



REX2024
PRCI Research Exchange

Reduction of Landslide Impact on Pipelines using Geobuffer *Field Installation*

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San Diego, California
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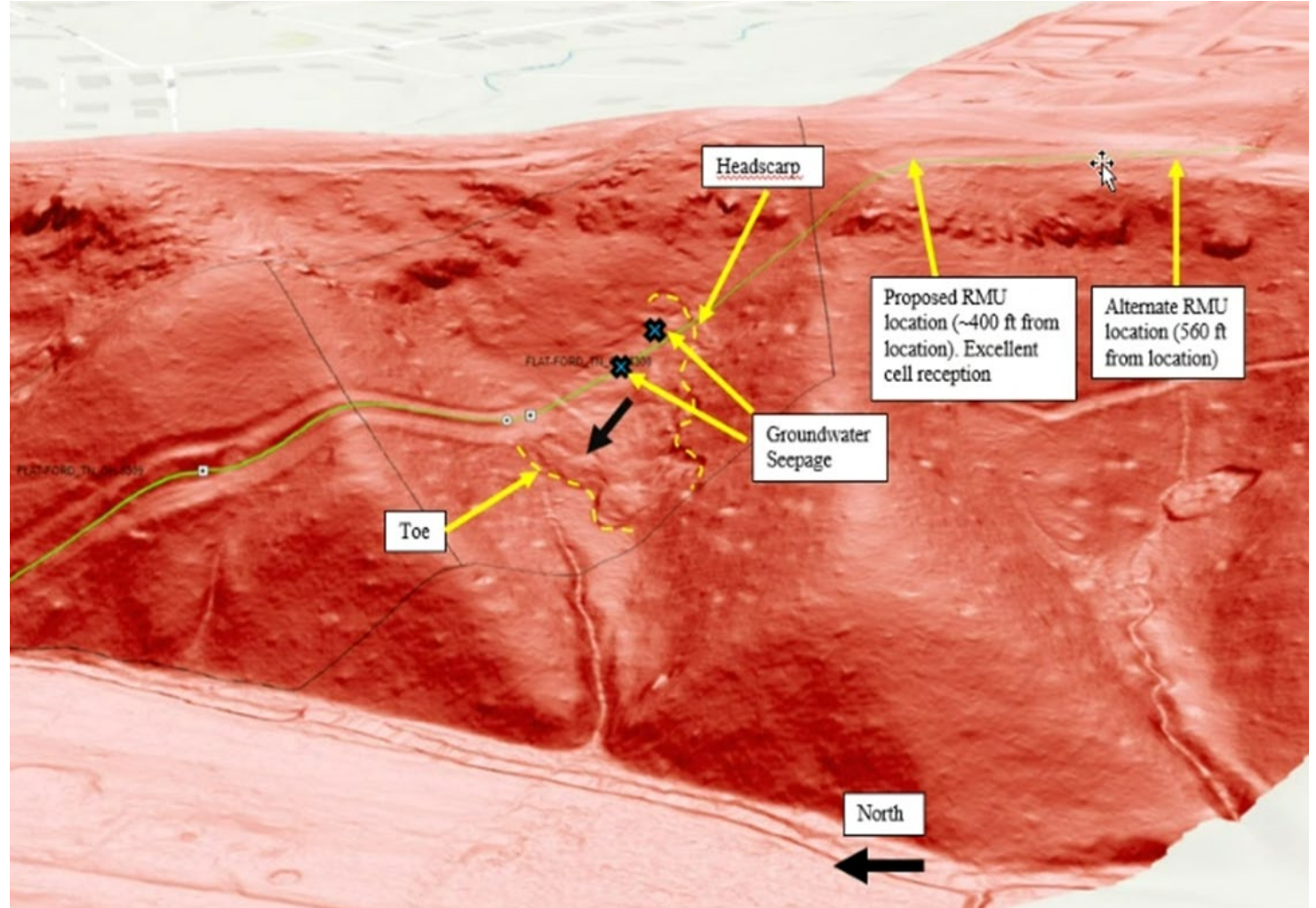


Pipeline Research Council International

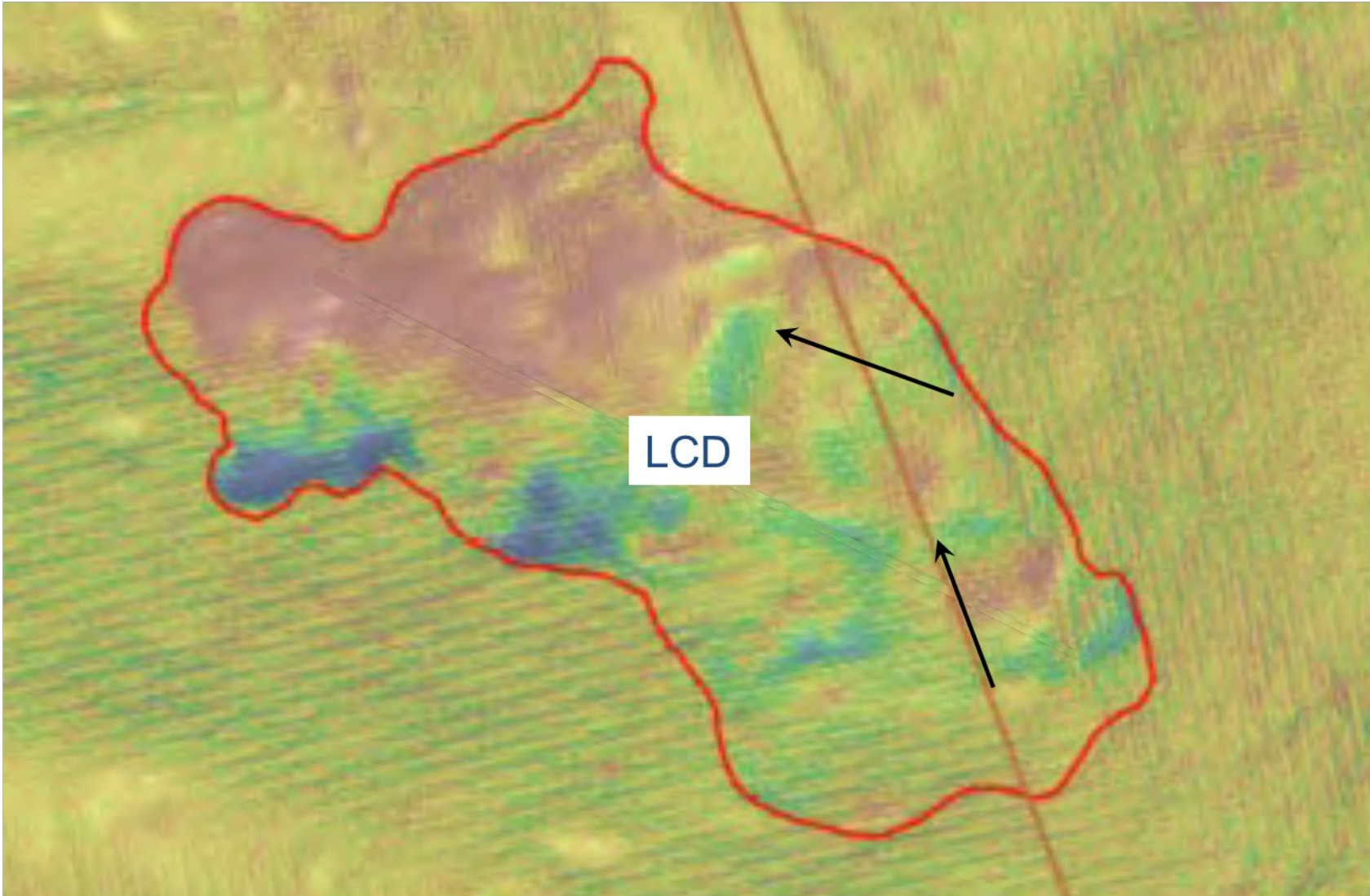
Site/Pipe Condition

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- Landslide identified in 2021 during LiDAR review
- Around 140 feet of intersection with pipeline
- Axial (upper slope) to oblique (mid-slope) direction of movement



LiDAR Change Detection 2016- 2020



Site/Pipe Condition

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- **NPS 8"**
- WT 0.188"
- Grade 42
- Installed 1962
- MOP 706 psi
- Non-piggable
- ~10 mile length
- **On Steep Slope (16°-28°)**
- **Single pipe on ROW**



Site/Pipe Condition

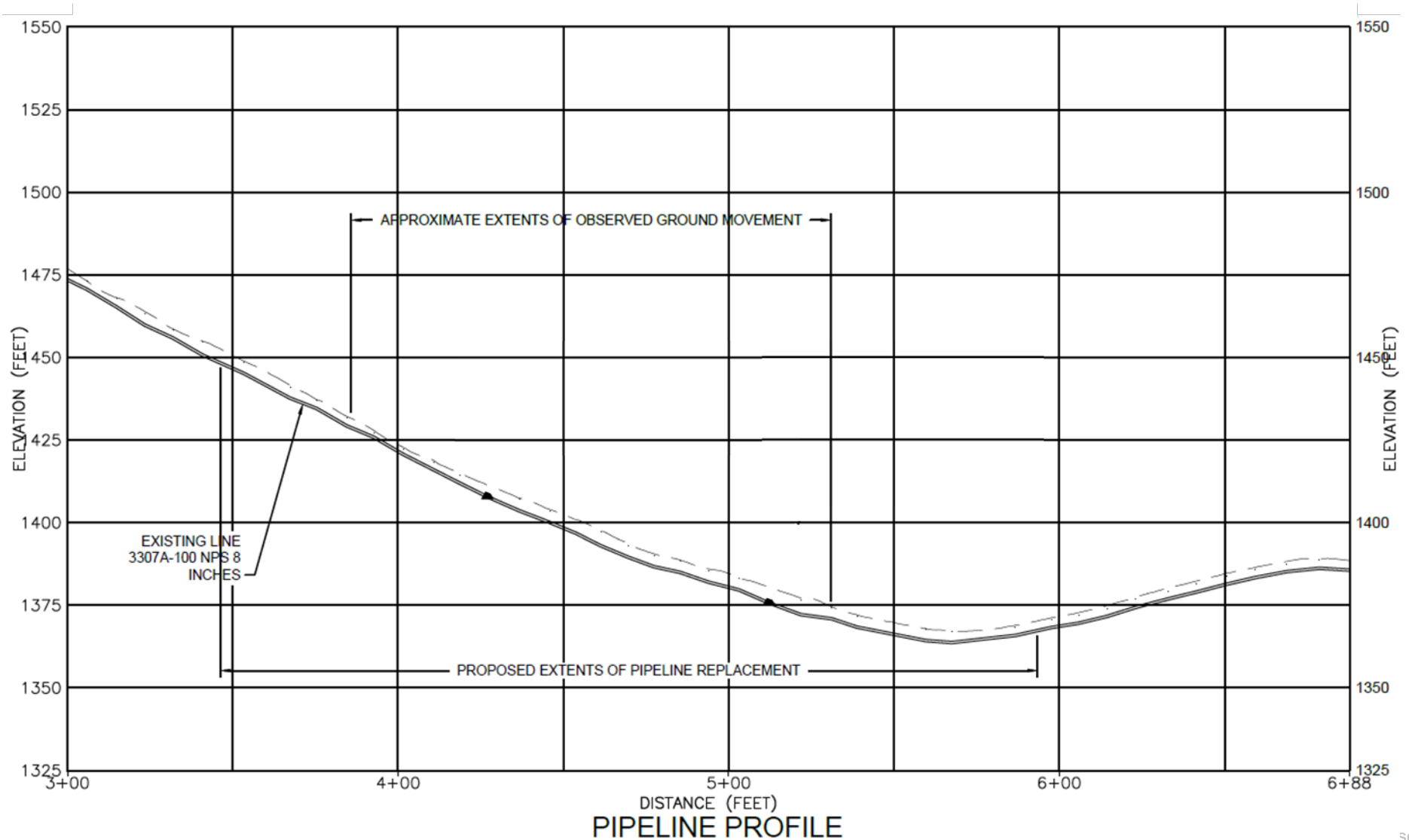
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- **Field assessment observed** evidence of recent landslide movement
- **From above ground survey** of 1ft OOS over 95 feet
- DOC of 2.4 to 4.1 feet within landslide
- In ROW, heads-scarp 1-to 2-foot high, internal scarps of 3.0 f high



Slope Profile

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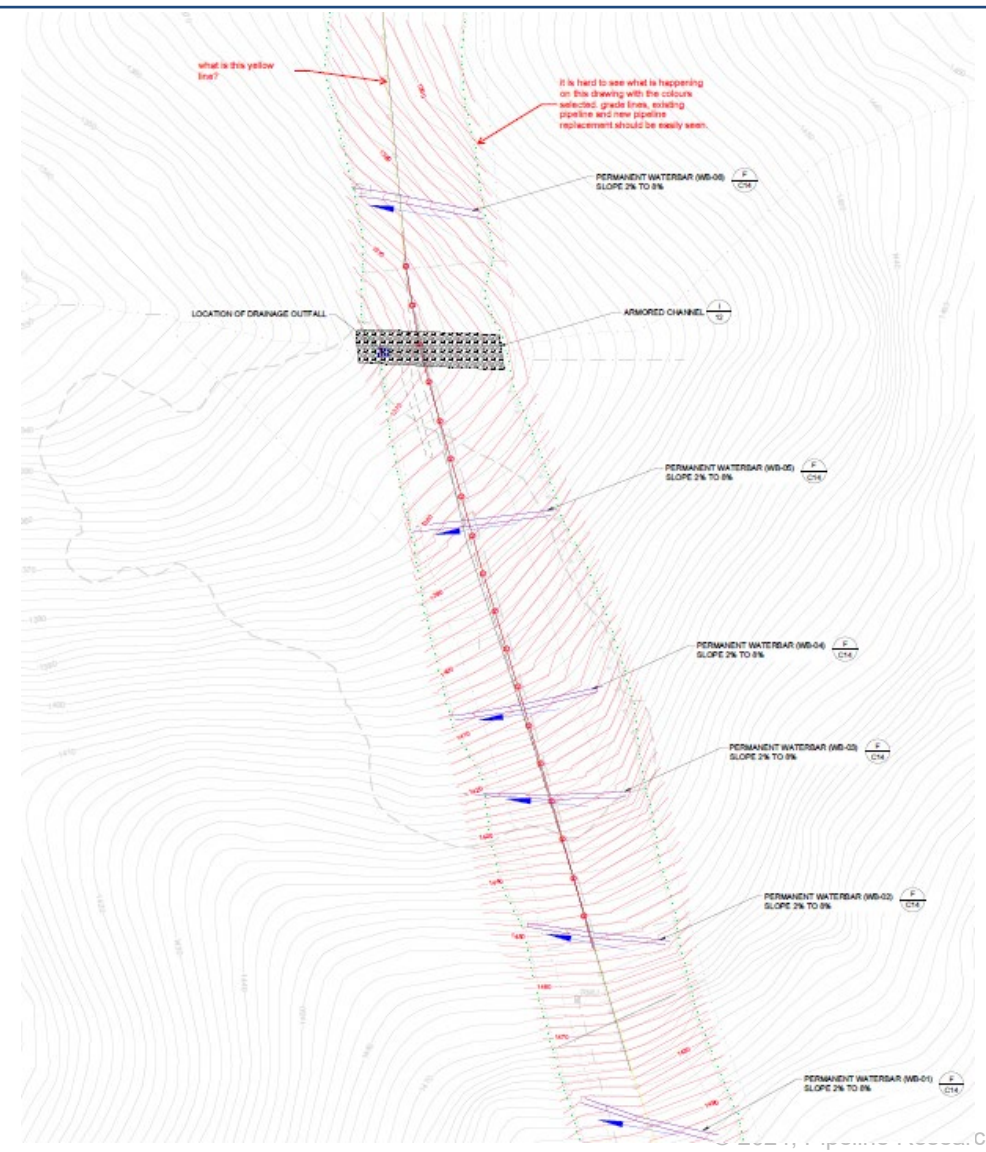
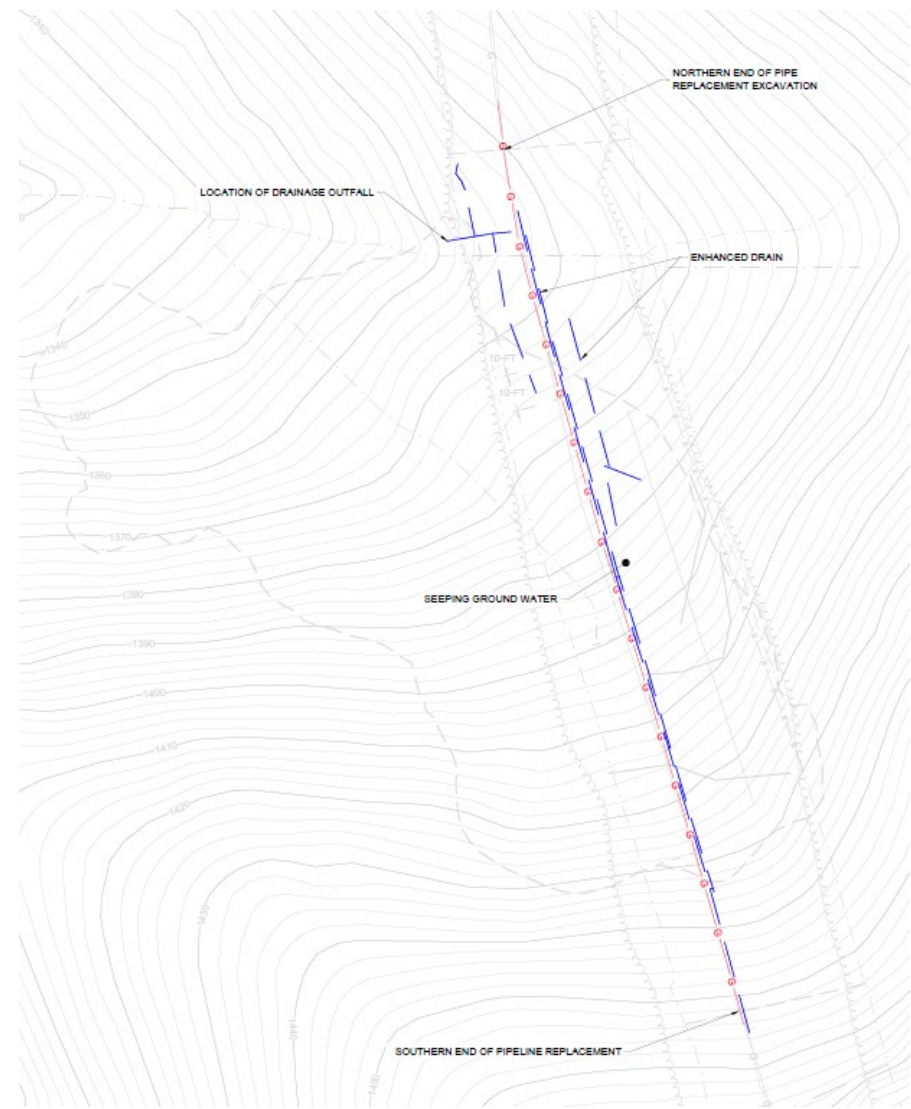
Initial Planned Remediation

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- Pipeline replacement of the section impacted by landslide
- Installation of in-trench drainage system
- Improve surface drainage
- Strain gauges installation

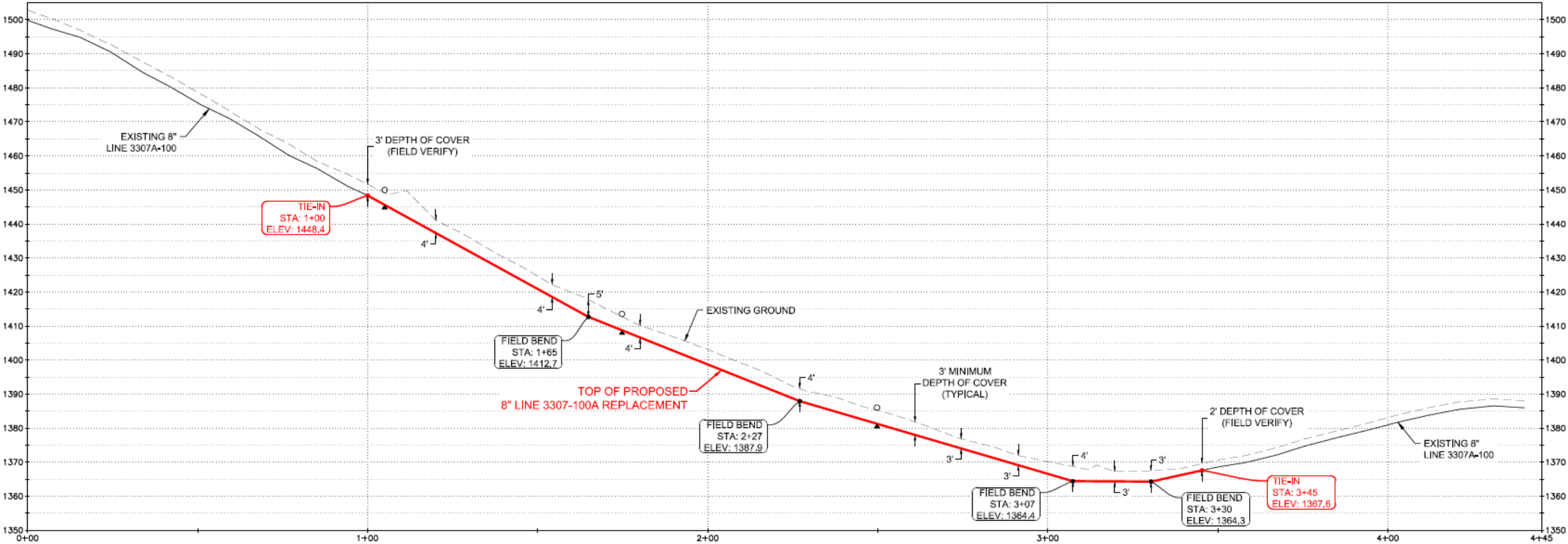
Geotechnical Improvements

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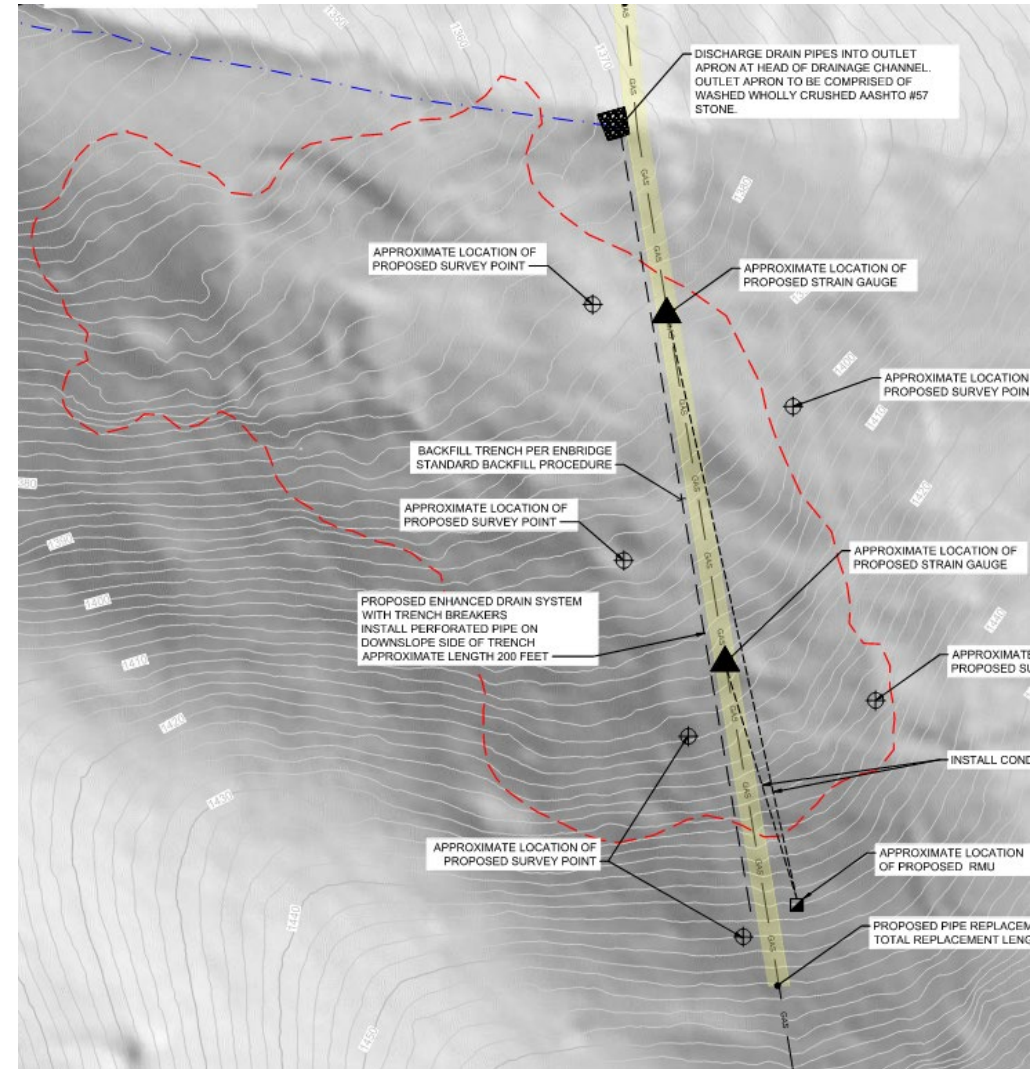


Pipe Replacement

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Strain Gauge Installation

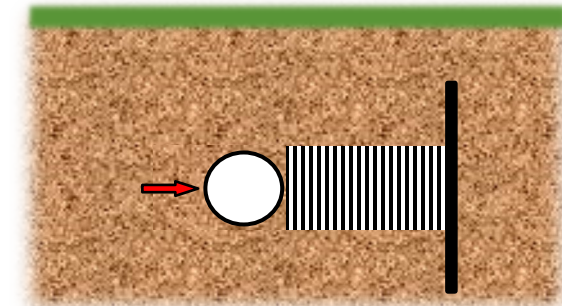
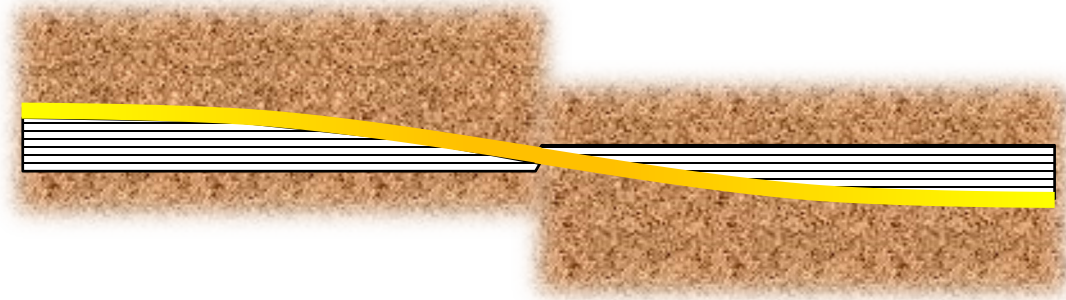
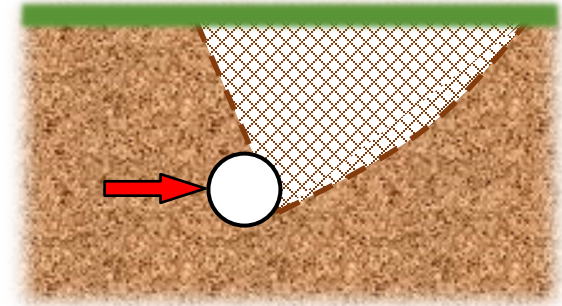
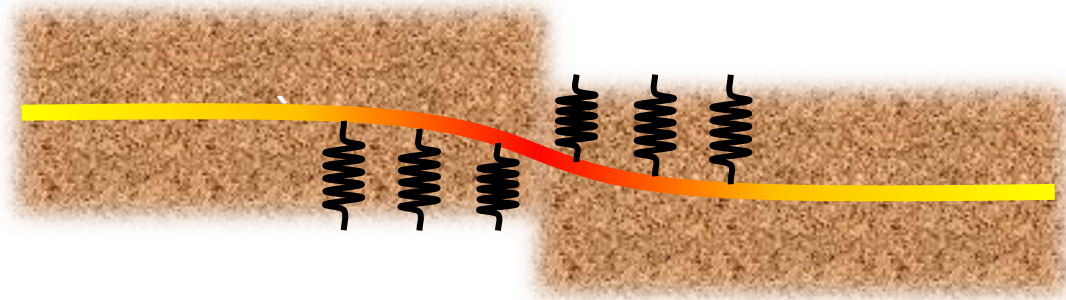


Final Planned Remediation

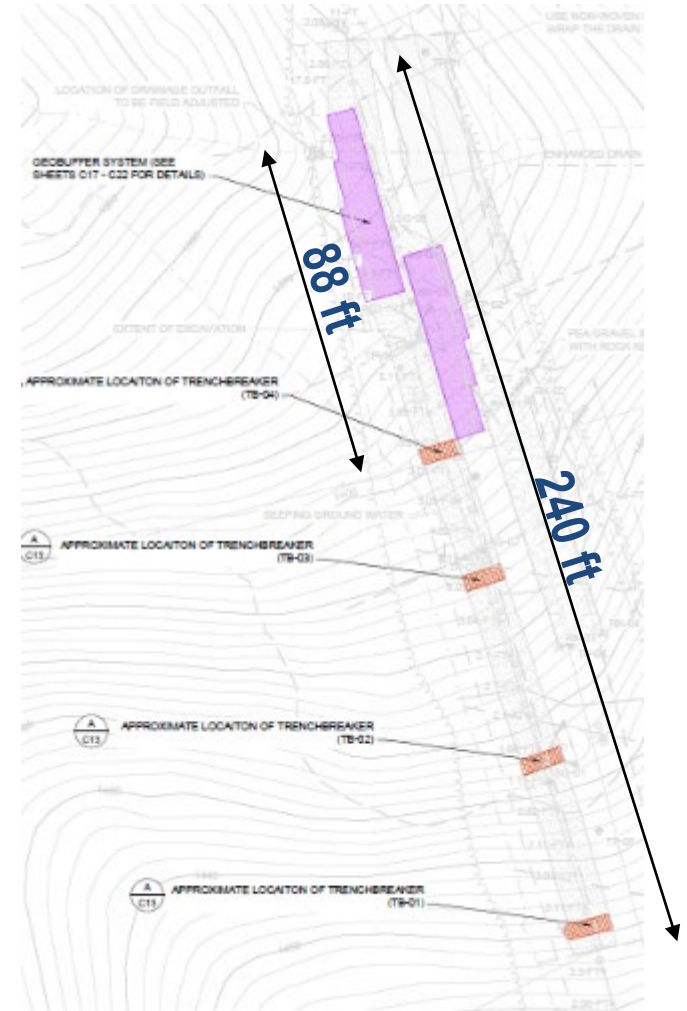
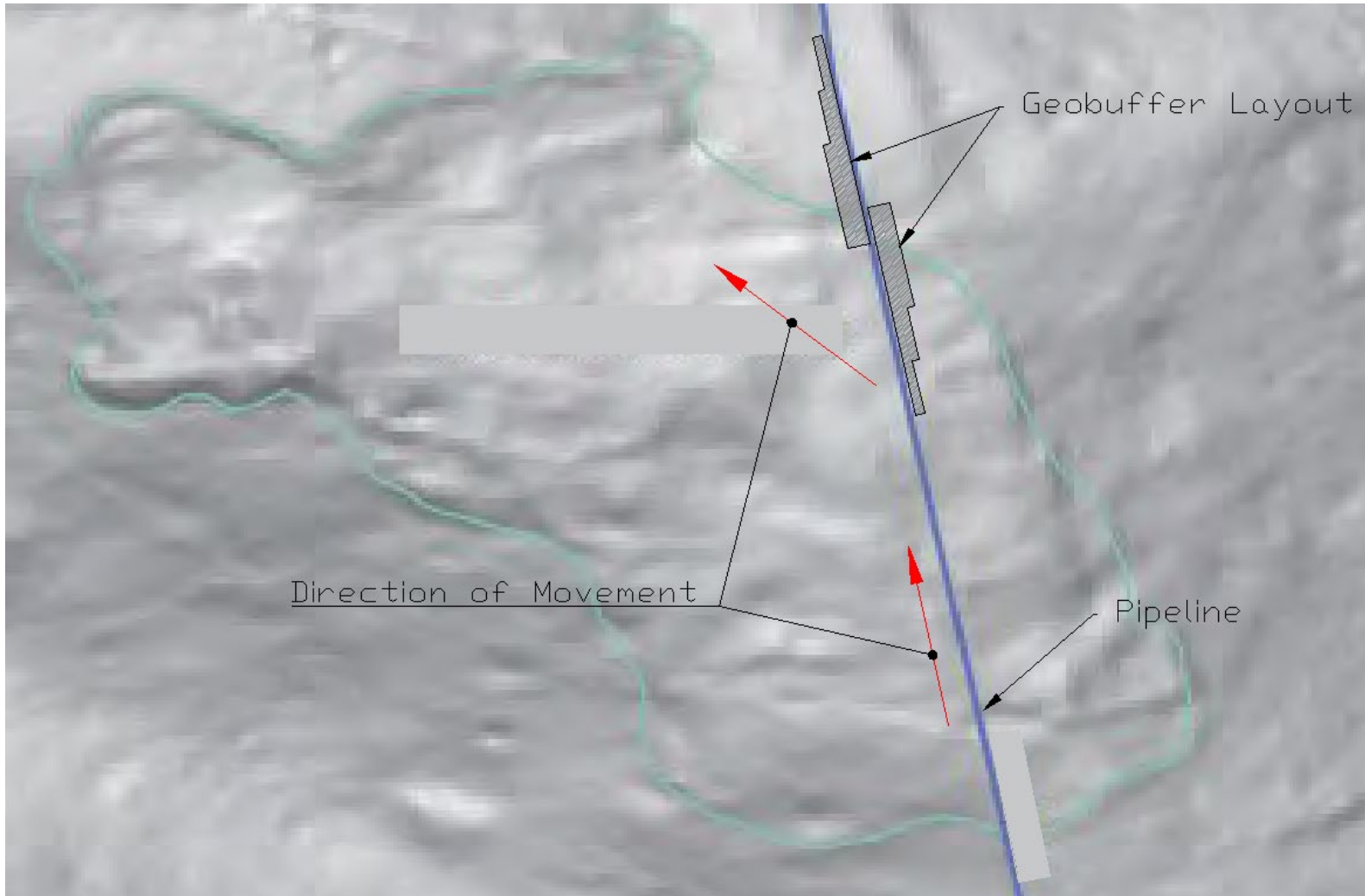
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- Pipeline replacement of the section impacted by landslide
- Installation of in-trench drainage system
- Improve surface drainage
- Strain gauges installation
- Installation of the Geobuffer system

What is Geobuffer?



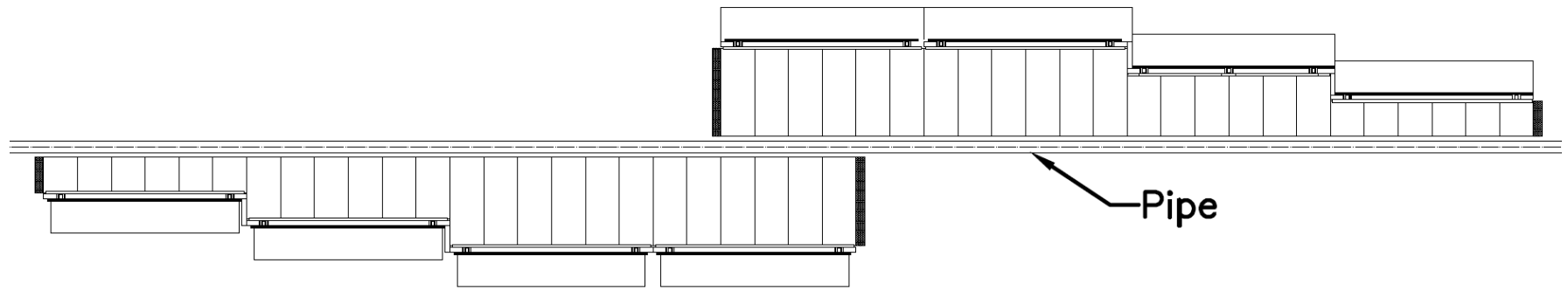
Installation Location



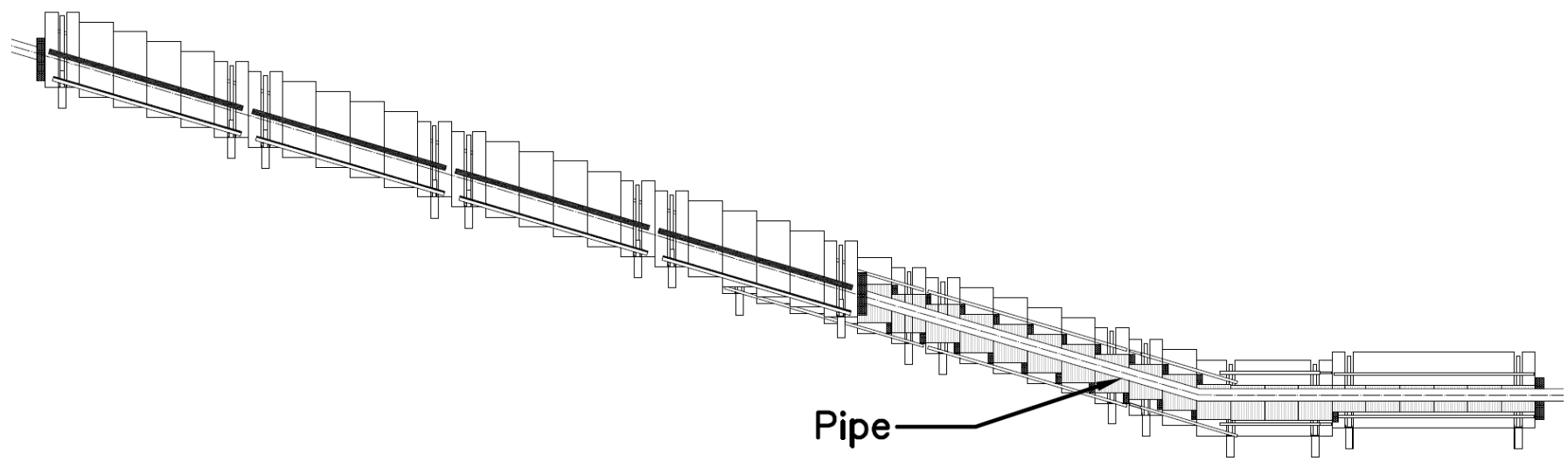
Installation Layout

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Plan View

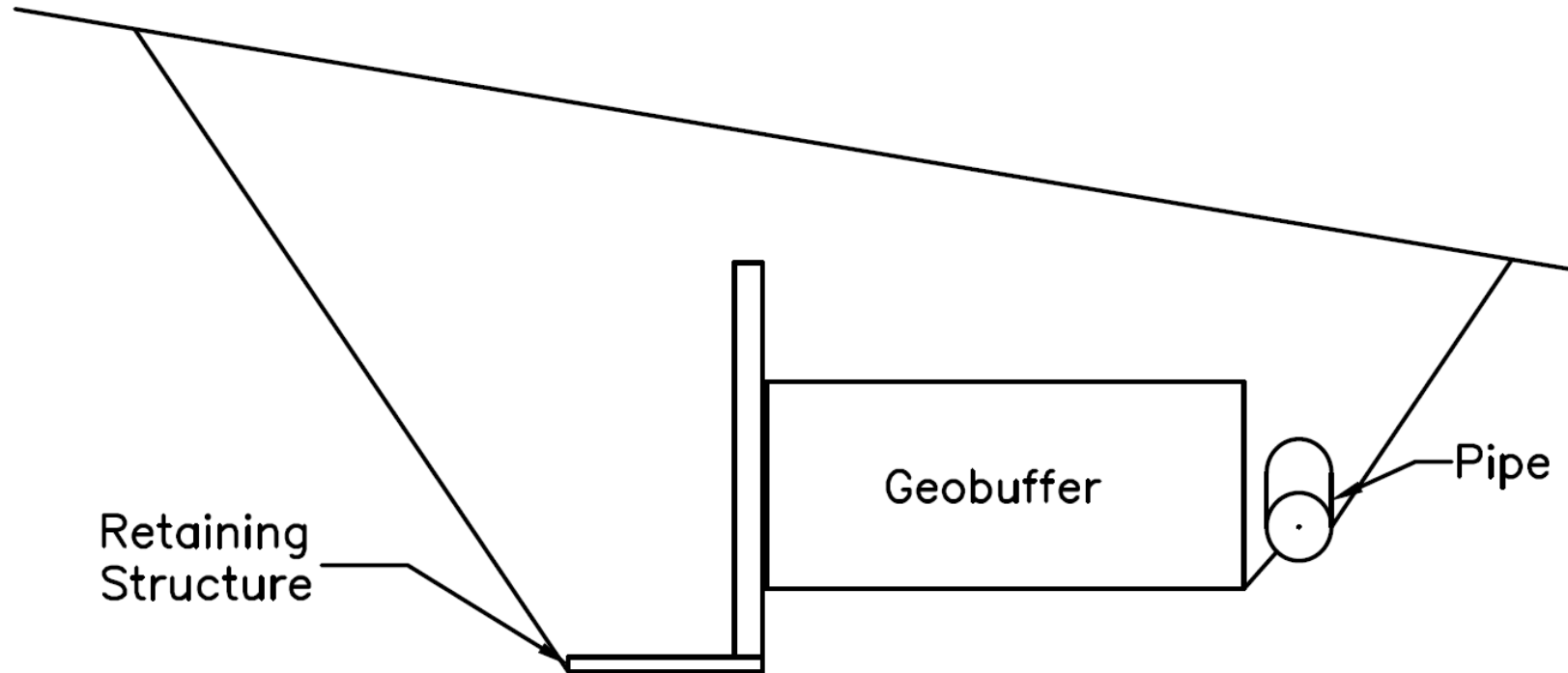


Side View



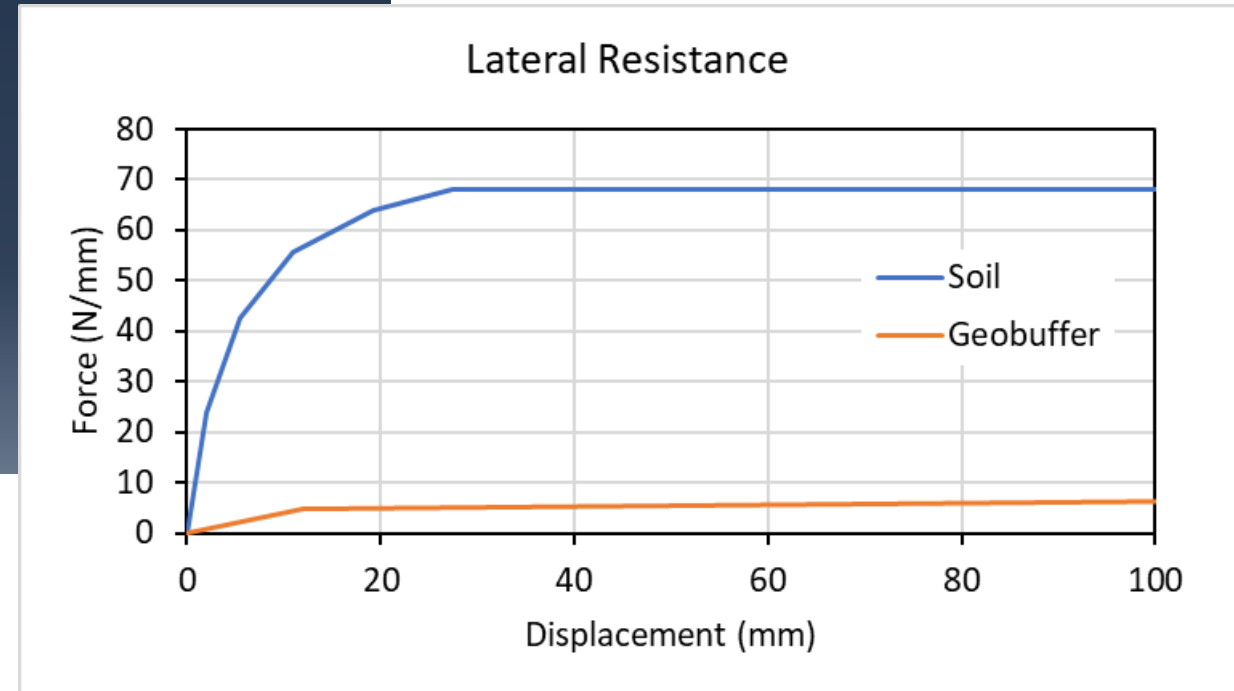
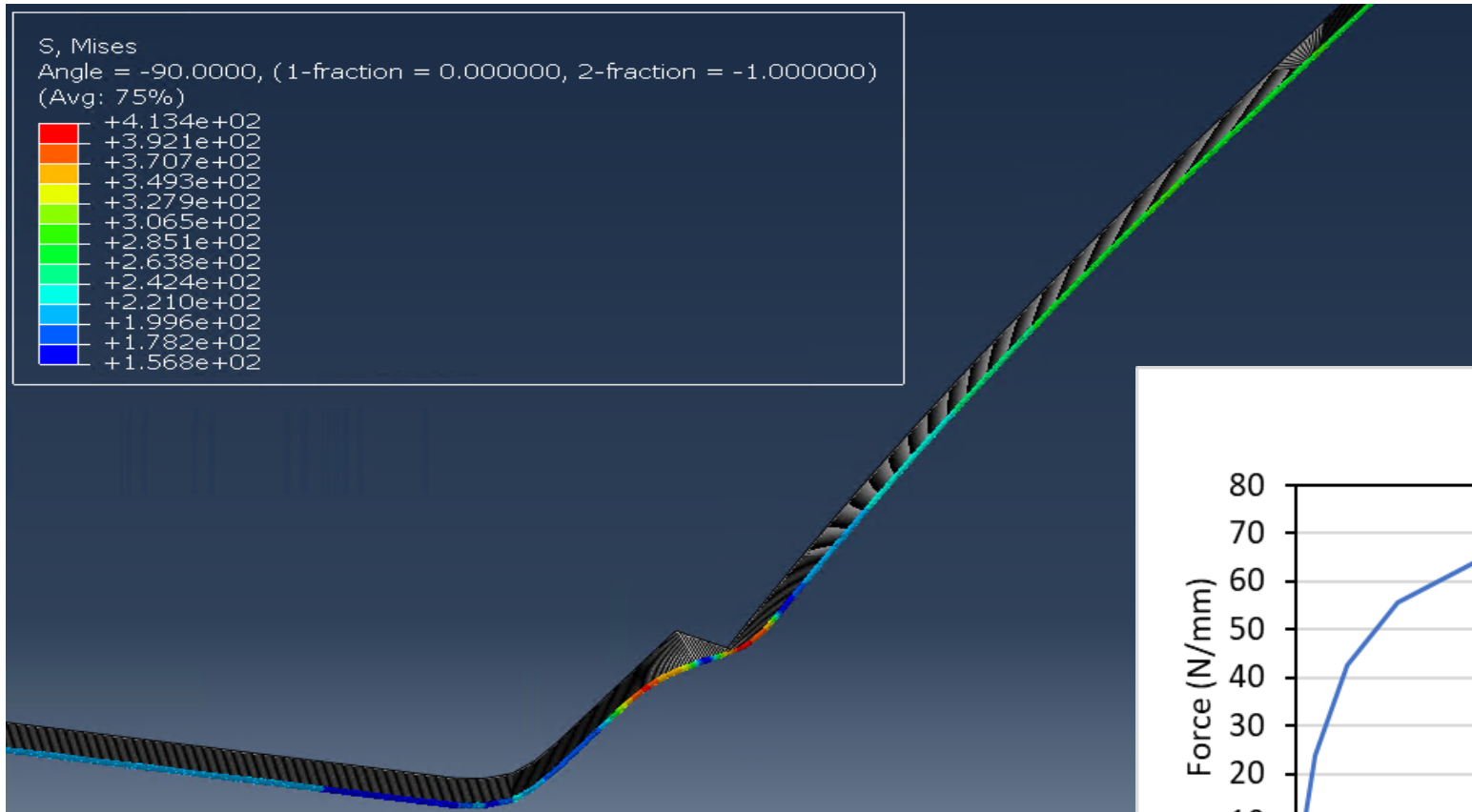
Installation X-section

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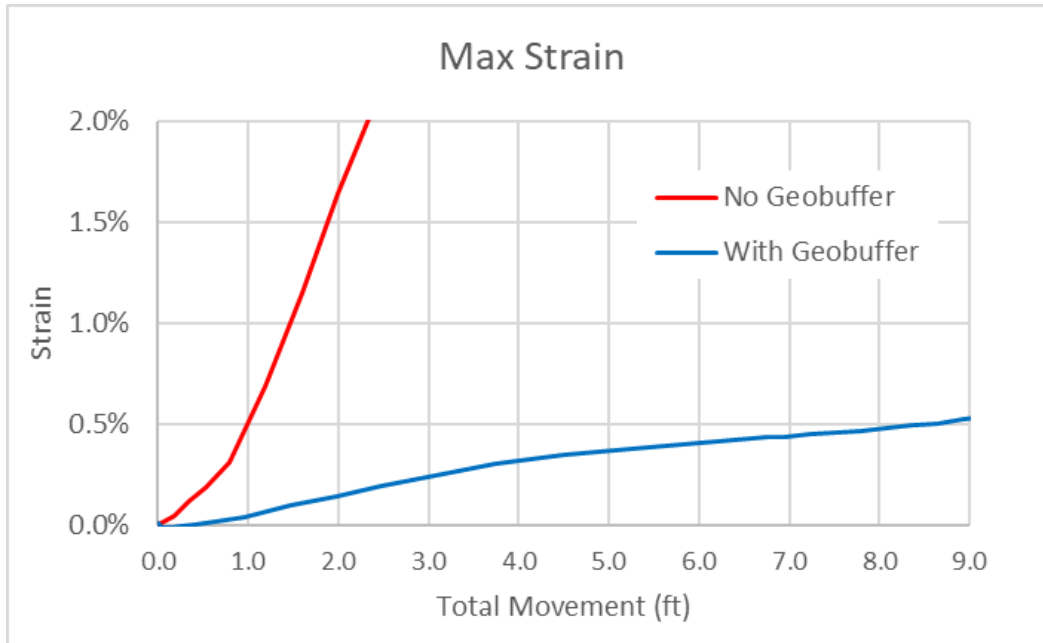


FEA Model

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Performance Assessment

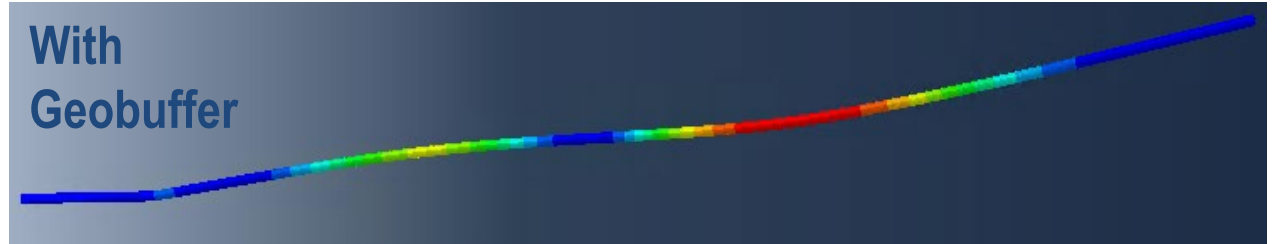


At 4.4 ft Total Movement

No Geobuffer

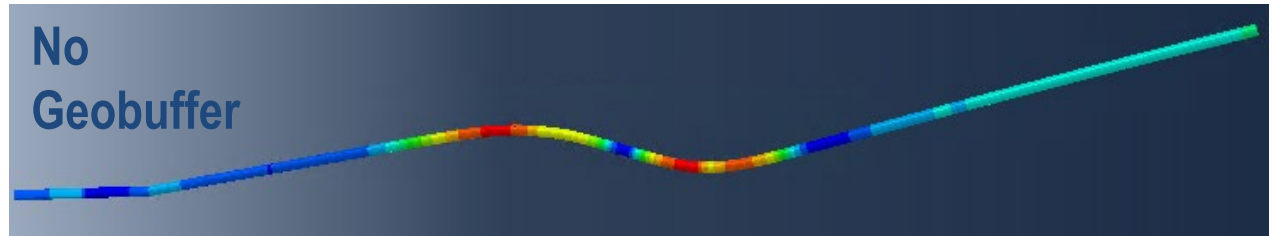


With Geobuffer

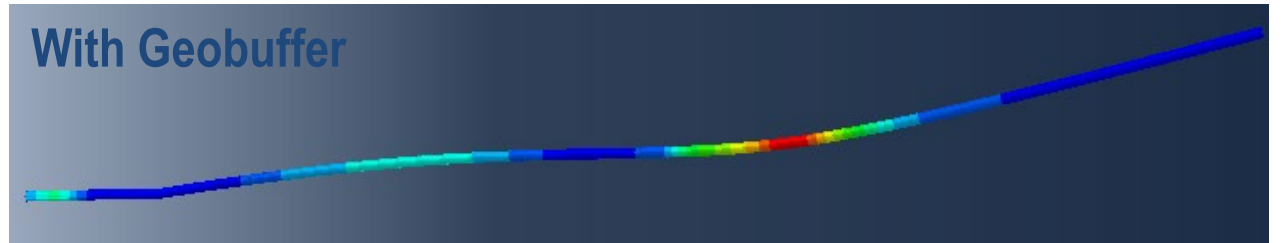


At 8.6 ft Total Movement

No Geobuffer



With Geobuffer



Fabrication

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Installation

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Installation of NW Leg

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Installation of SE Leg

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SE Leg



NW Leg



Full Installation

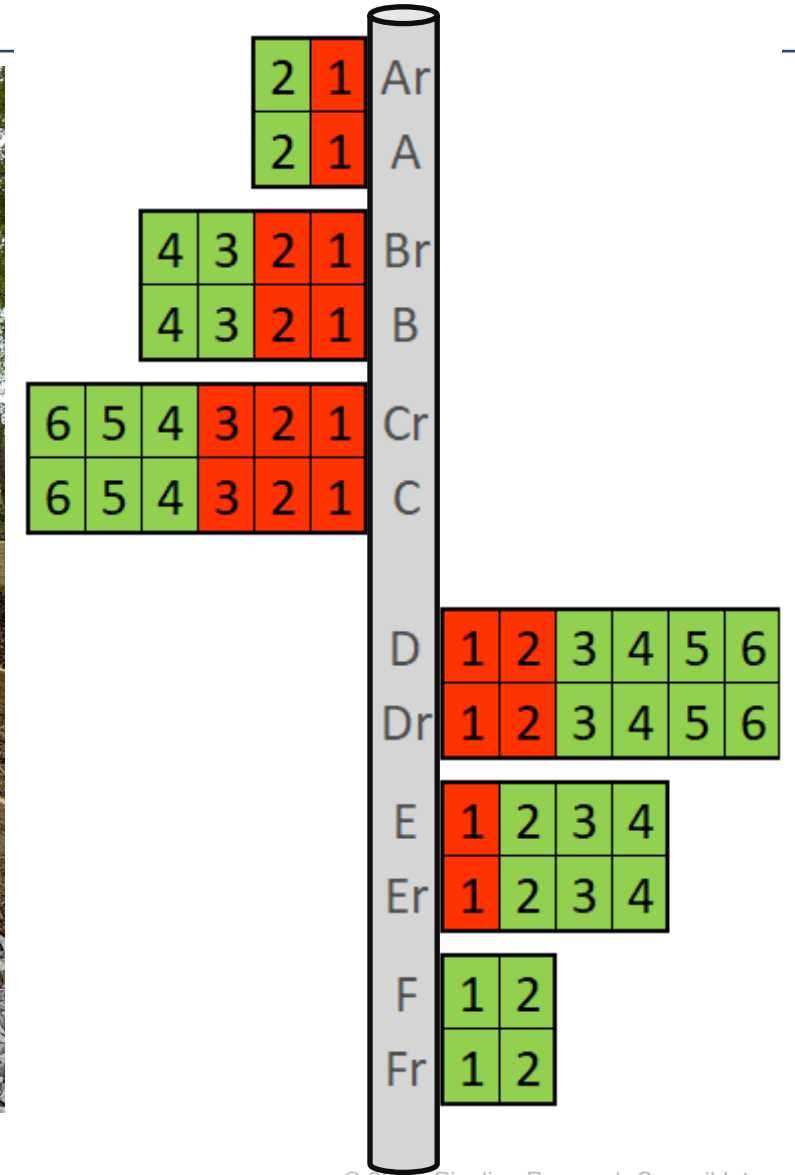
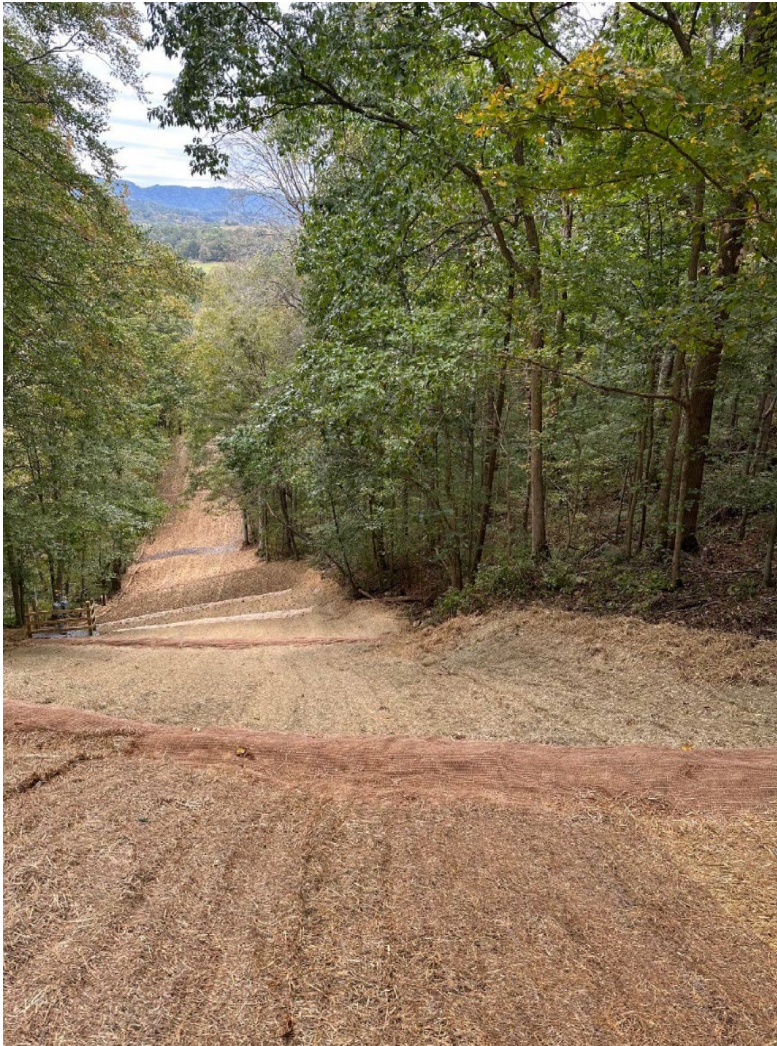


SE Leg
Installed second

NW Leg
Installed first

Completion & Monitoring

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Thank you



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