



NEXUS GAS TRANSMISSION PROJECT

RESOURCE REPORT 1 ***General Project Description***

FERC Docket No. PF15-10-000

Pre-filing Draft
June 2015

NOTICE TO PUBLIC STAKEHOLDER REVIEWERS

This Draft Resource Report for the NEXUS Gas Transmission Project (“Project”) is being filed as part of the Federal Energy Regulatory Commission’s (“FERC’s”) pre-filing process. The pre-filing process allows interested stakeholders, FERC, and regulatory agency staff to engage in early dialogue to identify affected stakeholders, facilitate early issue identification and resolution, provide multiple opportunities for public meetings (e.g., open houses), and support the preparation of high-quality environmental Resource Reports and related documents that describe the Project, assess its potential impacts, identify measures to avoid and mitigate impacts, and analyze alternatives to the Project.

Since the initial filing of Draft Resource Report 1 (Project Description) and 10 (Alternatives) on January 23, 2015, NEXUS hosted eight Open Houses along the proposed pipeline route to inform stakeholders about the proposed Project and to answer questions. FERC staff also hosted six independent Public Scoping Meetings along the proposed route in April and May of 2015, as part of the National Environmental Policy Act (“NEPA”) compliance process. This Draft Resource Report may contain items that are highlighted in grey that will be filed when NEXUS files its NGA 7(c) Certificate Application with the Commission in November 2015.

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1. Typical Right-of Way Configurations
2. 8½” x 11” USGS Quadrangle Excerpts
3. Other Aboveground Facility Plot Plan Drawings

Volume II-B – Oversized Mapping

1. Aerial Alignment Sheets
2. Full Size United States Geological Survey (“USGS”) Quadrangle Maps *[Not Included with this Filing]*
3. Full Size National Wetland Inventory (“NWI”) Maps *[Not Included with this Filing]*

APPENDIX 1B1 – Erosion and Sediment Control Plan
1B2 – Spill Prevention Control and Countermeasure Plan
1B3 – Blasting Plan
1B4 – Drainage Tile Mitigation Plan *[Not included with this Filing]*

APPENDIX 1C1 – Non-Landowner, Federal, State and Local Agency Contacts List
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1C4 – Ohio Natural Gas Market Study

Volume III - Privileged and Confidential (bound separately)

1. APPENDIX 1D – Landowner Line List – Privileged and Confidential Information (located in Volume III)
2. List of Abutters Within ½ Mile of the Proposed Compressor Stations

Volume IV - Critical Energy Infrastructure Information (bound separately)

1. Proposed Compressor Station Plot Plan Drawings

RESOURCE REPORT 1—GENERAL PROJECT DESCRIPTION	
Filing Requirement	Location in Environmental Report
<input checked="" type="checkbox"/> Provide a detailed description and location map of the project facilities (§ 380.12(c)(1)). <ul style="list-style-type: none"> • Include all pipeline and aboveground facilities. • Include support areas for construction or operation. • Identify facilities to be abandoned. 	Sections 1.1, 1.4, 1.5 Figures 1.1-1, 1.1-2 Appendix 1A
<input checked="" type="checkbox"/> Describe any non-jurisdictional facilities that would be built in association with the project. (§ 380.12(c)(2)). <ul style="list-style-type: none"> • Include auxiliary facilities (See § 2.55(a)). • Describe the relationship to the jurisdictional facilities. • Include ownership, land requirements, gas consumption, megawatt size, construction status, and an update of the latest status of Federal, state, and local permits/approvals. • Include the length and diameter of any interconnecting pipeline. • Apply the four-factor test to each facility (see § 380.12(c)(2)(ii)). 	Section 1.15
<input checked="" type="checkbox"/> Provide current, original United States Geological Survey (USGS) 7.5-minute series topographic maps with mileposts showing the project facilities (§ 380.12(c)(3)). <ul style="list-style-type: none"> • Maps of equivalent details are acceptable if legible (check with staff). • Show locations of all linear project elements, and label them. • Show locations of all significant aboveground facilities, and label them. 	Appendix 1A (8.5 x 11-inch)
<input checked="" type="checkbox"/> Provide aerial images or photographs or alignment sheets based on these sources with mileposts showing the project facilities. (§ 380.12(c)(3)). <ul style="list-style-type: none"> • No more than 1-year old • Scale no smaller than 1:6,000 	Appendix 1A Volume II-B
<input checked="" type="checkbox"/> Provide plot/site plans of compressor stations showing the location of the nearest noise-sensitive areas (NSA) within 1 mile. (§ 380.12(c)(3,4)). <ul style="list-style-type: none"> • Scale no smaller than 1:3,600 • Show reference to topographic maps and aerial alignments provided above. 	Appendix 9F in Draft Resource Report 9
<input checked="" type="checkbox"/> Describe construction and restoration methods. (§ 380.12(c)(6)).	Section 1.7
<input checked="" type="checkbox"/> Identify the permits required for construction across surface waters. (§ 380.12(c)(9)). <ul style="list-style-type: none"> • Include the status of all permits. • For construction in the Federal offshore area be sure to include consultation with the MMS. File with the MMS for rights-of-way grants at the same time or before you file with the FERC. 	Section 1.13, Appendix 1C, Table 1.13-1
<input checked="" type="checkbox"/> Provide the names and addresses of all affected landowners as required and certify that all affected landowners will be notified; <ul style="list-style-type: none"> • Affected landowners are defined in § 157.6(d)(2) • Provide an electronic copy directly to the environmental staff. 	Volume III Appendix 1D

RESOURCE REPORT 1—GENERAL PROJECT DESCRIPTION	
Filing Requirement	Location in Environmental Report
Additional Information	
<input checked="" type="checkbox"/> Describe all authorizations required to complete the proposed action and the status of applications for such authorizations	Section 1.13 and Table 1.13-1
<input checked="" type="checkbox"/> Provide plot/site plans of all other aboveground facilities that are not completely within the right-of-way.	Appendix 1A Volume II-B
<input checked="" type="checkbox"/> Provide detailed typical construction cross-section diagrams showing information such as widths and relative locations of existing rights-of-way, new permanent rights-of-way, and temporary construction rights-of-way. See Resource Report 8 – Land Use, Recreation, and Aesthetics.	Section 1.7 and Appendix 1A
<input checked="" type="checkbox"/> Summarize the total acreage of land affected by construction and operation of the project.	Section 1.6
<input checked="" type="checkbox"/> If Resource Report 5 - Socioeconomics is not provided, provide the start and end dates of construction, the number of pipeline spreads that would be used, and the workforce per spread.	Draft Resource Report 5
<input checked="" type="checkbox"/> Send two (2) additional copies of topographic maps and aerial images/photographs directly to the environmental staff of the Office of Energy Projects (OEP).	Appendix 1A Volume II-B

**RESPONSE TO FERC MARCH 24, 2015 COMMENTS ON
NEXUS RESOURCE REPORT 1 – GENERAL PROJECT DESCRIPTION**

FERC COMMENTS ON DRAFT RESOURCE REPORT 1	LOCATION OR RESPONSE TO COMMENT
<p>1. Various sections in draft Resource Report (RR) 1 indicated that information is “not included in this filing” or “will be included in the next filing of Resource Report 1.” Include copies of all draft drawings, maps, and plans with the next set of draft RRs, including draft aerial photo-based alignment sheets; updated topographic maps; compressor station plot plans; other aboveground facility typical drawings; right-of-way configuration cross-sections; and any other proposed drawings, maps, or mitigation plan (such as those listed in appendices 1A and 1B of RR 1).</p>	<p>Draft versions of aerial photo-based pipeline alignment sheets; updated USGS topographic map excerpts showing the pipeline route and aboveground facilities; and typical right-of-way configuration cross-sections are included in Appendix 1A and Volume II-B; compressor station plot plans are provided in Appendix 1A, Volume IV. The Project Erosion and Sedimentation Control Plan; Spill Prevention Control and Countermeasure Plan; and a draft Blasting Plan are provided as Appendices 1B1, 1B2, and 1B3 respectively.</p>
<p>2. Section 1.1 states that expansion of the Vector Pipeline system may be required for NEXUS Gas Transmission, LLC (NEXUS) to meet the transportation service commitments of the NEXUS Gas Transmission Project (Project). Indicate whether expansion of the Vector Pipeline system would or would not be required. If expansion is required, identify when Vector Pipeline L.P. expects to submit a request to the Federal Energy Regulatory Commission (FERC or Commission) to participate in the pre-filing process.</p>	<p>In order to support the NEXUS Project, Vector U.S. has advised NEXUS that it intends to modify the existing Milford Meter Station located in Oakland County, Michigan, to receive natural gas. Vector U.S. has advised NEXUS that the modification involves removing an existing 30-inch ultrasonic meter and replacing it with two 20-inch ultrasonic, bi-directional meters and adding various yard piping and valves. NEXUS also understands from Vector U.S. that it will construct approximately 0.6 miles of 30-inch pipeline to enable gas originating from NEXUS to move to the suction side of Vector U.S.’s existing Highland compressor station. The Milford Meter Station is located at approximate milepost 270.5 on the Vector U.S. system in Oakland County, Michigan. Vector U.S. has advised NEXUS that it will perform this work under its blanket certificate (issued by FERC in Docket No. CP98-135-000 on May 27, 1999) utilizing the automatic authorization permitted by 18 CFR §157.203(b). Vector U.S. has advised NEXUS that it will provide notice of this work after construction is complete and the facilities are placed in-service as part of its Annual Subpart F Blanket Report to FERC.</p>
<p>3. Sections 1.1.2 and 1.5.1 state that the Project includes total compression strength of 52,000 horsepower (hp) at the planned Compressor Station 1 in Columbiana County, Ohio and 26,000 hp at Compressor Station 4 in Lucas County, Ohio. Conversely, sections 1.5.1.1 and 1.5.1.4 state that the Project includes total compression strength of 26,000 hp at Compressor Station 1 in Columbiana County, Ohio and 52,000 hp at Compressor Station 4 in Lucas County, Ohio. Resolve this discrepancy.</p>	<p>The planned compression strength at NEXUS’ proposed Hanoverton Compressor Station (Compressor Station 1) in Columbiana, County Ohio will be 52,000 hp; the remaining three compressor stations will each be rated at 26,000 hp as described in Sections 1.1.2 and 1.5.1 of this report and described in detail in Draft Resource Report 9.</p>
<p>4. Provide a table in Section 1.2 that identifies contracted volumes of natural gas for the Project. The table should include shipper names, volumes, gas use (i.e., power generation, industrial use, and local distribution),</p>	<p>As discussed in Section 1.2, NEXUS has entered into precedent agreements with multiple utilities and producers, including Enbridge Gas Distribution Inc., DTE Gas Company, DTE Electric Company, Union Gas</p>

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contract durations, and proposed in-service dates.	Limited, Chesapeake Energy Marketing Inc., CNX Gas Company LLC, Noble Energy Inc., for a proposed November 1, 2017, in-service date. In addition, NEXUS is in on-going confidential negotiations with interested parties, including those that responded to NEXUS’ open seasons and located in key market areas as shown in Figure 1.2-1 in the Figures section of this Draft Resource Report. It is NEXUS’ understanding that the shippers who have entered into precedent agreements will be serving power generation, industrial loads and local distribution loads either directly or indirectly (<i>i.e.</i> , loads behind city gates). The shippers also will have transportation service rights to use their capacity to serve secondary markets, as well as to release their capacity to third parties in order to serve secondary markets.
5. Section 1.2 states that the Project will supply natural gas to markets in “Ohio, Michigan, Chicago, Illinois; and the Dawn Hub in Ontario, Canada.” Identify the approximate portion of transportation service that would serve each of those markets.	See response above. Also, NEXUS anticipates providing delivery capability of approximately (1) 1.5 Bcf/d into Ohio; (2) 1.5 Bcf/d into Michigan; and (3) 0.5 Bcf/d into Dawn Hub in Ontario, Canada (“Dawn”). NEXUS’ shippers will have rights to use their capacity to serve Chicago on a secondary basis, such that NEXUS cannot approximate the volume that will move to that market.
6. Section 1.2 states that NEXUS is discussing or negotiating additional transportation service with customers in Ohio, including customers in close proximity to Lake Erie. Provide an update on the status of those discussions and negotiations.	As depicted on Figure 1.2-1 (see Figures section), NEXUS has reached agreements to provide natural gas delivery to several customers located along the Project route. NEXUS is also in confidential negotiations with several additional customers located in Market Areas shown on Figure 1.2-1, including areas in proximity to Lake Erie. NEXUS will provide details on these customer negotiations, agreements, and delivery volumes in its NGA 7(c) Certificate Application to be filed with the Commission in November 2015.
7. Provide a table in section 1.4 or 1.6 that identifies where the Project is parallel or adjacent to existing rights-of-way. Identify, by milepost, the name of the utility within the existing right-of-way, the offset of the proposed pipeline centerline from the adjacent utility centerline, the amount of overlap onto the existing right-of-way that would be used for construction and operation, and how much additional right-of-way would be required that does not overlap. Alternatively, this information may be provided in RR 8 and cross-referenced in RR 1.	See Table 8.2-3 in the Tables Section of Draft Resource Report 8.
8. In Section 1.6, discuss the results of communications with the existing utility owners, since power lines, for example, often have required safety setbacks.	The process of contacting affected utility owners crossed by the proposed NEXUS pipeline is ongoing. These efforts will continue for the next approximately 12 to 18

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Alternatively, this information may be provided in RR 8 and cross-referenced in RR 1.	months as the pipeline route changes in response to stakeholder concerns and siting constraints, concurrent with the FERC filing process. NEXUS' goals are to inform the utility owners of the crossings; obtain technical data necessary to design crossings that safeguard both utility owners and NEXUS assets (both during construction and operations); and collectively to draft agreements or documentation, as necessary, allowing all parties to effectively maintain their assets.
9. In Section 1.5.3, identify the maximum height of each of the communication towers, provide an update on potential locations, and reference the appropriate RR where an analysis of visual impacts associated with the towers can be found.	See Section 1.1.2 of this Draft Resource Report for current status of proposed communications tower design and siting.
10. Provide a table in Section 1.6 that identifies, by milepost, locations where the construction right-of-way width varies (narrower or wider) from the 100-foot-wide construction right-of-way. Provide the rationale for each variance.	See Table 8.2-3 in the Tables Section of Draft Resource Report 8.
11. Provide a table in Section 1.6 that identifies, by milepost, additional temporary workspaces (ATWS) for the Project. Identify the reason for each ATWS.	See Table 8.2-4 in the Tables Section of Draft Resource Report 8.
12. Some modifications to the FERC's "Upland Erosion Control, Revegetation, and Maintenance Plan" (FERC Plan) and the FERC's "Wetland and Waterbody Construction and Mitigation Procedures" (FERC Procedures) have been incorporated into NEXUS' "Erosion and Sediment Control Plan" and the construction procedures described in RR 1. Complete a thorough comparison of the documents and provide justification of all proposed modifications to the FERC Plan and FERC Procedures. Describe how each proposed modification or alternative measure provides equal or better environmental protection than the FERC Plan and FERC Procedures, or explain why the FERC Plan or FERC Procedures would be infeasible or unworkable based on project-specific conditions. Include copies of any agency correspondence to support requested variances. Be sure to specifically address the following variance requests in detail, as well as other variances desired. Alternatively, this information may be provided in other RRs and cross-referenced in RR 1.	NEXUS' "Erosion and Sediment Control Plan" and proposed construction procedures, as described in RR 1, do not currently reflect any modifications to the FERC Plan and FERC Procedures. NEXUS listed areas where a variance to the FERC Procedures will be required in Table 8.2-4 in the Tables Section of Draft Resource Report 8.

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a. Section 1.6.1.1 states that NEXUS will attempt to site ATWSs in accordance with the wetland and waterbody setback requirements established in the FERC Procedures; however, ATWS setbacks may not be feasible at all wetlands and waterbodies due to construction limitations. Identify, by milepost, the location of each ATWS that does not meet the wetland and waterbody setback requirements established in the FERC Procedures and provide site-specific justification why the setback requirement cannot be met and measures to ensure the wetland or waterbody is adequately protected.	See Table 8.2-4 in the Tables Section of Draft Resource Report 8.
b. Section 1.7.1.2 states that minor streams (those less than 10 feet wide) containing cold water or significant warm water fisheries will be crossed using a dry crossing method. FERC Procedures require dry crossings of waterbodies up to 30 feet wide that are state-designated as either coldwater or significant coolwater or warm water fisheries, or federally designated as critical habitat, unless approved otherwise by the appropriate federal or state agency. Justify this variance.	See Table 2.3-2 in the Tables Section of Draft Resource Report 2. Table 2.3-2 provides the state Water Quality Classifications related to fisheries habitat for all waterbodies crossed by the Project. The waterbody crossings currently proposed by NEXUS would not require a variance from the FERC Procedures based on fisheries classifications.
c. Section 1.7.1.3 states that construction materials, fuels, <i>etc.</i> would not be stored within wetlands or within 100 feet of any stream or wetland system, except under limited, highly controlled circumstances. FERC Procedures prohibit storage of hazardous materials, including chemicals, fuels, and lubricating oils, within 100 feet of a wetland, or waterbody, unless the location is designated for such use by an appropriate governmental authority. Explain the limited, highly controlled circumstances under which NEXUS would store construction materials, fuels, <i>etc.</i> within wetlands and within 100 feet of any stream or wetland system, and justify this variance.	Construction materials, fuels, <i>etc.</i> will not be stored within wetlands or within 100 feet of any stream or wetland system, except under limited, highly controlled circumstances, <u>i.e.</u> , where a piece of equipment has broken down or run out of fuel.
13. Provide a table in Section 1.6.1 that identifies, by milepost, the locations where cut-and-fill (also sometimes referred to as two-tone construction or side-slope terracing) construction is anticipated. Alternatively, this information may be provided in RR 6 or 7 and cross-referenced in RR 1.	See Table 1.6-3 in the Tables Section of this Draft Resource Report 1.
14. Section 1.7.1.1 states that hydrostatic testing would be conducted in accordance with NEXUS' requirements to ensure pipeline integrity. Verify that hydrostatic testing also would be conducted in accordance with the U.S. Department of Transportation's regulations as provided in Title 49, Code of Federal Regulations, Part 192.	NEXUS will perform hydrostatic testing in accordance with the U.S. Department of Transportation's regulations as provided in Title 49, Code of Federal Regulations, Part 192. Additional details on proposed hydrostatic testing for the NEXUS project can be found in Sections 2.2.5 and 2.3.8 of Draft Resource Report 2.
15. Section 1.7.1.4 identifies several construction measures that would be taken in residential areas. Identify the criteria	NEXUS is still in the process of siting pipeline facilities and is prioritizing avoidance of residential areas. After

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for determining the locations of residential areas where these measures will be implemented.	careful evaluation and once the proposed pipeline route is finalized, NEXUS will prepare <u>site-specific construction plans</u> for inclusion in its NGA 7(c) Certificate Application for areas where residential dwellings are within 50 feet of the proposed construction workspace. These plans will show the proposed construction workspace and will detail proposed safety measures that will be implemented, including location of construction safety fencing, access provisions, and use of steel plates to maintain access. Special attention paid to these areas will ensure the safety and convenience of residences in the Project area. Additional details regarding the construction techniques to be used in residential areas will be provided in Draft Resource Report 8.
16. Section 1.7.1.4 indicates that site-specific residential construction plans would be developed for properties within 25 feet of construction, prior to construction. Provide drafts of these residential construction plans with RR 8, as the plans will be included in the draft environmental impact statement.	NEXUS is still in the process of siting pipeline facilities and is prioritizing avoidance of residential areas. After careful evaluation and once the proposed pipeline route is finalized, NEXUS will prepare site-specific construction plans for areas where residential dwellings are within 50 feet of the proposed construction workspace. <u>Site Specific Residential Crossing Plans</u> will be included in NEXUS' NGA 7(c) Certificate Application to be filed with the Commission in November 2015.
17. Discuss in Section 1.7.1.6 that NEXUS would provide a plan for locating existing and future drain tiles as well as procedures for constructing through drain-tiled areas and repairing drain tiles after construction. Indicate whether NEXUS plans to engage qualified drain tile specialists from the project area in developing these plans. This plan may be fully developed in RR 7 or RR 8 and cross-referenced in RR 1.	NEXUS plans to engage a qualified drain tile specialist(s) from the Project area to assist in developing a Drain Tile Mitigation Plan. The <u>Drainage Tile Mitigation Plan</u> for the Project will be included in NEXUS' NGA 7(c) Certificate Application to be filed with the Commission in November 2015.
18. Provide a table in Section 1.7.1.7 that identifies, by milepost, each road or drive crossed by the Project. Identify the road or drive name, number of lanes, surface width, surface type, ownership (<u>i.e.</u> , public or private), permitting agency and classification, and proposed crossing method. Identify the criteria for determining when a road would be open cut or bored. Additional discussions on road crossings can be provided in RR 8 and cross-referenced in RR 1.	See Table 8.2-10 in the Tables Section of Draft Resource Report 8.
19. Section 1.7.1.7 states that road crossing construction would be scheduled so as to avoid commuter traffic and schedules for school buses to the greatest extent practical. Explain how construction would be scheduled to avoid commuter traffic and schedules for school buses. Additional discussions on traffic can be	Construction will be scheduled for work within roadways and specific crossings to begin no earlier than 9:30 AM and be completed, plated and covered, or detour signage in place by 3:00 PM, to avoid commuter traffic and schedules for school buses to the extent practical. Appropriate traffic management and signage will be set

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FERC COMMENTS ON DRAFT RESOURCE REPORT 1		LOCATION OR RESPONSE TO COMMENT
provided in RR 8 and cross-referenced in RR 1.		up and necessary safety measures will be developed in compliance with applicable permits for work in the public roadway. Arrangements will be made with local officials to have traffic safety personnel on hand during periods of construction. Provisions will be made for detours or otherwise to permit traffic flow.
20. Provide a table in Section 1.7.1.8 that identifies, by milepost, all locations where blasting is anticipated and include any sensitive resources (i.e., wells, septic systems, structures, wetlands, waterbodies and aquatic resources, power lines). Include a discussion of potential impacts and mitigation measure (e.g., pre- and post-blasting monitoring, vibration monitoring). Alternatively, this information may be provided in RR 6 and cross-referenced in RR 1. Ensure that blasting impacts on water resources are discussed in RR 2.		Based on NEXUS’ field reconnaissance and review of soils and geologic mapping of the Project area, shallow bedrock (less than 5 feet from the surface) may be encountered at various locations along the Project route. NEXUS has prepared a draft NEXUS Blasting Plan that details how blasting will be performed for the Project including impact avoidance and minimization. A draft of the NEXUS Blasting Plan is included as Appendix 1B3 to this report.
21. Update table 1.13-1 to reflect the current status of NEXUS’ permitting and consultation effort on the Project and include copies of any agency consultations or correspondences, including emails or phone logs.		NEXUS has updated Table 1.13-1 to include agency meetings and consultations that have taken place since the January 23, 2015 filing of Draft Resource Report 1. Updated agency correspondence is located in Appendix 1C2.
22. Provide in Section 1.15 relevant information on non-jurisdictional facilities as required under 18 CFR 380.12(c)(2), including, but not limited to land requirements, hp, megawatt size, maps, and an update of the latest status of federal, state, and local permits/approvals.		NEXUS has included in Section 1.15 updated relevant information on non-jurisdictional facilities associated with the NEXUS project.
23. The FERC frequently monitors the construction of regulated pipeline projects through the use of third-party independent environmental monitors. Indicate in RR 1 whether or not NEXUS is proposing to use FERC third-party independent environmental monitors on this project.		NEXUS will employ FERC third-party environmental monitors during construction of the NEXUS Project.
24. As outlined in the following table, include a detailed discussion of cumulative impacts that the projects listed in table 1.16-1 and the NEXUS Project would have on each environmental resource. Include the measures that NEXUS would implement to minimize cumulative impacts and include a map showing these developments in relation to the NEXUS Project. Include in Section 1.16 impacts on water resources, air quality, noise, and traffic.		See Section 1.16 and Table 1.16-1 in the Tables Section of this Draft Resource Report 1.
Environmental Resource	Area of Impact (AOI)	
Surface Waters, Wetlands, Groundwater, Vegetation,	Hydrologic Unit Code 12 Watersheds	

**RESPONSE TO FERC MARCH 24, 2015 COMMENTS ON
NEXUS RESOURCE REPORT 1 – GENERAL PROJECT DESCRIPTION**

FERC COMMENTS ON DRAFT RESOURCE REPORT 1		LOCATION OR RESPONSE TO COMMENT
Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology		
Cultural	Overlapping impacts on historic properties	
Land Use (including visual and residential)	0.5 mile. For other projects requiring more than 10 acres of land, use 5 miles	
Noise	Overlapping noise-sensitive areas (0.5-mile)	
Air Quality	County (pipeline and stationary sources). For stationary sources near a county border the AOI is a 50-kilometer radius from the source.	
Socioeconomics	Impacted counties	

ACRONYMS AND ABBREVIATIONS

AER	Alberta Energy Regulator
API	American Petroleum Institute
ATWS	additional temporary workspace
Bcf/d	billion cubic feet per day
CEII	Critical Energy Infrastructure Information
Certificate	Certificate of Public Convenience and Necessity
Dawn	Dawn Hub in Ontario, Canada
DTE Gas	DTE Gas Company
DTE	DTE Energy Company
E&SCP	Erosion and Sediment Control Plan
EPA	U.S. Environmental Protection Agency
ER	Environmental Report
FERC Plan	<i>Upland Erosion Control, Revegetation, and Maintenance Plan</i>
FERC Procedures	<i>Wetland and Waterbody Construction and Mitigation Procedures</i>
FERC	Federal Energy Regulatory Commission
HDD	horizontal directional drill
hp	horsepower
M&R	metering and regulation station
MDNR	Michigan Department of Natural Resources
MLV	mainline valves
MP	milepost
MPSC	Michigan Public Service Commission
MW	megawatts
NEPA	National Environmental Policy Act
NEXUS Project or Project	NEXUS Gas Transmission Project
NEXUS	NEXUS Gas Transmission, L.L.C.
NGA	Natural Gas Act
OUPS	Ohio Utilities Protection Service
Pre-filing ER	Draft Environmental Resource Reports, Pre-filing Environmental Report
ROW	right-of-way
SPCC Plan	Spill, Prevention, Control and Countermeasure Plan
Tcf	trillion cubic feet
TEAL Project	Texas Eastern Appalachian Lease Project
Texas Eastern	Texas Eastern Transmission, LP
TGP	Tennessee Gas Pipeline Company, L.L.C.
U.S.	United States
USDOT or DOT	U.S. Department of Transportation
USEPA or EPA	U.S. Environmental Protection Agency
USFWS or FWS	U.S. Fish and Wildlife Service
Vector Canada	Vector Pipeline Limited Partnership
Vector U.S.	Vector Pipeline L.P.

1.0 RESOURCE REPORT 1 - GENERAL PROJECT DESCRIPTION

1.1 Introduction

NEXUS Gas Transmission, LLC (“NEXUS”) is seeking a Certificate of Public Convenience and Necessity (“Certificate”) from the Federal Energy Regulatory Commission (“FERC”) pursuant to Section 7(c) of the Natural Gas Act (“NGA”) authorizing the construction and operation of the NEXUS Gas Transmission Project (“NEXUS Project” or “Project”). NEXUS is owned by affiliates of Spectra Energy Partners, LP and DTE Energy Company (“DTE” or “DTE Energy”). The NEXUS Project will utilize greenfield pipeline construction and capacity of third party pipelines to provide for the seamless transportation of 1.5 billion cubic feet per day (“Bcf/d”) of Appalachian Basin shale gas, including Utica and Marcellus shale gas production, directly to consuming markets in northern Ohio and southeastern Michigan, and to the Dawn Hub in Ontario, Canada (“Dawn”). Through interconnections with existing pipelines, shippers on the NEXUS Project will also be able to reach the Chicago Hub in Illinois and other Midwestern markets. The United States portion of the NEXUS Project will traverse Pennsylvania, West Virginia, Ohio and Michigan, terminating at the United States (“U.S.”)/Canada international boundary between Michigan and Ontario. The Canadian portion of the Project will extend from the U.S./Canada international boundary to Dawn.

By combining greenfield pipeline construction with the use of capacity on other pipeline systems, NEXUS will be able to minimize environmental disruption and optimize project efficiencies. The greenfield portion of the NEXUS Project will be constructed, owned and operated by NEXUS and will extend from Kensington, Ohio to the DTE Gas Company system west of Detroit in Ypsilanti Township, Michigan. See Figure 1.1-1 for a NEXUS Project Location Map (Figures section). The remainder of the NEXUS Project, which NEXUS will contract from third-party pipelines, will be comprised of the following:

- (1) Expansion capacity on the Texas Eastern Transmission, LP (“Texas Eastern”) system in Ohio, West Virginia, and Pennsylvania;
- (2) Expansion capacity on the DTE Gas Company (“DTE Gas”) system in southeastern Michigan and extending to the U.S./Canada international boundary; and
- (3) Existing unsubscribed capacity on the Vector Pipeline L.P. (“Vector U.S.”) system in southeast Michigan.

Outside of the U.S., NEXUS will use existing unsubscribed capacity on the Vector Pipeline Limited Partnership (“Vector Canada”) in western Ontario to access Dawn. See Figure 1.1-2 for a Systems Overview Map.

NEXUS understands that Texas Eastern will file its own Certificate Application with FERC for approval of its expansion project, which is known as the Texas Eastern Appalachian Lease Project (“TEAL Project”). The TEAL Project is currently being reviewed as part of the pre-filing process at FERC in Docket No. PF15-11-000. NEXUS further understands that Vector U.S. will be performing work under its blanket certificate and will provide notice of such work after construction is complete and the facilities are in-service as a part of its Annual Subpart F Blanket Report to FERC. Construction of the associated DTE Gas expansion project will be subject to the jurisdiction of the Michigan Public Service Commission (“MPSC”), as DTE Gas is a state-regulated gas utility providing limited interstate transportation service pursuant to 18 CFR § 284.224. While each project will have separate regulatory approvals, NEXUS understands that FERC may consider their environmental impacts in an environmental impact statement for the Project.

The NEXUS Project will consist of the following proposed facilities:

1.1.1 Pipeline Facilities

The Project includes construction of approximately 250 miles of new, 36-inch diameter natural gas transmission mainline pipeline originating in Columbiana County, Ohio and extending through Ohio and Michigan and connecting with DTE in Ypsilanti, Michigan; and approximately 0.9 mile of new 36-inch interconnecting pipeline to Tennessee Gas Pipeline Company L.L.C. (“TGP”), as described below and shown in Figure 1.1-1 (*see* Figures section) and summarized in Table 1.1-1 (*see* Tables section). The majority of the proposed pipeline route (approximately 55 percent) is co-located with existing overhead electric transmission line, pipeline, or railroad utility corridors; with an additional 38 percent of the route (that is not co-located with existing utilities), crossing agricultural land uses, resulting a total of 93 percent of the proposed pipeline route sited to avoid conversion of existing land uses. The following sections more specifically describe the proposed pipeline facilities:

- Mainline Route – Originates at the Kensington Processing Plant in Columbiana County, Ohio and extends through Ohio and Michigan to connect with DTE Gas at Willow Run in Ypsilanti, Michigan. The proposed mainline route includes:
 - approximately 200 miles of new pipeline in Columbiana, Stark, Summit, Wayne, Medina, Lorain, Erie, Sandusky, Wood, Lucas, Henry, and Fulton Counties, Ohio; and
 - approximately 50 miles of new pipeline in Lenawee, Monroe, and Washtenaw Counties, Michigan.
- Interconnecting Pipeline to TGP – approximately 0.9 mile of new 36-inch diameter pipeline connecting the proposed metering and regulating (“M&R”) at the Kensington Processing Plant to the TGP mainline.

1.1.2 Aboveground Facilities

The Project includes the installation of four (4) new gas turbine compressor stations; four (4) new M&R stations; four (4) new launcher and receiver facilities; and seven new customer connections in Ohio, as described below:

- Compressor Stations
 - 52,000 hp (“horsepower”) at Hanoverton Compressor Station in Columbiana County, Ohio;
 - 26,000 hp at Wadsworth Compressor Station in Medina County, Ohio;
 - 26,000 hp at Clyde Compressor Station in Sandusky County, Ohio; and
 - 26,000 hp at Waterville Compressor Station in Lucas County, Ohio.

Facilities will be finalized pending completion of customer commitments and the associated engineering design.

- M&R Stations
 - NEXUS/Kensington M&R Station located at the Kensington Processing Plant in Columbiana County, Ohio;
 - NEXUS/Texas Eastern M&R Station located at the tie-in with the interconnecting pipeline with the Texas Eastern mainline extension in Columbiana County, Ohio;
 - NEXUS/TGP M&R Station located at the tie-in with the interconnecting pipeline with the TGP mainline in Columbiana County, Ohio; and
 - NEXUS/Willow Run delivery M&R Station located at the greenfield project terminus in Washtenaw County, Michigan.

- Launcher and Receiver Facilities

- launcher facility for the mainline and receiver for the TGP line will be located at the Kensington Processing Plant;
- launcher and receiver facilities located at the new compressor stations located in Medina County, Ohio and Lucas County, Ohio;
- receiver facility at the terminus of the pipeline within the NEXUS/Willow Run M&R Station; and
- launcher facility at the TGP interconnecting pipeline tie-in to the TGP mainline.

- Other Aboveground Facilities

- Mainline Valves – Mainline valves (“MLVs”) will also be constructed and operated as part of the NEXUS Project. Table 1.1-2 identifies preliminary locations of 20 remote controlled MLV’s proposed along the pipeline route by MP. Proposed MLVs are also shown on the Project alignment sheets included in Appendix 1A – Volume II-B.
- Communications Towers –The Project will include construction and operation of communications towers located along the Project route. The towers will support licensed VHF (Very High Frequency) Mobile Radio transmission equipment for voice communications and MAS (Multiple Address Radio System) point to multi-point radio for SCADA (supervisory control and data acquisition) communications with M&R stations and remote controlled mainline valve sites. NEXUS is evaluating the recently issued U.S. Department of the Interior, Fish and Wildlife Service’s (“USFWS”), *Interim Guidelines for Recommendations on Communications Tower Siting, Construction, Operation, and Decommissioning* (USFWS, 2014). These Guidelines will be used in the evaluation and development of the engineering designs and siting for NEXUS communications towers. At this point in time, evaluation and selection of towers and communication equipment is still ongoing. NEXUS will provide details on proposed communications towers in its NGA 7(c) Certificate Application to be filed in 2015.
- Northern Ohio Market Connections – NEXUS has signed customer agreements that will require installation of multiple connection points located along the proposed Project route (see Figure 1.2-1). NEXUS is in the process of designing the market delivery connections and will provide detailed descriptions of these facilities in its NGA 7(c) Certificate Application to be filed with the Commission in November 2015. NEXUS is currently proposing market connections at the following locations as part of the scope of the Project:
 - Dominion East Ohio Gas, Columbiana County – Approximate milepost (“MP”) 1.5 to 2.5;
 - Dominion East Ohio Gas, Wayne County – Approximate MP 48.5 to 49.5;
 - Brickyard and Rittman Industrial Parks, Wayne/Medina County – Approximate MP 54 to 55;
 - Erie County Industrial Park, Erie County, Ohio – Approximate MP 115.3 to 116.5;
 - Dominion East Ohio Gas, Erie County, Ohio – Approximate MP 123.4 to 125;
 - The Waterville Gas & Oil Company, Lucas County, Ohio – Approximate MP 176; and
 - Ohio Gas, Fulton County, Ohio – Approximate MP 197.2 to 199.1.

Details of the Project's aboveground facilities are summarized in Table 1.1-2. Locations of proposed aboveground facilities are shown on Project alignment sheets in Appendix 1A and Plot Plans for proposed Compressor Stations are filed as Appendix 1A – Volume IV, Critical Energy Infrastructure Information (“CEII”).

1.1.3 Additional Contracted Capacity

In addition to the greenfield pipeline and related facilities, the Project also comprises firm capacity on existing facilities including:

- Texas Eastern Capacity. Capacity on Texas Eastern from certain receipt points located between Berne, Ohio and Braden Run, Pennsylvania to a delivery point at a new interconnection between Texas Eastern and the greenfield NEXUS facilities at Kensington, Ohio. The facilities associated with this capacity are part of the Texas Eastern Appalachian Lease Project which, as noted previously, has filed to participate in the FERC pre-filing process in Docket No. PF-15-11-000.
- DTE Gas Capacity. Capacity on the DTE Gas system from Willow Run to the Vector-Milford Junction interconnect (Milford Meter Station) between DTE Gas and Vector U.S., as well as capacity on the DTE Gas system to the Belle River Mills interconnect with Vector U.S. and to the U.S./Canada border. The construction of the associated DTE Gas expansion project will be subject to the jurisdiction of the MPSC, as DTE Gas is a state-regulated gas utility providing limited interstate transportation service pursuant to 18 CFR § 284.224. Additional details on proposed DTE facilities can be found in Section 1.15.1 of this Draft Resource Report.
- Vector U.S. Capacity. Capacity on Vector U.S. extending from Vector U.S.'s Milford Meter Station in Michigan and from the Belle River Mills, Michigan meter station to the U.S./Canada border. Vector U.S. has advised NEXUS that it will be performing work under its blanket certificate and will be providing notice to FERC following construction and when the facilities are in-service as a part of its Annual Subpart F Blanket Report to FERC.

In addition to utilizing existing capacity, the Project will utilize existing capacity on Vector Canada. The final arrangements for transportation in Canada from the U.S./Canada border to Dawn will depend on final commercial arrangements.

This Draft Resource Report identifies the Purpose and Need for the proposed Project (Section 1.2), the organization of the Environmental Report (Section 1.3), the locations and descriptions of Project facilities (Section 1.4 and 1.5), and the land requirements associated with facility construction and operation (Section 1.6). This Draft Resource Report also discusses the proposed construction procedures (Section 1.7 and 1.8), construction schedule and work force (Section 1.9), operation and maintenance procedures (Section 1.10), potential plans for future expansion or abandonment of the proposed facilities (Section 1.11), agency consultation and landowner notification (Section 1.12), permits and approvals required to construct and operate the Project (Section 1.13), status of field surveys (Section 1.14), anticipated non-jurisdictional facilities (Section 1.15), and cumulative impacts (Section 1.16). A checklist showing the status of the FERC filing requirements for Draft Resource Report 1 is included as front matter to this Draft Resource Report following the table of contents.

1.2 Purpose and Need

The NEXUS Project will provide a seamless path to transport Appalachian Basin shale gas, including Utica and Marcellus shale gas, directly to consuming markets in northern Ohio, southeastern Michigan, and Dawn, Ontario. The region to be served by the NEXUS Project is in the midst of a sea change in natural gas supply and demand dynamics. Due to recent environmental policies and a focus on greater reliability, the region is experiencing significant pressure to invest in natural gas fired electric generation. At the same time, the traditional flow of natural gas to the region from the Gulf Coast and Western Canada is declining as exports from Canada have decreased and a number of pipelines that have served

the area have been repurposed from gas to oil. For these reasons, the region to be served by the NEXUS Project is uniquely positioned to benefit from the abundance of clean burning and affordable Marcellus and Utica shale gas. The NEXUS Project is the pathway to restore the balance between natural gas supply and demand dynamics in the region.

The NEXUS Project is both a market pull and a supply push pipeline project, meaning the Project targets and has been tailored to meet the transportation needs of both end-users and producers, respectively. The NEXUS Project design is based on contractual commitments with customers, market connections, and other parties that expressed interest during the NEXUS open season processes. In order to provide interested bidders an opportunity to obtain capacity on NEXUS, an open season was held from October 15, 2012 to November 30, 2012. A supplemental open season was held from July 23, 2014 to August 21, 2014, and a second supplemental open season was held from January 14 to February 12, 2015. As a result of these open seasons, NEXUS is proposing to construct facilities to provide 1.5 Bcf/d of capacity by November 1, 2017. NEXUS has signed precedent agreements for the majority of the capacity to be created by the Project and anticipates that additional capacity will be committed under binding, long-term contracts before NEXUS files its NGA 7(c) Certificate Application in November of 2015. Executed precedent agreements for these shippers will be included in NEXUS' Certificate Application. Placing the Project facilities in service by the target in-service date of November 1, 2017 is required to meet the firm transportation service requirements of the Project shippers.

The NEXUS Project Will Supply Abundant And Affordable Natural Gas Supplies To A Region Where Traditional Natural Gas Supply Sources Are Declining

One of the key gas supply sources for northern Ohio, southeastern Michigan, and Dawn has been Western Canadian supply. However, since 2006 or earlier, the amount of gas supply exported from Alberta to these markets has declined, largely due to increased consumption in Western Canada. According to a report by the Alberta Energy Regulator (“AER”) titled *Alberta’s Energy Reserves 2013 and Supply/Demand Outlook 2014-2023* (AER, 2014), a 4 Bcf/d decline in natural gas exports occurred in Alberta from 2006-2013, with an additional ~1 Bcf/d decline forecasted through 2023. In addition, recent proposals to convert existing natural gas pipelines to crude oil pipelines, including Energy Transfer’s Trunkline and TransCanada’s Energy East Project, will impact natural gas supply to the Project area. Specifically, the impact of these conversion projects is that a combined 1.9 Bcf/d of natural gas pipeline capacity (Trunkline 0.6 Bcf/d in 2015 and TCPL 1.3 Bcf/d in 2018) from the Gulf Coast and Western Canada will be unavailable to serve markets in northern Ohio, southeastern Michigan and Dawn Hub in Ontario. At the same time, per the ICF International Forecast: Natural Gas – Strategic Q2 Base Case (“ICF International Q2 2015 Forecast, 2014”), Marcellus and Utica shale gas production will average approximately 34 Bcf/d by 2025. In the East North Central region (defined by ICF International as Illinois, Indiana, Michigan, Ohio and Wisconsin), it is anticipated that production will increase by approximately 1.4 trillion cubic feet (“Tcf”), for the period 2015 to 2035, as a result of growth in Marcellus and Utica shale gas production. According to ICF International Q2 2015 Forecast, “The Marcellus Shale accounts for roughly 38 percent of the 18 Tcf of incremental production growth from shale formations.” By connecting northern Ohio, southeastern Michigan, and Dawn to Marcellus and Utica shale gas production, the NEXUS Project serves to mitigate the reduction in supply from traditional Western Canadian sources and from the conversion of natural gas pipelines serving the region to oil service.

The NEXUS Project Will Supply Abundant And Affordable Natural Gas Supplies To A Region Where Demand For Such Supplies Is Increasing

Per the ICF International Q2 2015 Forecast, gas demand will increase by approximately 0.6 Tcf in the East North Central and Ontario regions, for the period 2015 to 2035. Significant demand growth in the East North Central region is a result of coal plant retirements driving increased gas use for electric generation. According to IHS Cambridge Energy Research Associates’ 2015 base forecast (IHS Rivalry

Scenario; January 2015), overall gas demand growth in Ohio, Michigan, Illinois, Indiana, Ontario and Wisconsin from the power generation sector is projected at approximately 3.3 Bcf/d for the period 2014 through 2030. Of this amount, approximately 1.1 Bcf/d is attributable to projected gas demand growth in Ohio and Michigan.

The state of Michigan is in the process of undergoing an energy infrastructure transition, driven by environmental policy, fleet modernization efforts, and the low price of natural gas. In a November 2013 report from the MPSC titled, *Readying Michigan to Make Good Energy Decisions* (MPSC, 2013) the MPSC described this transition as follows:

Currently, the relatively low price of gas and the increase in shale production provides increased incentive to use gas for applications other than heating... Michigan, like the rest of the nation, is currently experiencing a compliance push to either upgrade, or retire and replace coal-fired electric power plants in order to comply with U.S. Environmental Protection Agency (“EPA”) regulations. The EPA regulations coupled with the current, relatively low price of natural gas, may lead to the development of new natural gas-fired electric generating plants in Michigan... Natural gas-fired electric generating plants are considered to be economically and operationally viable.

For example, both DTE Electric and Consumers Energy have announced plans to retire coal-fired generating capacity in Michigan, which will result in an approximately 6,000 megawatts (“MW”) gap for new generation that will likely need to be filled by generation fueled by natural gas (along with renewables). Between 2011 and 2012, Michigan experienced a 10 percent increase in the use of gas-fired electric generation. Consumers Energy recently acquired the natural-gas fired Jackson Plant and in 2014 DTE Electric issued a Request for Proposal to acquire gas-fired electric generation resources.

The growing demand for natural gas in Ohio is no different. According to the Ohio Natural Gas Market Study conducted by the Analysis Group (*see* Appendix 1C4), the gas demand in Northern Ohio from residential, commercial and industrial sectors could require an additional 12 Bcf/year of natural gas. The increase is driven by home heating conversions from oil to gas, industrial growth, and greater usage in these sectors of the low-cost fuel. In addition, the study projects incremental gas demand from the electric power sector in Northern Ohio at approximately 0.5 Bcf/day. According to the study, “Given both resource adequacy needs and the location of known retirements ... most of the new natural gas-fired resources (*i.e.*, approximately 3,050 MW) are located in Northern Ohio. These Northern Ohio plants are also the farthest along in their respective development and will be in-service before 2018.”

There are 16 coal-fired power plants in Ohio that have been announced for retirement with over 4,000 MW of capacity that will need to be replaced (SourceWatch.gov website, 2013). Some of these generators may be converted to natural gas, which would increase further the demand for natural gas in the region. Plans are also underway to construct at least seven new natural gas-fired generation facilities in Ohio, totaling nearly 4,800 MW in incremental capacity (*see* below *Planned Generating Units: Ohio*, table from the AGI’s Ohio Natural Gas Market Study).

The proposed NEXUS route is located in general proximity to these planned gas-fired generators, specifically Oregon Clean Energy Center, Carroll County Energy Center, Lordstown Generating Station and the Avon Lake Coal-to-Gas Repowering, all of which are located between the current pipeline route and Lake Erie.

NEXUS is in various stages of discussions and negotiations with potential customers in Ohio such as power generators, local distribution companies and industrial parks. Figure 1.2-1 shows both NEXUS market connections with signed agreements in Ohio and other key market areas in Ohio that would be served by the NEXUS Project. Each Prospective Market Area identified in Figure 1.2-1 includes multiple market sectors (*i.e.*, power generators, local distribution companies, and/or industrial parks.) NEXUS is designed to meet the diverse natural gas delivery requirements of each of these market areas. These include: Dominion East Ohio in Columbiana, Erie and Wayne Counties, Ohio; Brickyard and Rittman

Industrial Parks in Medina and Wayne Counties, Ohio; Erie County Industrial Park in Erie County, Ohio; and Waterville Gas and Ohio Gas in Wood County, Ohio. NEXUS designed the proposed pipeline route in order to serve the growing gas needs of these Northern Ohio markets economically while minimizing environmental impacts.

Planned Generating Units: Ohio

Plant Name	Capacity (MW, Nameplate)	Technology	County	In-Service Date	PJM Status	OPSB Status
<u>New Natural Gas Plants</u>						
Rolling Hills	610 uprate (1,460 Net)	Combined Cycle	Vinton	Q1 2017	Feasibility	Approved
Oregon Clean Energy Center	799	Combined Cycle	Lucas	Q2 2017	FSA/ISA	Approved
Carroll County Energy Center	742	Combined Cycle	Carroll	Q3 2017	FSA/ISA	Approved
Middletown Energy Center	513	Combined Cycle	Butler	Q2 2018	ISA	Approved
Meigs County	652	Combined Cycle	Meigs	-Delayed	Feasibility	Approved
Lordstown Generating Station	800	Combined Cycle	Trumbull	Q2 2019	Feasibility	Pending
<u>Coal to Gas Conversions</u>						
Avon Lake	710	Steam Turbine	Lorain			Pending
Notes: [1] PJM estimates that the commercial likelihood of units with completed Facility Study Agreements (FSA) and Interconnection Services Agreements (ISA) is 50 percent and 70 percent, respectively. Sources: [1] Ohio Power Siting Board, Accessed April 2015, available: http://www.opsb.ohio.gov/opsb/ [2] PJM Interconnection Queue, Accessed April 2015, available: http://www.pjm.com/planning/generation-interconnection/generation-queue-active.aspx						

Source: Ohio Natural Gas Market Study by Analysis Group, Inc., June 2015

As with Michigan and Ohio, the demand for natural gas in Ontario is also growing. Per the *ICF International Q2 2015 Forecast*:

In 2014, Ontario retired the last of its coal-fired power plants. Future growth in gas demand comes from recovery of industrial demand and incremental growth in power demand (due to both load growth and nuclear plant retirements). Eastern Canada's demand is likely to grow robustly, due to incremental gas-fired generation that replaces declines in nuclear generation that result from nuclear plant maintenance, refurbishment, and retirements.

The NEXUS Project is designed to deliver abundant and affordable natural gas to a region with diverse and growing natural gas needs.

The NEXUS Project Will Advance Federal and Regional Environmental Objectives

Ohio's Alternative Energy Portfolio Standard encourages the use of natural gas, which requires electric distribution utilities and electric services companies to secure a portion of their electricity supplies from alternative energy resources. By the year 2025, electric service companies may generate as much as 12.5 percent of their energy from "any new, retrofitted, refueled, or repowered generating facility located in Ohio, including a simple or combined-cycle natural gas generating facility..." to compensate for shortfalls in energy required to be generated from renewable sources (ORC Section 4928.01(A)(34)(h)). However, Ohio's Governor Kasich signed Senate Bill 310 in June of 2014, temporarily freezing Ohio's Renewable Portfolio Standard and energy efficiency mandates for two years and permanently removing the requirement that Ohio utilities procure renewable energy from resources located in Ohio (ORC, 2013).

The EPA's proposed Carbon Emission Rules (*Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Generating Units Standards*, published in the Federal Register [79 FR 34829] on June 14, 2014) specify carbon dioxide emissions standards for existing coal plants that will

likely require Ohio to implement new policies. The EPA's proposed rules target reduction of carbon dioxide emissions in the power sector and set a unique target emissions rate for each state to hit by 2030. To develop this target, EPA first determined a carbon emissions baseline (using 2012 data) based on each state's level of CO₂ emissions from fossil-fired power plants divided by its total electricity generation (including fossil-fired generation, renewable generation, and nuclear generation). Targets for 2030 were then established based on the capacity of each state to achieve reductions using the following four "building blocks" identified by EPA:

- Make coal-fired power plants more efficient;
- Use low-emitting natural gas combined cycle plants more where excess capacity is available;
- Use more zero- and low-emitting power sources such as renewables and nuclear; and
- Reduce electricity demand by using electricity more efficiently.

Based on current EPA proposed guidelines, Ohio would be required to reduce baseline (based on 2012 data) power sector emission rates 21 percent for the 2020-2029 interim compliance period goal and 28 percent by 2030; Michigan would be required to reduce baseline (based on 2012 data) power sector emission rates 27 percent for the 2020-2029 interim compliance period goal and 31 percent by 2030. These proposed targets increase the need for timely additions of new generation as coal plants are either retired or face significant curtailments in operations. The NEXUS Project will be in-service by November 2017 and will provide the needed infrastructure to support increased natural gas generation by the early 2020s, thereby supporting Ohio and Michigan in meeting the EPA's proposed target emission rates (USEPA, 2014).

1.3 Environmental Report Organization

The Environmental Report ("ER") that will be filed with NEXUS' Certificate Application will comprise 12 separate Resource Reports and will be prepared in accordance with FERC Order No. 603 and 18 CFR 380.12, which govern the filing of Applications for Certificates of Public Convenience and Necessity authorizing the construction and operation of facilities to provide service under Section 7 of the NGA.

NEXUS' NGA 7(c) Certificate Application and accompanying ER will be organized into separate volumes, in compliance with FERC's document control requirements for Public and Privileged & Confidential, and CEII classes of information. For this initial filing, only the Affected Land Owners List is considered Privileged & Confidential and therefore has been filed under separate cover from Draft Resource Reports 1 and 10.

1.3.1 Project Maps and Drawings

Appendix 1A (bound separately in Volumes II-B) includes drawings and maps for all proposed Project facilities. Appendix 1A also contains typical drawings for the various right-of-way ("ROW") configurations, compressor stations, and other aboveground facilities (e.g., MLVs and launcher/receiver facilities) as well as drawings showing the Project components on USGS 7.5 minute series topographic quadrangle maps. USGS Quadrangle excerpts are located in Appendix 1A. Detailed plot plans for the compressor stations are included in Appendix 1A (bound separately in Volume IV).

1.3.2 Changes to the ER and Project Maps

As part of the NGA 7(c) Certificate Application process, NEXUS is utilizing the FERC's National Environmental Policy Act ("NEPA") Pre-Filing Process, which provides all stakeholders (including federal, state and local agencies, landowners and local citizens) the opportunity for early cooperation and involvement to identify, evaluate and attempt to resolve issues and concerns prior to NEXUS' submission of a formal Application to the FERC. This second filing of Draft Resource Report 1 is still part of the Pre-filing process and reflects current engineering design and siting of facilities. As more information is obtained from Project stakeholders, the Project will become more refined and an updated Project description and mapping will be submitted to FERC in NEXUS' NGA Section 7(c) Certificate

Application. Changes to the Project will be detailed in subsequent filings so that the FERC and Project stakeholders will be informed about Project changes.

1.4 Location and Description of Pipeline Facilities

The proposed NEXUS pipeline facilities consist of approximately 250 miles of new 36-inch diameter mainline pipeline from Kensington, Ohio, to Ypsilanti, Michigan, and one new 0.9 mile, 36-inch diameter, interconnecting pipeline to connect certain Kensington facilities to TGP. NEXUS' primary goal is to align, as much as practical, the new pipeline parallel to existing ROWs and to utilize already disturbed and cleared ROWs to the extent practicable. Deviations from these alignments were made where potential residential impacts, screening, environmental or construction issues warrant. A summary of the NEXUS pipeline facilities is provided in Table 1.1-1. For greenfield segments of new pipeline, NEXUS has sited the route to avoid environmental and stakeholder impacts where feasible, and where impacts are unavoidable, impacts have been minimized to the extent practicable.

1.5 Location and Description of Aboveground Facilities

The proposed NEXUS Project includes aboveground facilities located in Ohio and Michigan including four new compressor stations in Hanover, Guilford, Townsend, and Waterville, Ohio; and four new M&R stations, three proposed in Columbiana County, Ohio, and one proposed in Ypsilanti, Michigan.

A summary of proposed NEXUS aboveground facilities is provided in Table 1.1-2. Site plans of the new compressor stations with an aerial photo background and other proposed aboveground facilities are included in Appendix 1A. Drawings of proposed compressor stations showing the location of the nearest noise sensitive areas within one mile of each facility are included in Draft Resource Report 9, Appendix 9F.

NEXUS will work with individual landowners, local community and state agency representatives where aboveground facilities are proposed in order to assess the need for visual screening. Outdoor lighting for aboveground facilities will be minimal and limited to what is necessary for safety and security. Compressor stations will be designed to meet applicable FERC and state noise regulations. Individual station layouts were configured to help reduce the noise levels beyond the site boundaries as further described in Draft Resource Report 9.

A description of the existing conditions and access to the proposed compressor stations is provided in the following sections.

1.5.1 New Compressor Stations

The NEXUS Project includes construction and operation of four (4) new compressor stations in Ohio, as shown on Figure 1.1-1. Preliminary engineering designs and facilities layouts for proposed compressor stations are depicted on the Compressor Station Site Plans included in Appendix 1A – Volume IV of this Draft Resource Report. A summary of land requirements for both construction and operations of the four proposed compressor stations can be found in Table 1.5-2. Below is a summary of the proposed compressor station sites.

1.5.1.1 Hanoverton Compressor Station

Hanoverton Compressor Station (Compressor Station 1) is proposed in Hanover, Columbiana County, Ohio at approximate MP 1.2 on the mainline pipeline. This station is currently planned to be comprised of two gas turbine-driven compressor packages totaling 52,000 hp.

1.5.1.2 Wadsworth Compressor Station

Wadsworth Compressor Station (Compressor Station 2) is proposed in Guilford, Medina County, Ohio at approximate MP 60.3 on the mainline pipeline. This station is currently planned to be comprised of a single gas turbine-driven compressor package totaling 26,000 hp.

1.5.1.3 Clyde Compressor Station

Clyde Compressor Station (Compressor Station 3) is proposed in Clyde, Sandusky County, Ohio at approximate MP 129.5 on the mainline pipeline. This station is currently planned to be comprised of a single gas turbine-driven compressor package totaling 26,000 hp.

1.5.1.4 Waterville Compressor Station

Waterville Compressor Station (Compressor Station 4) is proposed in Waterville, Lucas County, Ohio at approximate MP 178.1 on the mainline pipeline. This station is currently planned to be comprised of a single gas turbine-driven compressor package totaling 26,000 hp.

1.5.2 New Meter Stations

NEXUS will construct four (4) new M&R stations (*see* Table 1.1-2). Three of the new M&R stations will be constructed in Columbiana County, Ohio; and the fourth will be constructed in Washtenaw County, Michigan. Proposed locations of M&R stations are shown on the USGS Quadrangle map excerpts and Project alignment sheets included in Appendix 1A and Volume II-B and are summarized as follows:

- NEXUS/Kensington M&R Station located at the Kensington Processing Plant in Columbiana County, Ohio
- NEXUS/Texas Eastern M&R Station located at the tie-in with the Texas Eastern mainline extension in Columbiana County, Ohio
- NEXUS/TGP M&R Station located at the tie-in with the TGP mainline in Columbiana County, Ohio
- NEXUS/Willow Run delivery M&R Station located at the greenfield project terminus in Washtenaw County, Michigan

1.5.3 Additional Aboveground Facilities

Additional aboveground facilities include pig launcher and receivers, mainline valves, communications towers, and customer connections and are described as follows:

- Pig Launcher/Receivers

Launcher and receiver facilities are proposed at the M&R station at the Kensington Processing Plant in Columbiana, County, Ohio; at Wadsworth Compressor Station in Medina County, Ohio; and, at Waterville Compressor Station in Lucas County, Ohio. One (1) launcher facility is proposed at the TGP Interconnecting pipeline tie-in to the TGP mainline and one (1) receiver facility is proposed within the NEXUS/Willow Run M&R Station. A pipeline “pig” is a device to clean or inspect the pipeline. A pig launcher/receiver is an aboveground facility where pigs are inserted or retrieved from the pipeline.

- Mainline Valves

NEXUS is proposing construction and operation of 20 remote controlled MLVs as part of the Project (*see* Table 1.1-2). These MLVs will be installed within areas already disturbed by pipeline construction and will be primarily located within the permanent operational ROW. The design and siting of MLVs is ongoing and will be finalized for submittal in NEXUS’ NGA 7(c) Certificate Application to be filed with the Commission in November 2015.

- Communication Towers

The Project will include construction and operation of communications towers located along the Project route. The towers will support licensed VHF (Very High Frequency) Mobile Radio transmission equipment for voice communications and MAS (Multiple Address Radio System)

point to multi-point radio for SCADA (supervisory control and [real time] data acquisition) communications with M&R stations and remote controlled mainline valve sites. NEXUS is evaluating the recently issued USFWSs, *Interim Guidelines for Recommendations on Communications Tower Siting, Construction, Operation, and Decommissioning* (USFWS, 2014). These Guidelines will be used in the evaluation and development of the engineering designs and siting for NEXUS communications towers. At this point in time, evaluation and selection of towers and communication equipment are still on going. NEXUS will provide details on proposed communications towers in its next filing scheduled for November of 2015.

- Customer Delivery Connections – NEXUS has signed customer agreements that will require installation of connection points located along the Project route (*see* Figure 1.2-1). NEXUS is in the process of completing the design for customer delivery connections and will provide detailed descriptions of these facilities in its NGA 7(c) Certificate Application to be filed with the Commission in November 2015. NEXUS is currently proposing customer connections at the following locations as part of the scope of the Project:
 - Dominion East Ohio Gas, Columbiana County – Approximate MP 1.5 to 2.5;
 - Dominion East Ohio Gas, Wayne County – Approximate MP 48.5 to 49.5;
 - Brickyard and Rittman Industrial Parks, Wayne/Medina County – Approximate MP 54 to 55;
 - Erie County Industrial Park, Erie County, Ohio – Approximate MP 115.3 to 116.5;
 - Dominion East Ohio Gas, Erie County, Ohio – Approximate MP 123.4 to 125;
 - The Waterville Gas & Oil Company, Lucas County, Ohio – Approximate MP 176; and
 - Ohio Gas, Fulton County, Ohio – Approximate MP 197.2 to 199.1.

1.6 Land Requirements

The proposed NEXUS Project will result in temporary disturbance to existing land uses during construction of proposed facilities and, to a lesser degree, in the future during operations and maintenance of the facilities. Pipeline land requirements are discussed in Section 1.6.1 and are summarized in Table 1.6-1; land requirements for the aboveground facilities are discussed in Section 1.6.2 and are summarized in Table 1.6-2. Access roads and contractor ware yards are discussed in Sections 1.6.3 and 1.6.4, respectively. Land requirements for proposed access roads can be found in Table 1.6-3 and Table 1.6-4 provides a summary of land requirements for proposed contractor ware yards. Current land uses of all areas affected by the Project are described in Draft Resource Report 8 – Land Use, Recreation and Aesthetics.

1.6.1 Pipeline Construction ROW

NEXUS will require a minimum 100-foot wide construction ROW based on a detailed evaluation of a variety of conditions experienced during the construction and installation of other pipeline systems across the State of Ohio and Michigan. The size of the equipment necessary to safely install a 36-inch diameter pipeline, with concrete coating where required, the trench width required and room needed for temporary trench spoil storage, and associated pipeline support facilities were factors used to determine the minimum 100-foot-wide construction ROW width. An exception to the 100-foot-wide minimum construction ROW width is within wetlands where the construction ROW is reduced to 75 feet wide, which conforms to the FERC *Wetland and Waterbody Construction and Mitigation Procedures*, May 2013 version (“FERC Procedures”).

Many other conditions must be taken into consideration when determining the amount of construction workspace needed to build the pipeline including agricultural land, drainage tiles, proximity to existing residences, roads, railroads, transmission line structures and wires, existing pipeline crossings,

topography, soils, bedrock and wetlands and waterbodies. As a result, in many locations additional temporary workspace (“ATWS”) will be needed outside the nominal 100-foot corridor to manage these conditions (*see* Table 8.2-4 in the Tables Section of Draft Resource Report 8). To accommodate this varying workspace width, a typical study corridor of 300 feet in width was employed for biological and cultural resource field surveys, with the study area expanded as needed to evaluate potential visual impacts on historic structures.

New ROW

The creation of new ROW is required for segments of the Project pipeline route that cannot be located adjacent or parallel to existing ROWs. In these areas, the nominal construction ROW width will be 100 feet wide, which includes the 50-foot wide permanent easement. The construction working side of the ROW will be 60 feet wide (35 feet in wetlands) from the center of the ditch to accommodate trench excavation, trench bank sloping, topsoil segregation and safe equipment mobility. The non-working or trench spoil side of the construction ROW will be 40 feet wide from the center of the ditch and will be used to store spoil and rock generated from trench excavation. This does not include ATWS necessary for site-specific construction needs. The Typical ROW Configurations for the NEXUS Project are included in Appendix 1A of this Draft Resource Report.

Pipeline Adjacent to Powerline ROWs

In areas where the proposed pipeline is parallel and adjacent to an existing electric transmission line, the NEXUS pipeline permanent easement generally abuts the transmission line easement/ROW, where practical, so as to not create a “dead strip” of land between the NEXUS permanent easement and the electrical transmission line easement/ROW. By doing so, part of the NEXUS pipeline temporary workspace will overlap the electrical line easement/ROW. As a result, when parallel to a transmission line, the Project takes advantage of any existing clearing beyond the offset from the nearest conductor but in any case does not create an additional ROW edge. In these areas, the construction ROW width will be the nominal 100 feet, which includes the permanent easement. Generally, the construction working side of the ROW will be 60 feet wide (35 feet in wetlands) from the center of the ditch and the side used for spoil storage will be 40 feet wide from the center of the ditch. In general, the 50-foot-wide permanent easement will be 35 feet from the center of the pipe on what was the working side of the construction ROW and 15 feet from the center of the pipeline on the spoil side. This does not include possible ATWS needed for site-specific circumstances.

1.6.1.1 Collocation with Existing Utility Corridors

As previously noted, the majority of the proposed pipeline (approximately 55 percent) is located within or adjacent to existing pipelines, electric transmission lines, or railroad ROWs (*see* Section 8.4.4 of Draft Resource Report 8). The following is an updated list of the utilities currently crossed by the NEXUS Project. This list will continue to be refined as the engineering design progresses and will be updated in NEXUS’ NGA 7(c) Certificate Application to be filed with the Commission in November 2015.

Utility Name	Utility Type
• Access Midstream Partners, LP	Pipeline
• American Electric Power	Transmission Line
• ANR Pipeline Company	Pipeline
• Atlas Energy, LLC	Pipeline
• BP U.S.	Pipeline
• Buckeye Partners, LP	Pipeline

Utility Name	Utility Type
• Caiman Energy II, LLC	Pipeline
• Consumers Energy	Transmission Line
• Dominion	Pipeline
• Dominion East Ohio Gas	Pipeline
• DTE Energy	Transmission Line
• DTE Pipeline Company	Pipeline
• Enbridge, Inc.	Pipeline
• EV Energy Partners, L.P.	Pipeline
• FirstEnergy Corporation	Transmission Line
• Integrys Energy Group, Inc.	Pipeline
• ITC Holdings Corporation	Transmission Line
• Kinder Morgan	Pipeline
• Magellan Midstream Partners, LP/POET, LLC	Pipeline
• Marathon Pipeline, LLC	Pipeline
• NiSource	Pipeline
• Northeast Ohio Natural Gas Corporation	Pipeline
• Ohio Edison	Transmission Line
• PJM	Transmission Line
• Somerset Gas Transmission Company, LLC	Pipeline
• Southern Union Company	Pipeline
• Sunoco, Inc.	Pipeline
• Toledo Edison	Transmission Line
• TransCanada	Pipeline
• Wolverine Pipeline Company	Pipeline

Overall, the length of the proposed pipeline that deviates from existing ROWs is a total of approximately 112 miles or approximately 45 percent of the total length of the new pipeline.

NEXUS has identified ATWS and staging areas that are required to construct the pipeline in a safe and environmentally responsible manner. Locations of proposed ATWS is depicted on Project Alignment Sheets in Appendix 1A – Volume II-B and are summarized in Table 8.2-4 located in the Tables Section of Draft Resource Report 8. Table 8.2-4 lists required ATWS by milepost along with a justification for the need of the listed ATWS at that specific location. The ATWS is typically required when any of the following conditions are encountered:

- Agricultural land/drainage tiles;
- Power line crossovers and existing pipeline crossovers;
- Wetland crossings;
- River/Stream crossings;
- Topsoil segregation;
- Side slope;
- Extra depth trench required;
- Shallow bedrock along location of trench;
- Road crossings;
- Parking areas;
- Storage and burning of tree stumps;
- Spread move-arounds; and
- Other site-specific constraints.

The extent of ATWS is determined on a site-specific basis. The additional work area is restricted to the minimum size necessary to safely construct the pipeline. In the case of wetlands and waterbodies, NEXUS will attempt to locate ATWS in accordance with the setback requirements contained in the FERC Procedures. In certain instances, the setbacks cannot be maintained due to construction limitations, such as slope and road crossing requirements. In those cases, NEXUS will request a variance from the FERC Procedures. Draft Resource Report 2 identifies the locations where these variances are required as well as the justification for such variances.

1.6.2 Aboveground Facilities

Table 1.6-2 summarizes the land requirements for new aboveground facilities both during construction and operations of the Project. Based on current engineering designs for the Project aboveground facilities, approximately 284.2 acres of land will be temporarily impacted during construction of the Project aboveground facilities and approximately 141 acres of land would be used for operations of aboveground facilities.

1.6.3 Access Roads

Existing public and private road crossings along the proposed Project route are summarized in Table 8.2-10 (*see* Tables section of Draft Resource Report 8). To the extent feasible, existing public and private road crossings along the proposed pipeline facilities will be used as the primary means of accessing the construction ROW. NEXUS will also use existing public roads near proposed compressor and regulator stations where practicable. Table 1.6-3 summarizes access roads currently proposed for temporary use during construction and permanent use during operations of the Project. Table 1.6-3 also includes the location of proposed access roads by milepost along the pipeline route, state and municipality the road is located within, whether or not the road is proposed as temporary or permanent, the existing surface substrate, current ownership status, approximate distance from closest public way, and whether or not proposed improvements would be required. Access roads currently proposed as part of the NEXUS Project are also shown on USGS Quadrangle Map Excerpts included in Appendix 1A.

1.6.4 Contractor Ware Yards

Table 1.6-4 presents the land requirements for currently identified contractor ware yards proposed for temporary use during construction of the NEXUS Project. Proposed contractor ware yards are also shown

on Project alignment sheets included in Appendix 1A – Volume II-B.

1.7 Construction Procedures

1.7.1 Pipeline Facilities

Typical ROW configurations depicting construction methods proposed for installation of the NEXUS Project are provided in Appendix 1A and a summary of construction methods to be used along the NEXUS Pipeline Project is provided in Table 1.7-1.

1.7.1.1 Standard Construction and Restoration Techniques

The NEXUS Project will be constructed in compliance with applicable Federal regulations and guidelines, and the specific requirements of necessary permits (*see* Section 1.13, Permits and Approvals). Key Federal requirements and guidelines include:

- 18 CFR Part 380.15 – Siting and Maintenance Requirements;
- 18 CFR Part 380 – Guidelines to be Followed by Natural Gas Pipeline Companies in the Planning, Clearing and Maintenance of ROW and the Construction of Aboveground Facilities;
- 49 CFR Part 192 – Transportation of Natural Gas and Other Gas by Pipeline: Minimum Federal Safety Standards;
- The Federal Energy Regulatory Commission *Upland Erosion Control, Revegetation, and Maintenance Plan* (“FERC Plan”, May 2013 version) and FERC Procedures); and
- NEXUS Project, *Erosion and Sediment Control Plan* (“E&SCP”), provided in Appendix 1B1.

The Project facilities will be constructed and maintained in accordance with the FERC Plan and FERC Procedures. The following sections identify the general construction procedures for routine pipeline construction, as well as the specific construction techniques that will be utilized in environmentally sensitive areas for the NEXUS Project.

- Clearing operations;
- ROW and temporary construction workspace grading;
- Trench excavation;
- Blasting (where required);
- Stringing;
- Bending;
- Welding;
- Nondestructive weld inspection;
- Weld repair;
- Coating, including inspection and repair;
- Lowering-in;
- Tie-ins;
- Backfilling;
- Cleaning;
- Hydrostatic testing, dewatering and drying and

- Restoration and revegetation.

Clearing Operations

Clearing will be required for construction of pipeline facilities that traverse forested habitats. Initial clearing operations will include the removal of vegetation adjacent to the existing powerline ROWs, within the pipeline ROW, and the temporary construction workspace either by mechanical or hand cutting. The limits of clearing will be identified and flagged in the field prior to any clearing operations.

In wetlands, trees and brush will either be cut with rubber-tired and/or tracked equipment, or hand-cut. Unless grading is required for safety reasons, wetland vegetation will be cut off at ground level, leaving existing root systems intact, and the aboveground vegetation removed from the wetlands for chipping or disposal. In uplands, tree stumps and rootstock will be left in the temporary workspace wherever possible to encourage natural revegetation. Stumps will be removed from the ROW to approved disposal locations or made available to landowners upon request. Timber will be made available to land owners on request or removed from the ROW to approved locations and sold for lumber or pulp, or chipped on the ROW. Brush and tree limbs will be chipped and removed from the ROW for approved disposal. Wood chips will be sold as fuel or other marketable products, spread in approved locations and used as mulch, or hauled off site for disposal.

The cleared width within the ROW and temporary construction workspace will be kept to the minimum that will allow for spoil storage, staging, assembly of materials, and all other activities required to safely construct the pipeline. Closely following clearing and before grading activities, erosion controls will be installed at the required locations as outlined in the NEXUS E&SCP (Appendix 1B1).

ROW and Temporary Construction Workspace Grading

The entire width of the construction ROW, including the temporary construction workspace, will be rough graded as necessary to allow for safe passage of equipment and to prepare a work surface for pipeline installation activities. However, as stated above, tree stumps and rootstock in upland areas will be left in the temporary workspace wherever possible to encourage natural revegetation and, unless grading is required for safety reasons, wetland vegetation will be cut off at ground level, leaving existing root systems intact. Typically, the grading of the ROW will be completed with bulldozers. Backhoes will be used in conjunction with bulldozers in areas where boulders and tree stumps require removal. A travel lane or traffic control will be maintained to allow for the passage of daily traffic.

In agricultural and residential areas, topsoil will be stripped and stockpiled separately from the subsoil during grading. There may be some areas where the construction ROW is limited and topsoil will need to be stockpiled offsite. Topsoil will be replaced with appropriate imported material as required. The mixing of topsoil with subsoil will be minimized by using topsoil segregation construction methods in wetlands (except when standing water or saturated soils are present). Rock will be removed from all actively cultivated or rotated agricultural land. The size, density and distribution of rock left in construction work areas should be similar to adjacent areas not disturbed by construction, unless otherwise approved in writing by the landowner.

Trench Excavation

A trench will be excavated to the proper depth to allow for the burial of the pipe. In general, the trench will be deep enough (approximately seven feet) to provide a minimum of three feet of cover over the pipelines and comply with the requirements of 49 CFR Part 192 of the U.S. Department of Transportation ("USDOT") regulations. Deeper burial is required in specific areas. The excavated material will be placed next to the trench so as to avoid unnecessary movement of machinery across the terrain. Should it become necessary to remove water from the trench, it will be pumped to an off-ROW, stable, vegetated upland area (where practicable) and/or filtered through a filter bag or siltation barrier. The trench will be dug by a backhoe or ditching machine.

Blasting

Geological and soils information contained in Draft Resource Reports 6 and 7, respectively, identify the areas where shallow bedrock may be encountered at anticipated trench depths in the Project area. NEXUS anticipates that blasting may be required along segments of the proposed pipeline and has developed a NEXUS Project Blasting Plan; a draft version of this report is included as Appendix 1B3. In the event that un-rippable subsurface rock is encountered, blasting for ditch excavation will be necessary. In these areas, care will be taken to prevent damage to underground structures (e.g., cables, conduits, septic systems, and electric transmission tower foundations *etc.*) or to aboveground structures (e.g., homes, electric transmission towers, *etc.*) springs, water wells, or other water sources.

Blasting mats or soil cover will be used as necessary to prevent the scattering of loose rock. NEXUS will comply with all federal, state, and local regulations applying to blasting and blast vibration limits with regard to structures and underground utilities.

Stringing

Once the trench is excavated, the next process in constructing a pipeline is stringing the pipe along the trench. Stringing involves initially hauling the pipe by tractor-trailer, generally in 40 to 80 foot lengths from the pipe storage yard, onto the ROW. The pipe will be off-loaded from trucks and placed next to the trench using a specialized excavator or sideboom tractor. The pipe joints are lined up end-to-end to allow for welding into continuous lengths known as strings.

Bending

Once the sections of pipe have been placed on the ROW, the pipe is bent as necessary so the pipe fits the horizontal and vertical contours of the excavated trench. The Bending Engineer will survey the trench to determine the location and amount of each field bend. This information is marked on each segment of pipe so the Bending Foreman can make the appropriate pipe bends. Pipe is usually bent with a hydraulic pipe-bending machine. Pipe bends will be relatively long and gradual, which must be considered when the trench is dug.

Welding

All welding is performed in accordance with American Petroleum Institute ("API") Standard No. 1104, 20th Edition and NEXUS specifications. Welders performing work on the NEXUS Project must meet the stringent welder qualifications and testing requirements specified in API Standard No. 1104 20th Edition. The individual joints of pipe are welded together in two steps. The front-end welding crew, or pipe gang, will perform the first step. This crew will clean and align the pipe bevels in preparation for welding and place at least the first two passes in the welding process. The firing line, or back-end welders, perform the second step, completing the welds started by the front-end welders. The pipe is welded into long strings to minimize the number of welds that have to be made in the trench (tie-in welds). Gaps in the pipe welding process are often left by the welding crews at water/wetland crossings, road crossings, and other locations where access across the work area is required or when the pipe will be installed later in the construction process.

Nondestructive Weld Inspection

After welding, each weld is inspected to ensure its structural integrity is consistent with 49 CFR Part 192 of the USDOT's regulations. Radiographs or ultrasonic images are taken and processed on site for virtually instantaneous results. Those welds that do not meet the requirements established by the API Standard 1104 and NEXUS' specifications are marked for repair or replacement.

Weld Repair

The contractor may establish a weld repair crew, usually one welder and helper working independently, to follow the radiography crew to make any weld repairs that are required. All repaired and replaced welds are inspected to ensure proper repair and integrity.

Coating Inspection and Repair

The pipeline is coated to prevent corrosion. The pipe lengths will be coated (usually with a heat-applied epoxy) at a coating mill prior to being delivered to the Project. The ends of each piece are left bare to allow for welding. Once welds have been inspected and accepted, the weld area is field coated by the coating crew. Because pipeline coatings are electrically insulating, the coating is inspected using equipment that emits an electric charge to ensure there are no locations on the pipeline where there is a defect/void in the coating.

Lowering-In

After a pipe string has been coated and inspected, the trench is prepared for the installation of the pipeline. The trench is cleared of loose rock and debris. If water exists in the trench, the water is pumped out into a well-vegetated upland area and/or into an approved filter with the exception of wetland areas where the “push pull” installation may be required. In sandy soils, the trench is shaped to support the pipe. In areas where the trench contains bedrock, a sand bedding is placed on the bottom of the trench, and/or pads made of sandbags and/or clay are placed at regular intervals along the trench bottom to support the pipe. The lowering-in crew places the pipeline in the trench. Lowering-in is usually done with sideboom tractors.

Tie-Ins

Once the sections of pipe are lowered-in, the tie-in crew makes the final welds in the trench. Additional excavations as needed, lowering in, lining up, welding, weld nondestructive inspection and coating the final welds are accomplished by this crew.

Backfilling

All suitable material excavated during trenching will be replaced in the trench. In areas where excavated material is unsuitable for backfilling, additional select fill may be required. If the soil is rocky, the pipe is padded with relatively rock-free material placed immediately around the pipe. This material may be obtained from commercial borrow areas in the region. Where suitable, the subsoil may be mechanically screened to produce suitable padding material. Padding of the pipe is usually performed with backhoes. If padding is obtained from an offsite source, it is normally placed in the trench by front-end loaders. In no case will topsoil be used as padding material. Once the pipe is padded, the trench is then backfilled with suitable excavated subsoil material. The top of the trench may be slightly crowned to compensate for settling except for paved areas, where standard compaction methods will be employed. The topsoil is then spread across the graded construction ROW when applicable. The soil will be inspected for compaction, and scarified as necessary.

Cleaning

Once the pipeline tie-ins are completed, it is internally cleaned with pipeline “pigs.” A manifold is installed on one end of the long pipeline section and a pig is propelled by compressed air through the pipeline into an open pig receiver. The purpose is to remove any dirt, water or debris that was inadvertently collected within the pipeline during installation.

Hydrostatic Testing

After cleaning, the pipeline will be pressure tested in accordance with 49 CFR part 192 subpart J and NEXUS’ requirements to ensure its integrity for the intended service and operating pressures. The pipeline is hydrostatically tested with water. The water is normally obtained from water sources crossed

by the pipeline, including available municipal supply lines. It is pumped from the water source into the pipeline. The water propels a pig through the pipeline in a manner that displaces the air from the line and completely fills the pipeline with water. Test pressure is obtained by adding water to the test section with a high-pressure pump. At the completion of the hydrostatic test, the pressure is removed from the section and the water is released from the test section, via approved methods, by propelling the pig with air, which forces the water from the pipeline. All water will be discharged in accordance with state and federal requirements. Additional “drying” pig runs are made, if necessary, to remove any residual water from the pipeline.

Restoration and Revegetation

The cleanup crew completes restoration and revegetation of the ROW and temporary construction workspace. In general, every effort will be made, weather and soil conditions permitting, to complete final cleanup (including final grading) and installation of permanent erosion control measures within 20 days after the trench is backfilled. These restoration activities will be completed in residential areas within 10 days of backfilling. Specific restoration requirements defined by regulatory agencies will be utilized within 100 feet of waterbodies. In conjunction with backfilling operations, any woody material and construction debris will be removed from the ROW. The ROW will be fine-graded to prepare for restoration. Permanent slope breakers or diversion berms will be constructed and maintained in accordance with the FERC Plan. Fences and stone walls will be restored or repaired as necessary.

Revegetation will be completed in accordance with permit requirements and written recommendations on seeding mixes, rates, and dates obtained from the local soil conservation authority or other duly authorized agency and in accordance with the NEXUS Project E&SCP. The ROW will be seeded within six (6) working days following final grading, weather and soil conditions permitting. Alternative seed mixes specifically requested by the landowner or required by agencies may be used. Any soil disturbance that occurs outside the permanent seeding season or any bare soil left unstabilized by vegetation will be mulched in accordance with the FERC Plan and the NEXUS E&SCP.

1.7.1.2 Waterbody Construction Methods

To minimize potential impacts, waterbodies, streams and rivers will be crossed as quickly and as safely as possible. Adherence to the FERC Procedures will ensure stream flow will be maintained throughout construction. Most stream crossings will be completed using conventional backhoe type equipment using either an open cut (wet) or dry crossing technique. Proposed waterbody crossing methods for each waterbody crossed by the proposed pipeline will be provided in Draft Resource Report 2 and is described in more detail in NEXUS’ E&SCP.

Unless dry at the time of crossing, minor streams (those less than 10 feet wide) containing cold water or significant warmwater fisheries will be crossed using a dry crossing method. The dry crossing method will involve installation of a flume pipe(s) and/or dam and pump prior to trenching to divert the stream flow over the construction area and allow trenching of the stream crossing in drier conditions isolated from the stream flow. Spoil removed during the trenching will be stored away from the water’s edge and protected by sediment containment structures. Pipe strings will be fabricated on one bank and either pulled across the stream bottom to the opposite bank, floated across the isolated portion of the stream, or carried into place and lowered into the trench. Where these methods are employed, ATWS areas will be required for assembly of the pipe strings and spoil storage areas. Fisheries resources along the route will be discussed in Draft Resource Report 3.

The open-cut crossing method will involve excavation of the pipeline trench across the waterbody, installation of the pipeline, and backfilling of the trench with no effort to isolate flow from construction activities. Excavation and backfilling of the trench will be accomplished using backhoes or other excavation equipment working from the banks of the waterbody. Trench spoil will be stored at least 10 feet from the banks (topographic conditions permitting). A section of pipe long enough to span the entire crossing will be fabricated on one bank and either pulled across the bottom to the opposite bank, floated

across the stream, or carried into place and submerged into the trench. The trench will then be backfilled and the bottom of the watercourse and banks restored and stabilized. Sediment barriers, such as silt fencing, staked straw bales, or trench plugs will be installed to prevent spoil and sediment-laden water from entering the waterbody from adjacent upland areas.

Except where reasonable alternative access is available, temporary construction equipment crossings will be installed across all waterbodies to gain access along the ROW for construction operations. Equipment crossings will be carefully installed after clearing to minimize streambed disturbance and downstream siltation. Where culverts are used, devices will also be placed at the outlet to prevent scouring of the stream bottom. After such equipment crossings are established, construction equipment will not be permitted to drive through the waterbody for access, and the equipment crossings will be removed once access in the area is no longer needed. Only the equipment necessary to construct the crossing and install the pipe will be allowed to work in the waterbody. After clearing activities, construction equipment must cross waterbodies on bridges consisting of one of the following devices:

- Clean rock fill and culverts;
- Equipment pads, wooden mats, and/or culverts; or
- Flexi-float or portable bridge.

To facilitate pipeline construction across waterbodies, ATWS may be needed adjacent to the waterbody to assemble and fabricate the length of pipe necessary to complete the crossing. This work area is in addition to the standard construction ROW and will be located at least 50 feet away from the stream banks in cleared areas (except in actively cultivated or rotated agricultural lands and other disturbed areas) and, as required by regulatory agencies, at least 100 feet away from the stream banks in forested areas, topographic conditions permitting. If topographic conditions do not permit (e.g., a 50- or 100-foot setback), then these areas will be located at least 10 feet away from the water's edge. In several instances the setbacks could not be maintained due to construction limitations, such as slope and road crossing requirements. In these cases, NEXUS is requesting variances from the FERC Procedures. Table 2.4-2 in Draft Resource Report 2 identifies the locations where variances are required.

Vegetation will not be cleared between the ATWS area and the waterbody. The work area will be limited in size to the minimum area necessary to safely construct the waterbody crossing and accommodate any stockpile of excavated material from the trench and the prefabricated pipeline crossing section.

Typically, for extra workspace on minor and intermediate stream crossings, 50 feet of additional width may be used for a length of 100 feet on either side of the waterbody starting at the edge of the 50-foot setback. However, the size of ATWS areas can vary based on site-specific conditions and length of the pipe section for the crossing.

Horizontal Directional Drill

NEXUS is currently performing geotechnical investigations to support the engineering design of potential horizontal directional drill ("HDD") crossings of certain sensitive resources located along the proposed pipeline route. Table 1.7-2 provides a summary of currently proposed HDD's for the NEXUS Project, including the state and county, milepost location for the HDD enter and exit locations, the feature at the surface avoided by use of the HDD, and the estimated total crossing length.

The HDD method involves boring a pilot hole beneath the waterbody to the opposite side of the resource and then enlarging the hole with one or more passes of a reamer until the hole is the necessary diameter. A prefabricated pre-tested, pipe segment is then pulled through the hole to complete the crossing. A successful drill generally results in no impact on the stream bed or banks of the waterbody being crossed.

NEXUS is in the process of evaluating site specific conditions along with geotechnical information to design the best crossing method for each required resource crossing. If the HDD crossing method is selected, detailed engineering drawings will be prepared in addition to contingency plans outlining

procedures to be implemented in the case of drill failure or the inadvertent release of drilling fluid. NEXUS will submit these plans with its NGA 7(c) Certificate Application to be filed with the Commission in November 2015.

1.7.1.3 Wetland Construction Methods

Construction across wetlands will be performed in accordance with the FERC Procedures and the NEXUS Project E&SCP, unless an approved variance is obtained. Construction methods will minimize the extent and time that construction equipment operates in wetland areas. When wetland soils are inundated or saturated to the surface, the pipeline trench will be excavated across the wetland by equipment supported on wooden swamp mats to minimize the disturbance to wetland soils. In wetlands that have firm substrates, and are unsaturated and not frozen, the top 12 inches of wetland soil over the trenchline will be segregated. Trench spoil will be temporarily piled in a ridge along the pipeline trench. Gaps in the spoil pile will be left at appropriate intervals to provide for natural circulation or drainage of water. While the trench is excavated, where practicable the pipeline will be assembled in a staging area located in an upland area. If dry conditions exist within the wetland, the pipe fabrication will occur in the wetland. For inundated or saturated wetland conditions, pipe strings will be fabricated on one bank and either pulled across the excavated trench in the wetland, floated across the wetland, or carried into place and submerged into the trench. After the pipeline is lowered into the trench, wide track bulldozers or backhoes supported on swamp mats will be used for backfill, grading, and final cleanup. This method will minimize the amount of equipment and travel in wetland areas. If conditions allow, such as low flow or unsaturated soils, NEXUS requests the use of normal cross-country construction practices in wetlands. A complete description of construction methods can be found in the NEXUS Project E&SCP, included as Appendix 1B1.

ATWS may be needed adjacent to specific wetlands to facilitate the pipeline crossing. The staging areas are in addition to the typical construction ROW and may be used for the assembly and fabrication of the pipe section that will cross the wetland area. These work areas will be located at least 50 feet away from the wetland edge, topographic and other site specific conditions permitting. If topographic conditions do not permit a 50-foot setback, these areas will be located at least 10 feet away from the wetland. In these instances, the setbacks could not be maintained due to construction limitations, such as slope and road crossing requirements. In those cases, NEXUS is requesting variances from the FERC Procedures. Draft Resource Report 2 identifies the locations where ATWS wetland setback variances are required.

The size of ATWS required at wetland crossings is based on the wetland size, water content of wetland soils (or presence of standing water), and other construction constraints. Under no circumstances will vegetation be cleared between the work areas and the wetland. The work area will be limited to the minimum size necessary to safely construct the wetland crossing. Restricting the work area in this manner will minimize wetland impacts associated with pipeline construction.

NEXUS has prepared a Spill Prevention, Control and Countermeasure Plan ("SPCC Plan") to address the handling of construction fuel and other materials. The SPCC Plan provides a set of minimum requirements to be used by the contractor in developing their own Project-specific SPCC Plan. NEXUS' SPCC Plan is included in the NEXUS Project E&SCP (*see* Appendix 1B1). Except in circumstances specified in the SPCC Plan, potential impacts to water quality will be avoided while work is being performed in wetlands and other waterbodies by implementing the following measures:

- Construction materials, fuels, *etc.* will not be stored within wetlands or within 100 feet of any stream or wetland system, except under limited, highly controlled circumstances;
- Construction equipment will not be refueled within wetlands or within 100 feet of any stream or wetland system, except under limited, highly controlled circumstances and under direct supervision of the Environmental Inspector;
- Construction equipment will not be washed in any wetland or watercourse; and

- Equipment will be well maintained and checked daily for leaks.

1.7.1.4 Residential Areas

Residences within 50 feet of the outer limits of the construction work areas are identified in Draft Resource Report 8. Special care will be taken in residential areas to minimize neighborhood and traffic disruption and to control noise and dust to the extent practicable.

In general, the following measures will be taken in residential areas:

- Fence the boundary of the construction work area to ensure construction equipment, materials and spoil remain within the construction ROW;
- Preserve all mature trees and landscaping where practical, consistent with construction safety;
- Ensure pipe is welded and installed as quickly as reasonably possible consistent with prudent pipeline construction practices to minimize construction time affecting neighborhoods;
- Backfill the trench as soon as the pipe is laid or temporarily steel plate the trench; and
- Complete final cleanup (including final grading) and installation of permanent erosion control measures within 10 days after the trench is backfilled, weather conditions permitting.

Site-specific construction plans will be developed where residential dwellings are within 25 feet of construction workspace and filed prior to construction. These plans will show the construction area to be disturbed and safety measures that will be implemented, such as construction fencing, access provisions and use of steel plates. These measures are designed to ensure the safety and convenience of residences in the Project area. Additional details regarding the construction techniques to be used in residential areas will be provided in Draft Resource Report 8.

1.7.1.5 Rugged Topography

Permanent trench breakers consisting of sandbags, gravel, cement, or cement-filled or bentonite-filled sacks will be installed in the trench over and around the pipe in areas where sloping terrain presents erosion potential. Temporary trench plugs, usually composed of compacted earth or other suitable material with low permeability, will be used to protect waterbodies and wetlands and to minimize channeling of groundwater along the ditch line during construction.

If side slopes requiring special construction are encountered, the following techniques will be used. During grading, the upslope side of the pipeline ROW will be cut. The material removed from the cut will be used to fill the downslope edge of the ROW in order to provide a safe and level surface from which to operate the heavy equipment (two-tone construction). Side hills may require additional temporary workspace downslope in order to accommodate the fill material. During grade restoration, the spoil will be placed back in the cut and compacted. Springs or seeps encountered during excavations along sidehills will be carried downslope through appropriately sized conduits (*i.e.*, PVC pipe and/or gravel French drains). These conduits will be installed as part of restoration. Table 1.7-3 provides a summary of areas requiring sidehill construction along the NEXUS Project pipeline route.

1.7.1.6 Active Agricultural Land

Topsoil will be segregated in agriculturally cultivated or rotated agricultural lands and pasturelands. In these areas, topsoil will be stripped and placed separate from subsoil when excavating the trench. Excess rock will be removed from at least the top 12 inches of soil to the extent practical. The size, density and distribution of rock left in construction work areas should be similar to adjacent areas not disturbed by construction, unless otherwise approved in writing by the landowner. Additional temporary workspace may be required when topsoil segregation is required. After the pipe has been lowered into the ditch, subsoil is used for backfilling and topsoil is then spread across the graded ROW. Equipment traffic will

be strictly controlled within agricultural land to minimize rutting or compaction. Soil compaction will be treated, as necessary, in conjunction with the FERC Plan.

1.7.1.7 Road Crossings

Constructing the NEXUS Project across public and private roadways, using either conventional open cut or road bore methods, will be based on site conditions and road opening permit requirements. Public road crossings associated with the Project are identified in Draft Resource Report 8. Roadway opening permits will be obtained from applicable state and local agencies. Permit conditions will ultimately dictate the day-to-day construction activities at road crossings.

Prior to construction, Ohio Oil & Gas Producers Underground Protection Services along with the Ohio Utilities Protection Service, in Ohio, and the MISS DIG system, in Michigan, will be contacted. Prior to construction, state and/or local utility operators will be contacted so they can mark existing facilities that may intersect, or be in close proximity to, the proposed pipeline. The contractor may elect to excavate the utilities to confirm their location.

Construction will be scheduled for work within roadways and specific crossings so as to avoid commuter traffic and schedules for school buses to the greatest extent practical. Appropriate traffic management and signage will be set up and necessary safety measures will be developed in compliance with applicable permits for work in the public roadway. Arrangements will be made with local officials to have traffic safety personnel on hand during periods of construction. Provisions will be made for detours or otherwise to permit traffic flow.

Roadway crossing construction will generally occur using one of the following methods:

- **Open Cut** – This method is used on driveways and roads with low traffic densities where pipeline installation activities will not adversely impact the general public. The first step is to install the proper traffic control devices. Traffic may have to be detoured around the open trench during the installation process. Where practical, steel road plates may be utilized to allow passage of public traffic during open cut activities. For driveways and small roads, steel road plates may be utilized or a temporary bypass roadway may be constructed. Multi-lane roads may require the closure of one lane at a time with traffic diverted to the other lane(s). The pipeline crossing is installed one lane at a time. As the pipe is installed, successive lanes are alternately taken out of service for pipe installation until the crossing is completed. Another option is to detour traffic around the work area through the use of adjacent roadways.

If the roadway surface is paved, pavement over the proposed trench is cut, removed, and properly disposed of. The trench is excavated using a backhoe and the pipe is installed (welded, radiographed and coated). The trench is then backfilled. A 15:1 sand to concrete mix called flowable fill, or Controlled Density Fill, may be used. The backfill must be compacted properly to reduce stresses on the pipeline and to ensure the roadway supports the traffic load without settling. The existing trench subsoil may be used in the backfill if it can be compacted properly and is authorized by the permitting agency. In most cases, backfill material will be obtained from an outside source and hauled in. The material used and methods of placement will comply with the requirements of the permitting agency. If the roadway surface was paved, the paving will be properly restored in accordance with the permit requirements.

- **Bored** – On roads with higher traffic densities and for railroads where service must be maintained, the pipeline may be installed by boring a hole under the road or railway. Specialized boring equipment is used. The soil and or rock are bored by a drill that contains a cutting head which cuts through the soil. Dummy casing which is slightly larger in diameter than the pipeline, is installed immediately behind the cutting head. An auger is placed inside the pipe to remove the cuttings. When completed, the bored hole is slightly larger than the outside diameter of the pipeline to be installed. Once the bore is completed, the pipeline section is welded to the boring

pipe and pulled into place and the boring pipe is removed. Any voids between the pipeline and the subsoil are filled with grout (a sand-cement mix) to prevent settlement of the roadway surface or railroad track. This method allows the road or railroad to remain in service while the installation process takes place and eliminates the potential for trench settlement.

- **Cased** – The procedure for a cased crossing is similar to a bored crossing with one exception. A section of steel casing pipe, which is several inches in diameter greater than the pipeline, is bored into place. Casing sections are welded together to ensure water does not enter the casing. Once the casing pipe has been installed, the pipeline is pulled through the casing. To prevent potential corrosion of the pipeline due to contact between the pipeline and the casing, the pipeline is insulated from the casing pipe, either through the use of plastic insulators spaced along the pipeline or the pipeline is coated with a layer of concrete. To prevent water from entering the casing, the ends of the casing are sealed with rubber or polyethylene seals. The space between the casing and the pipeline is vented to the atmosphere through the use of sections of small diameter pipe (vent pipe), which are welded to the casing ends and run from the casing to several feet above the surface of the ground. Casing pipe is installed when required by permit or when there is a likelihood of encountering rock during the boring.
- **Hammer technique** – In addition to the boring techniques described above, pipeline contractors have been using another technique to complete road crossings. This technique consists of driving casing pipe that is slightly larger in diameter than the proposed pipeline under the roadway with a horizontal air operated reciprocating hammer. The casing pipe is placed against the end of the trench near the edge of the roadway and driven under the paved road. Once in place, the material inside the casing is augured out and the pipe is installed through the casing. The casing pipe is then removed while grout is placed around the pipeline. Where required, the casing pipe may be left in place as casing.

Expanded workspace ('ATWS') at road crossings will be based on the size of the road crossing and other construction constraints.

Crossings of private roadways will be coordinated with residents to minimize access impacts. In those areas where the excavation of a longer length of trench will not pose a safety problem, the pipeline will be installed using the standard open trench method. Open trenches will either be fenced or covered with steel plates during all non-working hours. Steel plates will be kept on site at each crossing so that a temporary platform can be made across the trench as required (e.g., emergency vehicles).

All roadway surfaces will be quickly restored to the specifications of the local Department of Public Works or the Ohio and Michigan Departments of Transportation as outlined in the permit requirements. Roadway markings and striping will be added as necessary.

1.7.1.8 Rock Removal and Blasting

Based on NEXUS' experience, field reconnaissance and review of soils and geologic maps of the Project area, shallow bedrock (less than 5 feet from the surface) may be encountered at various locations along the Project alignment.

Rock encountered during trenching will be removed using one of the following techniques. The technique selected is dependent on the relative hardness, fracture susceptibility, and expected volume of the material. Techniques include:

- Conventional excavation with a backhoe;
- Ripping with a dozer followed by backhoe excavation;
- Hammering with a pointed backhoe attachment followed by backhoe excavation;
- Blasting followed by backhoe excavation; or

- Blasting surface rock prior to excavation.

The NEXUS Project Blasting Plan (*see* Appendix 1B3) identifies the impact avoidance and minimization measures employed by NEXUS if blasting is determined necessary and will contain special provisions that will be taken to monitor and assess blasting within 150 feet of private or public water supply wells, should that situation arise.

Large rock not suitable for use as backfill material will either be windrowed along the edge of the ROW with permission from the landowner, used to construct ATV barriers across the ROW, or buried on the ROW. NEXUS will negotiate with landowners and will obtain permission to permanently store rock along, over, through or across the ROW. Otherwise the excess rock will be hauled off-site and disposed of in an appropriate manner. NEXUS is evaluating the need for specifying blast rock disposal areas in the Project vicinity. Any remaining rock will be used to backfill the trench to the top of the existing bedrock profiles.

1.7.2 Aboveground Facilities

The Project aboveground facilities will be constructed in compliance with the same federal regulations and guidelines as the pipeline facilities, and in accordance with the specific requirements of applicable federal and state approvals. The construction and restoration methods and procedures in the FERC Plan and FERC Procedures and the Project E&SCP will be followed, as applicable, for the aboveground facilities as well. Generally, aboveground facilities are sited to avoid cultural and natural resource impacts to the greatest extent feasible. Following is a brief description of the typical construction sequence for the new compressor stations.

1.7.2.1 Compressor Stations

A natural gas compressor station is similar to a pump station on a water line or other liquid system in that it provides the pressure in the pipeline to move the gas. The general construction procedures consist of clearing and grading the site, installation of foundations, installation of the piping, installation of the structures and machinery, start-up, testing and final clean up and stabilization of the site. Construction of the compressor stations is expected to begin in the first quarter of 2017 and extend into the fourth quarter of 2017.

Clearing and Grading

The first activity to take place at a new compressor station site is to clear the existing vegetation and establish a rough access road to the site. Only those areas required to install the structures, piping and roads, including sufficient workspaces, will be cleared. Some clearing will also be needed to install the perimeter security fencing. Stumps will be removed and either disposed of appropriately on site or hauled to an approved off-site disposal location. Commercial power and telephone will be established at the site as soon as possible. The cleared areas of the site will then be graded, if necessary, to provide level surfaces for the building foundations and work areas. The permanent site roadways and parking areas will be graded at this time as well. Large rocks dislodged during grading or other excavation will be properly disposed of on site or hauled off site for disposal in an approved area. Installation of various erosion and sedimentation controls will begin during the initial clearing of the site. These may take many forms and will be installed and maintained in accordance with the FERC Plan and FERC Procedures and the NEXUS Project E&SCP.

Foundations

Once the building sites have been cleared and graded, excavation will begin for the installation of building foundations and pipe supports. Generally, the foundation for the compressor building requires a significant mass of reinforced concrete to provide a stable support for the operating machinery. The area for the foundations must be excavated below the prevalent frost line for the site, adequate forms and reinforcing bars are installed and high strength concrete is poured to the appropriate levels. Rigid

controls on concrete quality and installation procedures ensure that a suitable foundation is obtained. Blasting may be required at some compressor station locations to install foundations and underground piping.

Piping

Installation of the various piping systems will begin at about the same time as the foundation work. Trenches will be dug for the underground portions of the piping. The pipe will be welded, radiographed or x-rayed, coated, and placed in the trench and backfilled. Some portions of the station piping will occur aboveground. Any aboveground piping will be installed on concrete or metal pipe supports and painted. Acoustic insulation may be installed on some of the piping for noise control. Some of the piping, valves and fittings are typically fabricated off-site at a fabrication shop and then transported to the site. As major parts of the piping are completed, each will be pressure tested to ensure its integrity. Test water is usually trucked to the site for the testing and will be discharged to the stormwater management system at each site or to a well vegetated upland area. Dewatering is performed with proper erosion and sedimentation controls as set forth in the FERC Plan and FERC Procedures and the NEXUS Project E&SCP. Electrical conduit systems will be installed during this period as well as domestic water and septic systems.

Structures and Machinery

Once the foundations have been completed and cured sufficiently, installation of the buildings and machinery for the station may begin. This is a highly coordinated activity as the machinery, buildings and piping are all installed during the same time period. Various piping and electrical conduit systems are connected once the machinery is set. Electrical wiring is installed for power and instrumentation. Domestic water and septic systems will be connected to the buildings as they are completed.

Start-up and Testing

As the various systems and subsystems are completed, they will be tested and calibrated for proper operation. Use of new computerized systems will allow much of the testing to proceed before gas is received at the site. Actual start-up of the compressor units will commence once the new facilities are tested and tied into the existing pipeline.

Final Clean up and Stabilization

Clean up and stabilization of the station yards will be an ongoing process throughout construction. Sections of the compressor station yards will be final graded, fertilized, seeded and mulched as work is completed and as provided in the FERC Plan and FERC Procedures and the Project E&SCP. Permanent erosion controls will be installed on a similar basis. It is anticipated that most of final stabilization will be complete prior to final testing and start-up of the compressors.

1.8 Environmental Training for Construction

Consistent with FERC guidelines, environmental training will be given to NEXUS' personnel and to contractor personnel whose activities may impact the environment during pipeline and aboveground facility construction (training protocol and content are outlined in the Project E&SCP, Appendix 1B1). The level of training will be commensurate with the type of duties of the personnel. All construction personnel from the chief inspector, environmental inspector, craft inspectors, and contractor job superintendent to loggers, welders, equipment operators, and laborers will be given the appropriate level of environmental training. The training will be given prior to the start of construction and throughout the construction process, as needed. The training program will cover the FERC Plan and FERC Procedures, Project-specific permit conditions, company policies, cultural resource procedures, threatened and endangered species restrictions, the Project E&SCP, the SPCC Plan, and any other pertinent information related to the Project. In addition to the environmental inspectors, all other construction personnel are expected to play an important role in maintaining strict compliance with all permit conditions to protect the environment during construction.

1.9 Construction Schedule and Work Force

The projected in-service date for the NEXUS Project is November 1, 2017. Construction of Project facilities is expected to start in the winter of 2016 with tree clearing and will be completed in November of 2017. Table 1.9-1 provides a preliminary construction schedule.

1.10 Operation and Maintenance

NEXUS personnel will patrol the pipeline on a routine basis and personnel qualified to perform both emergency and routine maintenance on interstate pipeline facilities will handle emergencies and maintenance.

The following sections provide specific detail on standard operation and maintenance procedures for cleared areas, erosion control and periodic pipeline and ROW patrols.

1.10.1 Erosion Control

Evidence of post-construction soil erosion or sedimentation on the pipeline ROW will be reported to the local operations supervisor. These reports may originate from NEXUS personnel performing routine patrols or from landowners. Prompt corrective measures will be performed as needed in accordance with the Project E&SCP.

1.10.2 Pipeline and ROW Patrols

During periodic pipeline and ROW patrols, all permanent erosion control devices installed during construction will be inspected to ensure that they are functioning properly. In addition, attention will be given to:

- Erosion and wash-outs along the ROW;
- Performance of water control devices such as diversions;
- Condition of banks at stream and river crossings;
- Fallen timber or other threats to the pipeline;
- General health of shrubs and other vegetation planted during construction; and
- Any other conditions that could endanger the pipeline, including third party excavation or encroachment on the ROW.

The local operations supervisor will be notified of any conditions that need attention. Significant conditions will be reported to the pipeline owners. Corrective measures will be performed in accordance with applicable regulations and standards.

1.11 Future Plans and Abandonment

At this time, NEXUS has not identified any specific plans for future expansion or abandonment of the facilities proposed in this docket. If additional demand for natural gas requires future expansion, NEXUS will seek the appropriate authorizations from FERC. When and if an Application is filed, the environmental impact of the new proposed facilities would be examined.

1.12 Public-Landowner/Agency Consultation

NEXUS began advising potential stakeholders, government officials, and other interested persons about the Project in September 2014 through letters and individual meetings. NEXUS has contacted officials at the federal, state, and local governments, including congressional delegations, state legislators, county commissioners, and local elected officials. As further described in the following sections, NEXUS has also met with members of the public through voluntary public outreach efforts.

A list of the other potential stakeholders that NEXUS has identified and a list of government officials contacted are included as Appendix E of the Public and Agency Participation Plan (Appendix 1C3). NEXUS will continue its ongoing efforts to identify and contact other potential stakeholders and interested persons, and updates to Appendix 1C1 will be submitted to Commission Staff, accordingly.

1.12.1 Public Officials Contacts

NEXUS representatives initially contacted federal, state and local public officials in September 2014 regarding the proposed Project. Additionally, NEXUS has held numerous face to face meetings with public officials along the route and attended various county commission and township trustee meetings to provide Project updates. As the Project continues through FERC's pre-filing process, meetings held with public officials will be included in the monthly report submitted to FERC and posted to the docket under docket number PF15-10-000.

1.12.2 Landowner Contacts

Proposed new Project facilities will affect portions of thirteen (13) counties in Ohio and three (3) counties in Michigan. . The proposed Project's footprint will have approximately 1,675 total affected landowner tracts along the pipeline portion of the Project. To date, these landowners have been contacted or multiple attempts have been made at making contacts by NEXUS. These communications have included a Project introduction letter, a letter requesting survey permission, individual discussions with NEXUS representatives, and site visits.

NEXUS began communicating with landowners within a 600-foot study corridor in August 2014, and landowner notification letters and survey permission letters were mailed to all identified affected landowners and those that are newly identified as Project route changes are developed. To date, NEXUS has been granted survey permission on 1,229 tracts of the total affected landowners, which constitutes 73 percent of the proposed Project ROW required to be surveyed.

NEXUS hosted a total of nine voluntary informational meetings for stakeholders in the vicinity of the proposed Project; seven in Ohio in October 2014 and two in Michigan in November 2014. Landowners affected by the survey study corridor were sent invitations to attend the respective meetings. The voluntary informational meetings were set up similar to open house meetings, with subject matter experts available in the areas of surveying, construction, environmental impacts, regulatory affairs, state and federal relations, and ROW activities. Aerial imagery mapping identifying impacted tracts by landowner were available to allow for site specific discussion between the project team and interested stakeholders.

Attendees were encouraged to ask general questions about the Project scope, schedule, noise levels, and safety and tract-specific questions around Project impacts. All questions were addressed during the informational meetings to the extent possible and any follow-up actions were tracked. To maximize landowner participation, all landowner Informational Meetings were held from 5:00 p.m. to 7:30 p.m. The dates and locations of the Informational Meetings are summarized below:

- October 7, 2014 Firelands Elementary School, Oberlin, Ohio (Lorain County)
- October 8, 2014 Stark State College, North Canton, Ohio (Columbiana, Stark, Summit, & Carroll Counties)
- October 9, 2014 Medina Community Rec. Center, Medina, Ohio (Medina & Wayne Counties)
- October 13, 2014 Swanton High School, Swanton, Ohio (Fulton & Lucas Counties)
- October 14, 2014 Margaretta Elementary School, Castalia, Ohio (Erie County)
- October 15, 2014 Terra Community College, Fremont, Ohio (Sandusky County)

- October 16, 2014 Owens Community College, Perrysburg, Ohio (Wood County)
- November 12, 2014 Lincoln High School, Ypsilanti, Michigan (Washtenaw County)
- November 13, 2014 Adrian High School, Adrian, Michigan (Lenawee County)

In addition, NEXUS held eight Open Houses along the pipeline route in Ohio and Michigan during February of 2015. The dates and locations of the Open House Meetings are summarized below:

- February 2, 2015 The Galaxy Banquet Center, Wadsworth, Ohio
- February 3, 2015 Lorain County Community College, Elyria, Ohio
- February 4, 2015 Margaretta Elementary School, Castalia, Ohio
- February 5, 2015 Terra State Community College, Fremont, Ohio
- February 10, 2015 United Local High School, Hanoverton, Ohio
- February 11, 2015 Swanton High School, Swanton, Ohio
- February 17, 2015 Adrian College, Adrian Michigan
- February 18, 2015 Lincoln High School, Ypsilanti, Michigan

NEXUS representatives were also available to stakeholders for the purpose of answering Project related questions for approximately one hour immediately prior to each of the FERC Public Scoping Meetings held by FERC in April and May 2015. The dates and locations of these meetings are summarized below:

- April 28, 2015 Midview Middle School, Grafton, Ohio
- April 29, 2015 Wadsworth High School, Wadsworth, Ohio
- April 30, 2015 Louisville High School, Louisville, Ohio
- May 5, 2015 Tecumseh Center for the Arts, Tecumseh, Michigan
- May 6, 2015 Swanton High School, Swanton, Ohio
- May 7, 2015 Fremont Ross High School, Freemont, Ohio

1.12.3 Agency Consultations

In addition to its public outreach efforts with landowners and local officials, NEXUS has been conducting an extensive planning and consultation process with Federal, state and local regulatory agencies, resource agencies and other groups having a stake in the Project. The consultation process involved briefings, meetings, letter requests for resource information, and telephone discussions and emails. This section provides a brief description of the more substantive agency and stakeholder consultations that have occurred to date.

Threatened and Endangered Species Consultations

As required under Section 7 of the U.S. Endangered Species Act and Ohio and Michigan protected species regulations, NEXUS initiated informal consultations with Federal and state resource agencies to update the known locations of federal- or state-listed threatened or endangered species and species of special concern, if any, that could potentially be affected by construction or operation of the Project. In most cases, responses have been received and follow-up consultations, meetings and field visits have occurred. Copies of agency correspondence received to date are provided in Appendix 1C2. NEXUS has maintained communications with regulatory agencies throughout the planning process and has shared the agencies species-specific survey protocols for agency review and comments prior to implementation in

the spring/summer of 2015. NEXUS has scheduled update meetings with the Michigan Department of Natural Resources (“MDNR”) on June 16, 2015; and the USFWS, Region 3 Office, on June 26, 2015.

Interagency and Other Review/Resource Agency Meetings

NEXUS has conducted 11 agency meetings to date to introduce the Project to agency representatives and to initiate communications regarding upcoming field surveys. NEXUS also informed agencies of its intent to use the FERC’s pre-filing process and discussed the anticipated timeline and filing requirements for various permit applications and how they relate to the FERC’s NEPA compliance process. The following agency introductory meetings have been conducted to date:

- USFWS, Columbus Ohio Field Office October 7, 2014
- Michigan State Historic Preservation Office October 8, 2014
- Ohio Department of Natural Resources October 14, 2014
- Ohio State Historic Preservation Office October 16, 2014
- Michigan Department of Natural Resources November 3, 2014
- USFWS Michigan Field Office November 12, 2014
- Ohio Environmental Protection Agency December 17, 2014
- U.S. Army Corps of Engineers; Buffalo, Huntington, Pittsburg Districts and Michigan Department of Environmental Quality January 14, 2015
- Ohio Environmental Protection Agency (project introduction to wetland and waterbody permitting staff) February 12, 2015
- Michigan Department of Environmental Quality (project introduction to wetland and waterbody permitting staff) February 17, 2015
- Ohio Environmental Protection Agency April 14, 2015
(Central Office –Air Quality Management District, Northeast District Office, Akron Regional Air Quality Management District, Northwest District Office, Ohio Environmental Protection Agency (project air permitting strategy overview))

NEXUS expects that agency coordination will be ongoing throughout the development process. NEXUS has also commenced participation in the FERC’s bi-weekly agency coordination meeting as a means to allow participating and cooperating regulatory agencies in Ohio and Michigan to keep up to date on NEXUS Project progress and to ask questions of NEXUS. Representatives from the U.S. Army Corps of Engineers, USFWS, USEPA, Ohio and Michigan State Historic Preservation Offices, National Park Service, Ohio and Michigan Departments of Transportation, Ohio and Michigan Departments of Natural Resources, and others have been invited to attend FERC’s biweekly agency meetings.

1.13 Permits and Approvals

Construction contractor(s) engaged by NEXUS will be required to observe and comply with all applicable Federal, state and local laws, ordinances, and regulations that apply to the conduct of the work. During the performance of the work, contractors will be required to comply with the Minimum Federal Safety Standards adopted by the USDOT under the Natural Gas Pipeline Safety Act of 1968, as amended, Occupation Safety and Health Administration guidelines, and NEXUS’ own standards.

Other safety construction codes and regulations may be enacted or adopted by duly constituted government agencies and bodies having jurisdiction over the locations where the work is to be performed. The contractor(s) will be required to observe and abide by all provisions that are applicable.

Notwithstanding anything to the contrary set forth in this section, nothing stated herein shall be construed to indicate that any state, regional, or local agency referred to has the power to impose any requirement inconsistent with federal law or to refuse to issue or to unreasonably delay the issuance or processing of any state, regional, or local permit, license, certificate, approval, review, or other requirement; nor shall this document be construed to limit NEXUS' legal rights under the NGA (15 U.S.C. § 717, *et seq.*), Pipeline Safety Improvement Act (49 U.S.C. §§ 60101, *et seq.*), or the United States Constitution, including, but not limited to, the Supremacy Clause and the Commerce Clause.

The construction, operation, and maintenance of the Project will require multiple permits and regulatory approvals from various federal, state, and local agencies, as well as consultations with Native American tribes and other interested parties. Consultations have been initiated with the several agencies as discussed in Section 1.12.3. Consultations with these and other agencies will continue throughout the Project review and permitting process. The applicable federal, state, and local permits and approvals, responsible agencies, filing status, and schedule for these permits and approvals are summarized in Table 1.13-1.

1.14 Status of Field Surveys

NEXUS has completed required wetlands and waterbody field surveys on approximately 71 percent of the proposed pipeline route and cultural resource surveys have been completed on approximately 69 percent of the proposed route. In addition, all four of the proposed compressor station sites have been field surveyed for cultural and biological resources. NEXUS will also continue to engage Federal and state resource agencies to identify known locations of federal- or state-listed threatened or endangered species and species of special concern that could potentially be affected by construction or operation of the Project. A summary of the field survey status is presented below.

1.14.1 Biological Field Surveys

NEXUS is conducting wetland and waterbody field surveys within a 300-foot-wide survey corridor centered on the proposed pipeline centerline, along access roads, and within properties where aboveground facilities are proposed outside of the pipeline survey corridor. Approximately 71 percent of the total Project route has been surveyed for wetland and waterbodies. Results of the wetland and waterbody surveys for the NEXUS Project are provided in Draft Resource Report 2. Currently, NEXUS is performing geotechnical investigations and is evaluating the engineering feasibility of implementing the HDD crossing method (*see* Table 1.7-1) for a number of the large waterbody crossings along the route, as described further in Draft Resource Report 2, Section 2.3.

NEXUS has consulted with the USFWS, Ohio Department of Natural Resources, MDNR and Michigan Natural Features Inventory regarding potential rare species within the Project area and requested information on known federal or state species records within a one-mile wide corridor of the Project pipeline route (*see* Draft Resource Report 1 Appendix 1C2). NEXUS evaluated the potential occurrence of protected species and their locations relative to the pipeline route. Further evaluation of habitat information collected from field surveys in the fall of 2014 and publically available information was also performed to determine the need for on-site species specific surveys. NEXUS has developed several proposed species survey protocols and is currently consulting with USFWS, MDNR, and Ohio Department of Natural Resources regarding proposed species-specific surveys. Surveys are currently on-going for several species and will continue throughout the summer and early fall. More detail regarding these survey protocols and field efforts are provided in Draft Resource Report 3, Section 3.5.

1.14.2 Cultural Field Surveys

Preliminary cultural resources background research and literature file reviews were performed at the Ohio and Michigan State Historic Preservation Offices during the summer and fall of 2014, and approximately 170.8 miles (68.6 percent) of identification-level field investigations have been completed for the NEXUS Project.

According to the available data reviewed to date, there are 729 archaeological sites recorded within one mile of the centerline of the proposed NEXUS pipeline. Field surveys for archaeological resources have been completed within a 300-foot-wide study corridor along approximately 68.6 percent of the proposed pipeline route. Survey investigations have also been completed for the proposed compressor station sites and compressor station alternative sites, as well as available access roads. A total of 101 sites have been identified within the Project's survey corridor and compressor station alternative sites. Ninety-eight of these sites will not be recommended as eligible for listing in the National Register of Historic Places. Three sites are potentially National Register of Historic Places eligible and recommended for avoidance or further evaluation; NEXUS is presently reviewing alternatives for avoidance to these resources.

The architectural survey has been completed for all of the Ohio and Michigan segments of the proposed pipeline route, as well as for the proposed aboveground facilities and available access roads. These survey investigations have resulted in the identification of 135 architectural resources in Ohio, and 57 architectural resources in Michigan. Of the 135 architectural resources in Ohio, 37 properties are recommended as potentially eligible for listing in the National Register, but should not be adversely affected by the Project while two properties in Michigan are recommended eligible for listing in the National Register, but should not be adversely affected by the Project. The remaining 153 historic architectural/industrial properties are recommended as not eligible for the National Register, and no additional evaluation is recommended. Results of the cultural resource surveys for the NEXUS Project are provided in Draft Resource Report 4.

1.15 Non-Jurisdictional Facilities

Non-jurisdictional facilities are those facilities related to the Project that are constructed, owned, and operated by others that are not subject to FERC jurisdiction. Non-jurisdictional facilities associated with the Project include the proposed construction and operation of new compressor units at two existing DTE Gas compressor station facilities in Michigan, as well as short connections to distribution lines to secure power to serve compressor stations, M&R stations and mainline valves proposed for the NEXUS Project. In addition, we note that Vector U.S. anticipates modifying the existing Milford Meter Station located in Oakland County Michigan, to receive natural gas. While these modifications to Milford Meter Station are FERC jurisdictional, we understand that Vector U.S. will proceed under its existing blanket authorization from the FERC and that only limited environmental review is required.

1.15.1 DTE Gas Non-Jurisdictional Facilities

In order to support the NEXUS Project, DTE Gas proposes to modify existing facilities including the Willow Gate Station and Willow Run Compressor Station located in Ypsilanti Township, Washtenaw County, Michigan; and the Milford Compressor Station located in Milford Township, Oakland County, Michigan. USGS topographic map excerpts showing the locations of DTE Gas' WGS, WRCS, and MCS are included as Figures 1.15-1 and 1.15-2. Descriptions of the proposed modifications at each facility and are summarized below:

Existing Willow Gate Station Modifications

Modifications to the Willow Gate Station will be constructed entirely within property currently owned by DTE Gas and will include:

- Pipe additions totaling approximately 2,000 linear feet of 36-inch, 30-inch, 24-inch, 16-inch, and 12-inch diameter pipe and necessary valves.
- One (1) 9- MMBTU/hr (one million British Thermal Units /hour) water bath line heater.
- Two (2) 6-MMBTU/hr water bath line heaters.

Existing Willow Run Compressor Station Modifications

Modifications to the Willow Run Compressor Station will be constructed entirely within property currently owned by DTE Gas and will include:

- Addition of up to 18,000-hp of new gas compression including associated compressor building
- Miscellaneous station/unit piping.
- Approximately 2,500 linear feet of 30-inch station discharge piping to Willow Gate Station.

Existing Milford Compressor Station Modifications

Modifications to the Milford Compressor Station will be constructed entirely within property currently owned by DTE Gas and will include:

- Addition of up to 45,000 hp of new gas compression including associated compressor buildings
- Miscellaneous station/unit piping.
- Approximately 2,000 linear feet of 36-inch suction/discharge header piping to existing DTE Gas transmission pipeline(s) valve nest.

Construction Schedules for DTE Gas Facilities Modifications

- Willow Gate Station

Due to the critical nature of the Willow Gate Station to support the DTE Gas distribution system, modifications to the Willow Gate Station will be performed over a 2-year period.

- Phase-1 Summer of 2016 – water bath gas heaters and certain valve tie-ins
- Phase-2 Summer of 2017 – tie-ins to Willow Run Compressor Station and NEXUS meter station.
- The Willow Gate Station interconnect to NEXUS will be available for service by November 1, 2017.

- Willow Run Compressor Station

Construction of the modifications to the Willow Run Compressor Station are planned to begin in the fall of 2016 with the completion of the facilities modifications and availability for service planned for November 1, 2017.

- Milford Compressor Station

Construction is planned to begin in the fall of 2016 and the proposed facilities available for service by November 1, 2017.

DTE Gas Non-Jurisdictional Facility Regulatory Permitting Status

Table 1.15-1 and Table 1.15-2 provide a summary of the regulatory authorizations and regulatory notifications for the required modifications to DTE Gas existing facilities.

1.15.2 NEXUS Aboveground Facility Electric Connections

The compressor stations, M&R stations and mainline valves proposed for the NEXUS Project will require connection to the local electrical distribution grid. The facilities will be sited near existing public roads with electric distribution lines. Therefore, short connections to existing electrical distribution lines will be required.

1.15.3 Vector U.S. Ancillary Facilities

In order to support the NEXUS Project, Vector U.S. has advised NEXUS that it intends to modify the existing Milford Meter Station located in Oakland County, Michigan, to receive natural gas. Vector U.S. has advised NEXUS that the modification involves removing an existing 30-inch ultrasonic meter and replacing it with two 20-inch ultrasonic, bi-directional meters and adding various yard piping and valves. NEXUS also understands from Vector U.S. that it will construct approximately 0.6 miles of 30-inch pipeline to enable gas originating from NEXUS to move to the suction side of Vector U.S.'s existing Highland compressor station (*see* Figure 1.15-3 as provided by Vector U.S.).

Regulatory Permitting Status for Vector U.S. Non-jurisdictional Facilities

Environmental surveys will be completed for the proposed modifications at the Milford Meter Station to support environmental permits and demonstrate automatic authorization compliance under Vector U.S.'s Blanket Certificate. The following environmental surveys, agency consultation and/or regulatory approvals will be completed for the Vector, U.S. facility modifications:

- Presence/absence surveys for protected tree roosting bats and/or any other required habitat or species surveys in compliance with the U.S. Endangered Species Act.
- Cultural resources surveys in support of Section 106 of the National Historic Preservation Act review(s).
- Wetland and stream delineation in support of Joint Permit Application per Section 401/404 of the Clean Water Act.
- Erosion and Sediment control along with permanent storm water control design to comply with various federal and state regulations.

Vector U.S. has advised NEXUS that it will perform this work under its blanket Certificate, which was issued by the Commission in Docket No. CP98-135-000 on May 27, 1999, utilizing the automatic authorization permitted by CFR §157.203(b). NEXUS understands that Vector U.S. will provide notice of such work after construction is complete and the facilities are placed in-service as part of its Annual Subpart F Blanket Report to FERC.

1.15.4 Four Factor Test for Jurisdictional Determinations

In order to determine whether non-jurisdictional components or facilities associated with a proposed project require environmental review by FERC, a four factor test is applied using the criteria specified in 18 CFR. §380.12(c)(2)(ii).¹ In short, these criteria are intended to determine whether there is sufficient federal control and responsibility over the subject component or facility as a whole to warrant environmental analysis. These factors to be considered include:

- i. Whether the regulated activity comprises “merely a link” in a corridor type project, e.g., a transportation or utility transmission project;
- ii. Whether there are aspects of the non-jurisdictional facility in the immediate vicinity of the regulated activity that affect the location and configuration of the regulated activity;
- iii. The extent to which the entire project would be within FERC’s jurisdiction; and
- iv. The extent of cumulative federal control and responsibility.

NEXUS has evaluated the four factors to be considered by FERC to determine whether an environmental analysis of the non-jurisdictional facilities by FERC is warranted. NEXUS has concluded that the

¹ See also Revisions to Regulations Governing Authorizations for Construction of Natural Gas Pipeline Facilities, 56 Fed. Reg. 52,330, 52,344 (Oct. 18, 1991).

proposed construction and operation of the new compressor units at two existing DTE Gas compressor station facilities in Michigan should not be included as part of FERC's environmental analysis solely on the basis of the four factor test. The regulated activity is merely a link in a corridor type project, and the new compressors do not determine the location and configuration of the NEXUS facilities, are not within FERC's jurisdiction, and have no other federal control and responsibility to warrant federal review of an otherwise private action.

NEXUS has also concluded that the remaining non-jurisdictional facilities, namely the electrical hook-ups for the compressor stations, M&R stations and mainline valves, while related to the Project, do not warrant FERC review because: (i) mere links in corridor-type projects (as in this case) do not justify review of non-jurisdictional facilities; (ii) the non-jurisdictional facilities in the immediate vicinity of the Project facilities did not affect the configuration and location of the Project; (iii) the non-jurisdictional electric distribution facilities are regulated by the Public Utility Commission of Ohio and MPSC and are not regulated by FERC; and (iv) the non-jurisdictional facilities will not be federally controlled or regulated, nor are any federal permits required for construction of those facilities.

Given the geographic proximity between the NEXUS Project and the non-jurisdictional facilities (specifically, the expanded DTE Gas compression stations and the electrical hook-ups for M&R stations and mainline valves), these non-jurisdictional facilities may be considered for potential cumulative impacts with the NEXUS Project as a whole.

1.16 Cumulative Impacts

In consideration of the potential for cumulative impacts, NEXUS has analyzed past, present and reasonably foreseeable future projects that could reasonably be expected to impact regional resources that will also be impacted by the NEXUS Project. To identify reasonably foreseeable future projects, NEXUS reviewed its Project alignment sheets, topographic maps and publically available data in conjunction with field reconnaissance and internet research and review of existing GIS data. Projects included in this cumulative impact analysis are those located within the same municipalities directly affected by construction of the Project. Table 1.16-1 lists reasonably foreseeable future projects that may cumulatively impact resources that would be affected by the construction and operation of the NEXUS Project.

1.16.1 Water Resources and Wetlands

Construction of the Project facilities will result in temporary impacts to water resources and wetlands. Each proponent for the projects listed in Table 1.16-1 will be required by the terms and conditions of their respective Clean Water Act Section 404 dredge/fill permits and Section 401 water quality certification requirements to provide compensatory mitigation for unavoidable impacts to waters of the U.S. The construction and operation of the NEXUS Project, along with the other potential projects, could result in a cumulative reduction in the amount and/or type of wetland within the respective municipalities and watersheds. NEXUS will work with regulatory agencies to identify appropriate mitigation should compensation for unavoidable impacts be deemed appropriate. In addition, NEXUS is proposing to utilize HDD crossing methods to avoid impacts to stream segments that have exceptional water quality, special ecological significance, or recreational value; including all of the Nationwide River Inventory-designated stream crossings and navigable waters crossed by the Project. Potential impacts to wetlands and waterbodies resulting from construction and operations of the proposed NEXUS Project are covered in detail in Draft Resource Report 2.

1.16.2 Vegetation and Wildlife

When projects are constructed at or near the same time, the combination of construction activities could have a cumulative impact on vegetation and wildlife in the immediate area. Clearing and grading and other construction activities associated with the projects will result in the removal of vegetation, alteration

of wildlife habitat, displacement of wildlife, and other secondary effects such as forest fragmentation and potential introduction of exotic invasive plant species.

It is expected that each project's permit conditions in addition to implementation of the FERC Plan and the FERC Procedures will require mitigation measures that will be implemented to minimize the potential for erosion, ensure re-vegetation of disturbed areas, increase the stabilization of site conditions, and control the spread of invasive species, and therefore minimize the degree and duration of the cumulative impact on vegetation and terrestrial wildlife from these projects. Potential impacts to vegetation and wildlife resulting from construction and operations of the NEXUS Project are covered in detail in Draft Resource Report 3.

1.16.3 Cultural Resources

Past disturbances to cultural resources in the Project area are typically related to accidental disturbances, intentional destruction or vandalism, lack of awareness of the historic value, and construction and maintenance operations associated with existing roads, railroads, utility lines, and electrical transmission line ROWs.

Federally regulated projects will include extensive research to identify cultural resources of potential historical significance in the vicinity of the projects, as well as mitigation measures designed to avoid or minimize additional direct impacts on these cultural resources. Typically these efforts are also coordinated with state historic preservation offices in Ohio and Michigan. Non-federal actions will need to comply with the procedures and mitigation measures required by the States of Ohio and Michigan. NEXUS is conducting a detailed review for cultural resources in the area of potential effect around the Project and has developed Project-specific plans to address unanticipated discoveries of cultural resources and human remains in the event they are discovered during construction. Potential impacts to cultural resources resulting from construction and operations of the proposed NEXUS Project are covered in detail in Draft Resource Report 4.

1.16.4 Socioeconomics

The NEXUS Project and the projects listed in Table 1.16-1 will generate temporary construction jobs. The local supply of construction workers needed for these projects may be derived from workers employed in the area, which will provide a direct economic benefit to those individuals and the communities in which they reside. The non-local laborers could represent an increase in the percent of the total population in the Project area (assuming half the construction workers are non-local); however, the existing local infrastructure and housing availability in the Project area is expected to be sufficient to provide for the needs of non-local workers. The anticipated sociologic effects of the proposed NEXUS Project are covered in detail in Draft Resource Report 5.

There will be positive cumulative economic benefits from these projects. For example, once completed, the projects to build or improve highways, roads and bridges will improve access necessary for commerce in the area. Taxes generated from such commerce and from operation of revenue-generating projects will result in an annual tax revenue increase. Permanent employment will also increase to support the operation of these projects, with the cumulative benefit of potentially lowering local unemployment rates.

1.16.5 Geology, Soils and Sediments

The facilities associated with the Project are expected to have a direct but temporary impact on near-surface geology, soils, and sediments. Clearing and grading associated with construction of the NEXUS Project and the other projects listed in Table 1.16-1 and shown in Figure 1.16-1 could, without adequate protection, accelerate the soil erosion process and, without adequate protection, could result in discharge of sediment to adjacent waterbodies and wetlands. Because the direct effects will be localized and limited primarily to the period of construction, cumulative impacts on geology, soils, and sediments will only occur if other projects are constructed at the same time and place as the proposed NEXUS Project facilities. The construction schedules of some of the projects listed in Table 1.16-1 coincide with the

schedule proposed for the NEXUS Project. NEXUS will implement the provisions of the FERC Plan and the Project E&SCP to establish a baseline for minimizing the potential for erosion as a result of water or wind action and to aid in reestablishing vegetation after construction. In addition, disturbance associated with construction activities will be minimized and mitigated through the application of Best Management Practices that are incorporated in the Project E&SCP. Should hazardous materials or contaminated soils and/or sediments be encountered during construction, they will be disposed of at fully licensed and permitted disposal facilities in accordance with applicable state and federal laws and regulations. As a result, the cumulative effects on geological resources, soils, and sediments are expected to be temporary and minor.

1.16.6 Land Use

The Project and several other projects listed in Table 1.16-1 will result in both temporary and permanent changes to current land uses. The current NEXUS pipeline route is co-located with existing utility rights of way for approximately 55 percent of the proposed route; with an additional 38 percent of the route, (that is not co-located with existing utilities), crossing agricultural land uses, resulting a total of 93 percent of the proposed pipeline route sited to avoid conversion of existing land uses.

New permanent effects on land use will be relatively minor because only 27 percent of the total area disturbed during construction will remain in permanent easements during operations. Approximately 73 percent of the land temporarily affected during construction of the Project, will be allowed to revert to prior land uses following construction.

Following construction, the 73 percent of land temporarily affected by construction activities will be restored, as near as possible, to pre-construction contours and revegetated in accordance with the FERC Plan and the FERC Procedures. Forested areas affected within the temporary construction workspace will be allowed to revert to forest habitats following construction. Most land uses, except forest habitat located over the permanent easement, will be allowed to revert to pre-construction uses following construction. NEXUS will maintain the area over the pipeline and within the permanent easement in herbaceous cover types to facilitate monitoring of the pipeline ROW as part of the integrity management program further described in Draft Resource Report 11. In most locations, agricultural activities may resume within the permanent ROW following construction, however, some restrictions would apply such as prohibitions on constructing aboveground structures. Details regarding potential impacts to land use resulting from construction and operations of the proposed NEXUS Project are summarized in Draft Resource Report 8.

1.16.7 Air Quality

Construction equipment and vehicles emit air pollutants in the immediate vicinity of construction, and fugitive dust emissions are generated by soil excavation and other construction activities. The cumulative impact on air quality from construction of the Project and projects listed in Table 1.16-1, will depend on the type of construction activities that are taking place at the same time and how close in proximity the construction activities are occurring. Construction of some of these projects is either i) already complete, ii) will occur in phases over many years (such as the highway projects) which reduces their impact at a given location during a given time period, or iii) will occur at varying distances from the Project such that construction of many of the other projects will result in a minimal, if any, cumulative impact with Project construction activities. Dust generated by the Project will be controlled by watering down the construction workspace or application of other dust control agents at regular intervals. Because construction activities for the Project, along with the other projects, will be localized, temporary and of short duration in a particular area, the cumulative effect of construction activities is not expected to result in significant adverse air quality impacts.

Operation of the projects listed in Table 1.16-1 will have air emissions associated with them; however, the other sources of air emissions from operation of these recent or planned projects are or will be controlled in accordance with state and federal air pollution laws and regulations. As described in Draft Resource Report 9, the air emissions resulting from operation of the proposed compressor stations will be subject to

the limitations imposed by air emissions permits issued under state and federal laws and regulations. These limitations take into consideration ambient air quality, to prevent significant impact to or deterioration of air quality in the region. As a result, long term, permanent degradation of air quality from operation of the Project in conjunction with the other projects listed in Table 1.16-1 is not expected. In fact, to the extent that the new clean-burning natural gas supply provided by the Project is used to replace the burning of coal or other fossil fuels, the Project may result in an overall improvement in regional air quality. The additional natural gas brought to the region will enable utilities and industry in Ohio and Michigan and the Midwestern U.S. to utilize this clean fuel for continued or increasing use at existing natural gas-fired facilities and for fuel switching at existing facilities, which will minimize air emissions and support compliance with applicable emission-limiting standards. The use of natural gas results in lower emission rates of greenhouse gases and criteria air pollutants than all other fossil fuels (standardized to emissions per unit of energy consumed).

1.16.8 Noise Quality

Construction activities also have the potential to produce an increase in noise levels. Similar to potential cumulative air quality impacts, cumulative impacts from construction noise from the Project and the other projects listed in Table 1.16-1 also depends on the type of construction activities that are taking place at the same time and how close in proximity the construction activities are occurring. Because the noise generated by construction activities will be temporary and localized, construction activities for the Project along with the other projects are not expected to result in significant adverse noise impacts.

The design of the proposed compressor stations will include noise abatement measures, as applicable, to ensure the off-site impact of the noise generated by operation of the compressor station is in compliance with applicable noise standards, including the FERC sound level limits.

1.16.9 Conclusion

The majority of cumulative impacts would be temporary and minor when considered in combination with past, present, and reasonably foreseeable activities. However, some long-term cumulative impacts would occur on wetland and upland vegetation and associated wildlife habitats. Some long-term cumulative benefits to the community would be realized from the increased tax revenues. Short-term cumulative benefits would also be realized through jobs and wages and purchases of goods and materials.

1.17 References

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TABLES

TABLE 1.1-1
NEXUS Project Proposed Pipeline Facilities

State/Facility/County	Pipe Diameter (inches)	Milepost Begin a/	Milepost End a/	Length (miles) b/	Municipal Crossing in Miles c/
OHIO					
<u>Mainline</u>					
Columbiana	36	0.0	12.3	12.3	Hanover Township, 4.1 West Township, 5.8 Knox Township, 2.4
Stark	36	12.3	32.8	20.5	Washington Township, 7.1 Nimishillen Township, 1.4 Marlboro Township, 5.6 Lake Township, 6.4
Summit	36	32.8	48.1	15.3	Green, 7.3 New Franklin City, 8.0
Wayne	36	48.1	54.2	6.1	Chippewa Township, 6.1
Medina	36	54.2	77.2	23.0	Wadsworth Township, 2.5 Guilford Township, 6.2 Montville Township, 1.6 Lafayette Township, 6.2 York Township, 5.1 Litchfield Township, 1.4
Lorain	36	77.2	98.2	21.0	Grafton Township, 5.9 LaGrange Township, 5.2 Pittsfield Township, 3.3 New Russia Township, 1.7 Oberlin Township, 0.6 Henrietta 4.3
Erie	36	98.2	127.1	28.9	Florence Township, 5.3 Berlin Township, 7.4 Milan Township, 5.3 Oxford Township, 5.4 Groton Township, 5.5
Sandusky	36	127.1	158.6	31.5	Townsend Township, 5.9 Riley Township, 6.4 Sandusky Township, 6.2 Washington Township, 6.4 Woodville Township, 6.6

TABLE 1.1-1					
NEXUS Project Proposed Pipeline Facilities					
State/Facility/County	Pipe Diameter (inches)	Milepost Begin a/	Milepost End a/	Length (miles) b/	Municipal Crossing in Miles c/
Wood	36	158.6	176.1	17.5	Troy Township, 6.7 Webster Township, 3.0 Middleton Township, 7.8
Lucas	36	176.1	183.9	7.8	Waterville Township, 4.8 Providence Township, 3.0
Henry	36	183.9	184.8	0.9	Washington Township 0.9
Fulton	36	184.8	202.7	17.9	Swan Creek Township, 8.0 Fulton Township, 5.5 Amboy Township, 4.4
Ohio Pipeline Facilities Subtotal:				202.7	
Michigan					
<u>Mainline</u>					
Lenawee	36	202.8	224.7	21.9	Ogden Township, 7.0 Palmyra Township, 4.2 Blissfield Township, 3.5 Deerfield Township, 1.3 Ridgeway Township, 5.6 Macon Township, 0.3
Monroe	36	224.7	231.2	6.5	Milan Township, 6.5
Washtenaw	36	231.2	249.0	17.9	York Township, 4.6 Augusta Township, 5.9 Ypsilanti Township, 7.4
Michigan Pipeline Facilities Subtotal:				46.3	
NEXUS MAINLINE PIPELINE TOTAL:				249.0	
Ohio					
<u>TGP Interconnecting Pipeline</u>					
Columbiana	36	TGP 0.0	TGP 0.9	0.9	Franklin Township, 0.1 Hanover Township, 0.8
TGP Interconnecting Pipeline Total::				0.9	

TABLE 1.1-1

NEXUS Project Proposed Pipeline Facilities

State/Facility/County	Pipe Diameter (inches)	Milepost Begin a/	Milepost End a/	Length (miles) b/	Municipal Crossing in Miles c/
a/ Approximate milepost along the pipeline rounded to the nearest tenth mile. b/ Crossing length within county. c/ Crossing length within municipality.					

TABLE 1.1-2

NEXUS Project Proposed Aboveground Facilities

Facility Name	NEMA Rated Horsepower a/	Milepost b/	Location
Ohio and Michigan			
<u>New Compressor Stations</u>			
Compressor Station 1 - Hanoverton	52,000	1.2	Hanover, Columbiana County, OH
Compressor Station 2 - Wadsworth	26,000	60.3	Guilford, Medina County, OH
Compressor Station 3 - Clyde	26,000	129.5	Townsend, Sandusky County, OH
Compressor Station 4 - Waterville	26,000	178.1	Waterville, Lucas County, OH
Total New Horsepower:	130,000		
<u>New M&R Stations</u>			
MR01	-	TGP 0.0	Franklin Township, Columbiana County, OH
MR02	-	0.0	Hanover Township, Columbiana County, OH
MR03	-	TGP 0.9	Hanover Township, Columbiana County, OH
MR04 c/	-	249.0	Ypsilanti Township, Washtenaw County, MI
<u>Over-pressure Regulation Installation (Mainline Valve Stations) d/</u>			
MLV-1	-	3.4	Hanover Township, Columbiana County, Ohio
MLV-2	-	14.3	Washington Township, Stark County, Ohio
MLV-3	-	33.4	Green City, Summit County, Ohio
MLV-4	-	42.3	New Franklin City, Summit County, Ohio
MLV-5	-	50.5	Chippewa Township, Wayne County, Ohio
MLV-6	-	63.1	Montville Township, Medina County, Ohio

TABLE 1.1-2
NEXUS Project Proposed Aboveground Facilities

Facility Name	NEMA Rated Horsepower a/	Milepost b/	Location
MLV-7	-	73.4	York Township, Medina County, Ohio
MLV-8	-	91.2	New Russia Township, Lorain County, Ohio
MLV-9	-	106.4	Berlin Township, Erie County, Ohio
MLV-10	-	117.9	Oxford Township, Erie County, Ohio
MLV-11	-	132.1	Townsend Township, Sandusky County, Ohio
MLV-12	-	145.2	Sandusky Township, Sandusky County, Ohio
MLV-13	-	153.1	Woodville Township, Sandusky County, Ohio
MLV-14	-	163.3	Troy Township, Wood County, Ohio
MLV-15	-	178.9	Waterville Township, Lucas County, Ohio
MLV-16	-	189.5	Swan Creek Township, Fulton County, Ohio
MLV-17	-	206.5	Ogden Township, Lenawee County, Michigan
MLV-18	-	222.5	Ridgeway Township, Lenawee County, Michigan
MLV-19	-	236.4	Augusta Township, Washtenaw County, Michigan
MLV-20	-	245.6	Ypsilanti Township, Washtenaw County, Michigan
<u>Launcher/Receiver Stations</u>			
Launcher (TGP Interconnection)	-	TGP 0.0	Franklin Township, Columbiana County, Ohio
Launcher/Receiver at Kensington	-	0.0	Hanover Township, Columbiana County, Ohio
Launcher/Receiver at CS 2	-	60.3	Guilford Township, Medina County, Ohio
Launcher/Receiver at CS 4	-	178.1	Waterville Township, Lucas County, Ohio
Receiver at Willow Run	-	249.0	Ypsilanti Township, Washtenaw County, Michigan
<p>a/ Horsepower information is not applicable to meter stations, MLVs, or the launcher and receiver facilities.</p> <p>b/ Approximate milepost along the pipeline rounded to the nearest tenth of a mile. Mileposts are presented for the mainline pipeline unless otherwise noted (TGP=TGP Interconnection).</p> <p>c/ Information for M&R Station 4 is preliminary; engineering design is on-going.</p> <p>d/ The number and locations of proposed MLVs are based on preliminary engineering design and will be updated based on finalization of the ongoing pipeline class location study and field verification.</p>			

TABLE 1.6-1		
Land Requirements for NEXUS Pipeline Facilities		
State/Facility Type/Facility	Construction Area (acres) a/	Operations Area (acres) b/
Ohio		
<i>Pipeline Facility</i>		
<u>Mainline</u>		
Pipeline Right-of-Way	2,386.9	1,225.3
Additional Temporary Workspace	748.4	0.0
<u>Interconnecting Pipeline</u>		
TGP Interconnecting Pipeline ROW	9.0	5.4
Additional Temporary Workspace	2.2	0.0
<i>Aboveground Facilities</i>		
<u>Compressor Stations</u>		
Compressor Station 1- Hanoverton	99.6	28.6
Compressor Station 2- Wadsworth	63.6	19.9
Compressor Station 3- Clyde	60.7	48.6
Compressor Station 4- Waterville	37.4	34.9
<u>Meter Stations</u>		
MR01	9.0	2.1
MR02 and MR03	11.3	4.5
<u>Additional Aboveground Facilities</u>	0.0	0.0
<i>Pipe and Contractor Yards</i>	244.8	0.0
<i>Access Roads c/</i>	60.2	1.7
Ohio Subtotal:	3,733.1	1,371.0
Michigan		
<i>Pipeline Facility</i>		
<u>Mainline</u>		
Pipeline Right-of-Way	552.3	280.2
Additional Temporary Workspace	190.4	0.0
<i>Aboveground Facilities</i>		
<u>Meter Station</u>		
MR04	2.6	2.1
<u>Additional Aboveground Facilities</u>	TBD	TBD
<i>Pipe and Contractor Yards</i>	67.8	0.0

TABLE 1.6-1 Land Requirements for NEXUS Pipeline Facilities		
State/Facility Type/Facility	Construction Area (acres) a/	Operations Area (acres) b/
<i>Access Roads</i>	14.1	0.3
Michigan Subtotal:	827.2	282.6
PROJECT TOTALS:	4,560.3	1,653.6
<p>Note: The totals shown in this table may not equal the sum of addends due to rounding.</p> <p>a/ Construction Area includes all areas required for construction of the greenfield facilities including the permanent operational ROW and the temporary construction ROW.</p> <p>b/ Operations Area includes only the new permanent easement or ROW. Operation Areas include the new permanent ROW for pipeline and aboveground facilities, including all areas inside perimeter fencing or where vegetation is maintained. However; small aboveground facilities located within the operational ROW of the pipeline or within the operational ROW for the compressor station or M&R station footprint, and do not contribute additional operational acreage, are calculated as having 0 acres of impact to avoid double counting of total operational area added for the project.</p> <p>c/ The acreage for the portion of access roads that will be within operational ROW for either the pipeline or other facilities is not included within the totals presented in this table to avoid double counting. Therefore, the totals for access roads within this table will not exactly match the values presented in Table 1.5-5.</p>		

TABLE 1.6-2

Land Requirements for NEXUS Aboveground Facilities

State/Facility Type/Facility	Milepost a/	Parcel Size (acres)	Approximate Site Dimensions b/		Construction Area (acres) c/	Operations Area (acres) d/
			Length (feet)	Width (feet)		
Ohio						
Compressor Stations						
Compressor Station 1 - Hanoverton	1.2	116.4	2,589	2,004	99.6	28.6
Compressor Station 2 - Wadsworth	60.3	75.2	2,455	1,332	63.6	19.9
Compressor Station 3 - Clyde	129.5	60.8	2,188	1,321	60.7	48.6
Compressor Station 4 - Waterville	178.1	37.4	1,627	1,311	37.4	34.9
M&R Stations						
MR01	TGP 0.0	35.2	300	300	9.0	2.1
MR02 and MR03	0.0/TGP 0.9	114.0	410	476	11.3	4.5
Ohio Subtotal:					281.6	138.6
Michigan						
M&R Station						
MR04	249.0	59.8	375	360	2.6	2.1
Michigan Subtotal:					2.6	2.1
PROJECT TOTALS					284.2	140.7
Note: The totals shown in this table may not equal the sum of addends due to rounding.						
a/ Approximate milepost along the pipeline rounded to the nearest tenth of a mile. Mileposts are presented for the mainline pipeline unless otherwise denoted (TGP= Interconnecting Pipeline to TGP).						
b/ Site dimensions refers to the total area owned by the applicant at aboveground facility sites which may not be the total area used for construction or operations. For irregular shaped sites the longest width and length are provided.						
c/ All areas required for construction of the facilities including the area used for operations and the temporary construction workspace.						
d/ Land Affected During Operation includes only the new permanent area used for operation of the compressor stations. Operation Areas includes all areas inside perimeter fencing or where vegetation is maintained. However, smaller aboveground MLVs located within the operational permanent ROW of the pipeline and do not contribute additional operational acreage, are calculated as having 0 acres of impact to avoid double counting of total operational area added for the Project.						

TABLE 1.6-3

Temporary and Permanent Access Roads along the NEXUS Project

State/Facility/ Road ID ^{a/}	Approx. MP of Intersect ^{b/}	Municipality, Township	Use (Permanent or Temporary)	Existing Surface ^{c/}	Approx. Length From Public Way to Project (feet) ^{e/}	Proposed Improvements & Comments ^{f/}
Ohio						
<u>Mainline</u>						
TAR-2.6	2.6	Hanover	Temporary	Gr	697	G
TAR-3.6	3.6	Hanover	Temporary	Gr	149	G/S
TAR-4.0	4.0	Hanover	Temporary	TBD	1766	G/S/W
TAR-4.3	4.3	West	Temporary	D/Gr	2870	G/S
TAR-4.8a	4.8	West	Temporary	TBD	233	G/W
TAR-4.8b	4.8	West	Temporary	TBD	350	G/W
TAR-7.2	7.2	West	Temporary	Gr	525	G
TAR-7.6	7.6	West	Temporary	Gr	1190	G/S
TAR-7.9	7.9	West	Temporary	D	808	G/W
TAR-10.4	10.4	Knox	Temporary	D/Gr	791	G
TAR-11.2	11.2	Knox	Temporary	D	1145	G/W
TAR-12.0	12.0	Knox	Temporary	D	612	G
TAR-13.0	13.0	Washington	Temporary	Gr	336	G
TAR-15.0	15.0	Washington	Temporary	D/G/Gr	2644	G/W
TAR-18.1	18.1	Washington	Temporary	Gr	1329	G
TAR-19.4	19.4	Nimishillen	Temporary	A/G	1500	W
TAR-19.8	19.8	Nimishillen	Temporary	D/Gr	2237	G/W
TAR-20.3	20.3	Nimishillen	Temporary	Gr	1132	G
TAR-24.6	24.6	Marlboro	Temporary	G	633	G/S/W
TAR-27.2	27.2	Lake	Temporary	G	1143	S/W
TAR-28.4	28.4	Lake	Temporary	G	526	S/W
TAR-34.0	34.0	Green	Temporary	D/G	2658	G/S
TAR-36.1	36.1	Green	Temporary	Gr	307	G
TAR-36.8	36.8	Green	Temporary	Gr	572	G
TAR-37.1	37.1	Green	Temporary	Gr	621	G
TAR-38.5	38.5	Green	Temporary	Gr	928	G
TAR-38.7	38.7	Green	Temporary	G/Gr	1853	G/S
TAR-39.1	39.1	Green	Temporary	Gr	999	G
TAR-40.6	40.6	New Franklin	Temporary	A	553	W
TAR-45.0	45.0	New Franklin	Temporary	Gr	1232	G/W
TAR-50.5	50.5	Chippewa	Temporary	G/Gr	399	G/S

TABLE 1.6-3

Temporary and Permanent Access Roads along the NEXUS Project

State/Facility/ Road ID ^{a/}	Approx. MP of Intersect ^{b/}	Municipality, Township	Use (Permanent or Temporary)	Existing Surface ^{c/}	Approx. Length From Public Way to Project (feet) ^{e/}	Proposed Improvements & Comments ^{f/}
TAR-50.7	50.7	Chippewa	Temporary	A/G	282	S/W
TAR-50.9	50.9	Chippewa	Temporary	Gr	847	G
TAR-53.9	53.9	Chippewa	Temporary	D	1070	G
TAR-60.8	60.8	Guilford	Temporary	G	543	S
TAR-61.9	61.9	Guilford	Temporary	Gr	1040	G
TAR-63.4	63.4	Montville	Temporary	D	1124	G
TAR-65.5	65.5	Lafayette	Temporary	Gr	1124	G
TAR-66.1	66.1	Lafayette	Temporary	D/G	1567	G/S
TAR-66.5	66.5	Lafayette	Temporary	D/G	1080	G/S
TAR-69.1	69.1	Lafayette	Temporary	Gr	158	G
TAR-69.8	69.8	Lafayette	Temporary	Gr	468	G
TAR-70.1	70.1	Lafayette	Temporary	G	1138	S/W
TAR-70.6	70.6	Lafayette	Temporary	C/G	167	S/W
TAR-72.1	72.1	York	Temporary	G/Gr	575	G/S
TAR-73.4	73.4	York	Temporary	G	531	S/W
TAR-74.3	74.3	York	Temporary	Gr	732	G
TAR-82.1	82.1	Grafton	Temporary	Gr	1237	G
TAR-82.6	82.6	Grafton	Temporary	Gr	181	G
TAR-83.5	83.5	LaGrange	Temporary	D/Gr	1233	G
TAR-83.6	83.6	LaGrange	Temporary	Gr	182	G
TAR-88.0	88.0	LaGrange	Temporary	Gr	1431	G
TAR-88.7	88.7	Pittsfield	Temporary	D	706	G/S
TAR-89.1	89.1	Pittsfield	Temporary	D	499	TBD
TAR-90.1	90.1	Pittsfield	Temporary	A/G	222	S
TAR-92.0	92.0	Oberlin	Temporary	G	1449	S/W
TAR-93.2	93.2	New Russia/Pittsfield	Temporary	Gr	1975	G
TAR-97.7	97.7	Henrietta	Temporary	G/Gr	1764	G/S
TAR-101.9	101.9	Florence	Temporary	Gr	405	G
TAR-107.7	107.7	Berlin	Temporary	TBD	578	TBD
TAR-111.8	111.8	Milan	Temporary	Gr	2798	G
TAR-111.9	111.9	Milan	Temporary	Gr	1553	G
TAR-112.5	112.5	Milan	Temporary	G	610	S/W
TAR-112.6	112.6	Milan	Temporary	G	274	S

TABLE 1.6-3

Temporary and Permanent Access Roads along the NEXUS Project

State/Facility/ Road ID ^{a/}	Approx. MP of Intersect ^{b/}	Municipality, Township	Use (Permanent or Temporary)	Existing Surface ^{c/}	Approx. Length From Public Way to Project (feet) ^{e/}	Proposed Improvements & Comments ^{f/}
TAR-112.7	112.7	Milan	Temporary	G	126	S
TAR-115.4	115.4	Milan	Temporary	A/Gr	1240	G
TAR-116.0	116.0	Milan	Temporary	G/Gr	1194	G/S
TAR-116.2	116.2	Milan	Temporary	G/Gr	1091	G/S
TAR-119.3a	119.3	Oxford	Temporary	D	109	G
TAR-119.3b	119.3	Oxford	Temporary	Gr	104	G
TAR-119.8	119.8	Oxford	Temporary	G	4144	S
TAR-124	124.0	Groton	Temporary	Gr	388	G
TAR-124.4	124.4	Groton	Temporary	Gr	424	G
TAR-124.5	124.5	Groton	Temporary	Gr	648	G
TAR-129a	129.0	Townsend	Temporary	D/G	64	G/S
TAR-129b	129.0	Townsend	Temporary	D/G	43	G/S
TAR-134.3	134.3	Riley	Temporary	Gr	501	G
TAR-134.8a	134.8	Riley	Temporary	Gr	1870	G
TAR-134.8b	134.8	Riley	Temporary	G	117	S
TAR-138.8a	138.8	Riley	Temporary	G	333	S
TAR-138.8b	138.8	Riley	Temporary	Gr	288	G
TAR-139.5a	139.5	Riley	Temporary	Gr	327	G
TAR-139.5b	139.5	Sandusky	Temporary	Gr	336	G
TAR-140.0a	140.0	Sandusky	Temporary	Gr	253	G
TAR-140.0b	140.0	Sandusky	Temporary	Gr	335	G
TAR-141.7	141.7	Sandusky	Temporary	A	1156	TBD
TAR-141.9	141.9	Sandusky	Temporary	Gr	1038	G
TAR-142.5	142.5	Sandusky	Temporary	Gr	249	G
TAR-142.6	142.6	Sandusky	Temporary	D	318	G
TAR-147.1	147.1	Washington	Temporary	Gr	798	G
TAR-150.0	150.0	Washington	Temporary	TBD	449	TBD
TAR-153.5	153.5	Woodville	Temporary	G	1203	S
TAR-153.9	153.9	Woodville	Temporary	D	757	G
TAR-158.8	158.8	Troy	Temporary	D/G	935	G/S
TAR-160.3	160.3	Troy	Temporary	D/G	2526	G/S
TAR-161.6	161.6	Troy	Temporary	D/G	2948	G/S
TAR-168.8a	168.8	Middleton	Temporary	A/Gr	912	G/W

TABLE 1.6-3

Temporary and Permanent Access Roads along the NEXUS Project

State/Facility/ Road ID a/	Approx. MP of Intersect b/	Municipality, Township	Use (Permanent or Temporary)	Existing Surface c/	Approx. Length From Public Way to Project (feet) e/	Proposed Improvements & Comments f/
TAR-168.8b	168.8	Middleton	Temporary	A/Gr	916	G
TAR-169.9	169.9	Middleton	Temporary	G/Gr	3895	G/S
TAR-173.8	173.8	Middleton	Temporary	G/D	738	G/S
TAR-173.9	173.9	Middleton	Temporary	Gr	1150	G
TAR-174.6	174.6	Middleton	Temporary	Gr	926	G
TAR-174.7	174.7	Middleton	Temporary	A/Gr	327	G
TAR-176.7	176.7	Waterville	Temporary	Gr	1864	G
TAR-179.9	179.9	Waterville	Temporary	Gr	223	G
TAR-180.4	180.4	Waterville	Temporary	Gr	477	G
TAR-195.4	195.4	Fulton	Temporary	D/Gr	1484	G/S
TAR-202.7	202.7	Ogden	Temporary	Gr	645	G
					102144	
<i>Compressor Stations</i>						
Compressor Station 1 - Hanoverton						
PAR-1.3	1.3	Hanover	Permanent	Gr	51	TBD
					51	
Compressor Station 2 - Wadsworth						
PAR-60.3	60.3	Guilford	Permanent	Gr	2055	TBD
					2055	
Compressor Station 3 - Clyde						
PAR-129.5	129.5	Clyde	Permanent	Gr	11	TBD
					11	
Compressor Station 4 - Waterville						
PAR-178.1	178.1	Waterville	Permanent	Gr	37	TBD
					37	
<i>Main Line Valve Stations</i>						
PAR-3.4	3.4	Hanover	Permanent	Gr	*60	TBD
PAR-14.3	14.3	Washington	Permanent	Gr	*67	TBD
PAR-33.4	33.4	Green	Permanent	Gr	*416	TBD
PAR-42.3	42.3	New Franklin	Permanent	Gr	*103	TBD
PAR-50.5	50.5	Chippewa	Permanent	Gr	*146	TBD
PAR-63.1	63.1	Montville	Permanent	D/Gr	580	TBD
PAR-73.4	73.4	York	Permanent	Gr	601	TBD

TABLE 1.6-3

Temporary and Permanent Access Roads along the NEXUS Project

State/Facility/ Road ID ^{a/}	Approx. MP of Intersect ^{b/}	Municipality, Township	Use (Permanent or Temporary)	Existing Surface ^{c/}	Approx. Length From Public Way to Project (feet) ^{e/}	Proposed Improvements & Comments ^{f/}
PAR-91.2	91.2	New Russia	Permanent	Gr	*137	TBD
PAR-106.4	106.4	Berlin	Permanent	Gr	1174	TBD
PAR-117.9	117.9	Oxford	Permanent	Gr	*165	TBD
PAR-132.1	132.1	Townsend	Permanent	Gr	*87	TBD
PAR-145.2	145.2	Sandusky	Permanent	Gr	*95	TBD
PAR-153.1	153.1	Woodsville	Permanent	Gr	388	TBD
PAR-163.3	163.3	Troy	Permanent	Gr	*143	TBD
PAR-178.9	178.9	Waterville	Permanent	Gr	*27	TBD
PAR-189.5	189.5	Swan Creek	Permanent	Gr	*92	TBD
					4281	
<i>M&R Stations</i>						
MR01 at TGP Interconnection						
PAR-0.0a	TGP 0.0	Franklin	Permanent	Gr	*451	TBD
					451	
MR02 at Kensington and MR03 at OPEN						
PAR-0.0b	0.0/TGP 0.9	Hanover	Permanent	Gr	24	TBD
					24	
Michigan						
<i>Mainline</i>						
TAR-202.8	202.8	Ogden	Temporary	Gr	601	G
TAR-204.6	204.6	Ogden	Temporary	Gr	722	G
TAR-220.7	220.7	Ridgeway	Temporary	Gr	721	G
TAR-223.9	223.9	Ridgeway	Temporary	G/Gr	770	G/S
TAR-225.0	225.0	Milan	Temporary	Gr	385	G
TAR-226.2a	226.2	Milan	Temporary	Gr	842	G
TAR-226.2b	226.2	Milan	Temporary	Gr	1112	G
TAR-231.6	231.6	York	Temporary	Gr	2251	G
TAR-232.1	232.1	York	Temporary	Gr	833	G
TAR-232.8	232.8	York	Temporary	G/D/Gr	4975	G/S
TAR-233.7	233.7	York	Temporary	D/Gr	512	G
TAR-233.8	233.8	York	Temporary	G/Gr	1090	G/S
TAR-236.6	236.6	Augusta	Temporary	D/G	894	G/S
TAR-238.8	238.8	Augusta	Temporary	Gr	912	G

TABLE 1.6-3

Temporary and Permanent Access Roads along the NEXUS Project

State/Facility/ Road ID a/	Approx. MP of Intersect b/	Municipality, Township	Use (Permanent or Temporary)	Existing Surface c/	Approx. Length From Public Way to Project (feet) e/	Proposed Improvements & Comments f/
TAR-240.4	240.4	Augusta	Temporary	Gr	2434	G
TAR-243.7	243.7	Ypsilanti	Temporary	Gr	118	G
TAR-243.9a	243.9	Ypsilanti	Temporary	A	43	TBD
TAR-243.9b	243.9	Ypsilanti	Temporary	G	46	S
TAR-244.1	244.1	Ypsilanti	Temporary	Gr	48	G
TAR-244.3	244.3	Ypsilanti	Temporary	A	29	TBD
TAR-244.4	244.4	Ypsilanti	Temporary	A/Gr	1828	G
TAR-245.2	245.2	Ypsilanti	Temporary	G/Gr	881	G/S
TAR-248.9	248.9	Ypsilanti	Temporary	A/G	167	S
TAR-249.0	249.0	Ypsilanti	Temporary	A/D	1835	G/S/W
					24049	
<i>Main Line Valve Stations</i>						
PAR-206.5	206.5	Ogden	Permanent	Gr	*145	TBD
PAR-222.5	222.5	Ridgeway	Permanent	Gr	*51	TBD
PAR-236.4	236.4	Augusta	Permanent	Gr	*282	TBD
PAR-245.6	245.6	Ypsilanti	Permanent	Gr	*221	TBD
					700	
<i>M&R Stations</i>						
MR04 at Willow Run						
PAR-249.0	249.0	Ypsilanti	Permanent	A/D	537	TBD
Subtotal:					537	
PROJECT TOAL:					134,339	

Note: The totals shown in this table may not equal the sum of addends due to rounding.

a/ TAR=Temporary, PAR=Permanent Access Road.

b/ Milepost at final intersection of access road with construction workspace. Approximate milepost rounded to the nearest tenth.

c/ Dominant surface condition provided. A=Asphalt, C=Concrete, G=Gravel, D=Dirt, Gr=Greenfield.

d/ Ownership = Permanent Ownership, Management = Management of Use.

e/ Does not include area overlapping with pipeline permanent ROW or aboveground facility permanent facility boundary (fence line/footprint).

Except for lengths denoted with an * which are part of permanent ROW.

f/ P=Paving, G=Grading, S=Stone, C=Culverts, W=Widening, R=Realignment. No improvements to occur within wetlands crossed by the access road.

TABLE 1.6-4				
Land Requirements for NEXUS Project Ware Yards				
State/County	Yard Name	Nearest Milepost a/	Construction Area (acres)	Existing Land Use Type b/
Ohio				
Stark	Yard 1-1	22.5	39.2	AG
Huron	Yard 2-1	106.4	56.6	AG
Wood	Yard 3-1	171.2	78.7	OL
Fulton	Yard 3-2	176.5	70.2	OL
Ohio Subtotal:			244.7	
Michigan				
Lenawee	Yard 4-1	222.5	44.3	AG
Washtenaw	Yard 4-2	245.5	7.3	OL
Washtenaw	Yard 4-3	244.1	16.1	AG
Michigan Subtotal:			67.7	
PROJECT TOTAL:			312.4	
<p>Note: The totals shown in this table may not equal the sum of addends due to rounding.</p> <p>a/ Approximate MP along the proposed pipeline rounded to the nearest tenth.</p> <p>b/ Land use types include Open Land (OL) and Agricultural (AG).</p>				

TABLE 1.7-1
Summary of Construction Methods to be Used Along the NEXUS Pipeline Project

Construction Method Number	Typical ROW Width (feet)	Construction Method Description	Typical Right of Way Configuration Drawing Number
CM1	75	Typical Wetland Construction 75ft Corridor Detail - Method #1	S4NX-P-8000
CM2	100	Typical Mainline Upland Construction 100ft Corridor Detail - Method #2	S4NX-P-8001
CM3	125 to 145	Typical Agricultural Mainline Construction 125ft to 145ft Corridor Detail - Method #3	S4NX-P-8002
CM4	125 to 145	Typical Existing Pipeline ROW Easement 125ft to 145ft Construction Corridor (East)	S4NX-P-8003
CM5	125 to 145	Typical Existing Pipeline ROW Easement 125ft to 145ft Construction Corridor (West)	S4NX-P-8004
CM6	100	Typical Existing Pipeline ROW Easement 100ft Construction Corridor (East)	S4NX-P-8005
CM7	100	Typical Existing Pipeline ROW Easement 100ft Construction Corridor (West)	S4NX-P-8006
CM8	125 to 145	Typical Mainline Construction Method #1A North Or East of Powerline Easement	S4NX-P-8007-A
CM9	125 to 145	Typical Mainline Construction Method #1B South Or West of Powerline Easement	S4NX-P-8007-B
CM10	125 to 145	Typical Mainline Construction Method #2A North Or East of Powerline Easement	S4NX-P-8008-A
CM11	125 to 145	Typical Mainline Construction Method #2B South Or West of Powerline Easement	S4NX-P-8008-B
CM12	125 to 145	Typical Mainline Construction Method #3A North Or East of Powerline Easement	S4NX-P-8009-A
CM13	125 to 145	Typical Mainline Construction Method #3B South Or West of Powerline Easement	S4NX-P-8009-B
CM14	125 to 145	Typical Mainline Construction Method #4A North Or East of Powerline Easement	S4NX-P-8010-A
CM15	125 to 145	Typical Mainline Construction Method #4B South Or West of Powerline Easement	S4NX-P-8010-B
CM16	125 to 145	Typical Mainline Construction Method #5A North Or East of Powerline Easement	S4NX-P-8011-A
CM17	125 to 145	Typical Mainline Construction Method #5B South Or West of Powerline Easement	S4NX-P-8011-B
CM18	125 to 145	Typical Mainline Construction Method #6A North Or East of Powerline Easement	S4NX-P-8012-A
CM19	125 to 145	Typical Mainline Construction Method #6B South Or West of Powerline Easement	S4NX-P-8012-B

TABLE 1.7-1
Summary of Construction Methods to be Used Along the NEXUS Pipeline Project

Construction Method Number	Typical ROW Width (feet)	Construction Method Description	Typical Right of Way Configuration Drawing Number
CM20	125 to 145	Typical Mainline Construction Method #7A North Or East of Powerline Easement	S4NX-P-8013-A
CM21	125 to 145	Typical Mainline Construction Method #7B South Or West of Powerline Easement	S4NX-P-8013-B
CM22	125 to 145	Typical Mainline Construction Method #8A North Or East of Powerline Easement	S4NX-P-8014-A
CM23	125 to 145	Typical Mainline Construction Method #8B South Or West of Powerline Easement	S4NX-P-8014-B
CM24	125 to 145	Typical Mainline Construction Method #9A North Or East of Powerline Easement	S4NX-P-8015-A
CM25	125 to 145	Typical Mainline Construction Method #9B South Or West of Powerline Easement	S4NX-P-8015-B
CM26	125 to 145	Typical Mainline Construction Method #10A North Or East of Powerline Easement	S4NX-P-8016-A
CM27	125 to 145	Typical Mainline Construction Method #10B South Or West of Powerline Easement	S4NX-P-8016-B
CM28	-	Typical 36" Mainline Valve General Plot Plan	S4NX-P-8017
CM29	125 to 145	Typical Side Slope Construction - Right Side	S4NX-P-8019
CM30	125 to 145	Typical Side Slope Construction - Left Side	S4NX-P-8020
CM31	-	Typical Bored Railroad Crossing Control Measure Detail	S4NX-P-8021
CM32	-	Typical Road Crossing Control Measure Detail	S4NX-P-8022
	-	Typical Stream Crossing Control Measure Detail	S4NX-P-8023
CM34	-	Typical Water Body Construction Detail with HDD Plan	S4NX-P-8024
CM35	-	Onshore Pipeline Construction Detail	S4NX-P-8025
CM36	-	Typical Bored Road Crossing Construction Detail	S4NX-P-8026

TABLE 1.7-2					
Horizontal Directional Drills Proposed for NEXUS Project					
State/Facility	Feature Crossed	County/ State	Milepost Enter a/	Milepost Exit a/	Length (feet) b/
Ohio					
<u>Mainline</u>	Railroad and Tuscarawas River	Summit, Ohio	45.8	46.2	2,072
	East Branch of Black River	Lorain, Ohio	83.1	83.5	1,718
	West Branch of Black River	Lorain, Ohio	88.8	89.0	1,477
	Vermillion River	Erie, Ohio	100.1	100.6	2,400
	Huron River	Erie, Ohio	112.7	113.2	2,757
	Sandusky River	Sandusky, Ohio	141.1	141.6	2,681
	Portage River	Sandusky, Ohio	157.3	157.6	1,504
	Maumee River	Wood, Ohio/ Lucas, Ohio	175.9	176.6	3,710
Ohio Subtotal:					18,319
Michigan					
<u>Mainline</u>	Saline River and Mooreville Road	Washtenaw, Michigan	231.7	232.0	1,629
	Hydro Park	Washtenaw, Michigan	244.8	245.2	1,965
	I-94	Washtenaw, Michigan	245.6	245.9	1,596
Michigan Subtotal:					5,190
PROJECT TOTAL:					23,509
a/ Approximate milepost along the pipeline rounded to the nearest tenth. b/ Length is provided in linear feet.					

TABLE 1.7-3 Areas Requiring Sidehill Construction Along the NEXUS Pipeline				
State/Facility Name/County	Milepost Begin a/	Milepost End a/	Length (miles) b/	
Ohio				
<i>Mainline Pipeline</i>				
Columbiana	0.4	1.1	0.7	>5%-30%
	1.2	1.3	0.1	>5%-30%
	1.5	1.7	0.2	>5%-30%
	1.9	2.3	0.4	>30%
	2.4	2.6	0.2	>5%-30%
	2.7	3.1	0.4	>5%-30%
	3.4	3.6	0.2	>5%-30%
Stark	None			
Summit	33.3	33.8	0.5	>5%-30%
	35.2	35.3	0.1	>5%-30%
	35.7	36.0	0.3	>5%-30%
	37.8	38.0	0.2	>5%-30%
	38.8	38.9	0.1	>5%-30%
	39.3	39.5	0.2	>5%-30%
	40.0	40.5	0.5	>5%-30%
	40.8	41.1	0.3	>5%-30%
	43.5	43.7	0.2	>5%-30%
	44.1	44.3	0.2	>5%-30%
	44.4	44.7	0.3	>5%-30%
	44.8	45.3	0.5	>5%-30%
	45.5	45.7	0.2	>5%-30%
	46.3	46.5	0.2	>5%-30%
	46.6	46.8	0.2	>5%-30%
	47.4	47.6	0.2	>5%-30%
	47.6	47.7	0.1	>5%-30%
Wayne	48.9	49.1	0.2	>5%-30%
	49.9	50.2	0.3	>5%-30%
	50.3	51.0	0.7	>5%-30%
Medina	59.0	59.1	0.1	>5%-30%

TABLE 1.7-3 Areas Requiring Sidehill Construction Along the NEXUS Pipeline				
State/Facility Name/County	Milepost Begin a/	Milepost End a/	Length (miles) b/	
	59.2	59.4	0.2	>5%-30%
	60.0	60.6	0.6	>5%-30%
	60.8	60.9	0.1	>30%
	61.5	61.8	0.3	>5%-30%
	62.2	62.3	0.1	>5%-30%
	64.2	64.2	0.0	>30%
	65.1	65.3	0.2	>30%
	71.9	72.2	0.3	>5%-30%
	72.5	72.7	0.2	>5%-30%
	74.2	74.4	0.2	>5%-30%
	76.1	76.2	0.1	>5%-30%
	77.1	77.3	0.2	>5%-30%
Lorain	77.1	77.3	0.2	>5%-30%
	80.9	81.0	0.1	>5%-30%
Erie	100.2	100.4	0.2	>5%-30%
	101.7	101.8	0.1	>5%-30%
	101.9	102.1	0.2	>5%-30%
Sandusky	None			
Wood	None			
Lucas	None			
Henry	None			
Fulton	None			
Ohio Mainline Pipeline Subtotal:			11.1	
Michigan				
<i>Mainline Pipeline</i>				
Lenawee	None			
Monroe	None			
Washtenaw	None			
Michigan Mainline Pipeline Subtotal:			0.0	
PROJECT MAINLINE PIPELINE TOTAL:			11.1	

TABLE 1.7-3				
Areas Requiring Sidehill Construction Along the NEXUS Pipeline				
State/Facility Name/County	Milepost Begin a/	Milepost End a/	Length (miles) b/	
Ohio				
TGP Interconnecting Pipeline				
Columbiana	0.2	0.3	0.1	>5%-30%
	0.4	0.5	0.1	>5%-30%
	0.6	0.7	0.1	>5%-30%
	0.9	0.9	0.0	>5%-30%
Interconnecting Pipeline Subtotal:			0.3	
PROJECT TOTAL:			11.4	
<hr/>				
a/ Approximate milepost along the pipeline rounded to the nearest tenth mile.				
b/ Crossing length within county rounded to the nearest tenth mile.				

TABLE 1.9-1					
Preliminary Construction Schedule and Work Force Requirements for the NEXUS Pipeline Project Facilities					
State/Facility	Milepost Begin <i>a/</i>	Milepost End <i>a/</i>	Length (miles)	Construction	
				Month/Year Begin	Personnel
Ohio					
Pipelines					
Mainline Pipeline	0.0	202.8	202.8	Feb-Oct 2017	TBD
TGP Interconnection	TGP 0.0	TGP 0.9	0.9	Feb-Oct 2017	TBD
Compressor Stations					
Compressor Station 1 - Hanoverton	1.2	N/A	N/A	Feb-Nov 2017	TBD
Compressor Station 2 - Wadsworth	60.3	N/A	N/A	Feb-Nov 2017	TBD
Compressor Station 3 - Clyde	129.5	N/A	N/A	Feb-Nov 2017	TBD
Compressor Station 4 - Waterville	178.1	N/A	N/A	Feb-Nov 2017	TBD
M&R Stations					
MR01 at TGP Interconnection	TGP 0.0	N/A	N/A	Feb-Oct 2017	TBD
MR02 at Kensington	0.0	N/A	N/A	Feb-Oct 2017	TBD
MR03 at OPEN	TGP 0.9	N/A	N/A	Feb-Oct 2017	TBD
Launcher and Receiver Stations					
Launcher, TGP Interconnecting Pipeline	TGP 0.0	N/A	N/A	Feb-Oct 2017	TBD
Launcher and Receiver, Compressor Station 2	60.3	N/A	N/A	Feb-Oct 2017	TBD
Launcher and Receiver, Compressor Station 4	178.1	N/A	N/A	Feb-Oct 2017	TBD
Michigan					
Pipeline					
Mainline Pipeline	202.8	249.0	46.2	Feb-Oct 2017	TBD
Launcher and Receiver Station					
Receiver at Willow Run	249.0	N/A	N/A	Feb-Oct 2017	TBD
M&R Station					
MR04 at Willow Run	249.0	N/A	N/A	Feb-Oct 2017	TBD
<i>a/</i> Mileposts presented are the approximate milepost along the pipeline to the facility site rounded to the nearest tenth. Mileposts are presented for the mainline pipeline unless otherwise denoted (TGP=Interconnecting Pipeline to TGP). N/A = Not applicable. TBD = To Be Determined.					

TABLE 1.13-1

Anticipated Environmental Permit, Review and Consultation List

Agency	Permit/Approval/ Consultation	Contact	Consultation Initiated ^{a/}	Report/ Application Submitted ^{a/}	Approval/Permit Received ^{a/}	Status
<u>FEDERAL</u>						
Federal Energy Regulatory Commission	Certificate of Public Convenience and Necessity - Section 7(c) of the Natural Gas Act requires preparation of an ER (consisting of 12 Resource Reports) to be included with the Section 7(c) application. NEXUS is using FERC's Pre-filing Process which will involve conducting public open houses, preparation of responses to comments received on the Project, and preparation of draft and final Resource Reports. Following submittal of the ER, support activities include responding to FERC staff data requests, reviewing FERC's EIS and preparing the Implementation Plan.	Joanne Wachholder, FERC Project Manager	17 Dec 14 introductory meeting			
U.S. Army Corps of Engineers ("USACE"): Buffalo, Pittsburgh, Huntington, and Detroit Districts	Dredge and Fill Permit under Section 10 of the Rivers and Harbors Act of 1899 (33 USC § 403)	Shawn Blohm, Buffalo District NEXUS designated point of contact Matt Mason, Pittsburgh District Regulatory Branch	31 Oct 14 introductory letter 14 Jan 15 introductory meeting			
	Dredge and Fill Permit under Section 404 of the Clean Water Act (33 USC § 1344)	Mark Taylor, Huntington District Chief, Energy Resources Stanley F. Cowton, Jr., Detroit District Regulatory Project Manager				

TABLE 1.13-1

Anticipated Environmental Permit, Review and Consultation List

Agency	Permit/Approval/ Consultation	Contact	Consultation Initiated <u>a/</u>	Report/ Application Submitted <u>a/</u>	Approval/Permit Received <u>a/</u>	Status
United States Department of the Interior, U.S. Fish and Wildlife Service, Midwest Region 3 (Columbus, OH and East Lansing, MI Field offices)	Consultation under Section 7 of the Endangered Species Act Coordination per the Migratory Bird Treaty Act; and the Fish and Wildlife Coordination Act (16 USC §§ 661 et seq.)	Chris Mensing, Fish and Wildlife Biologist Burr Fisher, Wildlife Biologist Angela Boyer, Endangered Species Coordinator	18 Sept 14 introductory letter 07 Oct 15 Columbus Ohio Field Office introductory meeting 12 Nov 14 East Lansing Field Office introductory meeting			
U.S. Department of the Interior, National Park Service	Wild and Scenic Rivers Act Section 7(a) Determination	Mark Weekly, Deputy Regional Director	31 Oct 14 introductory letter			
U. S. Environmental Protection Agency ("EPA"), Region 3	Spill Prevention, Control and Countermeasures Plan (33 USC § 1321(j) and 40 CFR § 112) Section 404 of the CWA (USEPA review of wetland permits issued by the USACE) Determination of General Conformity Applicability	Kenneth A. Westlake, Chief	31 Oct 14 introductory letter			
National Marine Fisheries Service ("NMFS")	Federal Endangered Species Act Magnuson-Stevens Fishery Conservation and Management Act	Donna Wieting, Director, Office of Protected Resources	31 Oct 14 introductory letter			
U.S. Department of Agriculture Natural Resources Conservation Service ("NRCS")	Restoration Consultation and potential Agricultural Impact Mitigation Agreement	TBD				

TABLE 1.13-1

Anticipated Environmental Permit, Review and Consultation List

Agency	Permit/Approval/ Consultation	Contact	Consultation Initiated ^{a/}	Report/ Application Submitted ^{a/}	Approval/Permit Received ^{a/}	Status
Advisory Council on Historic Preservation and Consultation with Native American Tribes	Section 106 Consultation, National Historic Preservation Act ("NHPA") - Section 106 Consultation	Mark Epstein, Department Head, Resource Protection and Review Brian D. Conway, State Historic Preservation Officer ("SHPO")	5 Nov 14 Ohio SHPO introductory letter 4 Dec 14 Michigan SHPO introductory letter			
<u>STATE</u>						
Ohio						
Ohio Power Siting Board ("OPSB")	Consultation and Intervener Status in FERC Process	TBD				
Ohio Environmental Protection Agency ("OEPA")	Section 401 Water Quality Certification	Mike Mansour, Central	9, 10 and 17 Dec 14 introductory meetings			
	Clean Air Act, Air Permit-to-Install-and-Operate	Dave Morehart, Central				
	Storm Water Discharge from Construction Activities	Ed Fasko, Northeast				
	NPDES Hydrostatic Test	Jana Gannon, Northeast Kevin Fortune, Northeast Sean Vadas, Akron Regional Kelly Kanoza, Akron Regional Duane LaClair, Akron Regional Matt Stanfield, Toledo				
Ohio Department of Natural Resources ("ODNR")	Consultation on Threatened and Endangered Species	John Kessler, P.E. Assistant Chief	18 Sep 14 introductory letter			

TABLE 1.13-1

Anticipated Environmental Permit, Review and Consultation List

Agency	Permit/Approval/ Consultation	Contact	Consultation Initiated ^{a/}	Report/ Application Submitted ^{a/}	Approval/Permit Received ^{a/}	Status
Ohio Historic Preservation Office	Water Withdrawal Facility Registration (>100,000 gallons per day)	Steve Holland, MPA Federal Consistency Administrator	2 Dec 14	introductory email and phone call		
	Coastal Management Zone Determination					
	Section 106 NHPA Consultation	Mark Epstein, Department Head, Resource Protection and Review	5 Nov 14	Ohio SHPO introductory letter		
	Permit for construction within 100 year Flood Plain	TBD				
Ohio – County Flood Plain Administrator	Permit for construction within 100 year Flood Plain	TBD				
Ohio Department of Transportation (“ODOT”)	State road, highway, or interstate crossing permits	TBD				
Michigan						
Michigan Department of Natural Resources (“MDNR”), Wildlife Division	State listed species consultation	Lori Sargent, Wildlife Division	22 Sep 14	introductory letter		
	Public Lands consultation, Permit to Use State Lands					
Michigan Department of Environmental Quality (“MDEQ”), Water Resources Division	MDEQ/USACE Joint Permit for impacts to wetlands, inland lakes, streams and floodplains NPDES Permit for Storm Water Discharge from Construction Activities Water Withdrawal Authorization	Katherine David, Jackson District Office	18 Dec 14	introductory letter		
	Possible permit to install for facility meter station air emissions					

TABLE 1.13-1

Anticipated Environmental Permit, Review and Consultation List

Agency	Permit/Approval/ Consultation	Contact	Consultation Initiated ^{a/}	Report/ Application Submitted ^{a/}	Approval/Permit Received ^{a/}	Status
Michigan Natural Resources Inventory ("MNRI")	State-listed threatened and endangered species consultations	Michael A. Sanders, Rare Species Review Specialist	23 Sep 14	introductory letter		
Michigan State Housing and Development Authority ("MSHDA") – Michigan Office of Historic Preservation	Section 106 NHPA Consultation	Brian D. Conway, SHPO	4 Dec 14	Michigan SHPO introductory letter		
Michigan Department of Transportation ("MDOT")	State road, highway, or interstate crossing permits	TBD				
<u>LOCAL</u>						
Lenawee County, MI	County Drain ROW Permits, Soil Erosion & Sedimentation Control Permit	TBD				
Monroe County, MI	County Drain ROW Permits, Soil Erosion & Sedimentation Control Permit	TBD				
Washtenaw County, MI	County Drain ROW Permits, Soil Erosion & Sedimentation Control Permit	TBD				
Washtenaw County Historic Preservation	Section 106 NHPA Consultation	Melissa Milton-Pung, Historic Preservation Planner	27 Oct 14	introductory letter		
Muskingum Watershed Conservancy District	Consultation	Boris E. Slogar, P.E., M.P.M. Chief Engineer				
^{a/} Permit applications to regulatory agencies have not been filed. Anticipated filing dates will be included with the next filing of RR 1.						

TABLE 1.15-1

DTE Facilities Permits & Approvals

Administrating Agency	Jurisdiction/Regulatory Involvement	Applicable Facilities	Anticipated Submittal Dates	Additional Notes
Michigan Department of Environmental Quality (MDEQ) SE Michigan District Office 27700 Donald Court Warren, MI 48092-2793	Clean Water Act Section 401/404 permitting administered by MDEQ; Public Act 451, Parts 301 (streams), 303 (wetlands), and 31 (floodplains).	Willow Run Compressor Station (WRCS) Willow Gate Station (WGS)	TBD – Late 2015/early 2016	Part 303 (wetlands) permit will be required for discharge pipeline connecting WRCS and WGS
	General Construction Stormwater Notice of Coverage and Erosion & Sedimentation Control - Public Act 451, Part 91.	Willow Run Compressor Station (WRCS) Willow Gate Station (WGS) Milford Compressor Station (MCS)	TBD	Notice of coverage (NOC) anticipated to be required for work at MCS as well as one NOC for cumulative impacts between WRCS and WGS.
	Hydrostatic Test Water Discharge – Public Act 451, Part 31	Willow Run Compressor Station (WRCS) Willow Gate Station (WGS) Milford Compressor Station (MCS)	TBD	Hydrostatic Test Water permits to be obtained for each station.
	Air Quality Division, Air Use Approval Rules - R 336.1201.	Willow Run Compressor Station (WRCS) Milford Compressor Station (MCS)	MCS – 8/1/2015 WRCS – 2/1/2016	
County or local municipality	Local agencies – County Enforcement Agency (CEA) or Municipal Enforcement Agency (MEA) delegated review/enforcement authority for Part 91 E&S and SWPPP compliance.	Willow Run Compressor Station (WRCS) Willow Gate Station (WGS) Milford Compressor Station (MCS)	TBD	Local County Soil Erosion and Sedimentation Control permits will be obtained for each facility prior to construction.
	Building Permits as required by Local Code	Willow Run Compressor Station (WRCS) Milford Compressor Station (MCS)	TBD	As local regulating authority requires for building permits at a facility.
United States Army Corps of Engineers (USACE) Detroit District 477 Michigan Ave Detroit, MI 48226	Clean Water Act Section 404 - Wetland and Waterbody crossing permits (and Section 401 Water Quality Certification <u>a/</u> will be requested and issued by MDEQ for water resource permit items detailed below).	Willow Run Compressor Station (WRCS) Willow Gate Station (WGS)	N/A	Would not anticipate USACE as a participating agency. Delegated authority to MDEQ under the Joint Permit Application process.

TABLE 1.15-1

DTE Facilities Permits & Approvals

Administrating Agency	Jurisdiction/Regulatory Involvement	Applicable Facilities	Anticipated Submittal Dates	Additional Notes
US Fish and Wildlife Service (USF&W) East Lansing Field Office 2651 Coolidge Road East Lansing, MI 48823	Section 7 Consultation – Endangered Species Act 16 USC Chapter 35.	Willow Run Compressor Station (WRCS) Willow Gate Station (WGS) Milford Compressor Station (MCS)	TBD or N/A	T&E surveys being verified in May 2015. Preliminary station surveys indicate no present bat habitat at the effected stations. Not anticipating T&E issues.
<p><u>a/</u> 401 Water Quality Certification administrated by MDEQ and applies to any permit program where a finding of water quality impact needs to be made by MDEQ (e.g. Section 404 permits, Stormwater General Permit coverage, hydrostatic test discharge, other NPDES discharges as applicable).</p> <p>MCS – Milford Compressor Station – Milford Township, Oakland County, MI; WRCS – Willow Run Compressor Station – Ypsilanti Township, Washtenaw County, MI WGS – Willow Gate Station - Ypsilanti Township, Washtenaw County, MI</p>				

TABLE 1.15-2

DTE Regulatory Notifications

Administrating Agency	Jurisdiction/Regulatory Involvement	Applicable Facilities	Anticipated Submittal Dates	Additional Notes
Pipeline and Hazardous Material Safety Administration (PHMSA)	PHMSA Title-49, Part-192	Willow Run Compressor Station (WRCS) Willow Gate Station (WGS) Milford Compressor Station (MCS)	Submission by 5/1/2016	60 Day Advance Notice – Facility Improvement
Michigan Public Service Commission (MPSC)	MPSC Rule 502, Gas Safety Standard	Willow Run Compressor Station (WRCS) Willow Gate Station (WGS) Milford Compressor Station (MCS)	Submission by 5/1/2016	60 Day Advance Notice – Facility Improvement
<p>MCS – Milford Compressor Station – Milford Township, Oakland County, MI; WRCS – Willow Run Compressor Station – Ypsilanti Township, Washtenaw County, MI WGS – Willow Gate Station - Ypsilanti Township, Washtenaw County, MI</p>				

<div>TABLE 1.16-1</div> <div>Recently Completed, Current, and Reasonably Foreseeable Projects within the NEXUS Project Vicinity</div>						
Project, County <u>a/</u>	Map Project ID	Description	Anticipated Date of Construction / Project Status	Approximate Distance from NEXUS (mi)	Potential Resources Affected	Source <u>b/</u>
Columbia Gas Transmission, LLC Leach XPress Project, Outside of NEXUS counties; located in Monroe, Noble, Muskingum, Morgan, Perry, Fairfield, Hocking, and Vinton Counties, OH	1	The proposed Leach XPress project involves construction of approximately 157 miles of 30- and 36-inch diameter natural gas pipelines, along with associated compression and other appurtenant facilities, in southeastern Ohio and West Virginia's northern panhandle.	Construction is planned to begin in late 2016, with a targeted in-service date during the second half of 2017. FERC is reviewing application (FERC Docket No. PF14-23).	70	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology	Columbia Pipeline Group website. 2015a
TransCanada ANR East Pipeline Project, Outside of NEXUS counties	2	The pipeline would consist of approximately 320 miles of large diameter, 1440 psig maximum allowable operating pressure pipeline and up to 140,000 hp of compression and is anticipated to have a capacity between 1.2 and 2.0 Bcf/d, depending upon contractual commitments, project scope and final design.	TransCanada has not entered the pre-filing process of the FERC.	23.7	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology	TransCanada website. 2014
Energy Transfer Rover Pipeline Project, Carroll, Stark, Wayne, Wood, Fulton, Lucas Counties, OH	3	Rover Pipeline LLC (Rover) is a proposed interstate natural gas pipeline company being designed to transport natural gas from processing facilities located in the Marcellus and Utica Shale areas to market regions in the United States and Canada. The Rover Project consists of 711 miles of 24-inch, 30-inch, 36-inch and 42-inch pipelines consisting of ten Supply Laterals and three Mainlines, nine compressor stations, and associated meter stations and other aboveground facilities that would be located in parts of West Virginia, Pennsylvania, and Ohio.	Construction is planned to begin in January 2016 with an in-service date of June 2017. A formal application was filed with FERC in February 2015 (FERC Docket No. CP15-93-000).	25	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Energy Transfer website. 2015
Utica/Point Pleasant Shale Horizontal Wells, Columbiana County, OH townships: Knox, West, Hanover Medina County, OH townships: Harrisville Stark County, OH townships: Marlboro, Osnaburg, Washington, Bethlehem, Sandy, Paris, Pike Wayne County, OH townships: East Union	Shown on Wells Figure	122 horizontal drilling permits have been issued and 81 wells have been drilled and/or are producing in counties traversed by the NEXUS Project area.	Data from Ohio Department of Natural Resources ("ODNR") through Dec. 27, 2014.	Varies	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Oilandgas.ohiodnr.gov website. 2015
Texas Eastern Ohio Pipeline Energy Network (OPEN) Project, Columbiana County, OH	4	The OPEN project consists of approximately 76 miles of new 30-inch diameter mainline pipeline and associated pipeline support facilities in Ohio, including a new compressor station in Colerain Township and reverse flow modifications at existing compressor stations along Texas Eastern's existing mainline in Ohio, Kentucky, Mississippi and Louisiana.	Construction is scheduled for 2015 with a planned in-service date of November 2015. FERC issued Section 7c Certificate in December 2014.	0	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Spectra Energy website. 2015
State Route 14F, Columbiana County, OH	5	Construct new four lane limited access highway from US Route 62 in Columbiana County to SR 11 in Mahoning County.	Ongoing 2005 to 2025.	10	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Dot.state.oh.us website. 2014a
US Route 62 (Hubbard Arterial) Highway, Columbiana County, OH	Not shown on map	Construct new four lane arterial from US Route 62F to Interstate 80.	Ongoing 2014-2030.	10	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Dot.state.oh.us website. 2014b

TABLE 1.16-1 Recently Completed, Current, and Reasonably Foreseeable Projects within the NEXUS Project Vicinity						
Project, County <u>a</u> /	Map Project ID	Description	Anticipated Date of Construction / Project Status	Approximate Distance from NEXUS (mi)	Potential Resources Affected	Source <u>b</u> /
US Route 30 Highway Work, Columbiana County, OH	6	Construct new four-lane limited access highway from State Route 44 to State Route 9.	Ongoing 2011-2030.	0	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Dot.state.oh.us website. 2014c
FirstEnergy Transmission Glenwillow-Bruce Mansfield Project, Columbiana County, OH	7	This project involves building 114.5 miles of new 345 kV transmission line through Trumbull, Columbiana, Mahoning, Portage, Summit and Cuyahoga counties in Ohio and Beaver County in Pennsylvania. A new substation will be constructed in the Cleveland, Ohio suburb of Glenwillow.	Construction started Spring 2013 with a proposed In-Service Date of June 1, 2015	8	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	firstenergycorp.com website. 2015
FirstEnergy Harmon-Toronto Transmission Line Project, Stark County, OH	Not shown on map	This project involves constructing approximately 60 miles of new 345 kV transmission line to connect two new substations, the Harmon and Toronto Substations. The new transmission line will be located in Stark, Carroll and Jefferson counties in Ohio. The Harmon Substation will be located in Stark County and the Toronto Substation will be located in Jefferson County.	Construction proposed to start in Dec 2013 with an In-Service Date of June 2017 (Project Withdrawn)	13	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	firstenergycorp.com website. 2015
FirstEnergy Harmon-Star Transmission Line Project, Stark County, OH	Not shown on map	This project involves constructing approximately 25 miles of new 345 kV transmission line from the new Harmon Substation in Stark County to the existing Star Substation in Medina County.	Construction proposed to start in Dec 2013 with an In-Service Date for Summer 2015 (Project Withdrawn)	0	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	firstenergycorp.com website. 2015
Columbia Pipeline Group Pipeline Improvement Project, Medina County, OH	25	Columbia Gas is replacing more than 10,000 feet of gas pipeline.	Project scheduled to start in June 2015 and be completed in October 2015	4	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Columbia Pipeline Group website. 2015b
Columbia Pipeline Group Pipeline Improvement Project, Lorain County, OH	8	Columbia Gas is replacing more than 16,000 feet of gas pipeline.	Project was completed in 2014	1	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Columbia Pipeline Group website. 2015b
Widen and rehab SR 57 between the Ohio Turnpike and I-90 in the city of Elyria, Lorain County, OH	9	Widening and rehabilitation of SR 57 to occur between the Ohio Turnpike and I-90 in the city of Elyria. The project will also include reconfiguration of the SR 57 and I-90 interchange and removal of the 49th St. bridge. Two lanes will be maintained on SR 57 during construction; however, 49th Street will be closed indefinitely. Midway Mall Boulevard and Griswold Road will be closed during construction.	Construction started in May 2014 and ends Summer 2016	5	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Dot.state.oh.us website. 2014b
Widen and rehab SR 611 bridge over I-90 in the City of Avon, Lorain County, OH	10	The project includes widening and rehabilitation of the existing SR 611 bridge over I-90 in the City of Avon, OH. The project includes widening for a bike lane and sidewalk on both sides, new bridge deck and resurfacing a portion of SR 611. SR 611 is reduced to one lane of traffic and I-90 to two narrowed lanes in each direction.	Construction started in August 2013 and ends in June 2015	15	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Dot.state.oh.us website. 2014b

TABLE 1.16-1 Recently Completed, Current, and Reasonably Foreseeable Projects within the NEXUS Project Vicinity						
Project, County <u>a</u> /	Map Project ID	Description	Anticipated Date of Construction / Project Status	Approximate Distance from NEXUS (mi)	Potential Resources Affected	Source <u>b</u> /
FirstEnergy Proposed Hayes-West Fremont Transmission Line Project, Erie County, OH	11	This Project involves building approximately 30 miles of new 138 kV transmission line that will extend from a new substation (Hayes Substation) in Erie County to an existing West Fremont Substation in Sandusky County.	Construction is proposed to start in mid-2017 with an In-Service Date of August 31, 2018	0.5	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	firstenergycorp.com website. 2015
2014 Construction Projects on I-90, Sandusky County, OH	12	Projects will involve base pavement replacement from Milepost 101.2 to 107.3. Pavement resurfacing will occur in both east and westbound lanes.	Construction completed in 2014	0	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Ohioturnpike.com website. 2014
FirstEnergy Dowling Substation and Transmission Line Project, Wood County, OH	13	This project includes extending an existing transmission line by 150 feet and constructing a new substation (Dowling Substation) in Wood County.	Construction started 1st Quarter 2014 with a proposed In-Service Date of June 1, 2015	5	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	firstenergycorp.com website. 2015
Jefferson Street Widening/Improvement Project, Wood County, OH: City of Perrysburg/Perrysburg Township	14	Widen and reconstruct 1,848 feet of pavement and construct 492 feet of new pavement on Jefferson Street, install curbs and gutters, major drainage improvements, culvert crossing of Kohl Ditch, sidewalks, extend waterline and sanitary sewer, extend left turn lane on State Route 25, widen corner radii at Waters Edge Drive/Williams Road intersection.	Phase A completed in 2014; Phase B to be performed and completed in 2015	5	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Wood County Commissioners website. 2015
Ohio DOT I-75 Reconstruction Project, Lucas County, OH	15	The Project involves reconstructing over 3 miles of pavement from Dorr Street to Central Avenue in downtown Toledo.	Started in Summer 2014 and proposed to be completed by Summer 2016	11	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Dot.state.oh.us website. 2014b
Ohio DOT McCord Rd Railroad Grade Separation Project, Lucas County, OH	16	The Project involves building an underpass at the Norfolk Southern railroad and constructing a roundabout at the intersection of McCord Road and North Mall Drive/Hill Street.	Started in June 2014 and proposed to be completed by November 2016	5	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Dot.state.oh.us website. 2014b
Ohio DOT I-475/US23 Improvement Project, Lucas County, OH	17	This safety project will improve movements at the I-475/U.S. 23 systems interchange, including adding through lanes from southbound U.S. 23 to I-475 and correcting weave movement from eastbound I-475 to southbound U.S. 23 and Central Avenue.	Two-year construction project to begin in 2015.	5	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Dot.state.oh.us website. 2014b
Ohio DOT Anthony Wayne Bridge (SR2) Widening Project, Lucas County, OH	18	The Anthony Wayne Bridge (SR 2) over the Maumee River in Downtown Toledo is closed through September 2015 for bridge reconstruction. Work includes re-decking the bridge, replacing existing truss spans, substructure improvements, new street lighting and rebuilding sidewalks, railings and fencing.	Started in July 2014 and proposed to be completed by November 2015	11	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Dot.state.oh.us website. 2014b

TABLE 1.16-1 Recently Completed, Current, and Reasonably Foreseeable Projects within the NEXUS Project Vicinity						
Project, County <u>a</u> /	Map Project ID	Description	Anticipated Date of Construction / Project Status	Approximate Distance from NEXUS (mi)	Potential Resources Affected	Source <u>b</u> /
Ohio DOT I-475 Bridge Widening Project, Lucas County, OH	19	Replace and widen three bridges on I-475. Bridges are located on I-475 over Wolf Creek, Norfolk Southern Railroad tracks and Angola Road.	Started in June 2014 and proposed to be completed in June 2016	4	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Dot.state.oh.us website. 2014b
2014 Lucas Culvert Project, Lucas County, OH	20	Lucas County will replace culverts in the following locations: 935 Jeffers Road, 989 Perry Road, and 1038 Manore Road.	LET Date April 9, 2014	1	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Providence Township, Lucas County Engineer website. 2014
2014 Road Construction Project, Monroe County, MI	21	Monroe 2014 Road Construction	Ongoing	Within county	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Monroe County Road Commission website. 2014
2015 Road Construction Project, Monroe County, MI	22	Monroe 2015 Road Construction	TBD; 2015	Within county	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Monroe County Road Commission website. 2015
2014 Road Construction Project, Washtenaw County, MI	23	Washtenaw 2014 Road Construction	TBD; 2015	Within county	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Washtenaw County Road Commission website. 2014
2015 Road Construction Project, Washtenaw County, MI	24	Washtenaw 2015 Road Construction	TBD; 2015	Within county	Surface Waters, Wetlands, Groundwater, Vegetation, Wildlife & Fisheries (including protected species and Migratory Birds), Soils, Geology, Cultural, Land Use, Noise and Air Quality, Socioeconomics	Washtenaw County Road Commission website. 2015

FIGURES









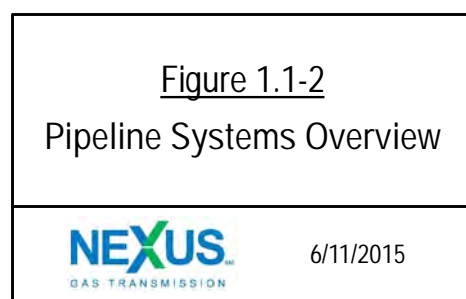
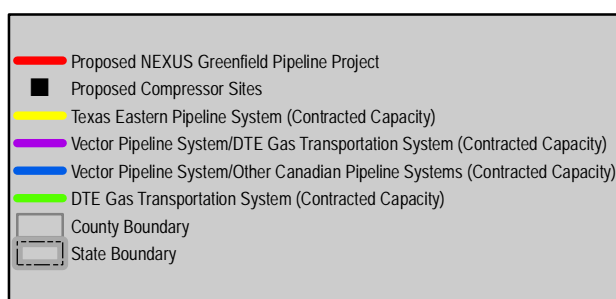
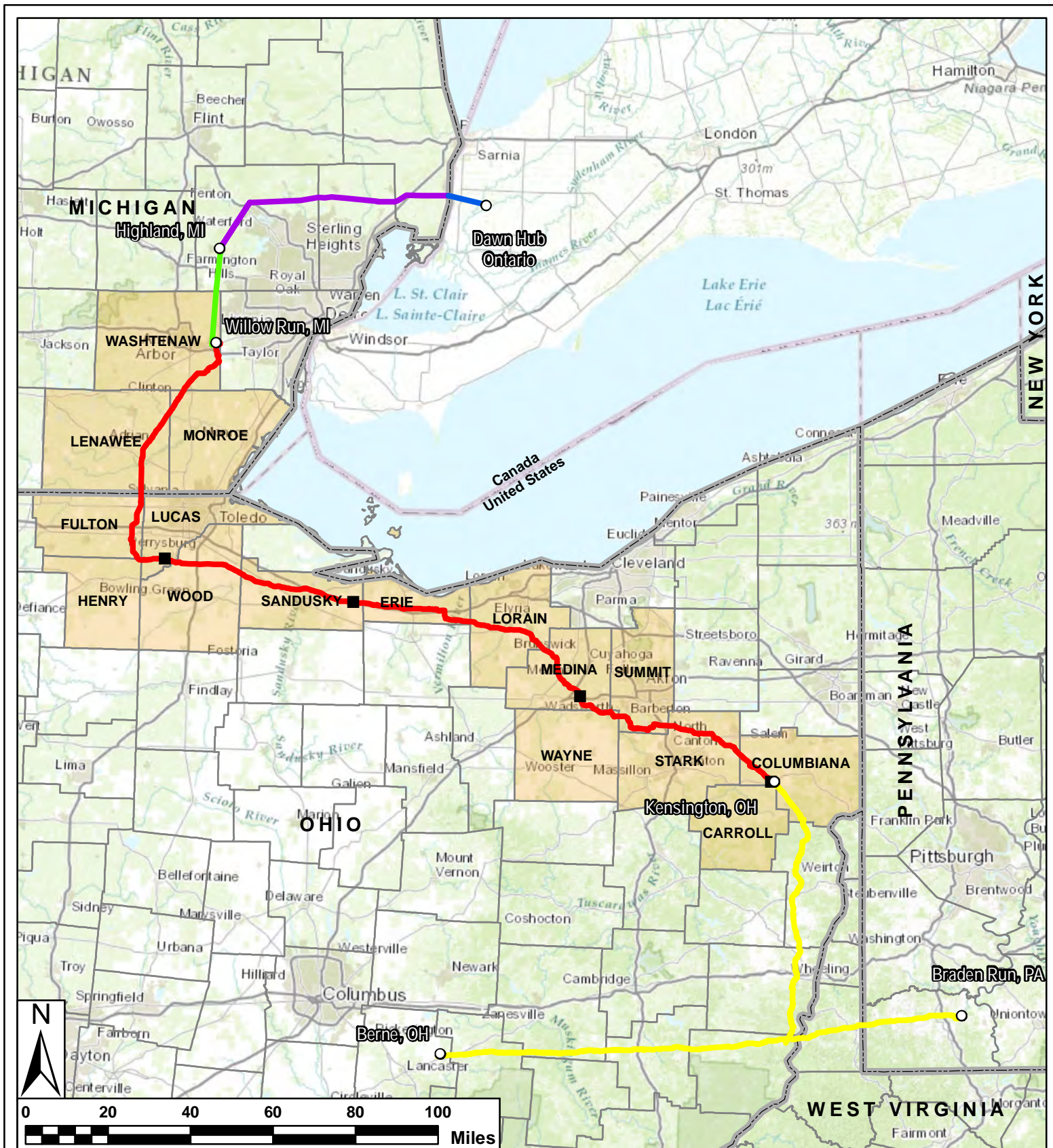
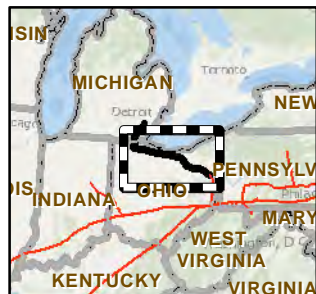
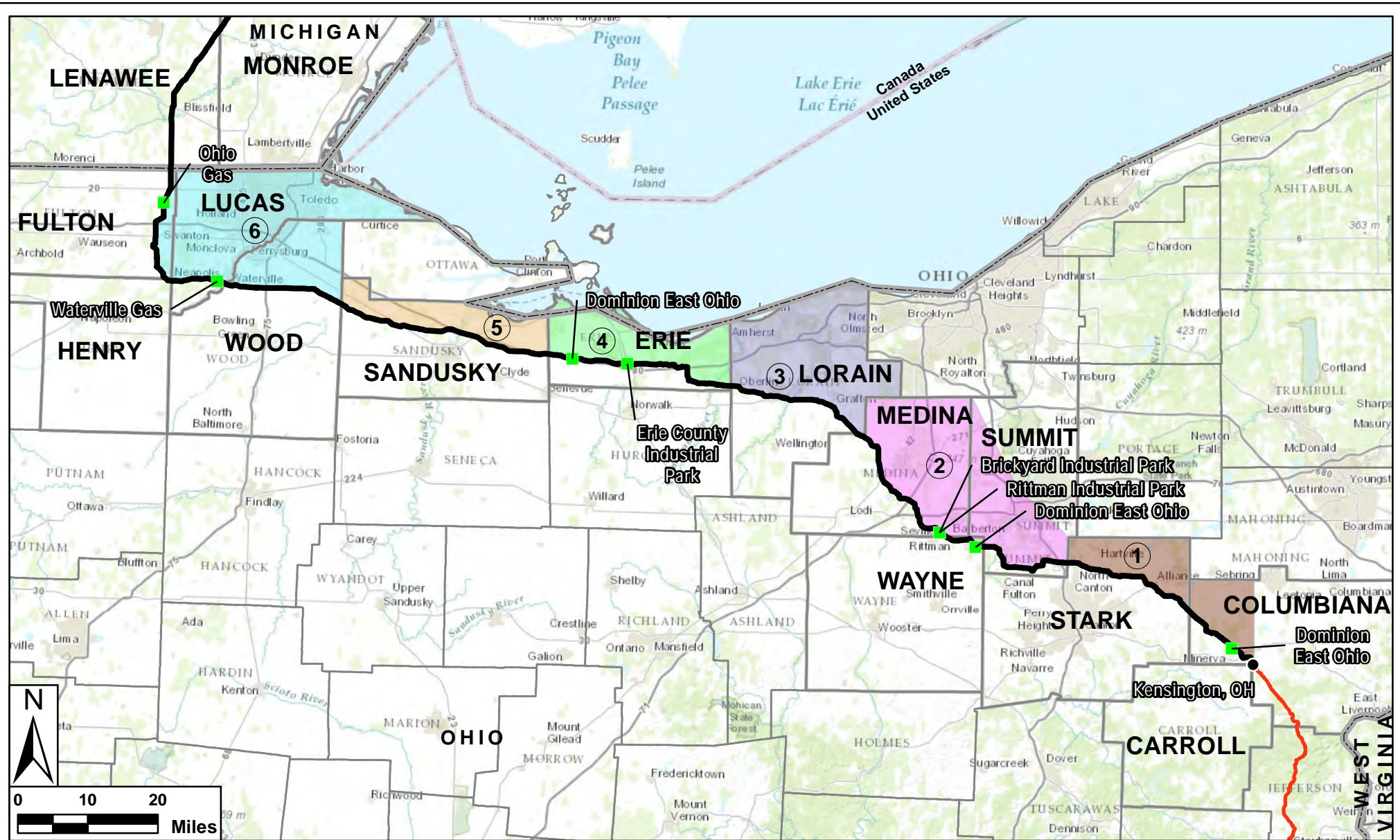
-  NEXUS Project Route
-  Compressor Station
-  M & R Station
-  Confirmed Market Connection
-  County Boundary
-  State Boundary

Figure 1.1-1
NEXUS Project Location Map





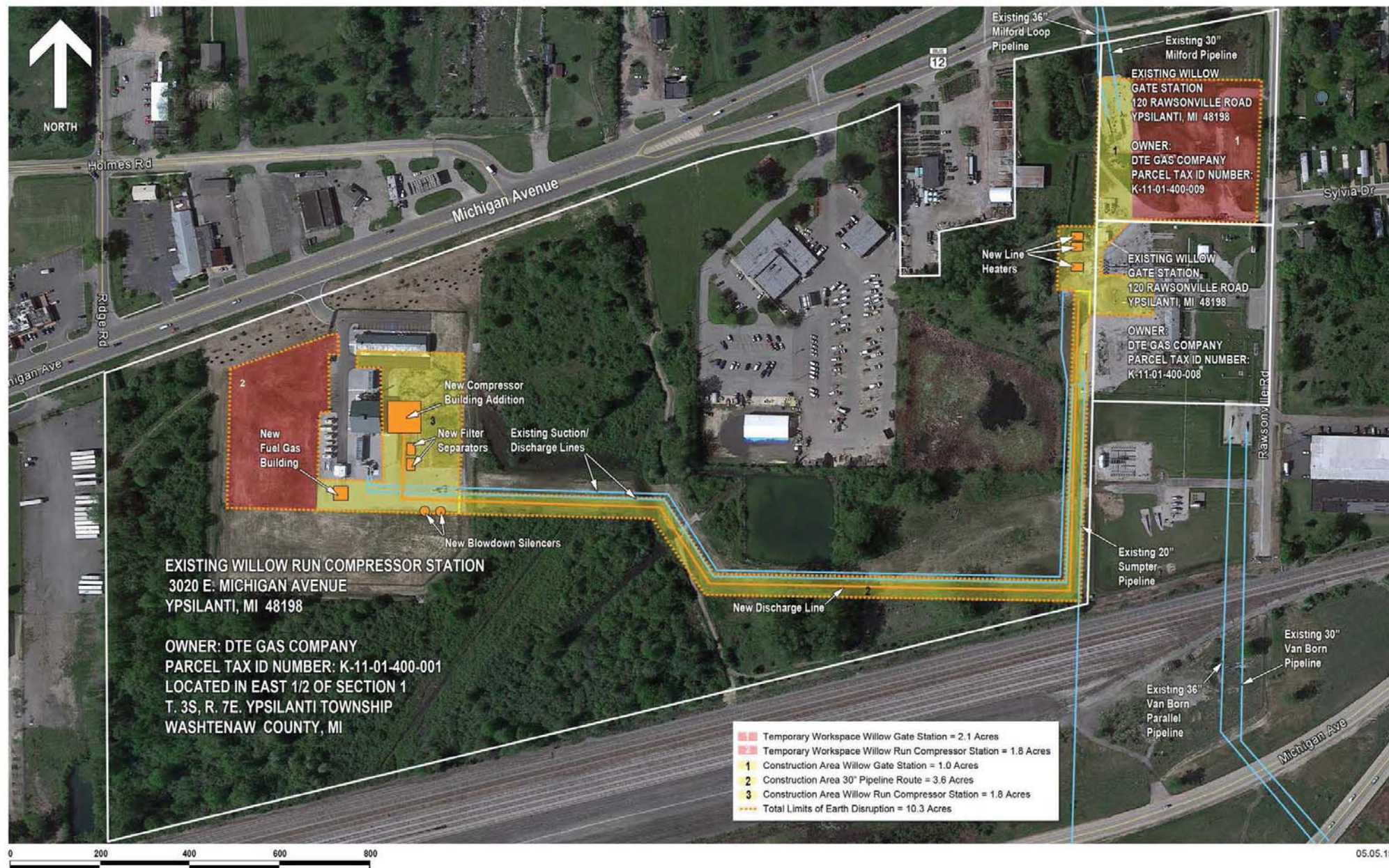
- Legend:**
- Proposed NEXUS Pipeline Project:** Thick black line
 - Texas Eastern Pipeline System:** Red line
 - County Boundary:** Thin grey line
 - State Boundary:** Dashed grey line
 - Confirmed Market Connection (as of June 12, 2015):** Green square
 - Prospective Market Areas:**
 - 1: Brown
 - 2: Pink
 - 3: Light Purple
 - 4: Light Green
 - 5: Orange
 - 6: Light Blue

Note: Prospective market areas depicted on this figure indicate areas where NEXUS is in on-going negotiations for additional market connections and this information will be updated in the Certificate Application that NEXUS plans to file in November of 2015.

Figure 1.2-1
Ohio Market Areas

DTE Gas Company - Willow Run Compressor Station & Willow Gate Station

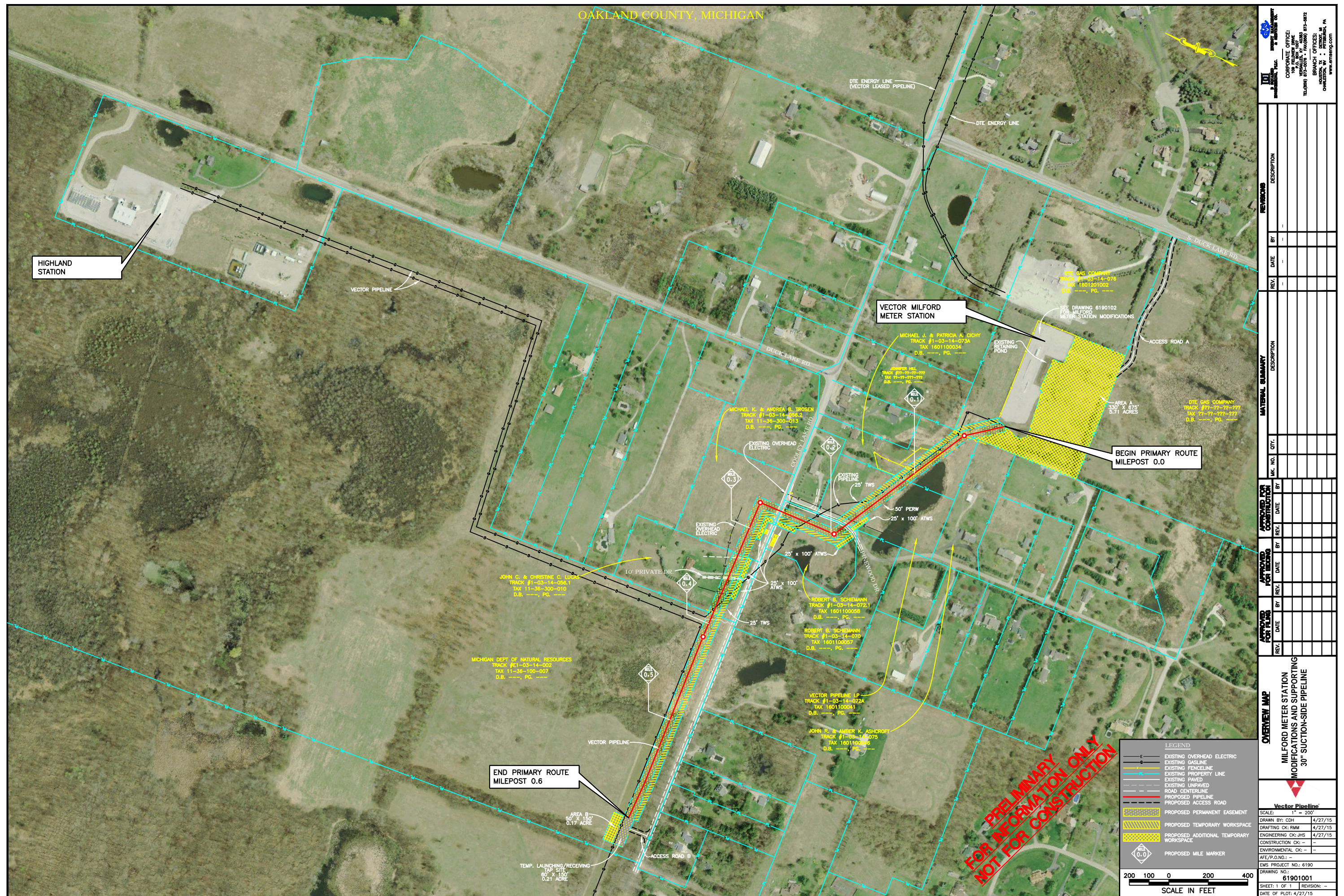
FIGURE 1.15-1



DTE Gas Company - Milford Compressor Station

FIGURE 1.15-2





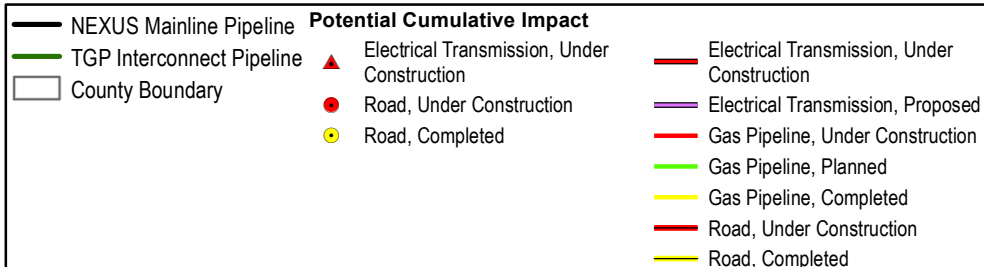
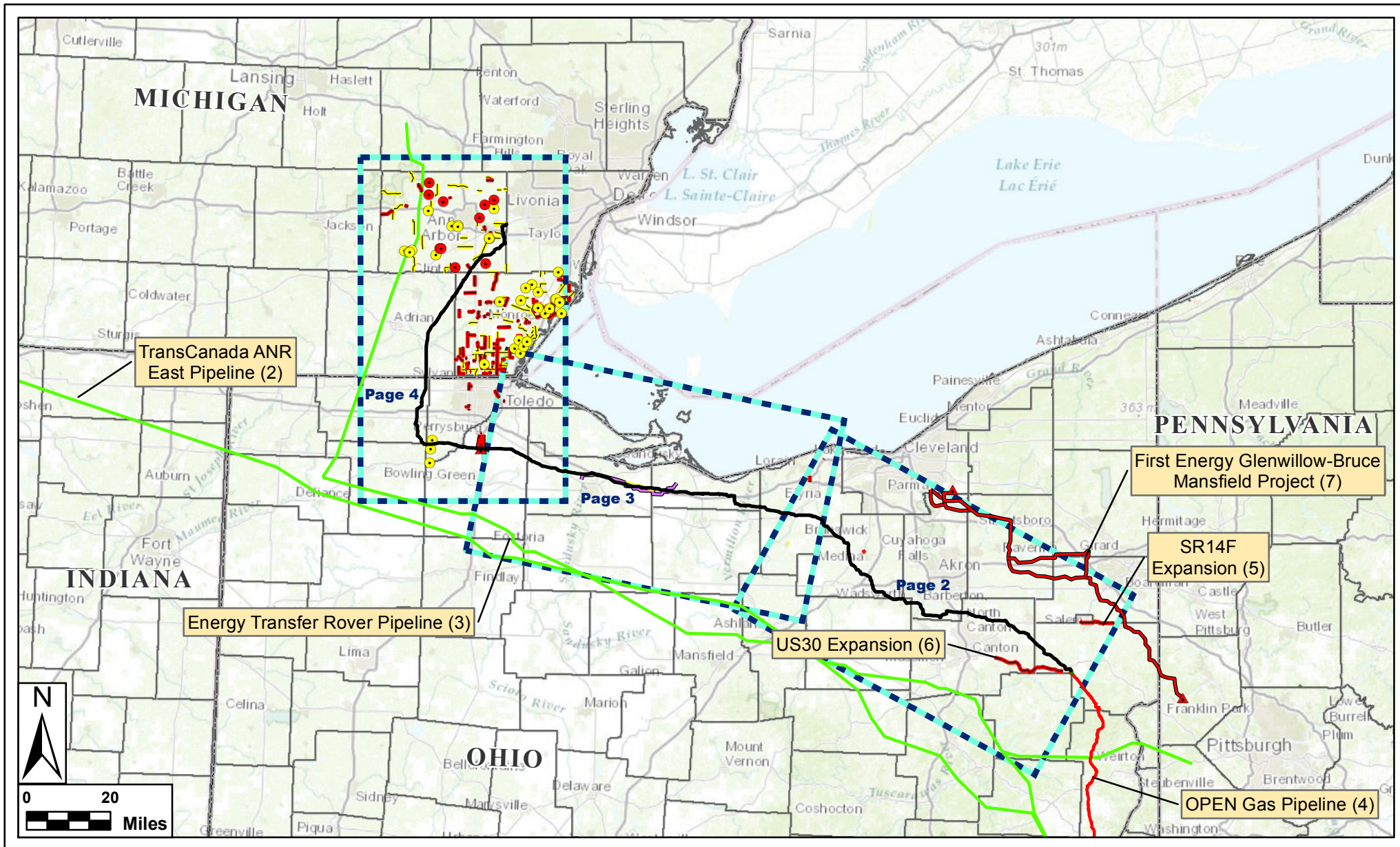
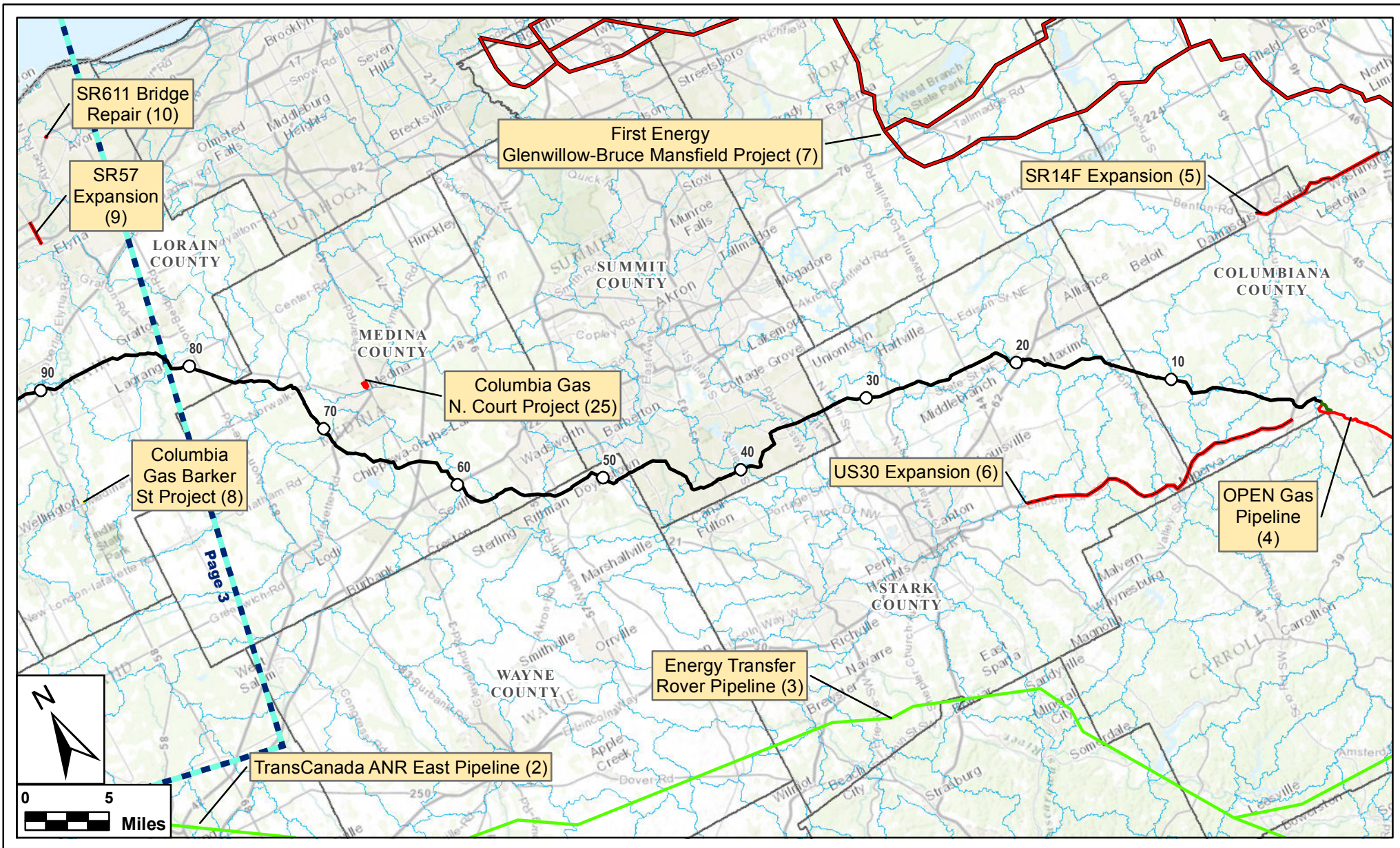


Figure 1.16-1
Recently Completed, Current, and Reasonably Foreseeable Projects within the NEXUS Project Vicinity

NEXUS
 GAS TRANSMISSION

Created: 6/10/2015
 Page 1 of 4



- | | |
|-----------------------------|---|
| ○ Milepost (10 mi) | Potential Cumulative Impact |
| — NEXUS Mainline Pipeline | — Electrical Transmission, Under Construction |
| — TGP Interconnect Pipeline | — Gas Pipeline, Under Construction |
| — Adjacent Page | — Gas Pipeline, Planned |
| — HUC 12 Watersheds | — Gas Pipeline, Completed |
| — County Boundary | — Road, Under Construction |

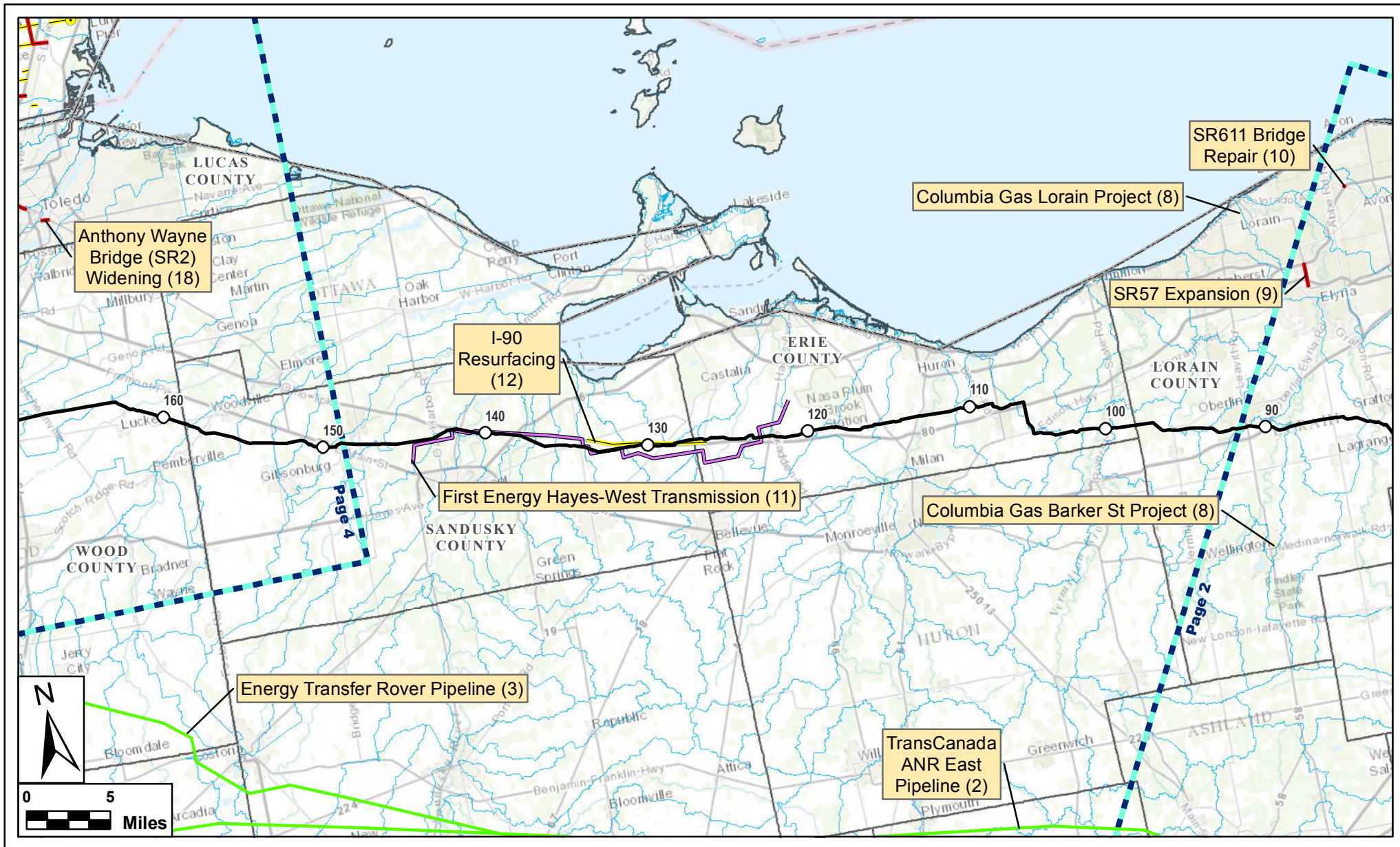
Figure 1.16-1

Recently Completed, Current,
and Reasonably Foreseeable Projects
within the NEXUS Project Vicinity



Created: 6/10/2015

Page 2 of 4



- | | | |
|-----------------------------|----------------------------|-------------------------------------|
| ○ Milepost (10 mi) | ● Road, Completed | — Electrical Transmission, Proposed |
| — NEXUS Mainline Pipeline | — Gas Pipeline, Planned | — Gas Pipeline, Completed |
| — TGP Interconnect Pipeline | — Road, Under Construction | — Road, Completed |
| — Adjacent Page | | |
| — HUC 12 Watersheds | | |
| — County Boundary | | |

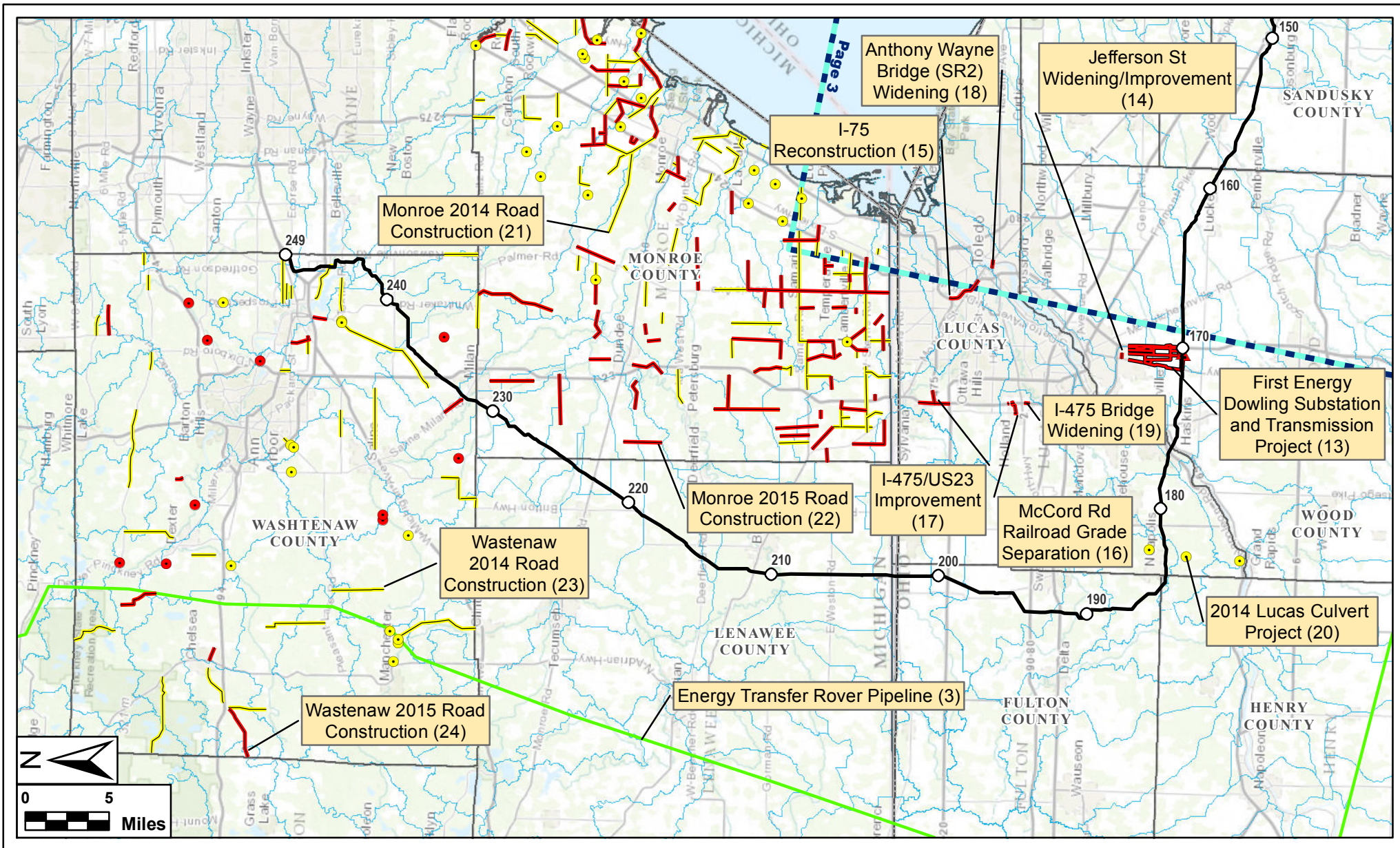
Figure 1.16-1

Recently Completed, Current,
and Reasonably Foreseeable Projects
within the NEXUS Project Vicinity

NEXUS
GAS TRANSMISSION

Created: 6/10/2015

Page 3 of 4



- Potential Cumulative Impact**
- Electrical Transmission, Under Construction
 - Road, Under Construction
 - Road, Completed
 - Electrical Transmission, Under Construction
 - Gas Pipeline, Planned
 - Road, Under Construction
 - Road, Completed

Figure 1.16-1

Recently Completed, Current,
and Reasonably Foreseeable Projects
within the NEXUS Project Vicinity



Created: 6/10/2015

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APPENDIX 1A

- Typical ROW Configurations
- 8.5- x 11-inch USGS Quadrangle Map Excerpts
- Other Aboveground Facility Plot Plan Drawings

Volume II-B – Oversized Mapping

- Alignment Sheets
- Full Size USGS Quadrangle Maps [*Not Included with this Filing*]
- Other aboveground Facility Plot Plan Drawings
- Full Size National Wetland Inventory (“NWI”) Maps [*Not Included with this Filing*]

Volume III - Privileged and Confidential (bound separately)

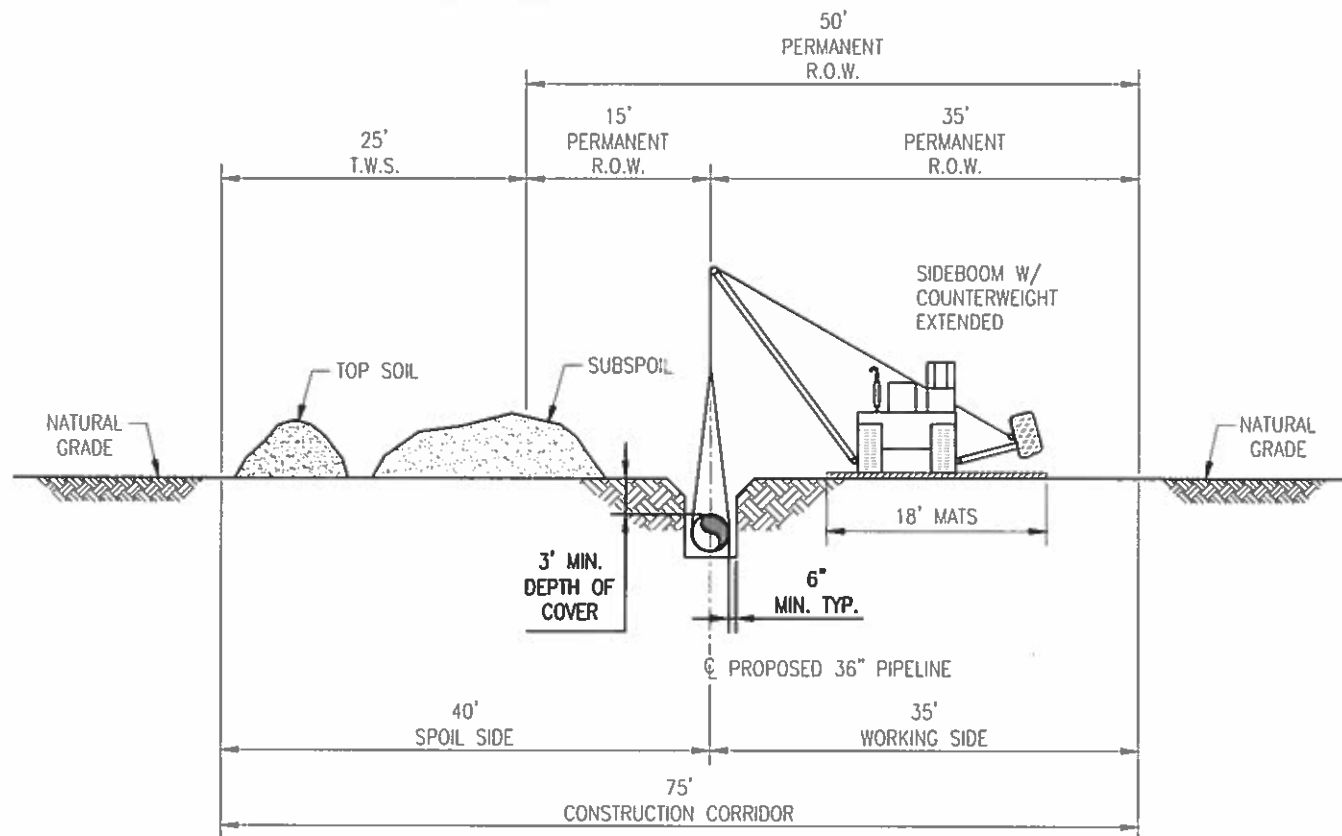
- Land Owner List
- List of Abutters Within ½ Mile of Proposed Compressor Stations
- Cultural Resources Information

Volume IV - CEII Information (bound separately)

- Proposed Compressor Station Site Plan Drawings

Typical ROW Configurations

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TYPICAL 75' CONSTRUCTION CORRIDOR

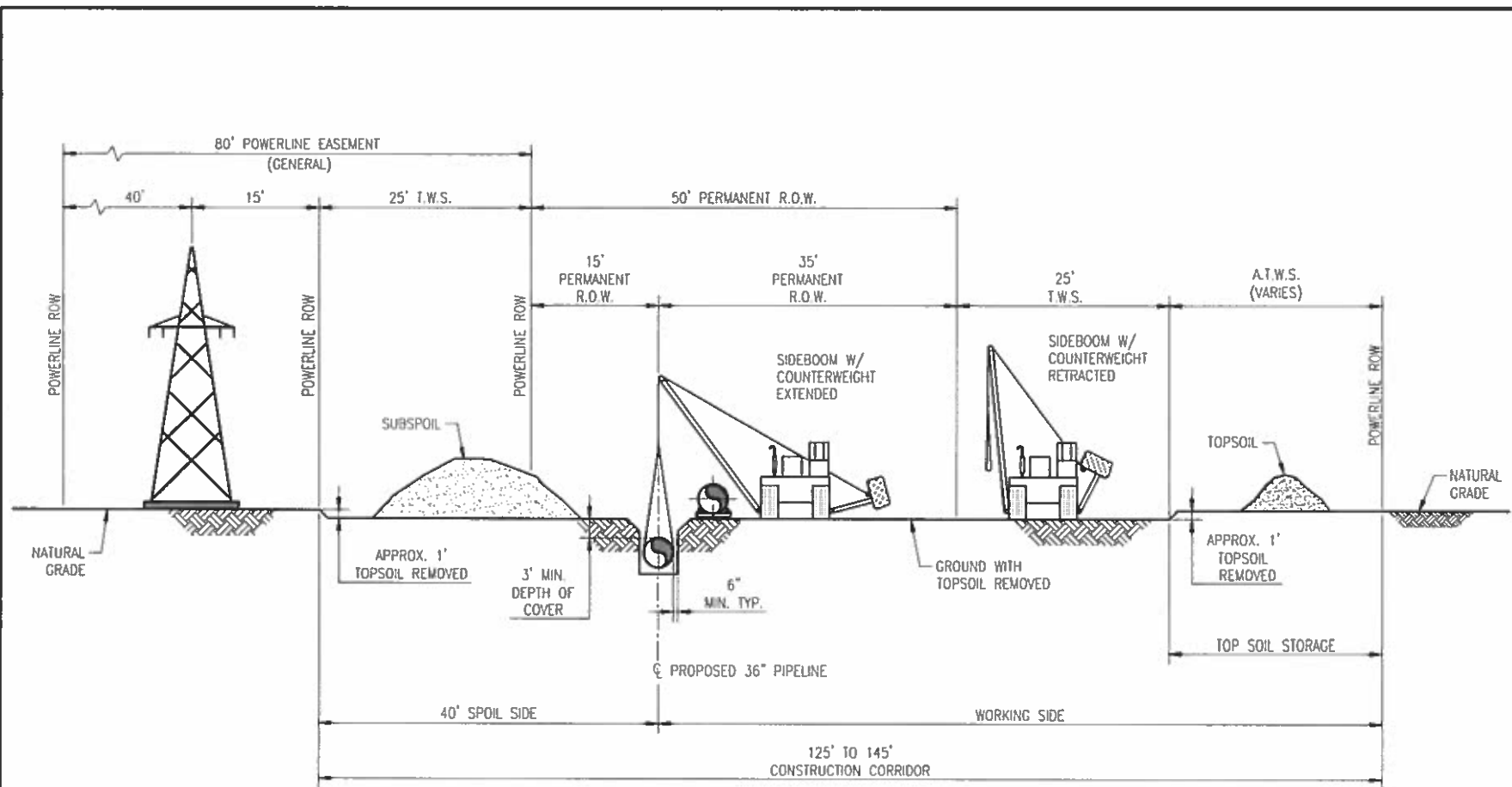
N.T.S.

NOTES:

1. THIS CONSTRUCTION METHOD APPLIES TO LOCATIONS WHERE THE APPLICABLE R.O.W. ARRANGEMENT CALLS FOR 15'-35' PERMANENT R.O.W.
2. THIS CONSTRUCTION METHOD APPLIES TO FORWARD & REVERSE PIPELINE LAY.
3. ALL SPOIL SHALL BE CONTAINED WITHIN THE CONFINES OF THE ROW.
4. THE PIPELINE COVER HAS A MINIMUM DEPTH OF 3FT. IF ROCK IS PRESENT, THE PIPE WILL NEED TO BE PLACED ON SAND BAGS AND THE CONTRACTOR WILL ACCOUNT FOR EXTRA DEPTH IN THE DITCH.
5. CONTRACTORS MAY REQUEST TO PLACE TOP SOIL TO THE WORKING SIDE OF THE CONSTRUCTION R.O.W. WHEN DEEMED FIT.

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	CHECKED BY ^{DC} DC	14Apr15	YR.: 2015			
	DRAWN BY: ^{RVE} RVE	14Apr15	W.O.			
	SCALE: NTS	DATE	REV.: A	LOC.: OHIO / MICHIGAN		

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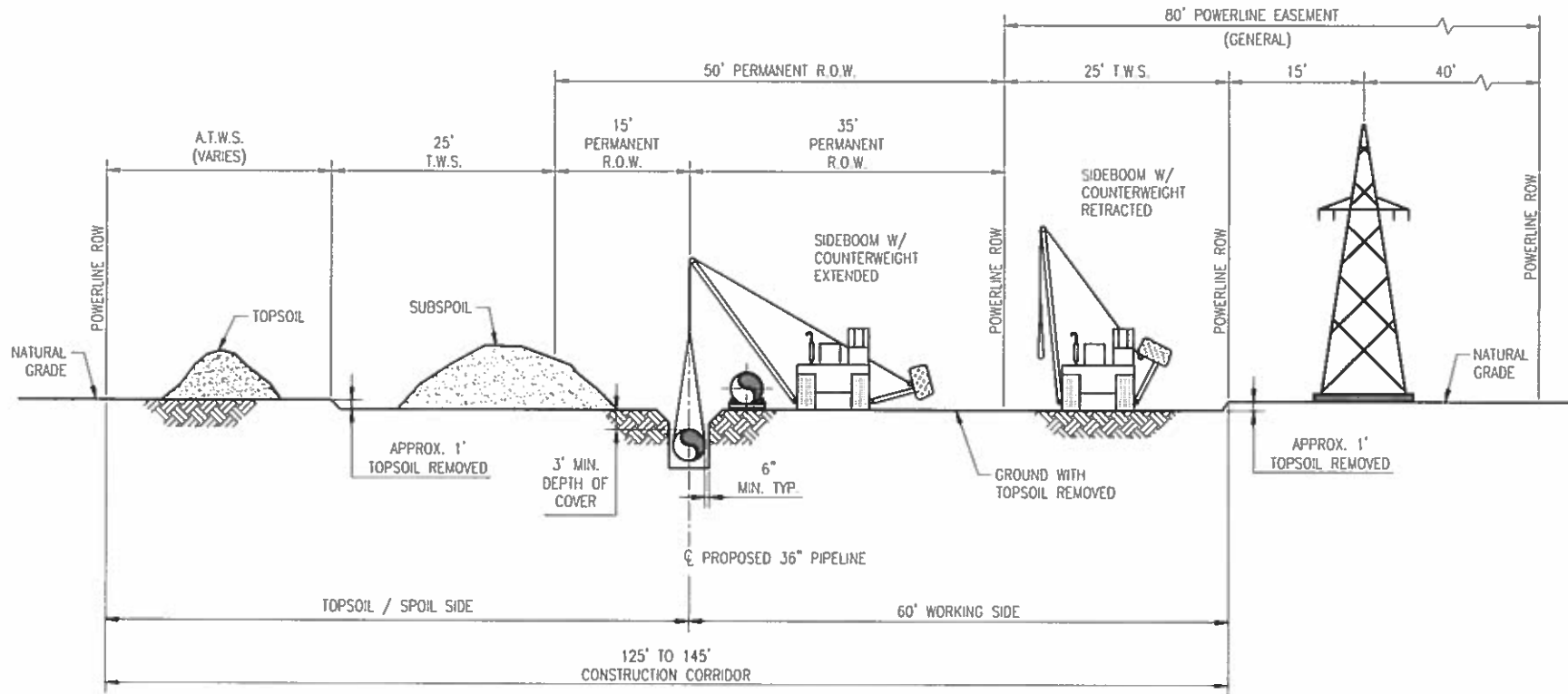


TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 80' POWERLINE EASEMENT

N.T.S.


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DRAWN BY: RVE	14Apr15	W.O.	NORTH OR EAST OF POWERLINE EASEMENT		
SCALE: NTS	DATE	REV.: A	LOC.: LUCAS COUNTY, OHIO	DWG. NO. S4NX-P-8015-A	

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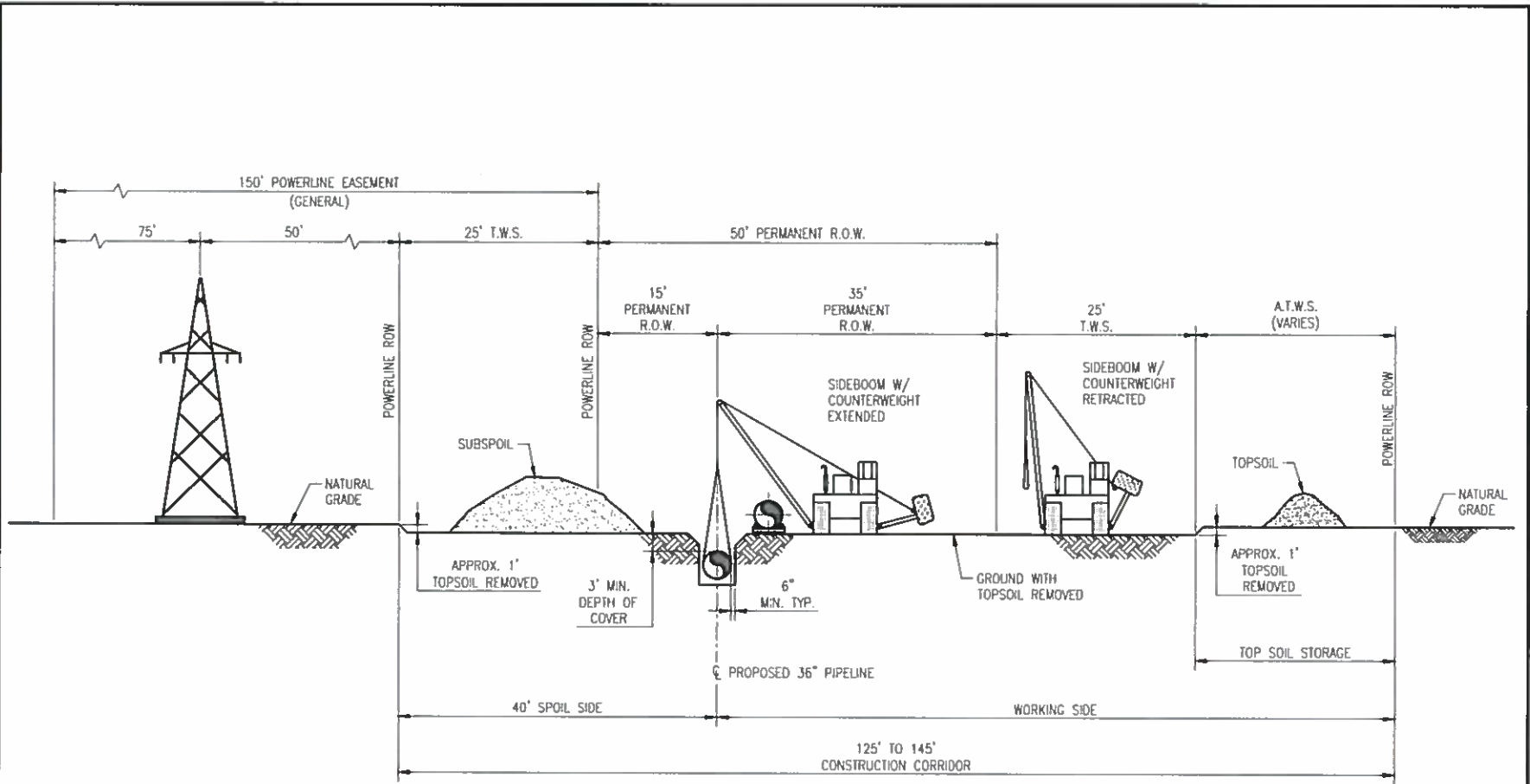


**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 80' POWERLINE EASEMENT**

N.T.S.

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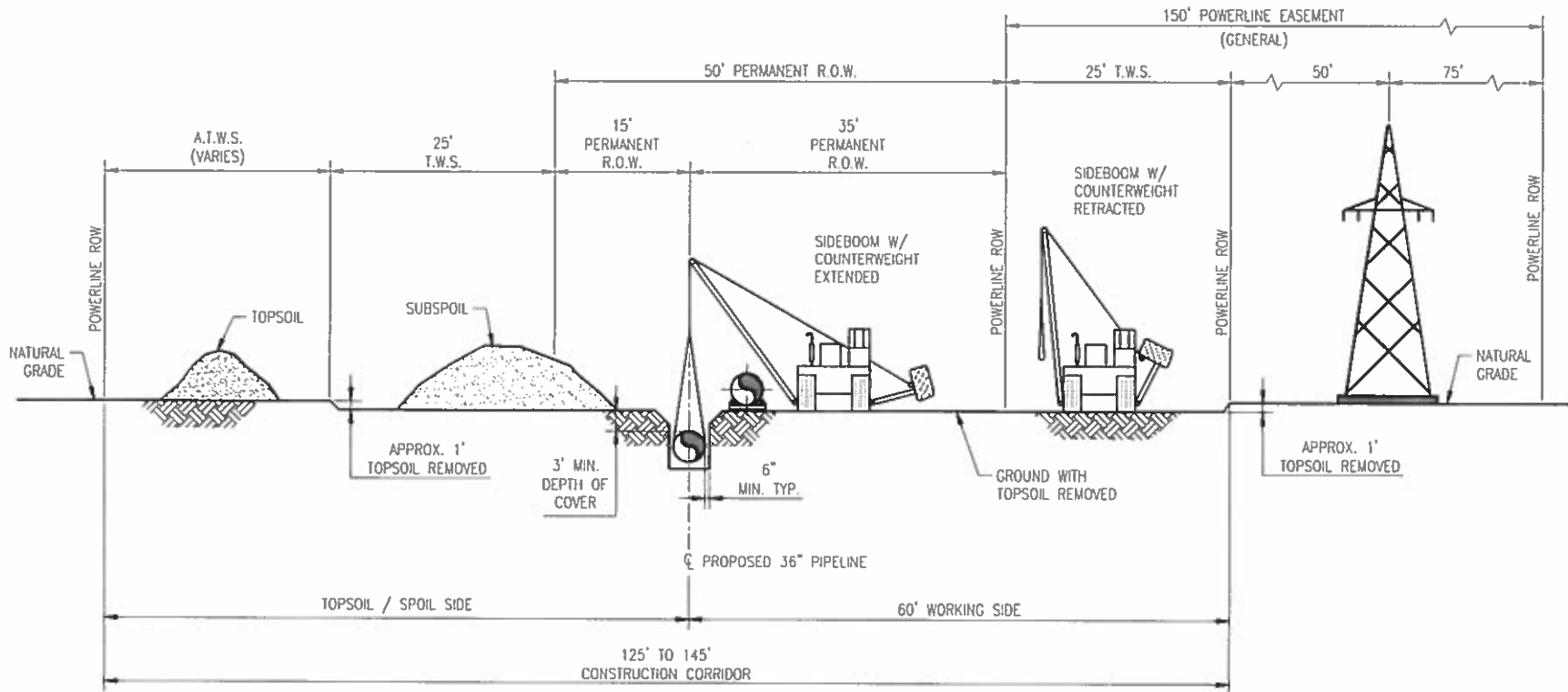
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**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 150' POWERLINE EASEMENT**
 N.T.S.

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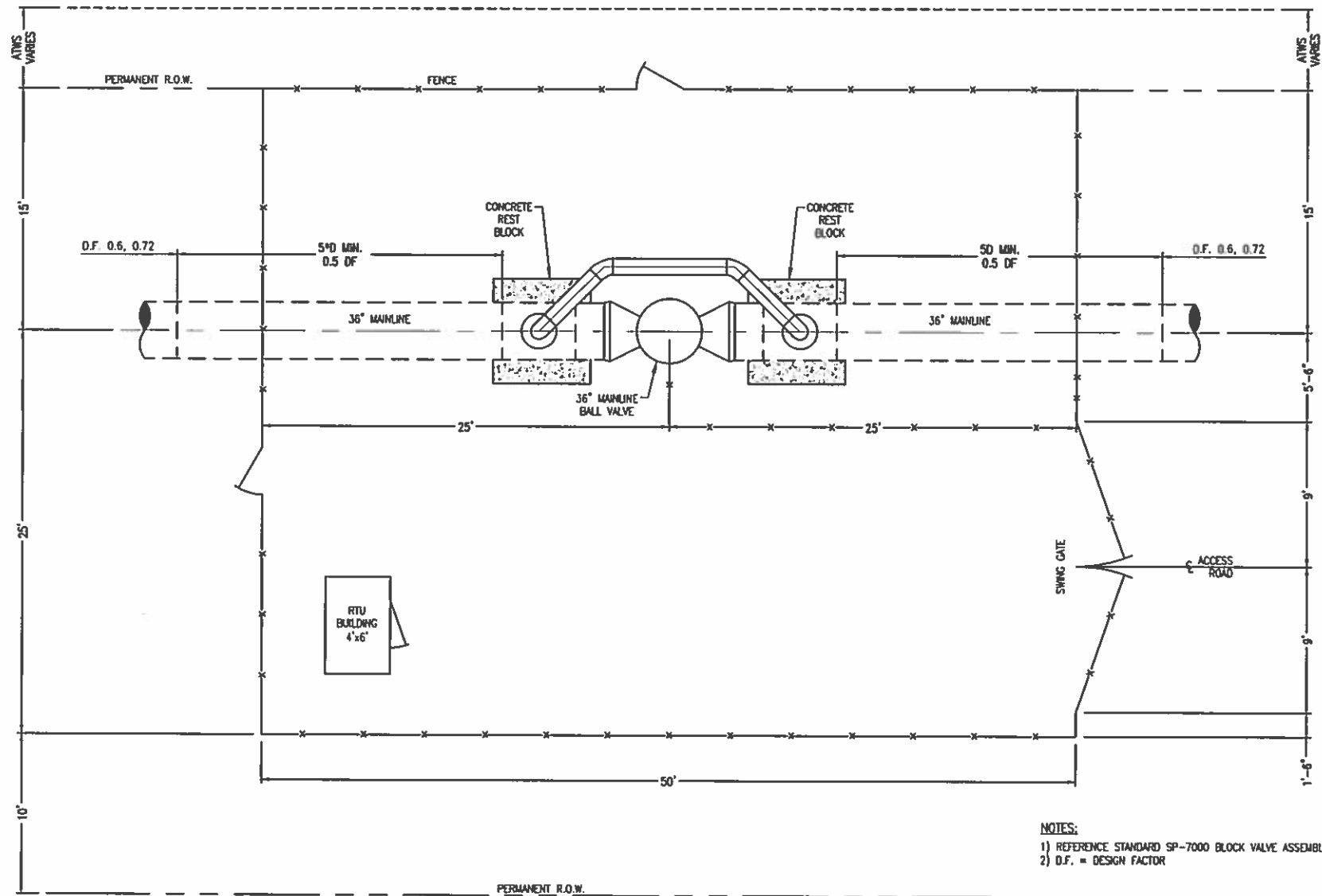


TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 150' POWERLINE EASEMENT

N.T.S.

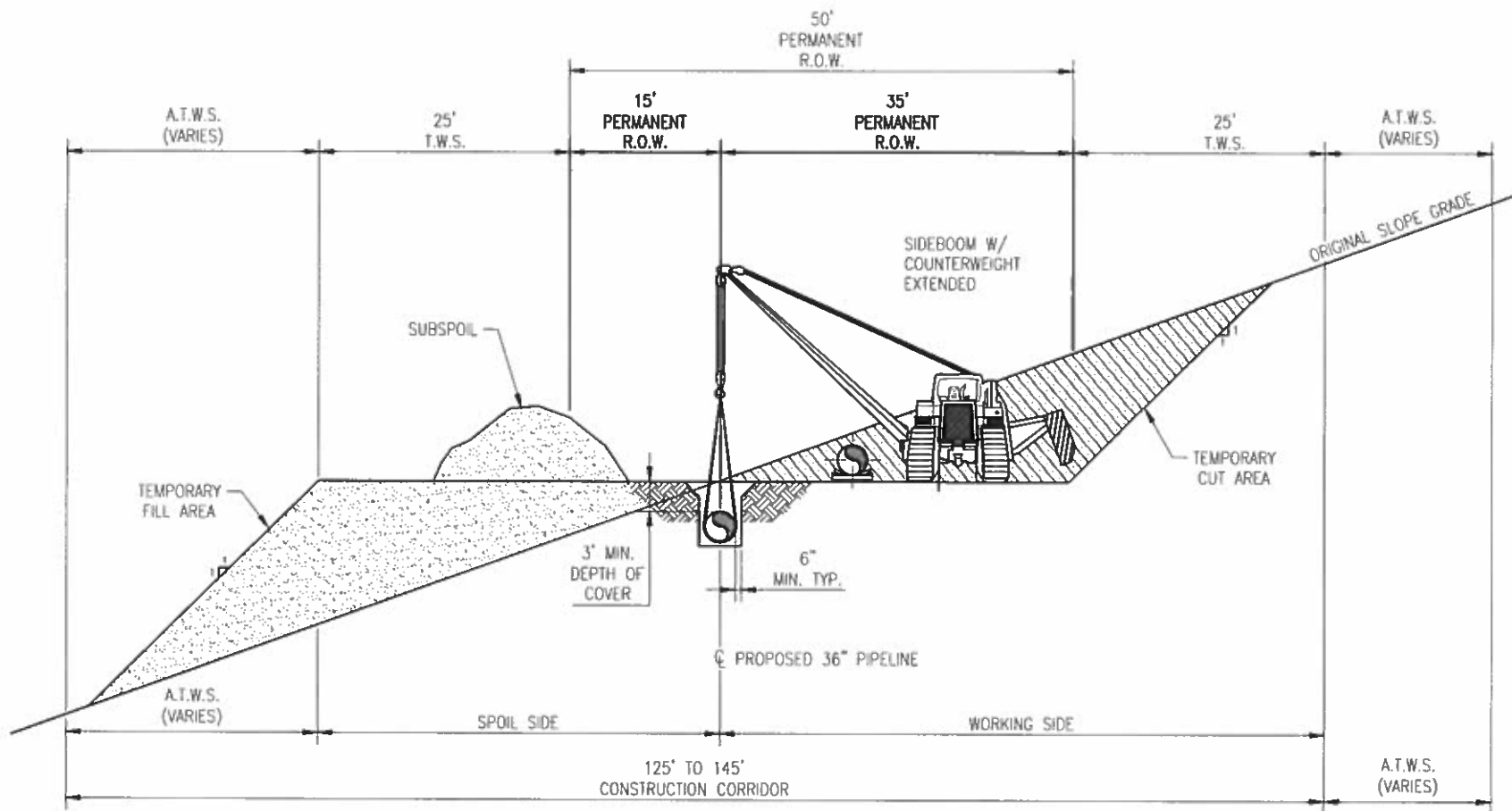
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NOTES:
 1) REFERENCE STANDARD SP-7000 BLOCK VALVE ASSEMBLY.
 2) D.F. = DESIGN FACTOR

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DRAWN BY:	RVE	14Apr15	W.O.		GENERAL PLOT PLAN		
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							NEXUS GAS TRANSMISSION



TYPICAL 125' TO 145' SIDE SLOPE CONSTRUCTION

N.T.S.

NOTES:

- SEE ADDITIONAL TEMPORARY WORKSPACE TABLE.
- REFERENCE EROSION & SEDIMENT CONTROL PLAN S4NX-D-1001 FOR TOPSOIL SEGREGATION.

ADDITIONAL TEMPORARY WORKSPACE		
SLOPE ANGLE	SPOIL SIDE	WORKING SIDE
0° - 10°	15	0
10° - 20°	25	0
20° - 30°	50	25

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 CHECKED BY **DC** 14Apr15
 DRAWN BY **RVE** 14Apr15
 SCALE: **NTS** DATE

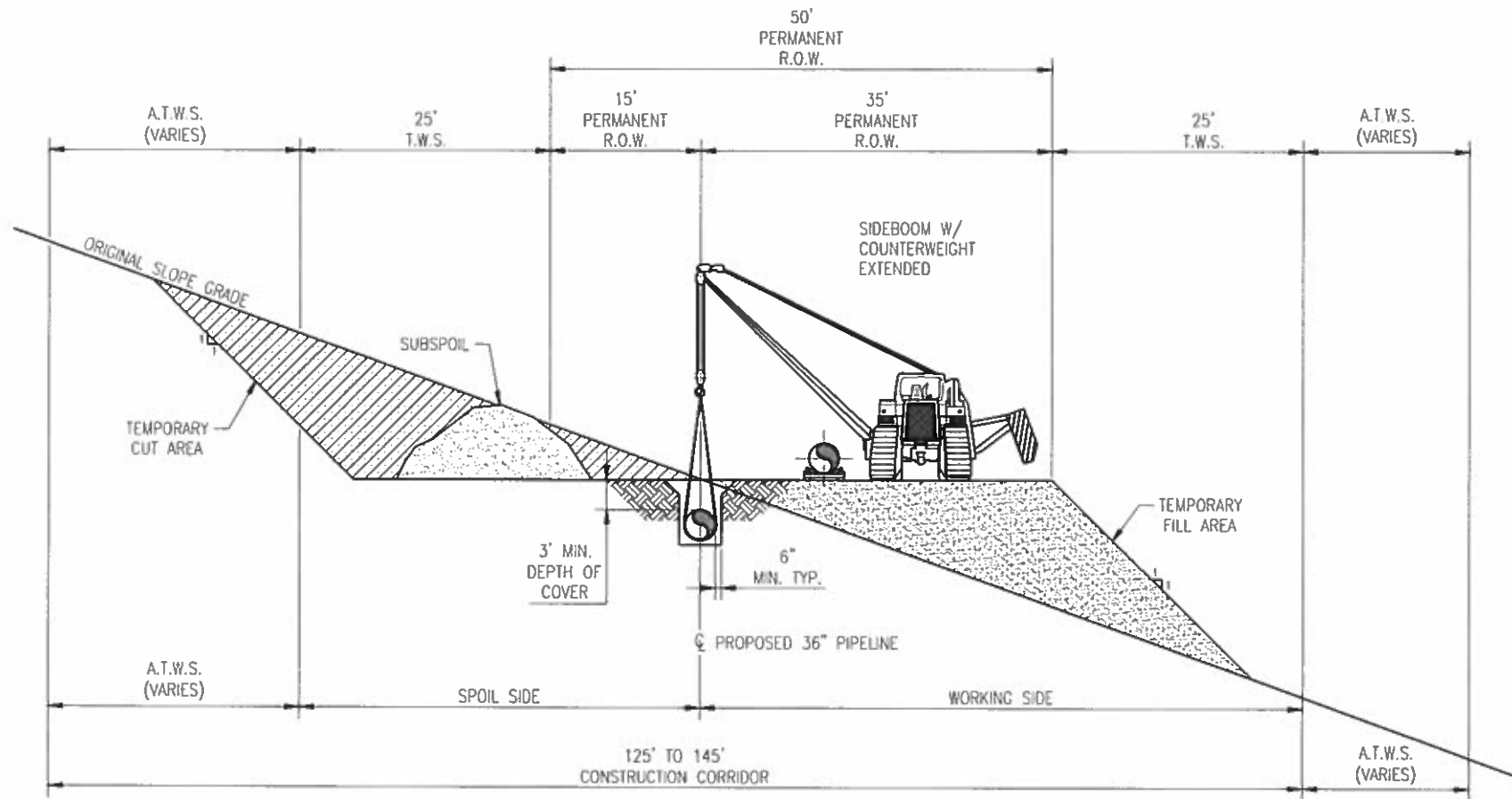
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 W.O.
 REV.: A

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 - RIGHT SIDE -
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DWG. NO. S4NX-P-8019

NEXUS
 GAS TRANSMISSION

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TYPICAL 125' TO 145'
SIDE SLOPE CONSTRUCTION
 N.T.S.

NOTES:

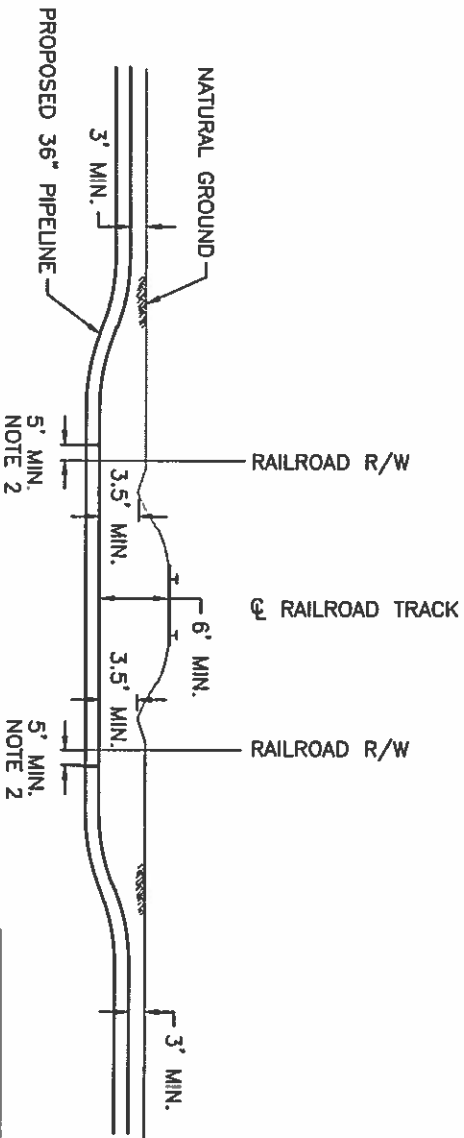
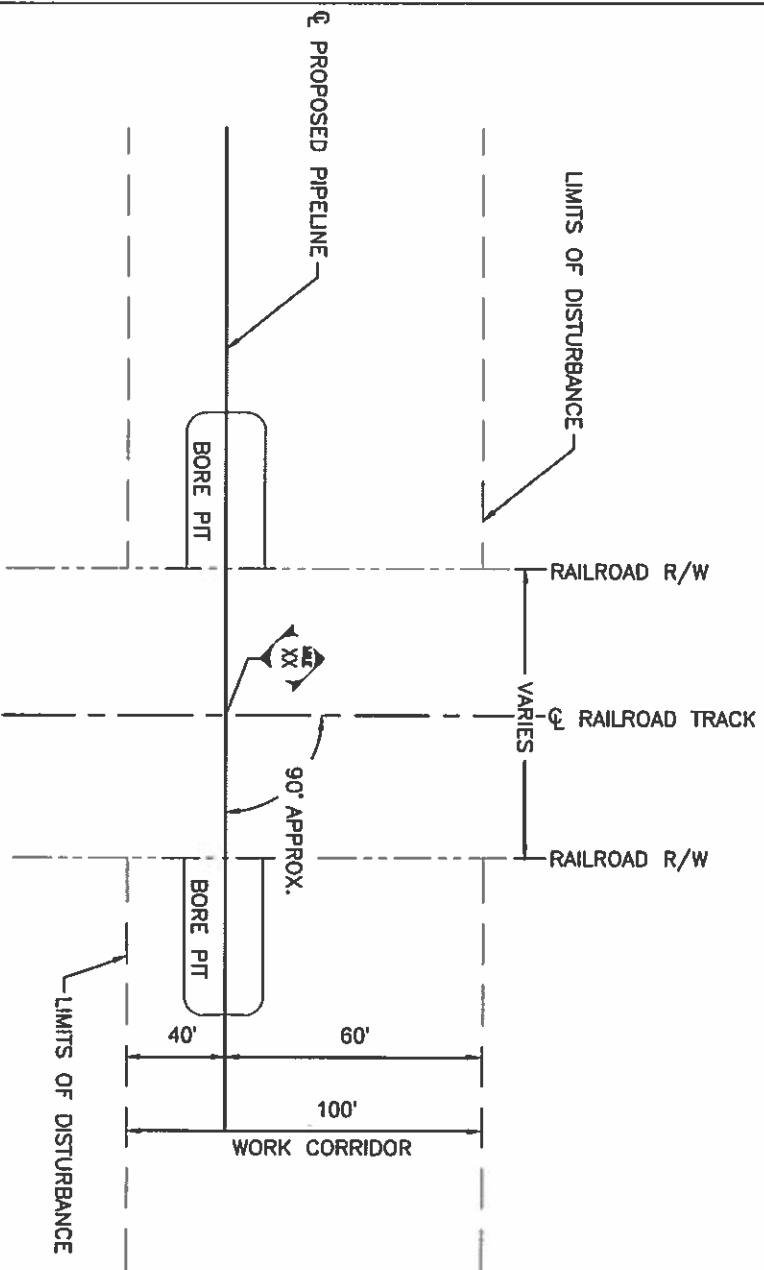
1. SEE ADDITIONAL TEMPORARY WORKSPACE TABLE.
2. REFERENCE EROSION & SEDIMENT CONTROL PLAN S4NX-D-1001 FOR TOPSOIL SEGREGATION.

ADDITIONAL TEMPORARY WORKSPACE		
SLOPE ANGLE	SPOIL SIDE	WORKING SIDE
0° - 10°	15	0
10° - 20°	25	0
20° - 30°	50	25

PROJ. ENG.	KG	14Apr15	
CHECKED BY:	DCDC	14Apr15	YR.: 2015
DRAWN BY:	RVE	14Apr15	W.O.
SCALE:	NTS	DATE	REV.: A

TITLE: NEXUS GAS TRANSMISSION PROJECT TYPICAL SIDE SLOPE CONSTRUCTION - LEFT SIDE -	
LOC.: OHIO / MICHIGAN	DWG. NO. S4NX-P-8020

NEXUS
 GAS TRANSMISSION



- NOTES:
1. PIPE SPECS WITHIN ROW:
 O.D.: 36"
 WALL: SEE TABLE
 GRADE: API 5L-X70
 2. DEFINES MINIMUM FOOTAGE OF STRAIGHT PIPE
 OUTSIDE OF RAILROAD R/W BEFORE RETURNING
 PIPELINE TO 3 FEET MIN. COVER AND POSSIBLE
 PIPE MATERIAL CHANGE

PROFILE
 N.T.S.

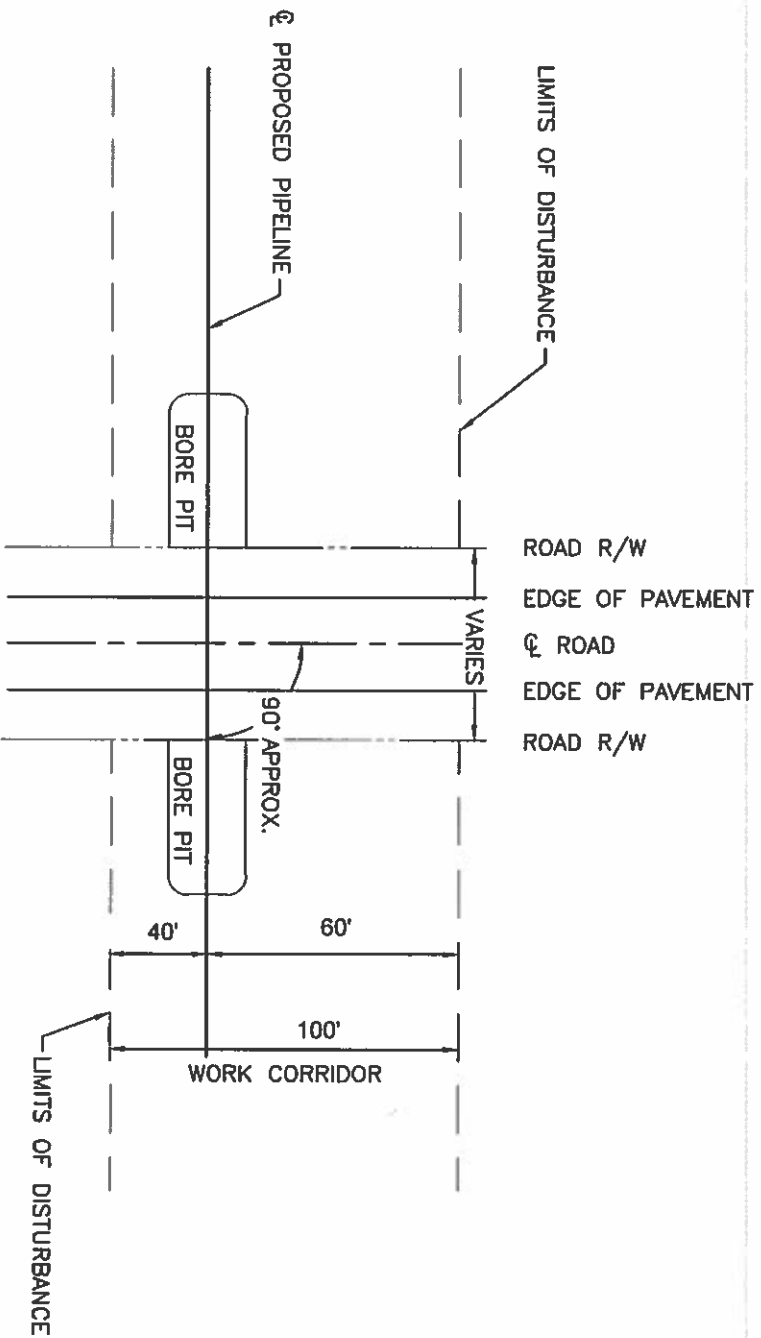
WALL THICKNESS	
CLASS	W.T. (IN)
1	0.514
2	0.617
3	0.741

NEXUS
 GAS TRANSMISSION

TITLE:
 NEXUS GAS TRANSMISSION PROJECT
 TYPICAL BORED RAILROAD CROSSING
 CONTROL MEASURE DETAIL

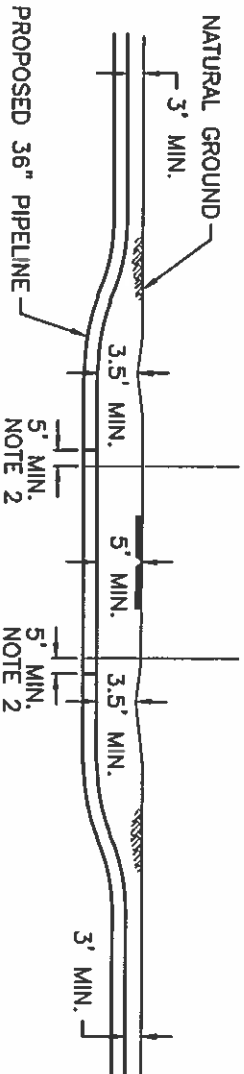
LOC: OHIO / MICHIGAN

PROJ. ENG.	KCG	6Apr15
CHECKED BY	DC	6Apr15
DRAWN BY	PURVE	6Apr15
SCALE:	NTS	YR: 2015
W.O.	REV: A	
DMG. NO.	S4NX-P-8021	



PLAN
N.T.S.

ROAD R/W
EDGE OF PAVEMENT
CL ROAD
EDGE OF PAVEMENT
ROAD R/W



- NOTES:
1. PIPE SPECS WITHIN R/W:
O.D.: 36"

PROFILE
N.T.S.

2. WALL: SEE TABLE
GRADE: API 5L-X70
3. DEFINES MINIMUM FOOTAGE OF STRAIGHT PIPE
OUTSIDE OF RAILROAD R/W BEFORE RETURNING
PIPELINE TO 3 FEET MIN. COVER AND POSSIBLE
PIPE MATERIAL CHANGE.
4. BORE PITS TO BE SET BACK SUCH AS NOT TO BE
LOCATED BENEATH POWERLINES.

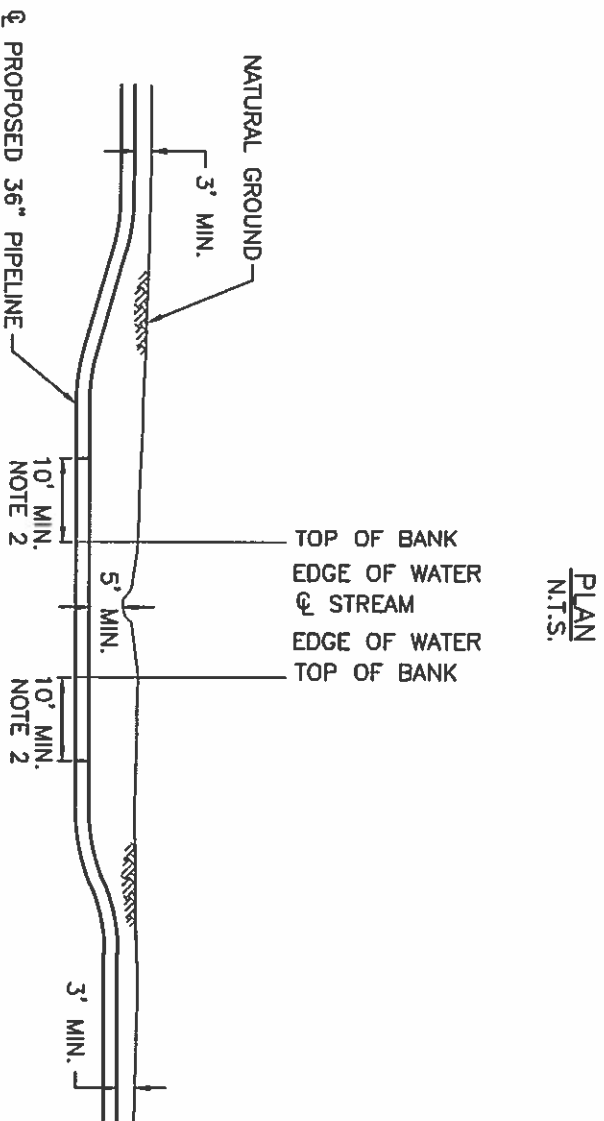
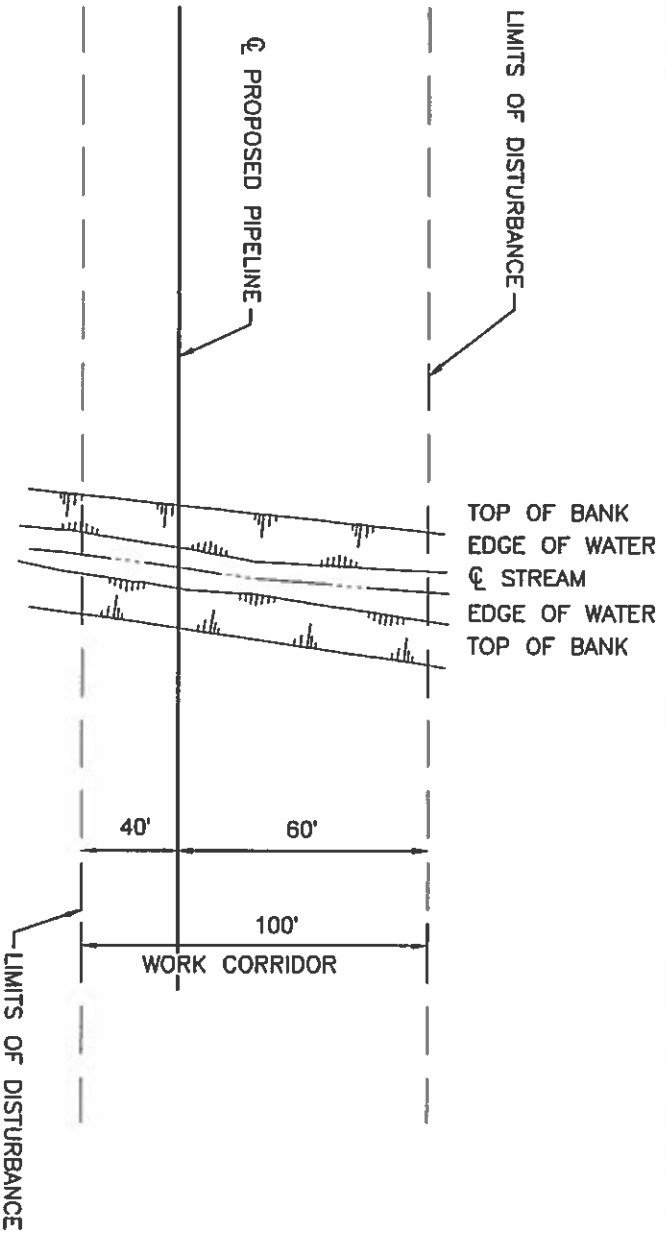
WALL THICKNESS	
CLASS LOCATION	W.T. (IN)
1	0.514
2	0.617
3	0.741

NEXUS
GAS TRANSMISSION

TITLE:
NEXUS GAS TRANSMISSION PROJECT
TYPICAL ROAD CROSSING
CONTROL MEASURE DETAIL

LOC.: OHIO / MICHIGAN

PROJ. ENG.	KCG	6Apr15
CHECKED BY	DC	6Apr15
DRAWN BY	20RVE	6Apr15
SCALE:	NTS	YR.: 2015
W.O.		REV.: A
DWG. NO.	S4NX-P-8022	



- NOTES:**
1. PIPE SPECS WITHIN ROW:
O.D.: 36"
WALL: SEE TABLE

PROFILE
N.T.S.

2. DEFINES MINIMUM FOOTAGE OF STRAIGHT PIPE
OUTSIDE OF RAILROAD ROW BEFORE RETURNING
PIPELINE TO 3 FEET MIN. COVER AND POSSIBLE
PIPE MATERIAL CHANGE.

WALL THICKNESS	
CLASS LOCATION	W.T. (IN)
1	0.514
2	0.617
3	0.741

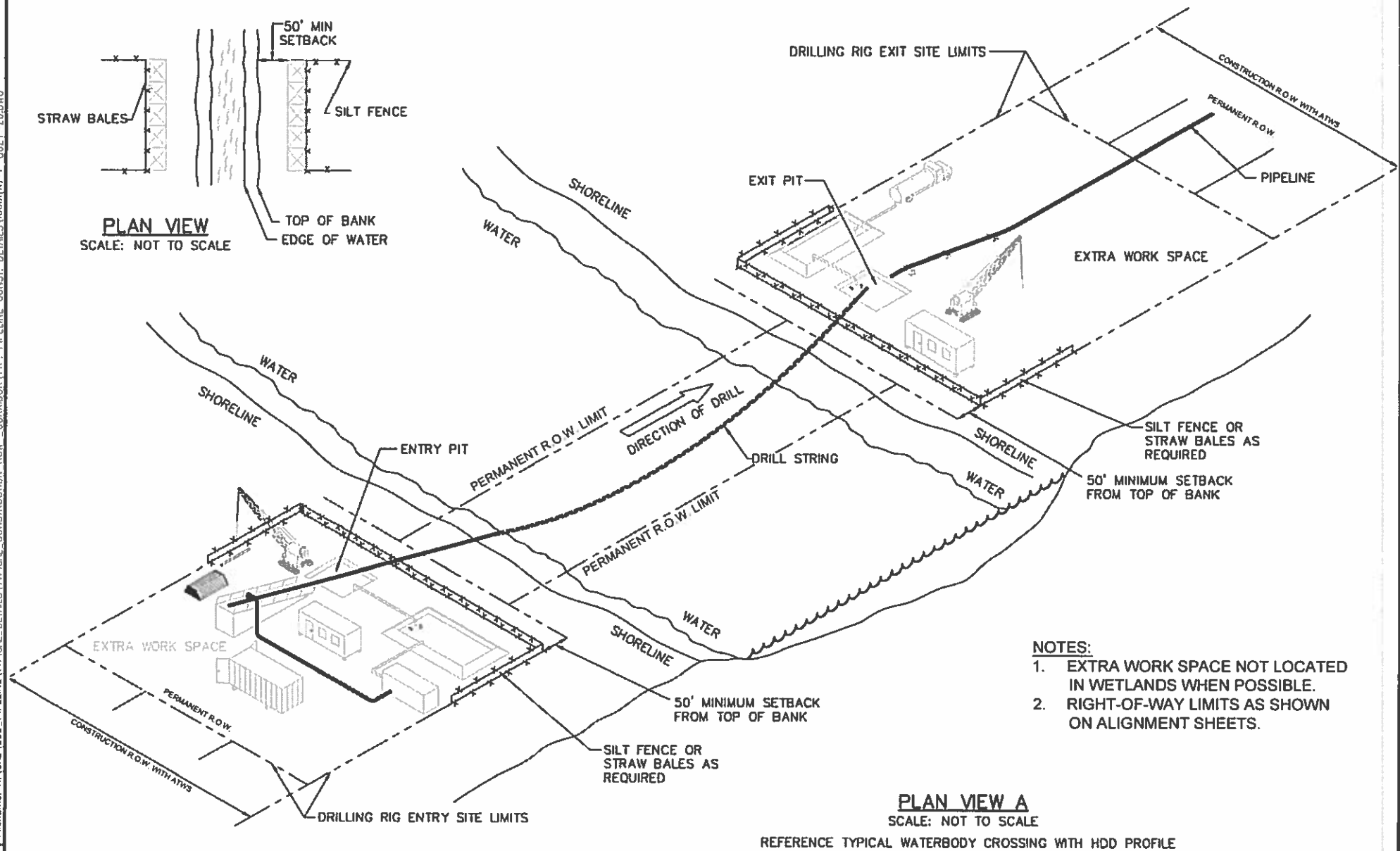
NEXUS
GAS TRANSMISSION

TITLE:
NEXUS GAS TRANSMISSION PROJECT
TYPICAL STREAM CROSSING
CONTROL MEASURE DETAIL

LOC.: OHIO / MICHIGAN

PROJ. ENG. KCG	6Apr15
CHECKED BY DC	6Apr15
DRAWN BY <i>206</i> RVE	6Apr15
SCALE: NTS	YR: 2015
W.O.	REV: A
DWG. NO. S4NX-P-8023	

ELJ22282 April 10, 2015 4:32pm
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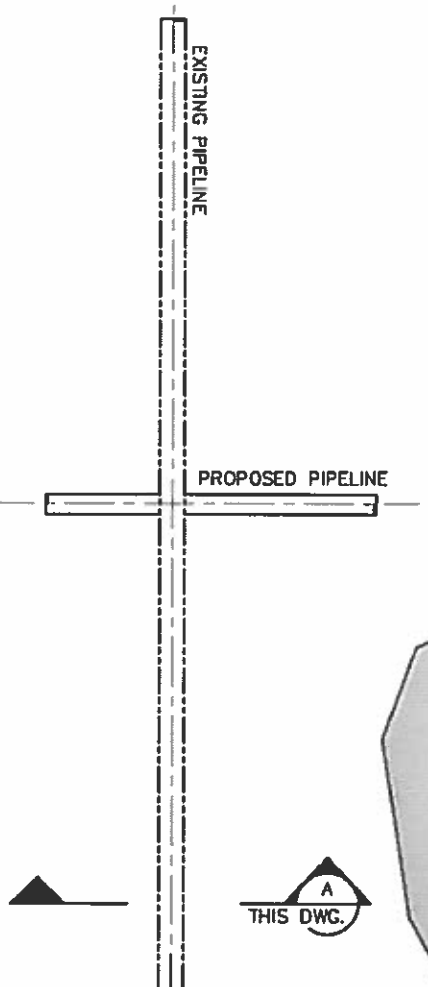
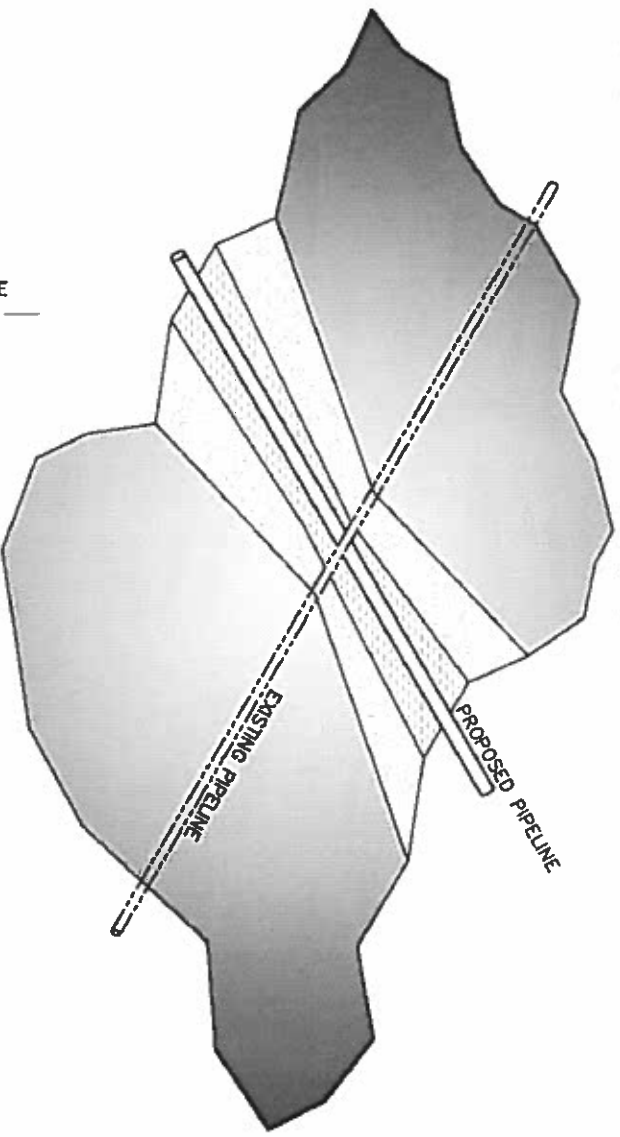


PROJ. ENG.	KG	9Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT TYPICAL WATER BODY CONSTRUCTION DETAIL WITH HDD PLAN
CHECKED BY:	DC	9Apr15	YR.: 2015	
DRAWN BY:	RVERVE	9Apr15	W.O.	
SCALE: NTS		DATE	REV.: A	
			LOC.: OHIO / MICHIGAN	

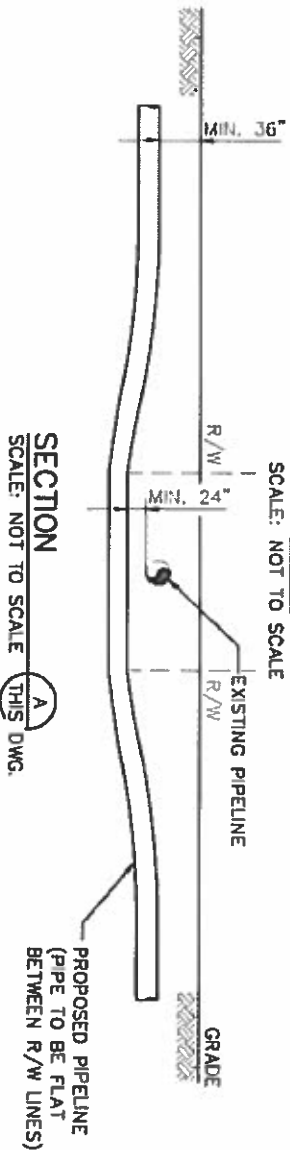
DWG. NO. S4NX-P-8024

NEXUS
GAS TRANSMISSION

ONSHORE PIPELINE CROSSING UNDER EXISTING PIPELINE



PLAN
SCALE: NOT TO SCALE



SECTION
SCALE: NOT TO SCALE (THIS DWG.)

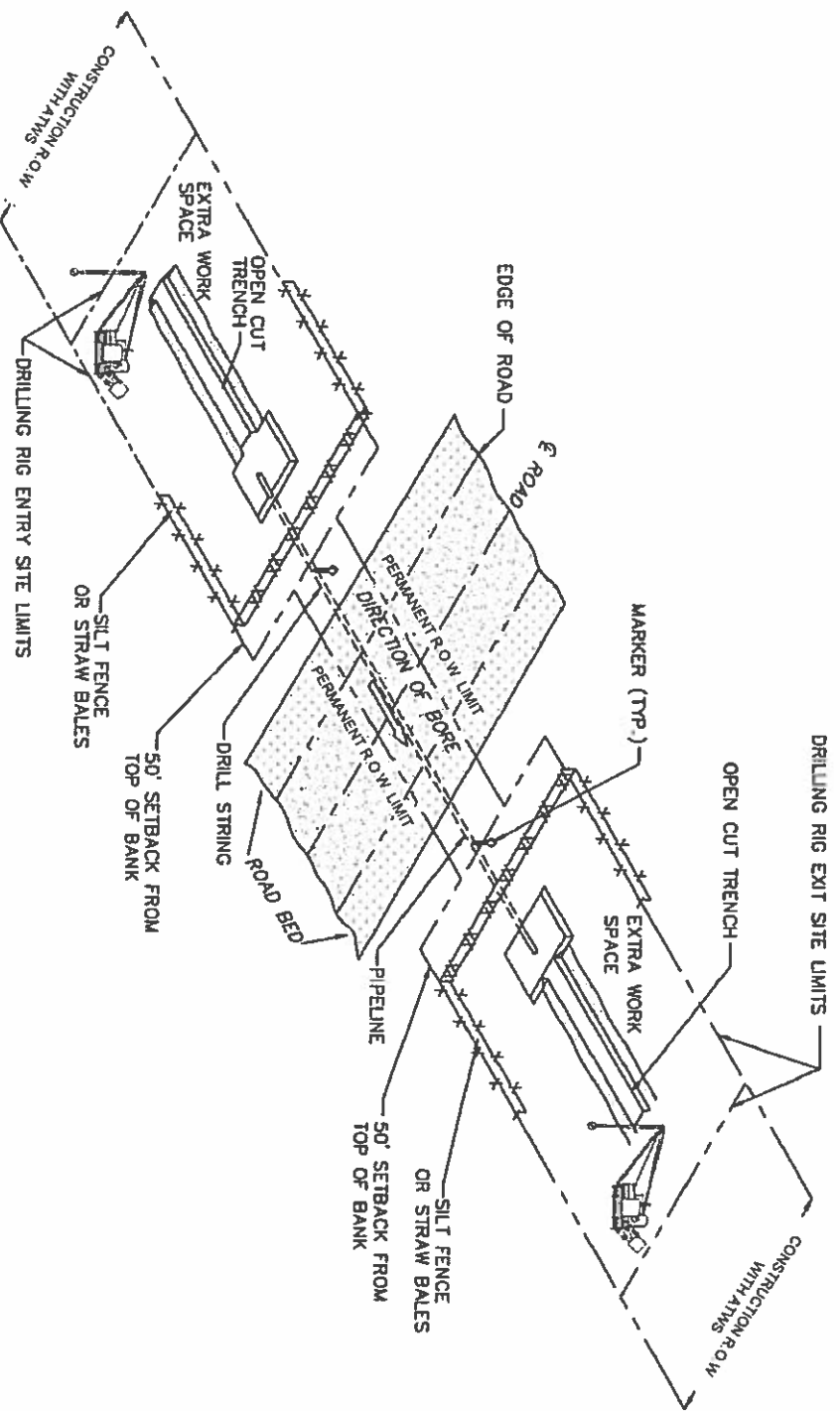
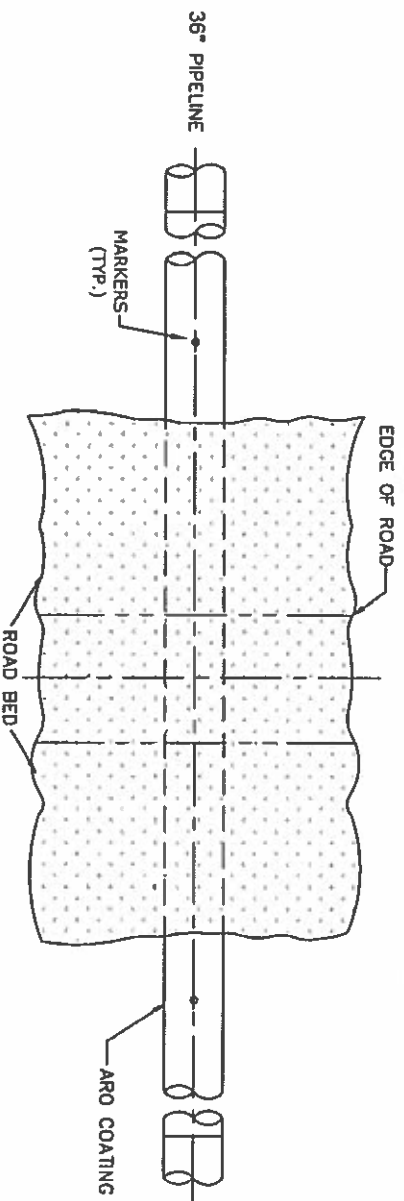
- NOTES:**
1. PROPOSED PIPE TO BE LAID TO ACCOMMODATE FREE-STRESS BENDING OR WILL BE FIELD BENDS.
 2. TRENCH BACKFILL MATERIAL SHALL BE TAKEN FROM SPOIL PILE OR APPROVED BY PERMITTING AGENCY / LANDOWNER / EXISTING PIPELINE OWNER. ALL BACKFILL MATERIAL TO BE STABILIZED TO PREVENT EROSION.
 3. IN WETLAND CROSSINGS WITH POORSOIL CONDITIONS, SANDBAGS OR CONCRETE MATS ARE TO BE USED BETWEEN PIPELINES TO MAINTAIN / ASSURE MINIMUM 24" SEPARATION.
 4. TRENCH CONFIGURATION FOR NEW PIPELINE SHALL MINIMIZE SPAN REQUIREMENTS FOR EXISTING LINE AT THE POINT OF CROSSING. TRENCH LAYOUT SHALL FLARE OUTWARD TO NORMAL SIDEWALL CONFIGURATION BEYOND PIPE CROSSING.

NEXUS
GAS TRANSMISSION

NEXUS GAS TRANSMISSION PROJECT
ONSHORE PIPELINE CONSTRUCTION DETAIL

LOC: OHIO / MICHIGAN

PROJ. ENG.	CHK	6Apr15
CHECKED BY:	DCG	6Apr15
DRAWN BY:	PAULVE	6Apr15
SCALE:	NTS	YR: 2015
W.O.		REV: A
DWG. NO.	S4NX-P-8025	

**NOTES:**

1. EXTRA WORK SPACE NOT LOCATED IN WETLAND WHEN POSSIBLE AND PRACTICAL.
2. RIGHT-OF-WAY LIMITS AS SHOWN ON ALIGNMENT SHEETS.
3. WORK AREA WILL BE TEMPORARILY MAINTED FOR MARSH AREAS.

NEXUS
GAS TRANSMISSION

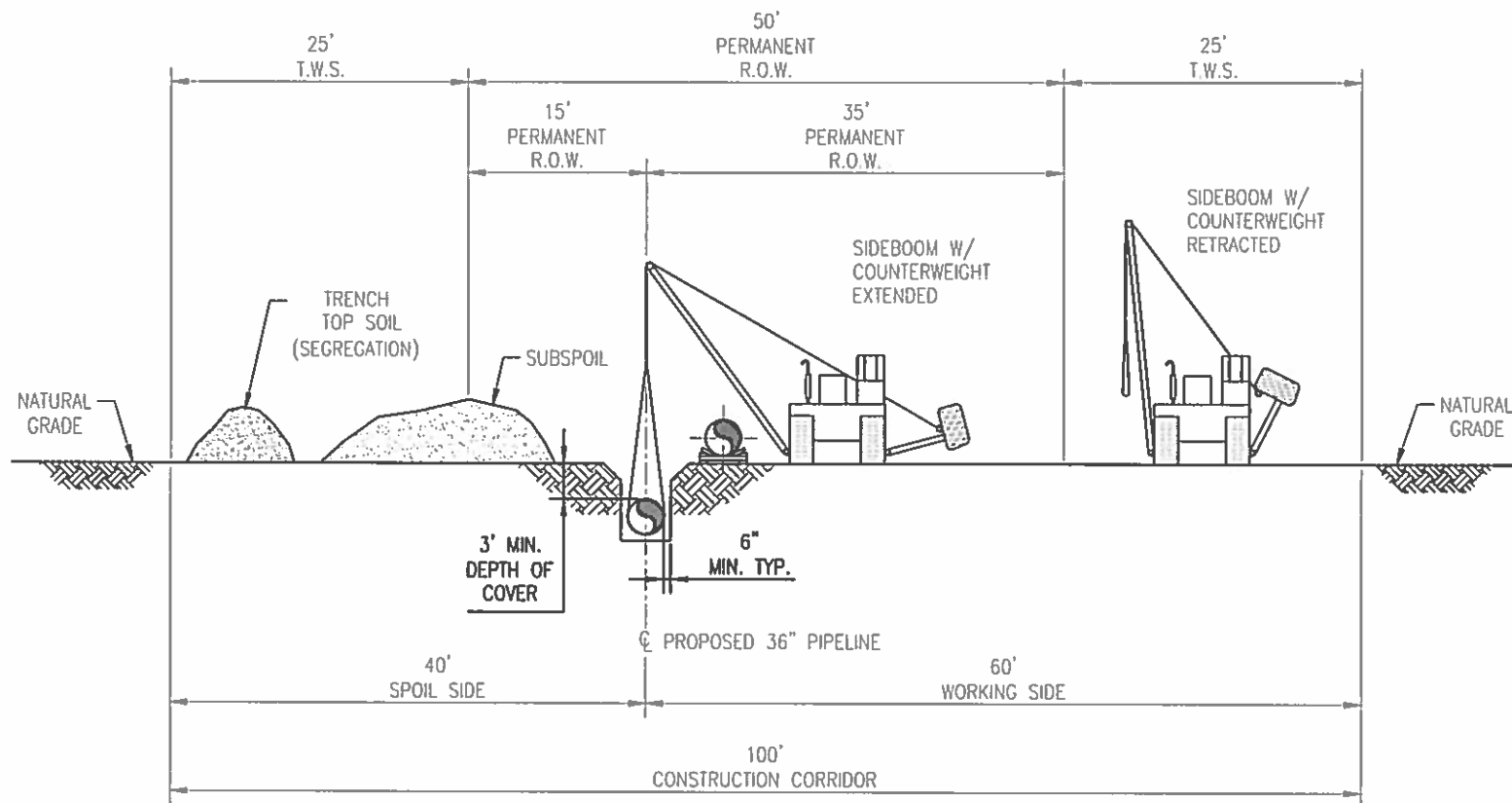
TITLE:

NEXUS GAS TRANSMISSION PROJECT
TYPICAL BORED ROAD CROSSING
CONSTRUCTION DETAIL

LOC.: OHIO / MICHIGAN

PROJ. ENG.	KG	9Apr15
CHECKED BY:	DG	9Apr15
DRAWN BY:	QUEVE	9Apr15
SCALE:	NTS	YR.: 2015
W.O.		REV.: A
DWG. NO.	S4NX-P-8026	

ELI22282 April 14, 2015 10:32am
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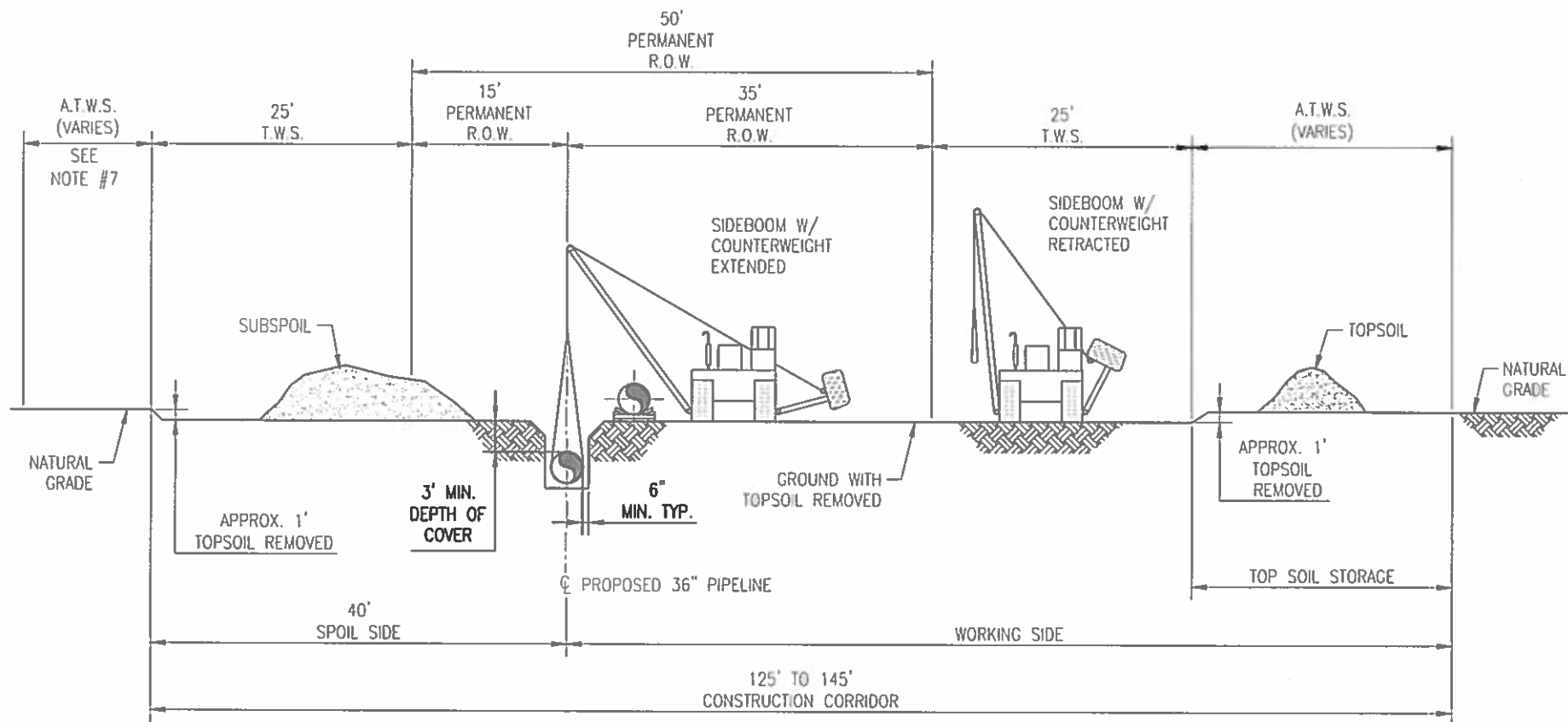


TYPICAL 100' CONSTRUCTION CORRIDOR
 N.T.S.

NOTES:

1. THIS CONSTRUCTION METHOD APPLIES TO LOCATIONS WHERE THE APPLICABLE R.O.W. ARRANGEMENT CALLS FOR 15'-35' PERMANENT R.O.W.
2. THIS CONSTRUCTION METHOD APPLIES TO FORWARD & REVERSE PIPELINE LAY.
3. ALL SPOIL SHALL BE CONTAINED WITHIN THE CONFINES OF THE ROW.
4. THE PIPELINE COVER HAS A MINIMUM DEPTH OF 3FT. IF ROCK IS PRESENT, THE PIPE WILL NEED TO BE PLACED ON SAND BAGS AND THE CONTRACTOR WILL ACCOUNT FOR EXTRA DEPTH IN THE DITCH.
5. CONTRACTOR MAY REQUEST TO PLACE TOP SOIL TO WORKING SIDE OF THE CONSTRUCTION R.O.W. WHEN DEEMED FIT.

IC#	PROJ. ENG. KG	14Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT TYPICAL MAINLINE UPLAND CONSTRUCTION 100' CORRIDOR DETAIL -METHOD #2		
	CHECKED BY: DC	14Apr15	YR.: 2015			
	DRAWN BY: RV	14Apr15	W.O.			
	SCALE: NTS	DATE	REV.: A			
			LOC.: OHIO / MICHIGAN	DWG. NO. S4NX-P-8001		



TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 N.T.S.

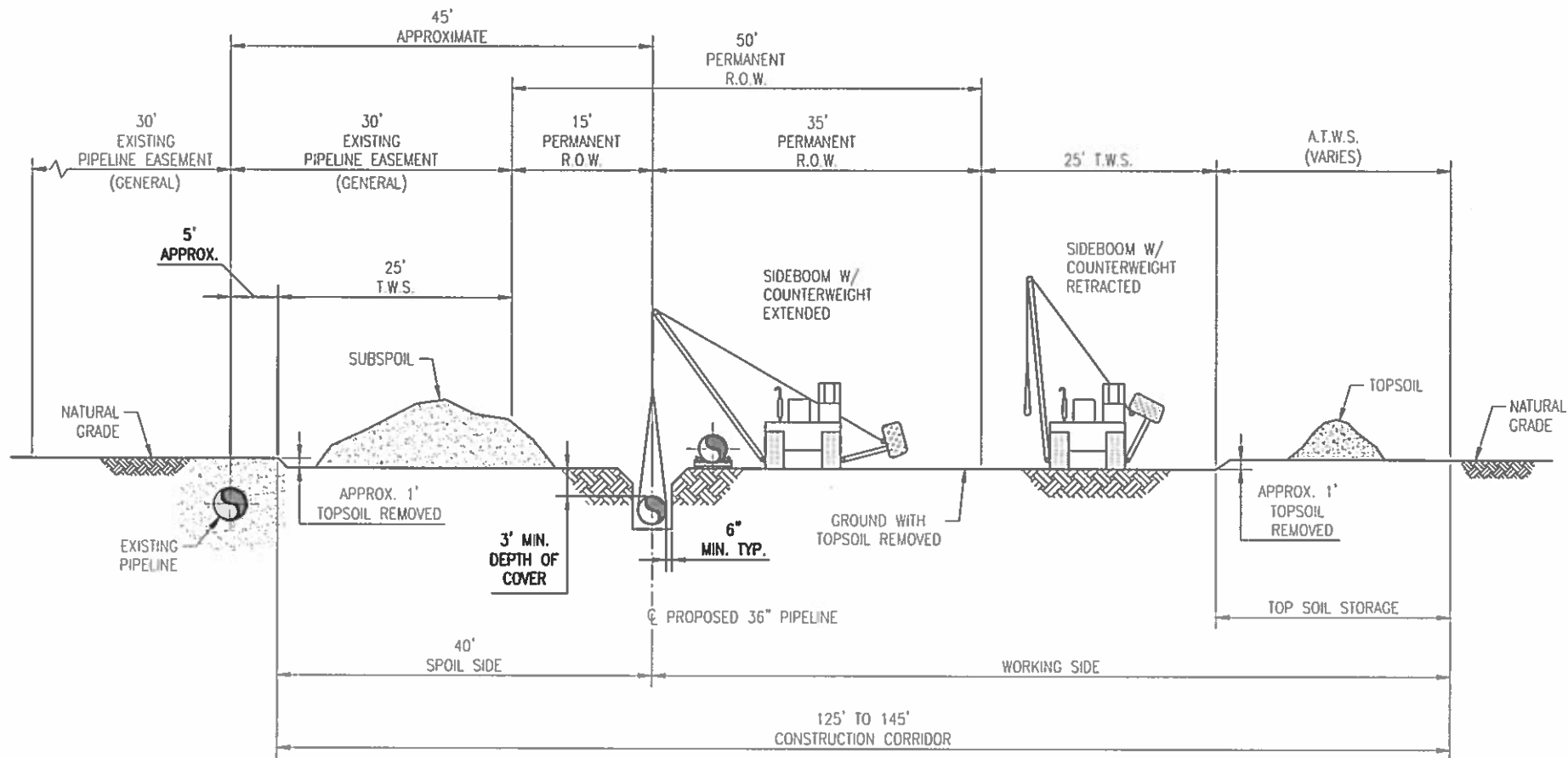
NOTES:

1. THIS CONSTRUCTION METHOD APPLIES TO LOCATIONS WHERE THE APPLICABLE R.O.W. ARRANGEMENT CALLS FOR 15'-35' PERMANENT R.O.W.
2. THIS CONSTRUCTION METHOD APPLIES TO FORWARD & REVERSE PIPELINE LAY.
3. ALL SPOIL SHALL BE CONTAINED WITHIN THE CONFINES OF THE ROW.
4. USE IN AREAS OF DRAIN TILE CROSSINGS, TOPSOIL SEGREGATION AND/ OR SIDE SLOPE.
5. THE PIPELINE COVER HAS A MINIMUM DEPTH OF 3FT. IF ROCK IS PRESENT, THE PIPE WILL NEED TO BE PLACED ON SANDBAGS AND CONTRACTOR WILL ACCOUNT FOR EXTRA DEPTH IN THE DITCH.
6. ATWS: POTENTIALLY USED WHEN DRAIN TILES ARE ENCOUNTERED.
7. TOPSOIL TO BE STORED ON SIDE OF ROW AS INDICATED BY 25 FT ATWS SHOWN ON PIPELINE ALIGNMENT SHEETS.

PROJ. ENG. KG	14Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT TYPICAL AGRICULTURAL MAINLINE CONSTRUCTION 125' TO 145' CORRIDOR DETAIL -METHOD #3
CHECKED BY DC	14Apr15	YR.: 2015	
DRAWN BY RVE	14Apr15	W.O.	
SCALE: NTS	DATE	REV.: A	LOC.: OHIO / MICHIGAN

DWG. NO. S4NX-P-8002

NEXUS
 GAS TRANSMISSION



TYPICAL 125' TO 145' CONSTRUCTION
 PROPOSED PIPELINE TO THE EAST OF EXISTING LINE
 N.T.S.

NOTES:

1. THIS CONSTRUCTION METHOD APPLIES TO LOCATIONS WHERE THE APPLICABLE R.O.W. ARRANGEMENT CALLS FOR 15'-35' PERMANENT R.O.W.
2. THIS CONSTRUCTION METHOD APPLIES TO FORWARD & REVERSE PIPELINE LAY.
3. ALL SPOIL SHALL BE CONTAINED WITHIN THE CONFINES OF THE ROW.
4. THE PIPELINE COVER HAS A MINIMUM DEPTH OF 3FT. IF ROCK IS PRESENT, THE PIPE WILL NEED TO BE PLACED ON SAND BAGS AND THE CONTRACTOR WILL ACCOUNT FOR EXTRA DEPTH IN THE DITCH.
5. USE IN AREAS OF DRAIN TILE CROSSINGS, TOPSOIL SEGREGATION AND/ OR SIDE SLOPE.
6. TRAVELING ON TOP OR ACROSS EXISTING PIPELINE IS PROHIBITED WITHOUT WRITTEN PERMISSION.

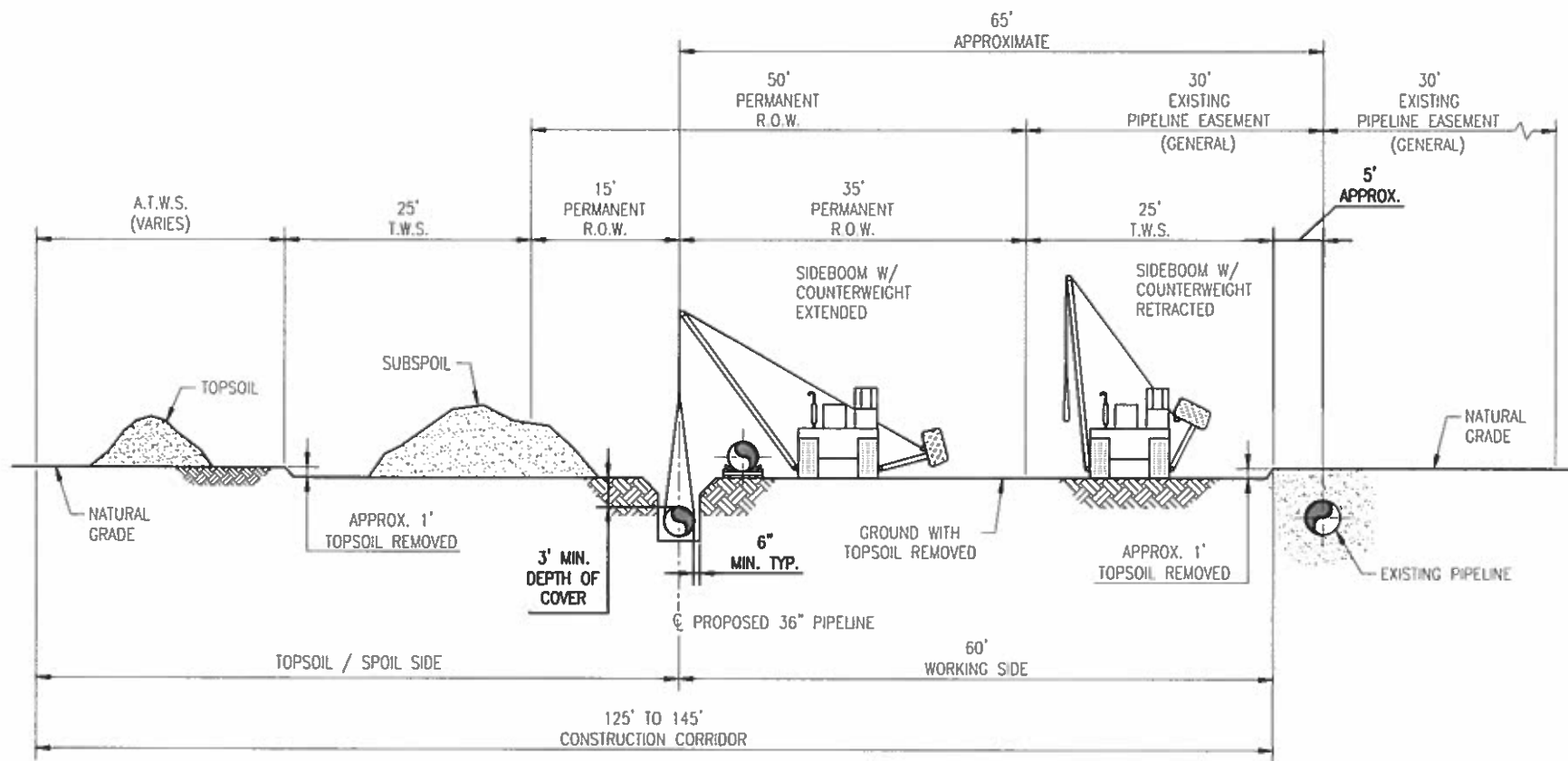
PROJ. ENG. KG *lok* 14Apr15
 CHECKED BY: DDC 14Apr15
 DRAWN BY: RVE 14Apr15
 SCALE: NTS DATE REV.: A

TITLE: NEXUS GAS TRANSMISSION PROJECT
 TYPICAL EXISTING PIPELINE ROW EASEMENT
 125' TO 145' CONSTRUCTION CORRIDOR (EAST)
 LOC.: OHIO \ MICHIGAN

DWG. NO. S4NX-P-8003

NEXUS
 GAS TRANSMISSION

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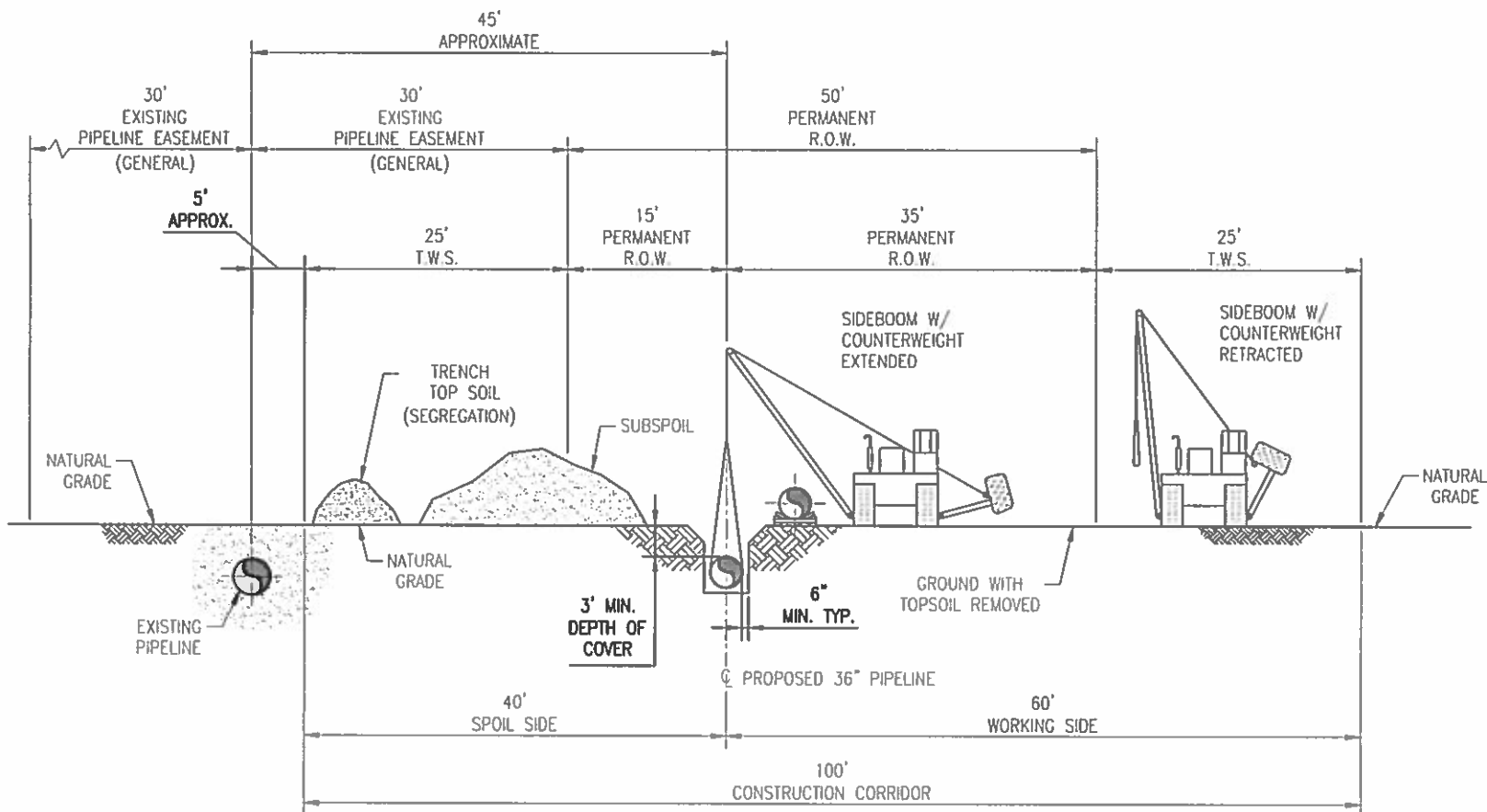


TYPICAL 125' TO 145' CONSTRUCTION
 PROPOSED PIPELINE TO THE WEST OF EXISTING LINE
 N.T.S.

NOTES:

1. THIS CONSTRUCTION METHOD APPLIES TO LOCATIONS WHERE THE APPLICABLE R.O.W. ARRANGEMENT CALLS FOR 15'-35' PERMANENT R.O.W.
2. THIS CONSTRUCTION METHOD APPLIES TO FORWARD & REVERSE PIPELINE LAY.
3. ALL SPOIL SHALL BE CONTAINED WITHIN THE CONFINES OF THE ROW.
4. THE PIPELINE COVER HAS A MINIMUM DEPTH OF 3FT. IF ROCK IS PRESENT, THE PIPE WILL NEED TO BE PLACED ON SAND BAGS AND THE CONTRACTOR WILL ACCOUNT FOR EXTRA DEPTH IN THE DITCH.
5. USE IN AREAS OF DRAIN TILE CROSSINGS, TOPSOIL SEGREGATION AND/ OR SIDE SLOPE.
6. TRAVELING ON TOP OR ACROSS EXISTING PIPELINE IS PROHIBITED WITHOUT WRITTEN PERMISSION.

PROJ. ENG. KG	14Apr15	TITLE: NEXUS GAS TRANSMISSION PROJECT	
CHECKED BY: CDC	14Apr15	YR.: 2015	
DRAWN BY: RVE	14Apr15	W.O.	
SCALE: NTS	DATE	REV.: A	
LOC.: OHIO \ MICHIGAN		DWG. NO. S4NX-P-8004	



TYPICAL 100' CONSTRUCTION PROPOSED PIPELINE TO THE EAST OF EXISTING LINE

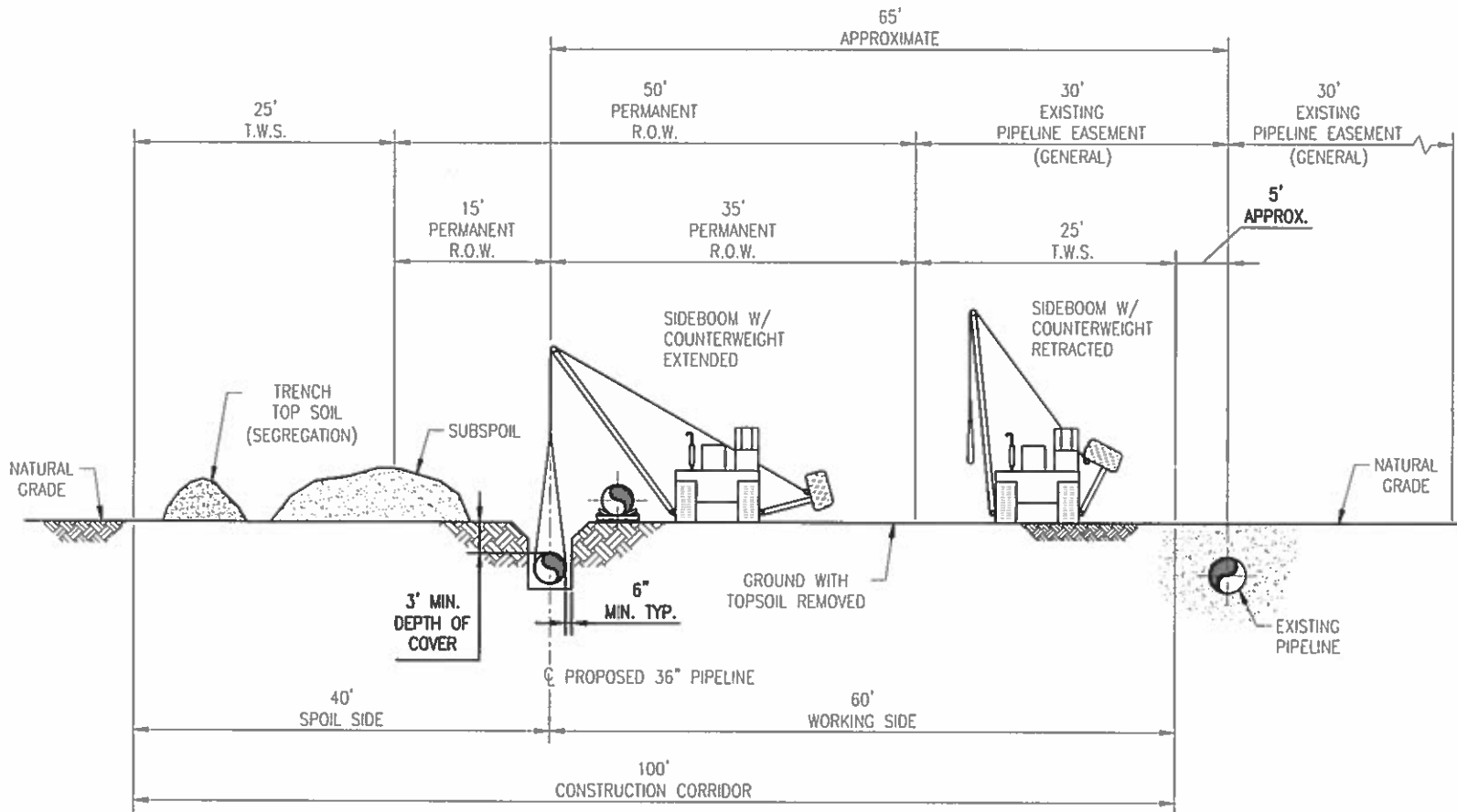
N.T.S.

NOTES:

1. THIS CONSTRUCTION METHOD APPLIES TO LOCATIONS WHERE THE APPLICABLE R.O.W. ARRANGEMENT CALLS FOR 15'-35' PERMANENT R.O.W.
2. THIS CONSTRUCTION METHOD APPLIES TO FORWARD & REVERSE PIPELINE LAY.
3. ALL SPOIL SHALL BE CONTAINED WITHIN THE CONFINES OF THE ROW.
4. THE PIPELINE COVER HAS A MINIMUM DEPTH OF 3FT. IF ROCK IS PRESENT, THE PIPE WILL NEED TO BE PLACED ON SAND BAGS AND THE CONTRACTOR WILL ACCOUNT FOR EXTRA DEPTH IN THE DITCH.
5. USE IN AREAS OF DRAIN TILE CROSSINGS, TOPSOIL SEGREGATION AND/ OR SIDE SLOPE.
6. TRAVELING ON TOP OR ACROSS EXISTING PIPELINE IS PROHIBITED WITHOUT WRITTEN PERMISSION.

PROJ. ENG.	KG	14Apr15	TITLE:	NEXUS GAS TRANSMISSION PROJECT		
CHECKED BY:	DC	14Apr15	YR.: 2015	TYPICAL EXISTING PIPELINE ROW EASEMENT		
DRAWN BY:	RVE	14Apr15	W.O.	100' CONSTRUCTION CORRIDOR (EAST)		
SCALE:	NTS	DATE	REV.: A	LOC.: OHIO \ MICHIGAN	DWG. NO.	S4NX-P-8005

NEXUS
 GAS TRANSMISSION



TYPICAL 100' CONSTRUCTION
 PROPOSED PIPELINE TO THE WEST OF EXISTING LINE

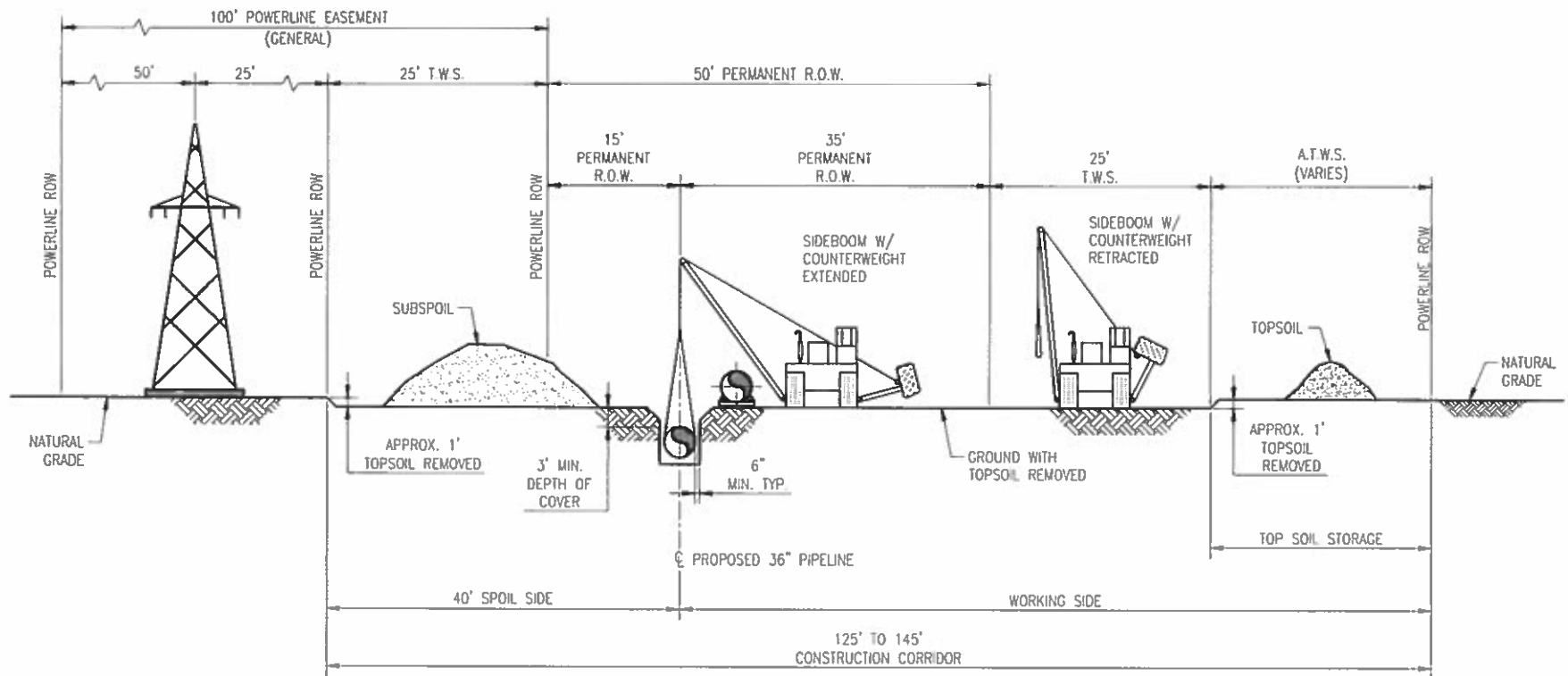
N.T.S.

NOTES:

1. THIS CONSTRUCTION METHOD APPLIES TO LOCATIONS WHERE THE APPLICABLE R.O.W. ARRANGEMENT CALLS FOR 15'-35' PERMANENT R.O.W.
2. THIS CONSTRUCTION METHOD APPLIES TO FORWARD & REVERSE PIPELINE LAY.
3. ALL SPOIL SHALL BE CONTAINED WITHIN THE CONFINES OF THE ROW.
4. THE PIPELINE COVER HAS A MINIMUM DEPTH OF 3FT. IF ROCK IS PRESENT, THE PIPE WILL NEED TO BE PLACED ON SAND BAGS AND THE CONTRACTOR WILL ACCOUNT FOR EXTRA DEPTH IN THE DITCH.
5. USE IN AREAS OF DRAIN TILE CROSSINGS, TOPSOIL SEGREGATION AND/ OR SIDE SLOPE.
6. TRAVELING ON TOP OR ACROSS EXISTING PIPELINE IS PROHIBITED WITHOUT WRITTEN PERMISSION.

PROJ. ENG.	KG	14Apr15		TITLE:	NEXUS GAS TRANSMISSION PROJECT		
CHECKED BY:	DC	14Apr15	YR.: 2015		TYPICAL EXISTING PIPELINE ROW EASEMENT		
DRAWN BY:	RVE	14Apr15	W.O.		100' CONSTRUCTION CORRIDOR (WEST)		
SCALE:	NTS	DATE	REV.: A	LOC.: OHIO \ MICHIGAN	DWG. NO.	S4NX-P-8006	
							NEXUS GAS TRANSMISSION

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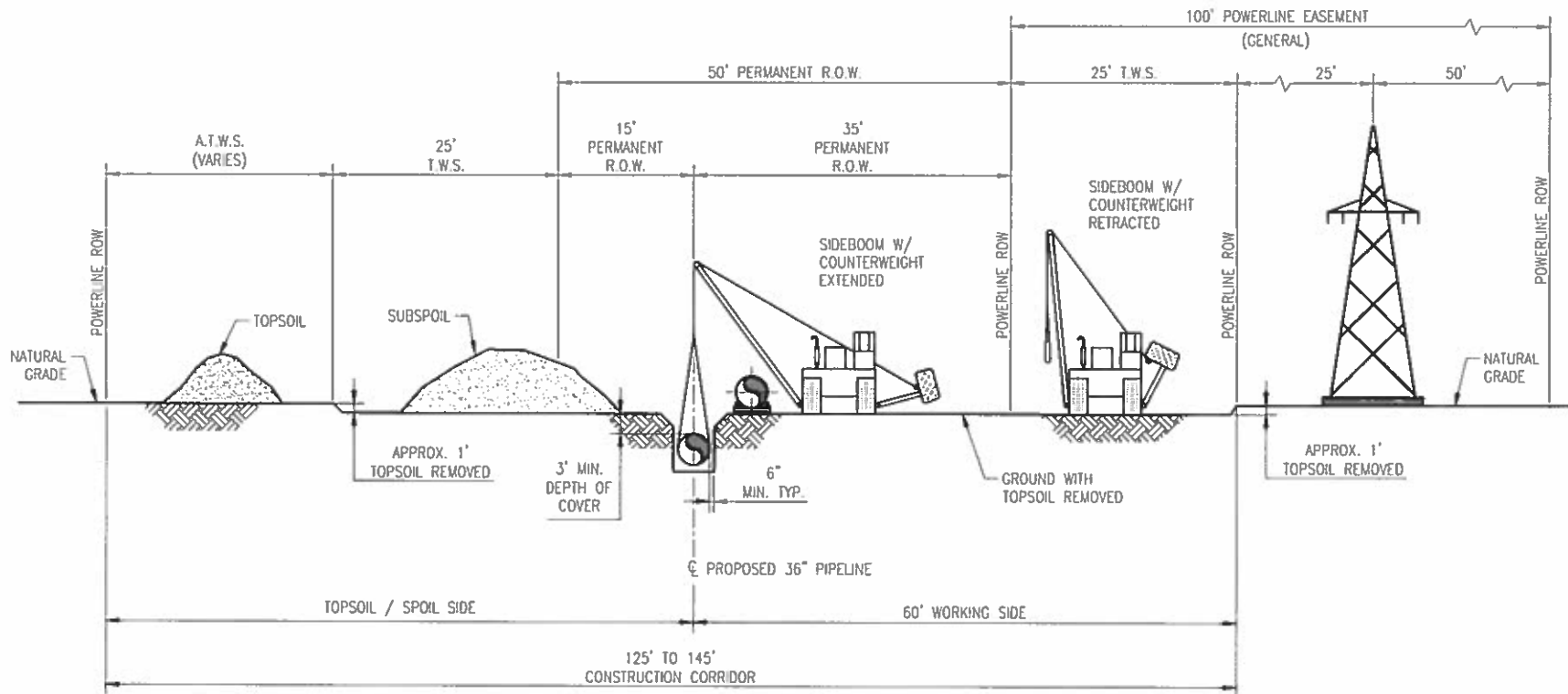


**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 100' POWERLINE EASEMENT**

N.T.S.

PROJ. ENG. KG <i>rok</i>	14Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT		
CHECKED BY: <i>DC</i>	14Apr15	YR: 2015	TYPICAL MAINLINE CONSTRUCTION METHOD #1A		
DRAWN BY: <i>flx</i> RVE	14Apr15	W.O.	NORTH OR EAST OF POWERLINE EASEMENT		
SCALE: NTS	DATE	REV: A	LOC: COLUMBIANA COUNTY, OHIO	DWG. NO. S4NX-P-8007-A	

ELJ22282 April 14, 2015 2:02pm
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**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 100' POWERLINE EASEMENT**
 N.T.S.

PROJ. ENG. KG	14Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT		
CHECKED BY: DC	14Apr15	YR.: 2015	TYPICAL MAINLINE CONSTRUCTION METHOD #1B		
DRAWN BY: RVE	14Apr15	W.O.	SOUTH OR WEST OF POWERLINE EASEMENT		
SCALE: NTS	DATE	REV.: A	LOC.: COLUMBIANA COUNTY, OHIO	DWG. NO. S4NX-P-8007-B	NEXUS GAS TRANSMISSION

1:39pm

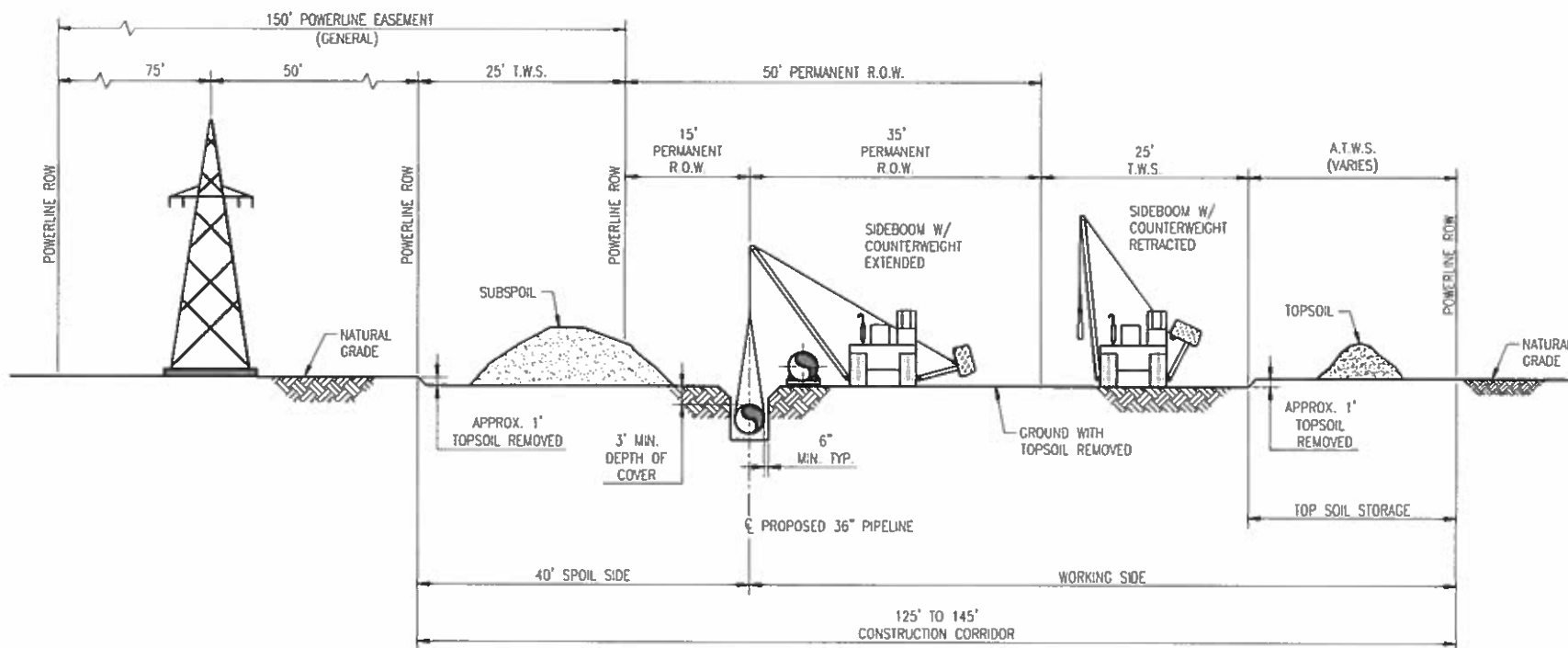
April 14, 2015

1:39pm


ELJ22282

1

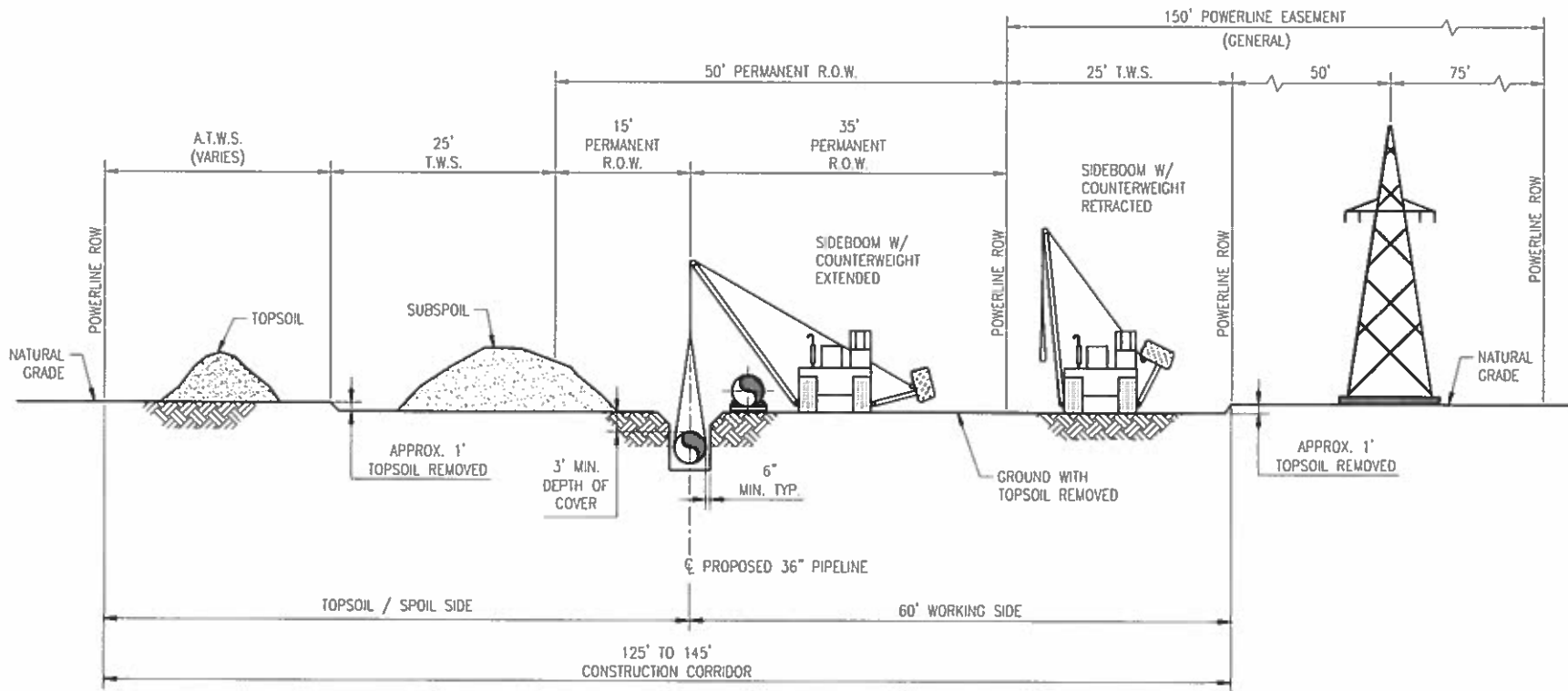
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TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
WITH 150' POWERLINE EASEMENT
N.T.S.

PROJ. ENG. KG	14Apr15	YR.: 2015 W.O.	TITLE: NEXUS GAS TRANSMISSION PROJECT TYPICAL MAINLINE CONSTRUCTION METHOD #2A NORTH OR EAST OF POWERLINE EASEMENT	DWG. NO. S4NX-P-8008-A	
CHECKED BY: CDC	14Apr15				
DRAWN BY: RVE	14Apr15				
SCALE: NTS	DATE	REV.: A	LOC.: STARK COUNTY, OHIO		

ELI22282 April 14, 2015 2:02pm
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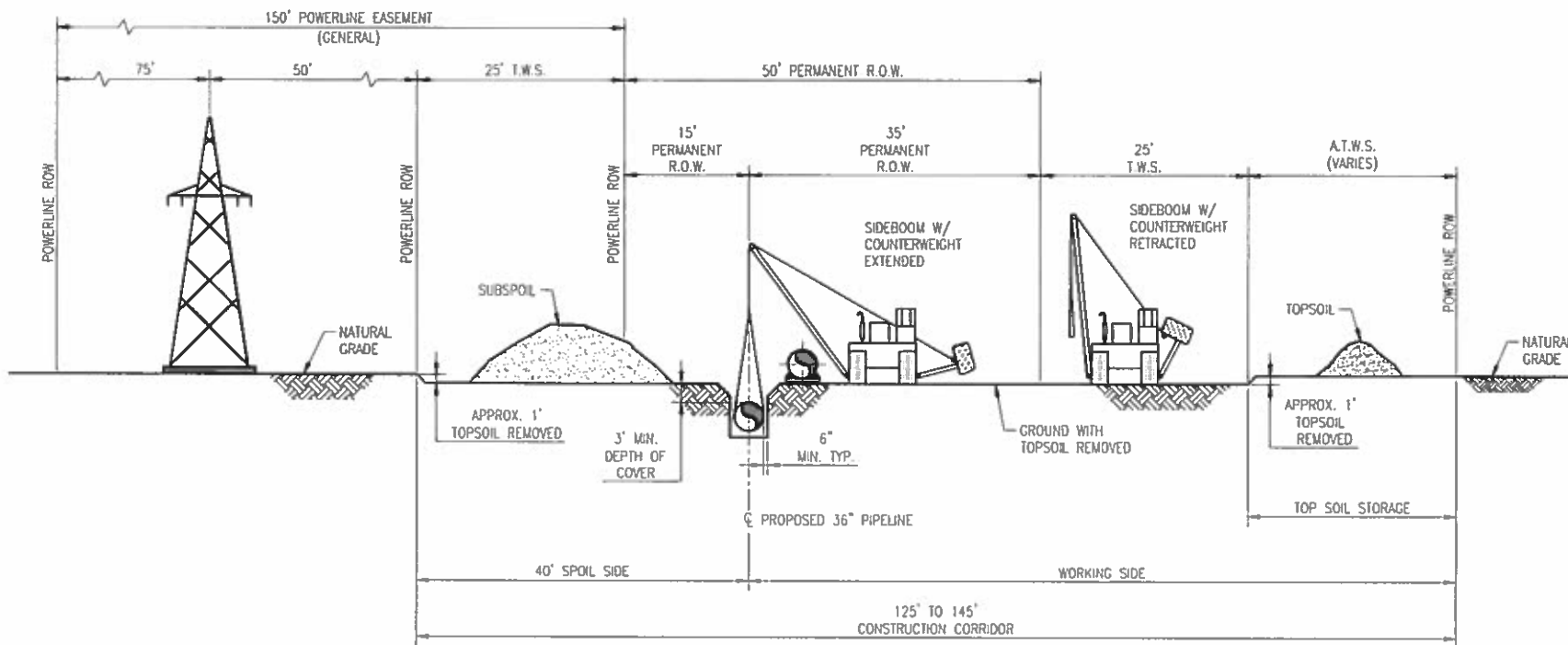


**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 125' POWERLINE EASEMENT**

N.T.S.

PROJ. ENG. KG	14Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT		
CHECKED BY: CDC	14Apr15	YR.: 2015	TYPICAL MAINLINE CONSTRUCTION METHOD #2B		
DRAWN BY: RVE	14Apr15	W.O.	SOUTH OR WEST OF POWERLINE EASEMENT		
SCALE: NTS	DATE	REV.: A	LOC.: STARK COUNTY, OHIO	DWG. NO. S4NX-P-8008-B	NEXUS GAS TRANSMISSION

ELJ22282 April 14, 2015 1:39pm
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**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 150' POWERLINE EASEMENT**

N.T.S.

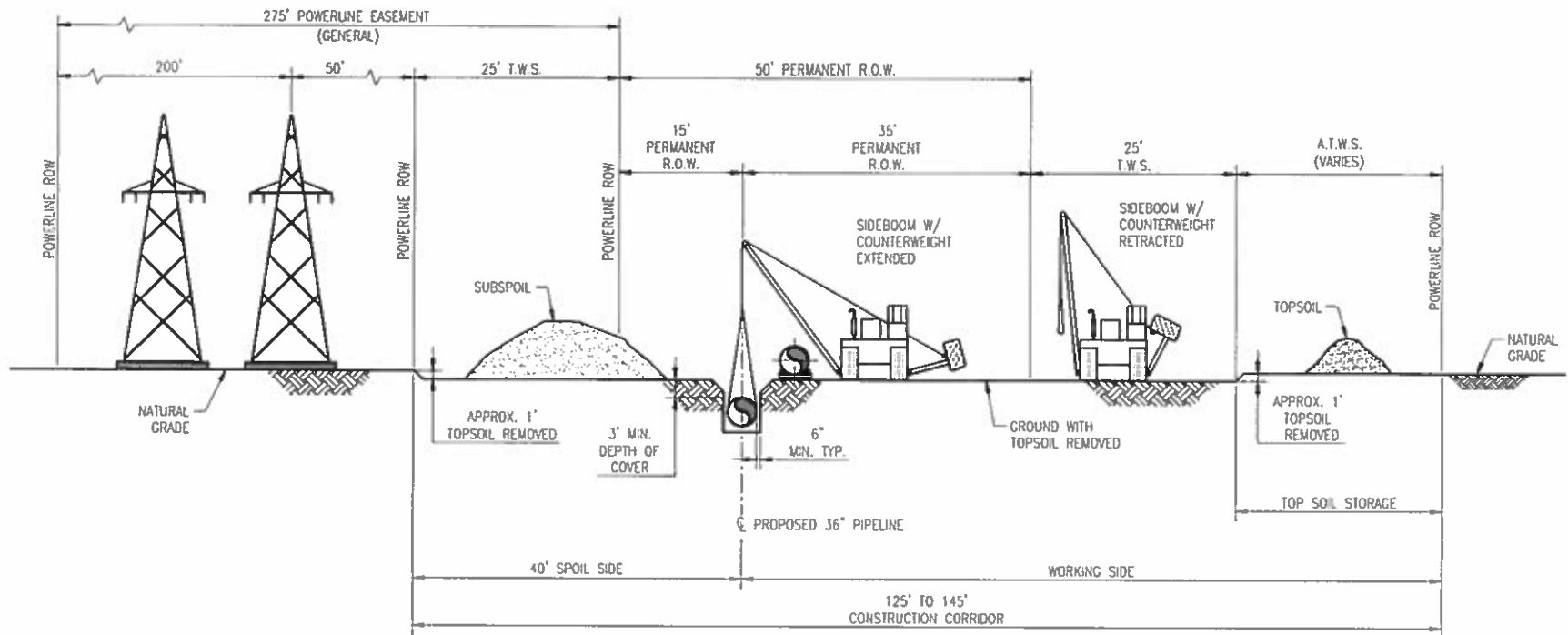
PROJ. ENG. KG	14Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT		
CHECKED BY: XDC	14Apr15	YR.: 2015	TYPICAL MAINLINE CONSTRUCTION METHOD #3A		
DRAWN BY: RERVE	14Apr15	W.O.	NORTH OR EAST OF POWERLINE EASEMENT		
SCALE: NTS	DATE	REV.: A	LOC.: SUMMIT COUNTY, OHIO	DWG. NO. S4NX-P-8009-A	NEXUS GAS TRANSMISSION

ELJ22282



NEXUS
GAS TRANSMISSION

EL122282
 April 14, 2015 1:39pm
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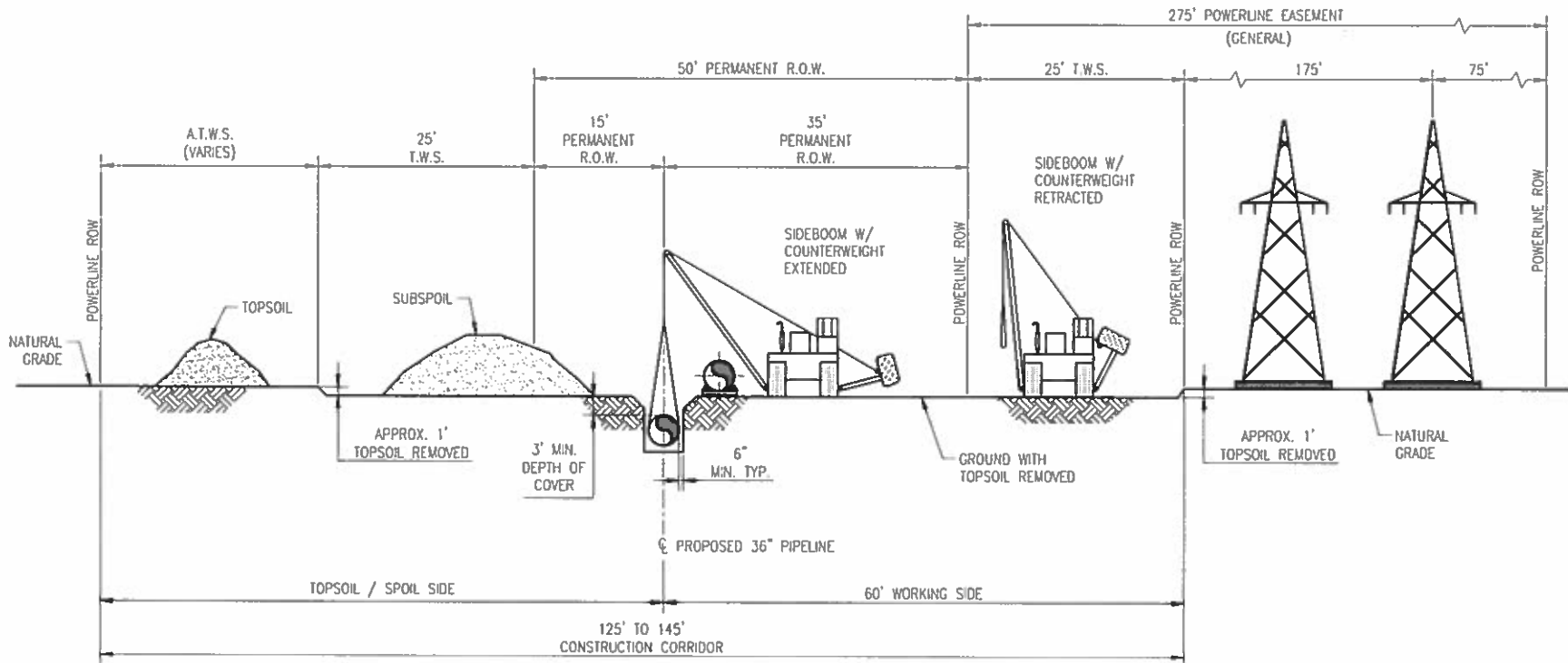


TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 275' POWERLINE EASEMENT

N.T.S.

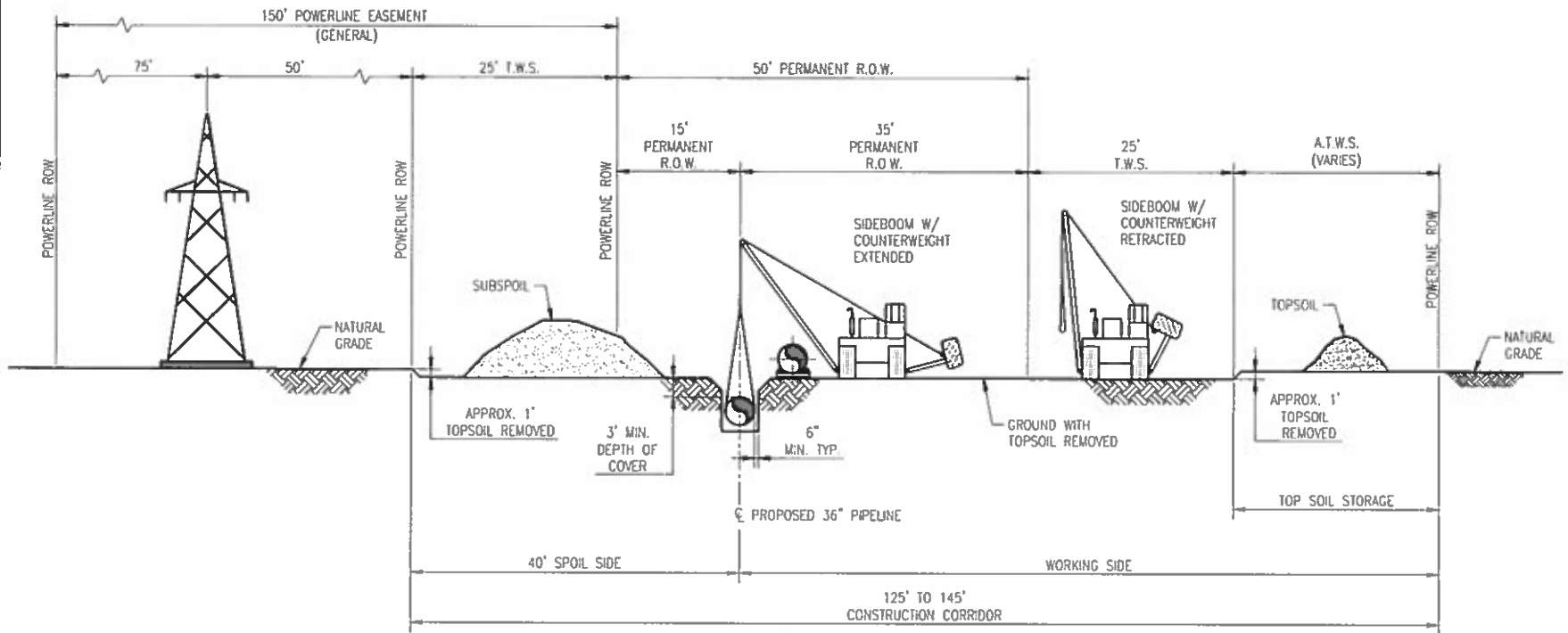
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CHECKED BY: DC	14Apr15	YR.: 2015	TYPICAL MAINLINE CONSTRUCTION METHOD #4A		
DRAWN BY: RVE	14Apr15	W.O.	NORTH OR EAST OF POWERLINE EASEMENT		
SCALE: NTS	DATE	REV.: A	LOC.: WAYNE COUNTY, OHIO	DWG. NO. S4NX-P-8010-A	

ELI22282 April 14, 2015 2:03pm
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**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 275' POWERLINE EASEMENT**
 N.T.S.

K1	PROJ. ENG.	KG	14Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT TYPICAL MAINLINE CONSTRUCTION METHOD #4B SOUTH OR WEST OF POWERLINE EASEMENT	DWG. NO. S4NX-P-8010-B	
	CHECKED BY:	DC	14Apr15	YR.: 2015			
	DRAWN BY:	RV	14Apr15	W.O.			
	SCALE:	NTS	DATE	REV.: A	LOC.: WAYNE COUNTY, OHIO		

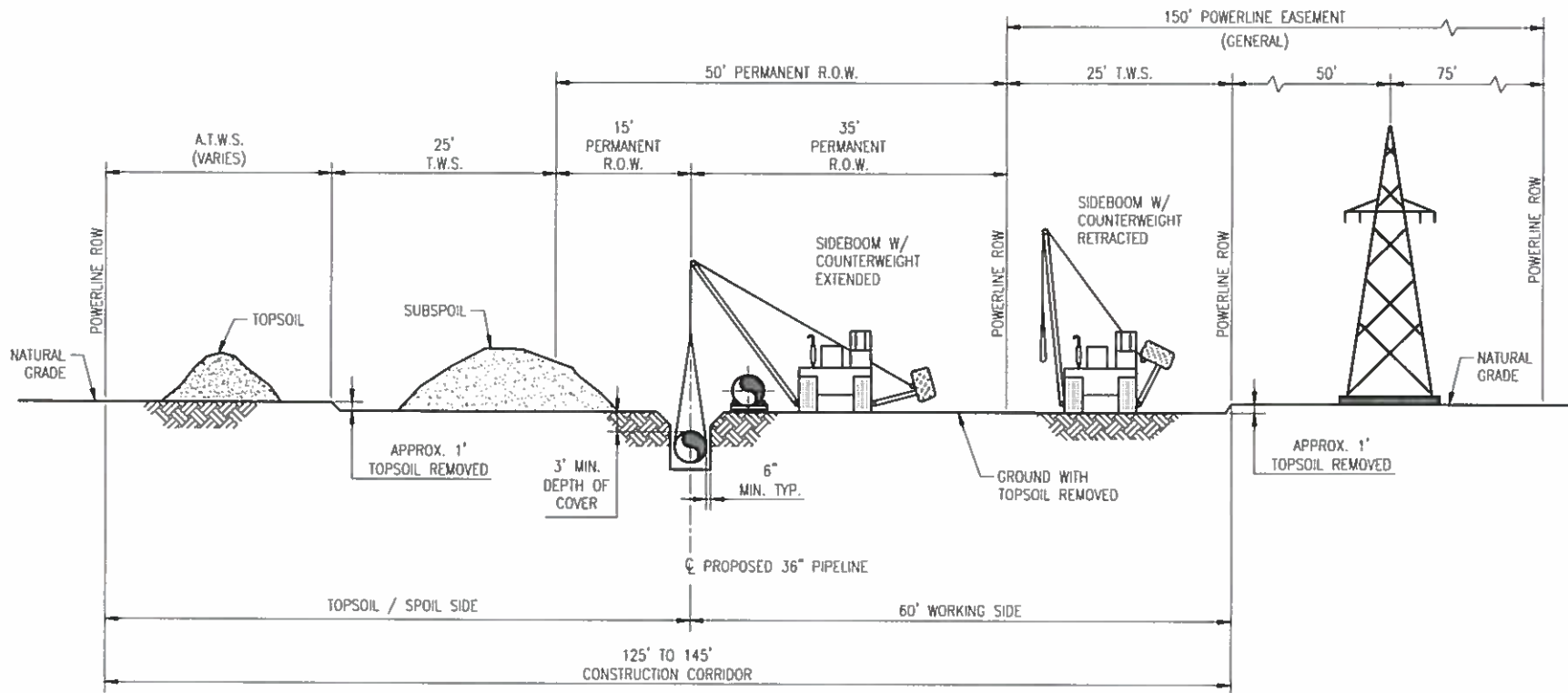


TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 150' POWERLINE EASEMENT

N.T.S.

PROJ. ENG. KG	14Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT		
CHECKED BY: <i>DOC</i>	14Apr15	YR.: 2015	TYPICAL MAINLINE CONSTRUCTION METHOD #5A		
DRAWN BY: <i>RVE</i>	14Apr15	W.O.	NORTH OR EAST OF POWERLINE EASEMENT		
SCALE: NTS	DATE	REV.: A	LOC.: MEDINA COUNTY, OHIO	DWG. NO. S4NX-P-8011-A	<div> <p>NEXUS GAS TRANSMISSION</p> </div>

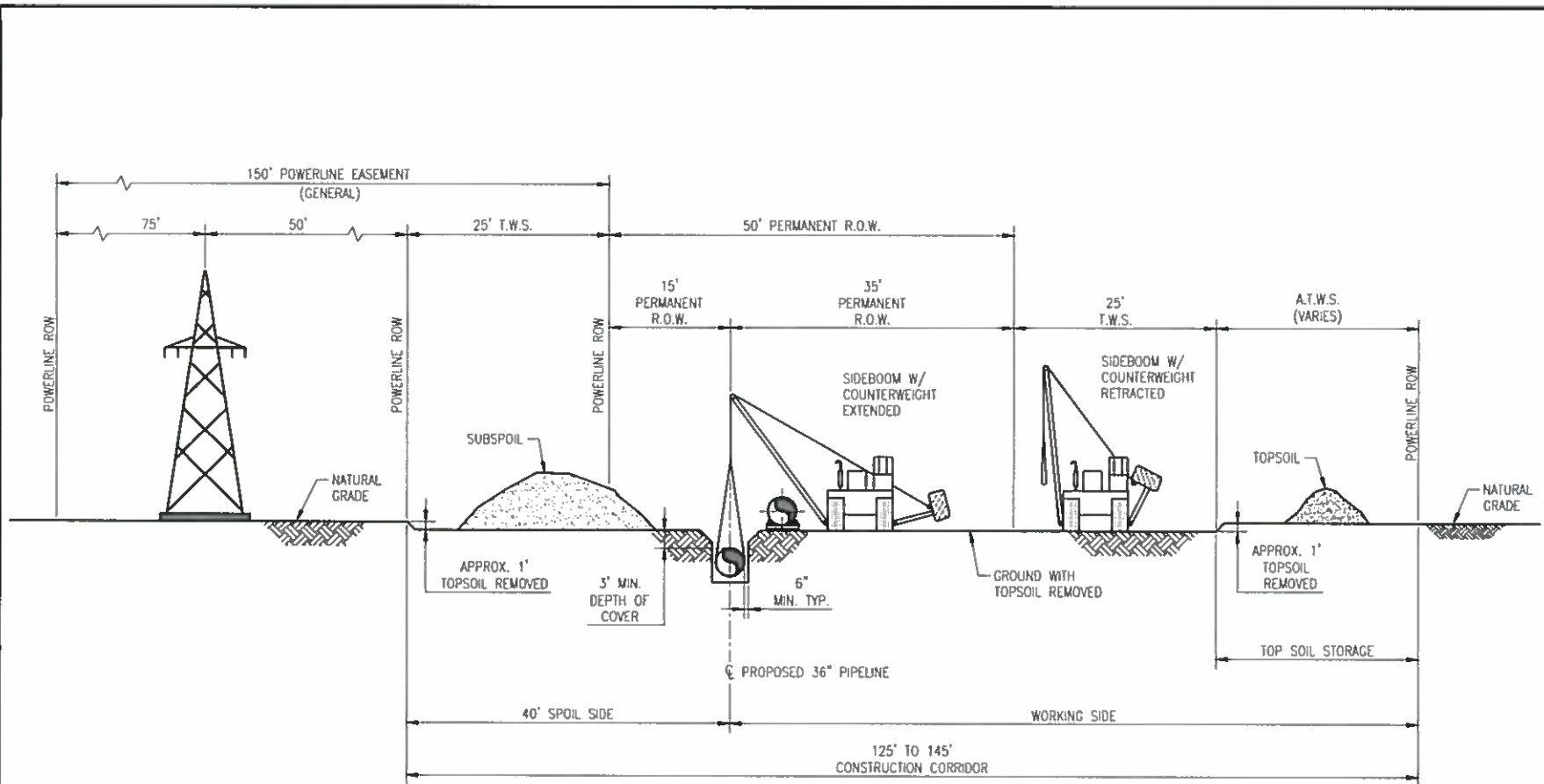
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TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 150' POWERLINE EASEMENT
 N.T.S.

PROJ. ENG.	KG	14Apr15		TITLE:	NEXUS GAS TRANSMISSION PROJECT		NEXUS GAS TRANSMISSION
CHECKED BY	DOC	14Apr15	YR.: 2015		TYPICAL MAINLINE CONSTRUCTION METHOD #5B		
DRAWN BY	RVE	14Apr15	W.O.		SOUTH OR WEST OF POWERLINE EASEMENT		
SCALE:	NTS	DATE	REV.: A	LOC.: MEDINA COUNTY, OHIO	DWG. NO.	S4NX-P-8011-B	

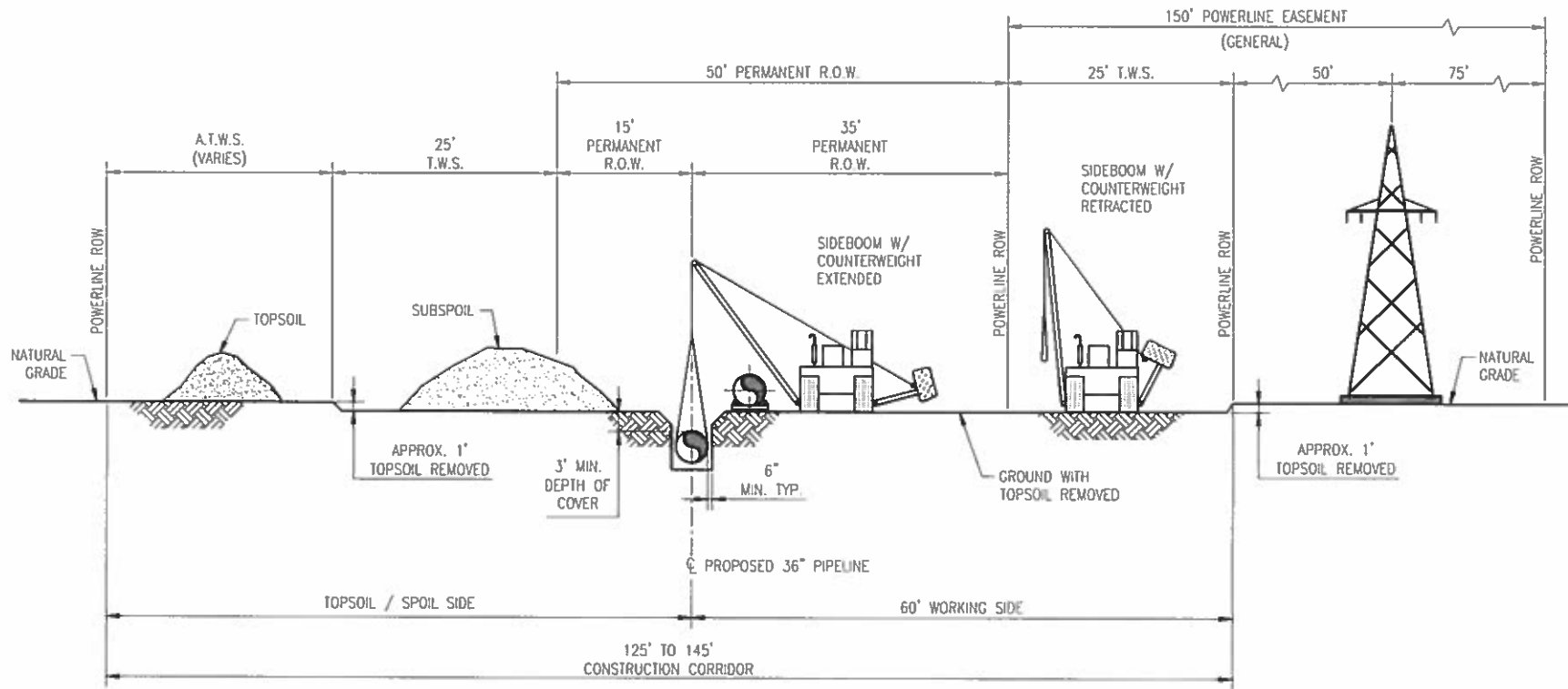
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**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 150' POWERLINE EASEMENT**
 N.T.S.

PROJ. ENG. KG	14Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT		
CHECKED BY: DC	14Apr15	YR.: 2015	TYPICAL MAINLINE CONSTRUCTION METHOD #6A		
DRAWN BY: RVE	14Apr15	W.O.	NORTH OR EAST OF POWERLINE EASEMENT		
SCALE: NTS	DATE	REV.: A	LOC.: LORAIN COUNTY, OHIO	DWG. NO. S4NX-P-8012-A	NEXUS GAS TRANSMISSION

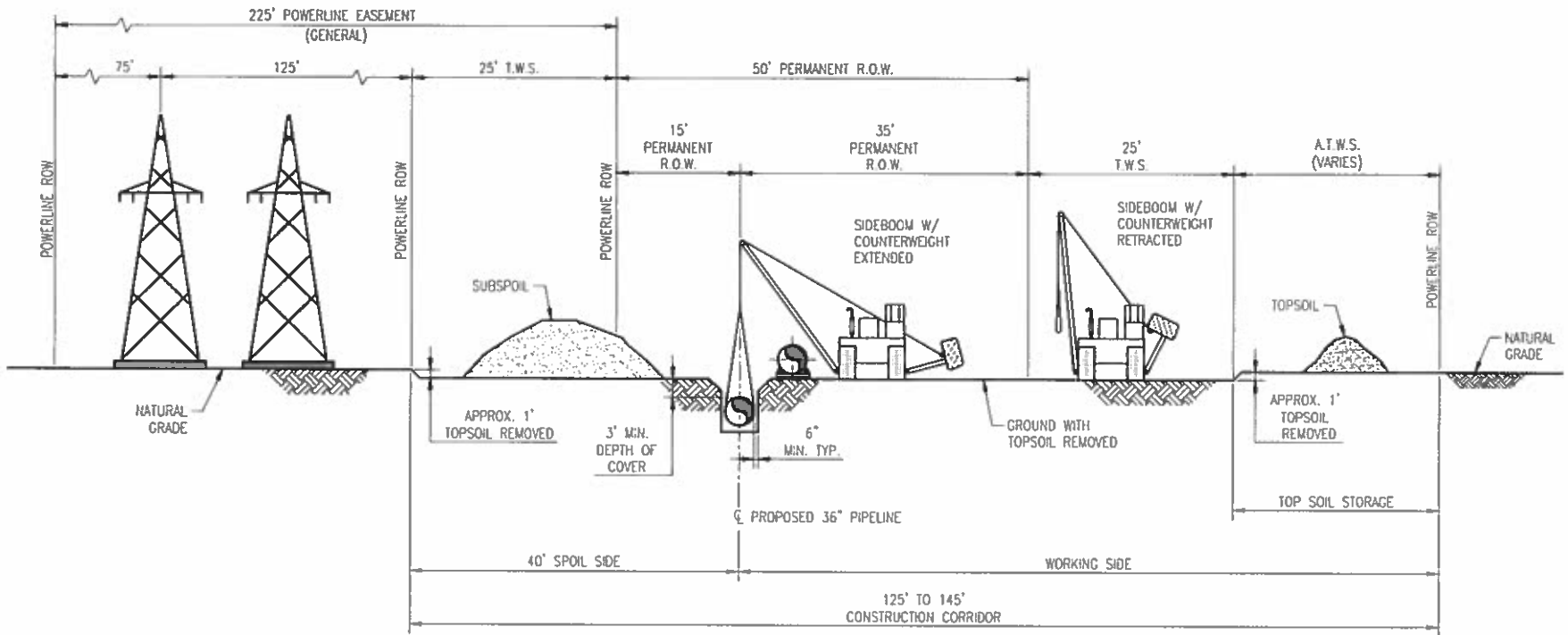
ELI22282 April 14, 2015 2:04pm
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**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 150' POWERLINE EASEMENT**
 N.T.S.

C.I.	PROJ. ENG. KG	14Apr15	TITLE: NEXUS GAS TRANSMISSION PROJECT TYPICAL MAINLINE CONSTRUCTION METHOD #6B SOUTH OR WEST OF POWERLINE EASEMENT	DWG. NO. S4NX-P-8012-B	
	CHECKED BY: DC	14Apr15			
	DRAWN BY: RVE	14Apr15			
	SCALE: NTS	DATE			
		REV.: A	LOC.: LORAIN COUNTY, OHIO		

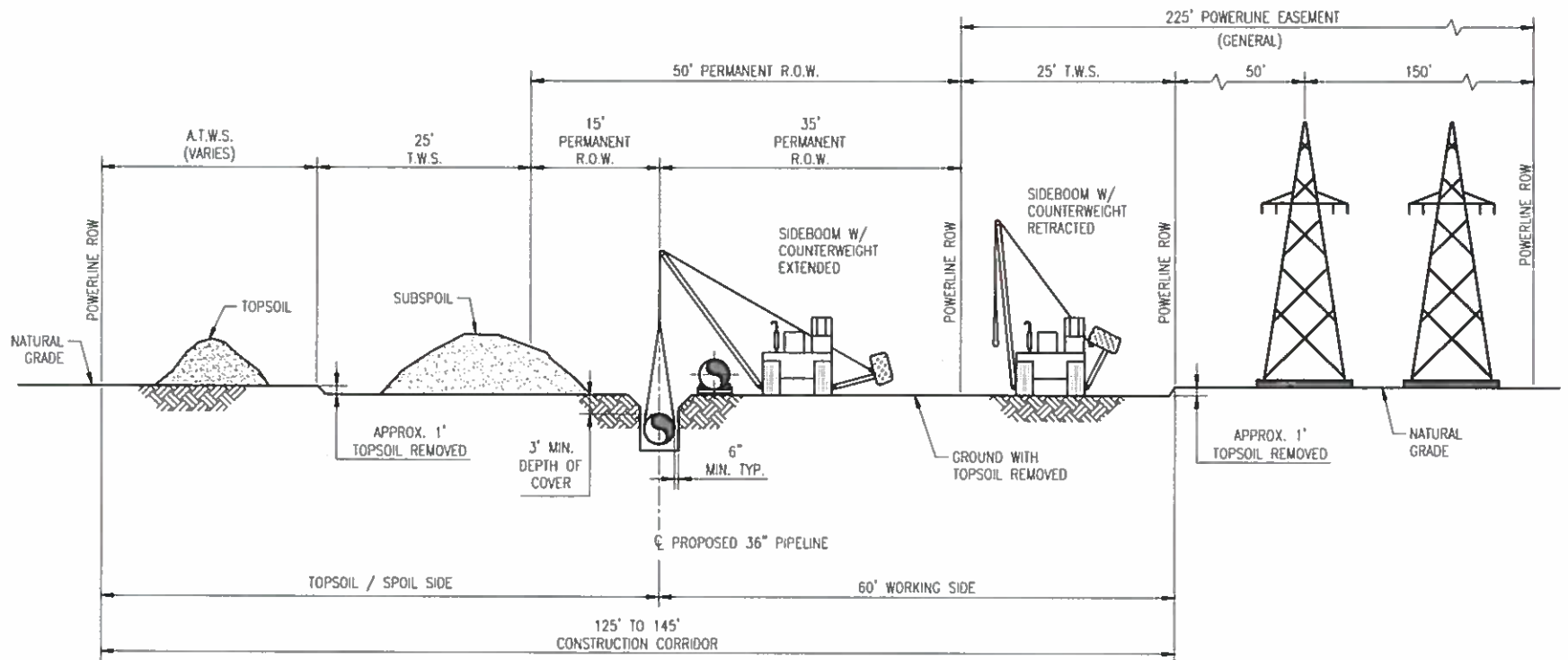
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**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 225' POWERLINE EASEMENT**
 N.T.S.

PROJ. ENG. KG	14Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT TYPICAL MAINLINE CONSTRUCTION METHOD #7A NORTH OR EAST OF POWERLINE EASEMENT		
CHECKED BY: CDC	14Apr15	YR.: 2015			
DRAWN BY: RARVE	14Apr15	W.O.			
SCALE: NTS	DATE	REV.: A	LOC.: ERIE COUNTY, OHIO	DWG. NO. S4NX-P-8013-A	

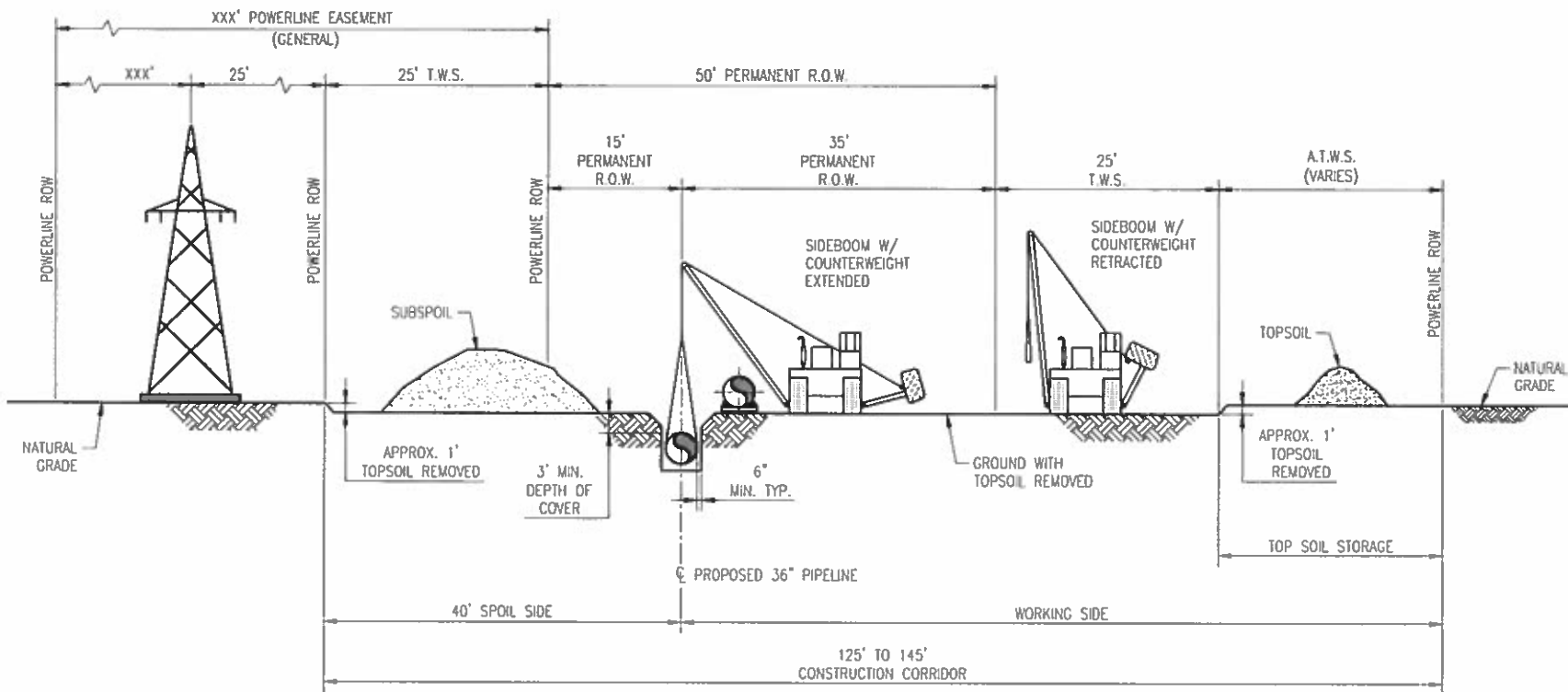
ELI22282 April 14, 2015 2:04pm
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**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH 225' POWERLINE EASEMENT**
 N.T.S.

I.G.#	PROJ. ENG. KG	14Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT TYPICAL MAINLINE CONSTRUCTION METHOD #7B SOUTH OR WEST OF POWERLINE EASEMENT		
	CHECKED BY: RDC	14Apr15	YR.: 2015			
	DRAWN BY: RVE	14Apr15	W.D.			
	SCALE: NTS	DATE	REV.: A			
				LOC.: ERIE COUNTY, OHIO	DWG. NO. S4NX-P-8013-B	

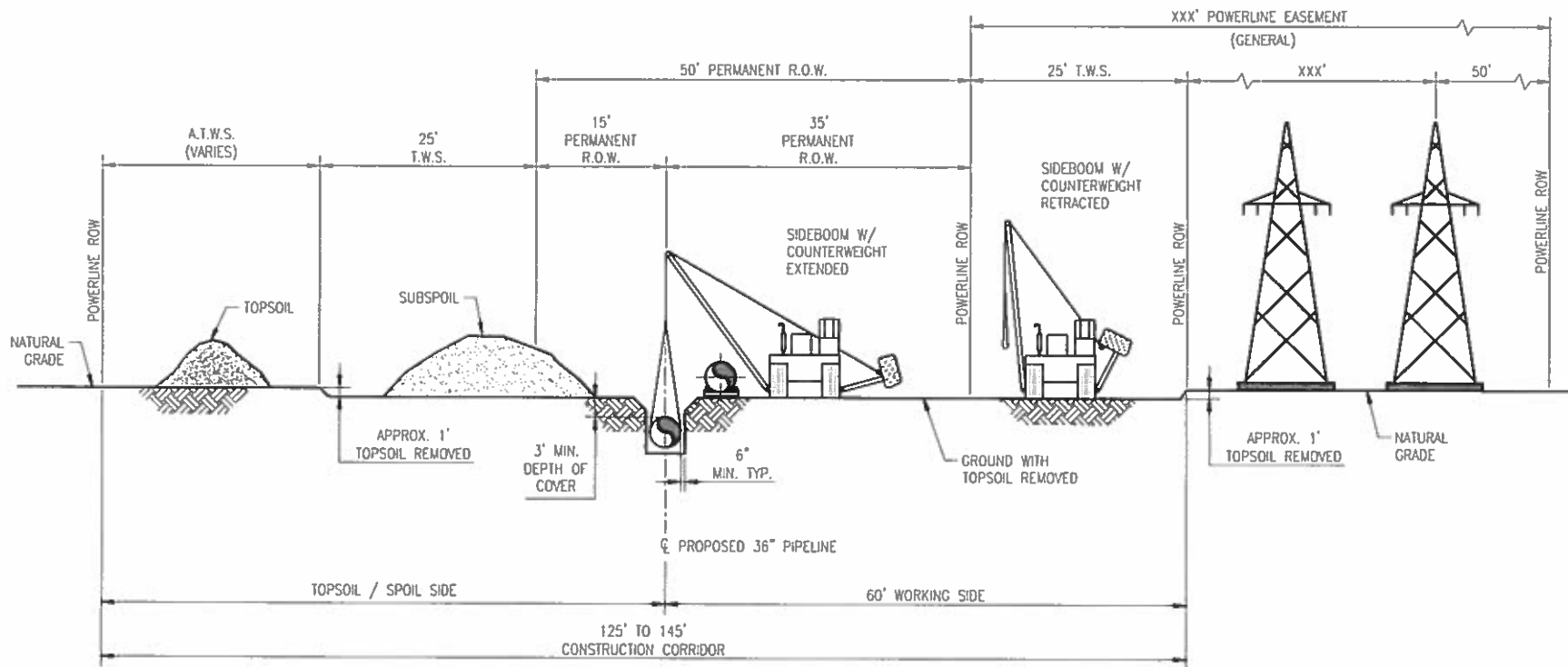
ELI22282 April 14, 2015 1:41pm
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**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH XXX' POWERLINE EASEMENT**
 N.T.S.

PROJ. ENG. KG	14Apr15		TITLE: NEXUS GAS TRANSMISSION PROJECT TYPICAL MAINLINE CONSTRUCTION METHOD #8A NORTH OR EAST OF POWERLINE EASEMENT		
CHECKED BY: DCDC	14Apr15	YR.: 2015			
DRAWN BY: RVE	14Apr15	W.O.			
SCALE: NTS	DATE	REV.: A	LOC.: WOOD COUNTY, OHIO	DWG. NO. S4NX-P-8014-A	

ELI22282 April 14, 2015 2:05pm
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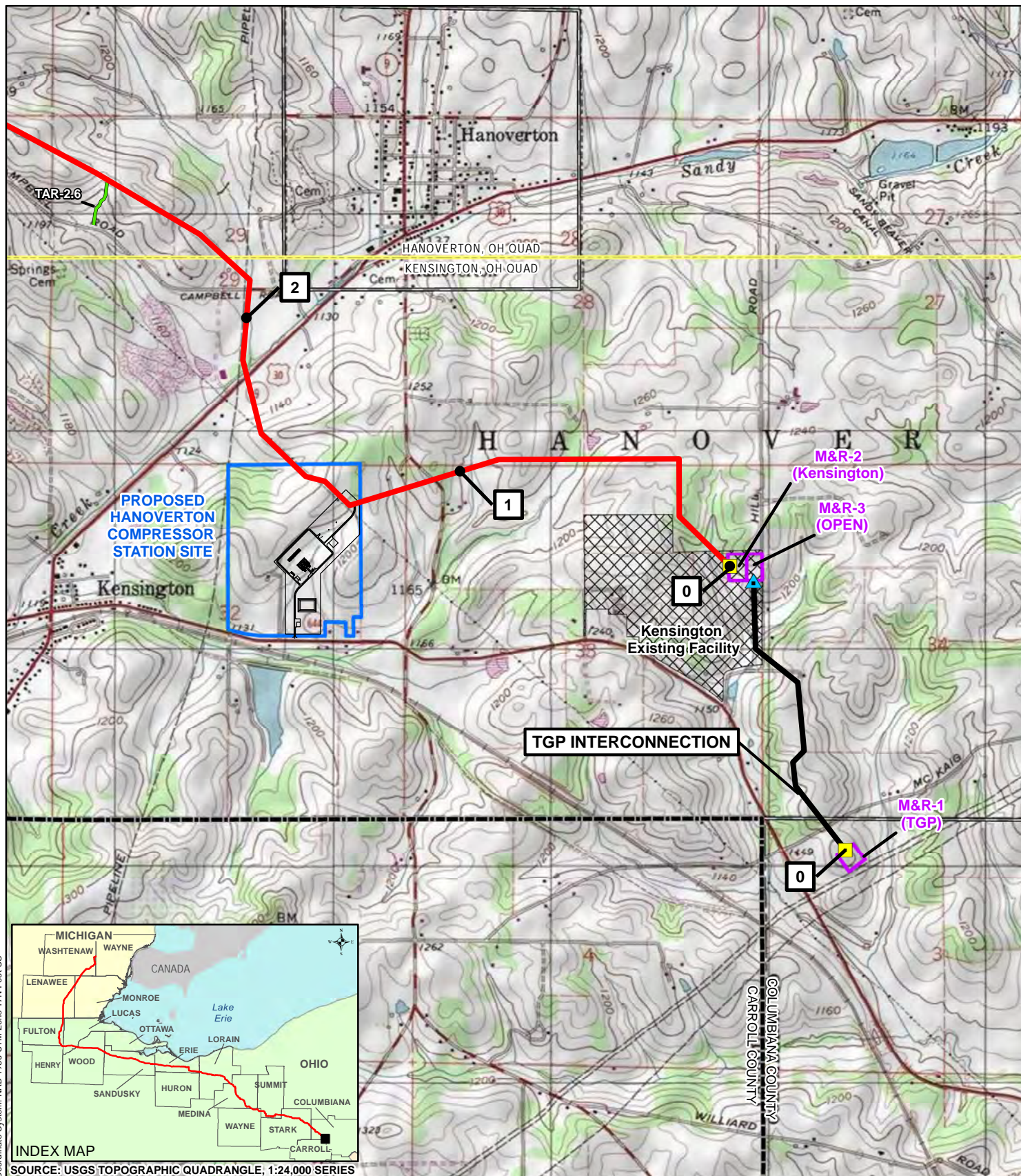


**TYPICAL 125' TO 145' CONSTRUCTION CORRIDOR
 WITH XXX' POWERLINE EASEMENT**

N.T.S.

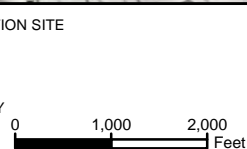
LG#	PROJ. ENG.	KG <i>LDK</i>	14Apr15	TITLE:	NEXUS GAS TRANSMISSION PROJECT TYPICAL MAINLINE CONSTRUCTION METHOD #8B SOUTH OR WEST OF POWERLINE EASEMENT	DWG. NO.	S4NX-P-8014-B	
	CHECKED BY:	DC	14Apr15					
	DRAWN BY:	PURVE	14Apr15					
	SCALE:	NTS	DATE					
			REV.: A	LOC.:	WOOD COUNTY, OHIO			

8.5- x 11-inch USGS Quadrangle Map Excerpts



Coordinate System: NAD 1983 UTM Zone 17N Foot US

- 1 MILEPOST
- PROPOSED MAINLINE VALVE (MLV)
- PROPOSED PIPELINE LAUNCHER
- PROPOSED PIPELINE RECEIVER
- PROPOSED MAINLINE PIPELINE
- PROPOSED INTERCONNECTING PIPELINE
- PROPOSED PERMANENT ACCESS ROAD (PAR)
- PROPOSED TEMPORARY ACCESS ROAD (TAR)
- PROPOSED METERING & REGULATION STATION (M&R)
- PROPOSED COMPRESSOR STATION SITE
- PROPOSED WARE YARD
- EXISTING FACILITY
- USGS QUADRANGLE BOUNDARY
- COUNTY BOUNDARY



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: CARROLL COUNTY, OH; COLUMBIANA COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

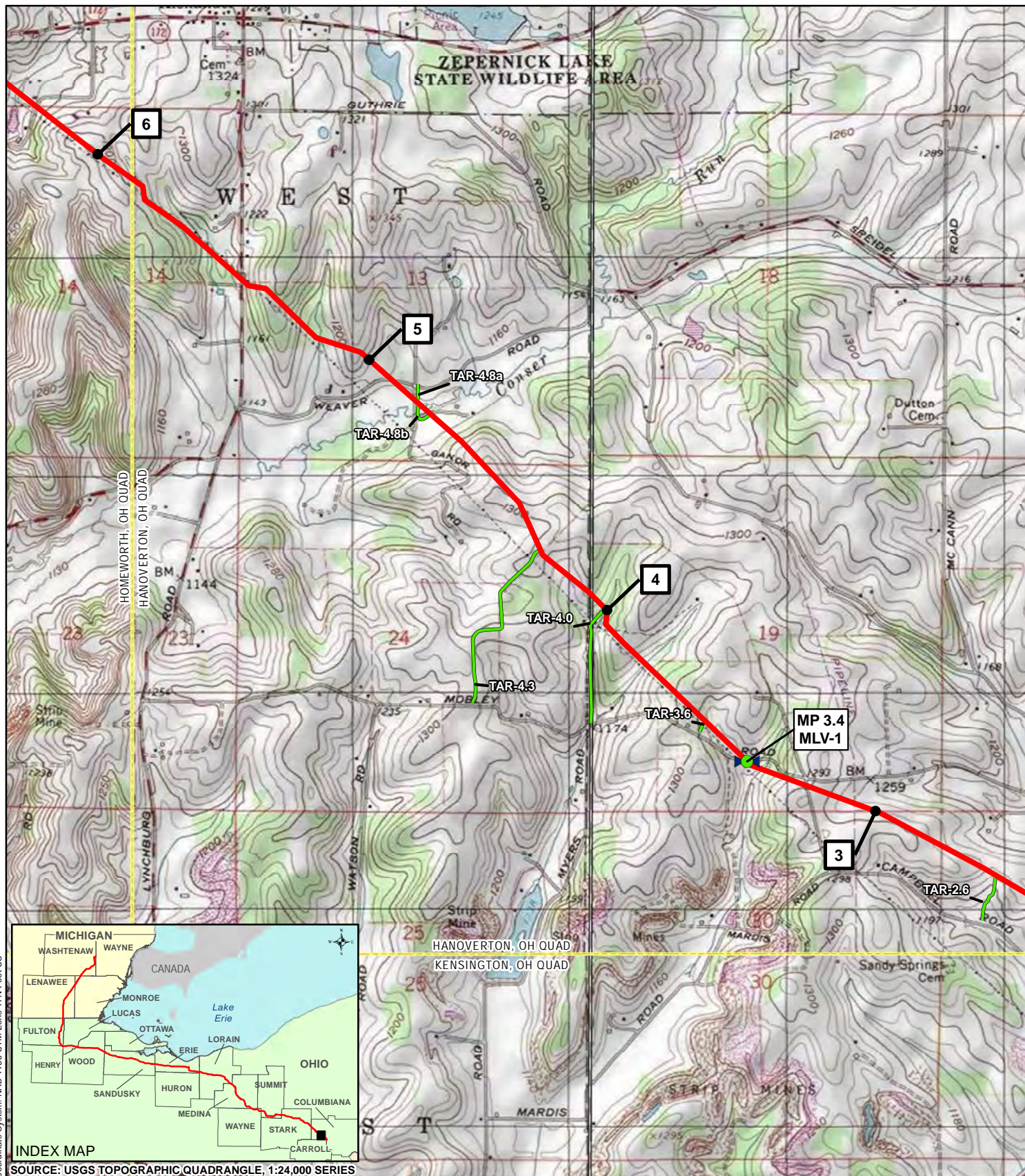
SCALE: 1" = 2,000'

FIGURE 1.1.1-1

MAP 1 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

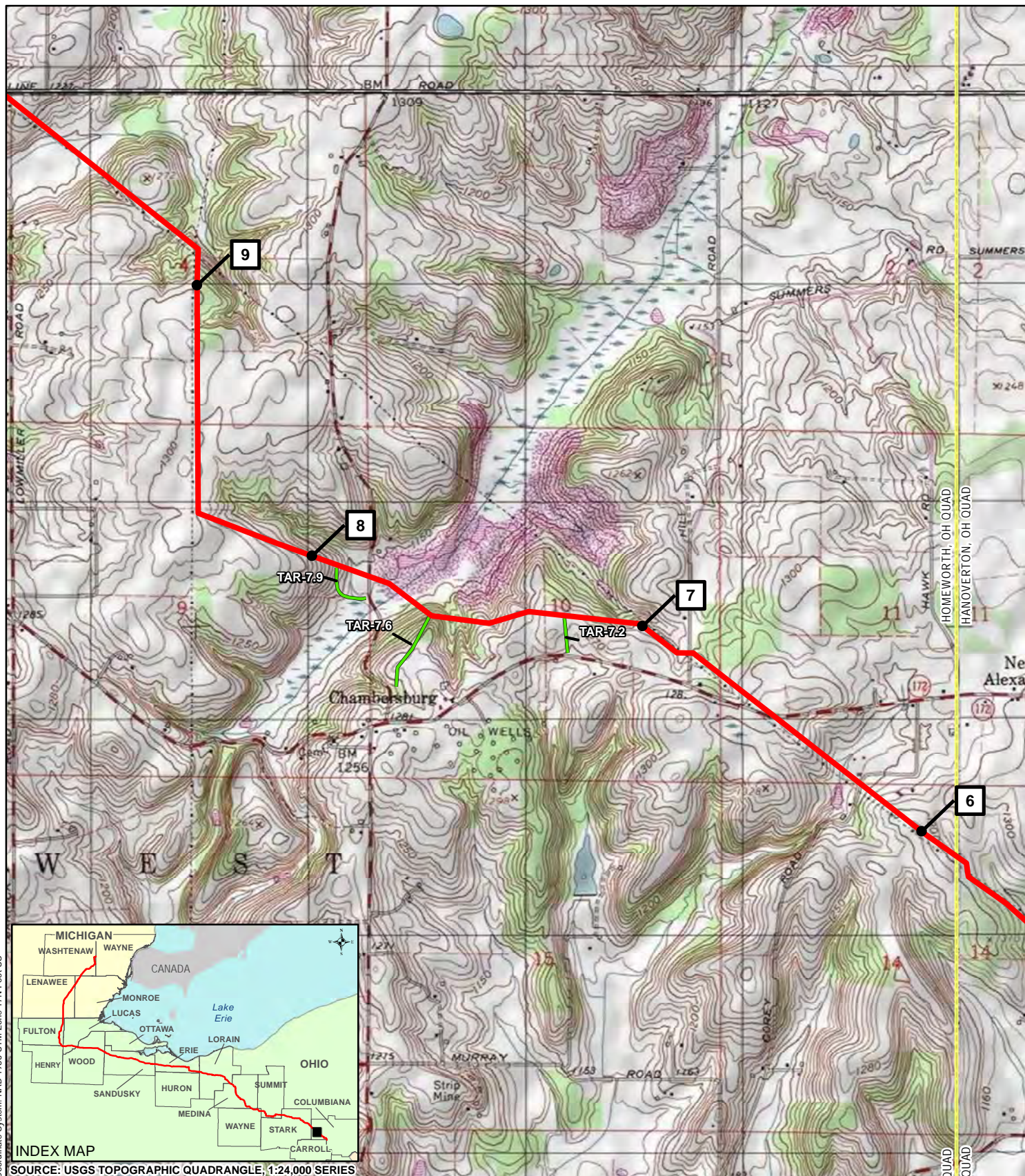
1 MILEPOST	PROPOSED MAINLINE PIPELINE	PROPOSED COMPRESSOR STATION SITE
PROPOSED MAINLINE VALVE (MLV)	PROPOSED INTERCONNECTING PIPELINE	PROPOSED WARE YARD
PROPOSED PIPELINE LAUNCHER	PROPOSED PERMANENT ACCESS ROAD (PAR)	EXISTING FACILITY
PROPOSED PIPELINE RECEIVER	PROPOSED TEMPORARY ACCESS ROAD (TAR)	USGS QUADRANGLE BOUNDARY
	PROPOSED METERING & REGULATION STATION (M&R)	COUNTY BOUNDARY

TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: COLUMBIANA COUNTY, OH

CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-2	MAP 2 of 81

Quad map based on data as of 08 April 2015

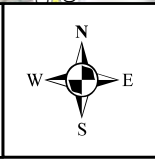


Coordinate System: NAD 1983 UTM Zone 17N Foot US



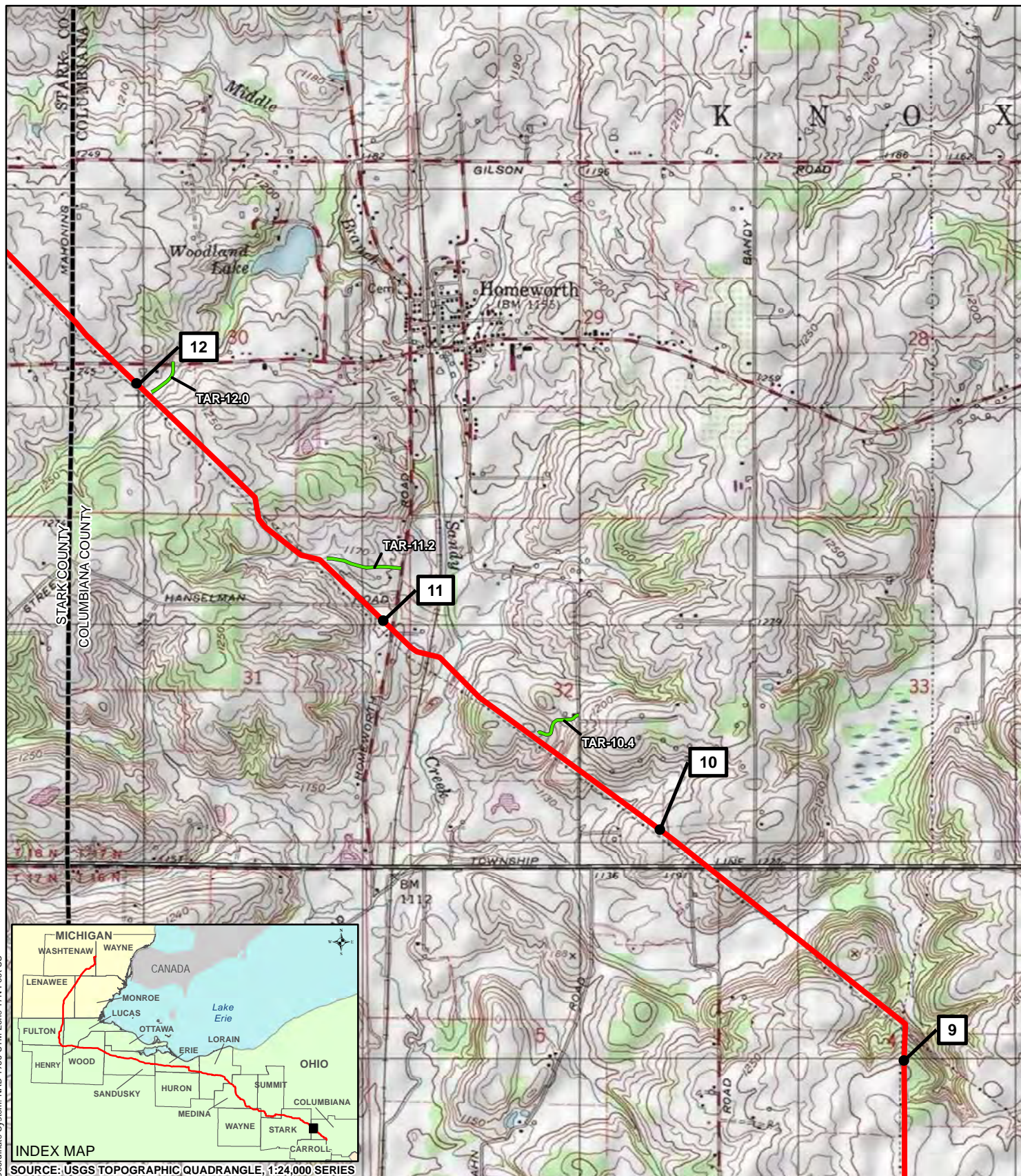
SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> 1 MILEPOST PROPOSED MAINLINE VALVE (MLV) PROPOSED PIPELINE LAUNCHER PROPOSED PIPELINE RECEIVER | <ul style="list-style-type: none"> PROPOSED MAINLINE PIPELINE PROPOSED INTERCONNECTING PIPELINE PROPOSED PERMANENT ACCESS ROAD (PAR) PROPOSED TEMPORARY ACCESS ROAD (TAR) PROPOSED METERING & REGULATION STATION (M&R) | <ul style="list-style-type: none"> PROPOSED COMPRESSOR STATION SITE PROPOSED WARE YARD EXISTING FACILITY USGS QUADRANGLE BOUNDARY COUNTY BOUNDARY |
|---|---|--|



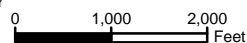
TITLE: NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP			
LOC.: COLUMBIANA COUNTY, OH			
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-3	MAP 3 of 81





SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: COLUMBIANA COUNTY, OH; STARK COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

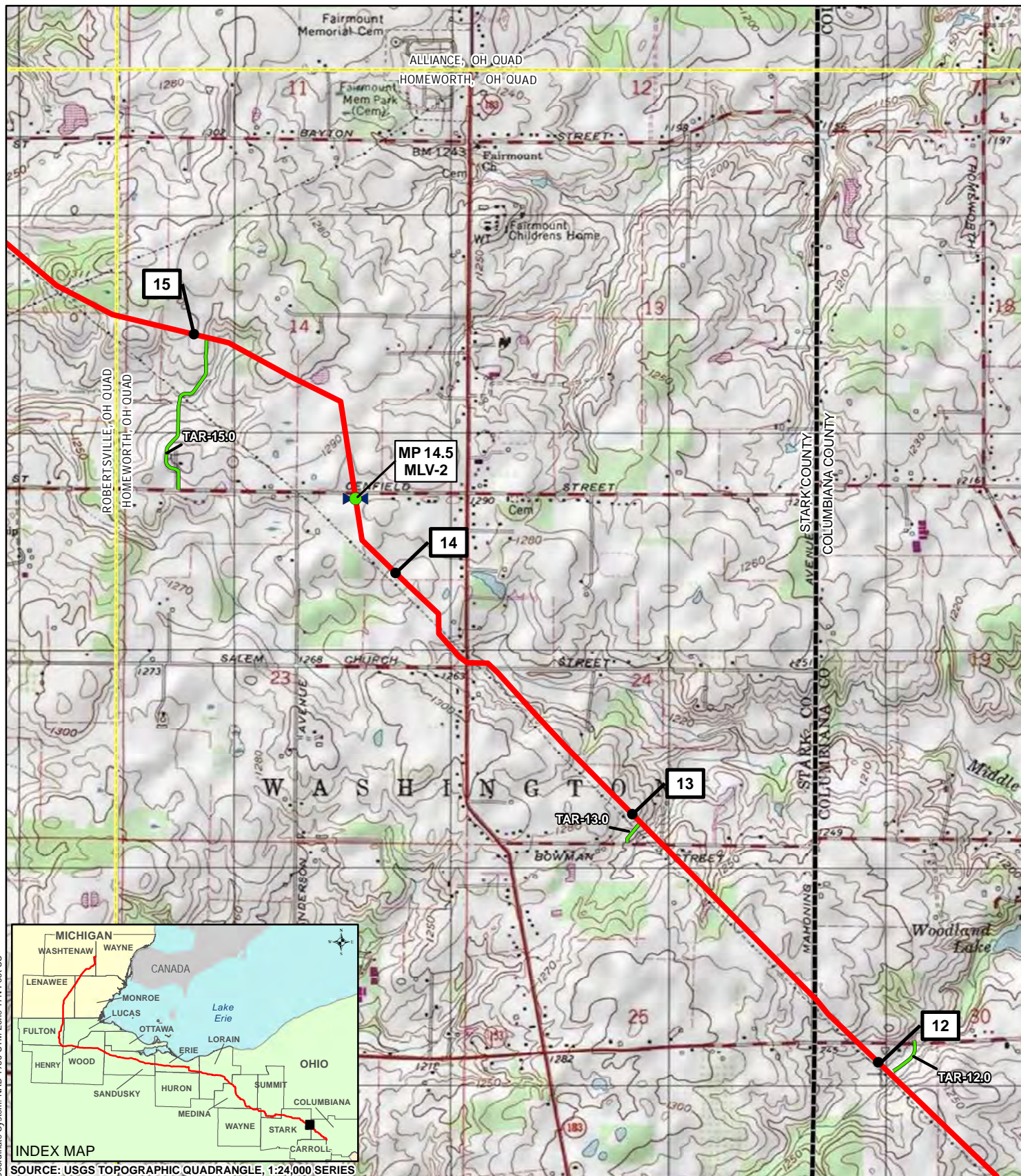
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-4

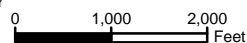
MAP 4 of 81

NEXUS
GAS TRANSMISSION



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: COLUMBIANA COUNTY; OH, STARK COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

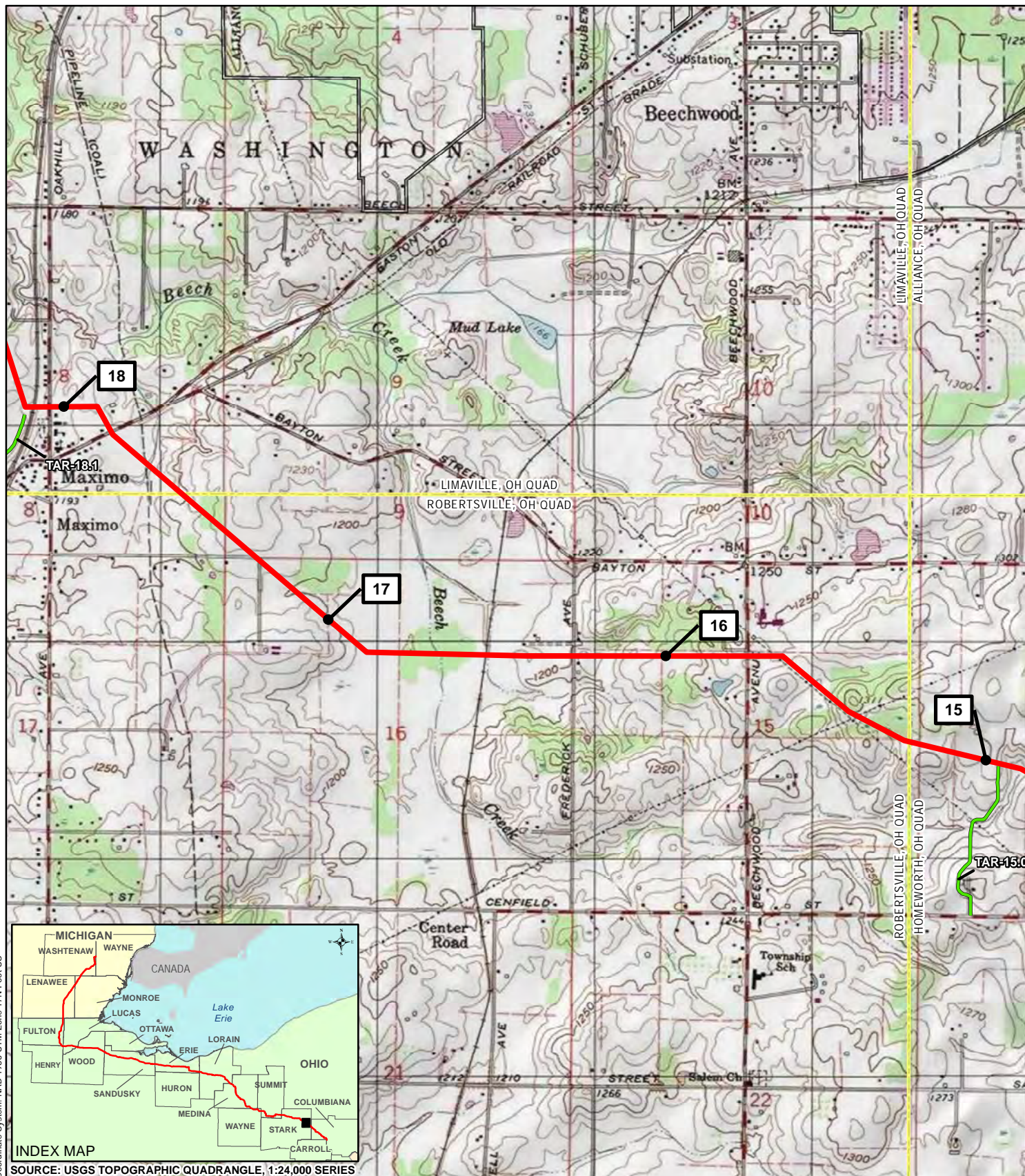
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-5

MAP 5 of 81

NEXUS
GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

- 1 MILEPOST
- PROPOSED MAINLINE VALVE (MLV)
- PROPOSED PIPELINE LAUNCHER
- PROPOSED PIPELINE RECEIVER
- PROPOSED MAINLINE PIPELINE
- PROPOSED INTERCONNECTING PIPELINE
- PROPOSED PERMANENT ACCESS ROAD (PAR)
- PROPOSED TEMPORARY ACCESS ROAD (TAR)
- PROPOSED METERING & REGULATION STATION (M&R)
- PROPOSED COMPRESSOR STATION SITE
- PROPOSED WARE YARD
- EXISTING FACILITY
- USGS QUADRANGLE BOUNDARY
- COUNTY BOUNDARY

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: STARK COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

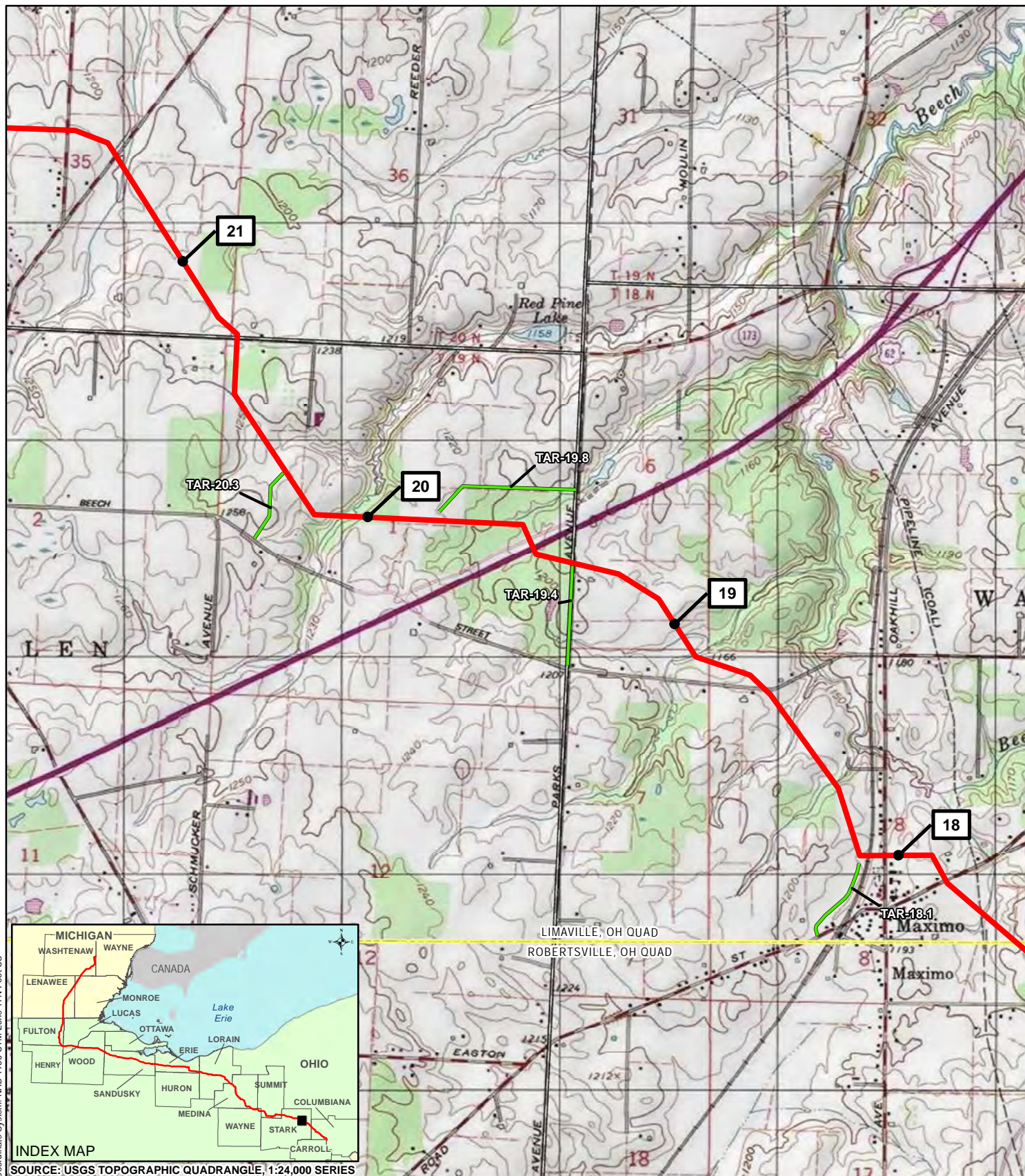
SCALE: 1" = 2,000'

FIGURE 1.1.1-6

MAP 6 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

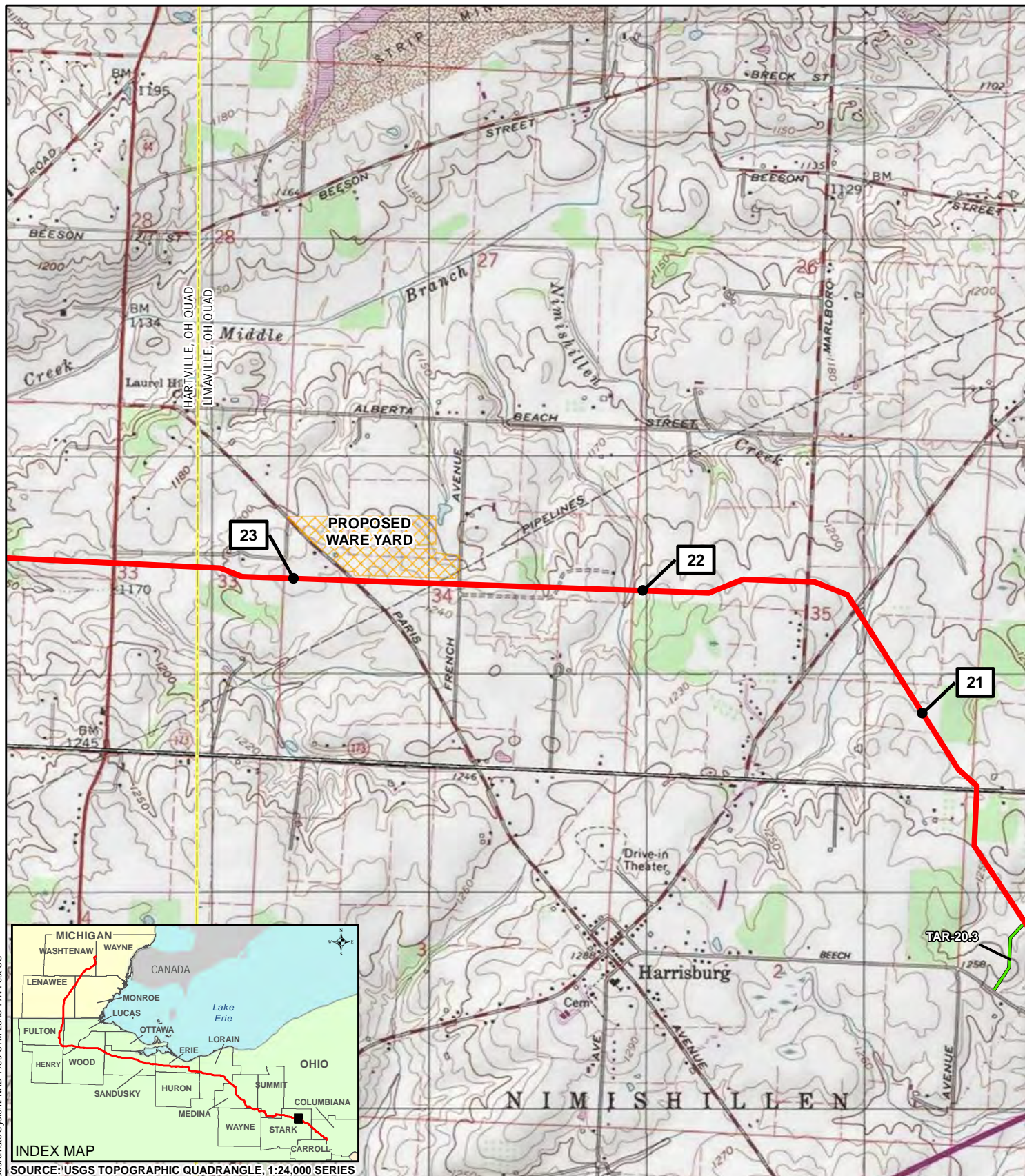
1 MILEPOST	PROPOSED MAINLINE PIPELINE	PROPOSED COMPRESSOR STATION SITE
PROPOSED MAINLINE VALVE (MLV)	PROPOSED INTERCONNECTING PIPELINE	PROPOSED WARE YARD
PROPOSED PIPELINE LAUNCHER	PROPOSED PERMANENT ACCESS ROAD (PAR)	EXISTING FACILITY
PROPOSED PIPELINE RECEIVER	PROPOSED TEMPORARY ACCESS ROAD (TAR)	USGS QUADRANGLE BOUNDARY
	PROPOSED METERING & REGULATION STATION (M&R)	COUNTY BOUNDARY

TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: STARK COUNTY, OH

CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-7	MAP 7 of 81

Quad map based on data as of 08 April 2015

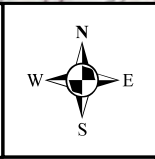


Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> 1 MILEPOST PROPOSED MAINLINE VALVE (MLV) PROPOSED PIPELINE LAUNCHER PROPOSED PIPELINE RECEIVER | <ul style="list-style-type: none"> PROPOSED MAINLINE PIPELINE PROPOSED INTERCONNECTING PIPELINE PROPOSED PERMANENT ACCESS ROAD (PAR) PROPOSED TEMPORARY ACCESS ROAD (TAR) PROPOSED METERING & REGULATION STATION (M&R) | <ul style="list-style-type: none"> PROPOSED COMPRESSOR STATION SITE PROPOSED WARE YARD EXISTING FACILITY USGS QUADRANGLE BOUNDARY COUNTY BOUNDARY |
|---|---|--|

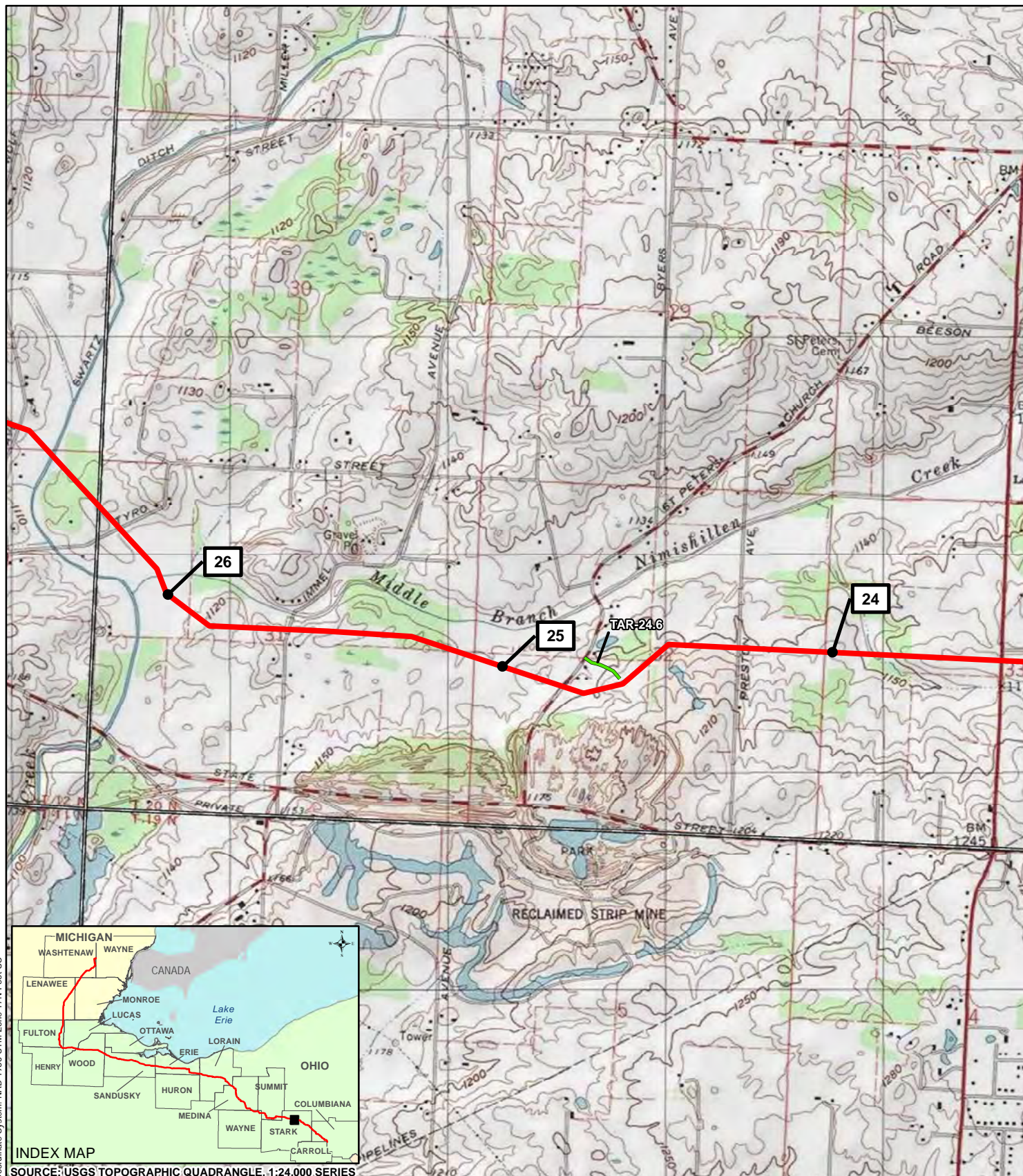


TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: STARK COUNTY, OH

CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-8	MAP 8 of 81





Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: STARK COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

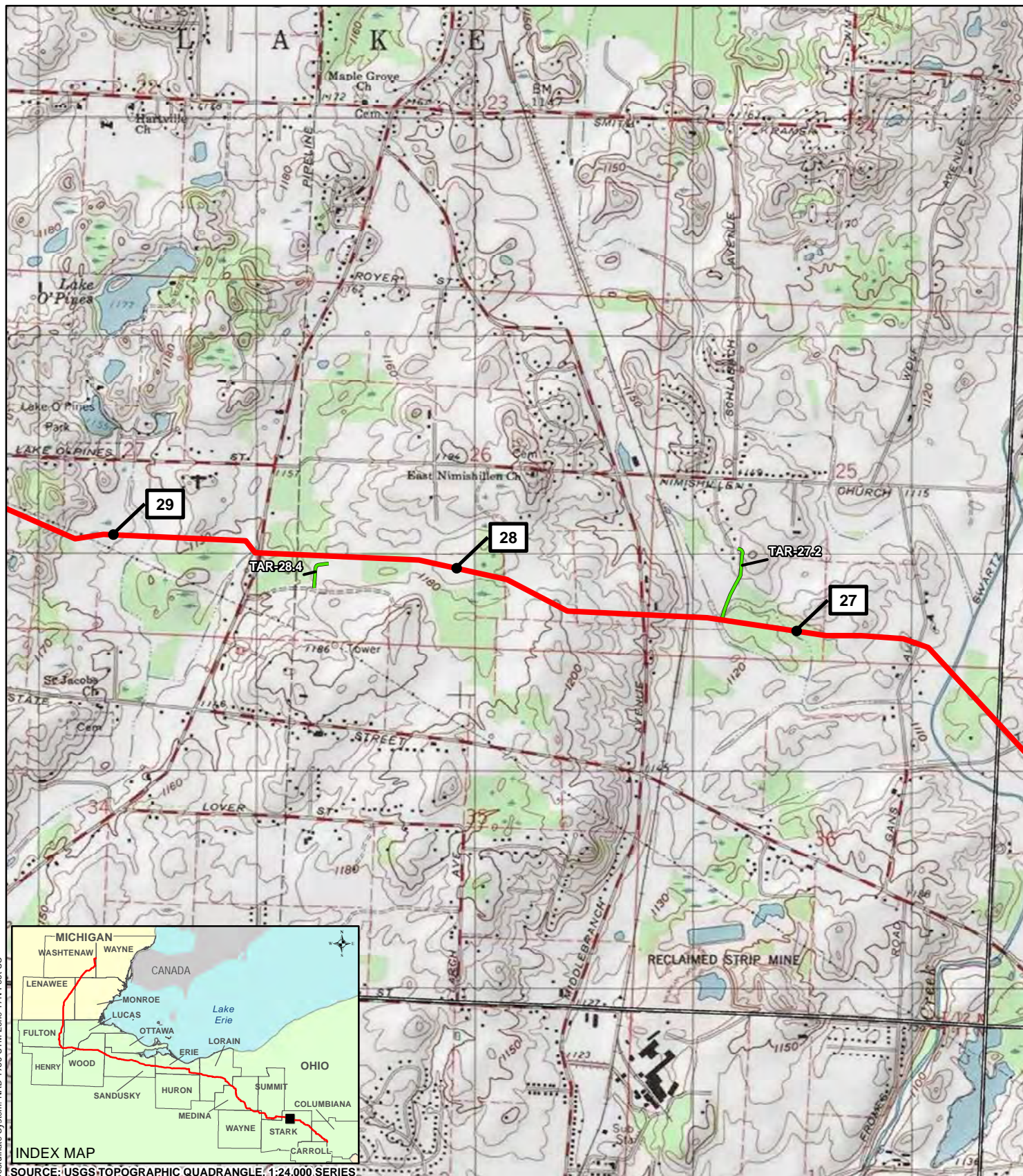
SCALE: 1" = 2,000'

FIGURE 1.1.1-9

MAP 9 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: STARK COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

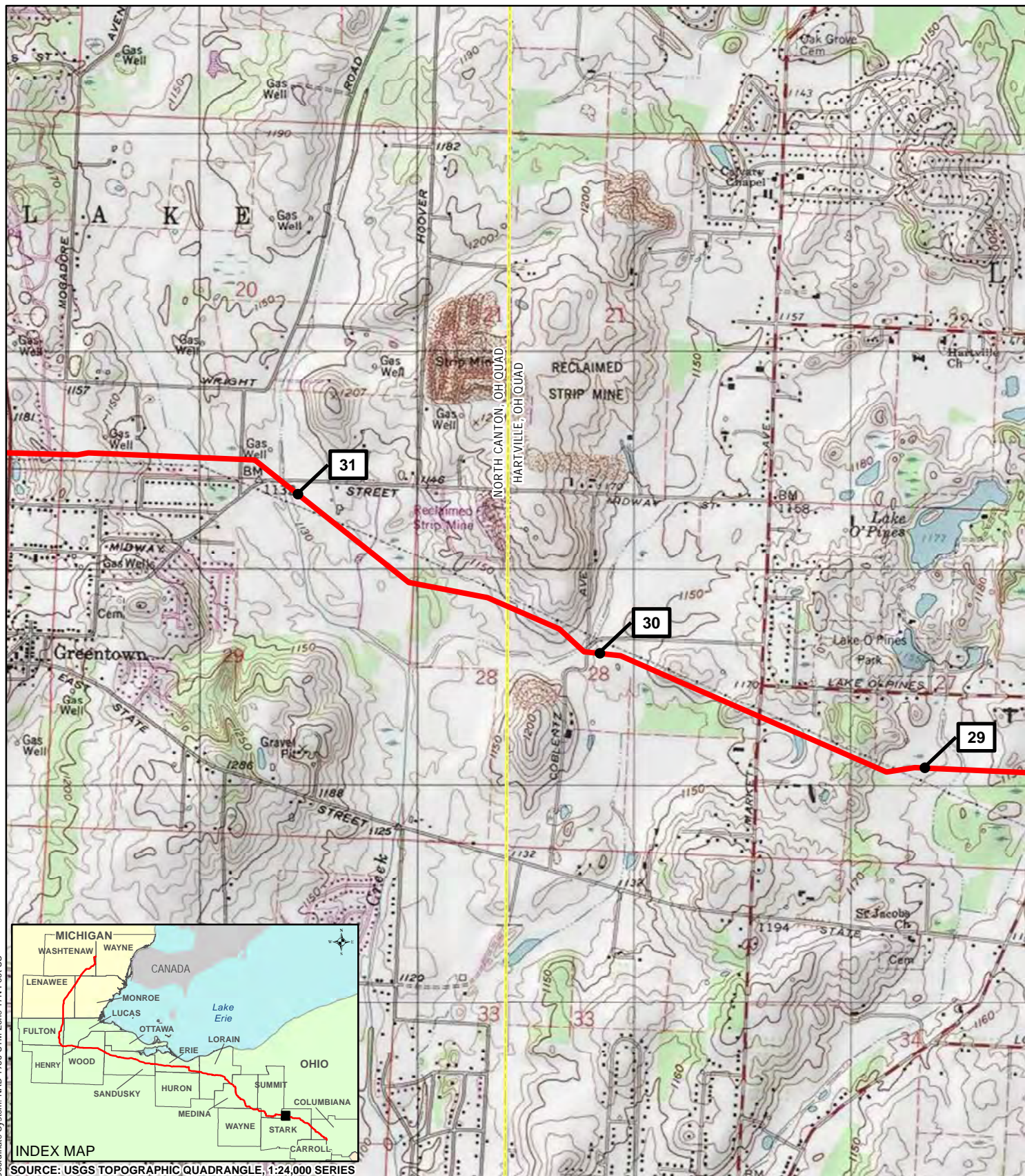
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-10

MAP 10 of 81

NEXUS
GAS TRANSMISSION



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: STARK COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

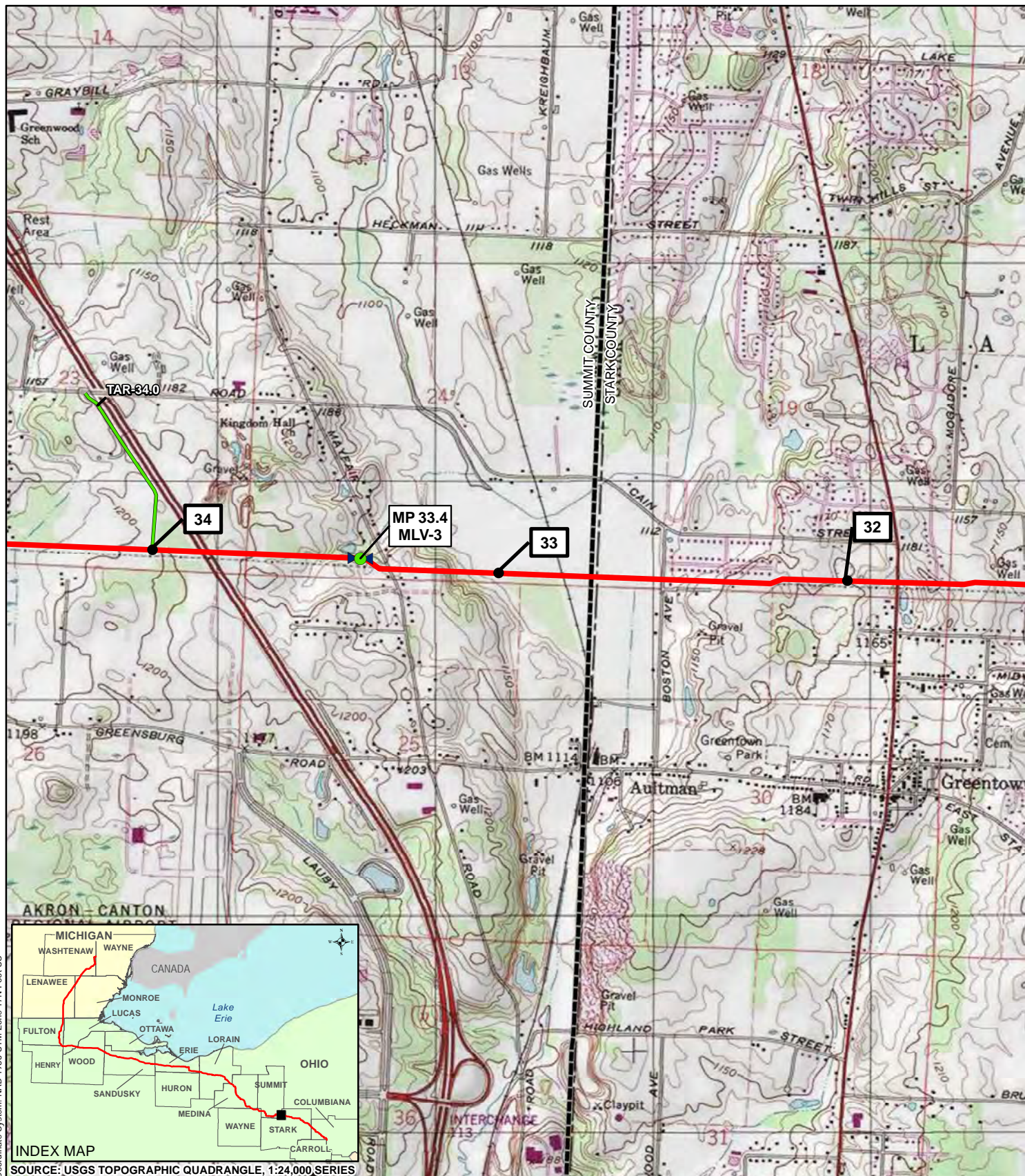
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-11

MAP 11 of 81

NEXUS
GAS TRANSMISSION

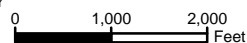


Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: STARK COUNTY, OH; SUMMIT COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

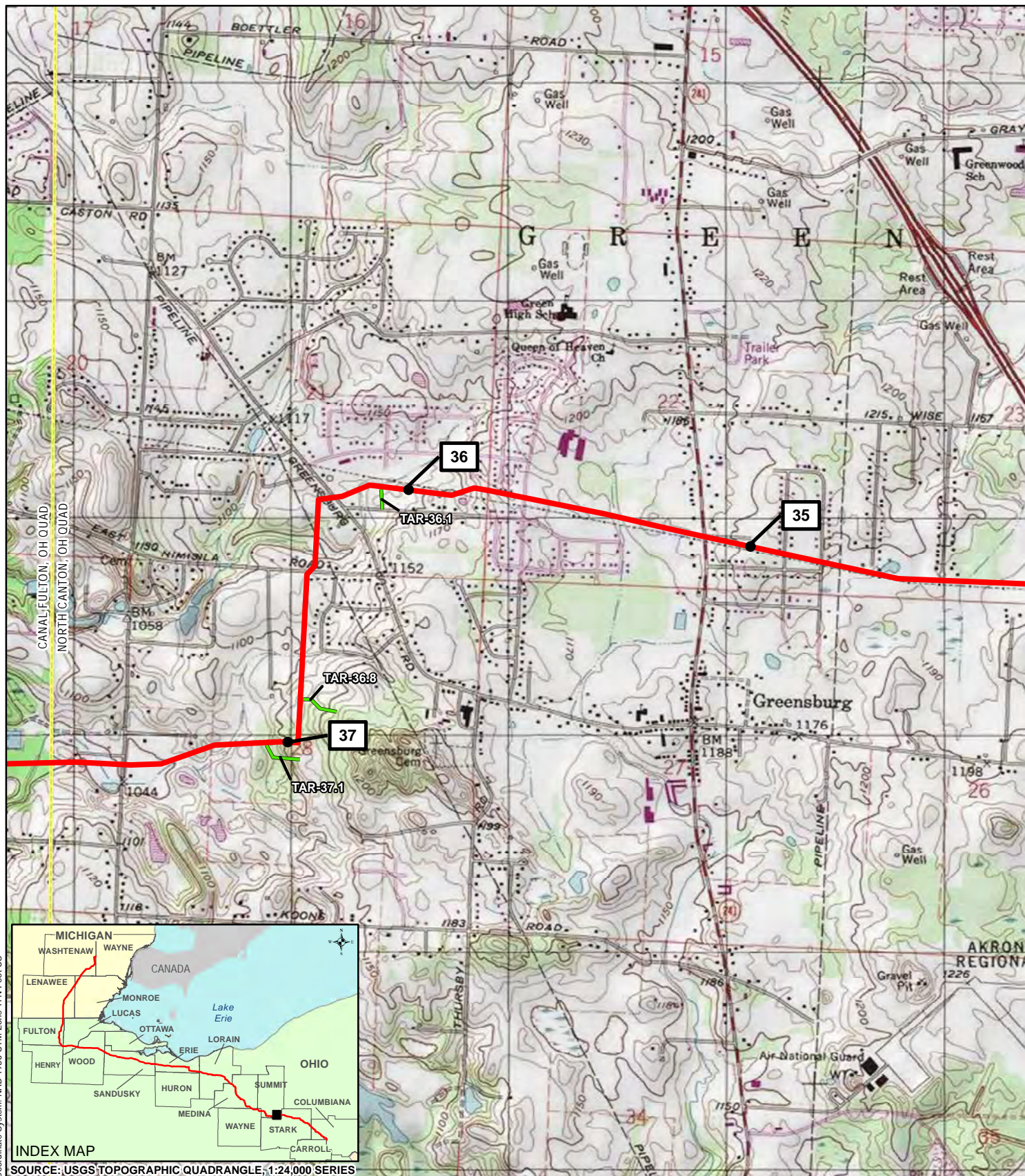
SCALE: 1" = 2,000'

FIGURE 1.1.1-12

MAP 12 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015

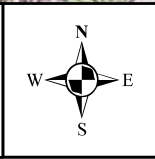


Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

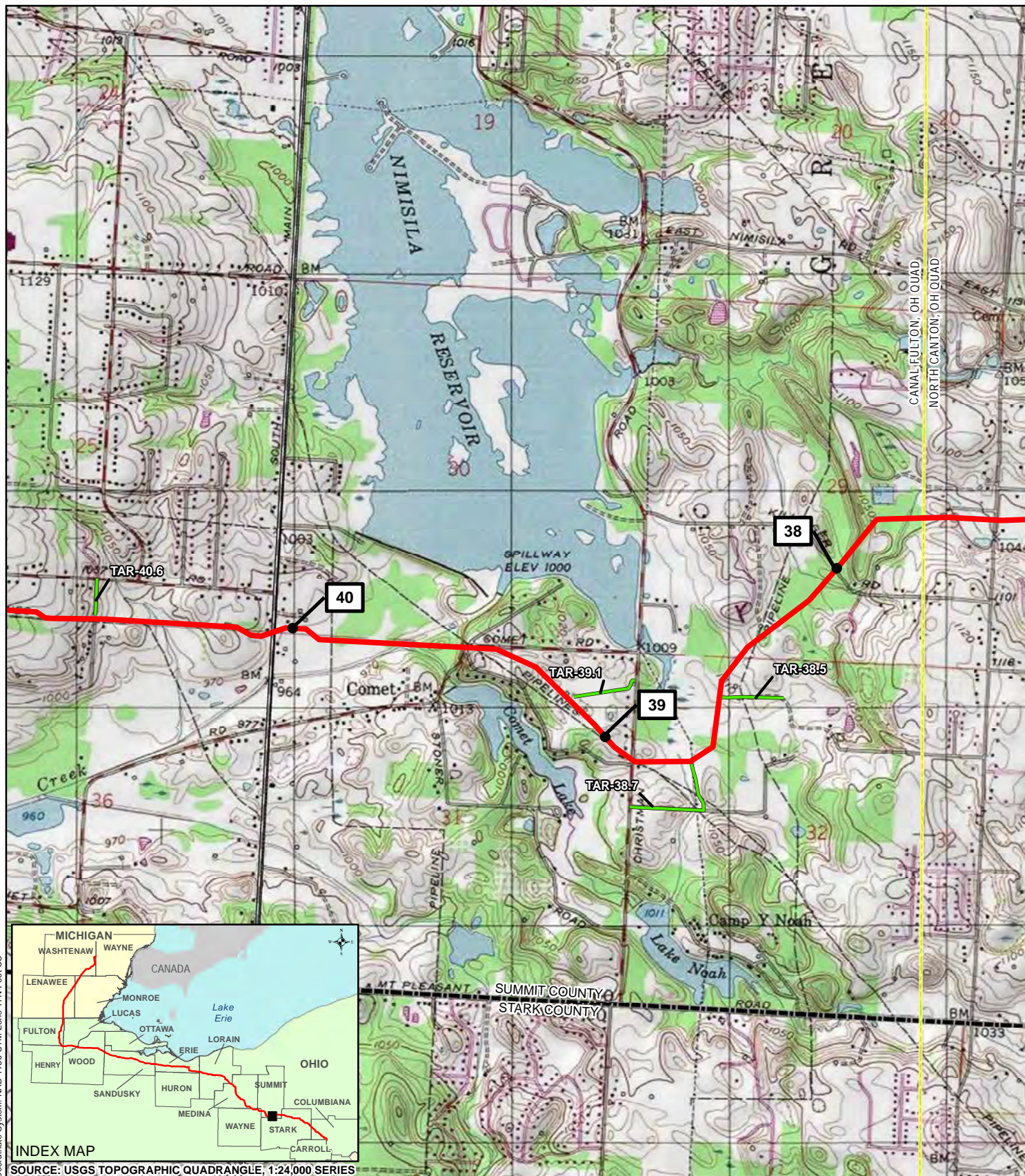


TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: SUMMIT COUNTY, OH

CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-13	MAP 13 of 81





SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

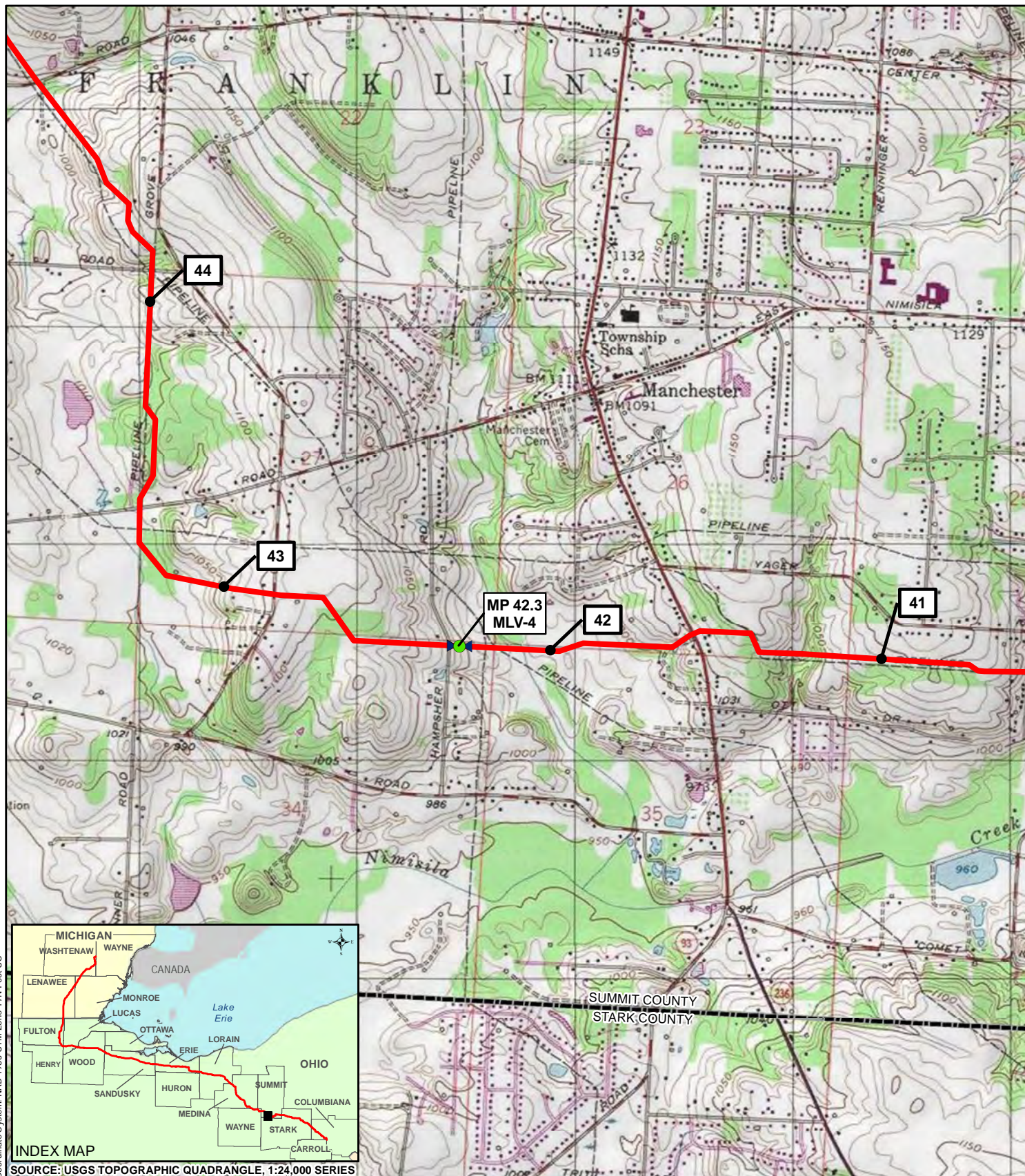
1 MILEPOST	PROPOSED MAINLINE PIPELINE	PROPOSED COMPRESSOR STATION SITE
PROPOSED MAINLINE VALVE (MLV)	PROPOSED INTERCONNECTING PIPELINE	PROPOSED WARE YARD
PROPOSED PIPELINE LAUNCHER	PROPOSED PERMANENT ACCESS ROAD (PAR)	EXISTING FACILITY
PROPOSED PIPELINE RECEIVER	PROPOSED TEMPORARY ACCESS ROAD (TAR)	USGS QUADRANGLE BOUNDARY
	PROPOSED METERING & REGULATION STATION (M&R)	COUNTY BOUNDARY

TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: SUMMIT COUNTY, OH

CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-14	MAP 14 of 81

Quad map based on data as of 08 April 2015

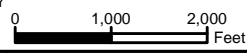


Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: SUMMIT COUNTY, OH

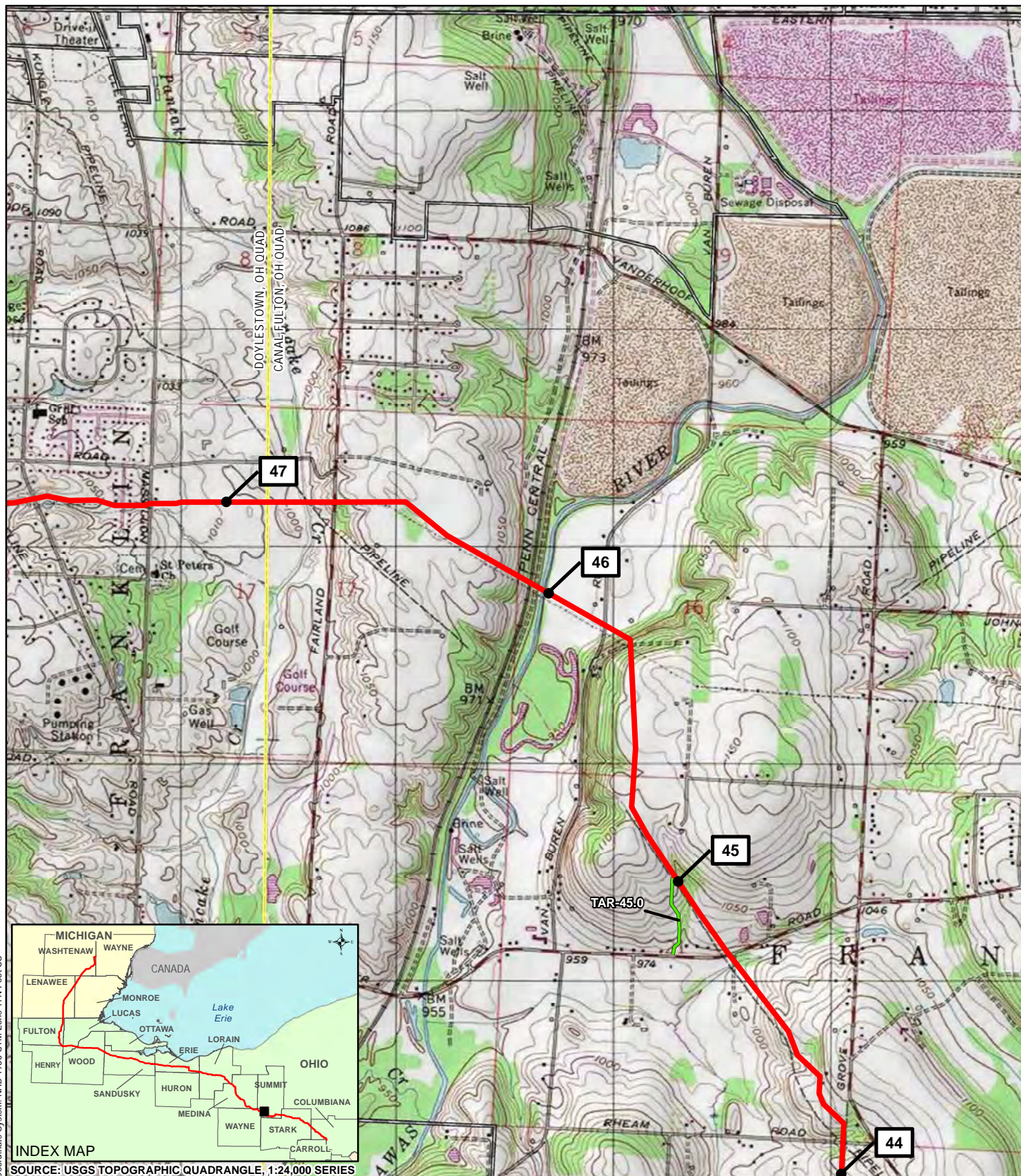
CKD. BY: NR
DRN. BY: KM

ENG.
SCALE: 1" = 2,000'

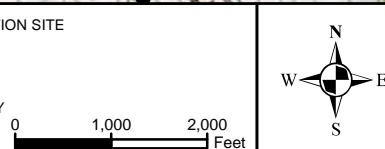
DATE: 3/6/2015
FIGURE 1.1.1-15

W.O.
MAP 15 of 81





- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: SUMMIT COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

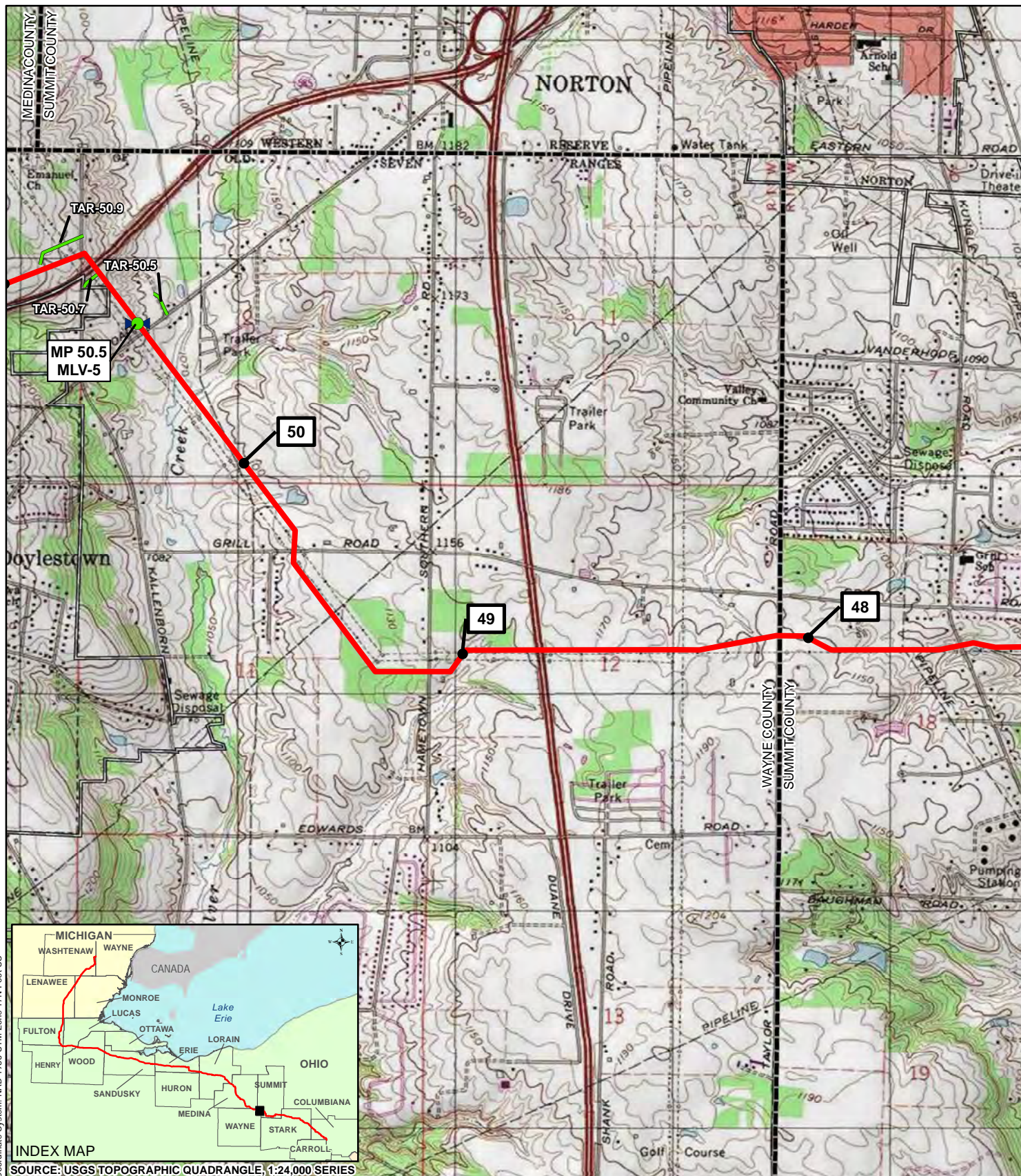
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-16

MAP 16 of 81

NEXUS
GAS TRANSMISSION



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: SUMMIT COUNTY, OH; WAYNE COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

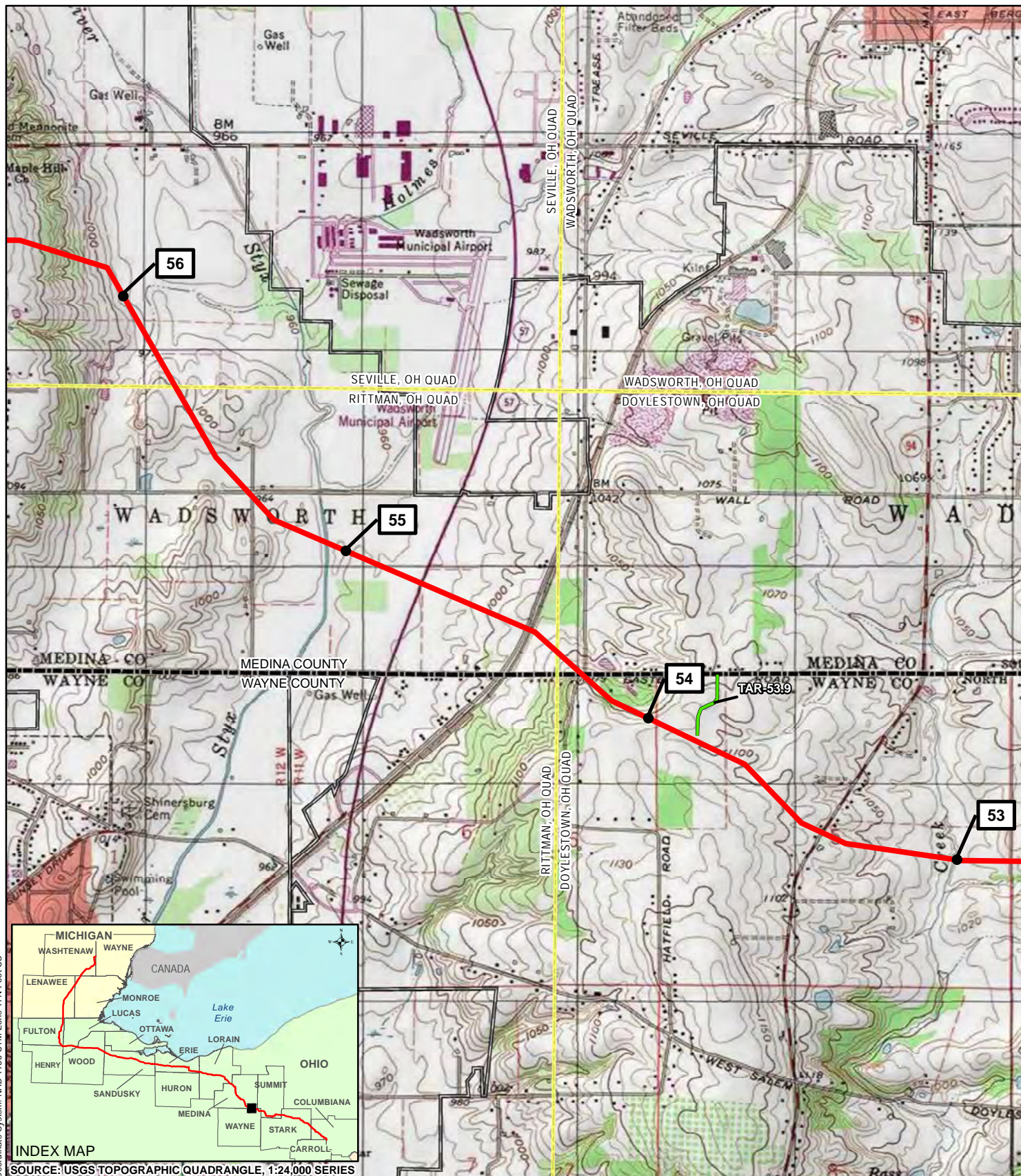
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-17

MAP 17 of 81

NEXUS
GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

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|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: WAYNE COUNTY, OH; MEDINA COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

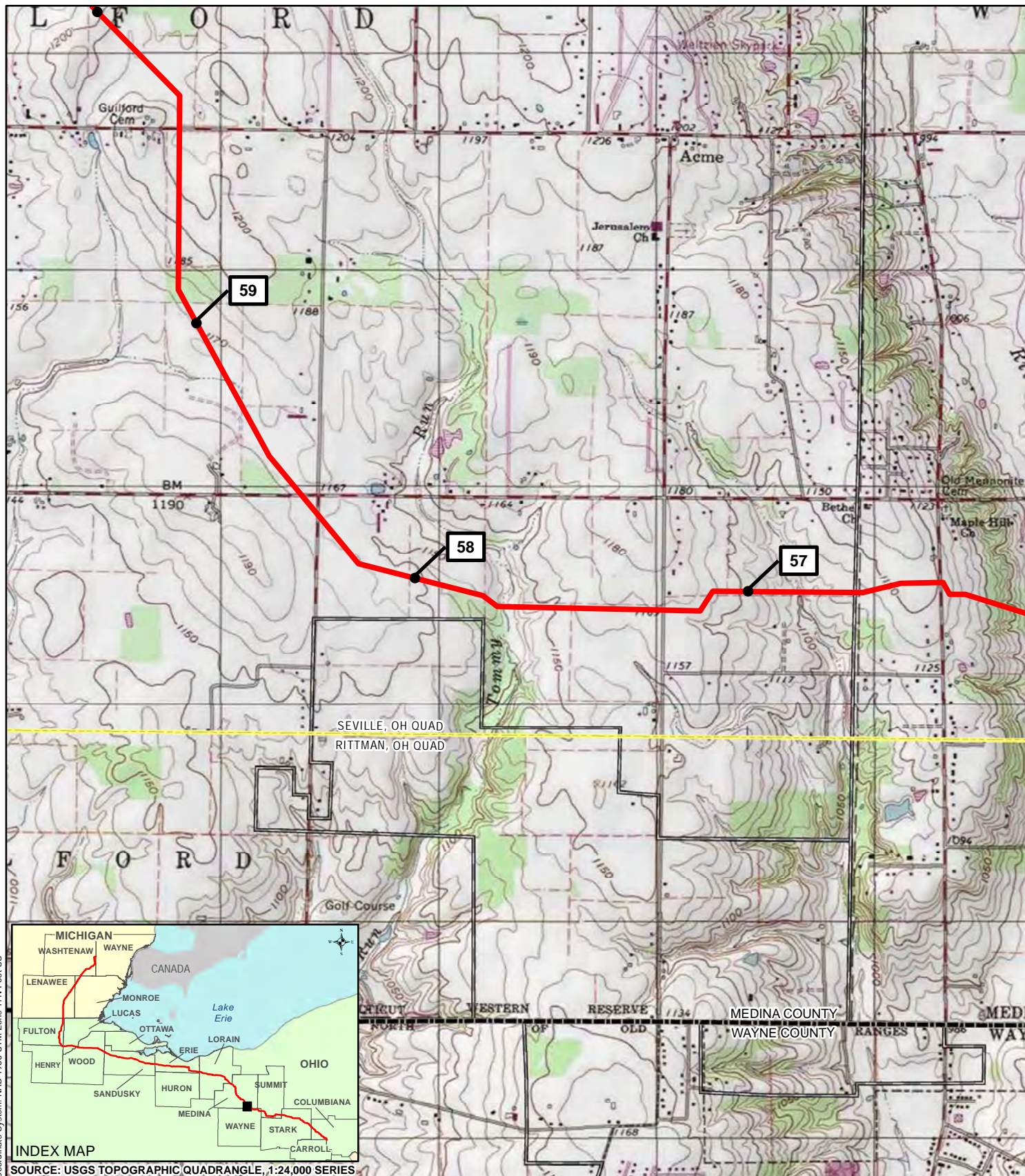
SCALE: 1" = 2,000'

FIGURE 1.1.1-19

MAP 19 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



- 1 MILEPOST
- PROPOSED MAINLINE VALVE (MLV)
- PROPOSED PIPELINE LAUNCHER
- PROPOSED PIPELINE RECEIVER
- PROPOSED MAINLINE PIPELINE
- PROPOSED INTERCONNECTING PIPELINE
- PROPOSED PERMANENT ACCESS ROAD (PAR)
- PROPOSED TEMPORARY ACCESS ROAD (TAR)
- PROPOSED METERING & REGULATION STATION (M&R)
- PROPOSED COMPRESSOR STATION SITE
- PROPOSED WARE YARD
- EXISTING FACILITY
- USGS QUADRANGLE BOUNDARY
- COUNTY BOUNDARY

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: MEDINA COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

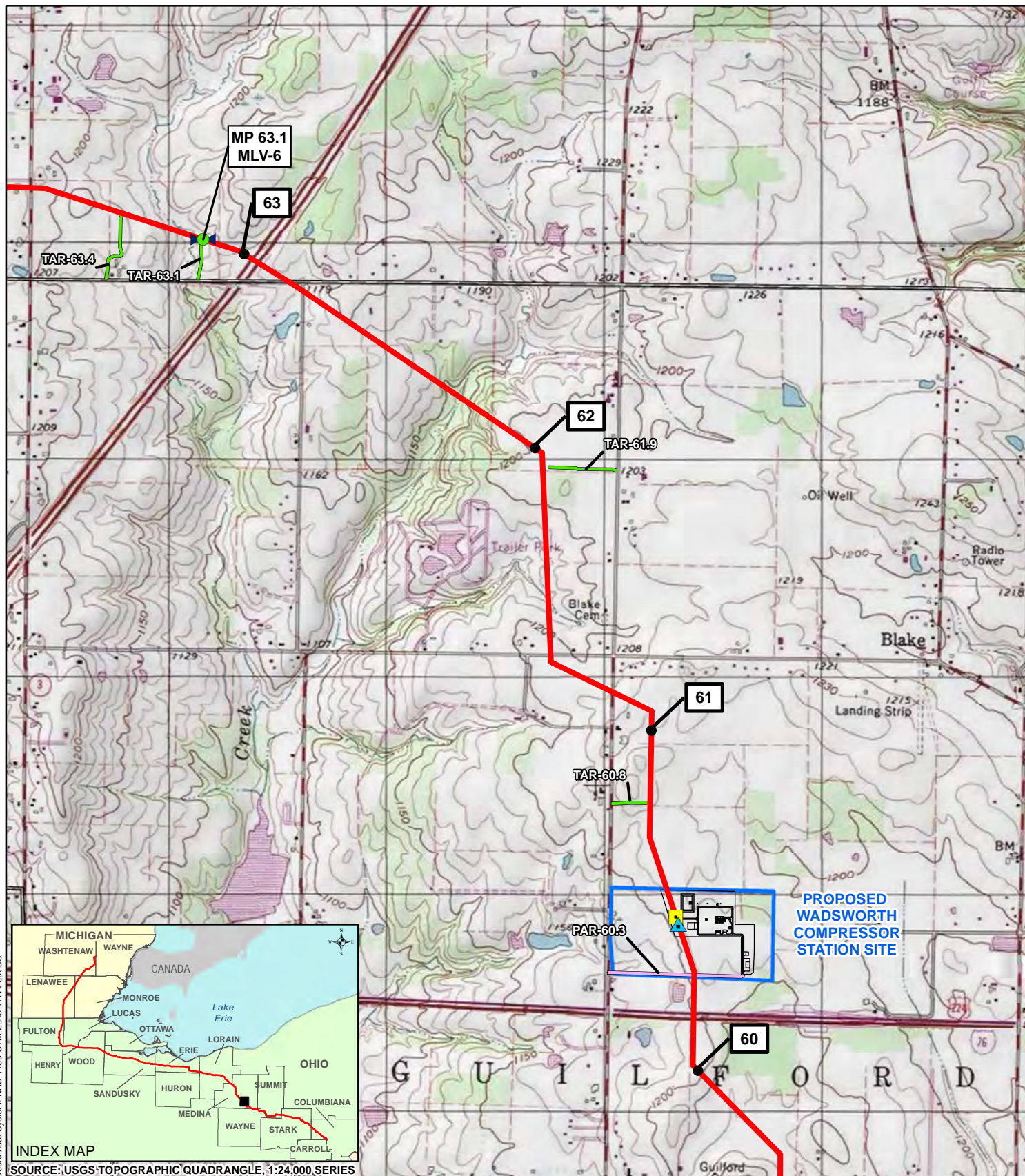
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-20

MAP 20 of 81

NEXUS
GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: MEDINA COUNTY, OH

CKD. BY: NR

ENG.:

DATE: 3/6/2015

W.O.:

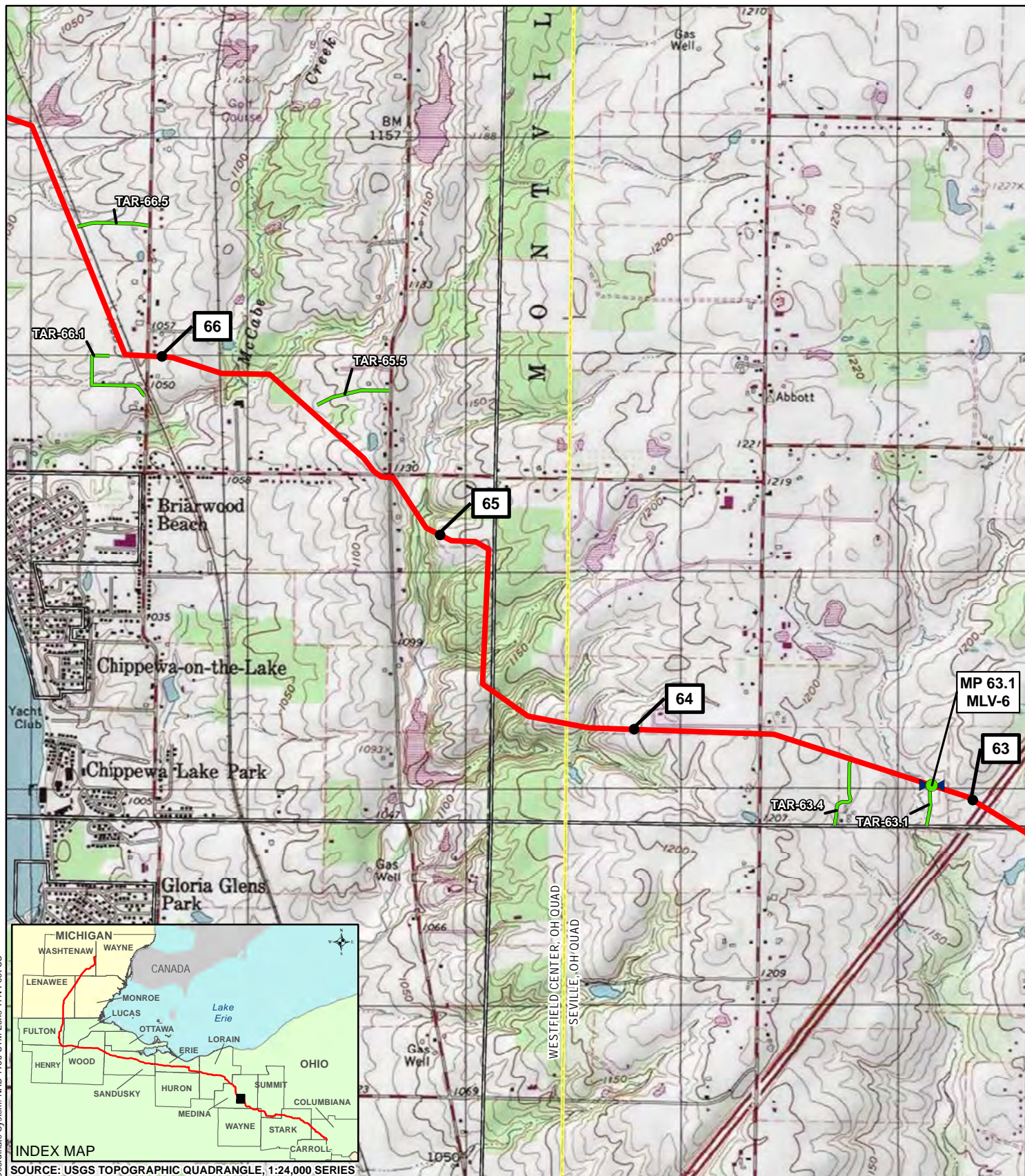
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-21

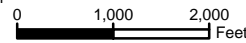
MAP 21 of 81

NEXUS
GAS TRANSMISSION



- 1 MILEPOST
- PROPOSED MAINLINE VALVE (MLV)
- PROPOSED PIPELINE LAUNCHER
- PROPOSED PIPELINE RECEIVER
- PROPOSED MAINLINE PIPELINE
- PROPOSED INTERCONNECTING PIPELINE
- PROPOSED PERMANENT ACCESS ROAD (PAR)
- PROPOSED TEMPORARY ACCESS ROAD (TAR)
- PROPOSED METERING & REGULATION STATION (M&R)

- PROPOSED COMPRESSOR STATION SITE
- PROPOSED WARE YARD
- EXISTING FACILITY
- USGS QUADRANGLE BOUNDARY
- COUNTY BOUNDARY



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: MEDINA COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

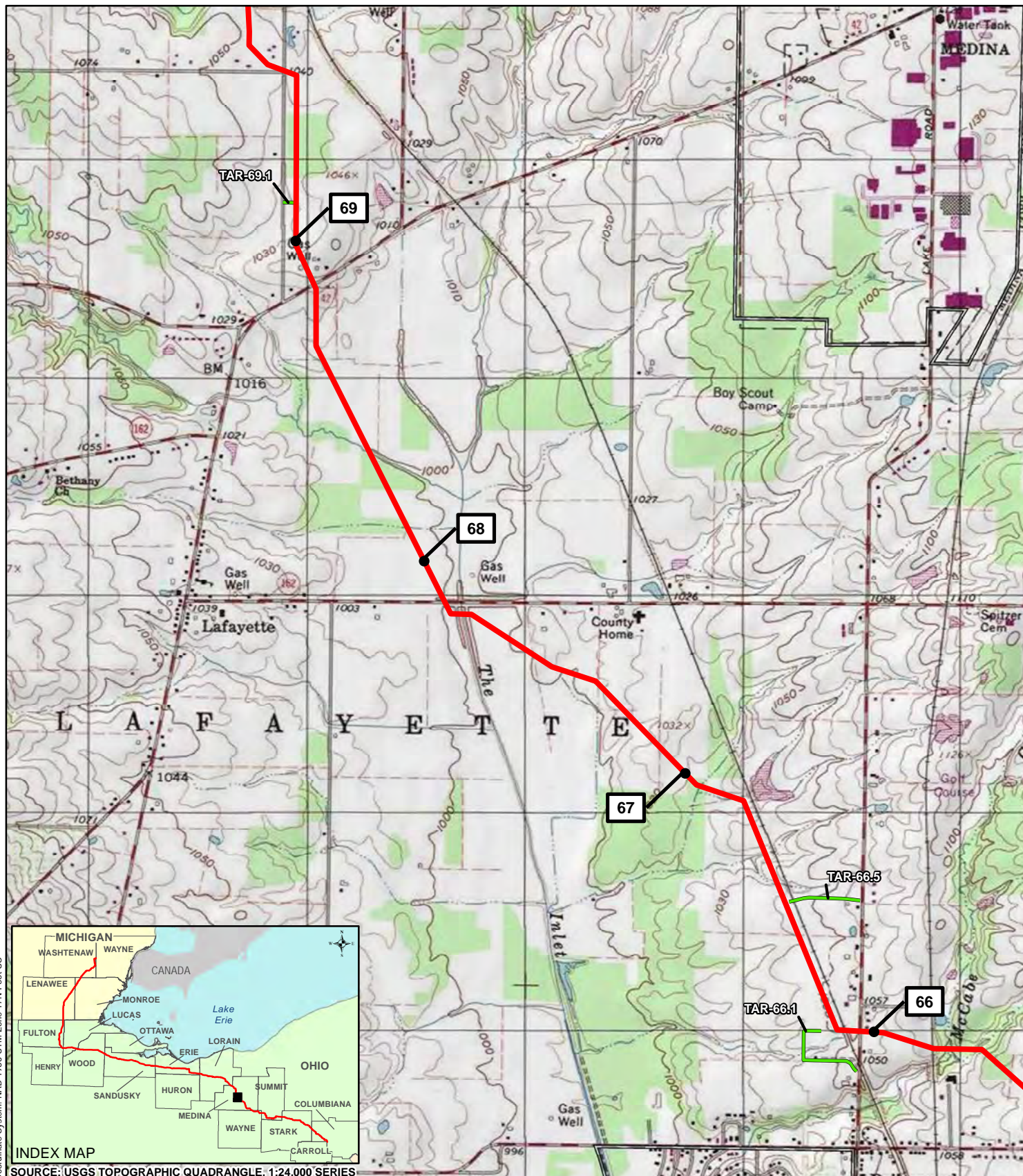
SCALE: 1" = 2,000'

FIGURE 1.1.1-22

MAP 22 of 81

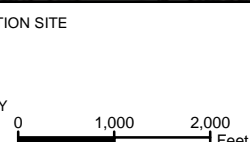


Quad map based on data as of 08 April 2015



Coordinate System: NAD 1983 UTM Zone 17N Foot US

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: MEDINA COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

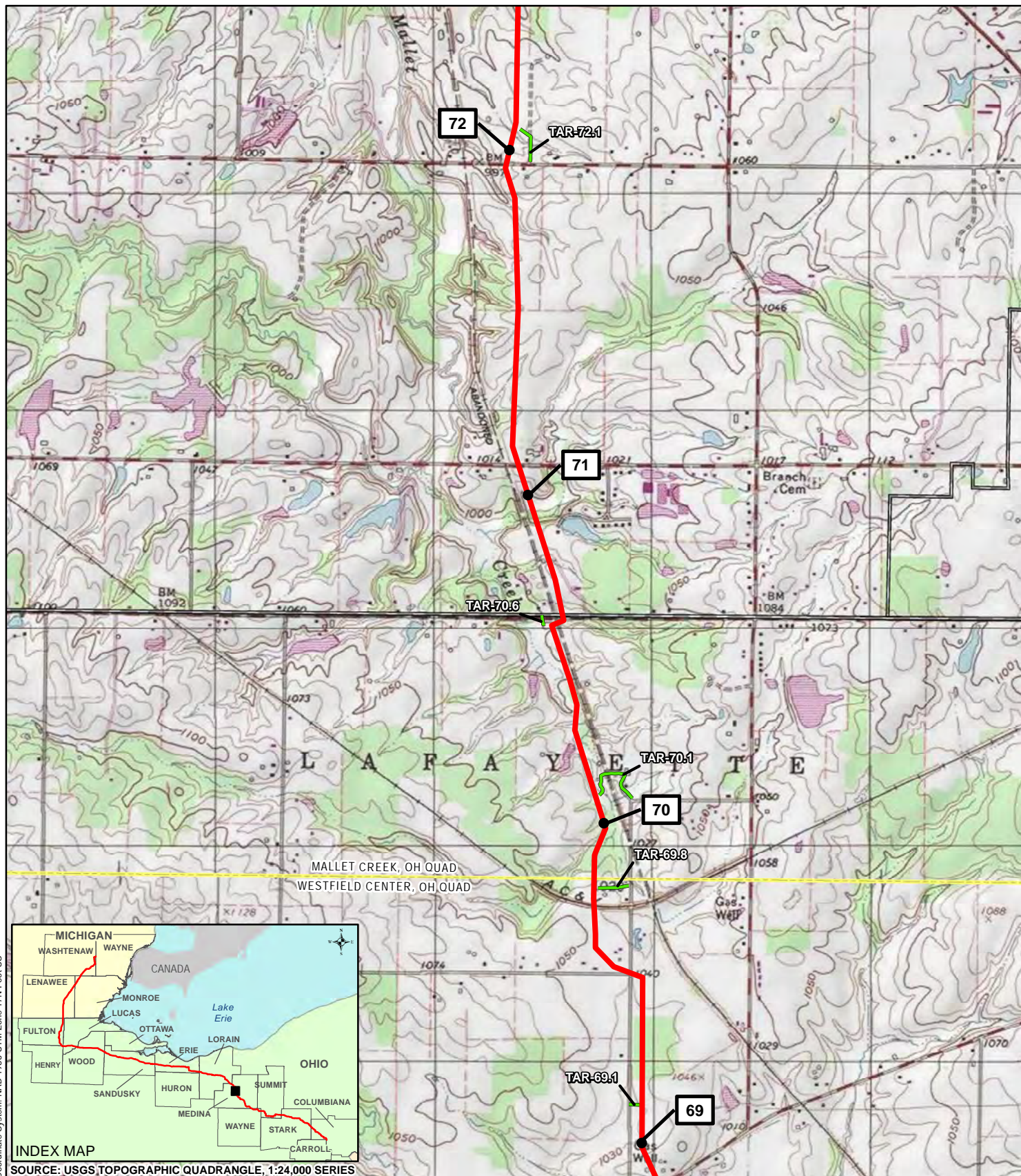
SCALE: 1" = 2,000'

FIGURE 1.1.1-23

MAP 23 of 81

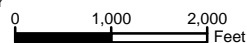
NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: MEDINA COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

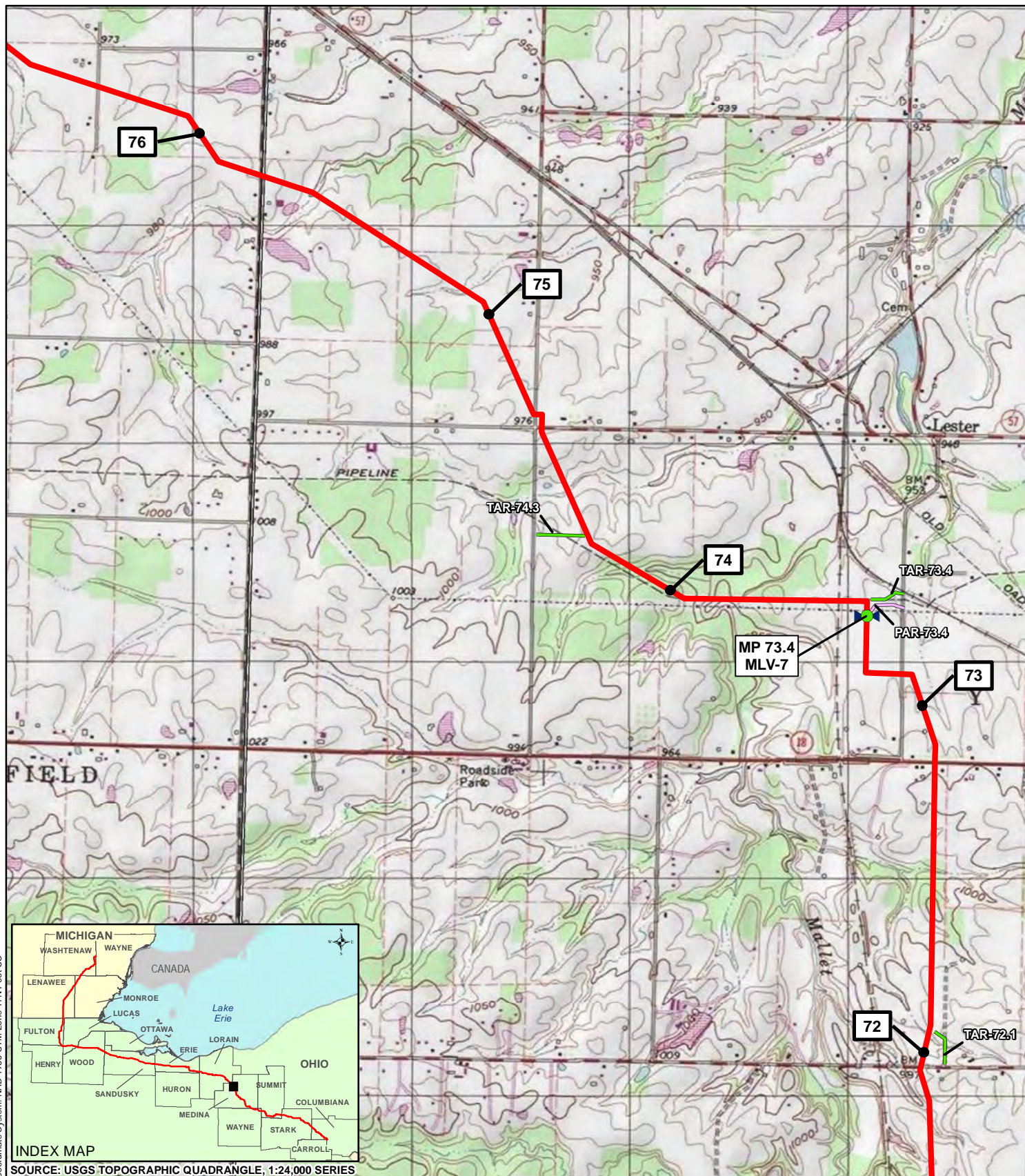
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-24

MAP 24 of 81

NEXUS
GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

1 MILEPOST	PROPOSED MAINLINE PIPELINE	PROPOSED COMPRESSOR STATION SITE
PROPOSED MAINLINE VALVE (MLV)	PROPOSED INTERCONNECTING PIPELINE	PROPOSED WARE YARD
PROPOSED PIPELINE LAUNCHER	PROPOSED PERMANENT ACCESS ROAD (PAR)	EXISTING FACILITY
PROPOSED PIPELINE RECEIVER	PROPOSED TEMPORARY ACCESS ROAD (TAR)	USGS QUADRANGLE BOUNDARY
	PROPOSED METERING & REGULATION STATION (M&R)	COUNTY BOUNDARY



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: MEDINA COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

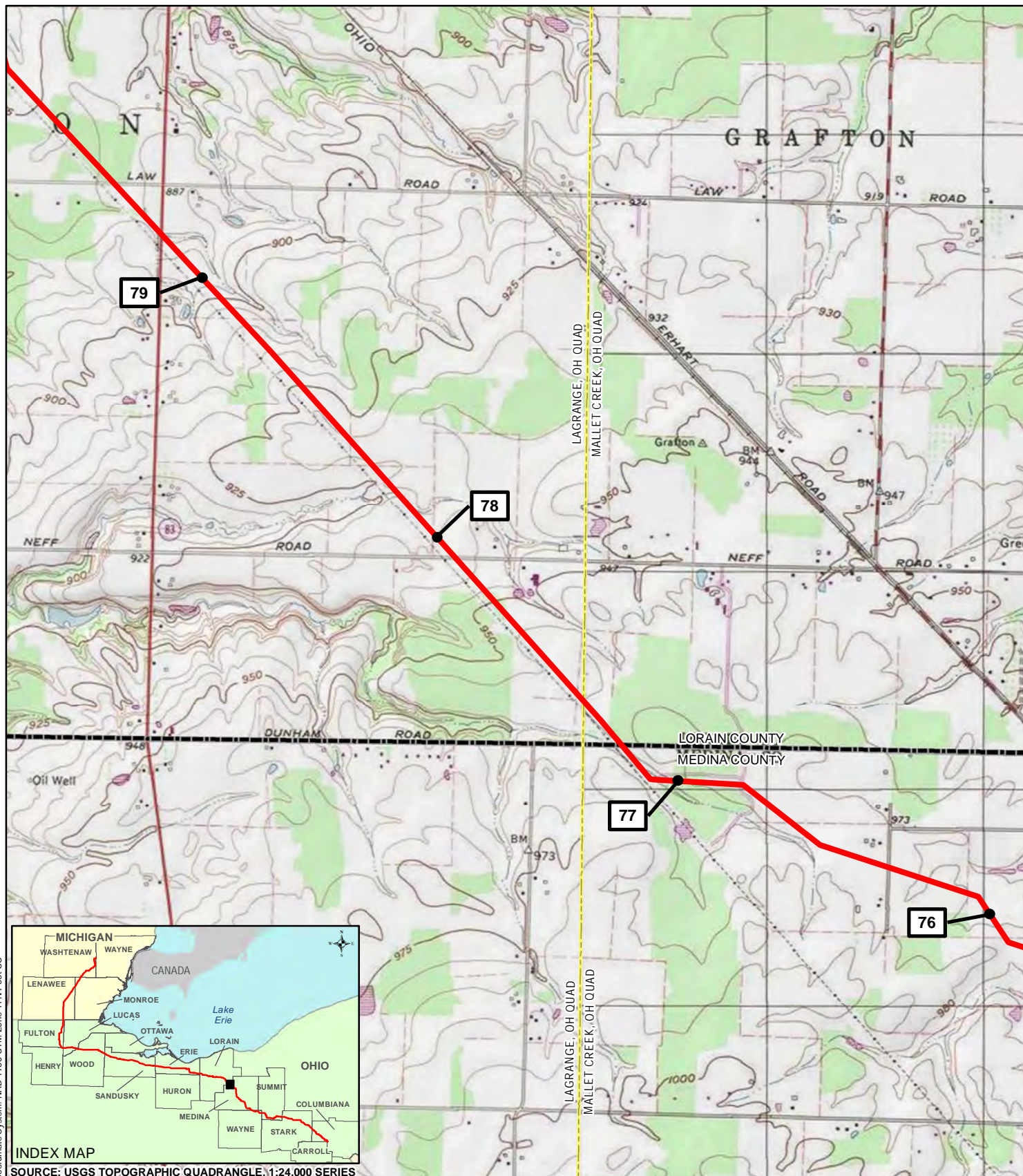
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-25

MAP 25 of 81





Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: MEDINA COUNTY, OH; LORAIN COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

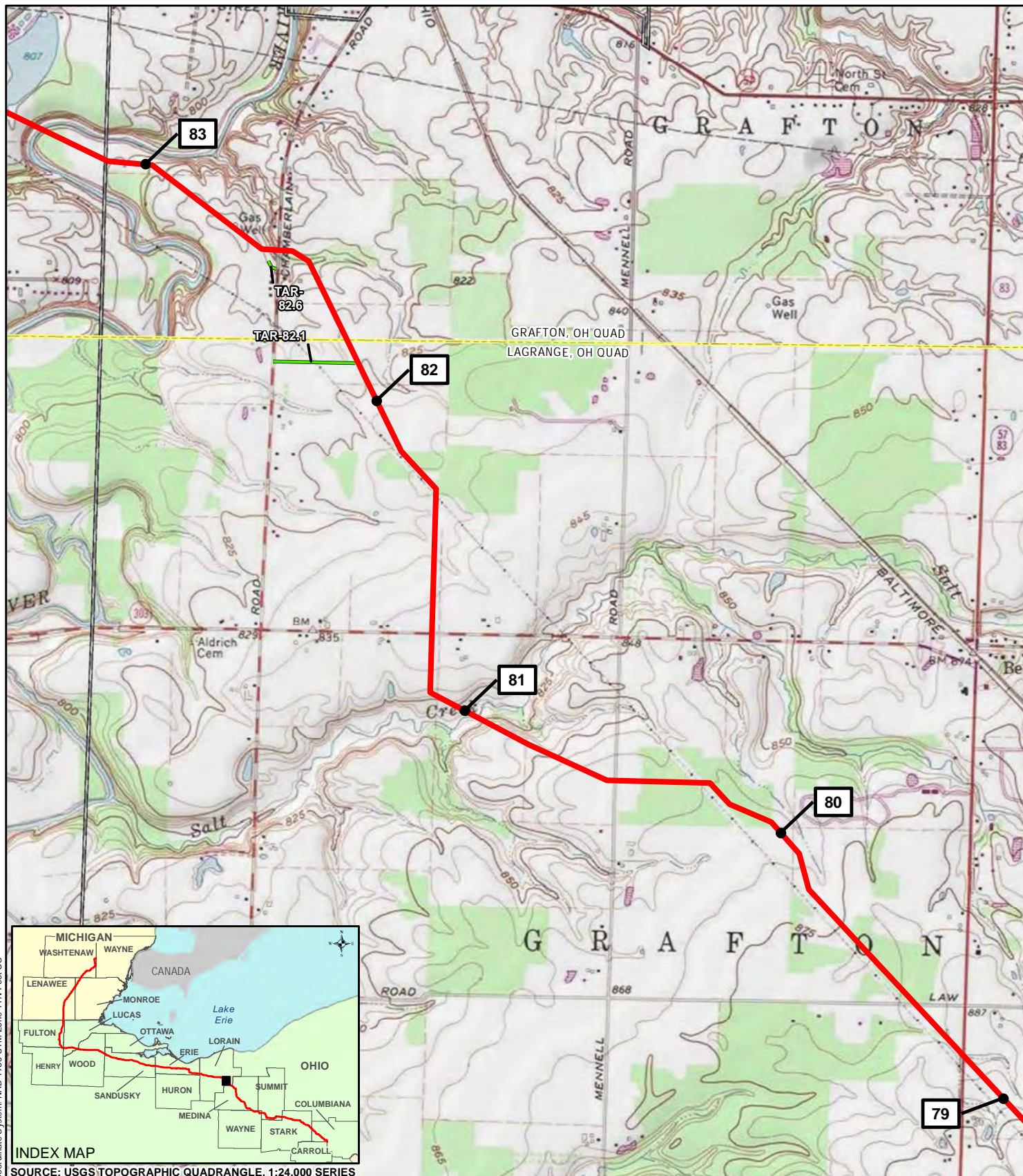
SCALE: 1" = 2,000'

FIGURE 1.1.1-26

MAP 26 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



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|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LORAIN COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

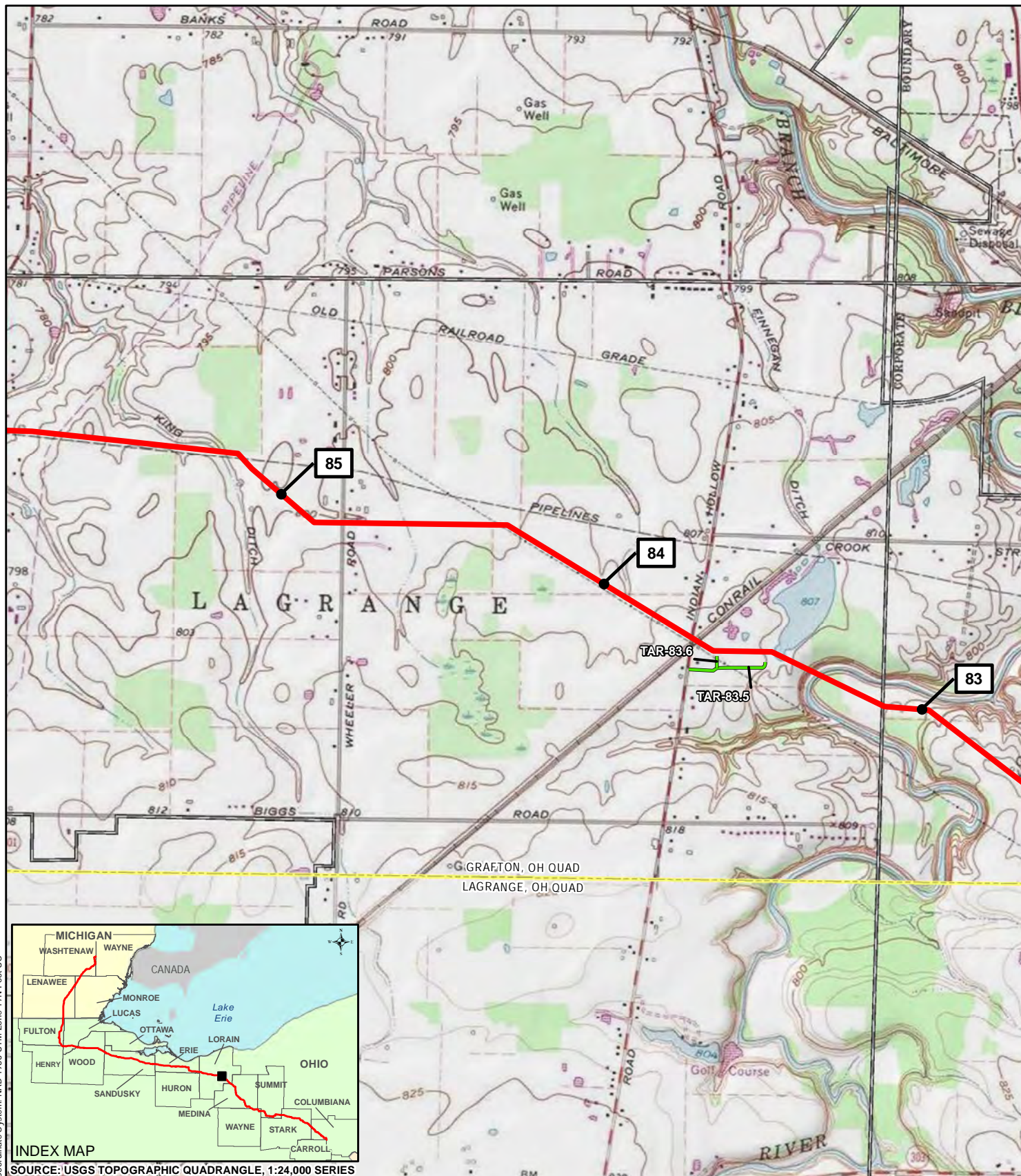
SCALE: 1" = 2,000'

FIGURE 1.1.1-27

MAP 27 of 81

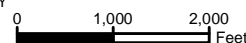
NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

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|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LORAIN COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

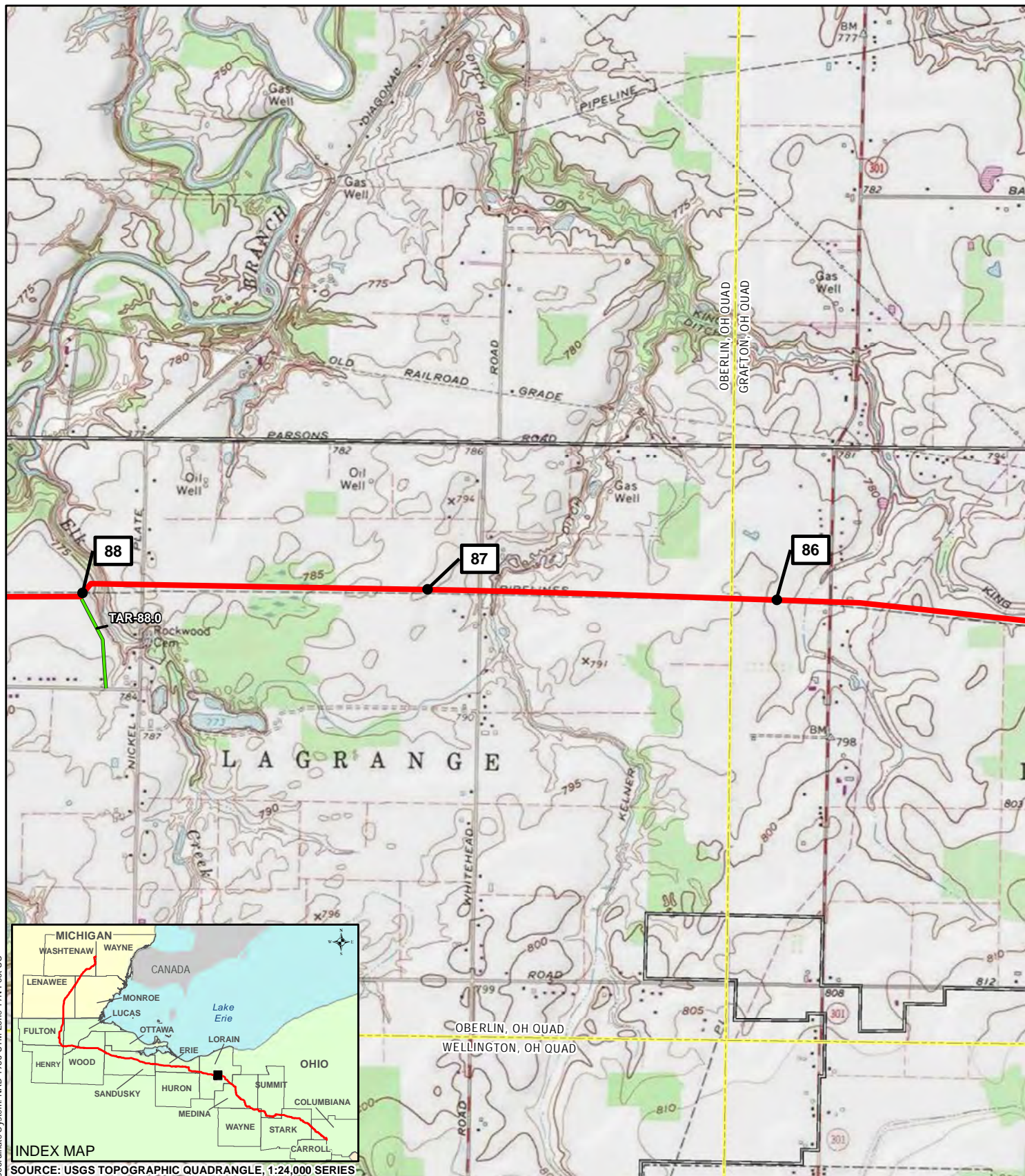
SCALE: 1" = 2,000'

FIGURE 1.1.1-28

MAP 28 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015

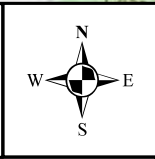


Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

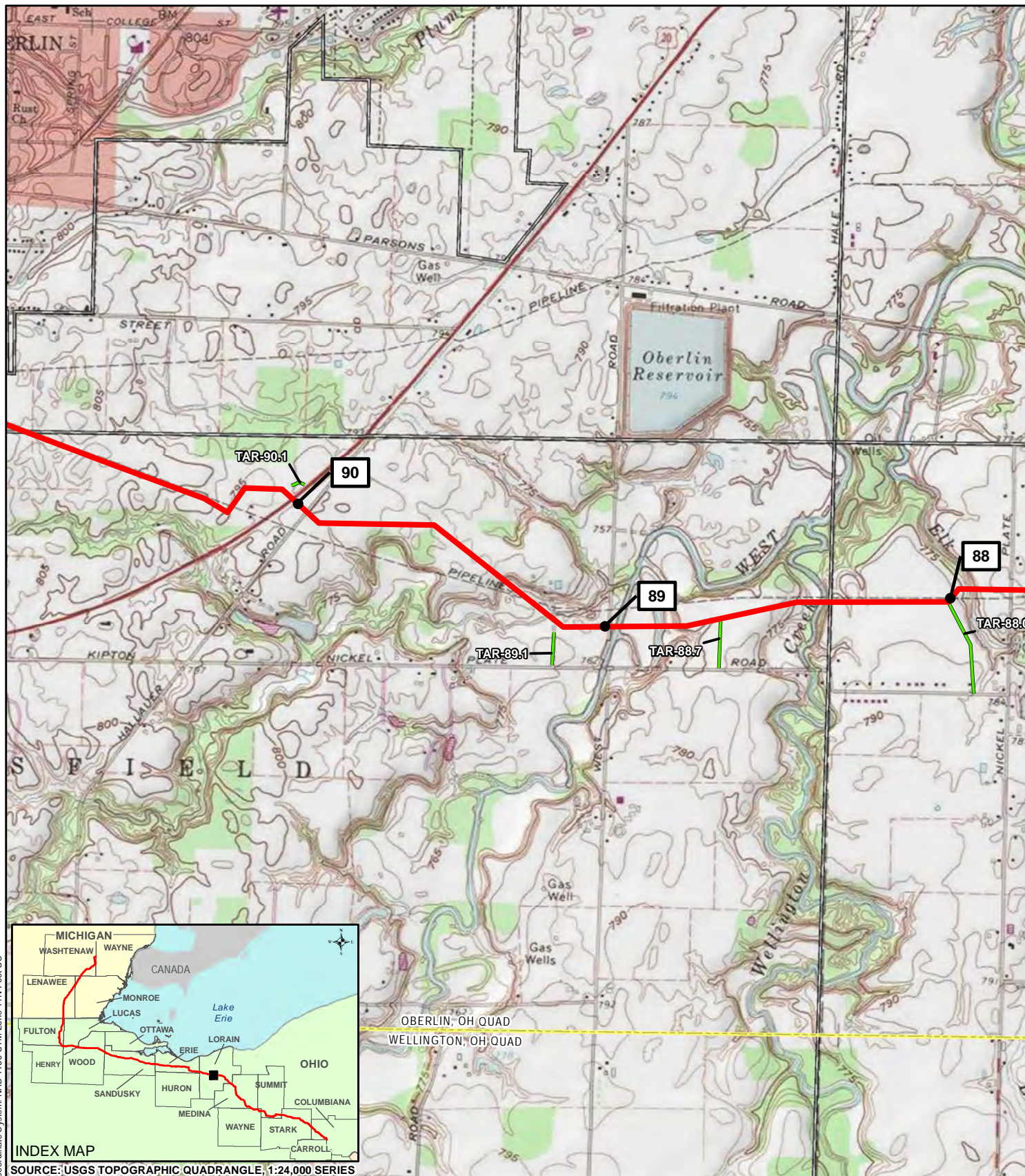


TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LORAIN COUNTY, OH

CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-29	MAP 29 of 81





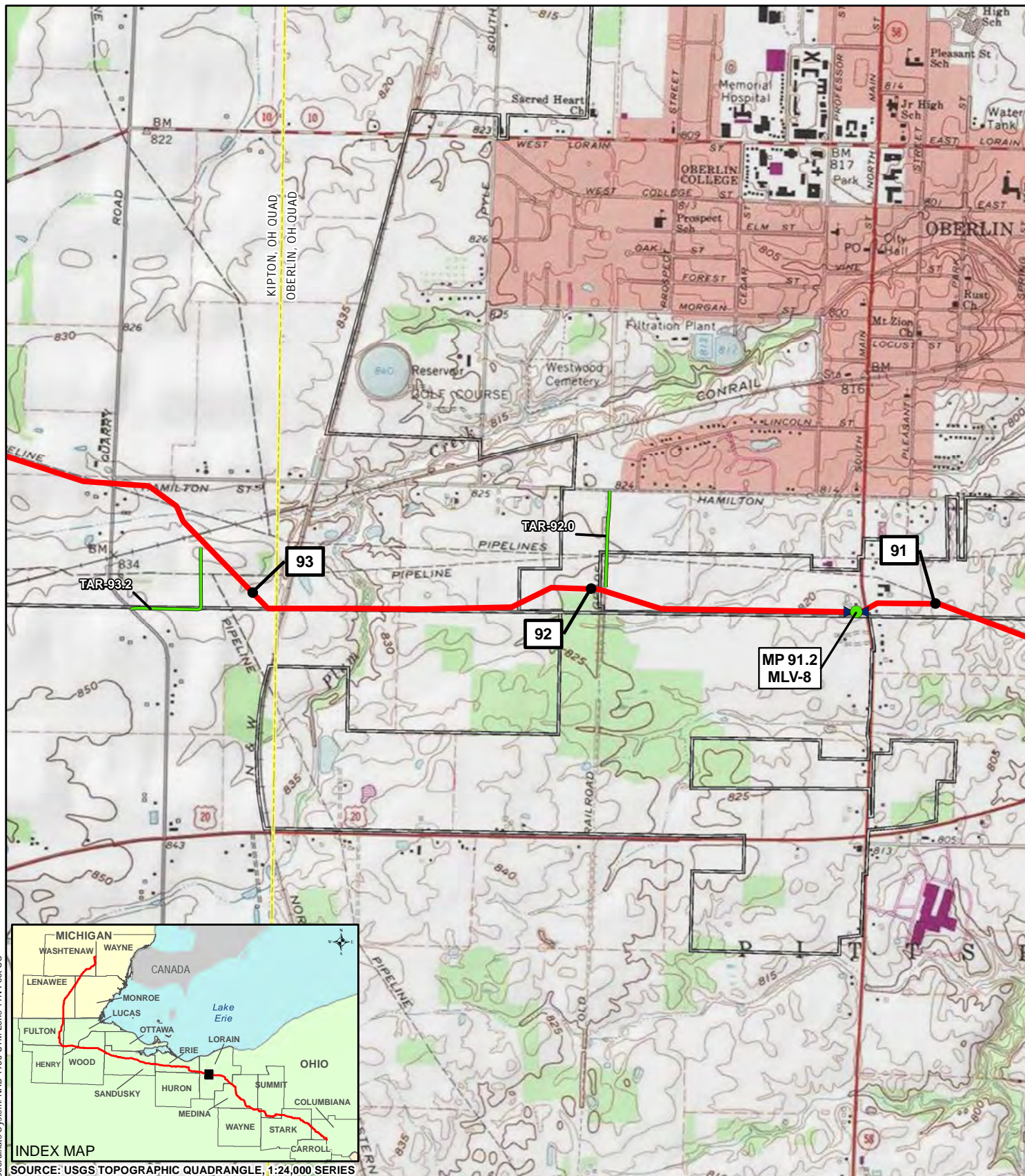
SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

1 MILEPOST	PROPOSED MAINLINE PIPELINE	PROPOSED COMPRESSOR STATION SITE
PROPOSED MAINLINE VALVE (MLV)	PROPOSED INTERCONNECTING PIPELINE	PROPOSED WARE YARD
PROPOSED PIPELINE LAUNCHER	PROPOSED PERMANENT ACCESS ROAD (PAR)	EXISTING FACILITY
PROPOSED PIPELINE RECEIVER	PROPOSED TEMPORARY ACCESS ROAD (TAR)	USGS QUADRANGLE BOUNDARY
	PROPOSED METERING & REGULATION STATION (M&R)	COUNTY BOUNDARY

TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LORAIN COUNTY, OH

CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-30	MAP 30 of 81



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|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LORAIN COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

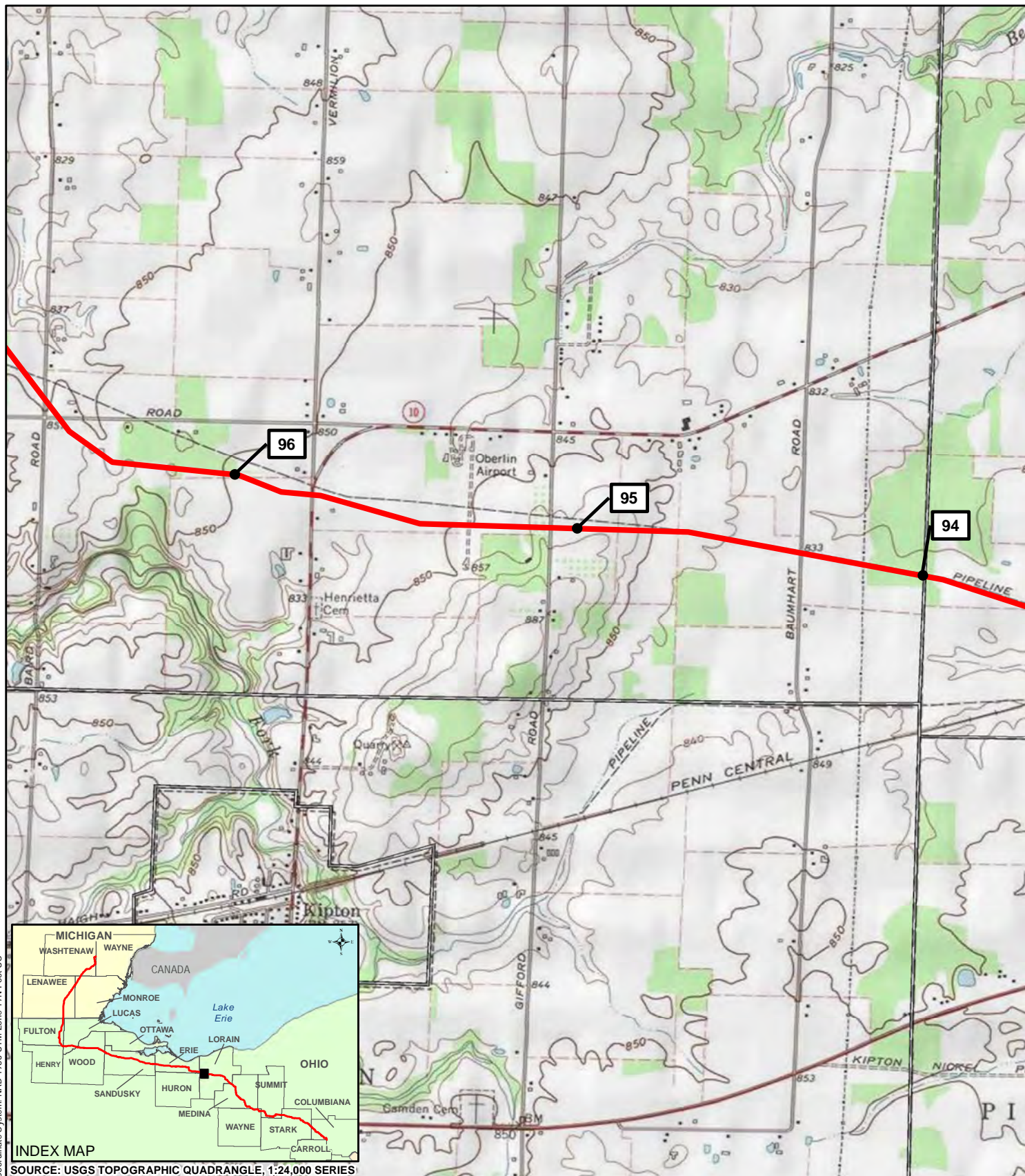
SCALE: 1" = 2,000'

FIGURE 1.1.1-31

MAP 31 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



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|--|--------------------------------------|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY | |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LORAIN COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

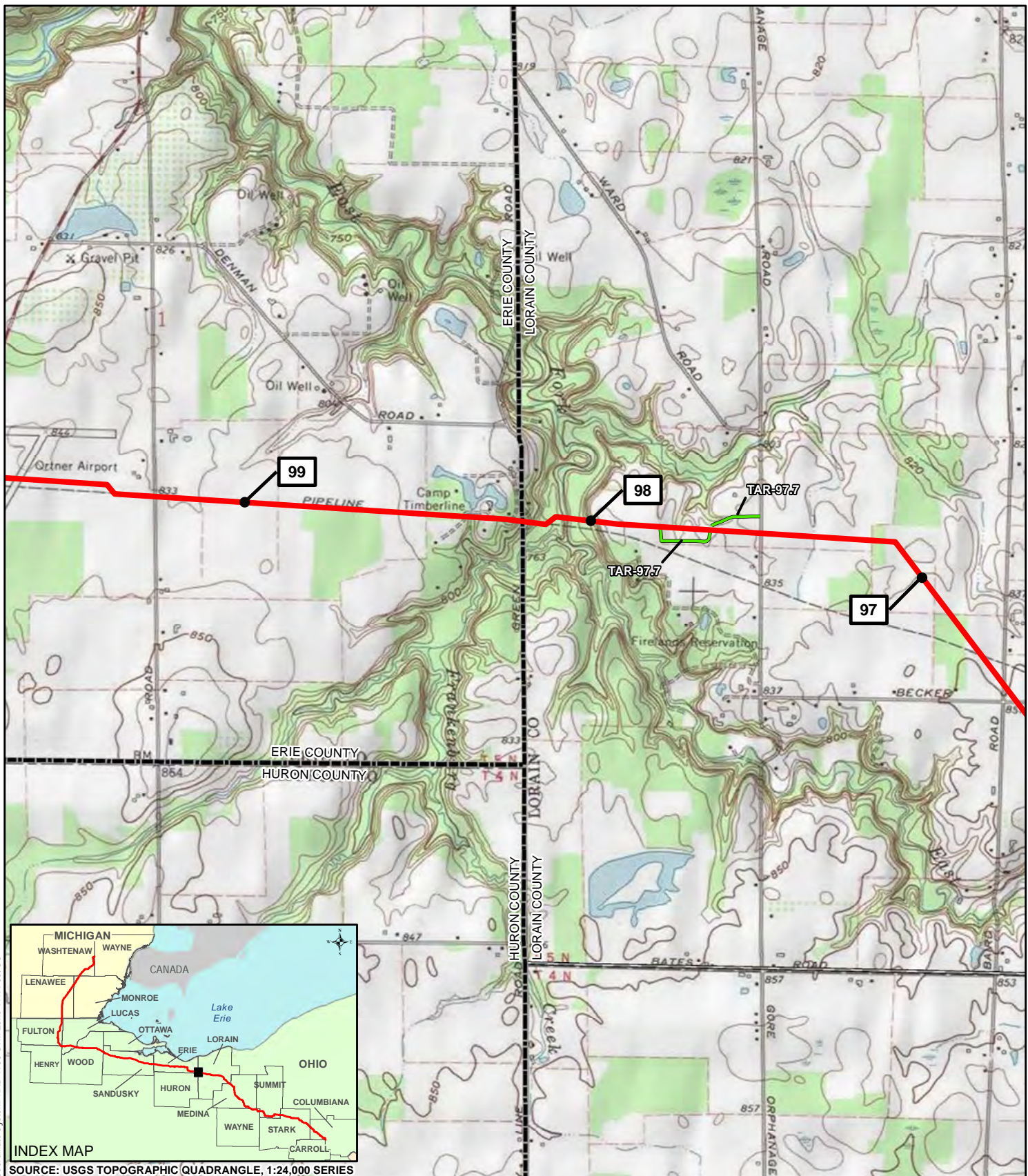
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-32

MAP 32 of 81

NEXUS
GAS TRANSMISSION



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LORAIN COUNTY, OH; ERIE COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-33

MAP 33 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

1 MILEPOST	PROPOSED MAINLINE PIPELINE	PROPOSED COMPRESSOR STATION SITE
PROPOSED MAINLINE VALVE (MLV)	PROPOSED INTERCONNECTING PIPELINE	PROPOSED WARE YARD
PROPOSED PIPELINE LAUNCHER	PROPOSED PERMANENT ACCESS ROAD (PAR)	EXISTING FACILITY
PROPOSED PIPELINE RECEIVER	PROPOSED TEMPORARY ACCESS ROAD (TAR)	USGS QUADRANGLE BOUNDARY
	PROPOSED METERING & REGULATION STATION (M&R)	COUNTY BOUNDARY

TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

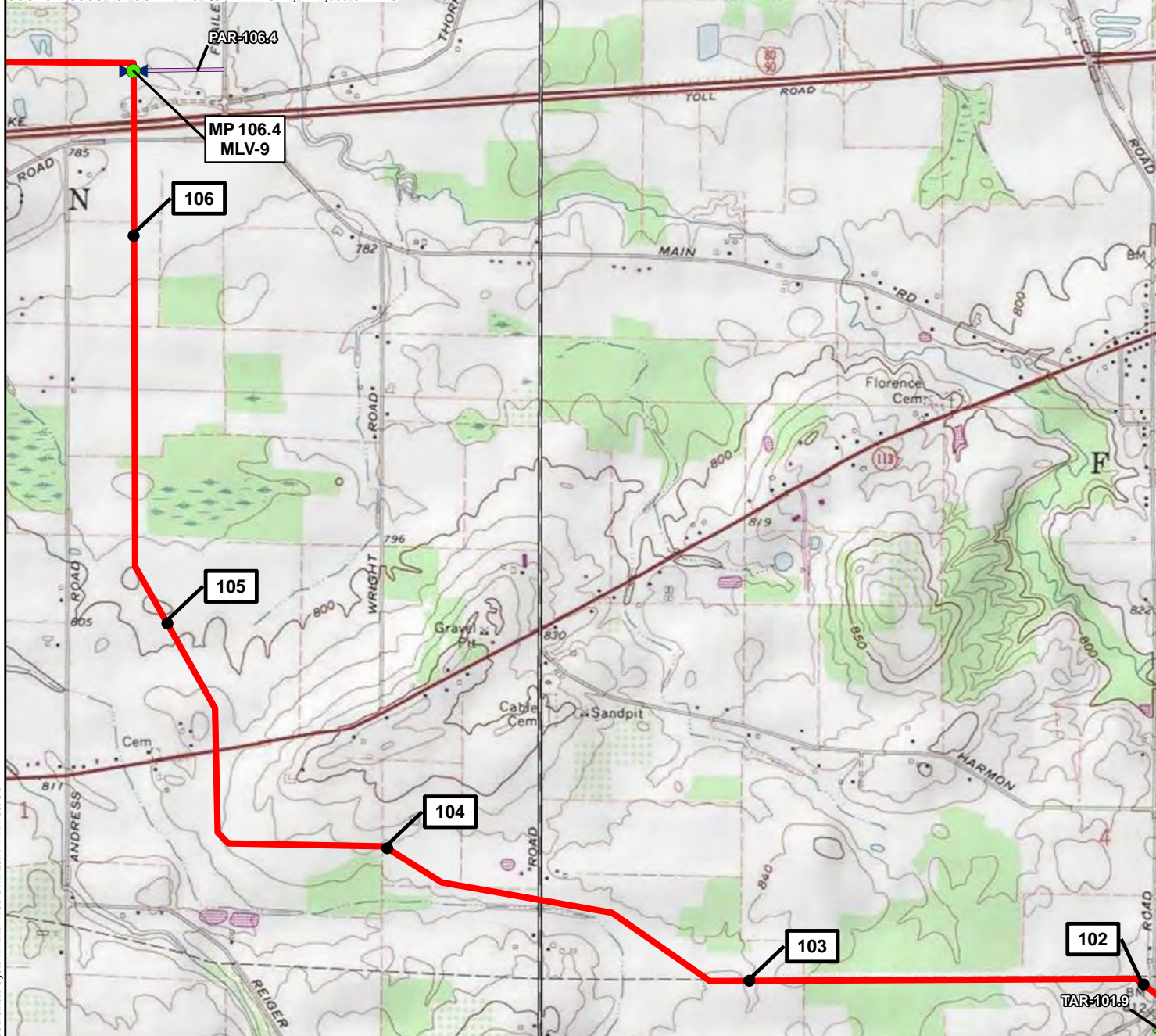
LOC.: ERIE COUNTY, OH

CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-34	MAP 34 of 81

Quad map based on data as of 08 April 2015

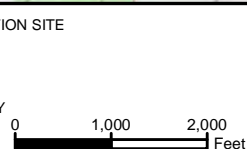


SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES



Coordinate System: NAD 1983 UTM Zone 17N Foot US

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: ERIE COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

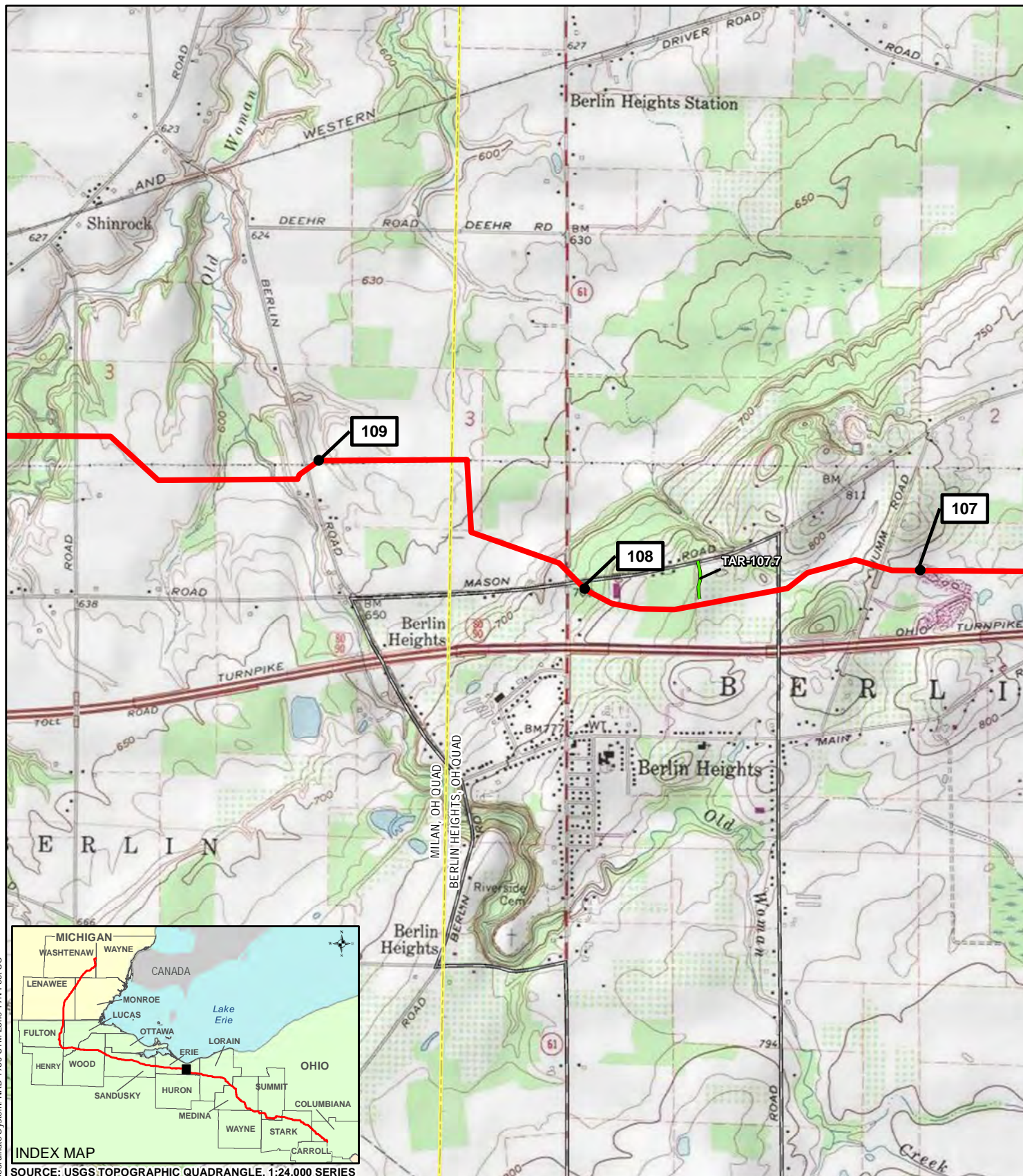
SCALE: 1" = 2,000'

FIGURE 1.1.1-35

MAP 35 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: ERIE COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

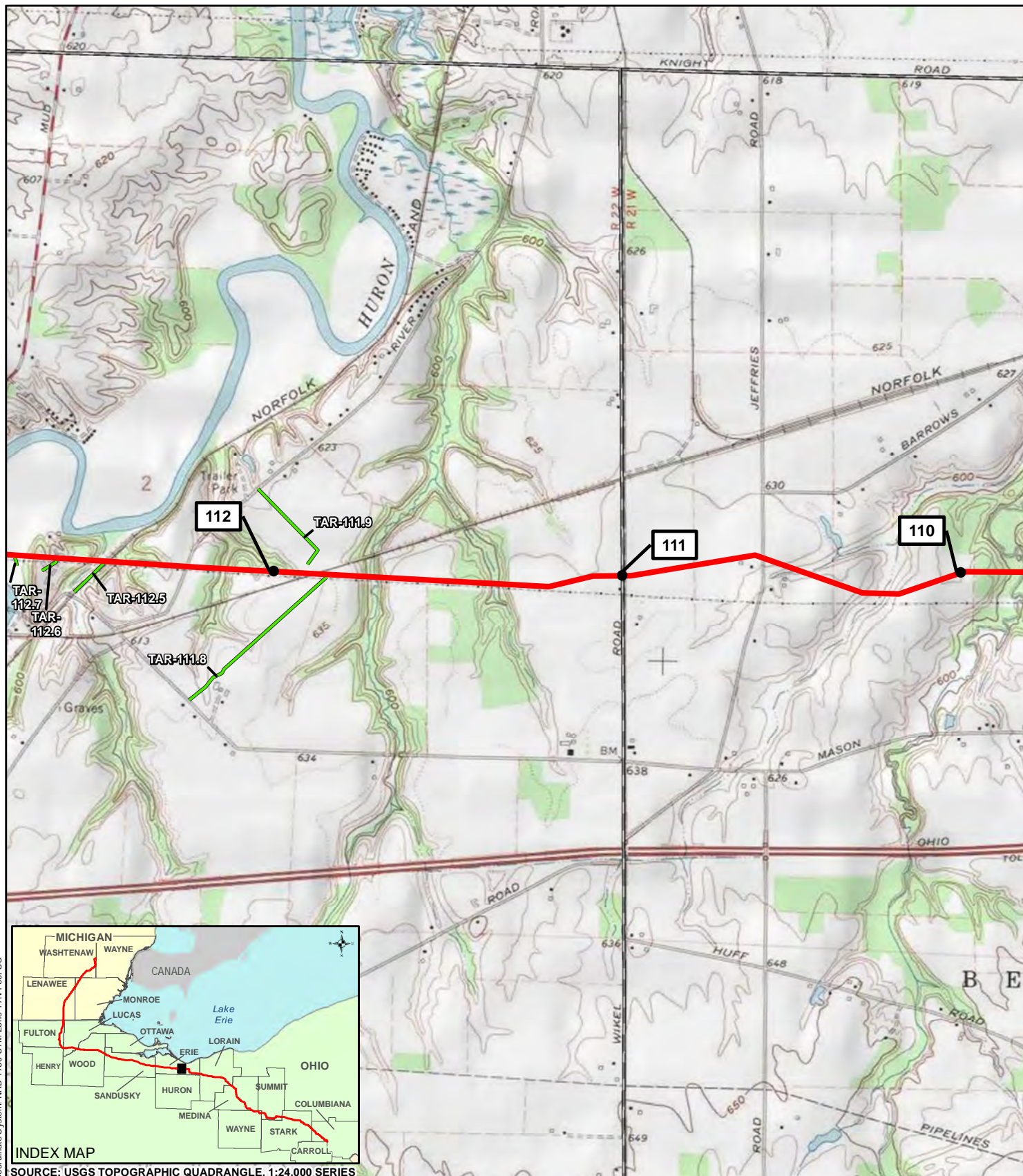
SCALE: 1" = 2,000'

FIGURE 1.1.1-36

MAP 36 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



Coordinate System: NAD 1983 UTM Zone 17N Foot US



INDEX MAP

SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: ERIE COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

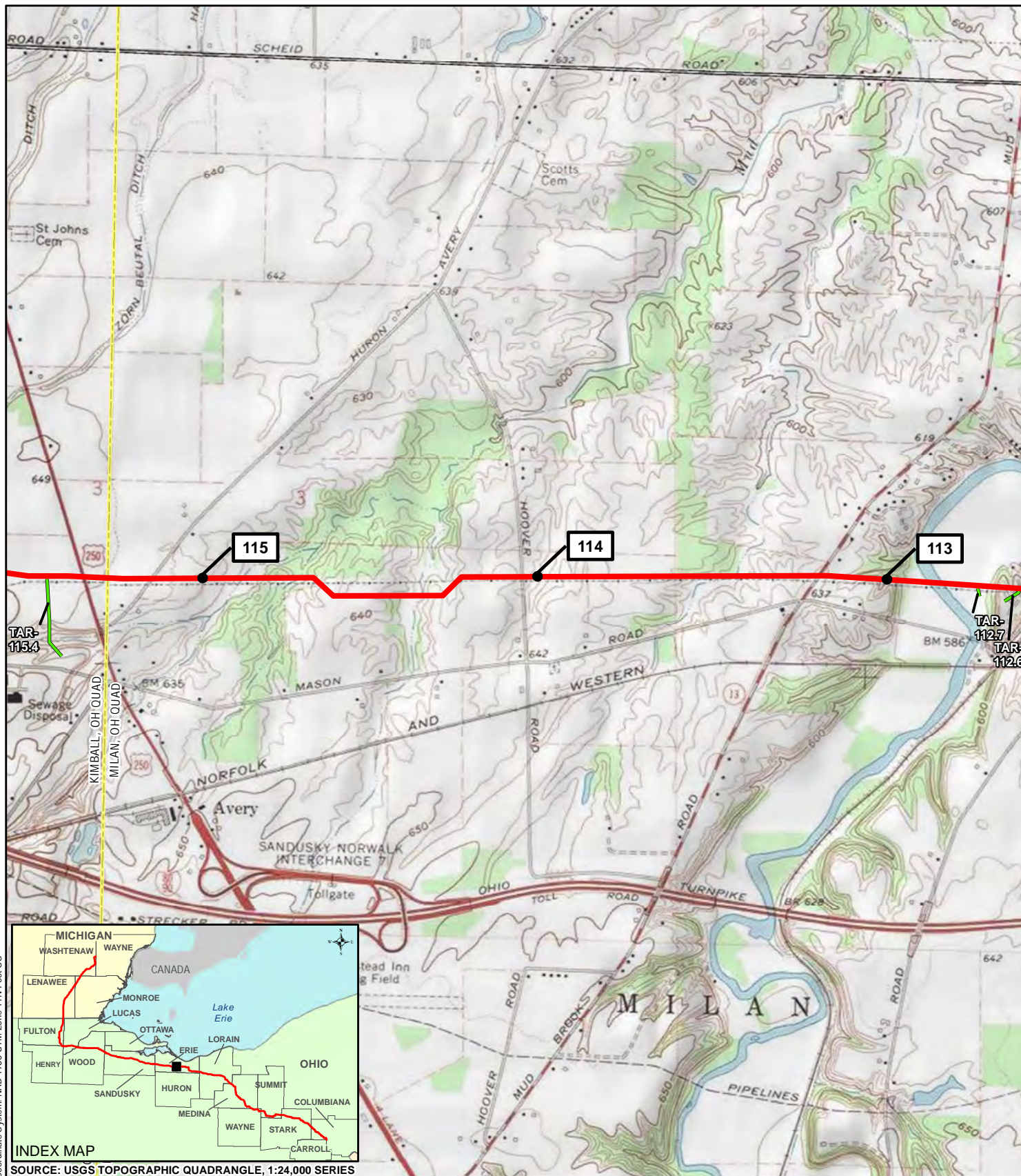
SCALE: 1" = 2,000'

FIGURE 1.1.1-37

MAP 37 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: ERIE COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

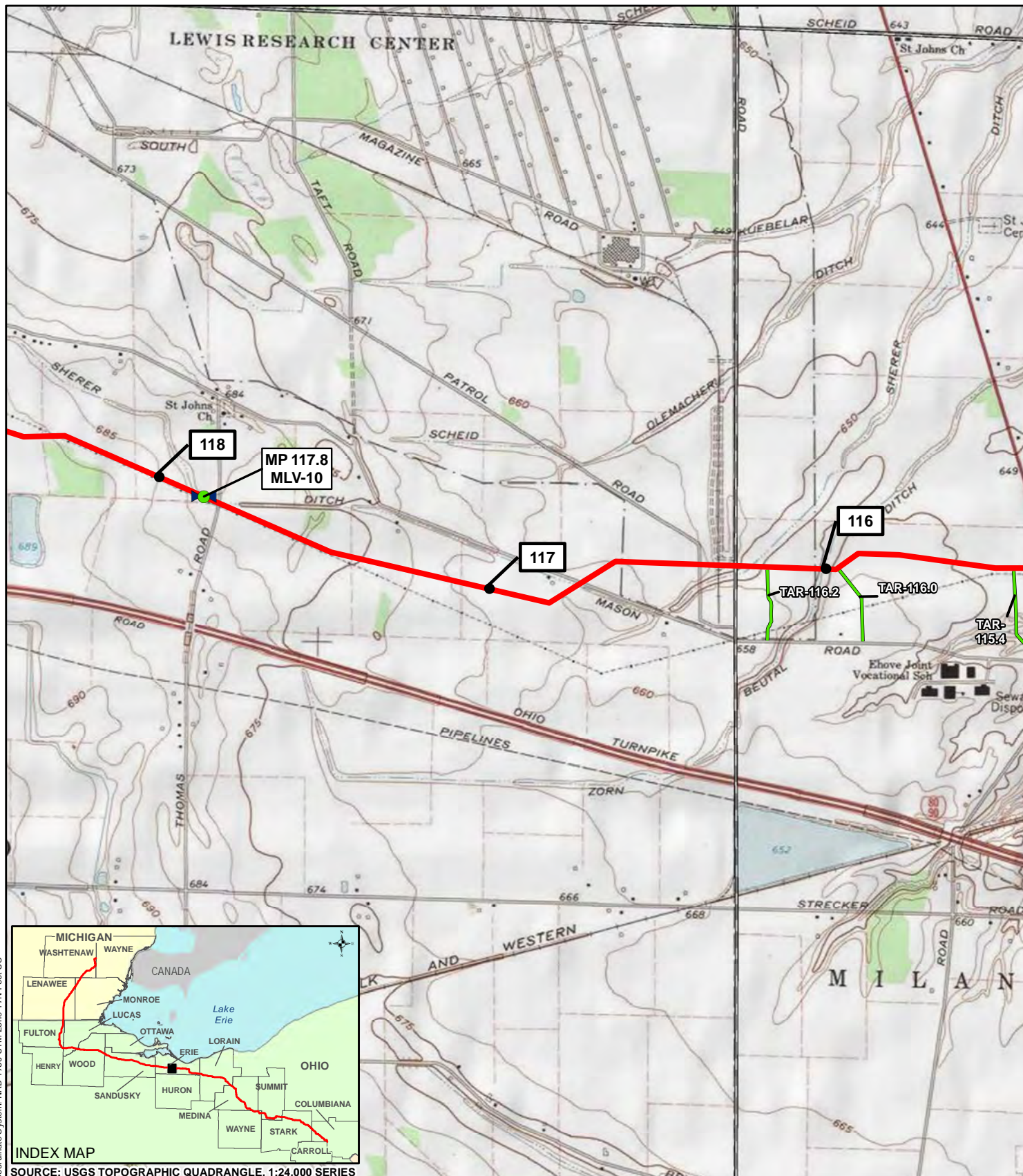
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-38

MAP 38 of 81

NEXUS
GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: ERIE COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

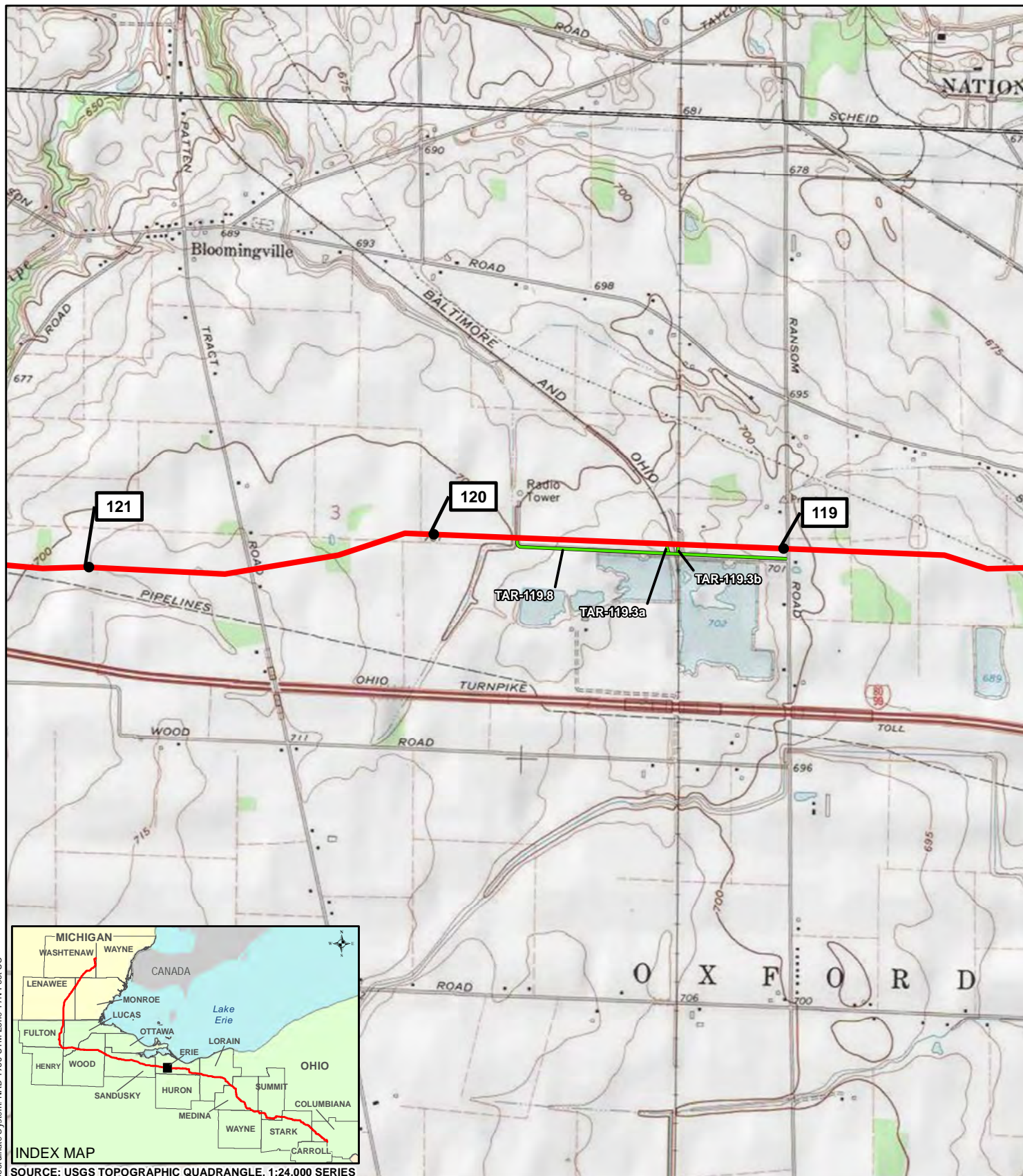
SCALE: 1" = 2,000'

FIGURE 1.1.1-39

MAP 39 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: ERIE COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

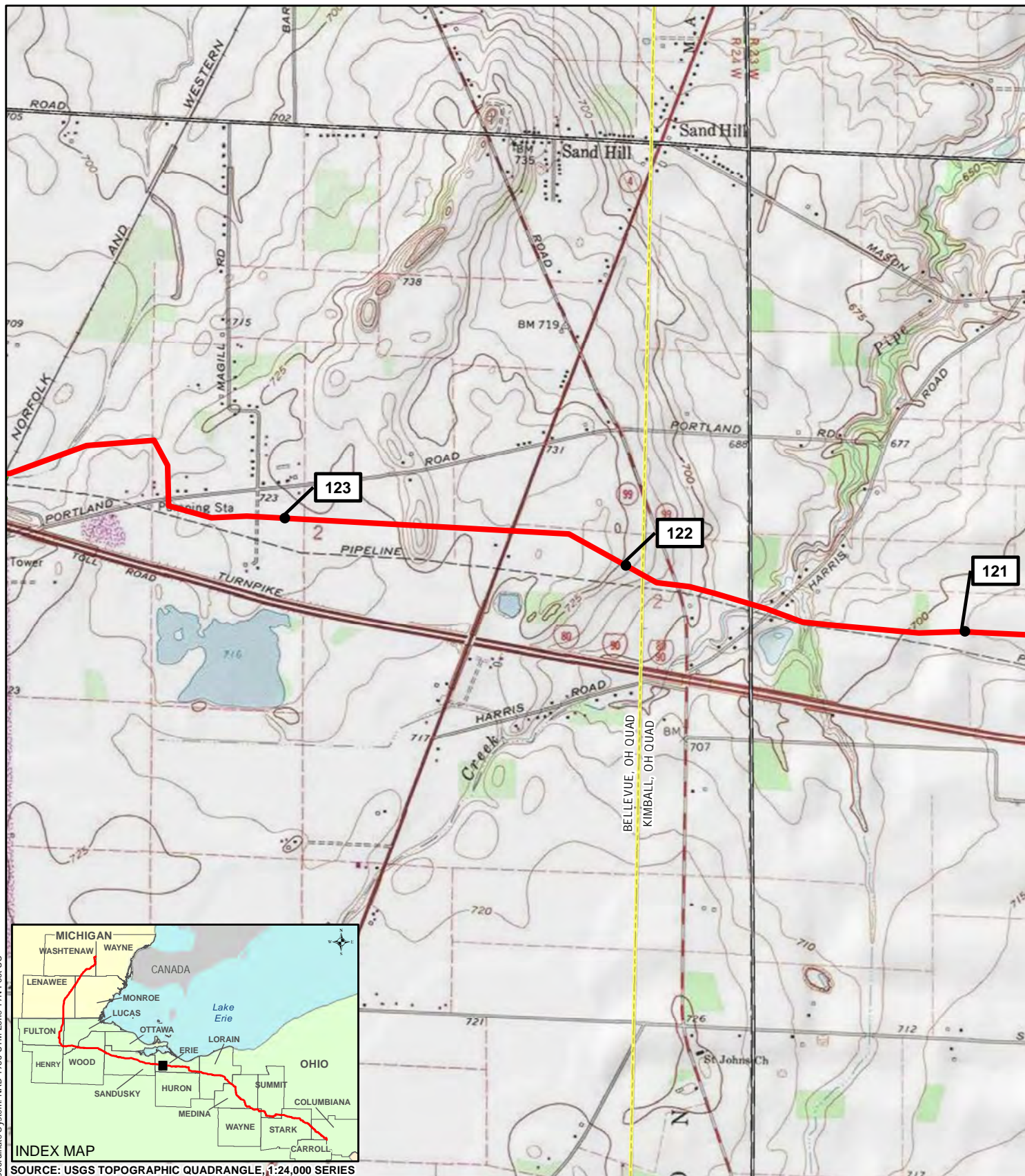
SCALE: 1" = 2,000'

FIGURE 1.1.1-40

MAP 40 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015

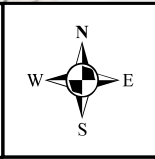


Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

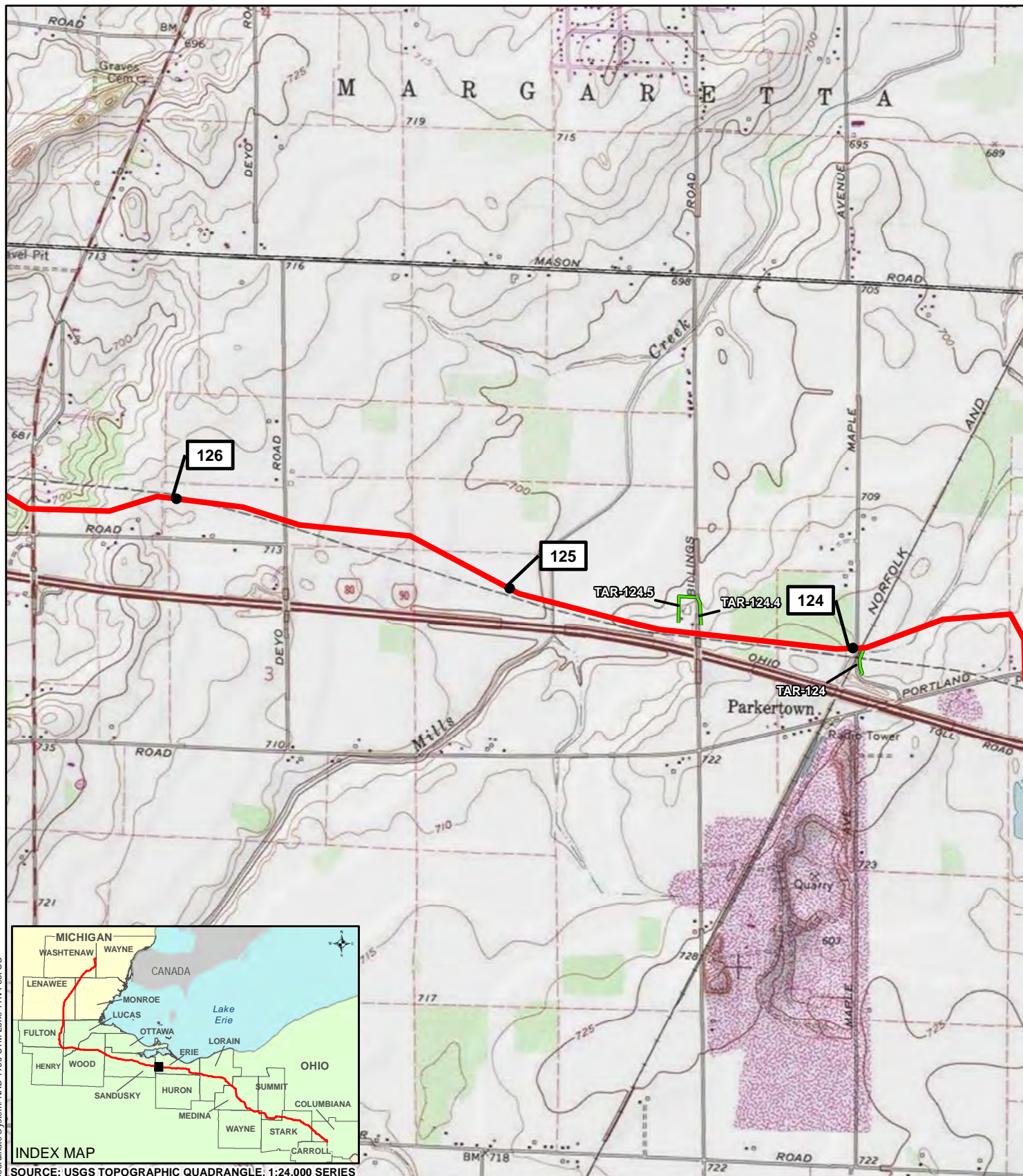
1 MILEPOST	PROPOSED MAINLINE PIPELINE	PROPOSED COMPRESSOR STATION SITE
PROPOSED MAINLINE VALVE (MLV)	PROPOSED INTERCONNECTING PIPELINE	PROPOSED WARE YARD
PROPOSED PIPELINE LAUNCHER	PROPOSED PERMANENT ACCESS ROAD (PAR)	EXISTING FACILITY
PROPOSED PIPELINE RECEIVER	PROPOSED TEMPORARY ACCESS ROAD (TAR)	USGS QUADRANGLE BOUNDARY
	PROPOSED METERING & REGULATION STATION (M&R)	COUNTY BOUNDARY



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: ERIE COUNTY, OH			
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-41	MAP 41 of 81





SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: ERIE COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

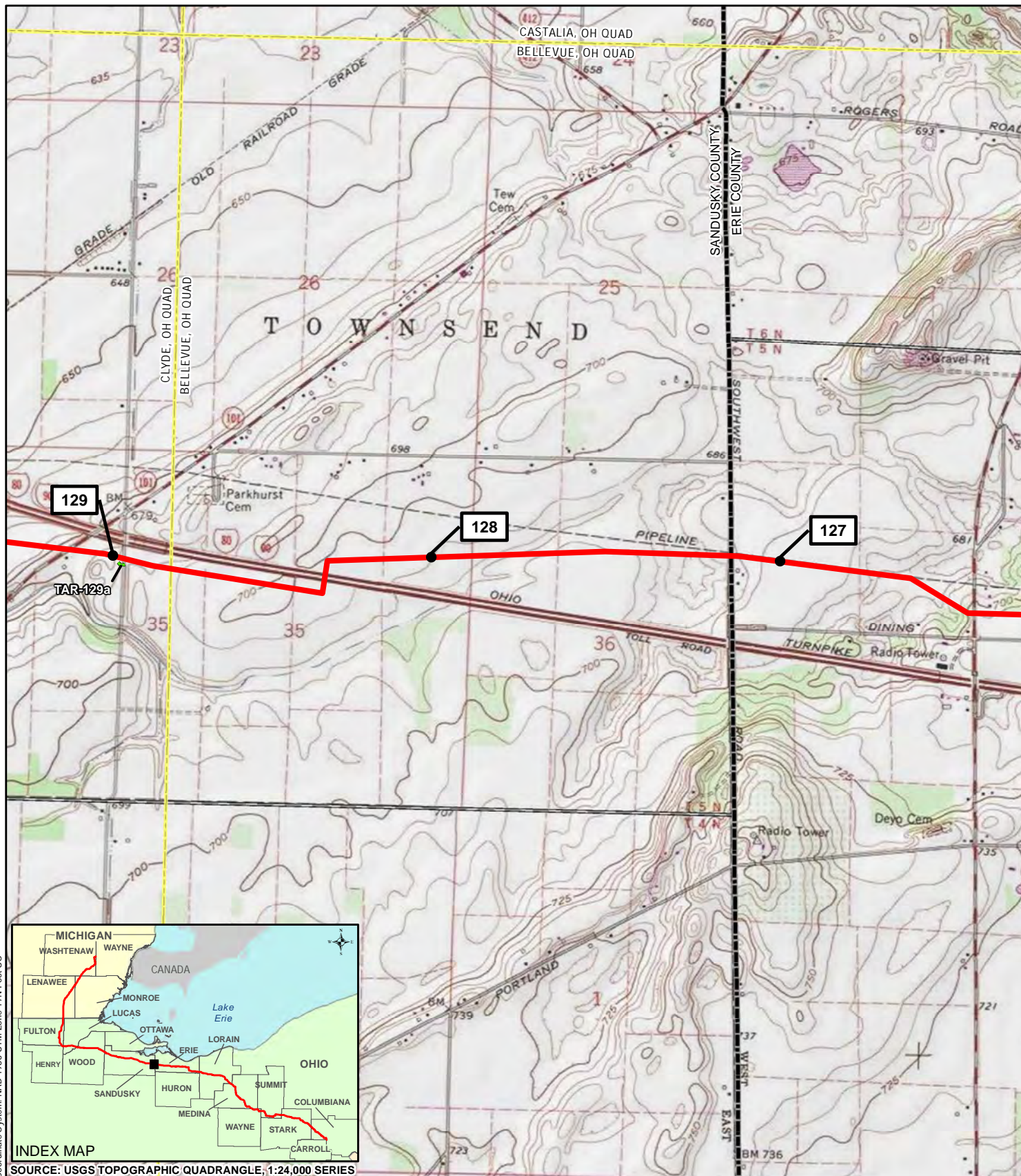
SCALE: 1" = 2,000'

FIGURE 1.1.1-42

MAP 42 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: ERIE COUNTY, OH; SANDUSKY COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

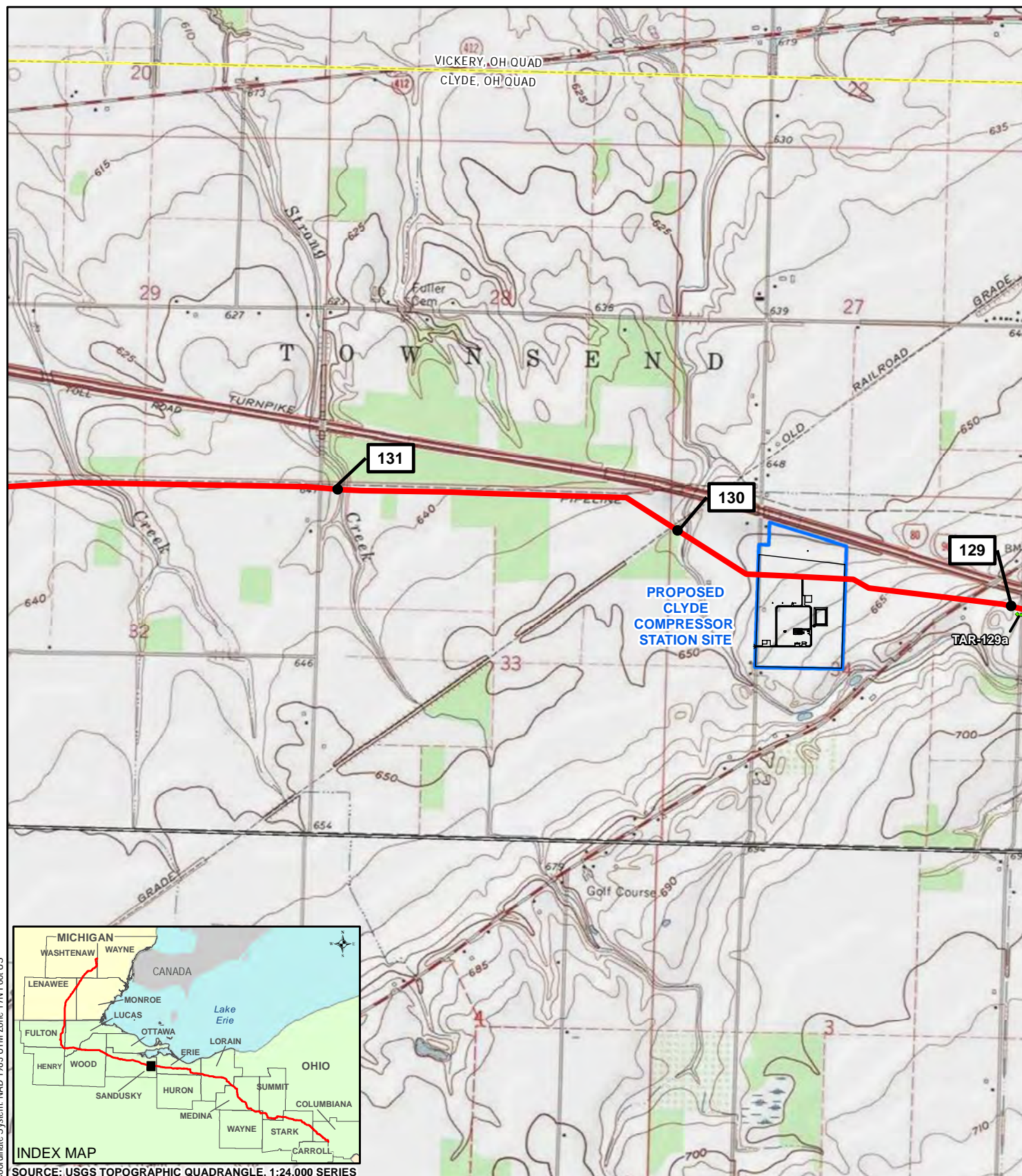
SCALE: 1" = 2,000'

FIGURE 1.1.1-43

MAP 43 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



Coordinate System: NAD 1983 UTM Zone 17N Foot US

INDEX MAP

SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

1 MILEPOST

 PROPOSED MAINLINE PIPELINE

— PROPOSED INTERCONNECTING PIPELINE

 PROPOSED PERMANENT ACCESS ROAD (PAR)
 PROPOSED TEMPORARY ACCESS ROAD (TPAR)

 PROPOSED TEMPORARY ACCESS ROAD (TAR)☐ PROPOSED METERING & REGULATION STATION (M&R)☐ PROPOSED COMPRESSOR STATION SITE PROPOSED WARE YARD

 EXISTING FACILITY

 USGS QUADRANGLE BOUNDARY COUNTY BOUNDARY

TITLE:	NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP
--------	---

LOC.: SANDUSKY COUNTY, OH

CKD.BY: NR

ENG.

SCALE: 1" = 2,000'

DATE: 3/6/2015

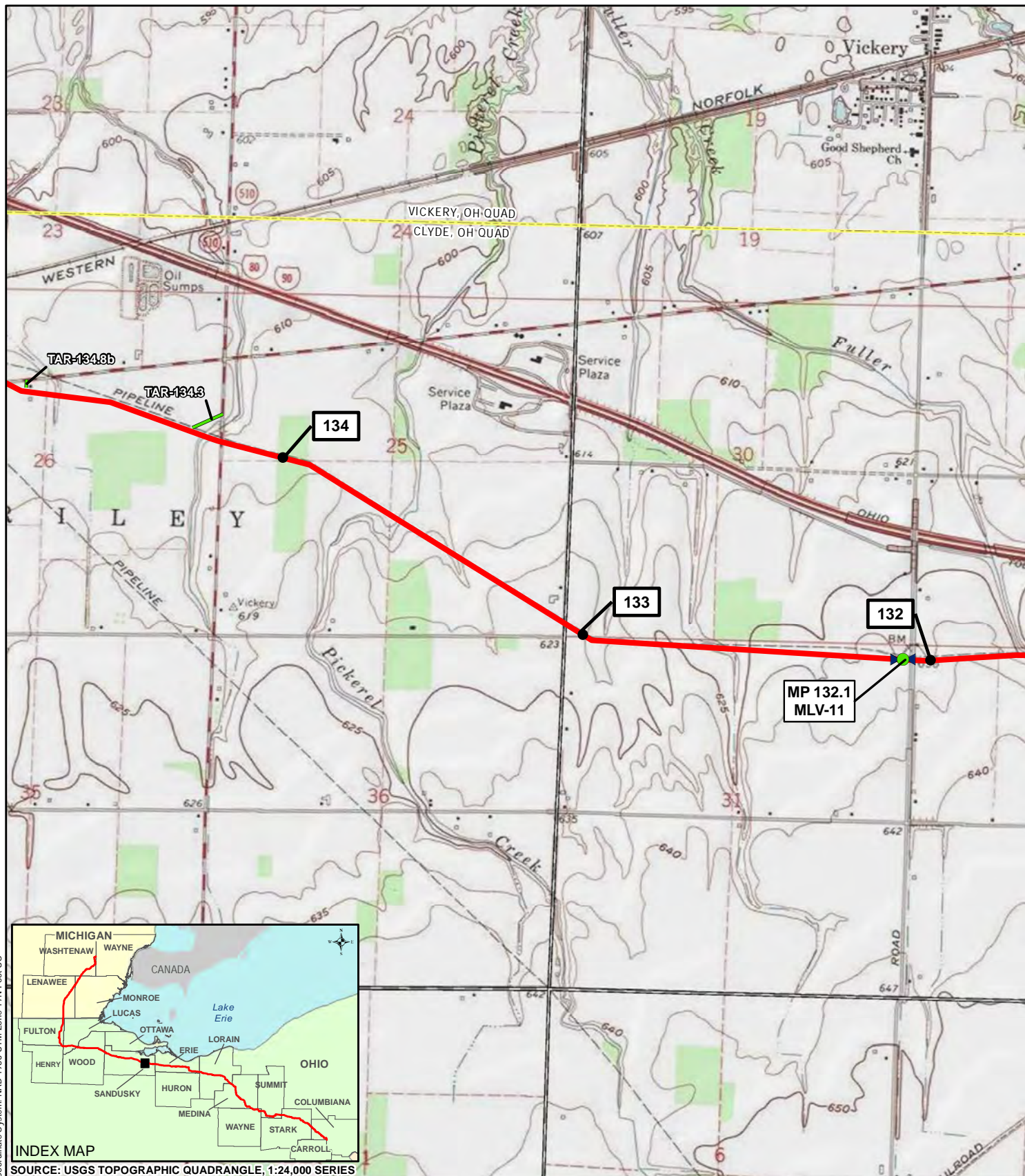
FIGURE 1.1.1-44

W.O.

MAP 44 of 81

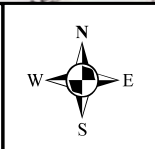
NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



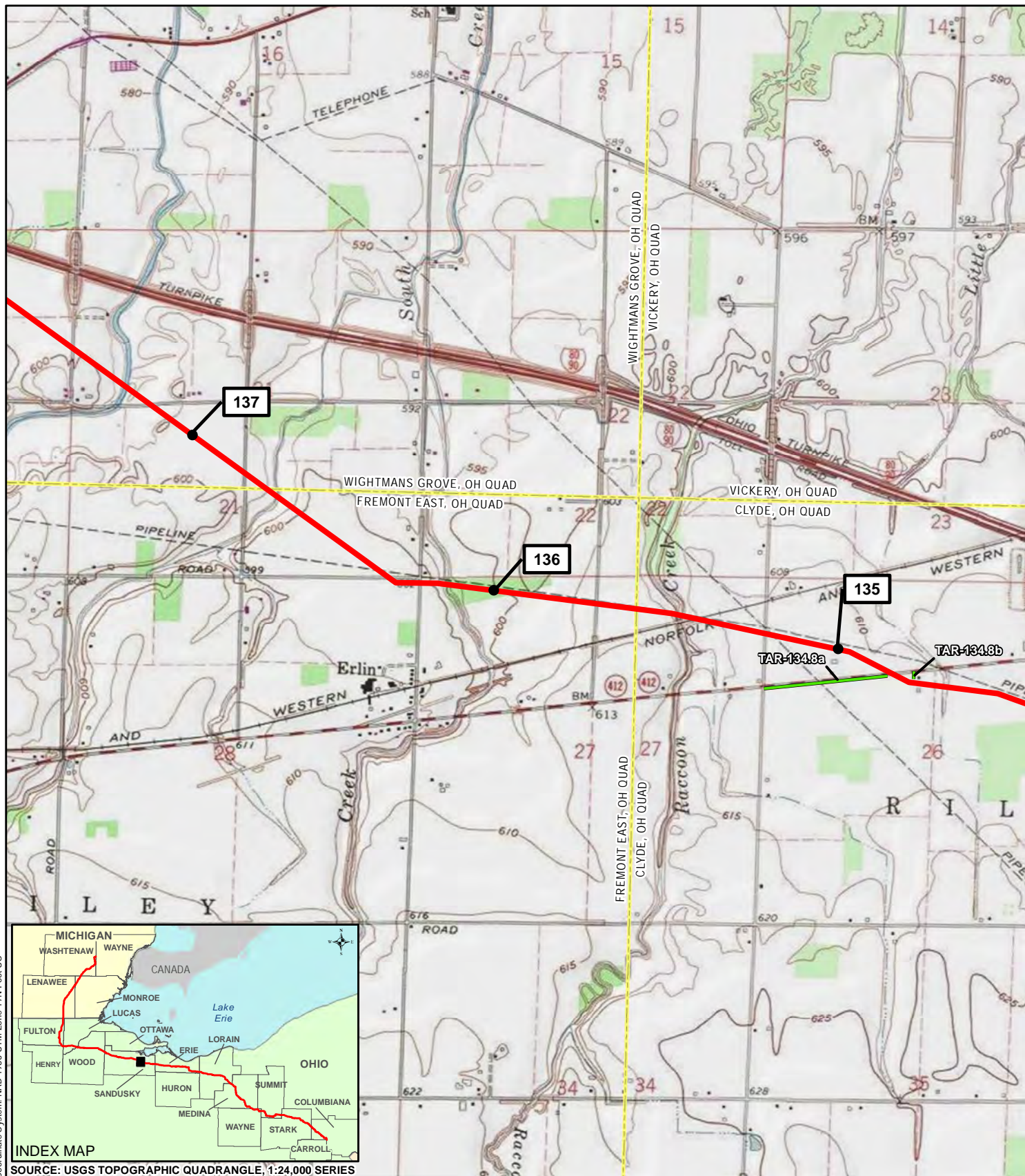
SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



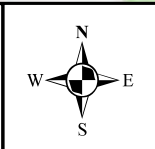
TITLE: NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP			
LOC.: SANDUSKY COUNTY, OH			
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-45	MAP 45 of 81



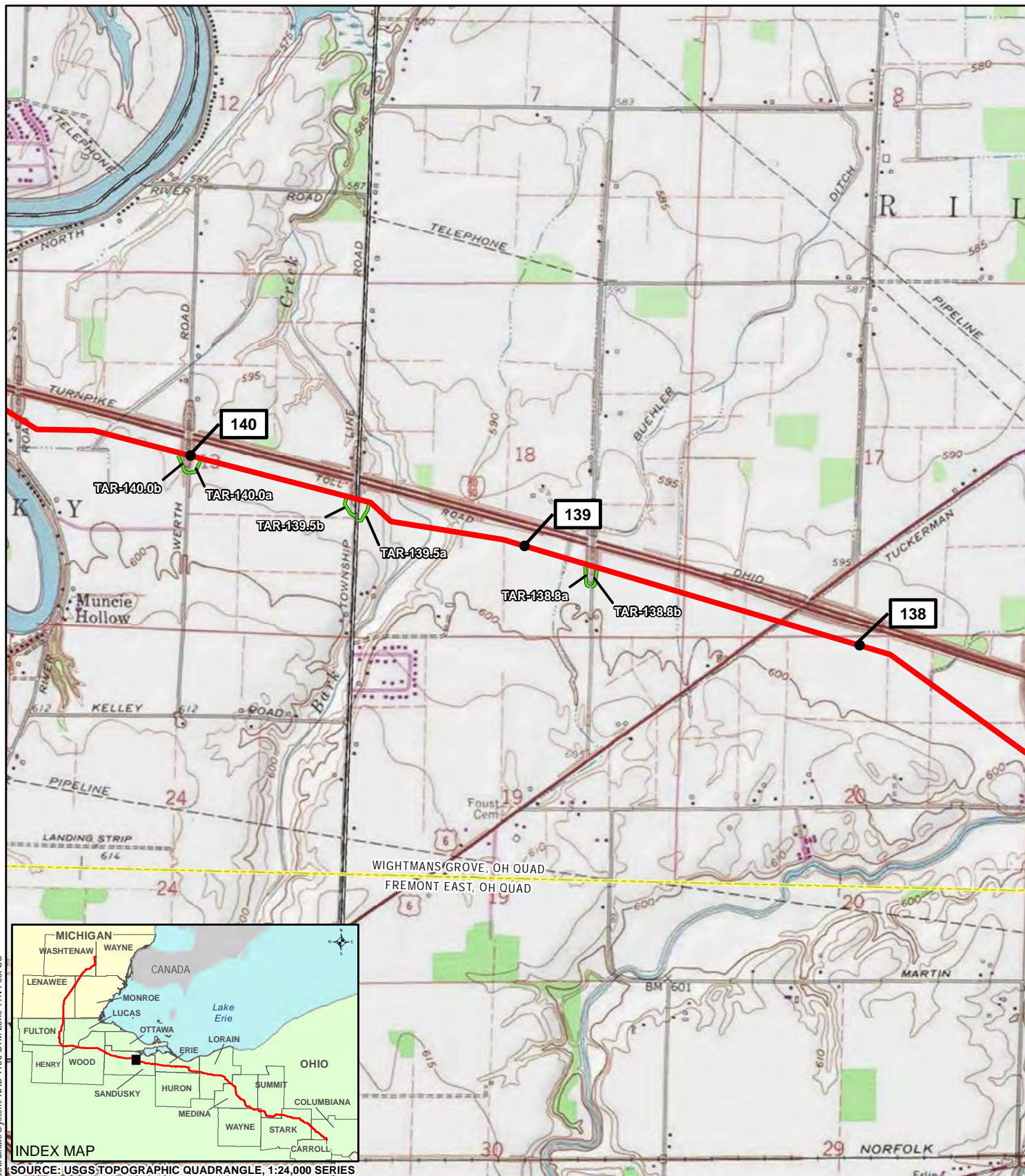


SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

1 MILEPOST	PROPOSED MAINLINE PIPELINE	PROPOSED COMPRESSOR STATION SITE
PROPOSED MAINLINE VALVE (MLV)	PROPOSED INTERCONNECTING PIPELINE	PROPOSED WARE YARD
PROPOSED PIPELINE LAUNCHER	PROPOSED PERMANENT ACCESS ROAD (PAR)	EXISTING FACILITY
PROPOSED PIPELINE RECEIVER	PROPOSED TEMPORARY ACCESS ROAD (TAR)	USGS QUADRANGLE BOUNDARY
	PROPOSED METERING & REGULATION STATION (M&R)	COUNTY BOUNDARY

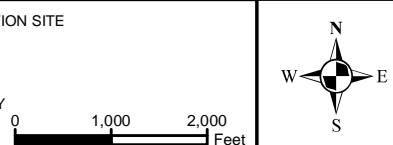


TITLE: NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP			
LOC.: SANDUSKY COUNTY, OH			
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-46	MAP 46 of 81



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

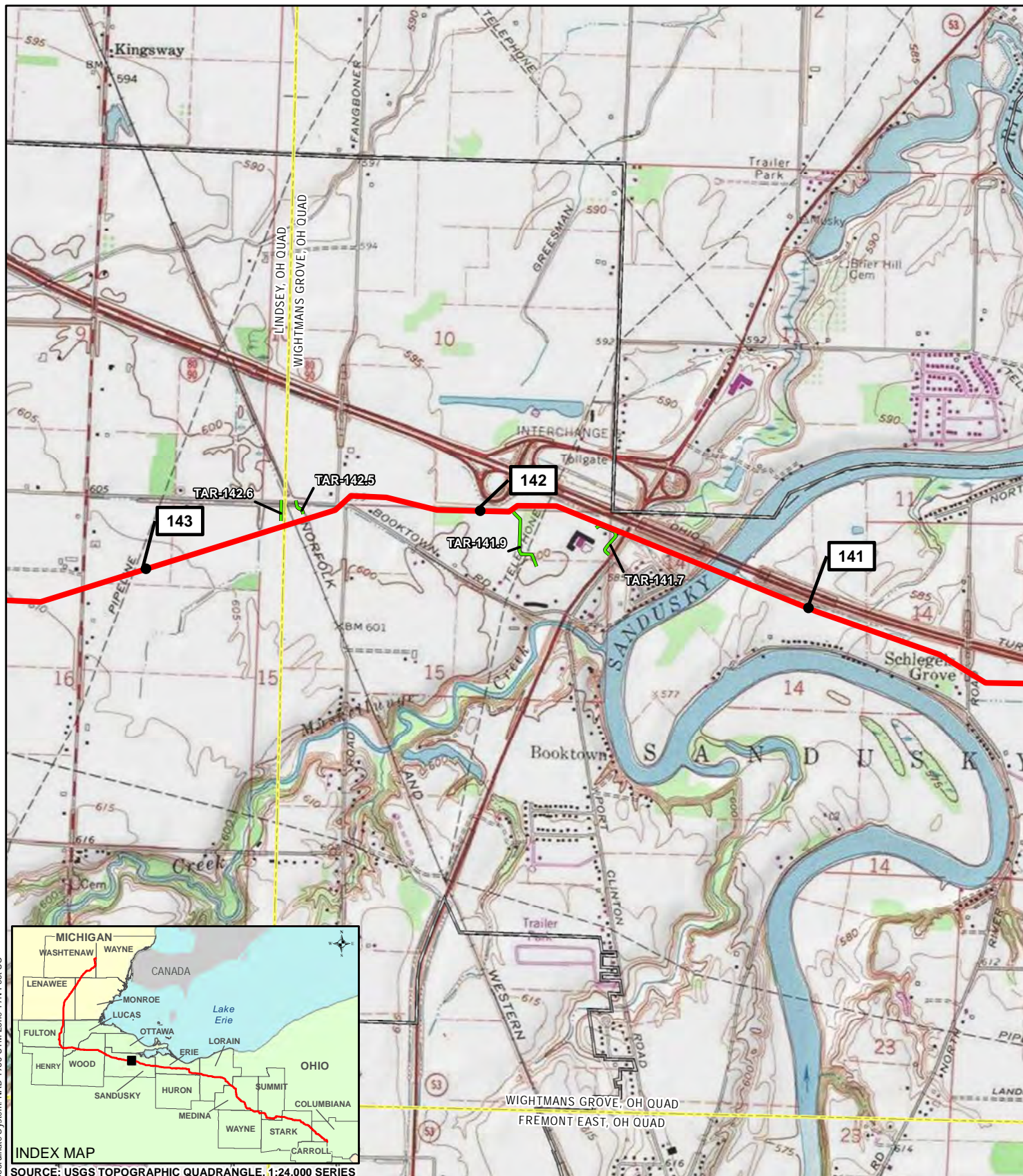
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-47

MAP 47 of 81





SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

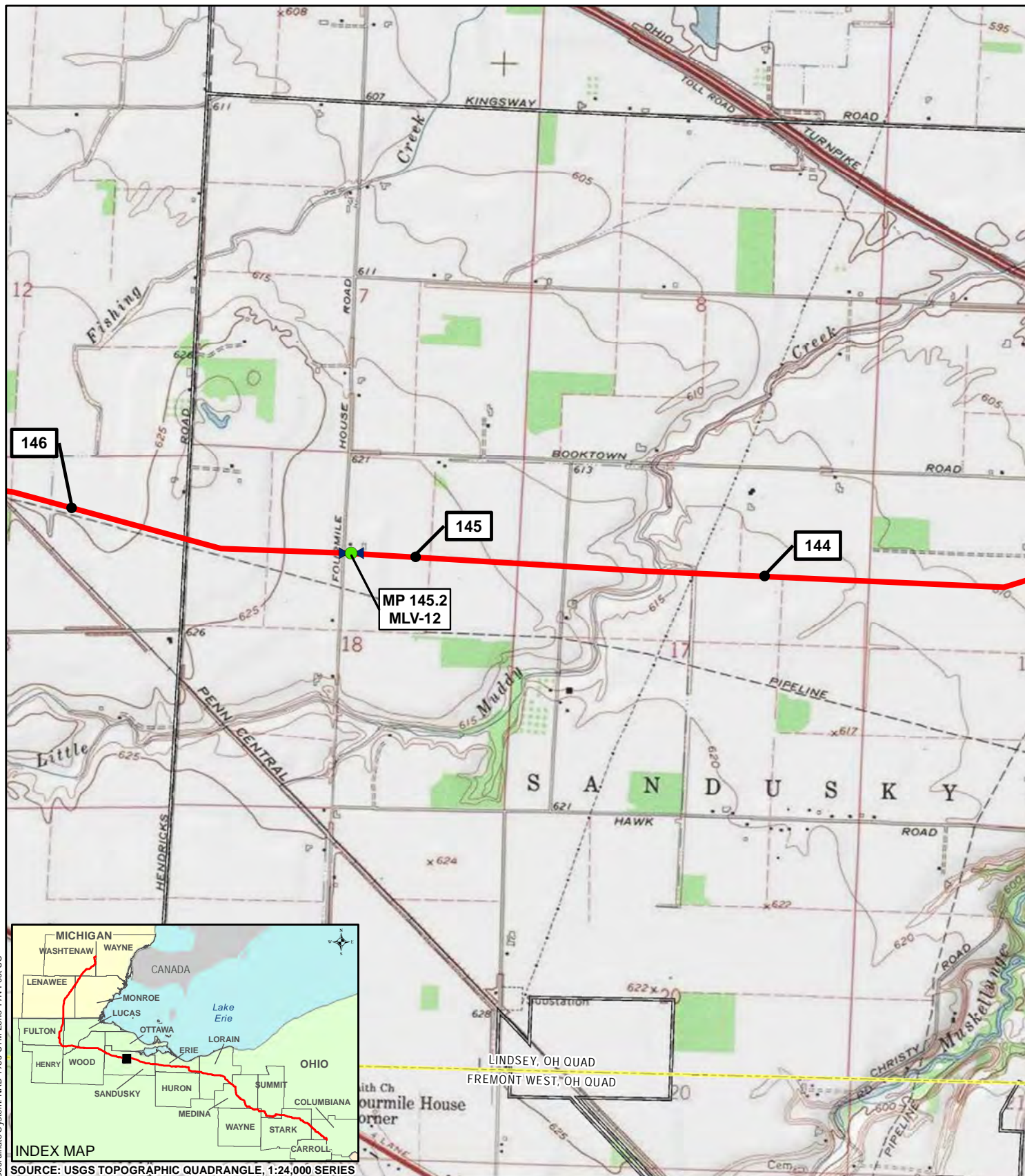
SCALE: 1" = 2,000'

FIGURE 1.1.1-48

MAP 48 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015

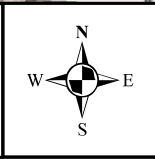


Coordinate System: NAD 1983 UTM Zone 17N Foot US

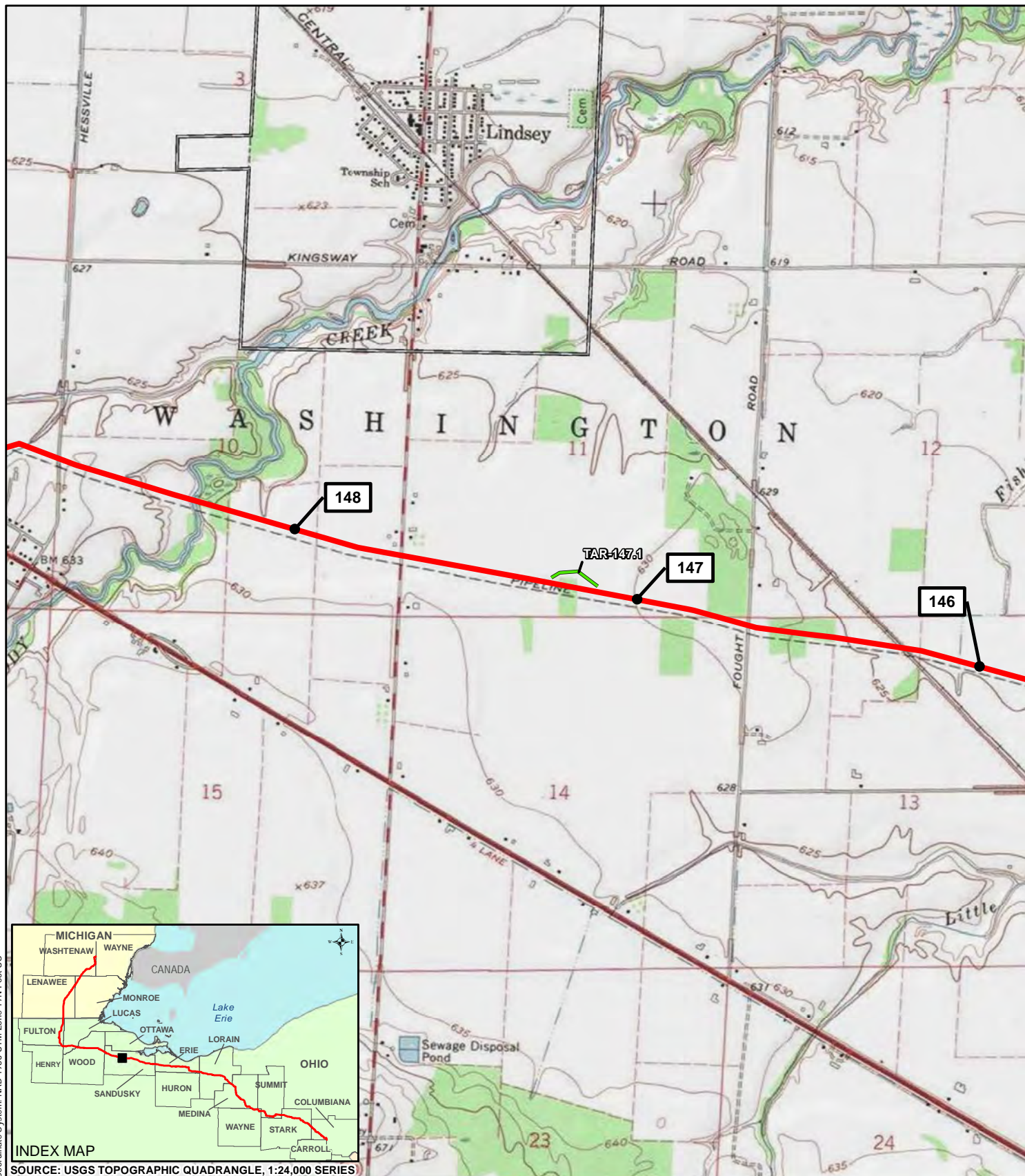


SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP			
LOC.: SANDUSKY COUNTY, OH			
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-49	MAP 49 of 81



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

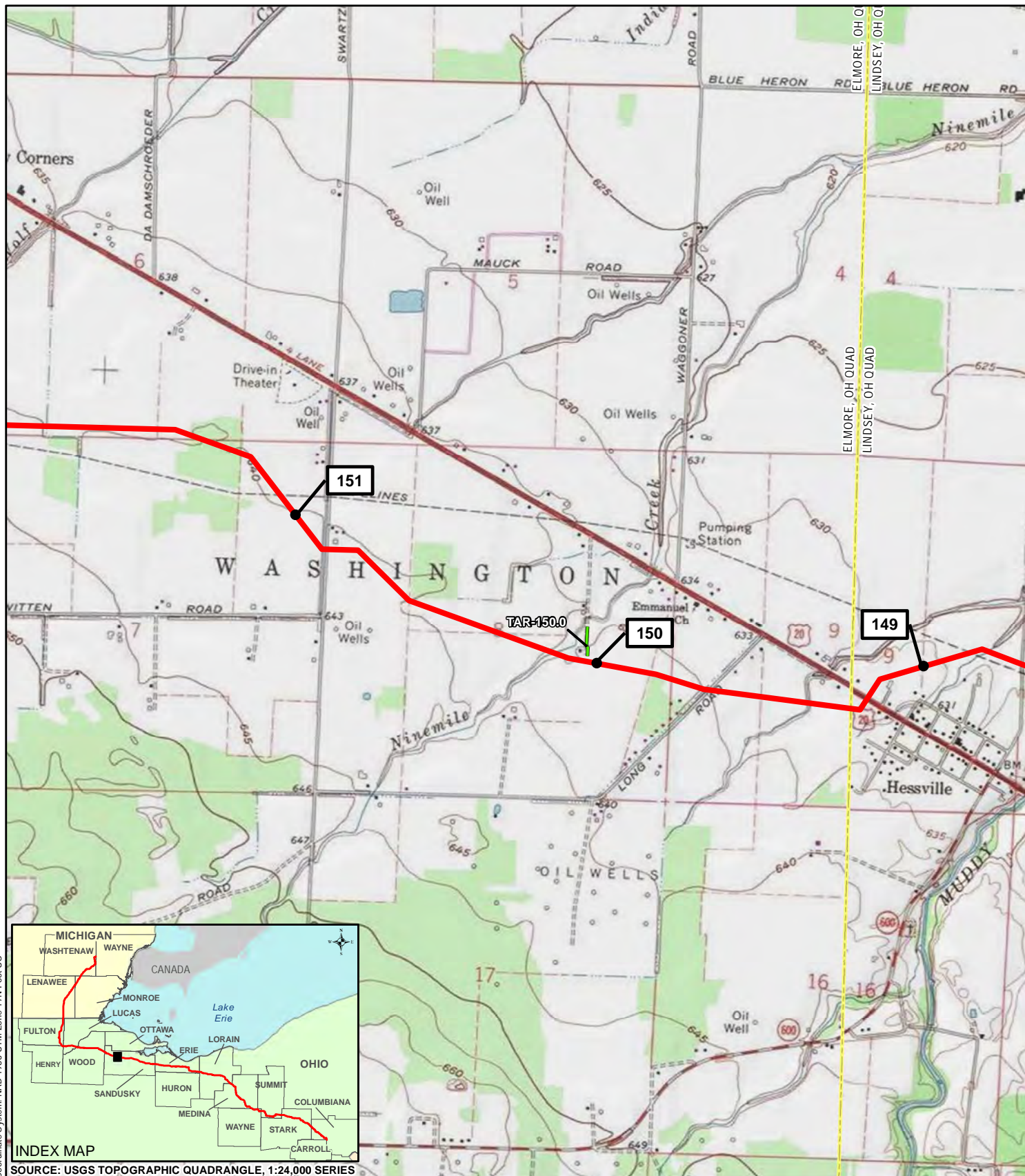
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-50

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NEXUS
GAS TRANSMISSION

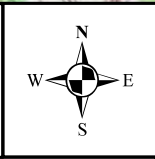


Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

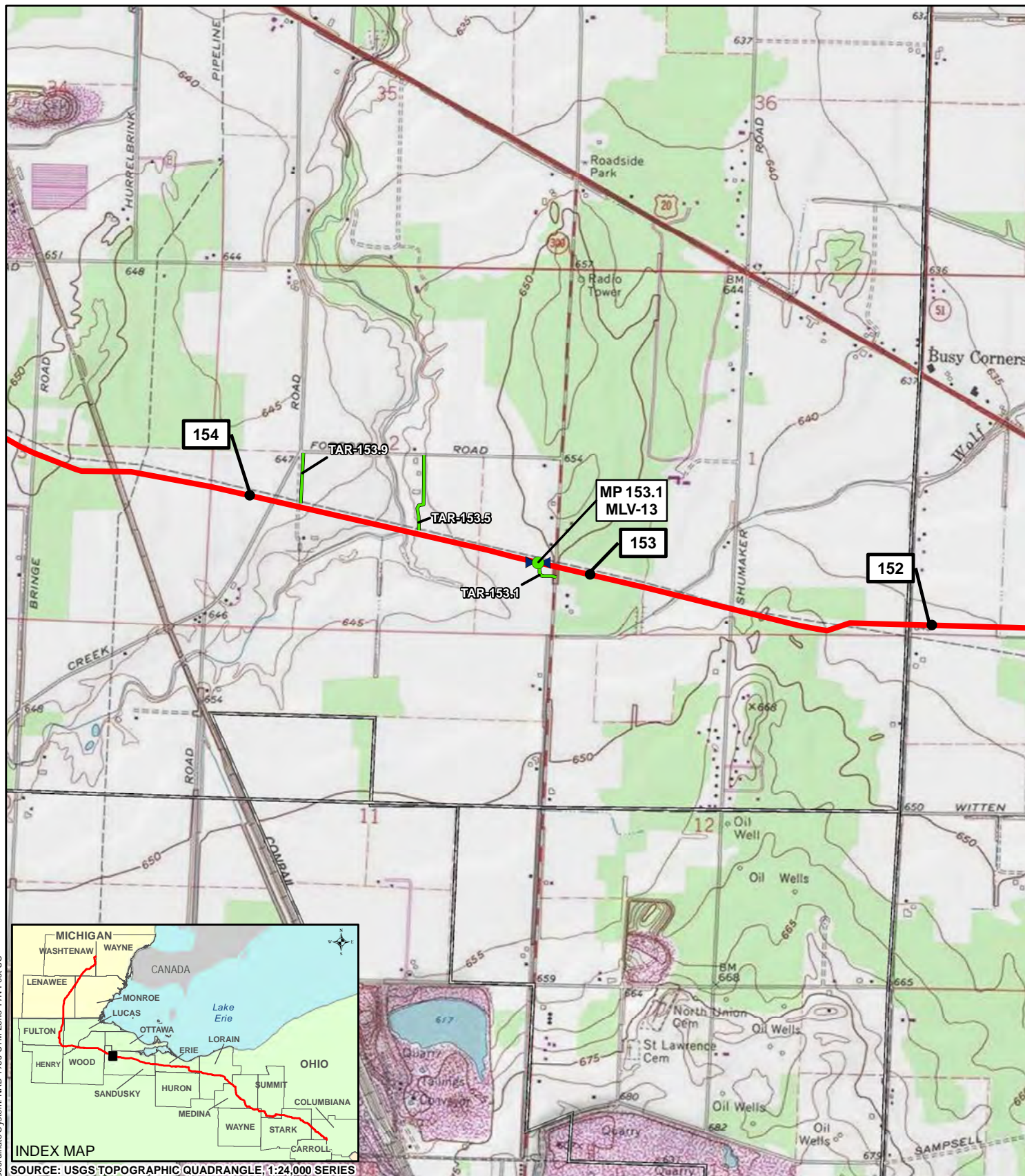


TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OH

CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-51	MAP 51 of 81





SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

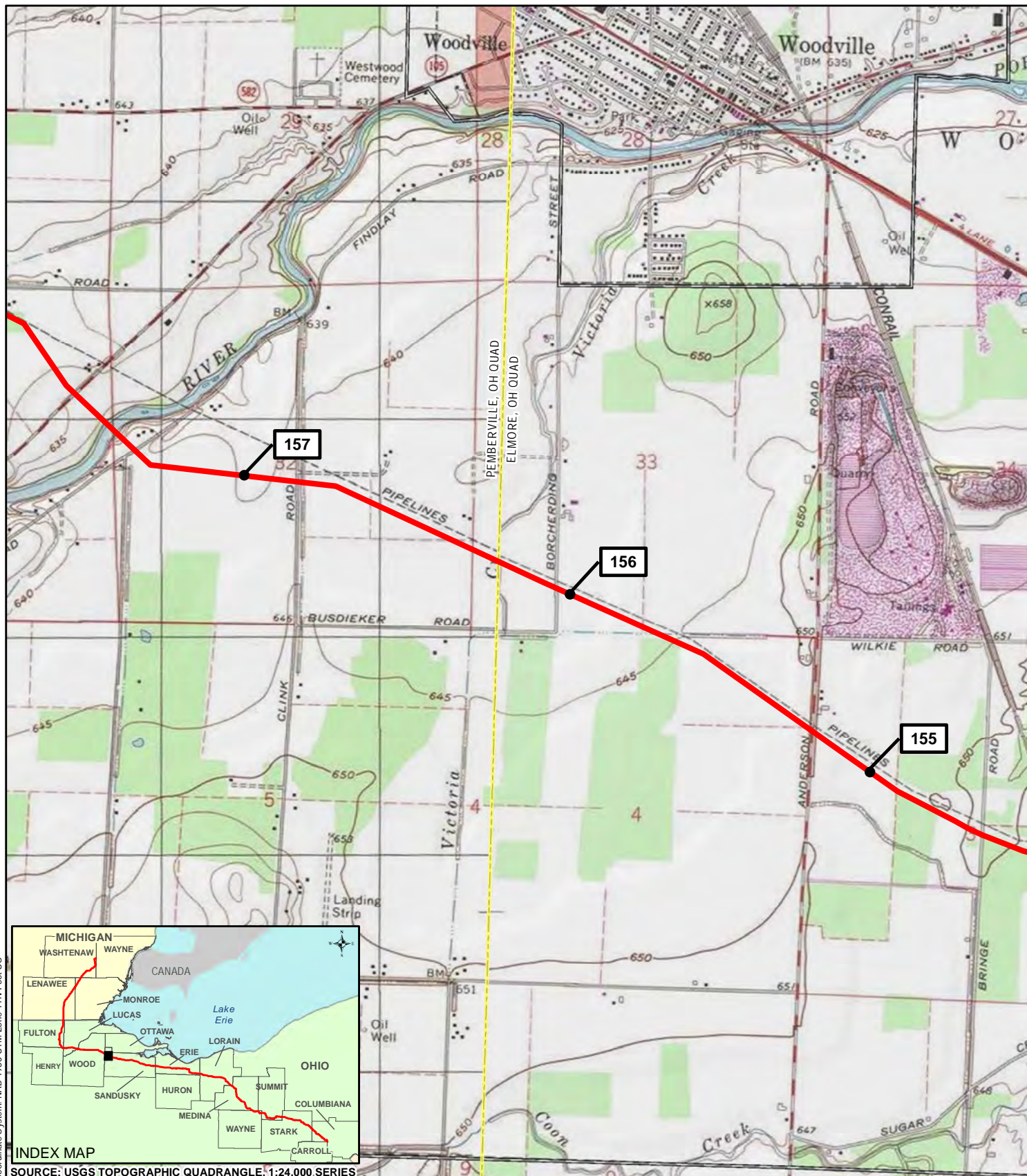
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-52

MAP 52 of 81

NEXUS
GAS TRANSMISSION



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OH

CKD. BY: NR

ENG.:

DATE: 3/6/2015

W.O.:

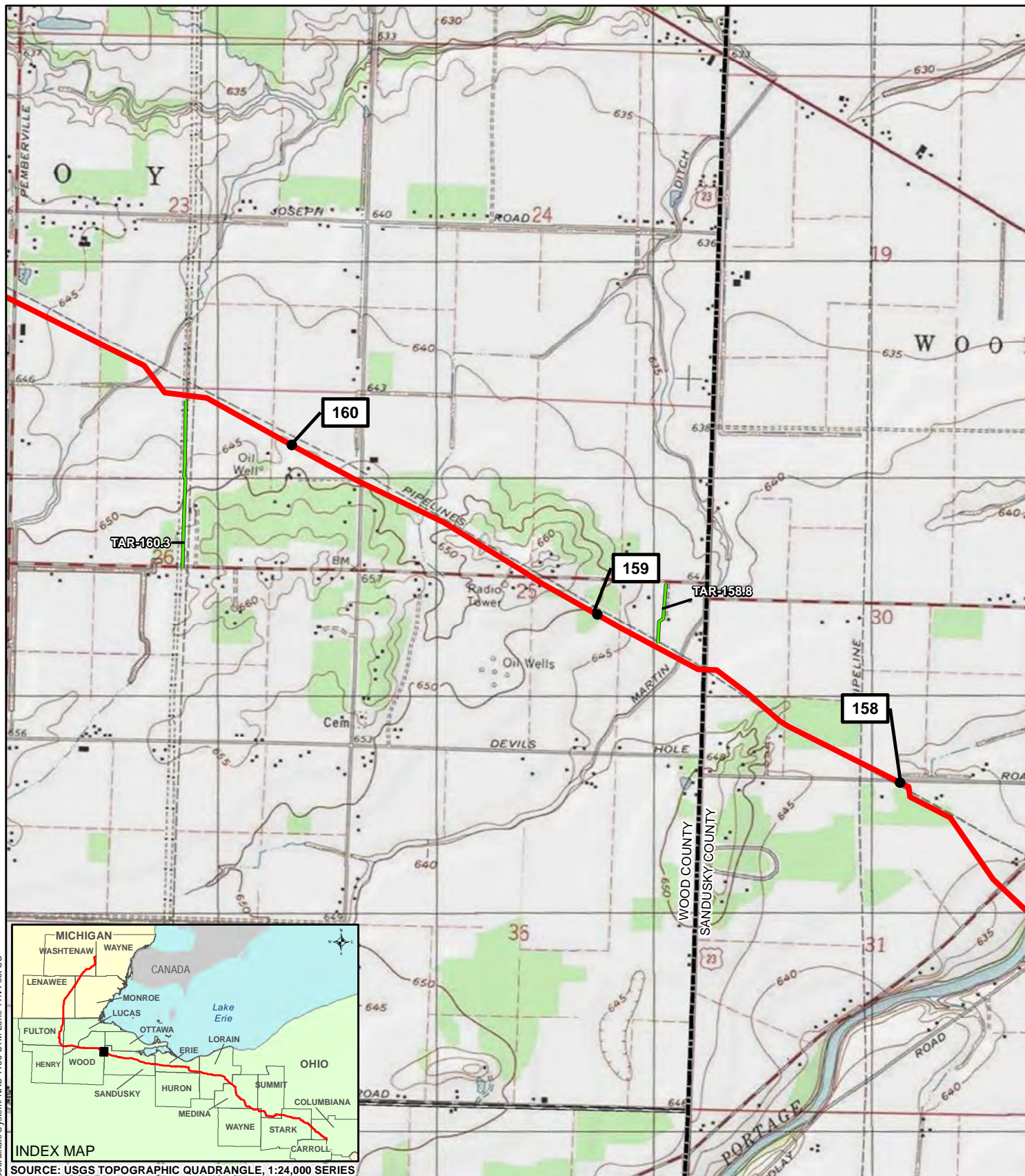
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-53

MAP 53 of 81

NEXUS
GAS TRANSMISSION



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

1 MILEPOST	PROPOSED MAINLINE PIPELINE	PROPOSED COMPRESSOR STATION SITE
PROPOSED MAINLINE VALVE (MLV)	PROPOSED INTERCONNECTING PIPELINE	PROPOSED WARE YARD
PROPOSED PIPELINE LAUNCHER	PROPOSED PERMANENT ACCESS ROAD (PAR)	EXISTING FACILITY
PROPOSED PIPELINE RECEIVER	PROPOSED TEMPORARY ACCESS ROAD (TAR)	USGS QUADRANGLE BOUNDARY
	PROPOSED METERING & REGULATION STATION (M&R)	COUNTY BOUNDARY

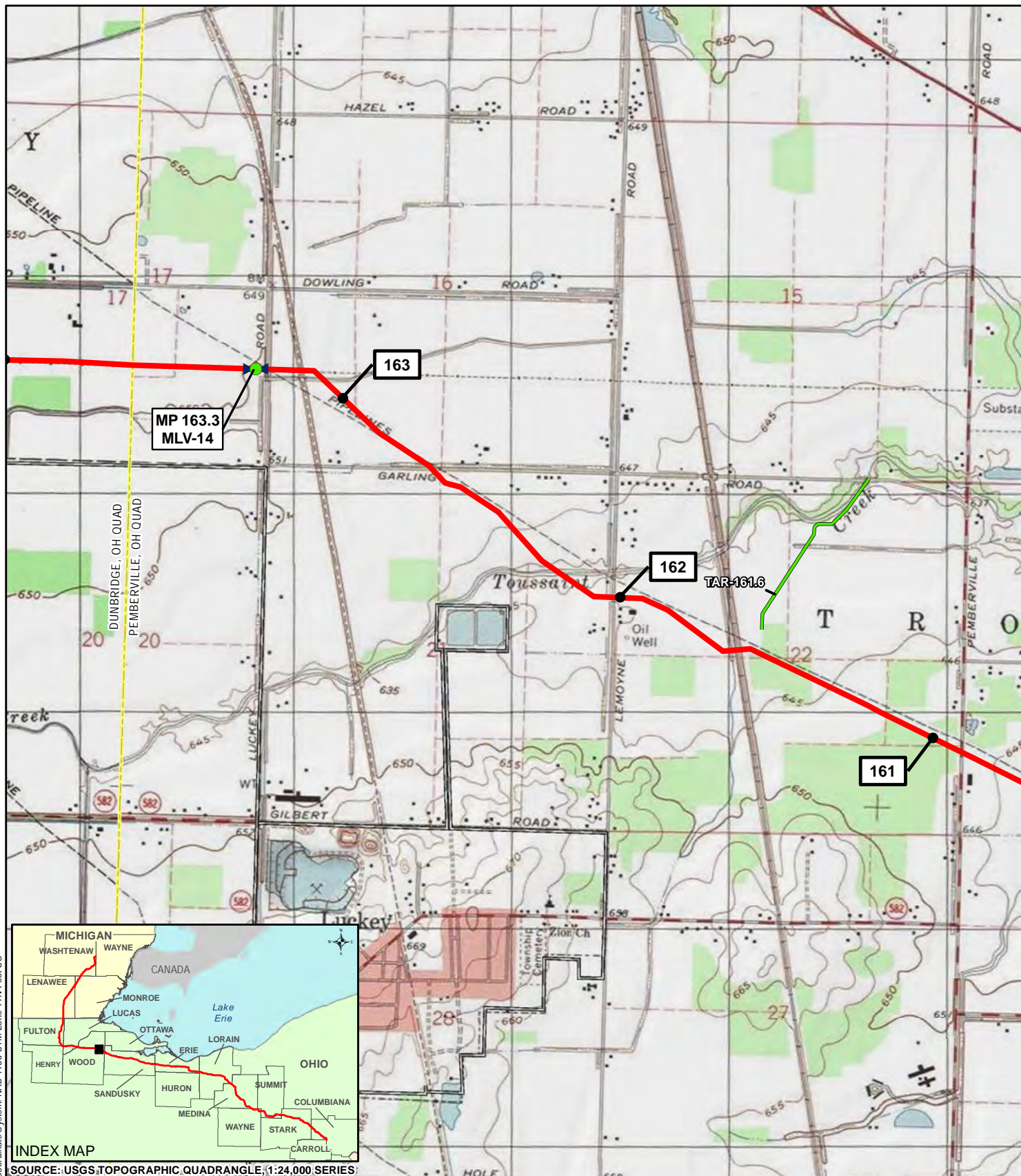
TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OH; WOOD COUNTY, OH

CKD. BY: NR **ENG.:** **DATE:** 3/6/2015 **W.O.:**

DRN. BY: KM **SCALE:** 1" = 2,000' **FIGURE** 1.1.1-54 **MAP** 54 of 81

Quad map based on data as of 08 April 2015



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: WOOD COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

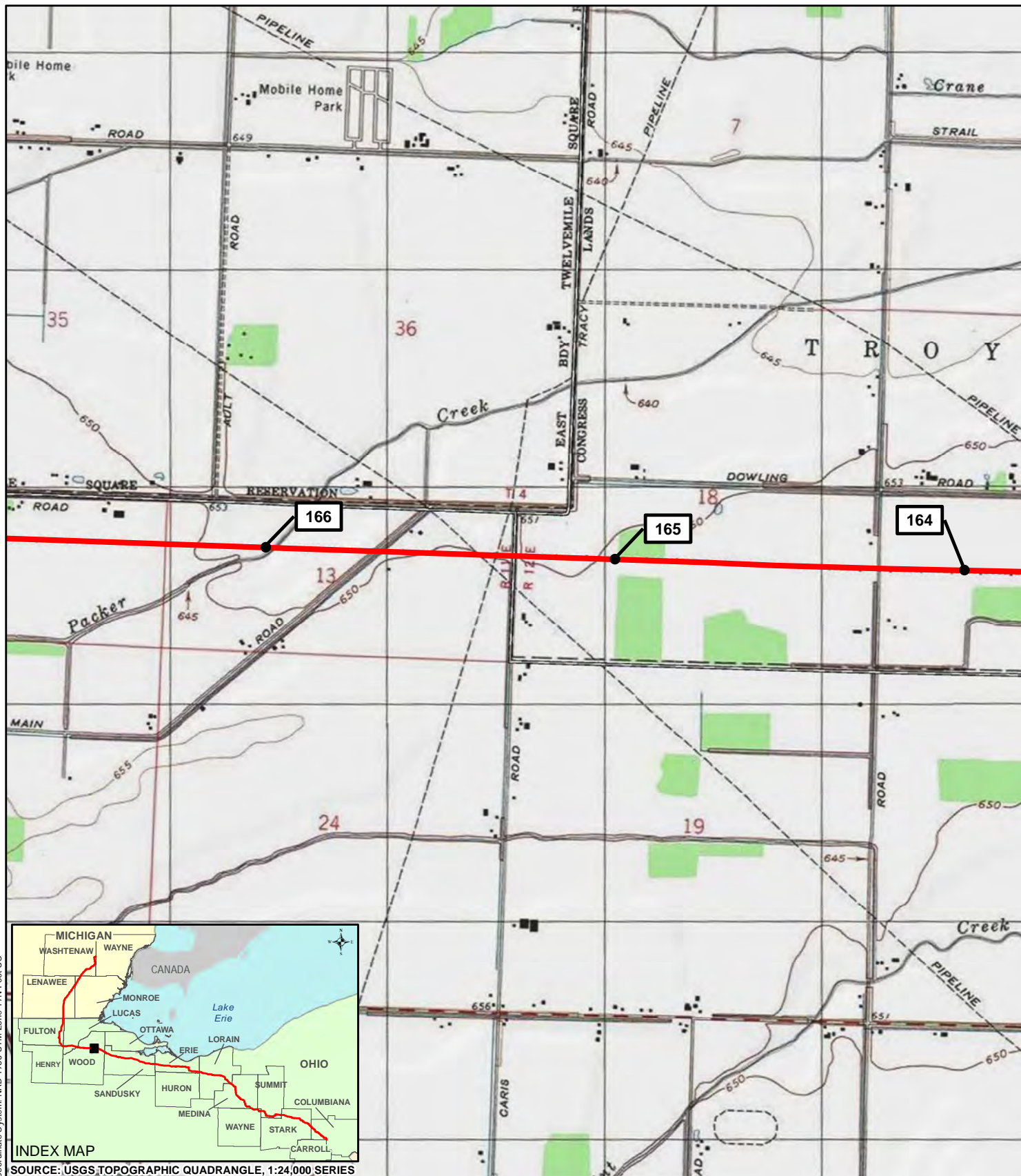
SCALE: 1" = 2,000'

FIGURE 1.1.1-55

MAP 55 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

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|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: WOOD COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

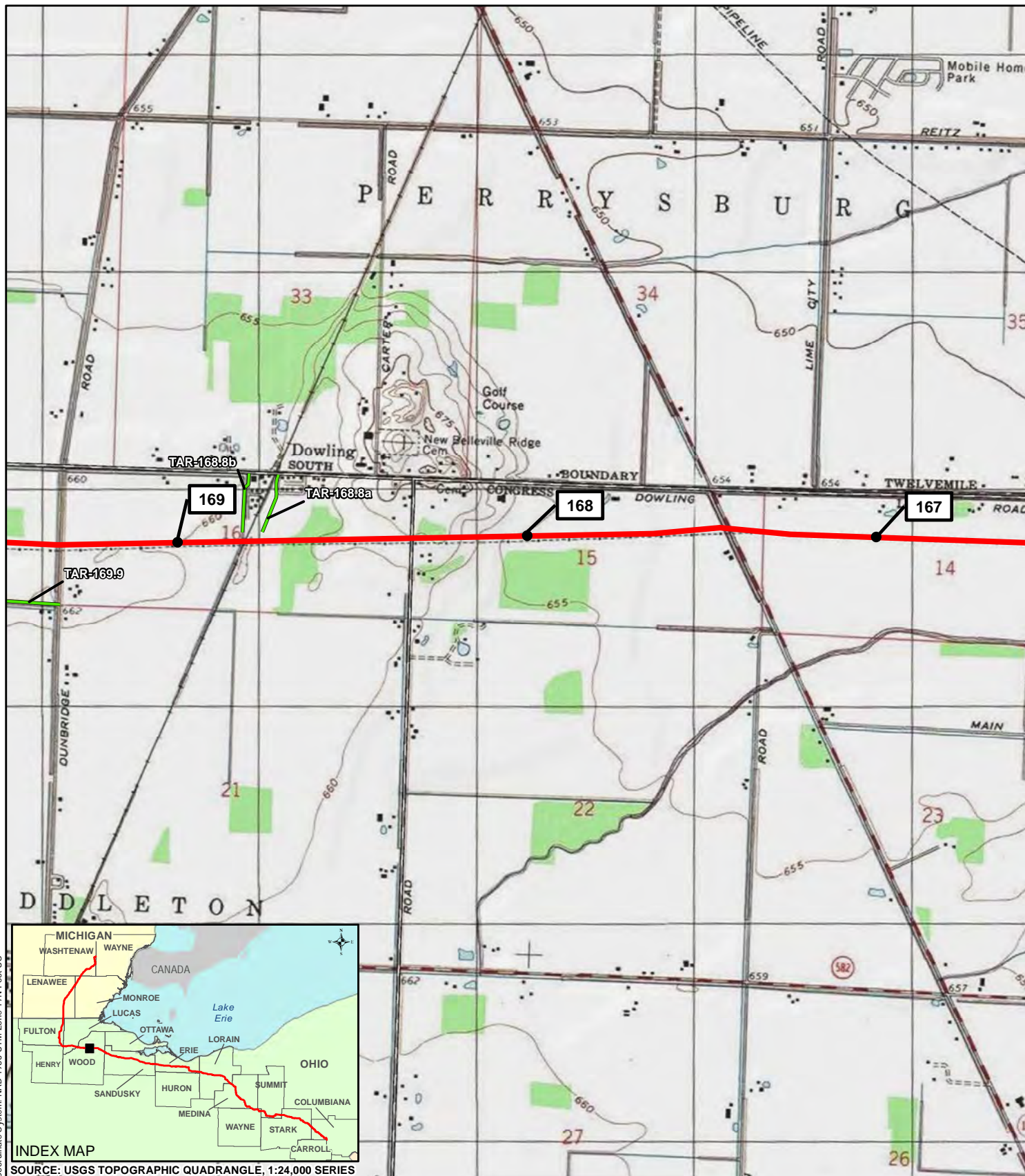
SCALE: 1" = 2,000'

FIGURE 1.1.1-56

MAP 56 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015

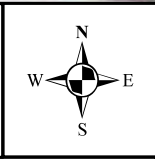


Coordinate System: NAD 1983 UTM Zone 17N Foot US

INDEX MAP

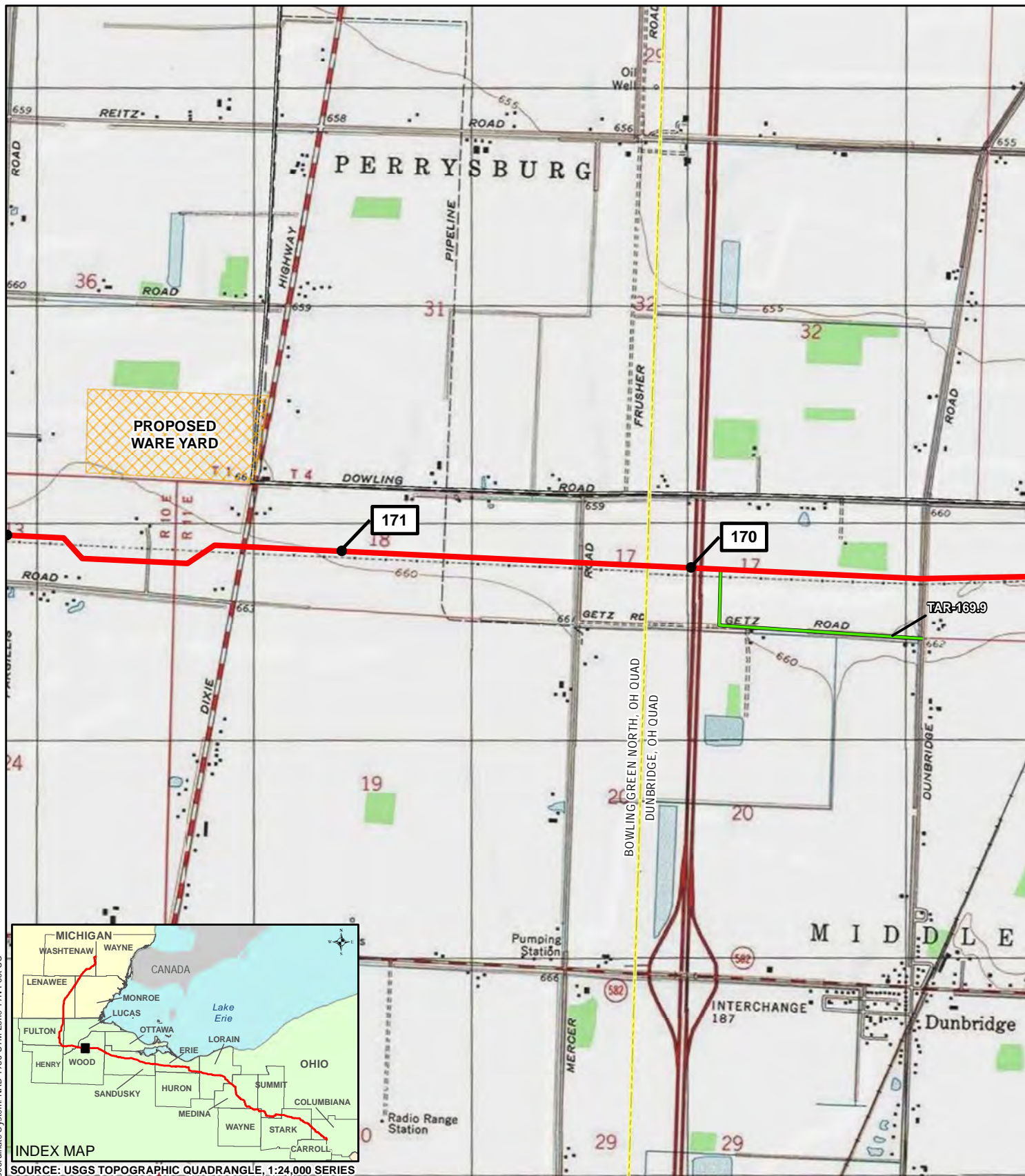
SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP			
LOC.: WOOD COUNTY, OH			
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-57	MAP 57 of 81

Quad map based on data as of 08 April 2015

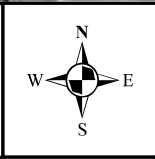


Coordinate System: NAD 1983 UTM Zone 17N Foot US



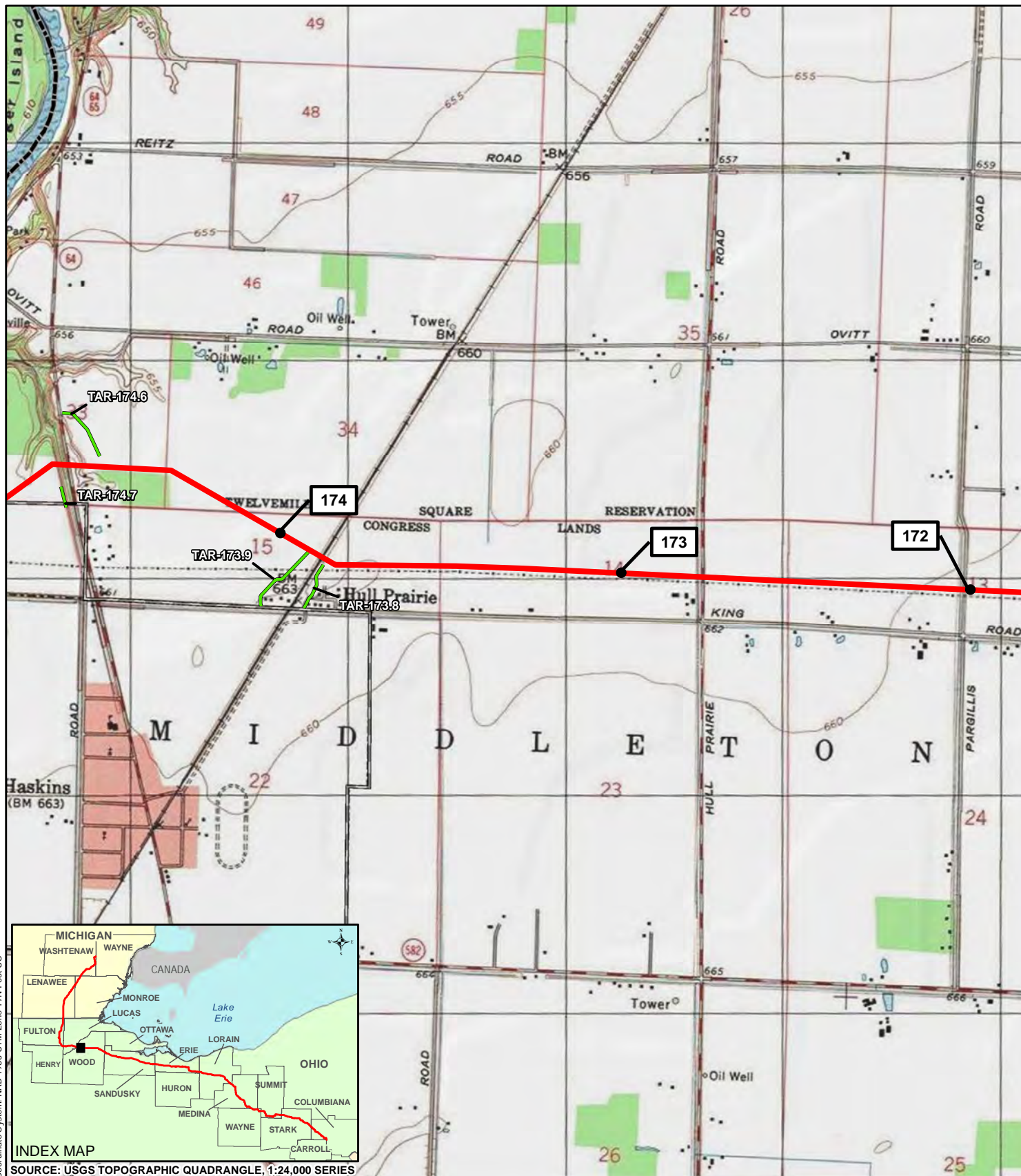
SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP			
LOC.: WOOD COUNTY, OH			
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-58	MAP 58 of 81





Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: WOOD COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

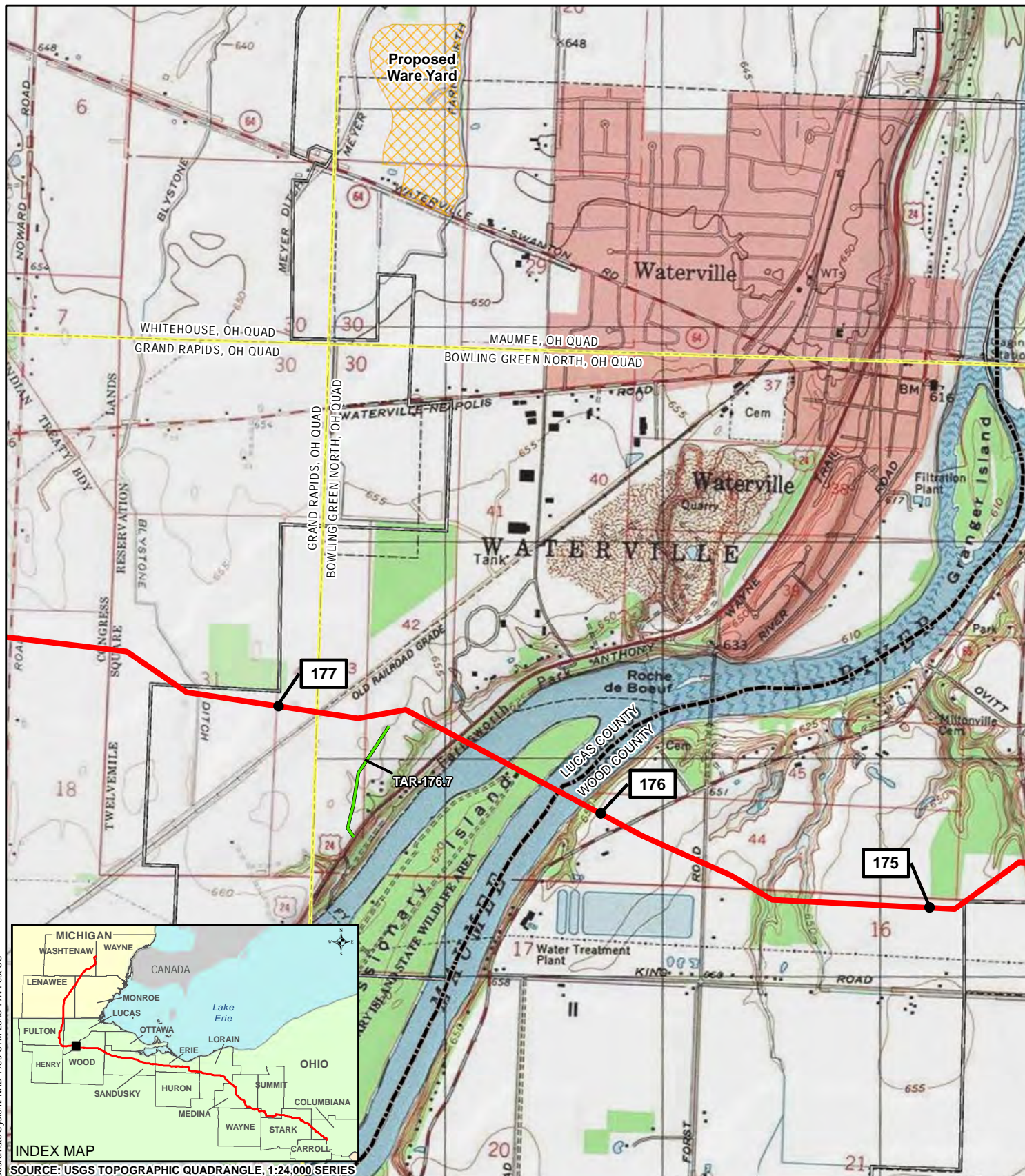
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-59

MAP 59 of 81

NEXUS
GAS TRANSMISSION

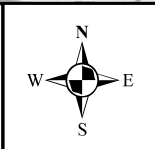


Coordinate System: NAD 1983 UTM Zone 17N Foot US



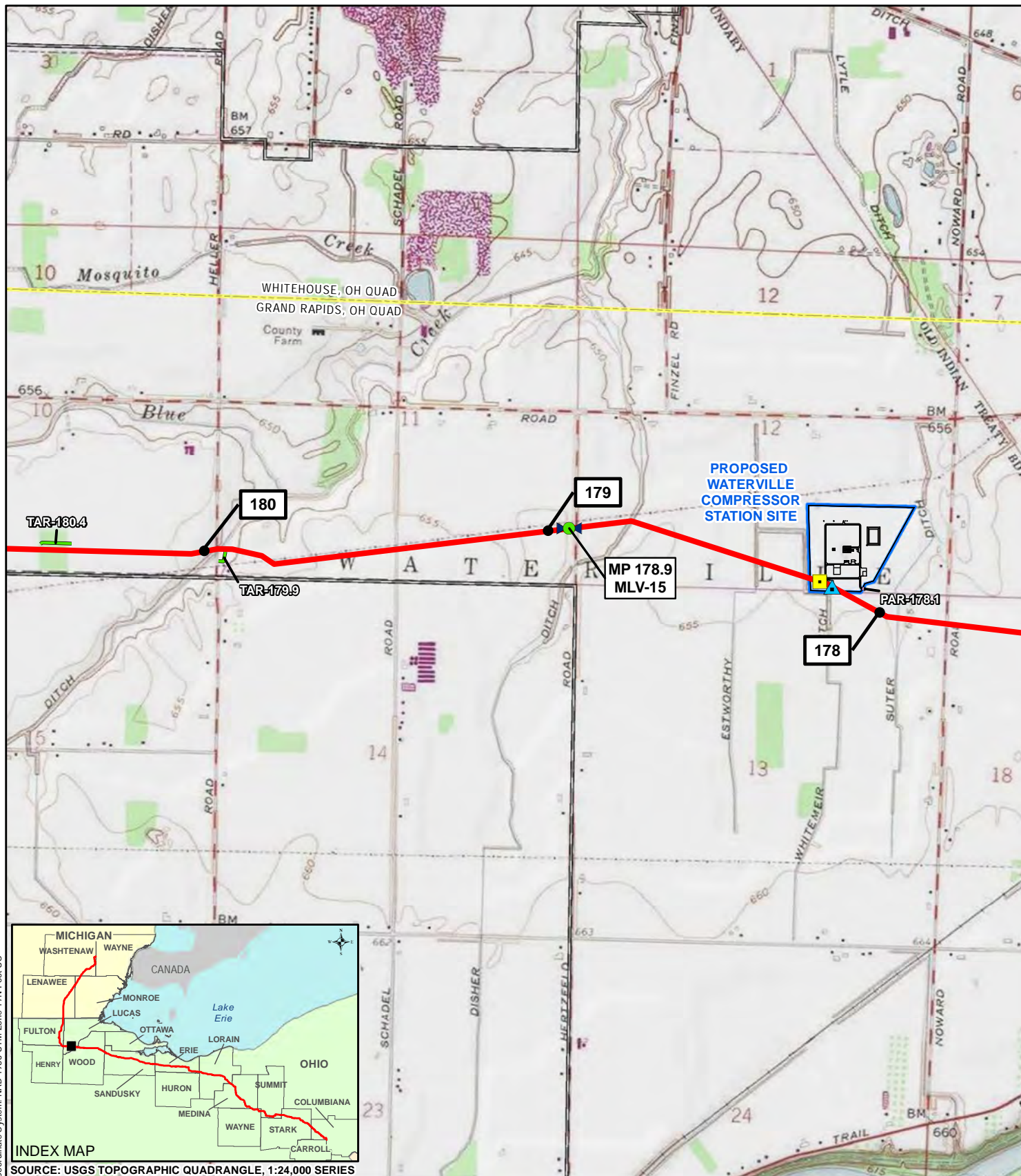
SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000, SERIES

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|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP			
LOC.: WOOD COUNTY, OH; LUCAS COUNTY, OH			
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-60	MAP 60 of 81





- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LUCAS COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

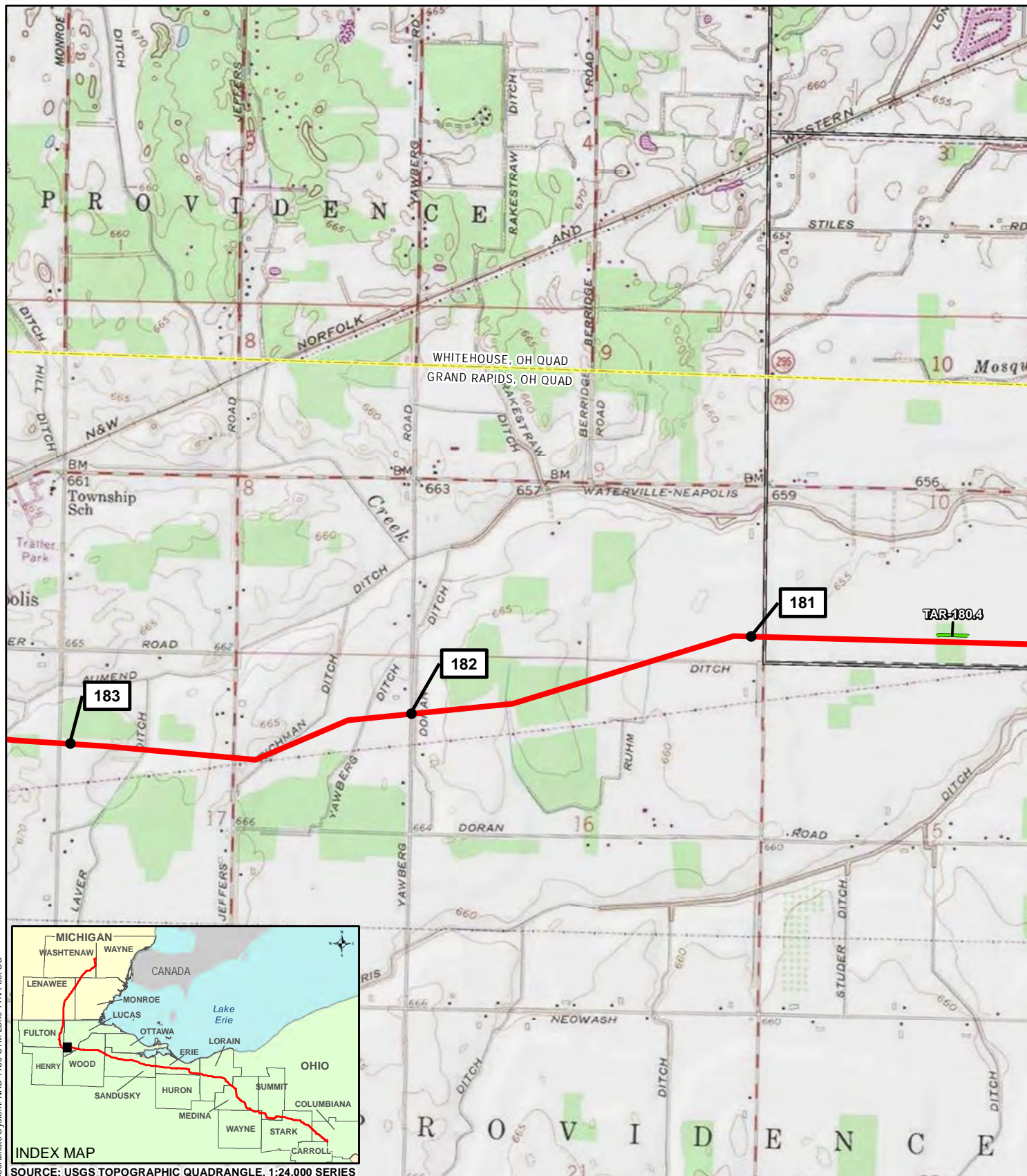
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-61

MAP 61 of 81

NEXUS
GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- 1 MILEPOST
- PROPOSED MAINLINE VALVE (MLV)
- PROPOSED PIPELINE LAUNCHER
- PROPOSED PIPELINE RECEIVER
- PROPOSED MAINLINE PIPELINE
- PROPOSED INTERCONNECTING PIPELINE
- PROPOSED PERMANENT ACCESS ROAD (PAR)
- PROPOSED TEMPORARY ACCESS ROAD (TAR)
- PROPOSED METERING & REGULATION STATION (M&R)

- PROPOSED COMPRESSOR STATION SITE
- PROPOSED WARE YARD
- EXISTING FACILITY
- USGS QUADRANGLE BOUNDARY
- COUNTY BOUNDARY



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LUCAS COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

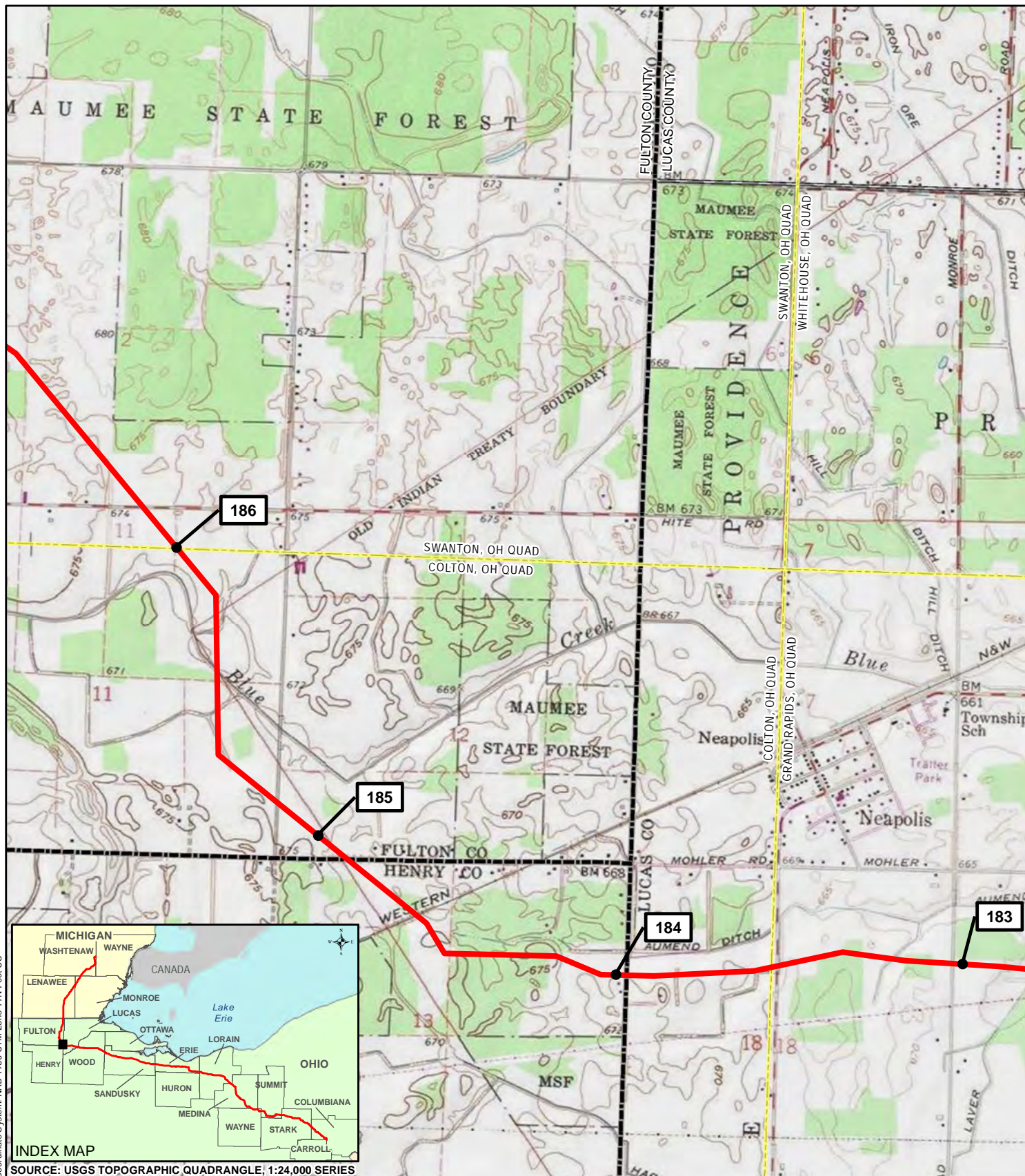
SCALE: 1" = 2,000'

FIGURE 1.1.1-62

MAP 62 of 81

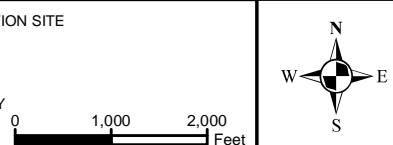


Quad map based on data as of 08 April 2015



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

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|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

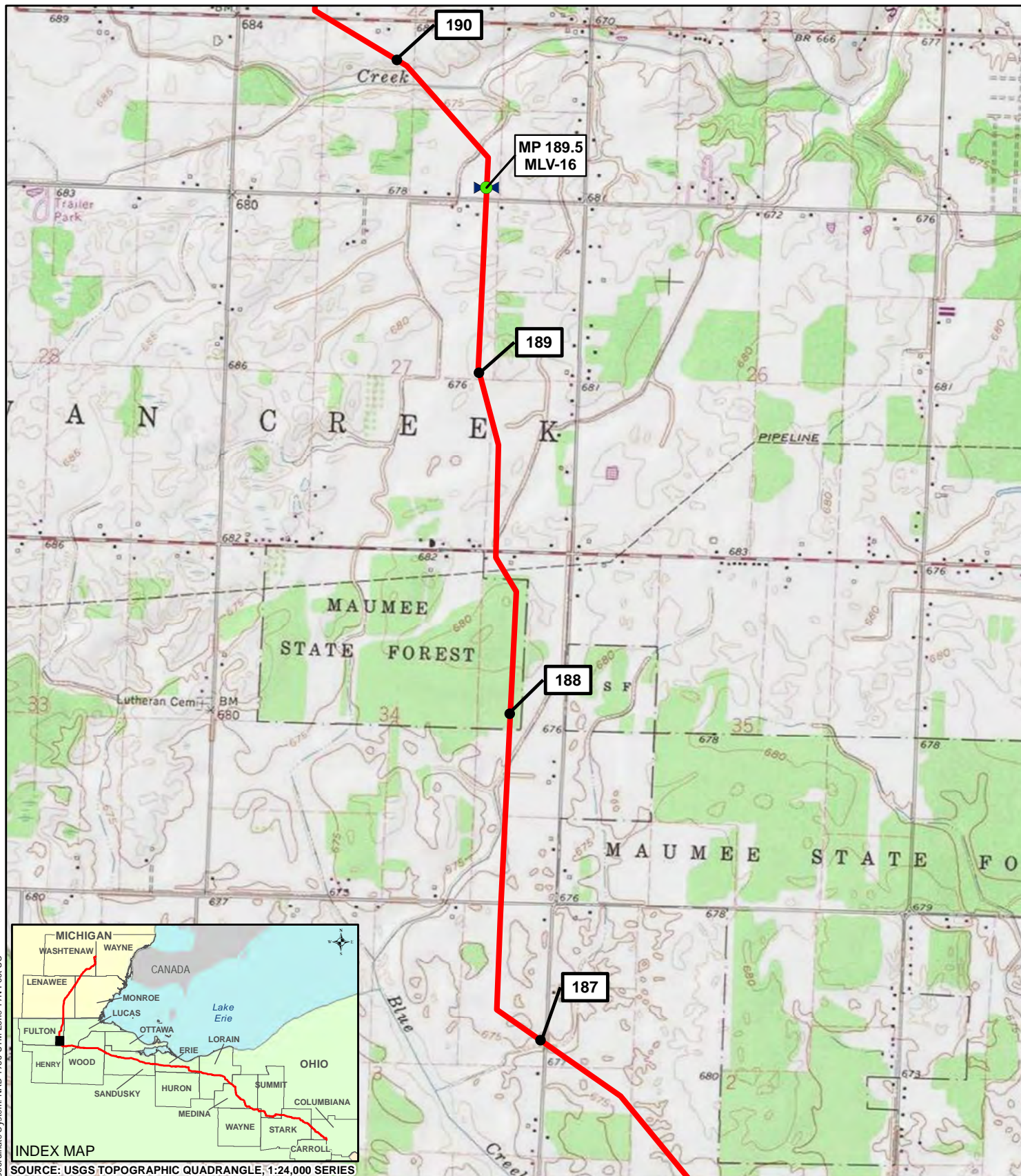


TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LUCAS COUNTY, OH; FULTON COUNTY, OH; HENRY COUNTY, OH

CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-63	MAP 63 of 81





SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: FULTON COUNTY, OH

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

SCALE: 1" = 2,000'

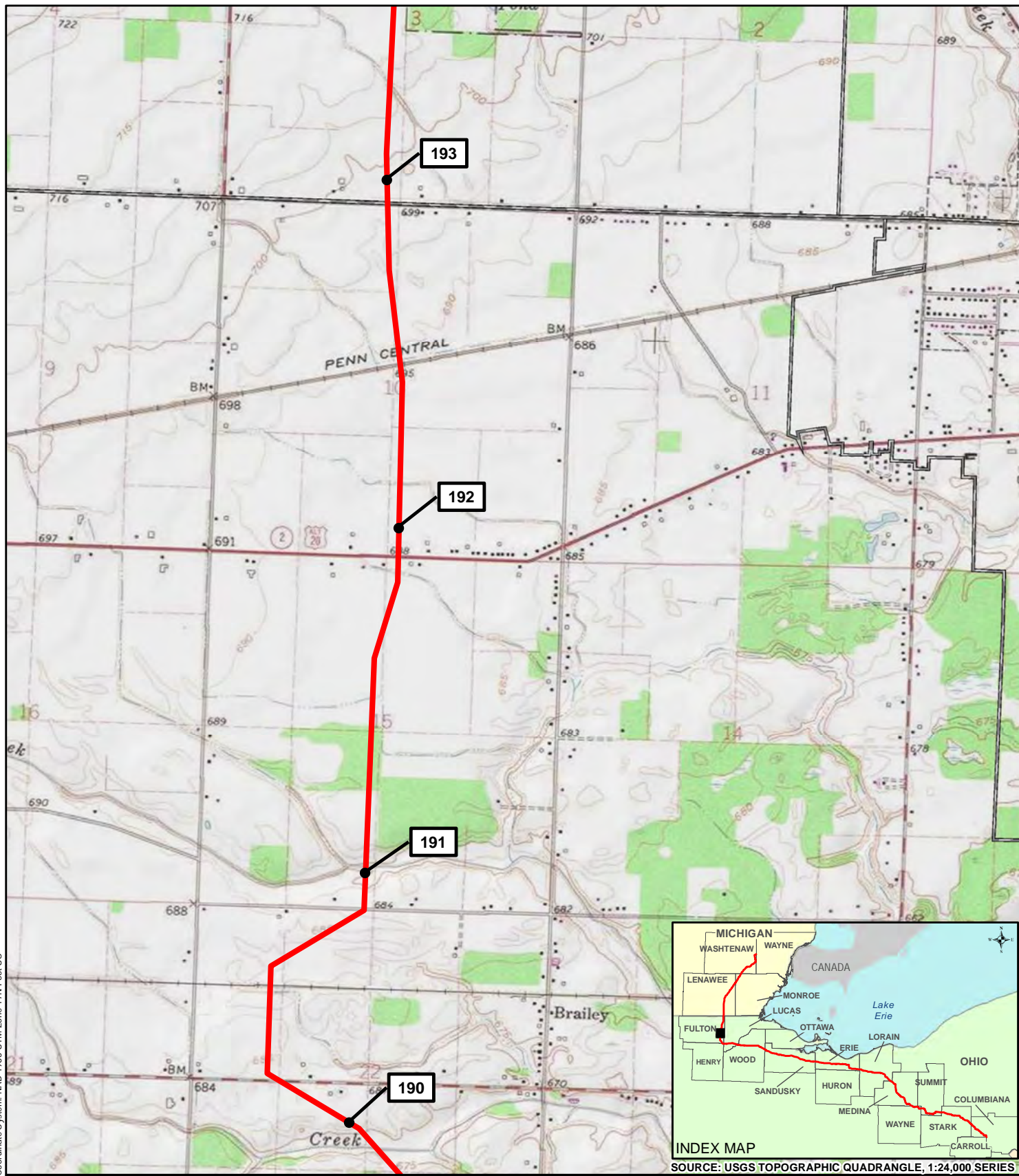
FIGURE 1.1.1-64

MAP 64 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015

Coordinate System: NAD 1983 UTM Zone 17N Foot US

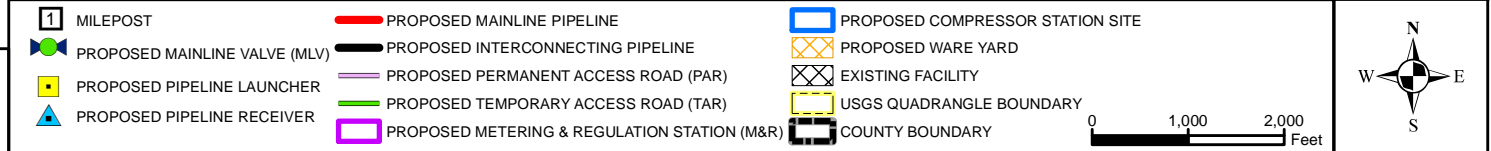
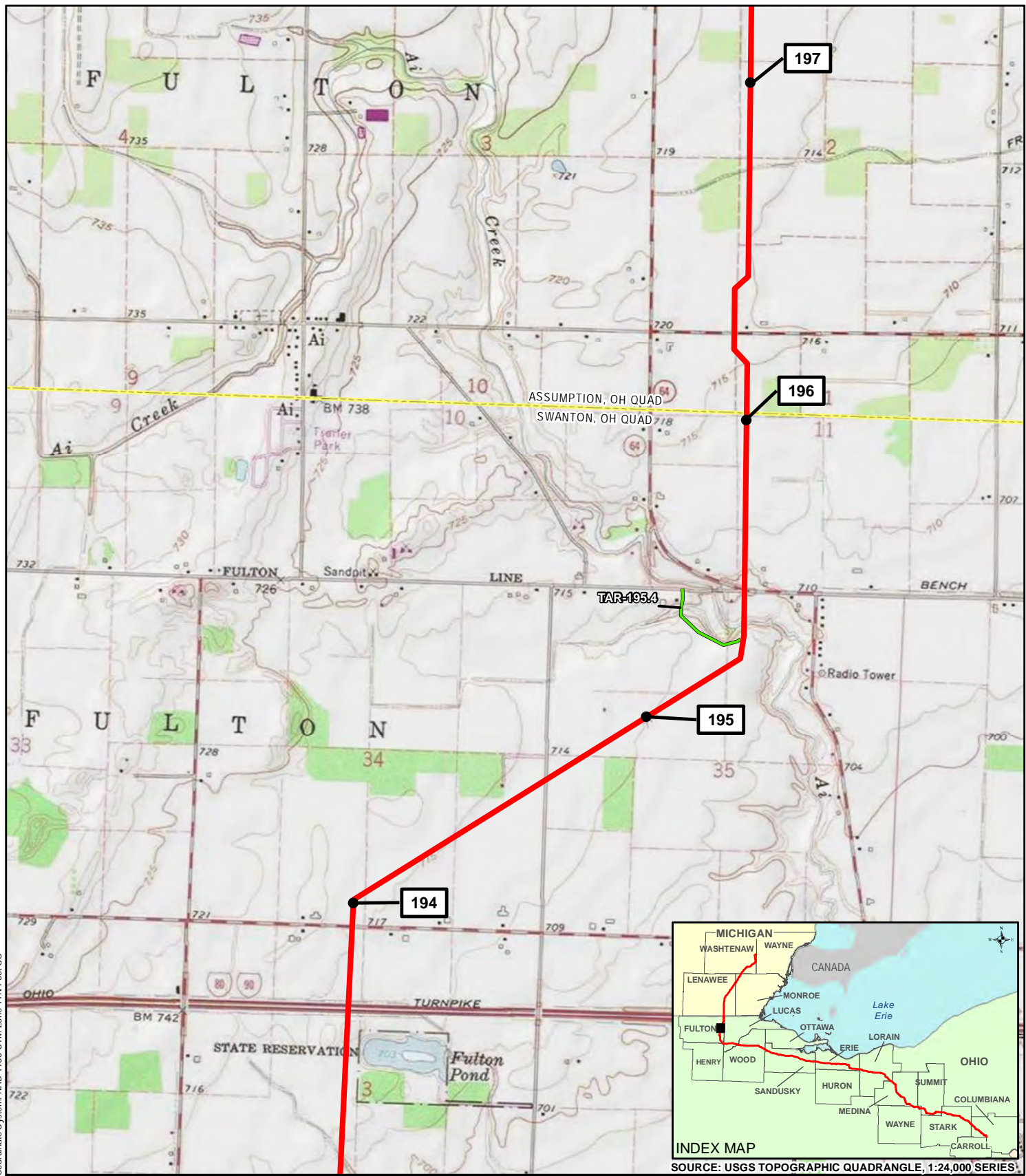


1 MILEPOST	PROPOSED MAINLINE PIPELINE	PROPOSED COMPRESSOR STATION SITE
PROPOSED MAINLINE VALVE (MLV)	PROPOSED INTERCONNECTING PIPELINE	PROPOSED WARE YARD
PROPOSED PIPELINE LAUNCHER	PROPOSED PERMANENT ACCESS ROAD (PAR)	EXISTING FACILITY
PROPOSED PIPELINE RECEIVER	PROPOSED TEMPORARY ACCESS ROAD (TAR)	USGS QUADRANGLE BOUNDARY
	PROPOSED METERING & REGULATION STATION (M&R)	COUNTY BOUNDARY

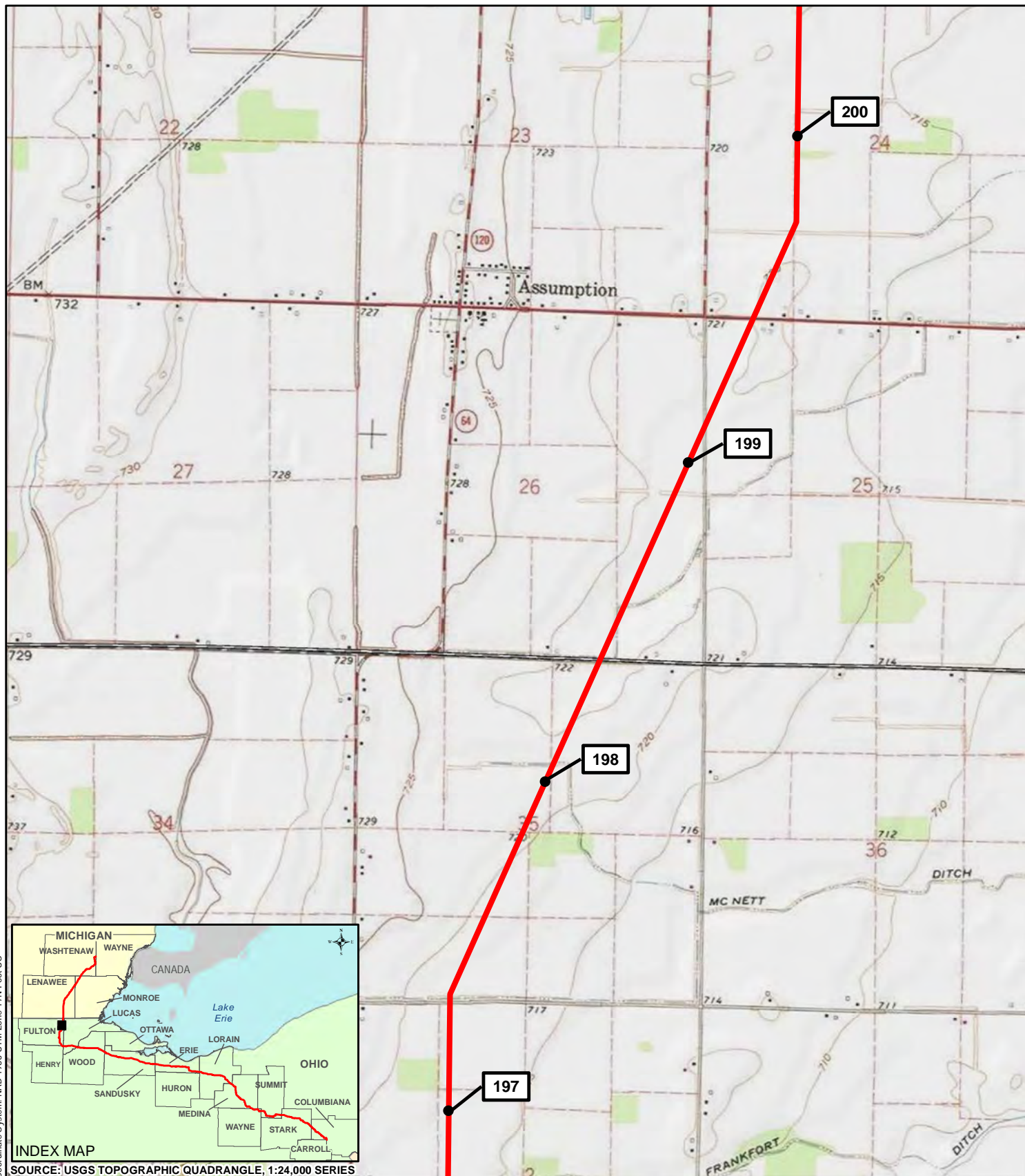
TITLE: NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP			
LOC.: FULTON COUNTY, OH			
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-65	MAP 65 of 81

Quad map based on data as of 08 April 2015

Coordinate System: NAD 1983 UTM Zone 17N Foot US



TITLE: NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP			
LOC.: FULTON COUNTY, OH			
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-66	MAP 66 of 81

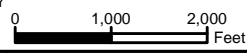


Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

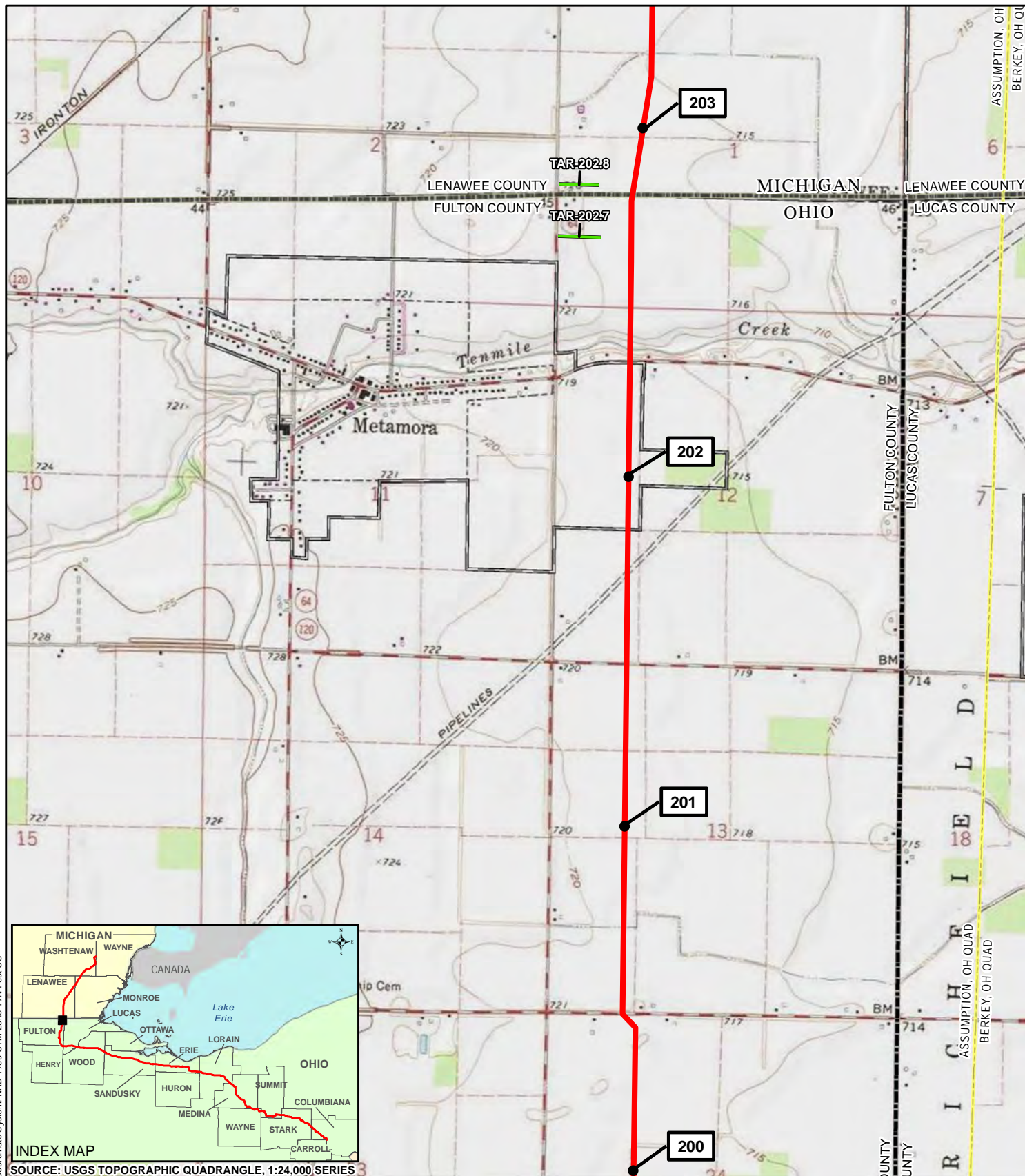
- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: FULTON COUNTY, OH	CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-67	MAP 67 of 81	



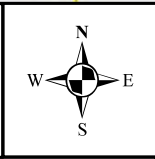


Coordinate System: NAD 1983 UTM Zone 17N Foot US



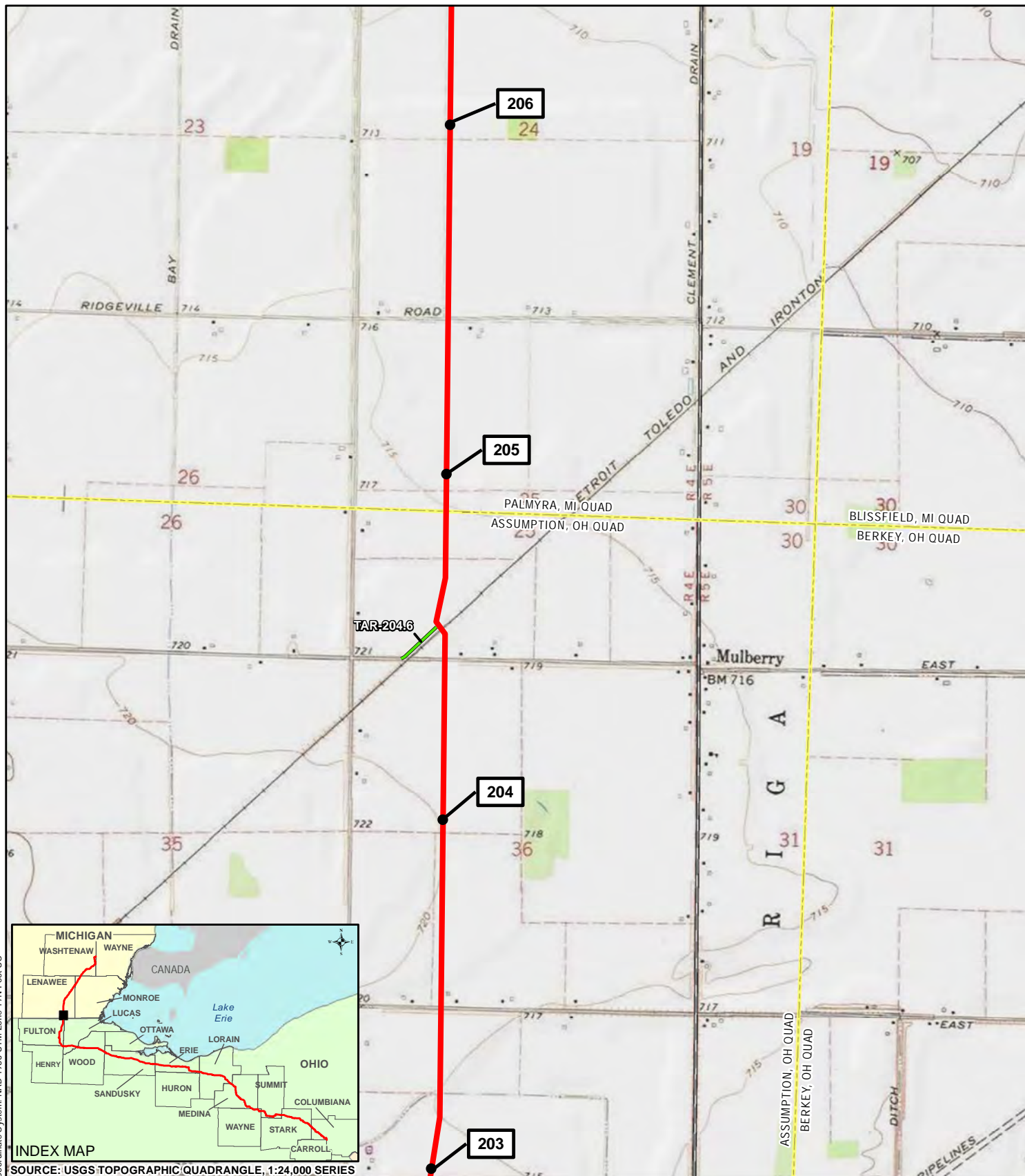
SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000, SERIES 3

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP			
LOC.: FULTON COUNTY, OH; LENAWEE COUNTY, MI			
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-68	MAP 68 of 81





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|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LENAWEE COUNTY, MI

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

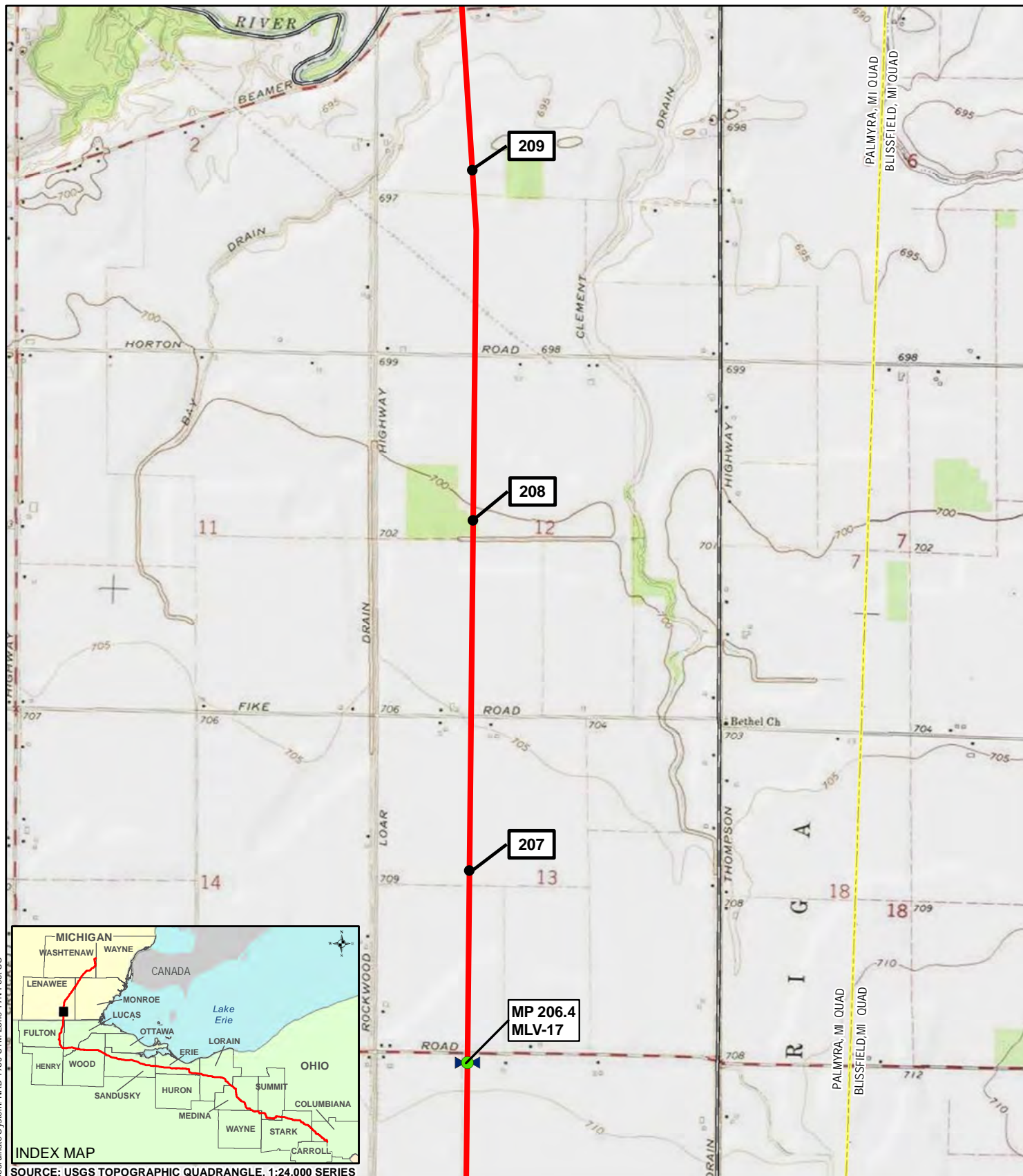
DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-69

MAP 69 of 81

NEXUS
GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US



SOURCE: USGS TOPOGRAPHIC QUADRANGLE, 1:24,000 SERIES

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|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LENAWEE COUNTY, MI

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

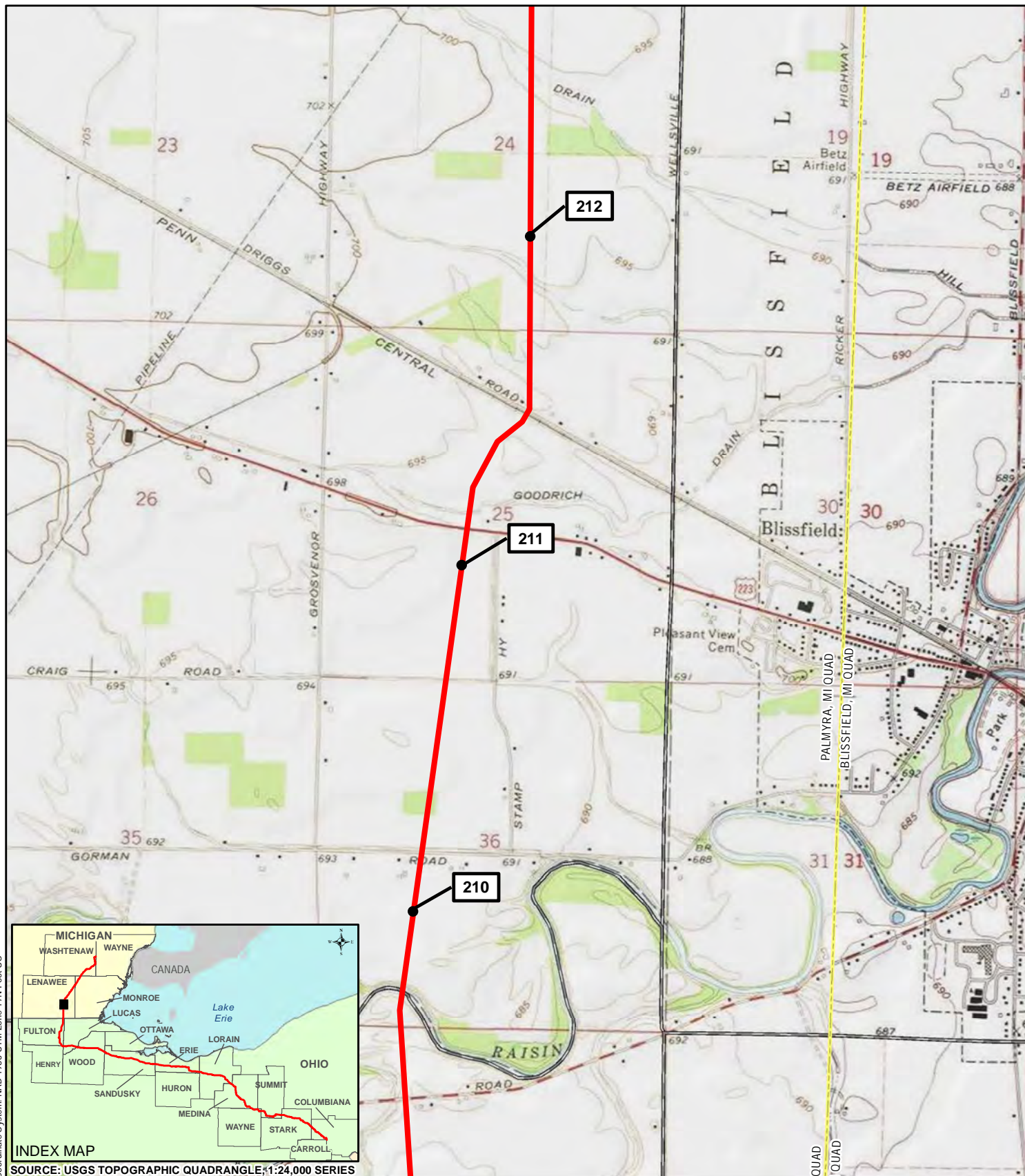
SCALE: 1" = 2,000'

FIGURE 1.1.1-70

MAP 70 of 81

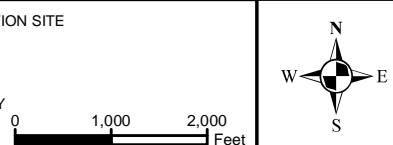
NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



SOURCE: USGS TOPOGRAPHIC QUADRANGLE 1:24,000 SERIES

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LENAWEE COUNTY, MI

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

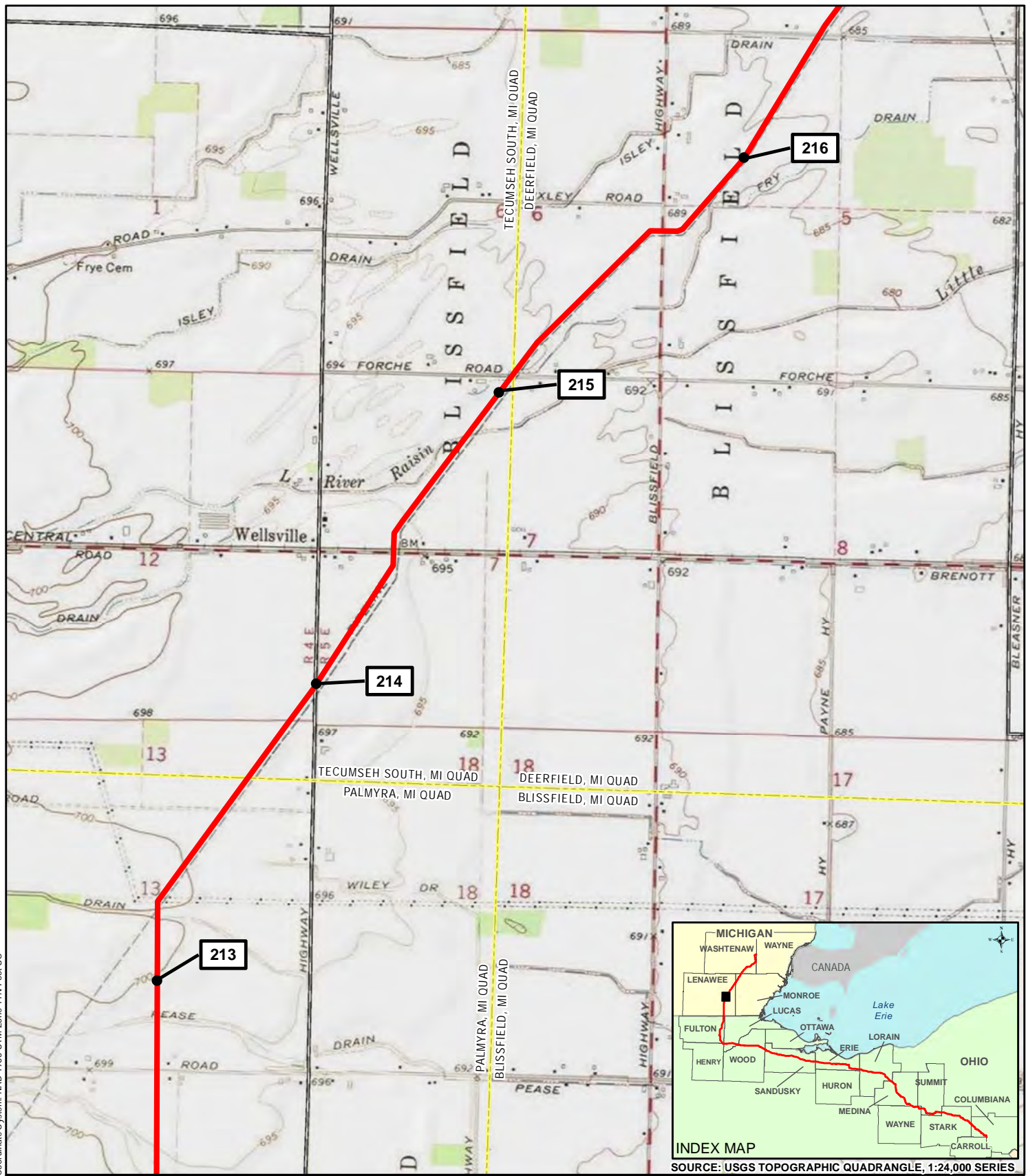
SCALE: 1" = 2,000'

FIGURE 1.1.1-71

MAP 71 of 81

NEXUS
GAS TRANSMISSION

Coordinate System: NAD 1983 UTM Zone 17N Foot US



1	MILEPOST	PROPOSED MAINLINE PIPELINE	PROPOSED COMPRESSOR STATION SITE
PROPOSED MAINLINE VALVE (MLV)	PROPOSED INTERCONNECTING PIPELINE	PROPOSED WARE YARD	EXISTING FACILITY
PROPOSED PIPELINE LAUNCHER	PROPOSED PERMANENT ACCESS ROAD (PAR)	USGS QUADRANGLE BOUNDARY	COUNTY BOUNDARY
PROPOSED PIPELINE RECEIVER	PROPOSED TEMPORARY ACCESS ROAD (TAR)		
	PROPOSED METERING & REGULATION STATION (M&R)		

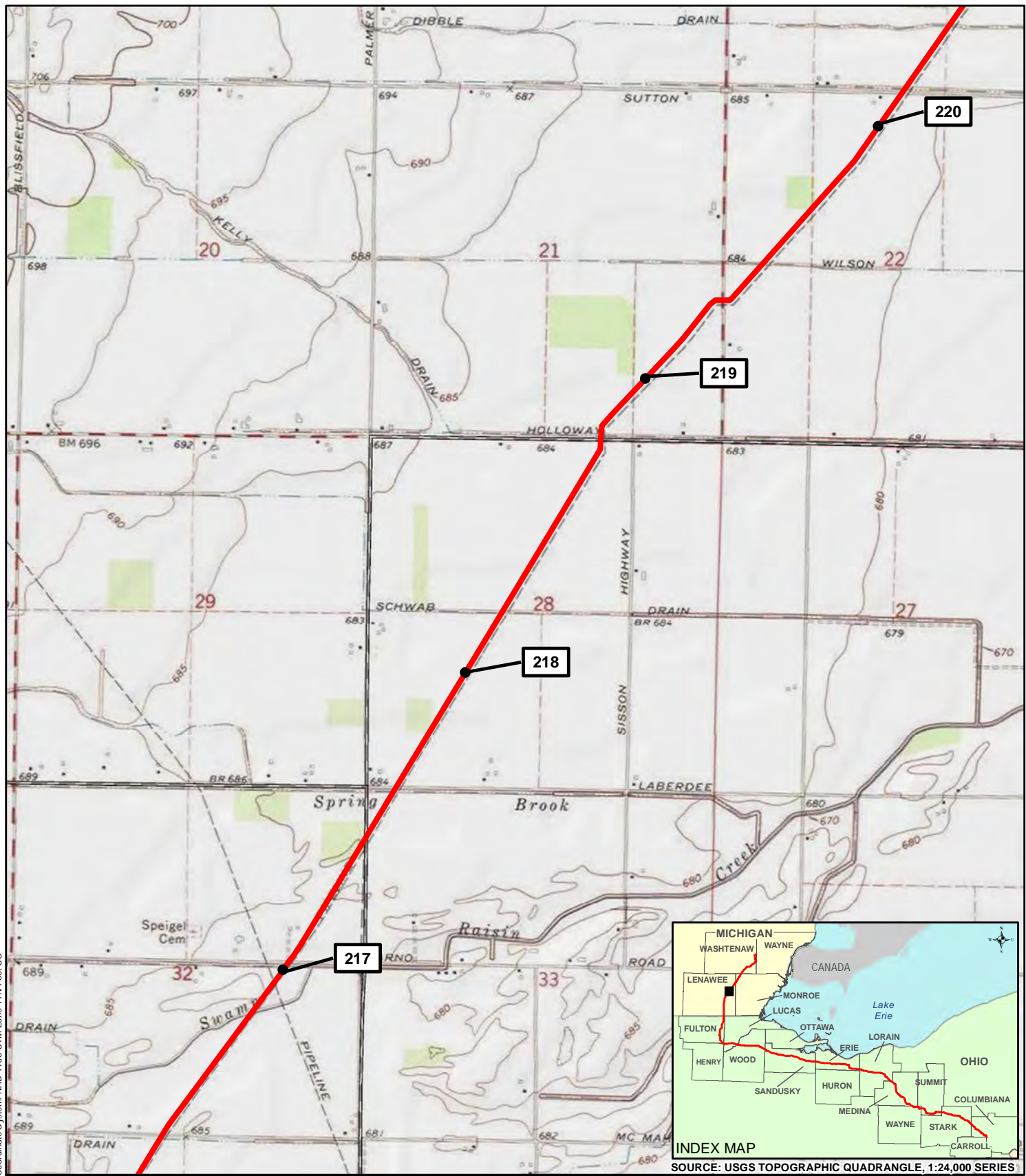
TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LENAWEE COUNTY, MI

CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-72	MAP 72 of 81

NEXUS
GAS TRANSMISSION

Coordinate System: NAD 1983 UTM Zone 17N Foot US



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|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LENAWEE COUNTY, MI

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

SCALE: 1" = 2,000'

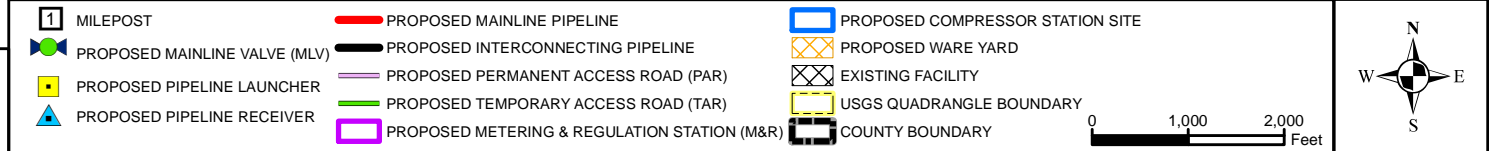
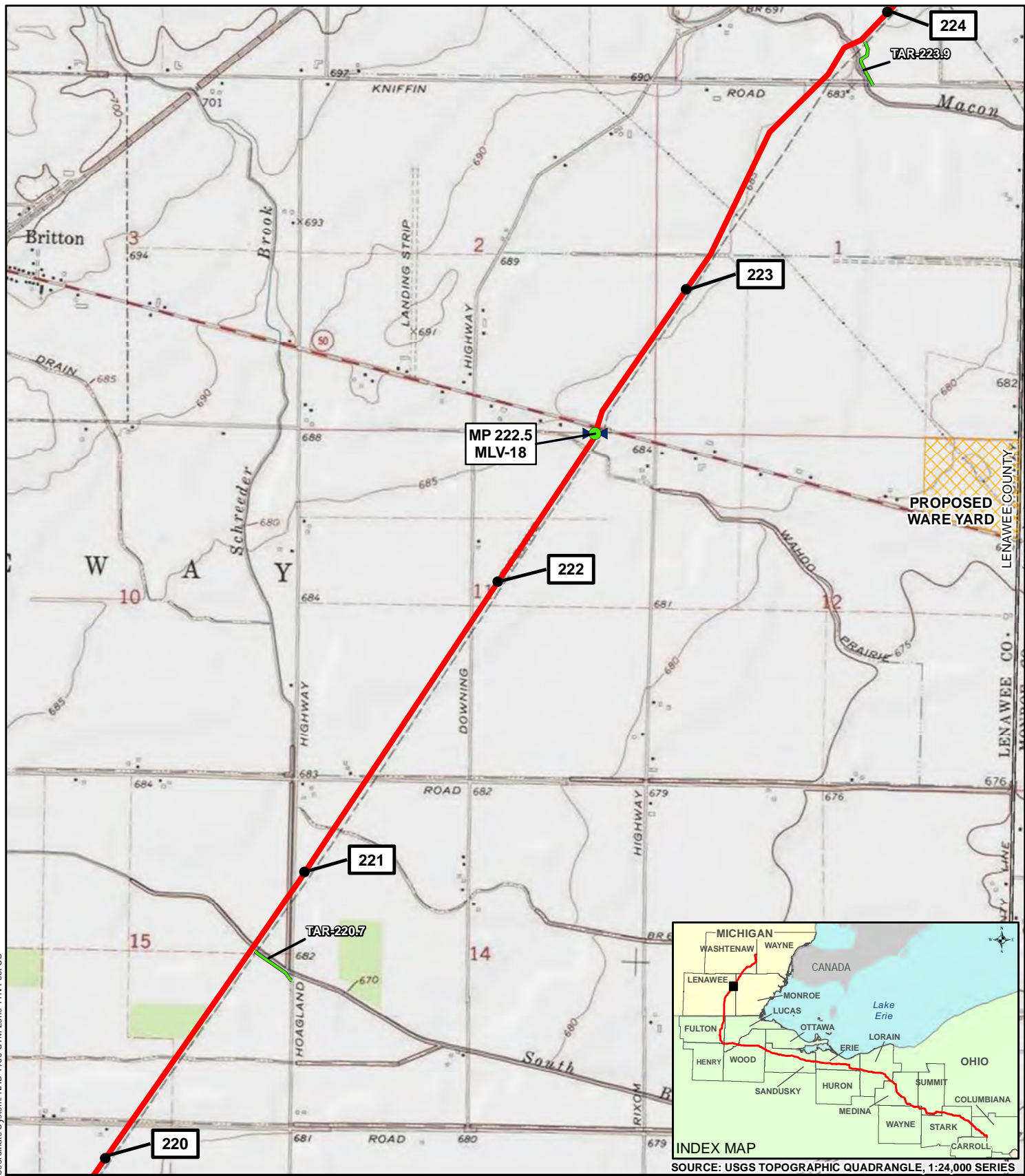
FIGURE 1.1.1-73

MAP 73 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015

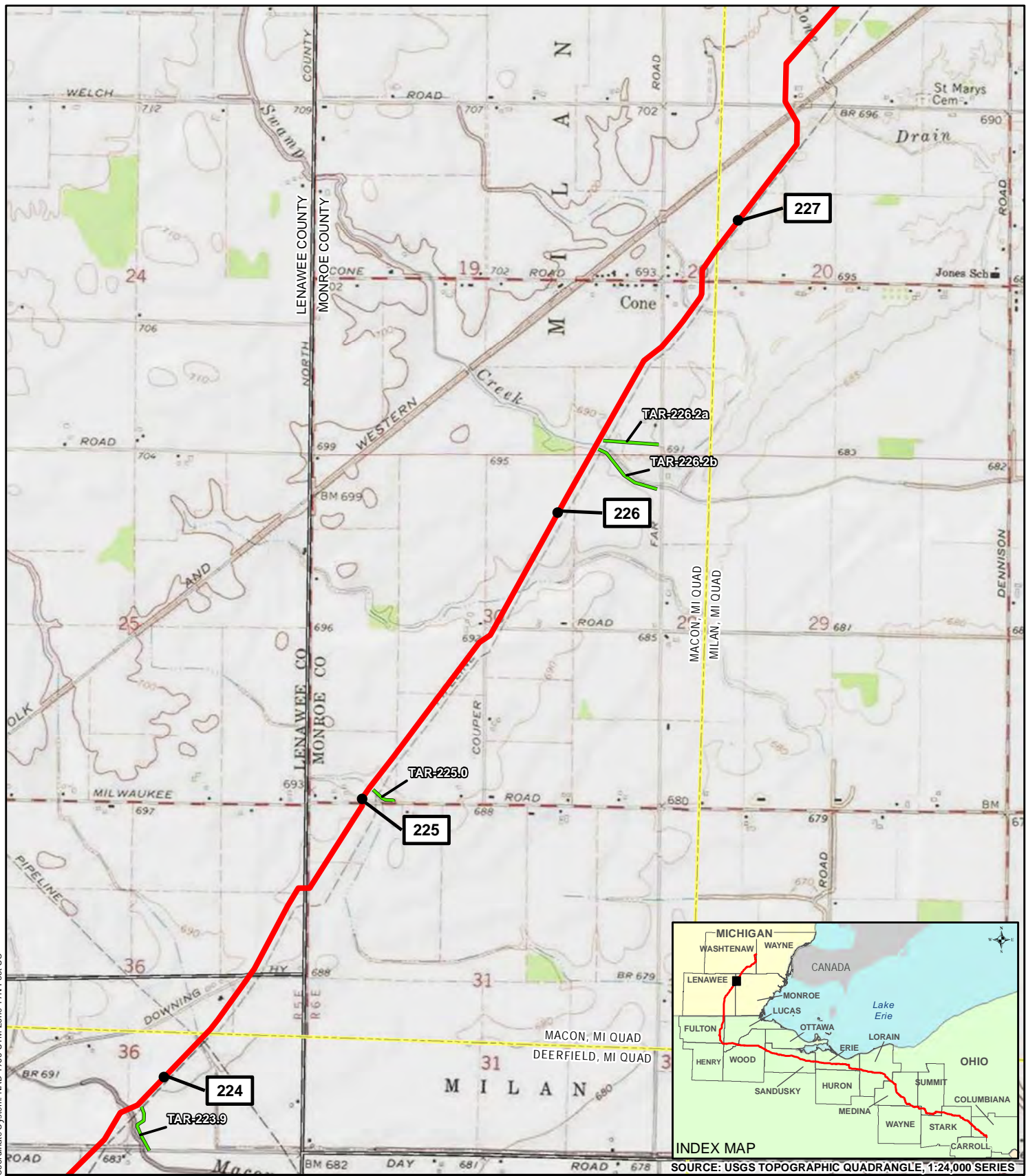
Coordinate System: NAD 1983 UTM Zone 17N Foot US



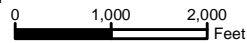
TITLE: NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP				
LOC.: LENAWEE COUNTY, MI				
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.	
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-74	MAP 74 of 81	



Coordinate System: NAD 1983 UTM Zone 17N Foot US



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE:
NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: LENAWEE COUNTY, MI; MONROE COUNTY, MI

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-75

MAP 75 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015



Coordinate System: NAD 1983 UTM Zone 17N Foot US

- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: MONROE COUNTY, MI: WASHTENAW COUNTY, MI

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

SCALE: 1" = 2,000'

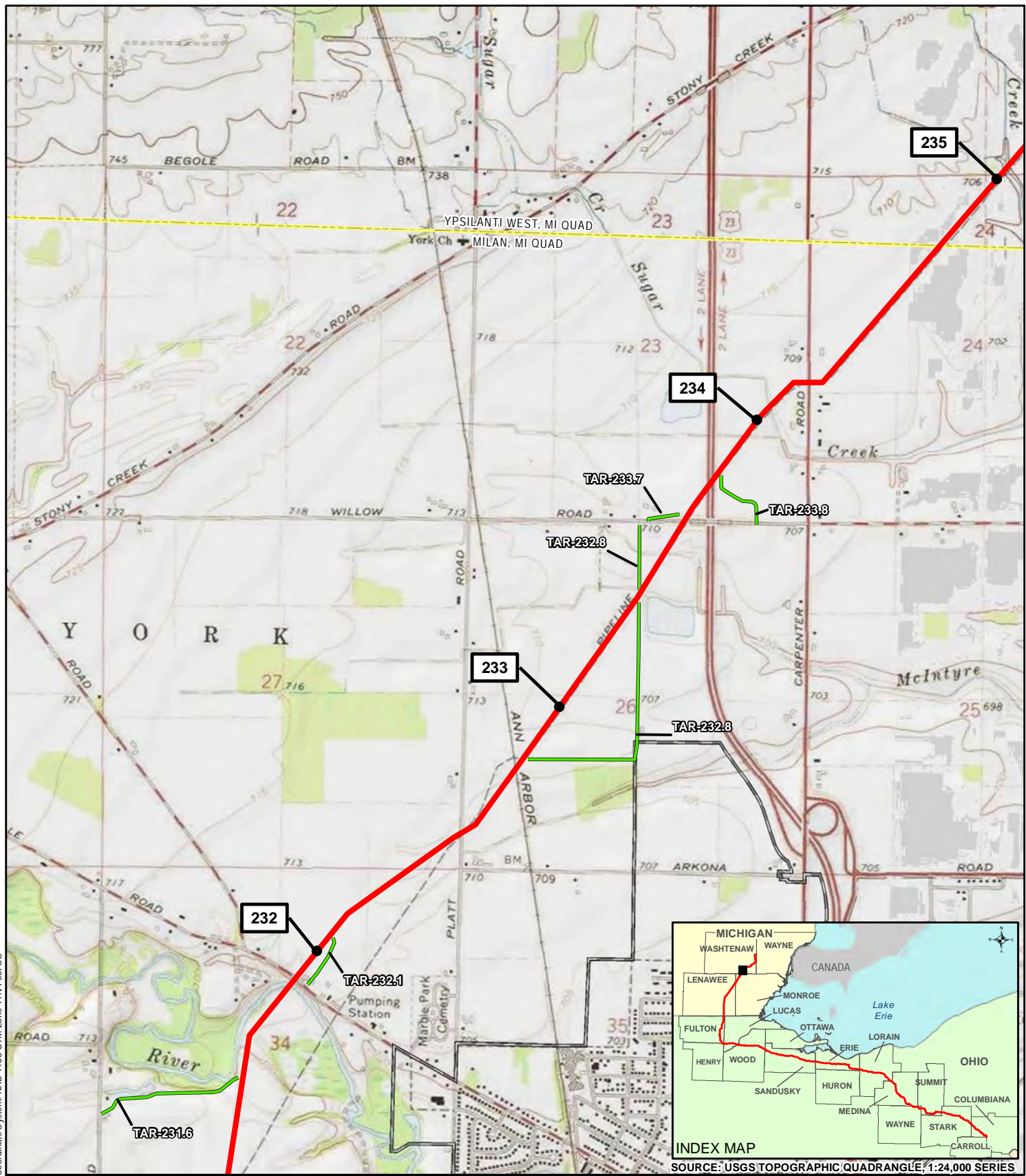
FIGURE 1.1.1-76

MAP 76 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015

Coordinate System: NAD 1983 UTM Zone 17N Foot US



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: WASHTENAW COUNTY, MI

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

SCALE: 1" = 2,000'

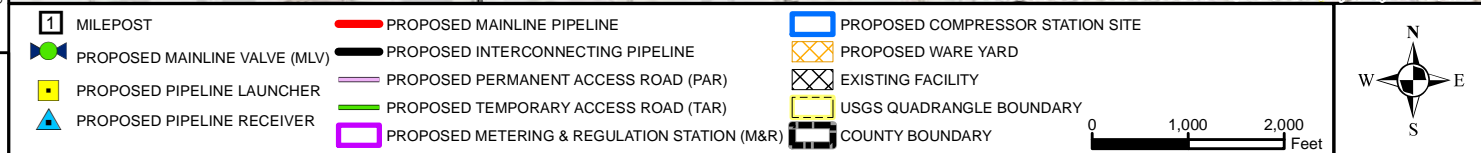
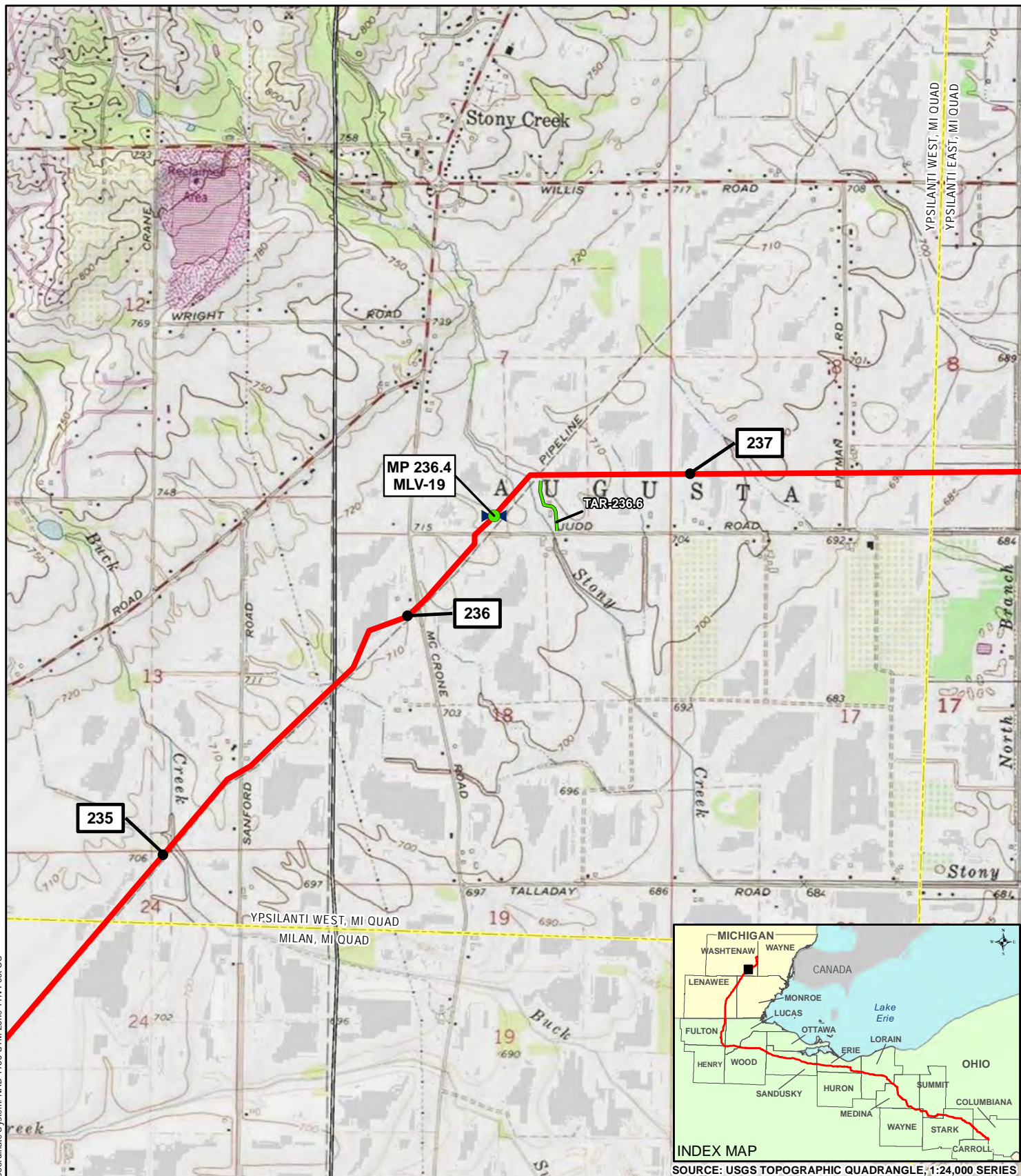
FIGURE 1.1.1-77

MAP 77 of 81

NEXUS
GAS TRANSMISSION

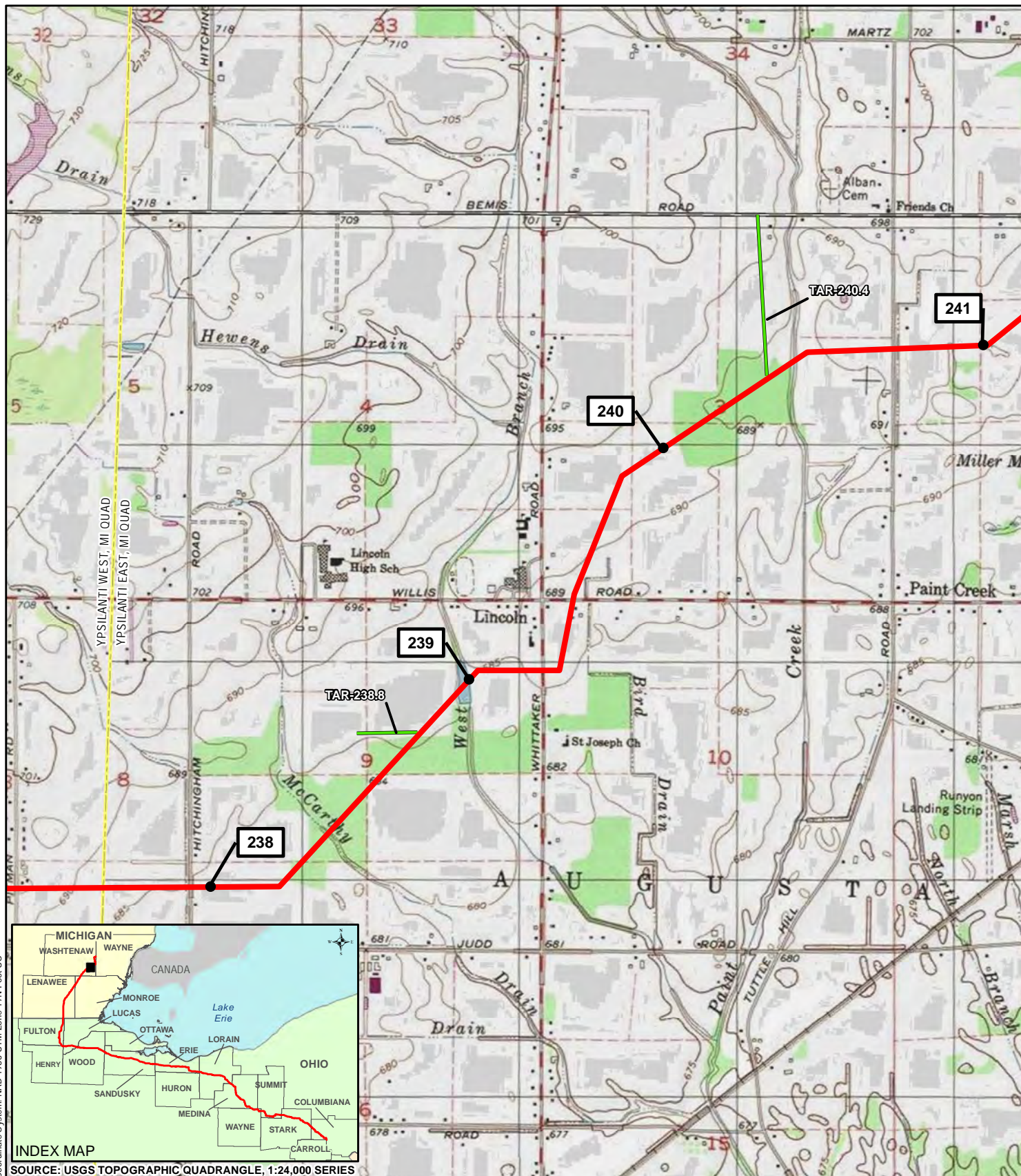
Quad map based on data as of 08 April 2015

Coordinate System: NAD 1983 UTM Zone 17N Foot US



TITLE: NEXUS GAS TRANSMISSION PROJECT PROPOSED PIPELINE - USGS QUAD MAP			
LOC.: WASHTENAW COUNTY, MI			
CKD. BY: NR	ENG.	DATE: 3/6/2015	W.O.
DRN. BY: KM	SCALE: 1" = 2,000'	FIGURE 1.1.1-78	MAP 78 of 81

Quad map based on data as of 08 April 2015



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: WASHTENAW COUNTY, MI

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

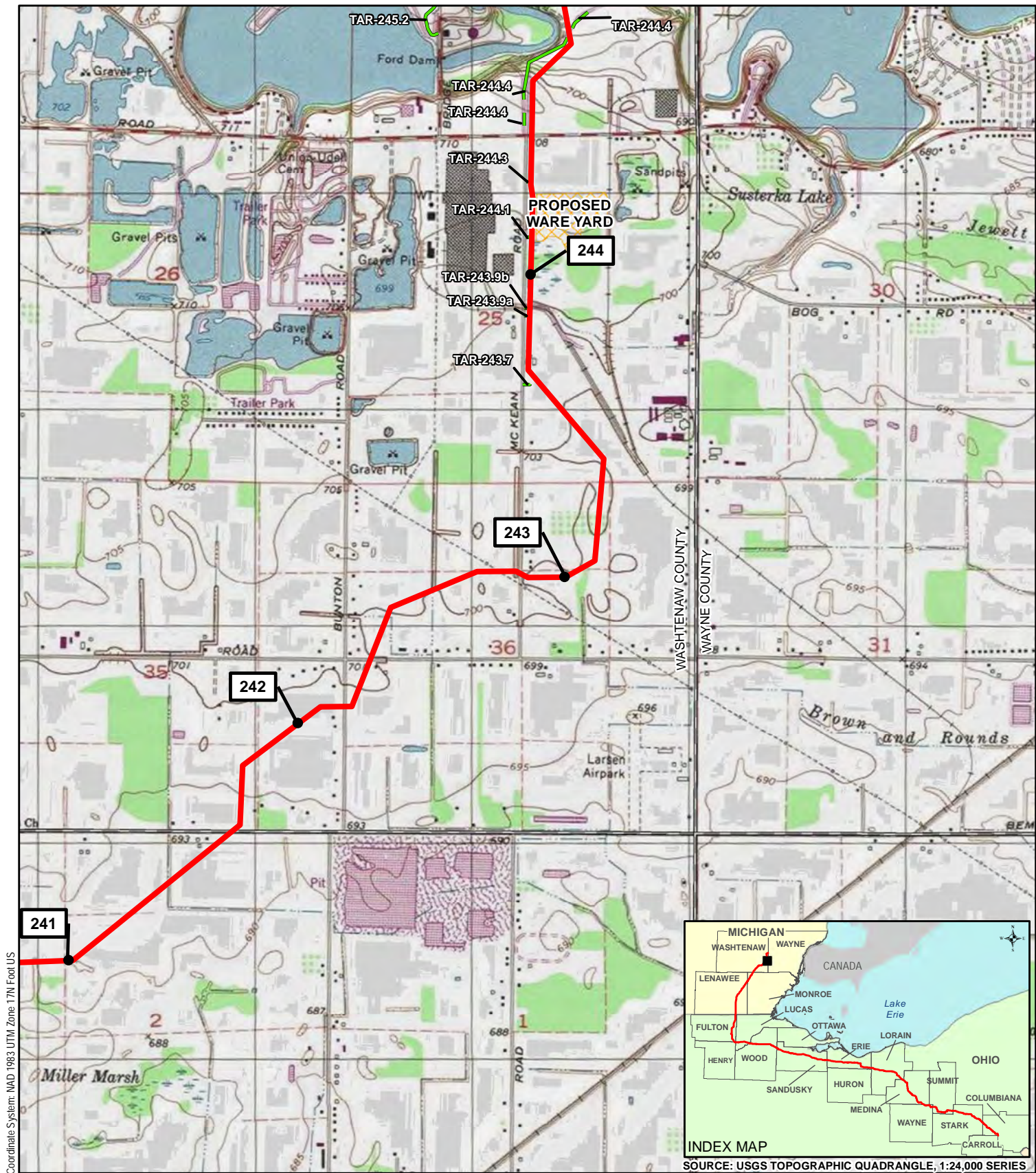
DRN. BY: KM

SCALE: 1" = 2,000'

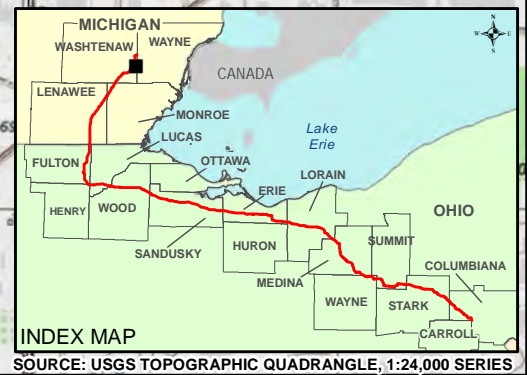
FIGURE 1.1.1-79

MAP 79 of 81

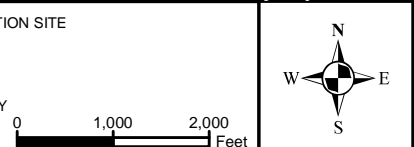
NEXUS
GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: WASHTENAW COUNTY, MI

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

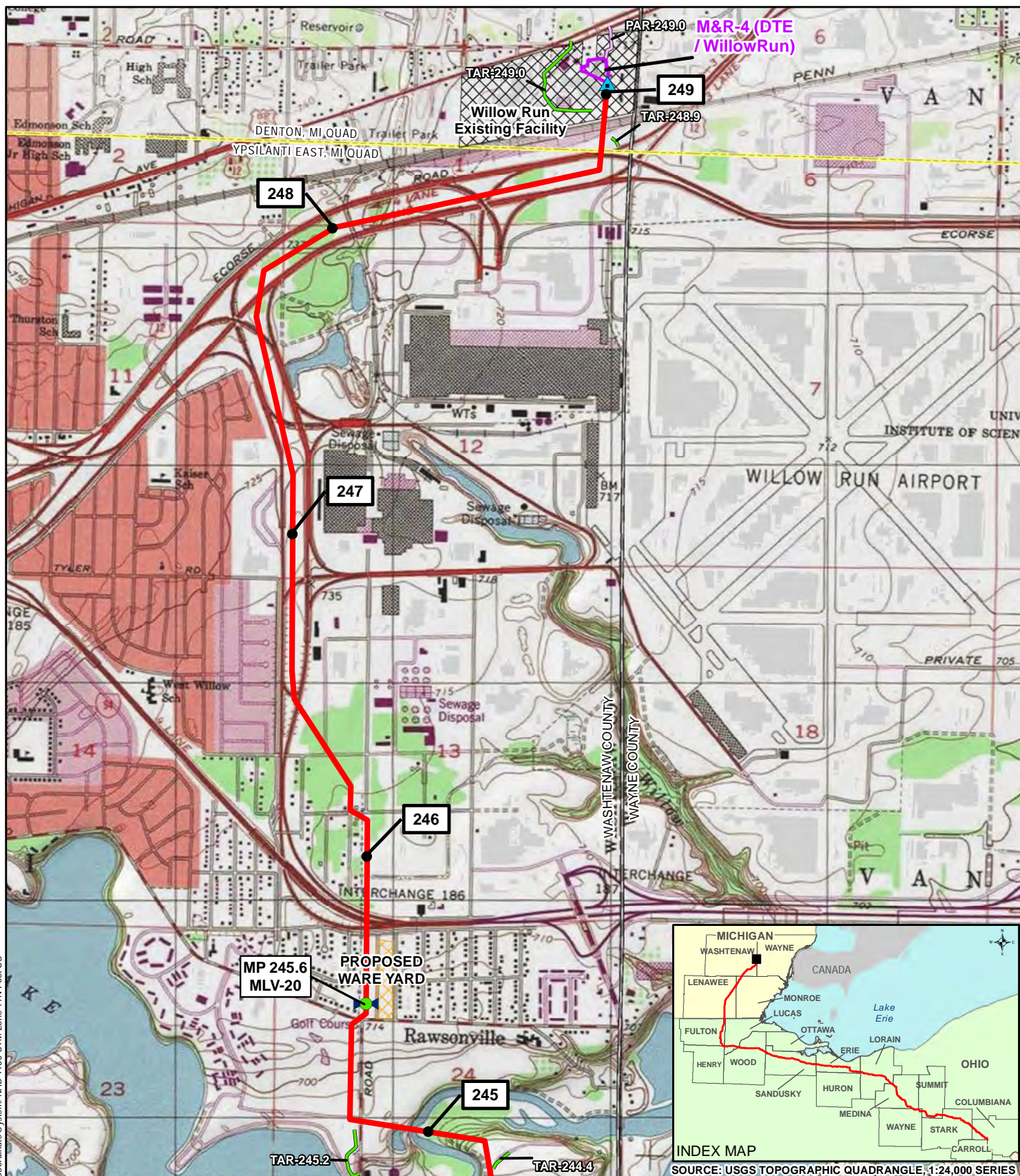
SCALE: 1" = 2,000'

FIGURE 1.1.1-80

MAP 80 of 81

NEXUS
GAS TRANSMISSION

Coordinate System: NAD 1983 UTM Zone 17N Foot US



- | | | |
|-------------------------------|--|----------------------------------|
| 1 MILEPOST | PROPOSED MAINLINE PIPELINE | PROPOSED COMPRESSOR STATION SITE |
| PROPOSED MAINLINE VALVE (MLV) | PROPOSED INTERCONNECTING PIPELINE | PROPOSED WARE YARD |
| PROPOSED PIPELINE LAUNCHER | PROPOSED PERMANENT ACCESS ROAD (PAR) | EXISTING FACILITY |
| PROPOSED PIPELINE RECEIVER | PROPOSED TEMPORARY ACCESS ROAD (TAR) | USGS QUADRANGLE BOUNDARY |
| | PROPOSED METERING & REGULATION STATION (M&R) | COUNTY BOUNDARY |

0 1,000 2,000 Feet



TITLE: NEXUS GAS TRANSMISSION PROJECT
PROPOSED PIPELINE - USGS QUAD MAP

LOC.: WASHTENAW COUNTY, MI

CKD. BY: NR

ENG.

DATE: 3/6/2015

W.O.

DRN. BY: KM

SCALE: 1" = 2,000'

FIGURE 1.1.1-81

MAP 81 of 81

NEXUS
GAS TRANSMISSION

Quad map based on data as of 08 April 2015

Other Aboveground Facility Plot Plan Drawings

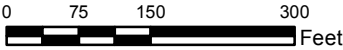
TOWN OF FRANKLIN
COLUMBIANA COUNTY, OHIO



Vicinity Map
1" = 40,000'

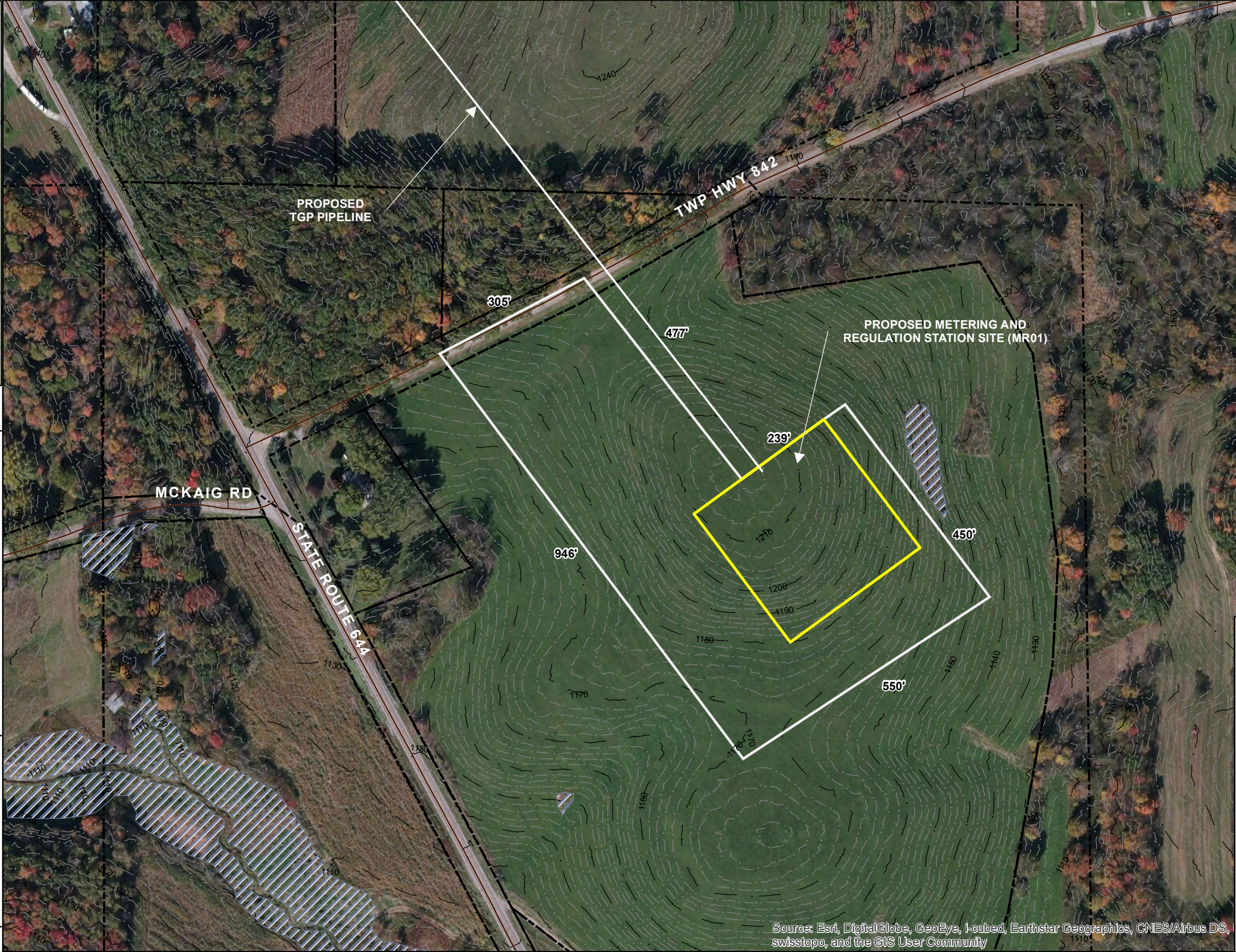
Legend

- Existing Overhead Wires
- Roads
- Temporary Workspace
- Major Contour
- Intermediate Contour
- Permanent Disturbance Area
- Property Line
- Wetland Area

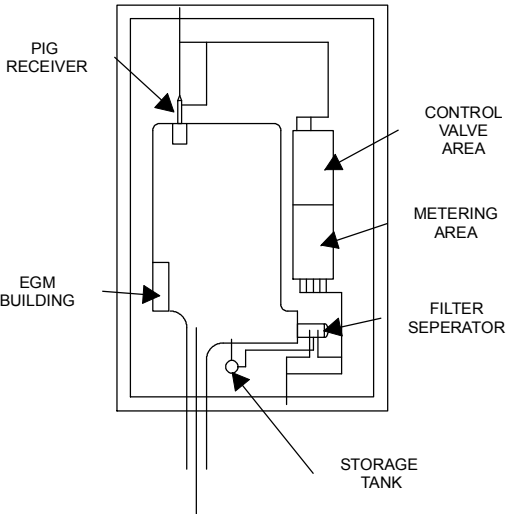


Map Notes

- Coordinates are reference to the North American Datum (NAD) of 1983 onto UTM zone 17 north
- Elevations depicted are referenced to the North American Vertical Datum (NAVD) of 1988.



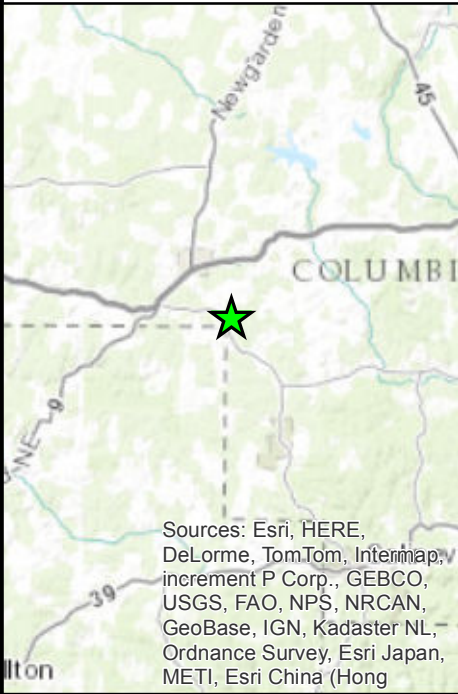
Typical Plot Plan



				DRAFTING DESIGNER					<div>SITE PLAN PROPOSED METERING AND REGULATION STATION SITE (MR01)</div>			
				ENGINEERING APPROVALS								
				DRAWN BY:	BID		CONSTRUCTION					
				DRAFTING SUPERVISOR								
				DESIGN ENGINEER								
				DESIGN MANAGER								
REV	DSN	CK	DESCRIPTION		INITIALS	DATE	INITIALS	DATE	YEAR: 3/6/2015	W.O.	SCALE: 1 " = 200 '	DW



TOWN OF FRANKLIN
COLUMBIANA COUNTY, OHIO

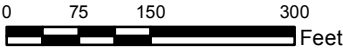


Vicinity Map

1" = 40,000'

Legend

- Proposed Mainline Pipeline
- Proposed TGP Pipeline
- Existing Overhead Wires
- Roads
- Temporary Workspace
- Major Contour
- Intermediate Contour
- Permanent Disturbance Area
- Wetland Area
- Property Line

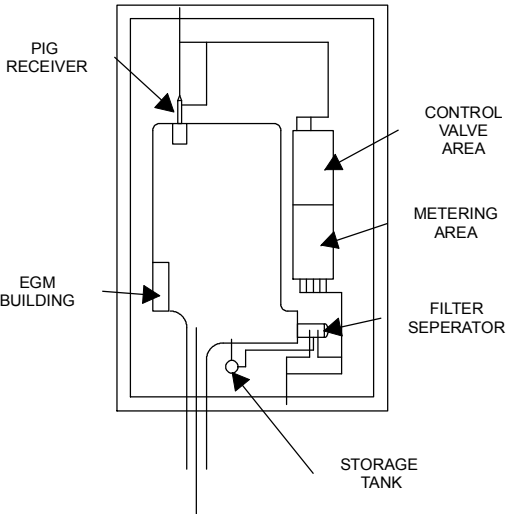



Map Notes

- Coordinates are reference to the North American Datum (NAD) of 1983 onto UTM zone 17 north
- Elevations depicted are referenced to the North American Vertical Datum (NAVD) of 1988.

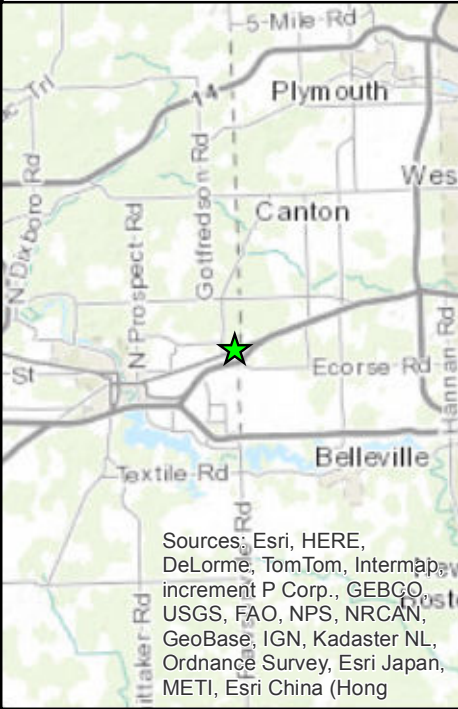


Typical Plot Plan



				DRAFTING DESIGNER					SITE PLAN PROPOSED METERING AND REGULATION STATION SITE (MR01)				
				ENGINEERING APPROVALS									
				DRAWN BY:	BID		CONSTRUCTION						
				DRAFTING SUPERVISOR									
				DESIGN ENGINEER									
				DESIGN MANAGER									
REV	DSN	CK	DESCRIPTION		INITIALS	DATE	INITIALS	DATE	YEAR: 3/6/2015	W.O.	SCALE: 1" = 200'	DWG.	REV.

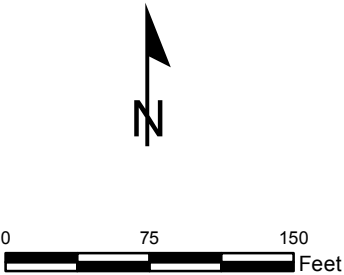
TOWN OF YPSILANTI
WASHTENAW COUNTY, MICHIGAN



Vicinity Map
1" = 40,000'

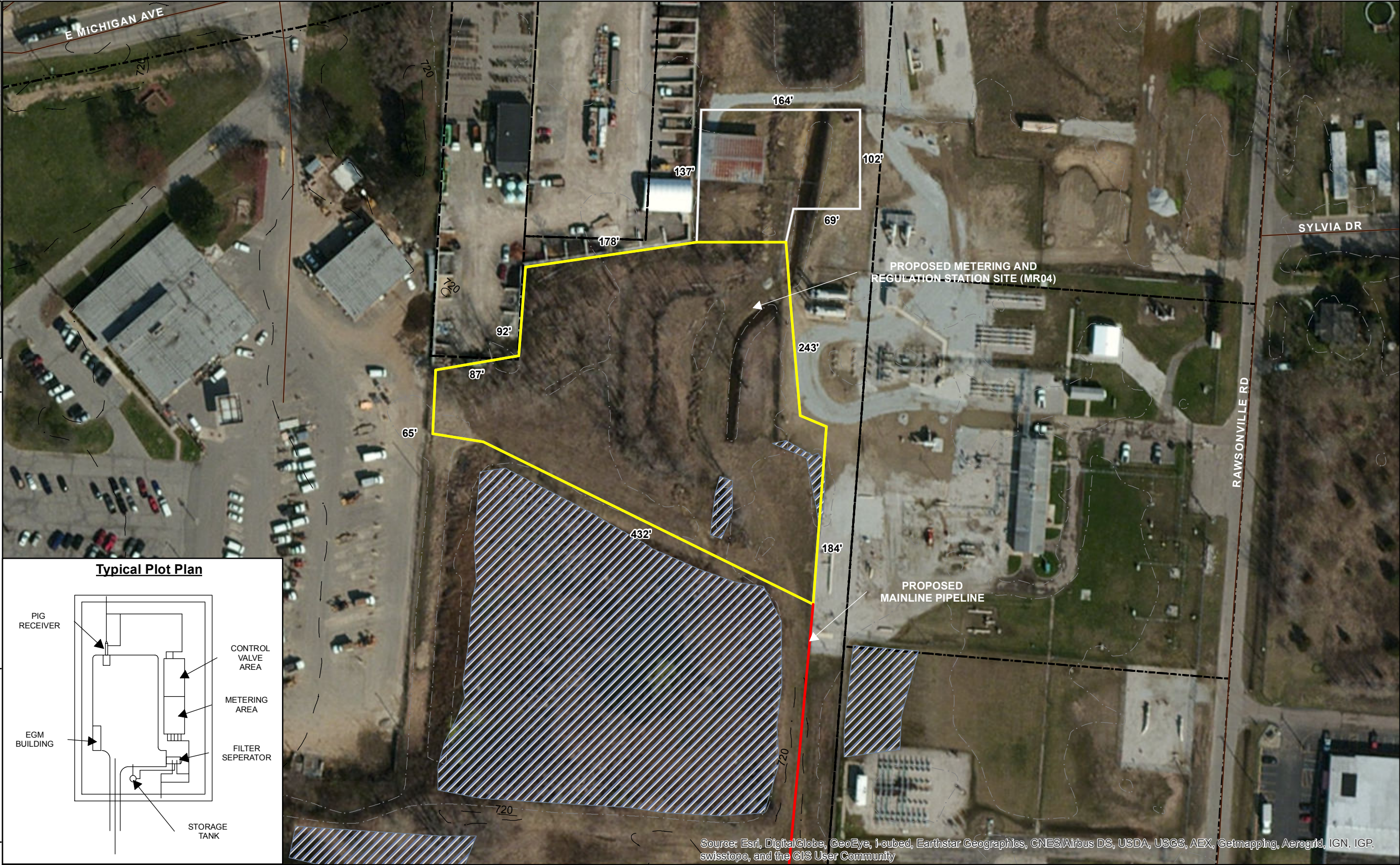
Legend


- Proposed Mainline Pipeline
- Temporary Workspace
- Roads
- Permanent Disturbance Area
- Wetland Area
- Property Line
- Index Contours
- Intermediate Contours



Map Notes

- Coordinates are reference to the North American Datum (NAD) of 1983 onto UTM zone 17 north
- Elevations depicted are referenced to the North American Vertical Datum (NAVD) of 1988.



				DRAFTING DESIGNER					SITE PLAN PROPOSED METERING AND REGULATION STATION SITE (MR04)				
				ENGINEERING APPROVALS									
				DRAWN BY:	BID		CONSTRUCTION						
				DRAFTING SUPERVISOR									
				DESIGN ENGINEER									
				DESIGN MANAGER									
REV	DSN	CK	DESCRIPTION		INITIALS	DATE	INITIALS	DATE	YEAR: 3/6/2015	W.O.	SCALE: 1" = 100'	DWG.	REV.

APPENDIX 1B

- **1B1 - Erosion and Sediment Control Plan**
- **1B2 - Spill Prevention Control and Countermeasure Plan**
- **1B3 – NEXUS Blasting Plan**

APPENDIX 1B1

Erosion and Sediment Control Plan

EROSION AND SEDIMENTATION CONTROL PLAN

Company: NEXUS Gas Transmission, LLC

Project: NEXUS Gas Transmission Project

Location: Ohio and Michigan

Prepared by: NEXUS Gas Transmission, LLC
Environmental Construction Permitting
5400 Westheimer Court
Houston, Texas 77056-5310

Effective February 18, 2003

Updated January 2015

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APPENDIX A – E&SCP FIGURES

APPENDIX B – WATERBODY REFERENCE CITING FERC REQUIREMENTS

APPENDIX C – SEED MIX RECOMMENDATIONS

Figure Number	CATEGORY ABBREVIATION / Figure Name
<u>CONSTRUCTION WORK AREAS (CW)</u>	
CW-1	Typical Trench Detail
CW-2	Right-of-Way Topsoil Segregation Techniques
CW-3	Typical Construction Widths Acquiring New Permanent Right-of-Way
CW-4	Typical Construction Widths Not Acquiring New Permanent Right-of-Way (Single Line System)
CW-5	Typical Construction Widths Not Acquiring New Permanent Right-of-Way (Multiple Line System)
<u>ACCESS ROADS & ROAD CROSSINGS (RD)</u>	
RD-1	Access Road Cross Section
RD-2	Rock Access Pad
RD-3	Typical Temporary Access Road Through Wetlands
RD-4	Typical Paved Road Crossing Control Measures (Open Cut)
RD-5	Typical Paved Road Crossing Control Measures (Bored)
<u>EROSION CONTROLS (EC)</u>	
EC-1	Silt Fence Detail
EC-2	Straw Bale Detail
EC-3	Straw Bale Check Dam in a Drainageway
EC-4	Rock-lined Drainage Swale
EC-5	Storm Drain Inlet Protection
EC-6	Temporary Trench Plug Options
EC-7	Temporary Slope Breaker
EC-8	Permanent Slope Breaker
EC-9	Chevron Slope Breaker
EC-10	Trench Breaker Detail (Sack)
EC-11	Trench Breaker Detail (Foam)
EC-12	Permanent Trench Breaker Options
EC-13	Erosion Control Fabric/Blanket Installation
EC-14	Typical Erosion Control Blankets on Slopes

LIST OF FIGURES, continued

Figure Number	<u>CATEGORY ABBREVIATION</u> / Figure Name
<u>WATER DISCHARGES (WD)</u>	
WD-1	Filter Bag
WD-2	Discharge Structure for Hydrostatic Test Water
WD-2	Options for Small Water Discharges
WD-3	Discharge of Hydrostatic Test Water to a Surface Water
<u>BRIDGES (BR)</u>	
BR-1	Temporary Equipment Bridge (Equipment Pads with or without Culverts)
BR-2	Temporary Equipment Bridge (Crushed Stone with Culverts)
BR-3	Temporary Equipment Bridge (Flexi-float or Portable Bridge)
<u>WATERBODY & WETLAND CROSSINGS (WC)</u>	
WC-1	Typical Standard Wetland Crossing
WC-2	Typical Wet Waterbody Crossing
WC-3	Typical Flume Waterbody Crossing
WC-4	Typical Dam-and-Pump Waterbody Crossing
WC-5	Typical Erosion Control Blankets on Streambanks
WC-6	Typical Rip-Rap Placement
<u>SPECIAL USE / AGRICULTURAL & RESIDENTIAL AREAS (SU)</u>	
SU-1	Drain Tile Repair Procedure

7(c) – Activities authorized under a project-specific Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission (FERC), pursuant to Section 7(c) of the Natural Gas Act, to transport or sell natural gas, as well as construct, acquire, extend, alter or operate specific natural gas facilities that provide natural gas service.

Abandonment – Permanent reduction in the availability for service of a FERC jurisdictional facility, including facility modifications which would result in changes to certificated parameters (e.g., permanently operating compressors at lower than certificated horsepower or pipelines at lower than certificated design pressures) as well as changes in operating status (e.g., abandoned-in-place, idled and not maintained, decommissioned or removed facilities). Abandonment of pipe or facilities may be authorized under the blanket certificate or a project-specific Order of Abandonment by FERC, in accordance with Section 7(b) of the Natural Gas Act.

Agricultural Land – Actively cultivated and rotated land used for the production of crops including but not limited to corn, grains, orchards, vineyards and hayfields.

Blanket Certificate Project – Blanket certificate authorization is obtained from FERC by the Company and allows the Company to construct, modify, acquire, operate, and abandon a limited set of natural gas facilities, and offer a set of services without the need for further activity-specific certificate authorizations. Regulations for FERC’s Blanket Certificate program are provided under Title 18 CFR Part 157, Subpart F. Examples of these projects include, but is not limited to, pipe replacements requiring new permanent right-of-way (ROW) or temporary workspace outside of the original construction footprint, miscellaneous pipe rearrangements, new receipt and delivery points, abandonments, temporary compression facilities, underground storage field remediation and maintenance activities, and underground storage testing and development activities.

Chief Inspector – Person, designated by the Company, responsible for the quality assurance of construction activities on a project by managing on-site project inspection staff and ensuring the construction contractor meets the requirements of the Company’s construction specifications, permits, and any plans and drawings related to specific construction activities. All inspectors on the project report to the Chief Inspector and the Chief Inspector reports to the Company’s Construction Superintendant.

Clearance Package/Permit Book – The document issued by the Company’s Environmental Construction Permitting (ECP) Department that contains all of the necessary environmental permits, clearances, plans and other requirements specific to a project. The Clearance Package/Permit Book is also included as part of the construction contract.

Deviation – A change to the placement of work limits, structures specified in the construction drawings, or changes in the design of control measures as set forth in the E&SCP, with the exception of minor variations from specifications in the typical E&SCP figures (refer to Appendix A) that are required due to site-specific conditions and which are designed to achieve an equivalent or greater degree of environmental protection.

Environmental Inspector (EI) – On-site Company representative responsible for inspecting and verifying site compliance with environmental conditions identified in the E&SCP as well as project-specific terms and conditions contained within the Clearance Package / Permit Book. The environmental inspector will perform the duties that are outlined in Section 2.1 of this plan.

Ephemeral stream – Waterbody which flows water only during precipitation events in a typical year and for a short duration after the events. Runoff from rainfall is the primary source of water for stream flow. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream.

Intermediate waterbody – Defined by FERC as a waterbody greater than 10 feet wide but less than or equal to 100 feet wide, measured from water's edge to water's edge at the time of construction.

Intermittent stream – Waterbody which flows during certain times of the year when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Line List – A list prepared by the Company of project-specific instructions for all properties affected by the project, specifying each property owner, the length of crossing, and any special instructions or restrictions for construction crew(s).

Major waterbody – Defined by FERC as a waterbody greater than 100 feet wide, measured at the water's edge at the time of construction.

Minor waterbody – Defined by FERC as a waterbody less than or equal to 10 feet wide, measured at the water's edge at the time of construction.

Pasture – Non-forested land used for grazing of domesticated livestock (horses, cattle, sheep, etc.). Pasture receives periodic renovation and treatments such as tillage, fertilization, mowing, weed control, and may be irrigated. Typical vegetation consists primarily of grasses, herbaceous plants, legumes, and forbs.

Perennial stream – Waterbody which flows water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow and runoff from rainfall is a supplemental source of water for stream flow.

Riparian area – Ecosystems that occupy the transitional zone between terrestrial and aquatic ecosystems. Typical examples of riparian areas include floodplains, streambanks, and lakeshores.

Spill Prevention, Control and Countermeasure Plan /

Preparedness, Prevention and Contingency Plan for Construction Projects (SPCC / PPC Plan) – Company document that contains measures to prevent or reduce the risk of spills or accidental exposure of oil or hazardous materials associated with construction activities, as well as procedures to be employed in the event of a spill, including measures that provide for prompt and effective cleanup of spills, notifications and proper disposal of waste generated during cleanup.

State-designated waterbody – Waterbodies specifically identified or recognized by the States or authorized Indian Tribe for water use, value or quality. Designations take into consideration the protection and propagation fish, shellfish and wildlife, as well as use and value for public water supplies, agricultural, industrial, recreational and other purposes, such as navigation. FERC's Procedures contain specific requirements with regards to state-designated fisheries.

Sensitive resource area – Areas (defined by FERC) that include wetlands, waterbodies, cultural resource sites, or sensitive species habitats.

Take up-and-Relay Pipeline Construction – Also called “lift and relay”, Company construction terminology for the removal of existing pipe and installation of new pipe at the same alignment within the existing permanent easement.

Wetland – Areas that are inundated or saturated by surface or groundwater at a frequency or duration sufficient to support and, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Types of wetlands include swamps, marshes, bogs, sloughs, wet meadows, mudflats and natural ponds.

Waterbody – Any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing during construction, as well as other permanent waterbodies such as ponds and lakes.

1. INTRODUCTION

1.1 Purpose of this Plan

This Erosion and Sedimentation Control Plan (E&SCP) has been prepared for use by the Company and its contractors as a guidance manual for minimizing erosion of disturbed soils and transportation of sediments off the construction ROW and into sensitive resource and residential areas during natural gas construction projects. The procedures developed in this plan, which represent the Company's best management practices, are designed to accommodate varying field conditions while achieving compliance with regulatory requirements and protecting environmentally sensitive areas.

This E&SCP is designed to provide guidelines, best management practices and typical techniques for the installation and implementation of soil erosion and sediment control measures while permitting adequate flexibility to use the most appropriate best management practice measures based on site-specific conditions. The intent of the E&SCP is to provide general information on the pipeline construction process and sequence, and to describe specific measures that will be employed during and following construction to minimize impacts to the environment.

Figures provided in Appendix A of this plan illustrate typical and minimum requirements of best management practices for design and utilization of construction workspace areas, access roads and erosion controls, as well as construction methods for special use areas (e.g., agricultural and residential land) and crossing of features during pipeline construction, including wetlands, waterbodies and roads. References to specific figure numbers provided in Appendix A are indicated throughout the E&SCP.

The goal of the E&SCP is to preserve the integrity of environmentally sensitive areas and to maintain existing water quality by:

- Minimizing the extent and duration of disturbance;
- Diverting runoff to stabilized areas;
- Installing temporary and permanent erosion control measures; and
- Establishing an effective inspection and maintenance program.

The E&SCP is intended to be used on Company projects that have been authorized by Federal Energy Regulatory Commission (FERC) pursuant to Section 7(b) and/or 7(c) of the Natural Gas Act to construct, acquire, alter, abandon or operate gas facilities or to provide gas services. This plan is also intended to be used for projects that are conducted under Company's blanket certificate which are regulated under 18 CFR Part 157, Subpart F. All blanket certificate projects that involve ground disturbance or changes to operational air and noise emissions are subject to the FERC's standard environmental conditions, including adherence to FERC's *Upland Erosion Control, Revegetation and Maintenance Plan (Plan)* and *Wetland and Waterbody Construction and Mitigation Procedures (Procedures)*, May 2013 Version.

1.2 Guidelines and Requirements

The measures described in this E&SCP have been developed based on guidelines from the FERC, United States Army Corps of Engineers (COE), the United States Fish and Wildlife Service, the United States

Department of Agriculture, the Natural Resource Conservation Service, and various state agencies as well as from the Company's significant experience and practical knowledge of pipeline construction and effective environmental protection measures. Lessons and insights gained during pipeline construction projects and comments from agency representatives are also incorporated into this E&SCP.

In accordance with FERC regulations, projects under the jurisdiction of Section 7 or the Company's blanket certificate are required to comply with the FERC's Plan and Procedures unless written approval to deviate from the Plan or Procedures is received from the Director of the Office of Energy Projects and the appropriate state agency. This revised version of the E&SCP is consistent with the requirements of FERC's Plan and Procedures (May 2013 version).

If conflicts or differences occur between project-specific conditions of appropriate federal and state agencies and the best management practices described in this E&SCP, consult with the Company Environmental Construction Permitting Department (ECP) representative or ECP Lead. The more stringent or site-specific requirement is typically applicable unless otherwise approved by ECP. With the exception of minor variations from the typical figures that may be required due to site-specific conditions and are designed to achieve an equivalent or greater degree of environmental protection, any deviations from the construction drawings or changes in the design of control measures as set forth in this E&SCP must be approved by the Company's ECP Lead and the appropriate permitting agency prior to implementation. Measures and practices identified within this plan are to be implemented during construction unless otherwise specified by project-specific permit conditions.

1.3 Surveys, Permits & Notifications

The Company shall perform the required environmental field surveys and acquire the necessary environmental permits, clearances and authorizations prior to start of construction of the project. The Company shall notify the appropriate federal, state, and local agencies prior to, during, and/or subsequent to the construction of the project, as identified in the Clearance Package/Permit Book.

1.4 Inquiries

Inquiries regarding this E&SCP should be addressed to the ECP Department at the address shown on the front cover. For field conditions requiring an immediate response, contact the designated person responsible at the address shown on the front cover.

2. SUPERVISION AND INSPECTION

To effectively mitigate project-related impacts, the E&SCP must be properly implemented in the field. Quick and appropriate decisions in the field regarding critical issues such as stream and wetland crossings, placement of erosion controls, trench dewatering, spoil containment, and other construction-related items are essential.

To ensure that the E&SCP is properly implemented, at least one Environmental Inspector (EI) will be designated by the Company for each construction spread during active construction or restoration activities. The EI is responsible for verifying environmental compliance on the construction spread, and performing the duties that are outlined in Section 2.1 below.

2.1 Role & Responsibilities of the Environmental Inspector

EIs will have the authority to stop activities that violate the environmental conditions of the FERC's Orders (if applicable), stipulations of other environmental permits or approvals, or landowner easement agreements, as well as order appropriate corrective action.

The EI will have peer status with all other activity inspectors and will report directly to the Chief Inspector who has overall authority on the construction spread or project.

The number and experience of EIs assigned to each construction spread shall be appropriate for the length of the construction spread and the number/significance of resources affected. On 7(c) and other large construction projects, the person designated as the EI will typically be a dedicated role for each construction spread. On blanket certificate projects and any other small construction activities carried out under this E&SCP, the EI role may be carried out by the Chief Inspector or another designated and properly trained Company Inspector on site, at the discretion of the Company. In such instances, the Company may employ additional periodic oversight of the EI by an environmental specialist.

At a minimum, the EI shall be responsible for:

1. Inspecting construction activities for compliance with the requirements of this E&SCP, the construction drawings, the environmental conditions of the FERC's Orders (if applicable), proposed mitigation measures, other federal or state and local (if applicable) environmental permits and approvals, and environmental requirements in landowner easement agreements;
2. Identifying, documenting, and overseeing corrective actions, as necessary to bring an activity back into compliance;
3. Verifying that the limits of authorized construction work areas and locations of access roads are visibly marked before clearing, and maintained throughout construction;
4. Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, including waterbodies and wetlands, or areas with special requirements along the construction work area;
5. Identifying erosion/sediment control and soil stabilization needs in all areas;

6. Ensuring that the design of slope breakers will not cause erosion or direct water into sensitive resource areas, including cultural resource sites, wetlands, waterbodies and sensitive species habitats;
7. Verifying that dewatering activities are properly monitored and do not result in the deposition of sand, silt, and/or sediment into sensitive resource areas, including wetlands, waterbodies, cultural resource sites, and sensitive species habitat; stopping dewatering activities if such deposition is occurring and ensuring the design of the discharge is changed to prevent reoccurrence; and verifying that dewatering structures are removed after completion of dewatering activities;
8. Ensuring that subsoil and topsoil are tested in agricultural and residential areas to measure compaction and determine the need for corrective action;
9. Advising the Chief Inspector when environmental conditions (such as wet weather, severe storm events or frozen soils) make it advisable to restrict or delay construction activities to avoid topsoil mixing excessive compaction;
10. Ensuring restoration of contours and topsoil;
11. Verifying that the soils imported for agricultural or residential use have been certified as free of noxious weeds and soil pests, unless otherwise approved by the landowner, and is considered clean and free of hazardous materials;
12. Ensuring that the appropriate erosion/sediment control and stabilization needs are implemented in all areas, including ensuring that erosion and sediment controls are properly installed and maintained daily to prevent sediment flow into sensitive resource areas (e.g., wetlands, waterbodies, cultural resource sites, and sensitive species habitats) and onto roads, and determining the need for additional erosion control devices;
13. Inspecting and ensuring the maintenance of temporary erosion and sediment control measures at least:
 - a. On a daily basis in areas of active construction or equipment operation;
 - b. On a weekly basis in areas with no construction or equipment operation; and
 - c. Within 24 hours of each 0.5 inch of rainfall.
14. Ensuring the repair of all ineffective temporary erosion and sediment control measures within 24 hours of identification, or as soon as conditions allow if compliance with this time frame would result in greater environmental impacts;
15. Identifying areas that should be given special attention to ensure stabilization and restoration after the construction phase;
16. Ensuring proper seed mixes, rates and restoration methods are used, and obtaining documentation;
17. Ensuring that the Contractor implements and complies with the Company's *Spill Prevention, Control and Countermeasure Plan & Preparedness, Prevention and Contingency Plan for*

Construction Projects (SPCC/PPC Plan), the Company's *Waste Management Plan*, and other Company environmental documents and standard operating procedures;

18. Verifying that locations for any disposal of excess construction materials for beneficial reuse comply with this E&SCP and any applicable permits / clearances; and,
19. Keeping records of compliance with the environmental conditions of the FERC's Orders and the mitigation measures proposed by the Company in the application submitted to the FERC (if applicable), and other federal or state environmental permits during active construction and restoration. Records should include photo documentation.

2.2 Environmental Training for Construction

Environmental training will be given to both the Company personnel and contractor personnel whose activities have the potential to impact the environment during pipeline construction. All construction personnel from the Chief Inspector, EI, craft inspectors, contractor job superintendent to loggers, welders, equipment operators, and laborers will be given some form of environmental training. The level of training will be commensurate with the type of duties of the personnel. At the discretion of the Company, environmental training for personnel may also be required on projects where it is not required by FERC.

Training will be given prior to the start of construction and throughout the construction process, as needed, and will cover the following issues:

- Specifics of this E&SCP and other Company plans;
- Job or activity specific permit requirements;
- Company policies and commitments;
- Cultural resource procedures and restrictions;
- Threatened and endangered species procedures and restrictions; and
- Any other pertinent information related to the job.

In addition to the EI, all other construction personnel are expected to play an important role in maintaining strict compliance with all permit conditions, and to promptly report any conditions that are perceived as having the potential to threaten environmental protection to the appropriate inspector during construction.

3. CONSTRUCTION TECHNIQUES FOR NATURAL GAS FACILITIES

3.1 Typical ROW Requirements

Pipeline construction workspace requirements are a function of pipe diameter, equipment size, topography, geological rock formations, location of construction such as at road crossings or river crossings, pipeline crossovers, methods of construction such as boring or open-cut construction, or existing soil conditions encountered during construction. As the diameter of the pipeline being installed increases, so does the depth of trench, excavated spoil material, equipment size, and ultimately the amount of construction work space that will be required to construct a project. See Figure CW-1 for a detail of a typical trench and Figures CW-3, CW-4 and CW-5 for typical construction ROW widths. All workspace locations for a given project will be shown on the construction drawings.

Additional construction ROW may be required at specific locations including, but not limited to, steep side or vertical slopes, road crossings, pipeline crossovers, areas requiring supplemental topsoil segregation, and staging areas associated with wetland and waterbody crossings. In particular, as shown on the construction drawings, the construction ROW width may be expanded up to 25 feet for the following situations / areas without approval from the FERC, however, prior approval is required from the EI or ECP:

- Accommodate full construction ROW topsoil segregation;
- Ensure safe construction where topographic conditions, such as side-slopes, or soil limitations exist; and
- Facilitate truck turn-arounds where no reasonable alternative access exists in limited, upland, non-riparian or non-forested areas.

All construction activities, including staging areas and additional spoil storage areas, are restricted to the construction ROW limits identified on the construction drawings, except for specific activities in limited, non-wetland and non-riparian areas that are allowed by the FERC Plan and Procedures (i.e. slope breakers, energy-dissipating devices, dewatering structures, and drain tile system repairs). Use of these limited areas is subject to landowner or land management agency approval and compliance with all applicable survey, permit, and reporting requirements; therefore, prior Company approval is required to use these areas. In some cases, federal, state and local permits and authorizations may require additional approvals.

Minor field realignments and workspace shifts per landowner needs and requirements are only allowed if construction activities remain within the environmental field survey area, comply with project-specific environmental permits and landowner easements, and do not affect new landowners or sensitive resource areas.

3.2 Access Roads & Access Points

To the extent practical, all access to the construction ROW will be limited to existing roads and will be minimized in wetlands. However, additional access roads to the construction ROW may be required at various points along the project where other road crossings (paved or gravel state/local roads) do not exist. Examples of types of access used include pipeline ROWs, abandoned town roads, railroad ROWs, power line service roads, logging roads and farm roads. Improvements to access roads (i.e., grading, placing gravel, replacing/installing culverts, and trimming overhanging vegetation) may be required due to the size

and nature of the equipment that would utilize the road (Figure RD-1). The following conditions apply to the use of all access roads:

1. During construction and restoration activities, access to the ROW is limited to the use of new or existing access roads identified on the construction drawings.
2. The only access roads that can be used in wetlands, other than the construction ROW, are those existing roads requiring no modification or improvements, other than routine repair, and posing no impact on the wetland.
3. The construction ROW may be used for access across wetlands when the wetland soil is firm enough to avoid rutting or the construction ROW has been appropriately stabilized to avoid rutting (e.g., with timber riprap, prefabricated equipment mats, or terra mats). However, access is not allowed through wetlands that are specifically being avoided by HDD or would not otherwise be impacted by the project.
4. In wetlands that cannot be appropriately stabilized, all construction equipment other than that needed to install the wetland crossing shall use access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, limit all other construction equipment to one pass through the wetland using the construction ROW.
5. Blanket certificate projects may not have construction drawings available in which case access to the ROW will be identified in the Clearance Package / Permit Book.
6. Maintain safe and accessible conditions at all road crossings and access points during construction and restoration. Access road maintenance through the construction sequence may include grading and the addition of gravel or stone when necessary.
7. Maintain access roads in a stable manner to prevent off-ROW impacts, including impacts to adjacent and/or nearby sensitive resource areas, and implement all appropriate erosion and sediment control measures for construction/improvement of access roads.
8. Minimize the use of tracked equipment on public roadways.
9. Remove any soil or gravel spilled or tracked onto roadways daily or more frequent as necessary to maintain safe road conditions.
10. Repair any damages to roadway surfaces, shoulders, and bar ditches.
11. If crushed stone/rock access pads are used in residential or agricultural areas, stone shall be placed on synthetic, nonwoven geotextile fabric to facilitate removal after construction (Figure RD-2).
12. All access roads across a waterbody must use an equipment bridge in accordance with Section 5.1.2.
13. For access through a saturated wetland, use timber mats or an equivalent, unless otherwise authorized by agency permits (Figure RD-3).

14. Limit construction equipment operating in wetland areas to that needed to clear the ROW, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction ROW. All other construction equipment shall use access roads located in upland areas to the maximum extent practical.

3.3 Pipe and Contractor Wareyards

Pipe and contractor wareyards are required for storing and staging equipment, pipe, fuel, oil, pipe fabrication, and other construction-related materials and preparations. The Contractor shall perform the following measures at pipe and contractor wareyards:

1. Strip and segregate topsoil in agricultural lands;
2. Install erosion and sediment control structures as directed by the EI or identified on the construction drawings, and as outlined in this E&SCP and the SPCC/PPC Plan. Maintain controls throughout construction and restoration activities;
3. Implement and comply with the SPCC/PPC Plan and the Waste Management Plan, including the completion of any required site-specific forms and attachments; and,
4. Restore and revegetate all disturbed areas in accordance with the measures outlined in this E&SCP, landowner agreements and/or as directed by the EI. At a minimum, the area must be returned to preconstruction contours and stabilized prior to contractor demobilization.

3.4 Off-ROW Disturbance

All construction activities are restricted to the construction ROW limits identified on the construction drawings, except for specific activities in limited, non-wetland and non-riparian areas that are allowed by the FERC Plan and Procedures. Activities allowed to occur off-ROW are limited to the installation of slope breakers, energy-dissipating devices and dewatering structures, as well as repairs to drain tile. Minor field realignment and workspace shifts per landowner needs and requirements are only allowed if construction activities remain within the environmental field survey area, maintain compliance with project-specific environmental permits and landowner easements, do not affect new landowners or environmental resources, and do not require the operation of heavy equipment off ROW. In the event that inadvertent off-ROW disturbance occurs, the following measures will be implemented:

1. The EI will immediately report the occurrence to the Chief Inspector and ROW Agent;
2. The conditions that caused the disturbance will be evaluated by the Chief Inspector and the EI, and they will determine whether work at the location can proceed under those conditions; and
3. If determined to be necessary by the Chief Inspector and EI, one or more of the following corrective actions will be taken: immediate restoration of the preconstruction contours, seeding and mulching of the disturbed area, and/or installation of erosion or sediment control devices, conduct additional tailgate or employee/contractor training, and investigation of the issue to develop lessons learned for future issue prevention.
4. The Company's ECP Department will be notified.

3.5 Construction Sequence for Pipeline Installation

Natural gas pipelines are installed using conventional overland buried pipeline construction techniques. These activities are necessary for the installation of a stable, safe, and reliable transmission facility consistent with U.S. Department of Transportation (U.S.DOT) requirements and regulations. This section provides an overview of the equipment and operations necessary for the installation of a natural gas pipeline, describes potential impacts that may occur from each operation, and identifies the measures that will be implemented to control these potential impacts. This section also discusses in detail the erosion and sediment control techniques that typically apply to each construction activity including clearing, grading, trenching, lowering-in of pipe, backfilling, and hydrostatic testing. Pipe abandonment in-place or removal, which may be associated with a pipeline replacement activity or occur as an independent activity on an existing pipeline, are also covered at the end of this section. ROW restoration is the final step in the typical construction sequence and will be addressed in Section 3.6.

Installation of the pipeline typically proceeds in a linear manner from one end of the construction spread to the other in an assembly line or "mainline" fashion. However, different stages may be running in parallel on different physical segments of the project. In some cases, this means that full completion of one of the construction sequence stages described below may not occur before the next construction sequence stage is initiated. Construction sequencing should be planned to limit the amount and duration of open trench sections, as necessary, to prevent excessive erosion or sediment flow into sensitive environmental resource areas. This is due to the Company's effort to adhere to strict construction schedules in order to minimize safety concerns, landowner effects, and environmental disturbance. The spacing between the individual crews responsible for each interdependent activity is based on anticipated rate of linear progress. The activities listed below are typically performed in the following sequence:

- Surveying and flagging the ROW;
- Clearing the ROW;
- Installing temporary sediment barriers;
- Grading the ROW;
- Installing temporary slope breakers;
- Trenching/excavating the trench;
- Pipe stringing and bending;
- Welding and weld inspection;
- Lowering the pipe into the trench;
- Backfilling the trench;
- Hydrostatic testing of pipe; and
- ROW restoration and clean-up.

Obstacles to the mainline technique are often encountered and are not considered to be out of the ordinary. These obstacles, which include side hill crossings, rock, wetlands, streams, roads and residential areas, do not normally interrupt the assembly line flow.

3.5.1 Clearing & Flagging

Clearing operations include the removal of vegetation within the construction ROW. Various clearing methods are employed depending on tree size, contour of the land, and the ability of the ground to support clearing equipment. Vegetative clearing can be accomplished either by hand or by cutting equipment. The following procedures will be standard practice during clearing:

1. Prior to beginning the removal of vegetation,
 - a. The limits of clearing will be established and visibly marked before clearing;
 - b. Signs and highly visible flagging will also be used to mark the boundaries of sensitive resource areas, including waterbodies and wetlands, and/or areas with special requirements along the construction work area, in accordance with the construction drawings;
 - c. Flagging or marking shall be maintained throughout construction;
 - d. Trees to be protected per landowner requests or as otherwise directed will be clearly marked;
2. All construction activities and ground disturbance will be confined to within the construction ROW shown on the construction drawings (with the limited exception of compliance activities described above in Section 3.4);
3. All brush and trees will be felled into the construction ROW to minimize damage to trees and structures adjacent to the ROW. Trees that inadvertently fall beyond the edge of the ROW will be immediately moved onto the ROW and disturbed areas will be immediately stabilized, per landowner approval;
4. Trees will be chipped and removed or cut into lengths identified by the landowner and then stacked at the edge of the ROW or removed. Trees may be burned depending on local and state restrictions, applicable permits, construction Line List stipulations, and landowner agreements;
5. Brush and limbs may be disposed of in one or more of the following ways depending on local restrictions, applicable permits, construction Line List stipulations, and landowner agreements:
 - a. Stockpiled along the edge of the ROW;
 - b. Burned;
 - c. Chipped, spread across the ROW in upland areas, and plowed in at the discretion of the Chief Inspector or EI (excess material must be removed);
 - d. Used as part of erosion control mix material; or
 - e. Hauled off site to a Company-approved location.
6. Existing surface drainage patterns shall not be altered by the placement of timber or brush piles at the edge of the construction ROW.

3.5.2 Temporary Sediment Barriers

Sediment barriers, which are temporary sediment controls intended to minimize the flow and deposition of sediment beyond approved workspaces or into sensitive resource areas, shall be installed following vegetative clearing operations. They may be constructed of materials such as silt fence, staked straw bales, compacted earth (e.g., drivable berms across travel lanes), sand bags, or other appropriate materials (Figures EC-1, EC-2, EC-3 and EC-5). Where allowed by regulatory agencies, hay bales may be used in lieu of straw bales with the following restrictions: hay bales shall not be used for mulching and the Contractor is responsible for their removal and disposal.

1. Install temporary sediment barriers at the base of slopes greater than 5% where the base of the slope is less than 50 feet from a road crossing, waterbody and/or wetland in accordance with Sections 5.1.4 and 6.3 respectively.
2. Do not stake or trench in place straw bales used on equipment bridges or on mats across the travel lane.
3. Inspect temporary sediment barriers daily in areas of active construction to ensure proper functioning and maintenance. In other areas with no construction or equipment operation, sediment barriers will be inspected and maintained on a weekly basis throughout construction, and within 24 hours of each 0.5 inch of rainfall. Conduct an inspection within 24 hours once a storm event has produced 0.5 inch of rainfall, even if the storm event is still continuing.
4. Maintain all temporary sediment barriers in place until permanent revegetation measures are successful or the upland areas adjacent to wetlands, waterbodies, or roads are stabilized.
5. Remove temporary sediment barriers from an area when replaced by permanent erosion or sediment control measures or when the area has been successfully restored as specified in Section 8.1.

3.5.3 Grading

The construction ROW will be graded as needed to provide a level workspace for safe operation of heavy equipment used in pipeline construction. The following procedures will be standard practice during grading:

3.5.3.1 Topsoil Segregation

During construction, topsoil and subsoil will be disturbed by grading of the right-of-way, trench excavation, and by heavy equipment moving along the right-of-way. Implementation of proper topsoil segregation is intended to mitigate these construction impacts and promote or facilitate post-construction revegetation success.

Topsoil segregation methods will be used in all residential areas (except where the topsoil is being replaced), wetlands (except areas where standing water is present or soils are saturated), cultivated or rotated croplands, managed pastures, hayfields, and other areas at the landowner's or land managing agency's request. Either the "ditch plus spoil side" or the "full right-of-way" segregation method will be used, as illustrated in Figure CW-2.

- a. Prevent the mixing of topsoil with subsoil by stripping topsoil from either the full work area or from the trench and subsoil storage area (“ditch plus spoil side” method) as stipulated in the Construction Contract or Line List.
- b. Segregate at least 12 inches of topsoil in deep soils with more than 12 inches of topsoil. In soils with less than 12 inches of topsoil, make every effort to segregate the entire topsoil layer.
- c. Within wetlands, segregate the top 12 inches of topsoil within the trenchline, except in areas where standing water is present or soils are saturated.
- d. In residential areas, importation of topsoil (i.e. topsoil replacement) is an acceptable alternative to topsoil segregation, if approved by the landowner and Chief Inspector.
- e. Maintain separation of salvaged topsoil and subsoil throughout all construction activities.
- f. Leave gaps in the topsoil piles and spoil piles for the installation of temporary slope breakers to allow water to be diverted off the construction ROW.
- g. Never use topsoil for padding the pipe, constructing temporary slope breakers, trench breakers or trench plugs, improving or maintaining roads, or as a fill material.
- h. Stabilize topsoil piles and minimize loss due to wind and water erosion with use of sediment barriers, mulch, temporary seeding, tackifiers, or functional equivalents, where necessary.

3.5.3.2 Tree Stump Removal and Disposal

- a. Remove tree stumps in upland areas along the entire width of the permanent ROW to allow adequate clearance for the safe operation of vehicles and equipment. Stumps within the temporary ROW will be removed or ground below the surface in accordance with Company construction specifications to allow the safe passage of equipment, as determined by the Chief Inspector or EI.
- b. In wetlands, limit pulling of tree stumps and grading activities to directly over the trenchline.
- c. Dispose of stumps by one of the following methods with the approval of the Chief Inspector and the landowner and in accordance with regulatory requirements:
 - Buried at a Company-approved off-site location (except in wetlands and agricultural areas);
 - Burned on construction ROW;
 - Chipped, spread across the construction ROW in upland areas, and plowed in;
 - Used as erosion control mix material;
 - Ground to grade in wetlands, excess chips will be removed for proper disposal; or
 - Hauled off-site.

- d. Grading operations and tree stump removal in wetland areas will be conducted in accordance with Section 6.2.

3.5.3.3 Rock Management

Rock, including blast rock, will be used, removed or disposed of in one of the following ways:

- a. Rock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. (Rock that is not returned to the trench shall be considered construction material or waste, unless approved for use as mulch or for some other use on the construction work areas by the land owner or land managing agency.);
- b. Windrowed per written landowner agreement with the Company;
- c. Removed and disposed of at a Company-approved landfill; or
- d. Used as riprap for streambank stabilization as allowed by applicable regulatory agency(ies) and provided the rock is uncontaminated and free of soil and other debris (Figure WC-6).

3.5.4 Temporary Slope Breakers

Temporary slope breakers, also called interceptor dikes, are temporary erosion control measures intended to reduce runoff velocity and divert water off the construction ROW. Temporary slope breakers may be constructed of materials such as compacted soil, silt fence, staked straw bales, or sand bags. Segregated topsoil may not be used for constructing temporary slope breakers. If permitted by regulatory agency(ies), hay bales may be used in lieu of straw bales except for mulching. If hay bales are used, the Contractor is responsible for their removal and Company-approved disposal.

1. Install temporary slope breakers on all disturbed areas as necessary following grading operations (Figure EC-7) to avoid excessive erosion. Unless otherwise specified by permit conditions, temporary slope breakers must be installed on slopes greater than 5% at the recommended spacing interval indicated below (Closer spacing should be used if necessary):

<u>Slope (%)</u>	<u>Spacing (feet)</u>
< 5	No structure
5 – 15	300
> 15 – 30	200
> 30	100

2. Direct the outfall of each slope breaker to a stable, well vegetated area or construct an energy-dissipating device (silt fence, staked straw bales, erosion control fabric) at the end of the slope breaker.
3. Position the outfall of each temporary slope breaker to prevent sediment discharge into wetlands, waterbodies, or other sensitive resource areas.

4. Install temporary slope breakers across the entire construction ROW along slopes greater than 5 % where the base of the slope is less than 50 feet from waterbody, wetland, and road crossings.
5. Inspect temporary slope breakers daily in areas of active construction to insure proper functioning and maintenance. In other areas, the slope breakers will be inspected and maintained on a weekly basis throughout construction, and within 24 hours of each 0.5 inch of rainfall. Repairs should be made within 24 hours of identification, if possible.

Drivable berms, which are smaller versions of slope breakers constructed of compacted soil or sand bags, may be used in place of staked straw bales at the entrances and exits of travel lanes at road crossings, waterbodies, and wetlands. They are installed across the width of the travel lane at the start of the equipment crossing and made low enough to allow equipment and other vehicles to pass. Yet, they should function to reduce and divert water runoff from sensitive resource areas.

3.5.5 Trenching

The trench centerline will be staked after the construction ROW has been prepared. In general, a trench will be excavated to a depth that will permit burial of the pipe with a minimum of 3 feet of cover (Figure CW-1). Overland trenching may be accomplished using a conventional backhoe or a rotary wheel-ditching machine. In shale or rocky areas where the use of the conventional excavation equipment is limited, a tractor-drawn ripper or rock hammer may be employed to break and loosen hard substratum material. In areas where rock cannot be ripped or hammered, drilling and blasting may be required. A backhoe may then be used to remove rock and soil from the ditch.

The following procedures will be standard practice during ditching:

- Flag drainage tiles damaged during ditching activities for repair;
- Place spoil in additional extra work areas or at least 10 feet away from the waterbody's edge in the construction ROW. Spoil will be contained with erosion and sediment control devices to prevent spoil materials or sediment-laden water from transferring into waterbodies and wetlands or off of the ROW; and,
- If temporary erosion or sediment controls are damaged or removed during trenching, they shall be repaired and/or replaced before the end of the work day.

3.5.5.1 Temporary Trench Plugs

Temporary trench plugs are barriers within the ditch that are intended to segment the continuous open trench prior to backfill. They typically consist of unexcavated portions of the ditch (hard plug), compacted subsoil or sandbags (soft plug) placed across the ditch, or some functional equivalent. Along steep slopes, they serve to reduce erosion and sedimentation in the trench and minimize dewatering problems at the base of slopes where sensitive environments such as waterbodies and wetlands are frequently located. In addition, they provide access across the trench for wildlife and livestock.

- a. Do not use topsoil for constructing trench plugs.

- b. Coordinate with the landowner to identify optimal locations for the placement of temporary hard plugs designed to provide access for livestock.
- c. Temporary trench plugs may be used in conjunction with slope breakers to prevent water in the trench from overflowing into sensitive resource areas (Figure EC-6). Attempt to divert trench overflow to a well-vegetated off-ROW location or construct an energy-dissipating device.
- d. Position temporary trench plugs, as necessary, to reduce trenchline erosion and minimize the volume and velocity of trench water flow at the base of slopes.

3.5.6 Trench & Site Dewatering

Dewatering may be periodically conducted to remove accumulated groundwater or precipitation from the construction ROW, including from within the trenchline. The need for erosion controls as well as the type of control used will vary depending on the type and amount of sediment within the water, and volume and rate of discharge.

- 1. Conduct dewatering (on or off the construction ROW) in such a manner that does not cause erosion and does not result in silt-laden water flowing into any waterbody or wetland.
- 2. Elevate and screen the intake of each hose used to withdraw the water from the trench to minimize pumping of deposited sediments.
- 3. Water may be discharged into areas where adequate vegetation is present adjacent to the construction ROW to function as a filter medium.
- 4. Where vegetation is absent or in the vicinity of waterbody / wetland areas, water will be pumped into a discharge structure that accommodates the anticipated discharge volumes as well as type and amount of sediment within the water being discharged, including
 - a. a filter bag, as illustrated in Figure WD-1, or
 - b. a structure composed of sediment barriers (Options for these types of controls are illustrated in Figure WD-2 and WD-3.).

A structure that is more typically used for discharges of hydrostatic test water, as illustrated in Figure WD-2, may be necessary for large volumes of water.

- 5. When using filter bags, secure the discharge hose to the bag with a clamp.
- 6. Remove dewatering structures as soon as practicable after the completion of dewatering activities.

3.5.7 Pipe Installation

During all phases of the pipe installation process, ensure that all roadway crossings and access points are safe and accessible conditions. Repair damaged temporary erosion controls by the end of the work day. If portions of slope breakers are removed from the travel lane to facilitate safe work conditions, they shall be restored prior to the end of the work day.

3.5.7.1 Stringing and Bending

Following trench excavation, pipe sections will be delivered to the construction site by truck or tracked vehicle, and strung out along the trench. Individual pipe sections will be placed on temporary supports or wooden skids and staggered to allow room for work on the exposed ends. Certain pipe sections will be bent, as necessary, to conform to changes in slope and direction of the trench.

All rope bands should be collected and disposed of properly.

3.5.7.2 Welding

Once the bending operation is complete, the pipe sections will be welded together on supports using approved welding procedures that comply with Company welding specifications. After welding, the welds will be inspected radiographically or ultrasonically to ensure their structural integrity.

3.5.7.3 Lowering-in and Tie-ins

Lowering-in consists of placing the completed pipeline sections into the trench typically using two or more sideboom tractors acting in unison and spaced so as not to buckle or otherwise damage the pipe. The pipeline will be lifted from the supports, swung out over the trench, and lowered directly into the trench. The equipment uses a “leap frogging” technique requiring sufficient area to safely move around other tractors within the construction ROW to gain an advanced position on the pipe. The unwelded ends of the completed pipeline segments (typically present at road crossings, stream crossings, etc.) are then welded together or “tied-in” by specialized tie-in crews.

3.5.8 Backfilling

Backfilling consists of covering the pipe with the earth removed from the trench or with other fill material hauled to the site when the existing trench spoil is not adequate for backfill. Backfilling will follow lowering-in of the pipeline as close as is practical.

In areas where the trench bottom is irregularly shaped due to consolidated rock or where the excavated spoil materials are unacceptable for backfilling around the pipe, padding material may be required to prevent damage to the pipe. This padding material will generally consist of sand or screened spoil materials from trench excavation.

1. Under no circumstances shall topsoil be used as padding material.
2. Excess rock, including blast rock, may be used to backfill the trench only to the top of the existing bedrock profile in accordance with Company specifications. Rock that is not used to backfill the trench will be managed as described in Section 3.5.3.3.
3. Any excess material will be spread within the ROW in upland areas and land contours will be roughed-in to match adjacent topography.

4. The trench may be backfilled with a crown over the pipe to compensate for compaction and settling. Openings will be left in the completed trench crown to restore pre-construction drainage patterns. Crowning shall not be used in wetland areas.

3.5.8.1 Permanent Trench Breakers

Permanent trench breakers are intended to slow subsurface water flow and erosion along the trench and around the pipe in sloping terrain. An engineer or similarly qualified professional shall determine the need for and spacing of permanent trench breakers. However, trench breakers will not be installed within a wetland.

Permanent trench breakers will be constructed with sand bags, polyurethane foam, or an equivalent as identified in the permit requirements (Figure EC-10 and EC-11). Topsoil shall not be used to construct trench breakers. Sakrete may be used at the discretion of the Chief Inspector on severe slopes greater than 30 percent.

Permanent trench breakers, which are used in conjunction with slope breakers, shall be installed at the locations shown on the construction drawings, at the same spacing interval as and upslope of permanent slope breakers, or as otherwise determined by an engineer or similarly qualified professional, such as the EI (Figure EC-12). At a minimum, install trench breakers:

- a. At the base of slopes greater than 5% where the base of the slope is less than 50 feet from a waterbody or wetland;
- b. Where needed to avoid draining of a resource, including at wetland boundaries where the pipeline trench may drain a wetland, and/or seal the trench bottom as necessary to maintain the original wetland hydrology; and,
- c. In agricultural fields and residential areas where slope breakers are not typically required, install trench breakers at the same spacing as if permanent slope breakers were required.

3.5.9 Hydrostatic Testing

Once the pipeline is completed and before it is placed into service, it will be hydrostatically tested for structural integrity. Hydrostatic testing involves filling the pipeline with clean water and maintaining a test pressure in excess of normal operating pressures for a specified period of time (typically 8 hours). The testing procedure involves filling the pipeline with water, performing the pressure test, and discharging the test water.

The following general hydrostatic testing procedures shall be adhered to for all projects. Environmental conditions for hydrostatic testing activities are also addressed in the project-specific Hydrostatic Test Clearance Package that is issued by ECP if permits are required for water appropriation and/or discharge. During planning and permitting of test events:

1. Identify the location of all waterbodies proposed for use as a hydrostatic test water source or discharge location. Use only the water sources identified in the Clearance Package/Permit Book.
 - a. Do not use water from or discharge into state-designated exceptional value waters, waterbodies that provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and/or local permitting agencies grant written permission.
2. Locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable.
3. Attempt to locate discharge sites in a well-vegetated and stabilized area, if practical, at least 50-feet from adjacent waterbody/wetland areas.
4. Apply for and obtain state-issued water withdrawal permits and National Pollutant Discharge Elimination System (NPDES) or state-issued discharge permits, as required.

During preparation for testing, including appropriation of source water and preparing discharge/outfall site:

1. At least 48 hours before testing activities, the EI shall notify appropriate state agencies (as identified in the relevant permit for hydrostatic test discharges) of the intent to use specific test water sources (unless waived in writing).
2. If pumps used for hydrostatic testing are within 100 feet of any waterbody or wetland, the use of secondary containment, operation and refueling of those pumps will be addressed and conducted in accordance with the SPCC/PPC Plan.
3. Screen the intake hose to minimize the potential for entrainment of fish and other aquatic life.
4. Maintain adequate flow rates to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users.
5. Install all discharge structures in a well-vegetated and stabilized area, if practical, and attempt to maintain at least a 50-foot vegetated buffer from adjacent waterbody/wetland areas. If an adequate buffer is not available, sediment barriers or similar sediment control measure must be installed.

During the discharge of hydrostatic test water on-site:

1. Discharge water only at the locations shown on the construction drawings or locations identified in the Clearance Package/Permit Book or ECP's Hydrostatic Test Clearance Package.
2. Regulate rate of discharge water and use energy dissipation device(s) and sediment barriers, as necessary, to prevent erosion, streambed scour to aquatic resources, sedimentation, flooding or excessive stream flow (Figures WD-2 and WD-3).

3. Use absorbent booms as necessary during discharge from existing pipe or as stipulated by the applicable NPDES permit.
4. The test water may be discharged through an appropriate filtration system including holding tanks or frac tanks and/or carbon filters if needed to meet effluent limitations or conditions stipulated in the NPDES permit.
5. Do not discharge into state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and local permitting agencies grant written permission.
6. The EI or appropriate designee shall sample and test the source water and discharge water in accordance with the permit requirements.

3.5.10 Pipeline Abandonment and Removal

Pipeline abandonment and removal activities may occur when gas service is no longer needed, such as the abandonment of a lateral to a customer receipt or delivery point. Removal or in-place abandonment of pipe can also be conducted as part of an expansion or maintenance project, such as the lift-and-relay of existing pipe, the replacement or relocation of an existing pipeline due to road or highway modifications, or activities required to maintain compliance with U.S.DOT requirements.

Abandonment approval from FERC, such as project-specific Section 7(b) Order or blanket certificate authorization, is required prior to abandoning facilities or services. Abandonment of FERC-regulated natural gas pipelines or storage facilities, either in place or by removal, must follow FERC's regulations.

Where removal of a section of existing pipeline is required, construction activities typically proceed in a construction sequence similar to what has been described above in Section 3.5, except that instead of the pipeline installation step, the existing pipeline would be cut and removed from the trench. If the pipeline removal is associated with a lift-and-relay project or a replacement, then the new pipeline installation would follow the removal of the old pipe. Pipe that is abandoned by removal will be handled, taken off-site and properly disposed of or recycled in accordance with Company procedures.

When a pipeline is abandoned in place, typically work involves only relatively small excavations to remove above-ground appurtenances and meters, as well as expose the pipe in certain locations, cut it, fill with grout or blanket gas and cap the ends of the pipe, in accordance with agency and Company requirements.

Mitigation measures for pipeline abandonment and removal activities, such as erosion control measures, will follow the same requirements outlined within the E&SCP for pipeline installation in order to minimize erosion and enhance revegetation, as well as mitigate the extent and duration of project-related disturbance to wetlands and waterbodies.

3.6 ROW Restoration & Final Cleanup

Restoration of the ROW will begin after pipeline construction activities have been completed. Restoration measures include the re-establishment of final grades and drainage patterns as well as the installation of permanent erosion and sediment control devices to minimize post-construction erosion. Residential areas will be restored in accordance with Section 4.3.3. Property shall be restored as close to its preconstruction condition as practical unless otherwise specified by the landowner.

1. The Contractor shall make every reasonable effort to complete final cleanup of an area (including final grading, topsoil replacement and installation of permanent erosion control structures) within 20 days after backfilling the trench in that area (within 10 days in residential areas). If seasonal or other weather conditions prevent compliance with these timeframes, continue to inspect and maintain temporary erosion and sediment controls (i.e. temporary slope breakers, sediment barriers, and mulch) until conditions allow completion of cleanup. If construction or restoration unexpectedly continues into the winter season, follow the requirements of Frozen Conditions & Winter Construction, Section 3.6.4.
2. Seed all disturbed soils within 6 working days of final grading, weather and soil conditions permitting.
3. If construction or restoration unexpectedly cannot be completed and is delayed until the next recommended growing season, the winter stabilization measures shall be followed.
4. Grade the ROW to pre-construction contours, with the exception of the installation of any permanent measures required herein.
5. Spread segregated topsoil back across the graded ROW to its original profile.
6. Remove excess rock from at least the top 12 inches of soil in all cultivated or rotated cropland, managed pastures, hayfields, residential areas, as well as other areas at the landowner's request. The size, density, and distribution of rock on the construction ROW shall be similar to adjacent areas not disturbed by construction. The landowner or land managing agency may approve other provisions in writing.
7. A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion and sediment control structures are installed, regularly inspected and maintained. When access is no longer required, the travel lane must be removed and the ROW restored.
8. Remove all construction debris (used filter bags, skids, trash, etc.) from all construction work areas unless the landowner or land managing agency approves leaving material onsite for beneficial reuse, stabilization, or habitat restoration. Grade or till the ROW to leave the soil in the proper condition for planting.

3.6.1 *Permanent Erosion Control*

3.6.1.1 Permanent Slope Breakers

Permanent slope breakers are intended to reduce runoff velocity, divert water off the construction ROW, and prevent sediment deposition into sensitive resources. Permanent slope breakers will be constructed of compacted soil (Figure EC-8). Stone or some functional equivalent may be used when approved by the Company.

- a. Construct and maintain permanent slope breakers in all areas, except cultivated areas and lawns, unless requested by the landowner, at the locations shown on the construction drawings.
- b. Use spacing recommendations obtained from the local soil conservation authority or land managing agency. If not shown on the construction drawings or in the absence of written recommendations, use the following spacing (same as temporary slope breaker spacing) unless closer spacing is necessary to avoid excessive erosion on the construction ROW:

<u>Slope (%)</u>	<u>Spacing (feet)</u>
< 5	No structure
5 – 15	300
> 15 – 30	200
> 30	100

- c. A permanent trench breaker will be located immediately upslope of the slope breaker.
- d. Install permanent slope breakers across the construction ROW at the base of slopes adjacent to roads. When the ROW parallels an existing utility ROW, permanent slope breakers may be installed to match existing slope breakers on the adjacent undisturbed utility ROW.
- e. Install permanent slope breakers across the construction ROW at the base of slopes greater than 5% that are less than 50 feet from a wetland or waterbody, or as needed to prevent sediment transport into a wetland or waterbody.
- f. Construct slope breakers with a 2 to 8 percent outslope to divert surface flow to a stable vegetative area without causing water to pool or erode behind the slope breaker. In the absence of a stable vegetative area, install an energy-dissipating device at the end of the slope breaker.
- g. Slope breakers may extend slightly (about 4 feet) beyond the edge of the construction ROW to effectively drain water off the disturbed area. Where slope breakers extend beyond the edge of the construction ROW, they are subject to compliance with all applicable survey and permit requirements.
- h. Install chevron-style slope breakers on slopes as appropriate (Figure EC-9).

- i. Where drainage is insufficient in upland areas, install a rock-lined drainage swale as approved by the EI. The drainage swale is generally 8 feet wide and a maximum of 18-24 inches deep (Figure EC-4).

3.6.1.2 Erosion Control Fabric / Blankets

Erosion control fabric or blankets are used during restoration, including as mulch, to slow down stormwater and stabilize soil until vegetation becomes established. Examples of these erosion controls include jute thatching or bonded fiber blankets. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat, unless the product is specifically designed to minimize harm to wildlife.

Install erosion control fabric or blankets where necessary or as recommended by the EI

- a. at slope breaker outlets and drainage swales (Figure EC-7, EC-8 and EC-4);
- b. on slopes adjacent to roads or waterbodies (Figure EC-14); and
- c. on waterbody banks at the time of final bank recontouring (Figure WC-5).

Anchor the erosion control fabric or blanket with staples or other appropriate devices in accordance with the manufacturers' recommendations (Figure EC-13). Evaluate flow conditions to determine if erosion control fabric is suitable as an effective vegetation stabilization technique on waterbody banks. High-velocity erosion control fabric should be used on the swale side of permanent slope breakers.

3.6.2 Revegetation and Seeding

Successful revegetation of soils disturbed by project-related activities is essential. Seeding will be conducted using the following requirements:

1. Fertilize and add soil pH modifiers in accordance with the recommendations in Appendix C. Incorporate recommended soil pH modifier and fertilizer into the top 2 inches of soil as soon as practicable after application;
2. Seed all disturbed areas within 6 working days of final grading, weather and soil conditions permitting;
3. Prepare seedbed in disturbed areas to a depth of 3 to 4 inches to provide a firm seedbed. When hydroseeding, scarify the seedbed to facilitate lodging and germination of seed;
4. Seed disturbed areas in accordance with the seed mixes, rates, and dates in Appendix C, except in upland areas where landowners or a land management agency may request alternative seed mixes, however, seeding is not required in cultivated croplands unless requested by the landowner;
5. Perform seeding of permanent vegetation within the recommended seeding dates as outlined in Appendix C. If seeding cannot be done within those dates, use appropriate temporary erosion

control measures discussed in Section 3.5.2 and perform seeding of permanent vegetation at the beginning of the next recommended seeding season. Dormant seeding or temporary seeding of annual species may also be used, if necessary, to establish cover, as approved by the EI. Mulch in accordance with Section 3.6.3. Lawns may be seeded on a schedule established with the landowner;

6. Base seeding rates on Pure Live Seed (PLS);
7. Use seed within 12 months of seed testing;
8. Treat legume seed with an inoculant specific to the species using the manufacturer's recommended rate of inoculant appropriate for the seeding method (broadcast, drill, or hydroseeding); and,
9. Uniformly apply and cover seed in accordance with the appropriate seed mix from Appendix C, in the absence of any recommendations from the local soil conservation authorities, landowner, or land managing agency to the contrary.
 - a. A seed drill equipped with a cultipacker is preferred for application but, where permitted by regulatory agencies, broadcast or hydroseeding can be used at double the recommended seeding rates.
 - b. Where seed is broadcast, firm the seedbed with a cultipacker or roller after seeding.
 - c. In rocky soils, or where site conditions may limit the effectiveness of this equipment, other alternatives may be appropriate (e.g., use of a chain drag) to lightly cover seed after application, as approved by the EI.

3.6.3 Mulch

Mulch is intended to stabilize the soil surface and shall consist of weed-free straw, wood fiber hydromulch, erosion control fabric or some functional equivalent as approved by the EI and Chief Inspector.

1. Mulch all disturbed upland areas (except cultivated cropland) **before** seeding if:
 - a. Final cleanup, including final grading and installation of permanent erosion control measures, is not completed in an area within 20 days after the trench in that area is backfilled (10 days in residential areas); or
 - b. Construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.

NOTE: When mulching before seeding, increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre of straw or equivalent.

2. Apply mulch on all slopes (except in cultivated cropland) concurrent with or immediately after seeding, where necessary, to stabilize the soil surface and to reduce wind and water erosion. Spread mulch uniformly over the ROW at a rate of 2 tons/acre of straw or equivalent.

3. Mulch with woodchips only under the following conditions with prior approval from the Chief Inspector or the EI:
 - a. Do not use more than 1 ton/acre; and
 - b. Add the equivalent of 11 lbs/acre available nitrogen (at least 50% of which is slow release).
4. Ensure that mulch is anchored to minimize loss by wind and water. Anchoring may be achieved by wet soil conditions, when approved by the EI, mechanical means, or use of liquid mulch binders.
5. When anchoring with liquid mulch binders, use rates recommended by the manufacturer. Do not use liquid mulch binders within 100 feet of wetlands and waterbodies, except where the product is certified environmentally non-toxic by the appropriate state or federal agency or independent standards-setting organization.
6. If used, install erosion control fabric or blankets in accordance with Section 3.6.1.2.

3.6.4 Frozen Conditions & Winter Construction

Winter weather may not provide suitable conditions for soil handling or restoration of disturbed areas. In the event that the construction occurs too late in the year for cleanup activities to adequately proceed or if construction is planned to occur during winter weather conditions, the Company will develop a project-specific Winter Construction Plan that addresses:

- Winter construction procedures (e.g., snow handling and removal, access road construction and maintenance, soil handling under saturated or frozen conditions, topsoil stripping);
- Stabilization and monitoring procedures if ground conditions will delay restoration until the following spring (e.g., mulching and erosion controls, inspection and reporting, stormwater control during spring thaw conditions); and,
- Final restoration procedures (e.g., subsidence and compaction repair, topsoil replacement, seeding).

The Winter Construction Plan will be provided within the project-specific Clearance Package / Permit Book. Section 7(c) and prior notice projects are required to file the Winter Construction Plan for the review and written approval by the FERC. (The requirement to file a plan does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.)

3.6.5 Unauthorized Vehicle Access to ROW

The Company will offer to install and maintain measures to control unauthorized vehicle access to the ROW based on requests by the manager or owner of forested lands. These measures may include:

- Signs;
- Fences with locking gates;

- Permanent access roads;
- Slash and timber barriers, pipe barriers, or a line of boulders across the ROW; or
- Conifers or other appropriate shrubs with a mature height of 4 feet or less across the ROW.

3.7 Aboveground Facility Construction

Construction at aboveground facilities, including compressor stations, meter stations, valve sites, and other facilities, will follow the same best management practices identified for pipeline installation and removal on the ROW. Work activities in this category can include installation of new aboveground facilities, modification or relocation of facilities at existing compressor station sites, upgrades or installations at existing meter station sites, construction of new receipt or delivery points, and a variety of other activities. Certain project types covered in this section may trigger additional stormwater permitting. Check with the ECP Lead to ensure that all stormwater requirements are met prior to construction.

1. Aboveground facilities shall not be located in any wetland, except as permitted or where the location of such facilities outside of wetlands would prohibit compliance with U.S.DOT regulations.
2. Install temporary sediment barriers at the base of slopes adjacent to roads and at waterbodies and wetlands in accordance with Sections 5.1.4 and 6.3 respectively.
3. Inspect temporary sediment barriers daily in areas of active construction to ensure proper functioning and maintenance. In other areas with no construction or equipment operation, sediment barriers will be inspected and maintained on a weekly basis throughout construction, and within 24 hours of each 0.5 inch of rainfall. Conduct an inspection within 24 hours once a storm event has produced 0.5 inch of rainfall, even if the storm event is still continuing.
4. If a waterbody is present on or immediately adjacent to an existing facility property where work is being conducted, install sediment barriers as necessary along the edge of the construction area to contain spoil and sediment within the work area.
5. All extra work areas should be located at least 50 feet away from the water's edge of a waterbody or a wetland, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land. FERC approval is necessary for the use of work areas if these setback conditions cannot be met.
6. Wetland boundaries and buffers (e.g., extra work area setbacks, refueling restrictions) must be clearly marked in the field with signs and /or highly visible flagging until construction-related ground disturbing activities are complete.
7. When work is required within a wetland at an existing facility, and standing water or saturated soils are present, or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands, use low-ground-weight construction equipment or operate normal equipment on timber riprap, prefabricated equipment mats or terra mats. Do not use more than two layers of timber riprap to stabilize the work area.

8. Maintain all temporary sediment barriers in place until permanent revegetation measures are successful or the upland areas adjacent to wetlands, waterbodies and roads are stabilized.
9. Remove temporary sediment barriers from an area when replaced by permanent erosion or sediment control measures or when the area has been successfully restored as specified in Section 8.1.
10. Temporary slope breakers are to be installed on all disturbed areas as necessary to avoid excessive erosion as described in Section 3.5.4.
11. Where required for work in wetlands (except areas where standing water is present or soils are saturated) segregate topsoil as described in Section 3.5.3.1.
12. Place spoil at least 10 feet upgradient from the edge of waterbodies or as indicated on construction drawings. Spoil will be contained with erosion and sediment control devices to prevent spoil materials or silt-laden water from transferring into waterbodies and wetlands or off of the facility property.
13. If required, dewatering should be conducted as described in Section 3.5.6.
14. The Contractor shall make every reasonable effort to complete final cleanup of an area (including final grading and installation of permanent erosion control structures) within 20 days after ground disturbing activities are completed. If seasonal or other weather conditions prevent compliance with these time frames, continue to inspect and maintain temporary erosion and sediment controls (temporary slope breakers and sediment barriers) until conditions allow completion of cleanup. Cleanup shall be conducted in accordance with Section 3.6 of this document.
15. Grade to contours shown on construction drawings or site plans or return grade to pre-construction contours.
16. New gravel, stone and paving at the site shall be placed in accordance with construction drawings. No additional gravel, stone, or paving shall be added without prior approval by ECP.
17. Install permanent erosion controls and post-construction stormwater measures at the locations shown on the construction drawings.
18. Disturbed soils will be seeded within 6 working days of final grading, weather and soil conditions permitting, unless permit conditions indicate otherwise.
19. Remove all timber riprap and prefabricated equipment mats in any wetlands upon completion of construction.

4. SPECIAL CONSTRUCTION METHODS

The Company will utilize the following specialized construction procedures for agricultural areas, road crossings, and residential areas along the pipeline project, when applicable. The project construction drawings, Line Lists, and Construction Contract will indicate the locations where specialized construction methods will be used.

4.1 Agricultural Areas

The following sections identify construction procedures and best practices for activities within actively cultivated or rotated land used for the production of crops including but not limited to corn, grains, orchards, vineyards and hayfields.

4.1.1 Drain Tiles

Develop procedures for constructing through drain-tiled areas and repairing drain tiles after construction. Engage qualified drain tile specialists, as needed, to conduct or monitor repairs to drain tile systems affected by construction. Use drain tile specialist from the project area, if available.

1. Attempt to locate existing drain tiles.
2. Probe all drainage tile systems within the area of disturbance to check for damage.
3. Ensure that the depth of cover over the new pipeline is sufficient to avoid interference with drain tile systems (existing or proposed). For adjacent pipeline loops in agricultural areas, install the new pipeline with at least the same depth of cover as the existing pipeline(s).
4. Repair damaged drain tiles to their original or better condition (Figure SU-1). Filter-covered drain tiles may not be used unless the local soil conservation authorities and the landowner agree in writing prior to construction.

4.1.2 Irrigation

Maintain water flow in crop irrigation systems, unless shutoff is coordinated with affected parties. Repair any damage to irrigation systems as soon as practical.

4.1.3 Soil Compaction Mitigation & Restoration

The following measures are to be employed during decompaction and restoration of soil within agricultural areas disturbed by construction activities:

1. In agricultural areas, test topsoil and subsoil disturbed by construction activities for compaction at regular intervals. Use penetrometers or other appropriate devices to conduct tests. In order to approximate preconstruction conditions, conduct tests on the same soil type under similar moisture conditions in undisturbed areas.
2. Plow severely compacted soils with a paraplow or other deep tillage implement;
 - a. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil.

- b. If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.
3. Soils imported for use within agricultural areas are to be certified as free of noxious weeds and soil pests, unless otherwise approved by the landowner.
4. Remove excess rock from at least the top 12 inches of soil in all cultivated or rotated cropland, managed pastures, hayfields. The size, density, and distribution of rock on the construction work area shall be similar to adjacent areas not disturbed by construction. The landowner or land management agency may approve other provisions in writing.

4.2 Road Crossings

The "open cut" method is typically used when installing the pipeline across small roads (Figure RD-4). Traffic is diverted while the trench is excavated across the road and the pipeline is installed. An open cut crossing may involve closing the road to all traffic and constructing an adequate detour around the crossing area, or excavating one-half of the road at a time allowing through traffic to be maintained. Any detour constructed around the crossing area must remain within the approved construction workspace. After completing the crossing, all backfill is compacted, the road bed is repaired and the road surface is replaced.

Bores are often used to install the pipeline across highways, major roads with heavy traffic, and railroads (Figure RD-5), unless the crossing permit allows an open cut crossing. Similar to a directional drill, as discussed in Section 4.4, the road bore is accomplished with a horizontal drill rig or boring machine. The boring machine drills a hole under the road to allow insertion of the pipe. Typically, a dummy pipe section is pulled through which is welded to the line pipe. The dummy pipe is pulled back through placing the line pipe in the crossing. In some instances, a casing (another larger pipe) is installed in the hole and the pipeline is inserted inside the casing. Casings typically are not installed today, although some states require casings on rail crossings. Casings also may be used in soils where it is difficult to pull pipe. The benefit of the road bore is that it allows installation of the pipeline without disrupting traffic.

Access roads shall be used and maintained in accordance with Section 3.2.

4.3 Residential Areas

Specialized construction procedures will be utilized in areas of heavy residential or commercial/ industrial congestion where residences or business establishments lie within 50 feet from the edge of the construction ROW.

1. Install safety fence at the edge of the construction ROW for a distance of 100 feet on either side of the residence or business establishment.
2. For a distance of 100 feet on either side any residence or business establishment, maintain a minimum distance of 25 feet between any structure and the edge of the construction work area. If a distance of 25 feet cannot be maintained, refer to Section 4.3.2.
3. If crushed stone/rock access pads are used in residential areas, rock shall be placed on nonwoven synthetic geotextile fabric to facilitate rock removal after construction.

4. Attempt to leave mature trees and landscaping intact within the construction work area unless the trees and landscaping interfere with the installation techniques or present unsafe working conditions, or as specified in landowner agreements.
5. Prevent the mixing of subsoil and topsoil by implementing segregation methods in all residential areas, except where the topsoil is being replaced, as stipulated in Section 3.5.3.1, unless the landowner or land managing agency specifically approves otherwise.

In addition to the aforementioned specialized procedures, smaller "spreads" of labor and equipment, operating independent of the mainline work force, will utilize either the stove pipe or drag section pipeline construction techniques in those areas of congestion where a minimum distance of 25 feet cannot be maintained between the residence (or business establishment) and the edge of the construction work area. In no case shall the temporary work area be located within 10 feet of a residence unless the landowner agrees in writing, or the area is within the existing maintained ROW.

The following techniques shall be utilized for a distance of 100 feet on either side of the residence or business establishment at the locations identified in the Company Construction Contract and/or Line List. Refer to site-specific residential construction plans, as applicable.

4.3.1 Stove Pipe Technique

The stove pipe construction technique is a less efficient alternative to the mainline method of construction, typically used when the pipeline is to be installed in very close proximity to an existing structure or when an open trench would adversely impact a commercial/industrial establishment. The technique involves installing one joint of pipe at a time whereby the welding, weld inspection, and coating activities are all performed in the open trench. At the end of each day after the pipe is lowered-in, the trench is backfilled and/or covered with steel plates or timber mats. The length of excavation performed each day cannot exceed the amount of pipe installed.

4.3.2 Drag Section Technique

The drag section construction technique, while less efficient than the mainline method, is normally preferred over the stove pipe alternative. This technique involves the trenching, installation, and backfill of a prefabricated length of pipe containing several segments all in one day. At the end of each day after the pipe is lowered-in, the trench is backfilled and/or covered with steel plates or timber mats. Use of the drag section technique will typically require adequate staging areas outside of the residential and/or commercial/industrial congestion for assembly of the prefabricated sections.

4.3.3 Residential Area Cleanup and Restoration

Restore all lawn areas and landscaping immediately following cleanup operations, or as specified in landowner agreements, including

1. Perform appropriate soil compaction mitigation in severely compacted residential areas.
2. Remove excess rock from at least the top 12 inches of soil in all cultivated or rotated cropland, managed pastures, hayfields. The size, density, and distribution of rock on the

construction work area shall be similar to adjacent areas not disturbed by construction. The landowner or land management agency may approve other provisions in writing.

3. Importation of topsoil is an acceptable alternative to topsoil segregation. Soils imported for use within residential areas are to be certified as free of noxious weeds and soil pests, unless otherwise approved by the landowner.
4. Reseed all disturbed lawns with a seed mixture acceptable to landowner or comparable to the adjoining lawn.

In residential areas, complete final grading, topsoil replacement, and installation of permanent erosion control structures within 10 days after backfilling the trench. Mulch all disturbed areas before seeding if final grading and installation of permanent erosion control measures will not be completed within 10 days after the trench in that area is backfilled in residential areas. If seasonal or other weather conditions prevent compliance with these time frames, maintain temporary erosion controls (i.e., temporary slope breakers, sediment barriers, and mulch) until conditions allow completion of cleanup.

Landowners shall be compensated for damages in a fair and reasonable manner, and as specified in the damage provision within the controlling easement on each property.

4.4 Horizontal Directional Drill Method

Horizontal Directional Drilling (HDD) is a trenchless crossing method that can help avoid direct impacts to sensitive resources (e.g., waterbodies and wetlands) or infrastructure (e.g., roads and railways) by directionally drilling beneath them. HDD installation typically is carried out in three stages:

1. Directional drilling of a small diameter pilot hole;
2. Enlarging the pilot hole to a sufficient diameter to accommodate the pipeline; and,
3. Pulling the prefabricated pipeline, or pull string, into the enlarged bore hole.

For each waterbody or wetland that would be crossed using the HDD method, the Company will prepare a project-specific HDD Plan that includes:

- Site-specific construction diagrams that show the location of mud pits, pipe assembly areas, and all areas to be disturbed or cleared for construction;
- Justification that disturbed areas are limited to the minimum needed to construct the crossing;
- Identification of any aboveground disturbance or clearing between the HDD entry and exit workspaces during construction;
- A description of how an inadvertent release of drilling mud would be contained and cleaned up; and
- A contingency plan for crossing the waterbody or wetland in the event the HDD is unsuccessful and how the abandoned drill hole would be sealed, if necessary.

The HDD Plan will be provided within the project-specific Clearance Package / Permit Book.



Section 7(c) and prior notice projects are required to file HDD plans for the review and written approval by the FERC. (This requirement to file a plan does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.)

During post-construction maintenance activities, do not conduct any routine vegetation mowing or clearing in riparian areas or wetlands that are between HDD entry and exit points.

5. WATERBODY CROSSINGS

The intent of these procedures is to minimize the extent and duration of project related disturbances within waterbodies. The following section describes the construction procedures and mitigation measures that will be used for pipeline installations at waterbodies. The length of the crossing, the sensitivity of the area, existing conditions at the time of the crossing, and permit requirements will determine the most appropriate measures to be used.

The *Waterbody Reference Citing FERC Requirements* in Appendix B summarizes general waterbody crossing methods and requirements identified in the FERC Procedures. These tables provide a brief reference of the restrictions on construction techniques for waterbody crossings; equipment bridges; construction time windows. However, as more stringent agency specific requirements may exist, refer to the Clearance Package / Permit Book for project-specific requirements.

5.1 General Waterbody Procedures

Pipeline construction across waterbody channels may result in short term water quality impacts. The following general procedures are to be followed to minimize or avoid impacts at waterbody crossings:

1. Crossings of waterbodies may proceed using standard upland construction techniques when they are dry or frozen and not flowing provided that the EI verifies that water is unlikely to flow between initial disturbance and final stabilization of the feature. In the event of perceptible flow, all applicable requirements of Section 5 must be followed.
2. Construct crossings as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions permit.
3. Where waterbodies meander or have multiple channels, route the pipeline to minimize the number of waterbody crossings.
4. Perform mobilization of construction equipment, trench excavation, and backfilling in a manner that will minimize the potential for erosion and sedimentation within the waterbody channel.
5. Locate all extra work areas, such as staging and additional spoil storage areas, at least 50 feet away from water's edge, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land. Site-specific written approval by FERC is required for all extra work areas with a less than 50-foot setback and associated measures to be used to ensure the waterbody is adequately protected.
6. Implement erosion control measures to confine water quality impacts within the immediate construction area and to minimize impacts to downstream areas.
7. Place all spoil from the waterbody within the construction ROW at least 10 feet from the water's edge or in the extra work areas shown on the construction drawings.
8. Maintain adequate flow rates to protect aquatic life and prevent the interruption of existing downstream uses.
9. Dewater trench in accordance with the procedures described in Section 3.5.6.

5.1.1 Time Windows for Instream Work

Unless expressly permitted or further restricted by the appropriate federal or state agency in writing on a site-specific basis, instream work must occur during the following time windows:

- Coldwater fisheries – June 1 through September 30; and
- Coolwater and warmwater fisheries – June 1 through November 30.

Installation or removal of equipment bridges above the top of bank is not subject to the aforementioned time windows.

5.1.2 Equipment Bridges

Equipment bridges may be installed and used where needed to allow equipment access across waterbodies.

1. Until the equipment bridge is installed, only clearing equipment and equipment necessary for installation of equipment bridges may cross the waterbody, and the number of crossings shall be limited to one crossing per piece of equipment, unless otherwise authorized by the appropriate permitting agency. EI approval is required prior to equipment crossing a waterbody without an equipment bridge.
2. Construct and maintain equipment bridges that allow unrestricted flow and prevent sediment from entering the waterbody. The Construction Contract agreement and/or permit conditions may specify the type of bridge to be used. Examples of bridges are provided below:
 - a. Equipment pads with or without culvert(s), as illustrated in Figure BR-1;
 - b. Clean crushed stone and culvert(s), as illustrated in Figure BR-2;
 - c. Flexi-float or portable bridges, as illustrated in Figure BR-3;
 - d. Double equipment pads, geotextile fabric and sideboards with or without culvert(s); or
 - e. Railroad car bridges without culverts.
3. Design and maintain each equipment bridge to withstand the highest flows that would occur. Align culverts/flumes to prevent bank erosion or streambed scour. If necessary, install energy dissipating devices downstream of culverts.
4. Do not use soil to construct or stabilize equipment bridges.
5. Design and maintain equipment bridges to prevent sediment from entering the waterbody.
6. Remove temporary equipment bridges as soon as practicable after permanent seeding.
7. If there will be more than 1 month between final cleanup and the beginning of permanent seeding and reasonable alternative access to the ROW is available, remove temporary equipment bridges as soon as practicable after final cleanup.

8. Obtain any necessary approval or authorization from the COE and/or the appropriate state agency for temporary and permanent bridges.

5.1.3 Clearing and Grading near Waterbodies

1. Confine construction activities and ground disturbance to the construction ROW boundaries, as shown on the construction drawings. Restrict extra work areas (such as staging areas and additional spoil storage areas) to only those shown on the construction drawings.
2. If the pipeline parallels a waterbody, maintain at least 15 feet of undisturbed vegetation between the waterbody (and any adjacent wetland) and the ROW except where maintaining this offset will result in greater environmental impact.
3. Clear the ROW adjacent to all waterbodies *up to the high water bank* (where discernible). *Within 10 feet of the high water bank*, trees shall be cut to ground level and with little to no ground disturbance. **Do not grub** this 10-foot vegetative strip with equipment.
4. Immediately remove all cut trees and branches that inadvertently fall into a waterbody and stockpile in an upland area within the construction ROW for disposal.
5. Grade the ROW adjacent to waterbodies *up to within 10 feet of the high water bank*, leaving an ungrubbed vegetative strip intact.
6. Clearing and grading operations may proceed through the 10-foot vegetative strip **only on the working side of the ROW** in order to install the equipment bridge and travel lane. Use temporary sediment barriers to prevent the flow of bank spoil into the waterbody.

5.1.4 Temporary Erosion and Sediment Controls at Waterbodies

Install sediment barriers immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers must be properly maintained throughout construction and repaired or reinstalled as necessary (such as after backfilling of the trench), until replacement by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in Section 3.5, however, the following specific measures must be implemented at stream crossings:

1. Install sediment barriers across the entire construction ROW at all waterbody crossings, where necessary to prevent the flow of sediments into the waterbody.
2. Install sediment barriers along the edge of the construction ROW as necessary to contain spoil within the construction ROW and prevent sediment flow into the waterbody where waterbodies are adjacent to the construction ROW or parallel to the construction ROW and the ROW slopes toward the waterbody.
3. Removable or temporary sediment barriers, such as slope breakers or drivable berms as described in Section 3.5.4, may be used in lieu of sediment barriers in front of equipment bridges or timber mats across the travel lane. Removable sediment barriers can be removed

during the construction day, but must be reinstalled after construction has stopped for the day or whenever heavy precipitation is imminent.

4. Use temporary trench plugs at all waterbody crossings, as necessary, to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody. Trench plugs shall be of sufficient size to withstand upslope water pressure.

5.2 Types of Waterbody Crossing Methods

Waterbody crossing techniques allowed for use on a project will be determined by agency consultations and permits. Construction at waterbodies will be conducted using two principal crossing methods, a “dry” crossing and a “wet” crossing. The “dry” or “dry-ditch” crossing procedure is further divided into a flume crossing and a dam-and-pump crossing methods. These methods are designed to maintain downstream flow at all times and to isolate the construction zone from the stream flow by channeling the water flow through a flume pipe or by damming the flow and pumping the water around the construction area. The overall objective is to minimize siltation of the waterbody and to facilitate trench excavation of saturated spoil. The two “dry” crossings are further described below in Sections 5.2.1 and 5.2.2.

The “wet” or “open-cut” crossing method involves trenching in the waterbody without isolating the construction zone from the stream flow. The objective of this method is to complete the waterbody crossing as quickly as practical in order to minimize the duration of impacts to aquatic resources. The wet crossing method is further described below in Section 5.2.3.

All streams, their classifications, timing windows, applicable permits and crossing procedures will be identified in the project-specific Clearance Package/Permit Book and on the construction drawings. Unless approved otherwise by the appropriate federal or state agency, pipeline construction and installation must occur using one of the two “dry” crossing methods for waterbodies state-designated as either coldwater or significant coolwater or warmwater fisheries, or federally designated as critical habitat. The flume and dam-and-pump crossing methods are applicable to waterbodies up to 30 feet wide (possibly wider depending on flow volume and rate) at the water’s edge at the time of construction.

5.2.1 Flume Crossing

The flume crossing method utilizes a flume pipe(s) to transport stream flow across the disturbed area and allows trenching to be done in drier conditions (Figure WC-3). The flume pipe(s) installed across the trench will be sized to accommodate anticipated stream flows. Flumes are generally not recommended for use on a waterbody with a broad unconfined channel, unstable banks, a permeable substrate, excessive stream flow, or where the installation and construction of the flume crossing will adversely affect the bed or banks of the stream.

The flume waterbody crossing shall be installed as follows:

1. Install flume pipe(s) after blasting and other rock breaking measures (if required), but before trenching;
2. Properly align flume pipe(s) to prevent bank erosion and streambed scour;

3. Use sand bags or equivalent dam diversion structure to provide a seal at either end of the flume to channel water flow (some modifications to the stream bottom may be required to achieve an effective seal);
4. **Do not remove flume pipe** during trenching, pipe laying (thread pipe underneath the flume pipe(s)), or backfilling activities, or initial streambed restoration efforts, except for crossings where a dam-and-pump method (as described in Section 5.2.2 below) has been established as an alternative measure to redirect stream flow; and
5. Remove all flume pipes and dams that are not also part of the equipment bridge as soon as final cleanup of the stream bed and bank is complete.

5.2.2 Dam-and-Pump Crossing

The dam-and-pump crossing method is presented as an alternative dry crossing procedure to the flume crossing (in limited cases, it may be used in combination with a flume crossing). The dam-and-pump method is accomplished by utilizing pumps to transport stream flow across the disturbed area (Figure WC-4). This method involves placing sandbags across the existing stream channel upstream from the proposed crossing to stop water flow and downstream from the crossing to isolate the work area. Pumps are used to pump the water across the disturbed area and back into the stream further downstream.

The dam-and-pump procedure allows for more space and flexibility during trenching and pipe installation, which shortens the duration of time spent at the waterbody. The dam-and-pump method may be used for crossings of waterbodies where pumps can adequately transfer stream flow volumes around the work area, and where there are no concerns about sensitive species passage.

The dam-and-pump crossing method shall be installed as follows:

1. Install and properly seal sandbags at the upstream and downstream location of the crossing;
2. Create an in-stream sump using sandbags if a natural sump is unavailable for the intake hose;
3. Initiate pumping of the stream around the work area prior to excavating the trench;
4. Monitor dam and pumps at all times to ensure proper operation until the waterbody crossing is completed; and,
5. Remove the sandbag dams, pumps and hoses and return normal flow back to the waterbody following installation and restoration of the streambed.

Implementation of the dam-and-pump crossing method will meet the following performance criteria:

- Use sufficient pumps, including onsite backup pumps, to maintain downstream flows;
- Construct dams with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner);
- Screen all intake hoses to minimize the entrainment of fish and other aquatic life
- Prevent streambed scour at pump discharge; and

- Continuously monitor the dam and pumps to ensure proper operation throughout the waterbody crossing.

5.2.3 Wet Crossing

Open-cut crossings involve excavating a trench for the pipeline across the bottom of the waterbody to be crossed (Figure WC-2). Depending on the depth of the water, construction equipment may be placed on barges or other floating platforms to excavate the pipe trench.

This construction technique is typically used to cross waterbodies that are not state-designated, such as ephemeral drainage ditches, and ephemeral and intermittent streams, as well as intermediate and major waterbodies with substantial flows that cannot be effectively flumed or pumped around the construction zone using one of the dry crossing techniques.

5.3 FERC Waterbody Classifications

In the FERC Procedures, a “waterbody” is defined to include any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes. Waterbodies have been further divided into three classifications by FERC depending on the width of the feature, which dictate construction limitations or requirements.

5.3.1 Minor Waterbodies

FERC defines a “minor waterbody” as a waterbody less than or equal to 10 feet wide at the water’s edge at the time of crossing. Minor waterbodies shall be crossed in accordance with the following requirements:

1. All spoil from minor waterbody crossings must be placed in the construction ROW at least 10 feet from the water’s edge or in additional extra work areas as described above in Section 5.1.
2. Unless approved otherwise by the appropriate federal or state agency, utilize a dry crossing construction technique to install crossings at all minor waterbodies that are state-designated fisheries or federally designated as critical habitat, as identified in the Clearance Package/ Permit Book (Figures WC-3 or WC-4).
 - a. All construction equipment must use an equipment bridge to cross state-designated fisheries as specified in Section 5.1.2.
3. Where a dry-ditch crossing is not required, minor waterbodies may be crossed using the wet crossing method, with the following restrictions:
 - a. Except for blasting and other rock breaking measures, complete instream construction activities (including trenching, pipe installation, backfill, and restoration of the streambed contours) within 24 hours. Streambanks and unconsolidated streambeds may require additional restoration after this period;
 - b. Limit use of equipment operating in the waterbody to that needed to construct the crossing;

- c. If a flume is installed within the waterbody during mainline activities, it can be removed just prior to lowering in the pipeline (The 24-hour timeframe starts as soon as the flume is removed.); and,
- d. Equipment bridges are not required at minor waterbodies that do not have a state-designated fishery classification or protected status (e.g., agricultural or intermittent drainage ditches). However, if an equipment bridge is used it must be constructed as described in Section 5.1.2.

5.3.2 Intermediate Waterbodies

FERC defines an "intermediate waterbody" as a waterbody greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of crossing. Intermediate waterbodies shall be crossed in accordance with the following requirements:

- 1. All spoil from intermediate waterbody crossings must be placed in the construction ROW at least 10 feet from the water's edge or in additional extra work areas as described above in Section 5.1.
- 2. Unless approved otherwise by the appropriate federal or state agency, install the pipeline using a dry crossing method for crossings of waterbodies up to 30 feet wide (at the water's edge at the time of construction) that are
 - a. state-designated as either coldwater or significant coolwater or warmwater fisheries, or
 - b. federally designated as critical habitat.
- 3. Where a dry-ditch crossing is not required, intermediate waterbodies may be crossed using the wet crossing method, with the following restrictions:
 - a. Complete instream construction activities (not including blasting and other rock breaking measures) within 48 hours, unless site-specific conditions make completion within 48 hours infeasible;
 - b. Limit use of equipment operating in the waterbody to that needed to construct the crossing; and,
 - c. All other construction equipment must cross on an equipment bridge as specified in Section 5.1.2.

5.3.3 Major Waterbodies

FERC defines a "major waterbody" as a waterbody greater than 100 feet wide at the water's edge at the time of crossing. Before construction, the Company shall prepare and file for the review and written approval by the FERC a detailed, site-specific construction plan and scaled drawings identifying all areas to be disturbed by construction for each major waterbody crossing, however the scaled drawings are not required for any offshore portions of pipeline projects. (The requirement to file major waterbody crossing plans does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.) This site-specific plan must be

developed in consultation with the appropriate state and federal agencies and shall include extra work areas, spoil storage areas, sediment control structures, etc., as well as mitigation for navigational issues.

Upland spoil from major waterbody crossings must be placed in the construction ROW at least 10 feet from the water's edge or in additional extra work areas as described in Section 5.2.

5.4 Restoration

Restore and stabilize the waterbody banks and channel in accordance with this section.

1. Return all waterbody banks to preconstruction contours or to stable angle of repose as approved by the EI.
2. Use clean gravel or native cobbles for the upper 12 inches of trench backfill in all waterbodies identified in the Clearance Package/Permit Book as coldwater fisheries, unless otherwise specified by state-specific agency recommendations or permit conditions.
3. For wet crossings, stabilize waterbody banks and install temporary sediment barriers within 24 hours of completing the crossing.
4. For dry crossings, complete bank stabilization before returning flow to the waterbody channel.
5. Limit the use of rock riprap to areas where flow conditions preclude effective vegetation stabilization techniques such as seeding and erosion control fabric, unless otherwise specified by COE and state permits. Limit the placement of rock riprap to the slopes along the disturbed waterbody crossing. Application of riprap for bank stabilization must comply with COE, or its delegated agency, permit terms and conditions.
6. Install erosion control fabric, in accordance with Section 3.6.1.2, or a functional equivalent on waterbody banks at the time of final bank contouring (Figure EC-13, WC-5). Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat unless the product is specifically designed to minimize harm to wildlife.
7. Revegetate disturbed riparian areas with native species of conservation grasses, legumes and woody species similar in density to adjacent undisturbed lands.
8. In the event that final cleanup is deferred more than 20 days after the trench is backfilled, all slopes within 100 feet of waterbodies shall be mulched with 3 tons/acre of straw.
9. Remove all temporary sediment barriers when replaced by permanent erosion controls or when restoration of adjacent upland areas is successful as specified in Section 8.1.
10. Install a permanent slope breaker and a trench breaker at the base of slopes greater than 5% that are less than 50 feet from each waterbody crossed.

6. WETLAND CROSSINGS

The term “wetland” as used in this plan includes any area that satisfies the requirements of the current federal methodology for identifying and delineating wetlands. The requirements outlined below do not apply to wetlands in actively cultivated or rotated cropland. Standard upland protective measures, including workspace and topsoil segregation requirements, apply to these agricultural wetlands.

Wetland boundaries are identified on the construction drawings and within the Clearance Package / Permit Book. Wetlands are delineated prior to construction using current federal methodology and summarized within a wetland delineation report, which identifies the following information for all wetlands that would be affected by the construction ROW:

- Location, including pipeline milepost if crossed by centerline;
- National Wetland Inventory (NWI) classification;
- Crossing length in feet;
- Area of permanent and temporary disturbance that would occur in each wetland, sorted by NWI classification type.

6.1 General Wetland Procedures

Crossing procedures are to comply with COE, or its delegated agency, permit terms and conditions. Project-specific permits or authorizations issued by the COE or other appropriate agency(ies) are provided in the Clearance Package / Permit Book. Implement the following general requirements during planning and construction near or across wetlands:

1. Route the pipeline to avoid wetland areas to the maximum extent possible.
2. If a wetland cannot be avoided or crossed by following an existing right-of-way, route the new pipeline in a manner that minimizes disturbance to wetlands. Where looping an existing pipeline, overlap the existing pipeline right-of-way with the new construction right-of-way. In addition, locate the loop line no more than 25 feet away from the existing pipeline unless site-specific constraints would adversely affect the stability of the existing pipeline.
3. Identify site-specific areas where excessively wide trenches could occur and/or where spoil piles could be difficult to maintain because existing soils lack adequate unconfined compressive strength.
4. Limit construction activity and ground disturbance in wetland areas to a construction ROW width of 75 feet or as shown on the construction drawings. Only with prior written approval from the FERC, construction ROW width within the boundaries of federally delineated wetlands may be expanded beyond 75 feet if required by site-specific topographic conditions or soil limitations.
5. All extra work areas must be located at least 50 feet away from wetland boundaries, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land. Only with prior written approval from the FERC, the Company can locate extra work areas closer than 50 feet from the wetland if site-specific conditions justify a less than 50-foot setback.

6. Aboveground facilities shall not be located in any wetland, except as permitted or where the location of such facilities outside of wetlands would prohibit compliance with U.S.DOT regulations.
7. In the event a waterbody crossing is located within or adjacent to a wetland crossing, the Company must file a site-specific crossing plan for review and obtain written approval by the FERC before construction if all measures of Sections V. and VI. of the FERC Procedures cannot be met.
8. Limit construction equipment operating in wetland areas to that needed to clear the ROW, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction ROW. All other construction equipment shall use access roads located in upland areas to the maximum extent practical. Refer to Section 3.2 for other requirements and restrictions pertaining to access to the construction ROW or use of roads across wetlands.

6.2 Clearing and Grading at Wetlands

1. Wetland boundaries and buffers (e.g., extra work area setbacks, refueling restrictions) must be clearly marked in the field with signs and /or highly visible flagging until construction-related ground disturbing activities are complete.
2. If standing water or saturated soils are present, or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands, use low-ground-weight construction equipment or operate normal equipment on timber riprap, prefabricated equipment mats or terra mats on the working side of the ROW during clearing operations.
3. Attempt to use no more than two layers of timber riprap to stabilize the ROW. If approved by the COE, woody debris can be burned in wetlands as long as it is in accordance with state and local regulations, ensuring that all woody debris is removed for disposal.
4. Cut vegetation just above ground level and grind stumps to ground level, leaving existing root systems in place and remove any excess vegetation (e.g., wood chips). Immediately remove all cut trees, limbs and branches from the wetland and stockpile in an upland area on ROW for disposal.
5. Limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the construction ROW in wetlands unless the Chief Inspector and EI determine that safety-related construction constraints require grading or the removal of tree stumps from under the working side of the construction ROW.
6. Do not cut trees outside of the construction ROW to obtain timber for riprap or equipment mats.
7. Cleared materials, such as slash, logs, brush, and wood chips, shall not be permanently placed within wetland areas.

6.3 Temporary Erosion & Sediment Control at Wetlands

Install sediment barriers immediately after initial ground disturbance at the following locations:

- Within the ROW at the edge of the boundary between wetland and upland;
- At the base of slopes greater than 5% where the base of the slope is less than 50 feet from a wetland;
- Across the entire ROW immediately upslope of the wetland boundary to contain spoil within the construction ROW and prevent sediment flow into the wetland;
- Along the edge of the ROW, where the ROW slopes toward the wetland, to protect adjacent, off ROW wetland; and
- Along the edge of the ROW as necessary to contain spoil and prevent sediment from migrating outside the construction ROW in areas where a wetland is both within and adjacent to the construction ROW.

Maintain all sediment barriers throughout construction and reinstall as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete in accordance with Section 8.1. Remove the sediment barriers during right-of-way cleanup.

6.4 Wetland Crossing Procedure

Procedures used to install a pipeline across wetlands vary depending on the level of soil stability and saturation encountered during construction. The following best management practices are to be employed during standard wetland crossings:

1. Assemble the pipeline in an upland area unless the wetland is dry enough to adequately support skids and pipe.
2. Do not use rock, soil imported from outside the wetland, tree stumps, or brush riprap to stabilize the ROW.
3. Perform topsoil segregation in accordance with Section 3.5.3.1, including segregating the top 1 foot of topsoil from the area disturbed by trenching, except in areas where standing water is present or soils are saturated. Immediately after backfilling is complete, restore the segregated topsoil to its original location.
4. If required, dewatering should be conducted as described in Section 3.5.6.
5. Minimize the length of time that topsoil is segregated and the trench is open. Do not trench the wetland until the pipeline is assembled and ready for lowering-in.
6. Use “push-pull” or “float” construction techniques to place the pipe in the trench where water and other site conditions allow (Refer to Section 6.4.1 below).
7. Install permanent trench breakers at the wetland boundaries and/or seal the trench bottom as necessary to maintain the original wetland hydrology at locations where the pipeline trench may drain a wetland.

8. Install a permanent slope breaker and a trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas for each wetland crossed.
9. Install a permanent slope breaker across the construction right-of-way at the base of slopes greater than 5% where the base of the slope is less than 50 feet from the wetland, or as needed to prevent sediment transport into the wetland. In some areas, with the approval of the EI, an earthen berm may be suitable as a sediment barrier adjacent to the wetland.
10. Restore segregated topsoil to its original position after backfilling is complete. When required, additional fill material imported from off the ROW must be approved by the EI.
11. Preconstruction wetland contours and flow regimes will be restored to the extent practical.

6.4.1 Push-pull Technique

The “push-pull” or “float” or “drag section” method may be utilized during wetland crossings if conditions are suitable at the time of construction. Sufficient, naturally present groundwater volumes that fill the excavated trench are required to facilitate this installation method. This method may be used to install the pipeline if the wetland to be crossed contains standing water or saturated and/or unstable soils.

- Trenching equipment will excavate a trench across the wetland, either using low-ground-weight equipment or working on timber matting.
- While the trench is being excavated, the pipeline crossing sections will be assembled and welded together in uplands.
- Prefabricated pipeline crossing sections will then be pushed or pulled into the trench; floated across the wetland and released into the trench if the trench is filled with water; or, carried into position with sideboom tractors supported on equipment mats.
- The excavating equipment will “walk through” the wetland by carrying timber mats and repositioning the mats as it operates from one mat to the next through the wetland during trenching, backfilling, and cleanup activities.

6.5 Wetland Cleanup and Restoration

1. Restore pre-construction wetland contours to maintain the wetland hydrology.
2. Revegetate the ROW with annual ryegrass at 40 lbs/acre PLS or with the recommended Wetland Seed Mix in Appendix C or project-specific seed mix where applicable, unless standing water is present or unless prohibited by state or land management agency.
3. **Do not use lime, mulch or fertilizer in wetland areas** unless required in writing by the appropriate federal or state agency, as identified in the Clearance Package/Permit Book.
4. In the event that final cleanup is deferred more than 20 days after the trench is backfilled, all slopes adjacent to wetlands shall be mulched with 3 tons/acre of straw for a minimum of 100 feet on each side of the crossing.

5. Remove all project-related material used to support equipment on the construction ROW, including timber riprap and prefabricated equipment mats, upon completion of construction.
6. Develop specific procedures in coordination with the appropriate federal or state agency, where necessary, to prevent the invasion or spread of invasive vegetation (such as purple loosestrife and phragmites).
7. Ensure that all disturbed areas permanently revegetate in accordance with Section 8.1.
8. Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after upland revegetation and stabilization of adjacent upland areas are successful as specified in Section 8.1.

7. SPILL PREVENTION & RESPONSE

7.1 SPCC / PPC Plan

The Company and Contractor shall adhere to the SPCC/PPC Plan at all times. This plan has been prepared to meet the requirements of several federal regulations and guidelines: the FERC's Plan and Procedures; Oil Pollution Act; Federal Water Pollution Control Act; Comprehensive Environmental Response, Compensation and Liability Act of 1980; the Resource Conservation and Recovery Act; Toxic Substances Control Act; and, the Clean Water Act.

The purpose of the SPCC/PPC Plan is to reduce the probability and risk of a potential spill or release of oil or hazardous materials during construction-related activities. The objectives of this plan are to identify and address:

- The type and quantity of material handled, stored, or used on site during construction;
- Measures to be taken for spill preparedness and prevention;
- Emergency response procedures;
- Spill incident reporting/notification procedures; and
- Local emergency response team arrangements.

7.2 Spill Prevention Measures

Structure operations in a manner that reduce the risk of spills or the accidental exposure of fuels or hazardous materials to waterbodies or wetlands. At a minimum,

1. All employees handling fuels and other hazardous materials are to be properly trained.
2. All equipment shall be in good operating order and inspected on a regular basis.
3. Fuel trucks transporting fuel to on-site equipment should travel only on approved access roads.
4. All equipment is to be parked overnight and/or fueled at least 100 feet from any wetland or waterbody. These activities can occur closer only if the EI determines that there is no reasonable alternative, and appropriate steps have been taken (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill.
5. Do not store hazardous materials, including chemicals, fuels, and lubricating oils within 100 feet of a wetland, waterbody or designated municipal watershed area, unless the location is designated for such use by an appropriate governmental authority. This applies to storage of these materials and does not apply to normal operation or use of equipment in these areas. If the 100-foot setback cannot be met, this activity can be performed within the 100-foot setback, with EI approval, if done in accordance with the SPCC/PPC Plan.
6. Do not perform fondle or concrete coating activities within 100 feet of any wetland or waterbody boundary, unless the location is an existing industrial site designated for such use. If the 100-foot setback cannot be met, these activities can be performed within the 100-foot setback, if the EI

determines that there is no reasonable alternative and appropriate steps have been taken (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill.

7. Pumps operating within 100 feet of a waterbody or wetland boundary shall utilize appropriate secondary containment systems to prevent spills; and
8. Bulk storage of hazardous materials, including chemicals, fuels, and lubricating oils have appropriate secondary containment systems to prevent spills.

7.3 Spill Cleanup & Response

Structure operations in a manner that provides for the prompt and effective cleanup of spills of fuel and other hazardous materials. At a minimum,

1. Ensure that each construction crew (including cleanup crews) has on hand sufficient supplies of absorbent and barrier materials to allow the rapid containment and recovery of spilled materials and knows the procedure for reporting spills and unanticipated discoveries of contamination;
2. Ensure that each construction crew has on hand sufficient tools and material to stop leaks; and,
3. Know the contact names and telephone numbers for all local, state, and federal agencies (including, if necessary, the U. S. Coast Guard and the National Response Center) that must be notified of a spill; and follow the requirements of those agencies in cleaning up the spill, in excavating and disposing of soils or other materials contaminated by a spill, and in collecting and disposing of waste generated during spill cleanup.

8. POST-CONSTRUCTION ACTIVITIES

8.1 Post-Construction Monitoring

Projects conducted under the blanket certificate or a project-specific Section 7 Order, shall meet the monitoring requirements set forth in this section. Company personnel shall perform the following:

1. Establish and implement a program to monitor the success of restoration upon completion of construction and restoration activities.
2. Conduct follow-up inspections of all disturbed upland areas as necessary, to determine the success of revegetation and address landowner concerns. At a minimum, conduct inspections after the first and second growing seasons.
3. In nonagricultural upland areas, revegetation shall be considered successful if the vegetative cover is sufficient to prevent the erosion of soils on the disturbed ROW and density and cover are similar to that in adjacent undisturbed area. Sufficient coverage in upland areas is defined when vegetation has a uniform 70 percent vegetative coverage.
4. In agricultural areas, revegetation shall be considered successful when upon visual survey, growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise.
5. In wetlands, monitor and record the success of revegetation annually, until wetland revegetation is successful:
 - a. Wetland revegetation will be considered successful when the affected wetland satisfies the current federal definition for a wetland (i.e. soils, hydrology, and vegetation);
 - b. Vegetation should be at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction;
 - c. If natural rather than active revegetation was used, the plant species composition must be consistent with early successional wetland plant communities in the affected ecoregion;
 - d. Invasive species and noxious weeds should be absent unless they are abundant in adjacent areas that were not disturbed by construction; and,
 - e. For any wetland where revegetation is not successful at the end of 3 years after construction, the Company shall develop and implement (in consultation with a professional wetland ecologist) a remedial plan to actively revegetate the wetland.
6. Inspect all remaining temporary erosion and sediment controls during routine patrols to ensure proper functioning. Any deficiencies found will be reported and corrected as needed. Once the area has revegetated and stabilized, the erosion controls will be removed.
7. Revegetation efforts (such as fertilizing or reseeding) will continue until revegetation is successful.

8. Restoration shall be considered successful if the ROW surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless otherwise approved by the land owner or land managing agency), revegetation is successful, and proper drainage has been restored.
9. Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in agricultural areas until restoration is successful.
10. Make efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, throughout the life of the project. Maintain signs, gates, and vehicle trails as necessary.

8.2 Post-Construction Maintenance

Routine maintenance of the ROW is required to allow continued access for routine pipeline patrols, maintaining access in the event of emergency repairs, and visibility during aerial patrols. Where the newly established pipeline ROW is located on other existing ROWs not affiliated with the Company, the easement holder or owner will continue to maintain their ROWs using procedures specified in their vegetative management programs.

Projects conducted under this E&SCP and subject to the FERC Plan and Procedures, shall meet the maintenance requirements set forth in this section. The following requirements restrict the amount of vegetation maintenance that can occur within new ROW.

8.2.1 Uplands

In upland areas, maintenance of the ROW will involve clearing the entire ROW of woody vegetation.

1. Routine vegetation mowing or clearing over the full width of the permanent ROW in uplands shall be conducted no more frequently than once every 3 years. However, to facilitate periodic corrosion and leak surveys, a 10-foot wide corridor centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state.
2. Routine vegetation mowing or clearing shall not occur between April 15 and August 1 of any year unless specifically approved in writing by the responsible land management agency of the U.S. Fish and Wildlife Service.

8.2.2 Waterbodies and Wetlands

1. Do not conduct routine vegetation mowing or clearing over the full width of the permanent ROW in wetlands or riparian areas.
 - a. Limit routine vegetation mowing or clearing practices adjacent to waterbodies to allow a riparian strip that measures 25 feet back from the waterbody's mean high water mark. This riparian strip will be allowed to permanently revegetate with native plant species across the entire construction ROW.
 - b. To facilitate periodic corrosion and leak surveys within wetlands and the 25-foot-wide riparian strip adjacent to waterbodies, a corridor up to 10 feet wide centered on the pipeline

may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state.

- c. Trees located within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating may be cut and removed from the permanent ROW.
2. Do not conduct any routine vegetation mowing or clearing in riparian areas or wetlands that are between HDD entry and exit points.
3. Herbicides or pesticides shall not be used in or within 100 feet of a wetland or waterbody, except as specified by the federal or state agency.
4. Time of year restrictions apply to routine mowing as well as selective clearing of trees within riparian or wetland areas. These activities are prohibited between April 15 – August 1 of any year.

8.3 Reporting

The Company shall maintain records that identify by milepost:

1. Method of application, application rate, and type of fertilizer, pH modifying agent, seed, and mulch used;
2. Acreage treated;
3. Dates of backfilling and seeding;
4. The location of any subsurface drainage repairs or improvements made during restoration;
5. Names of landowners requesting special seeding treatment and a description of the follow-up actions; and
6. Any problem areas and how they were addressed.

The Contractor is responsible for providing the EI with the information and documentation on applications, rates, and types of fertilizer, pH modifying agents, seed and mulch that are used during a project.

For the FERC-authorized projects, other than projects conducted under the blanket certificate, the Company will file quarterly activity reports documenting problems, including those identified by the landowner, and corrective actions taken for at least 2 years following construction.

A wetland revegetation monitoring report identifying the status of the wetland revegetation efforts will be filed at the end of 3 years following construction, and annually thereafter documenting progress within the wetland until revegetation is successful. The requirements to file wetland restoration reports with FERC does not apply to projects authorized under the blanket certificate (i.e. automatic and prior notice) or advanced notice provisions in the FERC regulations.

APPENDIX A

E&SCP FIGURES

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FIGURE NUMBER	STANDARD NUMBER	DRAWING TITLE
CONSTRUCTION WORKAREAS (CW)		
CW-1	ES-0001	TYPICAL TRENCH DETAIL
CW-2	ES-0002	RIGHT-OF-WAY TOPSOIL SEGREGATION TECHNIQUES
CW-3	ES-0003	TYPICAL CONSTRUCTION WIDTHS ACQUIRING NEW PERMANENT RIGHT-OF-WAY
CW-4	ES-0004	TYPICAL CONSTRUCTION WIDTHS NOT ACQUIRING NEW PERMANENT RIGHT-OF-WAY (SINGLE LINE SYSTEM)
CW-5	ES-0005	TYPICAL CONSTRUCTION WIDTHS NOT ACQUIRING NEW PERMANENT RIGHT-OF-WAY (MULTIPLE LINE SYSTEM)
ACCESS ROADS & ROAD CROSSINGS (RD)		
RD-1	ES-0006	ACCESS ROAD CROSS SECTION
RD-2	ES-0007	ROCK ACCESS PAD
RD-3	ES-0008	TYPICAL TEMPORARY ACCESS ROAD THROUGH WETLANDS
RD-4	ES-0009	TYPICAL PAVED ROAD CROSSING CONTROL MEASURES (OPEN CUT)
RD-5	ES-0010	TYPICAL PAVED ROAD CROSSING CONTROL MEASURES (BORED)
EROSION CONTROLS (EC)		
EC-1	ES-0011	SILT FENCE DETAIL
EC-2	ES-0012	STRAW BALE DETAIL
EC-3	ES-0013	STRAW BALE CHECK DAM IN A DRAINAGEWAY
EC-4	ES-0014	ROCK-LINED DRAINAGE SWALE
EC-5	ES-0015	STORM DRAIN INLET PROTECTION
EC-6	ES-0016	TEMPORARY TRENCH PLUG OPTIONS
EC-7	ES-0017	TEMPORARY SLOPE BREAKERS
EC-8	ES-0018	PERMANENT SLOPE BREAKERS
EC-9	ES-0019	CHEVRON SLOPE BREAKER
EC-10	ES-0020	TRENCH BREAKER DETAIL (SACK)
EC-11	ES-0021	TRENCH BREAKER DETAIL (FOAM)
EC-12	ES-0022	PERMANENT TRENCH BREAKER OPTIONS
EC-13	ES-0023	EROSION CONTROL FABRIC INSTALLATION
EC-14	ES-0024	TYPICAL EROSION CONTROL BLANKETS ON SLOPES
WATER DISCHARGES (WD)		
WD-1	ES-0025	FILTER BAG
WD-2	ES-0026	DISCHARGE STRUCTURE FOR HYDROSTATIC TEST WATER
WD-3	ES-0027	OPTIONS FOR SMALL WATER DISCHARGES
WD-4	ES-0028	DISCHARGE OF HYDROSTATIC TEST WATER TO A SURFACE WATER
BRIDGES (BR)		
BR-1	ES-0029	TEMPORARY EQUIPMENT BRIDGE (EQUIPMENT PADS WITH OR WITHOUT CULVERTS)
BR-2	ES-0030	TEMPORARY EQUIPMENT BRIDGE (CRUSHED STONE WITH CULVERTS)
BR-3	ES-0031	TEMPORARY EQUIPMENT BRIDGE (FLEXI-FLOAT OR PORTABLE BRIDGE)
WATERBODY AND WETLAND CROSSINGS (WC)		
WC-1	ES-0032	TYPICAL STANDARD WETLAND CROSSING
WC-2	ES-0033	TYPICAL WET WATERBODY CROSSING
WC-3	ES-0034	TYPICAL FLUME WATERBODY CROSSING
WC-4	ES-0035	TYPICAL DAM-AND-PUMP WATERBODY CROSSING
WC-5	ES-0036	TYPICAL EROSION CONTROL BLANKETS ON STREAMBANKS
WC-6	ES-0037	TYPICAL RIP-RAP PLACEMENT
SPECIAL USE / AGRICULTURAL AREAS (SU)		
SU-1	ES-0038	DRAIN TILE REPAIR PROCEDURE

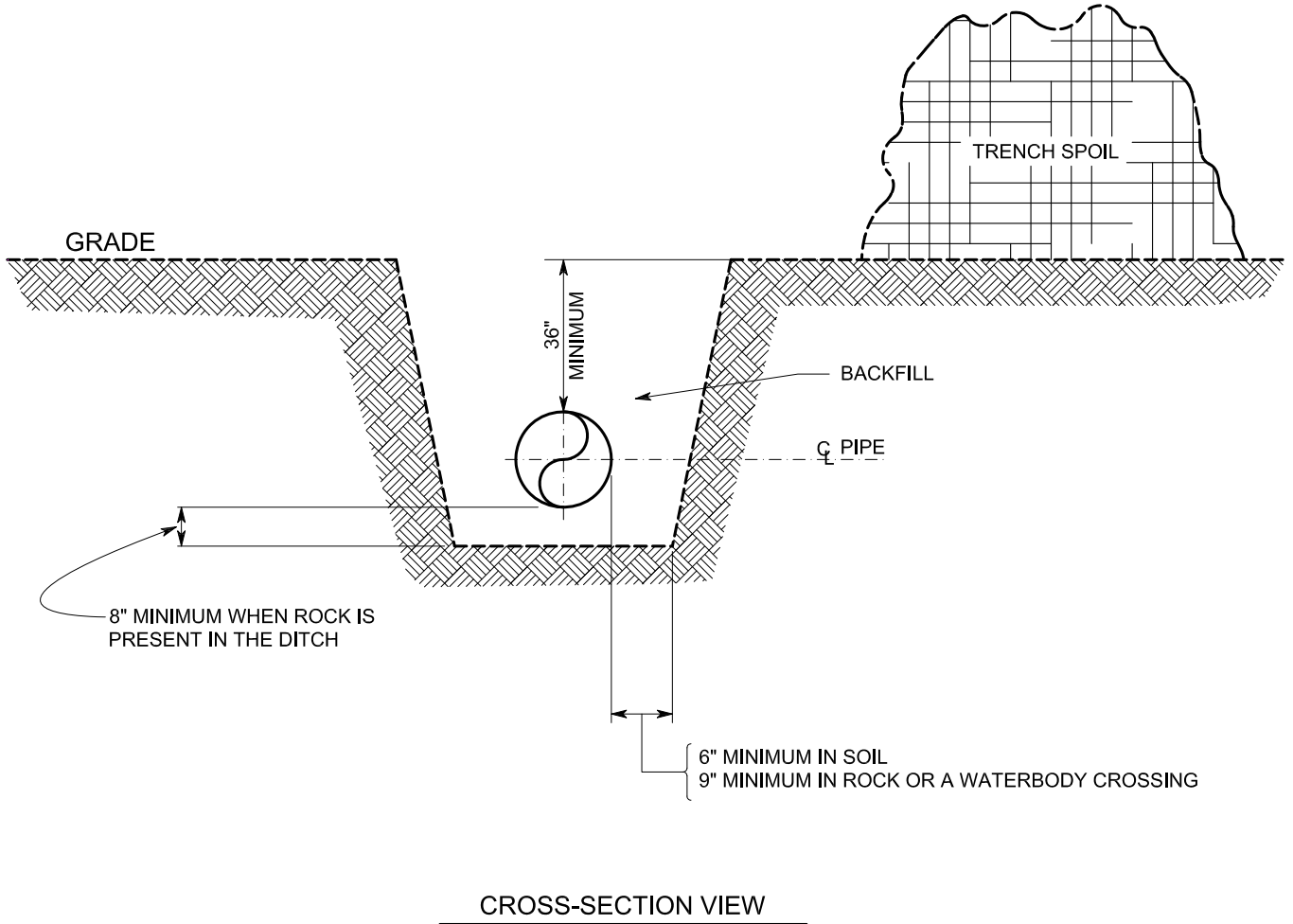
INDEX OF FIGURES

APPENDIX A

DWG.

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NOTES:

1. ALL PRECONSTRUCTION CONTOURS WILL BE RE-ESTABLISHED UPON COMPLETION OF PIPE INSTALLATION. EXCEPT IN WETLANDS, A CROWN MAY BE LEFT TO ACCOUNT FOR DITCH SETTLING, AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
2. IN COLD WATER FISHERY STREAMS, THE TOP 12" OF THE TRENCH WILL BE BACKFILLED WITH CLEAN GRAVEL OR NATIVE COBBLES UNLESS OTHERWISE SPECIFIED BY THE PERMITTING AGENCY.

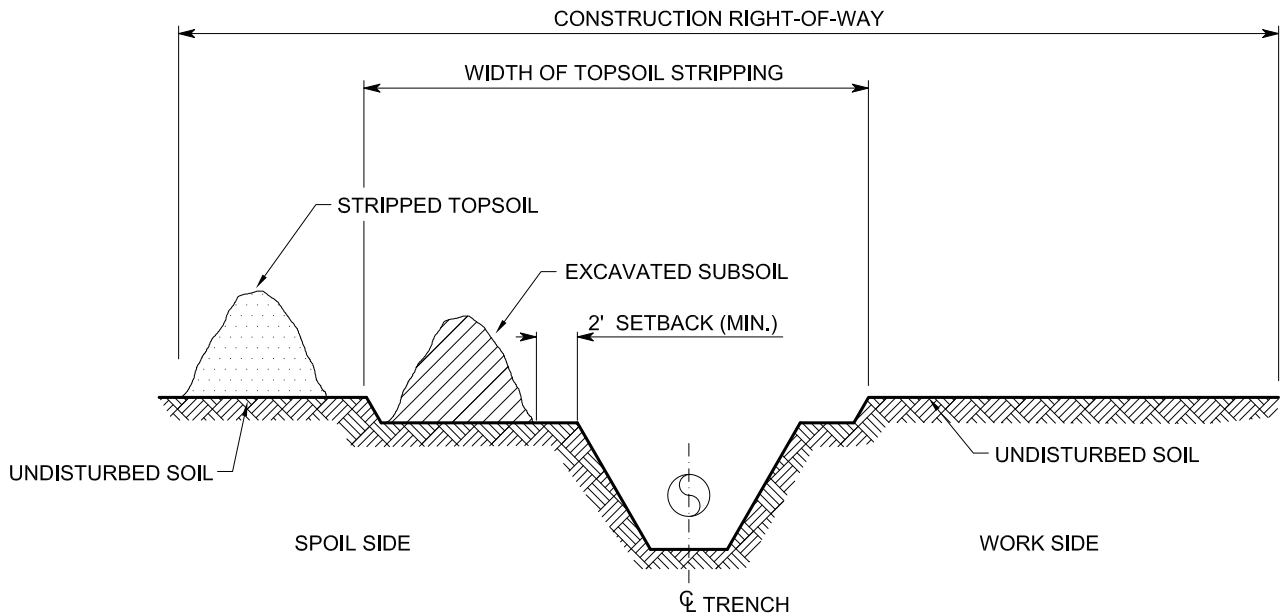
TYPICAL TRENCH DETAIL

FIGURE CW-1

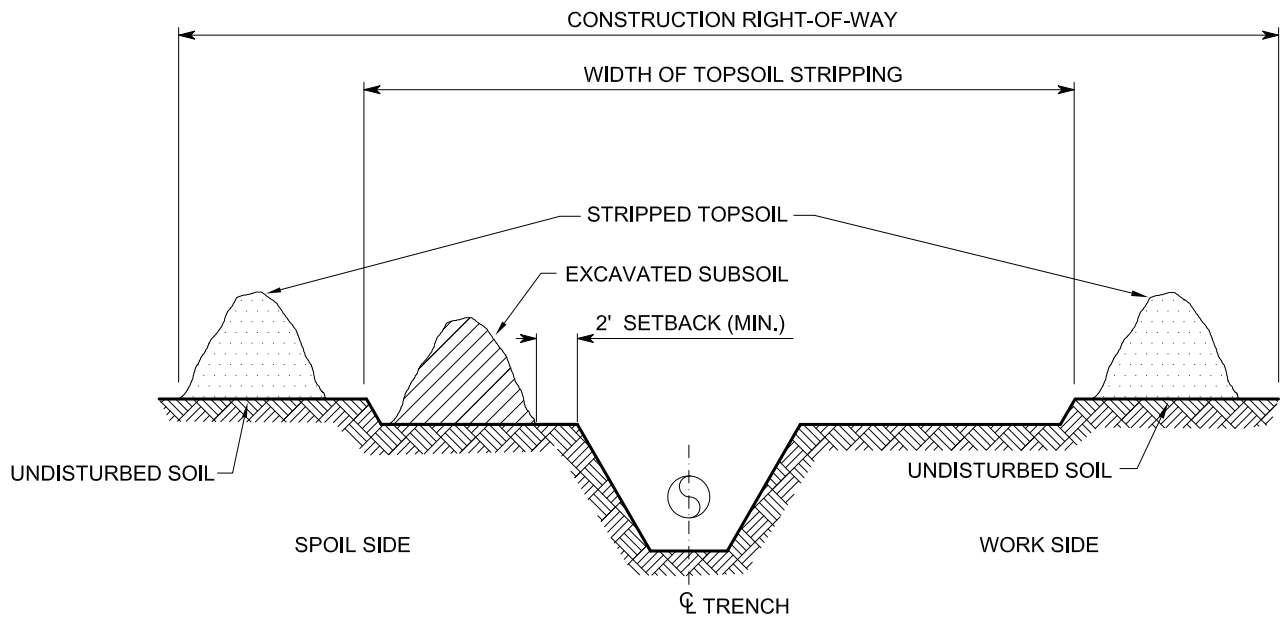
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DITCH PLUS SPOILSIDE TOPSOIL SEGREGATION



FULL RIGHT-OF-WAY TOPSOIL STRIPPING

NOTES:

1. TOPSOIL MAY BE STORED IN LOCATIONS AS SHOWN ABOVE OR AT OTHER COMPANY APPROVED LOCATIONS WITHIN THE CONSTRUCTION R.O.W.
2. LEAVE GAPS IN SPOIL PILES FOR WATER RUN-OFF.
3. MAINTAIN SEPARATION OF SALVAGED TOPSOIL AND SUBSOIL THROUGHOUT ALL CONSTRUCTION ACTIVITIES.
4. STABILIZE TOPSOIL PILES AND MINIMIZE LOSS DUE TO WATER OR WIND EROSION WITH USE OF SEDIMENT BARRIERS, MULCH, TEMPORARY SEEDING, TACKIFIERS OR FUNCTIONAL EQUIVALENTS, WHERE NECESSARY.

**RIGHT-OF-WAY TOPSOIL
SEGREGATION TECHNIQUES**

FIGURE CW-2

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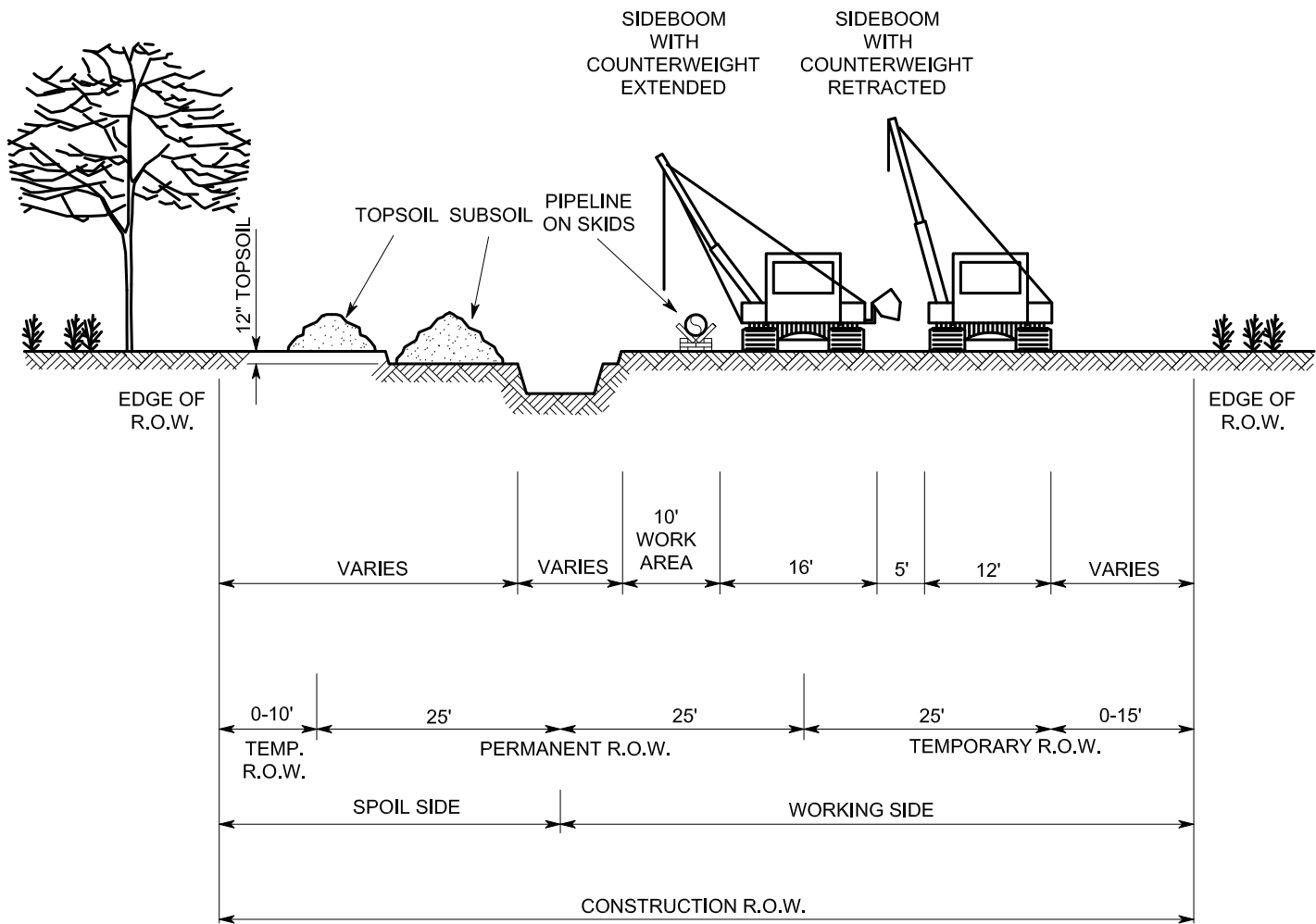
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PIPE DIAMETER	SPOIL SIDE (FT.)	WORKING SIDE (FT.)	CONSTRUCTION R.O.W. (FT.)
12" OR LESS	25	50	75
14" - 30"	35	50	85
36" - 42"	35	65	100
WETLANDS	25	50	75

NOTES:

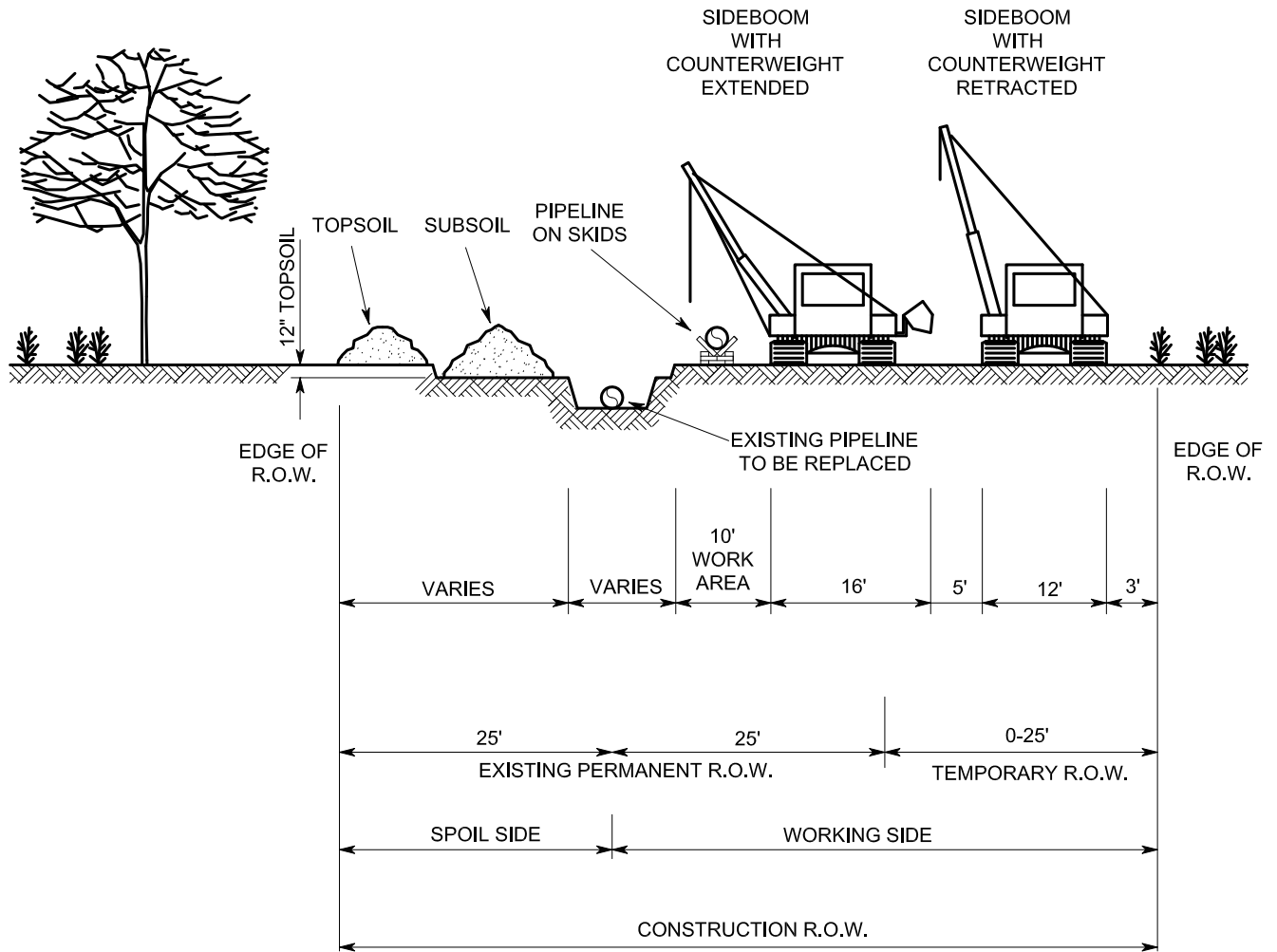
- ALTHOUGH THE DIMENSIONS SHOWN ARE TYPICAL, SOME VARIATIONS MAY EXIST DUE TO SITE SPECIFIC CONDITIONS. UNLESS OTHERWISE INDICATED ON THE ALIGNMENT SHEETS, THE MAXIMUM WIDTH OF THE CONSTRUCTION RIGHT-OF-WAY SHALL BE AS SHOWN IN THE TABLE FOR THE APPROPRIATE PIPE DIAMETER.
- TOPSOIL SEGREGATION METHODS WILL BE USED IN ALL RESIDENTIAL AREAS AND WHEN THE CONSTRUCTION ROW IS WIDER THAN 30 FEET IN CULTIVATED OR ROTATED AGRICULTURAL LANDS, MANAGED PASTURES, HAYFIELDS, AND OTHER AREAS AT THE LANDOWNER'S OR LAND MANAGEMENT AGENCY'S REQUEST. FOR WETLANDS, SEGREGATE THE TOP 12 INCHES OF TOPSOIL WITHIN THE DITCH LINE, EXCEPT IN AREAS WHERE STANDING WATER IS PRESENT OR SOILS ARE SATURATED.

TYPICAL CONSTRUCTION WIDTHS ACQUIRING
NEW PERMANENT RIGHT-OF-WAY

FIGURE CW-3

DWG. ES-0003

REV.



PIPE DIAMETER	SPOIL SIDE (FT.)	WORKING SIDE (FT.)	CONSTRUCTION R.O.W. (FT.)
12" OR LESS	25	25	50
14" - 30"	25	50	75
36" - 42"	25	50	75
WETLANDS	25	50	75

NOTES:

- ALTHOUGH THE DIMENSIONS SHOWN ARE TYPICAL, SOME VARIATIONS MAY EXIST DUE TO SITE SPECIFIC CONDITIONS. UNLESS OTHERWISE INDICATED ON THE ALIGNMENT SHEETS, THE MAXIMUM WIDTH OF THE CONSTRUCTION RIGHT-OF-WAY SHALL BE AS SHOWN IN THE TABLE FOR THE APPROPRIATE PIPE DIAMETER.
- TOPSOIL SEGREGATION METHODS WILL BE USED IN ALL RESIDENTIAL AREAS AND WHEN THE CONSTRUCTION ROW IS WIDER THAN 30 FEET IN CULTIVATED OR ROTATED AGRICULTURAL LANDS, MANAGED PASTURES, HAYFIELDS, AND OTHER AREAS AT THE LANDOWNER'S OR LAND MANAGEMENT AGENCY'S REQUEST. FOR WETLANDS, SEGREGATE THE TOP 12 INCHES OF TOPSOIL WITHIN THE DITCH LINE, EXCEPT IN AREAS WHERE STANDING WATER IS PRESENT OR SOILS ARE SATURATED.
- IF THE WORKING SIDE MUST BE GREATER THAN THE VALUES SHOWN IN THE TABLE, COMPANY MUST REQUEST APPROVAL FROM THE F.E.R.C.

TYPICAL CONSTRUCTION WIDTHS NOT
ACQUIRING NEW PERMANENT RIGHT-OF-WAY
(SINGLE LINE SYSTEM)

FIGURE CW-4

DWG.

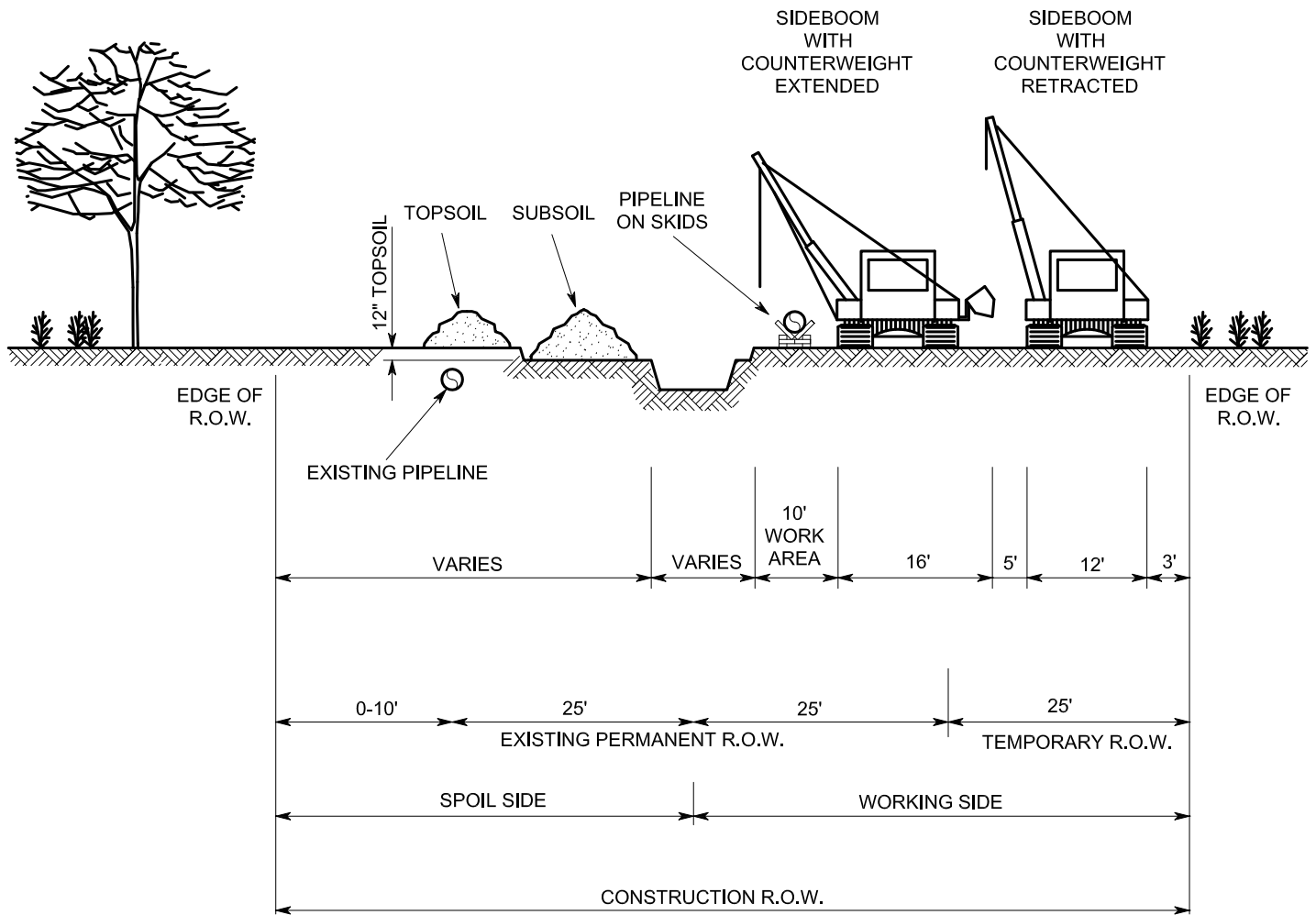
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PIPE DIAMETER	SPOIL SIDE (FT.)	WORKING SIDE (FT.)	CONSTRUCTION R.O.W. (FT.)
12" OR LESS	25	50	75
14" - 30"	35	50	85
36" - 42"	35	50	85
WETLANDS	25	50	75

NOTES:

- ALTHOUGH THE DIMENSIONS SHOWN ARE TYPICAL, SOME VARIATIONS MAY EXIST DUE TO SITE SPECIFIC CONDITIONS. UNLESS OTHERWISE INDICATED ON THE ALIGNMENT SHEETS, THE MAXIMUM WIDTH OF THE CONSTRUCTION RIGHT-OF-WAY SHALL BE AS SHOWN IN THE TABLE FOR THE APPROPRIATE PIPE DIAMETER.
- TOPSOIL SEGREGATION METHODS WILL BE USED IN ALL RESIDENTIAL AREAS AND WHEN THE CONSTRUCTION ROW IS WIDER THAN 30 FEET IN CULTIVATED OR ROTATED AGRICULTURAL LANDS, MANAGED PASTURES, HAYFIELDS, AND OTHER AREAS AT THE LANDOWNER'S OR LAND MANAGEMENT AGENCY'S REQUEST. FOR WETLANDS, SEGREGATE THE TOP 12 INCHES OF TOPSOIL WITHIN THE DITCH LINE, EXCEPT IN AREAS WHERE STANDING WATER IS PRESENT OR SOILS ARE SATURATED.
- IF THE WORKING SIDE MUST BE GREATER THAN 50 FEET (i.e. TEMPORARY WORKSPACE IS GREATER THAN 25 FEET), COMPANY MUST REQUEST APPROVAL FROM THE F.E.R.C.

TYPICAL CONSTRUCTION WIDTHS NOT
ACQUIRING NEW PERMANENT RIGHT-OF-WAY
(MULTIPLE LINE SYSTEM)

FIGURE CW-5

DWG.

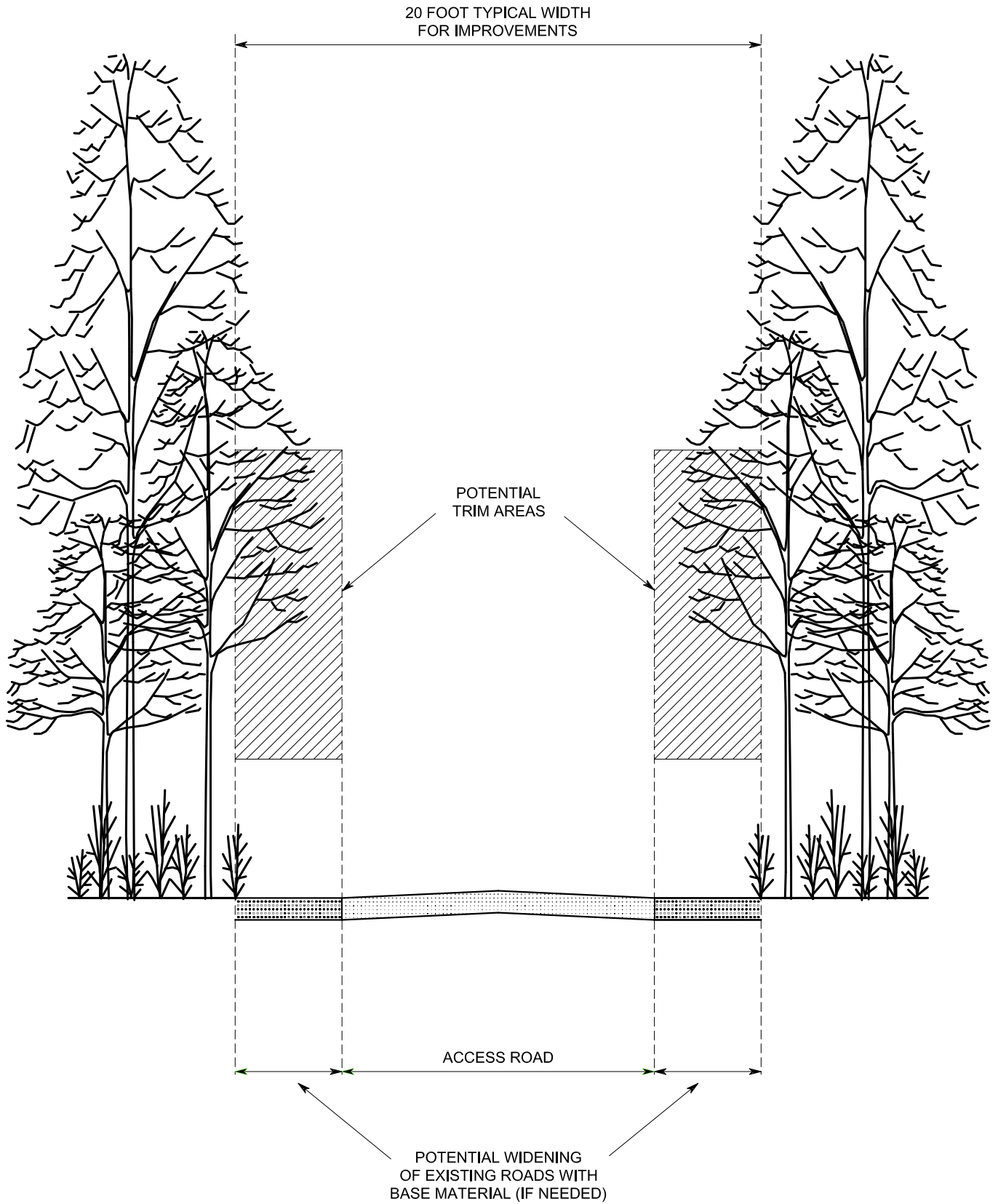
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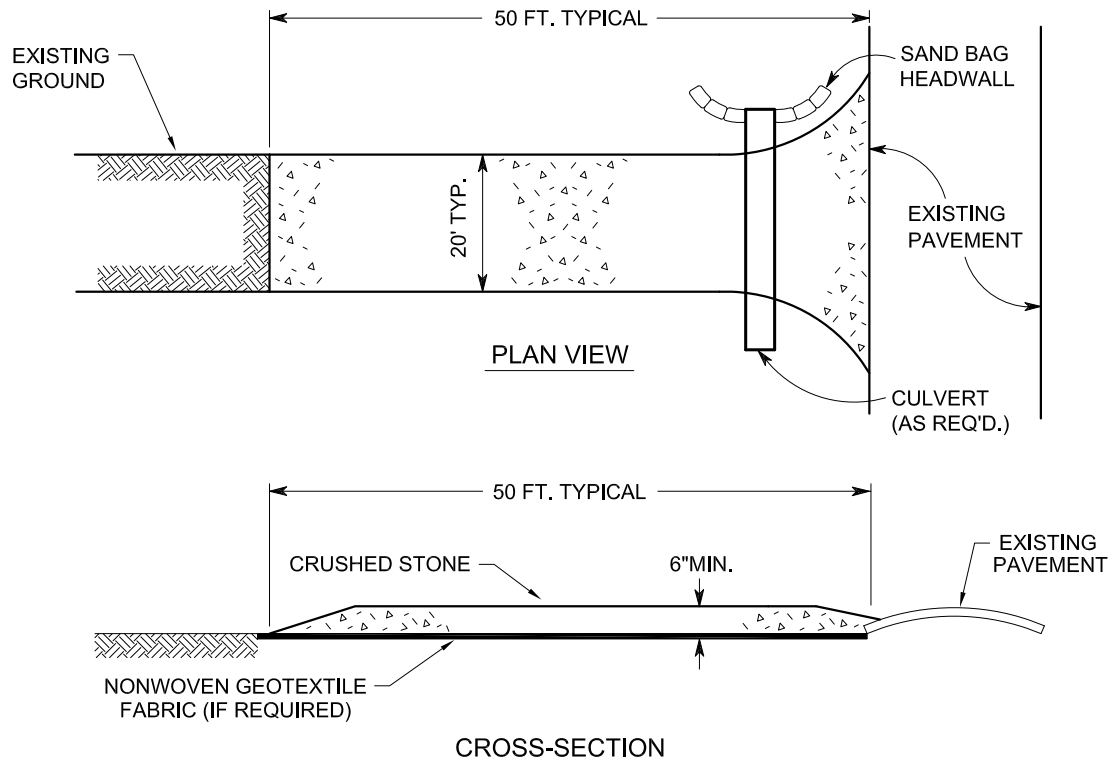


ACCESS ROAD CROSS SECTION

FIGURE RD-1

DWG. ES-0006

REV.

CONSTRUCTION SPECIFICATIONS:

1. STONE SIZE = 4" - 6" AVG. DIAMETER
2. ALL STONE MUST BE PLACED ON NON-WOVEN GEOTEXTILE FABRIC IF USED IN RESIDENTIAL OR AGRICULTURAL AREAS.
3. LENGTH = FIFTY (50) FOOT TYPICAL (IF SITE CONDITIONS ALLOW)
4. WIDTH = TWENTY (20) FOOT TYPICAL.
5. THICKNESS = SIX (6) INCHES MINIMUM.
6. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A DRIVEABLE BERM OR OTHER TEMPORARY EROSION CONTROL DEVICE CAN BE USED.
7. THE ENTRANCE SHALL BE PERIODICALLY INSPECTED AND MAINTAINED IN A CONDITION THAT MINIMIZES TRACKING OR FLOWING OF SEDIMENT ONTO ROADWAYS. MAINTENANCE MAY INCLUDE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR THE REPAIR / CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ANY SEDIMENT THAT IS SPILLED, DROPPED, WASHED OR TRACKED ONTO ROADWAYS MUST BE REMOVED AS SOON AS PRACTICAL.

ROCK ACCESS PAD

FIGURE RD-2

DWG.

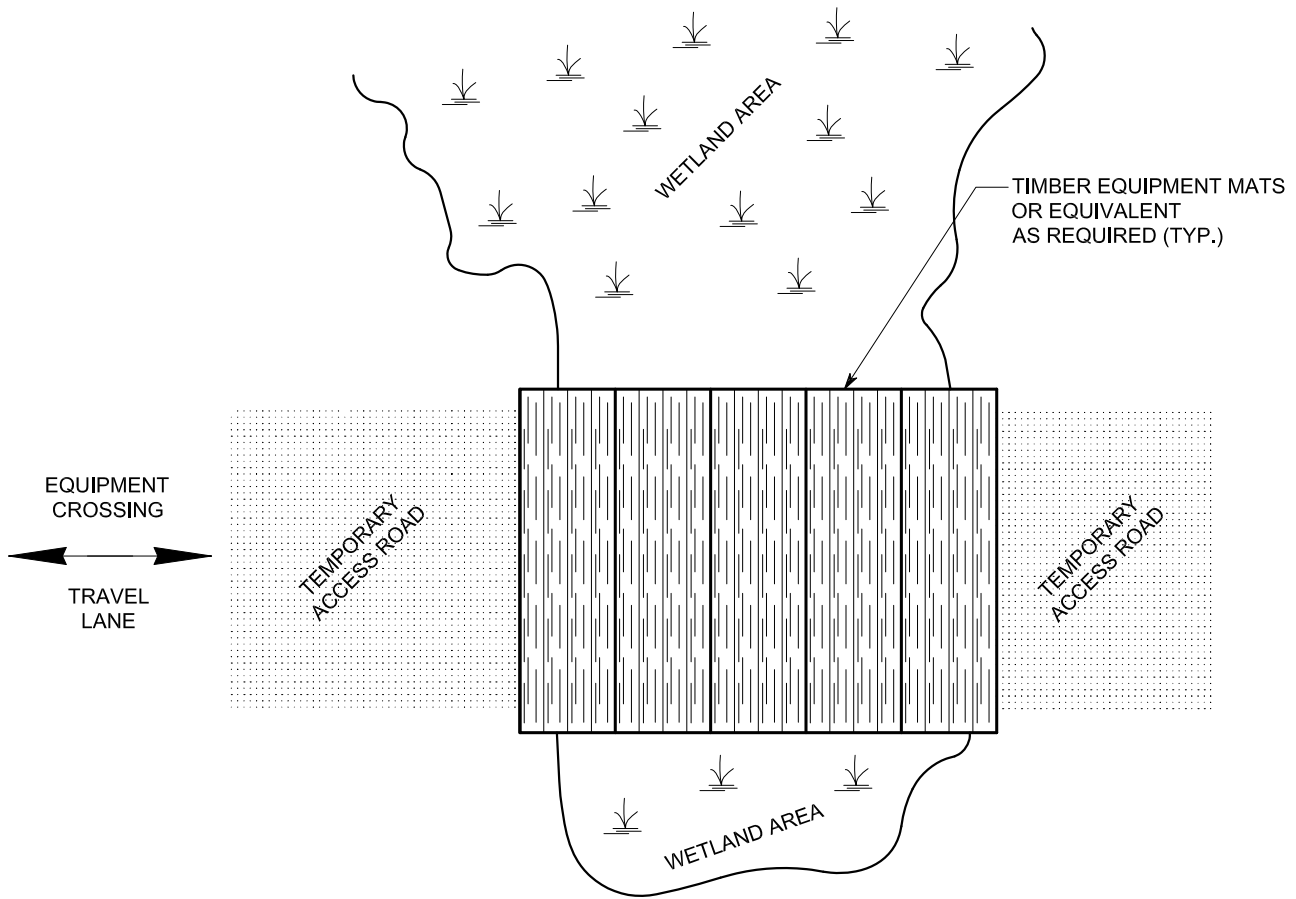
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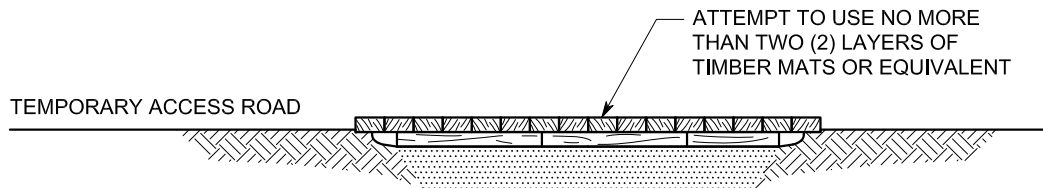
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PLAN VIEW
NOT TO SCALE



CROSS-SECTION
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NOTE:

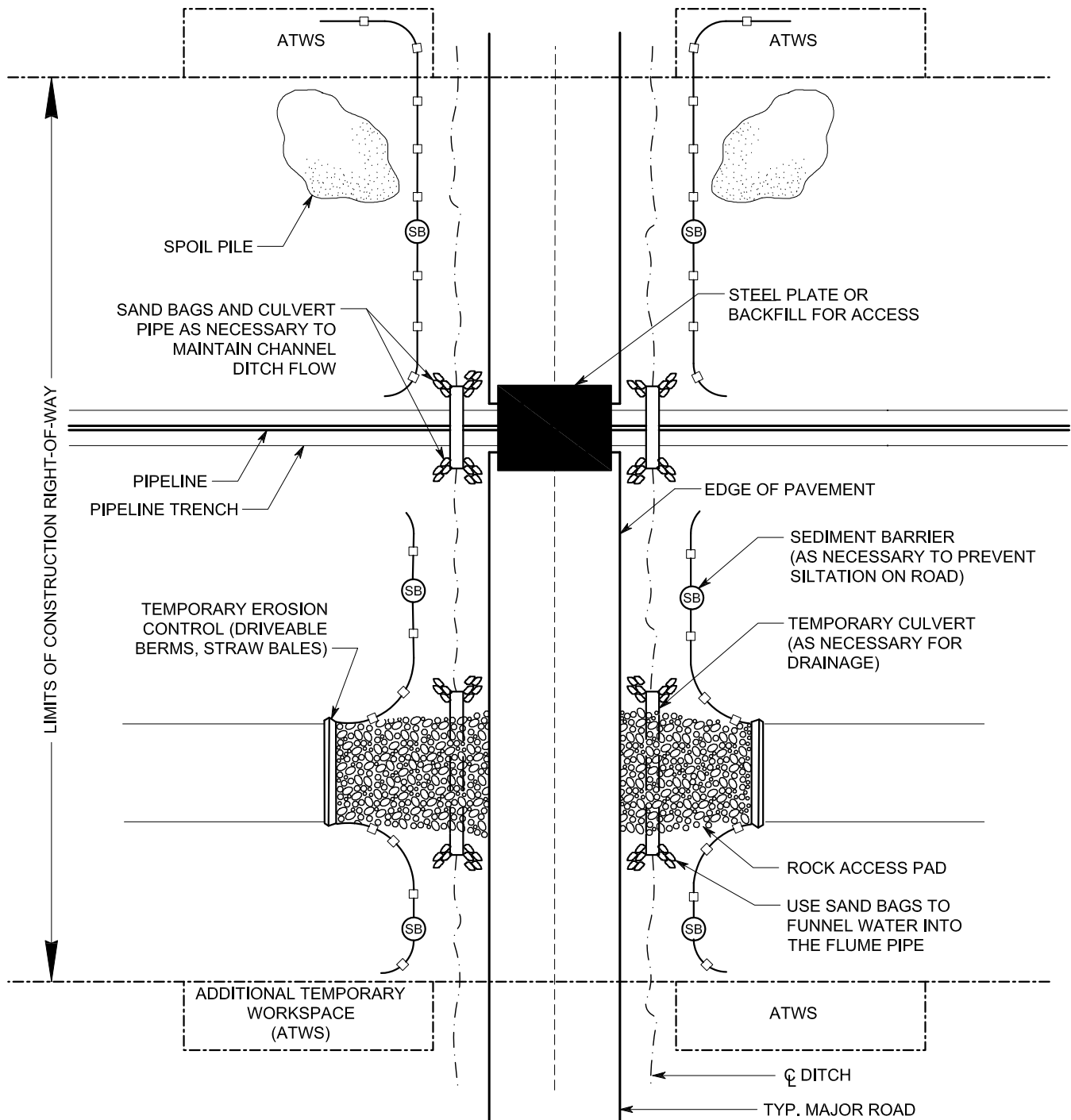
1. SILT FENCE OR STRAW BALES MAY BE USED, AS NECESSARY, TO PREVENT SEDIMENT FROM MIGRATING OUTSIDE OF ACCESS ROAD LIMITS.

TYPICAL TEMPORARY ACCESS ROAD
THROUGH WETLANDS

FIGURE RD-3

DWG. ES-0008

REV.



NOTES:

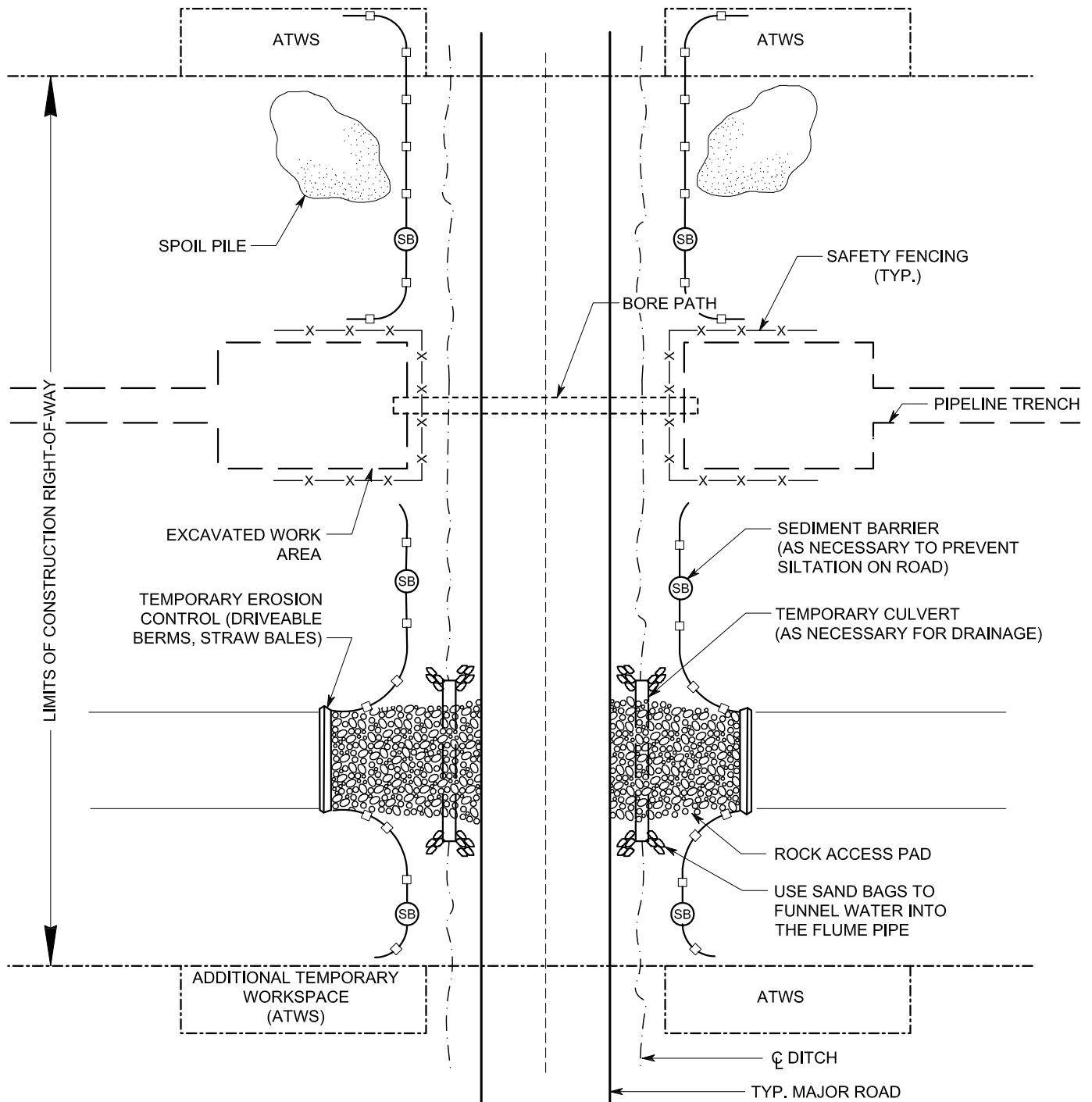
1. FIRST LAY SAND BAGS IN DITCH, THEN PLACE END OF CULVERT IN THE MIDDLE OF THE SAND BAGS BEFORE BUILDING HEAD WALLS TO CULVERT.
2. (SB) TEMPORARY SEDIMENT BARRIER OF SILT FENCE AND/OR STRAW BALES, OR OTHER APPROPRIATE MATERIALS.

TYPICAL PAVED ROAD CROSSING
CONTROL MEASURES (OPEN CUT)

FIGURE RD-4

DWG. ES-0009

REV.



NOTES:

1. BORE PIT DIMENSIONS WILL BE DICTATED BY SITE-SPECIFIC CONDITIONS (E.G. SOIL TYPE, WIDTH OF ROAD, DEPTH OF COVER).
2. (SB) TEMPORARY SEDIMENT BARRIER OF SILT FENCE AND/OR STRAW BALES, OR OTHER APPROPRIATE MATERIALS.

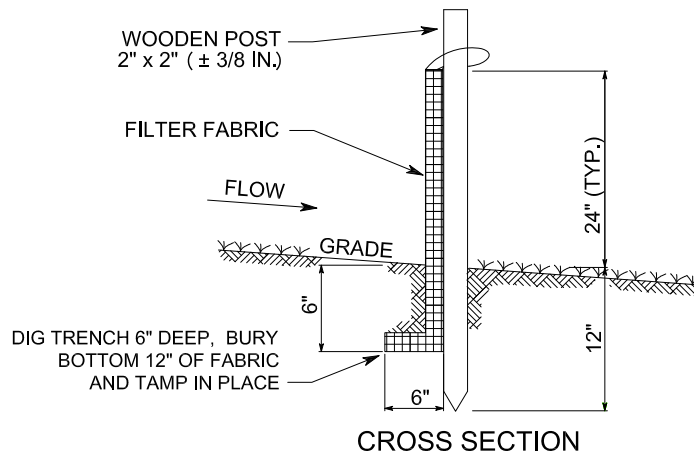
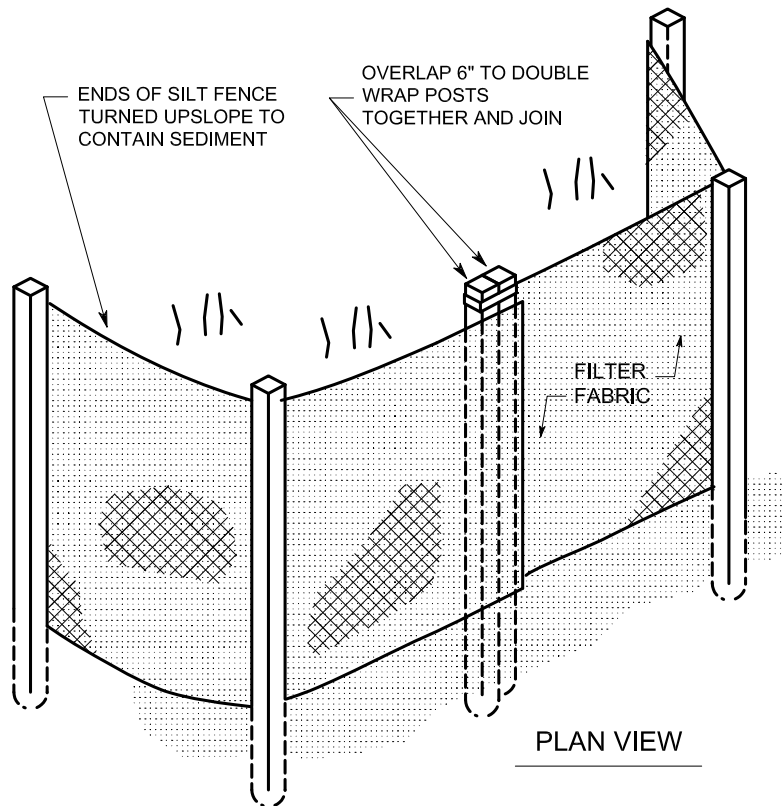
TYPICAL PAVED ROAD CROSSING
CONTROL MEASURES (BORED)

FIGURE RD-5

DWG.

ES-0010

REV.



INSTALLATION REQUIREMENTS:

- WHEN USING SILT FENCE, PLACE IT:
 - ◆ BETWEEN DISTURBED AREAS AND DOWN-SLOPE ENVIRONMENTAL RESOURCE AREAS
 - ◆ AT THE BASE OF ALL SLOPES NEXT TO WETLANDS, WATERBODIES, AND ROAD CROSSINGS
 - ◆ AT THE INLET AND OUTLET OF OPEN DRAINAGE STRUCTURES
 - ◆ APPROXIMATELY 8 FEET BEYOND THE TOE OF THE SLOPE TO GIVE THE SEDIMENT ROOM TO COLLECT (IF POSSIBLE)
- USE SANDBAGS OR BACKFILLING TO KEY IN THE BOTTOM OF THE FABRIC WHERE IT IS NOT FEASIBLE TO TRENCH IT IN (LEDGES, ROCKY SOIL, LARGE ROOTS, ETC.)

MAINTENANCE REQUIREMENTS:

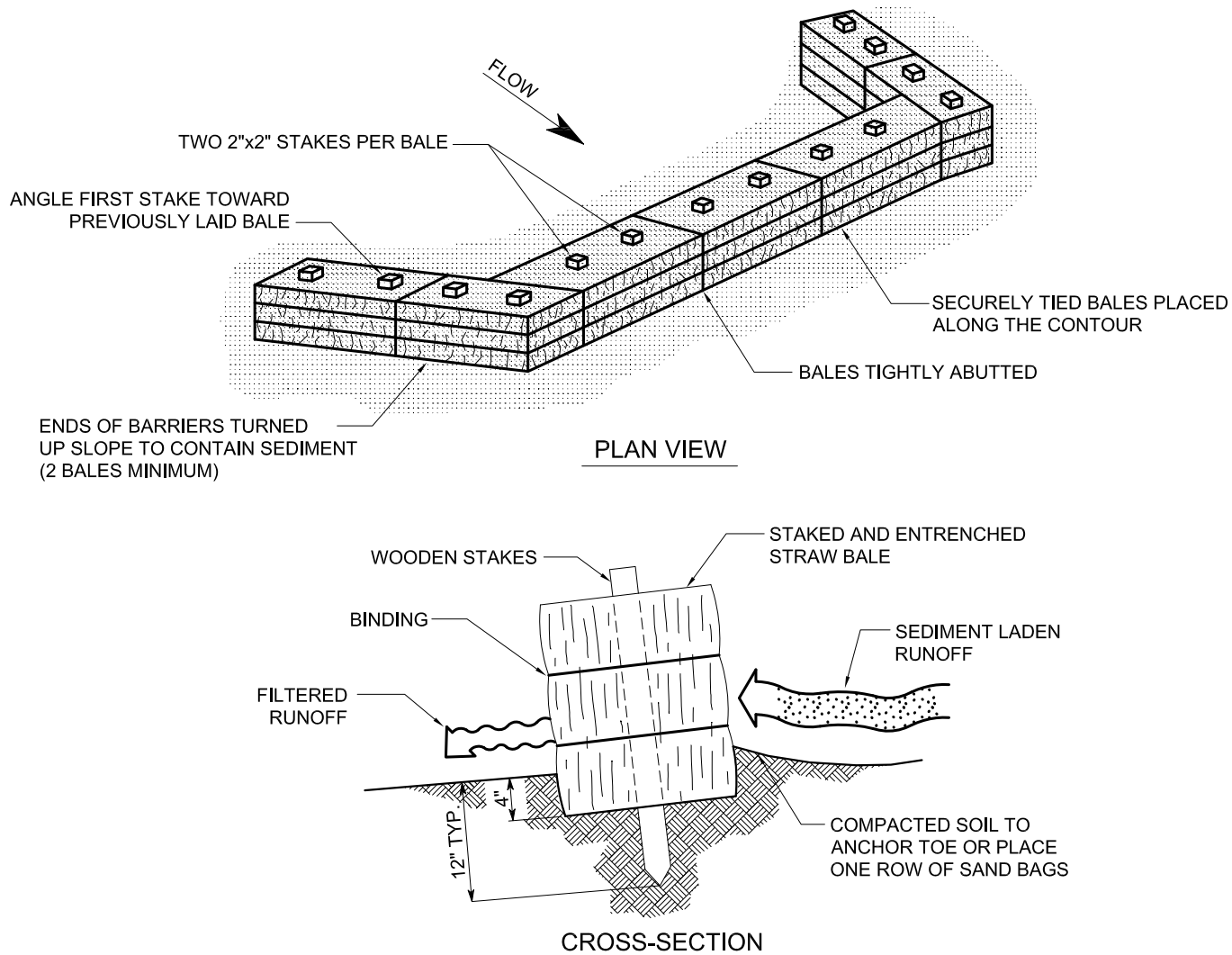
- INSPECT SILT FENCE:
 - ◆ DAILY IN AREAS OF ACTIVE CONSTRUCTION
 - ◆ WEEKLY IN AREAS WITH NO CONSTRUCTION
 - ◆ WITHIN 24 HOURS FOLLOWING EACH RAINFALL EVENT OF ≥ 0.5 INCH.
- REPAIR OR REPLACE SILT FENCE AS NEEDED
- REMOVE ACCUMULATED SEDIMENTS TO AN UPLAND AREA WHEN SEDIMENT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SILT FENCE.

SILT FENCE DETAIL

FIGURE EC-1

DWG. ES-0011

REV.

**INSTALLATION REQUIREMENTS:**

- WHEN USING STRAW BALES, PLACE THEM:
 - ◆ WITH THEIR ENDS TIGHTLY ABUTTING AND EMBEDDED IN THE SOIL A TYPICAL OF 4".
 - ◆ BETWEEN DISTURBED AREAS AND DOWN-SLOPE ENVIRONMENTAL RESOURCE AREAS.
 - ◆ AT THE BASE OF ALL SLOPES NEXT TO WETLANDS, WATERBODIES, AND ROAD CROSSINGS
 - ◆ AT THE INLET AND OUTLET OF OPEN DRAINAGE STRUCTURES.
 - ◆ APPROXIMATELY 6 FEET BEYOND THE TOE OF THE SLOPE TO GIVE THE SEDIMENT ROOM TO COLLECT.
- KEY IN THE BOTTOM OF THE BALE. IN AREAS WHERE IT IS NOT FEASIBLE TO TRENCH IT IN (LEDGES, ROCKY SOIL, LARGE TREE ROOTS, ETC.), USE NATIVE SOIL AS BACKFILL UP-SLOPE OF THE BALE OR PLACE ONE ROW OF SAND BAGS.
- DO NOT STAKE OR TRENCH IN PLACE STRAW BALES USED ON EQUIPMENT BRIDGES OR ON MATS ACROSS THE TRAVEL LANE.
- IF USED IN CONJUNCTION WITH SILT FENCE, BALES ARE PLACED DOWNSLOPE / UPSLOPE OF THE SILT FENCE AND DO NOT NEED TO BE TRENCHED IN.

MAINTENANCE REQUIREMENTS:

- INSPECT BALES:
 - ◆ DAILY IN AREAS OF ACTIVE CONSTRUCTION.
 - ◆ WEEKLY IN AREAS WITH NO CONSTRUCTION.
 - ◆ WITHIN 24 HOURS FOLLOWING EACH RAINFALL EVENT OF ≥ 0.5 INCH.
- REPAIR OR REPLACE BALES AS NEEDED.
- REMOVE ACCUMULATED SEDIMENTS TO AN UPLAND AREA AS NEEDED.

STRAW BALE DETAIL**FIGURE EC-2**

DWG.

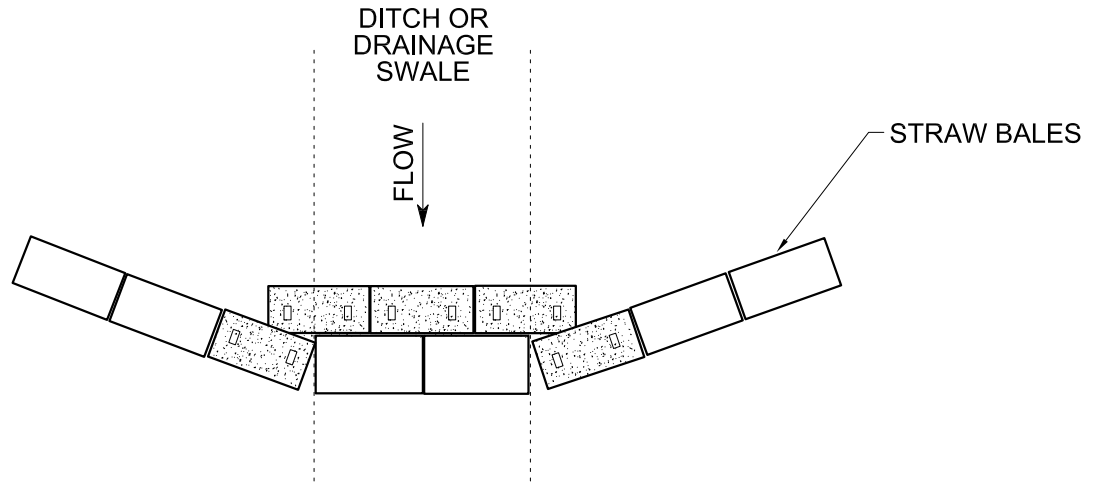
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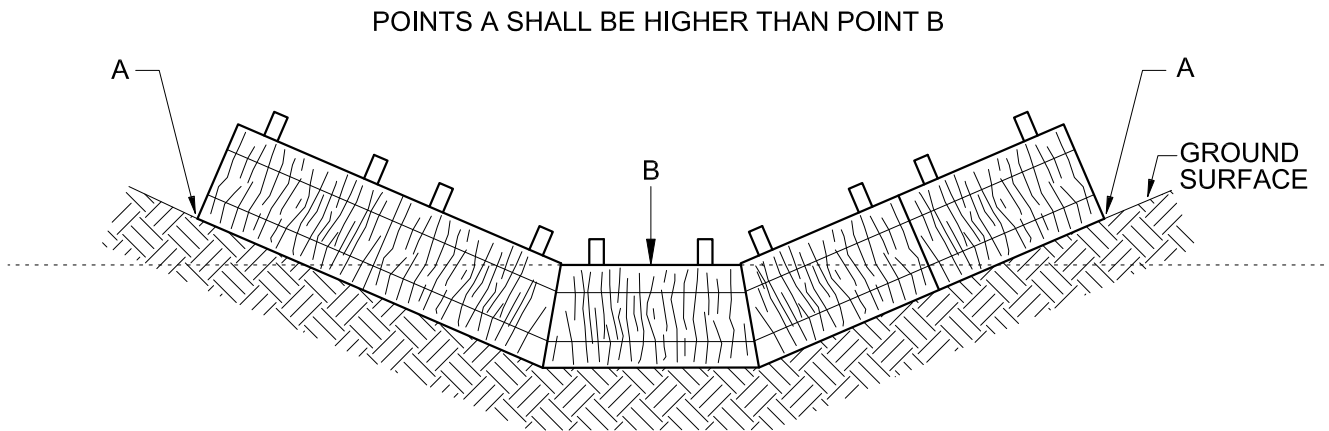
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PLAN VIEW
NOT TO SCALE



CROSS-SECTION
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NOTE:

1. THE NUMBER OF BALES IS DETERMINED BASED ON SITE SPECIFIC FACTORS.

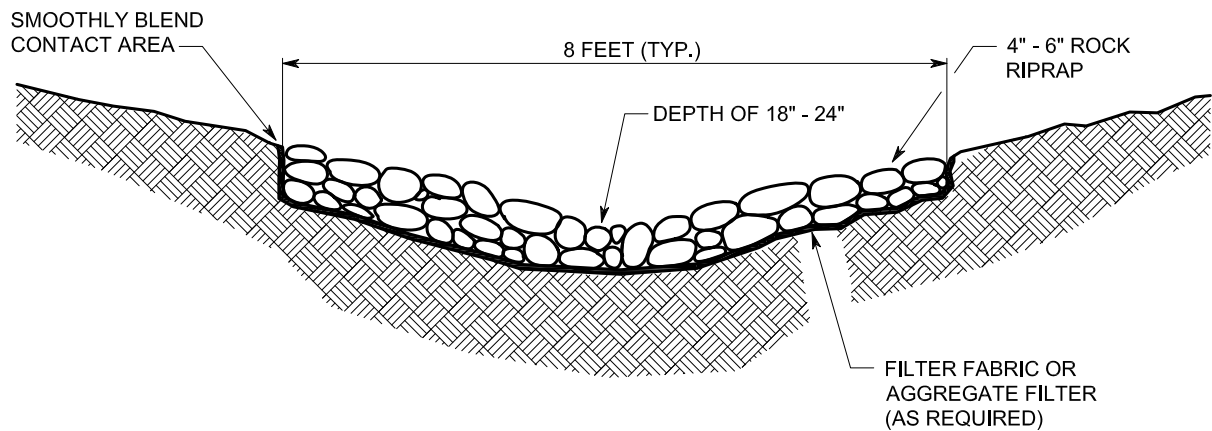
**STRAW BALE CHECK DAM
IN A DRAINAGEWAY**

FIGURE EC-3

DWG.

ES-0013

REV.



INSTALLATION REQUIREMENTS:

1. RIPRAP CHANNELS CAN BE CONSTRUCTED WITH GRASS-LINED SLOPES WHERE SITE CONDITIONS WARRANT.
2. STABILIZE CHANNEL INLET POINTS AND INSTALL OUTLET PROTECTION (AS NEEDED) DURING CHANNEL INSTALLATION.
3. INSTALL ENERGY DISSIPATING DEVICE (AS NEEDED) TO PREVENT SCOUR TO THE RECEIVING OUTLET.
4. REMOVE ALL TREES, BRUSH, AND OTHER OBJECTIONABLE MATERIAL FROM THE CHANNEL.
5. INSTALL FILTER FABRIC OR GRAVEL LAYER TO PREVENT PIPING (AS REQUIRED)

MAINTENANCE REQUIREMENTS:

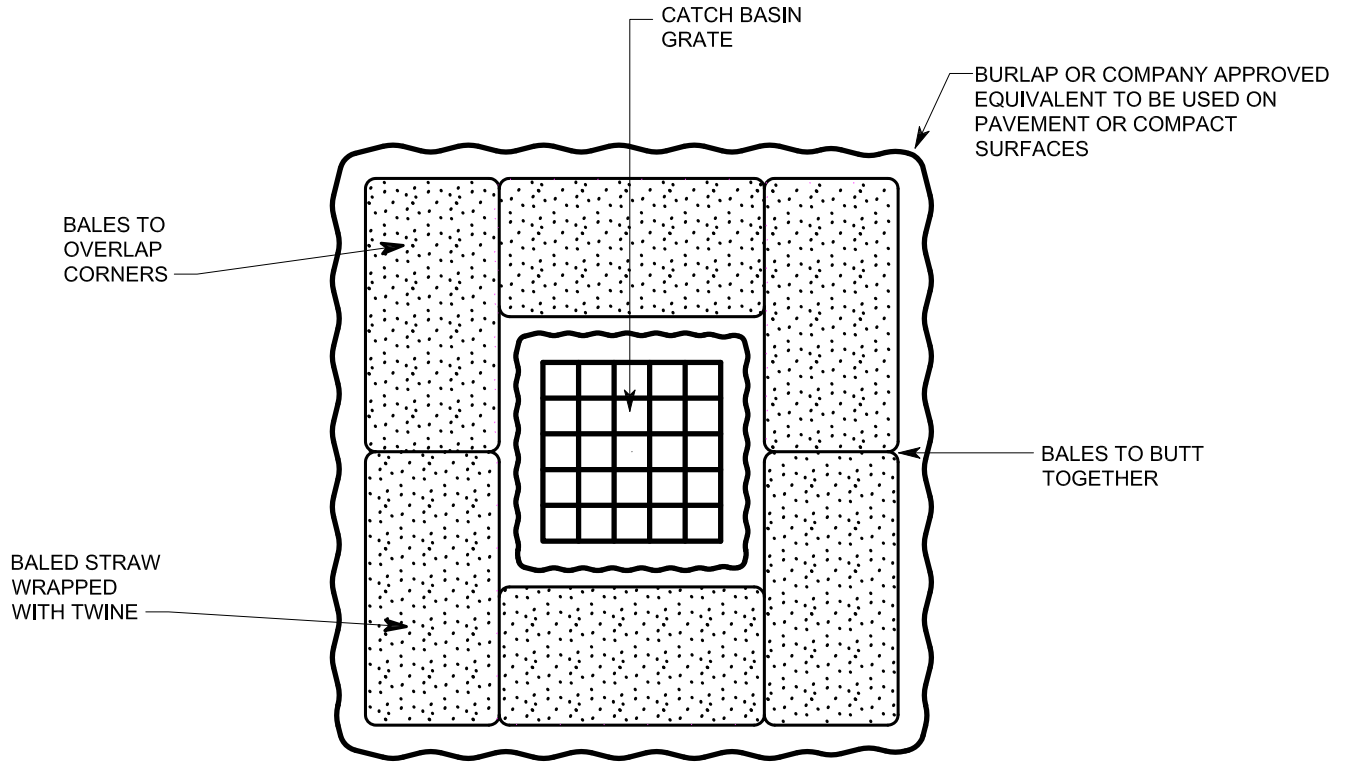
1. INSPECT CHANNEL DURING AND FOLLOWING CONSTRUCTION AND MAKE REPAIRS AS NEEDED.
2. KEEP THE CHANNEL FREE OF DEBRIS AND OBSTRUCTIONS.

ROCK-LINED DRAINAGE SWALE

FIGURE EC-4

DWG. ES-0014

REV.

PLAN VIEWNOTES:

1. SURROUND STREET DRAINAGE STRUCTURE INLET WITH STRAW BALES PRIOR TO CONSTRUCTION AND MAINTAIN UNTIL CONSTRUCTION IS COMPLETED.
2. FOR BALES PLACED ON PAVEMENT (OR COMPACT SURFACES), PLACE BURLAP OR COMPANY APPROVED EQUIVALENT BETWEEN PAVEMENT AND BALE.
3. REMOVE ACCUMULATED SEDIMENT.
4. AN ALTERNATIVE STORM DRAIN INLET PROTECTION MAY USE ONLY FABRIC LINING WITHOUT STRAW BALES BASED ON THE DISCRETION OF THE THE ENVIRONMENTAL INSPECTOR.

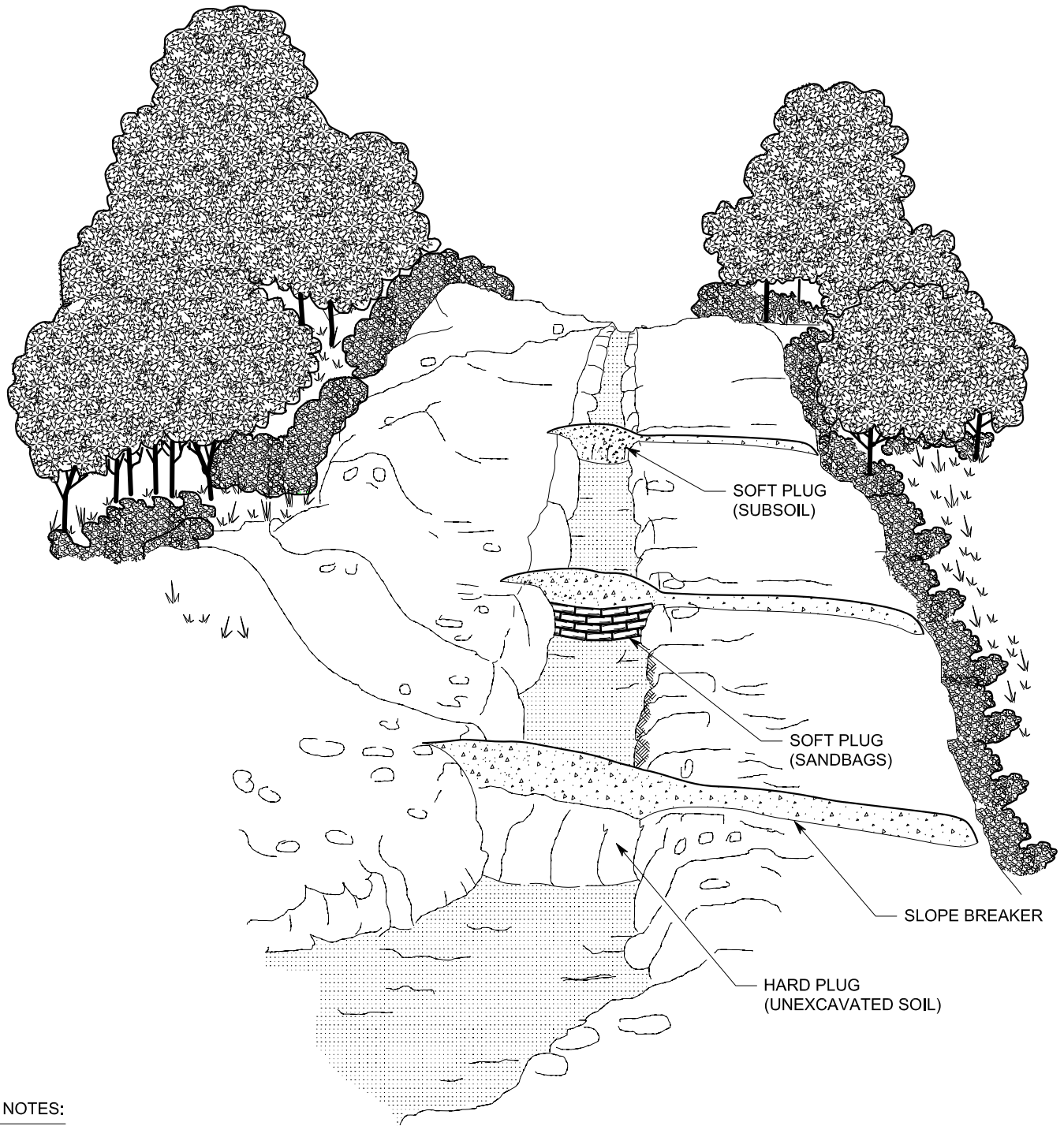
STORM DRAIN INLET PROTECTION

FIGURE EC-5

DWG.

ES-0015

REV.

**NOTES:**

1. TEMPORARY TRENCH PLUG MATERIALS MAY CONSIST OF UNEXCAVATED PORTIONS OF THE TRENCH (HARD PLUG), COMPACTED SUBSOIL OR SANDBAGS PLACED ACROSS THE DITCH (SOFT PLUG), OR SOME FUNCTIONAL EQUIVALENT. THESE OPTIONS ARE DEPICTED ABOVE. DO NOT USE TOPSOIL FOR TRENCH PLUGS.
2. POSITION TEMPORARY TRENCH PLUGS, AS NECESSARY, TO REDUCE TRENCHLINE EROSION AND MINIMIZE THE VOLUME AND VELOCITY OF TRENCH WATER FLOW AT THE BASE OF SLOPES.
3. TEMPORARY TRENCH PLUGS MAY BE USED IN CONJUNCTION WITH SLOPE BREAKERS TO DIVERT TRENCH WATER OVERFLOW AND PREVENT OVERFLOW INTO SENSITIVE RESOURCE AREAS.
4. DIVERT TRENCH OVERFLOW TO A WELL-VEGETATED OFF-R.O.W. LOCATION OR INSTALL APPROPRIATE ENERGY DISSIPATING DEVICE.
5. USE TEMPORARY TRENCH PLUGS AT WATERBODY CROSSINGS, AS NECESSARY.

TEMPORARY TRENCH PLUG OPTIONS**FIGURE EC-6**

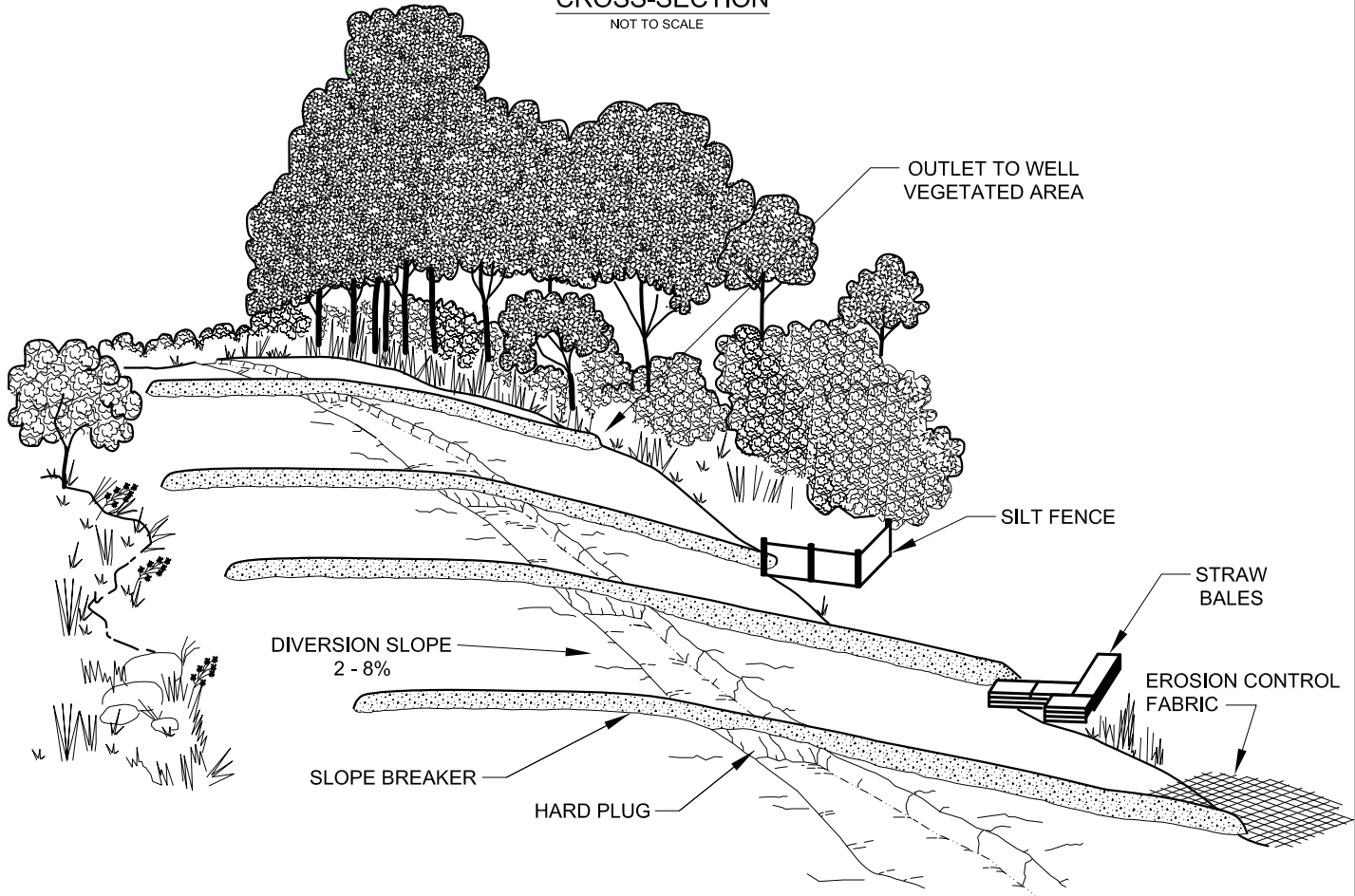
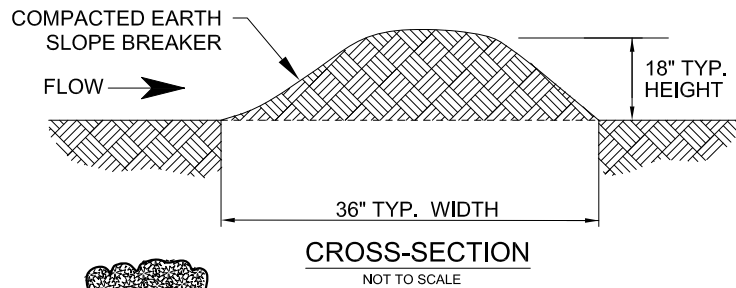
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INSTALLATION REQUIREMENTS:

- INSTALL SLOPE BREAKERS IN ALL DISTURBED AREAS AS NECESSARY TO AVOID EXCESSIVE EROSION AT THE LOCATIONS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS APPROVED BY THE ENVIRONMENTAL INSPECTOR (EI).
- MUST BE INSTALLED ON SLOPES GREATER THAN 5% WHERE THE BASE OF THE SLOPE IS LESS THAN 50 FEET FROM A WATERBODY, WETLAND OR ROAD CROSSING AT THE FOLLOWING MINIMUM SPACING:

SLOPE (%)	SPACING (FT.)
5 - 15	300
> 15 - 30	200
> 30	100

- CONSTRUCT USING SAND BAGS, STAKED STRAW BALES, SILT FENCE, OR SOIL.
- INSTALL WITH A 2 - 8% OUTFALL ANGLE.

- POSITION OUTFALL TO PREVENT SEDIMENT DISCHARGE INTO WETLANDS, WATERBODIES, OR OTHER SENSITIVE RESOURCES.
- FILTER RUN-OFF WATER BY CONSTRUCTING THE OUTLET IN A WELL VEGETATED STABLE AREA, OR BY USING AN ENERGY DISSIPATING DEVICE (SILT FENCE, STRAW BALES, EROSION CONTROL FABRIC). IF NEEDED, THE TYPE OF ENERGY DISSIPATION DEVICE WILL DEPEND ON SITE CONDITIONS (OPTIONS ARE DEPICTED ABOVE).

MAINTENANCE REQUIREMENTS:

- INSPECT DURING CONSTRUCTION AND MAKE REPAIRS AS NEEDED.
- KEEP THE CHANNEL FREE OF DEBRIS AND OBSTRUCTIONS.

TEMPORARY SLOPE BREAKERS

FIGURE EC-7

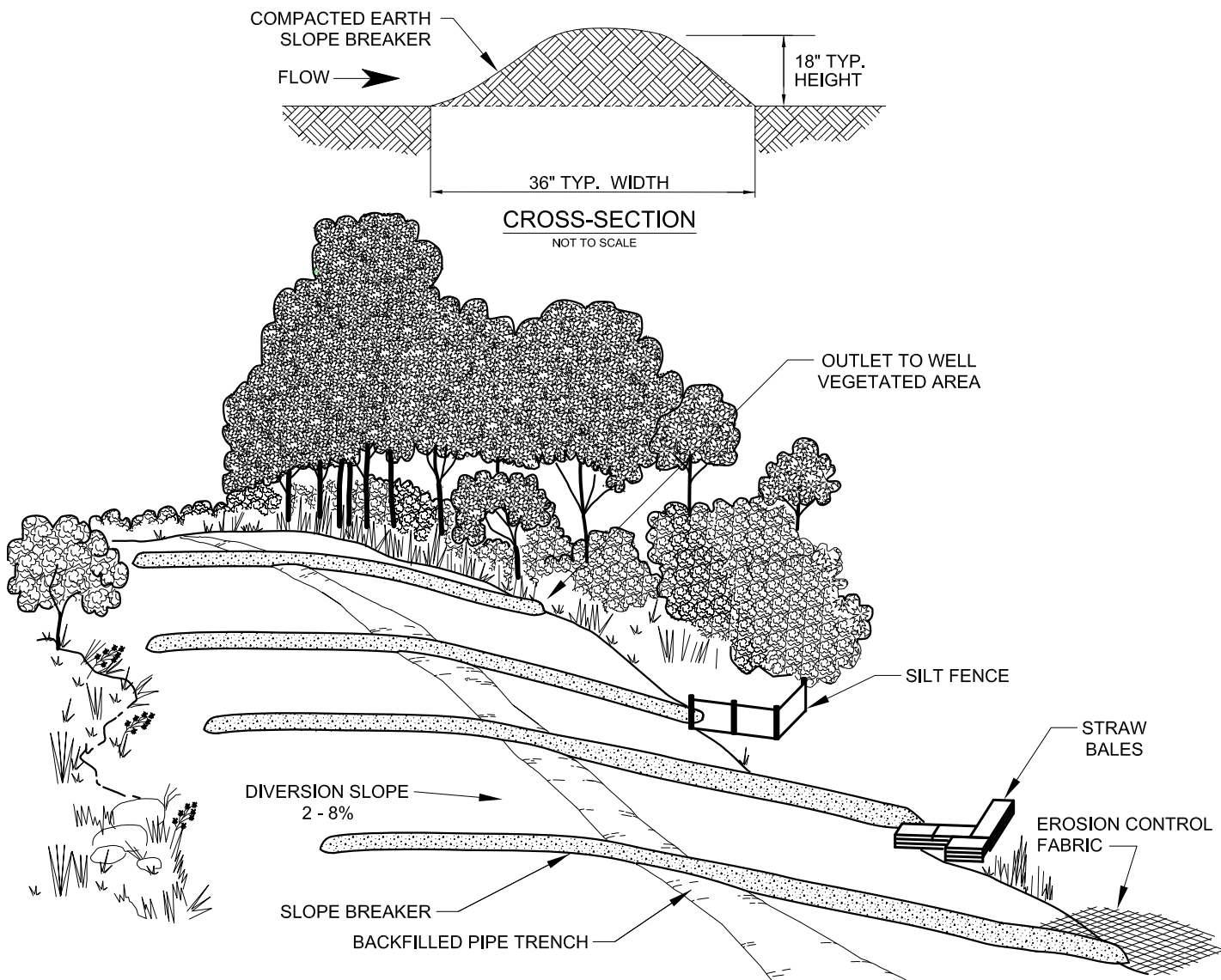
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INSTALLATION REQUIREMENTS:

- INSTALL AND MAINTAIN IN ALL DISTURBED AREAS TO AVOID EXCESSIVE EROSION, EXCEPT CULTIVATED AREAS AND LAWNS (UNLESS REQUESTED BY THE LANDOWNER), USING SPACING RECOMMENDATIONS OBTAINED FROM THE LOCAL SOIL CONSERVATION AUTHORITY OR LAND MANAGEMENT AGENCY, AT THE LOCATIONS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS APPROVED BY THE ENVIRONMENTAL INSPECTOR (EI).
- INSTALL ON SLOPES GREATER THAN 5% WHERE THE BASE OF THE SLOPE IS LESS THAN 50 FEET FROM A WATERBODY, WETLAND OR ROAD CROSSING AT THE FOLLOWING MINIMUM SPACING IN THE ABSENCE OF WRITTEN RECOMMENDATIONS:

SLOPE (%)	SPACING (FT.)
5 - 15	300
> 15 - 30	200
> 30	100
- CONSTRUCT USING SOIL, STONE, OR SOME FUNCTIONAL EQUIVALENT.
- INSTALL WITH A 2 - 8% OUTFALL ANGLE.
- POSITION OUTFALL TO PREVENT SEDIMENT DISCHARGE INTO WETLANDS, WATERBODIES, OR OTHER SENSITIVE RESOURCES.

- FILTER RUN-OFF WATER BY CONSTRUCTING THE OUTLET IN A WELL VEGETATED STABLE AREA, OR BY USING AN ENERGY DISSIPATING DEVICE (SILT FENCE, STRAW BALES, EROSION CONTROL FABRIC). IF NEEDED, THE TYPE OF ENERGY DISSIPATION DEVICE WILL DEPEND ON SITE CONDITIONS (OPTIONS ARE DEPICTED ABOVE).
- IF NECESSARY, OUTFALL MAY EXTEND SLIGHTLY, UP TO 4 FEET, BEYOND THE EDGE OF THE CONSTRUCTION RIGHT-OF-WAY, SUBJECT TO ALL APPLICABLE SURVEY REQUIREMENTS.

MAINTENANCE REQUIREMENTS:

- INSPECT DURING AND FOLLOWING CONSTRUCTION AND MAKE REPAIRS AS NEEDED.
- KEEP THE CHANNEL FREE OF DEBRIS AND OBSTRUCTIONS.
- SEED AND MULCH PERMANENT SLOPE BREAKERS FOLLOWING CONSTRUCTION.

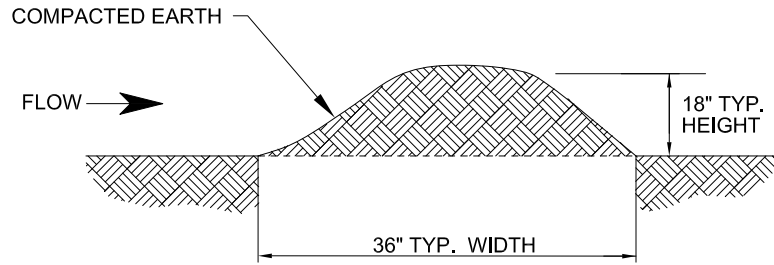
PERMANENT SLOPE BREAKERS

FIGURE EC-8

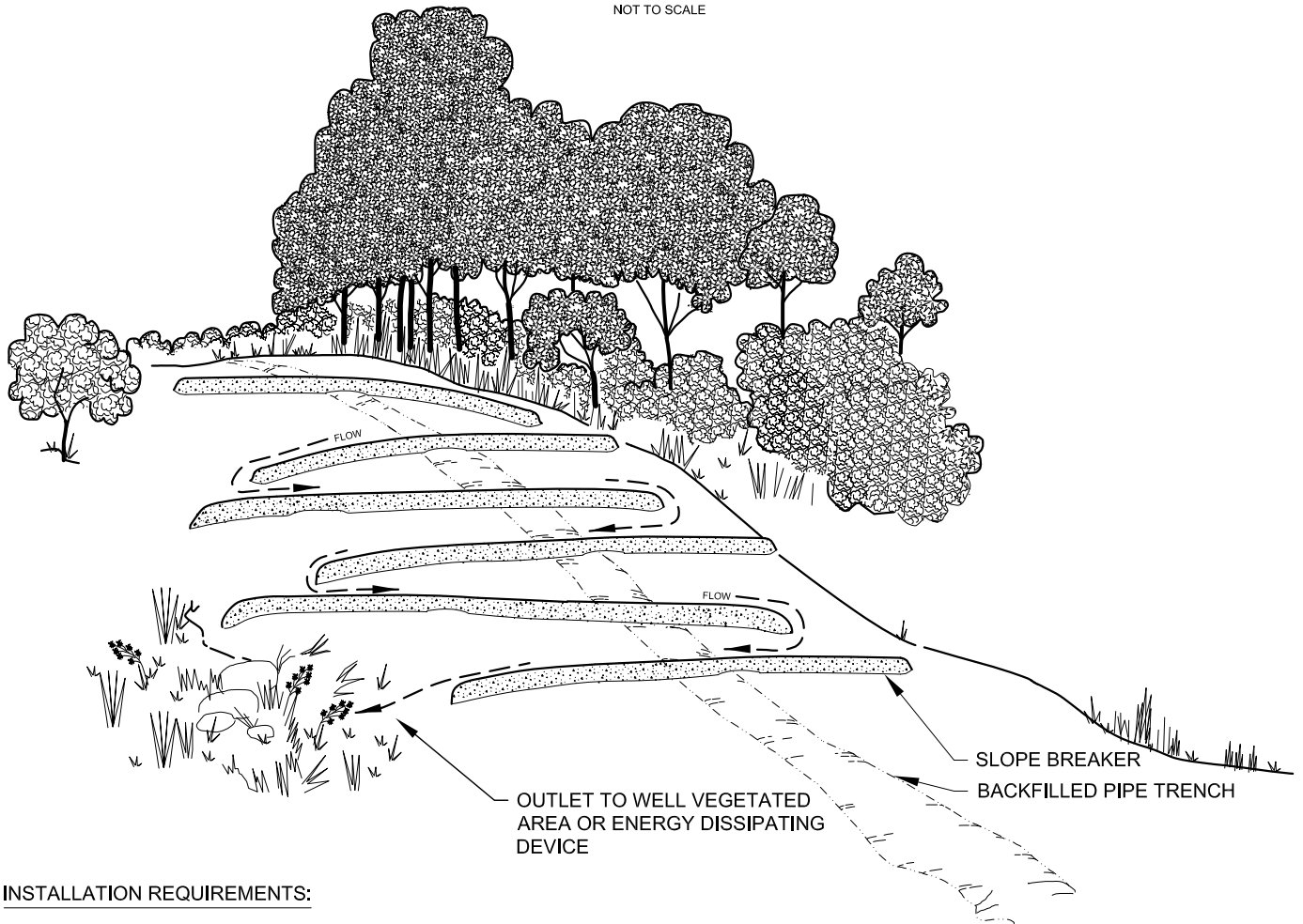
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INSTALLATION REQUIREMENTS:

- INSTALL IN ALL AREAS EXCEPT RESIDENTIAL OR AGRICULTURAL (UNLESS AUTHORIZED BY LANDOWNER OR LAND MANAGING AGENCY).
- CONSTRUCT USING EARTH FILLED SACKS OR STAKED STRAW BALES FOR TEMPORARY OR COMPACTED EARTH AND ROCK FOR PERMANENT.
- INSTALL WITH A 2 - 8% OUTFALL ANGLE.
- FOR TEMPORARY CHEVRON SLOPE BREAKERS, POSITION OUTFALL TO PREVENT SEDIMENT DISCHARGE INTO WETLANDS, WATERBODIES, OR OTHER SENSITIVE RESOURCES.
- FILTER RUN-OFF WATER BY CONSTRUCTING AN OUTLET USING AN ENERGY DISSIPATING DEVICE (SILT FENCE, STRAW BALES, EROSION CONTROL FABRIC), AS APPROVED BY THE ENVIRONMENTAL INSPECTOR.

MAINTENANCE REQUIREMENTS:

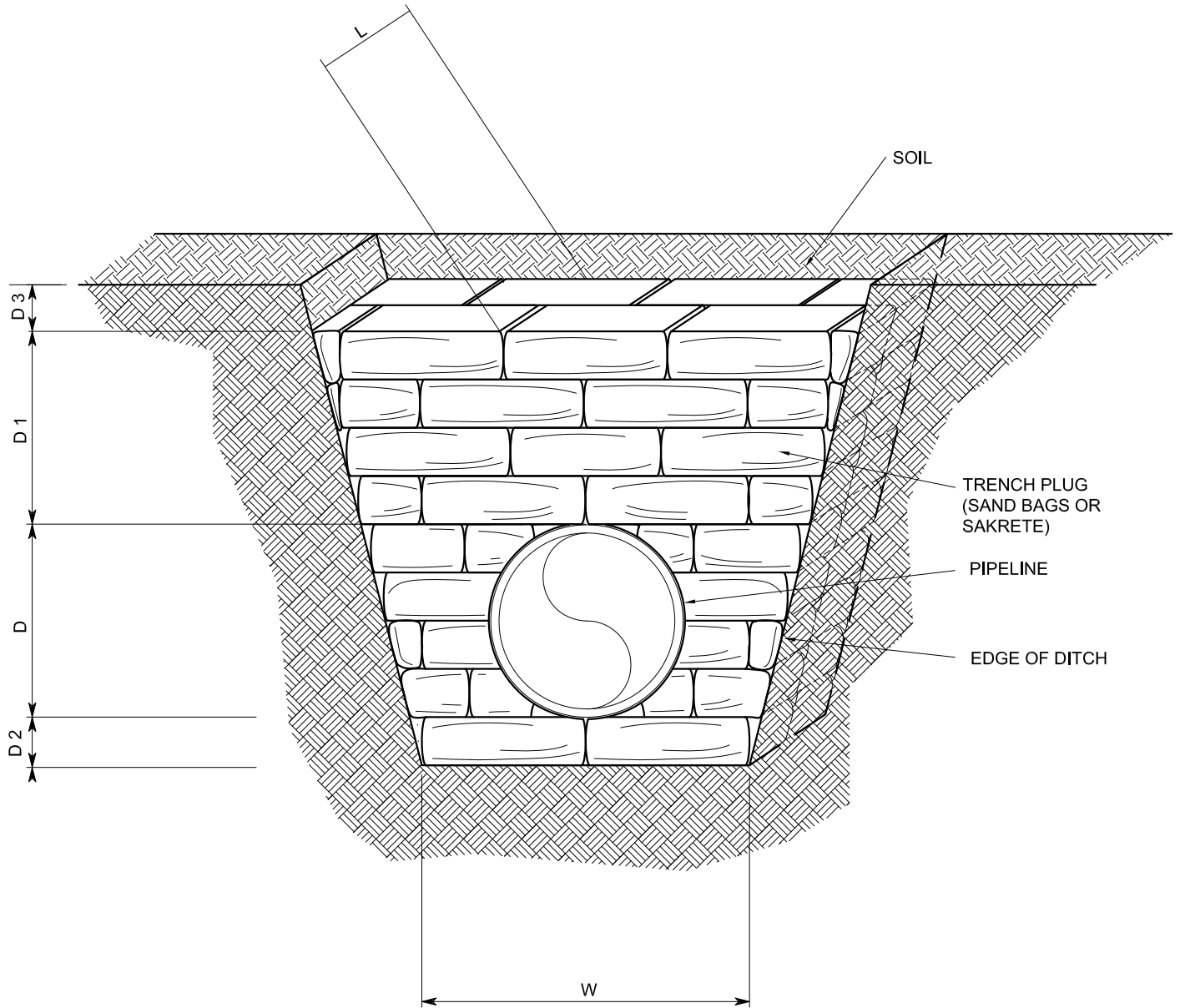
- INSPECT DURING AND FOLLOWING CONSTRUCTION AND MAKE REPAIRS AS NEEDED.
- KEEP THE CHANNEL FREE OF DEBRIS AND OBSTRUCTIONS.
- SEED AND MULCH PERMANENT SLOPE BREAKERS FOLLOWING CONSTRUCTION.

CHEVRON SLOPE BREAKER

FIGURE EC-9

DWG. ES-0019

REV.



D = PIPE DIAMETER
 D1 = APPROXIMATELY 24"
 D2 = APPROXIMATELY 6" (8" MIN. IN ROCK)
 D3 = APPROXIMATELY 12"
 W = D + 2 to 4 FEET
 L = APPROXIMATELY 18" - 24"
 D1 + D3 = 36" MINIMUM

NOTE:

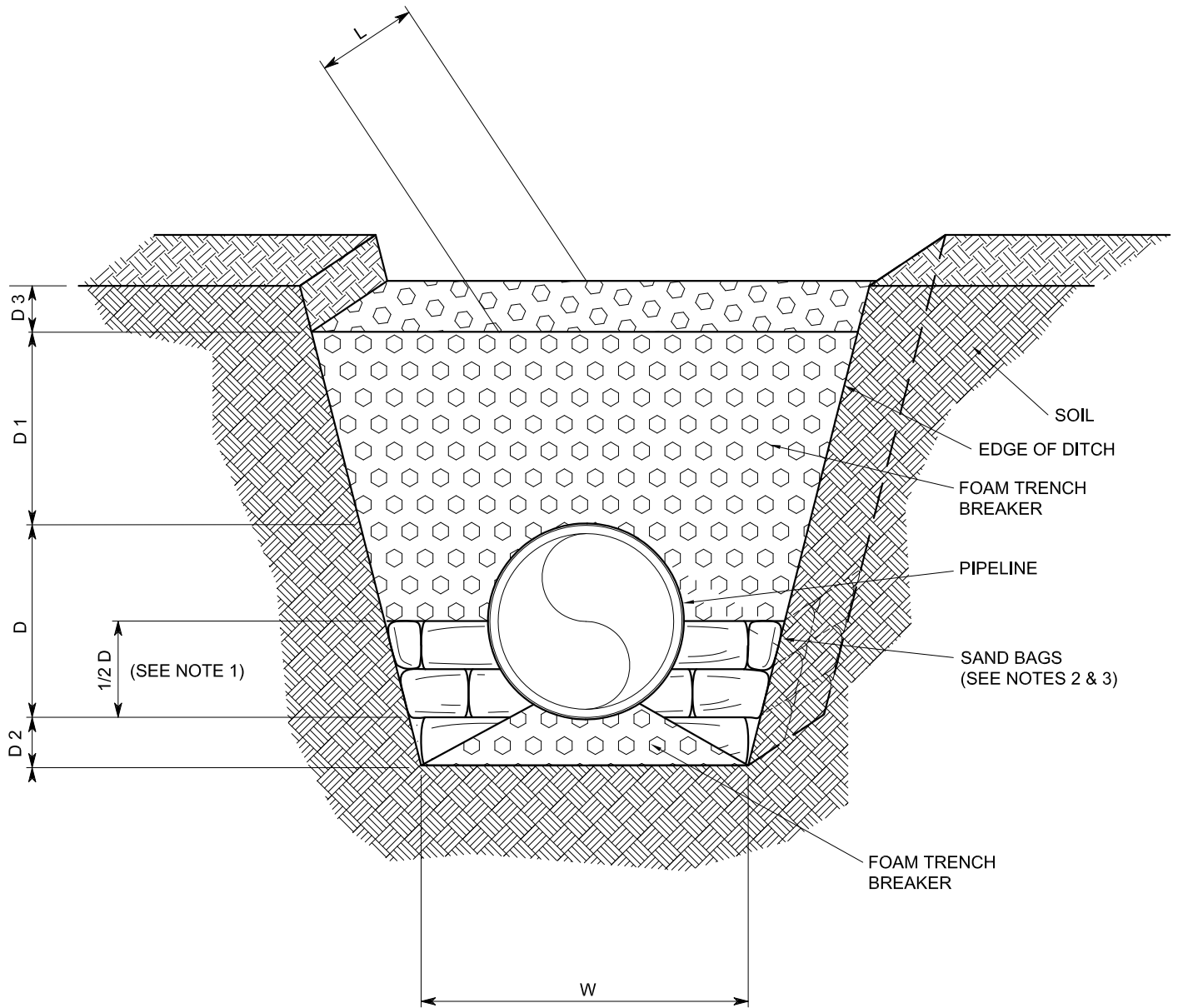
1. USE OF SAKRETE SHALL REQUIRE PRIOR COMPANY APPROVAL.
2. TOPSOIL SHALL NOT BE USED TO CONSTRUCT BREAKERS.
3. DO NOT INSTALL TRENCH BREAKERS WITHIN A WETLAND.

TRENCH BREAKER DETAIL (SACK)

FIGURE EC-10

DWG. ES-0020

REV.



D = PIPE DIAMETER
 D1 = APPROXIMATELY 24"
 D2 = APPROXIMATELY 6" (8" MIN. IN ROCK)
 D3 = APPROXIMATELY 12"
 W = D + 2 to 4 FEET
 L = APPROXIMATELY 18" - 24"
 D1 + D3 = 36" MINIMUM

NOTE:

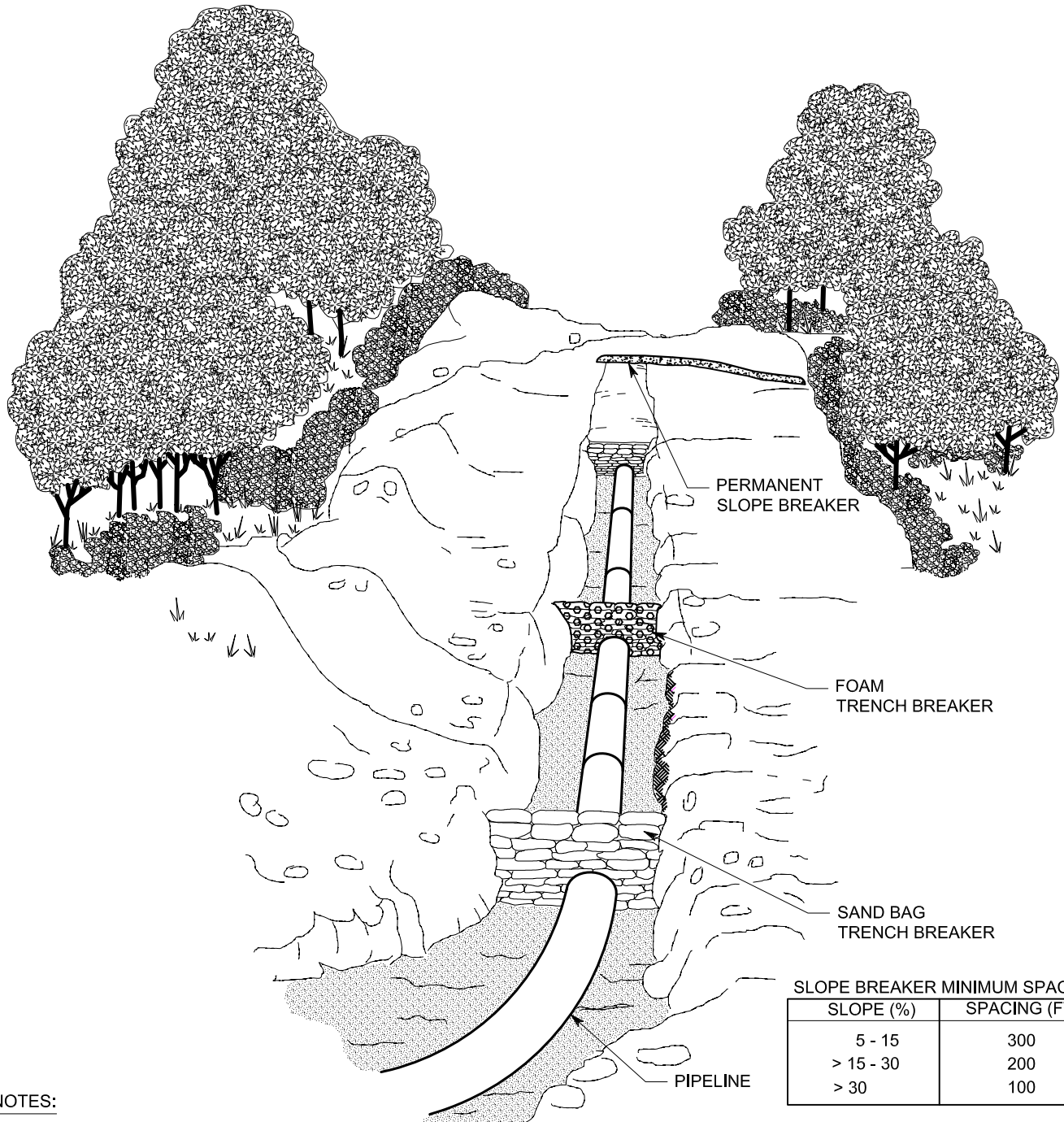
1. A MINIMUM OF TWO LAYERS OF BAGS SHALL BE INSTALLED.
2. THE ADDITION OF SAND BAGS UNDER THE FOAM WILL BE PLACED AS PRESCRIBED IN THE E&S PLAN OR AT THE DISCRETION OF THE ENVIRONMENTAL INSPECTOR (EI).
3. FOAM TRENCH BREAKERS ARE TO BE USED WITHIN UPLAND AREAS. DO NOT USE FOAM TRENCH BREAKERS AT WATERBODY OR WETLAND BOUNDARIES..

TRENCH BREAKER DETAIL (FOAM)

FIGURE EC-11

DWG. ES-0021

REV.



NOTES:

1. PERMANENT TRENCH BREAKER MATERIALS WILL CONSIST OF SAND BAGS, POLYURETHANE FOAM OR SOME FUNCTIONAL EQUIVALENT PLACED ACROSS THE DITCH AS IDENTIFIED IN PERMIT REQUIREMENTS. DO NOT USE TOPSOIL FOR TRENCH BREAKERS. THESE OPTIONS ARE DEPICTED ABOVE.
2. PERMANENT TRENCH BREAKERS, WHICH ARE USED IN CONJUNCTION WITH SLOPE BREAKERS, SHALL BE INSTALLED AT THE LOCATIONS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DETERMINED IN THE FIELD BY THE ENVIRONMENTAL INSPECTOR.
3. AT A MINIMUM, INSTALL A TRENCH BREAKER AT THE BASE OF SLOPES GREATER THAN 5 PERCENT WHERE THE BASE OF THE SLOPE IS LESS THAN 50 FEET FROM A WATERBODY OR WETLAND AND WHERE NEEDED TO AVOID DRAINING A WATERBODY OR WETLAND.
4. INSTALL TRENCH BREAKERS AT WETLAND BOUNDARIES AND/OR SEAL THE TRENCH BOTTOM AS NECESSARY TO MAINTAIN THE ORIGINAL WETLAND HYDROLOGY. DO NOT INSTALL TRENCH BREAKERS WITHIN A WETLAND.
5. IN AGRICULTURAL FIELDS AND RESIDENTIAL AREAS WHERE SLOPE BREAKERS ARE NOT TYPICALLY REQUIRED, INSTALL TRENCH BREAKERS AT THE SAME SPACING AS IF PERMANENT SLOPE BREAKERS WERE REQUIRED.

PERMANENT TRENCH BREAKER OPTIONS

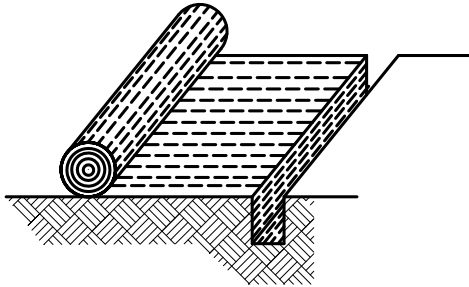
FIGURE EC-12

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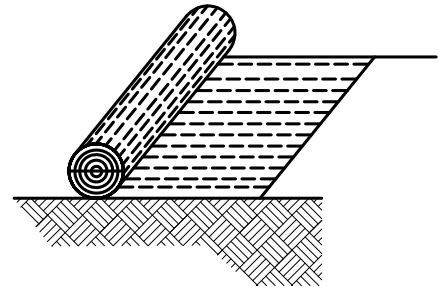
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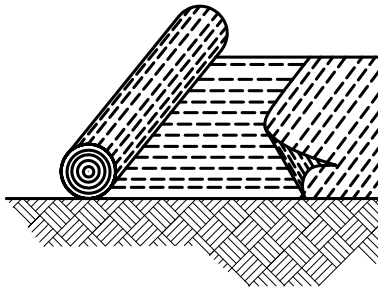
A. BURY THE TOP END OF THE ROLL
IN A 6" TRENCH (TYPICAL)



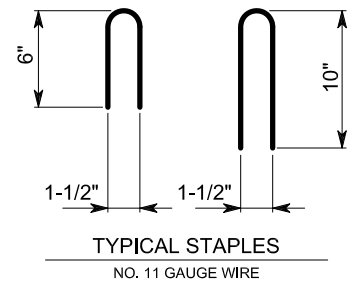
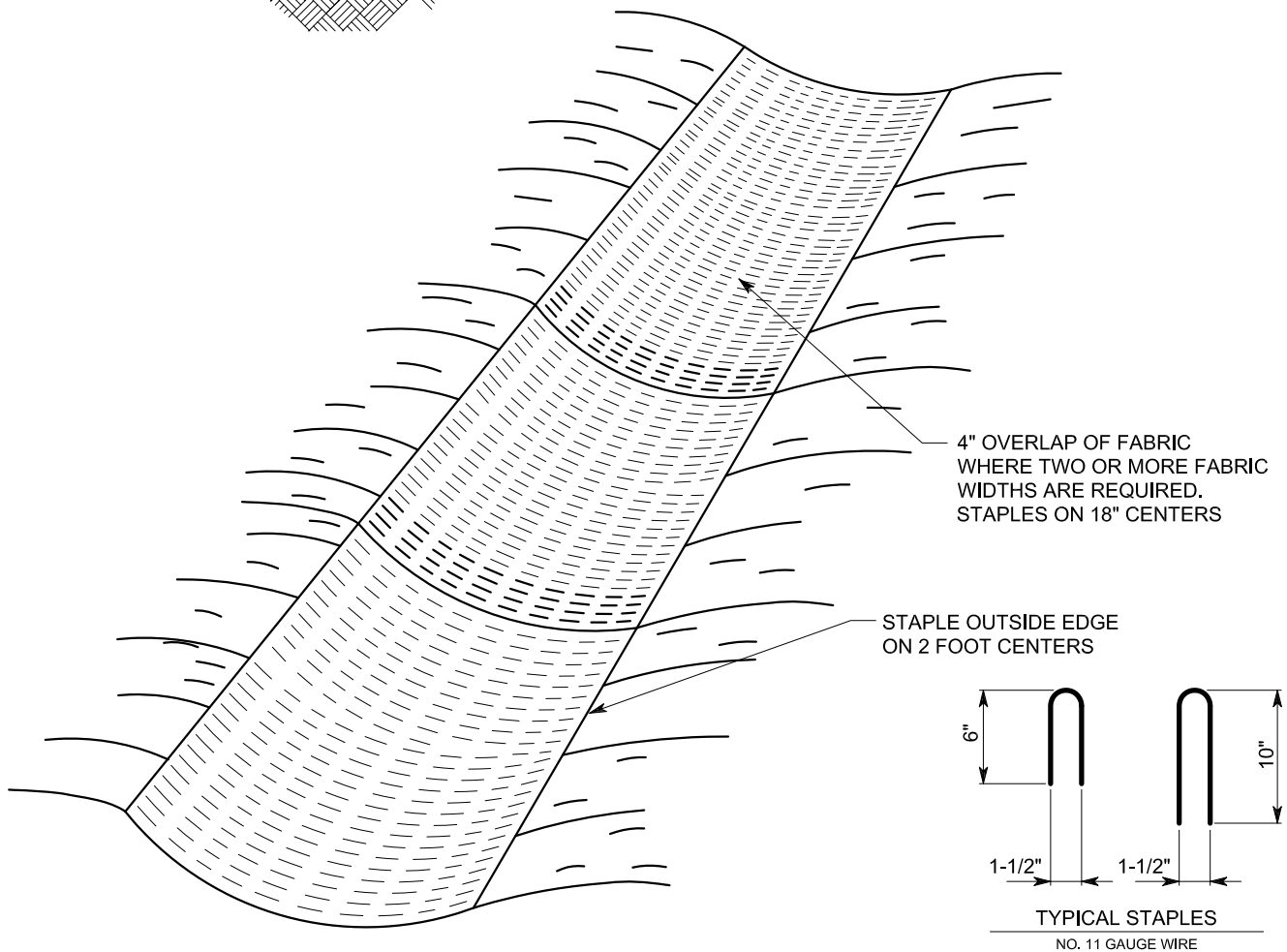
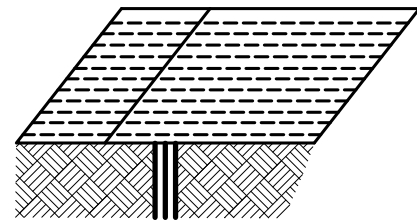
B. DOUBLE STAPLE EVERY 12" BEFORE
BACKFILLING AND COMPACTING.



C. BURY AND TAMP UPPER END OF LOWER
STRIP AS IN "A" AND "B". OVERLAP END
OF TOP STRIP 4" AND STAPLE.



D. WHERE FABRIC STOPS, FOLD, BURY,
AND TAMP ROLL IN SLIT TRENCH.
PROVIDE DOUBLE ROW OF STAPLES

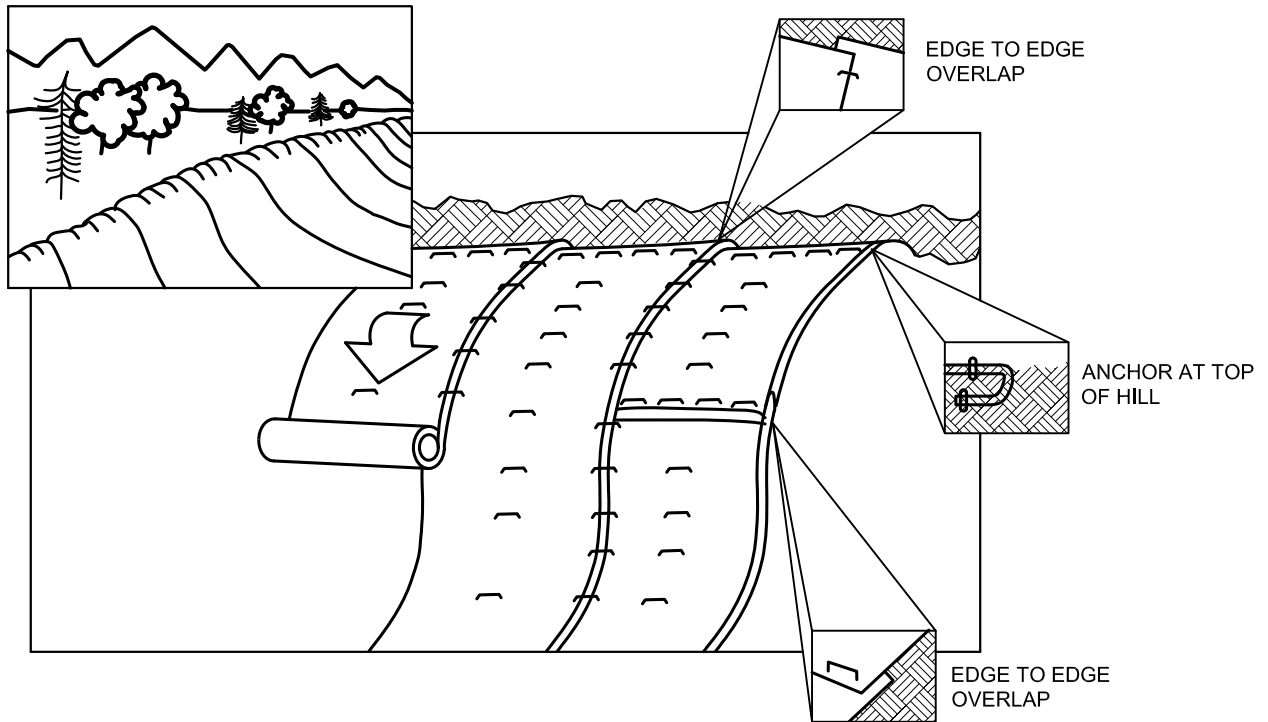


EROSION CONTROL FABRIC INSTALLATION

FIGURE EC-13

DWG. ES-0023

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**NOTES:**

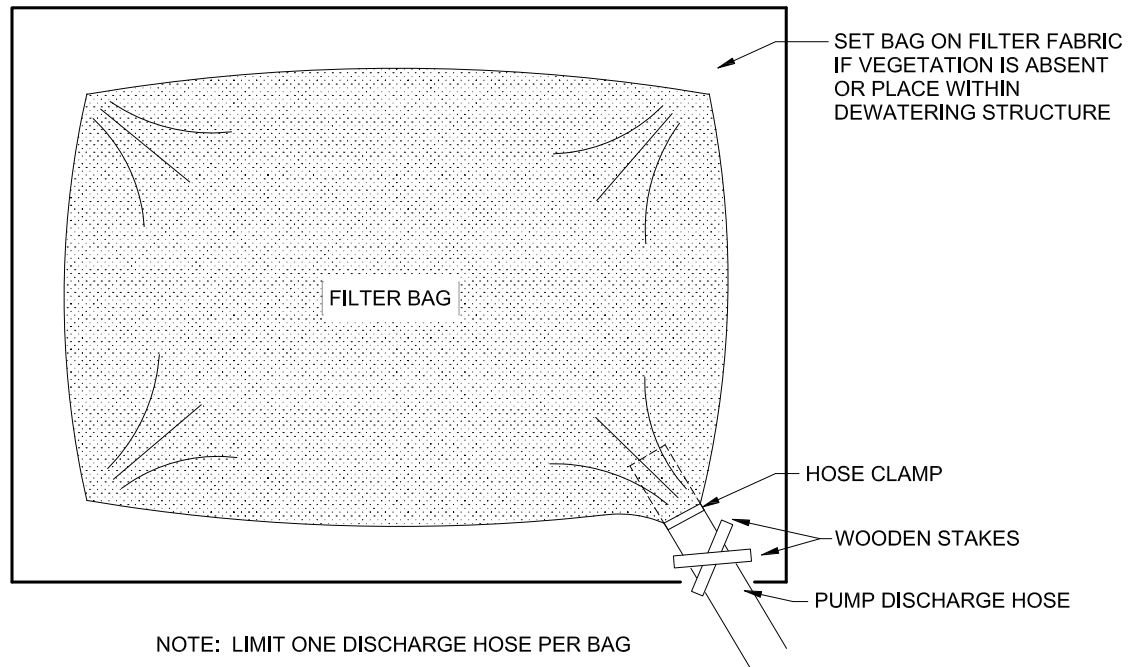
1. EROSION CONTROL BLANKETS (FABRIC) SHALL BE USED AT LOCATIONS IDENTIFIED IN THE PLAN AND/OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
2. EROSION CONTROL BLANKETS SHALL MEET THE REQUIREMENTS SPECIFIED IN THE PLAN AND/OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
3. STAPLES SHALL BE MADE OF 11 GAUGE WIRE, U-SHAPED WITH 6" LEGS AND A 1" CROWN. STAPLES SHALL BE DRIVEN INTO THE GROUND FOR THE FULL LENGTH OF THE STAPLE LEGS.
4. BLANKETS SHALL BE INSTALLED ACCORDING TO MANUFACTURER SPECIFICATIONS OR AS STATED BELOW:
 - EXTEND TOP OF BLANKET 3 FEET PAST THE UPPER EDGE OF THE SLOPE.
 - ANCHOR ("KEY") THE UPPER EDGE OF THE BLANKET INTO THE SLOPE USING A 6" DEEP TRENCH AND ROLL THE BLANKET DOWN THE HILL. DOUBLE STAPLE EVERY 12" BEFORE BACKFILLING AND COMPACTING TRENCH.
 - INSTALL LOOSELY ON SLOPE AND AVOID STRETCHING EROSION CONTROL BLANKETS DURING INSTALLATION.
 - BRING ROLL BACK OVER THE TOP OF THE TRENCH AND CONTINUE TO ROLL DOWN SLOPE. STAPLE EVERY 12" WHERE BLANKETS EXIT THE TRENCH AT THE TOP OF THE SLOPE.
 - WHEN BLANKETS ARE SPLICED DOWN-SLOPE TO ADJOINING BLANKETS (SLOPE OR STREAMBANK MATS), THE UPPER BLANKET SHALL BE PLACED OVER THE LOWER (SHINGLE STYLE) WITH APPROXIMATELY 6" OF OVERLAP. STAPLE THROUGH THE OVERLAPPED AREA EVERY 12".
 - OVERLAP ADJACENT BLANKETS 6". STAPLE EDGES OF BLANKETS AND CENTER EVERY 36".
5. IN LIVESTOCK AREAS WHERE EROSION CONTROL BLANKETS ARE APPLIED TO THE SLOPES, FENCING WILL BE USED IF NECESSARY TO EXCLUDE LIVESTOCK, WITH PERMISSION OF THE LANDOWNER.
6. MONITOR WASHOUTS, STAPLE INTEGRITY OR BLANKET MOVEMENT. REPLACE OR REPAIR AS NECESSARY.
7. DO NOT USE SYNTHETIC MONOFILAMENT MESH / NETTED MATERIALS IN AREAS DESIGNATED AS SENSITIVE WILDLIFE HABITAT, UNLESS THE PRODUCT IS SPECIFICALLY DESIGNED TO MINIMIZE HARM TO WILDLIFE.

**TYPICAL EROSION CONTROL
BLANKETS ON SLOPES**

FIGURE EC-14

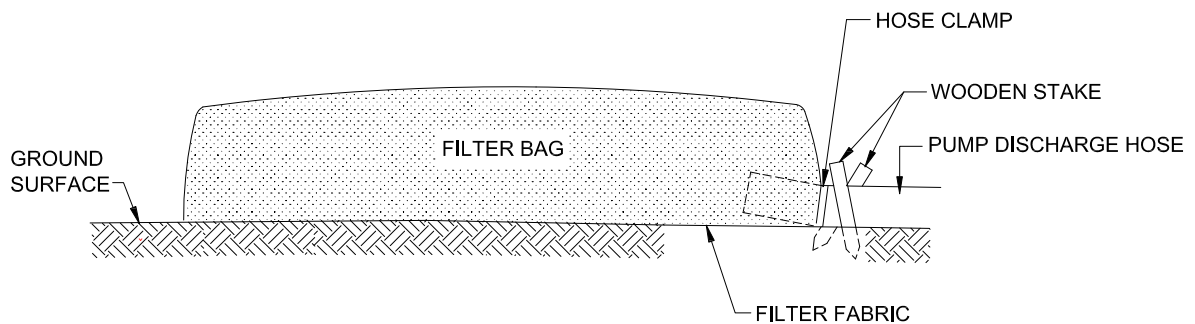
DWG. **ES-0024**

REV.



NOTE: LIMIT ONE DISCHARGE HOSE PER BAG

PLAN VIEW



CROSS-SECTION

NOTES:

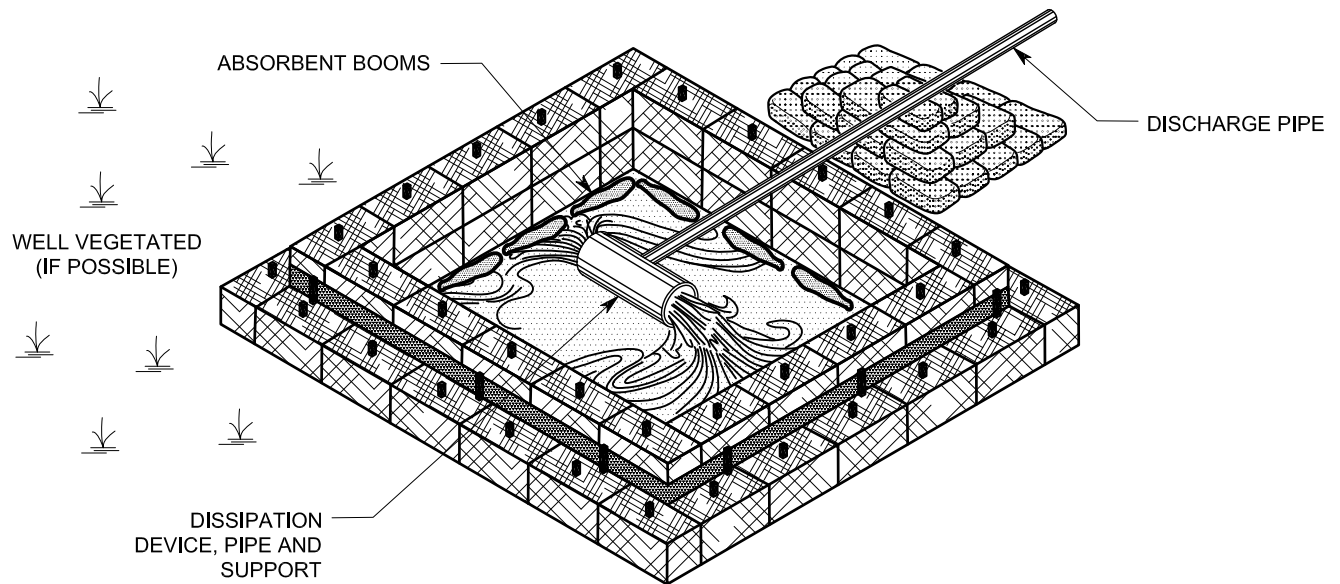
1. THE FILTER BAG OR STRUCTURE MUST BE MANNED WHEN THE PUMPING IS INITIATED TO ENSURE PROPER OPERATION AND FUNCTIONALITY.
2. REMOVE DEWATERING STRUCTURE AS SOON AS PRACTICABLE AFTER COMPLETION OF DEWATERING ACTIVITIES.
3. PLACEMENT OF FILTERBAGS SHOULD BE IN A MANNER THAT BAG USE DOES NOT CAUSE EROSION. IF SITE CONDITIONS ALLOW, PLACE FILTER BAG IN WELL-VEGETATED AREA, A MINIMUM OF 50 FEET FROM WETLANDS OR WATERBODIES.

FILTER BAG

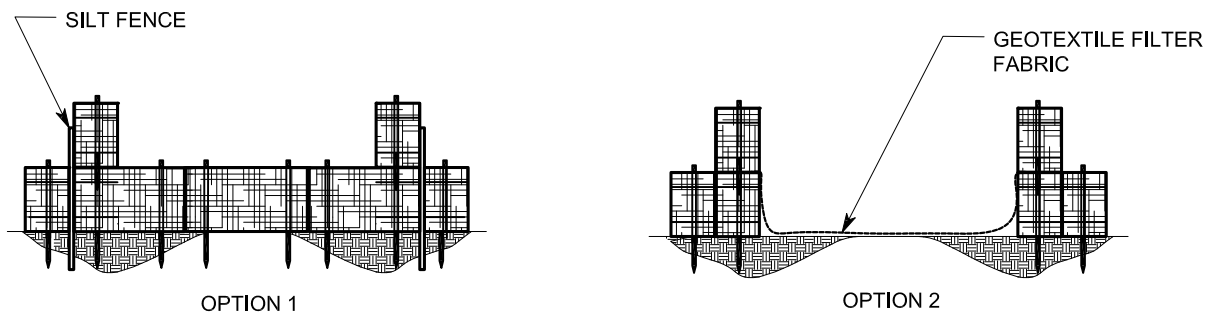
FIGURE WD-1

DWG. ES-0025

REV.



PLAN VIEW



CROSS SECTION VIEWS

NOTES:

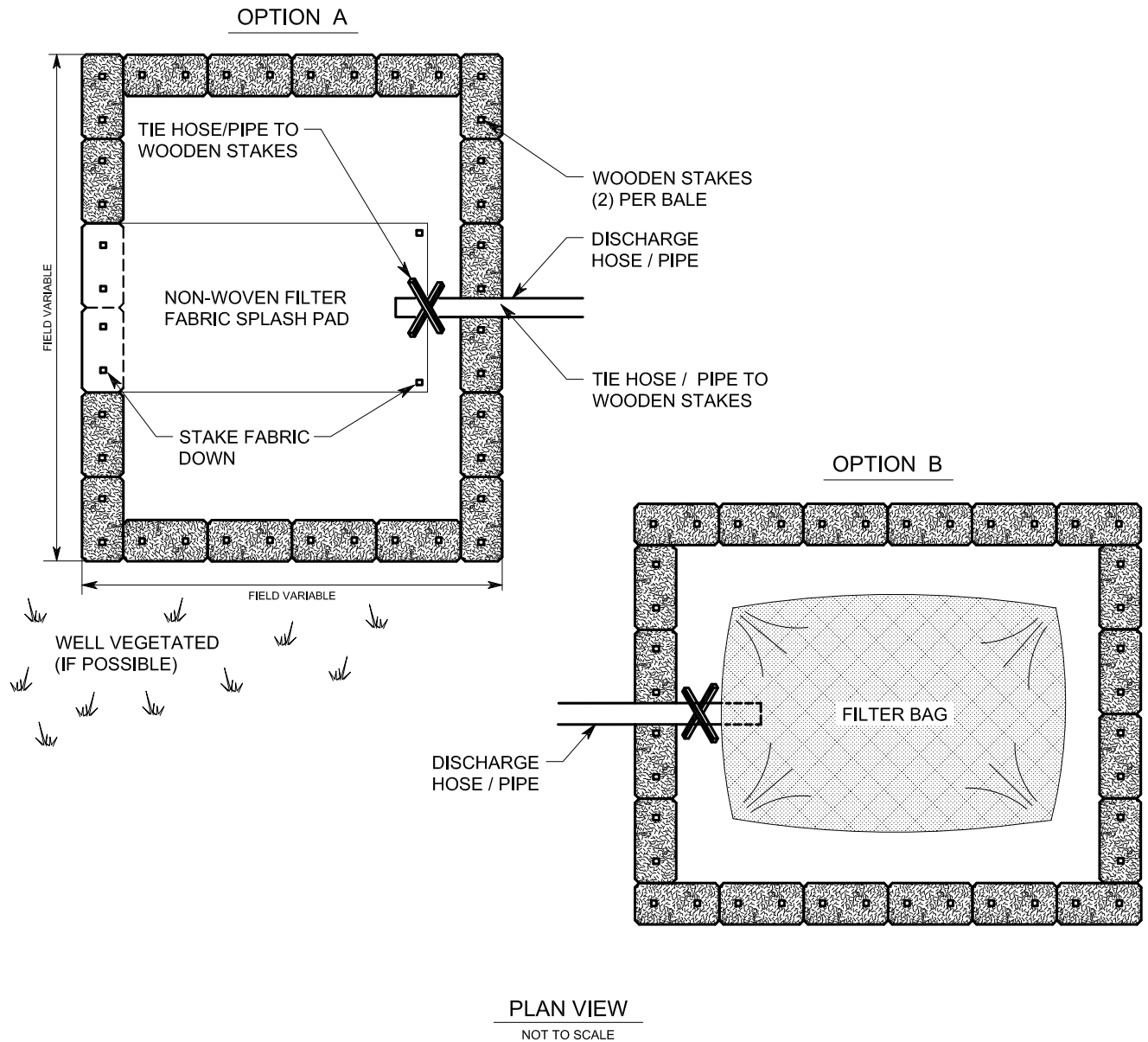
1. SIZE AND DIMENSION OF DEWATERING STRUCTURE WILL VARY DEPENDING ON THE VOLUME AND RATE OF DISCHARGE. STAGGER PLACEMENT OF STRAW BALES WHEN TWO ROWS ARE USED.
2. COVER THE BASE OF THE DISCHARGE STRUCTURE EITHER WITH STRAW BALES (OPTION 1) OR LINE WITH GEOTEXTILE FABRIC (OPTION 2).
3. PROVIDE SUPPORT TO ENSURE THAT DISCHARGE PIPE DOES NOT REST ON STRAW BALES.
4. PLASTIC SHEETING, WOODEN MATS OR STEEL PLATES MAY ALSO BE USED, AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR, TO PREVENT EROSION, STREAMBED SCOUR, SUSPENSION OF SEDIMENTS OR EXCESSIVE STREAMFLOW.
5. ABSORBENT BOOMS MUST BE USED DURING DISCHARGES FROM EXISTING / USED PIPE OR AS DIRECTED BY PERMIT REQUIREMENTS.
6. PREVENT EROSION, STREAMBED SCOUR, SUSPENSION OF SEDIMENTS AND EXCESSIVE STREAMFLOW BY PROPER DESIGN OF STRUCTURE, REGULATING THE WATER DISCHARGE RATE AS WELL AS USE OF ENERGY DISSIPATION DEVICE(S) AND SEDIMENT BARRIERS, AS NECESSARY.

DISCHARGE STRUCTURE FOR
HYDROSTATIC TEST WATER

FIGURE WD-2

DWG. ES-0026

REV.

NOTES:

1. SIZE AND DIMENSION OF DEWATERING STRUCTURE, INCLUDING NUMBER OF STRAW BALES USED, WILL VARY DEPENDING ON VOLUME OF WATER DISCHARGED, RATE OF DISCHARGE AND SITE CONDITIONS, SUCH AS THE TYPE AND AMOUNT OF SEDIMENT WITHIN THE DISCHARGE WATER.
2. PREVENT EROSION, STREAMBED SCOUR, SUSPENSION OF SEDIMENTS AND EXCESSIVE STREAMFLOW BY PROPER DESIGN OF STRUCTURE, REGULATING THE WATER DISCHARGE RATE AS WELL AS USE OF ENERGY DISSIPATION DEVICE(S) AND SEDIMENT BARRIERS, AS NECESSARY.
3. MONITOR AND CONDUCT DISCHARGES IN A MANNER THAT DOES NOT CAUSE EROSION AND DOES NOT RESULT IN SILT-LADEN WATER FLOWING INTO ANY WATERBODY OR WETLAND.
4. DO NOT DEPOSIT SAND, SILT, AND/OR SEDIMENT INTO SENSITIVE ENVIRONMENTAL RESOURCE AREAS, INCLUDING WETLANDS, WATERBODIES, CULTURAL RESOURCE SITES, AND SENSITIVE SPECIES HABITATS. STOP DEWATERING ACTIVITIES IF SUCH DEPOSITION IS OCCURRING AND ENSURE THE DESIGN OF THE DISCHARGE IS CHANGED TO PREVENT REOCCURRENCE.
5. ABSORBENT BOOMS MUST BE USED DURING DISCHARGES FROM EXISTING / USED PIPE OR AS DIRECTED BY PERMIT REQUIREMENTS.
6. FILTER BAGS SHOULD BE INSTALLED ACCORDING TO THE DETAILS SHOWN IN "FILTER BAG" FIGURE.
7. REMOVE STRUCTURE AS SOON AS PRACTICABLE AFTER COMPLETION OF WATER DISCHARGES.

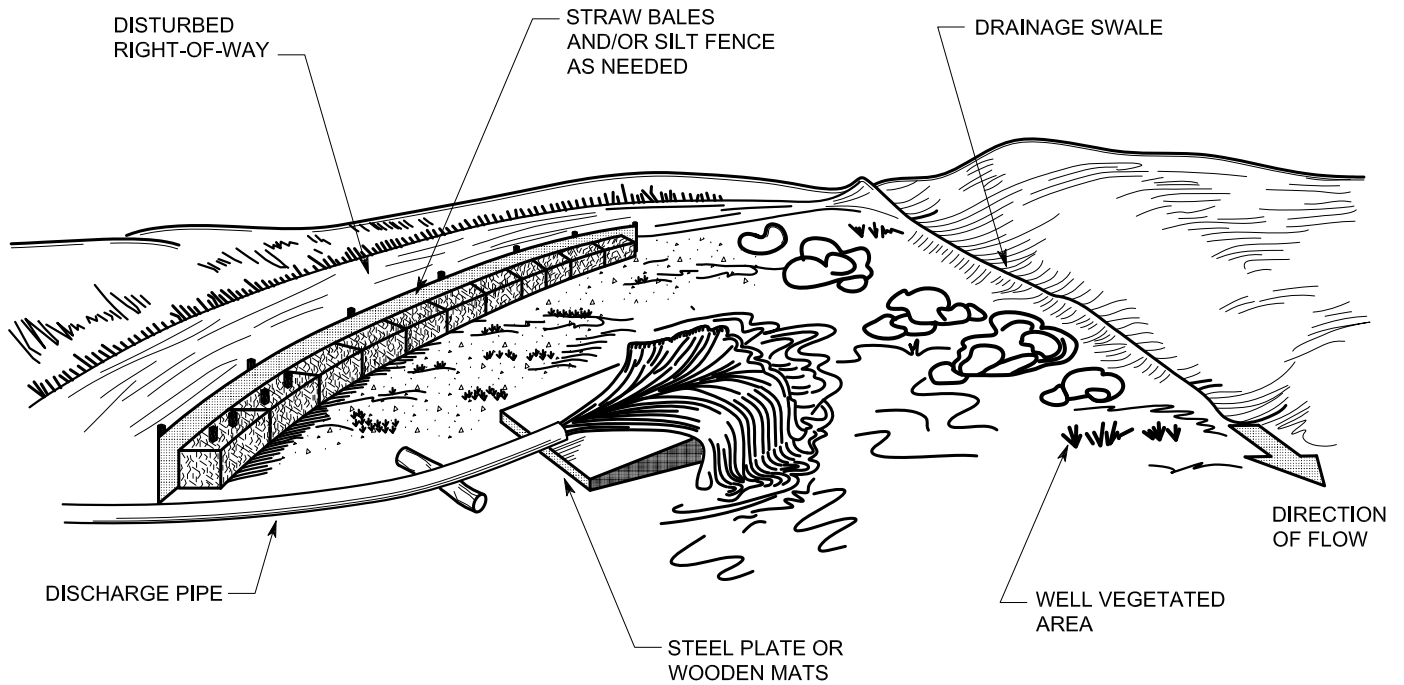
OPTIONS FOR SMALL WATER
DISCHARGES

FIGURE WD-3

DWG.

ES-0027

REV.



NOTES:

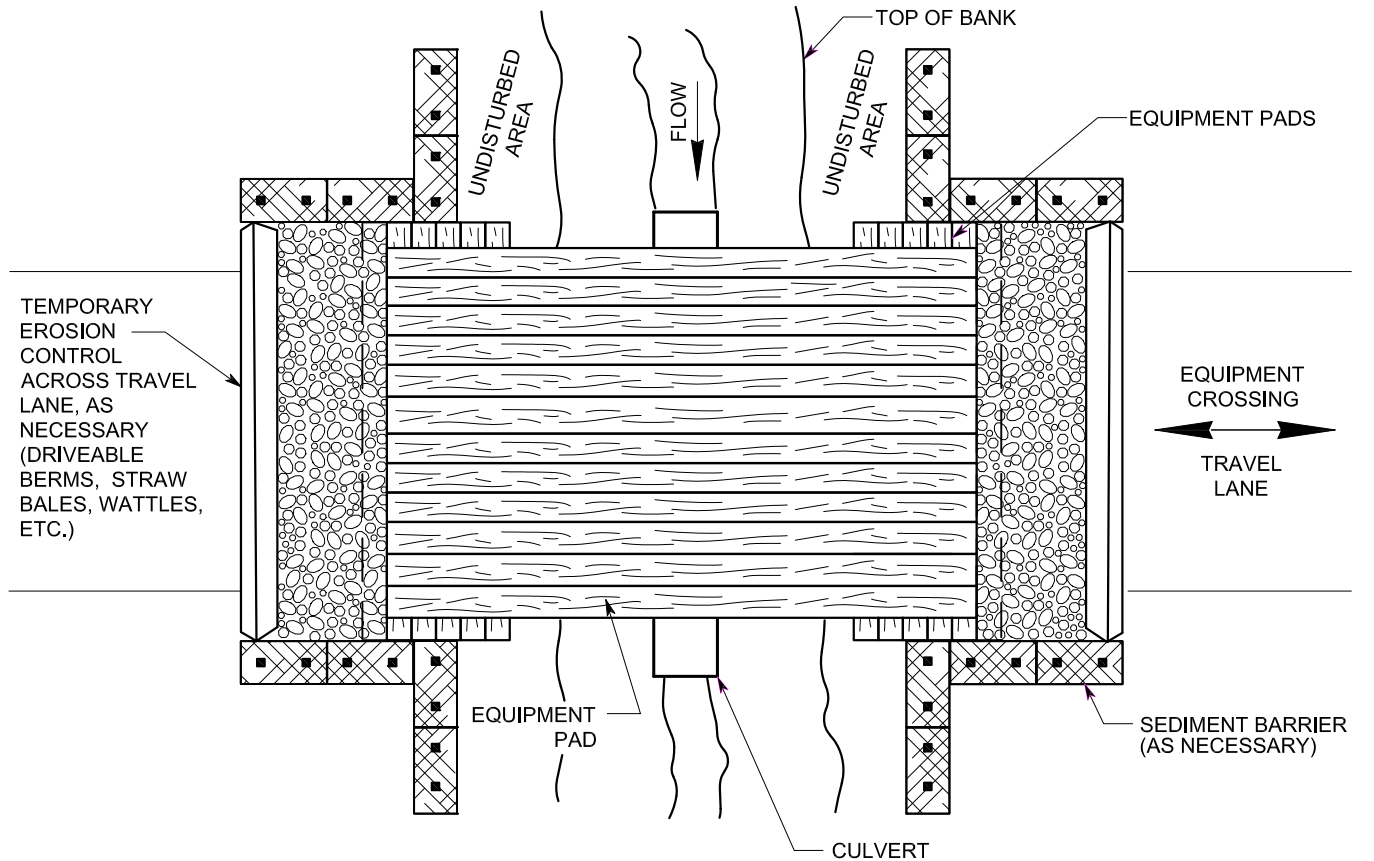
1. USE BACKHOE BUCKET OR DOZER BLADE TO ANCHOR DISCHARGE PIPE.
2. ON FLAT TERRAIN, USE STACKED STRAW BALES AND SILT FENCE AS NEEDED TO DIVERT WATER AWAY FROM DISTURBED RIGHT-OF-WAY.

DISCHARGE OF HYDROSTATIC TEST
WATER TO A SURFACE WATER

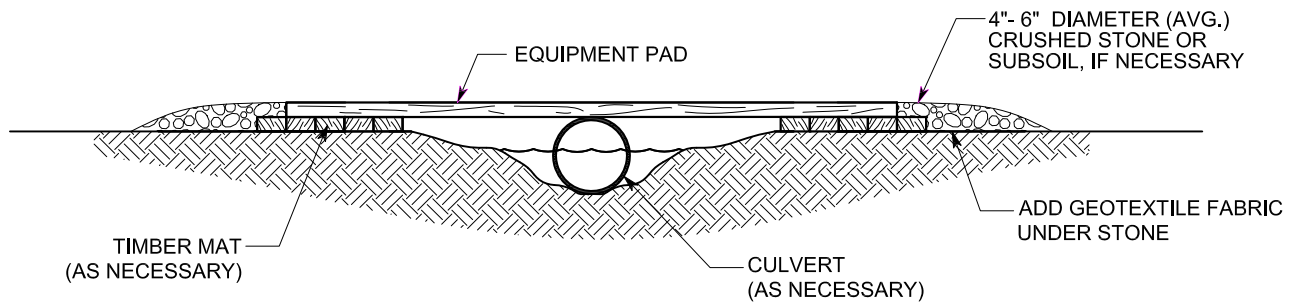
FIGURE WD-4

DWG. ES-0028

REV.



PLAN VIEW



CROSS SECTION VIEW

NOTES:

1. TEMPORARY SEDIMENT BARRIER CONSISTS OF SILT FENCE AND/ OR STRAW BALES, OR OTHER APPROPRIATE MATERIAL.
2. NUMBER AND DIAMETER OF CULVERTS, AS WELL AS USE OF CULVERTS, WILL DEPEND ON SITE-SPECIFIC CONDITIONS.
3. EQUIPMENT PAD, TYPICALLY CONSTRUCTED OF HARDWOOD, SHALL BE IN GOOD CONDITION AND MUST ACCOMMODATE THE LARGEST EQUIPMENT USED. ADDITIONAL EQUIPMENT PADS CAN BE PUT SIDE BY SIDE IF EXTRA WIDTH IS REQUIRED. BRIDGE MUST SPAN FROM TOP OF BANK TO TOP OF BANK.
4. CRUSHED STONE OR SUBSOIL MAY BE USED AS ILLUSTRATED, IF NECESSARY, WITHIN TRAVEL LANE AS RAMP.
5. CONSTRUCT AND MAINTAIN BRIDGE TO WITHSTAND THE HIGHEST EXPECTED FLOW WHILE BRIDGE IS IN USE AND PREVENT SOIL FROM ENTERING WATERBODY. DO NOT USE SOIL TO CONSTRUCT OR STABILIZE BRIDGE.

TEMPORARY EQUIPMENT BRIDGE
(EQUIPMENT PADS WITH
OR WITHOUT CULVERTS)

FIGURE BR-1

DWG.

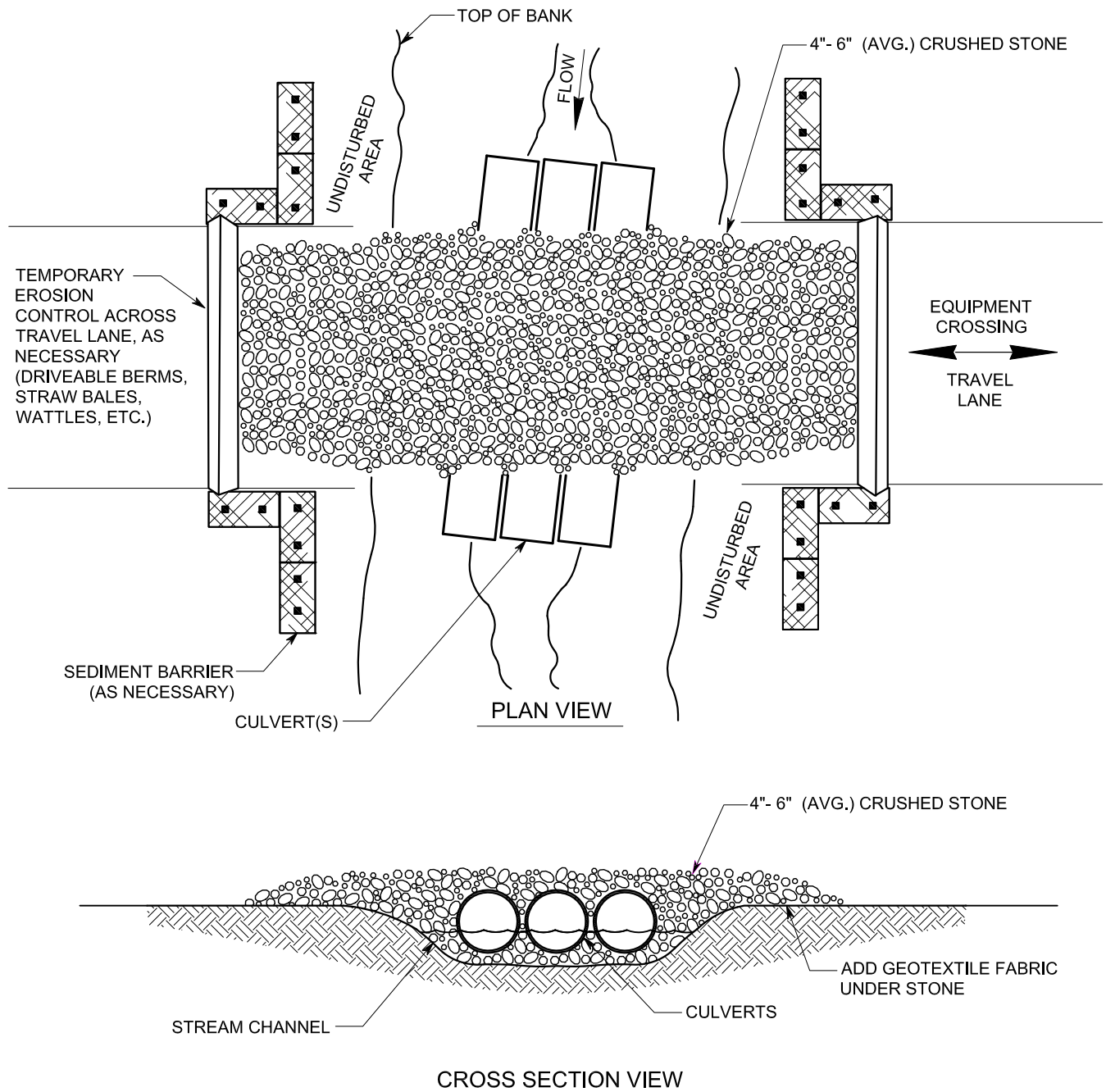
ES-0029

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6/3/2014 11:36 AM

I.G. ES0030.DWG



NOTES:

1. NUMBER AND DIAMETER OF CULVERTS WILL DEPEND ON SITE-SPECIFIC CONDITIONS. USE CULVERTS A MINIMUM OF 12-INCH DIAMETER.
2. ALIGN CULVERTS TO PREVENT EROSION AND STREAMBED SCOUR.
3. TEMPORARY SEDIMENT BARRIER CONSISTS OF SILT FENCES AND/OR STRAW BALES, OR OTHER APPROPRIATE MATERIALS.
4. ATTEMPT TO REMOVE ALL IMPORTED ROCK DURING REMOVAL OF THE BRIDGE.
5. DO NOT USE SOIL TO CONSTRUCT OR STABILIZE BRIDGES.

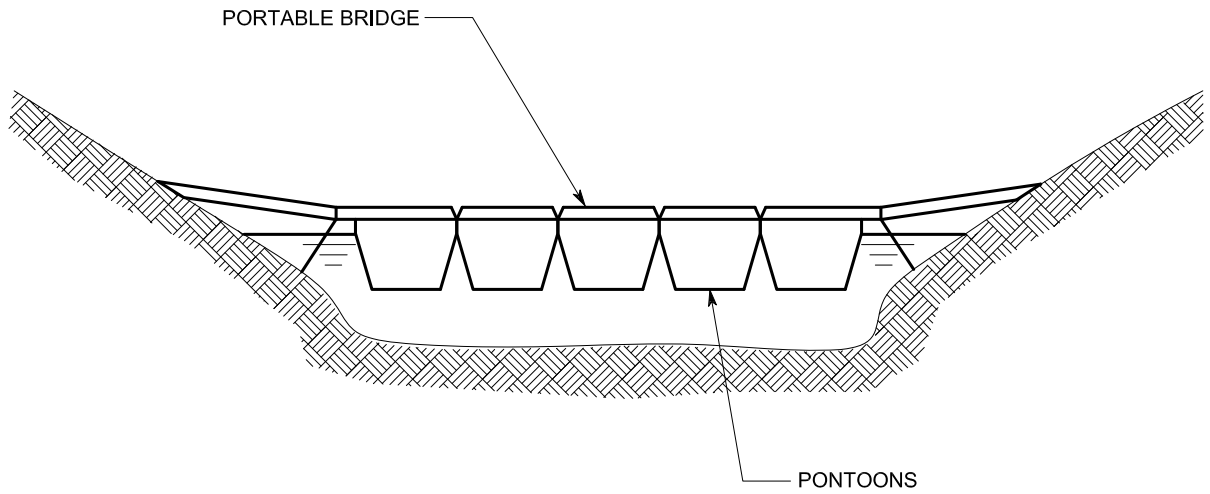
TEMPORARY EQUIPMENT BRIDGE
(CRUSHED STONE WITH CULVERTS)

FIGURE BR-2

DWG.

ES-0030

REV.



NOTES:

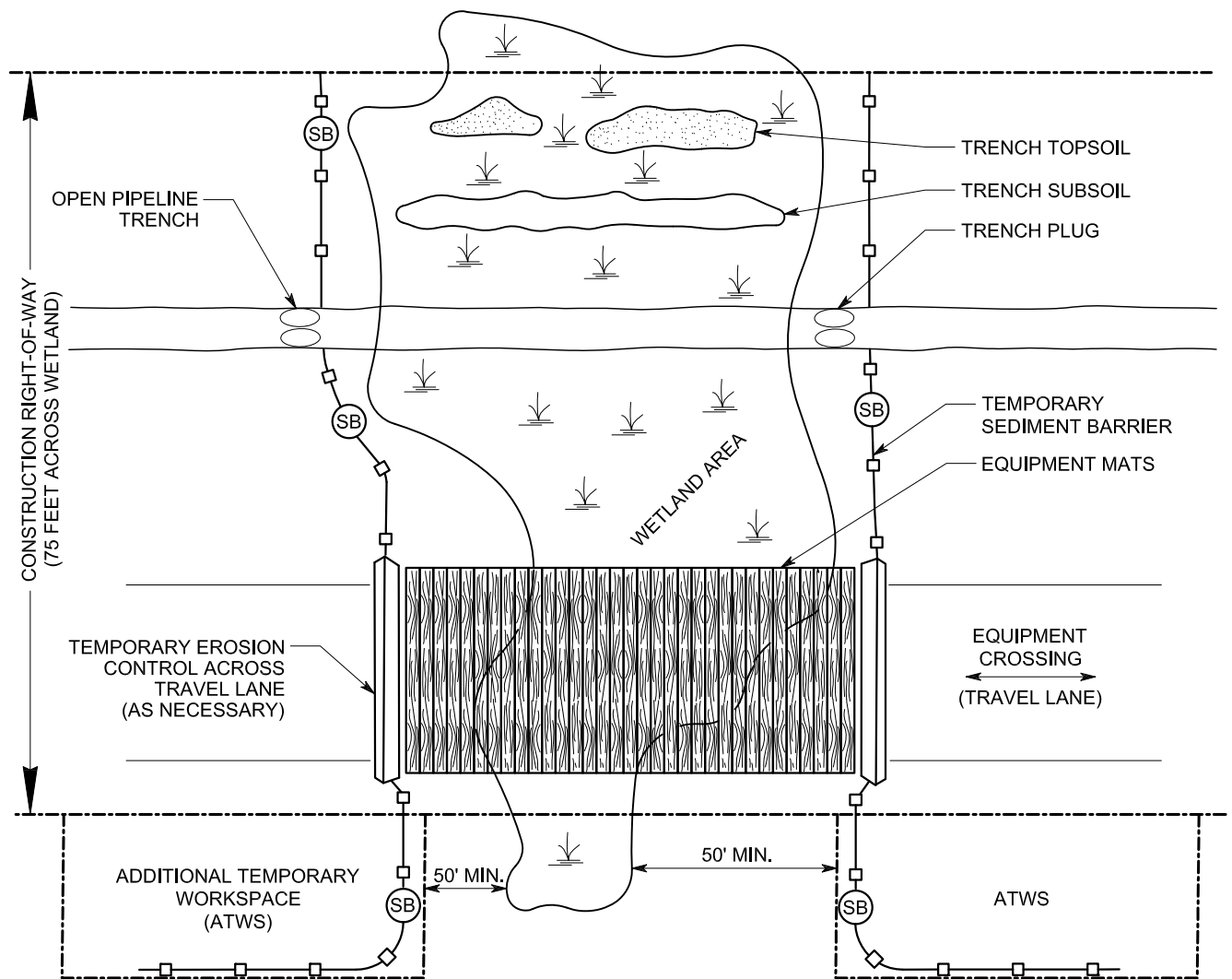
1. STABILIZE EDGES WITH SANDBAGS OR STONE.
2. REMOVE BRIDGE DURING CLEANUP.

TEMPORARY EQUIPMENT BRIDGE
(FLEXI-FLOAT OR PORTABLE BRIDGE)

FIGURE BR-3

DWG. ES-0031

REV.



NOTES:

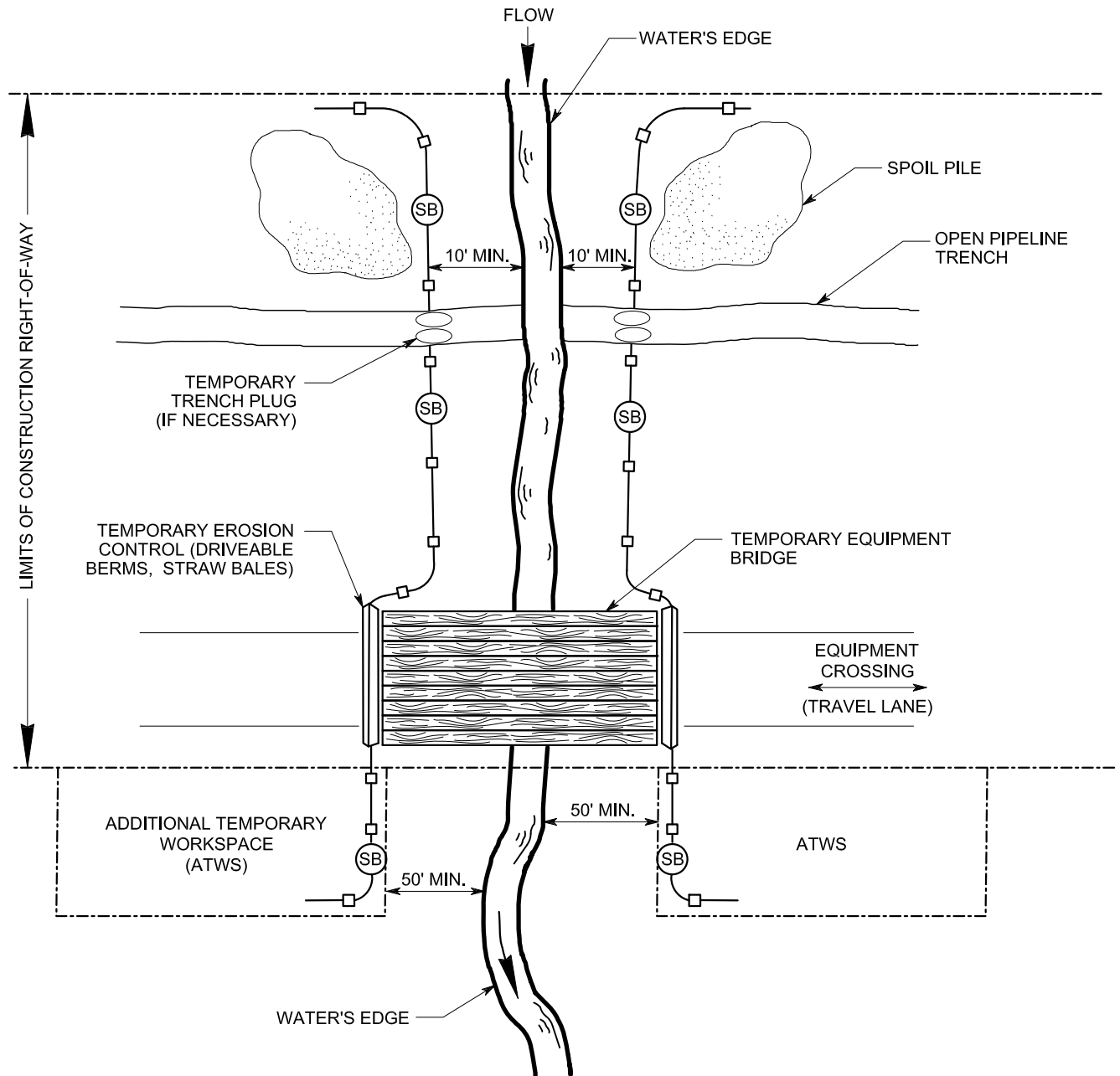
1. IN WETLANDS, EQUIPMENT MATS OR LOW GROUND WEIGHT EQUIPMENT SHALL BE UTILIZED IN SATURATED GROUND CONDITIONS.
2. LIMIT PULLING OF TREE STUMPS AND GRADING TO DIRECTLY OVER TRENCHLINE, EXCEPT IN SITUATIONS THAT THE CHIEF INSPECTOR AND ENVIRONMENTAL INSPECTOR DETERMINE SAFETY-RELATED CONSTRUCTION CONSTRAINTS REQUIRE GRADING OR THE REMOVAL OF STUMPS FROM UNDER THE WORKING SIDE.
3. SEGREGATE THE TOP 12 INCHES OF TOPSOIL WITHIN THE DITCHLINE IN WETLANDS, EXCEPT IN AREAS WHERE STANDING WATER IS PRESENT OR SOILS ARE SATURATED.
4. DO NOT TRENCH THE WETLAND UNTIL THE PIPELINE IS ASSEMBLED AND READY FOR LOWERING IN.
5. CONCRETE COATING OR PIPELINE WEIGHTS OF AN APPROPRIATE TYPE, WEIGHT AND SPACING WILL BE USED AS REQUIRED. NO CONCRETE COATING ACTIVITIES WITHIN 100 FEET OF A WETLAND OR WATERBODY BOUNDARY, UNLESS THE LOCATION IS AN EXISTING INDUSTRIAL SITE DESIGNATED FOR SUCH USE.
6. INSTALL SEDIMENT BARRIERS (SB) ALONG THE EDGE OF THE CONSTRUCTION RIGHT-OF-WAY AS NECESSARY TO CONTAIN SPOIL AND SEDIMENT WITHIN THE CONSTRUCTION RIGHT-OF-WAY THROUGH WETLANDS.
7. IN THE TRAVEL LANE, SEDIMENT BARRIERS MAY CONSIST OF REMOVABLE SEDIMENT BARRIERS OR DRIVABLE BERMS.
8. AT THE BASE OF SLOPES (GREATER THAN 5 PERCENT) THAT ARE LESS THAN 50 FEET FROM A WETLAND, INSTALL AND MAINTAIN TEMPORARY SEDIMENT BARRIERS ACROSS THE ENTIRE CONSTRUCTION RIGHT-OF-WAY UNTIL REVEGETATION IS SUCCESSFUL.
9. NO FERTILIZER OR LIME SHALL BE USED WITHIN WETLANDS.
10. DEWATER THE TRENCH IN A MANNER THAT DOES NOT CAUSE EROSION OR RESULT IN SILT-LADEN WATER FLOWING INTO ANY WETLAND.

TYPICAL STANDARD
WETLAND CROSSING

FIGURE WC-1

DWG. ES-0032

REV.



NOTES:

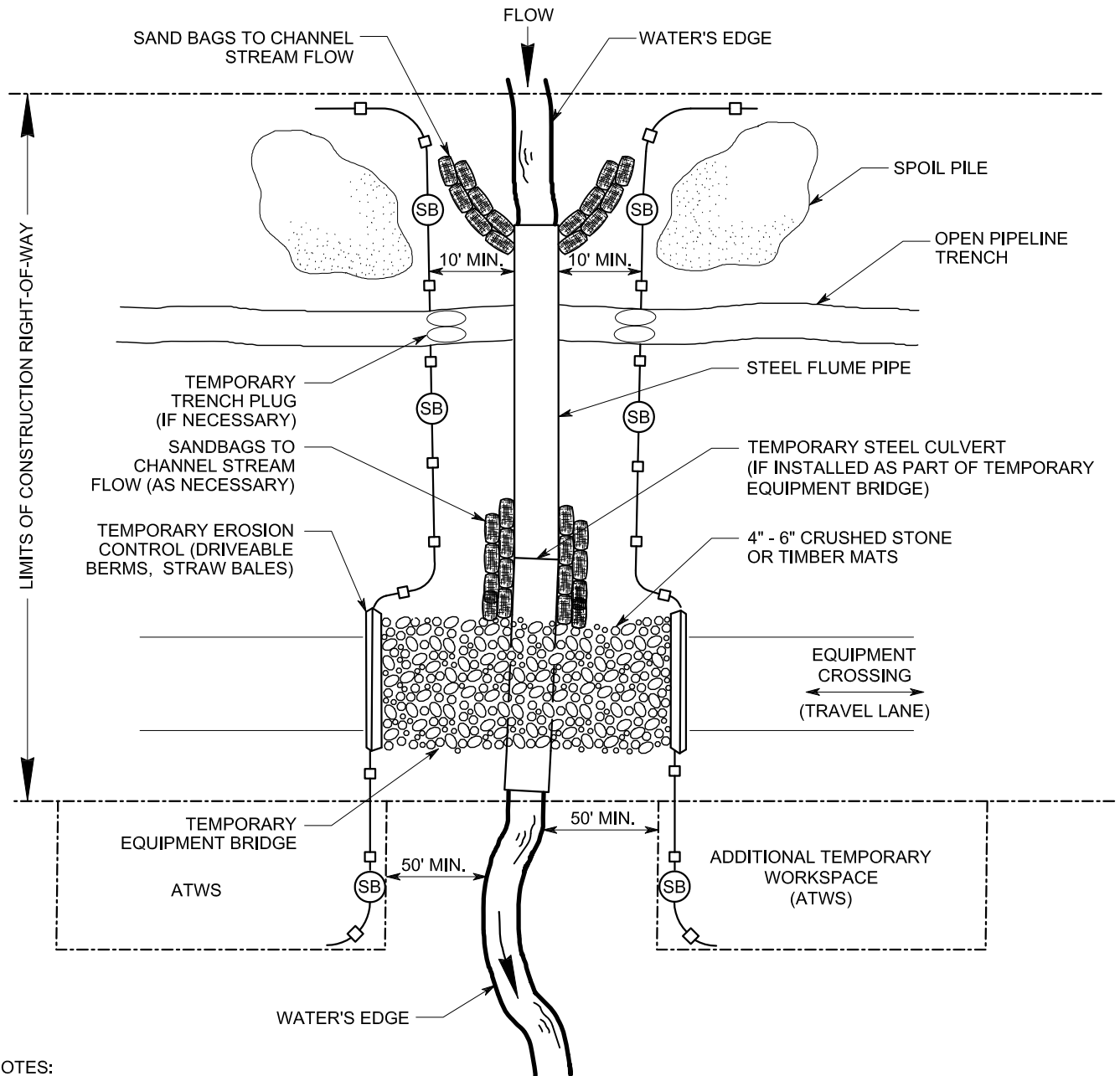
1. (SB) TEMPORARY SEDIMENT BARRIER OF SILT FENCE AND/OR STRAW BALES, OR APPROPRIATE MATERIALS.
2. FOR MINOR WATERBODIES, COMPLETE TRENCHING AND BACKFILLING IN THE WATERBODY (NOT INCLUDING BLASTING OR OTHER ROCK BREAKING MEASURES) WITHIN 24 CONTINUOUS HOURS. IF A FLUME IS INSTALLED WITHIN THE WATERBODY DURING MAINLINE ACTIVITIES, IT CAN BE REMOVED JUST PRIOR TO LOWERING IN THE PIPELINE. THE 24-HOUR TIMEFRAME STARTS AS SOON AS THE FLUME IS REMOVED.
3. FOR INTERMEDIATE WATERBODIES (>10 FEET TO 100 FEET WIDE MEASURED WATER'S EDGE TO EDGE), COMPLETE TRENCHING AND BACKFILLING IN THE WATERBODY (NOT INCLUDING BLASTING OR OTHER ROCK BREAKING MEASURES) WITHIN 48 CONTINUOUS HOURS, UNLESS SITE-SPECIFIC CONDITIONS MAKE COMPLETION WITHIN 48 HOURS INFEASIBLE.

TYPICAL WET
WATERBODY CROSSING

FIGURE WC-2

DWG. ES-0033

REV.



NOTES:

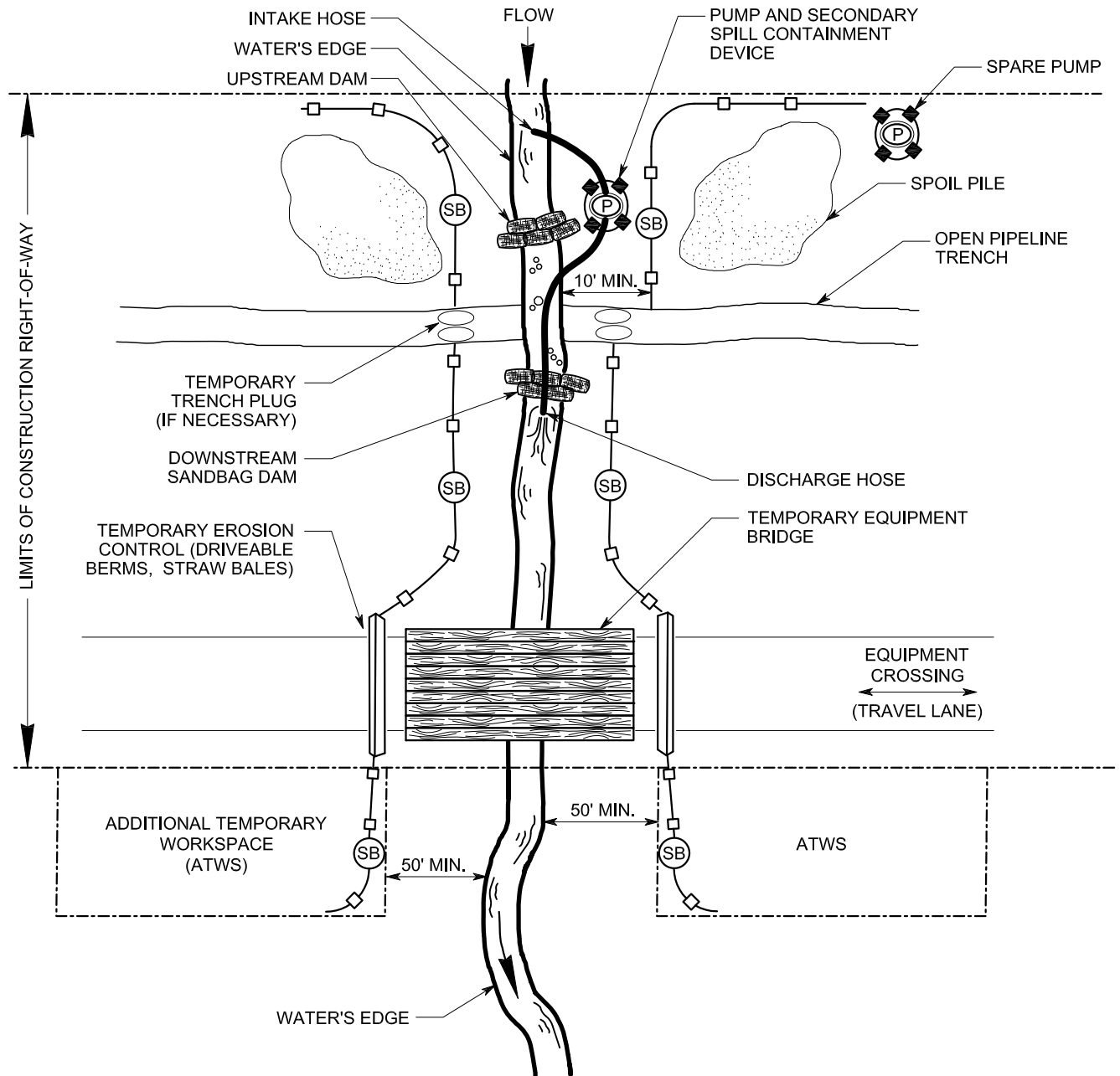
1. (SB) TEMPORARY SEDIMENT BARRIER OF SILT FENCE AND/ OR STRAW BALES, OR OTHER APPROPRIATE MATERIALS.
2. SAND BAGS MUST BE FILLED WITH SAND FREE OF SILT, ORGANICS, AND OTHER MATERIAL.
3. ENSURE SANDBAGS ARE INSTALLED BEFORE PLACING FLUME PIPE.
4. ALIGN FLUME(S) TO PREVENT BANK EROSION AND STREAM SCOUR.
5. CONDUCT ALL IN-STREAM ACTIVITY (EXCEPT BLASTING OR OTHER ROCK BREAKING MEASURES) WITH THE FLUME(S) IN PLACE. FLUME PIPE(S) MAY NOT BE REMOVED FOR LOWERING IN PIPE OR INITIAL STREAMBED RESTORATION EFFORTS.
6. THE ENDS OF THE FLUME AND CULVERT MUST EXTEND TO AN UNDISTURBED AREA.
7. CONTRACTOR TO DETERMINE ACTUAL NUMBER AND SIZE OF FLUMES AND CULVERTS REQUIRED BASED ON STREAM WIDTH AND STREAM FLOW RATE AT THE TIME OF CROSSING.
8. WATER ACCUMULATING WITHIN THE WORK AREA SHALL BE PUMPED TO A FILTER BAG OR DEWATERING STRUCTURE PRIOR TO DISCHARGING INTO ANY SURFACE WATER.

TYPICAL FLUME
WATERBODY CROSSING

FIGURE WC-3

DWG. ES-0034

REV.



NOTES:

1. (SB) TEMPORARY SEDIMENT BARRIER OF SILT FENCE AND/ OR STRAW BALES, OR OTHER APPROPRIATE MATERIALS
2. INSTALL AND SEAL SANDBAGS UPSTREAM AND DOWNSTREAM OF THE CROSSING.
3. CREATE AN UPSTREAM SUMP USING SANDBAGS IF NATURAL SUMP IS UNAVAILABLE FOR THE INTAKE HOSE.
4. EXCAVATE ACROSS STREAM CHANNEL FOLLOWING WATER REROUTING.
5. DO NOT REFUEL OR STORE FUEL WITHIN 100 FEET OF THE WATERBODY. IF NOT FEASIBLE, ALTERNATIVE METHODS MUST BE APPROVED BY ENVIRONMENTAL INSPECTOR.
6. MONITOR PUMPS AT ALL TIMES DURING STREAM CROSSING PROCEDURE.
7. (P) USE SUFFICIENT PUMPS, INCLUDING ONSITE BACKUP PUMPS, TO MAINTAIN DOWNSTREAM FLOW.
8. SCREEN PUMP INTAKES. PREVENT SCOURING WITHIN WATERBODY BY HOSE DISCHARGE.

TYPICAL DAM-AND-PUMP
WATERBODY CROSSING

FIGURE WC-4

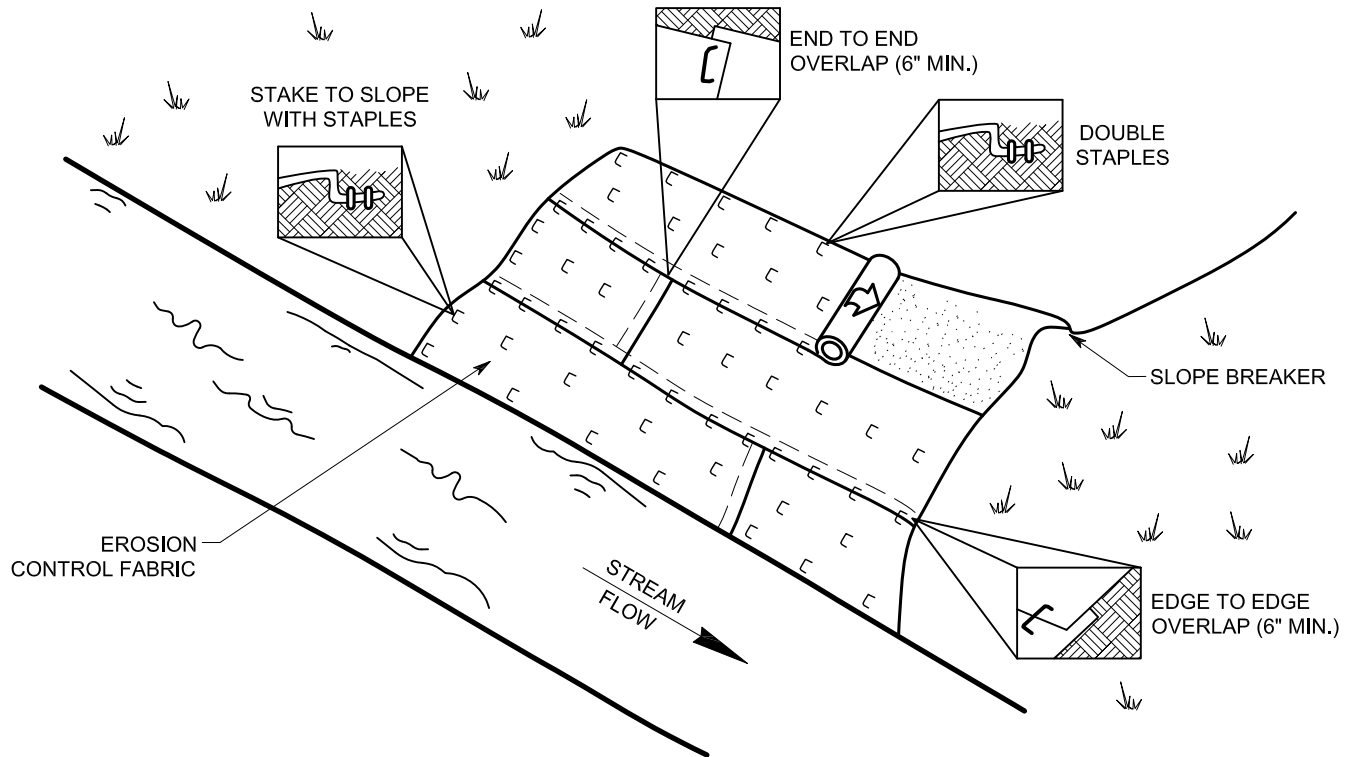
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6/9/2014 4:33 PM

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NOTES:

1. EROSION CONTROL BLANKETS (FABRIC) SHALL BE PLACED ON THE BANKS OF FLOWING STREAMS WHERE VEGETATION HAS BEEN REMOVED OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
2. EROSION CONTROL BLANKETS SHALL MEET THE REQUIREMENTS SPECIFIED IN THE E&S PLAN AND/OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
3. STAPLES SHALL BE MADE OF 11 GAUGE WIRE, U-SHAPED WITH 6" LEGS AND A 1" CROWN. STAPLES SHALL BE DRIVEN INTO THE GROUND FOR THE FULL LENGTH OF THE STAPLE LEGS. ALTERNATELY 1" WOODEN PEGS 6" LONG AND BEVELED TO SECURE MATTING.
4. BLANKETS SHALL BE INSTALLED ACCORDING TO MANUFACTURER SPECIFICATIONS OR AS STATED BELOW:
 - EXTEND TOP OF BLANKET 2 FEET PAST THE UPPER EDGE OF THE HIGH WATER MARK. IF A SLOPE BREAKER IS PRESENT ON THE APPROACH SLOPE, BEGIN THE BLANKET ON THE UPHILL SIDE OF THE SLOPE BREAKER.
 - INSTALL BLANKET(S) ACROSS THE SLOPE IN THE DIRECTION OF THE WATER FLOW.
 - ANCHOR ("KEY") THE UPSTREAM EDGE OF THE BLANKET(S) INTO THE SLOPE USING A 6" DEEP TRENCH. DOUBLE STAPLE EVERY 12" BEFORE BACKFILLING AND COMPACTING TRENCH
 - OVERLAP THE EDGES OF PARALLEL BLANKETS A MINIMUM OF 6". PLACE THE UPPER BLANKET OVER THE LOWER BLANKET (SHINGLE STYLE) AND STAPLE EVERY 12" ALONG THE LENGTH OF THE EDGE.
 - WHEN BLANKET ENDS ARE ADJOINED, PLACE THE UPSTREAM BLANKET OVER THE DOWNSTREAM BLANKET (SHINGLE STYLE) WITH APPROXIMATELY 6" OF OVERLAP AND STAPLE THROUGH THE OVERLAPPED AREA EVERY 12".
 - STAPLE DOWN THE CENTER OF THE BLANKET(S), THREE STAPLES IN EVERY SQUARE YARD.
5. IN LIVESTOCK AREAS WHERE EROSION CONTROL BLANKETS ARE APPLIED TO THE STREAMBANKS, FENCING MAY BE USED IF NECESSARY TO EXCLUDE LIVESTOCK, WITH PERMISSION OF THE LANDOWNER.
6. MONITOR WASHOUTS, STAPLE INTEGRITY OR BLANKET MOVEMENT. REPLACE OR REPAIR AS NECESSARY.
7. DO NOT USE SYNTHETIC MONOFILAMENT MESH / NETTED MATERIALS IN AREAS DESIGNATED AS SENSITIVE WILDLIFE HABITAT, UNLESS THE PRODUCT IS SPECIFICALLY DESIGNED TO MINIMIZE HARM TO WILDLIFE.

NOT TO SCALE

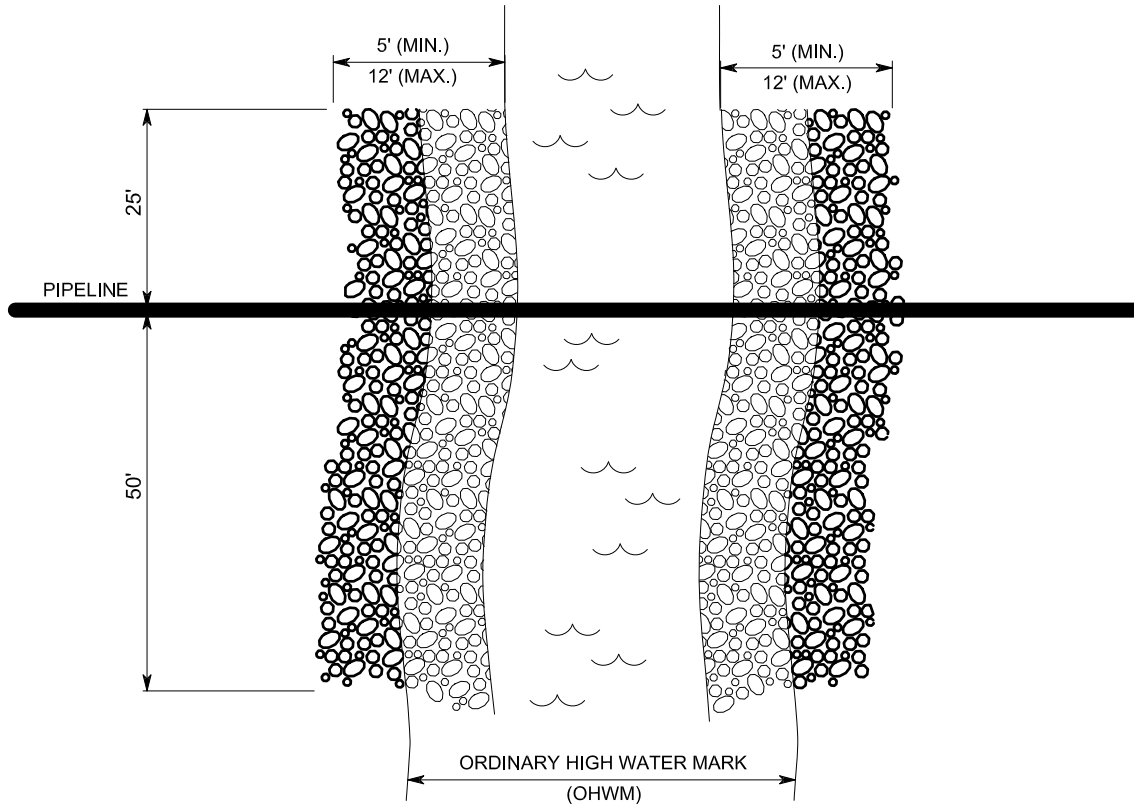
**TYPICAL EROSION CONTROL
BLANKETS ON STREAMBANKS**

FIGURE WC-5

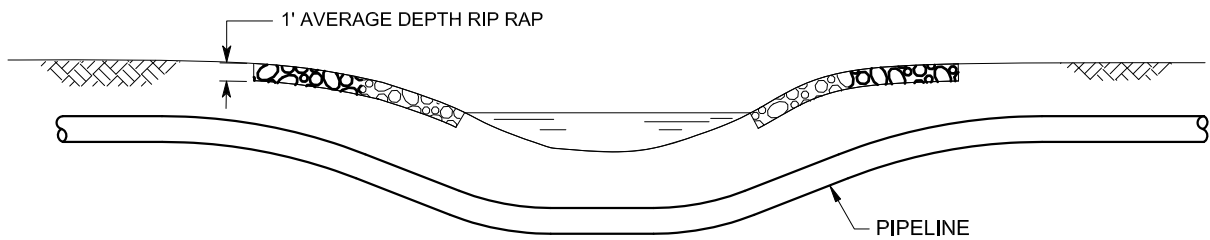
DWG.

ES-0036

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PLAN VIEW



CROSS-SECTION VIEW

NOTES:

1. RIP-RAP SHALL NOT EXCEED 500 FEET IN LENGTH ALONG THE BANK.
2. RIP-RAP WILL NOT EXCEED AN AVERAGE OF ONE CUBIC YARD PER RUNNING FOOT BELOW THE OHWM.
3. RIP-RAP INSTALLATION SHALL BE IN COMPLIANCE WITH ALL APPLICABLE PERMITS.
4. RIP-RAP MUST BE CLEAN AND FREE OF SOIL AND DEBRIS.
5. RIP-RAP SHALL NOT BE PLACED IN A MANNER THAT IMPAIRS SURFACE WATER FLOW.
6. GEOTEXTILE FABRIC MAY BE INSTALLED BELOW RIP-RAP.

NOT TO SCALE

TYPICAL RIP-RAP
PLACEMENT

FIGURE WC-6

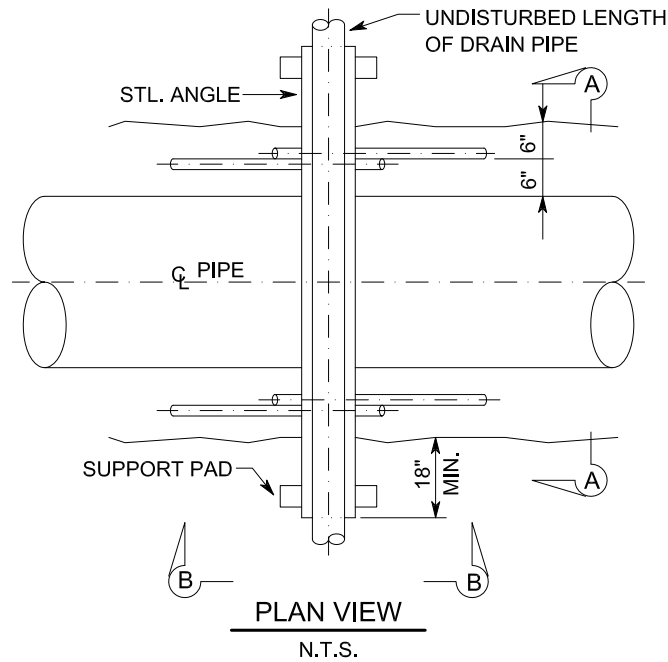
DWG. ES-0037

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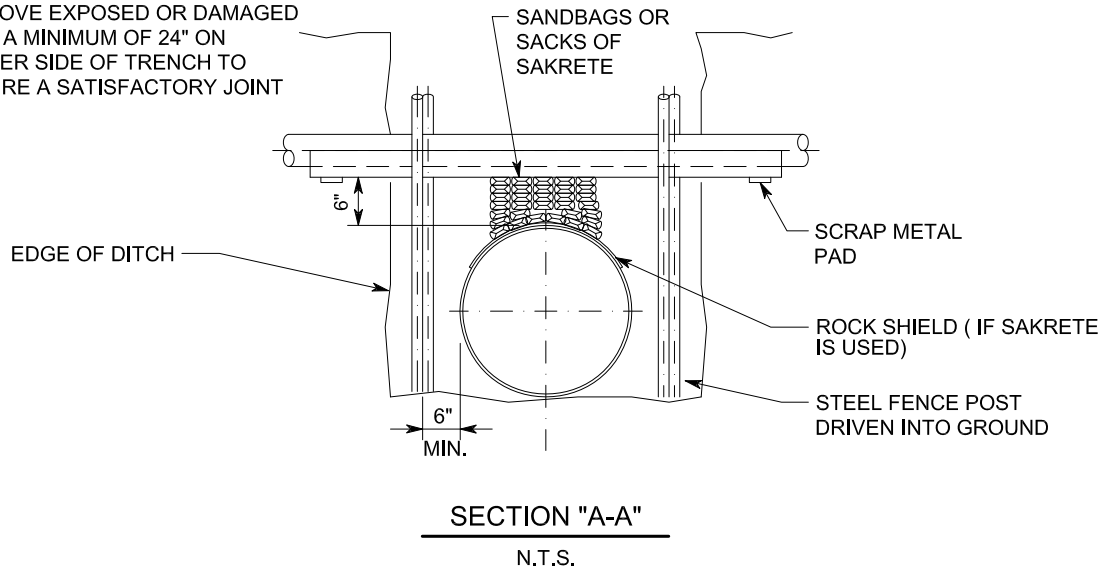
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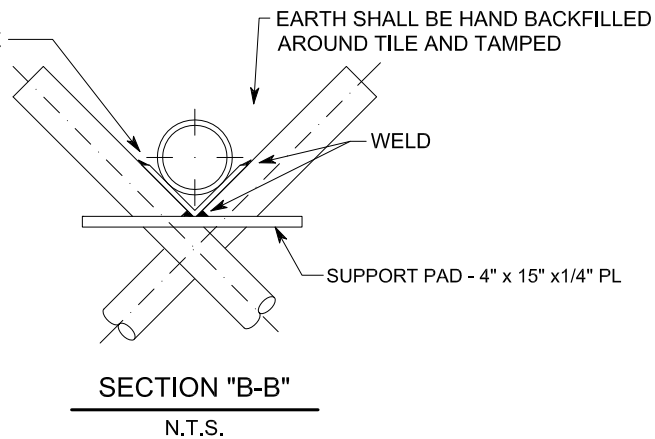


REMOVE EXPOSED OR DAMAGED
TILE A MINIMUM OF 24" ON
EITHER SIDE OF TRENCH TO
INSURE A SATISFACTORY JOINT



TO SUPPORT 4" & 6" TILE USE 4" x 1 / 4" ANGLE

"	8"	"	6" x 7 / 16"	"
"	10"	"	6" x 7 / 16"	"
"	12"	"	8" x 1 / 2"	"
"	16"	"	8" x 1 / 2"	"



NOTE:
USE OF SAKRETE SHALL REQUIRE PRIOR
COMPANY APPROVAL.

DRAIN TILE REPAIR PROCEDURE

FIGURE SU-1

DWG. ES-0038

REV.

WATERBODY REFERENCE CITING FERC REQUIREMENTS

APPENDIX B: Waterbody Reference Citing FERC Requirements

Waterbodies may be specifically identified or recognized by the States or authorized Indian Tribe for water use, value or quality, such as fisheries. FERC's *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures) contain specific requirements with regards to state-designated fisheries which are summarized in the table below. This table is a general reference of waterbody construction techniques and restrictions required by the FERC Procedures, 2013 version. Project-specific permits obtained for a given project may be more restrictive and must be followed (Refer to project-specific Clearance Package/Permit Book).

FERC Waterbody Type ^a	Crossing Width ^b	Construction Crossing Method ^c	Seasonal Timing Restriction ^d	Waterbody Construction Duration ^e
Not Designated Fisheries				
MINOR	≤ 10 feet	Dry or Wet	No	24 hours
INTERMEDIATE	> 10 feet but ≤ 100 feet	Dry or Wet	No	48 hours
MAJOR	> 100 feet	Refer to site-specific plan	No	N/A
Designated Fisheries				
MINOR	≤ 10 feet	Dry only	Yes	N/A
INTERMEDIATE	> 10 feet but ≤ 100 feet	Dry or Wet	Yes	N/A
MAJOR	> 100 feet	Refer to site-specific plan	Yes	N/A
<p>^a) Waterbody types or classifications as defined in the FERC Procedures. Refer to Section 5.3 of E&SCP.</p> <p>^b) Measured from the water's edge at the time of crossing.</p> <p>^c) "Dry" = Dry crossing includes dam-and-pump or flume crossing methods where the stream flow is isolated from the construction area. A dry crossing is generally required for crossings up to 30 feet wide for state designated fisheries or federally designated critical habitat. "Wet" = Wet crossing generally refers to the open-cut method that allows continuous flow of the stream across the construction area. "Refer to site-specific plan" = A plan is required for each major crossing as well as each waterbody or wetland that would be crossed using the HDD method requires a project-specific HDD Plan (refer to Section 4.4).</p> <p>^d) For designated fisheries, instream work must occur during the following seasonal time windows, unless expressly permitted or further restricted by the appropriate federal or state agency in writing on a site-specific basis:</p> <ul style="list-style-type: none"> • coldwater fisheries construction must occur from June 1 through September 30. • coolwater and warmwater fisheries construction must occur from June 1 through November 30. <p>NOTE: project-specific waterbody crossings may have other federal and state agency timing restrictions. Seasonal timing windows will be indicated within the project-specific waterbody crossing table and/or within the Environmental Clearance/Permit Book for the project. The FERC seasonal timing window restrictions do not apply to the installation or removal of equipment bridges.</p> <p>^e) The construction duration of the crossing officially begins with in-stream activities, including in-stream trenching, pipe installation, backfill, and restoration of the streambed contours. Duration does not apply to in-stream work for dry crossings, and does not apply to blasting activities.</p>				

APPENDIX C

SEED MIX RECOMMENDATIONS



SEED MIX RECOMMENDATIONS: “NORTHERN ZONE”

The Northern Zone is generally defined as areas north of the northern borders of Arkansas and Tennessee.

UPLAND AREAS

Lime	4.0 tons/acre
Fertilizer	1000 lbs./acre (10-20-20)
Mulch (Wheat Straw)	3.0 tons/acre

<u>Upland Seed Mix</u>	<u>75 lbs./acre Pure Live Seed (PLS)</u>
Kentucky Bluegrass	20%
Red Fescue ¹	20%
Kentucky 31 Tall Fescue ¹	15%
Redtop	10%
Perennial ryegrass	20%
White clover	5%
Birdsfoot Trefoil (Minimum 20% hard seed)	10%
¹ Fescue must be endophyte-free.	

<u>Pasture Mix</u>	<u>20 lbs./acre PLS</u>
<i>(For use only in disturbed pasture areas with landowner's permission.)</i>	
Kentucky Bluegrass	31%
Medium Red clover	26%
Norcen Trefoil	17%
Poly Perennial Rye	26%

Recommended Seeding Dates

(For the establishment of temporary or permanent vegetation.)

Spring:	March 15 - May 30
Fall:	August 1 - October 15

WINTER STABILIZATION

If restoration does not occur prior to October 15, seed the construction ROW with 1.5 bushels per acre of winter rye or similar variety of rye as requested by the landowner. Mulch the construction ROW at 3.0 tons per acre with wheat straw, including areas adjacent to streams and wetland crossings. Seed segregated topsoil piles with winter rye and mulch at a rate of 3.0 tons per acre.

WETLAND AREAS

DO NOT USE LIME OR FERTILIZER !!!

Do not use fertilizer, lime, or mulch within wetlands unless required in writing by the appropriate federal or state agency (as identified in the Clearance Package/Permit Book). Mulch consists of weed-free straw, wood fiber hydromulch or some functional equivalent as approved by the EI and Chief Inspector. When used, apply mulch (wheat straw) at a rate of 3.0 tons/acre.

<u>Wetland Seed Mix</u>
Annual Ryegrass

40 lbs./acre PLS



SEED MIX RECOMMENDATIONS: “SOUTHERN ZONE”

The Southern Zone is generally defined as areas south of the northern borders of Arkansas and Tennessee.

UPLAND AREAS

Lime (agricultural limestone)	2.5 tons/acre
Fertilizer (6-12-12)	950 lbs./acre
Mulch (Oats, Wheat or Bermudagrass Straw)	3.0 tons/acre

Seed Mixture¹

Sorghum, Sudangrass, or Sudangrass Hybrids ²	40 lbs/acre Pure Live Seed (PLS)
Kentucky 31 Tall Fescue ³	10 lbs/acre PLS
Big Bluestem	10 lbs/acre PLS
Indiangrass	10 lbs/acre PLS
Bermudagrass	10 lbs/acre PLS
Sericea Lespedeza ⁴	10 lbs/acre PLS
White Clover ⁴	5 lbs/acre PLS
Birdsfoot Trefoil ⁴	10 lbs/acre PLS

¹ An alternative seed mixture may be requested by the landowner(s).

² These species may be sold under the following trade names: DeKalb SX17, Greentreat II, Greentreat III, Tastemaker DR, Tastemaker III, FFR202, or Sordan 79.

³ Fescue must be endophyte-free.

⁴ Legumes should be treated with a species specific inoculate prior to seeding. Legume seed and soil should be scarified.

Recommended seeding dates

(For establishment of temporary or permanent vegetation.)

Spring: March 15 - May 30

Fall: August 1 - October 15

WINTER STABILIZATION

If restoration does not occur prior to October 15, seed the construction ROW with 1.5 bushels per acre of winter rye or similar variety of rye as requested by the landowner. Mulch construction ROW at 3.0 tons per acre with wheat straw, including areas adjacent to stream and wetland crossings. Seed segregated topsoil piles with winter rye and mulch at a rate of 3.0 tons per acre.

WETLAND AREAS

DO NOT USE LIME OR FERTILIZER !!!

Do not use fertilizer, lime, or mulch within wetlands unless required in writing by the appropriate federal or state agency (as identified in the Clearance Package/Permit Book). Mulch consists of weed-free straw, wood fiber hydromulch or some functional equivalent as approved by the EI and Chief Inspector. When used, apply mulch (Oats, Wheat, or Bermudagrass straw) at a rate of 3.0 tons/acre.

Wetland Seed Mix:

Annual Ryegrass	40 lbs/acre PLS
-----------------	-----------------

APPENDIX 1B2

Spill Prevention Control and Countermeasure Plan



**SPILL PREVENTION CONTROL AND COUNTERMEASURE
(SPCC) PLAN &**

**PREPAREDNESS, PREVENTION, AND
CONTINGENCY (PPC) PLAN for CONSTRUCTION PROJECTS**

Project: NEXUS Gas Transmission Project

Prepared By:

NEXUS Gas Transmission, LLC
Environmental Construction Permitting
5400 Westheimer Court
Houston, TX 77056-5310

Effective February 18, 2003

Updated: January 2015

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ABBREVIATIONS AND DEFINITIONS

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CI	Chief Inspector (Company employee or Contractor Employee performing the duties of the onsite Construction Manager or Engineer)
Company	NEXUS Gas Transmission, LLC
Company SC	Company Spill Coordinator (The Environmental Inspector or the Chief Inspector)
Contractor	Third party service provider performing construction activities for the Company on property owned or under the control of the Company. This role may be filled by the Company on small projects constructed by Company personnel and equipment.
Contractor SC	Contractor Spill Coordinator
CWA	Clean Water Act
DOT	U. S. Department of Transportation
E&C	Engineering & Construction
ECP	Environmental Construction Permitting
EHS, EH&S	Environmental Health and Safety
EI	Environmental Inspector (Company employee or Contractor Employee performing the duties of onsite environmental specialist overseeing Contractor compliance with environmental permit conditions, laws and regulations)
E&SCP	Erosion & Sedimentation Control Plan
FERC	Federal Energy Regulatory Commission
FWPC	Federal Water Pollution Control Act
HDD	Horizontal Directional Drill
JSA	Job Safety Analysis
MSDS	Material Safety Data Sheets
ppm	Parts per Million
Environmental Lead	Environmental Construction Permitting specialist assigned to the project
OPA	Oil Pollution Act
RCRA	Resource Conservation and Recovery Act
SPCC Plan or Plan	Spill Prevention, Control and Countermeasure Plan
TSCA	Toxic Substances Control Act

1.0 PURPOSE/PLAN OBJECTIVE

NEXUS Gas Transmission, LLC (“Company”) has prepared this Spill Prevention, Control and Countermeasure (“SPCC”) Plan (“Plan”) for construction projects in the United States. The purpose of this Plan is to reduce the probability and risk of a potential spill or release of oil or hazardous materials by the Company or Contractor during construction-related activities, by providing training to the Company and Contractor and expediting spill response and cleanup. This plan is not intended to meet the requirements of existing facility operations.

The Plan’s specific objectives are to identify and address:

- The type and quantity of material handled, stored, or used on site during construction;
- The measures to be taken for spill preparedness and prevention;
- Emergency response procedures;
- Spill incident reporting/notification procedures; and
- Local emergency response team arrangements.

This plan has been prepared to meet the requirements of the Federal Energy Regulatory Commission’s (“FERC’s”) *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures), the Oil Pollution Act (“OPA”), the Federal Water Pollution Control Act (“FWPC”), the Comprehensive Environmental Response, Compensation and Liability Act (“CERCLA”) of 1980, the Resource Conservation and Recovery Act (“RCRA”), the Toxic Substances Control Act (“TSCA”) and the Clean Water Act (“CWA”).

The Company Environmental Construction Permitting (“ECP”) group is responsible for the development and maintenance of this Plan. The Plan will be distributed to the Company Engineering & Construction (“E&C”) Department’s teams and associated Company personnel and will be included in the construction contract. It is the responsibility of the E&C teams to distribute to any necessary Contractors for implementation.

This Plan outlines both Company and Contractor responsibilities by topic. The Contractor is responsible for implementation of the Plan. In the absence of a Contractor, the Company will be responsible for both Company and Contractor responsibilities as they are laid out in this Plan.

A copy of the Plan must be on site during active construction and should also be maintained at the closest construction field office.

2.0 TRAINING

The Company requires all Contractor and Company personnel engaged in any construction activity to receive training in the implementation of the Plan prior to the commencement of on-site construction related activities.

Site visitors are to be given a brief review of the Plan as part of their orientation on safety and emergency procedures prior to the start of any on-site activities.

Contractor Responsibility

The Contractor will be responsible for the following:

- Keep training records
- Perform training briefings through ongoing meetings like tailgates and the daily project Job Safety Analysis (“JSA”) that include:
 - Precautionary measures to prevent spills;
 - Potential sources of spills, including equipment failure or malfunction;
 - Standard operating procedures in the event of a spill;
 - Applicable notification requirements;
 - Equipment, materials and supplies available for clean-up of a spill;
 - Hazardous waste identification procedures;
 - Generation and proper handling of all non-hazardous waste, hazardous waste, and other toxic substances;
 - Proper storage, labeling, transportation and disposal of non hazardous and hazardous waste; and
 - Sample collection procedures.

Company Responsibility

The Company Chief Inspector (“CI”), Environmental Inspector (“EI”), or their designate will perform the following:

- Teach awareness-level training at the initial project environmental training session;
- Ensure further training is available for other new project personnel; and
- Audit training records kept by the Contractor as necessary.

3.0 PRE-PLANNING - MATERIAL INVENTORY AND DOCUMENTATION

Contractor Responsibility

The Contractor will be responsible for the following **prior** to the start of construction:

- Develop an inventory of all oil/hazardous material stored or used during construction;
- Complete Tables I, II, IV, V and VI (see Appendix A);
- Obtain material safety data sheets (“MSDS”) (Appendix B) for all hazardous and non-hazardous substances listed in Table I (see Appendix A);
- Prepare a basic facility diagram or sketch for any storage areas, including pipe yards and temporary storage areas. The diagram should include locations of oil-filled containers, direction of run-off, emergency evacuation routes and assembly areas (see Appendix E); and
- Submit the required Tables, MSDS, and signature pages to the ECP’s Environmental Lead for review and approval.

Company Responsibility

- Complete Tables III (see Appendix A);
- Review the Tables, MSDS, and signature pages submitted by the Contractor for approval; and
- Distribute approved Tables, MSDS, and signature pages to include in Plan as Appendices A, B and D.
- Fill out any signature pages or forms (see Appendix D)
 - Management Approval and Cleanup Commitment
 - Certificate of Determination of Substantial Harm Criteria

4.0 SPILL AND LEAK PREPAREDNESS AND PREVENTION

4.1 Prevention and Preparedness

Contractor Responsibility

- Complete Appendix A, Table I, Material and Waste Storage Inventory, and Table VI, Areas for Potential Leaks and Spills, prior to construction;
- Provide spill prevention, containment, and clean up equipment, and keep it available on-site;
- Perform daily inspections of all equipment, storage tanks, and/or container storage areas;
- Repair all leaking equipment, machinery or tools immediately. If items cannot be repaired, remove them immediately from the project site;
- Maintain a minimal spill kit (absorbent diapers, plastic bags, gloves, etc.) for each piece of hydraulically operated equipment and personnel vehicles within the project area;
- Store materials as indicated in the storage facility diagram or sketch provided by the Contractor in Appendix E;
- Submit a secondary containment plan for any hazardous material storage within the project area to the Company for approval **prior** to storage; and
- Obtain written approval from the project CI or EI for hazardous material storage within 100 feet of a wetland or waterbody.

Company Responsibility

- Review any secondary containment or storage plans submitted by the Contractor for approval.

4.1.1 Secondary Containment

Contractor Responsibility

- Single wall tanks shall be provided with temporary secondary containment that will hold at least 110% of the tank capacity of the largest tank inside the containment area;
 - This includes pumps, generators, compressors or other petroleum powered equipment used on site for dewatering and other activities during construction.
- PCB (50 parts per million (“ppm”) or greater) storage tanks shall be double-walled or have secondary containment that will hold 200 percent of the tank capacity;
- All containers with a storage capacity greater than 55 gallons shall have temporary containment (see Appendix A, Table I for type of temporary containment); and
- All pumps and other portable fuel burning equipment used during construction will be sited in secondary containment.

4.1.2 Storage/Inspection (Tanks/Containers)

Contractor Responsibility

- Operate only those tanks for fuel and material storage that meet the approval of the Company;
- Elevate tanks a maximum of two feet above grade;
- Inspect vehicle-mounted tanks to ensure all are equipped with flame/spark arrestors on all vents to prevent self-ignition;

- Locate tank storage in areas that are at least 100 feet from all waterbodies, wetlands, and designated municipal watershed areas, with certain exceptions as approved by ECP and listed in Appendix A, Table IV;
- Complete Appendix A, Table IV, Tank and Container Storage Exception Areas, and submit to the Company for approval prior to construction;
- Inspect all tanks daily for leaks and deterioration. The results of all inspections shall be made available to the Company upon request;
- Do not store incompatible materials in sequence in tanks prior to decontamination (A general list of potentially incompatible materials that may be used during construction are included in Appendix A, Table I);
- Store small cans of gasoline, diesel, solvents, etc., within the temporary secondary containment or within secured trailers or vehicles when not in use;
- Replace leaking and/or deteriorated containers as soon as the condition is first detected; and
- Ensure that all container storage and containment areas being used to store hazardous materials or wastes are in compliance with applicable local, state and federal requirements.

4.1.3 Loading/Unloading Areas

Contractor Responsibility

- Transfer liquids and refuel only in pre-designated and pre-approved locations that are at least 100 feet from all waterbodies and wetlands, with certain exceptions as approved by the EI and listed in Appendix A;
- Inspect the area beneath loading/unloading location for spills before and after each use;
- Utilize drip pans at all hose connections while loading/unloading liquids. If a leak or spill occurs, the loading/unloading operation will be stopped and the spill will be contained, cleaned up and collected prior to continuing the operation;
- Inspect all outlets of the tank trucks prior to leaving the loading and unloading area to prevent possible leakage from the truck while in transit;
- Equip any service vehicle used to transport lubricants and fuel with an emergency response spill kit. At a minimum, this kit must include:
 - 25 lbs of granular oil absorbent
 - 10, 48" x 3" oil socks
 - 5, 17" x 17" oil pillows
 - 1, 10" x 4" oil boom
 - 20, 24" x 24" x 3/8" oil mats
 - Garden size, 6 mil, polyethylene bags
 - 10 pair of latex gloves
 - 1, 55-gallon polyethylene open-head drum;
- Equip any service vehicle used to transport lubricants and fuel with a chemical response kit. At a minimum, this kit must include:
 - 1 bag of loose chemical pulp
 - 2 to 3, 17" x 17" chemical pillows
 - 2, 48" x 3" chemical socks
 - 5, 18" x 18" x 3/8" adsorbent mats
 - garden-size, 6 mil, polyethylene bags
 - 10 pair of latex gloves
 - 1, 30-gallon polyethylene open-head drum
 - hazardous waste labels

Company Responsibility

- Personnel shall be present during loading and unloading activities.

5.0 CONTINGENCY PLAN AND EMERGENCY PROCEDURES

All Company and Contractor personnel have responsibilities for spill prevention, control, and countermeasure.

Contractor Responsibility

- Maintain adequate manpower and equipment at the pipe yard or contractor ware yard necessary to divert any spill from reaching waterbodies and wetland areas; and
- Complete Appendix A, Table I, Emergency Response and Personal Protective Equipment, with a list of emergency equipment and storage location.

Company Responsibility

- Complete Appendix A, Table III, Key Emergency Contacts, prior to construction, and update as necessary.

First Responder Responsibility

The first responder is the person who first observes a spill or release of oil or other hazardous materials to the environment.

This person will take the following steps:

- Assess the situation to determine if the situation poses an immediate threat to human health or the environment;
- Identify hazardous material involved, if any;
- Report the spill to the Company Spill Coordinator (“Company SC”) and Contractor Spill Coordinator (“Contractor SC”) immediately; and
- Standby at a safe distance and keep others away.

Contractor SC Responsibility

- Coordinate the response to all spills which occur as a result of Contractor operations;
- Report the spill to the Company;
- Coordinate with the Company SC; and
- Conduct subsequent site investigations and associated incident reports unless otherwise directed by the Company.

The Contractor SC may be removed by the Company SC as spill response coordinator at the discretion of the Company.

The Contractor SC will direct Contractor personnel to:

- Shut off source of spill or leak as quickly as possible;
- Minimize affected area with appropriate containment or dike/berm;
- Assemble required spill response equipment as required (protective clothing, gear, heavy equipment, pumps, absorbent material, empty drums, etc.);

- Ensure that spilled material is placed in appropriate containers, in accordance with the best management practices and applicable laws and regulations;
- Properly label and store containers in accordance with applicable requirements; and
- Ensure that all spill response equipment is fully functional. Any equipment that cannot be reused shall be replaced.

Company SC Responsibility

The Company SC will be responsible for overseeing the Contractor SC's clean up of all spills of oil or hazardous materials.

Upon notification, the Company SC shall:

- Assess situation for potential threat to human health, environment and the neighboring community;
- Implement evacuation, if necessary;
- Activate emergency shutdown, if necessary;
- Control source as conditions warrant;
- Ensure that incompatible materials are kept away from the impacted area;
- Keep any potential ignition source away from the impact area, if spilled material is flammable;
- Coordinate sampling, disposal and equipment decontamination with Environmental Health and Safety ("EHS") in Houston, if necessary;
- For spills of PCBs, contact EHS for special spill response requirements related to PCB spills;
- Assist with the coordination of cleanup and disposal activities;
- If necessary, contact outside remediation services, in coordination with EHS, to assist with clean up;
- Notify EHS of all quantities and description of wastes to be handled by EHS;
- Complete the *EH&S Incident Investigation Form* (see Appendix C) and distribute accordingly;
- For unanticipated release of hydrostatic test waters, notify state contact if required by state permit, in accordance with timeframes required by state permit;
- Review permits to determine if immediate water sampling of test water is required and arrange if necessary; and
- Determine if local Right of Way agent will notify public officials (e.g. township manager and/or mayor).

6.0 SPILL CLEAN-UP/WASTE DISPOSAL PROCEDURES OF HYDROSTATIC TEST WATER

6.1 Oil/Fuel and Hazardous Material Spills and Unanticipated Releases

Contractor Responsibility

- Ensure no immediate threat to surrounding landowners or environment;
- Identify/verify the material and quantity released;
- Review MSDS to determine the proper handling;
- Ensure that Personal Protective Equipment and containers are compatible with the substance;
- Remediate small spills and leaks as soon as feasible. Use adsorbent pads whenever possible to reduce the amount of contaminated articles;
- Restrict the spill by stopping or diverting flow to the oil/fuel tank;
- If the release exceeds the containment system capacity, immediately construct additional containment using sandbags or fill material. Every effort must be made to prevent the seepage of oil into soils, wetlands and surface waters;
- Block off drains and containment areas to limit the extent of the spill. For chemical spills, never wash down a spill with water;
- If a release occurs into a storm drain or stream, immediately pump any floating layer into drums. For high velocity streams, place oil booms or hay bales between the release area and the site boundary and downstream of affected area. As soon as possible, excavate contaminated soils and sediments within approved work areas;
- Collect and reclaim as much of the spill as possible using a hand pump or similar device. Containerize contaminated soils in an appropriate Department of Transportation (“DOT”) container in accordance with applicable requirements. Never place incompatible materials in the same drum;
- For larger quantities of soils, construct temporary waste piles using plastic liners placing the contaminated soils on top of the plastic and covered by plastic. Plastic-lined roll-off bins should be leased for storing this material as soon as feasible;
- Properly label any drums, containers or storage piles in accordance with applicable requirements;
- Move drum to secure staging or storage area;
- Decontaminate all equipment in a contained area and collect fluids in drums;
- Document and report cleanup activities to the Company SC as soon as feasible; and
- If environmentally sensitive resources (wetlands, waterbodies) exist in the area, ensure that Best Management Practices as described in Company’s Erosion & Sedimentation Control Plan (“E&SCP”) are utilized to minimize impact to these resources.

Company Responsibility

- If necessary, arrange for sampling the substance for analysis and waste profiling, according to instructions from the Company Standard Operating Procedures, and/ or EHS;
- Document and report activities to EHS as soon as feasible.

6.2 Disposal of Contaminated Materials/Soils

For Company and Contractor protocol on the disposal of contaminated materials, soils, or any other waste materials, please see the Company Waste Management Plan.

6.3 Notification

Company Responsibility

- The Company SC shall notify the Emergency Spill Hotline at (800) 735-6364 and those listed in Appendix A, Table III, immediately for spills that meet any of the following criteria:
 - one pound or more of a solid material (excluding Horizontal Directional Drill (“HDD”) mud) spilled on land;
 - five gallons or more of a liquid spilled on land;
 - creates a sheen on water; or
 - unanticipated release of hydrostatic test water.
- If necessary, notify the local fire department, law enforcement authority, or health authority as appropriate. The following information should be provided:
 - the name of the caller and callback number;
 - the exact location and nature of the incident;
 - the extent of personnel injuries and damage;
 - the extent of release; and
 - the material involved and appropriate safety information.
- An incident report form should be filled out following containment and cleanup of the spill or release. Incident data should be gathered using the *EH&S Incident Investigation Form* (see Appendix C) and should be sent to the appropriate ECP project manager for records retention and entry into the EPASS/ILP database.

7.0 HOUSEKEEPING PROGRAM

7.1 Construction Area

Contractor Responsibility

- Maintain construction area in neat and orderly manner; and
- Routinely collect and properly dispose of all trash off-site.

7.2 Contractor Yards/Ware Yards

Contractor Responsibility

- Produce a “site specific” plan to address storage, spill prevention and overall yard organization for all contractor yards and ware yards. Contractor yard “site specific” plans should include the following:
 - facility name;
 - physical address;
 - longitude and latitude coordinates;
 - directions to facility (including road names);
 - date of first oil and hazardous material storage;
 - location of oil and hazardous material containers greater than 55 gallons;
 - loading/unloading areas;
 - direction of drainage flow; and
 - primary and secondary evacuation routes.
- Provide adequate aisle spacing to allow unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment as necessary in storage areas;
- Ensure similar housekeeping practices enforced in construction areas are also implemented in storage areas; and
- Any facility with an aggregate aboveground oil storage capacity greater than 1,320 US gallons but less than 10,000 gallons must have the plan self-certified by the owner or operator of the qualified facility or a licensed Professional Engineer. Any facility with an aggregate aboveground oil storage capacity greater than 10,000 gallons must have the plan reviewed and certified by a licensed Professional Engineer.

7.3 Security

Contractor Responsibility

- Hazardous wastes and waste containing PCBs greater than 50 ppm will be stored in a secured location (i.e. fenced, locked, etc.). Fuel storage areas will be located to minimize, as much as possible, tampering by unauthorized personnel during non-operational hours.
- Complete Table V, Waste Storage Security Information, in Appendix A, prior to construction.

Company Responsibility

- Review Table V, Waste Storage Security Information in Appendix A, that has been prepared by the Contractor prior to construction.

Project Signatures:

Company Spill Coordinator:

Print Name

Signature

Date

Contractor Spill Coordinator

Print Name

Signature

Date

APPENDIX A - TABLES

TABLE I – MATERIAL AND WASTE INVENTORY

Oil and Fuel to be used or stored on site during construction:

STORAGE CAPACITY OF OIL FILLED-CONTAINERS

Container Number ^{a/}	Storage capacity (volume)	Location

^{a/} The reference container numbers should correspond to the facility diagram in Appendix E.

Commercial Chemicals to be used or stored on site during construction:

Hazardous and Non-Hazardous Wastes to be used or stored on site during construction:

Incompatible Materials to be used or stored on site during construction:

Type of Temporary Containment containers to be used:

<p>TABLE I TO BE COMPLETED BY CONTRACTOR Prior to the Start of Construction and updated as necessary</p>

TABLE II – EMERGENCY RESPONSE AND PERSONAL PROTECTIVE EQUIPMENT

Spill Response:

Equipment	Quantity	Location

Fire Protection:

Equipment	Quantity	Location

Personnel Protection:

Equipment	Quantity	Location

TABLE II TO BE COMPLETED BY CONTRACTOR
Prior to the Start of Construction and updated as necessary

4. **Environmental Agencies**

Notification to be made by Regional Environmental Coordinator and ECP's PM

5. **Potential Environmental Remedial Service Contractors**

Clean Harbors Environmental Services, Inc.	Howard Alexander	(800) 782-8805
Safety-Kleen (FS), Inc	Edward A. Mitchell	(281) 478-7700
U.S.A. Environment	Cesar Garcia	(713) 425-6925 or (832) 473-5354
WRS Infrastructure and Environment Inc	Steve Maxwell	(281) 731-0886

<p>TABLE III TO BE COMPLETED BY COMPANY Prior to the Start of Construction and updated as necessary</p>

TABLE IV – TANK AND CONTAINER STORAGE EXCEPTION AREAS

Tank and container storage shall be located in areas that are at least 100 feet from all waterbodies and wetlands.

The below exceptions have been approved by ECP and EHS:

- 1.
- 2.
- 3.
- 4.

<p>TABLE IV TO BE COMPLETED BY CONTRACTOR Prior to the Start of Construction and updated as necessary</p>
--

TABLE V – WASTE STORAGE SECURITY INFORMATION

<p>TABLE V TO BE COMPLETED BY CONTRACTOR Prior to the Start of Construction and updated as necessary</p>

TABLE VI–AREAS FOR POTENTIAL LEAKS AND SPILLS

- 1.
- 2.
- 3.
- 4.

<p>TABLE VI TO BE COMPLETED BY CONTRACTOR Prior to the Start of Construction and updated as necessary</p>
--

APPENDIX B - MSDS

APPENDIX C – EH&S INCIDENT INVESTIGATION FORM

APPENDIX D – REQUIRED SIGNATURE FORMS

Management Approval and Cleanup Commitment
40 CFR §112.7

This Spill Prevention, Control and Countermeasures Plan (Plan), including the Spill Procedures Chart and Supplemental Document, which has been prepared in accordance with 40 CFR 112, has been reviewed and approved by the Project Manager. The Project Manager has the level of authority to commit the necessary resources to fully implement this Plan and to contain and clean up any oil discharged at this facility. By signing below, the **Project Manager** also **authorizes station supervisors to expediently commit manpower, equipment, and materials necessary to contain and remove any harmful quantity of oil discharged from this facility (40 CFR §112.7). This commitment includes the authority to use company and/or contract personnel and equipment.**

Facility Name: _____

Location: _____

Signature: _____

Name: _____

Date: _____

Title: _____

CERTIFICATE OF DETERMINATION OF SUBSTANTIAL HARM CRITERIA

Facility Name: _____

Location: _____

Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons? Yes___ No ___

Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is large enough to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground oil storage tank area? Yes___ No ___

Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula in rule 40 CFR 112 Attachment C-III or a comparable formula) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments? For further description of fish and wildlife and sensitive environments, see Appendices I, II, and III to DOC/NOAA's "Guidance for Facility and Vessel Response Plans: Fish and Wildlife and Sensitive Environments" (see Appendix E to this Part, Section 13, for availability) and the applicable Area Contingency Plan. Yes___ No ___

Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula in Attachment C-III to this appendix or a comparable formula) such that a discharge from the facility would shut down public drinking water intake? For the purpose of 40 CFR 112, public drinking water intakes are analogous to public water systems as described in 40 CFR 143.2(c) Yes___ No ___

Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil discharge in an amount greater than or equal to 10,000 gallons within the last five years? Yes___ No ___

Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for this information, I believe that the submitted information is true, accurate, and complete.

Signature: _____

Title: _____

Name (please type or print): _____

Date: _____

APPENDIX E – PIPEYARD / FACILITY STORAGE DRAWING

APPENDIX 1B3

NEXUS Blasting Plan



NEXUS GAS TRANSMISSION PROJECT

BLASTING PLAN

FERC Docket No. PF15-10-000

June 2015

NEXUS Project Blasting Plan

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ACRONYMS AND ABBREVIATIONS

amsl	above mean seal level
CFR	Code of Federal Regulation
CI	Chief Inspector
FERC	Federal Energy Regulatory Commission
ms	milliseconds
msl	mean sea level
NEXUS	NEXUS Gas Transmission, LP
Project	NEXUS Project
ROW	right-of-way
TETLP	Texas Eastern Transmission, LP

1.0 INTRODUCTION

This Blasting Plan outlines the procedures and safety measures that NEXUS Gas Transmission, LP's ("NEXUS") contractor will adhere to while implementing blasting activities, should they be required, during the construction of the NEXUS Project. The contractor will be required to submit a detailed blasting plan to NEXUS prior to construction that is consistent with the provisions in this Blasting Plan and construction specifications CS-PL-1-7.7 (Appendix A).

2.0 PRE-BLAST INSPECTION

As required by FERC, NEXUS will conduct pre-blast surveys, with landowner permission, to assess the conditions of structures, wells, springs, and utilities within 150 feet of the proposed construction right-of-way. Should local or state ordinances require inspections in excess of 150 feet from the work area, the local or state ordinances will prevail. The survey will include:

- Informal discussions to familiarize the adjacent property owners with blasting effects and planned precautions to be taken on this project;
- Determination of the existence and location of site specific structures, utilities, septic systems, and wells;
- Detailed examination, photographs, and/or video records of adjacent structures and utilities; and
- Detailed mapping and measurement of large cracks, crack patterns, and other evidence of structural distress.

The results will be summarized in a condition report that will include photographs and be completed prior to the commencement of blasting.

3.0 MONITORING OF BLASTING ACTIVITIES

During blasting, the NEXUS contractor will take precautions to minimize damage to adjacent areas and structures. Precautions include:

- Dissemination of blast warning signals in the area of blasting;
- Use of blasting mats or other suitable cover (such as subsoil) to prevent fly-rock and possible damage to public, adjacent structures and natural resources;
- Posting warning signals, flags, or barricades;
- Following federal and state procedures and regulations for safe storage, handling, loading, firing, and disposal of explosive materials; and

Excessive vibration will be controlled by limiting the size of charges and by using charge delays, which stagger or sequence the detonation times for each charge.

If the contractor has to blast near buildings or wells, a qualified independent contractor will inspect structures and wells within 150 feet, or farther if required by local or state regulations, of the construction right-of-way prior to blasting, and with landowner permission. Post-blast inspections by a NEXUS representative will also be performed as warranted. All blasting will be performed by registered licensed blasters and monitored by experienced blasting inspectors. Recording seismographs will be installed by the contractor at selected monitoring stations under the observation of NEXUS personnel. During construction, the contractor will submit blast reports for each blast and keep detailed records as described in Section 4.7.

Ground vibration and air overpressure effects of each blast will be monitored by seismographs.

If a charge greater than eight pounds per delay is used, the distance of monitoring will be in accordance with the U.S. Bureau of Mines Report of Investigations 8507.

To maximize its responsiveness to the concerns of affected landowners, NEXUS will evaluate all complaints of well or structural damage associated with construction activities, including blasting. A toll-free landowner hotline will be established by NEXUS for landowners to use in reporting complaints or concerns. In the unlikely event that blasting activities temporarily impair well water, NEXUS will provide alternative sources of water or otherwise compensate the owner. If well or structural damage is substantiated, NEXUS will either compensate the owner for damages or arrange for a new well to be drilled.

4.0 BLASTING SPECIFICATIONS

The potential for blasting along the pipeline segments to affect any wetland, municipal water supply, waste disposal site, well, septic system, or spring will be minimized by controlled blasting techniques and by using mechanical methods for rock excavation as much as possible. Controlled blasting techniques have been effectively employed by NEXUS and other companies to protect active gas pipelines up to within 12 feet of trench excavation. The following sections present details of procedures for powder blasting that will be implemented in blasting areas along the NEXUS Project route.

4.1 General Provisions

The contractor will provide all personnel, labor, and equipment to perform necessary blasting operations related to the work. The contractor will provide a permitted blaster possessing all permits required by the states in which blasting is required during construction, and having a working knowledge of state and local laws and regulations that pertain to explosives.

Project blasting will be done in accordance with all applicable state and local laws; and regulations applicable to obtaining, transporting, storing, handling, blast initiation, ground motion monitoring, and disposal of explosive materials and/or blasting agents.

Any failure to comply with the appropriate law and/or regulations is the sole liability of the contractor. The contractor and the contractor's permitted blaster shall be responsible for the conduct of all blasting operations, which shall be subject to inspection requirements.

Affected landowners will be contacted prior to any blasting activities.

4.2 Storage of Explosives and Related Materials

Explosives and related materials shall be stored in approved facilities required under the provisions contained in 27 CFR Part 55 and all other applicable regulations. The handling of explosives may be performed by the person holding a permit to use explosives or by other employees under his or her direct supervision provided that such employees are at least 21 years of age.

4.3 Pre-Blast Operations

The contractor is required to submit a planned schedule of blasting operations to the CI or his designated representative for approval, prior to commencement of any blasting or pre-blast operation, which indicates the maximum charge weight per delay, hole size, spacing, depth, and blast layout. If blasting is to be conducted adjacent to an existing Texas Eastern Gas Transmission Pipeline ("TETLP"), approval must be received from the TETLP Transmission Department. The contractor shall provide this schedule to the CI at least 3 working days prior to any pre-blast operation for approval and use. Where residences are within 50 feet of the blasting operation, the CI may require notification in excess of 5 days. The blasting schedule is to include the blast geometry, drill hole dimensions, type and size of charges, stemming, and delay patterns and should also include a location survey of any dwelling or structures that may be affected by the proposed operation. Face material shall be carefully examined before drilling to determine the possible presence of unfired explosive material. Drilling shall not be started until all remaining butts of old holes are examined for unexploded charges, and if any are found, they shall be re-fired before work proceeds. No person shall be allowed to deepen the drill holes that have contained explosives.

A maximum loading factor shall not exceed the site specific allowable pounds of explosive per cubic yard of rock. However, should the loading fail to effectively break up the rock, a higher loading factor may be allowed if the charge weight per delay is reduced by a proportional amount and approved by the CI.

4.4 Discharging Explosives

Persons authorized to prepare explosive charges or conduct blasting operations shall use every reasonable precaution, including, but not limited to, warning signals, flags, barricades, or woven wire mats to ensure the safety of the general public and workmen.

The contractor shall obtain NEXUS's approval and provide them at least 72-hour notice prior to the use of any explosives. The contractor shall comply with local and state requirements for pre-blast notifications, such as "One Call", which requires a 72-hour notice.

Whenever blasting is being conducted in the vicinity of gas, electric, water, fire alarm, telephone, telegraph and steam utilities, the blaster shall notify the appropriate representatives of such utilities a minimum of 24 hours in advance of blasting. Verbal notice shall be confirmed with written notice. In an emergency, the local authority issuing the original permit may waive this time limit.

Blasting operations, except by special permission of the authority having jurisdiction, shall be conducted during daylight hours.

When blasting is done in congested areas or in proximity to a significant natural resource, structure, railway, or highway or any other installation that may be damaged, the blast shall be backfilled before firing or covered with a mat, constructed so that it is capable of preventing fragments from being thrown. In addition, all other possible precautions shall be taken to prevent damage to livestock and other property and inconvenience to the property owner or tenant during blasting operation. Any rock scattered outside the right-of-way by blasting operations shall immediately be hauled off or returned to the right-of-way.

Precautions shall be taken to prevent accidental discharge of electric blasting caps from currents induced by radar and radio transmitters, lightning, adjacent power lines, dust and snow storms, or other sources of extraneous electricity. These precautions, per 29 CFR 1926.900(k), shall include:

- Detonators shall be short-circuited in holes which have been primed and shunted until wired into the blasting circuit;
- Suspension of all blasting operations and removal of all personnel from the blasting area during the approach and progress of an electrical storm;
- The posting of all signs warning against the use of mobile radio transmitters on all roads within 350 feet (107 m) of blasting operations;
- Ensuring that mobile radio transmitters which are less than 100 feet away from electric blasting caps, in other than original containers, shall be deenergized and effectively locked, and
- Observance of the latest recommendations with regard to blasting in the vicinity of radio transmitters or power lines, as set forth in the IME Safety Library Publication No. 20, Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Electric Blasting Caps.

No blast shall be fired until the blaster in charge has made certain that all surplus explosive materials are in a safe place, all persons and equipment are at a safe distance or under sufficient cover, and that an adequate warning signal has been given.

Only the person making leading wire connections in electrical firing shall fire the shot. All connections should be made from the bore hole back to the source of firing current, and the leading wires shall remain shorted until the charge is to be fired. After firing an electric blast from a blasting machine, the leading wires shall be immediately disconnected from the machine and short-circuited. If there are any misfires while using cap and fuse, all persons shall remain away from the charge for at least one hour. If electrical blasting caps are used and a misfire occurs, this waiting period may be reduced to 30 minutes. Misfires shall be handled under the direction of the person in charge of the blasting and all wires shall be carefully traced in search for the unexploded charges.

Explosives shall not be extracted from a hole that has once been charged or has misfired unless it is impossible to detonate the unexploded charge by insertion of a fresh additional primer.

4.5 Waterbody Crossing Blasting Procedures

To facilitate planning for blasting activities for waterbody crossings, rock drills or test excavations may be used in waterbodies to test the ditch-line during mainline blasting operations to evaluate the presence of rock in the trench-line. The excavation of the test pit or rock drilling is not included in the time window requirements for completing the crossing. For testing and any subsequent blasting operations, stream flow will be maintained through the site. When blasting is required, FERC timeframes for completing in-stream construction begin when the removal of blast rock from the waterbody is started. If, after removing the blast rock, additional blasting is required, a new timing window will be determined in consultation with the Environmental Inspector. If blasting impedes the flow of the waterbody, the contractor can use a backhoe to restore the stream flow without triggering the timing window. During blasting operations, the contractor shall comply with the waterbody crossing procedures specified in the NEXUS Project Erosion and Sedimentation Control Plan as well as any project-specific permit conditions.

4.6 Disposal of Explosive Materials

All explosive materials that are obviously deteriorated or damaged shall not be used and shall be destroyed according to applicable local, state, and federal requirements.

Empty containers and packages, and paper on fiberboard packing materials that have previously contained explosive materials shall not be reused for any purpose. Such packaging materials shall be destroyed by burning at an approved outdoor location or by other approved method. All personnel shall remain at a safe distance from the disposal area.

All other explosive materials will be transported from the job site in approved magazines per local and/or state regulations.

4.7 Blasting Records

A record of each blast shall be made and submitted, along with seismograph reports, to the TETLP CI. The record shall contain the following minimum data for each blast:

- Name of company or contractor;
- Location, date and time of blast;
- Name, signature, and license number of contractor and of blaster in charge;
- Type of material blasted;
- Number of holes, depth of burden and stemming, and spacing;
- Diameter and depth of holes;

- Volume of rock in shot;
- Types of explosives used, specific gravity, energy release, pounds of explosive per delay, and total pounds of explosive per shot;
- Delay type, interval, total number of delays, and holes per delay;
- Maximum amount of explosives per delay period of 17 ms or greater;
- Power factor;
- Method of firing and type of circuit;
- Direction and distance in feet to nearest structure and utility owned or leased by the person conducting the blasting;
- Weather conditions;
- Type and height or length of stemming;
- If mats or other protection were used; and
- Type of detonators used and delay periods used.

The person taking the seismograph reading shall accurately indicate exact location of the seismograph, if used, and shall also show the distance of the seismograph from the blast.

Seismograph records, where required, should include:

- Name of person and firm operating and analyzing the seismograph record;
- Seismograph serial number;
- Seismograph reading; and
- Maximum number of holes per delay period of 17 ms or greater.

5.0 POST-BLAST INSPECTION

An independent contractor, with landowner permission, will examine the condition of structures within 150 feet, or as required by state or local ordinances, of the construction area after completion of blasting operations to identify any changes in the conditions of these properties or confirm any damages noted by the landowner. The independent contractor with landowner approval will conduct a re-sampling of wells within 150 feet, or as required by state or local ordinances, of the construction area. Should any damage or change occur during the blasting operations, an additional survey of the affected property will be performed before the continuation of blasting operations.

6.0 REFERENCES

Occupational Safety and Health Administration blasting requirements 29 CFR 1926.900(k)

Ohio Fire Code – Section 1301:7-7.

Ohio Administrative Code (OAC) Chapter 4123:1-5-29 Explosives and Blasting.

APPENDIX A

- ***BLASTING SPECIFICATIONS***