SECTION 34

POST-RECLAMATION TOPOGRAPHY

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APPENDIX NUMBER	APPENDIX TITLE

SECTION 34

POST-RECLAMATION TOPOGRAPHY

LIST OF REVISIONS DURING PERMIT TERM

REV. NUMBER	REVISION DESCRIPTION	DATE APPROVED

SECTION 34 POST-RECLAMATION TOPOGRAPHY

34.1 Post-Reclamation Final Surface Configuration

Through the mining process the original or pre-mine surface configuration and surface contours are altered. Reclamation plans are based on grading the mined areas to meet specific criteria outlined in this section. In order to ensure that these criteria will be met and the material balance maintained, the designs of a new topographical surface are created based on current mine plans and features for a given operating area. This replacement surface is defined as the final surface configuration (FSC) or approximate original contours (AOC); the terms can be used interchangeably within this permit application package. Refer to Exhibit 34.1-1 for the FSC designs for the No Name Permit area. Reclamation plans are based specifically around meeting the drainage requirements of this FSC surface. Because this FSC surface is created from a modeled post-mine surface, the actual contour configuration of the reclaimed topography may deviate from the design FSC. The locations, configurations, and sequence of mining operations and features may vary slightly from preliminary plans (e.g., ramp centerline locations, dragline plug locations). However, these deviations will not be significant. The actual reclaimed surface will closely approximate the approved FSC and this surface will ensure current FSC drainage designs are maintained, meet the requirements of this section, and ensure a material balance.

Navajo Transitional Energy Company (NTEC) will utilize fluvial geomorphic reclamation approaches to develop the FSC for the permit area. This reclamation approach is discussed further in Section 38 (Post-Reclamation Surface Stabilization and Sediment Control). This approach enables NTEC to meet the objectives of the FSC as described below:

1. Achieve mass balance while maximizing contemporaneous regrade acreage between ramps,
2. Achieve positive drainage, except for the small depressions mentioned below, from all areas including pits and ramps,
3. Develop an adequate drainage density,
4. Allow development of stable drainage channels,
5. Support the approved post-mining land use.

The fluvial geomorphic reclamation approach utilizes site-specific fluvial geomorphic data, including but not limited to drainage density, tributary lengths and associated areas, sinuosity, width to depth ratios, and length between channels, to develop a reclamation surface model that generally mimics the natural landscape. The fluvial geomorphic design input values that are used in the No Name FSC design are included in Section 38 (Post Reclamation Surface Stabilization and Sediment Control). For additional design information, please refer to Exhibit 34.3-1, Exhibit 34.3-2.01, and Exhibit 34.3-2.02.

The slope analysis for the post-reclamation final surface is provided in Table 34.1-1. A comparison between the pre-mine slopes, described in Section 13 (Topography) and post-reclamation slopes is provided in Figure 34.1-1.

34.1.1 AOC Exemption for Thin Overburden

NTEC is not requesting an AOC exemption for thin overburden. Therefore, this section is not applicable to the permit area.

34.1.2 AOC Exemption for Thick Overburden

NTEC is not requesting an AOC exemption for thick overburden. Therefore, this section is not applicable to the permit area.

34.1.3 Highwall Elimination Exemption for Operations on Previously Mined Areas

NTEC is not requesting a highwall elimination exemption on previously mined areas, as there are no previously mined areas that contain preexisting highwalls within the permit area. Therefore, this section is not applicable to the permit area.

34.1.4 AOC Variance for Mountaintop Removal Operations

NTEC is not requesting an AOC variance for mountaintop removal, as this is not a mountaintop removal operation. Therefore, this section is not applicable to the permit area.

34.1.5 AOC Variance for Steep Slope Mining Operations

NTEC is not requesting an AOC variance for steep slope mining, as this is not a steep slope mining operation. Therefore, this section is not applicable to the permit area.

34.2 Backfilling and Grading Plan

Overburden and parting materials are typically removed by a dragline and cast into the adjacent mined-out cuts. Such placements create spoil ridges (rows) or peaks, which need to be backfilled and/or graded. A post-mining configuration (PMC) (Exhibit 34.2-1) was created, based on a computer simulation of mining in the permit area. The computer simulation models the mining methods and dragline operation to create simulated PMC with graded spoil peaks. The PMC was then used to optimize the mass balance of the FSC design (Exhibit 34.1-1).

By combining the adjusted PMT and FSC designs, NTEC will be able to develop mass-balanced logical reclamation blocks (Exhibit 34.2-2) for the mining area. Unbalanced surplus material will be redistributed within the reclamation blocks and is not expected to significantly affect the overall FSC design.

Backfilling and grading will be completed in these logical reclamation blocks, which follow the stripping sequence.

These reclamation blocks will provide for a more consistent topography between regraded areas. In most cases, these logical reclamation blocks become available every 1 to 3 years in each mining area. The scheduling of these backfilling and grading blocks will result in a distance between the previous regraded area and the active pit; however, this distance will be operationally advantageous as it will allow for larger areas to be reclaimed at one time. Less area will need to be re-disturbed to tie into existing reclaimed areas. Larger portions of the post-mine watersheds can be constructed at a single time, thereby reducing the number of temporary drainage and sediment control structures. Topdressing, revegetation, and irrigation operations will be operationally easier at larger scales than in small irregular blocks. The areas around active ramps and final pits will remain ungraded until all mining activities are complete in order to preserve the material required to fill in these features.

Backfilling and grading operations of each logical block are divided into primary and secondary operations. Primary regrading utilizes track dozers to level off the spoil ridges. Primary regrading will be accomplished as necessary to accommodate the FSC and the backfilling and grading schedule (Table 51.1-1 in Navajo Permit Section 51 NM-0003I). Some pits and ramps might not have sufficient backfill material readily available for track dozers to adequately regrade the area. In these instances, supplemental equipment may be used to facilitate primary regrading activities. This equipment includes, but is not limited to, scrapers, draglines, and end-dump trucks working with a large front-end loader.

Several areas might require delays in reclamation in order to facilitate reaching the desired post-mining topography. Changes or fluctuations in the dragline stripping sequence may cause variations in spoil placement, resulting in localized peaks or valleys that may require regrading equipment and cause primary regrading delays. Un-regraded spoil areas of the mine are subject to applicable effluent standards and fugitive dust emissions. Refer to Section 25 (Sediment Control Plan), Section 26 (Drainage Control Plan) and Section 40.8 (Fugitive Dust Control Plan) for details discussion of the control measures associated with these plans.

Secondary regrading may, if needed, follow primary grading for additional contouring of the land surface to accommodate topdressing replacement. At this time, any special water control or wildlife habitat features will be constructed.

During the process of secondary grading, small depressions may be established on an opportunistic basis. These features will enhance post-mining topographic diversity and act as seasonal surface water collection sites. Small area depressions are discussed in Section 34.2.3.

Highwalls and ramps will be backfilled and graded per FSC maps shown in Exhibit 34.1-1. Portions of highwalls may remain in the FSC surface to replace natural escarpment features for wildlife habitat. Natural escarpment features and other wildlife habitat features are discussed in Section 38 (Post-Reclamation Surface Stabilization and Sediment Control) and Section 39 (Fish and Wildlife Enhancement).

Regraded lands are blended into the surrounding topography to establish drainage patterns, and the post-mining land use of range livestock grazing will be unimpaired following topdressing distribution and revegetation.

The mining operations, described in Section 20 (Mining Operations), will not generate any coal mine waste or coal processing waste as defined by 30 CFR 701.5.

The plans to minimize erosion and water pollution during backfilling and grading, and descriptions of the post-reclamation drainage and permanent impoundments are described in Section 35 (Hydrologic Reclamation Plan) and Section 38 (Post-Reclamation Surface Stabilization and Sediment Control).

34.2.1 Covering Acid-Forming and Toxic-Forming Materials and Combustibles

NTEC may encounter strata that contain limited quantities of potentially acid- and toxic-forming materials (PATFM). Based on the geologic description and overburden characterization in Section 17 (Geologic Information), the quantity of PATFM will be minimal and thus does not require special handling and disposal procedures.

NTEC will not generate coal mine waste or coal processing wastes. Small quantities of spilled coal and coal materials that do not meet quality standards (e.g., low BTU) will be hauled to mined-out areas and free dumped along the bottom of the pit or placed in an alternate location where the materials will not adversely affect reclamation operations. This coal material represents a low combustion risk; however, NTEC will follow the procedures discussed in the combustibles and coal mine waste fire control plan in Section 20 (Mining Operations) in the event that the material does combust.

The small quantity of PATFM and coal materials placed in mined-out areas will be handled in a manner that protects the environmental resources and will not impact surface drainages or the FSC. The handling and disposal procedures for these materials are presented in Section 20 (Mining Operations).

34.2.2 Post-Reclamation Slope Stability

The FSC surfaces for the permit area have been designed using a combination of fluvial geomorphic and traditional reclamation approaches. Areas designed with the fluvial geomorphic reclamation approach will contain geomorphically appropriate slopes, drainage densities, and channel profiles to mimic the pre-mine topography. Areas designed with traditional reclamation approaches will have interior slopes graded to less than or equal to 6.5h:1v overall and out-slopes graded to less than or equal to 4h: 1v overall. The designed slopes contained in the FSC surfaces have been designed to eliminate slopes at angle of repose and minimize the risk of slides.

NTEC may include natural escarpment replacement features (e.g., thin exposed areas of end walls or final pits) into the final FSC. These features will enhance the wildlife habitat of the post-reclamation topography. The natural escarpment replacement features will typically be less than 15 ft in height and less than 500 ft in length and have a safety factor of 1.3 or greater. The criteria for designing natural escarpment replacement features are described in Section 38 (Post-Reclamation Surface Stabilization and Sediment Control).

34.2.3 Small Depressions and Final Surface Preparation

Small depressions may be established on an opportunistic basis during secondary regrading. These features will enhance post-mining topographic diversity and act as seasonal surface water collection sites. Small depressions will serve as wildlife enhancement features and microtopographic niches for establishment of mesic and/or hydric plant species. Although these depressions will not have specific design criteria, they will be small enough that they will occur within the limits of the approved FSC. These small depressions will also meet the following specific criteria:

- Each depression or combination of directly adjacent depressions will be less than 1 acre foot total capacity;
- No depression will be deeper than 10 feet
- All small depressions will be incised (below ground level);
- The maximum in-slope for the small depression will be 6h:1v;
- At bond release, small depression areas will be subject to vegetation sampling similar to any area within the bond release parcel.

Small depressions meeting the design criteria listed above will not require design approval prior to construction from the Office of Surface Mining Reclamation and Enforcement (OSM). However, OSM must authorize the retention of small depressions prior to final bond release.

34.3 Post-Reclamation Topography Collection and Analysis

The initial PMC surface model was developed using Maptek Vulcan™ computer aided drafting and dragline spoil modeling techniques that jointly operate in an AutoCAD environment. The PMC model inputs included, but are not limited to, the operation mine plan, material swell factors and geologic modeling. This final PMC was used to design the FSC, develop the cut/fill contours, and perform volumetric calculations for the permit area.

Along with the final PMC surface, site-specific field measurements and Carlson Natural Regrade with GeoFluv^{TM} were used to develop the FSC surface. Section 38 (Post-Reclamation Surface Stabilization and Sediment Control) describes in detail the field investigations, design criteria, and FSC surface.

NTEC performed the post-reclamation slope analysis of the FSC using AutoCAD 3D. NTEC was able to calculate the percent slopes and determine percentage of permit area for each slope class in 3% slope increments. For a more detailed discussion on the slope analysis, see the pre-mine slope analysis discussion in Section 13 (Topography).

For additional design information, please refer to Exhibit 34.3-1, Exhibit 34.3-2.01, and Exhibit 34.3-2.02.

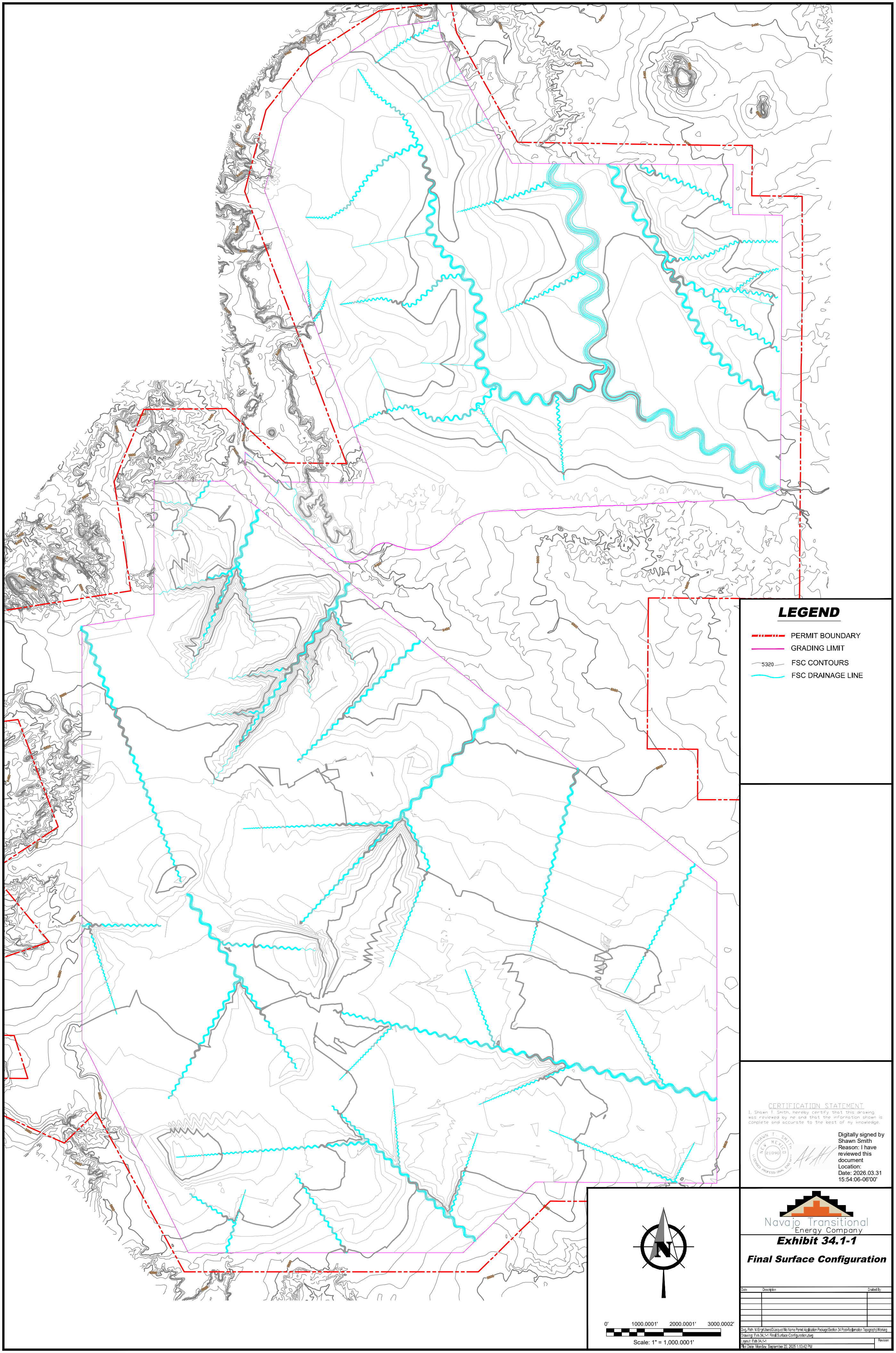
34.4 Certification of Designs and Exhibits

Certified exhibits for Section 34 are available for review upon request at the Navajo Mine office.

References

Dunne T., and L.B. Leopold. 1978. Water in Environmental Planning. W.H. Feeman, San Francisco, California.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.



CERTIFICATION STATEMENT

I, Shawn T. Smith, hereby certify that this drawing was reviewed by me and that the information shown is complete and accurate to the best of my knowledge.

SHAWN T. SMITH NEW MEXICO 21090 LICENSED PROFESSIONAL ENGINEER

Digitally signed by Shawn Smith
Reason: I have reviewed this document
Location:
Date: 2026.03.31 15:54:06-06'00'

Navajo Transitional Energy Company

Exhibit 34.1-1

Final Surface Configuration

Date	Description	Drafted By:

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Layout: Exh 34.1-1
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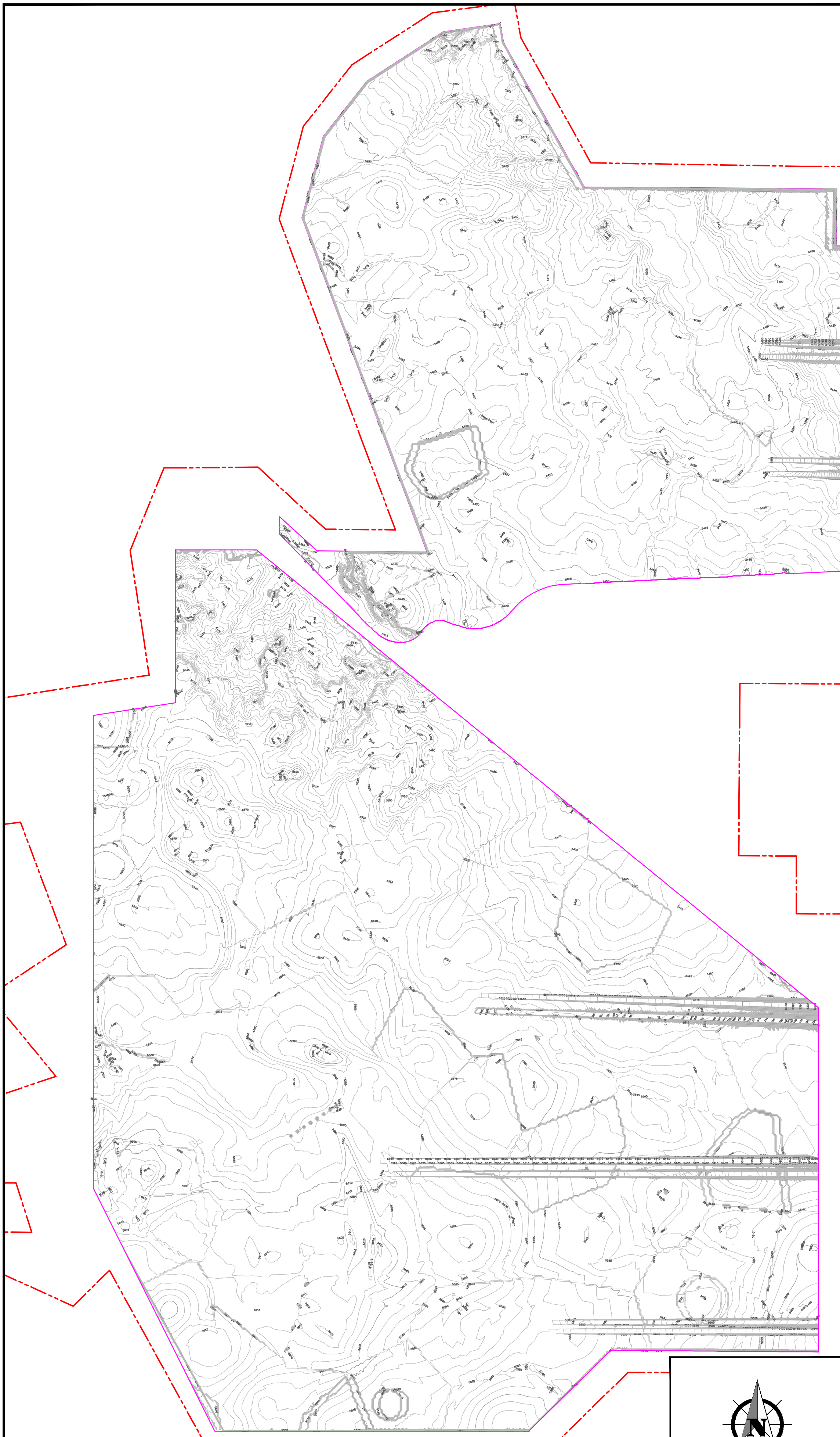
Revision



0' 1000.0001' 2000.0001' 3000.0002'

Scale: 1" = 1,000.0001'

LEGEND

- PERMIT BOUNDARY
- GRADING LIMIT
- 5320 PMC CONTOURS

CERTIFICATION STATEMENT

I, Shawn T. Smith, hereby certify that this drawing was reviewed by me and that the information shown is complete and accurate to the best of my knowledge.

SHAWN T. SMITH NEW MEXICO 21090 LICENSED PROFESSIONAL ENGINEER

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Reason: I have reviewed this document
Location:
Date: 2026.03.31 15:54:54-06'00'

Navajo Transitional Energy Company

Exhibit 34.2-1

Post Mining Configuration

Date	Description	Drafted By:

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Layout: Exh 34.2-1
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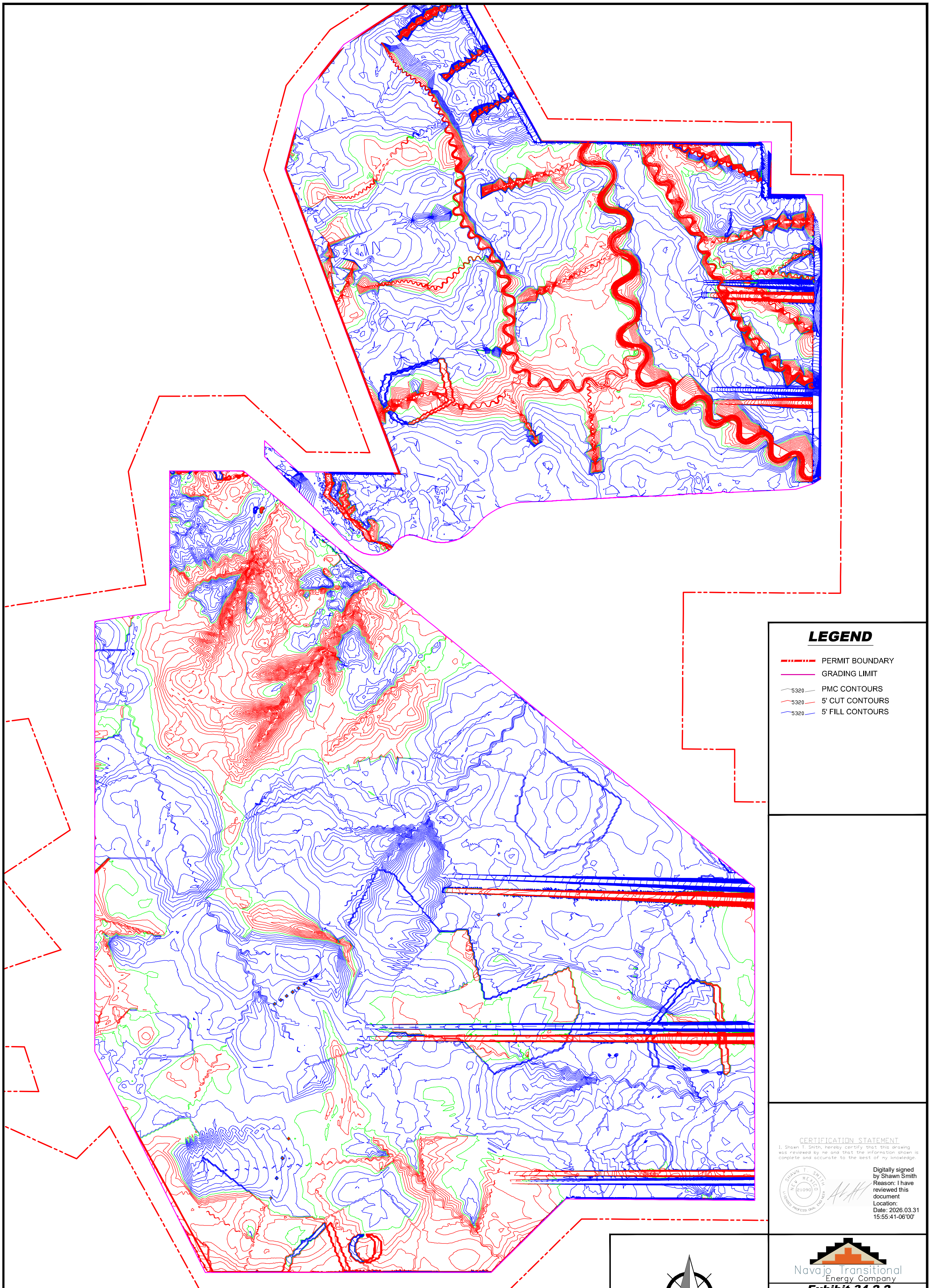
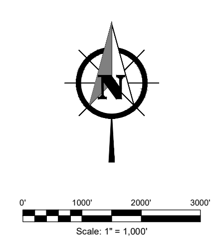
Revision



LEGEND

- PERMIT BOUNDARY
- GRADING LIMIT
- 5320 PMC CONTOURS
- 5320 5' CUT CONTOURS
- 5320 5' FILL CONTOURS



CERTIFICATION STATEMENT

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SHAWN T. SMITH NEW MEXICO 21090 LICENSED PROFESSIONAL ENGINEER

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Reason: I have reviewed this document
Location:
Date: 2026.03.31 15:55:41-06'00'

Navajo Transitional Energy Company

Exhibit 34.2-2

Reclamation Cut and Fill

Date	Description	Drafted By:

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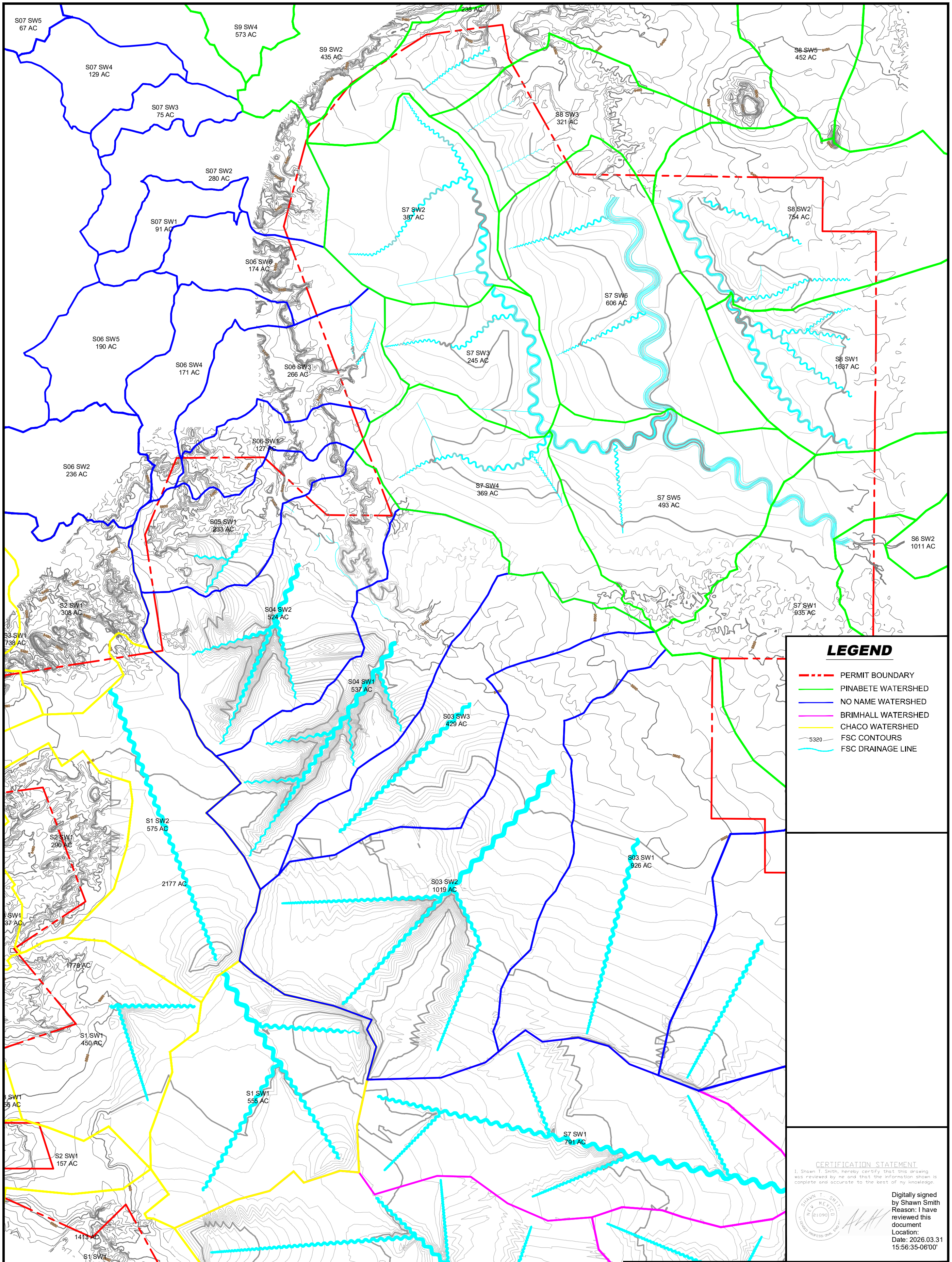
Layout: Exh 34.2-2

Plot Date: Thursday, September 25, 2025 9:50:57 AM

Revision



CERTIFICATION STATEMENT

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Reason: I have reviewed this document
Location:
Date: 2026.03.31 15:56:35-06'00'

Navajo Transitional Energy Company

EXHIBIT 34.3-1

Watershed Overview

Date	Description	Drafted By:

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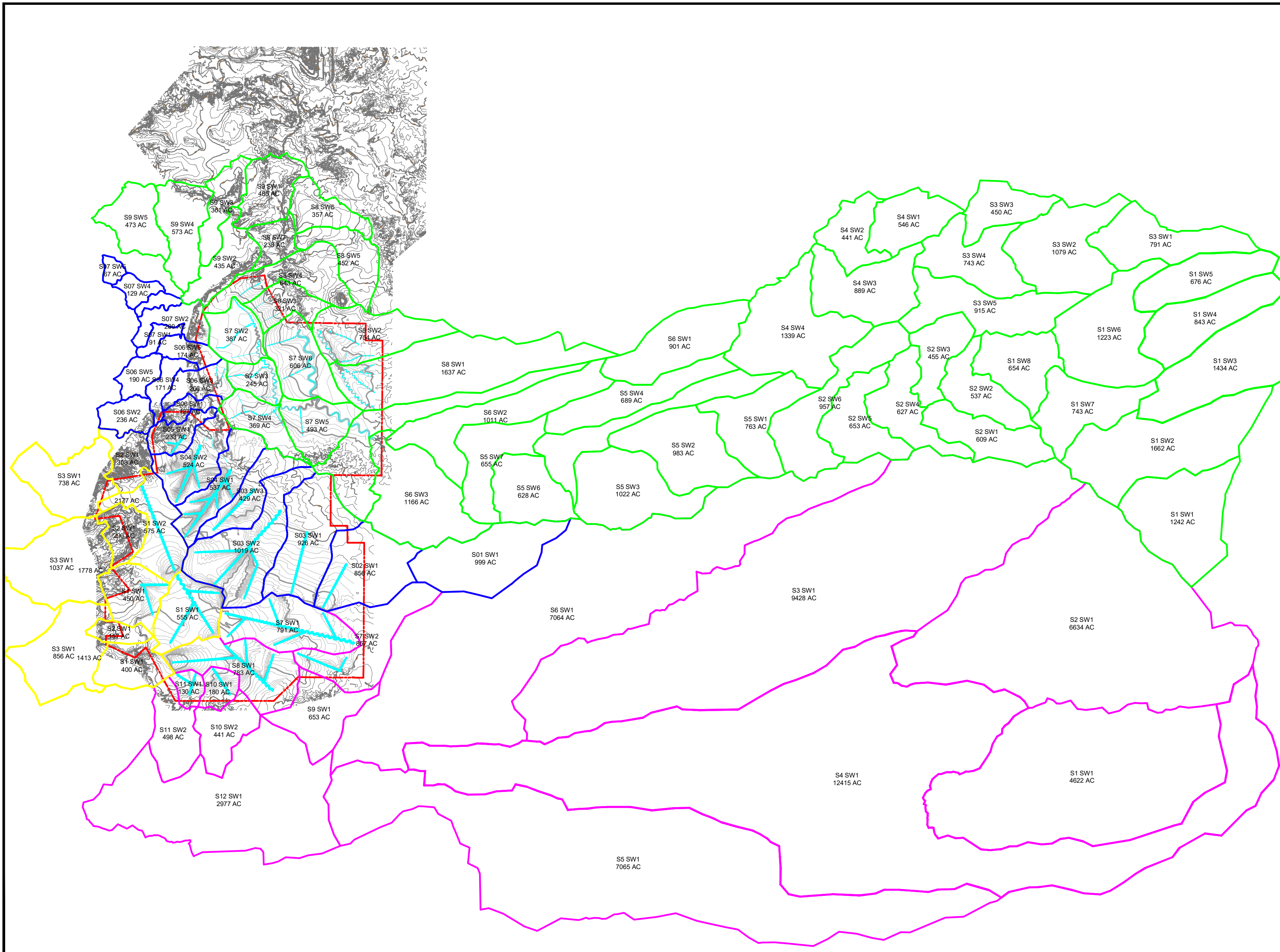
Drawing: Exh 34.3-2 SedCAD.dwg

Layout: Exh 34.3-1

Plot Date: Wednesday, September 24, 2025 9:07:09 AM

Revision



LEGEND

- PERMIT BOUNDARY
- PINABETE WATERSHED
- NO NAME WATERSHED
- BRIMHALL WATERSHED
- CHACO WATERSHED
- 5320 FSC CONTOURS
- FSC DRAINAGE LINE

CERTIFICATION STATEMENT

I, Shawn T. Smith, hereby certify that this drawing was reviewed by me and that the information shown is complete and accurate to the best of my knowledge.

SHAWN T. SMITH
NEW MEXICO
21090
LICENSED PROFESSIONAL ENGINEER

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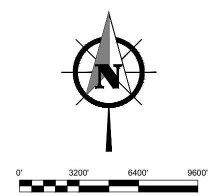

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Navajo Transitional Energy Company

EXHIBIT 34.3-2

SedCAD Drainage Subdivisions Map

Date	Description	Drafted By:

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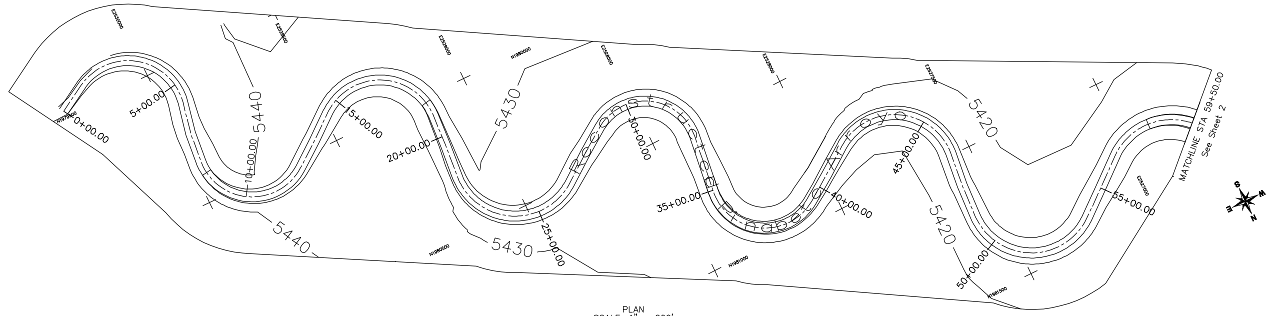
Layout: Exh 34.3-2
Plot Date: Wednesday, September 24, 2025 9:07:38 AM
Revision



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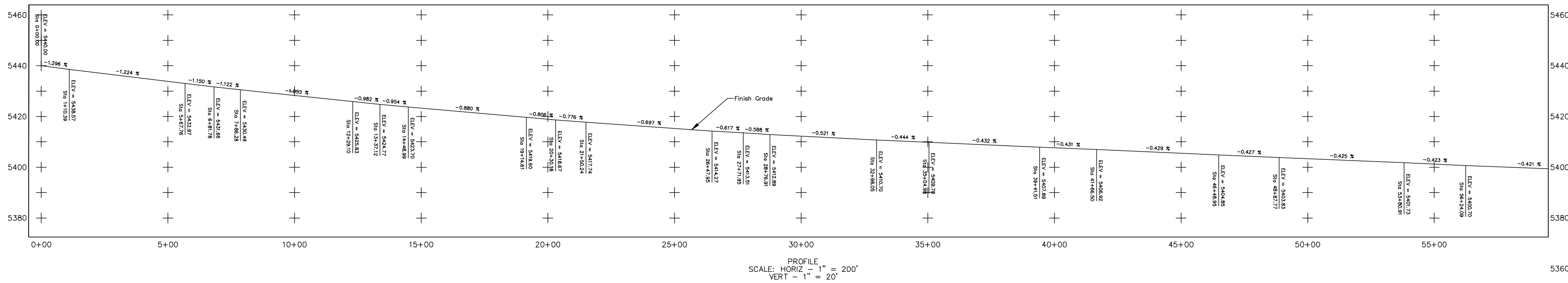

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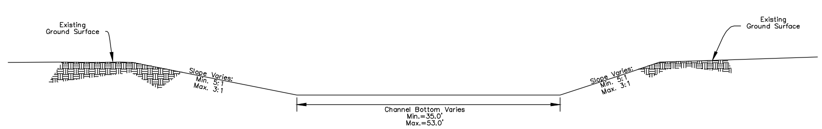

TYPICAL X–SECTION
N.T.S.

CERTIFICATION STATEMENT

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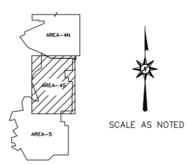
Digitally signed by Shawn Smith
Reason: I have reviewed this document
Location:
Date: 2026.03.31 15:57:52-06'00'

LEGEND

	ROAD		RAILROAD
	WATERSHED		TREES
	BUILDING		POWERLINE
	FENCE	×5338.5	SPOT ELEVATION
	IRRIGATION LINE	5300	INDEX CONTOUR
	CULVERT	5298	INTERMEDIATE CONTOUR
	DAM	218 5422.45	CONTROL
	DRAINAGE	L-30	LEASE CORNER
			PERMIT/LEASE BOUNDARY

NOTES

1. The Location of the reconstructed channel is presented on Exhibit 34.1-1.
2. The methods and procedures used to design the channel is presented in Section 35 and 38.



SCALE AS NOTED

Navajo Transitional Energy Company

DATE CERTIFIED
REVISION
PROJECT MANAGER:
ENGR. of RECORD:
REG. NO.
SRVYR of RECORD:
REG. NO.
PROJECT:
DATE:
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

Plan, Profile and Typical Cross Section

EXHIBIT 34.3-2.02
Reconstructed Pinabete Arroyo Design

DRAWING

SHEET 1
OF 3

CERTIFICATION STATEMENT

I, Shawn T. Smith, hereby certify that this drawing was reviewed by me and that the information shown is complete and accurate to the best of my knowledge.

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NEW MEXICO
21090
LICENSED PROFESSIONAL ENGINEER

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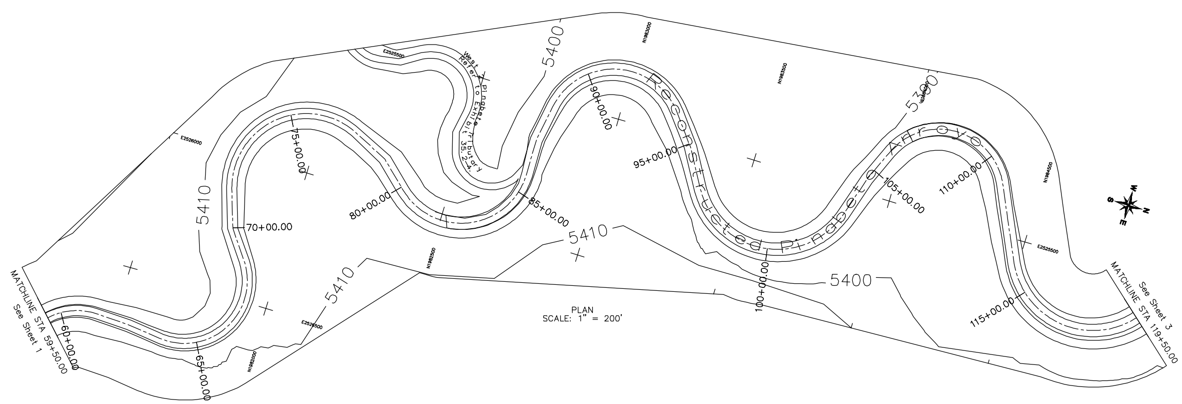

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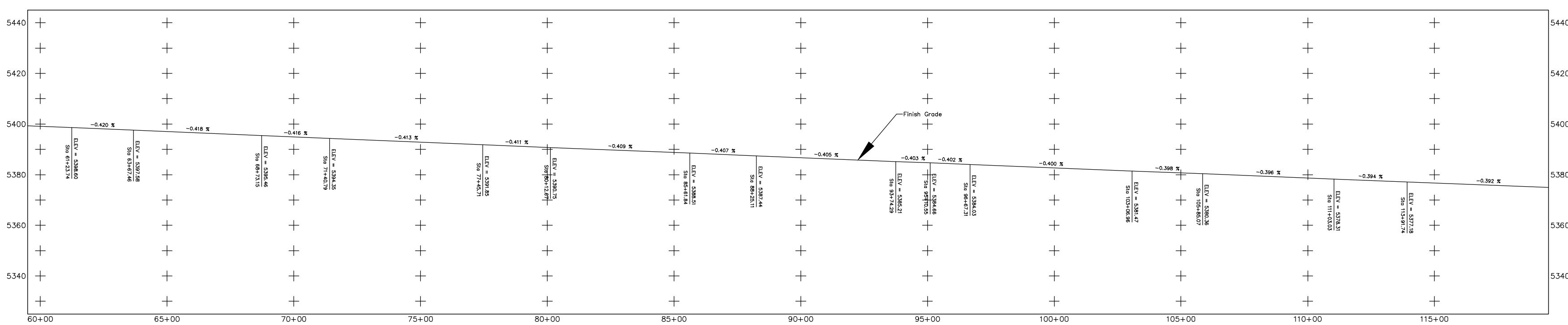


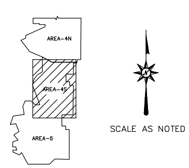
PROFILE
SCALE: HORIZ - 1" = 200'
VERT - 1" = 20'

LEGEND

- ROAD
- WATERSHED
- BUILDING
- FENCE
- IRRIGATION LINE
- CULVERT
- DAM
- DRAINAGE
- RAILROAD
- TREES
- POWERLINE
- ×5338.5 SPOT ELEVATION
- 5300 INDEX CONTOUR
- 5298 INTERMEDIATE CONTOUR
- 218 5422.45 CONTROL
- L-30 LEASE CORNER
- PERMIT/LEASE BOUNDARY

NOTES

1. The Location of the reconstructed channel is presented on Exhibit 34.1-1.
2. The methods and procedures used to design the channel is presented in Section 35 and 38.



SCALE AS NOTED

Navajo Transitional Energy Company

DATE CERTIFIED

REVISION

PROJECT MANAGER:
ENGR. of RECORD: REG. NO.
SRVYR. of RECORD: REG. NO.

PROJECT:
DATE:
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

Plan and Profile

EXHIBIT 34.3-2.02
Reconstructed Pinabete Arroyo Design

DRAWING

SHEET 2
OF 3

CERTIFICATION STATEMENT

I, Shawn T. Smith, hereby certify that this drawing was reviewed by me and that the information shown is complete and accurate to the best of my knowledge.

SHAWN T. SMITH NEW MEXICO 21090 LICENSED PROFESSIONAL ENGINEER

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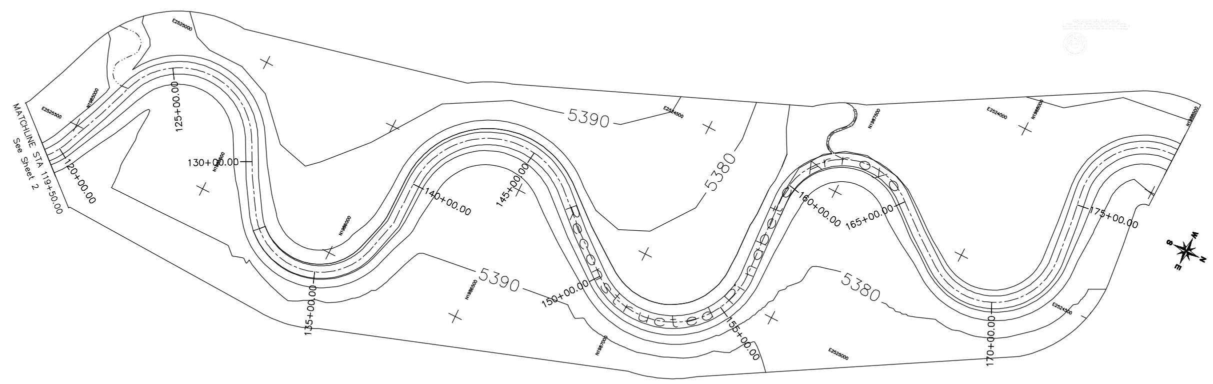

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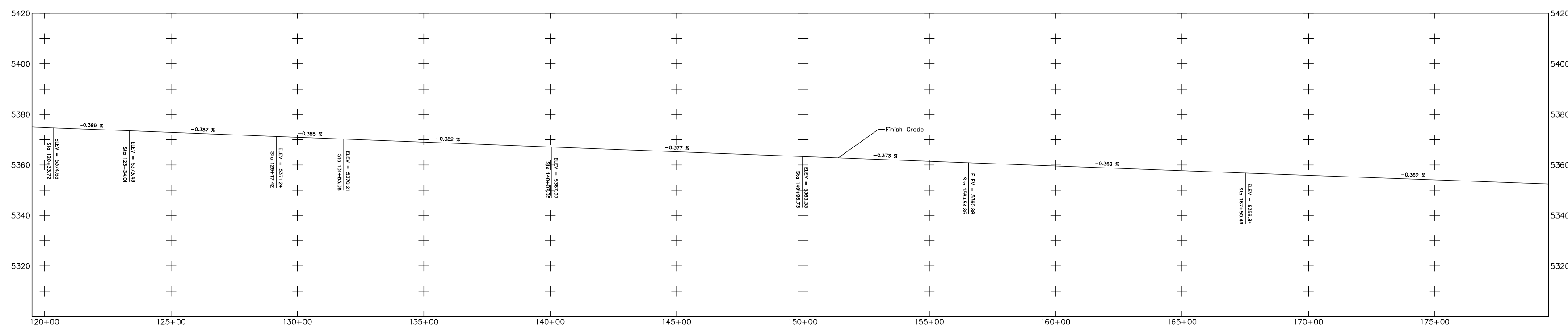

PROFILE VIEW
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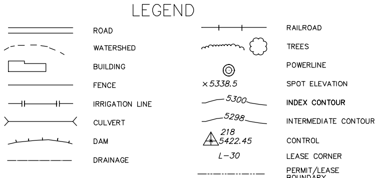
VERT – 1" = 20'

LEGEND



NOTES

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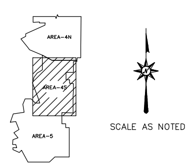
2. The methods and procedures used to design the channel is presented in Section 35 and 38.



SCALE AS NOTED

DATE CERTIFIED

REVISION

PROJECT MANAGER:
ENGR. of RECORD:
REG. NO:
SRVYR of RECORD:
REG. NO:

Navajo Transitional Energy Company

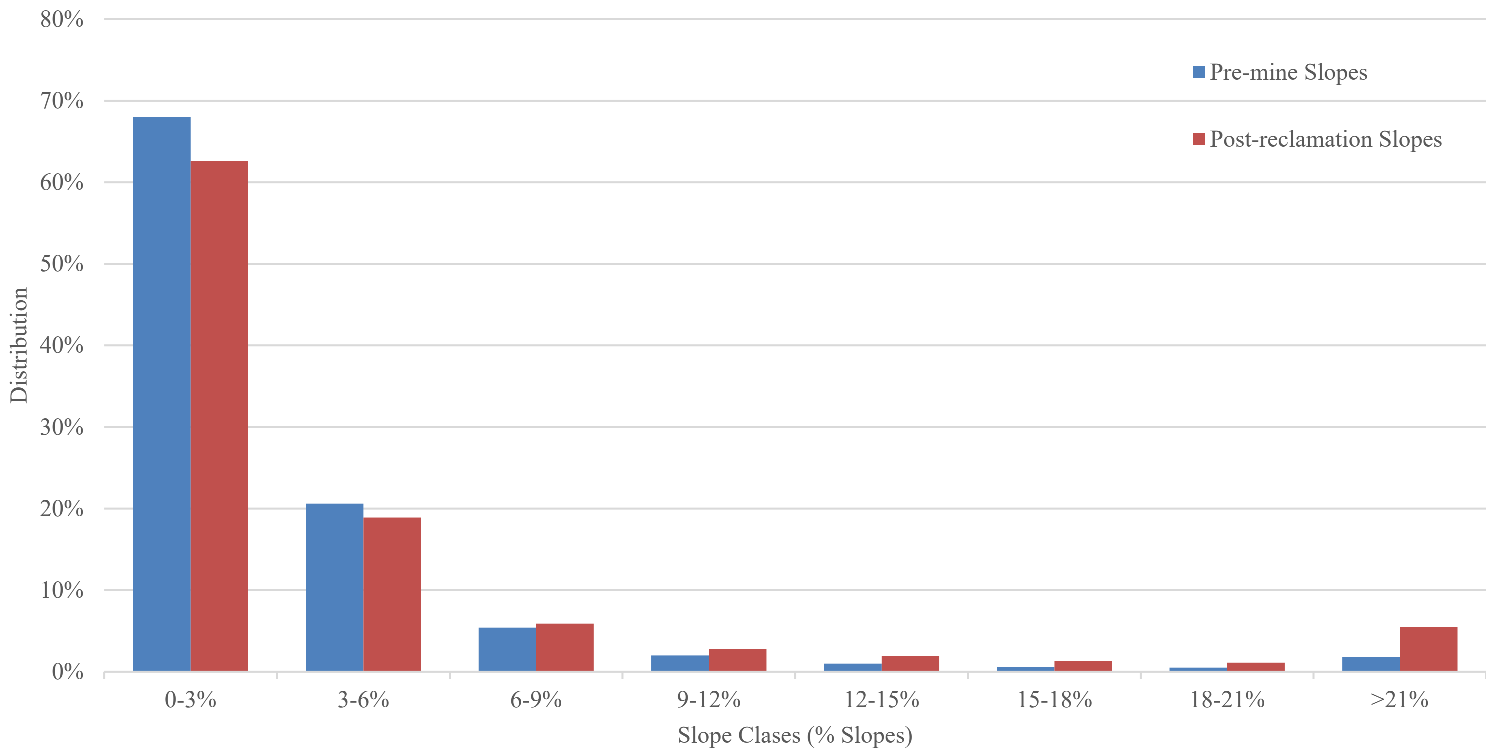
PROJECT: NMEP
DATE: June 2025
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

Plan and Profile

EXHIBIT 34.3–2.02
Reconstructed Pinabete Arroyo Design

DRAWING

SHEET 3 OF 3



Notes:

-Pre-mine slope analysis is provided on Table 13.1-1

-Post-reclamation slope analysis is provided on Table 34.1-1

Figure 34.1-1 Histogram Comparison of Pre-mine and Post-reclamation Slopes

Table 34.1-1 Post-Reclamation Final Surface Configuration Slope Analysis for No Name Permit

	No Name	
Slope increment	Acres	Percent (%)
0 – 3%	7211.5	62.6
>3 – 6%	2177.4	18.9
>6 – 9%	684.3	5.9
>9 – 12%	326.9	2.8
>12 – 15%	214.1	1.9
>15 – 18%	144.1	1.3
>18 – 21%	130.9	1.1
>21%	636.4	5.5
Total*	11525.6	100

*Total percent may not equal to 100 due to rounding