General Blasting Plan

Enbridge

Line 5 Wisconsin Segment Relocation

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LAKE SUPERIOR CONSULTING
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2 Revision History

2.1 Revision Log

#	Description	Revised By	Date
1	Issued for Review	Addie Shafer	4/5/2024
2	Issued for Use	Jordan Denardo	4/12/2024
3	Issued for Use	Addie Shafer	4/19/2024

2.2 Change Log

Revision	Section	Update	Date
2	4	Updated total blasting length and Table 4.1 to align with Bedrock Investigation report	4/12/2024
2	10	Added and included Table 10.1 with all potential in-stream blasting locations	4/12/2024
3	4	Reconciled discrepancy of blasting areas	4/19/2024

3 Acronyms & Abbreviations

ATWS	Additional Temporary Workspace
Contractor	Blasting contractor as defined in construction contract
Enbridge	Enbridge Inc. or its representatives
EPP	Environmental Protection Plan
HDD	Horizontal Directional Drill
LP/MP	Liquid Pipelines and Major Projects
LSC	Lake Superior Consulting, LLC
PPE	Personal Protective Equipment
ROW	Right-of-Way
This SOW	This document, Blasting Contractor SOW, and the information herein
TWS	Temporary Workspace
Work	The tasks described herein that are to be performed as part of the completion of the project

4 Introduction

The Enbridge Line 5 Wisconsin Segment Relocation Project consists of the installation of approximately 42 miles of 30-inch diameter, Grade X-70 carbon steel pipe via open trench, bore, and horizontal direction drills (HDDs) to reroute the existing Line 5 around the Bad River Reservation. Seven new valve settings will be installed at critical locations along the reroute. The valve settings include mainline block valves, instrumentation, controls, electrical buildings, fencing, grounding, gravel/rock, and access roads (as required). Two additional valve settings will be installed at locations on the existing Line 5 upstream of the reroute, and one additional valve setting will be installed downstream of the east end tie-in. The new reroute piping will be tied into the existing Line 5 at the beginning of the reroute section on the west side of the Bad River Reservation and at the end of the reroute on the east side of the Bad River Reservation.

The Line 5 Wisconsin Segment Relocation Project estimates a total of 41,400 feet of blasting from a combination of locations along the pipeline route. Based on Enbridge's review of the geologic conditions present along the route, eight of the potential blasting areas, outlined in Table 4.1, may require in-stream blasting. A complete list of streams that could potentially require in-stream blasting is listed in Table 10.1. The extent of bedrock present on either side of the stream crossing may deem traditional methods of construction non-feasible but will depend on on-site geotechnical investigation.

At such "in-stream" locations, the Contractor will employ best management practices required by regulatory agencies to protect the feature. Following any blasting activities, stream channels will be restored to near pre-construction contours, alignment, and conditions through post-construction restoration activities. Enbridge will monitor these crossings following construction as part of its Post Construction Monitoring Plan.

Table 4.1 outlines the anticipated blasting locations as well as the associated estimated blasting footage. The locations and estimated footages provided are preliminary and are subject to change.

Table 4.1: Potential Blasting Locations

Area	Stationing Start	Stationing End	Milepost Start	Milepost End	Length (feet)
1	1694+59	1729+77	32.09	32.76	3,518
2	1629+71	1678+33	30.87	31.79	4,862
3	1581+00	1615+68	29.94	30.60	3,468
4	1552+32	1579+00	29.40	29.91	2,668
5	1399+20	1475+76	26.50	27.95	7,656
6	1303+00	1367+52	24.68	25.90	6,452
7	1249+00	1272+48	23.66	24.10	2,348
8	1189+98	1246+08	22.54	23.60	5,610
9	1162+13	1169+22	22.01	22.14	709
10	1080+00	1115+00	20.45	21.12	3,500
11	1044+42	1050+51	19.78	19.90	609

*Estimated lengths are identified and are subject to change.

5 Purpose of Blasting Plan

This plan will provide guidelines and general requirements for blasting activities that may occur during the Project. This Plan will be supplemental to Enbridge's blasting contractor(s) blasting plans. The blasting contractor(s) are required to develop their own blasting procedures and site-specific blasting plans for each blasting location as required; which will be more project and site specific than the requirements listed in this Plan and are to be submitted to Enbridge prior to any blasting activities.

This Plan is intended to identify general blasting procedures, including safety, use, storage, and transportation of explosives that meet or exceed the minimum safety requirements as defined by federal, state, and local regulations. Regulations include Code of Federal Regulations (herein referred to as "CFR") Title 49 Part 177 – Carriage by Public Highway, CFR Title 29 Part 1910.109 – Occupational Safety and Health Standards– Explosives and Blasting Agents, CFR Title 29 Part 1926 Subpart U – Safety and Health Regulations for Construction - Blasting and the Use of Explosives, Wis. Administrative Code SPS 305.20 – Blasting and Fireworks - Blasters, and National Fire Prevention Association 495, Explosive Materials Code, Chapter 11. Additionally, this plan is intended to address environmental aspects of blasting activities and to identify areas of concern along the proposed Project route.

6 General Blasting Requirements

All blasting operations must be conducted under the direction and constant supervision of personnel certified and legally licensed to perform such activity in the jurisdiction where blasting occurs. Prior to blasting activities, the blasting contractor(s) will provide Enbridge with the experience, certifications, licenses, and permits associated with the blasting personnel. The Contractor will not use explosives to excavate any section of the proposed pipeline without a minimum 60 days advanced written notice and the written approval of Enbridge.

All blasting-related operations, including obtaining, transporting, storing, handling, loading, detonating, and disposing of blasting material, as well as ground-motion monitoring shall comply with all applicable federal, state, and local regulations, permit stipulations, and contracts. Blasting for excavation or grading purposes is to be used only when deemed necessary by a construction expert after examination of the site. Enbridge may specify locations where the proposed pipeline crosses foreign utilities and/or structures in which consolidated rock must be removed by approved mechanical equipment such as rock-trenching, hydraulic rams, jack hammers, or rock saws in lieu of blasting.

Before blasting, site-specific blasting plans consistent with the provisions of this Plan must be submitted by the Contractor to Enbridge for review and approval. Should there be an existing pipeline within 50 feet of an area proposed for blasting, the Contractor will complete a stress calculation to propose the allowable pounds of explosive per delay interval and determine the combined stress level of each affected pipeline. These recommendations must be reviewed by Enbridge and approved before blasting can commence.

7 Site Specific Blasting Plans

The blasting contractor(s) will create a site-specific blasting plan for any area determined to require blasting. Each site-specific blasting plan will include details and calculations regarding environmental variables that will be recorded closer to the time of the blast. The site-specific blasting plan will consider environmental/site-specific conditions that exist, as well as methods, materials, and locations of all explosives to be used for blasting.

Each plan will include a pre-blast risk assessment and must include at a minimum the following:

- Blasting contractor's name, company, copy of license, qualifications
- Seismograph company, names, equipment, and sensor location
- Copies of all permits
- Copies of all blasting calculations
- Materials including explosive type, product name and size, weight per unit, and density
- Methods including tamping method, blasting sequence, non-electrical initiation systems, magazine type, and storage locations
- Site dimensions, explosive depth, distribution, maximum charge/weight per delay
- Hole depth, diameter, pattern, and number of holes per delay
- Dates and hours that blasting will be conducted, distance and orientation to nearest above/below grade structures, and schedule identifying when blasting would occur within each waterbody greater than 10 feet wide or within any designated cold-water fishery
- The distance within which above/below grade structures will be affected by the blast and all structures located within that distance
- Blasting procedures for:
    - Storing, handling, transporting, loading, and activating explosives
    - Prevention measures for misfires, flyrock, fire, noise, and stray current accidental detonation
    - Signs, flagging, flagmen, and warning signals prior to each blast
    - Pre-blast inspections
    - Locations in which the pipeline route and construction workspace:

        - parallels or crosses an above or below grade electrical transmission line
        - parallels or crosses a highway or road
        - is within or adjacent to treed areas
        - approaches any potable water source, residence, building, occupied structure, or recreational area (distance to be determined by blasting contractor based on site-specific conditions and blasting specifications)
    - Timing and method(s) of notification of any affected residences, buildings, and occupied structures within the distances determined by the blasting contractor's pre-blast surveys
    - Post-blast inspections
    - Disposal methods of blasting material waste

Prior to blasting, Contractor must:

- Provide all aforementioned documentation (site-specific blasting plan, qualifications, permits, etc.)
- Make all necessary "one call" notifications in accordance with local, state, and federal requirements prior to blasting
- Complete all necessary pre-blasting notifications, surveys, and tests for the protection of above/below grade structures
- Verify to Enbridge that all property owners have been notified of the impending construction

During blasting operations, Contractor will monitor operations as specified by the approved Blasting Plan and applicable regulations. The Contractor shall provide seismic monitoring and reporting for all blasting events. The seismograph shall record peak particle velocity of all blasts in the vertical, longitudinal, and transverse directions. Seismic monitoring shall continue unless written authorization is explicitly given by an Enbridge representative. In some cases, an independent third-party contractor may also monitor with seismographs and provide Blasting Log records to Enbridge (i.e. if the blasting is in close proximity to their or another asset). All seismographs will be deployed and calibrated per the standards outlined by the International Society of Explosive Engineers. The peak particle velocity will be measured at adjacent pipeline(s), potable water sources, and aboveground structure within the distance established by the blasting contractor.

A Blast Report will be completed by the Contractor immediately after each blast. A copy of all Blast Reports, and all other required documentation, will be provided to Enbridge and applicable agencies as required.

8 Safety

The Contractor shall develop its own site-specific safety plan, as necessary, to fulfill its obligations as 'prime contractor' responsible for occupational health and safety for the work pursuant to the applicable OSHA requirements. Enbridge is committed to safety. In keeping with this commitment, special attention and focus shall be directed by the Contractor to all construction activities to ensure the

implementation and enforcement of safety matters. This approach will apply to the safe management of all construction activities when working near Enbridge operating facilities, other buried foreign facilities and any power transmission lines.

The Contractor shall ensure that all personnel who will be working on the project are informed of the potential hazard of working near operating high-pressure pipelines. Specific requirements for work near existing pipelines are contained in the Construction Specifications and the Contract Documents. Sections of the pipeline will be installed parallel to, adjacent to and crossing under power lines.

The Contractor shall install all applicable warning signs and traffic control measures as per the activity in progress. The Contractor shall obtain a Safe Work Permit from the Chief Inspector prior to starting work on certain activities, as detailed in the Enbridge LP/MP Safety Manual.

8.1 Protection of Aboveground and Underground Structures

Where blasting is required, Enbridge will identify any municipal water mains and will consult the local water authority. Reports of identified crossings will include location by milepost, owner, and status and results of contacts with the water authority.

Contractor will exercise control to prevent damage to aboveground and underground structures, including buildings, pipelines, utilities, springs, and water wells. Contractor will implement the following procedures:

- Any potable water source and/or associated pipe system within the distance established by the Contractor would be tested for yield and water quality before blasting. If damaged, Enbridge will repair or otherwise restore any damage, or Enbridge will compensate the owner for damages. Enbridge will provide an alternative potable water supply to the landowner until repairs occur. Locations of potable sources and/or associated pipe systems within the distance established by Contractor will be indicated on Enbridge's construction alignment sheets.
- A third-party vibration monitor and an Enbridge representative will inspect all aboveground structures within the distance established by Contractor before and after blasting. In the unlikely event that damage occurs to the aboveground structure, the owner will be compensated.
- Contractor is responsible for the ultimate resolution of all damage claims resulting from blasting.
- Blasting will not be allowed within 15 feet of an existing pipeline, unless specifically authorized by Enbridge.
- Holes that have contained explosive material shall not be re-drilled. Holes must not be drilled where danger exists of intersecting another hole containing explosive material.
- Blasting mats or padding will be used on all shots where necessary to prevent scattering of loose rock onto adjacent property and to prevent damage to nearby structures and overhead utilities.
- Blasting cannot begin until occupants of nearby buildings, stores, residences, places of business, places of public gathering, administrators of public recreation areas, and

farmers have been notified by Contractor sufficiently in advance to protect personnel, property, and livestock. Contractor must notify all such parties at least 48 hours prior to blasting; the specifics of how this notification will occur will be in the site-specific Blasting Plan.

- Blasting in or near environmentally sensitive areas, such as streams and wildlife areas, may include additional restrictions.
- All blasting is subject to the following limitations.
    - Maximum PPV of 12.0 inches per second in any of three mutually perpendicular axes, measured at the lesser distance of the nearest facility or the edge of the permanent easement.
    - Maximum diameter of explosive may be no larger than 2 inches unless approved by Enbridge.
    - Maximum quantity of explosive per delay is governed by the recorded measurements as influenced by work site conditions.
    - Explosive agents and ignition methods shall be approved by Enbridge.
    - Clean, crushed ¼ - 3/8 inch angular stemming material is to be used in all holes.
    - Holes are to be covered with a form of protective matting or cover to prevent flyrock as directed by Enbridge.
- The drilling pattern must be set in a manner to achieve smaller rock fragmentation (maximum 1 foot in diameter) in order to use as much as possible of the blasted rock as backfill material after the pipe has been padded in accordance with the specifications. The blasting contractor(s) must submit the proposed drilling pattern to Enbridge for approval.
- Under pipeline crossings and all other areas where drilling and blasting is required within 15 feet of existing facilities:
    - Enbridge approval must be given prior to blasting.
    - Drill holes must be reduced to a maximum of 2 inches or less in diameter.
    - The number of holes shot at one time is limited to three unless otherwise approved by Enbridge.
    - Appropriate delay between charges to attain desired fragmentation.

8.2 Protection of Personnel

Contractor must include in its procedures all federal, state, county, and local safety requirements for blasting. The procedures must address, at a minimum, the following requirements:

- The employer shall permit only authorized and qualified persons to handle and use explosives.
- All explosives shall be accounted for at all times.

- Employees authorized to prepare explosive charges or conduct blasting operations shall use every reasonable precaution including, but not limited to, visual and audible warning signals, flags, or barricades, to ensure employee safety.
- All blasting activities must be conducted only during daylight hours.
- Adequate signs, warning against the use of mobile radio transmitters, are to be prominently displayed on all roads within 1,000 feet of blasting operations.
- Explosives, blasting agents, and blasting supplies that are obviously deteriorated or damaged shall not be used.
- Tamping shall be done only with wood rods or plastic tamping poles without exposed metal parts, but non-sparking metal connectors may be used for jointed poles. Violent tamping shall be avoided. The primer shall never be tamped.
- No explosives or blasting agents shall be left unattended at the blast site.
- No activity of any nature other than that which is required for loading holes with explosives shall be permitted in a blast area.
- No explosive shall be loaded or used underground in the presence of combustible gases or combustible dusts.
- No loaded holes shall be left unattended or unprotected.
- All loading and blasting activity must cease and personnel in and around the blast area will retreat to a position of safety during the approach and progress of an electrical storm irrespective of the type of explosives or initiation system used.
- Fly-rock leaving the ROW must be collected immediately and disposed of at disposal sites approved by Enbridge. This work shall not be left to the cleanup crew.

8.3 Protection of Threatened and Endangered Species

Contractor will be required to coordinate with Enbridge's environment staff during initial planning to determine the potential to effect threatened and endangered species, as well as to implement measures to avoid impacts to identified species.

8.4 Lightning Hazard

A risk of accidental detonation caused by lightning strikes exists at any time the workplace is experiencing an electrical storm and there are loaded holes on site. If this hazard is judged to exist by the Enbridge representative, work will discontinue at all operations and workers will be moved to secure positions away from the loaded holes. Furthermore, workers cannot return to the work site until the storm has passed and the Enbridge representative has indicated it is clear to return.

Contractor must have on site approved lightning detectors capable of measuring the degree of electrical activity as a storm approaches, and the distance from the storm to the instrument.

9 Environmental

Enbridge is committed to minimizing adverse impacts on the environment during construction. Special attention and focus shall be directed by the Contractor during all blasting activities to ensure the complete implementation and enforcement of environmental requirements as stated in the EPP.

10 In-Stream Blasting

Based on Enbridge's review of the geologic conditions present along the route, there are currently locations that may require in-stream blasting. The extent of bedrock present on either side of the stream crossing may deem traditional methods of construction non-feasible but will depend on on-site geotechnical investigation. Using the blasting method would allow the Project to minimize the amount of time required working in the stream and overall disturbance to the feature.

At such locations, the blasting contractor(s) will furnish the necessary labor and equipment to employ best management practices required by regulatory agencies to protect the feature. Following any blasting activities, stream channels will be restored to near pre-construction contours, alignment, and conditions through post-construction restoration activities. Enbridge will monitor this crossing following construction as part of its Post Construction Monitoring Plan.

Table 10.1 lists stream crossings along the preferred route that may require in-stream blasting. In-stream blasting locations are subject to change based on on-site geotechnical investigation.

Table 10.1 - Potential In-Stream Blasting Locations

Crossing	Crossing Milepost
UNT Silver Creek – sasd1015p	19.84
UNT Silver Creek – sase005p	20.62
UNT Silver Creek – sasv002e	20.97
UNT Krause Creek – sasv020p	22.02
UNT Bad River – sasa008p	23.73
UNT Bad River – sasd1006e	24.72
UNT Montreal Creek – sasd1005e	25.42
UNT Scott Taylor Creek – sasv010i	26.70
UNT Scott Taylor Creek – sasv008i	27.11
UNT Scott Taylor Creek – sasv012e	27.21
UNT Scott Taylor Creek – sasv016i	27.51
UNT Scott Taylor Creek – sasv013i	27.56
UNT Scott Taylor Creek – sasv018i	27.94
Camp Four Creek – sasw005	29.81
UNT Camp Four Creek – saws006	29.87
UNT Feldcher Creek – sird1005i	31.11
Feldcher Creek – WDH-103	31.76

11 Storage Requirements

Explosives and related materials shall be stored in approved facilities required under the applicable provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 55, Commerce in Explosives. Additional storage provisions include, but are not limited to the following:

- Blasting caps, electric blasting caps, detonating primers, and primed cartridges shall not be stored in the same magazine with other explosives or blasting agents.
- Smoking, open flames, or any hot work shall not be permitted within 50 feet of the explosives and detonator storage magazine.
- Explosives not being used shall be kept in a locked magazine, unavailable to persons not authorized to handle them. The employer shall maintain an inventory and use record of all explosives. Appropriate authorities shall be notified of any loss, theft, or unauthorized entry into a magazine. Magazines will be marked in minimum 3-inch high letters with the words “DANGER – EXPLOSIVES” prominently displayed on all sides and roof.
- When explosive materials are taken from the storage magazine, they must be kept in the original containers until used. Small quantities of explosive materials may be placed in day boxes, powder chests, or detonator boxes. Any explosive material not used at the blast site must be returned to the storage magazine and replaced in the original container as soon as possible.

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