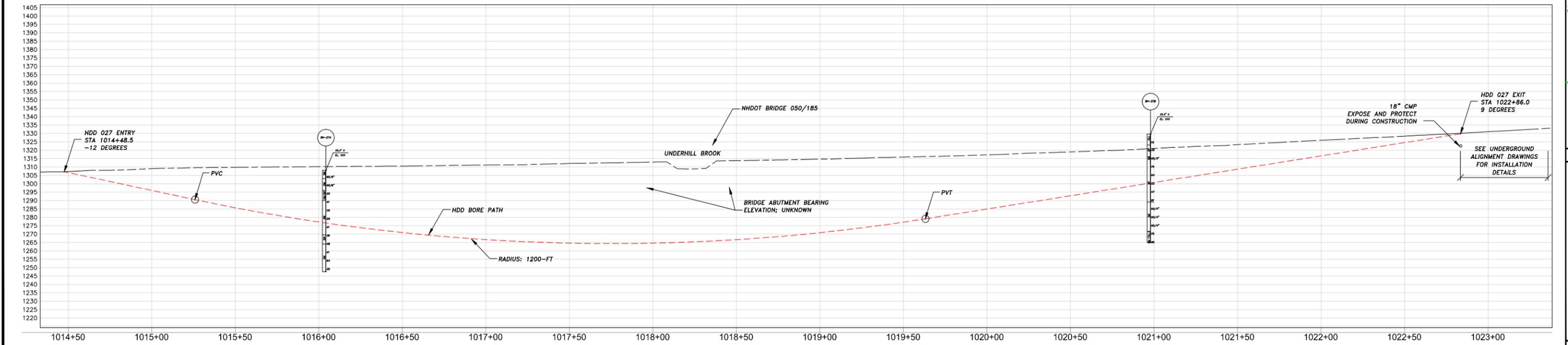
*Photograph #1 – HDD 027 entry area, facing north.*



*Photograph #2 – HDD 027 exit area, facing north.*



PLAN  
 30' 0' 10' 20' 30'



PROFILE  
 30' 0' 10' 20' 30'

NO.	REVISION	DATE	BY	CHKD	APPROV

BRIERLEY ASSOCIATES  
 Creating Space Underground

FAR  
 GEOTECHNICAL TESTING, INC.

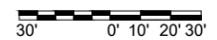
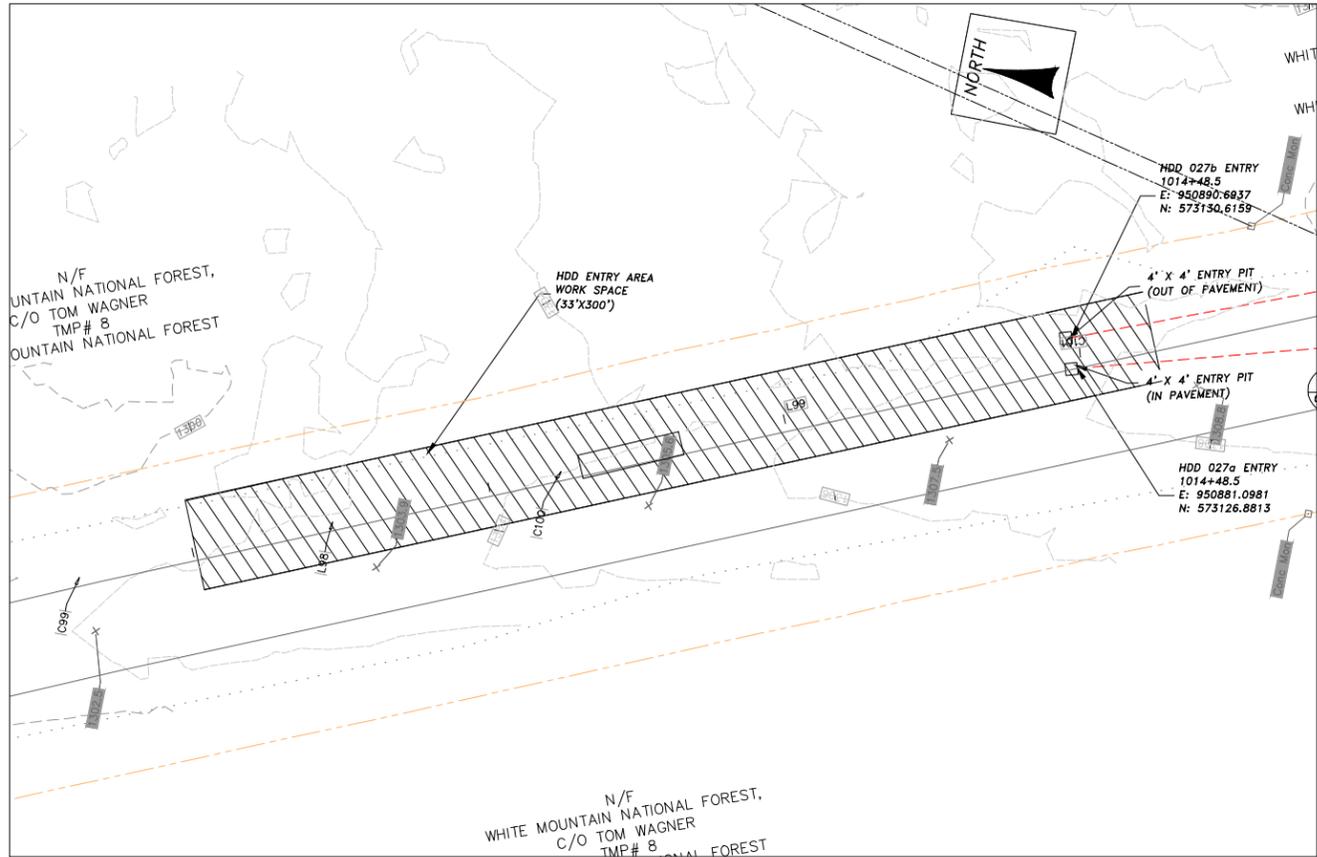
THE NORTHERN PASS  
 TRANSMISSION BUSINESS

NPT  
 UNDERGROUND ALIGNMENT  
 TRENCHLESS CROSSINGS  
 DATE: 10/27/2016  
 SCALE: 1" = 30'

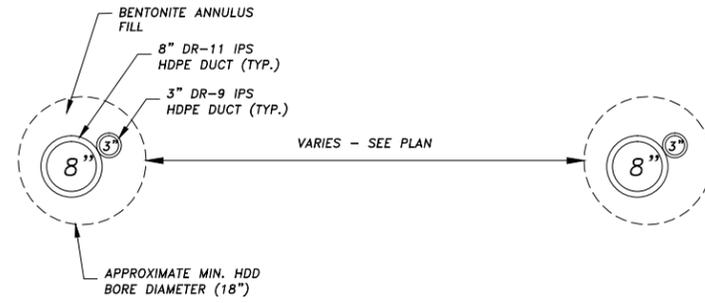
DES: CHK:  
 DRW: APR:  
 TOWN: EASTON/WOODSTOCK

TRANSMISSION LINE:  
 WMNF  
 SHEET  
 WMNF027-1

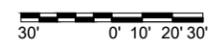
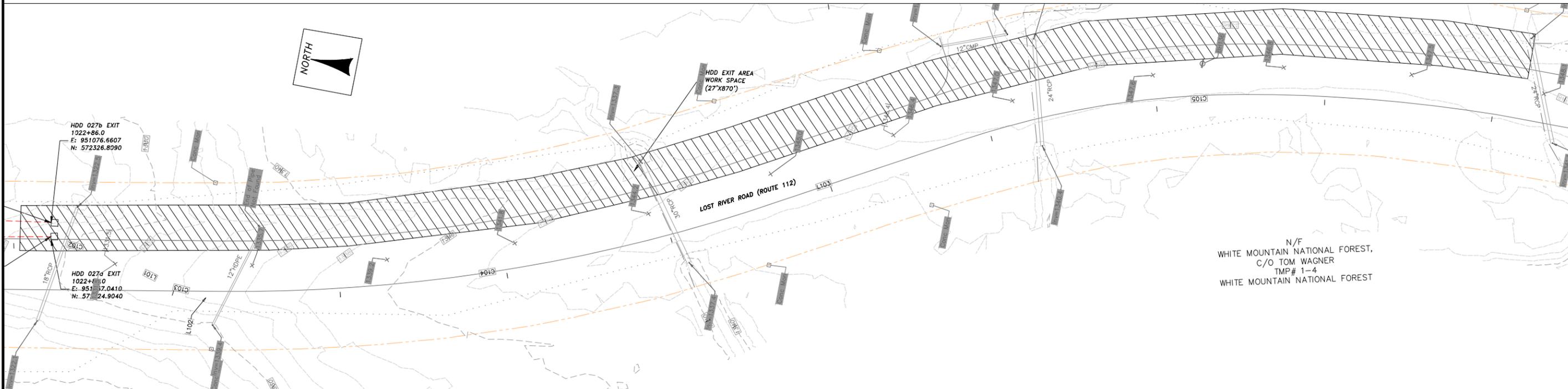
EXCEPTION NO. 146



HDD 027 ENTRY AREA WORK SPACE



DETAIL A - HDD DUCT BUNDLE  
SCALE: N.T.S.



HDD 027 EXIT AREA WORK SPACE

EXCEPTION NO. 146

PRELIMINARY - NOT FOR CONSTRUCTION

NO.	DATE	CHKD	DRWN	NS	BD
1	12/6/16	CLJ	DRN	NS	APR
PRELIMINARY DESIGN					
REVISION					

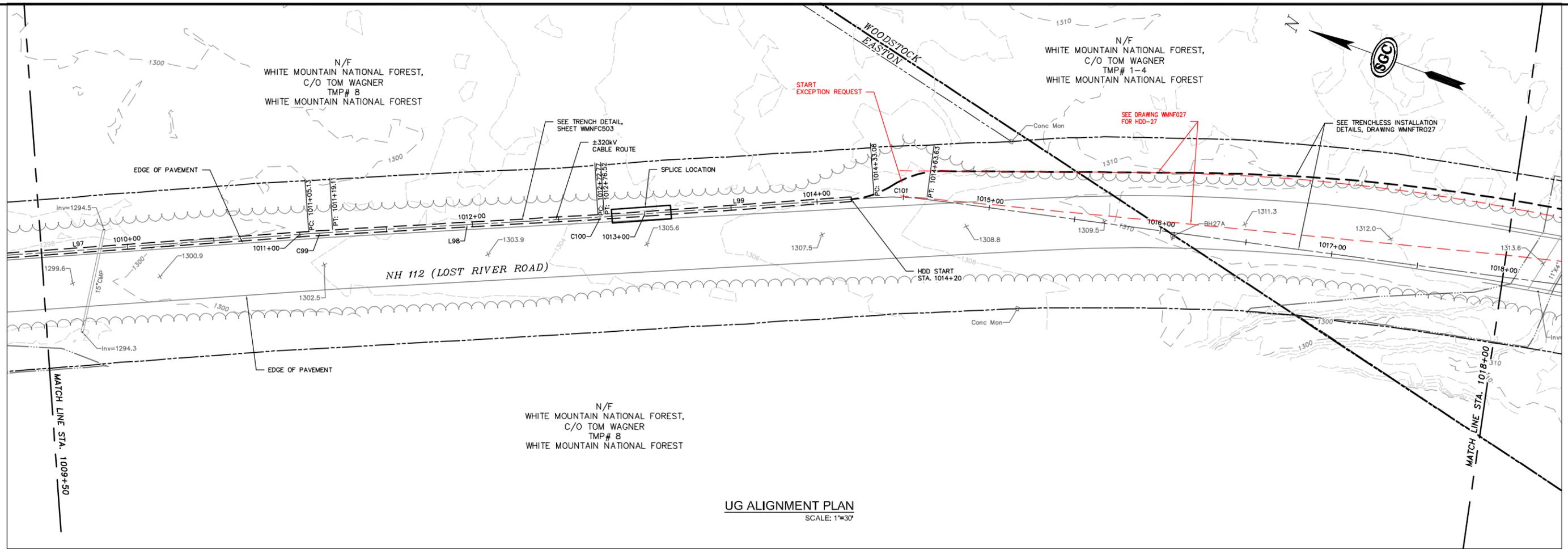
BRIERLEY ASSOCIATES  
Creating Space Underground

PAR  
THE NORTHERN PASS  
Transmission Business

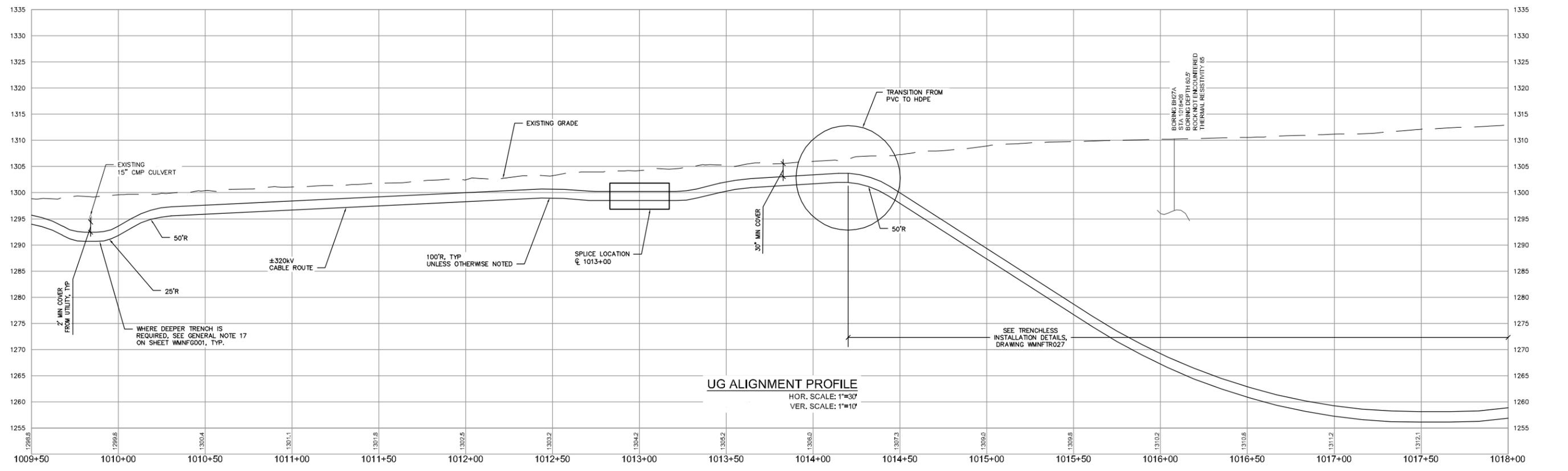
NPT  
UNDERGROUND ALIGNMENT  
TRENCHLESS CROSSINGS  
SCALE: 1" = 30'  
DATE: 10/7/2016

DES: CHK:  
DRW: APR:  
TOWN: EASTON/WOODSTOCK  
TRANSMISSION LINE:  
WMNF  
SHEET  
WMNF027-2

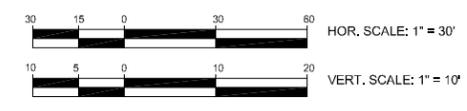
**PRELIMINARY - NOT FOR CONSTRUCTION**



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



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



NO.	REVISION	DATE	DRWN	CHKD	APPRV.
0	EXCEPTION REQUEST	07/25/17			



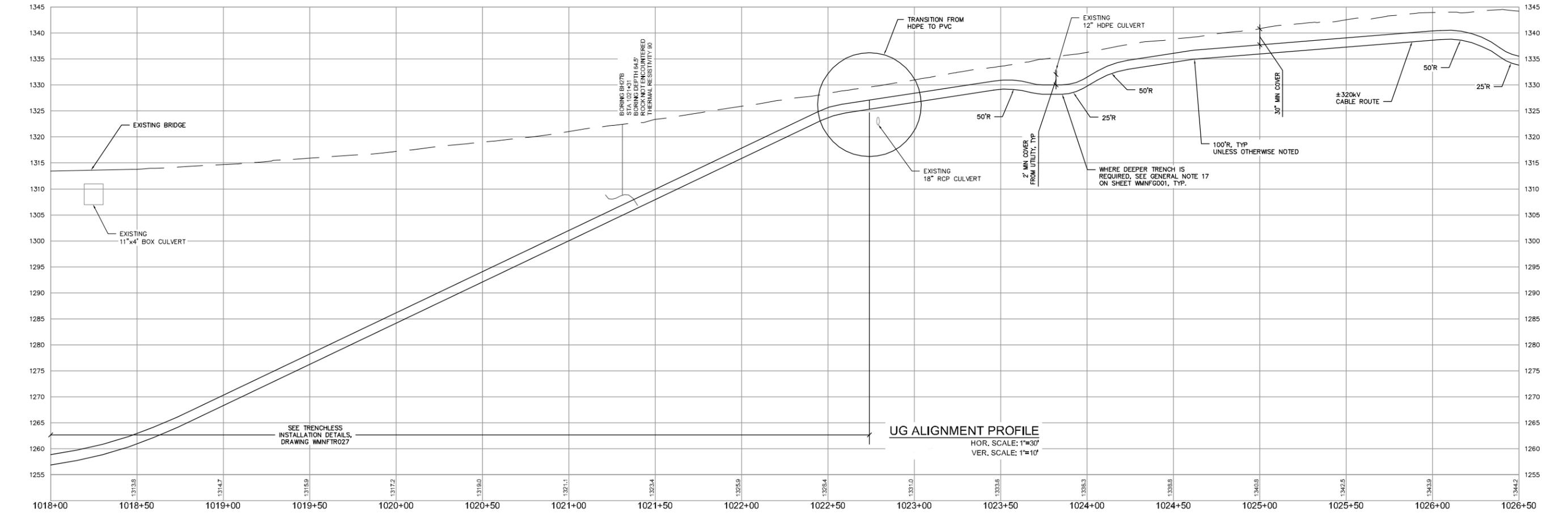
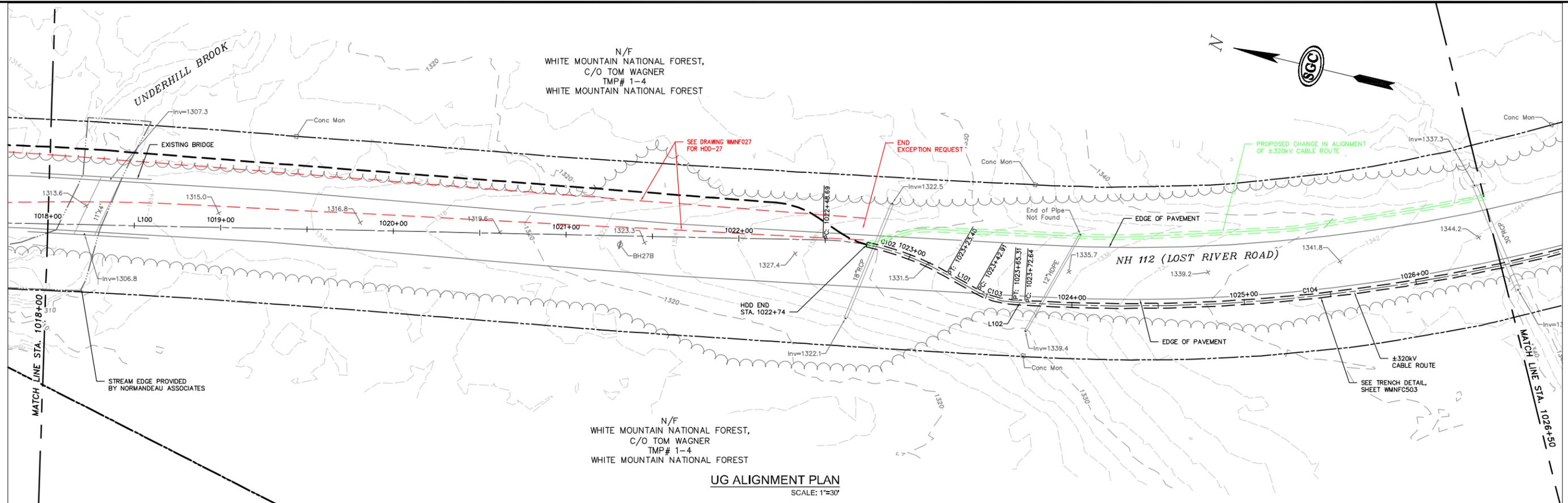
Transmission Business

EXCEPTION 146 - HDD 27  
DATE: 06/20/17  
SCALE: H 1"=30', V 1"=10'

TRANSMISSION LINE:  
WMNF

EXHIBIT B.1

**PRELIMINARY - NOT FOR CONSTRUCTION**



NO.	EXCEPTION REQUEST	REVISION	DATE	DRWN	CHKD	APPRV.
0			07/05/17			



Transmission Business

EXCEPTION 146 - HDD 27  
SCALE: H 1"=30', V 1"=10'  
DATE: 06/2017

DES: MRR | CHK: TDO  
DRW: BCC | APR: TMA  
TOWN: WOODSTOCK

TRANSMISSION LINE:  
WMNF

EXHIBIT B.2

