NEXUS GAS TRANSMISSION PROJECT

RESOURCE REPORT 10

Alternatives

FERC Docket No. CP16-__-000

November 2015

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Filing Requirement	**Location in Environmental Report**
☒ Address the "no action" alternative. For large projects, address the effect of energy conservation or energy alternatives to the project.	Section 10.2
☒ Identify system alternatives considered during the identification of the project and provide the rationale for rejecting each alternative.	Section 10.3
☒ Identify major and minor route alternatives considered to avoid impact on sensitive environmental areas (e.g., wetlands, parks, or residences) and provide sufficient comparative data to justify the selection of the proposed route.	Section 10.5 and 10.6
☒ Identify alternative sites considered for the location of major new aboveground facilities and provide sufficient comparative data to justify the selection of the proposed site.	Section 10.7

RESPONSE TO FERC JULY 30, 2015 COMMENTS ON NEXUS RESOURCE REPORT 10 – ALTERNATIVES

FERC COMMENTS ON DRAFT RESOURCE REPORT 10	LOCATION OR RESPONSE TO COMMENT
100.[1] Update Section 10.2.5, footnote 1 with the recent U.S. Supreme Court decision.	The footnote in Section 10.2.5 has been updated to include reference to the June 2015 U.S. Supreme Court ruling in *Michigan v. EPA* striking down the U.S. Environmental Protection Agency's Mercury and Air Toxics Standards.
101. Update the text, table, and map for the City of Green Alternative to account for laterals that would be required for customer gas deliveries necessary to meet the Project objective.	Section 10.5.1.2 of this Resource Report, Table 10.5-2 (*see* Tables Section), and Figure 10.5-2 (*see* Figures Section), have been updated to account for customer delivery laterals necessary to meet the Project's Purpose and Need set forth in Resource Report 1, Section 1.2.
102. Provide comparisons of how the proposed pipeline and alternatives could impact any remnant habitat in the Oak Openings region in Fulton, Henry, Lucas, and Wood Counties.	Section 10.5.3.2 of this Resource Report, Table 10.5-11, and Figures 10.5-13, assess the alternative that avoids the Oak Openings Region. Section 10.5.3.2 also evaluates potential impacts to remnant Oak Openings Habitat.
103. We received suggested route deviations for portions of the proposed pipeline route. Provide an analysis of:	
a. David Eigel's July 8, 2015 letter suggesting a modified alternative for the Electric Transmission Line Alternative; and	*See* Section 10.6.2 of this Resource Report and Figure 10.5-15 for an assessment of the *Modified Electric Transmission Line Alternative* at MP 27.5.
b. William Schaefer's July 1, 2015 comment suggesting the route follow the Ohio Turnpike the entire way.	*See* Section 10.5.3.3 of this Resource Report and Figure 10.5-14 for an assessment this stakeholder suggested Turnpike Alternative.

[1] Numbering of comments is based on letter from Federal Energy Regulatory Commission to Nexus Gas Transmission, LLC dated July 30, 2015 and posted to Docket Number PF15-10-000 regarding *Comments on Draft Resource Reports 1 through 8 and 10*.

ACRONYMS AND ABBREVIATIONS

ACEEE	American Council for an Energy Efficient Economy
AEPS	Alternative Energy Portfolio Standard
AWEA	American Wind Energy Association
Bcf/d	billion cubic feet per day
BTU	British Thermal Units
Certificate	Certificate of Public Convenience and Necessity, FERC Certificate
CO2	carbon dioxide
CS2	Compressor Station 2
CS3	Compressor Station 3
CS4	Compressor Station 4
DC	direct current
DTE	DTE Energy Company
EIA	U.S. Department of Energy, Energy Information Administration
EIAAEO	EIA's Annual Energy Outlook
EOPUS	Executive Office of the President of the United States
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
GIS	geographic information system
GW	gigawatts
HDD	horizontal directional drill
hp	horsepower
ID	identification
kg	kilogram
kV	kilovolt
kW	kilowatt
kWh	kilowatt hours
M&R	metering and regulating
MCC	motor control center
MISO	Midwest Independent System Operator
MMBtu	one million BTU
MP	Milepost
MW	megawatts
MVA	Megavolt Ampere
NEPA	National Environmental Policy Act
NEXUS	NEXUS Gas Transmission, LLC
NEXUS Project or Project	NEXUS Gas Transmission Project
NGA	Natural Gas Act
NHD	National Hydrography Data
NLEB	northern long-eared bat
NOx	nitrogen oxides
NRC	U.S. Nuclear Regulatory Commission
NWI	U.S. Fish and Wildlife Service National Wetland Inventory mapping
ODNR	Ohio Department of Natural Resources
Ohio EPA	Ohio Environmental Protection Agency
PJM	PJM Interconnection, LLC
PI	Point of Interest
$PM_{10/2.5}$	particulate matter less than 10 and 2.5 microns in diameter

ROW	right-of-way
RPS	Renewables Portfolio Standard
RTO	regional transmission organization
SO_2	sulfur dioxide
Spectra or Spectra Energy	Spectra Energy Partners, LP
system alternatives	natural gas transportation system alternatives
Texas Eastern	Texas Eastern Transmission, LP or Texas Eastern pipelines
UPS	uninterruptable power supply
U.S.	United States
USCG	U.S. Coast Guard
USDOE	U.S. State Department of Energy
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Vector	Vector Pipeline, LP
VFDs	variable frequency drives
WNPA	World Nuclear Power Association

10.0 RESOURCE REPORT 10 – ALTERNATIVES

10.1 Introduction

NEXUS Gas Transmission, LLC ("NEXUS") is seeking a Certificate of Public Convenience and Necessity ("Certificate") from the Federal Energy Regulatory Commission ("FERC or Commission") 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 ("Spectra" or "Spectra Energy") 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 million dekatherms per day 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 (the "Dawn Hub"). Through interconnections with existing pipelines, supply from the NEXUS Project will also be able to reach the Chicago Hub in Illinois and other Midwestern markets. The United States ("U.S.") portion of the NEXUS Project includes new greenfield pipeline in Ohio and Michigan and capacity leased from others in Pennsylvania, West Virginia, Ohio and Michigan, terminating at the 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 the Dawn Hub. A more detailed description of the Project is set forth in Resource Report 1.

This Resource Report 10 provides a description of alternatives identified and evaluated by NEXUS during the siting and route refinement stages of the proposed Project. The primary objectives in evaluating alternatives for facility siting are to avoid, minimize, and if necessary mitigate potential adverse effects on the natural and human environment while satisfying the Project's Purpose and Need. A detailed description of the Project's Purpose and Need is provided in Section 1.2 of Resource Report 1. Four principal types of alternatives are evaluated in this Resource Report:

- No-action alternative;
- Existing natural gas transportation system alternatives;
- Pipeline route alternatives; and
- Aboveground facility siting alternatives.

A checklist showing the status of the FERC filing requirements for Resource Report 10 is included following the Table of Contents. A table showing the location of responses to the FERC's July 30, 2015 comments on draft Resource Report 10 follows the FERC filing requirements checklist. Project drawings, maps, and aerial photo based alignment sheets are provided in Appendix 1A in Resource Report 1.

10.2 No-Action Alternative

The NEXUS Project will provide critical access to the abundant, emerging, domestic natural gas supplies from various U.S. supply areas including Marcellus and Utica shale gas producing areas and will provide energy consumers in the northern Ohio, southeastern Michigan, and the Dawn Hub in Ontario with reliable, affordable, cleaner-burning natural gas to help meet the growing need for cleaner power generation and home heating. The "no-action" alternative would avoid the temporary and permanent, short- and long-term environmental impacts associated with construction and operation of the NEXUS Project. However, by not constructing the Project there would be no ability to provide the natural gas transportation service requested by the Project shippers to meet energy demands and the requirement for incremental pipeline takeaway capacity out of the Marcellus and Utica region beginning in 2017. In addition, NEXUS anticipates continued growth in demand for natural gas in northern Ohio, southeastern Michigan, and the Dawn Hub in Ontario that largely reflects future usage from electric power producers as well as Ohio's industrial users, the replacement of declining volumes of gas reaching the area from Western Canada, and

the decline in Michigan production (*see* the Ohio Natural Gas Market Study - Prepared for the NEXUS Gas Transmission Project provided in Appendix 1C4 of Resource Report 1).

In addition, natural gas from the Marcellus/Utica region is bottlenecked by insufficient pipeline capacity linking produced natural gas to market areas with substantial and growing demand. Existing pipeline infrastructure has historically been designed to link market areas with producing regions far removed from the Marcellus/Utica region. As a result, the infrastructure is not optimized for current and projected development from this region, thereby limiting access to the natural gas and contributing to market inefficiency. As IHS Energy has explained:

> "… although producers need to understand the geology and do their best to produce at the lowest possible unit cost, what limits production is not a lack of geologic potential but rather the ability to export the gas out of the region. The latter is a function of pipeline capacity. As production continually sets new records, it also continually bumps up against pipeline capacity constraints."[2]

The pace of natural gas pipeline capacity expansions in the Marcellus/Utica region will be the main determinant of Appalachian gas production over the next few years. The Marcellus and Utica shale plays have large production and generally strong economics, but access to markets remains constrained by insufficient pipeline takeaway capacity to downstream markets. As a result, Marcellus/Utica production pricing points remain at large basis discounts to Henry Hub, despite the capacity expansions that have come online in the past few years, and Appalachian producers are keen to move supply to higher-priced markets.[2]

The NEXUS Project provides customers an important opportunity to link their natural gas production to growing market areas inadequately served by existing systems. The strong interest shown in the NEXUS Project by producers during Project open seasons reflects both the need for additional pipeline infrastructure and the expectation that the NEXUS Project can and will meet this need.

Given this demonstrated need to transport large quantities of abundant, domestically produced natural gas to the U.S. Midwest and eastern Canadian regions, other natural gas transmission companies would be required to increase their capacity on existing systems and/or construct new facilities. Such actions which may include but are not limited to pipeline replacement, incremental right-of-way ("ROW") acquisition, and horsepower upgrades, likely would result in the transfer of environmental impacts from one location to another, but would not eliminate or significantly reduce net environmental impacts in the region. If the No-Action Alternative were to be selected, confirmed NEXUS customers with signed agreements would be required to find a different natural gas transmission source or sources to transport the necessary volumes to meet the demonstrated market demand to be supplied by the Project.

Without an increase in the capacity to transport abundantly available natural gas to this region, markets in need of additional supplies of natural gas will need to: 1) seek other sources of fuel for energy; 2) forego meeting their natural gas demand needs until energy conservation measures stabilize or decrease demand, possibly limiting their growth and the growth of the local economies they serve; and/or, 3) depend on the future development of other projects with unknown and unpredictable schedules and environmental impacts. As described in more detail below, if existing natural gas transmission systems are not expanded or new natural gas transmission systems are not created, existing and anticipated demand for natural gas would not be met. Not building the NEXUS Project could also jeopardize plans and anticipated schedules for converting or replacing existing power generation facilities currently burning oil or coal (which emit more greenhouse gases and other pollutants) to an environmentally preferred fuel, clean burning natural gas.

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[2] *IHS Energy – North American Natural Gas*, October 30, 2015, provided as part of standard advisory service offering.

10.2.1 Regional Electricity Demand Projections

PJM Interconnection LLC ("PJM") is the regional transmission organization ("RTO") that coordinates the delivery of electricity through parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. Based on PJM's 2015 Load Forecast Report, the summer peak electric load for power generation in the region is projected to grow an average 1.0 percent per year over the next 10 years, and 0.9 percent over the next 15 years. The PJM RTO summer peak load is forecasted to be 171,580 megawatts ("MW") in 2025, a 10-year increase of 16,036 MW, and reaches 178,052 MW in 2030, a 15-year increase of 22,508 MW. Annualized 10-year summer peak demand growth rates for individual zones (within the PJM service area) range from 0.4 percent to 1.7 percent. Winter peak load growth for the PJM RTO is projected to average 0.9 percent per year over the next 10-year period, and 0.9 percent over the next 15-years. The PJM RTO winter peak load in 2024/25 is forecasted to be 142,561 MW, a 10-year increase of 12,850 MW, and reaches 147,981 MW in 2029/30, a 15-year increase of 18,270 MW. Annualized 10-year winter peak demand growth rates for individual zones range from 0.2 percent to 1.7 percent. PJM indicates in the Executive Summary its 2015 Load Forecast Report, that introduction of a new load forecasting modeling variable to better reflect usage trends such as adoption of more energy efficient end uses and behind the meter generation resulted in generally lower peak and energy load forecasts in this year's report, compared to the same years presented in the 2014 PJM Load Forecast Report (PJM, 2015).

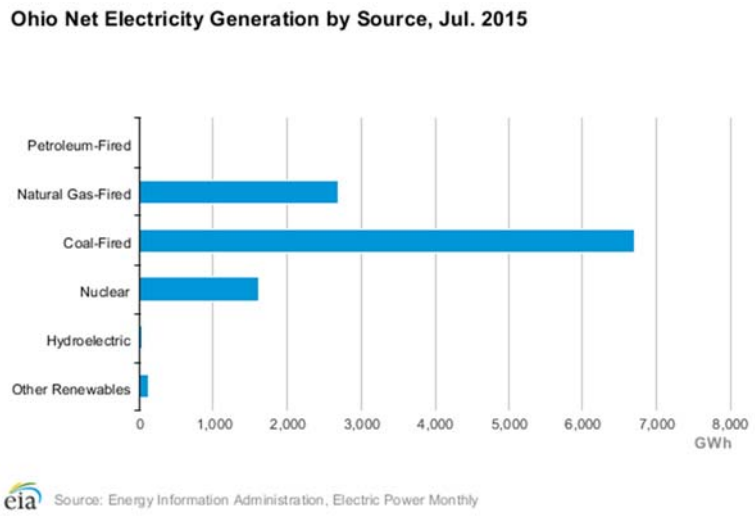
The Midwest Independent System Operator *(*"MISO") is the RTO that coordinates the delivery of electricity through Arkansas, Illinois, Indiana, Iowa, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, North Dakota, South Dakota, Wisconsin, Texas and Manitoba, Canada.

Based on MISO's 2014 Load Forecast Report, the summer peak electric load for power generation in the region is projected to grow an average 1.42 percent, without the EE adjustment, and 0.86 percent with the EE adjustment, per year over the next 10 years. The MISO RTO summer peak load is forecasted to be 143,118 MW in 2024, a 10-year increase of 18,860 MW. Annualized 10-year summer peak demand growth rates for individual zones (within the MISO service area) range from 0.77 percent to 2.01 percent using the Gross Forecast Method. Winter peak load growth is projected to average 1.41 percent, without the EE adjustment and 0.86 percent with the EE adjustment, per year over the next 10-year period. The MISO RTO winter peak load in 2023/24 is forecasted to be 111,684 MW, a 10-year increase of 14,425 MW. Annualized 10-year winter peak demand growth rates for individual zones range from 0.77 percent to 2.01 percent using the Gross Forecast Method.

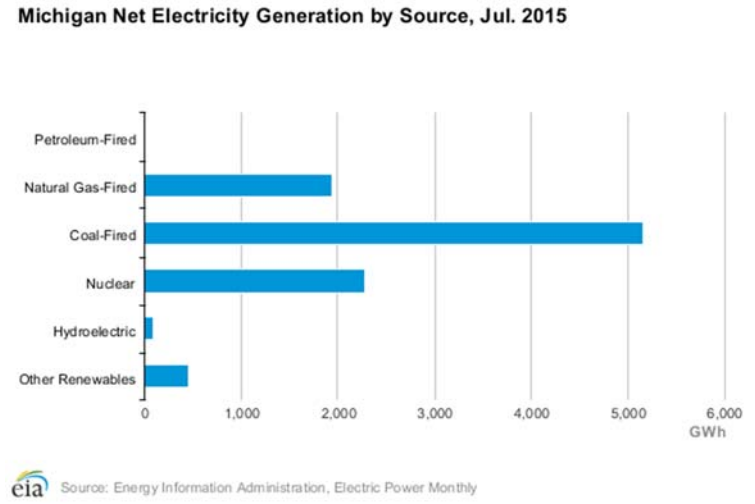
Unlike coal that can be stored onsite or near power generation facilities, natural gas needs to be transported to power generation facilities by infrastructure such as pipelines. The NEXUS Project will support the anticipated shift in power generation to natural gas in the region, and could supply a significant portion of the natural gas needed to meet the projected increase in the demand for electricity in both the affected MISO and PJM service areas.

10.2.2 Regional Electricity Generation by Source

Based on the U.S. Department of Energy, Energy Information Administration's ("EIA") *State Profiles and Energy Estimates*, the primary fuel for electric generation in Ohio is coal. Ohio is currently the fourth largest coal-consuming state in the nation (after Texas, Indiana, and Pennsylvania) and about 90 percent of the coal consumed in Ohio is used for electric power generation. In addition, Ohio is among the top 10 electric power generators in the nation and because Ohio's net generation does not currently meet state demand, Ohio is a net recipient of electricity from outside the state (EIA, 2015a). Based on EIA net electric generation by source estimates for July 2015, coal fueled 60 percent of Ohio's net electricity generation, natural gas contributed 24 percent, nuclear energy provided 14 percent, and renewables contributed approximately 1 percent, and petroleum and hydroelectric power generation contributed less than 1 percent (EIA, 2015a).



In Michigan, coal-fired power plants were responsible for 52 percent of net electricity generation in July 2015, nuclear energy supplied 23 percent (with three nuclear power plants and four reactor units), natural gas supplied 19 percent, renewables provided approximately 5 percent, and hydroelectric provided approximately 1 percent, and petroleum proved less than one percent (EIA, 2015b).



10.2.3 U.S. Energy Policy and Regulations

U.S. energy policy and regulations in the past decade have resulted in diversification in the U.S. energy portfolio through incentivizing development of alternative energy sources, supporting energy efficiency, and advocating conversion of power generation using fuels with high greenhouse gas emissions, such as coal, to cleaner burning, and domestically produced fuels, like natural gas.

In 2005, the U.S. Congress passed the Energy Policy Act ("EPAct") (Public Law 109-58) that provided regulatory guidelines to diversify America's energy supply and reduce dependence on foreign sources of

energy; increase residential and business energy efficiency and conservation (Energy Star Program); improve vehicular energy efficiency; and modernize the domestic energy infrastructure.

In 2007, the Energy Independence and Security Act (Public Law 110-140), was enacted to move the U.S. toward greater energy independence and security; to increase the production of clean renewable fuels; to protect consumers; to increase the efficiency of products, buildings, and vehicles; to promote research on and deploy greenhouse gas capture and storage options; and to improve the energy performance of the Federal Government.

On October 23, 2015, the U.S. Environmental Protection Agency's final rule on Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Generating Units (40 CFR Part 60), also referred to as the Clean Power Plan, was published in the Federal Register. In the final rule, EPA established emission guidelines for states to follow in developing plans to reduce greenhouse gas emissions from existing electric generating units. The rule sets a unique emission reductions target for each state to hit by 2030. To develop each state's goal, EPA first developed CO2 emission performance rates for fossil fuel-fired electric generating units and natural gas-fired combined cycle generating units. The Agency determined the emission performance rates for the two categories of electric generating units through application of three "building blocks," described by EPA as:

- Heat rate improvements at affected coal-fired steam electric generating units;
- Shifting electricity generation from high emitting fossil fuel-fired steam power plants to lower emitting natural gas-fired power plants;
- Increasing electricity generation from zero-emitting renewable sources of energy

The emission performance rates were applied to all affected sources within each state to come up with a statewide goal.

Based on current EPA guidelines, Ohio is required to reduce baseline (based on 2012 data) power sector emission rates by 28 percent by 2030; Michigan is required to reduce baseline (based on 2012 data) power sector emission rates by 31 percent by 2030 (EPA, 2015).

As currently proposed, the NEXUS project will be in-service by November 2017 and available as one of the EPA identified "building blocks" for compliance to support Ohio and Michigan in meeting its goals for power sector emissions reductions (28 percent and 31 percent respectively) by 2030.

Furthermore, based on All-of-the-Above Energy Strategy as a Path to Sustainable Economic Growth (EOPUS, 2014), published in May 2014 by the Executive Office of the President of the United States, from 2005 through 2011 (the last year of available data), the U.S. reduced its total carbon pollution more than any other nation, in part because of a shift in the U.S. toward cleaner natural gas and an increasing role for renewables. Natural gas has the lowest carbon dioxide ("CO2") emissions per unit of usable energy produced of any fossil fuel. Natural gas is also the most practical fuel for use in combined cycle gas turbine (CCGT) power plants. CCGT plants have thermal efficiencies nearly two times that of typical oil or coal burning Rankine cycle power plants. Based on the President's All of the Above energy report, switching from fuels with a greater carbon footprint to natural gas has played a vital role in decarbonizing the energy sector, and will continue to do so for the coming decades. Meeting the U.S. goals and projections for further decarbonizing the energy sector in coming decades could be delayed if the NEXUS Project is not built.

10.2.4 Energy Conservation

Reducing the need for additional energy usage is the preferred alternative for meeting future growth in energy demand. Conservation of energy reduces the demand for the finite and over-utilized reserves of fossil fuels that emit problematic greenhouse gases and other air pollutants, and for the use of nuclear power generation that has environmental costs associated with management of radioactive wastes. Energy conservation has been strongly advocated by both federal and state regulatory policies and incentives in recent years.

Based on the EIA's Annual Energy Outlook ("EIAAEO") 2014, electricity demand in the U.S. fell in only 3 years between 1950 and 2007, but it declined in four of the 5 years between 2008 and 2012 (the largest drop occurring in 2009). One contributing factor was the steep economic downturn from late 2007 through 2009, which led to a large drop in electricity sales in the industrial sector. However, other contributing factors cited include efficiency improvements associated with new appliance standards in the buildings sectors and overall improvement in the efficiency of technologies powered by electricity. Both energy efficiency and improved technology have slowed electricity demand growth and may contribute to slower growth in the future (EIAAEO, 2014).

Based on EIA's AEO 2015, increasing energy efficiency reduces the energy intensity of many residential end uses between 2013 and 2040. Total energy consumption for space heating is 4.2 quadrillion Btu in 2040, 1.7 quadrillion Btu (57 percent) lower than it was in 2013, despite a 23 percent increase in the number of households and an 11 percent increase in the average size (square feet) of a household. Energy use for lighting is 0.8 quadrillion Btu in 2040, 1.0 quadrillion Btu lower than it was in 2013 reflecting a 57 percent decline in energy use despite an increase in lighting services. Nevertheless, EIAAEO 2015 also projects the combined heat and power generation in the industrial sector, almost all of which occurs in the bulk chemicals, food, iron and steel, paper, and refining industries, grows by 50 percent from 147 billion kilowatt hour ("kWh") in 2013 to 221 billion kWh in 2040 based on AEO2015 (EIAAEO, 2015). So, while the expected growth in residential consumption of electricity is weaker, the growth in industrial use is much stronger than earlier projections. The overall growth rate projection for electricity demand throughout the U.S. is similar to the regional rates projected by PJM, as cited in Section 10.2.1.

Energy conservation reduces the demand or growth in demand for natural gas and other energy sources. It is possible that the development and implementation of additional cost-effective conservation measures will have an effect on customer demands for natural gas. However, substantial new development in technology would be needed before the magnitude of energy conservation measures necessary to offset the forecasted electric generation fueled by the Project could be implemented. Therefore, although energy conservation is likely to continue to be an important part of the U.S. energy strategy, it is not a viable alternative to meet the medium to short-term energy demands of the market.

10.2.5 Non-Gas Energy Alternatives

The NEXUS Project will increase gas transportation capacity to markets in northern Ohio, southeastern Michigan, and Dawn Ontario, providing consumers greater choice and access to the abundant Marcellus and Utica shale gas supplies. This encourages greater competition in fuel markets, creates economic incentives for power generators currently burning coal or oil, to convert to cleaner burning natural gas; and improves national security by reducing U.S. dependence on foreign energy supplies. As discussed below, if this demand for natural gas associated with heating, lighting, and power generation is not met, other energy sources such as non-gas-fired fossil fuel generation would likely need to be permitted, constructed, and operated. In addition, the Purpose and Need of the NEXUS Project is specific to the delivery of natural gas, so by definition any of the non-gas energy alternatives discussed below do not meet the NEXUS Purpose and Need.

Fossil Fuel Generation

Based on the EIAAEO 2014, the fossil fuel share of total U.S. energy use is projected to decline from 82 percent in 2012 to 80 percent in 2040. This is based on the assumption that the renewable energy share of total energy use (including biofuels) increases from 9 percent in 2012 to 12 percent in 2040 in response to the availability of federal tax credits for renewable electricity generation and capacity during the early years of the projection and in response to state renewable portfolio standard ("RPS") programs. In reality, the availability of federal tax credits and status of state RPS programs are likely to shift based on political and economic factors between now and 2040. Therefore, the use of fossil fuels as a dominant fuel source for the U.S. through 2040 is likely to remain in the range of 80 percent.

As cited in Section 10.2.2, Ohio and Michigan currently rely heavily on the use of coal to generate electricity. Continued use of coal (and oil) fossil fuels in the U.S. upper Midwest and eastern Canadian regions to supply the needs of the market could potentially result in environmental impacts due to increased air emissions and associated impacts on natural resources that otherwise would be minimized through the use of natural gas. State and federal air pollution control regulations indirectly promote the use of cleaner fuels to minimize adverse air quality impacts. For example, proposed U.S. Environmental Protection Agency rules reducing the emissions from the Electric Utility sector, such as the Mercury and Air Toxics Standards[3] (40 CFR Part 63, Subpart UUUUU), the proposed Standards of Performance for Greenhouse Gas Emissions From New Stationary Sources: Electric Utility Generating Units (Federal Register Volume 79, Issue 5, pp. 1429-1519), the proposed Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (Federal Register, Volume 79, Issue 117, pp. 34829-34958) and proposed Carbon Pollution Standards for Modified or Reconstructed Stationary Sources: Electric Utility Generating Units (Federal Register Volume 79, Issue 117, pp. 34959-34994), which is based on significant re-dispatching of existing coal-fired generation to natural gas-fired generation, will provide a driving force to use of natural gas as a fuel for power plants.

These regulations are proposed and implemented to improve both air quality and quality of life by avoiding pollution-related environmental degradation. The Project would provide utilities and other power generators access to the natural gas needed to build new power plants and re-power existing plants with natural gas as the primary fuel, enabling them to meet the EPA's latest standards, if promulgated. Moreover, non-gas fossil fuel alternatives would need to displace existing and proposed natural gas fired generation no later than 2017.

Combustion of natural gas to generate electricity results in lower emission rates of greenhouse gases and other pollutants (e.g., sulfur dioxide ["SO2"], nitrogen dioxide, and particle matter less than 10 and 2.5 microns in diameter ["PM10/2.5"]) than all other fossil fuels (standardized to emissions per unit of energy consumed). Based on default CO2 emission factors for various types of fuel provided in Table C-1 of 40 CFR Part 98, Mandatory Greenhouse Gas Reporting, use of natural gas results in nearly half the greenhouse gas emissions as the use of coal, in terms of CO2 per unit of energy input (i.e., 53 kilograms ("kg") of CO2 per MMBtu of natural gas versus 93.3 kg CO2 per MMBtu of coal). Using natural gas in place of coal and oil to generate electricity minimizes emissions of nitrogen oxides, SO2, and PM10 and PM2.5, with virtually no emissions of other fuel-bound contaminants such as mercury. The large reduction in air emissions when switching to natural gas is, in part, a result of the composition of natural gas. Pipeline natural gas, as proposed for the Project pipeline, is at least 80 percent methane (typically much higher than this minimum specification), meaning that natural gas is less chemically complex than other fuels with multiple chemical constituents. Natural gas also contains significantly less impurities that react during combustion to form air pollutants (e.g., SO2 and mercury). The greater chemical consistency and lower impurities reduce the formation of air pollutants, but also yield higher combustion efficiency – further reducing the air emissions per unit of heat input. Use of natural gas fired combined cycle gas turbine power production leverages the emissions advantage over coal by nearly another 50 percent due to cycle efficiency.

To the extent the new supply of natural gas provided by the Project is used to displace electric generation using coal and oil, significant reductions in regional air emissions can be expected. Furthermore, it is

[3] In June of 2015, the U.S. Supreme Court issued a 5-4 decision in *Michigan v. EPA* that invalidated the regulatory finding upon which the Mercury and Air Toxics Standards (MATS) rule was based on because EPA did not consider costs in determining whether to regulate the power sector. Following the Supreme Court's decision, the D.C. Circuit will need to determine whether the MATS rule should be remanded to EPA or vacated. However, because the rule was not stayed during the 4-year judicial review, retirement of coal-fired power plants, fuel-switching, and upgrade decisions have already been made at many facilities in response to MATS' initial compliance deadline of April 2015.

probable that the permitting and subsequent construction of new, non-gas power plants would take substantially longer than that anticipated for the permitting and construction of the NEXUS Project, if they could be successfully permitted at all.

Although U.S. energy policy also advocates for "clean coal technologies," utilization of natural gas as the primary source of fuel for electric generation in this region currently offers the most cost effective, environmentally preferred alternative to both meeting the current market demands and meeting the goals of the President's All of the Above energy policy to: 1) support economic growth and job creation; 2) enhance energy security; and 3) deploy low-carbon energy technologies and lay the foundation for a clean energy future (EOPUS, 2014).

Nuclear Energy

Nuclear energy power generation is considered an environmentally preferred alternative in terms of limiting air pollution, and because of the high energy output for relatively small land area required for generating facilities. However, following the Fukushima nuclear power plant incident in 2011, there has been a substantial re-examination of nuclear safety and nuclear energy policy throughout the world. As a result, Germany decided to shut down eight nuclear reactors immediately and to shut down all remaining reactors in the country by 2022 (World Nuclear Power Association ("WNPA"), 2015a). Italy banned nuclear power generation facilities altogether (WNPA 2015b). In the U.S., the Nuclear Regulatory Commission ("NRC") and nuclear industry representatives initiated an immediate coordinated response to the Fukushima accident, as well as implemented long-term actions intended to assure the safety of operating and planned reactors in the U.S. The ultimate cost of complying with NRC orders and proposed regulations and industry-led initiatives remains uncertain, as do the potential impacts on future nuclear power plant operations (EIAAEO, 2014).

Although nuclear power is also an important component of the EOPUS 2014 energy strategy, regulatory changes have the potential to introduce significant uncertainty in the timing and cost of both bringing new nuclear facilities into service and bringing existing facilities into compliance. As cited in Section 10.2.2, currently 15 percent of Ohio's, and 24 percent of Michigan's net electric energy generation is provided by nuclear reactors. Ohio currently has two operational nuclear power generating facilities; the Davis-Besse Nuclear Generation Station located in Oak Harbor, Ohio and the Perry Nuclear Generation Station located on Lake Erie in North Perry, Ohio. In Michigan, three nuclear power plants are currently in operation: Enrico Fermi Nuclear Generating Station in Monroe County (Unit 2 3,486 Megawatts [MW]), Donald C. Cook Nuclear Power Plant in Bridgman (2,110 MW), and Palisades Nuclear Power Plant in South Haven (800 MW). In Ohio, the Davis-Besse facility's nuclear operating license expires in April, 2017; the Perry facility's operating license expires in November, 2026 (NRC, 2014). In Michigan, the operating license for Fermi Unit 2 expires in March of 2025; Cook Unit 1 expires in October of 2034; and Cook Unit 2 expires in 2037; and Palisades expires in March of 2031 (NRC, 2015).

The ability of these units to continue to meet energy demand in the region is contingent on successful, timely renewal of licenses in the coming years. With uncertainty around the timing and compliance of existing nuclear reactor units, nuclear power does not represent a reliable alternative means for supplying the energy demand proposed to be served by the Project. Moreover, nuclear power does not meet the specific natural gas-related Purpose and Need of the Project.

Renewables

In 2008, Ohio created an Alternative Energy Portfolio Standard ("AEPS") that was part of broader legislation concerning the electric industry. The AEPS requires all of the state's retail electricity providers except municipal utilities and electric cooperatives to provide 25 percent of their retail electricity sales from alternative energy resources by the end of 2024. Unlike many other states, one-half of the standard can be met by "any new, retrofitted, refueled, or repowered generating facility located in Ohio," including those using fossil fuels. Therefore, the required renewables portion of the standard is 12.5 percent. The AEPS

contains a carve-out for solar energy resources; the ultimate solar target is 0.5 percent of the total electricity supply. An Energy Efficiency Portfolio Standard separate and distinct from the AEPS was also created. It requires utilities to put in place energy efficiency and peak demand reduction programs that achieve a cumulative energy savings of 22 percent by the end of 2025 (EIA, 2014a).

The AEPS requires all of the state's retail electricity providers except municipal utilities and electric cooperatives to provide 25 percent of their retail electricity sales from alternative energy resources by the end of 2024. However, in 2014, Senate Bill 310 ("SB 310") instituted a 2-year "freeze" of Ohio's renewable and efficiency standards, permanently repealed the "Buy Ohio" provision for renewable energy, created an exemption from the standards for large industries, and established an "Energy Mandates Study Committee" that is tasked with evaluating Ohio's standards and producing a report in 2015 (Ohio Chamber, 2014).

Michigan's Clean, Renewable, and Efficient Energy Act, enacted in 2008, required that electricity providers obtain at least 10 percent of their electricity supply from renewable energy resources by 2015. The act defined renewable energy resources as biomass; solar and solar thermal energy; wind energy; kinetic energy of moving water; geothermal energy; municipal solid waste; and landfill gas produced by municipal solid waste. In March of 2015, Governor Rick Snyder stated in his *Special Energy Message to Michiganders and the Michigan Legislature*, that Michigan met the 11th most aggressive renewable portfolio standard (i.e., 10 percent by 2015) and did so under budget – in some cases at no additional cost compared to other energy sources (Synder, 2015).

Total renewable energy generating capacity in the U.S. is projected to grow by 52 percent from 2012 to 2040 (EIAAEO, 2014). Non-hydropower renewable capacity, particularly wind and solar, nearly doubles and accounts for almost all of the growth in renewable capacity in the projection period. Solar power leads the growth in renewable capacity, increasing from less than 8 gigawatts ("GW") in 2012 to more than 48 GW in 2040. Wind capacity increases from less than 60 GW in 2012 to 87 GW in 2040, the second-largest amount of new renewable capacity. Although geothermal capacity more than triples and biomass capacity nearly doubles in the projection, combined they account for less than 15 percent of renewable capacity additions. Wind is the top source of non-hydropower renewable energy capacity during the projection period, surpassing the hydropower share in 2036.

Although renewables will continue to be part of the energy landscape, the intermittent nature of wind and solar will require that backup energy sources, such as natural gas, remain part of the region's energy portfolio.

A summary of potential renewable energy alternatives in Ohio and Michigan is provided below.

Wind

In 2013, wind energy provided only 0.8 percent of Ohio's in-state energy production with 435 MWs of installed capacity. The state is currently ranked 25th in the nation with 32 wind projects online, but no wind projects currently under construction. Wind energy has historically been the renewable resource chosen to meet Ohio's RPS requirements, fulfilling 86 percent of RPS requirements through 2011, driving economic development in the state as a result (AWEA-OH, 2015).

In Michigan, wind energy provided 2.4 percent of all in-state electricity production in 2013. The state's wind resource is ranked as 18th in the nation and they are currently ranked 15th in the nation for installed wind capacity at 1,350 MWs. Michigan currently has 23 wind projects online and has 206 MW of wind energy capacity under construction (AWEA-MI, 2015). However, many prime wind locations have already been developed, and recently Michigan jurisdictions have issued moratoriums on further wind developments. Additionally, overall renewable power generation contributes only approximately 6 percent to Michigan's net electric power generation as stated in Section 10.2.

Of potential renewable energy alternatives considered, it is likely wind projects will continue to be a small but prominent component of the region's renewable energy portfolio, assuming that federal tax credits, state

regulatory incentives, technological improvements, transmission and land availability, and public interest continue to support development of this technology. However, the intermittent nature of wind requires that backup energy sources, such as natural gas, remain part of the region's energy portfolio. In addition, the land area required to produce the energy equivalent of what has been requested by NEXUS' prospective customers, combined with inherent challenges with the regulatory permitting process for wind energy projects, make wind an infeasible alternative to the NEXUS Project by 2017.

Hydroelectric

Based on EIAAEO 2014, the predicted growth for hydroelectric capacity in the U.S. is only 0.01 percent annually through 2040. Currently, approximately 0.8 percent of net electricity generation in Ohio, and 0.3 percent in Michigan, is produced by hydroelectric generation facilities. Although efficiency upgrades at existing facilities may produce incremental additions to hydroelectric power in coming years, it is unlikely that large-scale improvements or new facilities will contribute substantively to the region by 2017 because of the time required to design, license, and construct such facilities. Hydroelectric power generation will likely continue to be a small part of the region's renewable energy portfolio and is not considered a feasible alternative to meeting the NEXUS Project's Purpose and Need by 2017.

Biomass

Biomass from wood and wood waste, as well as municipal solid waste and landfill gas, has contributed to Ohio's net electricity generation from renewables. However, the total contribution of renewable energy sources to net electric generation in Ohio is less than 1 percent. Researchers are investigating the potential of native Ohio switchgrass for cellulosic ethanol production and the biofuel potential of giant miscanthus, a perennial grass native to Asia. Additionally, methane from manure generated on Ohio's many farms could be used to generate electricity using biodigesters (EIA, 2013a).

In Michigan, biomass accounted for approximately 42 percent of Michigan's renewable net electricity generation in 2013. The total contribution of renewable energy sources to net electric generation in Michigan is only approximately 6 percent (EIA, 2013b). Therefore, although it is likely that biomass power generation will continue to be part of the Midwest Region's renewable energy portfolio, biomass is not considered a feasible alternative to meeting the Purpose and Need of the NEXUS Project by 2017.

Solar

Solar power is not considered a feasible alternative to meeting the existing and future natural gas fuel supply needs of electric generators (by 2017) and the needs of other natural gas customers for the NEXUS Project. In addition solar power may be less practical due to developmental costs, reliability issues and availability at times of peak demand (solar power generation is intermittent, depending on the time of day and weather conditions), and the need for large expanses of land. Some of the largest completed solar photovoltaic power plants, also called solar parks or fields, have area efficiency of about 4.5 to 13.5 acres per MW (Solar by the Watt 2009). Assuming all 1.5 Bcf/d of gas that will be supplied by the NEXUS Project was used to generate electricity in typical natural gas-fired combined cycle power plants, over 9,400 MW of electricity could be generated per hour (i.e., the electric generation from a 9,400 MW power plant).[4] Therefore, it is estimated that the land requirements for a 9,400 MW solar project would range between 42,300 and 126,900 acres of permanent disturbance. Note that natural gas fired power plants can generate electricity at full capacity throughout a day while solar power is more intermittent; thus, a solar project would need to be much larger than 9,400 MW to reliably produce on a daily basis the equivalent amount of electricity

[4] Based on the default high heat value for natural gas of 1,026 Btu/scf from Table C-1 of 40 CFR Part 98 and the typical combined cycle facility heat rate of 6,798 Btu/kWh from Exhibit ES-2 of the United States Department of Energy's *Cost and Performance Baseline for Fossil Energy Plants* (USDOE, 2013).

produced from natural gas fired generation and be able to store energy in some manner for use during night periods.

As a result of these extensive land requirements, it is not reasonable to expect solar power to be developed at a pace that would provide for the projected energy needs of the Project market area. The proposed Project may cause initial or temporary earth disturbance, however, unlike solar parks or fields, the majority of the area will be restored, re-vegetated, and the permanent ROW will be maintained in an herbaceous condition (rather than an impervious or shaded surface that would be found in a solar park or field) that can provide habitat for flora and fauna in the long term. While solar energy development will likely continue to be a component of the energy portfolio in the region, the land requirements needed for solar power to generate the amount of electricity that could be provided by the natural gas supplied by the NEXUS Project would be cost prohibitive. As such, solar power is not considered a feasible alternative to meeting the Purpose and Need of the NEXUS Project by 2017.

10.2.6 No-action Alternative Conclusion

The no-action alternative would avoid all of the direct environmental impacts that would be associated with the proposed action to construct and operate the NEXUS Project. The increasing demand for natural gas and the need for incremental pipeline takeaway capacity out of the Utica and Marcellus region would nonetheless need to be met through other natural gas pipeline infrastructure, energy conservation or some other energy alternative (e.g., increased use of other fossil fuels for electricity generation and by other industrial/commercial/residential users, some of which may come from foreign supplies), all of which have their own associated impacts. As described in Sections 10.2.4 and 10.2.5, above, energy conservation and the use of alternative energy strategies will not fully satisfy the market needs of targeted consumers. For these reasons, the no-action alternative was not found to be a feasible alternative for the Project since that alternative would not satisfy the Project's Purpose and Need.

10.3 Existing Natural Gas Transportation System Alternatives

Transportation system alternatives ("system alternatives") are alternatives to the proposed action that would make use of other existing, modified, or proposed pipeline systems to meet the stated objectives of the proposed Project. System alternatives would involve the transportation of the equivalent amount of incremental natural gas that would make it unnecessary to construct all or most of the proposed Project, although modifications or additions to other existing pipeline system(s) may be required to increase capacity, or another entirely new system may be required. Although these modifications or additions could result in environmental impacts, the impacts may be less, similar to, or greater than those associated with construction of the NEXUS Project.

As stated in Resource Report 1, Section 1.1.3, the Project is utilizing existing capacity on natural gas transportation systems to the extent practicable. Use of existing systems through contracting of capacity reduces the need for additional greenfield pipeline construction. Capacity will be contracted on Texas Eastern's system from certain receipt points located between Berne, Ohio and Uniontown, Pennsylvania to a delivery point at a new interconnection between Texas Eastern and Utica East Ohio Midstream, LLC's Kensington Processing Plant in Hanover Township, Ohio; on the DTE Gas system from Willow Run to the Vector-Milford junction interconnect (Milford Meter Station) between DTE Gas and Vector, as well as capacity on the DTE Gas system to the Belle River Mills interconnect with Vector and to the U.S./Canada border; and on Vector extending from Vector's Milford and Belle River Mills Meter Stations to the Union Gas Limited Dawn Hub in Ontario, Canada.

System alternatives that would result in significantly less environmental impact might be preferable to the Project. However, only those alternatives that are reasonable and consistent with the underlying Project Purpose and Need are required to be considered under the NEPA. Consequently, a viable system alternative that is technically and economically feasible and practicable must also satisfy the Project's Purpose and

Need including the necessary contractual commitments made with the shippers supporting the development of the NEXUS Project.

10.3.1 Modification of Existing Pipeline Systems

There are three existing pipeline systems or system combinations within the broad area to be served by the NEXUS Project that were evaluated to consider rendering the same service as proposed by NEXUS (*see* Figure 10.3-1). They are:

- Texas Eastern and Panhandle Eastern Pipeline Systems
- Dominion Transmission and Panhandle Eastern Pipeline Systems
- Columbia Gas Transmission

Each pipeline system is evaluated below for suitability to render the same service as that proposed by the NEXUS Project.

10.3.1.1 Texas Eastern and Panhandle Eastern Pipeline Systems

This transportation alternative evaluated utilizing existing pipeline systems to deliver gas from the Kensington Plant to the Dawn storage facility, and to NEXUS target markets, via expansions of the existing Texas Eastern and Panhandle Eastern systems for volumes up to 1 Bcf/d. To create 1.0 Bcf/d of capacity it would entail pipeline loop, new pipeline segments, new customer delivery laterals, and compression. Higher projected capital cost, rate stacking and higher fuel retention when compared to a greenfield project led to the conclusion that this route did not meet the economic expectations for the transportation route, so it was not evaluated further.

10.3.1.2 Dominion Transmission and Panhandle Eastern Pipeline

This alternative is very similar to the Texas Eastern and Panhandle Eastern route in that it would involve moving gas from the Kensington area to Gas City, Ohio along Dominion's existing system as well as greenfield pipe into the Panhandle Eastern system. It was determined by comparison that this alternative presents similar concerns as the Texas Eastern/Panhandle Eastern alternative described above (i.e., increased looping, new pipeline segments, new customer delivery laterals, and compression, higher projected capital cost, rate stacking and higher fuel retention when compared to a greenfield project). Therefore, this pipeline system alternative was not evaluated further.

10.3.1.3 Columbia Gas Transmission

The Columbia Gas Transmission system has a segment of pipeline that extends from near Kensington to the Toledo, Ohio area, generally similar to a large portion of the proposed NEXUS route. Columbia's information portal indicates that the capacity on the Columbia Gas Transmission system into the Toledo area is approximately 200 Mmcf/d. To create the ability to deliver 1.5 Bcf/d into the Toledo area or to DTE at Willow Run along Columbia would require incremental facilities similar to those already being proposed by NEXUS in addition to customer delivery laterals. Because the environmental and socio-economic impacts from such a project would be similar to that proposed by NEXUS, it was not evaluated further.

10.3.2 Proposed Pipeline Systems

There are three proposed pipeline systems within the broad regional area that would be served by the NEXUS Project. NEXUS evaluated whether the proposed Rover Pipeline Project (FERC Docket No. CP15-93-000), Leach XPress Project (FERC Docket No. CP15-514-000), or ANR East Pipeline Project could meet the demands of NEXUS' customers and avoid the need for the proposed NEXUS Project (*see* Figure 10.3-2). The following sections describe this analysis.

10.3.2.1 Rover Pipeline Project

Rover Pipeline, LLC ("Rover") is a subsidiary of Energy Transfer and proposes to construct a new natural gas pipeline system that would consist of approximately 712.9 miles of 24-inch, 30-inch, 36-inch and 42-inch pipelines. This would include ten Supply Laterals for a total of 238.4 miles and three Mainlines (Mainlines A [190.9 miles] and B [183.6 miles], and the Market Segment [100 miles]), ten compressor stations, and associated meter stations and other aboveground facilities that would be located in parts of West Virginia, Pennsylvania, and Ohio (Rover, 2015a). Generally, the Supply Laterals will deliver gas from receipt points in the Marcellus and Utica shale supply areas in West Virginia, Pennsylvania, and Ohio to delivery points along Mainlines A and B, which will run parallel (for most of their length) from Harrison County, Ohio to the Midwest Hub in Defiance County, Ohio. The Market Segment will run from the Midwest Hub north to the interconnection with Vector in Livingston County, Michigan.

Rover filed its Certificate Application with the FERC in February 2015 (FERC docket number: CP15-93-000). Since February 2015, Rover has responded to FERC data requests and is working with the FERC to complete the NEPA review process. Rover has expressed a desire to commence construction in June/July 2016, pending receipt of all applicable permits and clearances. In order to meet the production and delivery schedules of its shippers, Rover is proposing a Q1/Q2 2017 in-service date.

Development of the Rover Pipeline is driven by increases in domestic natural gas production, specifically in the Marcellus and Utica regions. Rover has entered into precedent agreements with nine producers, so that the Project is currently subscribed through 15- and 20-year contracts to transport 3.1 Bcf/day of the 3.25 Bcf/day available capacity. As such, the Rover Project is nearly fully subscribed (95 percent), and Rover anticipates subscribing the remaining 0.15 Bcf/day of firm capacity in the near future (Rover, 2015b).

The Rover Pipeline Project would provide a connection with producers in the Marcellus and Utica Shale areas of West Virginia, Pennsylvania, and Ohio, and would allow movement of their production to markets in the Gulf Coast, Midwest and Canada, including interconnections with Energy Transfer's existing Panhandle Eastern Pipeline and other Midwest pipeline interconnects near Defiance, Ohio, and a connection into the Canadian gas trading hub located in Dawn, Canada (Rover, 2015b).

The Rover Project is not a suitable alternative to NEXUS because it serves a different, producer-driven purpose and need that does not include the markets served by NEXUS. The NEXUS Project is both a supply push and market pull pipeline project, meaning the Project targets transportation needs of both producers and end-use customers. In contrast to Rover, the majority of the market areas that the NEXUS Project would serve in Ohio are located in close proximity to Lake Erie, either directly adjacent to the lake or to the south. As shown on Figure 10.4-1, NEXUS has selected its proposed Ohio pipeline route to serve the gas needs of these Ohio markets and to minimize environmental impacts. The distance to those market areas would require Rover to build and operate substantial additional laterals beyond the ten that Rover already expects to require to meet its purpose and need. Moreover, even with laterals, Rover has virtually no available capacity to serve the Ohio market areas that NEXUS serves. Finally, substantially increasing the size of the Rover Project to accommodate the demonstrated demand for NEXUS would require extensive new analysis, new design, public review, and engagement of agency (and other) stakeholders by Rover. Such efforts would make the Rover Project substantially unlikely to fulfill the NEXUS commitment to customers for a November 1, 2017, in-service date. For these reasons, the proposed facilities associated with the Rover Pipeline Project do not meet the NEXUS Project's Purpose and Need and are not a reasonable alternative to NEXUS.

10.3.2.2 Leach Xpress Project

Columbia Gas Transmission, LLC ("Columbia") proposes to construct and operate the Leach Xpress facilities in West Virginia and Ohio to transport natural gas produced in northern West Virginia, southwestern Pennsylvania, and eastern Ohio westward to Columbia's existing pipeline system located in

central Ohio. From this point, natural gas would flow south via Columbia's existing and the proposed project facilities for delivery to various market and interconnect points located on Columbia's system.

The Leach Xpress project consists of: i) two natural gas greenfield pipelines; ii) two natural gas pipeline loops; iii) the abandonment in place of a segment of one existing natural gas pipeline; iv) the construction of three greenfield compressor stations; v) the construction of three compressor units and the abandonment of one compressor unit at an existing compressor station; and vi) various appurtenant and auxiliary facilities. The proposed Leach Xpress project's pipeline facilities would total approximately 160.5 miles of pipe and add approximately 143,000 horsepower of compression to transport up to 1.5 Bcf/d of natural gas. Facilities to be constructed are located in Marshall and Wayne Counties, West Virginia, Greene County, Pennsylvania, and Monroe, Noble, Muskingum, Morgan, Perry Fairfield, Hocking, Jackson, Lawrence and Vinton Counties, Ohio (Columbia, 2015). These new facilities are being proposed to provide portions of the new capacity from central Ohio via Columbia's existing pipeline system to the Ohio market as well for Columbia's other operational requirements. Columbia anticipates initiating construction in late 2016, with a targeted in-service date during the second half of 2017 (Columbia, 2015).

Columbia filed its Certificate Application with the FERC in June 2015 (FERC docket number: CP15-514-000). The FERC's Notice of Application references Columbia Gulf Transmission's Rayne Xpress project as a connected action that must be considered in the Leach Xpress Environmental Impact Statement (EIS) for compliance with the NEPA and indicates that the Commission cannot begin preparation of the EIS until the Notice of Application for the Rayne Xpress project is issued. FERC will then issue a Notice of Schedule for Environmental Review that will indicate the anticipated date for the Commission's staff issuance of the final EIS analyzing both the Leach Xpress and Rayne XPress proposals (FERC, 2015).

The Leach Xpress Project is not a suitable alternative to NEXUS because it has a different purpose and need, serving different markets. Leach Xpress runs west and south in order to bring natural gas from the Ohio/West Virginia border to central Ohio and parts south. In contrast, the Purpose and Need of the NEXUS Project is to 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 the Dawn Hub in Ontario, Canada. The Leach Xpress Project does not come close to Michigan or Canada, so it would require an additional greenfield pipeline to reach the markets served by NEXUS. Even in Ohio, the two projects serve different markets. In Ohio, the NEXUS Project would serve primarily market areas in close proximity to Lake Erie. To serve these Ohio markets, the Leach Xpress Project would require substantial laterals whose total mileage is likely comparable to or greater than its proposed mainline pipeline. Modifying the Leach Xpress Project so fundamentally through the addition of significant greenfield mainline and lateral pipelines would also jeopardize the commitment of the NEXUS Project to provide service to customers by November 1, 2017. For these reasons, the proposed facilities associated with the Leach Xpress Project do not meet the NEXUS Project's Purpose and Need and are not a reasonable alternative to NEXUS.

10.3.2.3 ANR East Pipeline Project

The ANR East Pipeline Project was originally announced by TransCanada with a targeted in-service date in the 3rd Quarter of 2017. However, the project appears to be in an early stage of development, and it has not yet entered the pre-filing process with the FERC. Accordingly, the contours of the project remain uncertain. As currently envisioned, the project appears to be a producer-driven pipeline intended to provide Utica and Marcellus shale producers and other interested parties access to the Gulf Coast and certain Midwest markets. The pipeline would consist of approximately 320 miles of large diameter, 1440 psig maximum allowable operating pressure pipeline and up to 140,000 horsepoer ("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. In addition to receipt points at Cadiz, the ANR East Pipeline Project is proposed to provide receipt points at Tuscarawas with Dominion Transmission (TL-400) and Tenness*ee* Gas Pipeline.

The project would deliver gas into ANR's ML 3 tariff zone at Defiance and into ANR's Zone ML7 at the Joliet Hub in Lake County, Indiana (TransCanada, 2014a).

As currently conceived, the ANR East Pipeline Project is unsuitable as an alternative to the NEXUS Project because it is not sufficiently advanced in its details and regulatory status to achieve the in-service date requirements of NEXUS's customers. Moreover, it is not intended to fulfill the market demand served by NEXUS. No part of the ANR East Pipeline Project is anticipated to approach the market areas near and south of Lake Erie, which constitute the majority of the market areas that the NEXUS Project would serve in Ohio. For these reasons the proposed facilities associated with the ANR East Project do not meet the NEXUS Project's Purpose and Need and are not a reasonable alternative to NEXUS.

10.4 Facility Design and Siting of the NEXUS Facilities

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 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 to the Dawn Hub in 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. In addition, natural gas production in Michigan has been declining. According to the EIA, Michigan natural gas production peaked in 1997 at 854 MMcf per day. In 2014, Michigan production averaged 315 MMcf per day, a decline of 63 percent from the peak. As a result Michigan production is serving less regional demand than in the past. For these reasons, the region to be served by the NEXUS Project, which will contribute to the relief of pipeline capacity infrastructure constraints, 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.

NEXUS is proposing a combination of greenfield pipeline construction and capacity on other pipeline systems to meet the needs of the Project shippers and the demands of NEXUS markets in a way that maximizes the overall efficient use of its system. The location of the proposed NEXUS facilities was determined by the contractual requirements of the service to be rendered by the Project and by the requirements of NEXUS' existing customers, as well as the need to serve the growing market in northern Ohio. The majority of the market areas that the NEXUS Project would serve in Ohio are located in close proximity to Lake Erie, either directly adjacent to the lake or to the south. NEXUS designed the Project facilities and route to serve the gas needs of these Northern Ohio market areas, as shown on Figure 10.4-1, and to minimize environmental impacts. These market areas are critical in anchoring the location of the NEXUS route.

NEXUS began the facilities siting process with an understanding of prospective customer needs and known receipt and delivery locations. In addition, NEXUS anticipates continued growth in demand for natural gas in Ohio that largely reflects future usage from electric power producers as well as Ohio's industrial users (*see* the *Ohio Natural Gas Market Study - Prepared for the NEXUS Gas Transmission Project* provided in Appendix 1C4 of Resource Report 1) and NEXUS target markets. The process of siting pipeline facilities between these receipt and delivery points was initiated with a critical issues analysis that employed a Project-specific geographic information system ("GIS") for the evaluation of siting constraints. This project-specific GIS included U.S. Geological Survey ("USGS") topographic mapping; recently flown aerial photography, U.S. Fish and Wildlife Service ("USFWS") National Wetland Inventory ("NWI") mapping; Natural Resources Conservation Service medium intensity soil surveys; National Hydrography Data ("NHD"); and public lands datasets obtained from the Ohio and Michigan state agencies.

Potential siting constraints were evaluated by a multidisciplinary team of professionals including representatives from engineering, environmental, land acquisition, regulatory, and construction disciplines. Each segment of the proposed pipeline route was evaluated carefully using GIS data, supplemented with field reconnaissance where necessary, to identify the least-constrained route that meets the Project's Purpose and Need. Once this initial route was identified, NEXUS deployed its multidisciplinary team to the field where access is available to further refine the route and to initiate communications with landowners; local, state, and federal public officials; and regulatory agencies. As described in Resource Report 1, NEXUS held nine informational meetings along the proposed route to obtain public feedback on its initial siting of Project facilities within a 600-foot-wide study corridor. This public feedback and additional feedback received since the informational meetings continue to be evaluated. Extensive regulatory agency outreach has also been initiated and will continue throughout the facilities siting process (*see* Appendices 1C2 and 1C3 to Resource Report 1).

Determination of facilities and their proposed locations, detailed below, were further refined by considerations which include, but were not limited to, potential for impacts on the natural and human environment, proximity to major gas consumers, minimization of disturbance to local residents and businesses, access, suction pressure, discharge pressure, available horsepower, contract pressures and flows, site availability and site suitability for the proposed use.

NEXUS is committed to continuing its review of the pipeline route and aboveground facility locations with stakeholders and working to accommodate their concerns and to avoid and minimize potential impacts to the extent practicable. NEXUS has evaluated over 250 route variations to date and will continue to be responsive to stakeholder concerns throughout the regulatory review process.

10.5 Major Route Alternatives

Based on FERC guidance, a major route alternative is an alignment that has the potential to meet the Project objective but would deviate significantly from the proposed route. In evaluating the routing alternatives for the Project, NEXUS strived to co-locate the pipeline ROW within or adjacent to existing ROWs, including public and private roadways, railroads, and existing electric transmission line and pipeline corridors, to the maximum extent practicable. The use of co-location as a principal design element by NEXUS was necessitated, not only by Commission guidelines, which stress the corridor co-location concept, but also to avoid and minimize impacts on adjacent landowners to the extent practicable. Siting pipeline facilities along existing corridors and ROWs reduces the need to establish new maintained utility corridors in previously undisturbed areas and reduces the number of affected landowners.

This section examines major route alternatives that were identified and evaluated during the planning and siting stage of the Project and those that were incorporated into NEXUS' proposed route. Existing GIS data sources were evaluated by a multi-disciplinary team including engineering, environmental, lands and construction personnel. To facilitate consistency across the evaluations, field data collected for the proposed route were not included in these evaluations since equivalent field data were not available for the alternative routes. Data sources include high resolution aerial photography, USGS topographic maps; Google Earth™; GIS databases from county, state and federal sources; NHD; USFWS, NWI maps; and state natural resource and public land use data layers. The following Major Route Alternatives are organized by milepost ("MP"), generally from east to west. Tables in the Tables Section provide a comparison of the Major Route Alternatives with the corresponding segment of the proposed route. Figures depicting the Major Route Alternatives are located in the Figures Section of this resource report.

10.5.1 Major Route Alternatives Evaluated for the NEXUS Project

The following Major Route Alternatives were evaluated for the NEXUS Project during the siting of the pipeline facilities to address stakeholder comments and determine if environmental and engineering impacts could be avoided or minimized. The impact comparisons presented in the following sections (and associated tables and figures) may differ slightly from what was filed in the June 2015 pre-filing submittal

because the proposed route has changed as the result of refinements in the engineering design, further communications with existing utility owners, and in response to stakeholder requests.

10.5.1.1 Southern Route Alternative

NEXUS evaluated a Southern Route Alternative, in comparison to the proposed route, to address stakeholder comments and to evaluate the environmental and engineering feasibility of a more southern route that still accommodates the required deliveries to NEXUS confirmed market connections while also meeting the Project's Purpose and Need as described in Section 1.2 of Resource Report 1. The Southern Route Alternative is depicted in Figure 10.5-1 and a comparison of the Southern Route Alternative with the corresponding segment of the proposed route is provided in Table 10.5-1.

Alternative Description

The Southern Route Alternative deviates from the proposed route at MP 1.4 in Columbiana County, and crosses the northern boundary of the proposed Hanoverton Compressor Station site. The alternative route heads in a westerly direction for approximately 9.8 miles and would cross a combination of forest, open, and agricultural land. The alternative route generally parallels an abandoned railroad and existing pipeline ROW between approximate MP 3.7 and MP 7.0. It would cross U.S. Highway 30 at MP 0.5 and MP 3.4, parallel Sandy Creek at MP 3.7, cross Sandy Creek at MP 4.2 and MP 8.0, and cross U.S. Highway 30 and the Ohio Central Railroad at MP 7.8. The alternative route would cross the Columbiana/Stark county line at MP 8.3. Between MP 9.8 and MP 13.3, the Southern Route Alternative heads in a southwesterly direction, parallels an existing pipeline ROW between MP 11.1 and MP 12.3, and would cross the Stark/Carroll county line at MP 11.0 and Sandy Creek at MP 12.8 and MP 13.4.

At MP 13.3, the Southern Route Alternative turns generally west extending to MP 95.7 and would cross a combination of forest, open and agricultural land. Between MP 13.3 and MP 22.0, it follows an existing transmission line ROW and would cross the Carroll/Stark county line at MP 18.1. The alternative route deviates from this ROW at MP 22.0 to avoid residential, steep sloped, and forested areas and would cross Nimishillen Creek at MP 24.7. The alternative route rejoins the transmission line ROW at MP 26.3 and it continues to follow the existing transmission line ROW. It would cross Sulphur Run at MP 28.2 and then deviate from the ROW between MP 31.6 and MP 36.7 to avoid residential areas. The alternative route would cross Interstate 77 at MP 29.6, the Tuscarawas River at MP 34.6, and remain south of the Village of Navarre.

At MP 36.6, the Southern Route Alternative turns north, rejoins and follows an existing transmission line ROW to MP 39.9 where it then deviates from the ROW and turns northwesterly to avoid residential areas north of the Village of North Brewster. The alternative route would cross the Stark/Wayne county line at MP 43.5. At MP 44.0, the alternative route follows an existing Wheeling and Lake Erie Railroad ROW for approximately 2.0 miles and then begins to follow an existing transmission line ROW from MP 47.9 to MP 54.5. Between M 54.5 and MP 56.0, the alternative route deviates from the ROW and continues in a north and west direction to avoid residential areas in East Union Township. Once the alternative route rejoins the ROW it crosses through the northeastern portion of the City of Wooster and would cross U.S. Highway 30 at MP 57.0 and Spring Run at MP 58.7.

The Southern Route Alternative deviates from the existing transmission line ROW between MP 65.8 and MP 70.6 to avoid residential, steep sloped, and forested areas. It would cross Killbuck Creek and the Baltimore and Ohio Railroad at MP 67.9 and then deviate from the ROW between MP 73.4 and MP 78.4 to avoid residential areas and the Rowsburg community. It would cross the Wayne/Ashland county line at MP 74.7. From MP 78.4, the alternative route follows an existing pipeline ROW to MP 86.6 and turns in a northerly direction where it begins to parallel an existing transmission line ROW at MP 88.6 and skirts the southern and western portions of the City of Ashland and nearby residential areas. The alternative route would cross the Ashland/Richland county line at MP 91.7.

The Southern Route Alternative follows an existing transmission line ROW to MP 95.7 and then continues in a northwesterly direction where it leaves the ROW and follows an existing pipeline ROW to its terminus. Within this area, it would cross mostly open and agricultural land, the Sandusky River and Sandusky Scenic River State Access Area at MP 143.2, and the Portage River at MP 161.0. The alternative route would cross the Richland/Crawford county line at MP 110.5, Crawford/Huron county line at MP 114.6, Huron/Seneca county line at MP 117.3, Seneca/Sandusky county line at MP 141.1, and the Sandusky/Wood county line at MP 159.9, and extends to approximate MP 168.3 where it rejoins the proposed NEXUS route at MP 170.5 of the proposed route.

Market Deliveries

NEXUS has signed market connections that require installation of multiple connection points located along the proposed Project route. These confirmed market connections are depicted in Figure 10.4-1.

NEXUS has selected its proposed pipeline route to serve the gas needs of these Northern Ohio market areas (*see* Figure 10.4-1) while avoiding and minimizing impacts to the natural and human environments to the extent practicable. If the Southern Route Alternative were implemented, five customer delivery laterals totaling an additional 101.7 miles of pipeline, would be required to deliver gas to confirmed market connections as depicted on Figure 10.4-1A, and described in Table 10.5-1.

Compressor Station Relocations

If the Southern Route Alternative were adopted as NEXUS' proposed route, two of the proposed compressor stations along the proposed route would have to be relocated to the alternative pipeline route (*see* Figure 10.4-1A). To maintain hydraulic requirements, specific distances between compressor stations are required. As a result, compressor stations for the NEXUS Project must be located at approximate 60-mile intervals.

The proposed Wadsworth Compressor Station site in Medina County (approximate MP 63.5 of the proposed route) would be relocated to approximate MP 61.4 of the Southern Route Alternative. This would place the compressor station site near dense residential and commercial areas along the north-northeast side of the City of Wooster in Wayne County.

The proposed Clyde Compressor Station in Sandusky County (approximate MP 134.0 of the proposed route) would be relocated to approximate MP 121.5 of the Southern Route Alternative. This would place the compressor station site in an open/agricultural area near residences southwest of Caroline, an unincorporated community in Venice Township in Seneca County.

Environmental and Engineering Comparison

As shown in Table 10.5-1 (based on NWI wetlands mapping), the Southern Route Alternative with required laterals would affect 7.4 acres less wetlands than the corresponding segment of the proposed route. Environmental disadvantages of the Southern Route Alternative with laterals include 100.9 miles more pipeline construction, 1,222.5 acres more temporary construction workspace disturbance; 611.3 acres more permanent ROW; 159 more waterbody crossings resulting in 3,358.2 linear feet more waterbodies affected; 114.8 acers more forested land affected; 32.4 miles more areas of potential subsidence and 8.8 miles more areas of high landslide potential crossed (*see* Figure 10.4.1).

The primary engineering advantages of the Southern Route Alternative are that it would cross 4.4 miles less high and 9.9 miles less medium population density areas than the corresponding segment of the proposed route. The Southern Route Alternative is also co-located with existing ROWs for 39 more miles than the corresponding segment of the proposed route. The primary engineering disadvantages of the Southern Route Alternative are that it would require five customer delivery laterals totaling 101.7 miles of additional pipeline and two compressor stations would need to be relocated.

Schedule and Cost

The Project's scheduled in-service date is November 1, 2017. If the Southern Route Alternative were selected as the proposed route, the in-service date would likely be delayed until late 2018. The delayed in-service date would be due to several factors including the requirement to contact new landowners along the new pipeline route and laterals, request landowner survey permission, perform siting of new pipeline and compressor stations; prepare new engineering drawings; perform new stakeholder and landowner outreach activities; initiate new federal, state, and local agency consultations; perform new biological and cultural field surveys; hold additional public open houses and scoping meetings; update environmental impact assessments, revise Resource Reports and the Certificate Application and file with the FERC; update federal and state permit applications and file with regulatory agencies.

NEXUS has signed agreements for the majority of the Project's capacity. These market areas are depending upon NEXUS to provide natural gas transmission services in 2017 in order for them to meet their demands. Use of the Southern Route Alternative would not allow customers to meet their energy needs starting in 2017.

The estimated cost of the Southern Route Alternative would be approximately $706 million, which is approximately $138 million more than the corresponding segment of the proposed NEXUS route.

Conclusions

The majority of the market areas that the NEXUS Project would serve in Ohio are located in proximity to Lake Erie as depicted on Figure 10.4-1. The Southern Route Alternative is not considered a reasonable alternative to the proposed NEXUS route based on environmental, engineering, schedule and cost disadvantages including longer pipeline length; greater overall impact on the environment during pipeline construction and operation; crossing of more forest land and roads; and greater effects due to the number and total length of required customer delivery laterals, and the need to relocate two compressor stations.

10.5.1.2 City of Green Alternative

NEXUS performed a detailed analysis of the City of Green Alternative submitted to the FERC's docket via letter dated March 23, 2015. In this letter, the City of Green states "….we make this request based upon the principals of minimizing impacts of the proposed pipeline to both human and environmental features….". NEXUS performed its analysis of the City of Green Alternative to evaluate if adopting the City of Green Alternative would meet these objectives. In addition, NEXUS has maintained communications with City of Green officials throughout the development process, and in addition to providing Draft versions of Resource Report 1, *Project Description*, and Resource Report 10, *Alternatives*, during the pre-filing process, NEXUS participated in the following meetings in an effort to work with City of Green officials to address specific issues and address siting concerns:

- October 6, 2014 – Stark/Summit County Landowner Information Meetings
- October 30, 2014 – Project Overview Meeting with City of Green
- November 18, 2014 – Project Updated Meeting with City of Green
- January 26, 2015 – Project Update, Stark & Summit County Public Officials Briefing
- February 9, 2015 – NEXUS Open House, Stark/Summit County
- March 31, 2015 – Project Update Meeting - City of Green
- April 30, 2015 – FERC Public Scoping Hearing, Stark County
- September 23, 2015 – City of Green - Project Overview and Status Update
- October 2, 2015 – Project Route Discussion with City of Green and Akron Canton Regional Airport Officials

As a result, and based on stakeholder letters submitted to the FERC docket, in addition to the City of Green major route alternative presented below, many minor route variations have been evaluated in the vicinity

of the City of Green. These route variations are listed by NEXUS milepost and are summarized in Sections 10.6.1 and 10.6.2 of this Resource Report 10.

Introduction

In an effort to determine if the City of Green Alternative minimizes impacts to the natural and human environment, NEXUS evaluated the following metrics for both the City of Green Alternative and the corresponding segment of the NEXUS pipeline route: total pipeline length; percent pipeline paralleling existing rights-of-ways; total acres of temporary construction disturbance; total acres of permanent easement; laterals required to deliver gas to current NEXUS customers; total length of laterals including temporary and permanent easements in acres; total number of forested, scrub-shrub, emergent wetlands crossed and total acres of wetlands affected; total number of waterbodies crossed, total crossing distances, and number of major waterbodies crossed (i.e., greater than 100 feet wide); groundwater resources including groundwater wells, sole source aquifers and wellhead protection areas; wildlife habitats including acres of forested habitat, designated critical wildlife habitats, waterfowl production areas, and wildlife management areas; cultural resources including properties listed on the National Register of Historic Places; geologic hazards including faults, areas of potential subsidence and areas of high landslide potential; areas of rugged terrain requiring sidehill construction methods and expanded construction ROW; national and state parks and forests; public conservation lands; an assessment of land ownership including public, private, and tribal lands; residential structures within 50 feet of the proposed construction right of way; total road crossings including those that would need to be crossed using the horizontal bore, open cut, and horizontal directional drill crossing methods; and number of railroad crossings. A summary of this analysis is provided in Table 10.5-2, *Comparison of the City of Green Alternative with the Corresponding Segments of the Proposed Route* (*see* Tables section) at the end of this report. Maps showing the City of Green Alternative and the corresponding segment of the NEXUS pipeline route are provided as Figure 10.5-2 (*see* Figure section – Maps 1 of 38 through 38 of 38, City of Green Alternative). In addition minor route variations evaluated in the vicinity of the City of Green can be found by mileposts along the NEXUS route in Sections 10.6.1 and 10.6.2 of this Resource Report 10.

Analysis Methods

In order to perform the above described detailed analysis of the City of Green Alternative NEXUS created an electronic representation of the City of Green Alternative from the USGS maps attached to the City of Green's letter to the FERC. It is important to clarify that the NEXUS pipeline route shown on the City of Green's maps and evaluated by the City of Green represents an outdated pipeline alignment dated January 2015 in the pre-filing process. The *Comparison of the City of Green Alternative with the Corresponding Segments of the Proposed Route*, summarized in Table 10.5-2, is based on an updated (July 2015) NEXUS pipeline route that incorporated numerous line changes resulting from stakeholder and landowner feedback (summarized in Section 10.6 of this report) and depicted in Project alignment sheets included as Appendix 1A to Resource Report 1.

Additionally, the impact assessments performed by NEXUS are based on FERC guidance and on a proposed 100-foot-wide nominal construction ROW (i.e., temporary construction disturbance) in uplands and, pursuant to the FERC *Wetland and Waterbody Construction and Mitigation Procedures* (May 2013 version), a 75-foot-wide temporary construction ROW when crossing wetlands. In contrast, the analysis cited in the letter from the City of Green indicates that its wetland and waterbody impact assessments were based on "wetland and open water within 100 feet of either side of the pipeline" (i.e., a 200 foot construction disturbance) resulting in a more than double approximation of potential wetland and waterbody impacts compared to what would realistically occur. In addition, the City of Green analyses cite use of the National Hydrography Dataset from the USGS for the purpose of estimating wetland and waterbody impacts, as opposed to the USFWS NWI dataset which is recommended by the FERC Guidance. The impact assessment performed by NEXUS uses FERC guidance and performs an "apples to apples" comparison of the City of Green Alternative and the corresponding segment of the current NEXUS pipeline route using

the USFWS's NWI dataset to calculate wetland impacts and National Hydrography datasets for calculating waterbody impacts.

In addition to the environmental evaluation of the City of Green Alternative, NEXUS performed a detailed engineering evaluation based on desktop analyses, high resolution aerial photography, and GIS assessments. These analyses are summarized below following a description of the City of Green Alternative.

Alternative Description

The City of Green Route Alternative deviates from the proposed route at MP 1.8 in Columbiana County, approximately 0.17 mile north of the northern boundary of the proposed Hanoverton Compressor Station site. It heads in a westerly direction for approximately 62 miles, turns north to northwest for approximately 40.9 miles, and rejoins the proposed route at MP 98.8 in Lorain County (*see* Figure 10.5-2).

The City of Green Alternative would cross a combination of open, agricultural, and forest land. Based on NEXUS' review of the submitted alternative, it would be located south of the cities of Canton and Massillon and travel through the southernmost end of the city of Wooster, and cross major roadways including U.S. Highway 30, Interstate 77, U.S. Highway 62, U.S. Highway 250, Interstate 71, and U.S. Highway 20. The City of Green Alternative would cross several (four) strip mine areas, residential neighborhoods, and waterbodies, and would be along the western edge of the Camden Cemetery located southeast of the Village of Kipton. The City of Green Route Alternative would cross five counties in Ohio including Columbiana, Stark, Wayne, Medina, and Lorain.

Compressor Station Relocation

If the City of Green Alternative were adopted as NEXUS' preferred route, the proposed Wadsworth Compressor Station currently sited along the proposed NEXUS pipeline route would have to be relocated to the alternative pipeline route to maintain pipeline hydraulic requirements.

Based on pipeline engineering requirements, compression would be required at approximately 60 mile intervals. The proposed Wadsworth Compressor Station site in Medina County (approximate MP 63.5 of the proposed route) would be relocated to approximate MP 59.6 of the City of Green Alternative in Wayne County. This would place the new compressor station site in an existing residential area in the vicinity of Millbrook Road near the southwestern boundary of Wooster and southeastern boundary of Plain in Wayne County. Current land uses in this area include residential properties, mature forest, and agricultural lands.

Environmental and Engineering Comparison

As shown in Table 10.5-2, based on a comparison of the proposed NEXUS pipeline route with the City of Green Alternative and four customer delivery laterals, the alternative (based on NWI wetlands mapping) would affect 9.1 acres less wetlands. The alternative route would cross 0.31 mile less state park land, and 0.27 mile more of public or conservation lands than the corresponding segment of the proposed route. The primary environmental disadvantages of the alternative with laterals are that it would result in more waterbody impacts (123 additional crossings and an additional 3,531.4 linear feet of waterbody crossing length); would affect 152.5 acres more forested land; would cross 0.1 more mile of steep side slope areas, require 13.1 miles more side hill construction, cross 0.5 mile more areas of potential subsidence, and cross 2.6 miles more of area of high landslide potential.

The primary engineering disadvantages are that the City of Green Alternative would require four customer delivery laterals not required by the current route. The City of Green Alternative and laterals would result in 62.1 miles more pipeline impacting 752.8 acres more land during construction and 376.4 acres more land during operations (*see* Table 10.5-2). In addition, eight more wellhead protection areas would be crossed by a 300-foot corridor centered over the alternative route and laterals.

NEXUS also conducted a desktop engineering/construction review of the City of Green Alternative to evaluate potential constraints along the route. Following is a summary of this review, Figure 10.5-2 shows the referenced locations.

Between MP 0.6 and MP 1.3, the City of Green Alternative route would cross multiple shallow pipelines and a large wetland complex. It deviates from an existing utility ROW between approximate MP 2.3 and MP 4.3 and would be located within a rural residential area between MP 5.1 and MP 5.6. Several reroutes would be required within these areas to avoid and/or minimize potential impacts on the shallow pipelines, wetlands, and residences.

Between MP 8.4 and MP 9.4 the alternative route follows the centerline of an abandoned railroad bed. It would not be constructible in this area and would require a reroute approximately 200 feet to the south to avoid the railroad bed. The City of Green Alternative route traverses a deep ravine between MP 10.1 and MP 11.1 and would require the use of the horizontal directional drill ("HDD") method to avoid potential impacts in this area. It would cross the Minevera Airfield at MP 11.4, a ravine and wetland complex at MP 12.6, and a wetland area at MP 14.6. Between MP 17.1 and 23.1, the alternative route would encroach on strip mining areas and steep side slopes, parallel a waterbody, and encroach on roads and an additional strip mining area. NEXUS would attempt to reroute around each of these features to avoid and/or minimize potential impacts.

At MP 23.9, the City of Green Alternative rejoins an existing utility ROW and between MP 25.1 and 29.9 it would cross a steep side slope area, residential areas, a KOA Campground, landfill, and quarry, all of which NEXUS would attempt to avoid by implementing several additional reroutes. Between MP 30.0 and MP 33.0 the alternative route crosses the Tuscarawas River, railroad ROW, roads, and would be near residences. A substantial HDD (approximate 4,300 feet in length) in an area of steep side slopes and terrain would be required to cross the Tuscarawas River. Steep side slopes, wetlands, and residences also exist between MP 33.6 and 37.0.

Between MP 45.2 and 53.5, several reroutes would be required along the City of Green Alternative route to avoid and/or minimize potential impacts on forested areas, structures, and residences. The alternative route would not be constructible between MP 57.0 and MP 60.1 because it traverses barrow pits, wetlands, a quarry, and is surrounded by residences and state parks lands. Several other reroutes would be required between MP 60.1 and 75.6 along the alternative route to avoid and/or minimize potential impacts to wetlands, residences, and forested areas. In addition, Interstate 71 at MP 75.5 would be crossed using the HDD method. Between MP 78.1 and MP 80.1 the alternative route would be in proximity to an airport, at MP 81.6 the HDD method would be implemented to cross a railroad, ravine, and Highway 224. Shallow pipelines exist between MP 90.1 and 95.1, a railroad would be crossed at MP 96.1, and between MP 102.6 and MP 102.9 an additional railroad, pipelines, a quarry, and wetlands would be encountered, all of which would require reroutes to avoid and/or minimize potential impacts to each of these features.

Market Delivery Laterals

If the City of Green Alternative were adopted as NEXUS' preferred route, four laterals would be required to deliver natural gas to serve committed NEXUS market area connections located along the proposed route (*see* Figure 10.4-1A). In addition, one of the proposed compressor stations along the proposed route would have to be relocated to the alternative pipeline route to maintain hydraulic requirements. The proposed Wadsworth Compressor Station site in Medina County (approximate MP 63.5 of the proposed pipeline route) would be relocated to Wayne County in an area southwest of the City of Wooster along the City of Green Alternative route.

In summary, when impacts associated with the required customer delivery laterals are factored into total impacts, the City of Green Alternative would require 62.1 more miles of pipeline construction, 752.8 more acres of temporary construction disturbance, and 376.4 more acres of permanent easement.

Schedule and Costs

The NEXUS Project in-service date is November 1, 2017 and is required to meet the firm transportation service requirements of the Project shippers. The City of Green Alternative's in-service date would likely be late 2018. The in-service date delay is due to several factors including a substantive reengineering of the Project facilities; new stakeholder and landowner outreach; initiation of new federal, state, and local consultation; initial biological and cultural field surveys along the alternative route; route adjustments based on constraints revealed during field surveys; additional NEXUS open houses and informational meetings for new landowners; additional FERC public NEPA Scoping Meetings; and extensive recalculation of potential project impacts; new agency consultations; and revision to Resource Reports and Certificate Application filings.

NEXUS has signed agreements with the market connections shown in Figure 10.4-1 for the majority of the Project's capacity. These customers are depending on NEXUS to provide natural gas transmission services in 2017 in order for them to meet their demands. Use of the City of Green Alternative would not allow customers to meet their energy needs starting in 2017.

Additionally, the estimated cost of the City of Green Alternative would be approximately $404 million, which is approximately $78 million more than the corresponding segment of the proposed NEXUS pipeline route.

Lastly, the Purpose and Need of the Project is to provide for the seamless gas transportation path 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. Adopting the City of Green Alternative would preclude NEXUS' ability to efficiently serve a majority of these growing markets.

Conclusions

The City of Green Alternative is not located in the market areas identified by NEXUS and identified customers located along the current route shown in Figure 10.4-1 and, therefore, does not accomplish the Project's purpose and need. If the City of Green Alternative were implemented NEXUS would not be able to meet contractual agreements with customers to be in-service by November of 2017. In addition, when impacts associated with the required customer delivery laterals are factored into total impacts, the City of Green Alternative would require 62.1 more miles of pipeline construction; 752.8 more acres of temporary construction land disturbance; 376.4 more acres of permanent easement, and relocation of one compressor station. It would also cross 123 more waterbodies and affect 152.5 more acres of forest land than the corresponding segment of the proposed route. Therefore, implementing the City of Green alternative would not meet the stated objectives of City of Green for minimizing impacts to the natural and human environment.

10.5.1.3 Electric Transmission Line Alternative

NEXUS evaluated the Electric Transmission Line Alternative to address stakeholder comments and determine if an alternative route that parallels existing ROWs for the majority of its length would result in fewer environmental impacts than the proposed route.

Alternative Description

The Electric Transmission Line Alternative deviates from the proposed route at MP 1.8 in Columbiana County, approximately 0.29 mile north of the northern boundary of the proposed Hanoverton Compressor Station site. It heads in a southwesterly direction and follows U.S. Highway 30 and State Highway 9 for approximately 2.7 miles. It then turns westerly and follows Marble Road NE for approximately 1.8 miles and Andora Road NE, Ridge Road, and Mantle Road NE for approximately 0.8 miles. Once the Electric Transmission Line Alternative intersects with an existing powerline ROW it follows this ROW for approximately 22.0 miles and rejoins the proposed route at MP 29.7 in Stark County (*see* Figure 10.5-3).

The Electric Transmission Line Alternative would cross a combination of open, agricultural, and forest land. It would be located northeast of the Village of Minerva and cities of Louisville and North Canton and cross major roadways including U.S. Highway 30, State Highway 9, and U.S. Highway 62. The Powerline Route Alternative would cross Big Dawg's Golf Course, Brocklehurst Lake, a reclaimed strip mine area, residential neighborhoods, and waterbodies. It would cross three counties in Ohio including Columbiana, Carroll, and Wayne.

Environmental and Engineering Comparison

As shown in Table 10.5-3, the primary environmental advantages of the Electric Transmission Line Alternative, without considering the lateral, are that it would be 0.3 mile shorter, affect 3.9 less acres during construction and 2.0 acres less during operations, and would have 19.4 more miles of land parallel/adjacent to existing ROW than the corresponding segment of the proposed route. The primary environmental disadvantages of the Electric Transmission Line Alternative are that it would affect 6.3 more acres of forested area, cross 4 more roads, cross 30 more waterbodies, including seven more major waterbodies, cross three more wellhead protection areas, and cross 0.8 and 2.8 more miles of areas of potential subsidence and high landslide potential, respectively. It would also be within 50 feet of 115 more residential structures during construction. The Electric Transmission Line Alternative would cross four more roads, require 10 more bored road crossings and four more HDD road crossings than the corresponding segment of the proposed route. Both routes cross three railroads.

The lateral for the Electric Transmission Line Alternative would require 0.4 miles of additional pipeline, affect 5.1 acres more during construction, and 2.5 acres more during operations. Additional impacts on wetlands (2 additional wetlands crossed and 0.9 additional acres affected), waterbodies (3 additional crossings and an additional 23 linear feet of waterbody crossing length), and forest land (2.2 additional acres affected) would result from the lateral. In addition, one more wellhead protection area and 0.4 additional mile of high landslide potential areas would be crossed by the lateral.

Conclusion

The Electric Transmission Line Alternative (with associated lateral) was not considered a preferred alternative to the current route because of the associated environmental and engineering disadvantages, including that it would require 0.1 mile more of pipeline length; would affect 1.2 acres more during construction and 0.5 acre more during operations; affect 8.5 more acres of forested area; cross 4 more roads; cross 33 more waterbodies, including seven more major waterbodies; cross four more wellhead protection areas; cross 0.8 and 3.2 more miles of areas of potential subsidence and high landslide potential, respectively; and would be within 50 feet of 115 more residential structures during construction.

10.5.1.4 Lake Erie Crossing Alternatives

During the initial routing stages of Project development, NEXUS evaluated two wide routing corridors (eastern and western) for a major route alternative that would cross Lake Erie. The distance across the lake for these corridors ranges between 45 and 60 miles. Once NEXUS identified potential pipeline routes within the eastern and western study corridors, including the selection of potential preferred landfall locations, a more refined scale environmental resource review was conducted and focused on data pertinent to the feasibility of the routes. The evaluation of each route consisted of a 10-mile wide study corridor (5 miles to the east and west of each pipeline route) and focused on the feasibility of crossing Lake Erie and on land environmental resources in a general area within approximately 1 mile of preferred landfall/HDD locations. Preferred landfall locations are identified as Site 11 and Site 17 for the Lake Erie East Alternative and Site 5 and Site 13 for the Lake Erie West Alternative (*see* Figures 10.5-4 and 10.5-5, respectively). The parameters that were evaluated included bathymetry, sediments and geology, circulation/water quality, contamination, shipwrecks, utilities/intakes/disposal sites, navigation features, ice scour, aquatic resources, terrestrial resources, special status species, land use/cultural resources, recreation areas, timing windows, and potential construction equipment/methods.

Alternative Descriptions

The Lake Erie East Alternative extends from the Willoughby to Ashtabula shoreline area in Ohio (including preferred landfall location Site 11) across the lake to east of Rondeau Park, in Ontario, which is located south-southeast of preferred landfall location Site 17 (*see* Figure 10.5-4).

The Lake Erie West Alternative extends from the Huron to Lorain shoreline area in Ohio (including preferred landfall location Site 5) across the lake to east of Pt. Pelee Park, in Ontario, which is located south-southeast of preferred landfall location Site 13 (*see* Figure 10.5-5).

Impact Assessment

With regard to the environmental resources considered for the Lake Erie East and West Alternative corridors, those relative to bathymetry features included water depths and associated issues with ice scour and protection of the pipeline and long term maintenance and reliability of the pipeline. The Lake Erie West Alternative corridor would cross bathymetric features that are more regular and consist of deeper water while the Lake Erie West Alternative corridor would cross features that are more varied and irregular and it would cross the Pelee-Lorain Ridge, which could influence pipeline burial and backfilling methods.

The lake bottom sediments along the Lake Erie East Alternative corridor contain glacial till in the northernmost 2 miles of the corridor, approaching the shoreline and otherwise contain predominately mud across most of the lake except for a band of sand mud and bedrock near the southern shore. The Lake Erie West Alternative corridor is more heterogeneous and has extensive areas of glacial till near both shorelines and in areas scattered throughout the southern portion of the corridor along with sand, gravel and mud. A significant consideration throughout the region is that the shoreline areas in Lake Erie experience erosion that leads to recession rates that have been measured at approximately 1 meter per year or less (Li et al, 2001).

Depending on the types of construction equipment and methods employed, each of the alternatives would result in some degree of sediment disturbance resulting in resuspension and transport of sediments. Elevated levels of fine particle size sediment could have harmful effects on fish and other aquatic organisms, effect water withdrawals at shoreline intakes and result in elevated contaminant levels if disassociation from sediment particles occurs. Sediment disturbance could also result in the remobilization of nitrogen and phosphorous into the water column, both of which can result in increased phytoplankton production. In addition, given the industrial and agricultural activities that occur within the watershed of Lake Erie, sediments in the lake have become contaminated to varying degrees. Resuspension and transport of contaminated sediments would be a concern for pipeline installation along either the Lake Erie East or West Alternative corridors.

Routing a pipeline across Lake Erie would need to consider the locations of shipwrecks, underwater natural gas pipelines and wells, water intakes, and offshore (dredged material) disposal sites and potential impacts on these features during construction. Coordination with the U.S. Coast Guard ("USCG") through Notice to Mariner requirements would be required to make sure that construction activities would not impede navigating vessels, recreational lake users, commercial boating facilities, or coastal public access sites.

The Lake Erie East Alternative would cross mostly unmapped fishery habitat with the exception of habitat areas closer to shore, while the Lake Erie West Alternative would be entirely within mapped fishery habitat. Potential impacts on these resources could include re-mobilization of sediment bound contaminants, accidental spills or discharges of fuels, lubricants, or other fluids during construction and alteration of benthic conditions for bottom spawning or feeding fish. Use of the HDD method could be used to avoid the shallower portions of this habitat; however, given the seasonal requirement to construct during ice out periods, avoidance of Ohio and Ontario agency in-water work restriction periods may not be possible (*see* below). In addition, the preferred landfall locations sites would need to be surveyed for submerged aquatic vegetation habitat and if such habitat would be affected by construction, mitigation could be required.

Proper USCG protocols would need to be adhered to with regard to ballast water exchange and the potential to move invasive species from one part of the lake to another, thereby exacerbating the spread of invasive species within the lake. Impacts on the Lorain Artificial Reef Complex, located within the Lake Erie West Alternative corridor, would need to be avoided and impacts on wetlands near the preferred landfall location sites would also need to be avoided or minimized.

In addition, it is likely that Ohio and Michigan regulatory agencies would impose timing restrictions for in-water construction activities to protect early spawning walleye. The beginning of the window would likely be March 15 to protect the larval development stage, as well as the spawning of other species such as yellow perch; the window would likely extend to June 30. In Ontario, Ministry of Natural Resources has the responsibility for time of year restrictions for in-water construction activity ("timing window") guidelines. Lake Erie would be considered a part of the Southern Region of Ontario which has combined timing windows that would occur from March 15 to July 15 during spring, and September 15 to May 31.

Conclusion

NEXUS considered both engineering and environmental impacts associated with installing the pipeline using the Lake Erie East and West Alternatives. Based on these evaluations, it was determined that the complexity of the engineering analyses required to evaluate the environmental effects in the marine environments in addition to construction and operations of the pipeline in offshore conditions would make these offshore alternatives cost prohibitive, lengthy, unlikely to result in fewer impacts to the natural and human environments, and not suitable for efficiently accommodating the Project Purpose and Need. Therefore, the Lake Erie East and West Alternatives are not considered reasonable alternatives to the proposed NEXUS pipeline route.

10.5.2 Major Route Alternatives Incorporated into the NEXUS Project

The following Major Route Alternatives were evaluated for the NEXUS Project during the pre-filing stages of the Project to address stakeholder concerns and in an effort to avoid and minimize impacts to the natural and human environment in the Project vicinity. Because the route changes were necessitated to avoid and minimize environmental and engineering constraints, these Major Route Alternatives are now part of the proposed route and the original route is described as the "alternative route." The main determinants used to select the proposed route over the alternative routes focused on minimizing adverse environmental impacts, minimizing the number of affected landowners, ensuring constructability, and meeting NEXUS' desire to limit the extent of disruption on the communities potentially being affected during construction.

10.5.2.1 Nimisila Reservoir Alternative

Alternative Description

The Nimisila Reservoir Alternative deviates from the proposed route at approximate MP 35.8 in Summit County, Ohio, heads west/northwest for approximately 9.0 miles, and rejoins the proposed route at MP 47.8 (*see* Figure 10.5.-6). This alternative route would cross Portage Lakes State Park, managed by the Ohio Department of Natural Resources ("ODNR"), for approximately 5,500 feet and would involve an approximately 3,870 foot open water crossing of the Nimisila Reservoir, which is contained within the state park. It rejoins the proposed route at MP 47.8.

Portage Lakes State Park is a 411-acre park located in Akron, Ohio and contains some of the highest points of elevation in Ohio and lies on a major watershed divide where water drains into both Lake Erie and the Ohio River (ODNR, 2015). The Portage Lakes formation was a direct result of glacial activity. Some of the lakes were created to maintain the surrounding canal system in the early 1900s. In 1949, the Portage Lakes were acquired by the ODNR Parks and Recreation Division. The park is a valued recreational resource and offers trail hiking, camping, swimming, boating, fishing, hunting, winter recreation, and picnicking amenities.

Because of the extent of impacts associated with the public land and major waterbody crossings, NEXUS identified and evaluated a preferred route, which would continue to parallel existing utility corridors to the maximum extent practicable, while also minimizing the length of the Portage Lakes State Park crossings and the width of the Nimisila Reservoir crossing. ODNR land crossings have been avoided or minimized by NEXUS to the maximum extent practicable. On October 14, 2014, NEXUS met with ODNR staff to introduce the Project and discussed the Portage Lakes State Park and Nimisila Reservoir crossings. NEXUS has continued communications with ODNR throughout the pre-filing process and will continue communications throughout the regulatory permitting process.

Environmental and Engineering Comparison

The proposed route would cross the southern end of the Nimisila Reservoir and approximately 100 feet of open water, Portage Lakes State Park for approximately 1,160 feet, and approximately 3,833.7 fewer feet of waterbodies than the alternative route (*see* Table 10.5-4). The Nimisila Reservoir Alternative would be 3.0 miles shorter and affect 36.2 less acres during construction and 18.1 less acres during operation, and affect 25.5 fewer acres of forest land than the proposed route. The primary environmental disadvantages of the alternative route are that it would affect 2.9 acres more wetland, and cross approximately 3,833.7 more feet of waterbodies, including approximately 3,830 additional feet of the Nimisila Reservoir (i.e., open water), and approximately 4,370 additional feet of Portage Lakes State Park.

The primary engineering advantage of the proposed route crossing on the southern end of the Nimisila Reservoir is that it avoids crossing a much wider portion of the Nimisila Reservoir to the north. This waterbody crossing will be performed using the HDD crossing method. NEXUS is conducting geotechnical evaluations of the proposed reservoir crossing location and has consulted with the ODNR to identify the preferred location for crossing the park and the reservoir.

From an engineering perspective, the primary disadvantage of the Nimisila Reservoir Alternative is that it would cross approximately 3,870 feet of open water through the reservoir. Advantages of the proposed route would affect 18 fewer residential structures within 50 feet of the construction workspace compared to 28 for the alternative route. Much of the alternative route (6.6 miles) is co-located along existing powerline ROWs; however, to minimize the public lands crossing and length of the reservoir crossing, routing the pipeline to the south was preferred even though it reduced co-location of the proposed route within existing pipeline ROWs to 5.0 miles of the 12 total miles. The proposed route would cross 18 roads, which is three more than the alternative route. Neither route crosses any railroads.

10.5.2.2 Hubbard Valley Park Alternative

Alternative Description

The Hubbard Valley Park Alternative deviates from the proposed route at approximate MP 63.7 in Medina County, Ohio and heads west/northwest for approximately 3.6 miles. It rejoins the proposed route at MP 67.5 (*see* Figure 10.5-7). This alternative route would cross Hubbard Valley Park for approximately 3,000 feet and approximately 630 feet of a parcel of land held under conservation easement by the Western Reserve Land Conservancy.

Hubbard Valley Park was established as a flood-control project on Chippewa Creek in Guilford Township. Chippewa Subdistrict constructed the dam at Hubbard Lake and while doing so acquired additional land to permit the development of a permanent reservoir. The reservoir is approximately 21 acres and non-motorized boating is allowed. In the park, visitors have access to hiking trails, wildlife viewing areas, fishing, picnic amenities, playground, and winter recreation capabilities. This park is managed by the County of Medina (Medina County Park District, 2015). The Cox parcel is 62 acres of private land encumbered by a conservation easement and is managed by the Western Reserve Land Conservancy, which is a non-governmental organization (McDonald, personal communication, 2015).

Because of the impacts associated with these public and conservation land crossings, NEXUS identified and evaluated a preferred route which would eliminate the crossing of Hubbard Valley Park and Cox parcel conservation easement.

Environmental and Engineering Comparison

The primary environmental disadvantage of the Hubbard Valley Park Alternative, without considering the lateral, is that it crosses Hubbard Valley Park and the Cox parcel for a total of approximately 3,529 feet, which are public lands or lands held under a conservation easement. The alternative route would also impact 14.0 acres more forested land and cross 11 more waterbodies than the corresponding segment of the proposed route. No public lands or lands encumbered by conservation easements would be crossed by the proposed route. Furthermore, the proposed route would avoid crossing forested wetland and would cross 163 fewer feet of waterbodies than the alternative route (*see* Table 10.5-5). The primary environmental and engineering advantages of the alternative route are that it would be 0.2 miles shorter, and affect 2.5 less acres during construction and 1.2 less acres during operation, cross one less wetland, affect 0.4 acre less wetland, and cross one less road. The lateral would add 1.1 mile of pipeline length, affect 13.1 more acres during construction and 6.6 more acres during operation, add three waterbody crossings, and 4.3 acres of forest land crossings.

The proposed route has slightly more engineering complexity than the alternative route. It would cross one more road and would be within 50 feet of one residential structure while the proposed route is not within 50 feet of any residential structures.

Conclusion

The Hubbard Valley Park Alternative (with associated lateral) was not considered a preferred alternative to the current route because of the associated environmental and engineering disadvantages, including that it would require 0.9 mile more of pipeline length; affect 10.6 acres more during construction and 5.4 acre more during operations; affect 18.3 more acres of forested area; and cross 14 more waterbodies.

10.5.2.3 Edison Woods Preserve and Apple Orchard Alternative

NEXUS evaluated alternatives for avoiding the Edison Woods Preserve and a large apple orchard identified by stakeholders located north of current MP 111 in Erie County, Ohio. The Edison Woods Preserve was identified as an important ecological resource in the region and is designated as an Audubon Important Bird Area. It includes headwaters to a tributary to Old Woman Creek and about 550 acres of wetland habitats, 300 acres of restored native grasslands, sandstone cliffs, and an escarpment of the Appalachian Plateau. Edison Woods, managed by Erie MetroPark, contains one of northern Ohio's largest native grassland restoration projects and has 20 miles of natural surfaced trails for pedestrians and horseback riders and a 0.5-mile-long boardwalk (Erie MetroPark, 2015).

The Edison Woods Preserve and Apple Orchard Alternative deviates from the June pre-filing route at approximate MP 100.6 in Erie County, Ohio and heads north and then west for approximately 7.8 miles to where it rejoins the current route at MP 112.6. This alternative route would cross approximately 3,155 feet of Edison Woods Preserve and approximately 2,750 feet of the existing apple orchard. *See* Figure 10.5-8 and Table 10.5-6 for a Comparison of the Edison Woods Preserve and Apple Orchard Alternative with the Corresponding Segments of the Proposed Route.

Since the June pre-filing submittal to the Commission, NEXUS has evaluated several additional route variations in this area in response to stakeholder comments as depicted in Figure 10.5-8. The current route now completely avoids crossing the apple orchard in the vicinity of MP 111 and an additional route variation in the vicinity of MP 112 is being evaluated that completely avoids impacts to the Eddison Woods Preserve. This route variation is in the final stages of evaluation by NEXUS and will be filed with the Commission upon approval (*see* Section 10.6.2 below).

Environmental and Engineering Comparison

The main advantages of the current proposed route are that it avoids crossing the apple orchard and avoids crossing the southwestern corner of Edison Woods Preserve. In addition, as shown in Table 10.5-6, the proposed route would cross 11 fewer waterbodies, affect 2.7 acres less forest land, approximately 1,489 feet less pubic and conservation lands, and two less roads. The alternative route would affect 1.6 more acres of wetland and be within 50 feet of ten more residential structures during construction than the proposed route.

Both routes are similar from an engineering perspective. The alternative route would be co-located along existing powerline corridor ROWs; however, to minimize the public lands and apple orchard crossings, routing to the south was preferred and thereby reduced co-location of the corresponding segment of the proposed route with existing pipeline ROWs.

10.5.2.4 Black Swamp Land Conservancy and Sandusky River Alternative

The Black Swamp Land Conservancy and Sandusky River Alternative deviates from the proposed route at approximate MP 140.8 in Sandusky County, Ohio and heads west/northwest for approximately 8.7 miles. It rejoins the proposed route at MP 150.3 (*see* Figure 10.5-9). This alternative route would cross approximately 3,030 feet of the Miller Peninsula Farm which is located on the western side of the Sandusky River and is held under conservation easement by the Black Swamp Land Conservancy. The Miller Peninsula Farm has historical significance in the region because in 1781, the Wyandot Native American tribe gave this land to James and Elizabeth Whittaker, the first white settlers north of the Ohio River between Pittsburgh and Detroit (Black Swamp Conservancy, 2015). In 2001, Don Miller and Black Swamp Conservancy signed a perpetual land conservation agreement which restricts future use of the land for conservation purposes. Consultation with the Black Swamp Land Conservancy's director indicated that their easements prohibit pipeline crossings. Because of the potential impacts associated with conservation easement crossing, NEXUS identified and evaluated a route alternative which would continue to parallel existing infrastructure corridors to the maximum extent practicable, while also avoiding crossing any public conservation or conservation easement encumbered lands.

Environmental and Engineering Comparison

The main environmental advantage of the proposed route is that it avoids crossing through the Miller Peninsula Farm. Additional advantages of the proposed route are that it affect 4.1 fewer acres of forest land, and would be within 50 feet of seven fewer residential structures than the alternative route (*see* Table 10.5-7). The alternative route would cross one forested wetland and 5.0 acres of forested land. Both routes would cross the Sandusky River. The main environmental disadvantage of the alternative route is that it would cross through the Miller Peninsula Farm.

The proposed and alternative routes are similar from an engineering perspective. Much of the alternative route would be co-located along existing pipeline corridor; however, to avoid crossing the Black Swamp Land Conservancy easement, routing the pipeline to the north was favored and it reduces co-location of the proposed route with Interstates 80 and 90 to 0.1 miles of the 9.4 total miles. Both routes would cross one railroad and the proposed route would cross three more roads.

10.5.2.5 Maumee State Forest Alternative

The Maumee State Forest Alternative was evaluated early in the route development process (*see* Figure 10.5-10 and Table 10.5-8) based on consultations with ODNR regarding potential impacts to the Maumee State Forest and feedback received by NEXUS to avoid and minimize impacts to several separate parcels of Maumee State Forest in the vicinity. The alternative in this vicinity would have crossed approximately 9,155 feet of the Maumee State Forest. Since the original route was evaluated and based on ongoing communications with ODNR, NEXUS implemented a revised alternative in this area that further minimizes impacts to the Maumee State Forest and relocates the proposed pipeline further west of the Oak Openings

Metro Park in the vicinity of MP 186.4 to MP 200.6. Numerous route changes have been evaluated through this segment of the proposed route. Please *see* Section 10.6 and Figures 10.6.1-58 through 10.6.1-61 in the Figures Section at the end of this report for a summary of the route variations evaluated by NEXUS is this area. As discussed in Section 10.5.3.2, approximately 2,300 feet of the current route crosses the eastern boundary of the Maumee State Forest from MP 193.3 to MP 193.7. NEXUS will continue to work with the ODNR to find the least impact alternatives for crossing this area.

10.5.2.6 Washtenaw County School Complex Alternative

The Washtenaw County School Complex Alternative deviates from the proposed route at approximate MP 242.2 in Washtenaw County, Michigan and heads northeast/east for approximately 5.4 miles to where it rejoins the proposed route at MP 247.4 (*see* Figure 10.5-11). The alternative route is in closer proximity to an elementary school, two neighborhoods, a church, and a cemetery and would require approximately 2.6 miles of in-street construction along Bemis Road. The proposed route avoids these features and would not require in-street construction; however, the proposed route would still be in relatively close proximity to residences and waterbodies.

Environmental and Engineering Comparison

As shown in Table 10.5-9, the alternative route crosses one more wetland than the proposed route and the alternative route affects 0.6 acre more wetland. The alternative route crosses 4.7 acres less forested land than the proposed route. The proposed route would be within 50 feet of 15 fewer residential structures during construction than the alternative route. The proposed route would cross 11 waterbodies with a total waterbody crossing length of 176 feet while the alternative route would cross seven waterbodies with a total waterbody crossing length of 90.8 feet.

The primary advantage of the proposed route is that it would involve less in-street construction. Also, the proposed route would have construction workspace within 50 feet of 15 fewer residential structures. The alternative route is in closer proximity to an elementary school, two neighborhoods, a church, and a cemetery and would require approximately 2.6 miles of in-street construction along Bemis Road.

10.5.3 Additional Stakeholder Identified Major Route Alternatives

In addition to the major route alternatives discussed above, NEXUS evaluated several additional major route alternatives identified or suggested by stakeholders during the pre-filing process. These additional major route alternatives are evaluated in the following sections.

10.5.3.1 CORN Western Alternative

NEXUS evaluated the CORN Western Alternative to address stakeholder comments and determine whether the alternative route would provide substantial benefits with respect to the Oak Openings Region.

The segment of proposed pipeline identified by CORN as an alternative route was approximately 16.5 miles long located parallel to the NEXUS route and was offset from the NEXUS route to the west by approximately 6.3 mile. In order to evaluate a viable alternative to the corresponding segment of the NEXUS route, NEXUS sited mainline pipeline segments connecting the CORN route with the NEXUS route to the south and north of the route provided by CORN.

The CORN Western Alternative deviates from the proposed route at MP 189.8 in Henry County and heads in a westerly direction for approximately 6.7 miles and would follow the Norfolk and Western Railroad and an existing powerline ROW. It then turns northwest and north for approximately 18.0 miles and would parallel the Detroit, Toledo Ironton Railroad for much of its length. It deviates from the railroad approximately 4.0 miles south of the Ohio/Michigan state line. Once at the state line the CORN Western Alternative heads east-northeast for approximately 7.0 miles and rejoins the proposed route at MP 210.1 in Lenawee County, Michigan (*see* Figure 10.5-12).

Environmental and Engineering Comparison

As shown in Table 10.5-10, the primary environmental advantages of the CORN Western Alternative are that it would cross 2.1 miles less areas of potential subsidence and would cross 2,495 less feet of public lands or conservation lands. The primary disadvantages of the CORN Western Alternative are that it would be 10.9 miles longer and would temporarily affect approximately 131.9 acres more land during construction and would require 66.0 acres more acres of permanent easement during operations, than the corresponding segment of the NEXUS route. It would also affect three more forested wetlands, cross 11 more waterbodies, and affect 6.5 acres more forest land. It would also be within 50 feet of one more residential structure during construction than the corresponding segment of the proposed route. The primary engineering disadvantages of the CORN Western Alternative are that it would cross 14 more roads, which would all need to be bored.

The primary disadvantages of the CORN Western Alternative, without considering impacts associated with the required market delivery lateral (*see* Figure 10.4-1C), are that it would add 5.5 miles of additional pipeline length and would temporarily affect approximately 66.2 acres more land during construction and would require 33.1 more acres of permanent easement during operations, than the corresponding segment of the NEXUS route. In addition, the lateral would add one wetland crossing, 0.3 acre of wetland impacts, and 5 waterbody crossings.

Conclusions

In summary, the CORN Western Route Alternative and lateral would require construction of 16.4 miles more pipeline; would involve 198.1 acres more temporary land disturbance during construction and 99.1 acres more land in permanent easements during operations; would affect four more wetlands; cross 16 more waterbodies; and affect 6.5 acres more forest land. The CORN Western Route Alternative would also be within 50 feet of one more residential structure during construction than the corresponding segment of the proposed route and would involve 14 more bored road crossings. Based on these additional impacts during construction and operations, the CORN Western Alterative is unlikely to provide substantial benefits with respect to avoiding impacts to the natural and human environments.

10.5.3.2 Oak Openings Region Avoidance Alternative

NEXUS evaluated the Oak Openings Region Avoidance Alternative to address stakeholder comments and to determine whether the alternative route would provide substantial benefits while avoiding the Oak Openings Region. NEXUS received the boundary of the Oak Openings Region from The Nature Conservancy in Ohio, a participating partner in the Green Ribbon Initiative, which has been organized to protect the natural beauty and biological diversity of the Oak Openings Region. NEXUS used the boundary of the Oak Openings Region to site an alternative pipeline route that avoids the region and extends south and west of this region in Sandusky, Wood, Henry, and Fulton Counties, Ohio.

Alternative Description

The Oak Openings Region Avoidance Alternative deviates from the proposed route at MP 159.3 in Sandusky County, heads in a westerly direction, and crosses the Sandusky/Wood County line at MP 4.0. At MP 4.6 the alternative route turns to the northwest and parallels an existing pipeline ROW. At MP 6.1 the alternative route deviates from the existing utility ROW and continues in a westerly direction. At MP 26.9 the alternative route turns northwest, and crosses the Wood/Henry county line at MP 29.2. The alternative route turns north at MP 38.4, paralleling an Indiana and Ohio Railway ROW through MP 40.2, turns northwest away from the ROW at MP 40.2, crosses the Henry/Fulton county line at MP 41.2, turns northeast at MP 42.5, and rejoins the proposed route at MP 199.9 in Fulton County, Ohio (*see* Figure 10.5-13).

The Oak Openings Region Avoidance Alternative would cross a combination of agricultural, open and forest land. It would skirt the northeastern corner of the village of Pemberville, be located to the north of

the city of Bowling Green, cross through the villages of Grand Rapids and Liberty Center, and be located just outside of the southeastern corner of the village of Delta. It would cross major roadways including U.S. Highway 23, Interstate 75, U.S. Highway 24, and Interstates 80 and 90. The Oak Openings Region Avoidance Alternative would cross residential neighborhoods, wetlands and waterbodies, including the Maumee River.

Environmental and Engineering Comparison

As shown in Table 10.5-11, the primary environmental advantages of the Oak Openings Region Avoidance Alternative (without considering laterals) are that it would cross four fewer wetlands (0.3 acre less wetlands), three fewer waterbodies (36.7 linear feet), 31.0 acres less forested land, and 232.3 less linear feet of public lands or lands under conservation easement. The primary engineering advantage of the alternative route is that it would cross three fewer residences within 50 feet of the construction ROW than the corresponding segment of the proposed route. The primary disadvantages of the Oak Openings Region Avoidance Alternative are that it would be 13.4 miles longer and would temporarily affect approximately 163.2 acres more land during construction and would require 81.6 acres more acres of permanent easement during operations than the corresponding segment of the proposed route. It would cross two more wellhead protection areas, 2.5 miles more of areas of potential subsidence, 22 more roads, and three more railroads than the corresponding segment of the proposed route. Furthermore, the alternative route has 16.3 miles less co-location than the proposed route.

In addition, two laterals would be required for the Oak Openings Region Avoidance Alternative. The primary disadvantages of the Oak Openings Region Avoidance Alternative laterals are that they would add 6.9 miles of additional pipeline length and would temporarily affect approximately 83.9 acres more land during construction and would require 41.9 acres more acres of permanent easement during operations than the corresponding segment of the proposed route. In addition, the laterals would add two wetland crossings, 1.9 acre of wetland impacts, 2 waterbody crossings (one of which is a major waterbody), 1.4 acres of forested land, and 6.8 miles of areas of potential subsidence.

Schedule and Costs

The NEXUS Project in-service date is November 1, 2017 and is required to meet the firm transportation service requirements of the Project shippers. The Oak Openings Avoidance Alternative's in-service date would likely be mid to late 2018. The in-service date delay would be due to several factors including a reengineering of the Project facilities; new stakeholder and landowner outreach; initiation of new federal, state, and local agency consultations; requirement to conduct new biological and cultural field surveys along the alternative route; requirement for engineering route adjustments based on stakeholder concerns or constraints revealed during field surveys; and potential need for new landowner informational meetings and additional FERC public NEPA Scoping Meetings. Therefore, implementation of the Oak Openings Avoidance Alternative would delay NEXUS' ability to meet customer commitments by November of 2017.

The total cost associated with the Oak Openings Avoidance Alternative would be approximately $185 million, which is approximately $49 million more than the corresponding segment of the NEXUS Project proposed route.

Conclusions

In summary, the Oak Openings Region Avoidance Alternative and laterals would require construction of 20.3 miles more pipeline; would involve 247.1 acres more temporary land disturbance during construction and 123.5 acres more land in permanent easements during operations; would have 16.3 miles less co-location; would cross 22 more roads and three more railroads; cross two more wellhead protection areas; and cross 9.3 miles more areas of potential subsidence than the corresponding segment of the proposed route. The alternative route with laterals would require two fewer wetland crossing but would impact 1.6 acres more wetlands; would impact 1050.5 more linear feet of waterbody; and would affect 29.6 acres less

forest land. The Oak Openings Region Avoidance Alternative would also be within 50 feet of three fewer residential structures during construction than the corresponding segment of the proposed route. Based these analyses, the Oak Openings Avoidance Alternative, although it would avoid the Oak Openings Region defined by TNC, is unlikely to result in substantial benefits to the affected natural and human environments.

Comparison of Potential Impacts on Remnant Oak Openings Habitat

The Oak Openings Region Avoidance Alternative avoids the Oak Openings Region and, therefore, would be located outside of the unique geologic formation that supports the Oak Openings vegetative communities referred to as remnant Oak Openings habitat. As described in Resource Report 3, approximately only one percent of the natural Oak Openings vegetative communities remain intact within the Oak Openings Region. The majority (99 percent) was subject to conversion of land use for agricultural, commercial and industrial uses. The majority of the remnant rare vegetative communities endemic to the Oak Openings Region are located within protected lands, the largest being the Oak Opening Preserve Metropark, located approximately 2.5 miles east of the current NEXUS pipeline route. Other protected areas include Kitty Todd State Nature Preserve, Maumee State Forest, and Irwin Prairie State Nature Preserve.

The NEXUS pipeline route crosses through the southwestern extent of the Oak Openings Region in mostly Henry and Fulton Counties from MP 186.6 to MP 196.3. Approximately 189.02 acres of the Project corridor crosses the Oak Openings Region, 89 percent of which (168.37 acres) is currently within agricultural land use. The remaining land uses crossed by the Project within the region include forested areas (6 percent), open land (three percent), commercial or industrial (one percent), residential (less than one percent), and open water (less than one percent). The commercial or industrial category is almost entirely composed of existing public road crossings. Approximately 2,300 feet of the current route crosses the eastern boundary of the Maumee State Forest from MP 193.3 to MP 193.7.

NEXUS is committed to working with ODNR, TNC and other members of the Green Ribbon Initiate to maximize use of the proposed permanent easement through the Oak Openings Region to identify opportunities for re-establishing rare Oak Openings vegetative communities described in detail in Resource Report 3. NEXUS is willing to work with Green Ribbon Initiative partners to establish a ROW maintenance protocol that incorporates activities that maintain and/or enhance Oak Openings vegetative communities and desired wildlife habitats. In addition, the construction of the NEXUS Project through the Oak Openings Region presents an opportunity for habitat restoration that would be performed in partnership with the Green Ribbon Initiative using locally sourced plants and seed mixes. Implementation of the Oak Openings Avoidance Alternative, in addition to the impacts described previously, would forgo these opportunities.

10.5.3.3 Turnpike Alternative

NEXUS evaluated the Turnpike Alternative to address stakeholder comments and determine whether the alternative route would provide substantial benefits based on co-location with Interstate 80/90 in Erie, Sandusky, and Ottawa Counties, Ohio. The Turnpike Alternative deviates from the proposed route at MP 88.5 in Lorain County, heads in a northwesterly direction and parallels an existing transmission line ROW from MP 0.4 to MP 4.8. The alternative route crosses the Carlisle Reservation from MP 2.7 to MP 3.8. The alternative route turns away from the existing utility ROW at MP 4.8, continues west, and parallels the utility ROW again from MP 7.0 to MP 10.9. The route then travels west and begins paralleling Interstate 80/90 at MP 17.2. Between MP 17.2 and MP 73.4 the Turnpike travels in a west-northwesterly direction co-located with Interstate 80/90. The Turnpike Alternative turns to the southwest and away from the turnpike at MP 73.4 and rejoins the proposed route at MP 167.1 in Wood County (*see* Figure 10.5-14).

The Turnpike Alternative would cross a combination of agricultural, open, and forest land. It crosses to the south of the village of South Amherst, to the south of Edison Woods Preserve in the village of Berlin Heights, and crosses the village of Elmore. The Turnpike Alternative would cross major roadways including U.S. Highway 20, Interstate 80/90, U.S. Highway 250, and U.S. Highway 6. The alternative

route crosses residential neighborhoods, wetlands, and waterbodies including West Branch Black River, Vermillion River, Huron River, Sandusky River, and Portage River.

Environmental and Engineering Comparison

As shown in Table 10.5-12, the primary environmental advantages of the Turnpike Alternative are that it would be co-located with 11.4 more miles of existing road ROW, it would cross two less wellhead protection areas, and 9.3 acres less forested land than the corresponding segment of the proposed route. The primary engineering advantage of the alternative route is that it would cross 70 fewer residences within 50 feet of the construction. The primary environmental disadvantages of the Turnpike Alternative are that it would be 1.2 miles longer and would temporarily affect approximately 15.2 acres more land during construction and would require 7.6 acres more acres of permanent easement during operations. It would cross an additional 7.7 acres of wetland, 17 more waterbodies (including 6 major waterbodies), 1.1 miles more of areas of potential subsidence, 0.1 miles more of areas of steep slopes, 1.0 miles more areas of sidehill construction, and 2382.5 linear feet more public lands or lands held under conservation easements. The primary engineering disadvantages of the Turnpike Alternative are that it would cross eight more roads.

In addition, two laterals would be required for the Turnpike Alternative. The primary disadvantages of the laterals are that they would add 5.4 miles of additional pipeline length and would temporarily affect approximately 65.5 acres more land during construction and would require 32.8 acres more acres of permanent easement during operations than the corresponding segment of the proposed route.

Conclusions

In summary, the Turnpike Alternative would require construction of 6.6 miles more pipeline; would involve 80.7 acres more temporary land disturbance during construction and 40.4 acres more land in permanent easements during operations; would require crossing 11 more wetlands; would result in 7.7 acres of additional wetland impacts; would have 17 more waterbody crossings (including 6 major waterbodies); 1.1 miles more of areas of potential subsidence; 0.1 miles more of areas of steep slopes; 1.0 miles more areas of sidehill construction; and 2382.5 linear feet more public lands or lands held under conservation easements than the corresponding segment of the proposed route. The Turnpike Alternative would be co-located with 11.4 miles more of existing road ROW; it would cross two less wellhead protection areas; 9.3 acres less forested land; and would cross 70 fewer residences within 50 feet of the construction. The Turnpike Alternative would provide more co-location with existing utility ROWs and would cross fewer residences within 50 feet of the construction, but would result in increased wetlands, waterbodies, public lands or conservation lands crossings, as well as other environmental impacts. Based these analyses, the Turnpike Alternative is unlikely to result in substantial benefits to the affected natural and human environments.

10.6 Minor Route Variations

Minor route variations differ from system alternatives or major route alternatives in that they are identified to reduce impacts on specific localized features, are significantly shorter in length than major route alternatives, and do not always clearly display an environmental advantage other than reducing or avoiding impacts on specific features.

10.6.1 Route Variations Evaluated for the NEXUS Pipeline Route

The following sections provide a summary of route variations evaluated by NEXUS during the process of siting the proposed pipeline route. Many of these route variations were suggested by Project stakeholders including affected landowners, local officials, and regulatory agencies, and were specifically designed and sited to accommodate stakeholder requests. Others were evaluated to avoid engineering constraints and/or to avoid or minimize impacts to potential environmental constraints or to facilitate constructability. Table 10.6-1 summarizes the minor route variations evaluated to date for the NEXUS Project, listed by milepost, and providing the length of the variation, location by county and municipality, supporting reason for the

route variation, data sources used in evaluating the feasibility of incorporating the variation into the proposed route; along with the corresponding figure number. Figures depicting the minor route variations by milepost are included as Figures 10.6.1-1 through 10.6.1-80 and are organized from east to west along the pipeline route starting at milepost 0.00. These Figures show the currently proposed mainline pipeline route with a red and white line with milepost references and route variations evaluated are depicted with alternating colors. The route variations evaluated are identified both in the table and on the figures using the NEXUS variation identification ("ID") number. Route variations were evaluated by a multidisciplinary team including engineering, environmental, lands, and construction representatives and every effort has been made to accommodate stakeholder requests where practicable.

The following sections provide a brief summary of the minor route variations evaluated for the NEXUS pipeline to date starting with the TGP Interconnecting Pipeline in Columbiana County, Ohio and then to the kickoff of the NEXUS mainline pipeline at MP 0.0 and extending west and north to MP 255.2 in Washtenaw County, Michigan.

TGP Interconnecting Pipeline

MP 0.0: The proposed interconnecting pipeline route was developed to avoid a newly constructed Texas Eastern meter station and other infrastructure at the Kensington Processing Plant. This route connects to the proposed location of the Texas Eastern Metering and Regulating ("M&R") Receipt Station (MR03) adjacent to the Kensington Processing Plant. The northern portion of corresponding route variation (ID 130), which is not incorporated, does not connect to the proposed Texas Eastern M&R Receipt Station (MR03) and the southern portion does not connect to the proposed TGP M&R Receipt Station (MR01) which was relocated due to constraints at the existing TGP pipeline (*see* Figure 10.6.1-1).

MP 0.6: The proposed route was developed to allow the TGP Interconnect to avoid the foreign utility site located to the east of Tunnel Hill Road and also allows for the ATWS necessary to cross the creek and foreign pipeline in the area. Following desktop and field review to investigate these concerns, the corresponding route variation (ID 253) was not incorporated (*see* Figure 10.6.1-1).

NEXUS Mainline Pipeline

MP 0.0: The proposed route was developed to avoid a fence line and pipelines converging near the Kensington Processing Plant, including facilities operated by Momentum Midstream. The Momentum Midstream personnel who provided guidance determined that the location of the proposed route was the best option for this area. Following desktop and field review to investigate these concerns, the corresponding route variation (ID 88) was not incorporated (*see* Figure 10.6.1-2).

MP 0.9: The proposed route was adjusted to improve the angle for crossing four existing pipelines. The proposed route also ensures that construction workspace does not interfere with the existing pipelines. Following desktop and field review to investigate these concerns, the corresponding route variation (ID 142) was not incorporated (*see* Figure 10.6.1-2).

MP 1.0: The proposed route was adjusted to avoid a second powerline easement proposed for development by First Energy. The proposed route is on the south side of the First Energy easement to align the MLV site and pipeline within the Hanoverton Compressor Station property boundary. The proposed route reduces forest impacts and crosses less designated bat habitat. Following desktop and field review of these concerns, the corresponding route variation (ID 270) was not incorporated (*see* Figure 10.6.1-2).

MP 1.3: The proposed route was developed at the request of the landowner. The area is naturally low lying in the landscape and there is a pond that drains the area. The proposed route traverses through forested area and parallels a dirt road that the landowner has built and will avoid an agricultural field that had new drain tiles recently installed. The proposed route will avoid two high voltage powerline crossings and avoids approximately 200 feet of paralleling a stream. The proposed route crosses more forested land and comes

within 100 feet of two residential structures. Following desktop and field review, the corresponding route variation (ID 200) was not incorporated (*see* Figure 10.6.1-2).

MP 1.3: This route variation (ID 213) was developed in response of a landowner request to route the pipeline around a pond and further away from their property. This route variation was not incorporated because it goes through high value trees, one additional wetland and waterbody crossing, crosses more forested land and comes within 100 feet of a residential structure. Based on this review, the corresponding route variation (ID 213) was not incorporated (*see* Figure 10.6.1-2).

MP 1.3: This route variation (ID 131) was developed in response of a landowner request to shift the pipeline off their property. This route variation was rejected because it would have significantly increased wetland crossing distance, increased forested habitat crossing distance and would have added an additional minor waterbody crossing. Also, the route variation alignment would be within 100 feet of two additional residential structures. Based on this review, this route variation (ID 131) was not incorporated (*see* Figure 10.6.1-2).

MP 1.5: This route variation (ID 10) was developed to avoid crossing a pond and avoid being close to a house and barn. The route variation will cross more forested land and cross high voltage powerlines twice. Based on this review, the route variation (ID 10) was not incorporated (*see* Figure 10.6.1-2).

MP 2.2: This route variation was developed to avoid a wellhead and to minimize the distance that the pipeline would run parallel to a perennial stream. The variation avoids the well and reduces the distance that the pipeline would parallel the perennial stream by approximately 240 feet and it reduces the distance the pipeline would traverse a Federal Emergency Management Agency ("FEMA")-mapped floodplain by approximately 30 feet and is approximately 120 feet shorter than the original route. Following desktop and field review, the corresponding route variation (ID 11) was not incorporated (*see* Figure 10.6.1-2).

MP 2.2: This route variation (ID 126) was developed at the request of the landowner. The landowner brought to attention that there are water, gas and electric utility lines in the southwest quadrant of their property. The landowner was concerned with the proximity of these utility lines to construction and the crossing of their driveway. The route variation would be proposed to the north and would increase the wetland crossing distance by 550 feet, as well as increasing the length of the pipeline within the FEMA 100 year flood zone. The route variation would increase the total pipeline length by approximately 350 feet. Following desktop and field review of these concerns, the corresponding route variation (ID 126) was not incorporated (*see* Figure 10.6.1-2).

MP 3.4: The proposed route was developed as a result of new information from First Energy regarding a second high voltage powerline in Columbiana and Stark counties. This proposed route allows the permanent easement of the pipeline to have the proper offset to the First Energy easement. Following desktop and field review, the corresponding route variation (ID 263) was not incorporated (*see* Figures 10.6.1-2 and 10.6.1-3).

MP 4.2: This route variation was incorporated at the request of the landowner to shift the proposed alignment around a stand of trees that the landowner has future plans to harvest for his own use. While the proposed route crosses more forested area, neither route crosses wetlands or waterbodies. Following desktop and field review of the landowner concerns, the corresponding route variation (ID 132) was not incorporated (*see* Figure 10.6.1-3).

MP 4.3: The proposed route was adjusted to avoid a wellhead and storage tank by moving the proposed route to the northeast. The proposed route is located to the northeast of the wellhead and storage tank to avoid an additional pipeline crossing. Following desktop and field review of these concerns, the corresponding route variation (ID 74) was not incorporated (*see* Figure 10.6.1-3).

MP 5.2: The proposed route was developed as a result of new information from First Energy regarding a second high voltage powerline in Columbiana and Stark counties. This proposed route moves the permanent

easement of the pipeline to have the proper offset to the First Energy easement. The proposed route will place the centerline approximately 130 feet from an existing house on the east side of Rochester Road. The same landowner also has a small barn/playhouse approximately 75 feet from the proposed route. Due to terrain in the area, the crossing location of Rochester Road cannot be changed. The proposed route significantly increases the amount of forested land crossed. Following desktop and field review of these concerns, the corresponding route variation (ID 265) was not incorporated (*see* Figure 10.6.1-3).

MP 5.4: The proposed route was developed to avoid crossing a manmade pond. Feasible alternatives for the proposed route were limited due to existing powerline infrastructure (i.e., towers), surrounding residential development, and the presence of large, mature forested uplands and wetlands in the vicinity of the proposed route. Two additional powerline crossings are required in order to avoid the manmade pond. The proposed route is 75 feet longer and crosses approximately 260 more feet of forested land than the corresponding route variation. The proposed route avoids impacts on the manmade pond and portions of an adjacent riparian forest. Following desktop and field review of these concerns, the route variation (ID 16) was not incorporated (*see* Figure 10.6.1-3).

MP 5.5: The proposed route was developed to change the location of the Rochester Road crossing. The east side of Rochester Road is significantly higher than the west side of the road (approximately 30 feet difference). The corresponding route variation in this area crossed the powerline to the east of the road, creating a Point of Interest ("PI") about 80 feet from the road crossing which was deemed not constructible. The proposed route will cross the powerlines to the west of Rochester Road, therefore creating a more constructible crossing of Rochester Road. The proposed route crosses slightly less emergent/scrub shrub wetland than the corresponding route variation. The proposed route slightly increases the crossing amount of forested land that has been designated by USFWS as northern long eared bat habitat. Based on this review, the corresponding route variation (ID 189) was not incorporated (*see* Figure 10.6.1-3).

MP 5.6: This route variation (ID 13) was developed to avoid a manmade pond. Two additional powerline crossings are required in order to avoid the manmade pond. The route variation would increase the forested land crossed by 260 feet. Upon further review, this route variation (ID 13) was not incorporated because design variation would have created engineering/construction difficulties with respect to existing overhead electric transmission line (*see* Figure 10.6.1-3).

MP 5.9: The proposed route was developed as a result of new information from First Energy regarding a second high voltage powerline in Columbiana and Stark counties. The proposed route moves centerline northeast of the houses on Lorey Road. Due to residential lots, the First Energy easement and a manmade pond, this is the only option for centerline through this area. The route variation will add approximately 460 feet to the total length pipeline. The proposed route crosses 40 feet less of scrub/shrub emergent wetland. The proposed route crosses approximately 115 feet less of forested land and comes within 100 feet of one additional residential structure. Following desktop and field review of these concerns, the route variation (ID 264) was not incorporated (*see* Figure 10.6.1-3).

MP 6.6: The proposed route was developed to avoid a high quality potential Category III wetland according to the Ohio Rapid Assessment Method ("ORAM") scoring method. The proposed route will use an HDD crossing method for the wetland area, which would be approximately 1800 feet long. The proposed route impacts four fewer wetlands, including one forested wetland, and impacts five fewer waterbodies. The proposed route crosses significantly less forested land (-1509 feet) and the proposed route does not cross within 100 of any residential structures (the corresponding route variation crosses within 100 feet of one residential structure). Based on this review, the route variation (ID 205) was not incorporated (*see* Figures 10.6.1-3 and 10.6.1-4).

MP 7.1: This route variation (ID 205) was developed to avoid encroachment on a stream that would have been within 60 feet of the centerline as designed by alternate route variation ID 73. Route variation 205 would cross under the powerlines further to the south, allowing the construction ROW to be further away from the stream. This route variation would cross Hill Road at a 90 degree angle. This route variation would

avoid a stream impact on the working side of the ROW and reduces the amount of forested land crossed. Ultimately, neither route variation (ID 205 nor ID 73) were incorporated due to the corresponding proposed route (*see* Figures 10.6.1-3 and 10.6.1-4).

MP 7.4: This route variation (ID 205) was developed to avoid steep slopes, three ravines and minimize crossing distance in a large ponded wetland system as designed by alternative route variation (ID 18). This route variation traverses an area where the slope is not as steep and the ravines are narrower. This route variation relocates the centerline to the south of the largest portion of a seasonally flooded forested wetland. Ultimately, neither route variation (ID 205 nor ID 18) were incorporated due to the corresponding proposed route (*see* Figure 10.6.1-4).

MP 7.7: This route variation (ID 187) was developed to change the crossing method of a high quality potential Category III wetland according to the ORAM scoring method. The route variation increased forested wetland crossing by 425 feet, decreased scrub/shrub emergent wetland crossing by approximately 75 feet and the route variation added 340 feet of upland forested crossing. This route variation was not incorporated because it was determined to not be constructible (*see* Figure 10.6.1-4).

MP 8.7: The proposed route was developed to reduce tree clearing and wetland impacts. The proposed route is located further to the west to avoid forested and wetland areas. The proposed route eliminates a forested wetland crossing, crosses three less waterbodies and avoids crossing a cemetery. The proposed route eliminates approximately 2720 feet of forested land crossed. Based on this review, the route variation (ID 146) was not incorporated (*see* Figures 10.6.1-4 and 10.6.1-5).

MP 9.7: Route variation (ID 266) parallels First Energy high voltage powerlines. This route variation was not incorporated into the proposed route due to insufficient offsets to the First Energy powerline easement and proximity to houses on the north side of Township Line Road. The proposed route was developed to cross the high voltage lines after Township Line Road, accomplishes sufficient offsets from the First Energy high voltage powerlines. The proposed route reduces the length of the pipeline by 125 feet, increases the total crossing distance of emergent wetlands by approximately 50 feet, and increases forested land crossed by approximately 300 feet (*see* Figures 10.6.1-4 and 10.6.1-5).

MP 10.7: The proposed route has been developed to change the location of the railroad crossing. There is a creek and a forested wetland to the east of the railroad. The proposed route will cross the railroad tracks at a location where the creek is approximately 100 feet wide, which will allow the railroad and creek to be bored at the same time. The proposed route decreases total forested land crossed by 565 feet, decreases the total number of wetland crossed by one, decreases the length of forested wetland crossed by approximately 65 feet and the crossing length of emergent wetland will be approximately 130 feet more with the proposed route. The proposed route crosses one more waterbody and approximately 240 more feet of FEMA 100-year flood zone. Based on this review, the route variation (ID 180) was not incorporated (*see* Figures 10.6.1-4 and 10.6.1-5).

MP 11.6: The proposed route deviates to the south from the existing powerline corridor in order to avoid a large, flooded series of stream channels and associated forested floodplain wetland. The proposed route utilizes a cleared agricultural field to reduce the number of stream crossings and minimizes forested wetland conversion. Following desktop and field review of these concerns, the route variation (ID 9) was not incorporated (*see* Figure 10.6.1-5).

MP 11.8: The proposed route was developed as a result of new information from First Energy regarding a second high voltage powerline in Columbiana and Stark counties. The proposed route will move the centerline to parallel the First Energy easement with the proper offset to abut the two easements. Due to the locations of the houses on Bowman Street NE and the First Energy easement, the proposed route will have to deviate away from the FE easement for approximately 1800 feet to go around the houses. The proposed route crosses one more emergent/scrub shrub wetland and decreases the amount of forested land crossed by approximately 220 feet. The proposed route crosses one less intermediate waterbody. The proposed

route crosses less open water by 10 feet and avoids residential land. Based on this review, the route variation (ID 267) was not incorporated (*see* Figures 10.6.1-5 and 10.6.1-6).

MP 14.1: The proposed route was developed to create a right-angle crossing of Highway 183. The proposed route avoids existing pipeline infrastructure and two nearby waterbodies by changing the bore location. Following desktop and field review of these concerns, the route variation (ID 5) was not incorporated (*see* Figures 10.6.1-5 and 10.6.1-6).

MP 14.3: The proposed route was developed as a result of new information from First Energy regarding a second high energy voltage powerline in Columbiana and Stark counties. The proposed route will parallel the First Energy easement with the proper offset to abut the two easements. The proposed route increases forest land crossing by approximately 65 feet. Based on this review, the route variation (ID 269) was not incorporated (*see* Figures 10.6.1-5 and 10.6.1-6).

MP 15.5: The proposed route was developed as a result of new information from First Energy regarding a second high energy voltage powerline in Columbiana and Stark counties. The proposed route will parallel the First Energy easement with the proper offset to abut the two easements. Due to a large elevation drop on the northeast side of the powerlines, the proposed route will cross the powerlines further to the southeast. One forested wetland crossing will be eliminated and one emergent wetland crossing will be added. The proposed route decreases forested land crossed by approximately 700 feet. Following desktop and field review of these concerns, the corresponding route variation (ID 268) was not incorporated (*see* Figure 10.6.1-6).

MP 16.0: This route variation (ID 251) was created as a result of a landowner request to shift the alignment to the southern portion of the property. The route variation was designed as close to the southern property boundary as possible. The route variation was not incorporated because it increases the forested wetland crossing length by approximately 130 feet as well as increases the amount of forested land crossed by approximately 2300 feet. Both the wetland and forested areas are located entirely within designated USFWS northern long eared bat habitat. Following desktop and field review of these concerns, the route variation (ID 251) was not incorporated (*see* Figure 10.6.1-6).

MP 18.6: The proposed route was developed to avoid a wetland on the northwest side of Highway 62. The presence of this wetland eliminates the ability to cross the road by method of conventional bore, as there would be nowhere to allow for de-watering of the bore pit consequently requiring the crossing method to change from conventional road bore crossing to a HDD. The proposed route will move the road crossing approximately 3,550 feet to the southwest, which enables the pipeline to cross the road by method of conventional bore. There are two less waterbody crossings and five fewer wetland crossings for the proposed route. The proposed route crosses approximately 2430 feet less of forested land and 110 feet less open water. Based on this review, the route variation (ID 145) was not incorporated (*see* Figures 10.6.1-7 and 10.6.1-8).

MP 19.2: This route variation (ID 145) was developed to avoid a crude oil storage tank and a survey corner marker installed by the Ohio State Survey [previously impacted by route variation ID 6]. Route variation 145 would traverse cleared fields in an effort to minimize tree clearing resulting in approximately 425 feet of forested land crossing. Ultimately, neither route variation (ID 145 nor ID 6) were incorporated due to the advantages of the corresponding segment of the proposed route which includes an engineering modification that accommodates the conventional bore of Atlantic Boulevard NE and avoids a segment of the pipeline that would parallel a stream and avoids crossing of forested land (*see* Figure 10.6.1-7).

MP 22.1: The proposed route was developed based on a landowner request asking for that the pipeline to pass between the pump jack and the storage tanks on their property. The proposed route is located to the south of the storage tanks. The proposed route crosses within 100 feet of one additional residential structure. The route variation reduces the linear length by approximately 125 feet through the designated USFWS

northern long-eared bat habitat. Following desktop and field review of concerns, the corresponding route variation (ID 233) was not incorporated (*see* Figure 10.6.1-8).

MP 23.9: The proposed route was developed upon the request of a landowner for the pipeline to be moved from the middle of the property to the southern edge of the property. The property is a farm where customers can go out and pick their own fruits and vegetables. The proposed route will avoid crossing directly through the center of the farm and follow the southern property boundary as closely as possible. Following desktop and field review of these concerns, the corresponding route variation (ID 219) was not incorporated (*see* Figure 10.6.1-8).

MP 25.2: The proposed route between start ID 12 and end ID 12 was developed to avoid crossing a pond, to reduce crossing of upland forest by approximately 1,200 feet, to avoid crossing one stream, to reduce the crossing length through FEMA-mapped floodplains, and to avoid several proximal homesteads, five pump jacks, and two sets of storage tanks (*see* Figure 10.6.1-9).

MP 25.3: Route variation (ID 8) was developed to avoid a pond. This route variation is positioned between two houses while maintaining a 100 foot buffer around a well. Due to impacts on additional landowners, this route variation was not incorporated in lieu of the proposed route that is now located to the south (*see* Figure 10.6.1-9).

MP 26.4: This route variation (ID 204) would cross through the middle of an agricultural farm field. The proposed route was developed as an alternative to the route variation at the request of the landowner to shift the pipeline and associated workspace as far north as possible without impacting the tree line (*see* Figure 10.6.1-9).

MP 26.4: The proposed route between the start and end MPs (ID 217) was developed to accommodate the landowner requests associated with route ID 204 and route ID 193 and to avoid a conservation easement. The proposed route crosses fewer wetlands, completely eliminating four wetland crossings. The proposed route reduces both emergent/scrub shrub and forested wetland crossings by a total of approximately 860 feet, reduces forested land crossed by approximately 1700 feet, reduces the amount of FEMA 100-year floodplain by 1050 feet and crosses one less archaeological site (*see* Figure 10.6.1-9).

MP 26.5: This route variation (ID 193) was developed to avoid approximately 1100 feet of conservation easement. This route variation was superseded by the current route which also avoids the conservation easement and addressed landowner concerns associated with route variation 204 (*see* Figure 10.6.1-9).

MP 26.7: This route variation (ID 262) was developed in response to a landowner request for the pipeline to be moved to the high voltage powerline corridor nearby. The route variation crosses approximately 547 more feet of forested wetland, crosses one more major waterbody and crosses approximately 418 more feet of open water. The route variation crosses within 100 feet of ten additional residential structures. The route variation crosses approximately 2260 less feet of forested land. Based upon the additional impacts to wetlands, open water and residential property, route variation ID 262 was not incorporated (*see* Figures 10.6.1-9 and 10.6.1-10).

MP 27.3: The route variation (ID 229) was developed in response to a landowner request to move the pipeline. The route variation crosses fewer wetlands, reduces forested wetland crossings by 80 feet and emergent/shrub wetland crossings by 629 linear feet. Due to challenging constructability of this route variance, this route variance was not incorporated (*see* Figures 10.6.1-9 and 10.6.1-10).

MP 28.4: The proposed route was developed to avoid crossing a forested wetland that is a potential Category III wetland, according to the ORAM scoring method. The proposed route eliminates wetland crossing and reduces overall alignment length by 66 feet. The proposed route is routed to the north of the potential Category III wetland, eliminating impacts from construction related activities. Following desktop and field review of this area, the corresponding route variation (ID 118) was not incorporated (*see* Figure 10.6.1-10).

MP 29.3: The proposed route (between start and end ID 94) was developed in response to an ODNR request to avoid impacting a forested area crossed by the route segment ID 94. As a result of this request, the proposed route was shifted to the north so the pipeline and associated workspace would not impact forested land. The proposed route adds approximately 65 feet to the pipeline length and crosses 1062 less feet of forested land and accommodates ODNR's request (*see* Figure 10.6.1-10).

MP 29.9: The proposed route between start and end ID 61 was developed to avoid a pond, a well-maintained lawn area, and to increase distance from structures that were crossed but route segment ID 61 (*see* Figure 10.6.1-10).

MP 30.7: This route variation (ID 129) was developed as an alternative to crossing Dotwood Street and several utilities located in close proximity to Dotwood Street. Also, First Energy raised concerns about the pipeline being located between two powerlines. This route variation was developed as an attempt to route around some of the constraints raised by City of Green. The route variation is about 7 miles. From an environmental standpoint the route variation reduces the following: number of wetland crossings by 15, length of forested wetland and emergent/shrub wetland crossing by 3000 feet, number of waterbody crossings by 6, and length of 100-year floodplain crossing by 844 feet. The route variation increases the amount of forested land crossed by 9,716 feet, reduces the length of commercial/industrial land crossed by 1,328 feet and reduces the length of residential lands crossed by 2,050 feet. The route variation avoids nine archaeological sites but crosses in the vicinity of two historic structures. This route variation also crosses approximately 1,210 feet of Singer Lake Preserve, which encompasses two known endangered/threatened dragonfly/damselfly occurrences. Ultimately the route variation was incorporated due to both constructability concerns related to an abandoned underground mine and potential impacts (*see* Figures 10.6.1-11, 10.6.1-12 and 10.6.1-13).

MP 30.7: The proposed route was developed to avoid a cultural site. There are three less archaeological sites crossed by the proposed route. Following desktop and field review, the corresponding route variation (ID 216) was not incorporated (*see* Figure 10.6.1-11).

MP 30.7: This route variation (ID 216) was developed to avoid three large storage tanks, which would have be impacted by alternate route variation (ID 57). These storage tanks are located near Coblentz Avenue NW. This route variation passes the tanks to the south. Ultimately, neither route variation (ID 216 nor ID 57) were incorporated in lieu of the corresponding segment proposed route (*see* Figure 10.6.1-11).

MP 31.2: The proposed route was developed as an alternative to route segment 61 to avoid a pond, two large wetland areas and residential lots. The proposed route avoids the pond (215 feet), all associated wetland crossings (455 feet) and two residential properties, but increases upland forest impacts by 220 feet and adds approximately 50 feet of length to the pipeline (*see* Figure 10.6.1-11).

MP 31.4: The proposed route (ID 143) was developed to avoid a commercial structure and to better accommodate the crossing of the powerlines. The proposed route crosses the powerlines closer to a 45° angle and reduces the workspace located under the powerlines. The proposed route crosses Midway Street NW to the east to increase constructability. One archaeological site located along route variation segment 143 will be avoided by incorporated the proposed route (*see* Figure 10.6.1-11).

MP 32.5: Route ID 249 would cross two mines, the Akron-Canton airport property, within 100 feet of several residential structures, and the Akron-Canton international business park. The proposed route adjusted to avoid and minimize impacts to these constrains, adds approximately 7,200 feet to the total length of the pipeline, crosses five fewer wetlands, but increases wetland crossing length by approximately 2,800 feet (i.e., wetlands are crossed they are larger). The proposed route crosses two more waterbodies and also increases forested land crossed by approximately 11,360 feet, however, crosses within 100 feet of 18 fewer residential structures than route ID 249 (*see* Figures 10.6.1-11, 10.6.1-12, and 10.6.1-13).

MP 33.8: The proposed route was developed in response to landowner identified plans to build a house and several barns on their property in the vicinity of route segment ID 258. The landowner would like the pipeline moved away from the creek which runs east to west in the middle of the property. The proposed route increases wetland crossing by 183 feet but accommodates landowner requests (*see* Figures 10.6.1-11 and 10.6.1-12).

MP 38.2: This route variation (ID 144) was developed to avoid parallel encroachment on a creek. Avoidance of encroachment on the creek was achieved through the relocated proposed route to the south, therefore route variation (ID 144) was not incorporated (*see* Figure 10.6.1-13).

MP 38.8: This route variation (ID 111) was developed in response to a landowner request to move the pipeline as close to the eastern property boundary as possible. The landowner also requested that the pipeline cross the property perpendicular to their property line, rather than going through their property diagonally. The landowner requests were accounted by relocating the proposed pipeline route to the south, therefore, route variation (ID 111) was not incorporated (*see* Figure 10.6.1-13).

MP 40.7: The proposed route was developed to avoid several constructability issues associated route segment ID 58 including residential construction in proximity to an existing pipeline system and crossing the Portage Lakes State Park. The proposed route reduces residential impacts, reduces upland forest crossing by approximately 440 feet and avoids impacts to Portage Lakes State Park by implementing an HDD to cross the park boundary at this location (*see* Figure 10.6.1-13).

MP 40.9: The route variation (ID 59) was developed to move the pipeline further south to avoid two residential lots and two foreign pipelines. The route variation increases forested upland crossing by 1,257 feet in designated USFWS northern long-eared bat habitat, but reduces emergent wetlands crossed by 143 feet. Upon review, the proposed route resolves these concerns and route variation (ID 59) was not incorporated (*see* Figure 10.6.1-13).

MP 41.9: This route variation (ID 218) was developed in response to landowner request, which was followed as closely as possible with the exception of avoiding structures and aligning the two HDDs. The route variation would add approximately 5,100 feet to the total length of the pipeline; would increase emergent/scrub-shrub wetland crossings by 4,086 feet and forested wetland crossings by 9,243 feet; would decrease the number of waterbodies crossed by 10; increase forest land crossing by 1,167 linear feet; would cross two archaeological sites, one additional historic structure, and would cross the Ohio and Erie Canal Historic District. In addition, the route variation bypasses confirmed market connections and adds a 0.21 mile crossing of Maple Lakes Campground. Based on this review, the route variation (ID 218) was not incorporated into the proposed route (*see* Figure 10.6.1-14).

MP 41.9: The proposed route was developed as a result of meeting with Dominion East Ohio Gas and concerns associated with proximity to existing facilities. Based on these communications, it was recommended the pipeline be located 100 feet from their underground storage field and 30 feet from their existing pipelines. The proposed route has been designed to maintain a 70 foot offset from the Dominion East Ohio Gas line in the area. The proposed route crosses more wetland, adding an emergent/scrub-shrub wetland crossing and increases the total amount of wetlands crossed by 140 feet. The proposed route decreases the amount of forested land crossed by 480 feet. Based on this review, the corresponding route (ID 233) was not incorporated into the proposed route (*see* Figure 10.6.1-15).

MP 43.3: The proposed route was developed as a result of meeting with Dominion East Ohio Gas and concerns associated with proximity to existing facilities. Based on these communications, the proposed route has been designed to maintain a 70 foot offset from the Dominion East Ohio Gas line in the area. The proposed route reduces the length of the pipeline and avoids the constraints associated with the corresponding route (ID 224) (*see* Figure 10.6.1-15).

MP 44.4: The proposed route was developed as a result of meeting with Dominion East Ohio Gas and concerns associated with proximity to their underground gas storage field (ID 228) and proximity to residential structures. As a result, it was recommended that the proposed route be located 100 feet from the underground storage field and 30 feet from their existing pipelines (*see* Figure 10.6.1-16).

MP 46.4: The proposed route was developed to address constructability issues with a PI located on the side of a hill. The proposed route will remove the PI and reduce the total length of the pipeline. The proposed route decreases forest land crossing by 24 feet. Following desktop and field review, the corresponding route (ID 153) was not incorporated (*see* Figure 10.6.1-16).

MP 47.3: The proposed route was developed to address constructability issues with a PI located on the side of a hill. The proposed route will remove the PI and reduce the total length of the pipeline. The proposed route decreases forest land crossed by 285 feet. Following desktop and field review, the corresponding route (ID 155) was not incorporated (*see* Figure 10.6.1-16).

MP 48.9: The proposed route was developed to avoid being in close proximity of storage tanks. The proposed route crosses two fewer wetlands, eliminates forested wetland crossing but increases emergent/scrub-shrub wetland crossings by 44 feet. The proposed route increases the amount of forested upland crossed by approximately 1445 feet. The proposed route eliminates one archaeological site and the crossing of Pinto Drive. Based on this review, the corresponding route variation (ID 206) was not incorporated (*see* Figure 10.6.1-17).

MP 49.1: This route variation (ID 203) was developed to avoid crossing Pinto Drive. This route variation was not incorporated due to the location of storage tanks and increased wetland and waterbody impacts. Avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-17).

MP 50.2: The proposed route was developed to avoid close proximity to residential structures. The proposed route moves the pipeline north of the barn and further from the powerline, both which are located south of the barn. The proposed route increases the length of the pipeline by 65 feet and increases the crossing length of upland forest by 145 feet and minimizes impacts to residential structures. Following desktop and field review, the route (ID 14) was not incorporated (*see* Figure 10.6.1-17).

MP 51.3: The proposed route was developed as a result of a landowner request to shift the alignment further from two residential structures and to avoid clearing screen trees near a yard. The proposed route will move the pipeline to the south of the power line corridor, which removes all homeowner obstructions and allows the pipeline to be installed outside the powerline corridor (except where crossing through the powerline corridor). The proposed route adds one minor waterbody crossing, 70 feet of emergent wetland and 1,140 feet of upland forested land. Following desktop and field review, the corresponding route (ID 7) was not incorporated (*see* Figures 10.6.1-17 and 10.6.1-18).

MP 52.4: This route variation (214) has been developed in an attempt to change the location of the Highway 585 crossing due to significant elevation changes on each side of the road. The route variation will move the centerline approximately 700 feet to the northeast where the elevation change across the road is approximately 10 feet. The route variation crossed an additional 281 feet of forested wetland and 321 feet of emergent/shrub wetland as well as increasing the forest land crossing by 1,101 feet. The route variation increases the total length of the pipeline by approximately 1,150 feet. Based on this review, this route (ID 214) was not incorporated (*see* Figure 10.6.1-18).

MP 52.5: The proposed route has been developed in an attempt to change the location of the Highway 585 crossing due to significant elevation changes on each side of the road. The proposed route will cross Highway 585 via a conventional bore at a location where the elevation difference is less. Following desktop and field review of this area, avoidance of concerns addressed through corresponding route variations (ID 232 and 276) was achieved through the proposed route (*see* Figure 10.6.1-18).

MP 52.9: This route variation (ID 136) has been developed as a result of the data gathered on a future Doylestown Shopping Center Concept Plan. The route variation eliminates all wetland crossings (-16 feet of forested wetland and -126 feet of emergent/shrub wetland). The route variation crosses one additional waterbody and increases forested upland crossing by 555 feet. The route variation increases the distance of the Indiana bat habitat by 701 feet, but decrease the distance of the long-eared bat habitat crossed by 2,077 feet. The route variation is within 100 feet of one less residential structure. Upon further review, this route variation (ID 136) was not incorporated because it crossed an abandoned mine (*see* Figure 10.6.1-18).

MP 53.0: The proposed route has been designed in consideration of development plans for a neighborhood between Highway 585 and North Portage Road, as well as an effort to stay out of the middle of that property. The proposed route will follow a sewer/drainage easement along the southern boundary of Phase III of this development and then along the westernmost side of Phase III. The proposed route does not cross any wetlands, eliminating two emergent/scrub-shrub wetland crossings (-425 feet) and one forested wetland crossing (-70 feet). Based on this review, the corresponding route (ID 276) was not incorporated (*see* Figure 10.6.1-18).

MP 53.3: This route variation (ID 147) was developed avoid houses, a pond and an abandoned mine, keeping a minimum of 145 feet from the southern boundary of the abandoned mine. The route variation will add approximately 23 feet to the total length of the pipeline. The route variation decreases the length of forested land crossed by 278 feet. The route variation crosses 121 feet more northern long-eared bat and 250 feet more Indiana bat habitat. Following desktop and field review of these concerns, this route variation was not incorporated because avoidance of the concerns was accomplished through the proposed route (*see* Figure 10.6.1-18).

MP 53.5: This route variation (ID 273) has been developed at the request of a landowner to avoid an area of potential future development. The route variation will border the Highway 585 easement as closely as possible in order to make the property more usable to future landowners. The route variation will add approximately 2,637 feet to the total length of the pipeline. The route variation will increase crossing of northern long-eared bat habitat by 2,637 feet and increase the crossing of Indiana bat habitat by 452 feet. Based on this review and considering the additional impacts, the route (ID 273) was not incorporated (*see* Figure 10.6.1-18).

MP 53.7: This route variation (ID 40) was developed as to avoid a pond, residential lots, barns and storage tanks. The route variation would move the pipeline to the north and would cross 330 feet more forested wetland and 1,424 feet more forested upland. Based on these greater impacts, route variation (ID 40) was not incorporated (*see* Figure 10.6.1-18) and the constraints identified were avoided by the proposed route.

MP 53.7: This route variation (ID 55) was also developed to avoid the same pond, residential lots, barns and storage tanks as route (ID 40). This route variation crosses four more waterbodies than the proposed route. Based on these greater impacts, route variation (ID 55) was not incorporated (*see* Figures 10.6.1-18 and 10.6.1-19) and the constraints identified were avoided by the proposed route.

MP 55.3: The proposed route has been developed in order to avoid crossing near residential lots and powerlines. The proposed route passes to the south of residential lots of concern, between two houses which are approximately 140 feet apart, and therefore is located further from the powerlines. The proposed route crosses one less waterbody and 96 feet less of upland forest. Following desktop and field review, corresponding route variation (ID 82) was not incorporated (*see* Figure 10.6.1-19).

MP 55.7: The proposed route has been designed to adjust the pipeline to reduce impacts to a future housing development by following the property boundary. The proposed route eliminates emergent/scrub-shrub wetland crossings (-124 linear feet) but increases the distance of forested land crossed by approximately 12 feet. Following desktop and field review, the corresponding route (ID 260) was not incorporated (*see* Figure 10.6.1-19).

MP 56.0: This route variation (ID 116) has been developed in response to a landowner request for the pipeline to avoid a stand of mature native trees on their property. The route variation increases the total length of the pipeline by approximately 1,425 feet. The route variation increases forested upland crossed by the project by approximated 1,500 feet. The route variation will be within 100 feet of two additional residential structures. Based on this review, this route variation (ID 116) was not incorporated (*see* Figure 10.6.1-19).

MP 56.7: This route variation (ID 177) has been developed in an attempt to reduce the amount of tree clearing necessary for an ATWS, as well as relocate a PI away from a railroad. The route variation moves the pipeline approximately 105 feet to the south to allow room for the additional temporary workspace (ATWS) in the cultivated field, and it increases the distance of PI from the railroad tracks by approximately 300 feet. The route variation decreases the amount of emergent wetland crossed by 88 linear feet. This route variation was not incorporated to avoid conflicts with future development plans at the Wadsworth Municipal Airport (*see* Figure 10.6.1-19).

MP 56.7: This route variation (ID 109) has been developed to account for plans of the future expansion of the Wadsworth Municipal Airport. The route variation is located to avoid the proposed runway and a pump jack. This route variation adds approximately 460 feet to the pipeline length, increases the amount of emergent wetland crossing by 176 feet and increases the length of 100-year flood zone crossing by 361 feet. Upon further discussion with the Wadsworth Municipal Airport, this route variation was not incorporated (*see* Figure 10.6.1-19).

MP 56.8: This route variation (ID 56) has been developed to avoid properties with newly constructed residential structures. Due to the recent development, there is not adequate space for the pipeline. The route variation increases upland forested crossing by 1,260 feet, increases residential land crossed by 285 feet and crosses two additional minor streams. Based on this review, this route variation was not incorporated (*see* Figure 10.6.1-19).

MP 56.8: The proposed route has been developed as a result of meetings with the Wadsworth Municipal Airport and the Federal Aviation Administration. The proposed route accommodates the Wadsworth Municipal Airport and FAA's request that the pipeline be moved off the airport property. The proposed route will add approximately 3,200 feet to the total length of the pipeline, crosses three additional emergent/shrub wetlands and increases overall wetland crossing by 23 feet. The proposed route increases forested land crossing by 192 feet and increases the FEMA 100-year flood zone crossing by approximately 1000 feet. Based on this review, corresponding route variation (ID 248) was not incorporated (*see* Figure 10.6.1-19). The proposed route has been adjusted to avoid these properties as described under the route variation ID 103 description below (MP 59.1).

MP 58.4: The proposed route has been developed to avoid a property and tree clearing near a stream. The proposed route decreases forested land crossed by approximately 125 feet but increases emergent/scrub-shrub wetland crossing by approximately 100 feet. Following desktop and field review, the corresponding route variation (ID 161) was not incorporated (*see* Figures 10.6.1-19 and 10.6.1-20).

MP 59.1: The proposed route has been developed in response to a landowner request to move the pipeline away from a recently constructed house, a pet cemetery, and two barns/sheds, and that the pipeline be moved to another property owned by the same landowner. The proposed route crosses one less archaeological site. Based on this review, the corresponding route (ID 103) was not incorporated (*see* Figure 10.6.1-20).

MP 59.1: This route variation (ID 25) has been developed in response to a landowner request to avoid two properties with recent construction. The route variation reduces upland forested land crossed by approximately 300 feet and avoids a previously recorded archeological site. The eastern segment of route variation (ID 25) was incorporated into the proposed route with a few minor modifications along the western end (*see* Figure 10.6.1-20).

MP 59.4: This route variation (ID 34) was developed to avoid a pet cemetery. This route variation increases forested upland crossed by 150 feet while avoiding the pet cemetery. The majority of this route variation (that avoids the pet cemetery) was incorporated into the proposed route with a few minor modifications reflected in the proposed route (*see* Figure 10.6.1-20).

MP 59.5: This route variation (ID 257) has been developed as a request of a landowner to avoid their property. The route variation decreases upland forested crossing by approximately 25 feet and one less waterbody crossing. Upon further review, this route (ID 257) was not incorporated because avoidance of this concern was achieved through the proposed route (*see* Figure 10.6.1-20).

MP 59.5: Route variation (ID 29) was developed as a modification to route variation ID 34 to avoid the pet cemetery and also reduce forest land crossed by approximately 440 feet. This route variation (ID 29) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-20).

MP 61.6: The proposed route was developed in an effort to reduce the length of pipeline and ATWS in close proximity to a stream. The proposed route crosses one less wetland, but increases the amount of forested wetland crossed by 16 feet. Based on this review, the route variation (ID 181) was not incorporated (*see* Figures 10.6.1-20 and 10.6.1-21).

MP 61.6: This route variation (ID 158) has been developed in an effort to reduce the pipeline and ATWS in close proximity to a stream. The route variation adds approximately 125 feet to the total length of the pipeline. Upon further review, this route variation (ID 158) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-20 and 10.6.1-21).

MP 61.8: The proposed route has been developed to avoid construction workspace within close proximity of a stream and forested area. The proposed route will go around the forested area and move the construction workspace out of the trees. The proposed route crosses two fewer wetlands, eliminating forested wetland crossings (-400 feet). The route variation decreases forest land crossed by approximately 550 feet. Based on this review, the corresponding route (ID 252) was not incorporated (*see* Figures 10.6.1-20 and 10.6.1-21).

MP 62.1: The proposed route has been developed in response to landowners' request to move the pipeline away from their houses into a nearby field. The proposed route reduces the number of waterbody crossings by two and avoids paralleling a stream. The proposed route eliminates emergent/scrub-shrub wetland crossings, reduces the amount of forested wetland crossed by 54 feet, and decreases the amount of forested upland crossed by approximately 170 feet. Based on this review, the corresponding route variation (ID 105) was not incorporated (*see* Figures 10.6.1-20 and 10.6.1-21).

MP 62.7: The proposed route has been developed in response to a landowner request to relocate the pipeline off their property, as well as to avoid construction workspace within close proximity of a stream. The proposed route eliminates wetland crossings, which decreases the total amount of wetland crossed by 585 feet. The proposed route decreases the number of waterbody crossings by one. Based on this review, the corresponding route (ID 165) was not incorporated (*see* Figure 10.6.1-21).

MP 64.1: This route variation (ID 137) has been developed as an alternative crossing method for Interstate 71. The route variation will move the I-71 crossing approximately 4,100 feet to the southwest where the ground is more level. The route variation crosses approximately 1,400 more feet of wetland but crosses four less waterbodies. The route variation crosses Hubbard Valley Park (2,560 linear feet). The route variation adds one residential structure within 100 feet or the route. Upon further review, this route variation (ID 137) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-21 and 10.6.1-22).

MP 64.4: The proposed route was developed in response to two landowner requests to move the pipeline off one property and onto the other property crossed by the corresponding route (ID 104). The proposed

route increases the length of forested upland crossed by 95 feet while accommodating both landowner requests. Based on this review, the corresponding route (ID 104) was not incorporated (*see* Figure 10.6.1-21) in lieu of the proposed route that address landowner requests.

MP 64.8: This route variation (ID 160) was developed to avoid centerline and workspace within a wetland. The route variation will move the line to the west. The route variation decreases forested crossing by 320 feet. Upon further review, this route variation (ID 160) was not incorporated due to additional landowner concerns, which the proposed route avoids these concerns (*see* Figure 10.6.1-21).

MP 66.1: This route variation (ID 192) has been developed in order to avoid the Medina County Sanitary Engineer's water tower (tank), the Medina County Highway Engineer's Facility, Medina County Home and several neighborhoods (per landowners' request). The route variation avoids all residential structures within 100 feet of the pipeline (-8). The route variation will add approximately 1,040 feet to the total length of the pipeline, increase the amount of forested wetland crossed by 2,310 feet and increases forested land crossed by 545 feet. The route variation eliminates traversing through the Western Reserve Land Conservancy properties, but increases crossing distance of Medina County Park district by approximately 1,600 feet. Upon further review, this route variation (ID 192) was not incorporated due to construction constraints (*see* Figures 10.6.1-21, 10.6.1-22 and 10.6.1-23).

MP 66.1: This route variation (ID 261) has been developed in order to avoid the Medina County Sanitary Engineer's water tower (tank), the Medina County Highway Engineer's Facility, Medina County Home and several neighborhoods (per landowners' request). The route variation avoids seven residential structures within 100 feet of the pipeline. The route variation decreases the number of wetlands crossed by 10 (-1800 feet) and increases forested land crossed by 1,790 feet. The route variation reduces the distance of county managed lands crossed by 5,800 feet. Upon further review, this route variation (ID 261) was not incorporated (*see* Figures 10.6.1-21, 10.6.1-22 and 10.6.1-23).

MP 67.5: This route variation (ID 106) has been developed in response to a landowner request to shift the pipeline further from their house. The route variation moves the permanent easement and the construction work space off of the landowner's property. The route variation increases forested wetland crossing by approximately 50 feet, increases forested upland crossing by 200 feet and crosses an additional intermediate waterbody crossing. Based on this review, this route variation (ID 106) was not incorporated (*see* Figure 10.6.1-22).

MP 68.2: The proposed route has been developed to reduce the impact to nearby residences by increasing the length of the bore under the Chippewa and Ryan Road crossings. The proposed route will avoid having a bore pit near the existing utility and water storage tank along Chippewa Road. The proposed route crosses one more residential structure within 100 feet. Based on this review, the corresponding route variation (ID 162) was not incorporated (*see* Figure 10.6.1-22).

MP 68.4: The proposed route has been developed to change the location of the Chippewa Rail Trail crossing due to existing elevation changes. The proposed route has been moved to the south to a location that will make the bore constructible. The proposed route decreases forested land crossed by 140 linear feet and reduces waterbody crossings by 2. The proposed route comes within 100 feet of one more residential structure. Based on this review, the corresponding route variation (ID 183) was not incorporated (*see* Figure 10.6.1-22).

MP 69.2: The proposed route was incorporated to avoid construction workspace in close proximity of storage tanks. The proposed route increases emergent wetland crossing by approximately 290 feet. Based on this review, the corresponding route variation (ID 197) was not incorporated (*see* Figure 10.6.1-22).

MP 70.4: The proposed route was developed to relocate the PI between the Chippewa Inlet Trail and Wedgewood Road in order to increase constructability. The proposed route increases emergent wetland

crossing by approximately 120 feet but avoids one archaeological site. Based on this review, the corresponding route variation (ID 243) was not incorporated (*see* Figure 10.6.1-23).

MP 70.8: The proposed route was developed to incorporate an HDD as a crossing method to avoid a high quality potential Category III wetland according to the ORAM scoring method. The HDD would be approximately 1850 feet. The proposed route decreasing the wetland crossing total length by 31 feet and decreases forested land crossed by approximately 170 feet. Based on this review, the corresponding route (ID 246) was not incorporated (*see* Figure 10.6.1-23).

MP 72.7: The proposed route was developed to avoid stream and wetland crossings within close proximity of construction workspace. The proposed route crosses four fewer wetlands, decreases the amount of forested wetlands crossed by 53 feet and decreases emergent/shrub wetland crossed by 589 feet. The proposed route eliminates one intermediate and one minor waterbody crossing. The proposed route decreases forested land crossed by 1,290 feet. Based on this review, the corresponding route variation (ID 176) was not incorporated (*see* Figure 10.6.1-23).

MP 73.0: This route variation (ID 53) was developed to avoid workspace that parallels a stream to the west of the railroad tracks for approximately 1500 feet and also to reduce wetland impacts. The route variation relocates the centerline to the west of the creek. The route variation avoids three major waterbody crossings, and decreases the distance of emergent shrub/scrub wetland is crossed by 715 feet. The route variation increases forested upland crossing by 1,030 feet. Based on this review, route variation (ID 53) was not incorporated (*see* Figure 10.6.1-23).

MP 73.6: The proposed route was developed to avoid a communication box associated with the CSX railroad crossing and the West Smith Road crossing. The proposed route increases the amount of forested land crossed by 28 feet. Based on this review, the corresponding route variation (ID 208) was not incorporated (*see* Figure 10.6.1-24).

MP 75.3: The proposed route from MP 75.3 to 78.4 was developed to avoid a high quality potential Category III wetland (according to the ORAM scoring method), and eliminate the need for a HDD associated with corresponding route ID 250 and to avoid numerous PIs (points of intersection or bends) in the pipeline associated with both corresponding routes IDs 250 and 148 (*see* Figure 10.6.1-24).

MP 77.5: This route variation (ID 101) was developed in response to a landowner request to shift the alignment to follow the powerline corridor, therefore avoiding residences, development lots and mature tree. The route variation increases the amount of forested wetlands crossed by 142 feet and increases forested uplands crossed by 1,639 feet. Upon this review, this route variation (ID 101) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-24 and 10.6.1-25).

MP 77.6: This route variation (ID 51) was developed to avoid residential structures and residential lots under development. Although this route variation avoids crossing three intermittent streams this route variation was not incorporated due to crossing an additional 600 feet of forested land, and an additional 385 feet of forested wetlands. This route variation (ID 51) was not incorporated because the proposed route avoids the identified constraints (*see* Figures 10.6.1-24 and 10.6.1-25).

MP 77.6: This route variation (ID 65) was developed to avoid eight residential lots and to avoid paralleling a stream. The route variation avoids three waterbody crossings and eliminates wetland crossings. This route variation (ID 65) was not incorporated and avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-24 and 10.6.1-25).

MP 77.6: The proposed route was developed in response to a landowner comment to move the pipeline further north through cleared agricultural fields to avoid residences, development lots, mature trees and a wetland. The proposed route decreases forested wetland impacts by 262 feet, decreases emergent wetland

crossing by 178 feet and decreases upland forest crossed by 4,180 feet. Based on this review, the corresponding route variation (ID 102) was not incorporated (*see* Figures 10.6.1-24 and 10.6.1-25).

MP 77.9: This route variation (ID 250) was developed to adjust the crossing angles of Speith Road and Station Road. This route variation will cross both roads with one bore crossing by going underneath the intersection, as opposed to the previous alternate route variation (ID 164) which proposed two bores. The route variation reduces the amount of emergent wetland crossed by 49 feet. Upon further review, neither route variation (ID 164 nor 250) was incorporated because the proposed route avoids these concerns (*see* Figures 10.6.1-24 and 10.6.1-25).

MP 81.2: The proposed route was incorporated to avoid a landowner residence and a wetland. The proposed route will pass a house on the east side approximately 300 feet away. The proposed route decreases forested land crossed by approximately 600 feet, eliminates crossing any wetlands and reduces the number of waterbody crossings by one. By eliminating the wetland crossings, the proposed route eliminates 73 feet of scrub-shrub wetland crossing and 315 feet of forested wetland crossing. Based on this review, the corresponding route variation (ID 163) was not incorporated (*see* Figure 10.6.1-25).

MP 82.4: The proposed route was developed to avoid construction workspace paralleling a stream west of Wooster-Avon Lake Road. The proposed route reduces impacts to trees, crosses 55 less feet of emergent wetlands, and eliminates the problematic waterbody crossing. The proposed route crosses within 100 feet of one more residential structure. Based on this review, the corresponding route variation (ID 196) was not incorporated (*see* Figure 10.6.1-26).

MP 83.2: The proposed route was developed to avoid a pond and moves the route further away from nearby residential homes. The proposed route results in a minimal amount of additional emergent wetland and upland forest impacts. Following a review of constraints at this location, the corresponding route variation (ID 22) was not incorporated (*see* Figure 10.6.1-26).

MP 83.6: The proposed route was developed in response to a landowner request to avoid a pet cemetery. The proposed route is designed to be located approximately 420 feet south of the pet cemetery, while still remaining north of the neighbor's pond. This route variation reduces forested wetland crossed by approximately 132 feet and reduces upland forest crossed by 344 feet. Based on this review, the corresponding route variation (ID 36) was not incorporated (*see* Figure 10.6.1-26).

MP 83.9: This route variation (ID 222) was developed in response to a landowner request to move the pipeline further from their residence. The route variation increases the amount of forested wetland crossed by 67 feet, adds a waterbody crossing and increases the total distance of forested land crossed by 490 feet. Based on this review, this route variation (ID 222) was not incorporated due to increased environmental impacts (*see* Figure 10.6.1-26).

MP 84.2: The proposed route was developed to avoid a group of residential houses near LaGrange Richfield Road. The proposed route crosses LaGrange Richfield Road at a 90° angle. In addition, the proposed route eliminates one wetland crossing, reducing the forested wetland crossing length by 55 feet, and decreases the amount of forested upland crossed by 237 feet. Based on this review, the corresponding route variation (ID 30) was not incorporated (*see* Figures 10.6.1-26 and 10.6.1-27).

MP 85.3: The proposed route was developed to avoid several residential lots west of Chamberlain Road and to minimize the crossing distance through Lorain County Metro Park District's "Chamberlain Road Property". The proposed route does not come within 50 feet of any residential structures and traverses 0.25 miles less through the Metro Park. The proposed route increases crossing length of emergent wetland by 460 feet and crosses three additional waterbodies. Based on this review, the corresponding route variation (ID 27) was not incorporated (*see* Figures 10.6.1-26 and 10.6.1-27).

MP 86.0: The proposed route was incorporated to remove a PI in order to avoid a maple farm. Based on the need to avoid the maple farm, the corresponding route variation (ID 124) was not incorporated (*see* Figures 10.6.1-26 and 10.6.1-27).

MP 86.3: The proposed route was developed to improve the constructability of the HDD across the East Branch Black River by reducing the total crossing length and to reduce crossing of ODNR and protected county lands (i.e., the Chamberlin Road Property). The proposed route increases forested wetland crossing by 9 feet, increases emergent/scrub-shrub wetland crossing by 38 feet, increases the crossing of forested land by 113 feet; and reduces the crossing of ODNR managed land by 0.07 mile, and crosses 0.11 miles less of the protected county land. Based on this review, the corresponding route (ID 244) was not incorporated (*see* Figure 10.6.1-27) in lieu of the proposed route that avoids these impacts.

MP 86.3: Route variation (ID 31) was developed to avoid impacting a maple farm located east of Chamberlain Road. Ultimately, neither route ID 244 nor 31 were incorporated in lieu of the proposed route that avoids these concerns and others in the vicinity (*see* Figure 10.6.1-27).

MP 86.5: Route variation (ID 194) was developed to change the alignment and direction of the HDD across the East Branch Black River and to avoid having the pullback area impact an existing maple farm. The route variation crosses fewer wetlands, and reduces the amount of forested wetland crossed by 27 feet, increases upland forest crossed by 258 feet, increases the length of ODNR management areas crossed by 71 feet, and decreases the metro parks crossed by 54 feet. For these reasons, in addition to constructability concerns route variation (ID 194) was not incorporated (*see* Figure 10.6.1-27).

MP 87.7: The proposed route was developed to avoid traversing two existing (20-inch & 30-inch) pipelines. The proposed route alignment crosses 260 more feet of emergent wetland and 438 less feet of forested upland. Based on this review, route (ID 43) was not incorporated (*see* Figure 10.6.1-27) in lieu of the proposed route that avoids crossing the two existing pipelines.

MP 90.1: The proposed route was designed in response to a landowner request to avoid an area where the landowner plans to build a house. The proposed route will add approximately 70 feet to the total length of the pipeline. Based on these facts, the corresponding route (ID 209) was not incorporated (*see* Figure 10.6.1-28).

MP 91.4: The proposed route was developed to avoid a state and federally protected wetland and portion of Lorain Country Metro Parks Carlisle Reservation near the intersection of Diagonal Road and Parsons Road. The alternative route avoids crossing the state and federally protected wetland by passing to the south, thereby decreasing emergent wetland crossing length by 1,117 feet; crosses 92 more feet of forested upland and 54 additional feet of 100-year flood zone. Based on this review, the corresponding route variation (ID 110) was not incorporated (*see* Figure 10.6.1-28) in lieu of the proposed route that avoids these impacts.

MP 91.8: This route variation (ID 70) was developed in response to the pipeline passing within 400 feet of a bald eagle nest. The route variation moves the centerline outside of the required 660 foot bald eagle nest buffer zone. Following desktop and field review, the route variation was not incorporated due to constructability concerns, which are resolved by the proposed route (*see* Figures 10.6.1-28 and 10.6.1-29). Avoidance of the bald eagle nest buffer zone by the proposed route is described under MP 91.9 below.

MP 91.9: Route variation ID 84 was developed to reduce the total length of the re-route necessary to avoid the bald eagle nest. This route variation was superseded by the proposed route in this area that accommodates the reroute that avoids the Lorain Country Metro Parks Carlisle Reservation to the east while still providing an adequate buffer around a bald eagle's nest. The proposed route adds 291 feet to the total length of the pipeline, but is further away from a known bald eagle nest and crosses 1,310 less feet of forest land. For these reasons, the route variation (ID 84) was not incorporated (*see* Figure 10.6.1-28).

MP 92.7: The proposed route was developed to avoid a high quality potential Category III wetland according to the ORAM scoring method and to minimize mature forest clearing. The proposed route will avoid all wetland crossings by traversing through agricultural fields, as well as reducing the length of mapped 100-year flood zone crossing by 860 feet. Based on this review, the corresponding route variation (ID 117) was not incorporated (*see* Figures 10.6.1-28 and 10.6.1-29).

MP 93.6: The proposed route was developed to avoid a pond, while softening the bend at the PI allowing a more suitable area for construction workspace. The proposed route increases the total pipeline length by approximately 100 feet, which is all located within agricultural land. Based on this review, the corresponding route variation (ID 199) was not incorporated (*see* Figure 10.6.1-29).

MP 93.7: The proposed route was developed to minimize the number of crossings of an existing pipeline. The proposed route maintains a 65 foot offset to the south of the existing pipeline and removes two crossings of the existing pipeline. The proposed route decreases wetlands crossed by 298 feet, decreases overall pipeline length by 26 feet but crosses an additional 95 feet of upland forest. Based on this review, the corresponding route variation (ID 96) was not incorporated (*see* Figure 10.6.1-29).

MP 94.4: The proposed route was developed to avoid a confluence of five existing pipelines, in addition to avoiding an ODNR conservation easement. The proposed route is located approximately 40 feet from the existing line which it parallels. The proposed route reduces approximately 318 feet from the total length of the pipeline, has three less wetland crossings (eliminating 156 feet of emergent wetland crossing). The proposed route increases the forested wetland crossed by approximately 1,035 feet. Based on constructability concerns in the area, the corresponding route variation (ID 67) was not incorporated (*see* Figures 10.6.1-29 and 10.6.1-30).

MP 94.6: The proposed route was designed to shift the pipeline further from residential lots with future plans for development. The proposed route crosses one less waterbody and is approximately 17 feet shorter in total length. Based on this review, the corresponding route variation (ID 83) was not incorporated (*see* Figure 10.6.1-29).

MP 96.4: The proposed route was developed to avoid properties owned by the Boy Scouts of America and Girl Scouts of the USA and relocate the HDD across Vermillion River to the southeast, thereby reducing the length of the HDD by approximately 500 feet and allowing the pullback area to be located completely within the existing proposed workspace. The proposed route eliminates a bore that would be required to cross an airport runway. The proposed route increases the length of the total pipeline by approximately 3,000 feet, however it eliminates crossing a Boy Scout Camp, a Girl Scout Camp, and a Western Reserve Land Conservancy easement. The proposed route crosses within 100 feet of one less residential structure, avoids three archaeological sites and avoids crossing 27 feet of mature beech-sugar maple forest. Based on this review, the corresponding route variation (ID 166) was not incorporated (*see* Figures 10.6.1-30, 10.6.1-31, 10.6.1-32, 10.6.1-33, and 10.6.1-34)

MP 97.8: This route variation (ID 166) was developed to shift the proposed pipeline further away from residential structures on both sides of Gilford Road, as opposed to alternate route variation (ID 28). This route variation maintains a distance of approximately 100 feet from the residential structures. The route variation results in an additional 560 feet of upland forest impacts, but avoids crossing within 50 feet of 3 residential structures. Ultimately, neither route variation (ID 166 nor 28) was incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-30 and 10.6.1-31).

MP 99.3: This route variation (ID Scout Camp) was developed to avoid the Girl Scouts of the USA property. The route variation avoids crossing through a large section of an ODNR-mapped rare habitat (beech-sugar maple forest) while also avoiding large areas of forested wetland and upland. The route variation also reduces the crossing length through a conservation property owned by the Girl Scouts of

America. This route variation was not incorporated because these concerns are addressed by the proposed route (*see* Figures 10.6.1-31 and 10.6.1-32).

MP 99.5: This route variation (ID 134) was designed to avoid development plans for the western portion of the property owned by Girl Scouts of the USA and to avoid boring a property associated with the Ortner Airport. The route variation is located south of the Girl Scout's property and the airport. The route variation decreases forested land crossed by 6,208 feet, crosses fewer wetlands, decreases scrub-shrub wetland crossings by 650 feet and reduces the amount of forested wetland crossed by 2,222 feet. The route variation crosses seven waterbodies, eliminating one major waterbody crossing and adding three minor waterbody crossings. The route variation eliminates crossing 27 feet of a beech-sugar maple forest community, which has been identified as a protected community by the Ohio Department of Natural Resources. Following desktop and field review, this route variation was not incorporated due to constructability concern with the HDD crossing of the Vermillion River. Route variation (ID 134) was superseded by the relocation of the proposed route to the south as depicted in Figures 10.6.1-31, 10.6.1-32 and 10.6.1-33.

MP 103.8: The proposed route was developed to shift the alignment further from residential lots in two moderately populated areas. The proposed route crosses 330 less feet of emergent wetland, 313 additional feet of forested wetland, nine less waterbodies and 2,596 less feet of forested upland. The proposed route avoids two identified archeological sites and reduces the total length of the pipeline by 1,918 feet. Based on this review, the corresponding route variation (ID 68) was not incorporated (*see* Figure 10.6.1-34).

MP 107.4: The proposed route was developed to adjust the construction workspace to be located further away from a bridge on Cable Road and associated guardrails. The proposed route minimizes parallel encroachment on a stream. Based on this review, the corresponding route variation (ID 198) was not incorporated (*see* Figure 10.6.1-35).

MP 107.7: This route variation (ID 50) was designed per landowner request to minimize impacts to an orchard, a forested section of the landowner's property and environmental resources, specifically forested wetlands and streams. This route variation avoids crossing forested wetland, reduces upland forested land crossed by 2,525 feet and crosses one less stream. The route variation increases emergent wetland crossing by 158 feet. Following desktop and field review of this area, this route variation (ID 50) was not incorporated because avoidance of these concerns are addressed by the proposed route (*see* Figure 10.6.1-34).

MP 107.7: This route variation (ID 32) was designed per landowner request to minimize impacts to an orchard, a forested section of the landowner's property and environmental resources, specifically forested wetlands and streams. The route variation increases forested wetland crossing by 366 feet, reduces emergent wetland crossings by 204 feet and reduces waterbody crossing by one. Following desktop and field review of this area, this route variation (ID 32) was not incorporated because these concerns are addressed by the proposed route (*see* Figure 10.6.1-35).

MP 108.8: This route variation (ID 133) was designed in response to a landowner request to avoid a drain tile system. The route variation increases the total wetland crossing distance by 1,450 feet and increases upland forested crossing distance by 1,370 feet. Based on this review, the route variation was not incorporated (*see* Figure 10.6.1-35).

MP 109.8: This route variation (ID 272) was developed to evaluate the feasibility of an HDD crossing of Interstate 80. Based on geotechnical information gathered for this area, this route variation (ID 272) was incorporated due to complexities associated with the long distance of the horizontal bore crossing of Interstate 80 (*see* Figure 10.6.1-35).

MP 110.4: The proposed route was developed to minimize crossing of forested wetland. The proposed route will eliminate the forested wetland crossing (-43 feet) and decreases the total upland forested land

crossed by approximately 500 feet. Based on this review, the corresponding route variation (ID 157) was not incorporated (*see* Figure 10.6.1-35).

MP 110.9: The proposed route was designed in response to a landowner request to align the pipeline to minimize impacting an orchard on their property, which is achieved through moving the pipeline to the south. The proposed route crossing within 100 feet of one additional residential structure. Based on this review, the corresponding route variation (ID 221) was not incorporated (*see* Figure 10.6.1-35).

MP 113.0: The proposed route was developed to avoid being in close proximity of two barns. The proposed route decreases waterbody crossings by two, decreases total wetland crossing by approximately 110 feet and decreases forested upland crossed by 145 feet. The proposed route eliminates crossing within 100 feet of any residential structures, but will add approximately 420 feet to the total length of the pipeline. Based on this review, this route variation (ID 33) was not incorporated (*see* Figures 10.6.1-36 and 10.6.1.37).

MP 113.0: The route variation (ID 26) was developed to avoid being in close proximity of two barns. The route variation increases forested wetland crossing by 235 feet, increases upland forested land crossed by 185 feet and crosses a waterbody at the convergence of two streams. Based on this review, this route variation was not incorporated, these concerns are addressed by the proposed route (*see* Figure 10.6.1-36).

MP 114.2: This route variation (ID 41) was developed to avoid being within close proximity of a large garage and house. The route variation crosses one additional wetland, but overall reduces the distance of forested wetland crossed by 25 feet. The route variation reduces forested upland crossing by 285 feet. Following desktop and field review, this route variation (ID 41) was not incorporated because these concerns are addressed by the proposed route (*see* Figures 10.6.1-36 and 10.6.1-37).

MP 114.3: The proposed route was developed to avoid impacts to several nearby residential lots, two barns/sheds within a forested area. The proposed route will avoid the homes by approximately 160 feet, and will avoid the nearest shed by approximately 100 feet. The proposed route increases emergent wetland crossing by 50 feet and increases forested upland crossed by 100 feet. Based on this review, the corresponding route variation (ID 45) was not incorporated (*see* Figures 10.6.1-36 and 10.6.1-37).

MP 116.4: The proposed route was designed in response to a landowner request for the pipeline to avoid a drain flowing from the pond on their property. The proposed route increases the crossing length of forested wetlands by 54 feet and increases total forested upland crossed by approximately 500 feet. Based on this review and the landowner request to avoid the pond drainage system, the route variation (ID 230) was incorporated into the route with minor adjustments depicted by the proposed route (*see* Figure 10.6.1-37).

MP 116.6: This route variation (ID 188) eliminates a PI prior to the HDD crossing of the Huron River, which was proposed by alternate route variation (ID 95). This variation will eliminate the currently proposed PI on the east side of the Huron River, while maintaining the Erie County required 165 feet of offset from the powerline to the south. This route variation reduces the total length of the pipeline by 18 feet and reduces the forested upland crossing distance by 132 feet. Ultimately, neither route variation (ID 188 nor 95) was incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-37).

MP 116.7: The proposed route was developed to shift a PI to the west in order to improve constructability of the HDD crossing of the Huron River. Based on this review, the corresponding route variation (ID 188) was not incorporated (*see* Figure 10.6.1-37).

MP 117.5: The proposed route was developed in response to a request from Erie County Department of Environmental Services to shift the line to the south in order to collocate the pipeline with the southern boundary of the powerline right of way, which will provide the Erie County landfill the acreage necessary for future expansion. The proposed route reduces emergent wetland crossing by 128 feet, but increases wetland forested crossing by 134 feet and increases upland forested crossing by 231 feet. The proposed

route decreases the crossing length of FEMA 100-year flood zone by 121 feet. Based on this review, the corresponding route variation (ID 135) was not incorporated (*see* Figures 10.6.1-36 and 10.6.1-37).

MP 118.3: This route variation (ID 135) was designed to avoid an active private shooting range by shifting the route alignment to the south, which alternate route variation (ID 42) was within 40 feet of. This route variation crosses an additional 20 feet of forested wetland and an additional 483 feet of forested upland. Ultimately, neither route variation (ID 135 nor 42) was incorporated because avoidance of these concerns are addressed by the proposed route (*see* Figure 10.6.1-38).

MP 119.2: This route variation (ID 63) was developed in response to a landowner request for a larger buffer between their property and the Sandusky Norwalk Road bore. The route variation moves the pipeline to the north of the property, thus decreasing of forested land and adjacent residential land by 115 feet. Based on this review, the route variation (ID 63) was not incorporated (*see* Figure 10.6.1-38).

MP 119.2: The proposed route was designed in response to a landowner request to shift the alignment of the proposed route in order to avoid an area of future residential development. The proposed route eliminates one historical site, but also increases habitat for the northern long-eared bat by 484 feet and the Indiana bat by 481 feet. Following desktop and field review, the corresponding route variation (ID 207) was not incorporated (*see* Figure 10.6.1-38).

MP 119.6: The proposed route was developed to avoid a substation, four powerlines and a pond as well as minimize impacts on nearby residential structures and a business. The proposed route increases wetland crossings by one, eliminating forested wetlands crossed (-30 feet) and increasing emergent wetland crossing by 80 feet. The proposed route crosses two additional waterbodies and increases forested upland crossed by 110 feet. The proposed route has four less archaeological sites. Based on this review, the corresponding route variation (ID 19) was not incorporated (*see* Figures 10.6.1-38 and 10.6.1-39).

MP 119.8: This route variation (ID 69) was designed to avoid a substation, four powerlines, a pond, minimizing impacts on nearby residential structures and a business, as well as avoiding properties owned by NASA. The route variation avoids the NASA properties and five recorded cultural sites, but crosses an additional 65 feet of emergent wetland, 76 feet of forested wetland and 271 feet of upland forested land. Following desktop and field review, this route variation was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-38 and 10.6.1.-39).

MP 120.6: The proposed route has been designed in response to a landowner request to increase the distance between their residential structure and the pipeline, moving the alignment further into the corn field on their property. The proposed route decreases the crossing of the NASA Plumbrook Station by 361 feet but the proposed route increases the amount of Indiana bat and northern long-eared bat habitat crossed by 252 feet. Based on this review, the corresponding route variation (ID 202) was not incorporated (*see* Figure 10.6.1-39).

MP 120.8: This route variation (ID 259) was submitted at the request of the landowner for the pipeline to follow the highway, rather than collocate with the powerlines across their property. The route variation crosses one fewer waterbody but increases the total length of the pipeline by 1,220 feet. Based on this review, route variation (ID 259) was not incorporated (*see* Figure 10.6.1-39).

MP 125.8: The proposed route was developed to avoid an archaeological site. The proposed route will completely avoid the archaeological site, decreases the distance crossed by FEMA 100-year flood zone by 150 feet but increases the total length of the pipeline by approximately 365 feet. Based on this review, the corresponding route variation (ID 215) was not incorporated (*see* Figure 10.6.1-40).

MP 126.9: The proposed route was designed in response to a landowner request to shift the alignment of the pipeline to the south, in order to collocate and parallel an existing pipeline. The proposed route adds approximately 125 feet to the total length of the pipeline. Based on this review, the corresponding route variation (ID 225) was not incorporated (*see* Figure 10.6.1-40).

MP 127.8: The proposed route was designed to avoid a PI in close proximity of a waterbody crossing. The proposed route will eliminate approximately 170 feet of forested upland crossing. The proposed route allows for additional construction workspace and avoids encroachment on the nearby waterbody. Based on this review, the corresponding route variation (ID 156) was not incorporated (*see* Figure 10.6.1-40).

MP 130.4: The proposed route was designed to avoid conflict with existing pipelines within a narrow workspace between two residential lots by moving the pipeline to the south. The proposed route will increase the amount of upland forest impacts by approximately 430 feet but it reduces the number of waterbodies crossed by one and crosses 388 less feet of residential land. Following desktop and field review, the corresponding route variation (ID 49) was not incorporated (*see* Figure 10.6.1-41).

MP 131.5: The proposed route was developed to create a 90° angle crossing of Interstate 80/90 to alleviate potential construction concerns at the Interstate 80/90 crossing. The proposed route crosses one less waterbody. Based on this review, the corresponding route variation (ID 48) was not incorporated (*see* Figures 10.6.1-41 and 10.6.1-42).

MP 133.3: This route variation (ID 24) was developed to avoid crossing directly through a highway overpass. Upon further review of the area, this route variation (ID 24) was not incorporated because avoidance of this concern was achieved through the proposed route (*see* Figure 10.6.1-42.)

MP 133.8: The proposed route was developed to avoid ten forested wetland crossings while also moving the pipeline to a better stream crossing location. The proposed route also decreases the amount of forested upland crossing by approximately 580 feet. Based on this review, the corresponding route variation (ID 167) was not incorporated (*see* Figure 10.6.1-42).

MP 135.2: The proposed route was developed to avoid traversing a proposed First Energy powerline. The proposed route increases the total distance of the pipeline by approximately 185 feet. The proposed route decreases the distance of FEMA 100-year flood zone crossed by 130 and decreases the total forested upland crossed by approximately 320 feet. Based on this review, the corresponding route variation (ID 255) was not incorporated (*see* Figures 10.6.1-42 and 10.6.1-43).

MP 138.8: This route variation (ID 178) was developed to avoid an existing waste management facility with known various test wells within its boundaries, as alternate route variation (ID 47) would be located within the facility boundary. This route variation shift will avoid paralleling an intermediate stream for approximately 830 feet. Ultimately, neither route variation (ID 178 nor 47) was incorporated because the avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-44).

MP 138.8: The proposed route was developed to avoid tree clearing. The proposed route will utilize conventional boring techniques when crossing beneath Castalia road. The proposed route decreases emergent wetland crossing by approximately 70 feet and doesn't cross any forested land. Based on this review, the corresponding route variation (ID 178) was not incorporated (*see* Figure 10.6.1-44).

MP 140.2: The proposed route was developed to minimize forest upland and forested wetland crossings. The proposed route decreases the forested land crossed by 600 feet and decreases forested wetland crossed by 265 feet. Based on this review, the corresponding route variation (ID 179) was not incorporated (*see* Figure 10.6.1-44).

MP 140.8: The proposed route was developed to remove crossing a stream at a bridged location, as well as decrease the total length of the pipeline. The proposed route decreases the total length of the pipeline by approximately 170 feet. The proposed route increases FEMA 100-year flood zone by 350 feet and increases the total forested upland crossed by approximately 100 feet. Following desktop and field review, the corresponding route variation (ID 113) was not incorporated (*see* Figures 10.6.1-44 and 10.6.1-45).

MP 143.8: The proposed route was developed to avoid construction workspace within close proximity of a proposed First Energy powerline easement. The proposed route will impact two fewer wetlands, and the

HDD crossing of the Sandusky River will lessen impacts to forested wetlands by 360 feet but increase emergent and scrub-shrub wetland crossing by approximately 415 feet. The proposed route crosses one additional waterbody but decreases the crossing distance of forested uplands by approximately 1500 feet. Based on this review, the corresponding route variation (ID 256) was not incorporated (*see* Figures 10.6.1-45 and 10.6.1-46).

MP 143.8: This route variation (ID 211) was developed to reduce the number of PIs within the area, reduce the length of the pipeline and workspace. The route variation reduces the total length of the pipeline by 73 feet. Upon further review, the route variation (ID 211) was not incorporated (*see* Figures 10.6.1-45 and 10.6.1-46).

MP 145.1: This route variation (ID 227) was developed to avoid a State of Ohio owned salt storage area, a barn and an earthen berm. The route variation increases forested land crossed by approximately 270 feet. Upon further review, this route variation (ID 227) was not incorporated (*see* Figures 10.6.1-45 and 10.6.1-46).

MP 147.9: This route variation (ID 119) was designed in response of a landowner's request to move the pipeline off of their property. The route variation increases the total length of the pipeline by 832 feet and creates three additional PIs. Based on this review, the route variation (ID 119) was not incorporated (*see* Figure 10.6.1-47).

MP 148.2: The proposed route was developed to avoid workspace within close proximity of a stream. The proposed route increases the crossing distance of FEMA 100-year flood zone by approximately 75 feet but crosses one less waterbody. Based on this review, the corresponding route variation (ID 186) was not incorporated (*see* Figure 10.6.1-47).

MP 148.4: This route variation (ID 186) was designed to avoid the use of an unnecessary bend in the pipeline and to reduce the pipeline length, which was incorporated through alternate route variation (ID 112). Removal of the PI resulted in decreasing the total length of the pipeline by approximately 445 feet. This route variation increases the total FEMA 100-year flood zone crossed by 50 feet and decreased forested land crossed by 40 feet. Ultimately, neither route variation (ID 186 nor 112) was incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-47).

MP 153.9: The proposed route was developed to minimize the crossing of a Black Swamp Conservancy easement. The proposed route reduces paralleling a stream channel for approximately 1,164 feet and the length of the pipeline by 60 feet. The proposed route adds one waterbody crossing and 26 feet of forested upland. Based on this review, the corresponding route variation (ID 78) was not incorporated (*see* Figure 10.6.1-48).

MP 155.3: The proposed route was developed to avoid a Black Swamp Conservancy easement. The proposed route avoids entering and crossing approximately 1,695 feet of a Black Swamp Conservancy easement. Based on this review, the corresponding route variation (ID 79) was not incorporated (*see* Figure 10.6.1-48).

MP 156.0: The proposed route was developed to minimize the crossing of a Black Swamp Conservancy property. The proposed route avoids crossing the Black Swamp Conservancy easement for 2,984 feet, decreases wetland crossings by two wetlands, decreases emergent wetland crossing by approximately 50 feet, decreases forested upland crossed by 342 feet, but increases forested wetlands crossed by approximately 35 feet. Based on this review, the route (ID 80) was not incorporated (*see* Figure 10.6.1-49) in lieu of the proposed route that avoids Black Swamp Conservancy lands and reduces impacts.

MP 157.3: This route variation (ID 3) was developed to avoid paralleling the future expansion of an existing active rock quarry. The route variation increases the total forested land crossed by 1,900 feet. Upon further review and discussion with the landowners, this route variation (ID 3) was not incorporated

because avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-49, 10.6.1-50 and 10.6.1-51).

MP 157.3: The proposed route was developed in respond to a landowner request to move the pipeline workspace off their yard. The proposed route increases forested wetland crossing by 190 feet, increases total forested upland crossing by 83 feet, but it reduces emergent wetland crossing by 117 feet and avoids crossing within 100 feet of a residential structure. Based on this review, the corresponding route variation (ID 191) was not incorporated (*see* Figure 10.6.1-49).

MP 157.4: This route variation (ID 152) was developed to avoid two unidentified structures and to address the proximity of the construction workspace in relation residential structures. The route variation decreases the distance of forested wetlands crossed by 77 feet. The route variation was not incorporated due to structures being movable, thus eliminating construction workspace concerns with the proposed route (*see* Figure 10.6.1-49).

The route variation was not incorporated due to structures being movable and construction workspace concerns were avoided with the proposed route (*see* Figure 10.6.1-49).

MP 158.8: This route variation (ID 23) was developed to avoid paralleling the future expansion of an existing active rock quarry. Upon further review and discussion with the landowners, this route variation (ID 23) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-49 and 10.6.1-50).

MP 161.4: The proposed route was developed to avoid two existing pipelines and forested wetlands. The proposed route improves constructability of the proposed HDD crossing of the Portage River and decreases total wetland crossing by 263 feet, completely eliminating 184 feet of emergent wetlands. The proposed route also reduces the crossing within the FEMA 100-year flood zone by approximately 400 feet and reduces forested upland crossed by 16 feet. Based on this review, the corresponding route (ID 90) was not incorporated (*see* Figures 10.6.1-50 and 10.6.1-51).

MP 163.0: This route variation (ID 168) was proposed to avoid forested clearing along a collocated utility corridor. The route variation eliminates forested wetland, which decreases 560 feet of forested wetland crossing and decreases 1,262 feet of forested land. Upon further review, the route variation (ID 168) was not incorporated due to landowner concerns (*see* Figure 10.6.1-51).

MP 163.7: The proposed route was developed to avoid construction workspace encroachment on a landowner's property and to avoid crossing within 100 feet of residential structures. The proposed route crosses one less waterbody and decreases forested land crossed by 1,645 feet. The proposed route eliminates crossing within 100 feet of any residential structures. Based on this review, the corresponding route variation (ID 169) was not incorporated (*see* Figures 10.6.1-51 and 10.6.1-52).

MP 163.7: The proposed route was developed in response to a landowner request to reduce environmental impacts, specifically clearing trees on their property. The proposed route decreases forested land crossed by 2,046 feet, decreases residential land crossed by 140 feet, and decreases open water crossed by 7 feet. The proposed route does not cross within 100 feet of any residential structures. Following desktop and field review of these concerns, the corresponding route variation (ID 271) was not incorporated (*see* Figures 10.6.1-51 and 10.6.1-52).

MP 164.2: This route variation (ID 120) was developed per landowner request to move the pipeline off their property. This route variation decreases forested upland crossed by 244 feet, but crosses an additional 138 feet of forested wetland. The route variation crosses within 50 feet of two additional residential structures. Based on this review, the route variation (ID 120) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-51 and 10.6.1-52).

MP 166.4: This route variation (ID 77) was designed to avoid an electrical transmission line tower. This variation shifts the alignment south of the tower and decreases forest land crossed by 10 feet. Following desktop and field review, the route variation (ID 77) was not incorporated (*see* Figure 10.6.1-52).

MP 166.4: This route variation (ID 220) was developed to increase constructability of a difficult railroad crossing by shifting the pipeline to the south. This route variation decreases forested wetland crossed by 1,288 feet, decreases emergent/shrub wetland by 261 feet and decreases forested land by 1,306 feet. Upon further review, this route variation (ID 220) was not incorporated due to the increased number of landowners impacted (*see* Figures 10.6.1-52, 10.6.1-53 and 10.6.1-54).

MP 166.7: The proposed route was developed to improve constructability of a railroad crossing. This route variation decreases the distance of emergent/scrub-shrub wetland crossings by 6 feet. Based on this review, the corresponding route variation (ID 242) was not incorporated (*see* Figures 10.6.1-52 and 10.6.1-53).

MP 166.8: This route variation (ID 242) was developed to provide a right-angle approach and crossing of the railroad, which was not achieved through alternate route variation (ID 38). This route variation decreases upland forested crossing by 25 feet. Ultimately, neither route variation (ID 242 nor 38) was incorporated because avoidance of these concerns were achieved through the proposed route (*see* Figures 10.6.1-52 and 10.6.1-53).

MP 167.4: The proposed route was developed to realign the pipeline to maintain the required offset from existing pipelines and to reduce unnecessary foreign pipeline crossings. The proposed route will decrease the overall pipeline length by 3 feet and increase forested upland crossing length by 120 feet. Based on this review, the corresponding route variation (ID 114) was not incorporated (*see* Figures 10.6.1-52, 10.6.1-53 and 10.6.1-54).

MP 175.2: The proposed route avoids traversing through an existing electrical substation with future plans for development. The proposed route will offset the substation property by 340 feet to the south as well as a landowner's home by 210 feet to the south, and allow for a right angle crossing of Mercer Rd (County Rd 90). Following desktop and field review of these concerns, the corresponding route variation (ID 151) was not incorporated (*see* Figure 10.6.1-55).

MP 176.6: This route variation (ID 37) was developed to shift the alignment further away from a residential structure. This route variation would have created a situation where the house was surrounded by utilities and therefore was not incorporated. Avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-55).

MP 176.7: The proposed route was incorporated to shift the alignment further away from a residential structure. The proposed route is 228 feet longer but avoids close proximity to a residential structure and 274 feet of residential land. Based on this review, the corresponding route variation (ID 76) was not incorporated (*see* Figure 10.6.1-55).

MP 178.9: The proposed route was incorporated to decrease unnecessary ATWS for an HDD pull string and allow for a right-angle approach and crossing of a railroad. The proposed route increases the amount of forested land crossed by approximately 49 feet. Following desktop and field review of these concerns, the corresponding route variation (ID 210) was not incorporated (*see* Figure 10.6.1-56).

MP 179.2: The proposed route was incorporated to avoid powerline and road crossings in addition to shifting the alignment further from residential structures and avoiding a driveway crossing. The proposed route increases the amount of forested land crossed by approximately 49 feet. Based on this review of these concerns, the corresponding route (ID 107) was not incorporated (*see* Figure 10.6.1-56).

MP 179.6: This route variation (ID 52) was developed to avoid residences that are in close proximity to the pipeline. The route variation crosses two additional minor waterbodies, but decreases upland forest crossing by 56 feet and decreases the amount of residential structures within 50 feet by six. This route

variation was not incorporated as the design would have added two PIs and approximately 736 feet to the alignment (*see* Figure 10.6.1-56).

MP 179.6: This route variation (ID 39) was developed to avoid residential structures and to increase the distance between the pipeline and a powerline. The route variation will increase the upland forest crossing by 264 feet. Upon further review, the route variation (ID 39) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-56).

MP 179.7: This route variation (ID 85) was developed in response to a landowner request to avoid residential structures and to increase the distance from a powerline. The route variation will increase the upland forest crossing by 13 feet and will shift the alignment to the south of the residential properties. This route variation (ID 85) was not incorporated due to concerns regarding construction of the pipeline between two power lines and the depth of the creek to the west of the road crossing. Avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-56).

MP 180.0: This route variation (ID 173) was developed in response to a deep waterbody on the western side of Findley Road which required a HDD crossing method. The route variation increases forested land crossed by 78 feet. This route variation (ID 173) was not incorporated due to constructability concerns through the deep creek and avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-56).

MP 181.1: The proposed route shifts the alignment of the pipeline to a right-angle approach and crossing for the proposed HDD crossing under the Maumee River. On the western bank of the Maumee River the proposed route shifts to the south, avoiding approximately 450 feet through a developed area and crossing within 100 feet of a pond. Based on the increased constructability of the proposed route, the corresponding route variation (ID Maumee River Crossing) was not incorporated (*see* Figures 10.6.1-56 and 10.6.1-57).

MP 181.9: The proposed route was developed in response to a landowner request to avoid the landowner's sewer lift station and to avoid an area that landowner intends to develop. The proposed route will increase the total length of the pipeline by 89 feet and increases the crossing of the FEMA 100-year flood zone by 480 feet and decreases the number of archaeological sites by one. Following desktop and field review of these concerns, the corresponding route variation (ID 149) was not incorporated (*see* Figure 10.6.1-57).

MP 182.1: This route variation (ID 139) was developed in response to a landowner request to avoid the landowner's sewer lift station and to avoid an area that landowner intends to develop. The route variation increases the total length of the pipeline by approximately 80 feet. The route variation (ID 139) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-57).

MP 183.3: The proposed route was incorporated to provide a right-angle approach and crossings for Highway 24 and Hertzfeld Road. Based on the increased constructability of the proposed route, the corresponding route variation (ID 64) was not incorporated (*see* Figures 10.6.1-57 and 10.6.1-58).

MP 183.5: The proposed route was developed to avoid a PI that is in close proximity of an existing creek and adds unnecessary centerline length. The proposed route will provide a better creek crossing location. Based on the increases constructability of the proposed route, the corresponding route variation (ID 171) was not incorporated (*see* Figures 10.6.1-57 and 10.6.1-58).

MP 185.2: This route variation (ID 4) was developed to avoid crossing at a Highway 151 bridge and associated bridge pilings by shifting the alignment to the south. This route variation (ID 4) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-58).

MP 185.3: The proposed route was developed to avoid forested wetland impacts. The proposed route decreases the crossing distance of forested upland by 415 feet, eliminates crossing forested wetlands (a 325

linear foot reduction), and eliminates several PIs. Following desktop and field review of these concerns, the corresponding route variation (ID 170) was not incorporated (*see* Figure 10.6.1-58).

MP 186.4: The proposed route was developed to avoid field-confirmed OEPA Category 3 wetlands, several possible road lays, the Town of Swanton, and relocates the proposed pipeline further west of the Oak Openings Preserve Metro Park (approximately 3.6 miles); Growing Hope Farms and Johnson Fruit Farms. NEXUS responded to concerns raised by managers of Growing Hope Farms, a facility/community for people with autism and Johnston Fruit Farm, growers of specialty crops and with a petting zoo as further described in Draft Resource Report 8.

The proposed route increases the length of forested wetlands crossed by 702 feet, but decreases the amount of emergent/shrub wetland by 2,219 feet, crosses two fewer waterbodies, reduces Maumee State Forest crossing distance by 0.11 miles, and reduces forested upland crossed by 4,226 feet. This variation increases the pipeline length by greater than 2 miles. Based on the need to address all of these concerns, the corresponding route (ID 99) was not incorporated (*see* Figures 10.6.1-58, 10.6.1-59, 10.6.1-60, 10.6.1-61, 10.6.1-62, 10.6.1-63 and 10.6.1-64).

MP 186.4: This route variation (ID 97) was developed to avoid high population residential areas and associated utilities along Hite Road. This route variation increases the distance crossed through the Maumee State Forest, increases forested upland crossing distance by 1,673 feet and increases wetland crossing distance by approximately 960 feet. Based on this review, the route variation (ID 97) was not incorporated and the avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-58, 10.6.1-59, 10.6.1-60 and 10.6.1-61).

MP 187.5: This route variation (ID 86) was developed to avoid multiple wetlands and potential culturally sensitive areas as identified by the landowner. This route variation is 501 feet longer than the proposed route, but reduces wetland impacts by 401 feet, reduces forested upland by 114 feet and crosses one less waterbody. Based on this review, the route variation (ID 86) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-59).

MP 187.7: The proposed route was developed to avoid PIs that are currently underneath an existing high voltage powerline. Additionally, the proposed route avoids construction workspace of the bore crossing of Jeffers Rd encroaching onto a landowner's front yard, which would require tree clearing. The proposed route decreases the amount of emergent wetland crossed by 52 feet. Following desktop and field review of these concerns, the corresponding route variation (ID 174) was not incorporated (*see* Figure 10.6.1-59).

MP 192.1: The proposed route was developed to avoid workspace within close proximity of a culvert at the Route 3 road crossing. The proposed route shifts the alignment slightly north of the original Route 3 crossing and increases the distance between the alignment and a residential structure located to the south. Following desktop and field review, the corresponding route variation (ID 175) was not incorporated (*see* Figures 10.6.1-60 and 10.6.1-61).

MP 192.7: This route variation (ID 87) was developed in response to a landowner request to minimize impacts to their agricultural field and drain tile system. This route variation (ID 87) was not incorporated due to additional impacts to the Maumee State Forest. Avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-60 and 10.6.1-61).

MP 193.9: This route variation (ID 98) was developed to avoid a high density residential development and multiple confirmed OEPA Category III wetlands according to the ORAM scoring method. This route variation increases the length of forested wetlands crossed by 69 feet, but reduces the overall wetland crossing length by 3,102 feet and upland forest crossing by 3,659 feet. Upon further review, this route variation (ID 98) was not incorporated because avoidance these concerns was achieved through the proposed route (*see* Figures 10.6.1-61, 10.6.1-62, 10.6.1-63 and 10.6.1-64).

MP 194.8: This route variation (ID 21) was developed to shift the alignment to the east of residential structures that are within close proximity. The route variation increases forested upland crossed by 750 feet. This route variation (ID 21) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-61 and 10.6.1-62).

MP 196.2: The proposed route was developed to minimize the total forested wetland crossed. The proposed route eliminates forested wetland crossed (a 168 foot reduction) and reduces the length of FEMA 100-year flood zone crossed by 174 feet. Based on this review, the corresponding route variation (ID 172) was not incorporated (*see* Figure 10.6.1-62).

MP 197.3: This route variation (ID 99) was developed to shift the alignment further away from several residential structures and associated lots, which were being affected by alternate route variation (ID 46). This route variation was also designed to create a right-angle crossings of a stream and an active railroad, and to avoid an existing electrical substation. This route variation avoids 944 feet of forested upland crossing. Ultimately, neither route variation (ID 99 or 46) was incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-63).

MP 197.6: This route variation (ID 44) was developed to shift the alignment further from residential structures. The route variation increases crossing of forested wetland by approximately 185 feet but decreases forested upland crossed by 64 feet. Upon further review, this route variation (ID 44) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-62 and 10.6.1-63).

MP 197.9: This route variation (ID 20) was designed to provide a right-angle approach and crossing for the railroad and to avoid close proximity of an existing electrical substation. The route variation decreases forested upland crossed by 1,675 feet but crosses one additional waterbody. Based on this assessment, route (ID 20) was not incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-62, 10.6.1-63 and 10.6.1-64).

MP 201.5: The proposed route was developed to adjust the crossing angle of the powerline to the required minimum crossing angle. Based on the increased constructability of the proposed route, the corresponding route variation (ID 280) was not incorporated (*see* Figures 10.6.1-63 and 10.6.1-64).

MP 201.5: The route variation (ID 17) was developed to avoid traversing through a residential structure. This route variation (ID 17) was not incorporated to avoid having the landowner's residential structure surrounded by utilities (proposed route and existing powerlines). Avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-64).

MP 201.5: The proposed route was developed to avoid traversing through a residential structure. The proposed route eliminates coming within 100 feet of any structures. Based on this review, the corresponding route variation (ID 35) was not incorporated (*see* Figure 10.6.1-64).

MP 204.4: The proposed route was developed to avoid being within close proximity of a residential structure and to accommodate the required workspace for the Route 20 bore crossing. The proposed route decreases the distance of residential land crossed by 174 feet and eliminates the one residential structure within 100 feet. Based on this review, the corresponding route variation (ID 154) was not incorporated (*see* Figure 10.6.1-65).

MP 206.1: The proposed route was developed to reduce crossing the powerlines and reduce the total length of the pipeline. The proposed route reduces the length of the total pipeline by 186 feet and reduces two powerline crossings. Based on this review, the corresponding route variation (ID 89) was not incorporated (*see* Figure 10.6.1-65).

MP 206.9: The proposed route was developed to avoid traversing through the Village of Metamora Water Facility. The proposed route reduces waterbody crossings by one. Based on the increased constructability

of the proposed route, the corresponding route variation (ID 15) was not incorporated (*see* Figure 10.6.1-66).

MP 207.9: The proposed route was developed to reduce crossing the powerlines and reduce the total length of the pipeline. The proposed route reduces the pipeline length by 29 feet and reduces two powerline crossings. Based on this review, the corresponding route variation (ID 91) was not incorporated (*see* Figure 10.6.1-66).

MP 209: The proposed route was developed to avoid the pipeline being within existing pipeline easements and create the proper 50 foot offset. The proposed route increases the forested upland crossing by 667 feet. Based on the proposed route increasing constructability, the corresponding route variation (ID 75) was not incorporated (*see* Figures 10.6.1-66, 10.6.1-67, 10.6.1-68, 10.6.1-69, 10.6.1-70, and 10.6.1-71).

MP 209.7: The proposed route was developed to cross East Mulberry Road and the railroad with one conventional bore crossing. Based on the increased constructability of the proposed route, the corresponding route variation (ID 184) was not incorporated (*see* Figures 10.6.1-66 and 10.6.1-67).

MP 214.1: The route variation (ID Wetlands I) was developed to reduce forested clearing adjacent to the River Raisin. Due to constructability concerns, this route variation (ID Wetlands I) was not incorporated (*see* Figures 10.6.1-68 and 10.6.1-69).

MP 214.6: The proposed route was developed to realign the HDD crossing location of River Raisin to improve constructability and reduce the length of the HDD crossing. The proposed route increases forested wetland crossing by 379 feet and emergent wetland crossing by 15 feet. The proposed route crossed approximately 300 feet more of forested land. These crossings will be minimized due to the HDD crossing method proposed. Based on the need to increase constructability of the HDD crossing, the corresponding route variation (ID 245) was not incorporated (*see* Figures 10.6.1-68 and 10.6.1-69).

MP 215.3: Route variation (ID 245) was developed to reduce the number of PIs and to reduce the overall length of the pipeline, which was increased by route variation (ID 81). This route variation would reduce pipeline length by 560 feet, and eliminates three PIs. Ultimately, neither route variations (ID 245 nor 81) were incorporated in lieu of the proposed route in this area which achieved the objectives of both route variations while also accommodating the River Rasin HDD crossing (*see* Figure 10.6.1-69).

MP 216.8: The proposed route was developed to increase the distance from a residential structure, decrease impacts to forested land, and reduce constraints associated with the proposed railroad/road bore location. Following desktop and field review of these concerns, the corresponding route (ID 235) was not incorporated (*see* Figures 10.6.1-69 and 10.6.1-70) in lieu of the proposed route.

MP 217: This route variation (ID 54) was developed to avoid the route passing through a residential structure, which was affected by alternate route variation (ID 75) which shifted the pipeline to maintain appropriate setbacks for co-location with existing pipeline facilities. Route variation ID 54 would relocate the pipeline to achieve and approximately 130 foot setback from the existing structure. Ultimately, neither route variation (ID 75 nor 54) was incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figures 10.6.1-69 and 10.6.1-70) which is located even further from the residential structure to the east while also accommodating the required setbacks for co-location with existing pipelines.

MP 218.9: The proposed route was developed to relocates a PI bend in order to position the pipeline further away from existing high voltage powerlines as well as an existing foreign pipeline. Based on the increased constructability of the proposed route, the corresponding route variation (ID 190) was not incorporated (*see* Figure 10.6.1-70).

MP 221.3: The proposed route was developed to avoid an easement overlap with two existing TransCanada pipelines. Following field and desktop review of the improved constructability, the corresponding route variation (ID 278) was not incorporated (*see* Figure 10.6.1-71).

MP 224.9: The proposed route was developed to avoid a 60-inch culvert at the Britton Highway crossing location. The proposed route increases the emergent wetland crossing length by 8 feet. Based on this review, the corresponding route variation (ID 279) was not incorporated (*see* Figure 10.6.1-72)

MP 224.9: The proposed route was developed to reduce the amount of impact to forested bat habitat. The proposed route decreases forested upland crossed by 345 feet, and removes 404 feet of forested wetland crossing. Based on this review, the corresponding route variation (ID 254) was not incorporated (*see* Figure 10.6.1-72).

MP 226.9: This route variation (ID 236) was developed to avoid impact to forested bat habitat. This route variation increases the total length of the pipeline and decreases the forested impacts by 452 feet. Upon further review, this route variation (ID 236) was not incorporated in lieu of the proposed route that completely avoids forested habitat (*see* Figure 10.6.1-72) and supersedes route variations 254 and 236.

MP 232.9: This route variation (ID 93) was developed to cross the railroad at the required 90° angle and to avoid crossing multiple foreign pipelines. This route variation will increase the total length of the pipeline by approximately 598 feet. Upon further review, this route variation (ID 93) was not incorporated as these concerns have been addressed by the proposed route (*see* Figure 10.6.1-73).

MP 232.9: This route variation (ID 71) was developed to cross the railroad at the required 90° angle as well as to avoid crossing multiple foreign pipelines. This route variation decreases forested upland crossing length by 48 feet. Upon further review, this route variation (ID 71) was not incorporated as these concerns have been addressed by the proposed route (*see* Figures 10.6.1-73).

MP 232.9: This route variation (ID 121) was developed to cross the railroad at the required 90° angle as and avoid crossing multiple foreign pipelines. The route variation crosses two additional waterbodies and 91 additional feet of forested upland. The route variation decreases residential land crossed by 565 feet but increases the length of FEMA 100-year flood zone by 740 feet. Based on this review, the proposed route variation (ID 121) was not incorporated as these concerns have been addressed by the proposed route (*see* Figure 10.6.1-73).

MP 234.5: The proposed route was developed to realign the pipeline further from a residential structure and to accommodate the required workspace necessary for the Mead Road crossing. The proposed route crosses one less waterbody and comes within 100 feet of one less residential structure. Following desktop and field review of these concerns, the corresponding route variation (ID 150) was not incorporated (*see* Figure 10.6.1-73).

MP 235.3: The proposed route was developed to mitigate constructability concerns with the crossing of two existing TransCanada pipelines. The route variation increases the length forested land crossed by 171 feet but decreases the total forested wetland crossed by 134 feet. Based on this review, the corresponding route variation (ID 238) was not incorporated (*see* Figure 10.6.1-73 and 10.6.1-74).

MP 236.0: This route variation (ID 185) was developed to avoid crossing four existing pipelines. The route variation adds approximately 490 feet to the length of the pipeline. The route variation adds one more road crossing. Upon further review, this route variation (ID 185) was not incorporated (*see* Figure 10.6.1-73 and 10.6.1-74).

MP 236.2: This route variation (ID 122) was developed in response to a landowner request to move the pipeline further from a residential structure. The route variation increases emergent wetland crossing by 17 feet and would require crossings two existing roads with associated utilities. Upon further review of the existing utilities in the area, this route variation (ID 122) was not incorporated in lieu of the current route (*see* Figure 10.6.1-73 and 10.6.1-74) which proposes one road crossing.

MP 237.8: This route variation (ID 125) was developed to avoid four existing pipeline crossings and allow for the HDD pullback string to be located within the existing proposed construction workspace. Upon

further review of the feasibility of obtaining ATWS to support construction in this area, this route (ID 125) was not incorporated (*see* Figure 10.6.1-74 and 10.6.1-75) in lieu of the proposed route.

MP 236.8: The proposed route was developed to reduce forest clearing adjacent to the Saline River. The proposed route significantly reduces the forested clearing on the southern bank of Saline River. Based on this review, the corresponding route variation (ID Wetlands II) was not incorporated (*see* Figure 10.6.1-74).

MP 238.2: The proposed route was developed to increase length of the pipeline collocated with existing pipeline corridors and reduce the number of foreign pipeline crossings required. The proposed route increases the total length of the pipeline by 169 feet but reduces two foreign pipeline crossings. Based on this review, the corresponding route variation (ID 138) was not incorporated (*see* Figures 10.6.1-74 and 10.6.1-75).

MP 238.9: The proposed route was developed to reduce the length of pipeline that traverses through a wetland and avoid crossing within close proximity of a pond. The proposed route decreases forested wetland by 163 feet reduces forested upland crossing by 312 feet, and widens the buffer between the route and a nearby pond by 175 feet. Following desktop and field review of these concerns, the corresponding route variation (ID 140) was not incorporated (*see* Figures 10.6.1-74 and 10.6.1-75).

MP 239.3: The proposed route was developed to cross Highway 23 at a 90° angle and decrease the length of the bore at this proposed road crossing. The proposed route decreases the distance of emergent wetland crossed by 16 feet and decreases the distance of forested upland crossed by 267 feet. Based on this review, the corresponding route variation (ID 237) was not incorporated (*see* Figures 10.6.1-74 and 10.6.1-75).

MP 241.5: The proposed route was developed to avoid residential structures (a home and multiple barns). The proposed route reduces forested upland crossing by 648 feet, as well as removes a PI located within a waterbody. Based on this review, the corresponding route variation (ID 212) was not incorporated (*see* Figures 10.6.1-75 and 10.6.1-76).

MP 241.5: This route variation (ID 212) was developed to avoid residential structures (a home and multiple barns), which are affected by alternate route variation (ID 62). This route variation adds an additional 100 feet of forested upland crossing but avoids two residential structures within 100 feet. Ultimately, neither route variation (ID 212 nor 62) were incorporated because avoidance of these concerns was achieved through the proposed route (*see* Figure 10.6.1-75).

MP 241.5: This route variation (ID 182) was developed to decrease the crossing length through forested wetlands, decrease existing pipeline crossings and optimize the location of a PI. The route variation decreases the amount of forested upland crossed by 220 feet. Upon further review of these concerns, the route variation (ID 182) was not incorporated because of increased total length of pipeline (*see* Figures 10.6.1-75 and 10.6.1-76).

MP 243.8: The proposed route was developed to reduce the number of PIs and reduce the total length of the pipeline. The proposed route will decrease forested wetland crossing by approximately 284 feet and decrease forested upland crossing by approximately 727 feet. Based on this review, the corresponding route variation (ID 239) was not incorporated (*see* Figures 10.6.1-76 and 10.6.1-77).

MP 244.4: The proposed route was designed to in response to a landowners request to avoid an area that the landowner plans to develop for a neighborhood, and to move the pipeline further from a residential structure. The proposed route increases the forested upland crossing length by 439 feet but it avoids crossing within 100 feet of any residential structure. Following field and desktop review of these concerns, the corresponding route variation (ID 240) was not incorporated (*see* Figures 10.6.1-76 and 10.6.1-77).

MP 245.6: The proposed route was developed to reduce the crossing length within forested wetland. The proposed route eliminates one forested wetland crossing and reduces the distance of forested wetland

crossing by 495 feet. The proposed route reduces impacts to FEMA 100-year floodplain by 498 feet. Based on this review, the corresponding route variation (ID 115) was not incorporated (*see* Figures 10.6.1-77 and 10.6.1-78).

MP 245.6: This route variation (ID 123) was developed in response to a landowner request to move the pipeline off their property. The route variation reduces the length of forested wetland crossed by 229 feet and reduces the distance of forested upland crossed by 440 feet. Upon further review, route variation (ID 123) was not incorporated because it creates construction-related concerns and adds approximately 470 feet of total length to the pipeline (*see* Figure 10.6.1-77).

MP 246.8: The proposed route was developed to avoid residential structures, waterbodies, and a mobile home park. The proposed route will prevent approximately 3.6 miles of street lay near an elementary school, multiple densely populated neighborhoods, a church, and a cemetery. The proposed route will decrease the total length of the pipeline by 1,627 feet. Based on the construction-related benefits of the proposed route, the corresponding route variation (ID 100) was not incorporated (*see* Figures 10.6.1-77 and 10.6.1-78).

MP 246.8: This route variation (ID 72) was developed to avoid an elementary school, two densely populated neighborhoods, a church and a cemetery. Due to construction-related issues created by the long street lay that would be required, this route variation (ID 72) was not incorporated (*see* Figures 10.6.1-77 and 10.6.1-78).

MP 247.4: This route variation (ID 66) was designed to avoid two ponds and decreases forested upland crossing by 21 feet. Route variation (ID 66) was not incorporated in lieu of the proposed route which was relocated approximately 3000 feet to the west to avoid constraints associated with route IDs 66, 72, and 100 (*see* Figure 10.6.1-78).

MP 247.4: The proposed route was designed to reduce the number of PIs and eliminate the PI in the crossing of Bemis Road. Based on the increased constructability of the proposed route, the corresponding route variation (ID 281) was not incorporated (*see* Figures 10.6.1-77 and 10.6.1-78)

MP 248.3: This route variation (ID 241) was developed in response to a landowner request to avoid impacting trees on their property. This route variation increases the total length of the pipeline by 270 feet and therefore was not incorporated (*see* Figure 10.6.1-78).

MP 249.2: The proposed route was developed to avoid existing HVAC powerlines, and to shift the street lay for the boring of McKean road to be located near the railyard. The proposed route decreases the length of forested wetland crossing by 80 feet but increases the emergent wetland crossing by 485 feet. The proposed route increases the distance of forested upland crossed by 245 feet. Due to the reduced construction-related concerns with the proposed route, the corresponding route variation (ID 128) was not incorporated (*see* Figures 10.6.1-78 and 10.6.1-79).

MP 249.2: This route variation (ID 108) was developed to avoid existing underground utilities. This alignment shift adds four additional wetland crossings, increasing forested wetland crossing distance by 739 feet and emergent wetland crossing distance by 30 feet, and increases the length of forest land impacts by 2,493 feet. Based on this review, the route variation (ID 108) was not incorporated (*see* Figures 10.6.1-78, 10.6.1-79, and 10.6.1-80).

MP 250.4: The proposed route, derived from a subset of route variation ID 108, was developed to align the centerline with HDD contractor's recommended HDD alignment. The HDD enter and exit locations need to align with the centerline and the installation of PIs. The proposed route increases the crossing distance of the Blanchard's cricket habitat by approximately 288 feet. Based on this review, the corresponding route variation (ID 283) was not incorporated (*see* Figure 10.6.1-79).

MP 250.4: The proposed route was designed to improve the alignment of the HDD across the Huron River, and avoid impacts to parkland, a river crossing, HVAC lines, existing pipelines, water mains, water towers, a dam and nearby roads. The proposed route will increase the total forested crossing distance by 2,389 feet,

which includes 434 feet more forested wetland crossing. The proposed route decreases the amount of residential structures within 50 feet of the workspace by 8. Based on this review and need to increase constructability through this area, the corresponding route variation (ID 127) was not incorporated (*see* Figures 10.6.1-79 and 10.6.1-80).

MP 251.7: The proposed route was developed to avoid an existing salvage yard. Based on this review, the corresponding route variation (ID Junk Yard) was not incorporated (*see* Figures 10.6.1-79 and 10.6.1-80).

MP 252.1: The proposed route was developed to avoid a high voltage powerline and substation as well as several vacant lots. The route variation increases the length of forest land crossed by 108 feet. Based on this review, the corresponding route variation (ID 195) was not incorporated (*see* Figure 10.6.1-80).

MP 252.4: The proposed route was developed to avoid existing underground utilities and information received from the Michigan Department of Transportation that laying pipeline within the middle of the median would not be possible. The proposed route adds 471 feet of forested wetland crossing but decreases emergent/scrub-shrub wetland crossings by 209 feet. The proposed route crosses within 100 feet of two residential structures. Based on this review and information received, the corresponding route variation (ID 231) was not incorporated (*see* Figure 10.6.1-80).

MP 252.4: This route variation (ID 141) was developed to avoid existing underground utilities and information received from the Michigan Department of Transportation that laying pipeline within the middle of the median would not be possible. The route variation increases the length of forested land crossed by 4,362 feet and adds three forested wetland crossings totaling 685 additional feet. Based on this review, the route variation (ID 141) was not incorporated (*see* Figures 10.6.1-79 and 10.6.1-80).

MP 252.4: This route variation (ID 226) was developed to avoid existing underground utilities and information received from the Michigan Department of Transportation that laying pipeline within the middle of the median would not be possible. The route variation crosses 625 additional feet of forested wetland but decreases the emergent wetland crossing by 210 feet. The route variation adds two major waterbody crossings and increases the distance of forested land crossed by approximately 1800 feet. Upon further review, this route variation (ID 226) was not incorporated (*see* Figures 10.6.1-79 and 10.6.1-80).

MP 252.4: This route variation (ID 234) was developed to avoid existing underground utilities and information received from the Michigan Department of Transportation that laying pipeline within the middle of the median would not be possible. The route variation increases the length of forested wetlands by 21 feet, adds on major waterbody crossing and increases the distance of forested upland crossed by the 373 feet. Upon further review, this route variation (ID 234) was not incorporated (*see* Figures 10.6.1-79 and 10.6.1-80).

MP 253.4: The proposed route was developed to avoid a waterline, a water main, as well as other existing utilities in the area. The route variation reduces the distance of forested land crossed by 56 feet. Based on desktop and field review, the corresponding route variation (ID 274) was not incorporated (*see* Figure 10.6.1-80)..

10.6.2 Route Variations Under Evaluation

The following sections provide a summary of route variations that are still under evaluation by NEXUS. Some of these route variations were identified by the FERC in its July 30, 2015 *Comments on Draft Resource Reports 1 through 8 and 10* and several of the following route variations were requested by stakeholders. These route variations are shown on Figures 10.6.3-1 through 10.6.3-16 and are organized by starting milepost (*see* Figures section) from east to west as they occur along the pipeline route. The route variations discussed in this section are not currently reflected in the Project alignment sheets and are in the final stages of evaluation by NEXUS.

Landowner Requested Alternative

TGP MP 0.0: NEXUS is evaluating a route variation at the request of the landowner located north of the proposed County Road 842 crossing in Hanover Township, Columbiana County, Ohio at approximate MP 0.0 of the TGP Interconnecting Pipeline. This landowner has requested that the pipeline be moved as far to the west as possible on his property because he is planning on building a pole barn near the proposed route, in an area of level ground. NEXUS is evaluating a route variation to the west of the proposed route to accommodate the landowner's request which is approximately 0.2 mile in length and would slightly realign the proposed crossing of McKaig Road (*see* Figure 10.6.3-1). The route variation would reduce the total length of the pipeline by approximately 12 feet.

Cultural Resource Avoidance Alternative

MP 7.1: NEXUS is evaluating a route variation to avoid two potential areas of cultural resource sensitivity located east of the proposed Field Road crossing in West Township, Columbiana County, Ohio at approximate MP 7.1. NEXUS is evaluating a route alternative to the south of the proposed pipeline to avoid and provide an adequate buffer to the potential cultural sites (*see* Figure 10.6.3-2). The route variation reduces the total length of the pipeline by approximately 81 feet.

Landowner Requested and Cultural Resource Avoidance Alternative

MP 15.6: NEXUS is evaluating a route variation at the request of the landowner owning property to the east and west of Frederick Avenue NE in Washington Township, Stark County, Ohio, at MP 15.6 (*see* Figure 10.6.3-3). The landowner has requested that the pipeline follow the southern portion of his properties. The landowner has family which owns the adjacent properties; NEXUS has consulted with the family members who own land which would be crossed by the route variation.

The route variation which deviates from the proposed route at MP 15.6 travels generally west through agricultural fields for approximately 3,419 feet. The route variation then turns to the northwest and travels approximately 5,086 feet through forested and agricultural land and rejoins the proposed route at MP 17.4. The alternative route would reduce the pipeline length by approximately 272 feet. This route variation is preferred over a previous route variation which ran from MP 16.0 west approximately 5,909 feet through agricultural and forested land, before turning to the northwest and traveling through agricultural and another large forested tract for approximately 1,663 feet to rejoin the proposed route at MP 17.4.

The proposed route variation would also avoid an area of potential cultural resource located west of the proposed Frederick Avenue NE crossing in Washington Township, Stark County, Ohio at approximate MP 17.1 (*see* Figure 10.6.3-3).

Modified Electric Transmission Line Alternative

MP 27.5: NEXUS evaluated this route variation in response to a letter submitted to the FERC docket dated July 8, 2015, and in response to FERC comment 103 a. on NEXUS' June pre-filing submittal of Resource Report 10. The route variation suggested by the landowner departs from the current route at MP 27.5 in Stark County, heads in a generally westerly direction, turns northwest, and parallels an existing transmission line ROW for approximately 1.6 miles from MP 0.7 to where the alternative route rejoins the proposed route at MP 29.8 in Stark County (*see* Figure 10.5-15). The Stakeholder Powerline Alternative would cross a combination of agricultural, open, and forest land. The alternative route crosses residential neighborhoods, wetlands, and waterbodies.

The primary environmental advantages of this route variation are that it would be co-located with 1.0 more miles of existing powerline ROW, it would cross one less waterbody, 30.5 acres less forested land, and 0.5 mile less state park lands than the corresponding segment of the proposed route. The primary engineering advantage of the alternative route is that would cross 0.1 mile less area of sidehill construction. The primary environmental disadvantages of this route variation are that it would be 0.2 miles longer and would temporarily affect approximately 1.7 acres more land during construction and would require 0.9 acres more

acres of permanent easement during operations. It would cross 1 more wetland, 1.9 acres more wetland, and 2.4 miles more of areas of potential subsidence. The primary engineering disadvantages of this route variation are that it would cross 2 more roads, and one more residence within 50 feet of the construction ROW. In summary, this route variation would temporarily affect approximately 1.7 acres additional land during construction and would require 0.9 acres more acres of permanent easement during operations; it would cross 1 additional wetland, impact 1.9 additional wetland acres, and 2.4 additional miles of potential subsidence. This route variation would be co-located with 1.0 more miles of existing powerline ROW; cross one less waterbody; 30.5 acres less forested land; and 0.5 mile less state park lands. NEXUS has not yet completed its evaluation of this route variation.

Cultural Resource Avoidance Alternative

MP 30.9: NEXUS is evaluating a route variation to avoid an area of potential cultural resource sensitivity located west of the proposed Coblentz Avenue NW crossing in Lake Township, Stark County, Ohio at approximate MP 30.9. NEXUS is evaluating a route alternative to the southwest to avoid the cultural site (*see* Figure 10.6.3-4).

City of Green and Greentown Route Alternatives

MP 31.1: NEXUS evaluated route variations beginning at MP 31.1 to minimize proximity to residential structures in the vicinity of Dotwood Road, an existing electric utility corridor, the Green Soccer Association soccer fields, and Portage Lakes Career Center. A potential route variation was proposed and submitted in the June pre-filing. This route alternative deviated from the proposed route at approximate MP 31.1 in Stark County, Ohio, headed southwest and then generally west through mainly agricultural, forested and open land, and extended into Summit County, Ohio; the total alternative route length was approximately 7.9 miles. It rejoined the proposed route at MP 37.2 in Summit County (*see* Figure 10.6.3-5). The route variation increased the total pipeline length by 0.9 miles compared to the June pre-filing route.

Numerous utilities including gas pipelines, storm water drains, sewer lines, forced water mains, cable, and phone utilities, were identified along the previous route under and adjacent to Dotwood Road by civil survey crews from (June 2015 pre-filing) MP 31.7 to MP 32.2. The presence of these utilities makes the proposed street lay infeasible. The June pre-filing route entered an electric transmission line corridor to the west of Dotwood Road at MP 32.2 and ran between two FirstEnergy transmission lines to MP 33.4. Discussions with FirstEnergy indicated that the utility would not allow the NEXUS pipeline to be installed between their utility lines in this area. The June pre-filing route crossed approximately 90 feet to the south of the Green Soccer Associated soccer fields, which are located on the Portage Lakes Career Center property at MP 35.6 on the previous route. The career center building is located approximately 660 feet to the north of the June pre-filing pipeline construction workspace. NEXUS received comments from the City of Green and the Portage Lakes Career Board of Education regarding their opposition to the June pre-filing pipeline location. Other constraints associated with the June pre-filing route included close proximity to residential structures, potential archaeological sites, and wetland and waterbody crossings.

The June pre-filing route alternative avoided Dotwood Road; traversing an area between two FirstEnergy transmission lines; the Green Soccer Association soccer fields; and the Portage Lakes Career Center property. The proposed June pre-filing route variation passed through residential areas, most notably across Bletchley Avenue, but was feasible and constructible. This proposed route variation passed in very close proximity to two residential structures and a pond on/adjacent to Bletchley Avenue; this location would be crossed by an HDD, thereby minimizing residential and environmental impacts in this area.

NEXUS has continued to evaluate the pipeline route within the City of Green and Greentown since the June pre-filing and based upon further review has refined routing in this area. From MP 31.1, the current route generally follows the June pre-filing route through MP 32.8. At MP 32.8 the current route deviates from the June pre-filing route to the north to avoid Dotwood Street. The current route then turns to the west-

southwest to avoid residential subdivisions to the west of the proposed crossing of Cleveland Avenue NW at MP 33.1 in Greentown, Stark County. At MP 34.2 the proposed route crosses into Summit County, turns northwest and routes around residences adjacent to the proposed Mayfair Road crossing in Urban Township at MP 35.0. The proposed route turns southwest, crosses through Ariss Park, turns west and parallels an existing powerline corridor through MP 35.8, and then travels south and west through mainly agricultural and forested areas through MP 37.2, where the proposed route follows the June pre-filing route proposed alternative. The current route is in the location of the June pre-filing route alternative from MP 37.2 through MP 39.5.

The primary environmental advantages of the proposed route compared to the June pre-filing route are that it avoids: Dotwood Road; traversing an area between two FirstEnergy transmission lines; the Green Soccer Association soccer fields; and the Portage Lakes Career Center property. Furthermore, the proposed route compared to the eastern portion of the June pre-filing route avoids the Akron-Canton Airport.

NEXUS is also evaluating a route variation at MP 35.8 to adjust the pipeline away from an area of planned expansion for businesses on two parcels, per the City of Green's request. The City has stated that the proposed route will create an obstacle for business expansion in this area. The route variation would deviate from the proposed route at MP 35.8 and extend generally west-southwest through agricultural and forested land and rejoin the proposed route at MP 36.6. The proposed route is approximately 4,205 feet and the route variation is approximately 3,960 feet; the route variation would reduce the pipeline length by approximately 245 feet.

NEXUS is also evaluating a route variation at MP 36.7 to adjust the pipeline route on a parcel within the City of Akron International Business Park, per the City of Green's request. The city has expressed concern that the proposed pipeline location would hinder future developments on the parcel. A route variation is under evaluation which would shift the pipeline route to the west on the parcel, and parallel the parcel boundary. The proposed route is 1,362 feet and the route variation is approximately 1,339 feet; the route variation would reduce the pipeline length by approximately 23 feet.

NEXUS is still evaluating opportunities to refine this route variation to minimize potential landowner, cultural resource, wetland, and waterbody impacts.

Landowner Requested Alternative and Category 3 Wetland Avoidance Alternatives

MP 39.1: NEXUS is evaluating route variations at the request of the landowners located east of the proposed Killinger Road crossing in the City of Green, Summit County, Ohio at approximate MP 40.3. These landowners expressed concerns regarding the crossing of a large forested wetland complex on their property and adjacent properties and submitted letters to the FERC docket dated August 17, August 30, and September 5, and September 26, 2015 suggesting potential route variations to avoid this wetland. NEXUS has confirmed, based on field investigation and desktop review (where survey permission has not been granted), that Ohio Category 3 wetlands are located to the northeast and southwest of Killinger Road. NEXUS is evaluating eight potential route variations in the area from MP 39.1 through MP 41.5 (*see* Figure 10.6.3-6).

NEXUS reviewed the four potential route variations proposed by the landowner (depicted as proposed alternative routes on Figure 10.6.3-6). All of the landowner proposed routes cross known or likely Ohio Category 3 wetlands and therefore are not viable alternatives. Portions of the landowner-proposed route variations, outside of Category 3 wetland crossing areas, are being evaluated in combination with NEXUS-proposed route variations in this area.

NEXUS reviewed four route variations that are a combination of NEXUS' and the landowner's proposed routes that would avoid the known and likely Ohio Category 3 wetlands as well as minimize wetland and residential impacts. Two of these routes are optimized versions of older route variations considered. After

detailed review of the area, NEXUS is further evaluating the route variation from MP 39.9 to 41.5 (*see* Figure 10.6.3-6).

The route variation which deviates from the proposed route at MP 39.9, travels southwest, crosses Killinger Road within a residential area, and then continues southwest through agricultural, open and forested land. The route variation turns to the northwest, crosses Portages Lake State Park and the Nimisila Reservoir, and rejoins the proposed route at MP 41.5.

The primary environmental advantages of the MP 39.9 to 41.4 route variation are that it crosses fewer wetlands than the proposed route, eliminates approximately 1,400 feet of wetland crossings, avoids crossing confirmed Category 3 wetlands, and crosses two fewer waterbodies than the proposed route. Based on desktop review, none of the wetlands crossed by the route variation are Category 3 wetlands. The route variation also adjusts the HDD crossing angle of the Nimisila Reservoir, so that there are no Category 3 wetland impacts associated with the HDD. The route variation increases the length of the Portage Lakes State Park crossing at the Nimisila Reservoir by approximately 0.3 mile; however, the crossing will be via HDD. The primary engineering disadvantages of the route variation are that it would increase the pipeline length by approximately 854 feet.

NEXUS is still evaluating opportunities to refine this route variation to avoid Category 3 wetland crossings and minimize potential landowner, wetland, and waterbody impacts.

Landowner Requested Alternative

MP 54.2: NEXUS is evaluating a route variation at the request of the landowner located west of the proposed Clinton Road crossing in Chippewa Township, Wayne County, Ohio at approximate MP 54.2. This landowner has requested a route variation because the proposed route crosses a planned swimming pool location. NEXUS is evaluating a route alternative to the north side of the landowner's house to accommodate his request. The route variation would increases the total length of the pipeline by approximately 13 feet (*see* Figure 10.6.3-7).

Landowner Requested Alternatives

MP 55.7: NEXUS is evaluating route variations submitted to NEXUS by the landowner (via email on October 12 and 13, 2015; and via letter submitted to the FERC docket on August 18, 2015) located to the east of the proposed Eastern Road crossing at MP 55.7 in Chippewa Township, Wayne County, Ohio. The landowner provided four route variations between MP 55.7 and 62.3 (*see* Figure 10.6.3-8).

One of the route variations which deviates from the proposed route at MP 55.7 in Wayne County, travels generally west to northwest, through forested, open land, and agricultural areas, travels to the south of Premier Pontiac and crosses the Wayne/Medina county line. The route continues to the northwest turns to the southwest-south, crosses the Medina/Wayne county line again and passes to the south of the Rawiga County Club. Beyond the county club the route turns to the northwest-north through agricultural land and rejoins the proposed route at MP 62.3. This route variation would add approximately 4,417 feet to the total length of the pipeline. An engineering disadvantage of this route is that east of Shondel Road there is a section of sidehill construction about 500 feet long which would require an approximately 20-foot cut.

The second route variation which deviates from the proposed route at MP 55.7 in Wayne County, travels to the north, crosses Eastman Road, then turns to the west, and follows the proposed route from MP 56.7 to 57.4, crossing along the eastern side of Premier Pontiac parking lot. The route variations then turns to the southwest and deviates from the proposed route, travels through open land, agricultural, and forested areas. The route turns to the northwest and crosses the Wayne/Medina county line. The route continues to the northwest turns to the southwest-south, crosses the Medina/Wayne county line again and passes to the south of the Rawiga County Club. Beyond the county club the route turns to the northwest-north through agricultural land and rejoins the proposed route at MP 62.3. This route variation would add approximately 5,919 feet to the total length of the pipeline. An engineering disadvantage of this route is that there is a

house within approximately 40 feet of the construction workspace of the route variation on the north side of Eastern Road based on the landowner's proposed alignment.

The third route variation which deviates from the proposed route at MP 55.7 in Wayne County, travels generally west to northwest, through forested, open land, and agricultural areas, travels to the south of Premier Pontiac, and crosses the Wayne/Medina county line. The route continues to the northwest through mainly agricultural land, crosses to the east of the Ohio Western Reserve National Cemetery and rejoins the proposed route at MP 60.7. This route variation would add approximately 2,040 feet to the total length of the pipeline. An engineering disadvantage of this route is that east of Shondel Rd there is a section of sidehill construction about 500 feet long which would require an approximately 20-foot cut.

The fourth route variation which deviates from the proposed route at MP 55.7 in Wayne County, travels to the north, crosses Eastman Road, then turns to the west, and follows the proposed route from MP 56.7 to 57.4, crossing along the eastern side of Premier Pontiac parking lot. The route variations then turns to the southwest and deviates from the proposed route, travels through open land, agricultural, and forested areas. The route turns to the northwest, travels through mainly agricultural land, crosses to the east of the Ohio Western Reserve National Cemetery and rejoins the proposed route at MP 60.7. This route variation would decrease the total length of the pipeline by approximately 536 feet. An engineering disadvantage of this route is that there is a house within approximately 40 feet of the construction workspace of the route variation on the north side of Eastern Road based on the landowner's proposed alignment.

NEXUS is still evaluating opportunities to refine this route variation to minimize potential landowner, wetland, and waterbody impacts.

Category 3 Wetland Avoidance Alternative

MP 89.6: NEXUS is evaluating a route variation to avoid a confirmed Category 3 wetland which is crossed by the proposed route from MP 90.7 to 90.9 in Lagrange Township, Lorain County, Ohio (*see* Figure 10.6.3-9).

The route variation would deviate from the proposed route at MP 89.6 and travel to the northwest for approximately 3,222 feet through agricultural and open land. It would then turn and travel to the west for approximately 1,576 feet, turn and travel northwest for approximately 952 feet. The route would then travel west and then southwest for approximately 4,003 feet through agricultural land and rejoin the proposed route at MP 91.3. By routing to the north of the forest containing the Category 3 wetland identified at MP 90.7 – 90.9 of the proposed route, this route variation would avoid Category 3 forested wetland impacts and would eliminate two waterbody crossings. The proposed route would add approximately 733 feet of length to the pipeline.

Landowner Requested Alternatives

MP 98.1: NEXUS is evaluating route variations as a result of discussions with the landowner of a quarry located to the west of Gifford Road in Camden Township, Lorain County, Ohio (*see* Figure 10.6.3-10). The southern portion of the quarry has several existing utility ROWs and the quarry has asked that the NEXUS pipeline follow the existing utility corridor. The proposed route variations are offset 45 feet to the north of the northernmost existing utility line on the property.

One of the route variation deviates from the proposed route at MP 98.1, heads to the southwest through agricultural and open land, parallels an existing pipeline ROW, then crosses the ROW and heads northwest, rejoining the proposed route at MP 99.1. The proposed route is approximately 2,589 feet and the route alternative is approximately 3,431 feet; this route variation would add approximately 842 feet of pipeline length.

The second route variation in this area deviates from the proposed route at MP 98.6, travels southwest through agricultural land, parallels the utility ROW through open land, crosses the ROW and rejoins the

proposed route at MP 98.6. The proposed route is approximately 4,871 feet and the route variation is approximately 5,411 feet; the route variation would add approximately 540 feet of pipeline length.

Edison Woods MetroPark Property Alternative

MP 111.9: NEXUS is evaluating a route variation to avoid crossing the Edison Woods MetroPark Property in the Village of Berlin Heights, Erie County, Ohio, at MP 111.9. NEXUS has been in communications with the Erie County MetroParks, owner and manager of the park regarding the proposed crossing location. NEXUS coordinated with Erie County MetroParks and Ohio Environmental Protection Agency representatives in August of 2015. There is a Restrictive Covenant on the property which does not allow utility easements or crossings; therefore, NEXUS is evaluating a route variation which would avoid crossing the southwestern corner of the metropark (*see* Figure 10.6.3-11). The route variation will move the pipeline centerline approximately 75 feet to the southwest so that the proposed road bore will cross underneath the intersection of Mason Road and Lake Street without having the permanent easement or construction workspace on the Edison Woods MetroPark property. The route variation increases the total pipeline length by 50 feet.

Cultural Site Avoidance Alternative

MP 136.0: NEXUS is evaluating a route variation to avoid an identified cultural site located west of the proposed County Road 268 crossing in Townsend Township, Sandusky County, Ohio at approximate MP 136.0 of the proposed pipeline. NEXUS is evaluating a route alternative to the south of the proposed route to avoid and provide an adequate buffer to the cultural site (*see* Figure 10.6.3-12). The route variation increases the total length of the pipeline by approximately 46 feet.

Landowner Requested Alternative

MP 168.1: NEXUS is evaluating a route variation at the request of the landowner located east of the proposed County Road 11 crossing in Troy Township, Wood County, Ohio at approximate MP 168.1. This landowner expressed concerns regarding existing Conservation Reserve Program easement commitments and concerns with regard to the extent of potential impacts to newly-installed agricultural drain tiles that would be impacted by the proposed pipeline. The landowner provided NEXUS with a preferred alternative route that would depart from the current route at approximate MP 168.1 and extend north for approximately 351 feet (crossing two existing Dominion gas pipelines) and bending to the northwest and extending another 488 feet to another bend in the pipeline and extending west crossing existing high tension powerlines, County Road 11, and two more existing pipelines for a distance of approximately 1,573 feet and connecting with the current route at approximate MP 168.5. NEXUS evaluated this landowner identified route based on engineering, environmental, constructability and land ownership constraints. The alternative route would be approximately 2,304 feet compared to the current route at 2,013 feet; the route variation would add approximately 291 feet of pipeline length (*see* Figure 10.6.3-13). This route variation is still under consideration by NEXUS.

Landowner Requested and Oaks Opening Habitat Avoidance Alternative

MP 190.3: NEXUS is evaluating route variations at the request of the landowner located west of the proposed County Road 2 crossing in Swan Creek Township, Fulton County, Ohio, at approximate MP 190.3. The landowner has requested a route modification because he feels that the proposed pipeline is located too close to his son's property, which is located east of the proposed pipeline route (*see* Figure 10.6.3-14). The route variation to accommodate the landowner's request would deviate from the proposed route at MP 190.5 and travel west for 665 feet. The route variation would then turn northwest for approximately 706 feet. The route variation would then make another bend and travel northeast for approximately 887 feet. The route variation would tie into the proposed route at approximately MP 190.9. The proposed route variation is approximately 2,262 feet in length versus the proposed route which is 1,760 feet; the route variation would results in an increase in total pipeline length of approximately 502 feet.

In addition to the landowner's request, NEXUS is also evaluating a variation in this area to avoid potential Oaks Opening Habitat (potential oak and blueberry forest) which is associated with the son's property. The route variation to avoid the potential Oaks Opening Habitat would deviate from the proposed route at MP 190.3 and head northwest for approximately 843 feet, routing to a point east of County Road 2. The route variation would then make a slight bend and continue northwest for approximately 1,211 feet, routing to a west of a landowner's home. The route will then makes a bend and head north for approximately 1,403 feet. The route will then make a slight turn and head northwesterly for approximately 1,670 feet, rejoining the proposed route at MP 191.3. The route variation is approximately 5,171 feet in length versus the proposed route, which is approximately 5,166 feet; therefore, the route variation would reduce the pipeline length by approximately 5 feet.

Landowner Requested Alternative

MP 248.2: NEXUS is evaluating a route variation at the request of the landowner located north of the proposed Martz Road crossing in Ypsilanti Township, Washtenaw County, Michigan at approximate MP 248.2 (*see* Figure 10.6.3-15). The landowners have requested that the pipeline be relocated to the southern border of their property.

The route variation would deviate from the proposed route at approximate MP 248.2 and head northeast for approximately 186 feet. The route would make a turn and head east, along the property line, for approximately 592 feet. Once the route variation reaches the southeastern corner of the property it would make another bend and head northeast for approximately 990 feet. The route variation would then make a turn, head east for approximately 32 feet, and rejoin the proposed route at MP 248.6. The route variation is approximately 1,786 feet versus the proposed route which is approximately 1,718 feet; the route variation would add approximately 68 feet of pipeline length. A previously reviewed route variation to the north of the proposed route from the MP 248.3 to MP 248.7 to avoid landowner's trees (ID #241) was not incorporated into the route due to excess pipeline length additions.

RACER Alternatives

MP 253.1: NEXUS is evaluating route variations and consulting with Revitalizing Auto Communities Environmental Response (RACER) regarding the proposed crossing of two RACER properties in Ypsilanti Township, Washtenaw County, Michigan and Van Buren Township, Wayne County, Michigan. NEXUS is evaluating six variations to cross the RACER properties while minimizing impacts to the landowner, wetlands, waterbodies, and existing utility corridors (*see* Figure 10.6.3-16). The proposed route crosses RACER properties from MP 253.3 to 254.4 and MP 254.6 to 254.8 (which is the location of the Van Buren Landfill). *See* Resource Report Section 7.4.6 for a detailed discussion of the landfill.

Consultation with RACER and engineering and construction constraints in the area have led to numerous route variations being reviewed between MP 253.1 and the pipeline terminus at the Willow Run M&R. Six route variations are being evaluated in this area to minimize or avoid impacts to the RACER properties where development is proposed and in the location of the closed landfill. A number of the variations are routed north from MP 253.1, parallel Wiard Road to the east, then turn to the northeast and parallel U.S. Highway 12. Several of the route variations cross U.S. Highway 12 in a general northeast/southwest direction via HDD. One of the route variations continues to parallel U.S. Highway 12, then parallels Ecorse Road and crosses Ecorse Road just outside of the eastern boundary of the Van Buren Landfill. This route variation then turns sharply to the west, turns to the north paralleling Rawsonville Road, and then turns west again and ends at the pipeline terminus at the Willow Run M&R.

10.7 Aboveground Facility Alternatives

NEXUS has conducted engineering evaluations to determine optimal siting and layout for aboveground facilities located along the Project route. The following sections describe the aboveground facilities siting process conducted to date.

10.7.1 Compressor Station Alternatives

NEXUS completed multiple hydraulic analyses to determine the optimum horsepower and compression required to transport the new volumes of natural gas necessary to meet market demand and to accommodate the NEXUS Purpose and Need. The hydraulic analysis identified the need for up to four new compressor stations, all of which would need to be located in Ohio. The initial priority for finding suitable compressor station sites was to identify available, suitably-sized parcels of land located adjacent or close to the proposed Project mainline pipeline. The following site design considerations also influenced the analyses for finding acceptable sites for the new compressor stations:

- Compressor Station Siting Design: Compressor station sites were initially selected to be as evenly spaced along the mainline route as practical (i.e., approximate 60 mile intervals), taking into account system hydraulics, site availability and suitability, and proximity to sensitive land use or receptors. Multiple iterations of the hydraulic analyses confirmed the current proposed locations of the compressor stations based on the previously stated criteria.
- Land/workspace Requirements: Undeveloped parcels totaling approximately 40 acres or larger were prioritized for evaluation to accommodate the construction and operation of new compressor station facilities.
- Engineering, Design and Construction: Several engineering, design and construction factors were evaluated for selection of suitable sites, including property configuration (to maximize distance from adjacent properties), topography (parcels featuring relatively flat topography were preferred), and access to existing roads, electric utilities, and water supply.
- Road Access: NEXUS sought to maximize proximity of the new compressor station sites to existing public roads, thereby minimizing the need for new access roads, as well as minimizing the need for modifications or improvements to existing roads.
- Interconnecting Pipe: To minimize potential impacts on the surrounding community, the siting analysis favored properties closest to the proposed ROW to minimize the need for suction and discharge piping or an extension of the mainline. This approach also minimizes the land requirements for the Project, thereby minimizing the number of affected property owners and potential environmental impacts.
- Land Use: Rural, agricultural, and/or undeveloped settings were preferred, since the landowners in these areas typically own multiple properties or large tracts of land separated from existing residential or commercial development.
- Environmental Effects: An initial evaluation of environmental resources was completed for each site based on a review of the project-specific GIS data generated from publically-available state and federal GIS datasets, including recently flown aerial photography, Lidar topographic contours, conservation land datasets, USGS/NHD/NWI mapping, and Natural Resources Conservation Service soils mapping. In addition, publicly available literature on environmental resources in the vicinity of each site was reviewed and incorporated. Several factors were evaluated and compared for each alternative site including:
    - Existing Land Use: a comparison of the land use on each of the sites was completed, which included the following land use categories: forested, agricultural, open land, open water, residential, and commercial/industrial;
    - Water Resources: the locations of major, intermediate, and minor waterbodies; presence of designated fisheries or natural and scenic rivers; and presence and type of wetlands on site were compared;

- Public and Private Properties: the proximity to residential or public lands and other Noise Sensitive Areas ("NSA"); e.g., schools, churches, nursing homes, *etc.*, was evaluated;
- Protected Habitat: the potential for each site to provide critical habitat or habitat for federal and/or state-listed threatened or endangered species, based on lists of protected species and species of concern provided by state and federal agencies was identified; and
- Cultural or Historic Resources: each potential compressor station site was reviewed by the designated Cultural Resources Principal Investigator for the NEXUS Project to determine the likelihood of occurrence of historic or prehistoric cultural resources.

Following the desktop-level review, NEXUS performed a more in-depth analysis of the preferred alternative sites, including coordination with landowners to obtain field survey access. Following coordination with landowners, NEXUS performed detailed environmental resource field surveys including wetland and waterbody field delineations, land use cover-type mapping, and preliminary engineering evaluations including construction access, proximity to existing utilities, and topographic assessments. These sites were also reviewed for potential cultural resources. Table 10.7.1-1 provides a comparison of the NEXUS compressor station alternatives, which are further described below. Following detailed evaluations of alternative compressor station sites, NEXUS selected the preferred sites because they were deemed the least environmentally damaging practicable alternatives that meet the Project Purpose and Need, with landowners willing to allow survey access and enter into negotiations with NEXUS. Following receipt of landowner permission, NEXUS also performed Phase I Environmental Site Assessments for the proposed compressor station sites to determine if historic land uses, including farming, may have resulted in contamination. Results of all four Phase I ESAs indicated no reportable environmental conditions.

10.7.1.1 Hanoverton Compressor Station Alternatives - CS 1 (Columbiana County)

Following the protocol described above, five site alternatives were evaluated for the Hanoverton Compressor Station - Compressor Station 1 ("CS1"). Following initial review, two of the sites were eliminated from consideration due to limiting property size or configuration and three alternatives were analyzed further to determine a proposed site. The currently proposed compressor station site (Alternative 1) and the two alternatives are discussed below and depicted in Figure 10.7.1-1; Table 10.7.1-1 provides a comparative analysis of the three final alternatives evaluated for the Hanoverton Compressor Station and a Site Plan depicting the proposed Hanoverton Compressor Station is included in Appendix 1A to Resource Report 1 in Volume IV.

CS1 Alternative Site 1 (MP 1.4) – Currently Proposed Alternative

CS1 Alternative Site 1 is an approximately 120-acre parcel of land that intersects with the NEXUS mainline pipeline route at approximate MP 1.4. The property is located northeast of the intersection of State Highway 644 and Mechanicstown Road, in Hanover, Ohio. Existing land use within the proposed site is primarily agriculture (hayfields) with a small area of upland, hardwood forest on the northeastern boundary and small inclusions of forested and non-forested wetland. Preliminary engineering design suggests that the compressor station could be sited to avoid the forest and wetlands; however, substantial grading may be required to site the proposed compressor station facilities on this site while avoiding forest and wetland impacts. CS1 Alternative Site 1 has public road access, reasonable access to existing electric utilities, is located in close proximity to the proposed pipeline, and has a landowner who has shown initial willingness to discuss placement of a compressor station on this property.

CS1 Alternative Site 2 (MP 3.5)

CS1 Alternative Site 2 consists of an approximately 64-acre parcel located northeast of the NEXUS mainline alignment at approximate MP 3.5 in the Town of Hanover, Ohio. At its closest boundary, CS1 Alternative Site 2 is located approximately 200 feet north of the mainline alignment, on the opposite side of Buffalo Road. A new road crossing and a currently indeterminate length of mainline extension or suction

discharge lines would be required for this site. Current land use on CS1 Alternative Site 2 is primarily agricultural (corn and pasture/hay) with a small section of upland, hardwood forest on the northwestern corner of the site. No wetlands or streams were identified during field review on this property. This alternative is smaller than the other potential CS1 sites, and the majority of the site is unscreened and visible from Buffalo Road. Preliminary engineering review indicates that due to topographic relief on this site, approximately 20 feet of cut-and-fill would be required to prepare the site for station construction. Additionally, no sources of municipal water were noted in the area, thus a new water well may be required for this alternative.

CS1 Alternative Site 3 (MP 3.5)

CS1 Alternative Site 3 consists of portions of four parcels, totaling approximately 100 acres located southwest of the NEXUS mainline alignment at approximate MP 3.5. CS1 Alternative Site 3 is located in the Town of Hanover. No wetlands or streams were identified during field review on this property. CS1 Alternative Site 3 will require a road crossing of Buffalo Road and approximately 140 feet of mainline extension or suction discharge lines to achieve connection with the alignment at its closest point. Due to the rolling nature of the topography of this alternative site, costly site grading would be necessary to construct proposed compressor station facilities. Land use on CS1 Alternative Site 3 is primarily agricultural (corn and pasture/hay) with three small areas of mature, hardwood forest (including two forested valleys in the field and a small strip of trees between the field and Buffalo Road). Access and development of the pipeline connection for this site would require removal of a section of the forested land between Buffalo Road and the open fields. Clearing mature forest in this area may require additional review by NEXUS as this area of Ohio is mapped by the USFWS as potential habitat for the northern long-eared bat ("NLEB") (*Myotis septentrionalis*), a species proposed for listing under the federal Endangered Species Act. NLEB may roost in mature trees within their home range, however, it is unlikely that the limited clearing associated with development of CS1 Alternative Site 3 would result in significant or adverse modifications to potential NLEB forested habitat. CS1 Alternative Site 3 has public road access, access to existing electric utilities, is in close proximity to the proposed pipeline, and has a landowner who has shown initial willingness to discuss placement of a compressor station on this property.

Hanoverton Compressor Station Alternatives Analysis Conclusions

Of the three remaining alternative sites evaluated for the Hanoverton Compressor Station, Alternative Site 1 was determined to be the proposed alternative because the existing land use within the proposed site is primarily agriculture (hayfields) with a small area of upland hardwood forest along the northeastern and northwestern boundaries and small inclusions of forested and non-forested wetlands. Based on preliminary engineering designs (*see* Map 1 of 4 in Appendix 1A – Volume IV), the proposed compressor station facilities can be sited on this property to avoid both the existing forest and wetlands, although grading will be necessary due to existing topography. In addition, this site has good public road access, access to existing electric utilities, is located in close proximity to the proposed pipeline, and has a landowner who has shown initial willingness to discuss placement of a compressor station on this property.

10.7.1.2 Wadsworth Compressor Station Alternatives – Compressor Station 2 (Medina County)

In accordance with the process for analyses discussed in Section 10.7.1, eight sites were initially analyzed for Compressor Station 2 ("CS2"). Access permission for field surveys was denied for four of the alternative sites and these were removed from further consideration. A fifth site was dismissed because it was located very close to Buckeye Woods Park and on a busy public road. It was determined that the potential for noise and visual impact concerns was prohibitive at this location. The three remaining alternatives were analyzed further, and a proposed site was chosen. The currently proposed CS2 location and the two alternatives are discussed below and are depicted in Figure 10.7.1-2. Table 10.7.1-1 provides a comparative analysis of the three remaining alternatives evaluated for the Wadsworth Compressor Station

and a Site Plan depicting the proposed Wadsworth Compressor Station is included in Appendix 1A to Resource Report 1 in Volume IV.

CS2 Alternative Site 1 (MP 63.5) – Currently Proposed Alternative

CS2 Alternative Site 1 is an approximately 77-acre parcel that intersects with the NEXUS mainline alignment at approximate MP 63.5. CS2 Alternative Site 1 is located east of Guilford Road and north of Route 76, in Guilford, Ohio. Existing land use within the site is primarily agriculture (hayfields) with a small area of mature, hardwood forest and two small wetlands on the eastern property boundary. Preliminary design suggests that the compressor station could be sited to avoid the forest and wetlands on the property. The proposed location has good public road access, access to electric utilities, is proximal to the pipeline alignment, and it has a landowner who has shown initial willingness to discuss placement of a compressor station on this property. There is currently a home and barns on the western boundary of the property adjacent to Guildford Road, however there are few homes in the area adjacent to Guilford Road.

CS2 Alternative Site 2 (MP 65.0)

CS2 Alternative Site 2 consists of an approximately 60-acre parcel that intersects with the NEXUS mainline alignment at approximate MP 65. The site is east of Guilford Road in the Town of Guilford, Ohio. There is no existing access to CS2 Alternative Site 2 and there are three houses located between the site and the nearest road. Land use on the CS2 Alternative Site 2 is primarily agricultural (row crops and pasture/hay) with a large component (approximately 22 percent of the entire property) of mature, hardwood forest on the northwest and northeast corners of the property. Preliminary engineering design and layout of facilities on this site are in the early stages of development. It is currently unknown if forest clearing would be necessary to build the compressor station at this site.

CS2 Alternative Site 3 (MP 66.1)

CS2 Alternative Site 3 consists of an approximately 36-acre parcel that intersects with the NEXUS mainline alignment at approximate MP 66.1. The site is north of Good Road and just west of Interstate 71 in the Town of Montville, Ohio. There is existing access to CS2 Alternative Site 3 via Good Road. Land use on the Alternative Site 3 is primarily agricultural (pasture/hay) with a small component of upland, hardwood forest on the northeast corner of the site. A large stream runs along the western border of the site, adjacent to the existing gravel access road. Additionally, the site has undulating topography, and construction of a compressor station at this location would require earth work and grading. There does not appear to be a municipal water supply in this area, and there is limited accessibility to electricity at this alternative site.

Wadsworth Compressor Station Alternatives Analysis Conclusions

Of the three remaining alternative sites evaluated for the Wadsworth Compressor Station, Alternative Site 1 was determined to be the proposed site because the existing land use within the site is primarily agriculture (hayfields) and the area of mature, hardwood forest and two small wetlands located in the eastern portion of the property can be avoided both during construction and operations of the compressor station (*see* Map 2 of 4, Resource Report 1 Appendix 1A – Volume IV). This proposed location also has good public road access, access to existing electric utilities, is proximal to the pipeline alignment, and with a landowner who has shown initial willingness to discuss placement of a compressor station on this property.

10.7.1.3 Clyde Compressor Station Alternatives – Compressor Station 3 (Erie and Sandusky Counties)

Four alternative sites were analyzed for Compressor Station 3 ("CS3"). One of the sites did not provide adequate setback from property lines to facilitate construction of the compressor station. Three remaining alternatives were analyzed further, and a proposed site was chosen. The currently proposed CS3 location and the two alternatives are discussed below and are depicted in Figure 10.7.1-3. Table 10.7.1-1 provides a comparative analysis of the three remaining alternatives evaluated for the Clyde Compressor Station and

a Site Plan depicting the proposed Clyde Compressor Station is included in Appendix 1A to Resource Report 1 in Volume IV.

CS3 Alternative Site 1 (MP 129.0)

CS3 Alternative Site 1 is an approximately 54-acre parcel that intersects with the NEXUS mainline alignment at approximate MP 129. The site is west of Billings Road and north of Interstate-80/90 in the Town of Groton, Erie County, Ohio. Existing land use on the site is primarily agriculture (corn) with a small area of residential property (a farmhouse, barn and yard) on the western boundary of the site along Billings Road. There are currently two existing pipelines that traverse this site to the south, parallel with Interstate-80/90, and there is existing access to electric utilities. Mill Creek, a small perennial channel, abuts this site along the western property boundary. Preliminary engineering design indicates that the proposed compressor station could avoid the stream. However, the FEMA-mapped floodplain of Mill Creek extends across most of CS3 Alternative Site 1. CS3 Alternative 1 has good public road access, is proximal to the pipeline alignment, has been developed for pipeline corridors in the past, and it has a landowner who has shown initial willingness to discuss placement of a compressor station on this property.

CS3 Alternative Site 2 (MP 131.6)

CS3 Alternative Site 2 consists of an approximately 68-acre parcel that intersects with the NEXUS mainline alignment at approximate MP 131.6. The site is west of Northwest Road and north of Interstate-80/90 in the Town of Townsend, Sandusky County, Ohio. CS3 Alternative Site 2 intersects the pipeline alignment and access would be via Northwest Road. Current land use of the property is agriculture (corn and other row crops). The landowner of this parcel has rejected permission to access the property and is currently unwilling to negotiate a potential option with NEXUS.

CS3 Alternative Site 3 (MP 134.0) – Currently Proposed Alternative

CS3 Alternative Site 3 consists of an approximately 59-acre assemblage of three parcels that intersects with the NEXUS mainline alignment at approximate MP 134. The site is east of County Road 302 and south of Interstate 80/90 in the Town of Townsend, Sandusky County, Ohio. Based on site visits, there are no streams or wetlands on CS3 Alternative Site 3. Current land use of the property is agriculture (soybeans). There is good access to this site, it is relatively level and the landowners of this site have granted survey permission and have shown initial willingness to discuss placement of a compressor station on this property.

Clyde Compressor Station Alternatives Analysis Conclusions

Of the three remaining alternative sites evaluated for the Clyde Compressor Station, Alternative Site 3 was determined to be the proposed site because existing land use within the site is entirely agricultural (soybeans) and there is no forested land or protected wetlands or waterbodies that would be impacted by construction and operation of a compressor station. In addition, there is good existing road access to this site, it is relatively level and the landowners of this site have granted survey permission and have shown initial willingness to discuss placement of a compressor station on this property.

10.7.1.4 Waterville Compressor Station Alternatives– Compressor Station 4 (Lucas County)

Three alternative sites were analyzed for Compressor Station 4 ("CS4"). Following initial desktop review, these alternatives were analyzed further and a proposed site was chosen. The currently preferred CS4 site and the two alternatives are discussed below and are depicted in Figure 10.7.1-4. Table 10.7.1-1 provides a comparative analysis of the three remaining alternatives evaluated for the Waterville Compressor Station and a Site Plan depicting the proposed Waterville Compressor Station is included in Appendix 1A to Resource Report 1 in Volume IV.

CS4 Alternative Site 1 (MP 183.4 – south side of alignment)

CS4 Alternative Site 1 is an approximately 40-acre parcel intersects with the NEXUS mainline alignment at approximate MP 183.4. The parcel is located at the southern end of an undeveloped, cul-de-sac named

Moosman Drive. The site is west of US-24 in the Town of Waterville, Ohio. Existing land use within the proposed site is agriculture (corn). A ditched stream (named "Whitmeir Ditch") runs through a portion of the site, but preliminary design suggests that the compressor station can be sited to avoid this feature; however a pipeline extension would need to be constructed across the stream to reach CS4 (there is an existing box culvert crossing over the stream within the field). Preliminary analyses indicate municipal water is not available in the immediate vicinity of this site, therefore, a new water well may need to be installed if this site is selected. This site has good road access, access to electric utilities, is proximal to the pipeline alignment, and it has a landowner who has shown initial willingness to discuss placement of a compressor station on this property.

CS4 Alternative Site 2 (MP 183.5 – north side of alignment) – Currently Proposed Alternative

CS4 Alternative Site 2 consists of two parcels, totaling approximately 50 acres that intersect with the NEXUS mainline alignment at approximate MP 183.5. CS4 Alternative Site 2 is located at the southern end of an undeveloped, cul-de-sac named Moosman Drive and west of US-24 in the Town of Waterville, Ohio (north of CS4 Alternative Site 1). Existing land use within the site is agriculture (soybeans). A ditched stream ("Whitmeir Ditch") runs along the western and southwestern boundary of the site, but preliminary engineering design suggests that the compressor station could be sited to avoid this feature. CS4 Alternative Site 2 has good road access, access to electric utilities, is bisected by the pipeline alignment, and it has a landowner who has shown initial willingness to discuss placement of a compressor station on this property.

CS4 Alternative Site 3 (MP 186.6)

CS4 Alternative Site 3 is an approximately 80-acre parcel that intersects with the NEXUS mainline alignment at approximate MP 186.6. The site is located south of Neapolis Waterville Road and west of Berkey Southern Road (OH-295), in the Town of Providence, Ohio. Land use on the CS4 Alternative Site 3 is primarily agricultural (soybeans and corn) with a component of wetland forest on the western boundary of the site (the forest makes up approximately 20 percent of the site). There is also an intermediate, perennial waterbody that flows across the northern end of the site. Access from Neapolis Waterville Road would need to cross this stream to access the proposed mainline pipeline and the larger portions of the property. The preliminary design is inconclusive thus far as to whether the compressor station could be sited to avoid the stream or upland and wetland forest on this site. CS4 Alternative Site 3 is proximal to the pipeline alignment, and it has a landowner who has shown initial willingness to discuss placement of a compressor station on this property. However, CS4 Alternative Site 3 has no existing access to the pipeline without crossing a stream or traversing another property along the pipeline alignment from the east.

Waterville Compressor Station Alternatives Analysis Conclusions

Of the three remaining alternative sites evaluated for the Waterville Compressor Station, Alternative Site 2 was determined to be the proposed site because the existing land use within the site is entirely agriculture (soybeans) and there is no forested land that would be impacted by construction and operation of a compressor station. There is one ditched stream ("Whitmeir Ditch") that runs along the western and southwestern boundary of the site, but preliminary engineering design indicate that the compressor station could be sited to avoid this feature. This site also has good road access, access to electric utilities, is bisected by the pipeline alignment, and it has a landowner who has shown initial willingness to discuss placement of a compressor station on this property.

10.7.1.5 Compression Drive Alternatives

In evaluating the types of compressor drives to be installed as part of the Project, NEXUS considered factors to meet applicable emissions and noise standards as well as construction, operational costs, timing, operational flexibility, and reliability. While technically feasible, electric motor-driven compressor units were not selected for the following reasons:

- Decreased reliability of providing uninterrupted gas supplies to delivery points, thus not meeting the Project Purpose and Need;
- Increased environmental impacts to install new electric transmission lines as well as new ROW and potentially new or modified substations to connect to the compressor stations; and
- Higher total capital and operating costs associated with electric motor-driven compressor units.

As a general design and operating philosophy, a gas turbine driven compressor unit is preferable because the fuel source supply is inherently connected to the pipeline system and compressor station and does not require a third party for delivery or operation. Furthermore, it does not require additional infrastructure such as expansion or extension of existing electric transmission lines and large substations which have additional environmental and landowner impacts. The cost and efficiency of an electric motor-driven compressor unit is primarily a function of proximity to existing power lines with sufficient capacity to supply the power requirements of the compressor unit as well as the price for the electric supply. Additionally, an outage of the electrical transmission grid would result in an outage of the compressor station and natural gas service to NEXUS's customers. There is no feasible backup power for an electric driven compressor unit when the utility power is interrupted, unlike a turbine driven station which would have an emergency standby generator, fueled by the same gas fuel source: therefore, a gas turbine driven compressor unit is preferable for reliability. Electric driven compressor units would require electric power at high voltage supplied by overhead transmission lines to a substation that would be located at each compressor station site. The following summarizes the specific additional electrical infrastructure required to use electric drives instead of gas turbines at each of the four proposed NEXUS compressor stations.

Hanoverton Compressor Station- The horsepower requirement at this station is 52,000 hp (38,776 kWs). The nearest high voltage power is approximately 300 feet from the site and would require an extension of this line to supply the compressor station. The Hanoverton Compressor Station site would require a substation with two 230 kilovolt ("kV") to 13.8 kV, 60 Megavolt Ampere ("MVA") step down transformers to feed the electric drives. Two additional variable frequency drives ("VFDs") would be required primarily to start the motor and then for speed control of the compressor. New direct current ("DC") system for the VFD's, new motor control center ("MCC") for auxiliary systems to support the large VFDs and substation equipment to include: power supply disconnects, breakers, substation relay protection, metering, transmission line relay protection, uninterruptable power supply ("UPS") and additional SCADA (supervisory control systems and data acquisition) for monitoring and control. A new climate controlled building would be required to house all the equipment.

Wadsworth Compressor Station- The hp requirement at this station is 26,000 hp (19,388 kWs). The nearest high voltage power is a utility substation approximately 5,000 feet from the site and would require a new transmission line to supply the compressor station. The Wadsworth Compressor Station site would require a substation with one 230 kV to 13.8 kV, 30 MVA step down transformer to feed the electric drive. One VFD would be required primarily to start the motor and then for speed control of the compressor. New DC system for the VFD, new MCC for auxiliary systems to support the large VFD and substation equipment to include: power supply disconnects, breakers, substation relay protection, metering, transmission line relay protection, UPS and additional SCADA for monitoring and control. A new climate controlled building would be required to house all the equipment.

Clyde Compressor Station- The hp requirement at this station is 26,000 hp (19,388 kWs). The nearest high voltage power source is approximately 12,500 feet from the site and would require an extension of this line to supply the compressor station. The Clyde Compressor Station site would require a substation with one 230 kV to 13.8 kV, 30 MVA step down transformer to feed the electric drive. One VFD would be required primarily to start the motor and then for speed control of the compressor. New DC system for the VFD, new MCC for auxiliary systems to support the large VFD and substation equipment to include: power supply disconnects, breakers, substation relay protection, metering, transmission line relay protection, UPS

and additional SCADA for monitoring and control. A new climate controlled building would be required to house all the equipment.

Waterville Compressor Station- The hp requirement at this station is 26,000 hp (19,388 kWs). The nearest high voltage power source is approximately 300 feet from the site and would require an extension of this line to supply the compressor station. The Waterville Compressor Station site would require a substation with one 230 kV to 13.8 kV, 30 MVA step down transformer to feed the electric drive. One VFD would be required primarily to start the motor and then for speed control of the compressor. New DC system for the VFD, new MCC for auxiliary systems to support the large VFD and substation equipment to include: power supply disconnects, breakers, substation relay protection, metering, transmission line relay protection, UPS and additional SCADA for monitoring and control. A new climate controlled building would be required to house all the equipment.

NEXUS has chosen specific components for the gas turbine driven units to minimize emissions and maximize efficiencies. To reduce air emissions, gas driven turbine units with dry low nitrogen oxides ("NOx") technology will be installed to meet federal and state air permit regulations. The turbine combustor injectors have been specified to use the very latest development in injector technology (9 ppm NOx), which will satisfy the Ohio Environmental Protection Agency's requirement to apply Best Available Technology. Compliance with these Best Available Technology requirements will ensure that emissions are far below other applicable NOx limitations including state-level Reasonably Available Control Technology limits and the federal New Source Performance Standards. Aerodynamic assemblies were selected based on anticipated peak and off-peak operating conditions to try to achieve operations within the best efficiency range of the aerodynamic assemblies. Selecting the aerodynamic assembly for each unit on this basis helps to minimize the brake HP requirements of each unit and the power or fuel requirements of the drives.

10.7.2 Metering and Regulation Stations, Mainline Valves, and Other Aboveground Facilities

Proposed metering and regulation ("M&R") stations and mainline valve locations are summarized in Table 1.1-2 (*see* Tables Section of Resource Report 1). The siting of M&R stations reflect customer and system requirements and were located in close proximity to existing all-weather roads that could be used for access for maintenance during operation. The siting of Mainline Valves along the pipeline is in accordance with the spacing requirements of 49 CFR Part 192, Transportation of Natural or Other Gas by Pipeline: Minimum Federal Safety Standards. Pig launcher/receiver facilities were sited for efficient testing and cleaning of the pipeline and are co-located with other aboveground facilities to the maximum extent practicable, to minimize effects on the natural and human environment. The locations of proposed NEXUS communications towers are summarized in Table 1.1-3 (*see* Tables Section of Resource Report 1) and are described in Section 1.1.2 of Resource Report 1. All proposed communications towers are co-located with other NEXUS facilities in an effort to maximize operational efficiencies and avoid or minimize potential impacts. These aboveground facilities are all depicted on both Project USGS Quadrangle Map excerpts and Project Alignment Sheets submitted as Appendix 1A of Resource Report 1.

10.8 Future Considerations Regarding Alternatives

NEXUS has and will continue to engage in extensive landowner and public agency outreach in the siting of the proposed pipeline and associated aboveground facilities. NEXUS understands that as the Project moves forward in the public permitting process and the routing is examined more closely by affected stakeholders, additional suggestions and issues may be raised and additional alignment changes and changes to the siting of aboveground facilities may be proposed. In addition, market opportunities and potential customer demands could also influence the location and scale of various Project facilities. NEXUS remains open to the consideration of such alternatives and will continue to investigate and evaluate viable alternatives and will submit this information to the FERC for review and comment, as appropriate.

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TABLES

TABLE 10.5-1

Comparison of the Southern Route Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
Multiple, OH	**MP 1.4 – SOUTHERN ROUTE ALTERNATIVE ***			
	Pipeline Length/ROW Summary			
	MP to MP b/	MP	0.0 to 168.3	1.4 to 170.5
	Total Length	mile	168.3	169.1
	Parallel/Adjacent to Existing ROW+	mile	106.4	67.4
	Construction ROW (based on a 100-foot-wide ROW)	acre	2039.9	2050.4
	Permanent ROW (based on a 50-foot-wide ROW)	acre	1020.0	1025.2
	Laterals Summary			
	Laterals Required	no.	5	0
	Total Length of Laterals	mile	101.7	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	1233.0	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	616.5	N/A
	Total Wetlands Crossed c/	no.	21	N/A
	Forested	no.	9	N/A
	Scrub Shrub	no.	1	N/A
	Emergent	no.	5	N/A
	Scrub Shrub/Emergent	no.	5	N/A
	Total Wetlands Affected d/	acre	9.2	N/A
	Total Waterbodies Crossed e/	no.	176	N/A
	Total Length of Waterbodies Crossed e/	LF	2,655.3	N/A
	Major Waterbodies >100 feet e/	no.	0	N/A
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	N/A
	Sole Source Aquifers	no.	0	N/A
	Wellhead Protection Areas	no.	12	N/A
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	130.2	N/A
	Geologic Hazards i/	---	---	---
	Faults	no.	0	N/A
	Areas of Potential Subsidence	mile	26.9	N/A
	Areas of High Landslide Potential	mile	0.6	N/A
	Environmental Factors *			
	Total Wetlands Crossed c/	no.	41	64
	Forested	no.	11	16
	Scrub Shrub	no.	3	7
	Emergent	no.	7	15
	Scrub Shrub/Emergent	no.	7	15
	Total Wetlands Affected d/	acre	15.1	31.7
	Total Waterbodies Crossed e/	no.	274	291
	Total Length of Waterbodies Crossed e/	LF	6408.9	5706
	Major Waterbodies >100 feet e/	no.	7	4
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	2

TABLE 10.5-1

Comparison of the Southern Route Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	12	17
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	305.1	320.5
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---	---	---
	Faults	no.	0	0
	Areas of Potential Subsidence	mile	50.2	44.7
	Areas of High Landslide Potential	mile	15.8	7.6
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	0.1	0.0
	Areas of Sidehill Construction	mile	38.8	24.0
	National and State Parks and Forests k/	---	---	---
	State	mile	0.05	0.3
	Federal	mile	0	0
	Public Lands or Conservation Lands Crossed l/	LF	6,225.5	14,565.0
	Land Ownership (100' corridor)	---	-	-
	Public Land	no./mile	22 / 1.2	21 / 2.8
	Private Land	no./mile	1,141 / 139.3	0 / 0
	Tribal Land	no./mile	0 / 0	0 / 0
	Unknown Land	no./mile	29 / 1.2	0 / 0
	Residential Structures within 50 feet of Construction ROW m/	no.	118	122
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	263	233
	Construction in Roadways	mile	1.41	2.83
	Bored Road Crossings	no.	186	234
	Open Cut Road Crossings	no.	61	39
	HDD Road Crossings	no.	16	11
	Railroads Crossed	no.	18	17
	Engineering Factors*			
	Existing Infrastructure Crossed	---	---	---
	Natural Gas	no.	80	190
	Oil	no.	2	6
	Products	no.	23	15
	Electric	no.	48 AG / Unknown UG	235 AG/6 UG
	Telecommunication	no.	Unknown	29
	Hydraulic Studies:	---	---	---
	Pipeline Length	mile	168.3	169.1
	Pipeline Diameter	inch	36	36
	Pipeline Pressure	psig	1440	1440

TABLE 10.5-1

Comparison of the Southern Route Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	MAOP	psig	1440	1440
	Population Density (high, medium, low)	---	---	---
	High	mile	2.0	6.4
	Medium	mile	2.5	12.4
	Low	mile	163.8	150.3
	USDOT Class Locations	---	---	---
	Class 1	mile	138.6	108.4
	Class 2	mile	27.2	49.7
	Class 3	mile	2.5	11.0
	Class 4	mile	N/A	N/A

NOTES: TBD = To Be Determined. AG = Aboveground. UG = Underground. N/A = Not Applicable.

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.
b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.
c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.
d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.
e/ Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.
f/ Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.
g/ Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.
h/ Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.
i/ Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.
j/ Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.
k/ Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.
l/ Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy easement data, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.
m/ Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.
n/ Number of roads crossed includes federal, state and local roads, but does not include driveways.

\+ Parallel/Adjacent to Existing ROW is classified as any utility within 200 feet of the project workspace.
* Does not include impacts associated with the laterals required for delivery of gas.

TABLE 10.5-2

Comparison of the City of Green Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
Multiple, OH	**MP 1.8 – CITY OF GREEN ALTERNATIVE ***			
	Pipeline Length/ROW Summary	---	---	---
	MP to MP b/	MP	0.0 to 102.9	1.8 to 98.8
	Total Length	mile	102.9	97
	Parallel/Adjacent to Existing ROW+	mile	21.4	35.2
	Construction ROW (based on a 100-foot-wide ROW)	acre	1247.1	1175.4
	Permanent ROW (based on a 50-foot-wide ROW)	acre	623.5	587.7
	Laterals Summary			
	Laterals Required	no.	4	0
	Total Length of Laterals	mile	56.2	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	681.1	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	340.6	N/A
	Total Wetlands Crossed c/	no.	15	N/A
	Forested	no.	4	N/A
	Scrub Shrub	no.	1	N/A
	Emergent	no.	5	N/A
	Scrub Shrub/Emergent	no.	4	N/A
	Total Wetlands Affected d/	acre	6.6	N/A
	Total Waterbodies Crossed e/	no.	130	N/A
	Total Length of Waterbodies Crossed e/	LF	1696.4	N/A
	Major Waterbodies >100 feet e/	no.	0	N/A
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	N/A
	Sole Source Aquifers	no.	0	N/A
	Wellhead Protection Areas	no.	8	N/A
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	86.9	N/A
	Geologic Hazards i/	---	---	---
	Faults	no.	0	N/A
	Areas of Potential Subsidence	mile	0	N/A
	Areas of High Landslide Potential	mile	0.4	N/A
	Environmental Factors	---	---	---
	Total Wetlands Crossed c/	no.	14	54
	Forested	no.	3	13
	Scrub Shrub	no.	1	6
	Emergent	no.	5	15
	Scrub Shrub/Emergent	no.	4	13
	Total Wetlands Affected d/	acre	9.7	25.4
	Total Waterbodies Crossed e/	no.	188	195
	Total Length of Waterbodies Crossed e/	LF	4,910.6	3075.6
	Major Waterbodies >100 feet e/	no.	7	1
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	0

TABLE 10.5-2

Comparison of the City of Green Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	8	8
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	307.3	241.7
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---	---	---
	Faults	no.	0	0
	Areas of Potential Subsidence	mile	0.5	0
	Areas of High Landslide Potential	mile	9.4	7.2
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	0.1	0.0
	Areas of Sidehill Construction	mile	36.4	23.3
	National and State Parks and Forests k/	---	---	---
	State	mile	0	0.31
	Federal	mile	0	0
	Public Lands or Conservation Lands Crossed l/	LF	8,143.5	6,728.7
	Land Ownership (100' corridor)	---	677	465
	Public Land	no./mile	12 / 1.6	12 / 1.3
	Private Land	no./mile	0 / 0	452 / 49.2
	Tribal Land	no./mile	0 / 0	0 / 0
	Unknown	no./mile	4 / 0.1	1 / 0.2
	Residential Structures within 50 feet of Construction ROW m/	no.	80	76
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	130	136
	Construction in Roadways	mile	0.7	1.7
	Bored Road Crossings	no.	127	107
	Open Cut Road Crossings	no.	0	24
	HDD Road Crossings	no.	3	5
	Railroads Crossed	no.	14	12

NOTES: TBD = To Be Determined.

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.

b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.

c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.

d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.

e/ Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.

f/ Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.

TABLE 10.5-2

Comparison of the City of Green Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route

g/ Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.

h/ Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.

i/ Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.

j/ Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.

k/ Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.

l/ Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy Easements, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.

m/ Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.

n/ Number of roads crossed includes federal, state and local roads, but does not include driveways.

\+ Parallel/Adjacent to Existing ROW is classified as any utility within 200 feet of the project workspace.

* Does not include impacts associated with the laterals required for delivery of gas.

TABLE 10.5-3

Comparison of the Electric Transmission Line Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
Columbiana, Stark, OH	**MP 1.8 – ELECTRIC TRANSMISSION LINE ALTERNATIVE**			
	Pipeline Length/ROW Summary	---	---	---
	MP to MP b/	MP	0.0 to 27.6	1.8 to 29.7
	Total Length	mile	27.6	27.9
	Parallel/Adjacent to Existing ROW	mile	27.3	7.9
	Construction ROW (based on a 100-foot-wide ROW)	acre	334.4	338.3
	Permanent ROW (based on a 50-foot-wide ROW)	acre	167.2	169.2
	Laterals Summary			
	Laterals Required	no.	1	0
	Total Length of Laterals	mile	0.4	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	5.1	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	2.5	N/A
	Total Wetlands Crossed c/	no.	2	N/A
	Forested	no.	0	N/A
	Scrub Shrub	no.	0	N/A
	Emergent	no.	2	N/A
	Scrub Shrub/Emergent	no.	0	N/A
	Total Wetlands Affected d/	acre	0.9	N/A
	Total Waterbodies Crossed e/	no.	3	N/A
	Total Length of Waterbodies Crossed e/	LF	23	N/A
	Major Waterbodies >100 feet e/	no.	0	N/A
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	N/A
	Sole Source Aquifers	no.	0	N/A
	Wellhead Protection Areas	no.	1	N/A
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	2.2	N/A
	Geologic Hazards i/	---		---
	Faults	no.	0	N/A
	Areas of Potential Subsidence	mile	0	N/A
	Areas of High Landslide Potential	mile	0.4	N/A
	Environmental Factors	---	---	---
	Total Wetlands Crossed c/	no.	16	17
	Forested	no.	3	2
	Scrub Shrub	no.	0	2
	Emergent	no.	2	9
	Scrub Shrub/Emergent	no.	4	3
	Total Wetlands Affected d/	acre	6.7	6.7
	Total Waterbodies Crossed e/	no.	77	47
	Total Length of Waterbodies Crossed e/	LF	2,835.3	600
	Major Waterbodies >100 feet e/	no.	7	0
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	0

TABLE 10.5-3

Comparison of the Electric Transmission Line Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	3	0
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	55.9	49.6
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---	---	---
	Faults	no.	0	0
	Areas of Potential Subsidence	mile	0.9	0.1
	Areas of High Landslide Potential	mile	10	7.2
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	0	0
	Areas of Sidehill Construction	mile	11.2	8.5
	National and State Parks and Forests k/	---	---	---
	State	mile	0	0
	Federal	mile	0	0
	Public Lands or Conservation Lands Crossed l/	LF	350.8	422.9
	Land Ownership (100' corridor)	---	-	-
	Public Land	no./mile	10 / 0.07	1 / 0.08
	Private Land	no./mile	363 / 25.6	192 / 27.4
	Tribal Land	no./mile	0 / 0	0 / 0
	Residential Structures within 50 feet of Construction ROW m/	no.	129	14
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	42	38
	Construction in Roadways	mile	0.3	0.3
	Bored Road Crossings	no.	37	27
	Open Cut Road Crossings	no.	0	10
	HDD Road Crossings	no.	5	1
	Railroads Crossed	no.	3	3

NOTES: TBD = To Be Determined.
Parallel/Adjacent to Existing ROW is classified as any utility within 200 feet of the project workspace.

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.

b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.

c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.

d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.

e/ Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.

f/ Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of

TABLE 10.5-3

Comparison of the Electric Transmission Line Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route

Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.

g/ Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.

h/ Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.

i/ Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.

j/ Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.

k/ Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.

l/ Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy Easements, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.

m/ Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.

n/ Number of roads crossed includes federal, state and local roads, but does not include driveways.

TABLE 10.5-4

Comparison of the Nimisila Reservoir Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
Summit, OH	**MP 35.8 – NIMISILA RESERVOIR ALTERNATIVE**			
	Pipeline Length/ROW Summary	---	---	---
	MP to MP b/	MP	0.0 to 9.0	35.8 to 47.8
	Total Length	mile	9.0	12.0
	Parallel/Adjacent to Existing ROW	mile	6.6	5.0
	Construction ROW (based on a 100-foot-wide ROW)	acre	108.8	145.0
	Permanent ROW (based on a 50-foot-wide ROW)	acre	54.4	72.5
	Laterals Required	no.	0	0
	Total Length of Laterals	mile	N/A	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	N/A	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	N/A	N/A
	Environmental Factors	---	---	---
	Total Wetlands Crossed c/	no.	14	12
	Forested	no.	0	1
	Scrub Shrub	no.	1	2
	Emergent	no.	2	2
	Scrub Shrub/Emergent	no.	1	4
	Total Wetlands Affected d/	acre	9.7	6.8
	Total Waterbodies Crossed e/	no.	24	34
	Total Length of Waterbodies Crossed e/	LF	4,561.9	728.2
	Major Waterbodies >100 feet e/	no.	2	1
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	0
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	1	3
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	42.1	67.6
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---	---	---
	Faults	no.	1	0
	Areas of Potential Subsidence	mile	0.08	0
	Areas of High Landslide Potential	mile	0	0
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	3	9.5
	Areas of Sidehill Construction	mile	2.7	3.4
	National and State Parks and Forests k/	---	---	---
	State	mile	1.0	0.3

TABLE 10.5-4

Comparison of the Nimisila Reservoir Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	Federal	mile	0	0
	Public Lands or Conservation Lands Crossed l/	LF	5,267.2	2,759.6
	Land Ownership (100' corridor)	---	169	248
	Public Land	no./mile	3 / 100	5 / 0.5
	Private Land	no./mile	166 / 8.8	243 / 15.4
	Tribal Land	no./mile	0 / 0.0	0 / 0.0
	Residential Structures within 50 feet of Construction ROW m/	no.	28	18
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	15	18
	Construction in Roadways	mile	0.1	0.2
	Bored Road Crossings	no.	15	12
	Open Cut Road Crossings	no.	0	5
	HDD Road Crossings	no.	0	1
	Railroads Crossed	no.	0	0

NOTES: TBD = To Be Determined.

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.

b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.

c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.

d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.

e/ Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.

f/ Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.

g/ Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.

h/ Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.

i/ Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.

j/ Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.

k/ Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.

l/ Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy Easements, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.

m/ Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.

n/ Number of roads crossed includes federal, state and local roads, but does not include driveways.

+ Parallel/Adjacent to Existing ROW is classified as any utility within 200 feet of the project workspace.

TABLE 10.5-5

Comparison of the Hubbard Valley Park Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
Medina, OH	**MP 63.7 – HUBBARD VALLEY PARK ALTERNATIVE**			
	Pipeline Length/ROW Summary	---	---	---
	MP to MP b/	MP	0.0 to 3.6	63.7 to 67.5
	Total Length	mile	3.6	3.8
	Parallel/Adjacent to Existing ROW	mile	0	0
	Construction ROW (based on a 100-foot-wide ROW)	acre	43.1	45.6
	Permanent ROW (based on a 50-foot-wide ROW)	acre	21.6	22.8
	Laterals Summary			
	Laterals Required	no.	1	0
	Total Length of Laterals	mile	1.1	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	13.1	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	6.6	N/A
	Total Wetlands Crossed c/	no.	0	N/A
	Forested	no.	0	N/A
	Scrub Shrub	no.	0	N/A
	Emergent	no.	0	N/A
	Scrub Shrub/Emergent	no.	0	N/A
	Total Wetlands Affected d/	acre	0	N/A
	Total Waterbodies Crossed e/	no.	3	N/A
	Total Length of Waterbodies Crossed e/	LF	38.1	N/A
	Major Waterbodies >100 feet e/	no.	0	N/A
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	N/A
	Sole Source Aquifers	no.	0	N/A
	Wellhead Protection Areas	no.	0	N/A
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	4.3	N/A
	Geologic Hazards i/	---	---	---
	Faults	no.	0	N/A
	Areas of Potential Subsidence	mile	0	N/A
	Areas of High Landslide Potential	mile	0	N/A
	Environmental Factors	---	---	---
	Total Wetlands Crossed c/	no.	1	2
	Forested	no.	1	0
	Scrub Shrub	no.	0	0
	Emergent	no.	0	0
	Scrub Shrub/Emergent	no.	0	2
	Total Wetlands Affected d/	acre	0.2	0.6
	Total Waterbodies Crossed e/	no.	17	6
	Total Length of Waterbodies Crossed e/	LF	211.7	48.7
	Major Waterbodies >100 feet e/	no.	0	0
	Groundwater Resources f/	---	---	---

TABLE 10.5-5

Comparison of the Hubbard Valley Park Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	Groundwater Wells	no.	0	0
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	0	0
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	19.9	5.9
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---	---	---
	Faults	no.	0	0
	Areas of Potential Subsidence	mile	0	0
	Areas of High Landslide Potential	mile	0	0
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	0	0
	Areas of Sidehill Construction	mile	1.7	1.0
	National and State Parks and Forests k/	---	---	---
	State	mile	0	0
	Federal	mile	0	0
	Public Lands or Conservation Lands Crossed l/	LF	3,529.0	0
	Land Ownership (100' corridor)	---	---	---
	Public Land	no./mile	6 / 0.7	0 / 0
	Private Land	no./mile	33 / 2.8	32 / 3.6
	Tribal Land	no./mile	0 / 0	0 / 0
	Residential Structures within 50 feet of Construction ROW m/	no.	1	0
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	5	6
	Construction in Roadways	mile	0.1	0.1
	Bored Road Crossings	no.	5	6
	Open Cut Road Crossings	no.	0	0
	HDD Road Crossings	no.	0	0
	Railroads Crossed	no.	0	0

NOTES: TBD = To Be Determined.
Parallel/Adjacent to Existing ROW is classified as any utility within 200 feet of the project workspace.

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.

b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.

c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.

d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.

TABLE 10.5-5

Comparison of the Hubbard Valley Park Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

	County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
e/	Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.				
f/	Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.				
g/	Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.				
h/	Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.				
i/	Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.				
j/	Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.				
k/	Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.				
l/	Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy Easements, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.				
m/	Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.				
n/	Number of roads crossed includes federal, state and local roads, but does not include driveways.				

TABLE 10.5-6

Comparison of the Edison Woods Preserve and Apple Orchard Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	June 2015 Pre-Filing Route
Erie, OH	**MP 100.6 – EDISON WOOD PRESERVE AND APPLE ORCHARD ALTERNATIVE**			
	Pipeline Length/ROW Summary	---	---	---
	MP to MP b/	MP	0.0 to 7.8	100.6 to 108.5
	Total Length	mile	7.8	8.9
	Parallel/Adjacent to Existing ROW	mile	3.8	0.9
	Construction ROW (based on a 100-foot-wide ROW)	acre	94.5	108.1
	Permanent ROW (based on a 50-foot-wide ROW)	acre	47.3	54
	Laterals Required	no.	0	0
	Total Length of Laterals	mile	N/A	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	N/A	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	N/A	N/A
	Environmental Factors	---	---	---
	Total Wetlands Crossed c/	no.	5	0
	Forested	no.	2	0
	Scrub Shrub	no.	1	0
	Emergent	no.	1	0
	Scrub Shrub/Emergent	no.	1	0
	Total Wetlands Affected d/	acre	1.6	0
	Total Waterbodies Crossed e/	no.	14	3
	Total Length of Waterbodies Crossed e/	LF	197.4	41.5
	Major Waterbodies >100 feet e/	no.	0	0
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	0
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	0	0
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	20.0	17.3
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---	---	---
	Faults	no.	0	0
	Areas of Potential Subsidence	mile	0	0
	Areas of High Landslide Potential	mile	0	0
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	0	0.02
	Areas of Sidehill Construction	mile	0.7	0.1
	National and State Parks and Forests k/	---	---	---
	State	mile	0	0

TABLE 10.5-6

Comparison of the Edison Woods Preserve and Apple Orchard Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	June 2015 Pre-Filing Route
	Federal	mile	0	0
	Public Lands or Conservation Lands Crossed l/	LF	1,618.4	130.9
	Land Ownership (100' corridor)	---	---	---
	Public Land	no./mile	1 / 0.3	1 / 0.02
	Private Land	no./mile	48 / 7.3	61 / 8.7
	Tribal Land	no./mile	0 / 0	0 / 0
	Residential Structures within 50 feet of Construction ROW m/	no.	10	0
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	12	10
	Construction in Roadways	mile	0.1	0.2
	Bored Road Crossings	no.	12	8
	Open Cut Road Crossings	no.	0	0
	HDD Road Crossings	no.	0	2
	Railroads Crossed	no.	0	0

NOTES: TBD = To Be Determined.
Parallel/Adjacent to Existing ROW is classified as any utility within 200 feet of the project workspace.

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.

b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.

c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.

d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.

e/ Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.

f/ Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.

g/ Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.

h/ Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.

i/ Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.

j/ Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.

k/ Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.

l/ Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy Easements, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.

m/ Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.

n/ Number of roads crossed includes federal, state and local roads, but does not include driveways.

TABLE 10.5-7

Comparison of the Black Swamp Land Conservancy and Sandusky River Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
Sandusky, OH	**MP 140.8 – BLACK SWAMP LAND CONSERVANCY AND SANDUSKY RIVER ALTERNATIVE**			
	Pipeline Length/ROW Summary	---	---	---
	MP to MP b/	MP	0.0 to 8.7	140.8 to150.3
	Total Length	mile	8.7	9.4
	Parallel/Adjacent to Existing ROW	mile	6.8	0.1
	Construction ROW (based on a 100-foot-wide ROW)	acre	105.0	114.5
	Permanent ROW (based on a 50-foot-wide ROW)	acre	52.5	57.3
	Laterals Required	no.	0	0
	Total Length of Laterals	mile	N/A	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	N/A	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	N/A	N/A
	Environmental Factors	---	---	---
	Total Wetlands Crossed c/	no.	2	2
	Forested	no.	1	0
	Scrub Shrub	no.	0	0
	Emergent	no.	0	0
	Scrub Shrub/Emergent	no.	0	1
	Total Wetlands Affected d/	acre	1.1	1.8
	Total Waterbodies Crossed e/	no.	12	15
	Total Length of Waterbodies Crossed e/	LF	699.0	1060.6
	Major Waterbodies >100 feet e/	no.	1	2
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	2
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	2	3
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	5.0	0.9
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---	---	---
	Faults	no.	0	0
	Areas of Potential Subsidence	mile	8.7	9.4
	Areas of High Landslide Potential	mile	0	0
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	0.0	0.0
	Areas of Sidehill Construction	mile	0.4	0.0
	National and State Parks and Forests k/	---	---	---
	State	mile	0	0
	Federal	mile	0	0

TABLE 10.5-7

Comparison of the Black Swamp Land Conservancy and Sandusky River Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	Public Lands or Conservation Lands Crossed l/	LF	0'	633.6
	Land Ownership (100' corridor)	---	---	---
	Public Land	no./mile	0 / 0	4 / 0.1
	Private Land	no./mile	51 / 8.7	52 / 9.3
	Tribal Land	no./mile	0 / 0	0 / 0
	Residential Structures within 50 feet of Construction ROW m/	no.	9	2
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	11	14
	Construction in Roadways	mile	0.1	0.1
	Bored Road Crossings	no.	11	10
	Open Cut Road Crossings	no.	0	4
	HDD Road Crossings	no.	0	1
	Railroads Crossed	no.	1	1

NOTES: TBD = To Be Determined.
Parallel/Adjacent to Existing ROW is classified as any utility within 200 feet of the project workspace.

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.

b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.

c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.

d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.

e/ Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.

f/ Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.

g/ Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.

h/ Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.

i/ Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.

j/ Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.

k/ Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.

l/ Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy Easements, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.

m/ Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.

n/ Number of roads crossed includes federal, state and local roads, but does not include driveways.

TABLE 10.5-8

Comparison of the Maumee State Forest Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
Lucas, Fulton, OH	**MP 186.4 – MAUMEE STATE FOREST ALTERNATIVE**			
	Pipeline Length/ROW Summary	---	---	---
	MP to MP b/	MP	0.0 to 11.6	186.4 to 200.7
	Total Length	mile	11.6	14.3
	Parallel/Adjacent to Existing ROW	mile	4.1	1.8
	Construction ROW (based on a 100-foot-wide ROW)	acre	141.1	173.6
	Permanent ROW (based on a 50-foot-wide ROW)	acre	70.6	86.8
	Laterals Summary			
	Laterals Required	no.	1	N/A
	Total Length of Laterals	mile	1.1	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	13.7	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	6.8	N/A
	Total Wetlands Crossed c/	no.	0	N/A
	Forested	no.	0	N/A
	Scrub Shrub	no.	0	N/A
	Emergent	no.	0	N/A
	Scrub Shrub/Emergent	no.	0	N/A
	Total Wetlands Affected d/	acre	0	N/A
	Total Waterbodies Crossed e/	no.	0	N/A
	Total Length of Waterbodies Crossed e/	LF	0	N/A
	Major Waterbodies >100 feet e/	no.	0	N/A
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	N/A
	Sole Source Aquifers	no.	0	N/A
	Wellhead Protection Areas	no.	0	N/A
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	0	N/A
	Geologic Hazards i/	---	---	---
	Faults	no.	0	N/A
	Areas of Potential Subsidence	mile	1	N/A
	Areas of High Landslide Potential	mile	0	N/A
	Environmental Factors	---	---	---
	Total Wetlands Crossed c/	no.	16	2
	Forested	no.	13	1
	Scrub Shrub	no.	0	1
	Emergent	no.	2	0
	Scrub Shrub/Emergent	no.	0	0
	Total Wetlands Affected d/	acre	6.4	0.6
	Total Waterbodies Crossed e/	no.	25	26
	Total Length of Waterbodies Crossed e/	LF	311.3	563.7
	Major Waterbodies >100 feet e/	no.	0	0
	Groundwater Resources f/	---	---	---

TABLE 10.5-8

Comparison of the Maumee State Forest Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	Groundwater Wells	no.	0	0
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	0	0
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	36.7	12.3
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---	---	---
	Faults	no.	0	0
	Areas of Potential Subsidence	mile	11.6	13.9
	Areas of High Landslide Potential	mile	0	0
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	0.0	0.0
	Areas of Sidehill Construction	mile	0.0	0.1
	National and State Parks and Forests k/	---	---	---
	State	mile	1.6	0.4
	Federal	mile	0	0
	Public Lands or Conservation Lands Crossed l/	LF	5,757.9	5,266.9
	Land Ownership (100' corridor)	---	---	---
	Public Land	no./mile	0	3 / 1.0
	Private Land	no./mile	59 / 10.2	66 / 13.2
	Tribal Land	no./mile	0 / 0	0 / 0
	Residential Structures within 50 feet of Construction ROW m/	no.	7	4
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	19	19
	Construction in Roadways	mile	0.1	0.1
	Bored Road Crossings	no.	18	17
	Open Cut Road Crossings	no.	0	2
	HDD Road Crossings	no.	1	0
	Railroads Crossed	no.	1	1

NOTES: TBD = To Be Determined.
Parallel/Adjacent to Existing ROW is classified as any utility within 200 feet of the project workspace.

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.

b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.

c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.

d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.

TABLE 10.5-8

Comparison of the Maumee State Forest Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route

e/ Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.

f/ Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.

g/ Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.

h/ Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.

i/ Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.

j/ Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.

k/ Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.

l/ Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy Easements, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.

m/ Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.

n/ Number of roads crossed includes federal, state and local roads, but does not include driveways.

TABLE 10.5-9

Comparison of the Washtenaw County School Complex Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
Washtenaw, MI	**MP 242.2 – WASHTENAW COUNTY SCHOOL COMPLEX ALTERNATIVE**			
	Pipeline Length/ROW Summary	---	---	---
	MP to MP b/	MP	0.0 to 5.4	242.2 to 247.4
	Total Length	mile	5.4	5.3
	Parallel/Adjacent to Existing ROW	mile	5.4	0.3
	Construction ROW (based on a 100-foot-wide ROW)	acre	65.1	64
	Permanent ROW (based on a 50-foot-wide ROW)	acre	32.6	32
	Laterals Required	no.	0	0
	Total Length of Laterals	mile	N/A	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	N/A	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	N/A	N/A
	Environmental Factors	---	---	---
	Total Wetlands Crossed c/	no.	4	3
	Forested	no.	0	1
	Scrub Shrub	no.	1	0
	Emergent	no.	1	0
	Scrub Shrub/Emergent	no.	0	0
	Total Wetlands Affected d/	acre	1.3	0.7
	Total Waterbodies Crossed e/	no.	7	11
	Total Length of Waterbodies Crossed e/	LF	90.8	176
	Major Waterbodies >100 feet e/	no.	0	0
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	7	3
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	0	0
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	2.5	7.2
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---	---	---
	Faults	no.	0	0
	Areas of Potential Subsidence	mile	0	0
	Areas of High Landslide Potential	mile	0	0
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	0.0	0.0
	Areas of Sidehill Construction	mile	0.0	0.0
	National and State Parks and Forests k/	---	---	---
	State	mile	0	0
	Federal	mile	0	0

TABLE 10.5-9

Comparison of the Washtenaw County School Complex Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	Public Lands or Conservation Lands Crossed l/	LF	0.0	0.0
	Land Ownership (100' corridor)	---	---	---
	Public Land	no./mile	1 / 0	0 / 0
	Private Land	no./mile	65 / 2.7	36 / 5.2
	Tribal Land	no./mile	0 / 0	0 / 0
	Residential Structures within 50 feet of Construction ROW m/	no.	15	0
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	5	6
	Construction in Roadways	mile	0.1	0.1
	Bored Road Crossings	no.	5	3
	Open Cut Road Crossings	no.	0	3
	HDD Road Crossings	no.	0	0
	Railroads Crossed	no.	0	0

NOTES: TBD = To Be Determined.
Parallel/Adjacent to Existing ROW is classified as any utility within 200 feet of the project workspace.

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.

b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.

c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.

d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.

e/ Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.

f/ Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.

g/ Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.

h/ Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.

i/ Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.

j/ Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.

k/ Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.

l/ Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy Easements, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.

m/ Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.

n/ Number of roads crossed includes federal, state and local roads, but does not include driveways.

TABLE 10.5-10

Comparison of the CORN Western Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
Henry, Fulton, Lenawee, OH	**MP 189.8 – CORN WESTERN ALTERNATIVE**			
	Pipeline Length/ROW Summary	---	---	---
	MP to MP b/	MP	0.0 to 31.1	189.8 to 210.1
	Total Length	mile	31.1	20.2
	Parallel/Adjacent to Existing ROW +	mile	14.3	8.0
	Construction ROW (based on a 100-foot-wide ROW)	acre	377.1	245.2
	Permanent ROW (based on a 50-foot-wide ROW)	acre	188.6	122.6
	Laterals Required	no.	1	0
	Total Length of Laterals	mile	5.5	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	66.2	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	33.1	N/A
	Laterals Summary			
	Laterals Required	no.	1	0
	Total Length of Laterals	mile	5.5	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	66.2	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	33.1	N/A
	Total Wetlands Crossed c/	no.	1	N/A
	Forested	no.	0	N/A
	Scrub Shrub	no.	0	N/A
	Emergent	no.	0	N/A
	Scrub Shrub/Emergent	no.	1	N/A
	Total Wetlands Affected d/	acre	0.3	N/A
	Total Waterbodies Crossed e/	no.	5	N/A
	Total Length of Waterbodies Crossed e/	LF	67.9	N/A
	Major Waterbodies >100 feet e/	no.	0	N/A
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	N/A
	Sole Source Aquifers	no.	0	N/A
	Wellhead Protection Areas	no.	0	N/A
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	0	N/A
	Geologic Hazards i/	---	---	---
	Faults	no.	0	N/A
	Areas of Potential Subsidence	mile	0.1	N/A
	Areas of High Landslide Potential	mile	0	N/A
	Environmental Factors	---	---	---
	Total Wetlands Crossed c/	no.	5	2
	Forested	no.	4	1
	Scrub Shrub	no.	0	1

TABLE 10.5-10

Comparison of the CORN Western Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	Emergent	no.	1	0
	Scrub Shrub/Emergent	no.	0	0
	Total Wetlands Affected d/	acre	1.4	53.6
	Total Waterbodies Crossed e/	no.	45	34
	Total Length of Waterbodies Crossed e/	LF	573.1	676.0
	Major Waterbodies >100 feet e/	no.	0	0
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	0
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	0	0
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	14.1	7.6
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---	---	---
	Faults	no.	0	0
	Areas of Potential Subsidence	mile	9.7	11.8
	Areas of High Landslide Potential	mile	0	0
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	0	0
	Areas of Sidehill Construction	mile	0	0.1
	National and State Parks and Forests k/	---	---	---
	State	mile	0.3	0.4
	Federal	mile	0	0
	Public Lands or Conservation Lands Crossed l/	LF	1,689.9	4,185.0
	Land Ownership (100' corridor)	---	92	202
	Public Land	no./mile	2 / 0.3	5 / 0.8
	Private Land	no./mile	90 / 23.2	198 / 25.8
	Tribal Land	no./mile	0 / 0	0 / 0
	Residential Structures within 50 feet of Construction ROW m/	no.	4	3
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	39	25
	Construction in Roadways	mile	0.2	0.2
	Bored Road Crossings	no.	39	22
	Open Cut Road Crossings	no.	0	3
	HDD Road Crossings	no.	0	0
	Railroads Crossed	no.	2	2

NOTES:

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.

b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.

TABLE 10.5-10

Comparison of the CORN Western Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route

c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.

d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.

e/ Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.

f/ Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.

g/ Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.

h/ Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.

i/ Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.

j/ Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.

k/ Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.

l/ Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy Easements, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.

m/ Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.

n/ Number of roads crossed includes federal, state and local roads, but does not include driveways.

TABLE 10.5-11

Comparison of the Oak Openings Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
Sandusky, Henry, Wood, Fulton, OH	**MP 159.3 – OAK OPENINGS ALTERNATIVE**			
	Pipeline Length/ROW Summary	---	---	---
	MP to MP b/	MP	0.0 to 54.0	159.3 to 199.9
	Total Length	mile	54.0	40.6
	Parallel/Adjacent to Existing ROW +	mile	3.8	20.1
	Construction ROW (based on a 100-foot-wide ROW)	acre	654.8	491.6
	Permanent ROW (based on a 50-foot-wide ROW)	acre	327.4	245.8
	Laterals Required	no.	2	0
	Total Length of Laterals	mile	6.9	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	83.9	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	41.9	N/A
	Laterals Summary			
	Laterals Required	no.	2	0
	Total Length of Laterals	mile	6.9	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	83.9	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	41.9	N/A
	Total Wetlands Crossed c/	no.	2	N/A
	Forested	no.	1	N/A
	Scrub Shrub	no.	0	N/A
	Emergent	no.	0	N/A
	Scrub Shrub/Emergent	no.	0	N/A
	Total Wetlands Affected d/	acre	1.9	N/A
	Total Waterbodies Crossed e/	no.	2	N/A
	Total Length of Waterbodies Crossed e/	LF	1087.2	N/A
	Major Waterbodies >100 feet e/	no.	1	N/A
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	N/A
	Sole Source Aquifers	no.	0	N/A
	Wellhead Protection Areas	no.	0	N/A
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	1.4	N/A
	Geologic Hazards i/	---	---	---
	Faults	no.	0	N/A
	Areas of Potential Subsidence	mile	6.8	N/A
	Areas of High Landslide Potential	mile	0	N/A
	Environmental Factors	---	---	---
	Total Wetlands Crossed c/	no.	4	8
	Forested	no.	2	3
	Scrub Shrub	no.	0	1
	Emergent	no.	0	0

TABLE 10.5-11

Comparison of the Oak Openings Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	Scrub Shrub/Emergent	no.	0	0
	Total Wetlands Affected d/	acre	4.5	4.8
	Total Waterbodies Crossed e/	no.	64	67
	Total Length of Waterbodies Crossed e/	LF	2,848.5	2,885.2
	Major Waterbodies >100 feet e/	no.	2	3
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	0
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	7	5
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	5.2	36.2
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---		---
	Faults	no.	1	1
	Areas of Potential Subsidence	mile	42.7	40.2
	Areas of High Landslide Potential	mile	0	0
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	0.0	0.0
	Areas of Sidehill Construction	mile	0.0	0.3
	National and State Parks and Forests k/	---	---	---
	State	mile	0	0.5
	Federal	mile	0	0
	Public Lands or Conservation Lands Crossed l/	LF	3,558.7	3,326.4
	Land Ownership (100' corridor)	---	---	---
	Public Land	no./mile	11 / 0.7	15 / 0.7
	Private Land	no./mile	279 / 53.3	225 / 39.8
	Tribal Land	no./mile	0 / 0	0 / 0
	Residential Structures within 50 feet of Construction ROW m/	no.	2	5
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	76	54
	Construction in Roadways	mile	0.4	0.6
	Bored Road Crossings	no.	73	50
	Open Cut Road Crossings	no.	0	0
	HDD Road Crossings	no.	3	4
	Railroads Crossed	no.	8	5

TABLE 10.5-11

Comparison of the Oak Openings Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route

NOTES: TBD = To Be Determined.

\+ Parallel/Adjacent to Existing ROW is classified as any utility within 200 feet of the project workspace.

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.

b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.

c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.

d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.

e/ Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.

f/ Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.

g/ Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.

h/ Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.

i/ Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.

j/ Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.

k/ Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.

l/ Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy Easements, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.

m/ Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.

n/ Number of roads crossed includes federal, state and local roads, but does not include driveways.

TABLE 10.5-12

Comparison of the Turnpike Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
Henry, Fulton, Lenawee, OH	**MP 88.5 – TURNPIKE ALTERNATIVE**			
	Pipeline Length/ROW Summary	---	---	---
	MP to MP b/	MP	0.0 to 79.8	88.5 to 167.1
	Total Length	mile	79.8	78.6
	Parallel/Adjacent to Existing ROW +	mile	47.5	36.1
	Construction ROW (based on a 100-foot-wide ROW)	acre	967.8	952.6
	Permanent ROW (based on a 50-foot-wide ROW)	acre	483.9	476.3
	Laterals Required	no.	2	0
	Total Length of Laterals	mile	5.4	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	65.6	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	32.8	N/A
	Environmental Factors	---	---	---
	Total Wetlands Crossed c/	no.	24	13
	Forested	no.	10	5
	Scrub Shrub	no.	2	1
	Emergent	no.	3	0
	Scrub Shrub/Emergent	no.	1	3
	Total Wetlands Affected d/	acre	16.1	8.4
	Total Waterbodies Crossed e/	no.	128	111
	Total Length of Waterbodies Crossed e/	LF	5,057.7	3,545
	Major Waterbodies >100 feet e/	no.	10	4
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	2	2
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	7	9
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	80.4	89.7
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---	---	---
	Faults	no.	0	0
	Areas of Potential Subsidence	mile	42.3	41.2
	Areas of High Landslide Potential	mile	0	0
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	0.1	0.0
	Areas of Sidehill Construction	mile	1.5	0.5
	National and State Parks and Forests k/	---	---	---
	State	mile	0.2	0
	Federal	mile	0	0
	Public Lands or Conservation Lands Crossed l/	LF	13,270.5	10,888.0’

TABLE 10.5-12

Comparison of the Turnpike Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	Land Ownership (100' corridor)	---	---	---
	Public Land	no./mile	24 / 2.5	420 / 75.4
	Private Land	no./mile	13,270.5	10,888.0
	Tribal Land	no./mile	0 / 0	0 / 0
	Residential Structures within 50 feet of Construction ROW m/	no.	8	78
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	109	101
	Construction in Roadways	mile	0.9	1.2
	Bored Road Crossings	no.	103	81
	Open Cut Road Crossings	no.	5	13
	HDD Road Crossings	no.	1	7
	Railroads Crossed	no.	6	6

NOTES: TBD = To Be Determined.

\+ Parallel/Adjacent to Existing ROW is classified as any utility within 200 feet of the project workspace.

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.

b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.

c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.

d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.

e/ Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.

f/ Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.

g/ Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.

h/ Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.

i/ Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.

j/ Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.

k/ Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.

l/ Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy Easements, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.

m/ Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.

n/ Number of roads crossed includes federal, state and local roads, but does not include driveways.

TABLE 10.5-13

Comparison of the Stakeholder Powerline Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
STARK, OH	**MP 27.5 –STAKEHOLDER POWERLINE ALTERNATIVE**			
	Pipeline Length/ROW Summary	---	---	---
	MP to MP b/	MP	0.0 to 2.5	27.5 to 29.8
	Total Length	mile	2.5	2.3
	Parallel/Adjacent to Existing ROW +	mile	1.4	0.4
	Construction ROW (based on a 100-foot-wide ROW)	acre	30.0	28.3
	Permanent ROW (based on a 50-foot-wide ROW)	acre	15.0	14.1
	Laterals Required	no.	0	0
	Total Length of Laterals	mile	N/A	N/A
	Total Construction ROW for Laterals (based on a 100-foot-wide ROW)	acre	N/A	N/A
	Total Permanent ROW for Laterals (based on a 50-foot-wide ROW)	acre	N/A	N/A
	Environmental Factors	---	---	---
	Total Wetlands Crossed c/	no.	3	2
	Forested	no.	1	0
	Scrub Shrub	no.	0	1
	Emergent	no.	0	0
	Scrub Shrub/Emergent	no.	0	1
	Total Wetlands Affected d/	acre	2.8	0.9
	Total Waterbodies Crossed e/	no.	4	5
	Total Length of Waterbodies Crossed e/	LF	53.1	108
	Major Waterbodies >100 feet e/	no.	0	0
	Groundwater Resources f/	---	---	---
	Groundwater Wells	no.	0	0
	Sole Source Aquifers	no.	0	0
	Wellhead Protection Areas	no.	0	0
	Wildlife Habitat g/	---	---	---
	Forested Land	acre	2.1	32.6
	Designated Critical Wildlife Habitat	no.	0	0
	Known Endangered Species Critical Habitat	no.	0	0
	Waterfowl Production Areas	no.	0	0
	Wildlife Management Areas	no.	0	0
	Cultural Resources h/	---	---	---
	Listed National Register Historic Places Sites	no.	0	0
	Geologic Hazards i/	---	---	---
	Faults	no.	1	1
	Areas of Potential Subsidence	mile	40.5	38.1
	Areas of High Landslide Potential	mile	0	0
	Rugged Terrain j/	---	---	---
	Areas of Steep Slopes	mile	0.0	0.0
	Areas of Sidehill Construction	mile	0.1	0.2
	National and State Parks and Forests k/	---	---	---
	State	mile	0	0.5
	Federal	mile	0	0
	Public Lands or Conservation Lands Crossed l/	LF	0	0
	Land Ownership (100' corridor)	---	---	---
	Public Land	no./mile	0 / 0	0 / 0

TABLE 10.5-13

Comparison of the Stakeholder Powerline Alternative with the Corresponding Segments of the Proposed NEXUS Pipeline Route

County, State	Alternatives by Milepost MP Environmental / Engineering Factors	Unit a/	Alternative Route	Proposed Route
	Private Land	no./mile	30 / 2.5	16 / 2.3
	Tribal Land	no./mile	0 / 0	0 / 0
	Residential Structures within 50 feet of Construction ROW m/	no.	2	1
	Road Crossings	---	---	---
	Total Roads Crossed n/	no	4	2
	Construction in Roadways	mile	0.0	0.0
	Bored Road Crossings	no.	4	2
	Open Cut Road Crossings	no.	0	0
	HDD Road Crossings	no.	0	0
	Railroads Crossed	no.	1	1

NOTES: TBD = To Be Determined.

\+ Parallel/Adjacent to Existing ROW is classified as any utility within 200 feet of the project workspace.

a/ MP = mile post; no. = number of features crossed; LF = linear feet crossed; acre = acreage of area within estimated workspace generally a 100-foot-wide nominal construction right of way ("ROW"), except 75-foot-wide construction ROW in wetlands.

b/ Each alternative route has distinct mile-posting; these MPs do not necessarily correlate to the MPs of the currently Proposed Route.

c/ Number of wetlands crossed calculated by intersecting centerline with U.S. Fish & Wildlife Service ("USFWS") National Wetland Inventory ("NWI") data.

d/ Estimated acres of wetland impact is based on a 75-foot-wide-construction ROW in wetlands based on NWI data.

e/ Total number of waterbodies, length of waterbodies, and number of major waterbodies crossed calculated by intersecting centerline with National Hydrography Data ("NHD") waterbodies and from review of aerial photography and waterbodies identified on U.S. Geological Survey ("USGS") topographic maps.

f/ Public wells, surface water protection areas, and sole source aquifers were identified using publicly available datasets from the Ohio Environmental Protection Agency ("OEPA"), Division of Drinking and Ground Water and the Michigan Department of Environmental Quality ("MDEQ"), Statewide Groundwater Database. Data presented are based on resources encountered within a 300-foot area centered over the pipeline centerline.

g/ Wildlife Management Areas crossed by the pipeline centerline based on Ohio Department of Natural Resources ("ODNR") and Michigan Department of Natural Resources ("MDNR") publicly available datasets. Critical Habitat/Endangered Species Area based on USFWS datasets. Waterfowl protection areas based on WPA Mapper. Forested land acreage based on 100-foot-wide construction ROW.

h/ Total number of sites based on the National Register of Historic Places crossed within a 300-foot area centered over the propose pipeline centerline.

i/ Numbers and lengths of geologic hazards based on fault lines, karst geology, and number of earthquake epicenters occurring within a 300-foot area centered over the proposed pipeline centerline based on USGS and ODNR datasets.

j/ Rugged terrain crossed includes areas of steep slopes and sidehill construction based on USGS topographic maps within a 300-foot area centered on the proposed pipeline centerline.

k/ Length of crossings of national and state parks and forests based on Ducks Unlimited dataset intersecting the centerline.

l/ Length of public lands or conservation lands crossed based on datasets from Ducks Unlimited, Black Swamp Conservancy Easements, Western Reserve Land Conservancy Protection Properties, and ODNR Conservation Areas intersecting the centerline.

m/ Number of residential structures includes houses, garages and sheds within 50 feet of the proposed construction ROW i.e., 100 foot distance on both sides of the pipeline centerline based on review of aerial photography/LIDAR data.

n/ Number of roads crossed includes federal, state and local roads, but does not include driveways.

TABLE 10.6-1

Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
TGP								
0.0*	0.7*	5,503	Columbiana	Franklin, Hanover	Proposed interconnecting route avoids metering sites and other infrastructure at Kensington Process Facility.	Field/Aerial/ROW	10.6.1-1	130
0.6	0.9	1,259	Columbiana	Hanover	Proposed interconnecting route avoids a foreign utility site and avoids impacts to a creek and foreign pipeline.	Field/Aerial/NWI/NHD	10.6.1-1	253
Proposed NEXUS Mainline								
0.0*	1.4*	6,607	Columbiana	Hanover	Proposed route was rerouted around existing infrastructure	Field/ROW	10.6.1-2	88
0.9	1.0	774	Columbiana	Hanover	Proposed route was adjusted to improve the angle for crossing 4 existing pipelines.	Field	10.6.1-2	142
1.0	1.5	2,166	Columbiana	Hanover	Proposed route avoids a power line easement, reduces forest impacts and aligns the pipeline and mainline valve within the Hanoverton Compressor Station (CS1) property boundary.	Field/Aerial/ROW	10.6.1-2	270
1.3*	2.2	4,540	Columbiana	Hanover	Proposed route avoids a pond and existing drainage tiles as per landowner request.	Field/ROW/NHD/NWI	10.6.1-2	200
1.3*	2.2	4,103	Columbiana	Hanover	Route variation ID 213 was developed per landowner request to route pipeline around a pond, but was not incorporated as the alternative goes through high value trees and more wetlands areas.	ROW/Field	10.6.1-2	213
1.3*	2.2	3,977	Columbiana	Hanover	Route variation ID 131 was requested by landowner to shift alignment off property but was not incorporated because variation would have increased wetland and forest impacts and the alignment would be within 100 feet of two residences.	ROW/Field	10.6.1-2	131
1.5*	1.8*	1,427	Columbiana	Hanover	Route variation (ID 10) avoids a pond, house and barn.	Aerial/Field	10.6.1-2	10
2.2	2.4	1,100	Columbiana	Hanover	Proposed route avoids a wellhead, minimizes distance paralleling stream and reduces footprint within FEMA mapped floodplain.	Field/Aerial/FEMA	10.6.1-2	11
2.2	2.6	2,361	Columbiana	Hanover	Route variation (ID 126) was requested by a landowner to shift alignment further from residential structures, to minimize tree clearing and to avoid utilities, but variation was not incorporated because shift would have increased wetland crossing.	ROW/Field	10.6.1-2	126
3.4	4.1	3,556	Columbiana	Hanover	Proposed route avoids construction workspace within First Energy powerline easement.	ROW/Field	10.6.1-2, 10.6.1-3	263
4.2	4.3*	958	Columbiana	West	Proposed route shifted as per landowner request to preserve trees located north of the existing high voltage powerlines.	ROW	10.6.1-3	132
4.3*	4.7	2,113	Columbiana	West	Proposed route avoids a wellhead and storage tank.	Aerial/ROW/Field	10.6.1-3	74
5.2	5.7	2,638	Columbiana	West	Proposed route avoids construction workspace within First Energy powerline easement.	ROW/Field	10.6.1-3	265
5.4*	5.9*	2,477	Columbiana	West	Proposed route avoids crossing through a pond.	Field	10.6.1-3	16

TABLE 10.6-1

Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
5.5*	5.6*	861	Columbiana	West	Proposed route was developed to change the crossing location of Rochester Road due to uneven terrain.	Field	10.6.1-3	189
5.6*	5.9*	1,552	Columbiana	West	Route variation ID 13 avoids a manmade pond and shifts alignment further from existing residential structures but was not incorporated due to constructability issues with existing powerline infrastructure.	Field	10.6.1-3	13
5.9*	6.6	3,161	Columbiana	West	The proposed route avoids construction workspace within the First Energy powerline easement and houses adjacent to powerline corridor.	ROW/Field	10.6.1-3	264
6.6*	8.6*	10,198	Columbiana	West	The proposed route realigns the pipeline to perform HDD crossing around a potential Category III Wetland.	Field/NHD/NWI	10.6.1-3, 10.6.1-4	205
7.1*	7.2*	901	Columbiana	West	Route variation (ID 205) avoids encroachment on a stream with construction workspace designed on alternate route variation (ID 73).	Field/NHD/NWI	10.6.1-3, 10.6.1-4	73
7.4*	8.0*	2,297	Columbiana	West	Route variation (ID 205) minimizes steep slope and wetland crossings designed as part of alternate route variation (ID 18).	Field/NHD/NWI	10.6.1-4	18
7.7*	8.1*	2,020	Columbiana	West	Route variation (ID 187) was developed to change crossing location through a swamp, but was not incorporated due to constructability concerns around wetland.	Field/NHD/NWI	10.6.1-4	187
8.7*	9.8*	6,939	Columbiana	West	The proposed route was developed to eliminate tree clearing and reduce wetland impacts.	Field/NHD/NWI	10.6.1-4, 10.6.1-5	146
9.7	10.7	5,451	Columbiana	Knox, West	The proposed route avoids construction workspace within the First Energy powerline easement and houses adjacent to powerline corridor.	ROW/Field	10.6.1-4, 10.6.1-5	266
10.7*	11.7	4,525	Columbiana	Knox	The proposed route changes the crossing location of a railroad and reduces forested clearing impacts.	Field/NHD/ NWI	10.6.1-4, 10.6.1-5	180
11.6*	11.9*	1,363	Columbiana	Knox	The proposed route avoids and minimizes crossing through forested wetlands and along stream, which minimizes forested wetland conversion.	NWI/NHD	10.6.1-5	9
11.8	14.1	11,306	Columbiana, Stark	Knox, Washington	Proposed route avoids construction workspace within the First Energy powerline easement and houses adjacent to powerline corridor.	ROW/Field	10.6.1-5, 10.6.1-6	267
14.1	14.3	870	Stark	Washington	Proposed route creates a right-angle crossing at Highway 183 and avoids two ditched streams at the boring location.	FIELD/NHD/NWI/Aerial	10.6.1-5, 10.6.1-6	5
14.3	14.7	2,131	Stark	Washington	The proposed route avoids construction workspace within the First Energy powerline easement.	ROW/Field	10.6.1-5, 10.6.1-6	269
15.5	16.2	3,920	Stark	Washington	The proposed route avoids construction workspace within the First Energy powerline easement.	Field/NHD/NWI	10.6.1-6	268
16.0*	17.4	7,572	Stark	Washington	Route variation (ID 251) was developed per landowner request to shift the alignment to the southern boundary of the property, but was not incorporated due to increased forest impacts.	ROW/Field	10.6.1-6	251
18.6	22.2	17,662	Stark	Marlboro, Nimishillen, Washington	The proposed route avoids paralleling a stream, reduces forest and wetland impacts and improves constructability at the Highway 62 crossing.	ROW/Field	10.6.1-7, 10.6.1-8	145

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
19.2*	19.4*	1,400	Stark	Washington	Route variation (ID 145) avoids a crude oil storage tank and a survey section corner point installed by Ohio State Survey as previously impacted by alternate route variation (ID 6).	Field	10.6.1-7	6
22.1*	22.5	2,782	Stark	Marlboro	Proposed route was developed per landowner request to route the pipeline between a pump jack and storage tanks on the property.	ROW/Field	10.6.1-8	233
23.9	24.4*	2,288	Stark	Marlboro	Proposed route was developed per landowner request to shift the alignment to the southern boundary of the property. .	ROW/Field	10.6.1-8	219
25.2	26	3,908	Stark	Marlboro	The proposed route avoids a pond and several houses, reduces forested impacts, eliminates a stream crossing and avoids a large section of FEMA-mapped floodplain.	Field/FEMA	10.6.1-9	12
25.3*	25.7*	1,912	Stark	Marlboro	Route variation (ID 8) was designed to avoid a pond, but was not incorporated because it would have impacted additional landowners and crossed between two houses.	Field/NHD/NWI	10.6.1-9	8
26.4	26.7	1,590	Stark	Marlboro	Route variation (ID 204) was developed per landowner request to align to route closer to tree line, but was not incorporated.	ROW/Field/Aerial	10.6.1-9	204
26.4	28.1	9,124	Stark	Lake, Marlboro	The proposed route avoids a conservation easement and satisfies a landowner request to align the route closer to a tree line.	ROW/Field	10.6.1-9	217
26.5*	28.1	8,419	Stark	Lake, Marlboro	Route variation (ID 193) avoids crossing a conservation easement, but was not incorporated.	Aerial/NWI/NHD/Public Lands Data	10.6.1-9, 10.6.1-10	193
26.7	29.8	15,784	Stark	Lake, Marlboro	Route variation (ID 262) was developed per landowner request to route the pipeline adjacent to the powerline corridor, but was not incorporated due to significant increase of affected landowners and wetland impacts.	ROW/Field	10.6.1-9, 10.6.1-10	262
27.3	29.2	10,245	Stark	Lake	Route variation (ID 229) was developed per a landowner request to avoid a property, but was not incorporated due to constructability issues within the increased residential area.	ROW/Field	10.6.1-9, 10.6.1-10	229
28.4	28.8	2,457	Stark	Lake	The proposed route was incorporated to avoid an OEPA Class III Wetland.	Field	10.6.1-10	118
29.3	29.9*	3,014	Stark	Lake	The proposed route was developed, as requested by ODNR staff to avoid a forested area.	ROW	10.6.1-10	94
29.9*	30.3	1,760	Stark	Lake	The proposed route avoids traverses a pond.	Field/NHD	10.6.1-10	61
30.7	39.4	43,210	Stark, Summit	Lake, Green	Route variation (ID 129) was developed as option to route around the City of Green, but was not incorporated due to constructability concern around abandoned underground mine.	ROW/Field/Aerial/ NHD/NWI	10.6.1-11, 10.6.1-12, 10.6.1-13	129
30.7	31.2*	2,688	Stark	Lake	Proposed route avoids cultural site.	Cultural Investigation	10.6.1-11	216
30.7*	31.0*	1,351	Stark	Lake	Route variation (ID 216) avoids three large storage tanks as previously impacted by an alternate route variation (ID 57)	ROW/Aerial	10.6.1-11	57
31.2*	31.7*	2,405	Stark	Lake	Proposed route avoids a pond and large associated wetland area and moves the alignment further away from two residences.	Field/NHD/ NWI	10.6.1-11	60

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
31.4	32.1	2,973	Stark	Lake	Proposed route avoids a commercial structure, adjusts the crossing of a powerline and improves constructability of a road and river crossing.	ROW/Field/Aerial	10.6.1-11	143
32.5	39.6	36,714	Stark, Stark	Lake, Green	Proposed route avoids underground abandoned mines, the Akron-Canton airport and a business park.	ROW/Field/Aerial/NWI/ ODNR	10.6.1-11, 10.6.1-12, 10.6.1-13	249
33.8	34.2	1,826	Stark, Summit	Lake, Green	The proposed route was developed in response to information that the landowner has plans to construct barns.	ROW/Field	10.6.1-11, 10.6.1-12	258
38.2*	38.8*	2,057	Summit	Green	Route variation (ID 144) was developed to avoid encroachment of a construction workspace on a parallel stream, but was not incorporated as avoidance was achieved by the proposed route.	Field/NHD/NWI	10.6.1-13	144
38.8*	39.5*	4,669	Summit	Green	Route variation (ID 111) was developed per landowner request to avoid cutting through property and instead parallel northern property border. This variation was not incorporated, as avoidance was achieved by the proposed route.	ROW	10.6.1-13	111
40.7	41.3	4,591	Summit	Green	Proposed route avoids impacting reservoir by adding HDD.	Field/NHD/NWI	10.6.1-13	58
40.9*	41.2*	3,157	Summit	Green	Route variation (ID 59) avoids crossing between two residential structures near existing underground utility corridors, but not incorporated as the variation would have increased forested upland crossing distance by 1,257 linear feet.	Field/NHD/NWI	10.6.1-13	59
41.9	65.6	125,305	Medina, Wayne, Summit	Guilford, Franklin, Green, Chippewa, Milton	Route variation (ID 218) was developed in response to a route proposed by a landowner, which was followed as closely as possible. It was not incorporated due to increased wetland and cultural site impacts.	ROW/Field	10.6.1-14	218
41.9	42.6	3,089	Summit	Franklin, Green	Proposed route avoids workspace in proximity of existing Dominion East Ohio Gas facilities.	ROW/Field	10.6.1-15	223
43.3	43.5	1,125	Summit	Franklin	Proposed route avoids workspace in proximity of existing Dominion East Ohio Gas facilities.	ROW/Field	10.6.1-15	224
44.4	45.2*	4,302	Summit	Franklin	Route variation (ID 228) avoids workspace in proximity of existing Dominion East Ohio Gas facilities, but not incorporated due to close proximity to landowner homes.	Field	10.6.1-16	228
46.4	46.7	1,717	Summit	Franklin	Proposed route eliminates a PI.	Field	10.6.1-16	153
47.3*	47.9	2,532	Summit	Franklin	Proposed route avoids construction of a PI on a hill and reduces forest impacts.	Field	10.6.1-16	155
48.9	49.8	4,159	Summit	Franklin	Proposed route avoids storage tanks and eliminates the crossing of Pinto Drive.	ROW/Field	10.6.1-17	206
49.1*	49.8	3,664	Summit	Franklin	Route variation (ID 203) eliminates crossing Pinto Drive, but was not incorporated due to increased wetland impacts presence of storage tanks. Avoidance of these concerns was achieved by the proposed route.	Field	10.6.1-17	203
50.2	50.6	2,039	Wayne, Summit	Franklin, Chippewa	Proposed route avoids close proximity to a barn and residential structure.	ROW/Aerial	10.6.1-17	14
51.3*	52.1*	3,456	Wayne	Chippewa	Propose route was developed to increase distance from residential structures.	ROW/Aerial	10.6.1-17, 10.6.1-18	7

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
52.4	53.3*	6,404	Wayne	Chippewa	Route variation (ID 214) improves the constructability of a road crossing, but was not incorporated due to increased forested wetland impacts and excess pipeline length addition.	Field/Aerial	10.6.1-18	214
52.5	53.5*	5,565	Wayne	Chippewa	Proposed route was incorporated to improve the constructability of a the Highway 585 crossing.	Field/NHD/NWI	10.6.1-18	232, 276
52.9*	54.7	9,968	Wayne	Chippewa	Route variation (ID 136) avoids potentially planned retail development expansion, but was not incorporated as the variation remains in close proximity to a mine.	ROW/Field	10.6.1-18	136
53	54.7	8,715	Wayne	Chippewa	Proposed route avoids a future development area and incorporates input from Doylestown.	ROW/Field	10.6.1-18	276
53.3*	54.4*	5,335	Wayne	Chippewa	Route variation (ID 147) avoids houses, a pond and an abandoned mine, but was not incorporated. Avoidance of the area was achieved by the proposed route.	Field/NHD/NWI/ROW	10.6.1-18	147
53.5*	54.2*	6,151	Wayne	Chippewa	Route variation (ID 273) was developed per landowner request to route the pipeline along the boundary of the property, but was not incorporated due to excessive pipeline length addition and increased environmental impacts.	ROW/Field	10.6.1-18	273
53.7*	56.2*	13,383	Wayne	Chippewa	Route variation (ID 40) avoids a pond, residences, barns, and storage tanks, but was not incorporated as the variation would have significant increases of forested areas.	Field/Aerial	10.6.1-18, 10.6.1-19	40
53.7*	56.1*	13,424	Wayne	Chippewa	Route variation (ID 55) was designed to shift alignment further from residences, but was not incorporated due to increase of environmental impacts.	Field/Aerial	10.6.1-18, 10.6.1-19	55
55.3	56.0*	3,583	Wayne	Chippewa	Proposed route avoids crossing near residences and a powerline, in addition to reducing impacts forested areas.	ROW/Aerial/Field	10.6.1-19	82
55.7	56.4	3,043	Wayne	Chippewa	Proposed route was developed per landowner request to avoid an area of future development.	ROW	10.6.1-19	260
56.0*	56.7*	5,343	Medina, Wayne	Wadsworth, Chippewa	Route variation (ID 116) was developed per landowner request to avoid stand of mature, native trees but was not incorporated as the designed variation added significant length and more forested impacts.	ROW/Field	10.6.1-19	116
56.7	57.9*	4,717	Medina	Wadsworth	Route variation (ID 177) decreases tree clearing and moves PI away from a railroad track, but was not incorporated due to future development plans of an airport. "Complications with FAA"	Field/Aerial	10.6.1-19	177
56.7	57.6*	5,043	Medina	Wadsworth	Route variation (ID 109) was developed avoids the planned expansion of an airport. Not incorporated due to future development plans of an airport. "Complications with FAA"	ROW/Field/Aerial	10.6.1-19	109
56.8	60.7	16,945	Medina	Guilford, Wadsworth	Route variation (ID 56) avoids two newly constructed residential structures and avoids a pet cemetery but was not incorporated as the variation significantly increases forested upland crossing distance.	ROW/Field/Aerial	10.6.1-19, 10.6.1-20	56

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
56.8	58.4*	5,142	Medina, Wayne	Wadsworth, Chippewa, Milton	Proposed route was developed per request of the Wadsworth Municipal Airport and the FAA to avoid airport property.	ROW/Field	10.6.1-19	248
58.4*	59.1	3,659	Medina	Guilford, Wadsworth	Proposed route avoids clearing trees near a stream and additional landowners impacted.	Field/NHD/NWI	10.6.1-19, 10.6.1-20	161
59.1	60.1	5,645	Medina	Guilford, Wadsworth	Proposed route avoids newly constructed residential structures and two large sheds/barns.	ROW/Aerial/Field	10.6.1-20	103
59.1*	59.6*	2,485	Medina	Wadsworth	Route variation (ID 25) was requested by landowner to avoid crossing through two parcels with houses under construction, but was not incorporated.	ROW/Field	10.6.1-20	25
59.4*	60.1*	3,154	Medina	Guilford, Wadsworth	Route variation (ID 34) avoids a pet cemetery and reduces number of tracts crossed, but was not incorporated.	ROW/Field/Aerial	10.6.1-20	34
59.5	60.2*	3,187	Medina	Guilford, Wadsworth	Route variation (ID 257) was developed per landowner request to avoid property. Not incorporated due to future landowner development would be affected.	ROW/Field	10.6.1-20	257
59.5*	60.2	3,135	Medina	Guilford, Wadsworth	Route variation (ID 29) avoids a pet cemetery and reduces the number of tracts crossed, but was not incorporated.	ROW/Field/Aerial	10.6.1-20	29
61.6	62.1*	2,866	Medina	Guilford	Proposed route avoids construction workspace within proximity of a stream.	Field/NHD/NWI	10.6.1-20, 10.6.1-21	181
61.6	62.1*	3,026	Medina	Guilford	Route variation (ID 158) avoids construction workspace close proximity to a stream, but was not incorporated.	Field/NHD/NWI	10.6.1-20, 10.6.1-21	158
61.8*	62.3	2,435	Medina	Guilford	Proposed route avoids construction workspace within proximity of a stream and forested area.	Field/NHD/NWI	10.6.1-20, 10.6.1-21	252
62.1*	63.1*	4,693	Medina	Guilford	Proposed route was developed as a result of a discussion with landowners at an open house meeting to no longer route the alignment between their houses.	ROW	10.6.1-20, 10.6.1-21	105
62.7	63.1*	2,119	Medina	Guilford	Proposed route avoids placement of a construction workspace within proximity of a stream and moves the alignment off a property per landowner request.	Field/NHD/NWI/ROW	10.6.1-21	165
64.1*	66.6	15,645	Medina	Guilford, Montville	Route variation (ID 137) avoids potential constructability concerns for an HDD under I-71, but was not incorporated as the proposed variation would have crossed significantly more wetland and would have crossed a portion of Hubbard Valley Park.	Field/Aerial	10.6.1-21, 10.6.1-22	137
64.4*	65.2	3,848	Medina	Guilford	Proposed route was a result of a discussion with landowners at an open house meeting where one landowner requested to have pipeline on their property and another requested to remove it from their property.	ROW	10.6.1-21	104
64.8*	65.0*	1,464	Medina	Guilford	Route variation (ID 160) reduces wetland impacts, but was not incorporated due to increased number of landowners affected.	Field/NHD/NWI	10.6.1-21	160

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
66.1	71.7*	30,981	Medina	Lafayette, Montville	Route variation (ID 192) was developed per landowners requests to avoid several Medina County facilities and neighborhoods, but was not incorporated due to increased forested wetland impacts, Medina County Park crossings and constructions constraints.	ROW/Field	10.6.1-21, 10.6.1-22, 10.6.1-23	192
66.1	73.1	36,402	Medina	Lafayette, Montville	Route variation (ID 261) was developed per landowners requests to avoid several Medina County facilities and neighborhoods, but was not incorporated due to increased forested wetland impacts and constructions constraints.	ROW/Field	10.6.1-21, 10.6.1-22, 10.6.1-23	261
67.5*	67.7*	939	Medina	Lafayette, Montville	Route variation (ID 106) was designed per landowner request to shift alignment further from residence, but was not incorporated due to increased forested wetland and upland areas.	ROW/Field	10.6.1-22	106
68.2*	68.4	954	Medina	Lafayette	Proposed route decreases impacts to residences by increasing bore length under Chippewa and Ryan Road.	Field	10.6.1-22	162
68.4	69	3,417	Medina	Lafayette	Proposed route was incorporated to change the location of the Chippewa Rail Trail crossing.	Field/NHD/NWI	10.6.1-22	183
69.2	69.3*	661	Medina	Lafayette	Proposed route avoids construction workspace in proximity of storage tanks.	ROW/Field	10.6.1-22	197
70.4	70.9	2,743	Medina	Lafayette	Proposed route relocates a PI to improve constructability.	Field	10.6.1-23	243
70.8	71.8*	5,264	Medina	Lafayette	Proposed route implements an HDD as a crossing method of a Category III Wetland.	Field/NHD/NWI	10.6.1-23	246
72.7	73.2	2,921	Medina	Lafayette	Proposed route avoids construction workspace within proximity of several streams and wetlands.	Field/NHD/NWI	10.6.1-23	176
73.0*	73.4*	1,934	Medina	Lafayette	Route variation avoids construction parallel to a stream and reduces temporary wetland impacts; the route variation was not incorporated due to increased forested upland crossing distance by over 1000 feet	Field/NHD/NWI	10.6.1-23	53
73.6	73.8	1,177	Medina	Lafayette, York	Proposed route avoids a communication box.	Field	10.6.1-24	208
75.3	78.3	14,799	Medina	York	Proposed route avoids a potential Category III Wetland.	Field/NHD/NWI	10.6.1-24, 10.6.1-25	250
77.2*	77.5*	4,132	Medina	York	Route variation (ID 148) reduces the number of Pies but was not incorporated due to routing through a confirmed Category III Wetland.	Field	10.6.1-24	148
77.5*	78.7*	11,003	Medina	Litchfield, York	Route variation (ID 101) was developed per landowner request to avoid residences, development lots and mature trees, but was not incorporated due increased wetland impacts and forested clearing.	ROW/Field	10.6.1-24, 10.6.1-25	101
77.6*	78.4*	6,951	Medina	York	Route variation (ID 51) avoided residences and residential lots under development, but was not incorporated.	Field/NHD/NWI	10.6.1-24, 10.6.1-25	51
77.6*	78.4*	7,481	Medina	York	Route variation (ID 65) avoids eight residential lots and avoids paralleling a stream, but was not incorporated.	Field/NHD/NWI	10.6.1-24, 10.6.1-25	65

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
77.6*	80.4	14,462	Medina	Litchfield, York	Proposed route was developed per landowner request to move into cleared agricultural fields avoiding the resulting variation is further away from several developed lots, a stream crossing, a mature American Elm, and a wetland.	ROW	10.6.1-24, 10.6.1-25	102
77.9*	78.3	2,704	Medina	York	Route variations (ID 250) was developed to adjust the crossing angle of roads to avoid multiple bores as previously designed by an alternate route variation (ID 164).	Field	10.6.1-24, 10.6.1-25	164
81.2	81.7	2,354	Lorain	Grafton	Proposed route avoids construction workspace in close proximity of a landowner residence and avoids wetlands.	Field/NHD/NWI/ROW	10.6.1-25	163
82.4*	82.7	1,213	Lorain	Grafton	Proposed route avoids construction workspace paralleling a stream and avoids impacts to nearby trees.	Field/NHD/NWI	10.6.1-26	196
83.2*	83.5*	1,741	Lorain	Grafton	Proposed route avoids a pond and moves the pipeline further away from nearby homes.	Field/NHD/NWI	10.6.1-26	22
83.6	84.2	2,961	Lorain	Grafton	Proposed route avoids a pet cemetery at the request of landowners.	ROW/Field	10.6.1-26	36
83.9	84.5*	3,615	Lorain	Grafton	Route variation (ID 222) is a response to a landowner request to increase the distance from the landowner's home. Not incorporated due to increased impacts.	ROW/Field	10.6.1-26	222
84.2	85.1	3,993	Lorain	Grafton	Proposed route avoids several houses, crosses the road at a 90 degree angle, and reduces forested conversion.	Field/ROW/Aerial	10.6.1-26, 10.6.1-27	30
85.3	86.2*	5,354	Lorain	Grafton	Proposed route avoids several homes and reduces crossing length through a metro park.	Field/NWI/NHD	10.6.1-26, 10.6.1-27	27
86.0*	86.4*	2,121	Lorain	Grafton	Proposed route removes a Point of Inflection (“PI”) in order to avoid a maple farm.	ROW	10.6.1-26, 10.6.1-27	124
86.3	86.9	3,398	Lorain	Grafton, Lagrange	Proposed route improves constructability by realigning the HDD across the East Branch Black River.	Field	10.6.1-27	244
86.3*	86.5*	1,039	Lorain	Grafton	Proposed route avoids a maple farm and minimizes mature forest conversion.	Field	10.6.1-27	31, 244
86.5*	87.4	5,409	Lorain	Grafton, Lagrange	Route variation (ID 194) changes the alignment of a HDD to avoid a maple farm. Route variation was not incorporated due to constructability concerns.	ROW/Field	10.6.1-27	194
87.7*	88.5*	4,042	Lorain	Lagrange	Proposed route avoids traversing two existing pipelines.	LiDAR/ROW	10.6.1-27	43
90.1	91.4	6,915	Lorain	Lagrange	Proposed route designed in response to a landowner request to avoid area of future development.	Field/ROW	10.6.1-28	209
91.4	91.9*	2,299	Lorain	Lagrange, Pittsfield	Proposed route avoids wetland and portion of a Lorain County Metro Park.	Field/ROW	10.6.1-28	110
91.8*	93.0*	6,820	Lorain	Pittsfield	Route variation (ID 70) was designed to shift the alignment of the pipeline further away from a bald eagle nest. Route variation was not incorporated due to constructability concerns.	Field/ROW	10.6.1-28, 10.6.1-29	70
91.9*	92.7	4,457	Lorain	Pittsfield	Proposed route avoids a bald eagle nest and reduces the total length of the pipeline.	Field/ODNR	10.6.1-28	84
92.7	93.3	1,684	Lorain	Pittsfield	Proposed route avoids a potential Class III Wetland and minimizes mature forest clearing.	NWI/Field	10.6.1-28, 10.6.1-29	117

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
93.6	93.9	1,684	Lorain	Pittsfield	Proposed route increases constructability around a pond.	Field/NHD	10.6.1-29	199
93.7*	94.4*	3,463	Lorain	Pittsfield, Russia	Proposed route eliminates two foreign pipeline crossings and maintains the proper offset from the foreign pipeline.	Field/ROW	10.6.1-29	96
94.4*	96.0*	8,819	Lorain	Russia	Proposed route avoids a confluence of five existing pipelines and avoids ODNR easement.	Field/Ariel/ROW	10.6.1-29, 10.6.1-30	67
94.6	94.8	1,504	Lorain	Russia	Proposed route realigns pipeline further from residential lots with future plans for a development.	ROW	10.6.1-29	83
96.4	106.3	49,330	Huron, Erie, Lorain	Florence, Camden, Pittsfield, Wakeman	Proposed route avoids Boy and Girl Scout property, as well as the Western Reserve Land Conservancy, and provides a new alignment for HDD.	Field/NWI/NHD/ODNR	10.6.1-30, 10.6.1-31, 10.6.1-32, 10.6.1-33, 10.6.1-34	166
97.8*	99.0*	5,919	Lorain	Henrietta, Florence	Proposed route realigns the pipeline further from residential structures.	NWI/ROW/LiDAR	10.6.1-30, 10.6.1-31	28
99.5*	106.3*	37,458	Huron, Erie, Lorain	Florence, Camden, Henrietta, Wakeman	Route variation (ID 134) avoids Girl Scout Camp property with plans for future development. The route variation was not incorporated due to constructability concerns with the HDD crossing.	Field/NHD/NWI/ROW	10.6.1-31, 10.6.1-32, 10.6.1-33	134
99.3*	102.5*	15,511	Lorain, Erie	Henrietta, Florence	Avoids crossing through a large section of an ODNR-mapped rare habitat (beech-sugar maple forest) and avoids a large area of forested wetland and upland. The variation will also reduce the crossing length through a conservation property owned by the Girl Scouts of America.	Field/NWI/NHD/ODNR	10.6.1-31, 10.6.1-32	Scout Camp
103.8*	111.0*	34,485	Erie	Berlin, Florence	Proposed route shifts alignment further from two moderately populated residential areas.	ROW	10.6.1-34	68
107.4	107.8	2,307	Erie	Berlin, Florence	Proposed route avoids construction workspace in close proximity of bridge and guard rails while also minimizing parallel encroachment of a stream.	Field	10.6.1-35	198
107.7*	111.0*	7,678	Erie	Berlin	Route variation (ID 50) minimizes tree clearing and avoids an orchard per landowner request. This route variation was not incorporated because the proposed route avoids these concerns.	ROW/Field	10.6.1-34	50
107.7*	111*	7,728	Erie	Berlin	Route variation (ID 32) minimizes tree clearing and avoids an orchard per landowner request. This route variation was not incorporated because the proposed route avoids these concerns.	ROW/Field	10.6.1-34	32

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
108.8*	110.6*	9,677	Erie	Berlin	Route variation (ID 133) was designed in response to a landowner request to avoid drainage tiles. This route variation was not incorporated because it would have significantly increased wetland and forested crossing distances.	ROW/Field	10.6.1-35	133
109.8	110.4	2,992	Erie	Berlin	The proposed route is designed for a HDD crossing method of Interstate 80.	Field/Geotechnical	10.6.1-35	272
110.4*	110.9*	2,934	Erie	Berlin	Proposed route was designed to avoid forested wetland and reduce the length of forested upland crossing.	Field/NWI/NHD	10.6.1-35	157
110.9*	111.4	2,350	Erie	Berlin	Proposed route designed to minimize impacts on an orchard per landowner request.	Field/ROW	10.6.1-35	221
113.0*	114.2	5,888	Erie	Berlin	Proposed route is designed to avoid being in close proximity of two barns .	Field/Aerial/FEMA	10.6.1-36, 10.6.1-37	33
113.0*	114.1*	5,801	Erie	Berlin	Route variation (ID 26) was designed to avoid two barns. The route variation was not incorporated as avoidance was achieved through proposed route.	Field	10.6.1-36	26
114.2*	116.0*	10,030	Erie	Berlin, Milan	Route variation (ID 41) shifts the alignment further from residence and garage. This route variation was not incorporated because avoidance was achieved through the proposed route.	Field	10.6.1-36, 10.6.1-37	41
114.3	115.2	4,564	Erie	Berlin, Milan	Proposed route shifts alignment further away from residential structure and barns/sheds.	ROW/LiDAR	10.6.1-36, 10.6.1-37	45
116.4	116.5	807	Erie	Milan	Proposed route was designed to avoid a pond drainage system per landowner request.	Field/ROW	10.6.1-37	230
116.6*	116.9*	1,650	Erie	Milan	Route variation (ID 95) designed to shift a PI prior to the HDD crossing of the Huron River, which was not correctly aligned through alternate route variation (ID188). This route variation was not incorporated because avoidance of this concern was achieved through the proposed route.	ROW/LiDAR	10.6.1-37	95, 188
116.7	117.4*	3,636	Erie	Milan	Proposed route realigns the HDD and shifts a PI to the west to improve constructability.	Field	10.6.1-37	188
117.5*	119.3*	9,232	Erie	Milan	County request to collocate on south side of power line.	Field/ROW	10.6.1-37, 10.6.1-38	135
118.3*	118.7*	2,205	Erie	Milan	Route variation (ID 42) was developed to avoid an active private shooting range, affected by alternate route variation (ID 135). Avoidance of these concerns was achieved through the proposed route.	Aerial/FEMA	10.6.1-38	135, 42
119.2*	119.6*	2,125	Erie	Milan	The route variation (ID 63) shifts the alignment further from residence at proposed road bore location. This route variation was not incorporated because it would have added approximately 205 feet of additional length to the pipeline.	Field	10.6.1-38	63
119.2*	120.3	5,292	Erie	Milan	Proposed route was designed to avoid future residential development per landowner request.	Field/ROW	10.6.1-38	207
119.6*	120.8	10,493	Erie	Milan	Proposed route avoids a substation, four powerlines, a pond and minimizes impacts on nearby residential structures and a business.	Field/ROW/LiDAR	10.6.1-38, 10.6.1-39	19

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
119.8*	121.0*	5,709	Erie	Milan, Oxford	Route variation (ID 69) was designed to avoid a substation, four powerlines, a pond and minimizes impacts on nearby residential structures and a business, as well as avoiding properties owned by NASA. This route variation was not incorporated because the proposed route avoided these concerns.	Field/ROW	10.6.1-38, 10.6.1-39	69
120.6	121.7	5,168	Erie	Oxford	Proposed route was designed in response to a landowner request to move the pipeline further away from their residence.	Field/ROW	10.6.1-39	202
120.8	123.0	13,073	Erie	Oxford	Route variation (ID 259) was developed per landowner request to follow the turnpike instead of the powerline corridor, but was not incorporated due to increased number of landowners affected, decreases collocation with powerline and increases pipeline length.	ROW/Field	10.6.1-39	259
125.8*	126.5*	3,227	Erie	Groton, Oxford	Proposed route avoids a cultural site and Indiana bat habitat.	Field/NWI/NHD	10.6.1-40	215
126.9	127.6	3,546	Erie	Groton	Proposed route was designed per landowner request to parallel an existing pipeline.	Field/ROW	10.6.1-40	225
127.8	128.3	2,689	Erie	Groton	Proposed route moves a PI away from a stream and ditch and reduces tree clearing.	Field	10.6.1-40	156
130.4*	131*	3,035	Erie	Groton	Proposed route avoids passing between two residences while paralleling an existing pipeline ROW.	ROW	10.6.1-41	49
131.5*	133.3*	8,568	Sandusky	Townsend	Proposed route creates a right-angle crossing at Interstate 80/90.	Aerial/LiDAR	10.6.1-41, 10.6.1-42	48
133.3*	133.4	1,244	Sandusky	Townsend	Route variation (ID 24) was developed to avoid a highway overpass at I-80/I-90 but was not incorporated.	Field	10.6.1-42	24
133.8	135.3*	8,036	Sandusky	Townsend	Proposed route avoids several wetland crossings and crosses a creek at a more constructible location.	Field/ROW/Aerial	10.6.1-42	167
135.2*	137.6	1,244	Sandusky	Riley, Townsend	Proposed route avoids a proposed First Energy powerline easement.	Field/ROW	10.6.1-42, 10.6.1-43	255
138.8*	139.4*	2,992	Sandusky	Riley	Route variation (ID 178) avoids a waste management facility (property has various test wells within its boundaries), avoids paralleling a large stream and minimizes wetland impacts as previously designed by an alternate route variation (ID 47).	Field/Aerial	10.6.1-44	47
138.8	139.4*	3,100	Sandusky	Riley	Proposed route avoids a forested area.	Field/Aerial	10.6.1-44	178
140.2	140.7	2,537	Sandusky	Riley	Proposed route avoids a forested wetland.	Field/Aerial	10.6.1-44	179
140.8	142.4	8,310	Sandusky	Riley	Proposed route avoids an existing bridge and shortens overall alignment.	ROW/Field	10.6.1-44, 10.6.1-45	113
143.8	147.4*	15,687	Sandusky	Rice, Riley, Sandusky	Proposed route avoids a proposed First Energy powerline easement.	Field/ROW	10.6.1-45, 10.6.1-46	256
143.8	145.1*	5,520	Sandusky	Riley, Sandusky	Route variation (ID 211) was developed to reduce the number of PIs, but was not incorporated.	Field	10.6.1-45, 10.6.1-46	211
145.1*	145.6*	2,736	Sandusky	Sandusky	Route variation (ID 227) avoids a salt storage area and a barn, but was not incorporated.	Field/Aerial	10.6.1-46	227

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
147.9	148.9*	6,184	Sandusky	Sandusky	Route variation (ID 119) was moved off of a property per landowner request, but was not incorporated would have added 832 feet and three angles to the alignment.	ROW/Field	10.6.1-47	119
148.2	150.1	9,911	Sandusky	Sandusky	Proposed route avoids construction workspace within proximity of a stream.	ROW/Field	10.6.1-47	186
148.4*	150.3	10,371	Sandusky	Sandusky	Route variation (ID 186) removes a PI to shorten the overall alignment that was previously developed by an alternate route variation (ID 112).	ROW	10.6.1-47	112
153.9	154.7	4,580	Sandusky	Washington	Proposed route avoids a Black Swamp Conservancy easement and avoids paralleling small stream for approximately 1,164 feet.	Aerial/NWI/NHD/Public Lands Data	10.6.1-48	78
155.3*	155.8	2,845	Sandusky	Washington	Proposed route avoids a Black Swamp Conservatory easement 1,695 feet.	Public Lands Data	10.6.1-48	79
156.0	157.4*	6,866	Sandusky	Washington, Woodville	Proposed route avoids a Black Swamp Conservatory easement 2,984 feet.	Public Lands Data	10.6.1-49	80
157.3*	162.2*	27,445	Sandusky	Woodville	Route variation (ID 3) avoids paralleling active rock quarry planned for future expansion; the route variation would cross 1,900 more feet of forested land and was not incorporated based on follow-up discussions with the landowner regarding future plans.	Field/Aerial/ROW	10.6.1-49, 10.6.1-50, 10.6.1-51	3
157.3	157.8	2,415	Sandusky	Woodville	Proposed route avoids construction workspace encroachment on a landowner's property.	Field	10.6.1-49	191
157.4*	157.9	2,840	Sandusky	Woodville	Route variation (ID 152) was developed to avoid two unidentified structures and proximity to a landowner's home, but was not incorporated due to structures being movable.	Field/Aerial	10.6.1-49	152
158.8*	161.1*	13,736	Sandusky	Woodville	Route variation avoids paralleling active rock quarry planned for future expansion, but was no incorporated due to unnecessary addition of length to the alignment and follow-up discussions with quarry owners regarding future plans.	Field/Aerial/ROW	10.6.1-49, 10.6.1-50	23
161.4*	162.9*	7,740	Sandusky	Woodville	Proposed route avoids crossing over two existing pipelines and minimizes impacts on wetland.	NWI/Aerial/ROW	10.6.1-50, 10.6.1-51	90
163	163.7	3,826	Sandusky	Woodville	Route variation (ID 168) avoids impacting forested wetlands, but was not incorporated due to land owner opposition.	Field/NHD/NWI	10.6.1-51	168
163.7	163.8	4,226	Wood	Troy	Proposed route avoids construction workspace encroachment on a landowner's property and significantly reduces forest clearing.	Field	10.6.1-51, 10.6.1-52	169
163.7	164.9	6,341	Wood	Troy	Proposed route avoids removal of a tree line/windbreak per landowner request.	Field/Aerial	10.6.1-51, 10.6.1-52	271
164.2*	165.0	3,607	Wood	Troy	Route variation (ID 120) was developed per landowner request to move the alignment off a property, but was not incorporated due to crossing more forested and residential areas and crossing within 50-feet of two residential structures.	ROW/Field	10.6.1-51, 10.6.1-52	120
166.4*	165.7*	1,136	Wood	Troy	Proposed route avoids an electrical transmission line tower.	ROW	10.6.1-52	77

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
166.4	171.0	24,918	Wood	Troy, Webster	Route variation (ID 220) Improves constructability and reduces impacts to wetlands, but was not incorporated as it increases the number of landowners impacted.	Field/NHD/NWI	10.6.1-52, 10.6.1-53, 10.6.1-54	220
166.7	167	1,450	Wood	Troy	Proposed route improves constructability of a railroad crossing.	Field	10.6.1-52, 10.6.1-53	242
166.8*	167.0*	1,155	Wood	Troy	Route variation (ID 242) was developed to cross railroad at a 90 degree angle, as previously designed by an alternate variation (ID 38).	ROW	10.6.1-52, 10.6.1-53	38
167.4	168.5*	5,677	Wood	Troy	Proposed route allows for the proper offset distance within easement of existing pipeline and reduces foreign pipeline crossings.	ROW/Field	10.6.1-52, 10.6.1-53, 10.6.1-54	114
175.2	176.7	7,411	Wood	Middleton	Proposed route avoids traversing through an existing electrical substation and future development.	ROW	10.6.1-55	151
176.6*	177.2	2,874	Wood	Middleton	Route variation (ID 37) shifts the alignment further away from residential structure; the route variation was not incorporated because it would have moved the alignment north of the house thus putting utilities on both sides of the house.	Field	10.6.1-55	37
176.7*	177.1*	2,337	Wood	Middleton	Proposed route shifts alignment further from a residential structure.	ROW	10.6.1-55	76
178.9*	180.3*	6,929	Wood	Middleton	The proposed route was incorporated to decrease unnecessary false ROW to accommodate the HDD pullback string and to provide a right-angle approach and crossing for the railroad	Field	10.6.1-56	210
179.2*	180.8	7,967	Wood	Middleton	The proposed route was incorporated to avoid powerline and road crossings in addition to shifting the alignment further from residential structures and avoiding a driveway crossing	ROW	10.6.1-56	107
179.6*	180.3*	3,731	Wood	Middleton	This route variation (ID 52) was developed to avoid residences that are in close proximity to the pipeline. The route variation was not incorporated as the design would have added two PIs and approximately 736 feet to the total length of the pipeline	Field	10.6.1-56	52
179.6*	180.3*	3,294	Wood	Middleton	This route variation (ID 39) was developed to avoid residential structures and to increase the distance between the alignment and a powerline. The route variation was not incorporated because the proposed route avoids these concerns	Field	10.6.1-56	39
179.7*	180.3*	1,490	Wood	Middleton	This route variation (ID 85) was developed in response to a landowner request to avoid residential structures and to increase the distance between the alignment and a powerline. Route variation was not incorporated due safety concerns of shifting the alignment between two power lines and the depth of the creek to the west of the road crossing	ROW/Field	10.6.1-56	85
180.0	180.3*	1,391	Wood	Middleton	This route variation (ID 173) was developed in response to a deep waterbody on the western side of Findley Road which required a HDD crossing method. This route variation (ID 173) was not incorporated due to constructability concerns through the deep creek	Field	10.6.1-56	173

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
181.1*	182.4*	8,527	Wood, Lucas	Washington, Waterville	Proposed route increases the constructability of the HDD crossing under the Maumee River.	NWI/LiDAR/ROW	10.6.1-56, 10.6.1-57	Maumee River Crossing
181.9*	183.3*	7,099	Lucas	Waterville	The proposed route was developed in response to a landowner request to avoid the landowner's sewer lift station and to avoid an area that landowner intends to develop.	Field/NHD/NWI/ROW	10.6.1-57	149
182.1*	182.6*	2,462	Lucas	Waterville	This route variation (ID 139) was developed in response to a landowner request to avoid the landowner's sewer lift station and to avoid an area that landowner intends to develop. The route variation was not incorporated because avoidance of these concerns was achieved through the proposed route	ROW	10.6.1-57	139
183.3*	184.9*	8,330	Lucas	Waterville	The proposed route was incorporated to provide a right-angle approach and crossings for Highway 24 and Hertzfeld Road	ROW/Aerial	10.6.1-57, 10.6.1-58	64
183.5	184.2	3,650	Lucas	Waterville	The proposed route was developed to avoid a PI that is in close proximity of an existing creek and adds unnecessary centerline length.	Field	10.6.1-57, 10.6.1-58	171
185.2*	185.4*	818	Lucas	Waterville	This route variation (ID 4) was developed to avoid crossing at a Highway 151 bridge and associated bridge pilings, avoidance was achieved through the proposed route	Field	10.6.1-58	4
185.3	185.9	3,027	Lucas	Waterville	The proposed route was developed to avoid forested wetland impacts.	Field	10.6.1-58	170
186.4	200.3	64,526	Fulton, Lucas, Henry	Fulton, Swan Creek, Washington, Providence	The proposed route was developed to avoid confirmed Category III wetlands according to the ORAM scoring method, several possible road lays, the Town of Swanton, relocates the pipeline further west of the Oak Openings Preserve Metro Park (approximately 3.6 miles), and avoids both the Growing Hope Farms and Johnson Fruit Farms.	FIELD/NWI/ODNR	10.6.1-58, 10.6.1-59, 10.6.1-60, 10.6.1-61, 10.6.1-62, 10.6.1-63, 10.6.1-64	99
186.4	192.1*	36,274	Fulton, Lucas, Henry	Swan Creek, Washington, Providence	This route variation (ID 97) was developed to avoid high population residential areas and associated utilities along Hite Road. The route variation (ID 97) was not incorporated and the avoidance of these concerns was achieved through the proposed route	ROW/Field	10.6.1-58, 10.6.1-59, 10.6.1-60, 10.6.1-61	97
187.5*	188.3*	5,738	Lucas	Providence	This route variation (ID 86) was developed to avoid multiple wetlands and potential culturally sensitive areas as identified by the landowner. The route variation (ID 86) was not incorporated because avoidance of these concerns was achieved through the proposed route	ROW/Field	10.6.1-59	86
187.7	187.9*	1,221	Lucas	Providence	The proposed route was developed to avoid PIs that are currently underneath an existing high voltage powerline. Additionally, the proposed route avoids construction workspace of the bore crossing of Jeffers Rd encroaching onto a landowner's front yard, which would require tree clearing.	Field	10.6.1-59	174
192.1	192.5	2,592	Fulton	Swan Creek	The proposed route was developed to avoid workspace within close proximity of a culvert at the Route 3 road crossing.	Field	10.6.1-60, 10.6.1-61	175

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
192.7*	193.9*	6,322	Fulton	Swan Creek	This route variation (ID 87) was developed in respond to a landowner request to shift the pipeline alignment to minimize impact to their agricultural field and drain tile system. This route variation (ID 87) was not incorporated due to additional impacts to the Maumee State Forest.	ROW/Field	10.6.1-60, 10.6.1-61	87
193.9*	200.7*	39,179	Fulton	Fulton, Swan Creek	This route variation (ID 98) was developed to avoid a high density residential development and multiple confirmed OEPA Category III wetlands. Route variation (ID 98) was not incorporated because avoidance these concerns was achieved through the proposed route	Field/NHD/NWI	10.6.1-61, 10.6.1-62, 10.6.1-63, 10.6.1-64	98
194.8*	195.4*	2,909	Fulton	Swan Creek	This route variation (ID 21) was developed to shift the alignment to the east of residential structures that are within close proximity but was not incorporated as avoidance of this area was achieved through the proposed route.	Field	10.6.1-61, 10.6.1-62	21
196.2	197.1	4,777	Fulton	Swan Creek	The proposed route was developed to minimize the total forested wetland crossed.	Field/NWI/NHD	10.6.1-62	172
197.3*	199.4*	11,152	Fulton	Fulton, Swan Creek	This route variation (ID 99) was developed to shift the alignment further away from several residential structures and associated lots, which were being affected by alternate route variation (ID 46). Ultimately, neither route variation (ID 99 or 46) was incorporated because avoidance of these concerns was achieved through the proposed route	Field/NHD/NWI/Aerial	10.6.1-62, 10.6.1-63	46, 99
197.6*	197.8*	1,220	Fulton	Swan Creek	This route variation (ID 44) was developed to shift the alignment further from residential structures. This route variation (ID 44) was not incorporated because avoidance of these concerns was achieved through the proposed route	Field	10.6.1-62, 10.6.1-63	44
197.9*	199.9*	9,402	Fulton	Fulton, Swan Creek	This route variation (ID 20) was designed to provide a right-angle approach and crossing for the railroad and to avoid close proximity of an existing electrical substation. The proposed route variation (ID 20) was not incorporated because avoidance of these concerns was achieved through the proposed route	ROW/Field	10.6.1-62, 10.6.1-63, 10.6.1-64	20
201.5	201.8	1,468	Fulton	Fulton	The proposed route was developed to adjust the crossing angle of the powerline to the required minimum crossing angle.	ROW/Field	10.6.1-63, 10.6.1-64	280
201.5*	201.8*	1,466	Fulton	Fulton	The route variation (ID 17) was developed to avoid traversing through a residential structure. Avoidance of these concerns was achieved through the proposed route	Field	10.6.1-63, 10.6.1-64	17
201.5	201.8*	1,321	Fulton	Fulton	The proposed route was developed to avoid traversing through a residential structure.	Field/ROW	10.6.1-63, 10.6.1-64	35
204.4	205.3*	4,204	Fulton	Amboy	The proposed route was developed to avoid being within close proximity of a residential structure and to accommodate the required workspace for the Route 20 bore crossing.	Field/Aerial	10.6.1-65	154
206.1	206.9	4,795	Fulton	Amboy	The proposed route was developed to reduce crossing the powerlines and reduce the total length of the pipeline.	ROW	10.6.1-65, 10.6.1-66	89

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Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
206.9*	207.9*	5,241	Fulton	Amboy	The proposed route was developed to avoid traversing through the Village of Metamora Water Facility.	ROW	10.6.1-65, 10.6.1-66	15
207.9	208.7	4,126	Fulton	Ogden, Amboy	The proposed route was developed to reduce crossing the powerlines and reduce he total length of the pipeline.	ROW/Aerial	10.6.1-66	91
209	221.0*	63,272	Lenawee	Ridgeway, Deerfield, Blissfield	The proposed route was developed to avoid the pipeline being within existing pipeline easements and create the proper 50 foot offset	ROW/LiDAR	10.6.1-66, 10.6.1-67, 10.6.1-68, 10.6.1-69, 10.6.1-70, 10.6.1-71	75
209.7	210.4	3,761	Lenawee	Ogden	The proposed route was developed to cross East Mulberry Road and the railroad with one conventional bore crossing.	ROW/Aerial	10.6.1-66, 10.6.1-67	184
214.1	215.7*	6,737	Lenawee	Ogden, Palmyra	The route variation (ID Wetlands I) was developed to reduce forested clearing adjacent to the River Raisin. Due to constructability concerns, this route variation (ID Wetlands I) was not incorporated	LiDAR/NWI/Field	10.6.1-68, 10.6.1-69	Wetlands I
214.6	216.4	9,208	Lenawee	Palmyra, Ogden	The proposed route was developed to realign the HDD crossing location of River Raisin to improve constructability	Field	10.6.1-68, 10.6.1-69	245
215.3*	216.7	7,789	Lenawee	Palmyra, Ogden	This route variation (ID 245) was developed to reduce the amount of PIs and reduces the overall length of the alignment, which was increased by alternate route variation (ID 81). Neither route variation (ID 245 nor 81) was incorporated because avoidance of these concerns was achieved through the proposed route	ROW/LiDAR	10.6.1-69	81, 245
216.8	219.0	11,676	Lenawee	Palmyra	The proposed route was developed to increases the distance from a residential structure and decreases impacts to forested areas, reducing the constraints on the workspace near the railroad/road bore location.	Field/NHD/NWI/ROW	10.6.1-69, 10.6.1-70	235
217.0*	217.2*	915	Lenawee	Palmyra	This route variation (ID 75) was developed to avoid the route passing through a residential structure, which was affected by alternate route variation (ID 54). Neither route variation (ID 75 nor 54) was incorporated because avoidance of these concerns was achieved through the proposed route	ROW/LiDAR	10.6.1-69, 10.6.1-70	54, 75
218.9*	219.0	913	Lenawee	Palmyra	The proposed route was developed to relocates a PI bend in order to position the pipeline further away from existing high voltage powerlines as well as an existing foreign pipeline.	Field	10.6.1-70	190
221.3	221.6	1,526	Lenawee	Blissfield	The proposed route was developed to avoid an easement overlap with two existing TransCanada pipelines.	Field/ROW	10.6.1-71	278
224.9	225.1*	1,027	Lenawee	Ridgeway	The proposed route was developed to avoid a 60-inch culvert at the Britton Highway crossing location.	Field	10.6.1-72	279

TABLE 10.6-1

Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
224.9	226.7	9,346	Lenawee	Ridgeway	The proposed route was developed to reduce the amount of impact to forested bat habitat.	Field/Aerial	10.6.1-72	254
226.9*	226.1*	1,314	Lenawee	Ridgeway	This route variation (ID 236) was developed to avoid impact to forested bat habitat but was not incorporated due to increased existing pipeline crossings.	Field/ODNR	10.6.1-72	236
232.9*	235.5*	13,452	Monroe	Milan	This route variation (ID 93) creates a 90 degree angle and a railroad crossing and avoids existing pipeline crossings.	Field	10.6.1-73	93
232.9*	234.7*	8,607	Monroe	Milan	The proposed route was developed to cross the railroad at the required 90° angle as well as to avoid crossing multiple foreign pipelines.	ROW/LiDAR	10.6.1-73	92
232.9*	234.7*	5,812	Monroe	Milan	This route variation (ID 71) was developed to cross the railroad at the required 90° angle as well as to avoid crossing multiple foreign pipelines.	Field	10.6.1-73	71
232.9*	234.8*	11,095	Monroe	Milan	This route variation (ID 121) was developed to cross the railroad at the required 90° angle as well as to avoid crossing multiple foreign pipelines.	ROW/Field	10.6.1-73	121
234.5	235.1	3,401	Monroe	Milan	The proposed route was developed to realign the pipeline further from a residential structure and to accommodate the required workspace necessary for the Mead Road crossing.	Field/Aerial	10.6.1-73	150
235.3	236.6	6,468	Monroe	Milan	The proposed route was developed to increase constructability over two existing TransCanada pipeline.	Field	10.6.1-73, 10.6.1-74	238
236*	236.6	3,507	Monroe	Milan	This route variation (ID 185) was developed to avoid crossing four existing pipelines. This route variation was not incorporated because of an additional road crossing.	Field	10.6.1-73, 10.6.1-74	185
236.2*	236.3*	428	Monroe	Milan	This route variation (ID 122) was developed in response to a landowner request to move the pipeline further from a residential structure. Upon further review of the existing utilities in the area, this route variation (ID 122) was not incorporated	ROW/Field	10.6.1-73, 10.6.1-74	122
237.8	238.5	3,939	Washtenaw	York	This route variation (ID 125) was developed to avoid four existing pipeline crossings and allow for enough HDD pullback area within the proposed workspace. Upon further review of ATWS potential, this route variation (ID 125) was not incorporated	Field	10.6.1-74, 10.6.1-75	125
236.8*	238.1*	6,784	Washtenaw	York	The proposed route was developed to reduce forest clearing adjacent to the Saline River	Aerial/Field	10.6.1-74	Wetlands II
238.2*	238.5*	1,640	Washtenaw	York	The proposed route was developed to increase length of the pipeline collocated with existing pipeline corridors and reduce the number of foreign pipeline crossings required.	Field	10.6.1-74, 10.6.1-75	138
238.9	239.3*	1,873	Washtenaw	York	The proposed route was developed to reduce the length of crossing that traverses through a wetland and avoid crossing within close proximity of a pond	Field/NHD/NWI	10.6.1-74, 10.6.1-75	140
239.3	239.7	1,948	Washtenaw	York	The proposed rote was developed to cross Highway 23 at a 90° angle and decrease the length of the bore.	Field	10.6.1-74, 10.6.1-75	237

TABLE 10.6-1

Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
241.5	242.5	4,643	Washtenaw	Augusta	The proposed route was developed avoids residential structures consisting of a home and multiple barns on the property.	Field/Aerial	10.6.1-75, 10.6.1-76	212
241.5*	241.7*	1,067	Washtenaw	Augusta	This route variation (ID 212) was developed avoids residential structures consisting of a home and multiple barns on the property, which are affected by alternate route variation (ID 62). Neither route variation (ID 212 nor 62) were incorporated because avoidance of these concerns was achieved through the proposed route	ROW/LiDAR	10.6.1-75	62, 212
241.5*	242.8	6,934	Washtenaw	Augusta	This route variation (ID 182) was developed to decrease the crossing length through forested wetlands, decreases existing pipeline crossings and improves the constructability of a PI. Route variation (ID 182) was not incorporated because of increased total length of pipeline	Field/NHD/NWI	10.6.1-75, 10.6.1-76	182
243.8	F 244.4*	3,480	Washtenaw	Augusta	The proposed route was developed to reduce the number of PIs and reduce the total length of the pipeline.	Field	10.6.1-76, 10.6.1-77	239
244.4	245.0	3,661	Washtenaw	Augusta	The proposed route was designed to in response to a landowners request to avoid an area that the landowner plans to develop for a neighborhood and also to move the pipeline further from a residential structure.	ROW	10.6.1-76, 10.6.1-77	240
245.6	246.9*	6,093	Washtenaw	Augusta	The proposed route was developed to reduce the crossing length within forested wetland.	Field/Aerial	10.6.1-77, 10.6.1-78	115
245.6	245.9*	1,984	Washtenaw	Augusta	This route variation (ID 123) was developed in response to a landowner request to move the pipeline off their property. Route variation (ID 123) was not incorporated.	ROW/Field	10.6.1-77	123
246.8*	248.9	13,086	Washtenaw	Ypsilanti, Augusta	The proposed route was developed to avoid residential structures, waterbodies, and a mobile home park. The proposed route will prevent approximately 3.6 miles of street lay near an elementary school, multiple densely populated neighborhoods, a church, and a cemetery.	ROW/Field/LiDAR	10.6.1-77, 10.6.1-78	100
246.8*	247.4*	8,383	Washtenaw	Ypsilanti, Augusta	This route variation (ID 72) was developed to avoid an elementary school, two densely populated neighborhoods, a church and a cemetery. Due to the long street lay still required, this route variation (ID 72) was not incorporated	ROW/Field	10.6.1-77, 10.6.1-78	72
247.4*	248.9	4,118	Washtenaw	Ypsilanti	This route variation (ID 66) was designed to avoid two ponds within close proximity of the pipeline.	Field/Aerial	10.6.1-78	66
247.4*	247.5*	126	Washtenaw	Ypsilanti	The proposed route was designed to reduce the number of PIs and eliminate the PI in the crossing of Bemis Road.	Field	10.6.1-77, 10.6.1-78	281
248.3	248.7*	2,277	Washtenaw	Ypsilanti	This route variation (ID 241) was developed in response to a landowner request to avoid impacting trees on their property. This route variation increases the total length of the pipeline by 270 feet and therefore was not incorporated	Field/Aerial	10.6.1-78	241

TABLE 10.6-1

Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID
249.2	250.4*	6,093	Washtenaw	Ypsilanti	The proposed route was developed to avoid existing HVAC powerlines, and to shift the street lay for the boring of McKean road to be located near the railyard.	ROW/Field/LiDAR	10.6.1-78, 10.6.1-79	128
249.2	251.4	11,622	Washtenaw	Ypsilanti	This route variation (ID 108) was developed to avoid existing underground utilities. Not incorporated due to excessive environmental impacts	Field	10.6.1-78, 10.6.1-79, 10.6.1-80	108
250.4	251.1*	3,843	Washtenaw	Ypsilanti	The proposed route was developed to align the centerline with HDD contractor's recommended HDD alignment.	Field	10.6.1-79	283
250.4*	251.4	3,857	Washtenaw	Ypsilanti	The proposed route was designed to improve the alignment and HDD location across the Huron River to avoid parkland, river crossing, HVAC lines, existing pipelines, water mains, water towers, a dam and nearby roads.	ROW/LiDAR/Field	10.6.1-79, 10.6.1-80	127
251.7*	251.8*	590	Washtenaw	Ypsilanti	The proposed route was developed to avoid an existing salvage yard.	ROW/LiDAR/Aerial	10.6.1-79, 10.6.1-80	Junk Yard
252.1	252.3	870	Washtenaw	Ypsilanti	The proposed route was developed to avoid a high voltage powerline and substation as well as several vacant lots.	Field/ROW	10.6.1-79, 10.6.1-80	195
252.4	255.1*	13,226	Washtenaw, Wayne	Ypsilanti, Van Buren	The proposed route was developed to avoid existing underground utilities and information received from the Michigan Department of Transportation that laying pipeline within the middle of the median would not be permitted.	Field	10.6.1-79, 10.6.1-80	231
252.4	255.2*	15,803	Washtenaw, Wayne	Ypsilanti, Van Buren	This route variation (ID 141) was developed to avoid existing underground utilities and information received from the Michigan Department of Transportation that laying pipeline within the middle of the median would not be permitted.	ROW/Field	10.6.1-79, 10.6.1-80	141
252.4	255.2*	13,095	Washtenaw	Ypsilanti	This route variation (ID 226) was developed to avoid existing underground utilities and information received from the Michigan Department of Transportation that laying pipeline within the middle of the median would not be permitted	ROW/Field	10.6.1-79, 10.6.1-80	226
252.4	255.1*	12,227	Washtenaw	Ypsilanti	This route variation (ID 234) was developed to avoid existing underground utilities and information received from the Michigan Department of Transportation that laying pipeline within the middle of the median would not be permitted	ROW/Field	10.6.1-79, 10.6.1-80	234
253.4	254.4	5,187	Washtenaw	Ypsilanti	The proposed route was developed to avoid a waterline, a water main, as well as other existing utilities in the area	Field	10.6.1-80	274

TABLE 10.6-1

Route Variations Evaluated for the NEXUS Project

Start MP	End MP	Length of Corresponding Route Variation (Feet)	County (or Counties)	Municipality	Route Evaluation Summary	Data Sources Used in Route Variation Analyses a/	Figure Number	Corresponding Route Variation ID

a/ Pipeline alignment planning decisions were based on a number of data sources including onsite assessment of project constraints (in some areas) along with review of the NEXUS Project Geographic Information System (GIS) database. The database includes information collected from commercial, municipal, state, federal, educational, and conservation sources. Additionally, data sources particularly pertinent to the minor route variations described in Resource Report 10 include:
Aerial = 2014 Aerial Photography interpretation
FEMA = Federal Emergency Management Agencies National Flood Insurance Rate Maps
Field= NEXUS resource field surveys
HDD = Horizontal Directional Drill
LiDAR = (light detection and ranging) – remote sensing technology providing three-dimensional surface data from aerial reconnaissance
NHD = National Hydrography Dataset (NRCS)
NWI = National Wetlands Inventory (USFWS)
ODNR = Ohio Department of Natural Resources
ROW = right-of-way agents and/or landowner contact
* Milepost derived from pre-Certificate Application pipeline route as depicted on corresponding Figures.

TABLE 10.7.1-1

Comparison of NEXUS Compressor Station Alternatives

Property and Resources Evaluated	Hanoverton Compressor Station 1			Compressor Station 2			Compressor Station 3			Compressor Station 4		
	Alt. 1 (Proposed Site)	**Alt. 2**	**Alt. 3**	**Alt. 1** (Proposed Site)	**Alt. 2**	**Alt. 3**	**Alt. 1**	**Alt. 2**	**Alt. 3** (Proposed Site)	**Alt. 1**	**Alt. 2** (Proposed Site)	**Alt. 3**
Approximate Milepost	1.25	3.14	3.25	60.1	61.8	62.9	124.2	127.0	129.3	177.7 (south)	177.7 (north)	181
Property Size (approx. acres)	116.3	37.5	54.8	75.3	59.4	36.4	53.6	67.9	59.7	40.1	37.7	78.8
Wetlands (acres) a/	0.9	0	0 (*estimate)*	0.7	1.6	0.7	0	0 (*estimated*)	0	0.1	0	7.6
Streams (linear feet) b/	1,157	0	0 (*estimate*)	0	2,148	138	0	0 (*estimated*)	0	656	332	2,517
Predominant Land Uses (approx. % of property)												
Agricultural	87%	83%	40%	80%	71%	86%	93%	100%	100%	100%	100%	81%
Forest/Wood-land	13%	17%	45%	15%	22%	14%	-	-	-	-	-	19%
Open Land	-	-	15%	-	7%	-	-	-	-	-	-	-
Residential	-	-	-	5%	-	-	7%	-	-	-	-	-
Distance from Property to Pipeline (feet)	0 (intersects)	200	75	0 (intersects)	0 (intersects)	0 (intersects)	0 (intersects)	0 (intersects)	0 (intersects)	0 (intersects)	0 (intersects)	0 (intersects)
Prime Farmland Soils (approx. % of total property)												
Prime	22%	16%	-	56%	>1%	33%	10%	12%	>1%	-	-	3%
Prime if drained	-	-	-	39%	76%	35%	87%	88%	100%	100%	100%	76%
Prime if drained and protected from flooding	1%	-	-	-	10%	1%	-	-	-	-	-	-
Prime if protected from flooding	-	-	-	-	-	-	-	-	-	-	-	-
Total % of Actual or Potential Prime Soils	23%	16%	-	75%	87%	69%	97%	100%	100%	100%	100%	79%
Critical Habitat, Federal T&E Species c/	potential habitat for NLEB; other T&E TBD upon further review	potential habitat for NLEB; other T&E TBD upon further and review	potential habitat for NLEB; other T&E TBD upon further review	None identified; TBD upon further review	potential habitat for NLEB and IBat; other T&E TBD upon further review	potential habitat for NLEB and IBat; other T&E TBD upon further review	potential habitat for NLEB and IBat; other T&E TBD upon further review	None identified; TBD upon further review	None identified; TBD upon further review	None identified; TBD upon further review	None identified; TBD upon further review	None identified; TBD upon further review
Cultural Resources Onsite	No	No	No	No	No	No	No	No	No	No	No	No
Approx. Number of NSAs within ½-mile of Property	89	27	33	73	79 (campground to southwest assessed as one NSA)	54	33	31	34	16	28	41

TABLE 10.7.1-1

Comparison of NEXUS Compressor Station Alternatives

Property and Resources Evaluated	Hanoverton Compressor Station 1			Compressor Station 2			Compressor Station 3			Compressor Station 4		
	Alt. 1 (Proposed Site)	**Alt. 2**	**Alt. 3**	**Alt. 1** (Proposed Site)	**Alt. 2**	**Alt. 3**	**Alt. 1**	**Alt. 2**	**Alt. 3** (Proposed Site)	**Alt. 1**	**Alt. 2** (Proposed Site)	**Alt. 3**
Nearest NSA To Property Boundary (approx. feet) d/	60	350	180	0 (farmhouse on property)	112	615	0 (farmhouse on property)	40 (farmhouse on outparcel)	25 (house on outparcel)	1,085	650	158
Preliminary Visual Impact Assessment	Visible from OH 644	Visible from Buffalo and Campbell Roads Potentially visible from Ellyson Road	Visible from Buffalo and Myers Roads Potentially visible from Mardis Road	-Visible from Guilford Road and US-224/I-76 and Guilford Road - Potentially visible from Route 118 (Blake Road) and Route 97 (Greenwich Road)	- Visible from Guilford Road - Potentially visible from Route 118 (Blake Road) and Good Road	- Visible from I-71, Good Road, Hubbard Valley Road - Potentially visible from Route 3 (Wooster Pike)	- Visible from I-80/90, Billings Road, Route 13 (Mason Road), Deyo Road, and Route 32 (Portland Road)	- Visible from I-90/80, Northwest Road, County Road 235, Dining Road, OH 269, and OH 101	- Visible from I-90/80, North County Roads 278, 294 and 302, OH-101, and County Road 237	-Visible from US 24, Route 221 (Hertzfeld Road), Route 136 (Neapolis Waterville Road), Route 143, and Moosman Drive - Potentially visible from Norward Road, and Blue Creek Park	-Visible from US 24, Route 221 (Hertzfeld Road), Route 136 (Neapolis Waterville Road), Norward Road, and Moosman Drive - Potentially visible from Route 143) , and Blue Creek Park	- Visible from Route 136 (Neapolis Waterville Road), Route 295 (Berkey Southern Road), Yawberg Road, and Route 142 (Doran Road) - potentially visible from Blue Creek Park

a/ Unless noted, wetlands were field delineated. The term “estimated” means resource areas were estimated based on aerial photo interpretation or Project GIS datasets (in most cases because land access was not authorized in time for this report.) The acreage provided includes all wetland areas within the boundary of the proposed or alternative compressor station site and does not correlate with potential impacts. These data, if applicable, will be included in the next filing of Resource Report 10 when compressor station engineering designs have progressed.

b/ Unless noted, streams were field delineated. The term “estimated” means resource areas were estimated based on aerial photo interpretation or Project GIS datasets (in most cases because land access for field surveys was not authorized in time for this report.) The linear footage provided includes all stream lengths within the boundary of the proposed or alternative compressor station site and does not correlate with potential impacts. These data, if applicable, will be included in the next filing of Resource Report 10 when compressor station engineering designs have progressed.

c/ T&E = Threatened & Endangered
TBD = To Be Determined
NLEB = Northern Long Eared Bat (*Myotis septentrionalis*)
IBat = Indiana Bat (*Myotis sodalis*)

d/ NSA is noise sensitive areas. Physical locations (i.e., construction footprint) of compressor station facilities within alternative sites are TBD, the measurements for this early analysis of NSAs are measured from the property lines of the site being described herein.

FIGURES

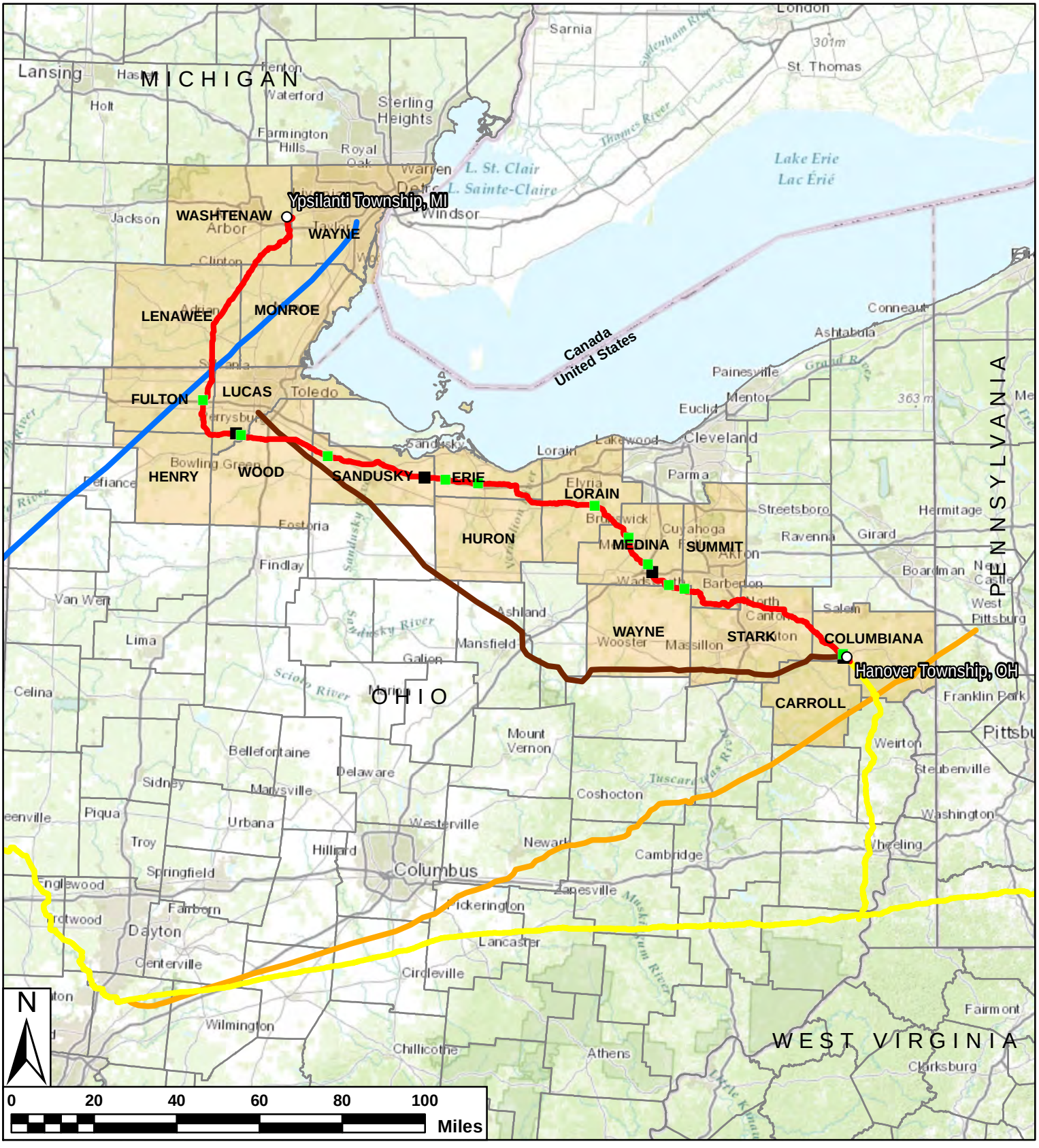
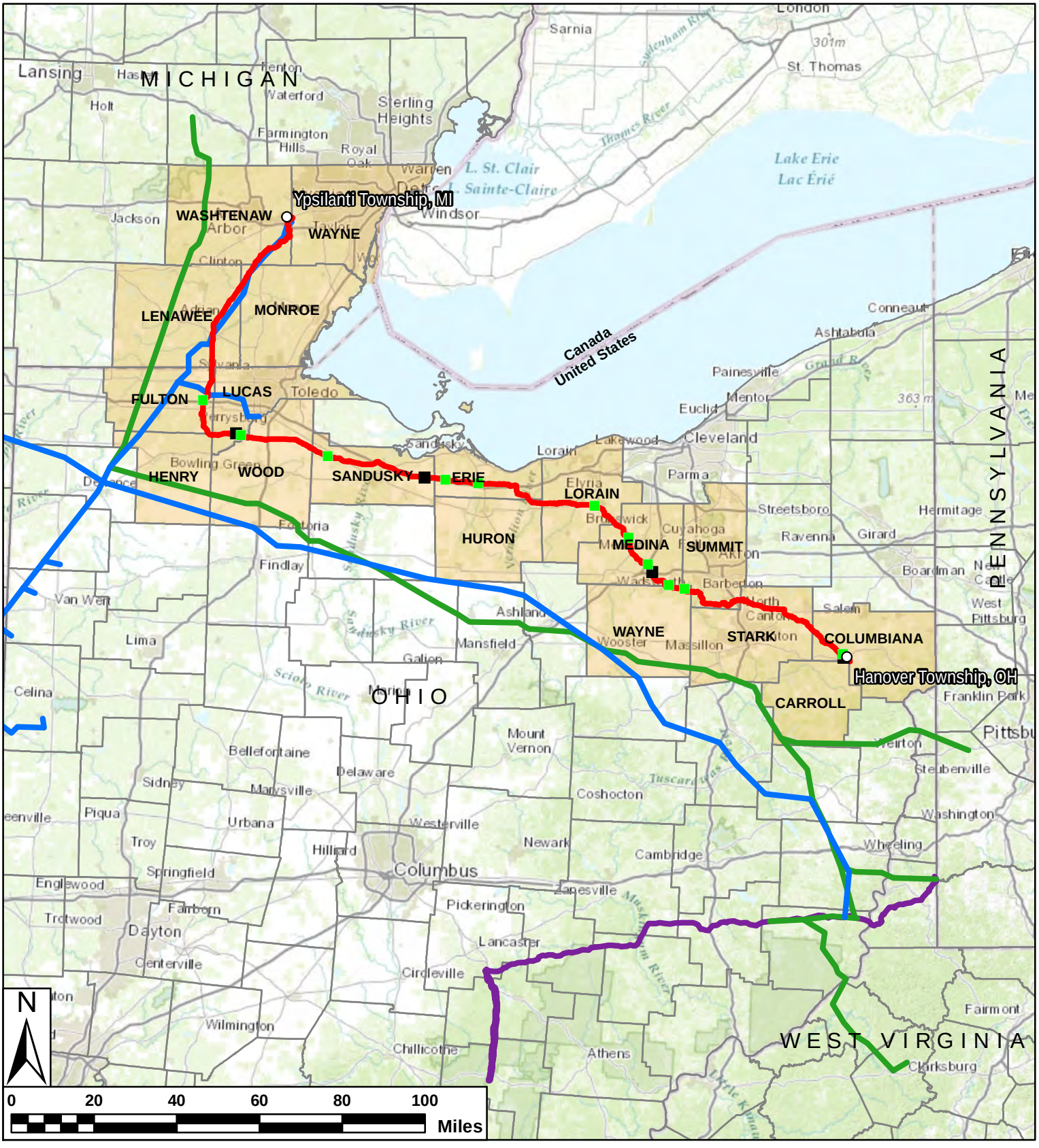


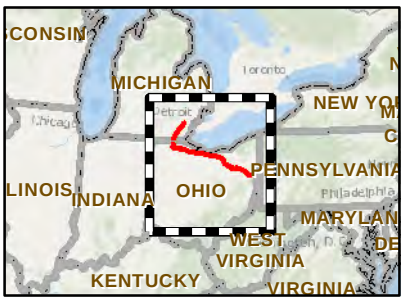
Figure 10.3-1

Existing Pipeline System Alternatives

NEXUS GAS TRANSMISSION

11/6/2015





- Proposed NEXUS Mainline Pipeline
- Confirmed Market Connections
- Proposed Compressor Sites
- County Boundary
- State Boundary

Proposed Pipeline System Alternatives

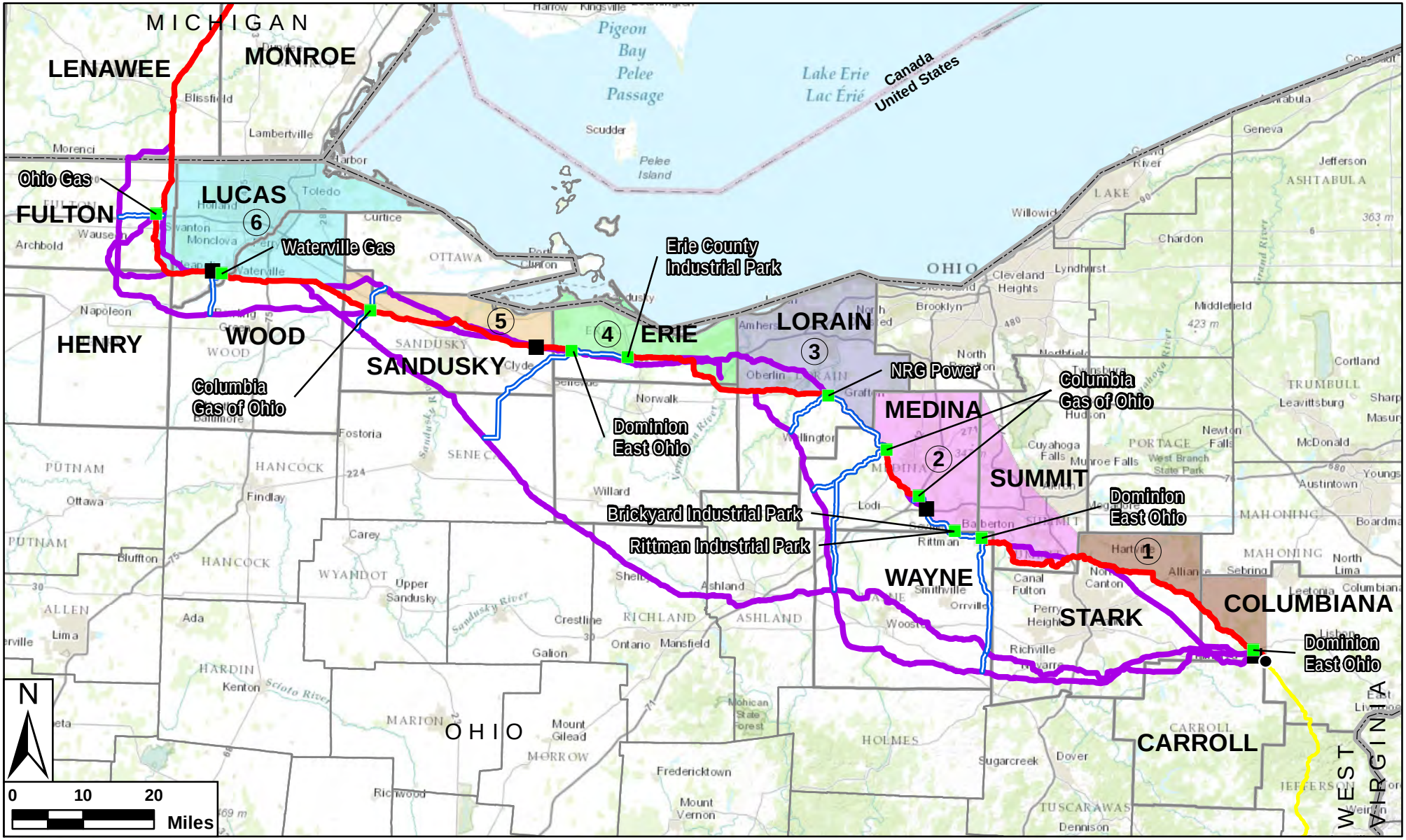
- Leach Xpress Pipeline
- Rover Pipeline Project
- ANR East Pipeline Project

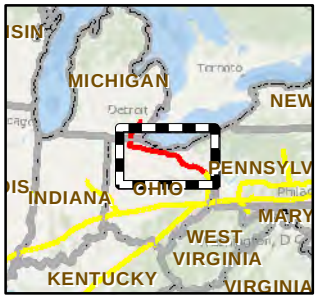
Figure 10.3-2

Proposed Pipeline System Alternatives

NEXUS GAS TRANSMISSION

11/6/2015





- Confirmed Market Connections
- Proposed Compressor Sites
- Proposed NEXUS Mainline Pipeline
- Texas Eastern Pipeline System
- Major Route Alternatives
- Alternative Route Laterals Needed to Reach Confirmed Market Connections
- County Boundary
- State Boundary

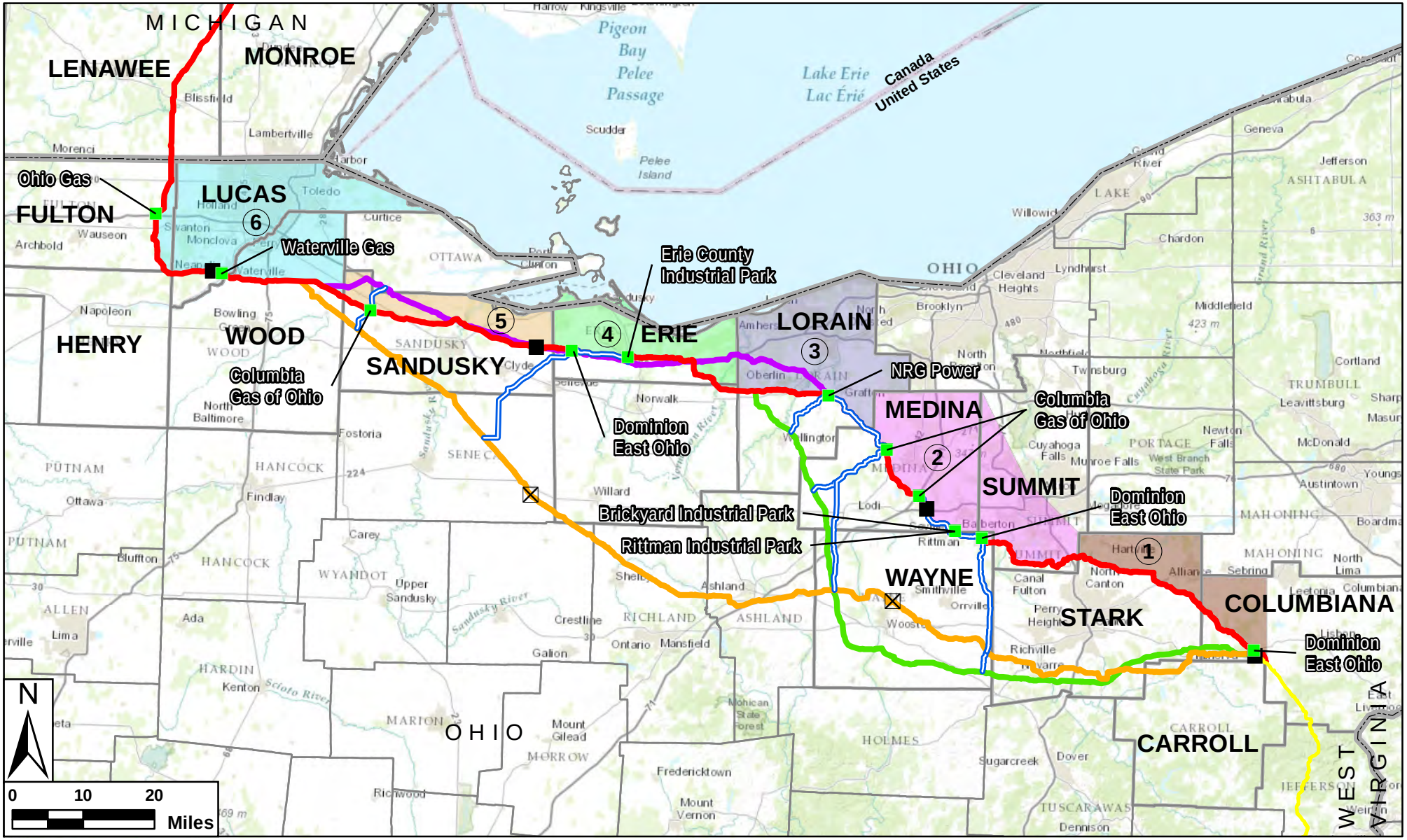
Prospective Market Areas
1
2
3
4
5
6

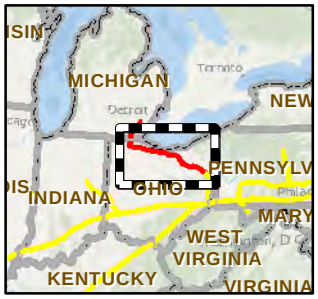
Figure 10.4-1

Ohio Market Areas with Major Route Alternatives Overview

NEXUS GAS TRANSMISSION

Nov 06, 2015





- Confirmed Market Connections
- Proposed Compressor Sites
- Relocated Compressor Sites for Southern Route Alternative
- Proposed NEXUS Mainline Pipeline
- Texas Eastern Pipeline System
- County Boundary
- State Boundary

Major Route Alternatives
- City of Green Alternative
- Southern Route Alternative
- Turnpike Alternative
- Alternative Route Laterals Needed to Reach Confirmed Market Connections

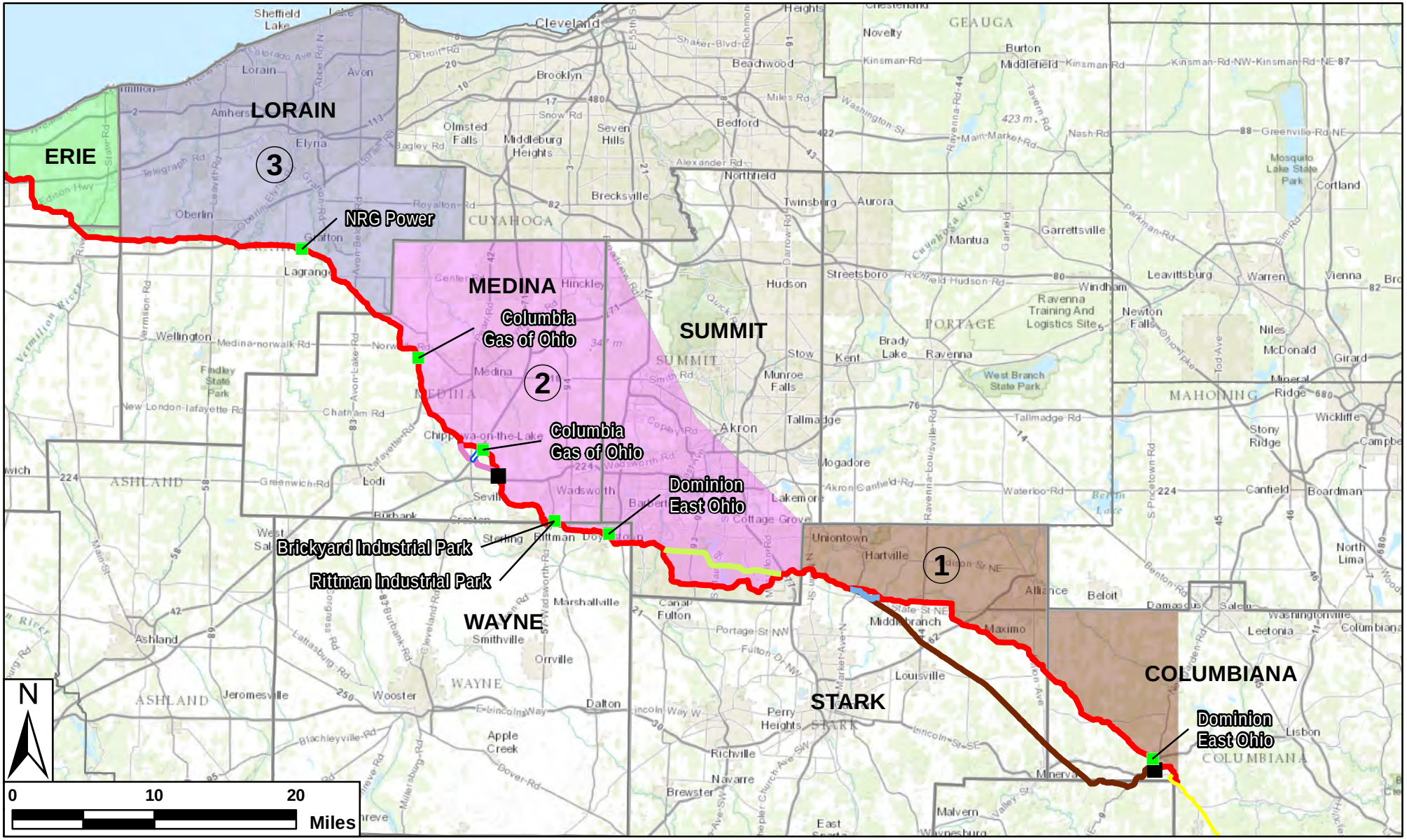
Prospective Market Areas
- 1
- 2
- 3
- 4
- 5
- 6

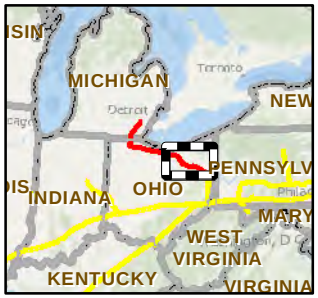
Figure 10.4-1A

Ohio Market Areas Major Route Alternatives

NEXUS GAS TRANSMISSION

Nov 06, 2015





Confirmed Market Connections
Proposed Compressor Sites
Proposed NEXUS Mainline Pipeline
Texas Eastern Pipeline System
County Boundary

Major Alternative Route
Electric Transmission Line Alternative
Stakeholder Powerline Alternative
Hubbard Valley Park Alternative
Nimisila Reservoir Alternative
Alternative Route Laterals Needed to Reach Confirmed Market Connections

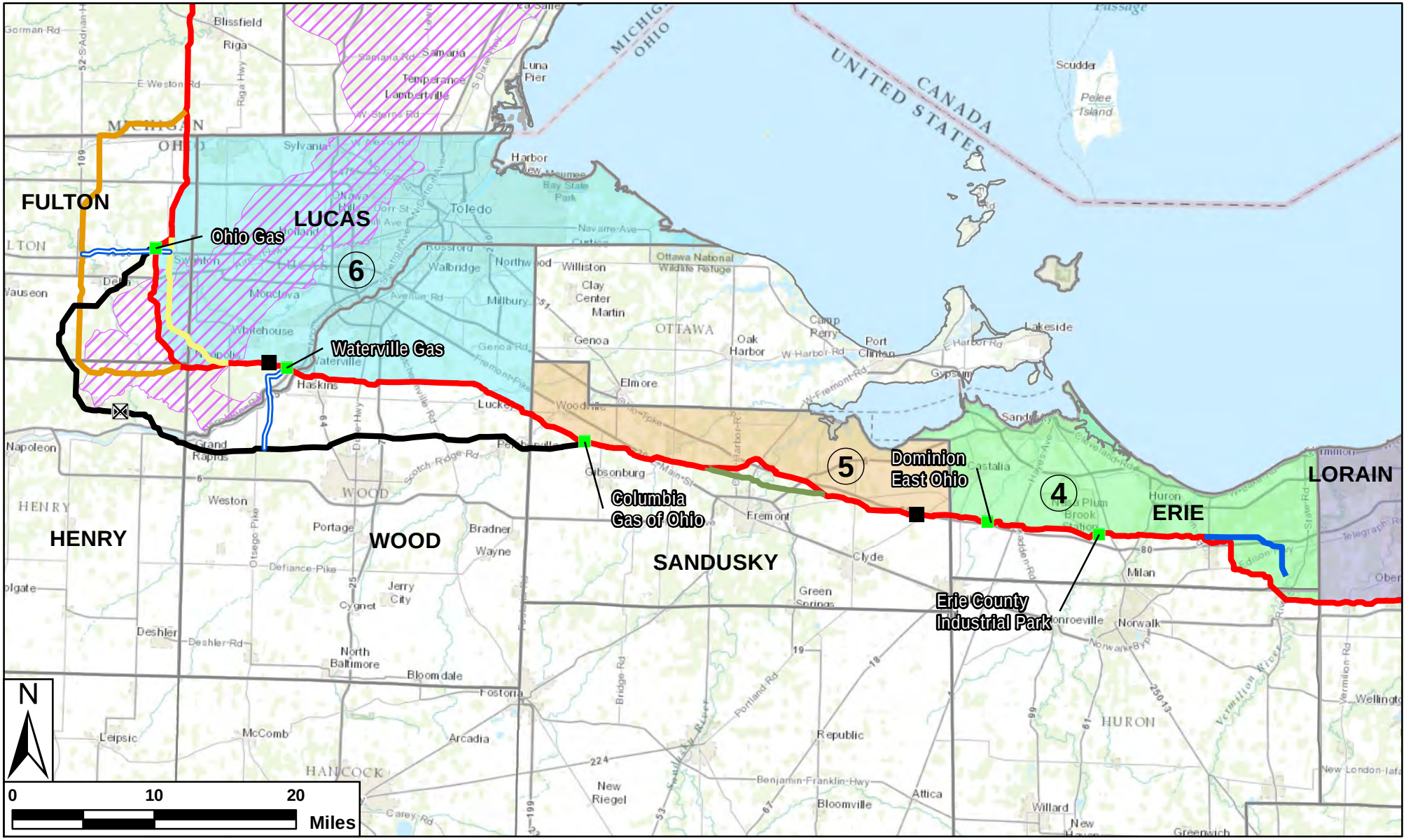
Prospective Market Areas
1
2
3
4
5
6

Figure 10.4-1B

Market Areas 1, 2, & 3
Major Route Alternatives

NEXUS GAS TRANSMISSION

Nov 06, 2015



- Confirmed Market Connections
- Proposed Compressor Sites
- Relocated Compressor Site for Oak Openings Avoidance Alternative
- Proposed NEXUS Mainline Pipeline
- Texas Eastern Pipeline System
- County Boundary
- Historical Oak Openings Region

Major Alternative Route

- Black Swamp Land Conservancy & Sandusky River Alternative
- CORN Western Alternative
- Edison Woods Perserve & Apple Orchard Alternative
- Maumee State Forest Alternative
- Oak Openings Avoidance Alternative
- Alternative Route Laterals Needed to Reach Confirmed Market Connections

Prospective Market Areas

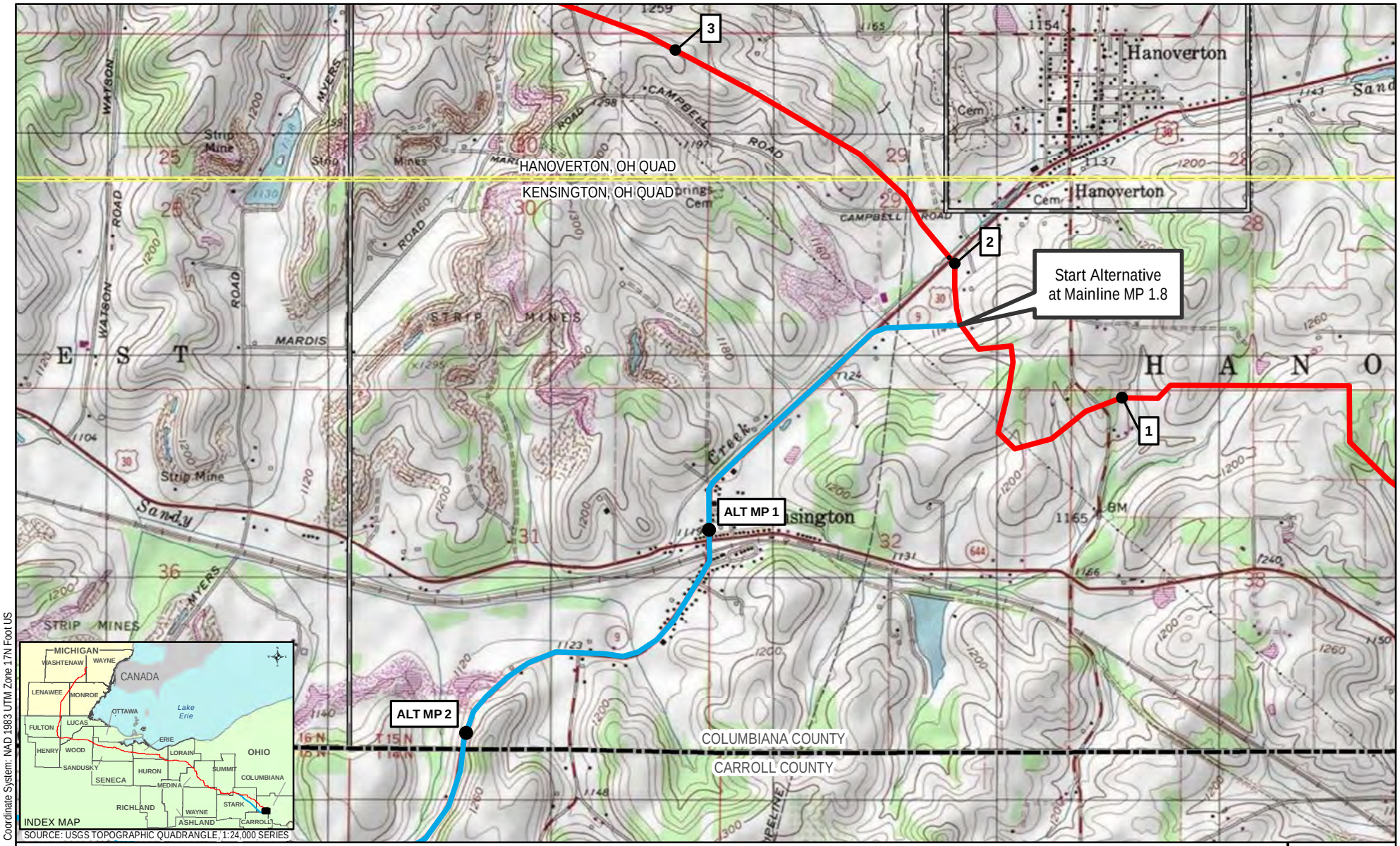
- 1
- 2
- 3
- 4
- 5
- 6

Figure 10.4-1C

Market Areas 4, 5, & 6 Major Route Alternatives

NEXUS GAS TRANSMISSION

Nov 11, 2015



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST
PROPOSED MAINLINE PIPELINE
ALTERNATIVE ROUTE
USGS QUADRANGLE BOUNDARY
PUBLIC LANDS
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

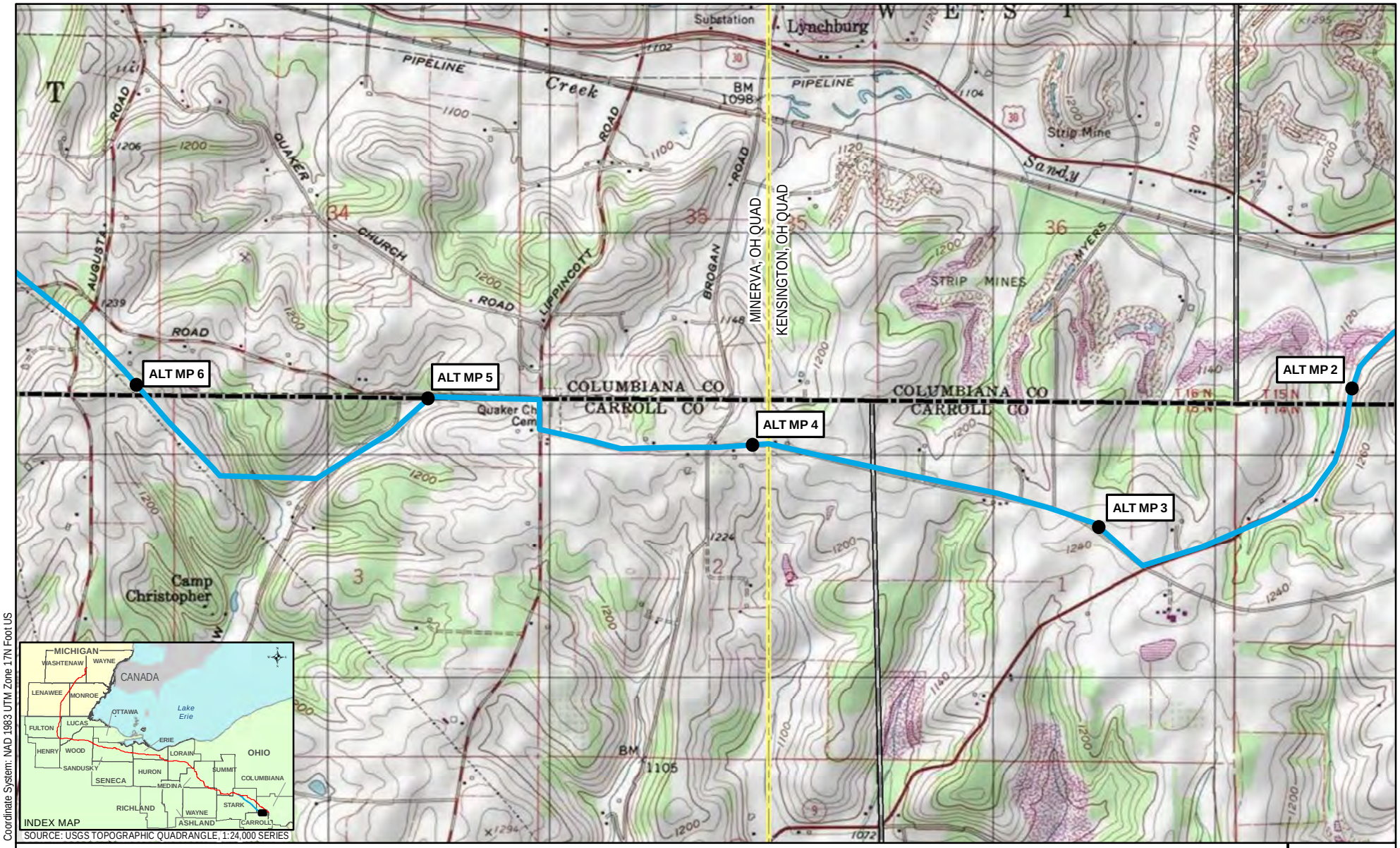
REVISION RECORD

NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 1.8 June 2015 Prefiling RR 10	7/27/2015	

TITLE:
NEXUS GAS TRANSMISSION PROJECT
ELECTRIC TRANSMISSION ALTERNATIVE - USGS QUAD MAP

LOC.: COLUMBIANA COUNTY; CARROLL COUNTY, OHIO
MOC:
CKD. BY: KM
DRN. BY: CPA
DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet
FIGURE 10.5-3
REV F
MAP 1 of 9

NEXUS GAS TRANSMISSION



1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 1.8 June 2015 Prefiling RR 10	7/27/2015	

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
ELECTRIC TRANSMISSION ALTERNATIVE - USGS QUAD MAP

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

MOC:

CKD. BY: KM

DRN. BY: CPA

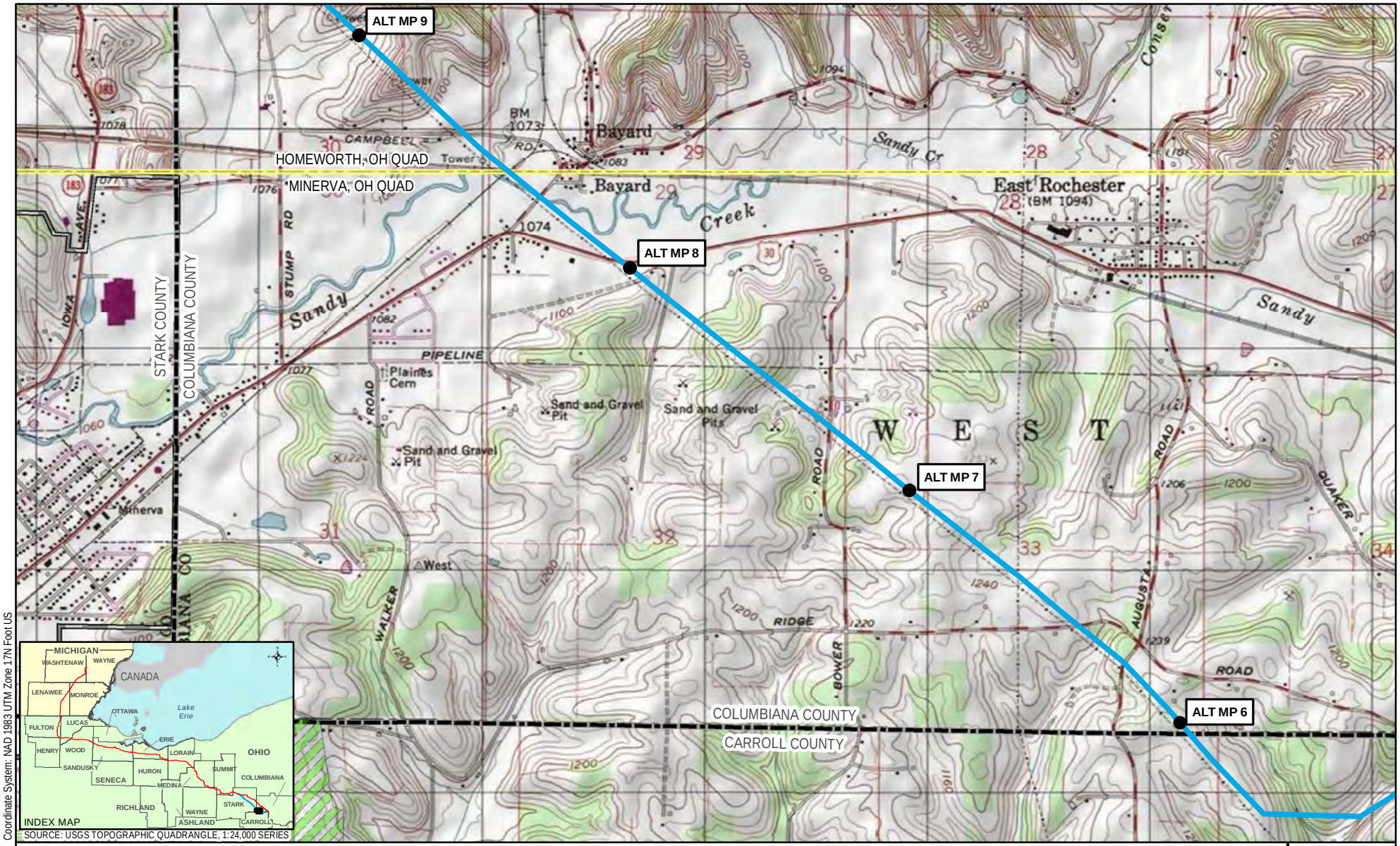
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-3 REV F

MAP 2 of 9

NEXUS GAS TRANSMISSION



1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 1.8 June 2015 Prefiling RR 10	7/27/2015	

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
ELECTRIC TRANSMISSION ALTERNATIVE - USGS QUAD MAP

LOC.: CARROLL COUNTY; COLUMBIANA COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

DATE: 07/27/2015

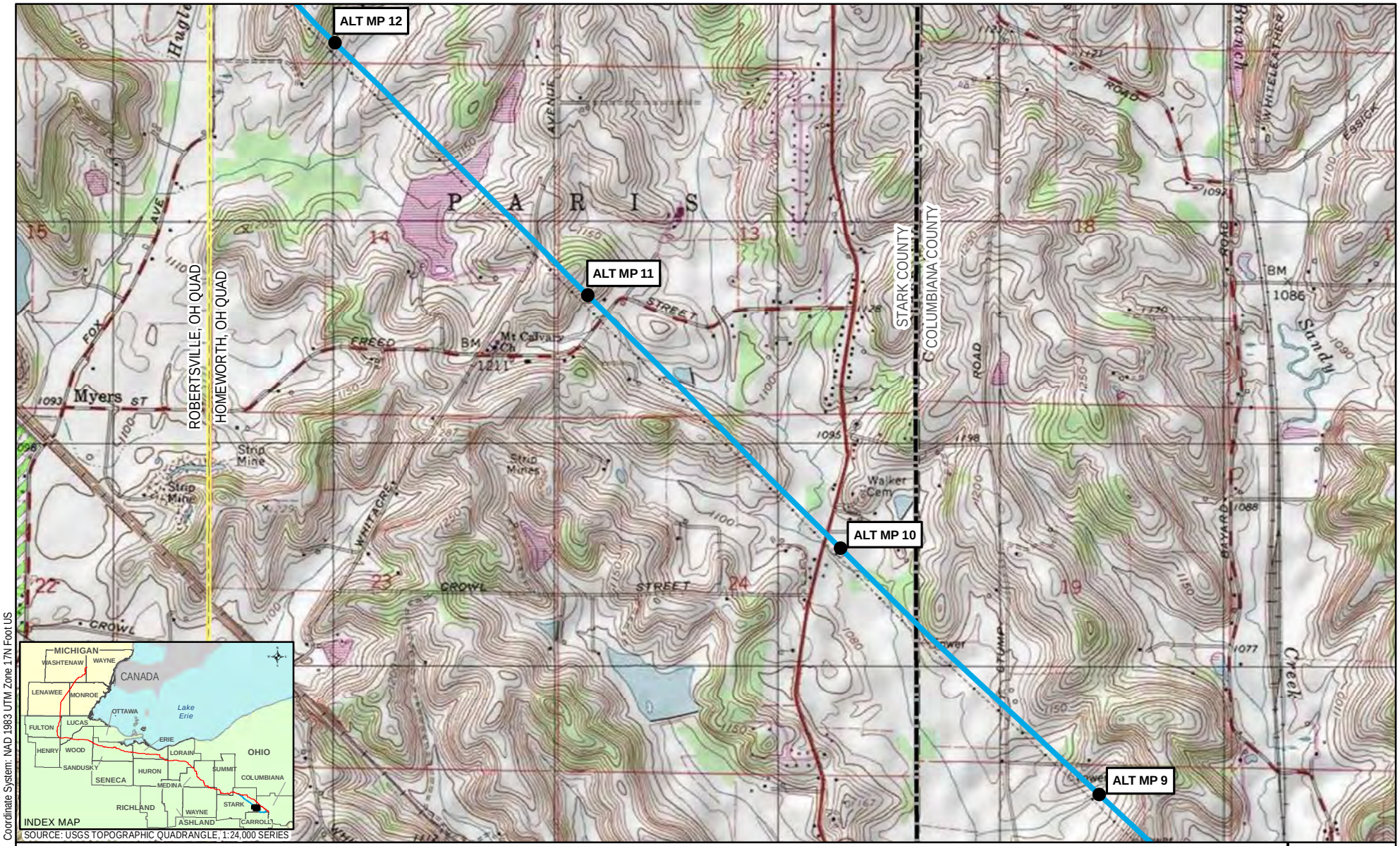
SCALE: 1 inch = 2,000 feet

FIGURE 10.5-3

REV F

MAP 3 of 9

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD

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I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
ELECTRIC TRANSMISSION ALTERNATIVE - USGS QUAD MAP

LOC.: COLUMBIANA COUNTY; STARK COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

DATE: 07/27/2015

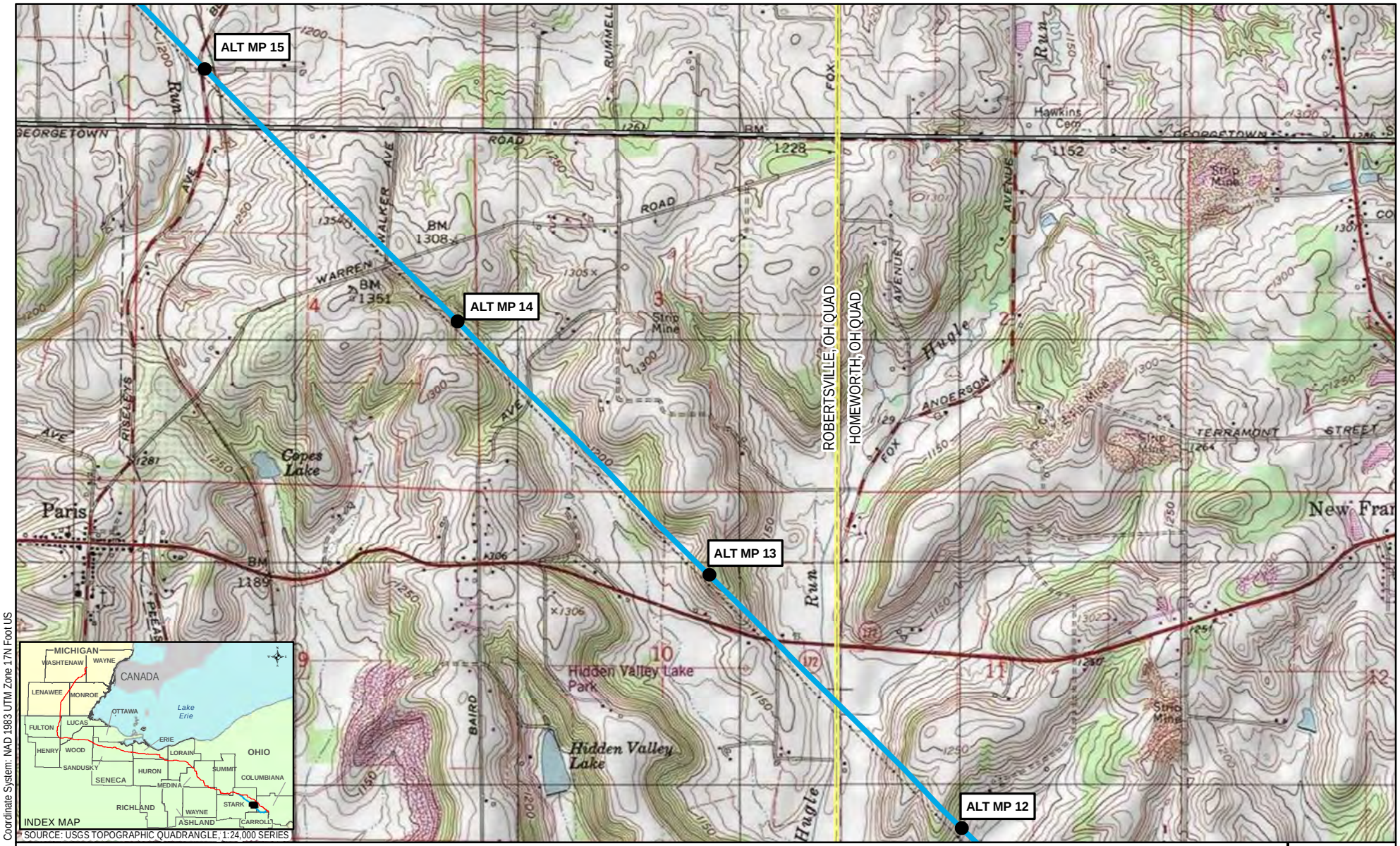
SCALE: 1 inch = 2,000 feet

FIGURE 10.5-3

REV F

MAP 4 of 9

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

N W E S

0 1,000 2,000 Feet

REVISION RECORD

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I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
ELECTRIC TRANSMISSION ALTERNATIVE - USGS QUAD MAP

LOC.: STARK COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

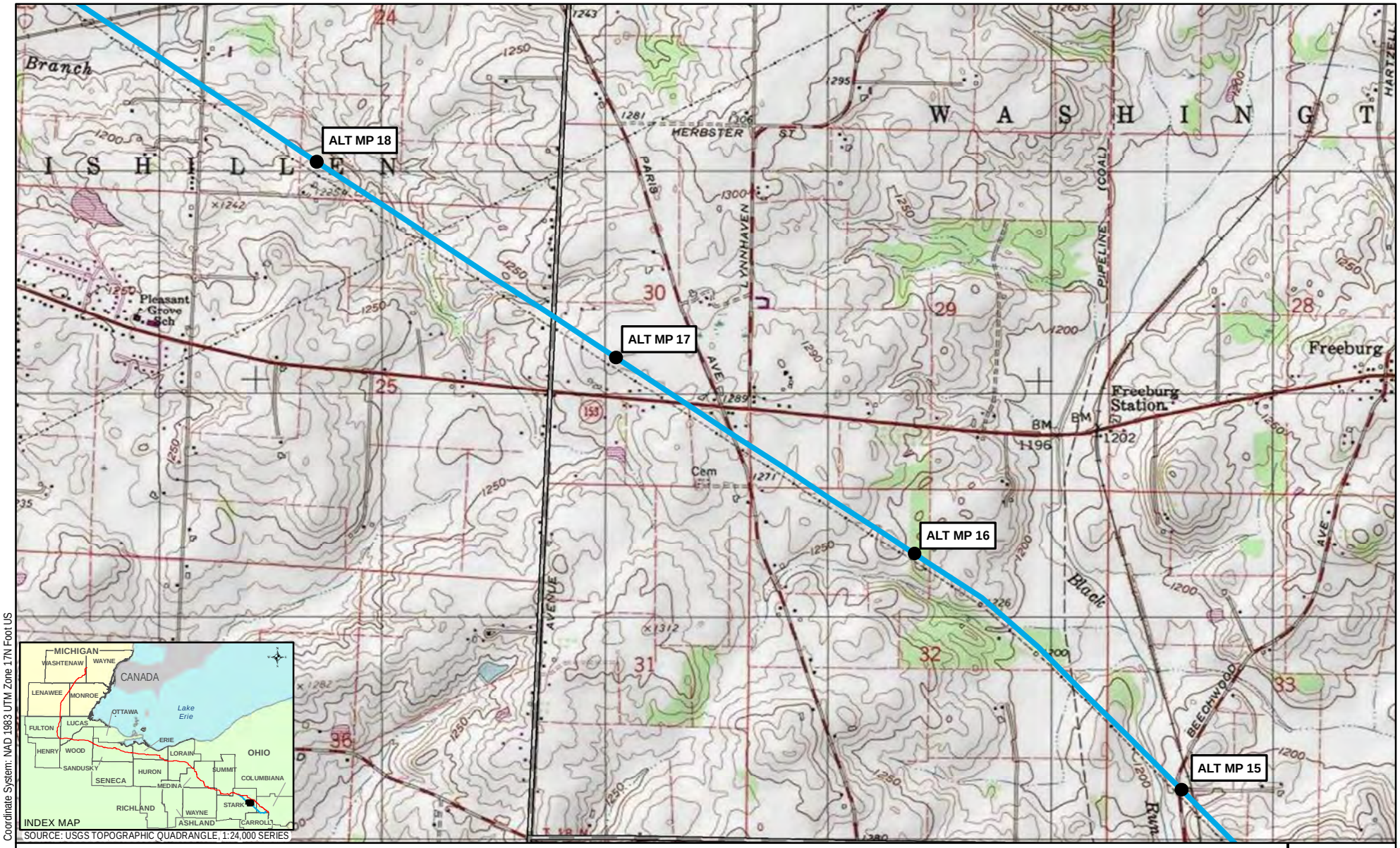
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-3 REV F

MAP 5 of 9

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

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TITLE:

NEXUS GAS TRANSMISSION PROJECT
ELECTRIC TRANSMISSION ALTERNATIVE - USGS QUAD MAP

LOC.: STARK COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

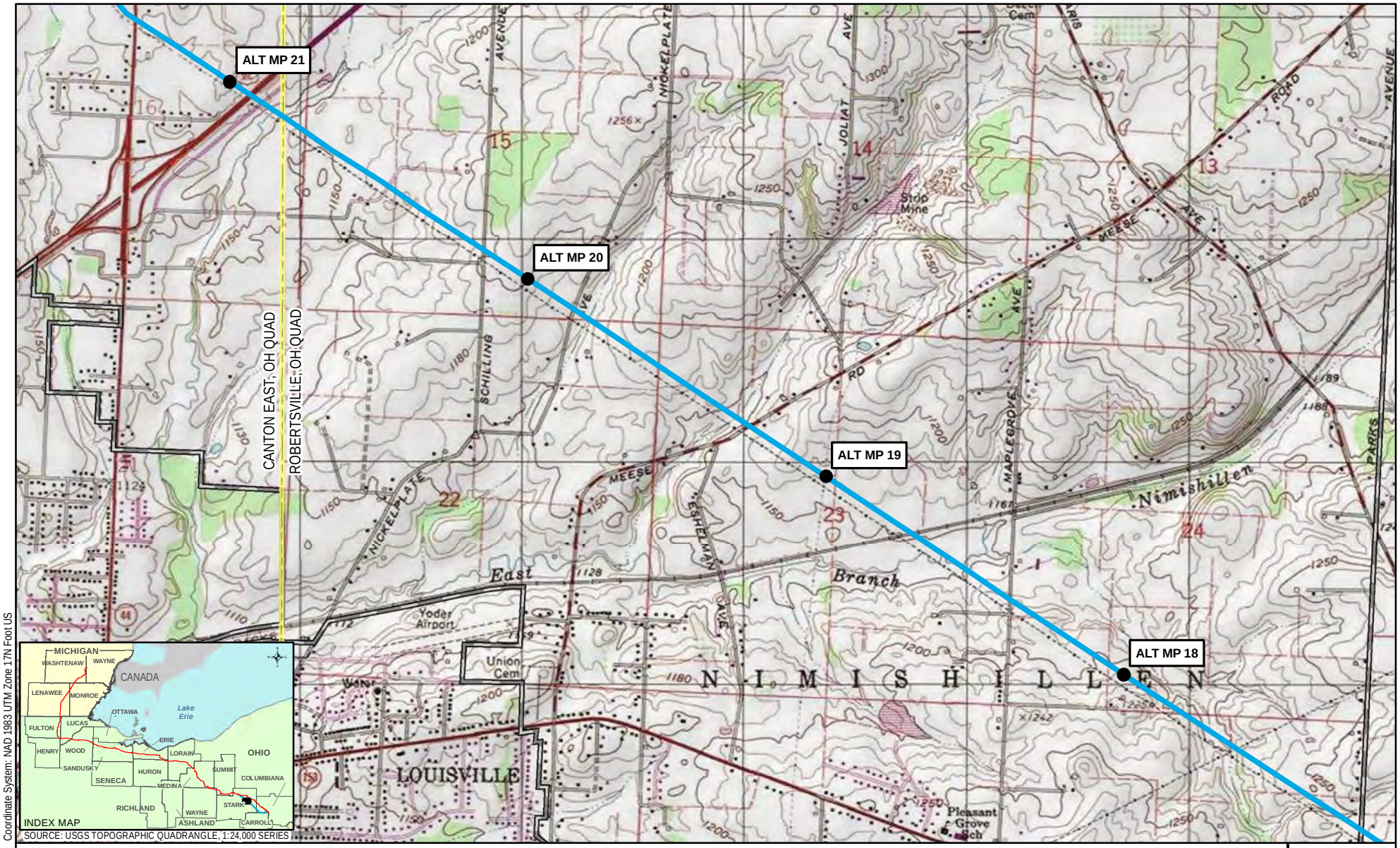
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-3 REV F

MAP 6 of 9

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

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TITLE:

NEXUS GAS TRANSMISSION PROJECT
ELECTRIC TRANSMISSION ALTERNATIVE - USGS QUAD MAP

LOC.: STARK COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

DATE: 07/27/2015

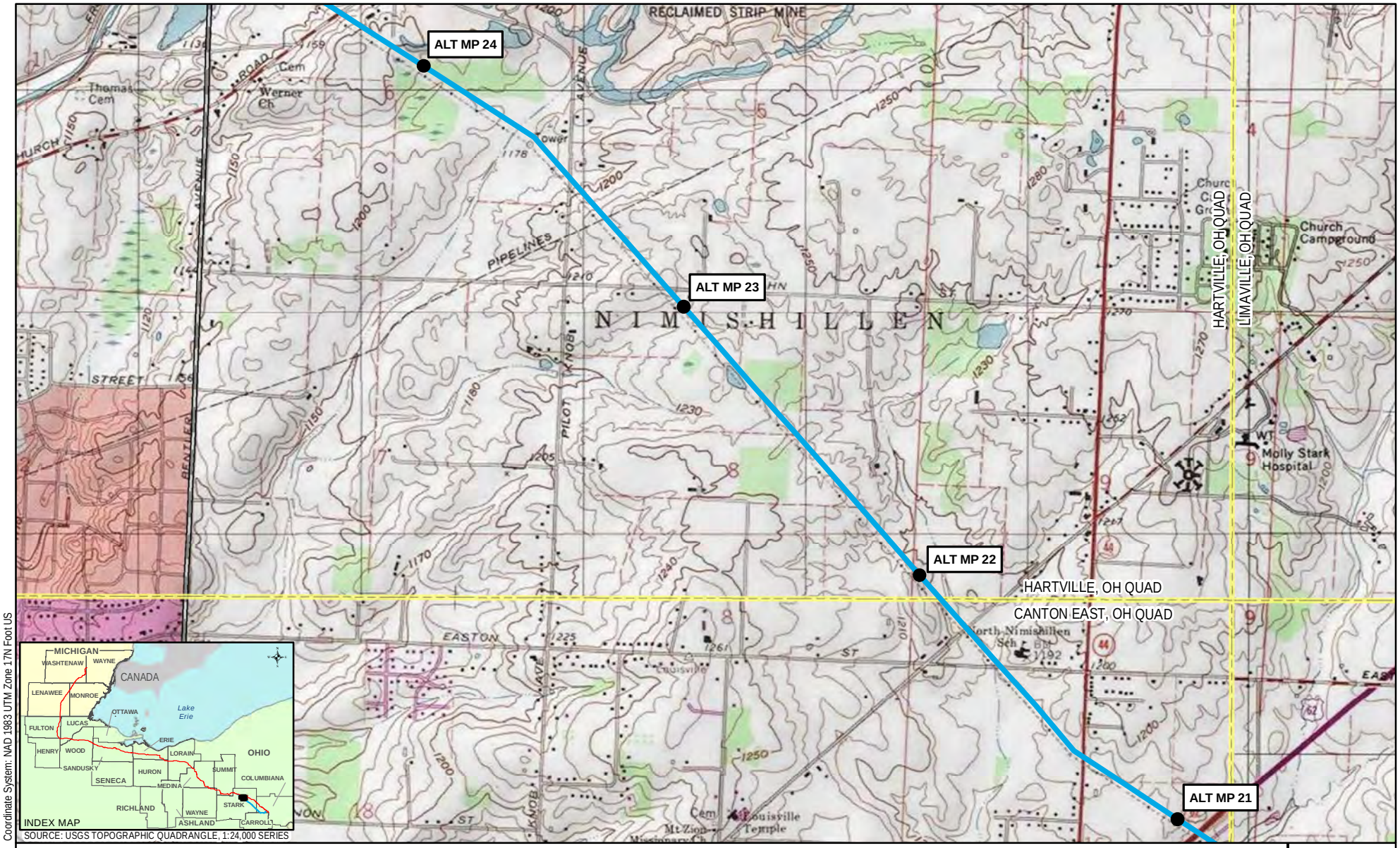
SCALE: 1 inch = 2,000 feet

FIGURE 10.5-3

REV F

MAP 7 of 9

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

REVISION RECORD

NO.	REVISION - DESCRIPTION	DATE	MOC#
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TITLE:

NEXUS GAS TRANSMISSION PROJECT
ELECTRIC TRANSMISSION ALTERNATIVE - USGS QUAD MAP

LOC.: STARK COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

DATE: 07/27/2015

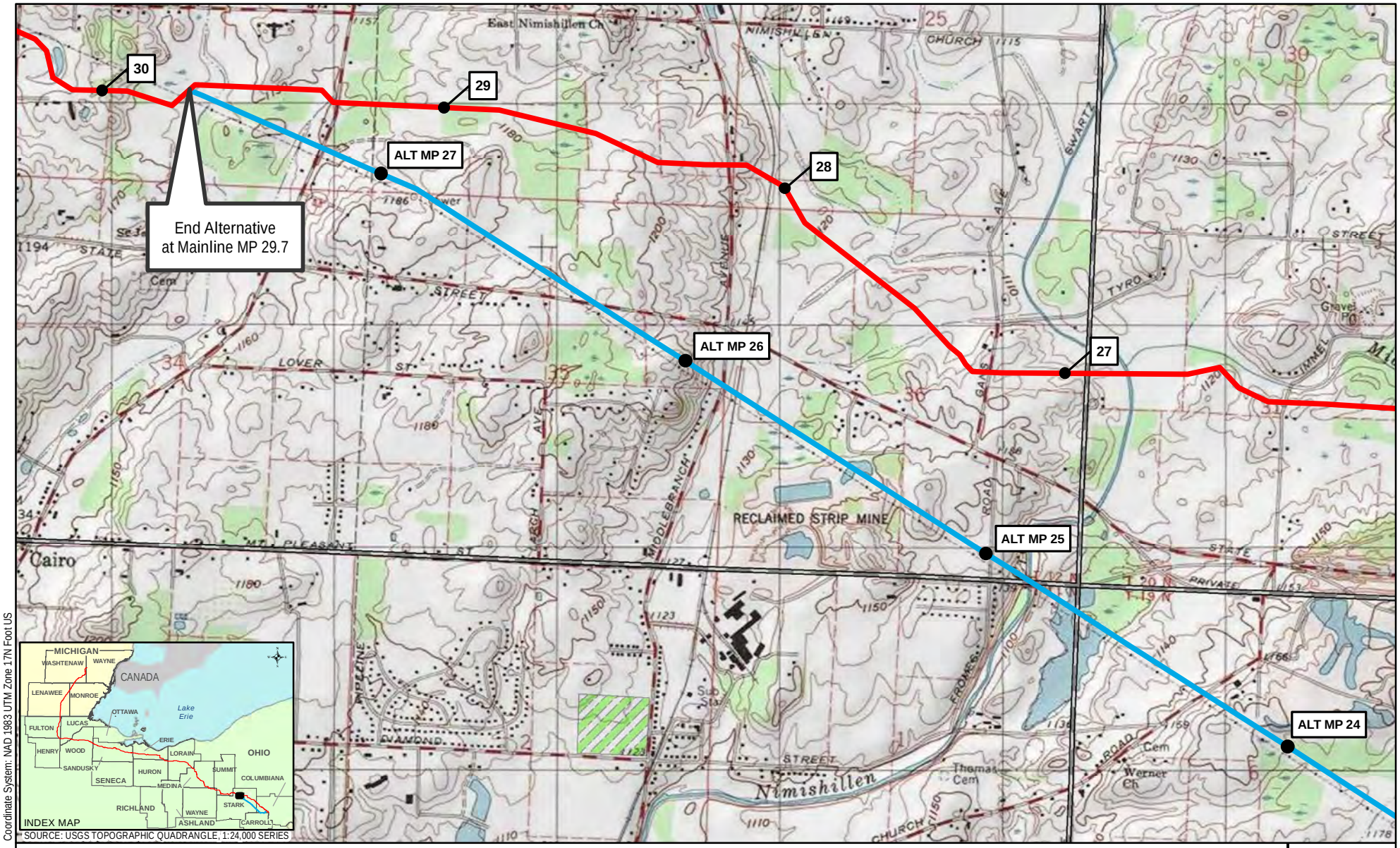
SCALE: 1 inch = 2,000 feet

FIGURE 10.5-3

REV F

MAP 8 of 9

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
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TITLE:

NEXUS GAS TRANSMISSION PROJECT
ELECTRIC TRANSMISSION ALTERNATIVE - USGS QUAD MAP

LOC.: STARK COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

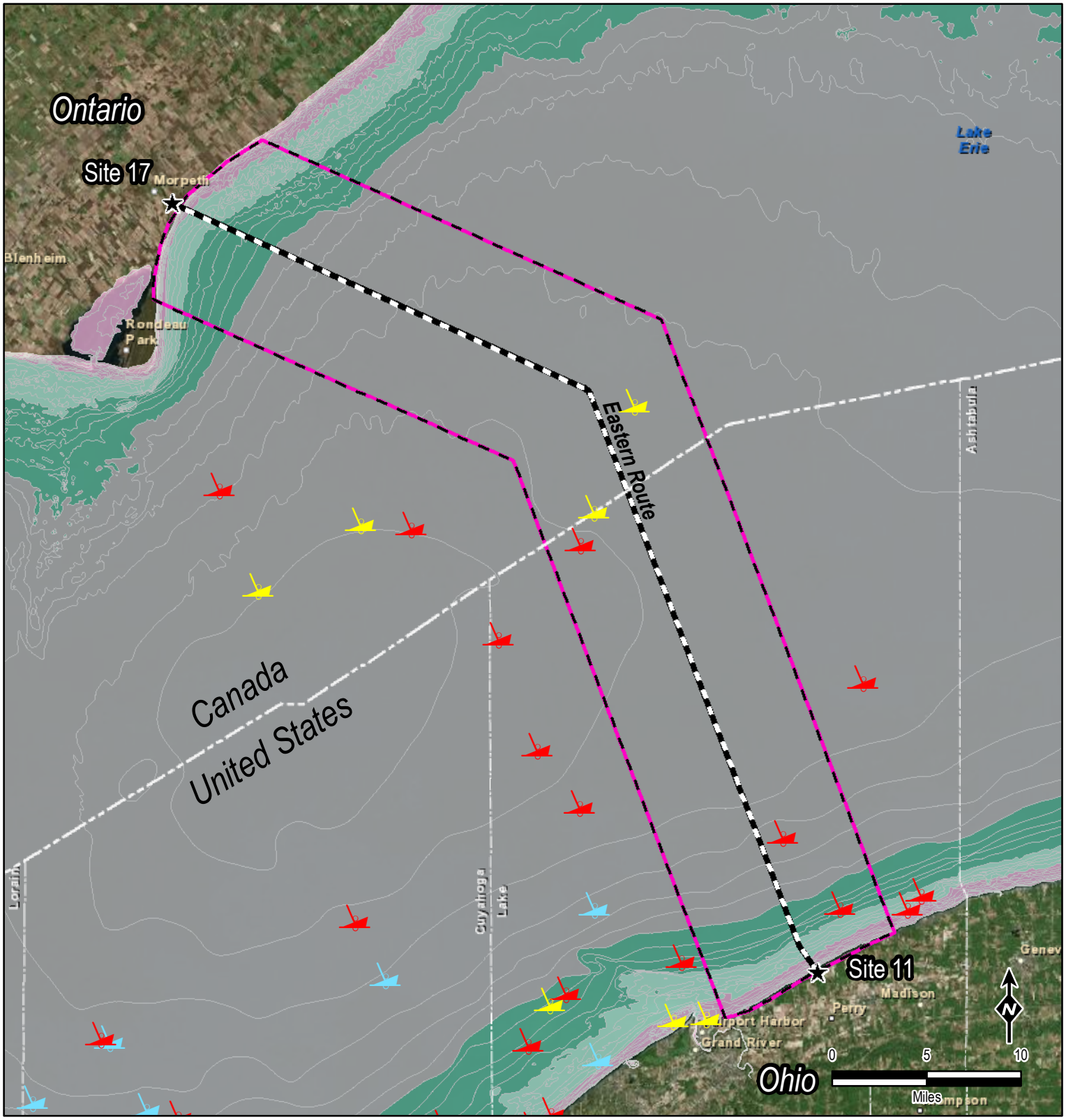
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-3 REV F

MAP 9 of 9

NEXUS GAS TRANSMISSION



Legend

- Landfall Site
- Eastern Route
- Eastern Environmental Study Corridor
- Artificial Reef
- Approximate Wreck
- Confirmed Wreck
- Confirmed Wreck - Seagrant
- Walleye Larval & Juvenile Production Areas
- Adult Walleye Habitat
- Walleye/Perch Habitat
- "Dead Zone" (Bathymetry >55 feet)

Sources: ESRI, SPECTRA, TRC, Ohio Office of Coastal Management

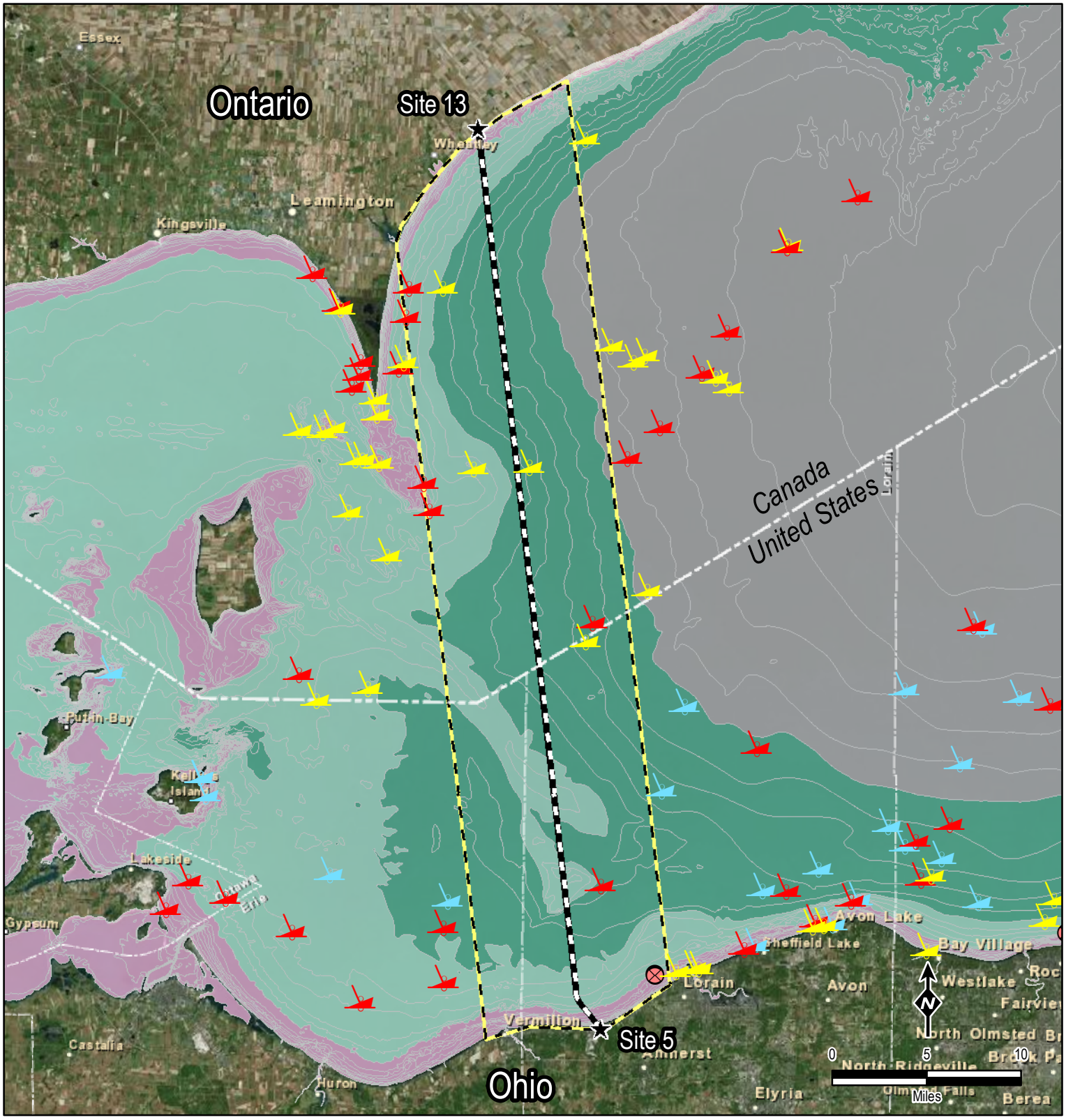
Projection: NAD83, UTM Zone 17N
US Survey Feet, Grid North.

Figure 10.5-4

Lake Erie East Crossing

NEXUS GAS TRANSMISSION

5/26/2015



Legend

- Landfall Site
- Western Route
- Western Environmental Study Corridor
- Artificial Reef
- Approximate Wreck
- Confirmed Wreck
- Confirmed Wreck - Seagrant
- Walleye Larval & Juvenile Production Areas
- Adult Walleye Habitat
- Walleye/Perch Habitat
- "Dead Zone" (Bathymetry >55 feet)

Sources: ESRI, SPECTRA, TRC, Ohio Office of Coastal Management

Projection: NAD83, UTM Zone 17N
US Survey Feet, Grid North.

Figure 10.5-5

Lake Erie
West Crossing

NEXUS GAS TRANSMISSION

5/26/2015

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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST
PROPOSED MAINLINE PIPELINE
ALTERNATIVE ROUTE
USGS QUADRANGLE BOUNDARY
PUBLIC LANDS
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

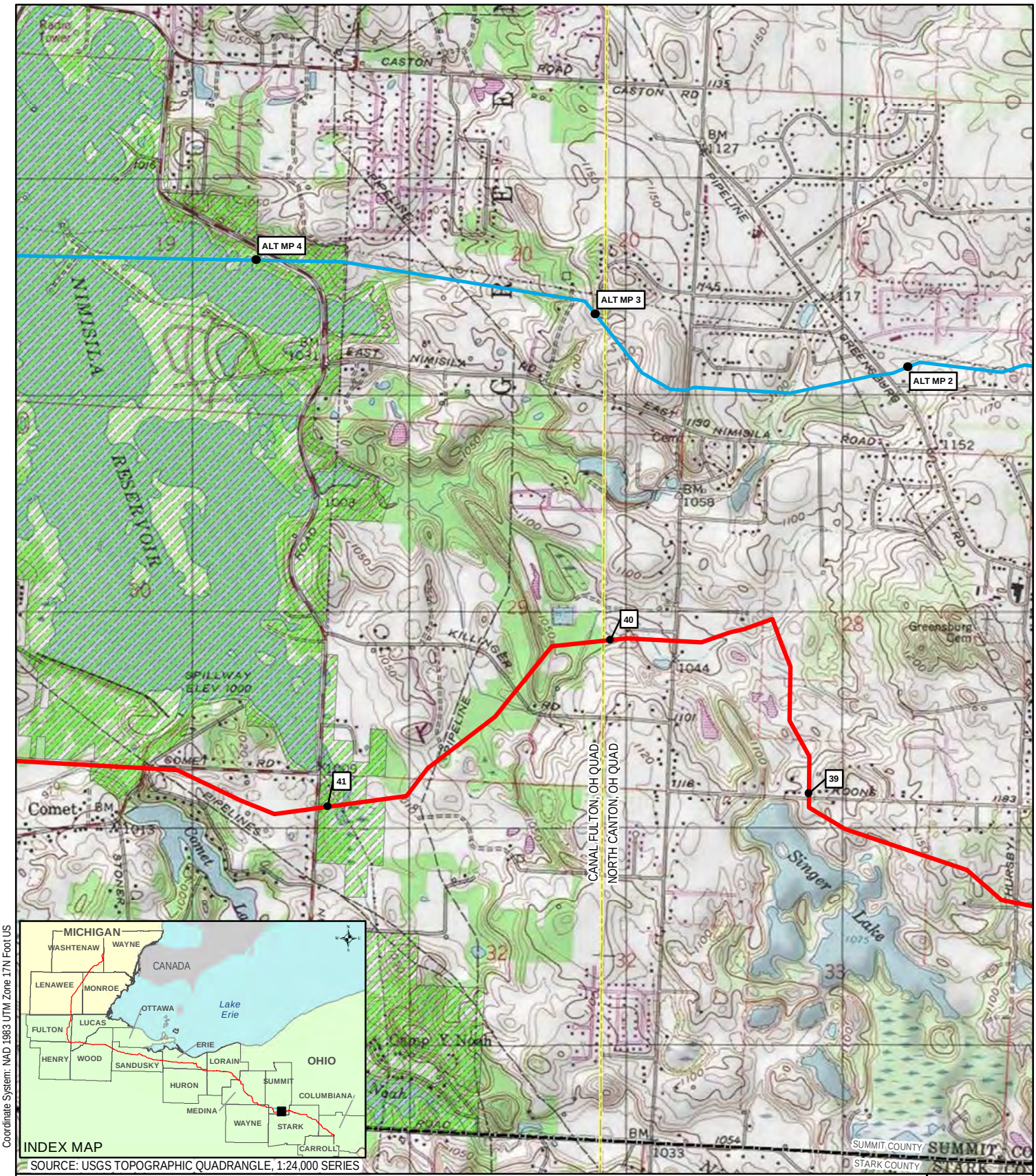
REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
0	Prev. filed as Alternative Route at MP 36.2 Jan 2015 Prefiling RR 10	3/6/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
NIMISILA RESERVOIR ALTERNATIVE
USGS QUAD MAP

LOC.: SUMMIT COUNTY, OHIO MOC:
CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet FIGURE 10.5-6 REV D MAP 1 of 4

NEXUS SM
GAS TRANSMISSION

I.G.



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
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TITLE: NEXUS GAS TRANSMISSION PROJECT
NIMISILA RESERVOIR ALTERNATIVE
USGS QUAD MAP

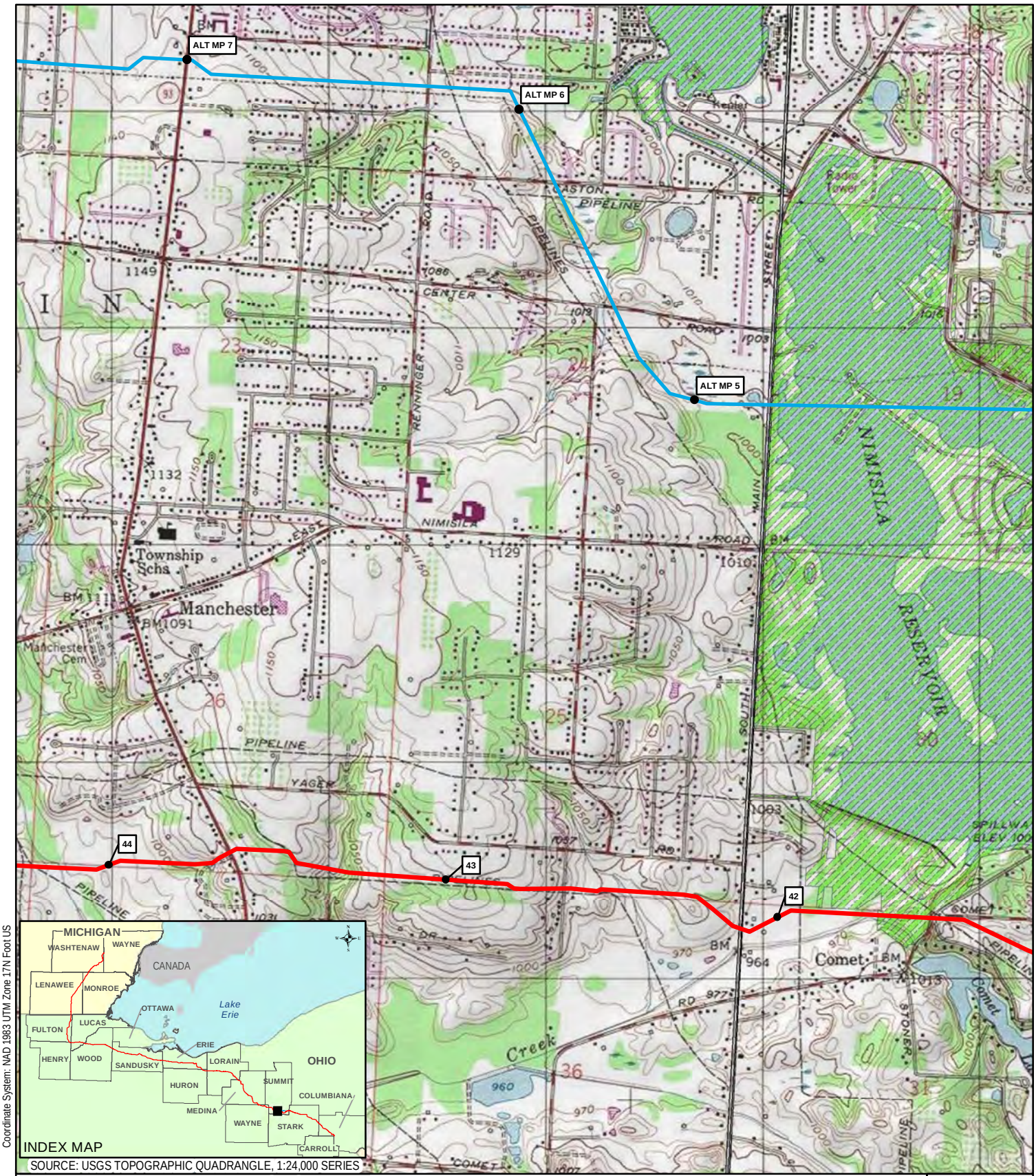
LOC.: SUMMIT COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-6 REV D MAP 2 of 4

NEXUS GAS TRANSMISSION

I.G.



REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 36.2 Jan 2015 Prefiling RR 10	3/6/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
NIMISILA RESERVOIR ALTERNATIVE
USGS QUAD MAP

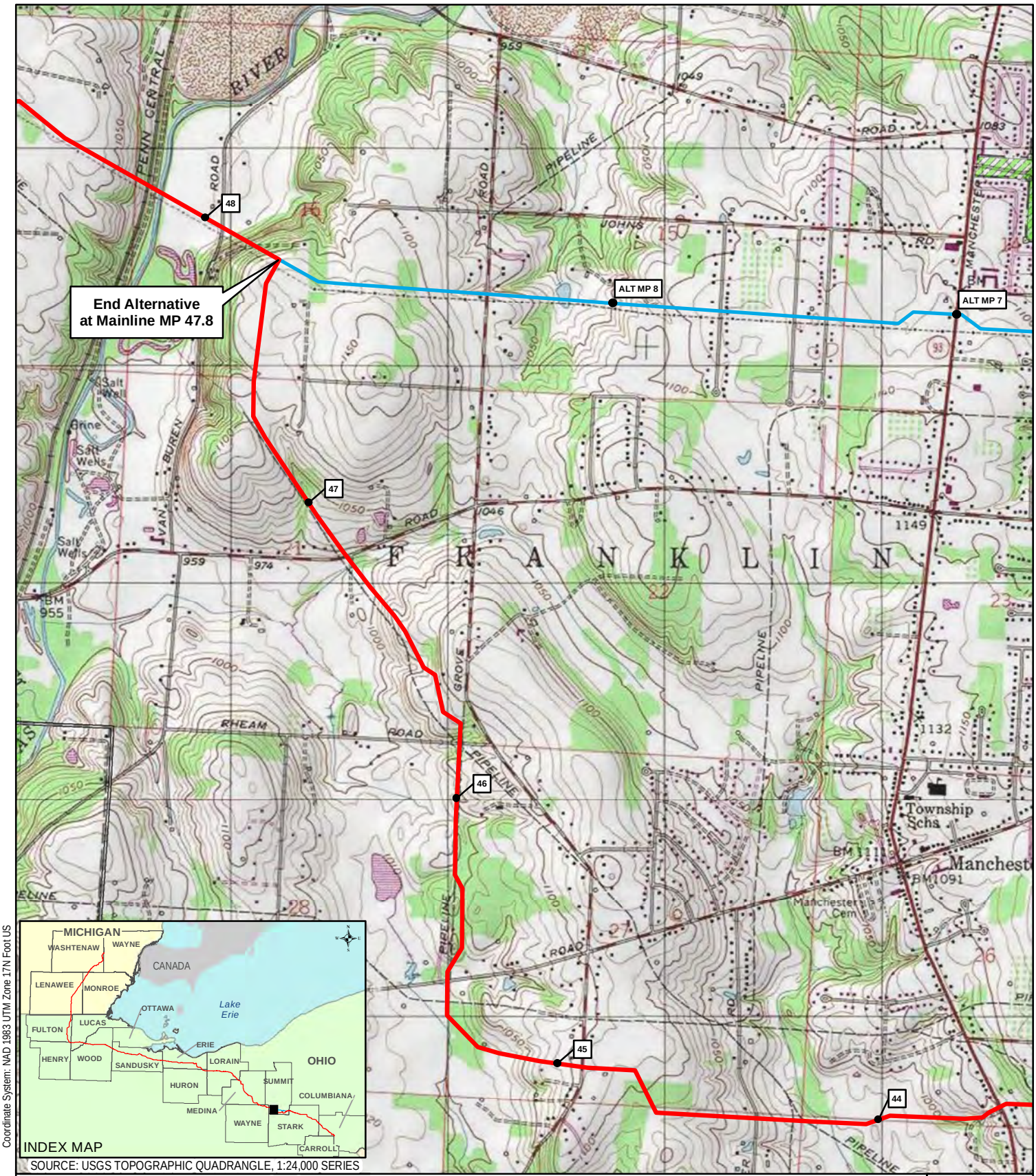
LOC.: SUMMIT COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-6 REV D MAP 3 of 4

NEXUS SM
GAS TRANSMISSION

I.G.



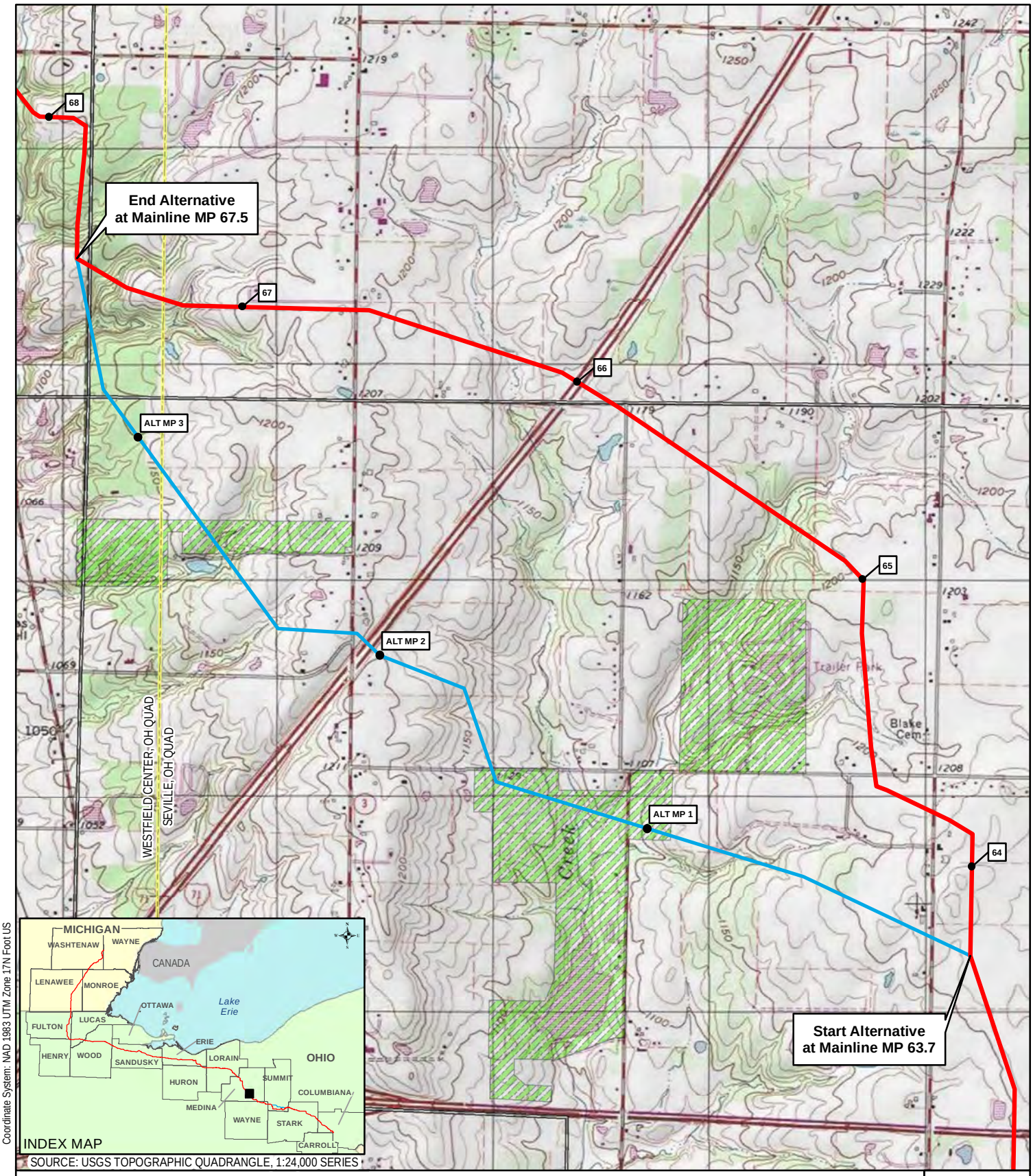
REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 36.2 Jan 2015 Prefiling RR 10	3/6/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
NIMISILA RESERVOIR ALTERNATIVE
USGS QUAD MAP

LOC.: SUMMIT COUNTY, OHIO		MOC:
CKD. BY: KM	DRN. BY: CPA	DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-6 REV D	MAP 4 of 4

NEXUS SM
GAS TRANSMISSION

I.G.



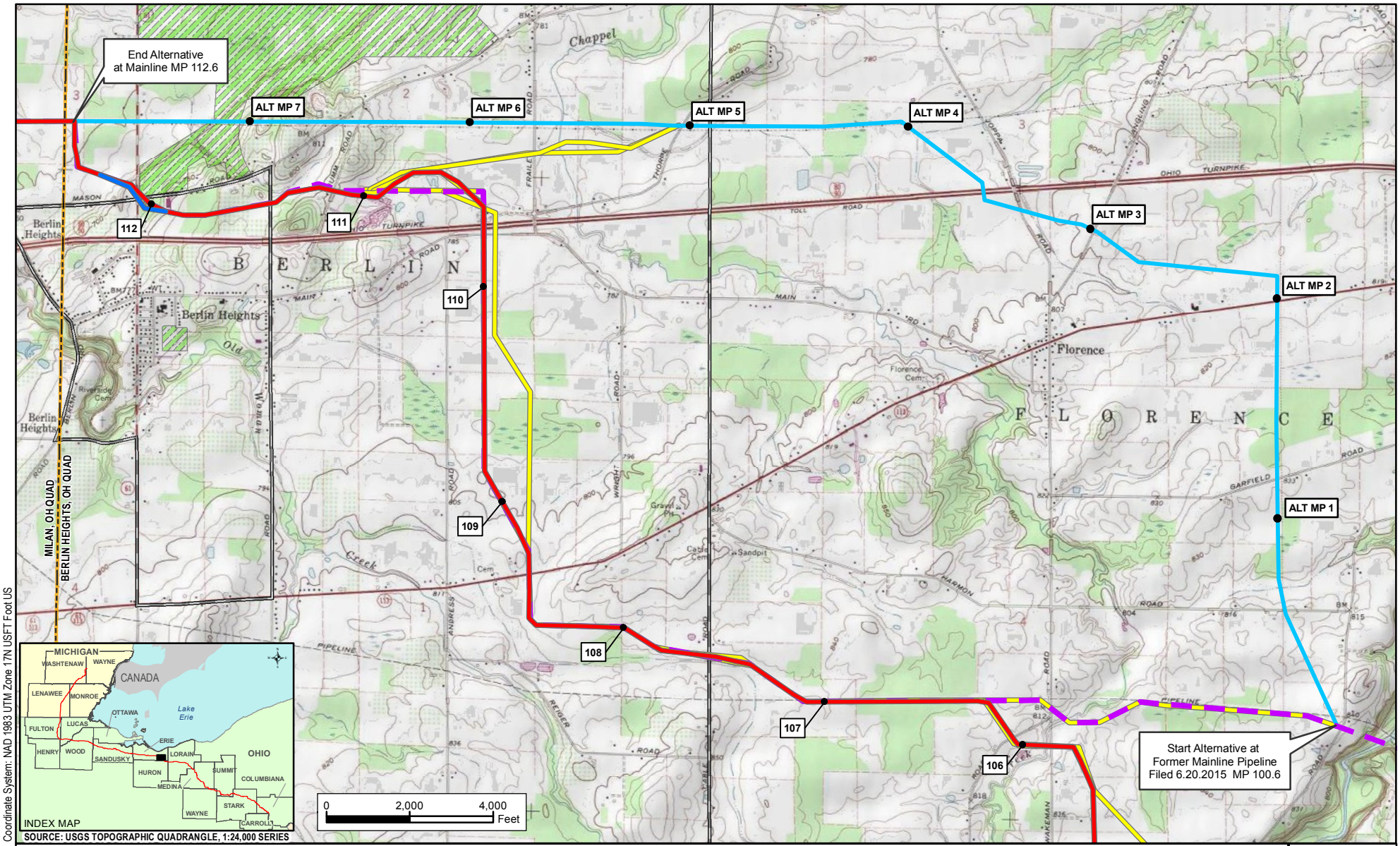
REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 60.5 Jan 2015 Prefiling RR 10	3/6/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
HUBBARD VALLEY PARK ALTERNATIVE
USGS QUAD MAP

LOC.: MEDINA COUNTY, OHIO		MOC:
CKD. BY: KM	DRN. BY: CPA	DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-7 REV D	MAP 1 of 1

NEXUS SM
GAS TRANSMISSION

I.G.



REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

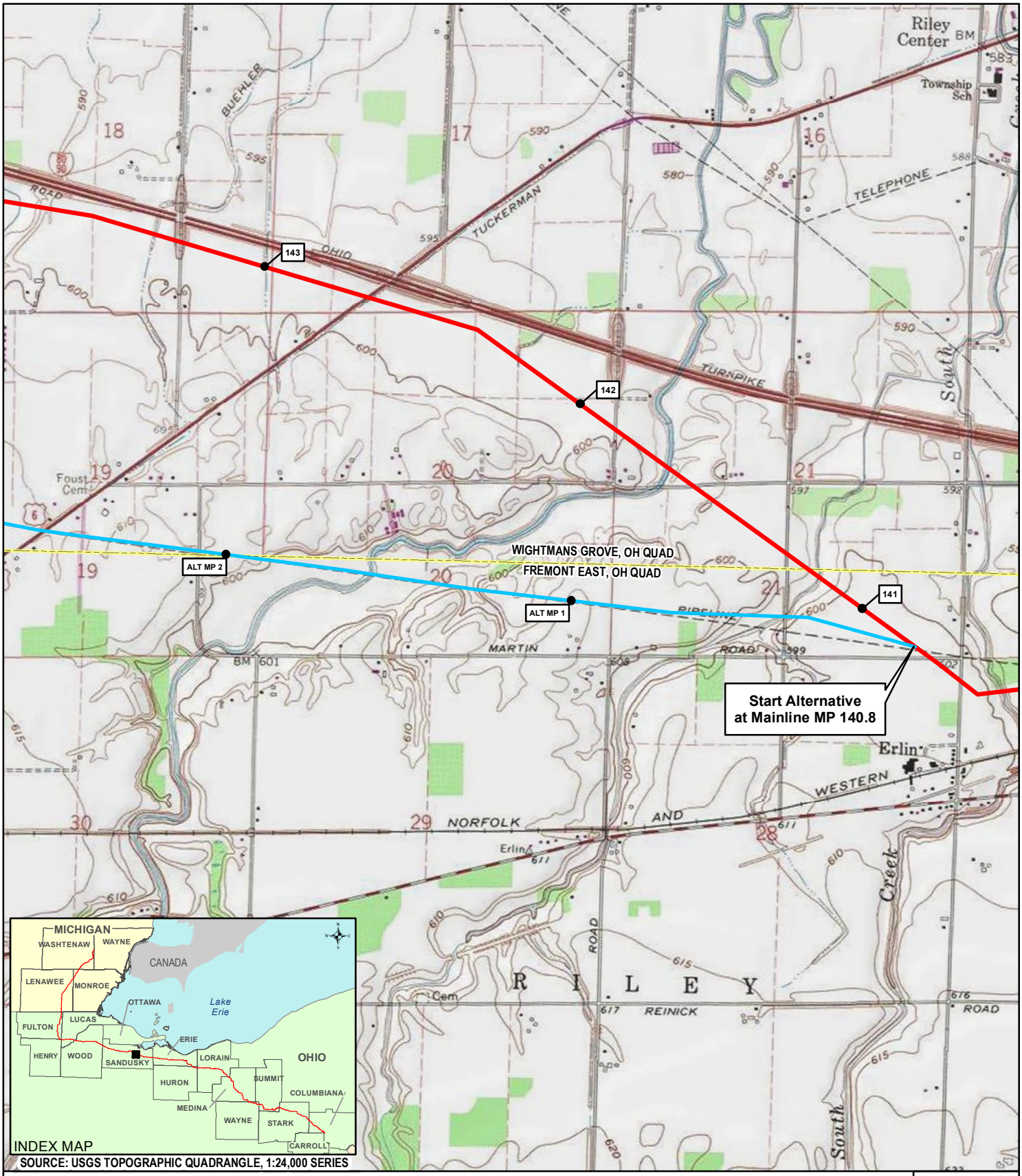
I.G.

TITLE: **NEXUS GAS TRANSMISSION PROJECT**

EDISON WOODS PRESERVE & APPLE ORCHARD ALTERNATIVE - USGS QUAD OVERVIEW MAP

LOC.: ERIE COUNTY, OHIO			MOC:
CKD. BY: KM	DRN. BY: CPA		DATE: 07/27/2015
SCALE: 1 inch = 3,250 feet	FIGURE 10.5-8	REV D	MAP 1 of 1

NEXUS SM
GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 136.5 Jan 2015 Prefiling RR 10	3/6/2015	
2	Prev. filed as Alternative Route at MP 136.4 June 2015 Prefiling RR 10	7/27/2015	

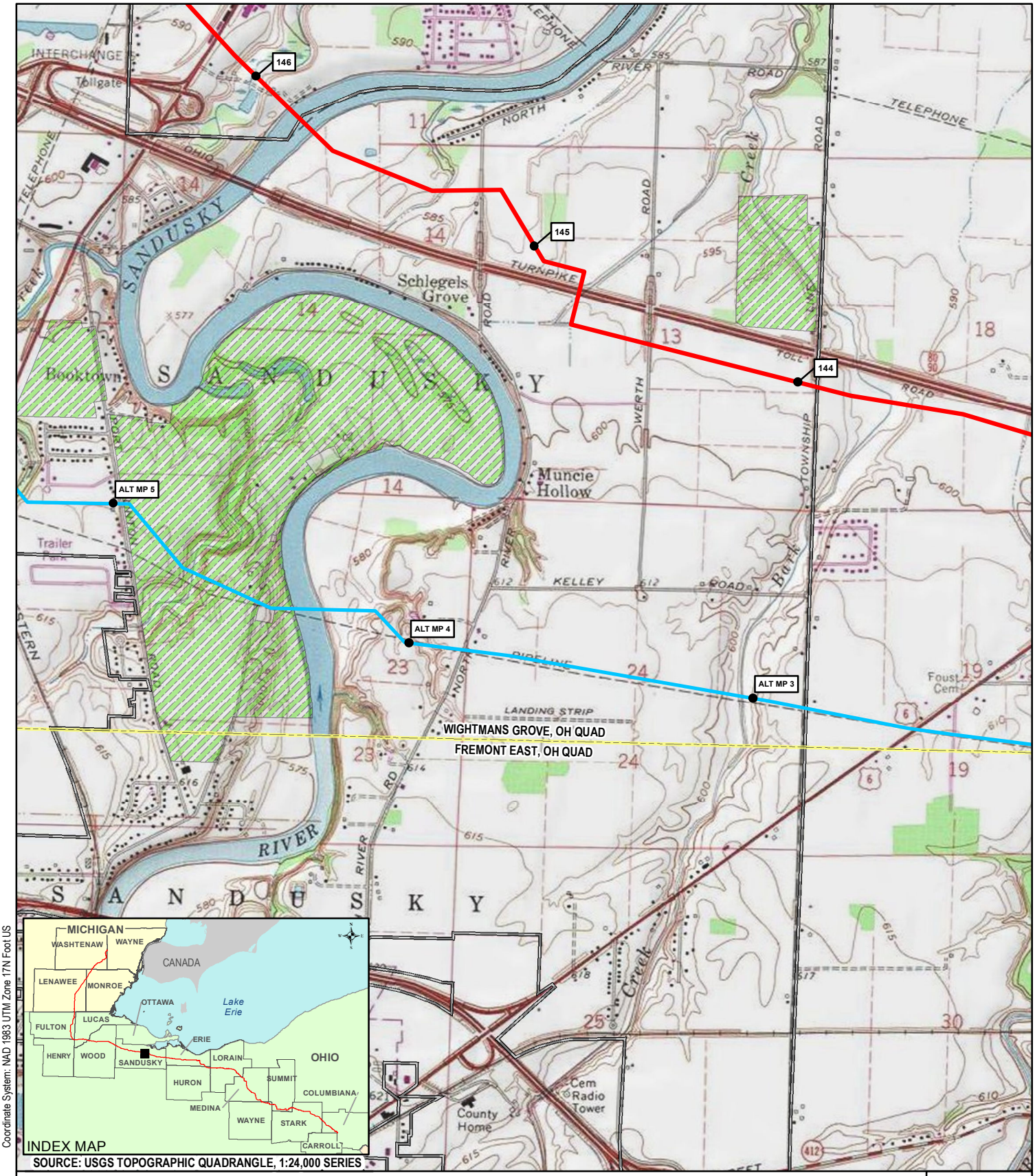
TITLE: NEXUS GAS TRANSMISSION PROJECT
BLACK SWAMP LAND CONSERVANCY & SANDUSKY RIVER ALTERNATIVE- USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-9 REV D MAP 1 of 4

NEXUS SM
GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

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

1 MILEPOST
PROPOSED MAINLINE PIPELINE
ALTERNATIVE ROUTE
USGS QUADRANGLE BOUNDARY
PUBLIC LANDS
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
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TITLE: NEXUS GAS TRANSMISSION PROJECT
BLACK SWAMP LAND CONSERVANCY & SANDUSKY RIVER ALTERNATIVE- USGS QUAD MAP

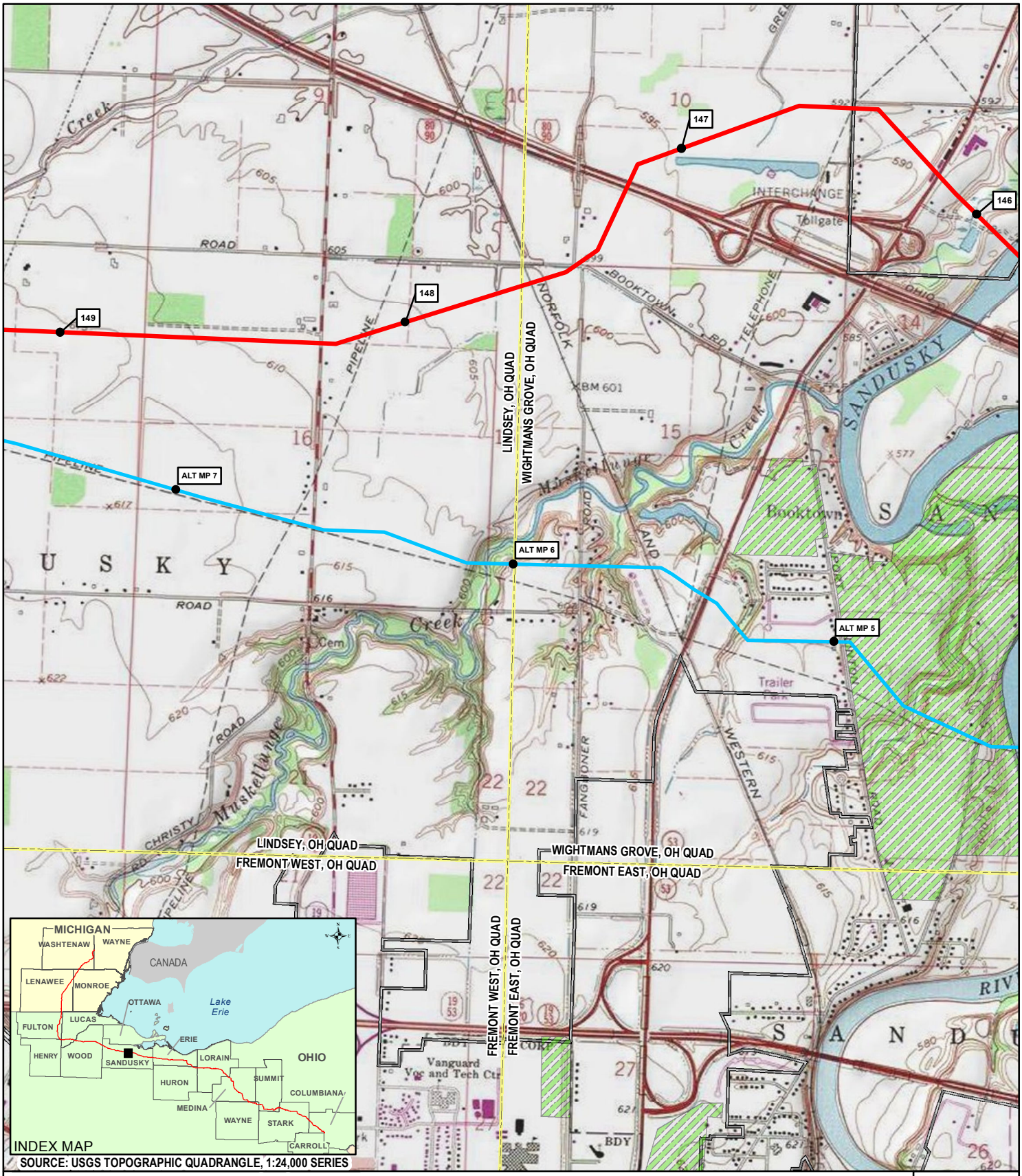
LOC.: SANDUSKY COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-9 REV D MAP 2 of 4

NEXUS GAS TRANSMISSION

I.G.



REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
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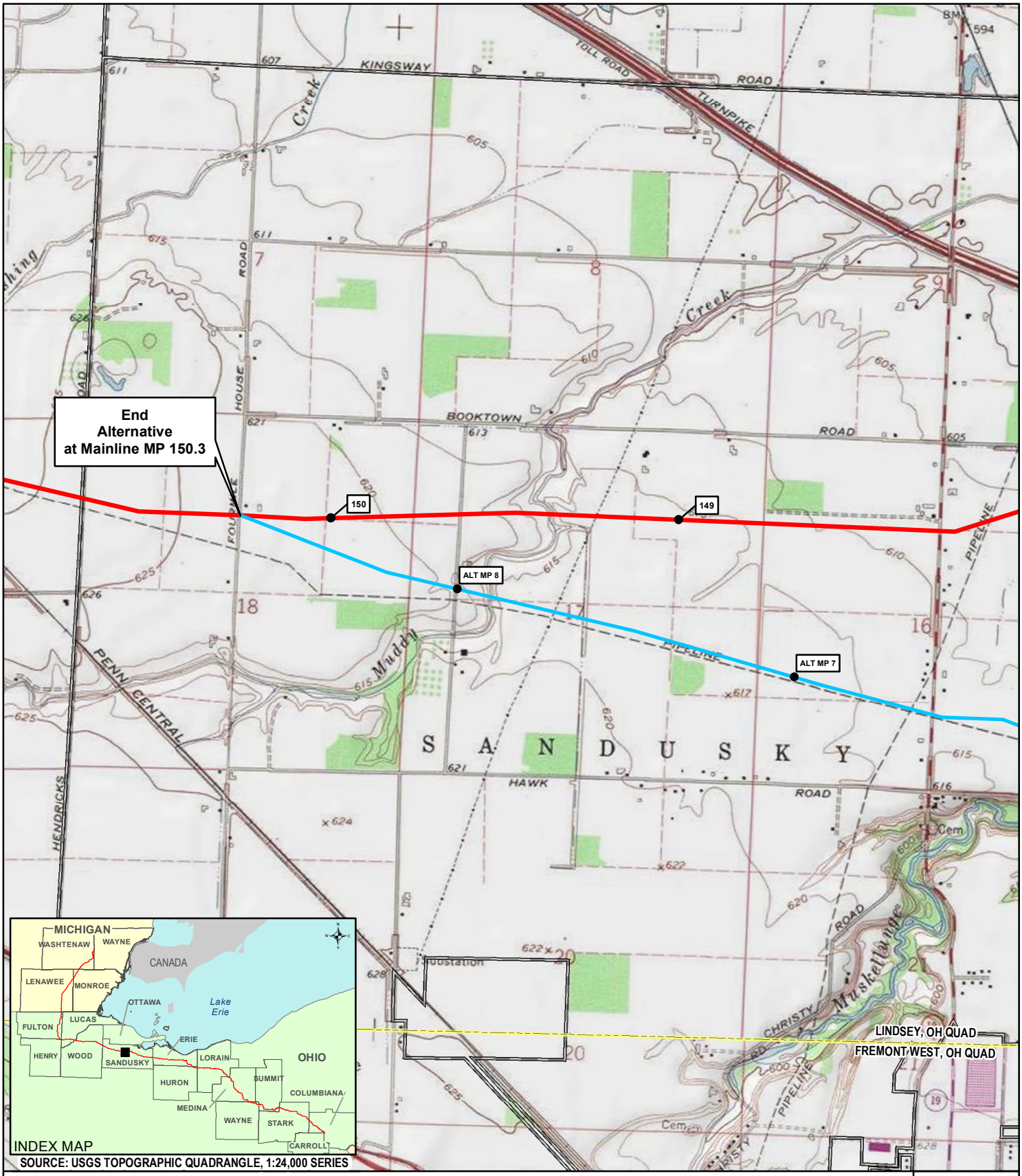
I.G.

TITLE: NEXUS GAS TRANSMISSION PROJECT
BLACK SWAMP LAND CONSERVANCY & SANDUSKY RIVER ALTERNATIVE- USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OHIO		MOC:
CKD. BY: KM	DRN. BY: CPA	DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-9 REV D	MAP 3 of 4

NEXUS SM
GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST
PROPOSED MAINLINE PIPELINE
ALTERNATIVE ROUTE
USGS QUADRANGLE BOUNDARY
PUBLIC LANDS
COUNTY BOUNDARY
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STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
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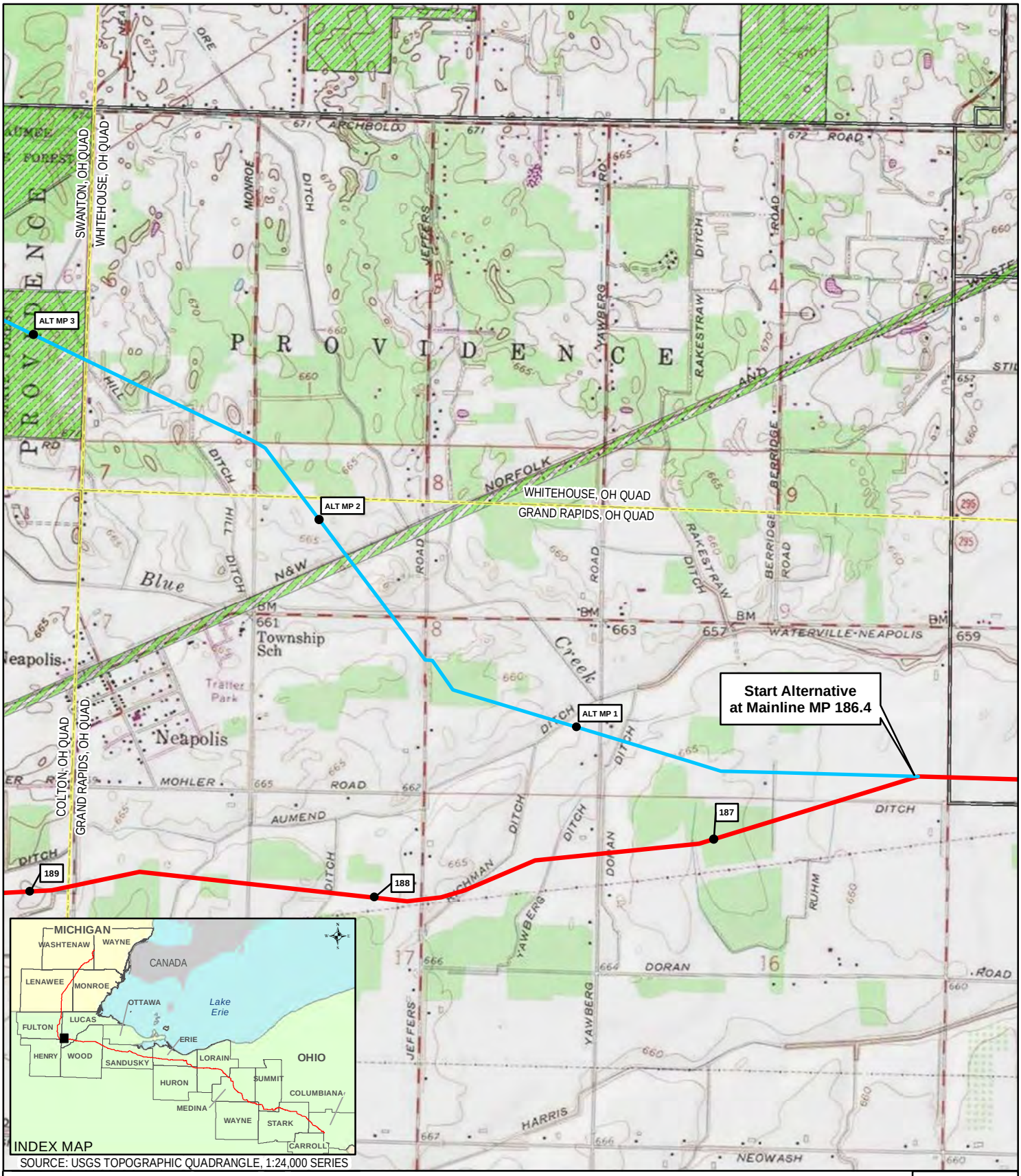
TITLE: NEXUS GAS TRANSMISSION PROJECT
BLACK SWAMP LAND CONSERVANCY & SANDUSKY RIVER ALTERNATIVE- USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OHIO		MOC:	
CKD. BY: KM	DRN. BY: CPA	DATE:	07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-9	REV D	MAP 4 of 4

NEXUS SM
GAS TRANSMISSION

I.G.



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST
PROPOSED MAINLINE PIPELINE
ALTERNATIVE ROUTE
USGS QUADRANGLE BOUNDARY
PUBLIC LANDS
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

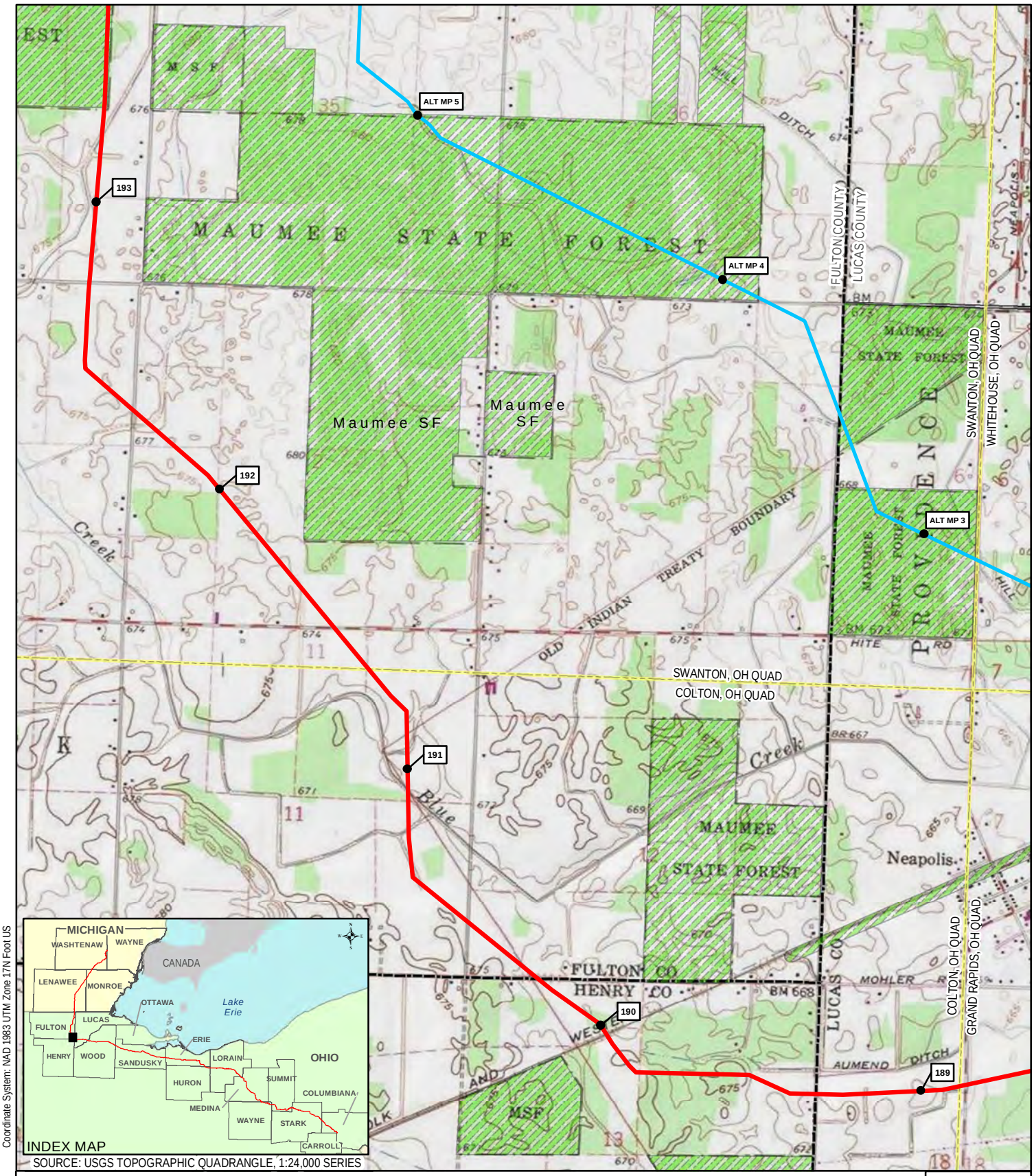
REVISION RECORD

NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 182.9 Jan 2015 Prefiling RR 10	3/6/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
MAUMEE STATE FOREST ALTERNATIVE - USGS QUAD MAP

LOC.: LUCAS COUNTY, OHIO		MOC:
CKD. BY: KM	DRN. BY: CPA	DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-10	REV D MAP 1 of 5

NEXUS SM
GAS TRANSMISSION



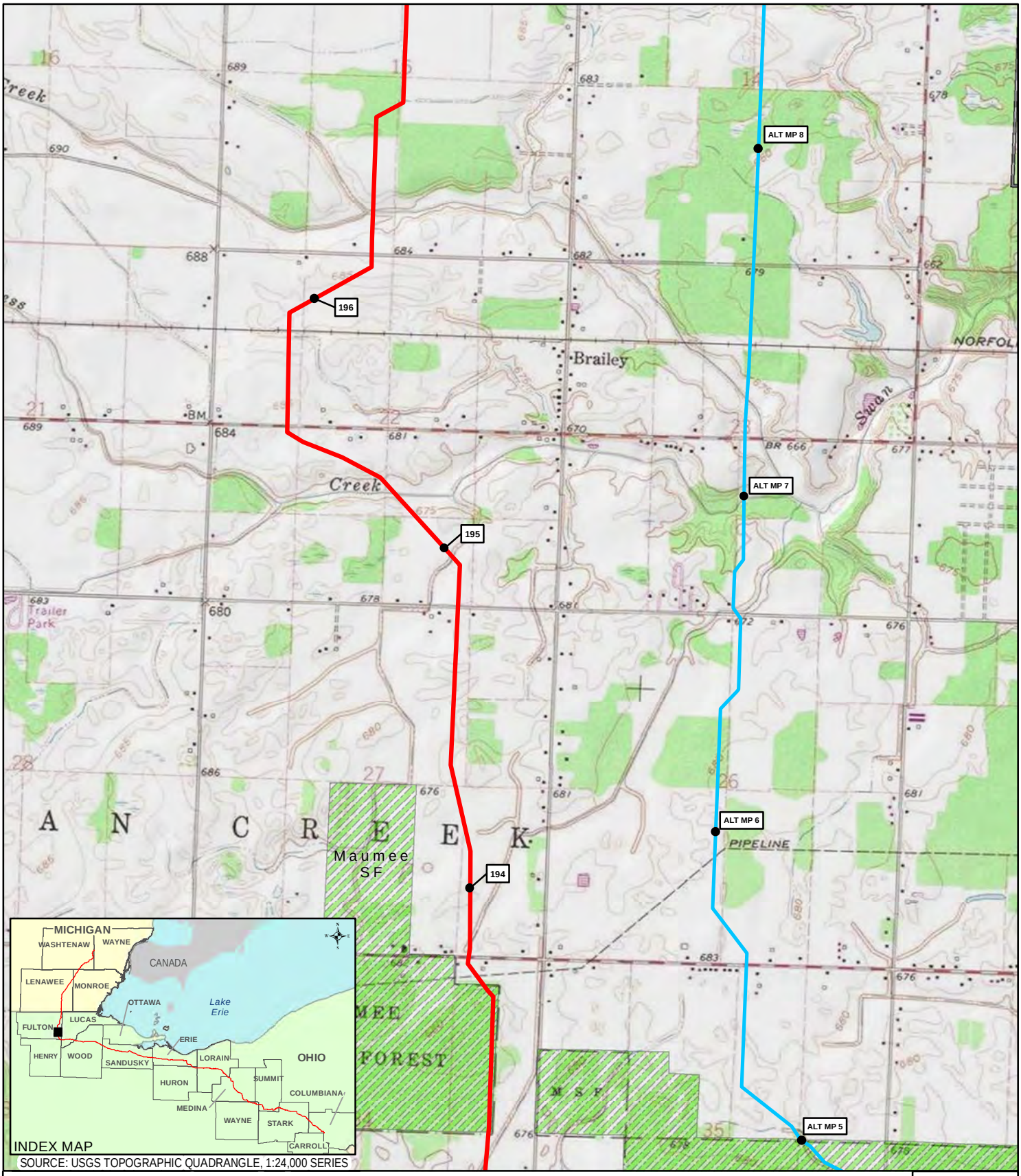
REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 182.9 Jan 2015 Prefiling RR 10	3/6/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
MAUMEE STATE FOREST ALTERNATIVE - USGS QUAD MAP

LOC.: LUCAS COUNTY; FULTON COUNTY, OHIO		MOC:	
CKD. BY: KM	DRN. BY: CPA	DATE: 07/27/2015	
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-10	REV D	MAP 2 of 5

NEXUS SM
GAS TRANSMISSION

I.G.



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST
PROPOSED MAINLINE PIPELINE
ALTERNATIVE ROUTE
USGS QUADRANGLE BOUNDARY
PUBLIC LANDS
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD

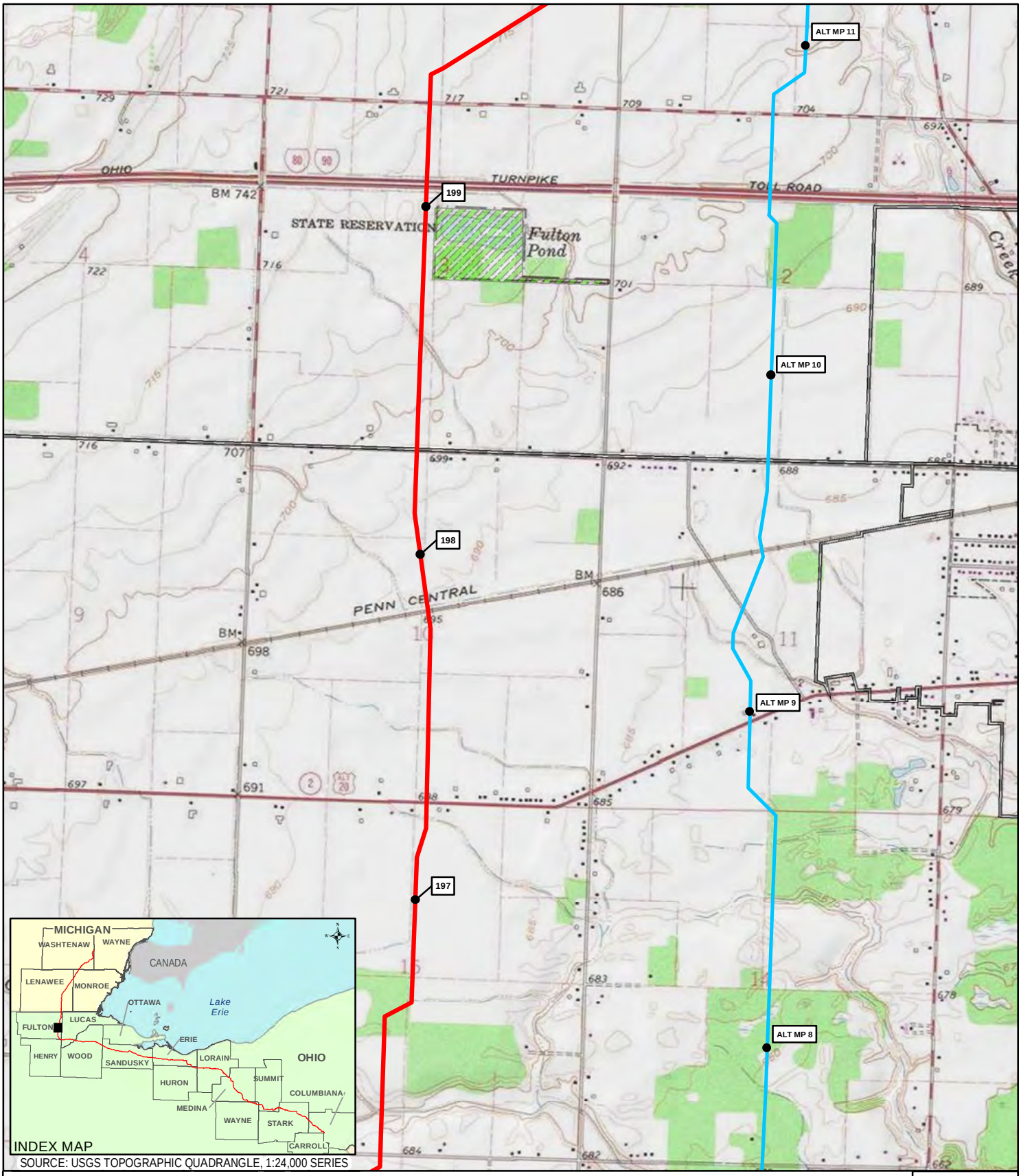
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 182.9 Jan 2015 Prefiling RR 10	3/6/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
MAUMEE STATE FOREST ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON COUNTY, OHIO		MOC:	
CKD. BY: KM	DRN. BY: CPA	DATE: 07/27/2015	
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-10	REV D	MAP 3 of 5

NEXUS GAS TRANSMISSION

I.G.



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

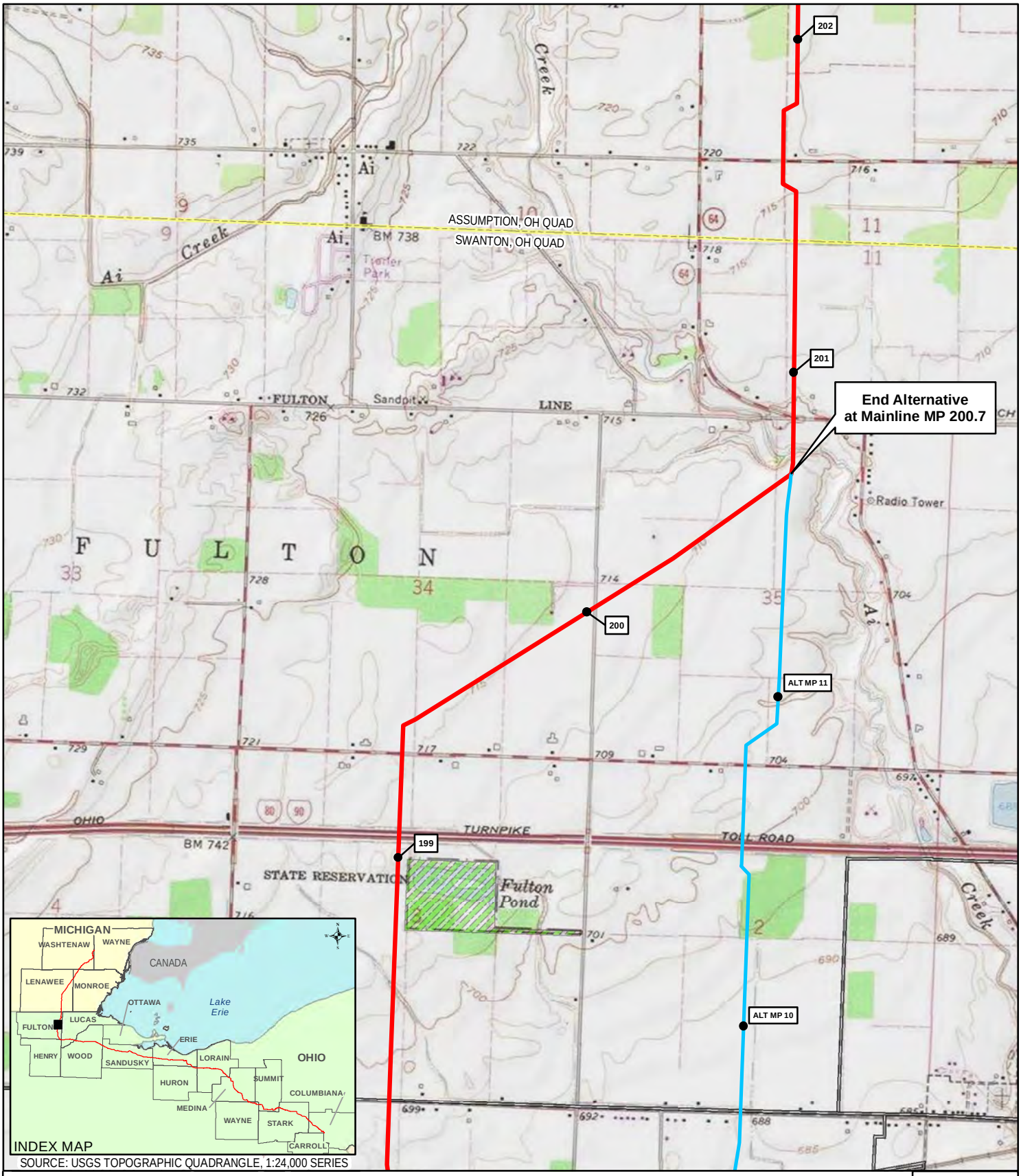
REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 182.9 Jan 2015 Prefiling RR 10	3/6/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
MAUMEE STATE FOREST ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON COUNTY, OHIO		MOC:	
CKD. BY: KM	DRN. BY: CPA	DATE: 07/27/2015	
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-10	REV D	MAP 4 of 5

NEXUS SM
GAS TRANSMISSION

I.G.



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

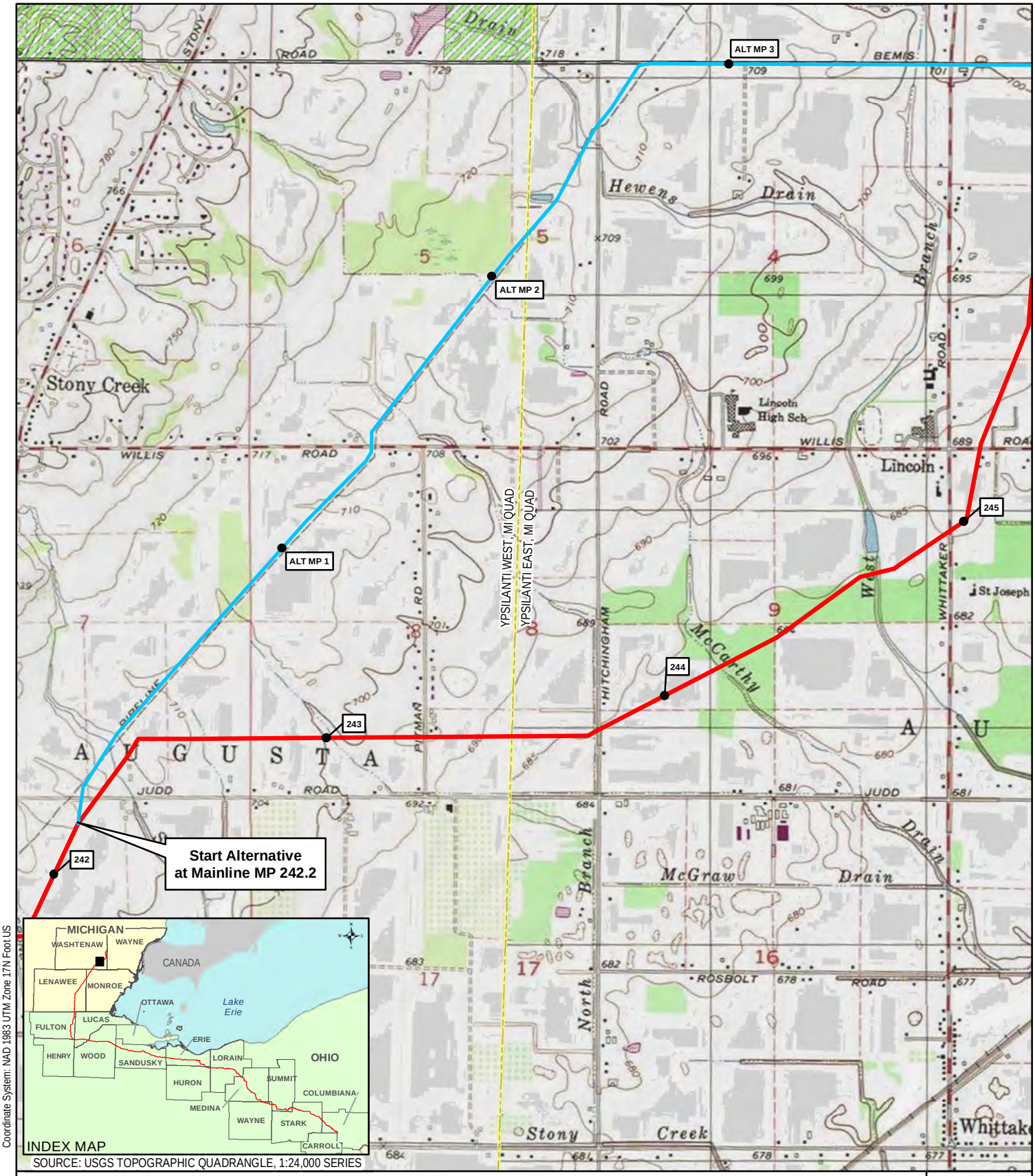
REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 182.9 Jan 2015 Prefiling RR 10	3/6/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
MAUMEE STATE FOREST ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON COUNTY, OHIO		MOC:	
CKD. BY: KM	DRN. BY: CPA	DATE: 07/27/2015	
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-10	REV D	MAP 5 of 5

NEXUS GAS TRANSMISSION

I.G.



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST
PROPOSED MAINLINE PIPELINE
ALTERNATIVE ROUTE
USGS QUADRANGLE BOUNDARY
PUBLIC LANDS
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

REVISION RECORD

NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 234.1 Jan 2015 Prefiling RR 10	3/6/2015	
2	Prev. filed as Alternative Route at MP 236.5 June 2015 Prefiling RR 10	7/27/2015	

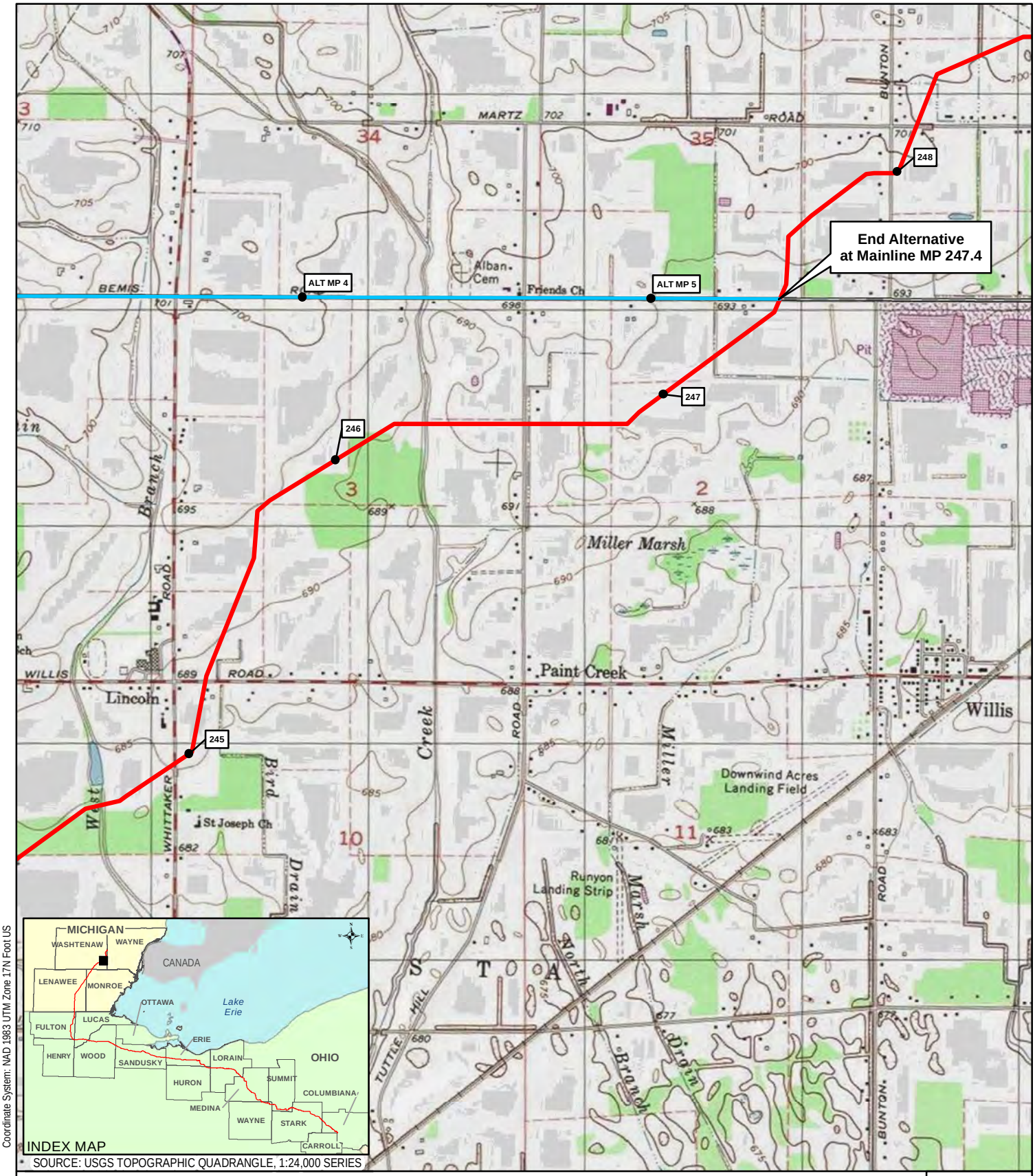
TITLE: NEXUS GAS TRANSMISSION PROJECT
WASHTENAW COUNTY SCHOOL COMPLEX
ALTERNATIVE- USGS QUAD MAP

LOC.: WASHTENAW COUNTY, MICHIGAN MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-11 REV D MAP 1 of 2

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
ALTERNATIVE ROUTE
USGS QUADRANGLE BOUNDARY
PUBLIC LANDS
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD

NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 234.1 Jan 2015 Prefiling RR 10	3/6/2015	
2	Prev. filed as Alternative Route at MP 236.5 June 2015 Prefiling RR 10	7/27/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
WASHTENAW COUNTY SCHOOL COMPLEX
ALTERNATIVE- USGS QUAD MAP

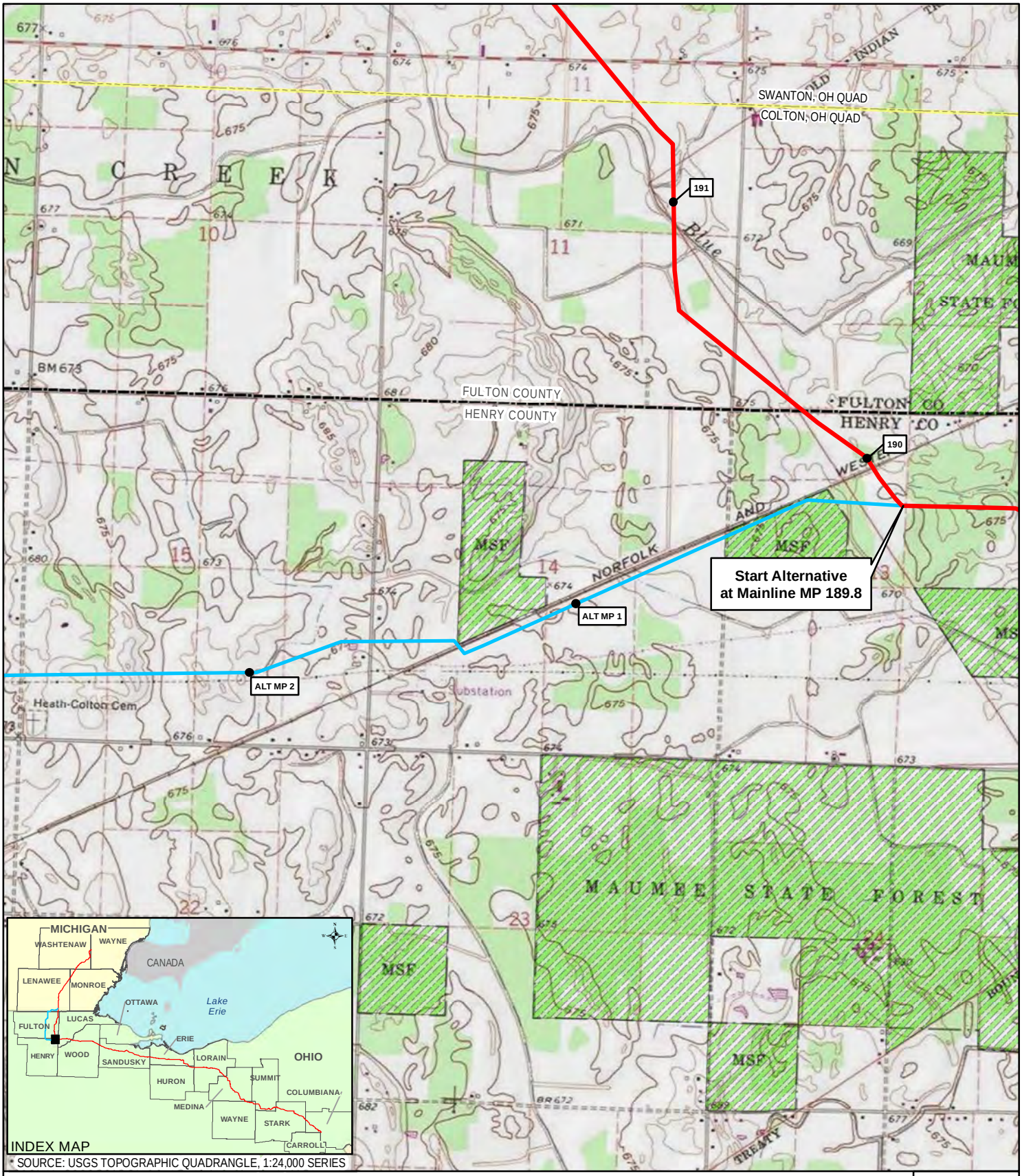
LOC.: WASHTENAW COUNTY, MICHIGAN MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-11 REV D MAP 2 of 2

NEXUS SM
GAS TRANSMISSION

I.G.



Coordinate System: NAD 1983 UTM Zone 17N Foot US

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

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD

NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 184.5 June 2015 Prefiling RR 10	7/27/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
CORN WESTERN ROUTE ALTERNATIVE - USGS QUAD MAP

LOC.: HENRY COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-12 REV D MAP 1 of 10

NEXUS GAS TRANSMISSION

I.G.

Coordinate System: NAD 1983 UTM Zone 17N Foot US

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

1 MILEPOST
PROPOSED MAINLINE PIPELINE
ALTERNATIVE ROUTE
USGS QUADRANGLE BOUNDARY
PUBLIC LANDS
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD

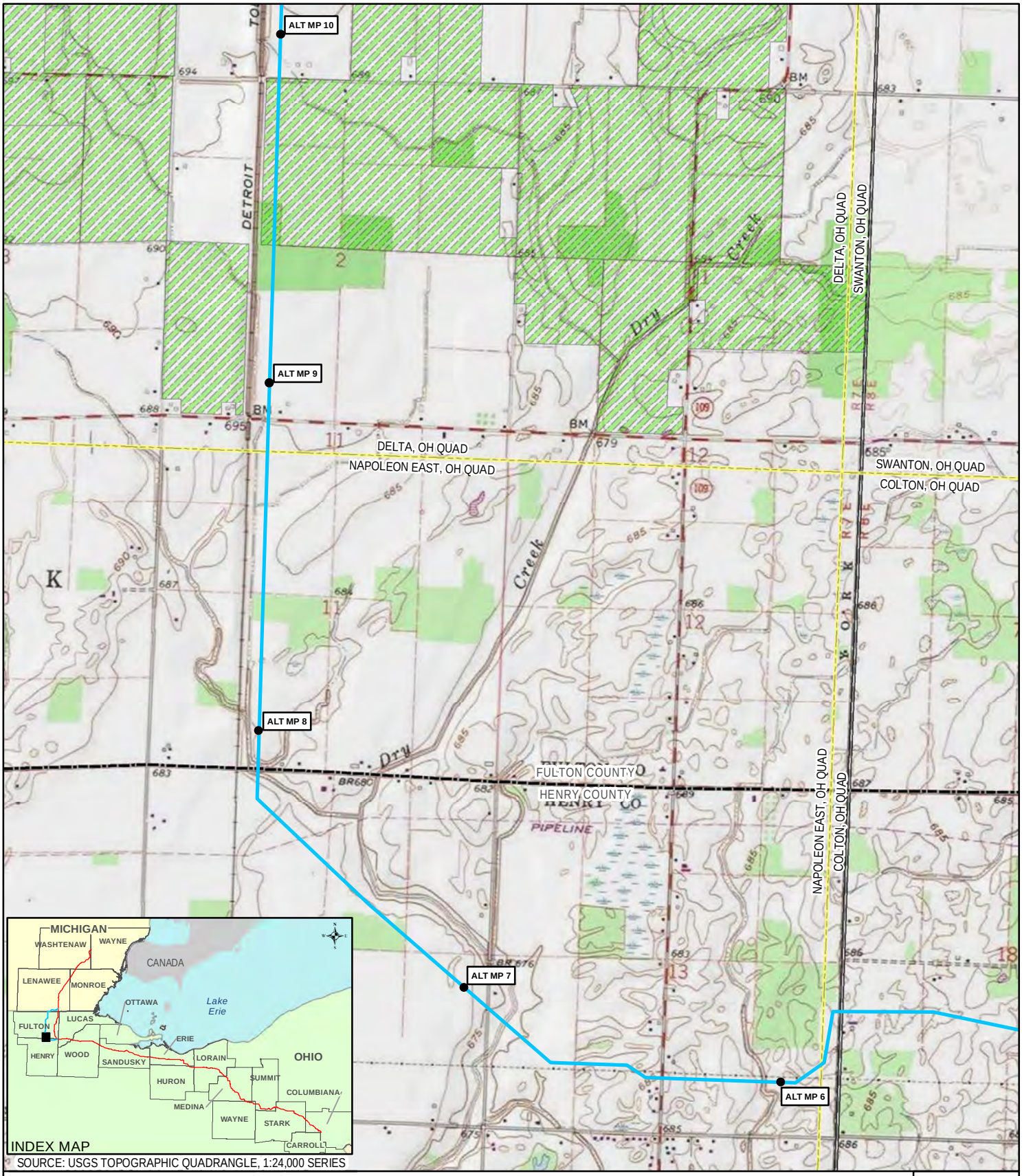
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 184.5 June 2015 Prefiling RR 10	7/27/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
CORN WESTERN ROUTE ALTERNATIVE - USGS QUAD MAP

LOC.: HENRY COUNTY, OHIO		MOC:
CKD. BY: KM	DRN. BY: CPA	DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-12 REV D	MAP 2 of 10

NEXUS SM GAS TRANSMISSION

I.G.



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

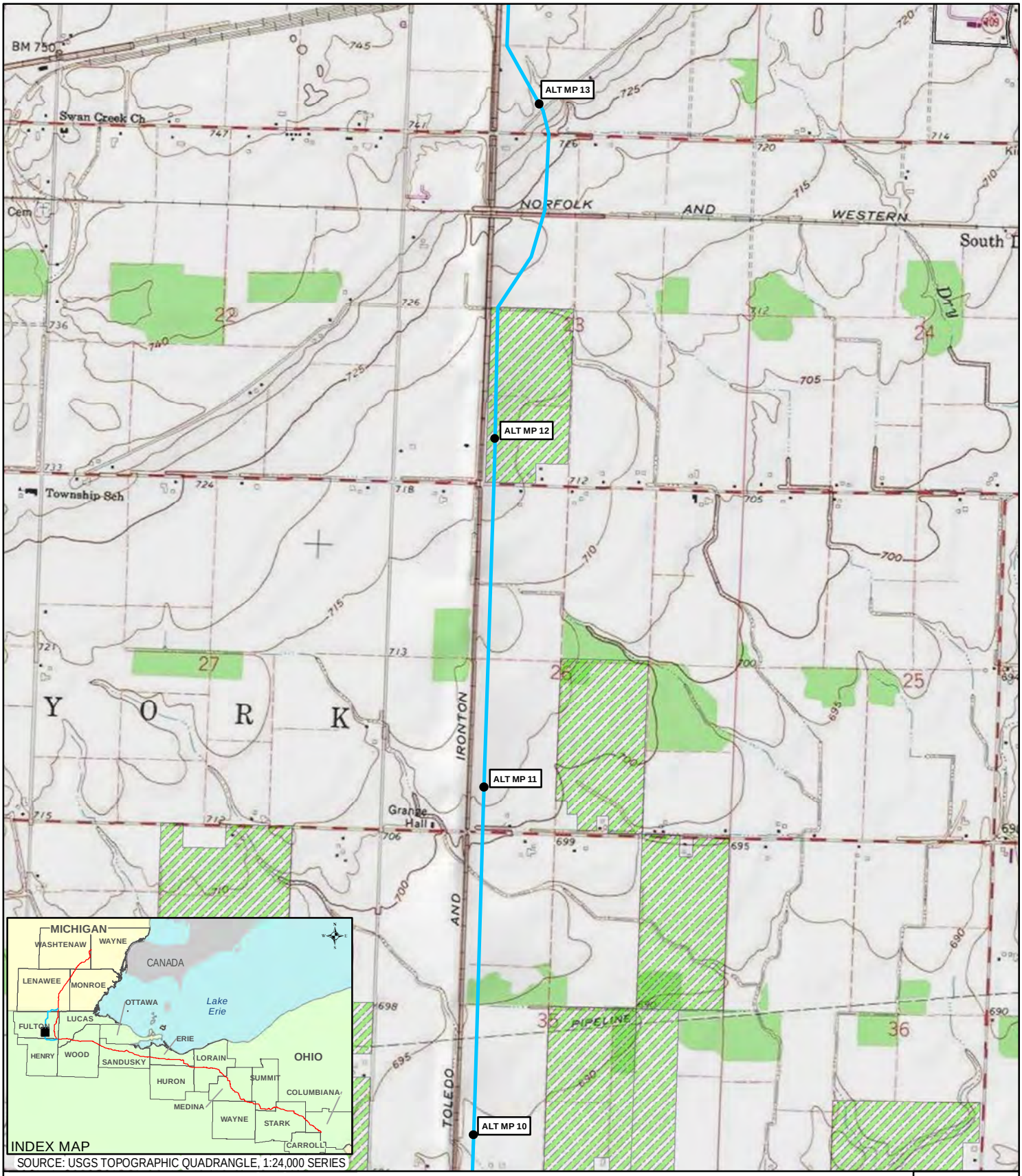
REVISION RECORD

NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 184.5 June 2015 Prefiling RR 10	7/27/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
CORN WESTERN ROUTE ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON COUNTY; HENRY COUNTY, OHIO		MOC:	
CKD. BY: KM	DRN. BY: CPA	DATE:	07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-12	REV D	MAP 3 of 10

NEXUS SM GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

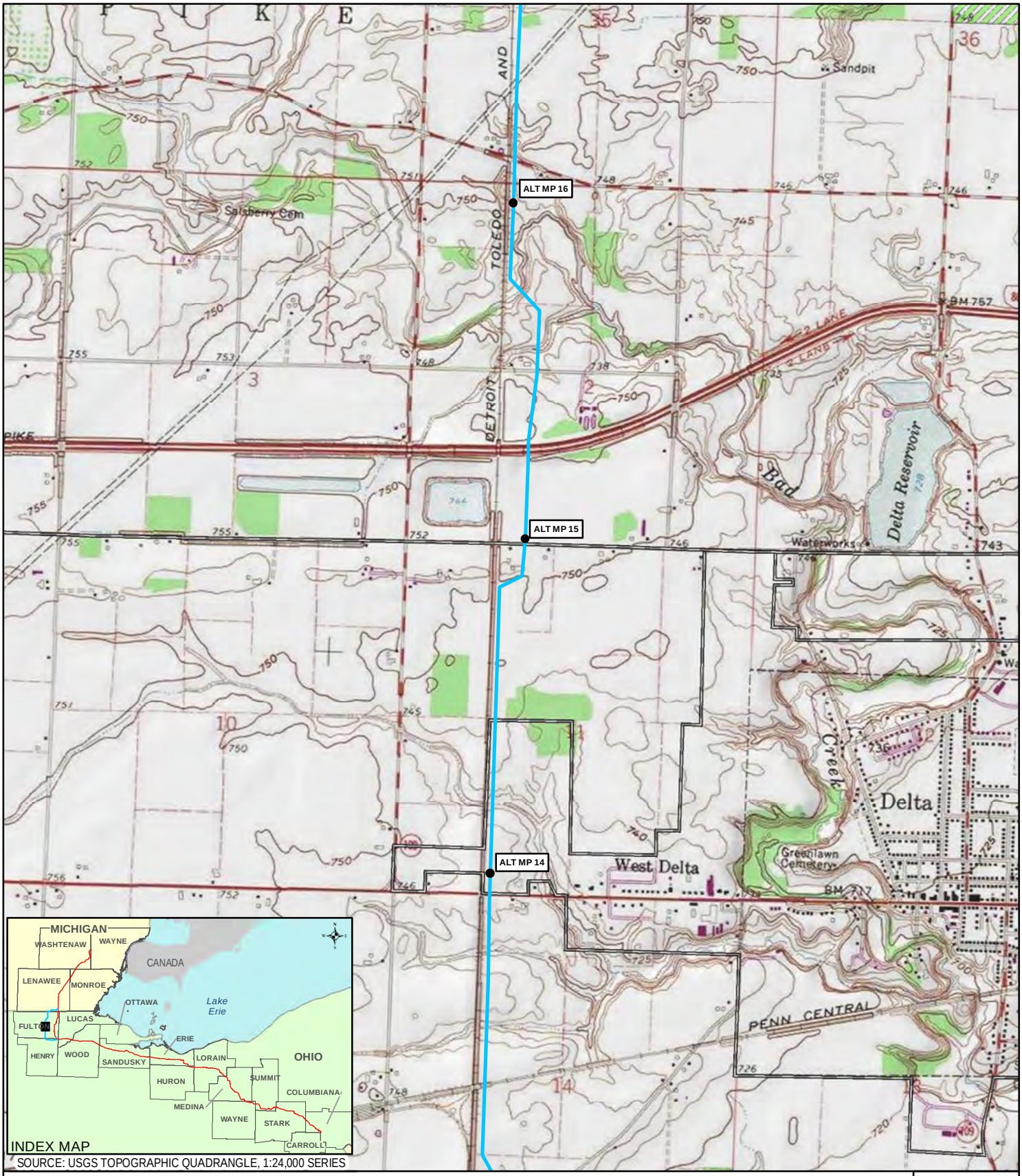
REVISION RECORD

NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 184.5 June 2015 Prefiling RR 10	7/27/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
CORN WESTERN ROUTE ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON COUNTY, OHIO		MOC:	
CKD. BY: KM	DRN. BY: CPA	DATE:	07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-12	REV D	MAP 4 of 10

NEXUS SM GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

REVISION RECORD

NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 184.5 June 2015 Prefiling RR 10	7/27/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
CORN WESTERN ROUTE ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON COUNTY, OHIO		MOC:	
CKD. BY: KM	DRN. BY: CPA	DATE: 07/27/2015	
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-12	REV D	MAP 5 of 10

NEXUS SM GAS TRANSMISSION

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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST
PROPOSED MAINLINE PIPELINE
ALTERNATIVE ROUTE
USGS QUADRANGLE BOUNDARY
PUBLIC LANDS
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 184.5 June 2015 Prefiling RR 10	7/27/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
CORN WESTERN ROUTE ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON COUNTY, OHIO		MOC:	
CKD. BY: KM	DRN. BY: CPA	DATE: 07/27/2015	
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-12	REV D	MAP 6 of 10

NEXUS GAS TRANSMISSION

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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

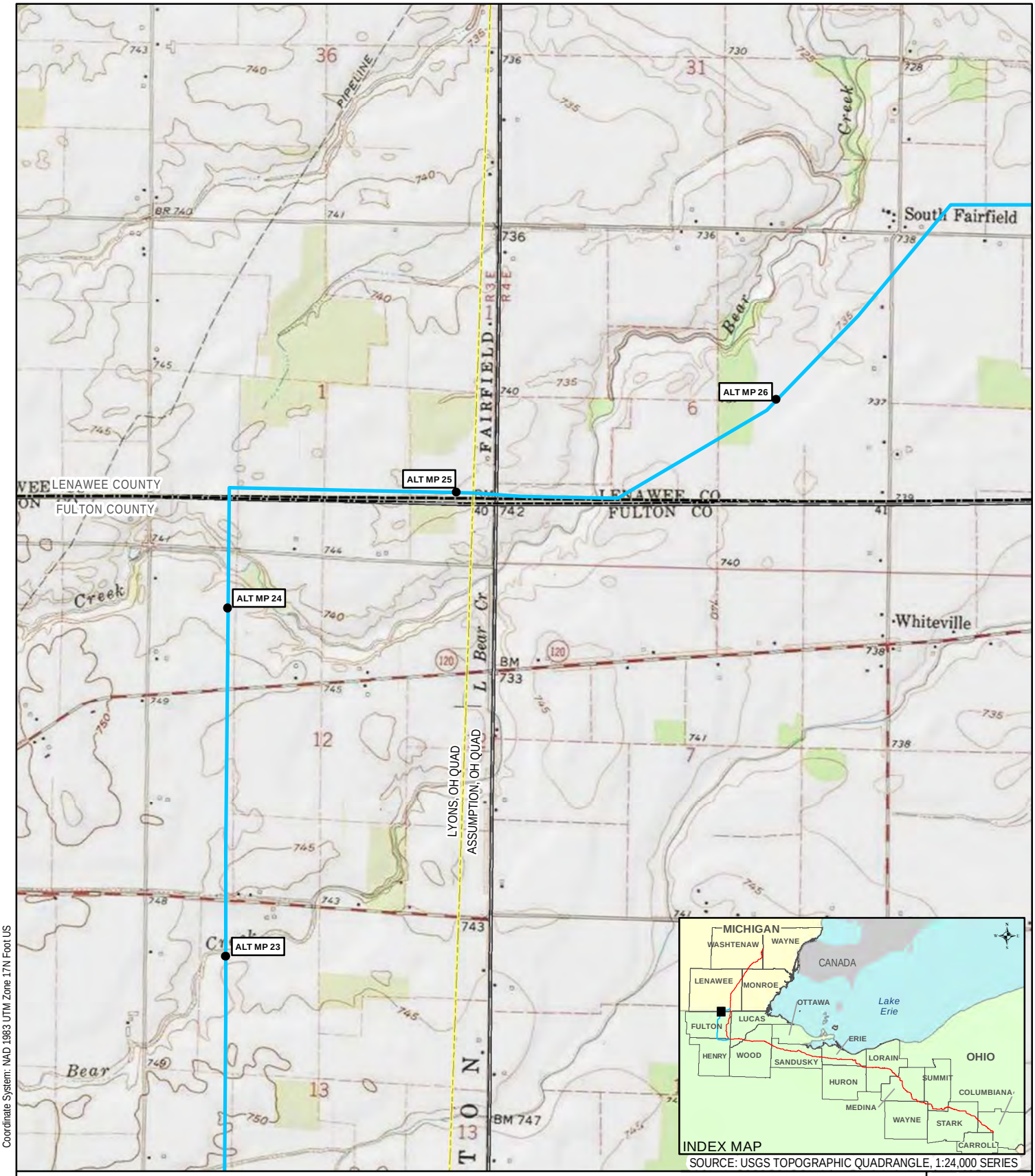
REVISION RECORD

NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 184.5 June 2015 Prefiling RR 10	7/27/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
CORN WESTERN ROUTE ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON COUNTY, OHIO		MOC:
CKD. BY: KM	DRN. BY: CPA	DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-12 REV D	MAP 7 of 10

NEXUS SM GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 184.5 June 2015 Prefiling RR 10	7/27/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
CORN WESTERN ROUTE ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON CO, OHIO; LENAWEE CO, MICHIGAN MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-12 REV D MAP 8 of 10

NEXUS GAS TRANSMISSION

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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST
PROPOSED MAINLINE PIPELINE
ALTERNATIVE ROUTE
USGS QUADRANGLE BOUNDARY
PUBLIC LANDS
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

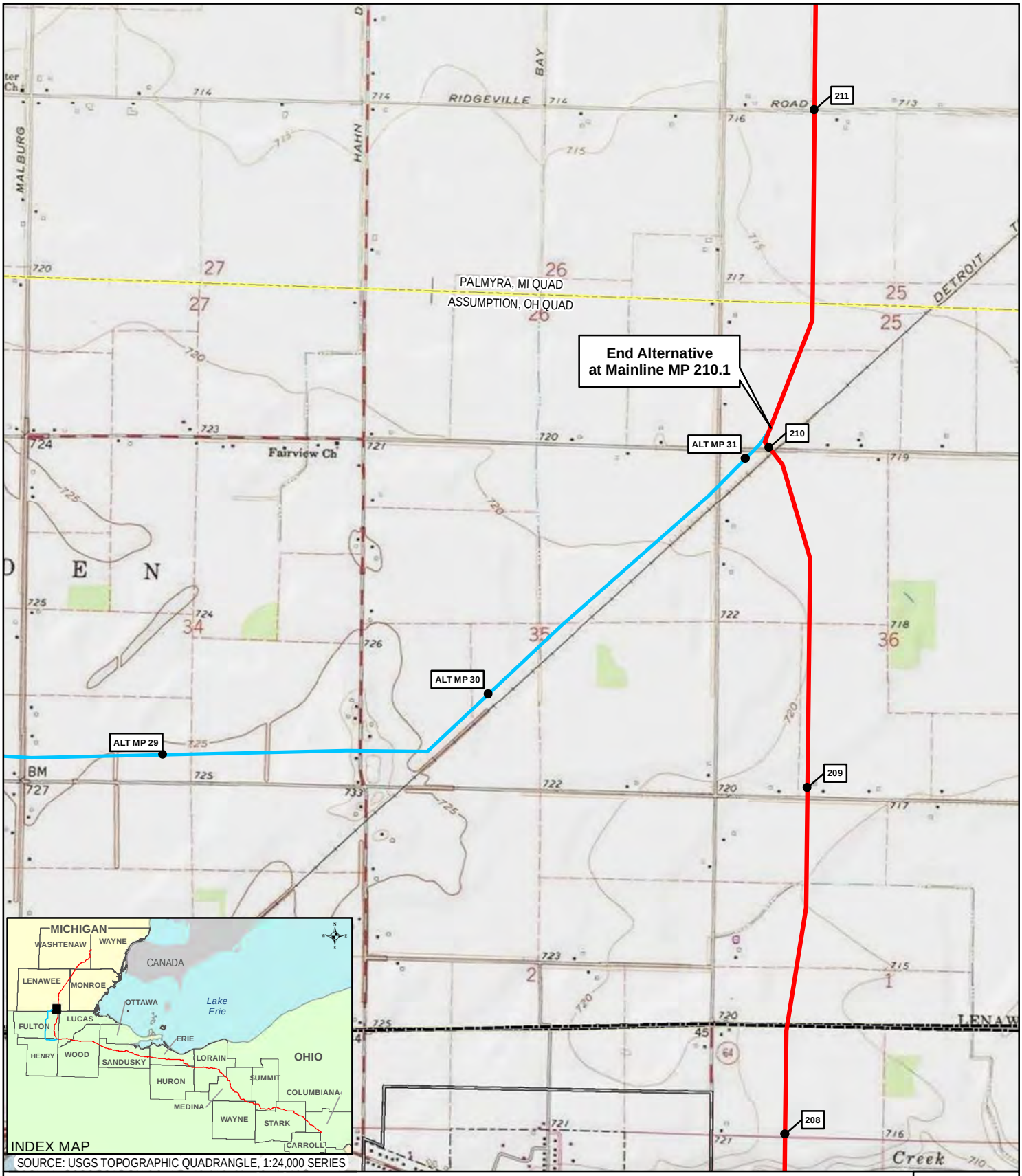
I.G.

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 184.5 June 2015 Prefiling RR 10	7/27/2015	

TITLE: NEXUS GAS TRANSMISSION PROJECT
CORN WESTERN ROUTE ALTERNATIVE - USGS QUAD MAP

LOC.: LENAWEE COUNTY, MICHIGAN		MOC:	
CKD. BY: KM	DRN. BY: CPA	DATE:	07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-12	REV D	MAP 9 of 10

NEXUS SM
GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

REVISION RECORD

NO.	REVISION - DESCRIPTION	DATE	MOC#
1	Prev. filed as Alternative Route at MP 184.5 June 2015 Prefiling RR 10	7/27/2015	

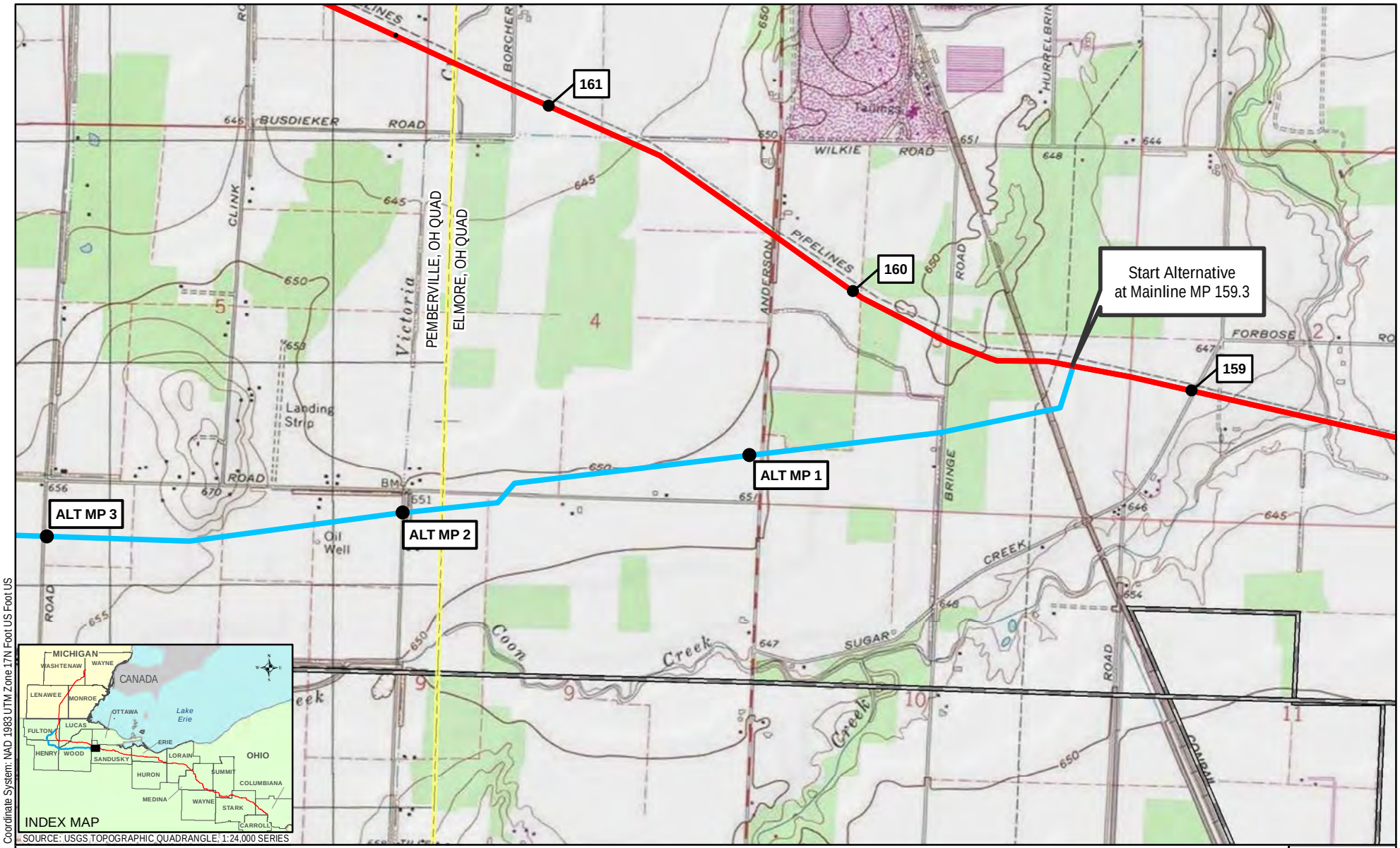
TITLE: NEXUS GAS TRANSMISSION PROJECT
CORN WESTERN ROUTE ALTERNATIVE - USGS QUAD MAP

LOC.: LENAWEE COUNTY, MICHIGAN MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-12 REV D MAP 10 of 10

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

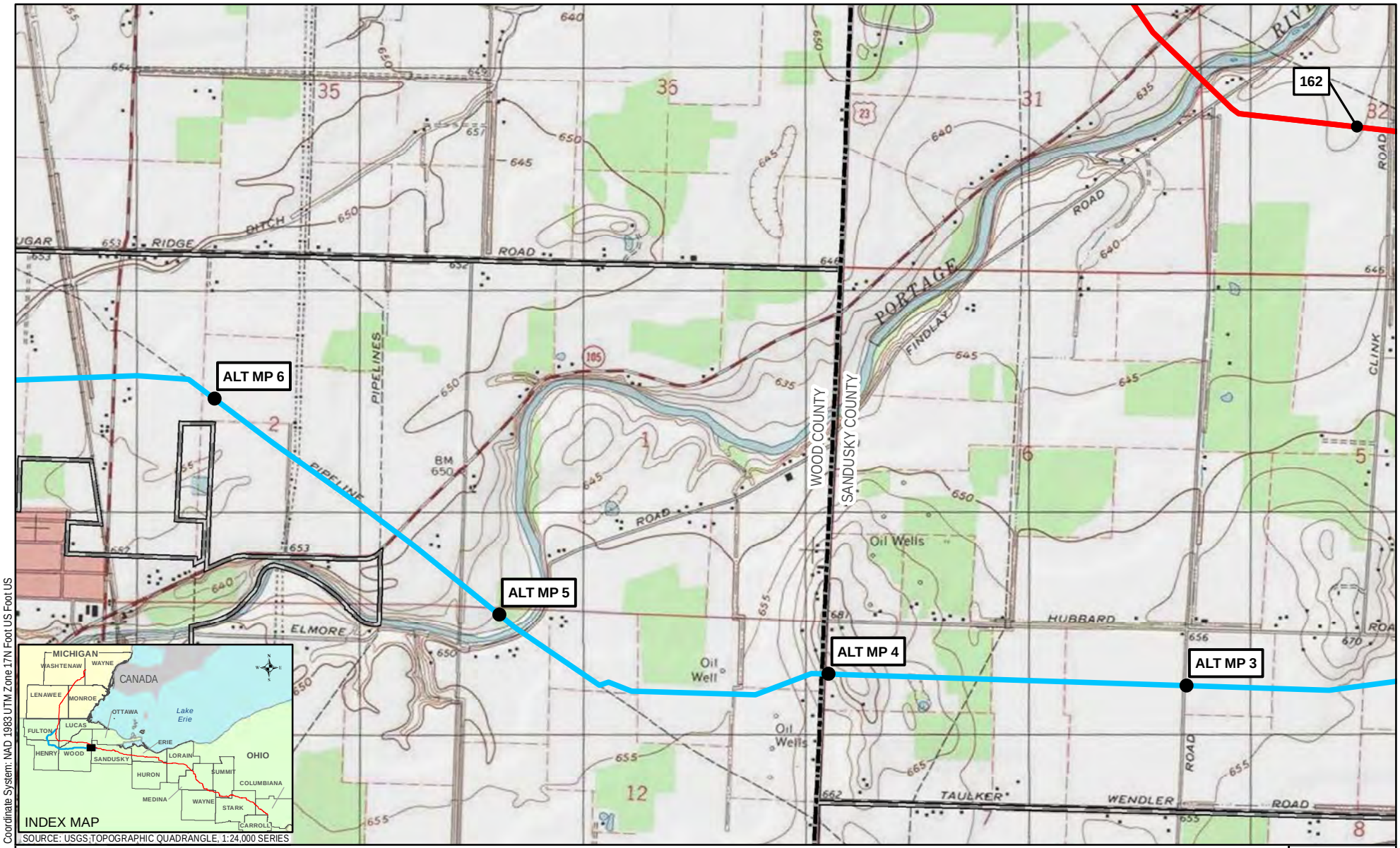
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13 REV E

MAP 1 of 17

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

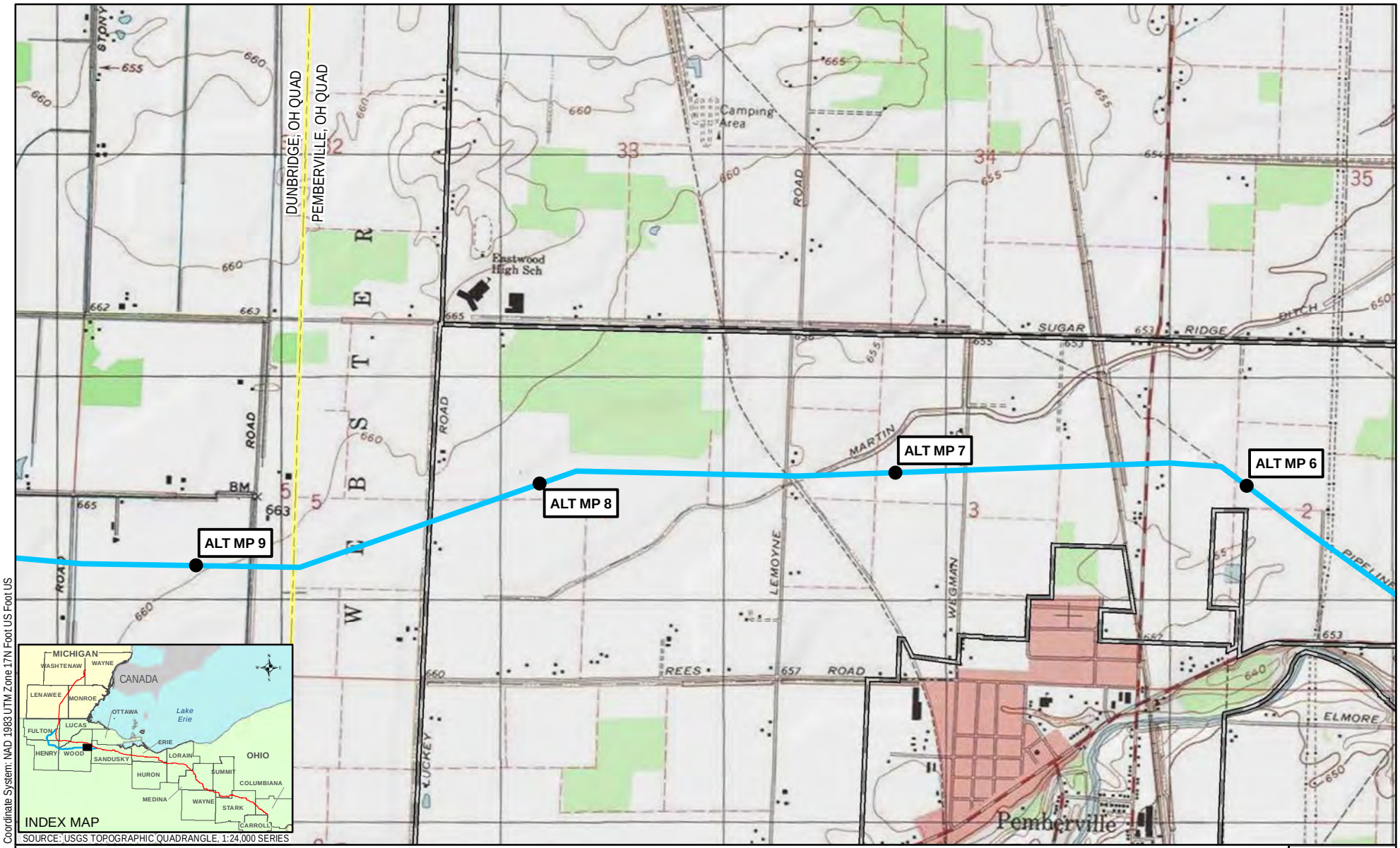
I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY; WOOD COUNTY, OHIO			MOC:
CKD. BY: KM	DRN. BY: CPA		DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-13	REV E	MAP 2 of 17

NEXUS SM
GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: WOOD COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

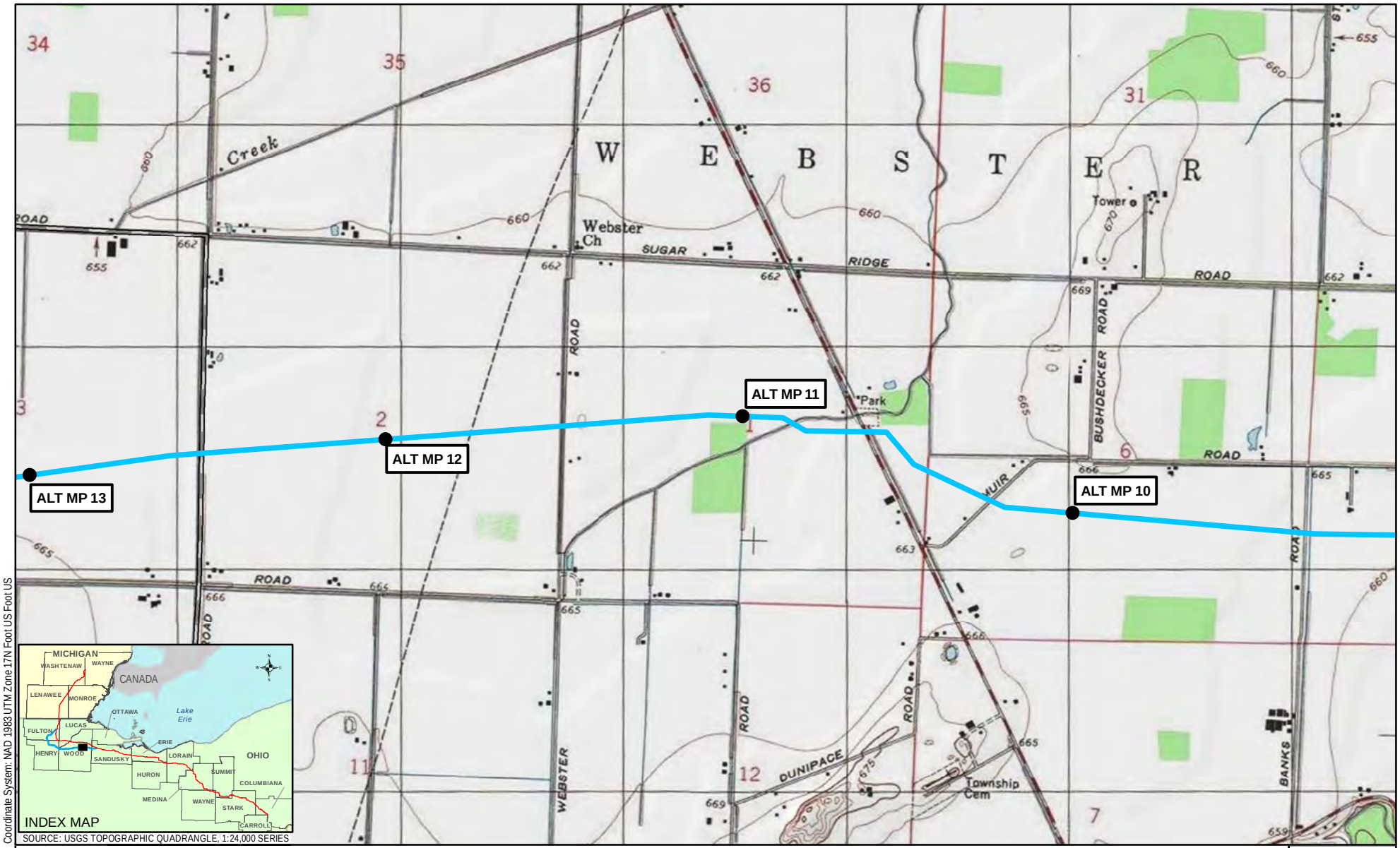
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13 REV E

MAP 3 of 17

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: WOOD COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

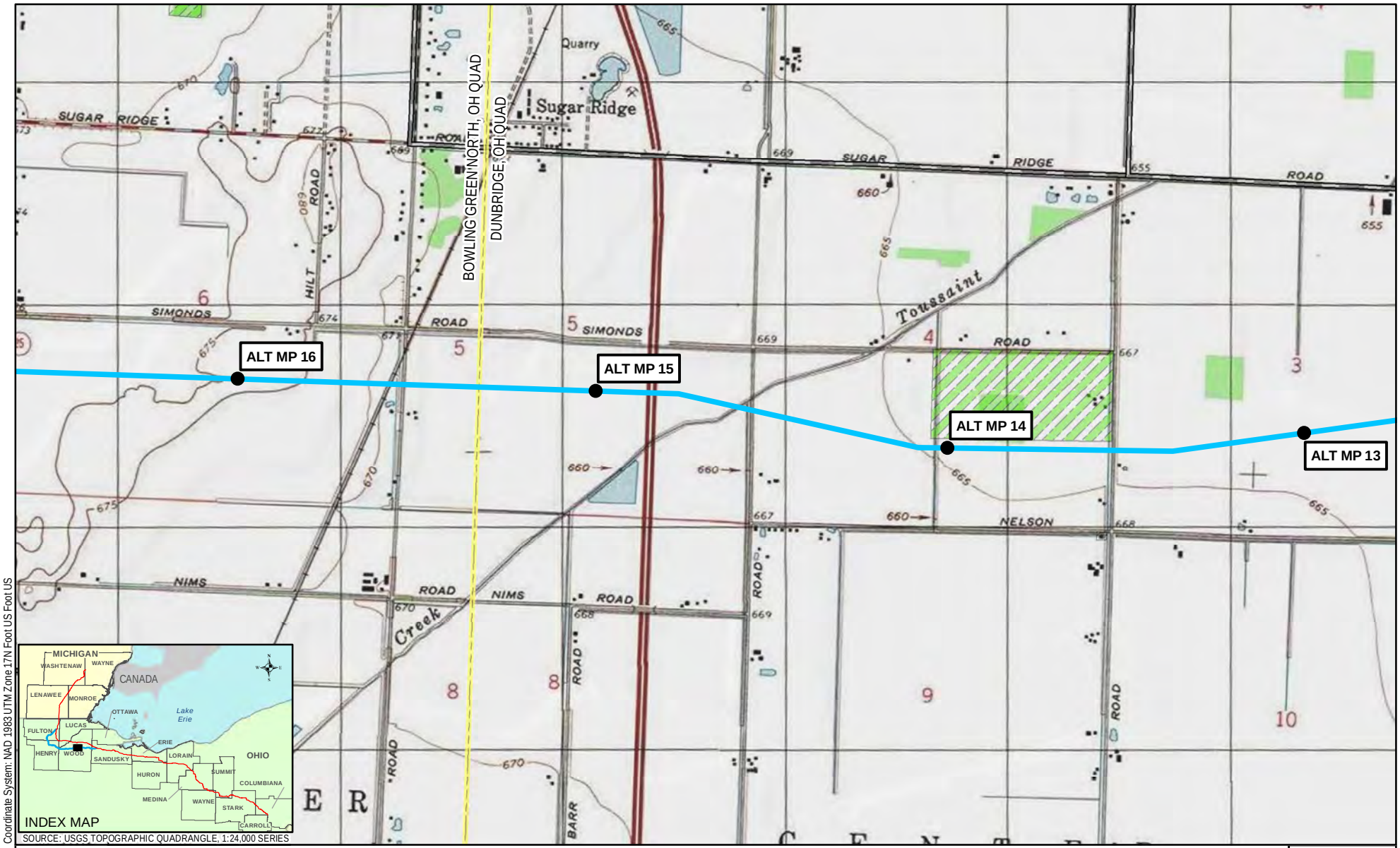
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13 REV E

MAP 4 of 17

NEXUS GAS TRANSMISSION



1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: WOOD COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

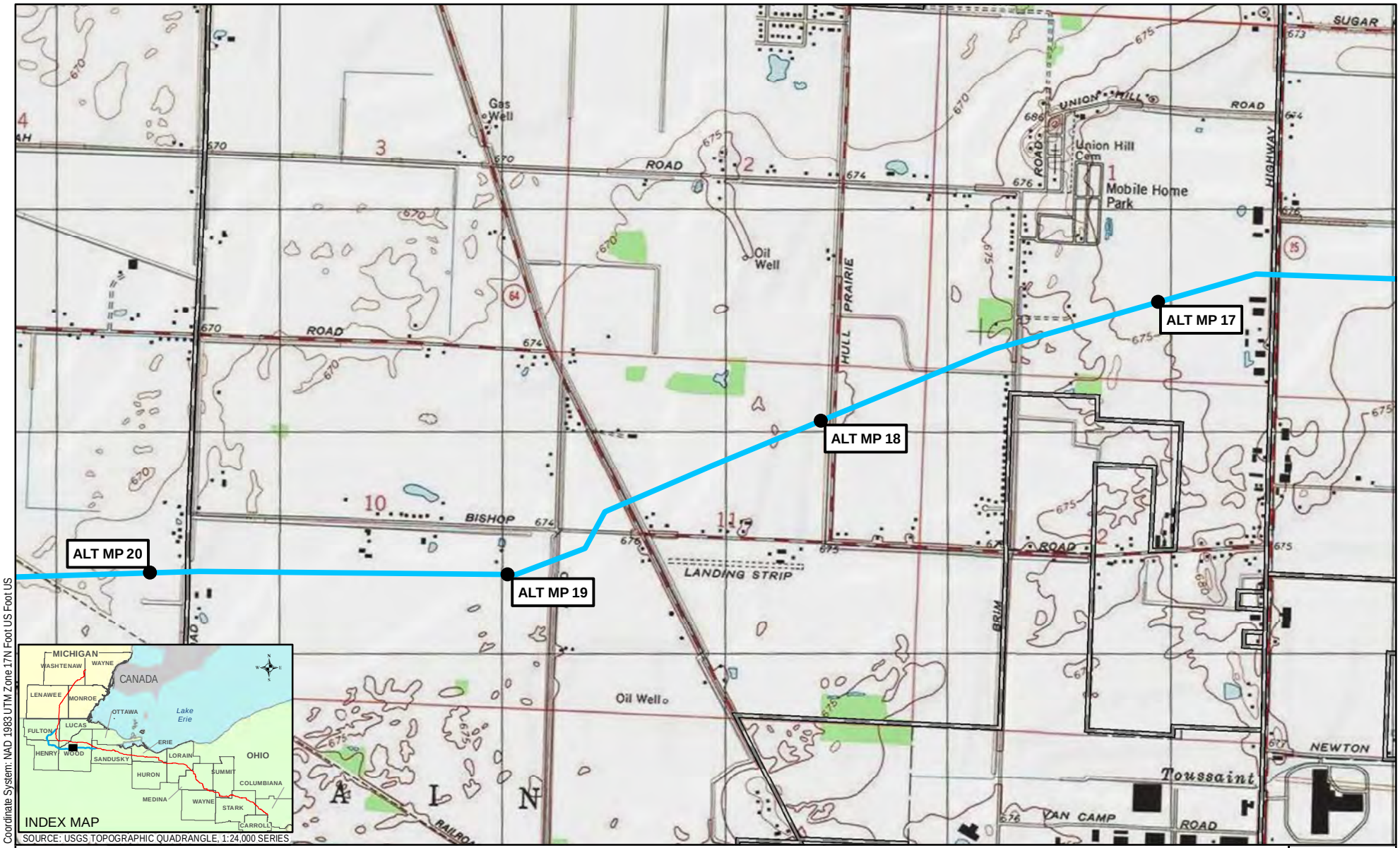
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13 REV E

MAP 5 of 17

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

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NEXUS GAS TRANSMISSION PROJECT
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LOC.: WOOD COUNTY, OHIO

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DRN. BY: CPA

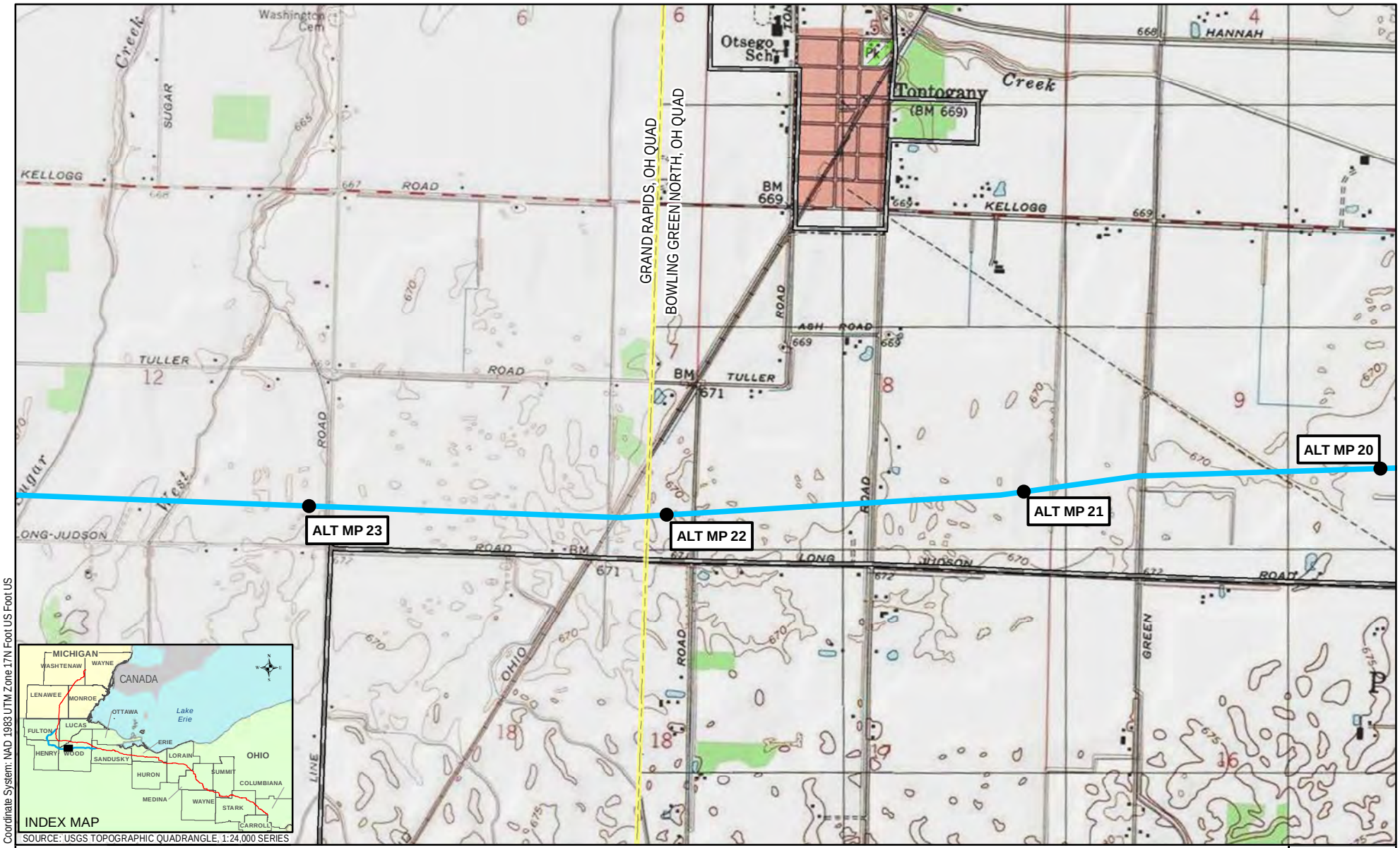
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13 REV E

MAP 6 of 17

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

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NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: WOOD COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

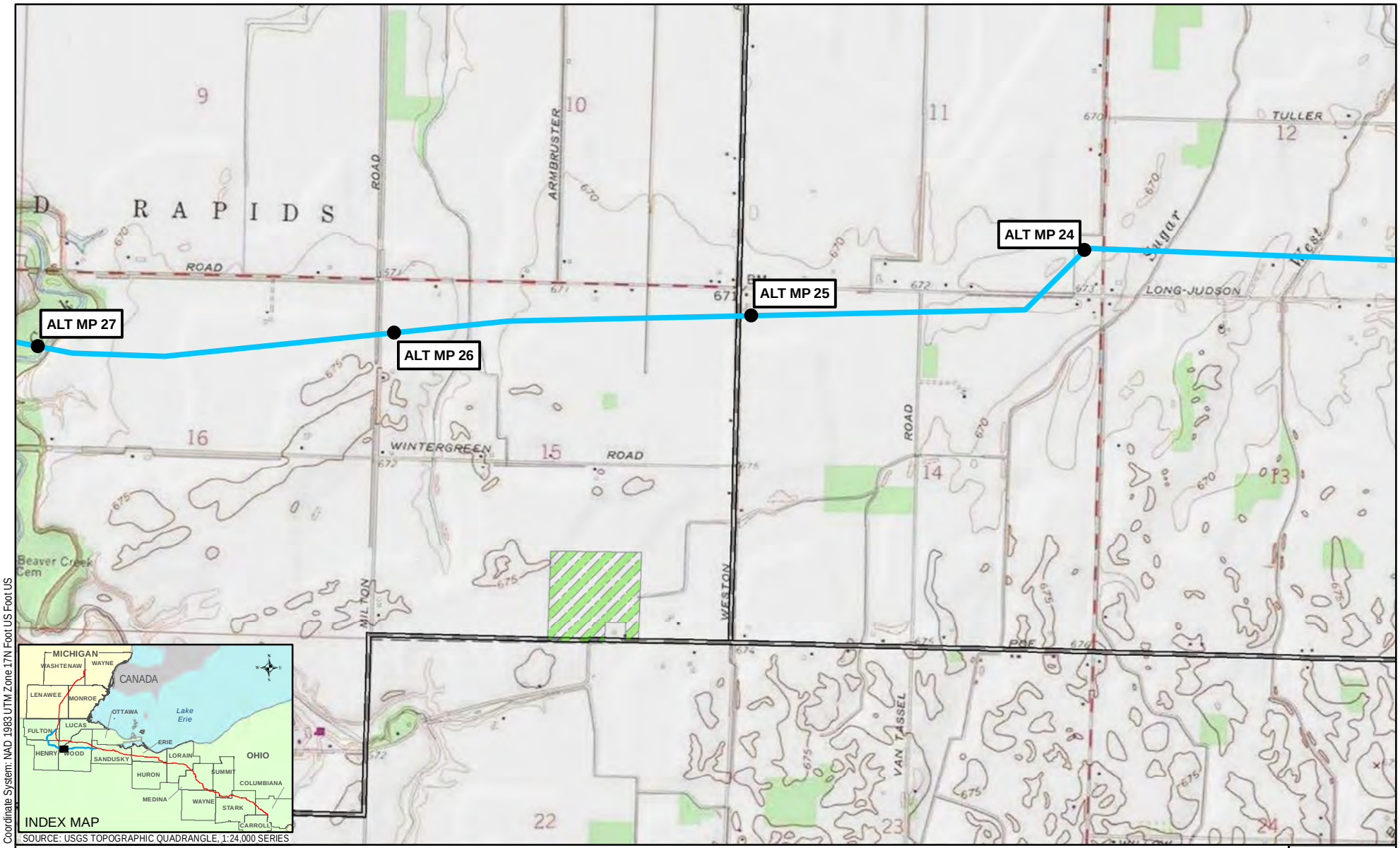
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13 REV E

MAP 7 of 17

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

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OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: WOOD COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

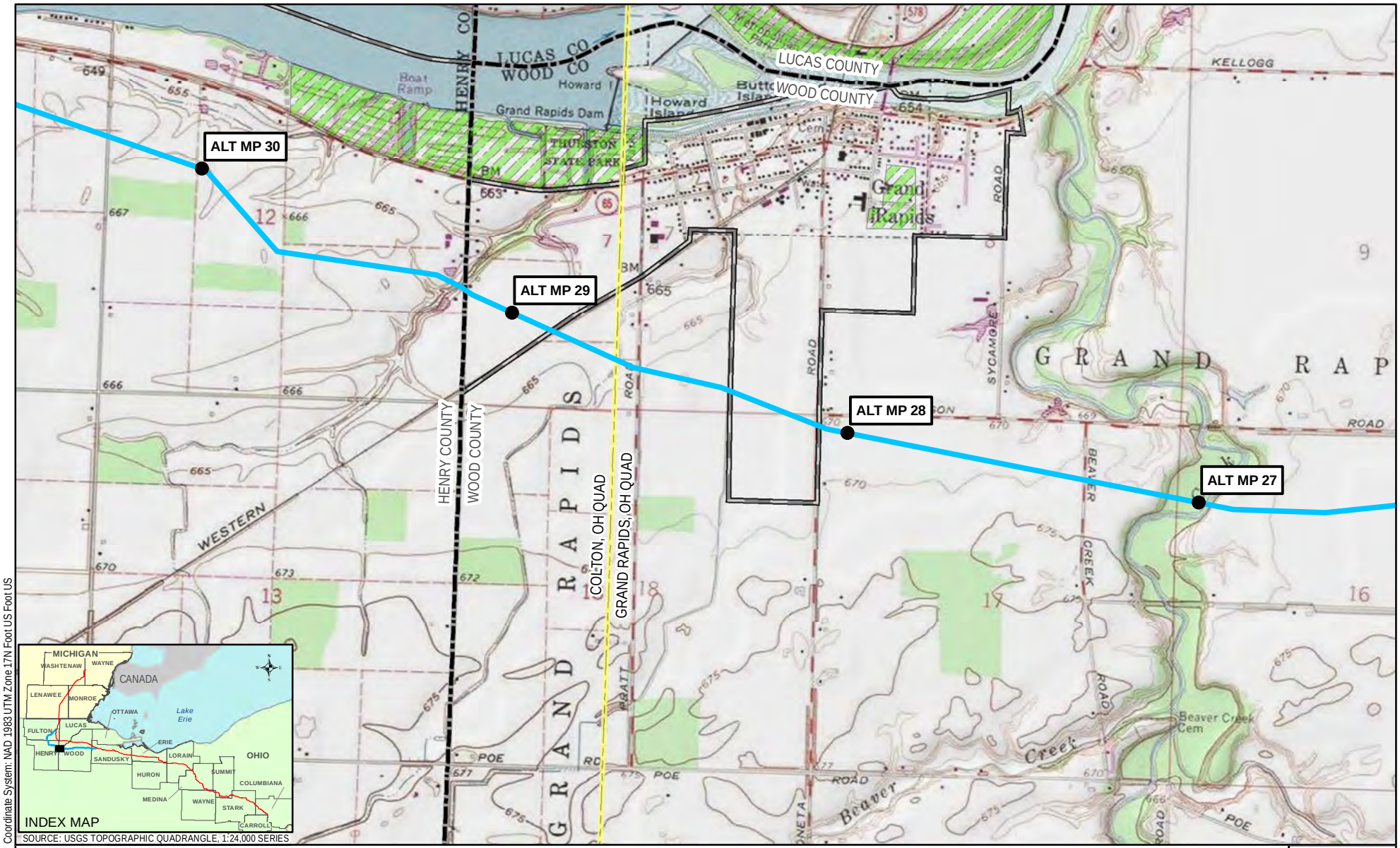
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13 REV E

MAP 8 of 17

NEXUS GAS TRANSMISSION



REVISION RECORD			
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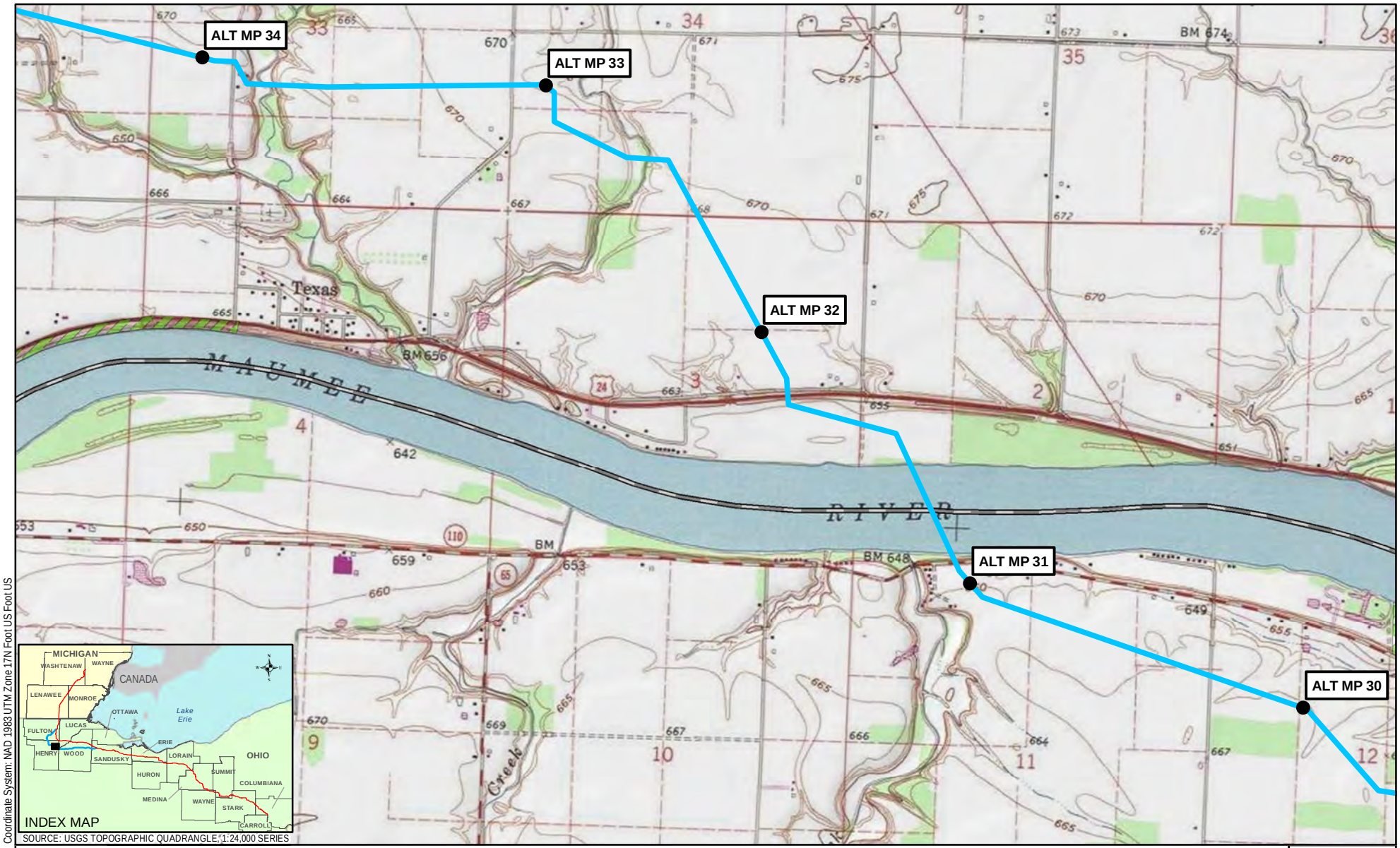
TITLE:

NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: WOOD COUNTY; HENRY COUNTY, OHIO			MOC:
CKD. BY: KM	DRN. BY: CPA		DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-13	REV E	MAP 9 of 17

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

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NO.	REVISION - DESCRIPTION	DATE	MOC#

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TITLE:

NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: HENRY COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

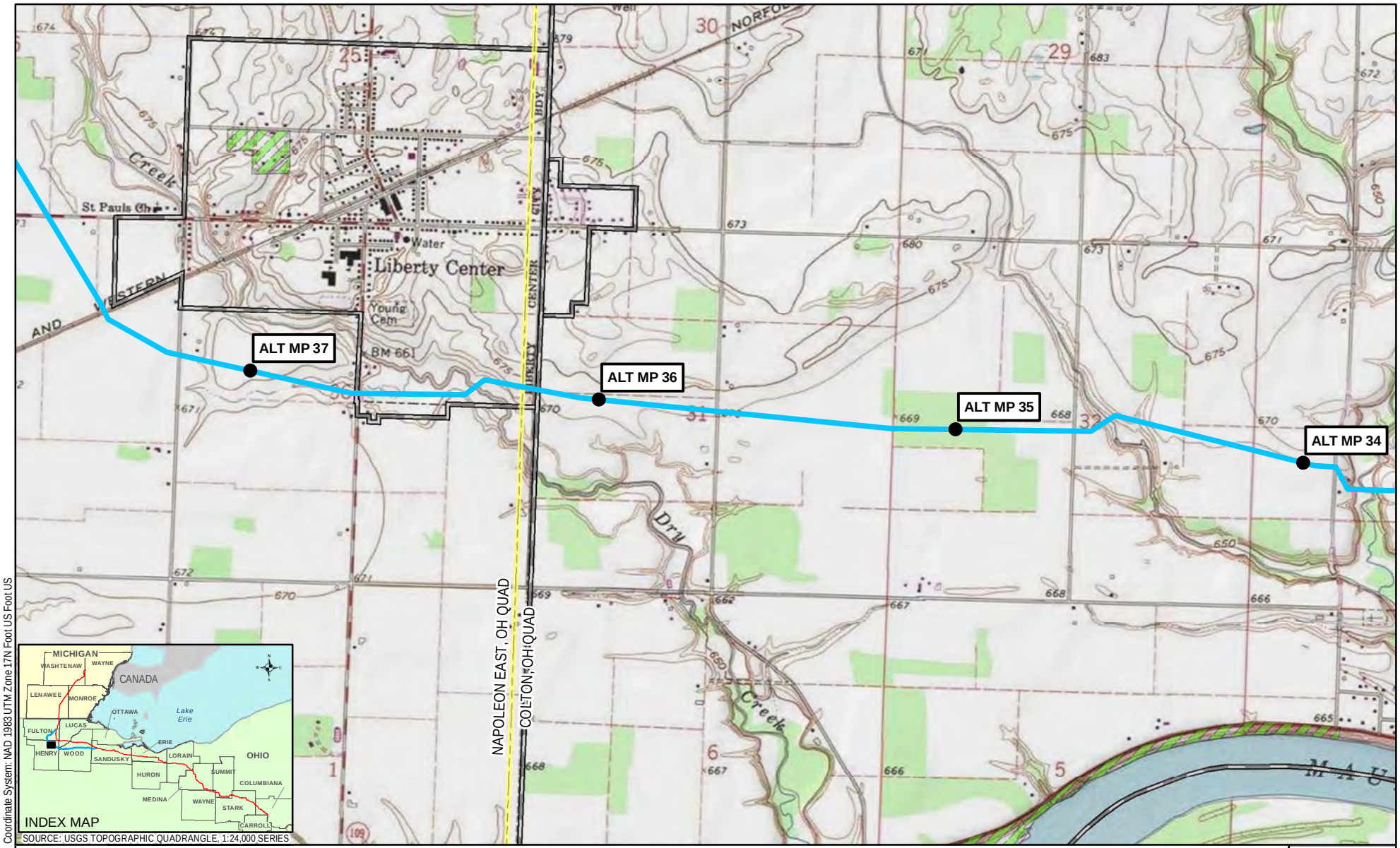
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13 REV E

MAP 10 of 17

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

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NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: HENRY COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13 REV E

MAP 11 of 17

NEXUS GAS TRANSMISSION

Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: HENRY COUNTY, OHIO			MOC:
CKD. BY: KM	DRN. BY: CPA		DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-13	REV E	MAP 12 of 17

NEXUS GAS TRANSMISSION

Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: HENRY COUNTY; FULTON COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

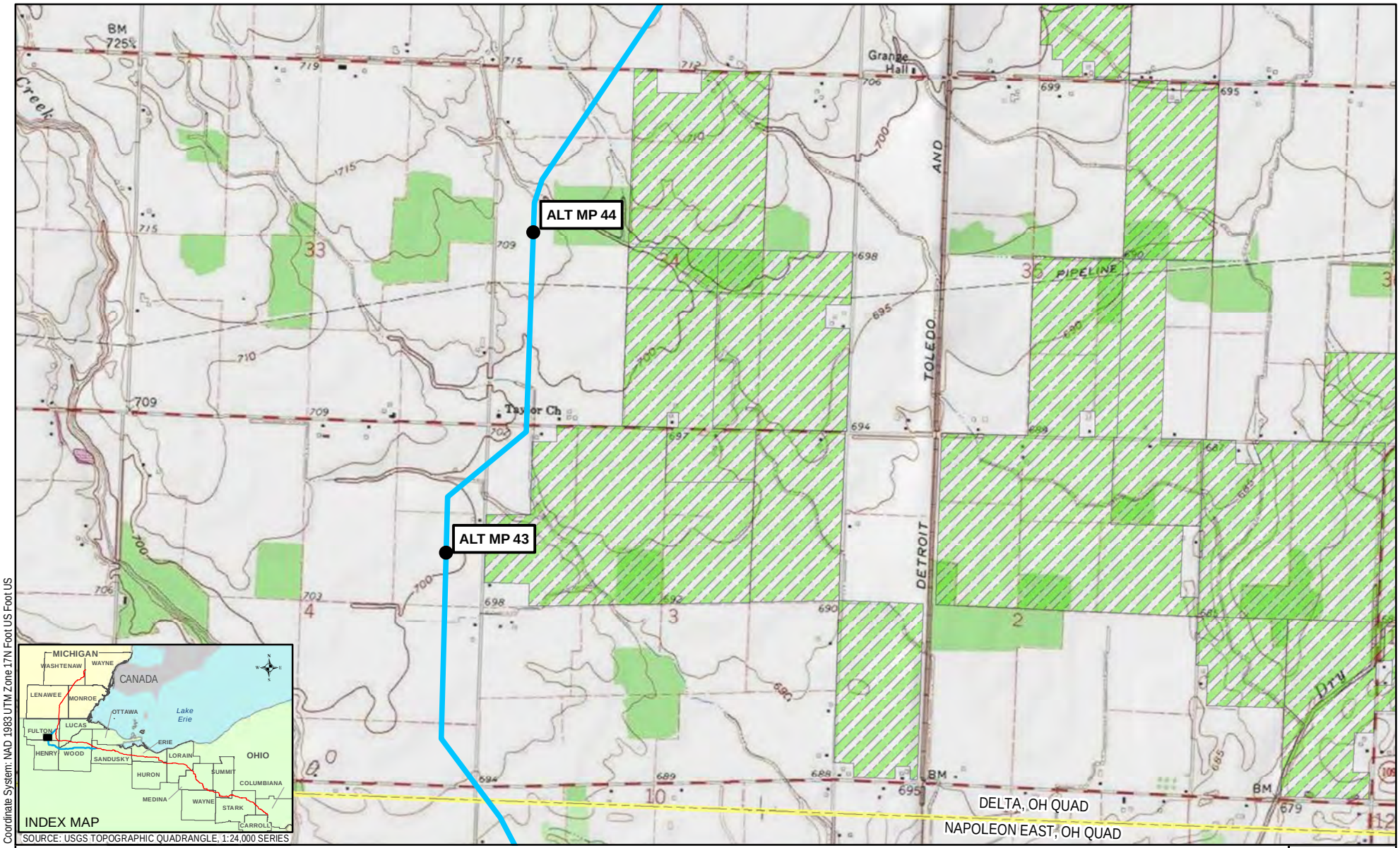
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13 REV E

MAP 13 of 17

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

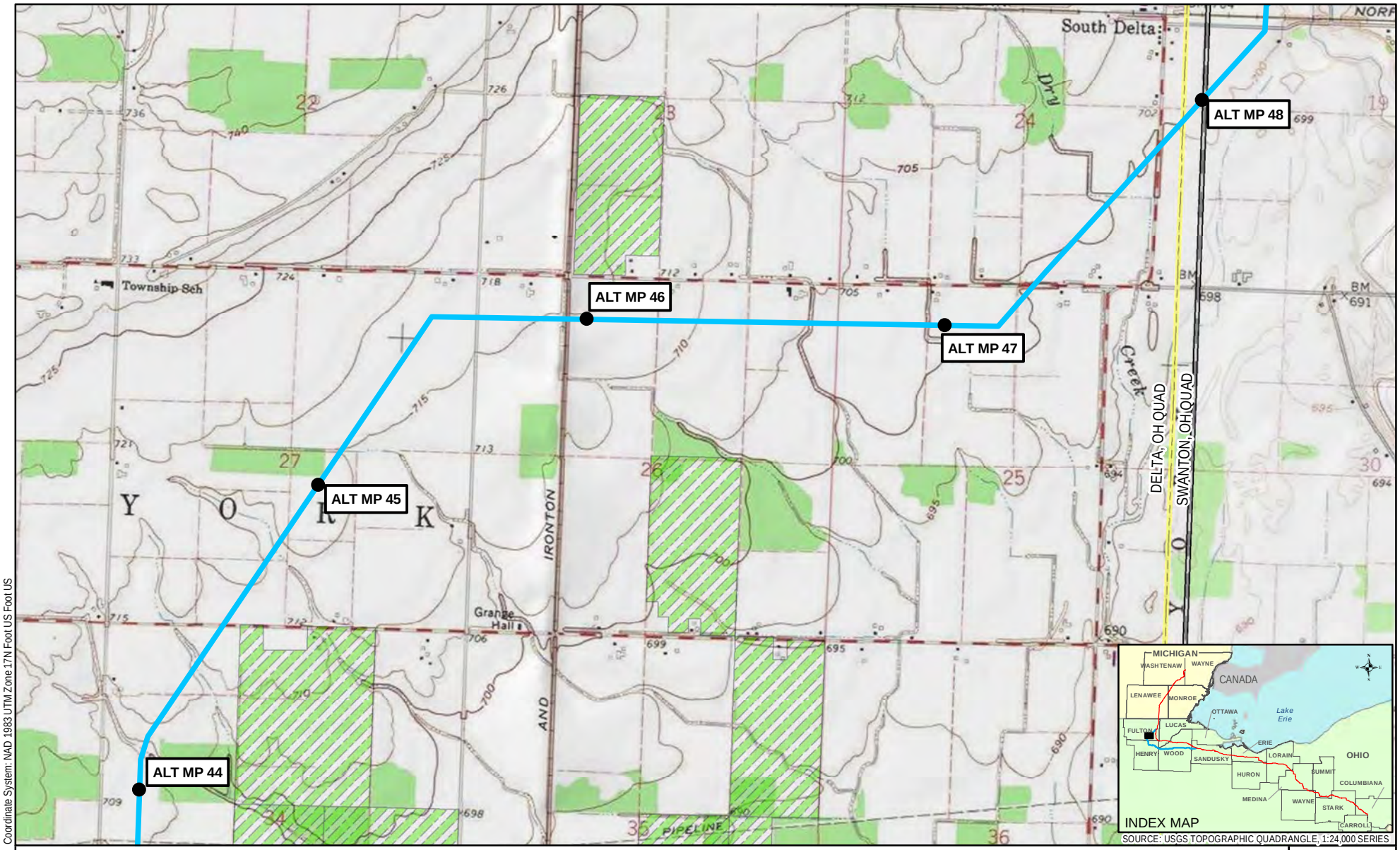
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13 REV E

MAP 14 of 17

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

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NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

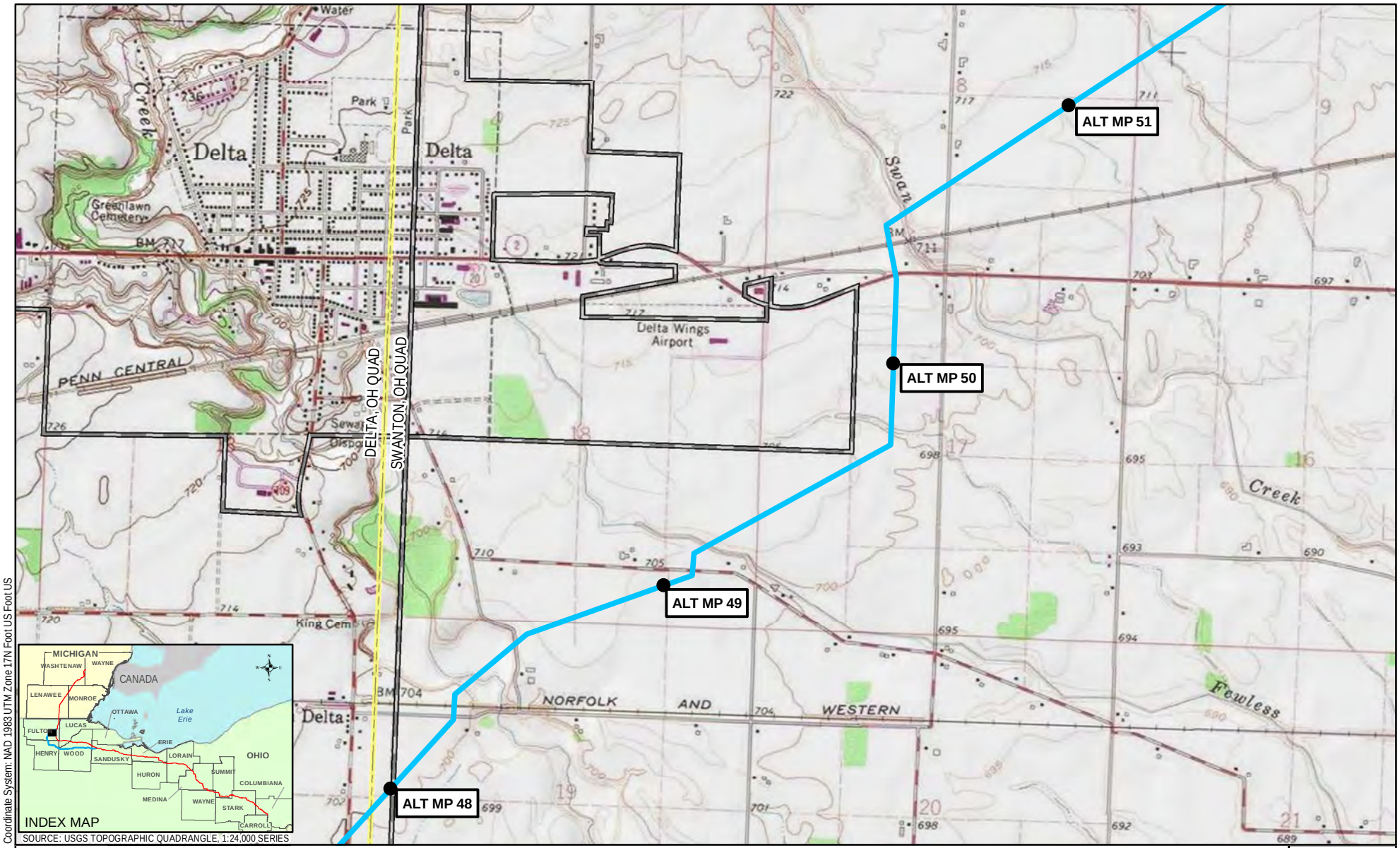
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13 REV E

MAP 15 of 17

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

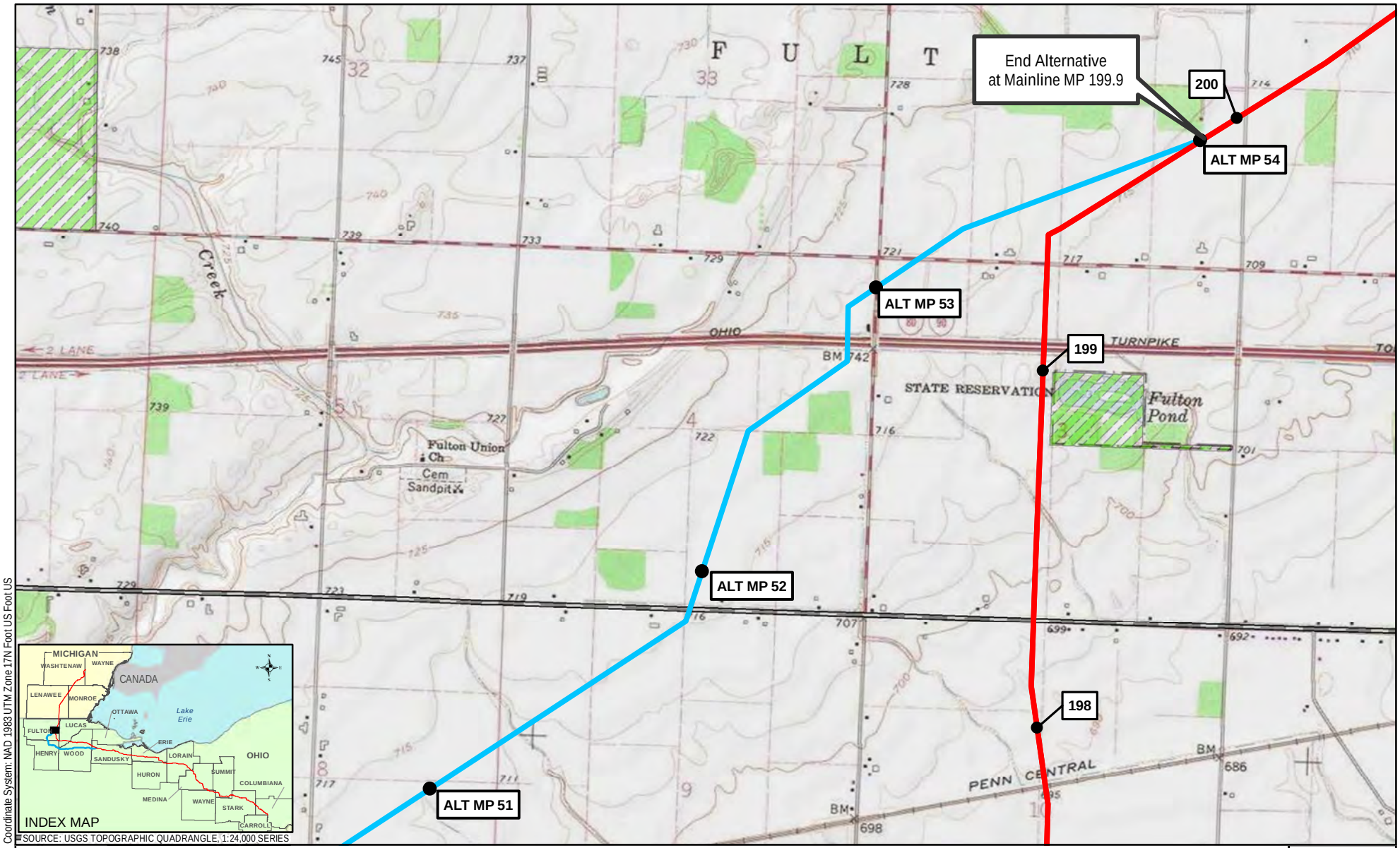
I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON COUNTY, OHIO			MOC:
CKD. BY: KM	DRN. BY: CPA		DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-13	REV E	MAP 16 of 17

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
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TITLE:

NEXUS GAS TRANSMISSION PROJECT
OAK OPENINGS AVOIDANCE ALTERNATIVE - USGS QUAD MAP

LOC.: FULTON COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

DATE: 07/27/2015

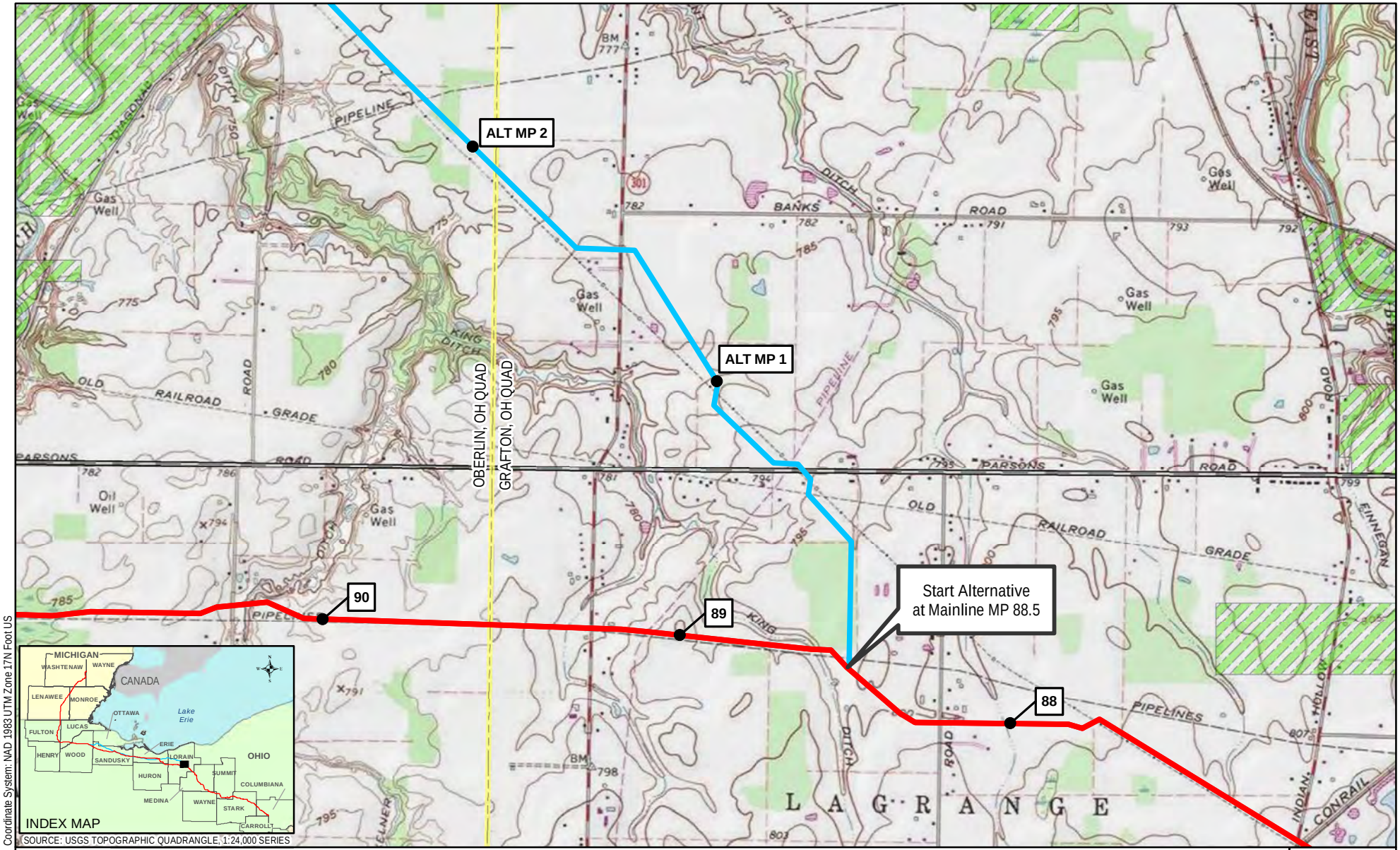
SCALE: 1 inch = 2,000 feet

FIGURE 10.5-13

REV E

MAP 17 of 17

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

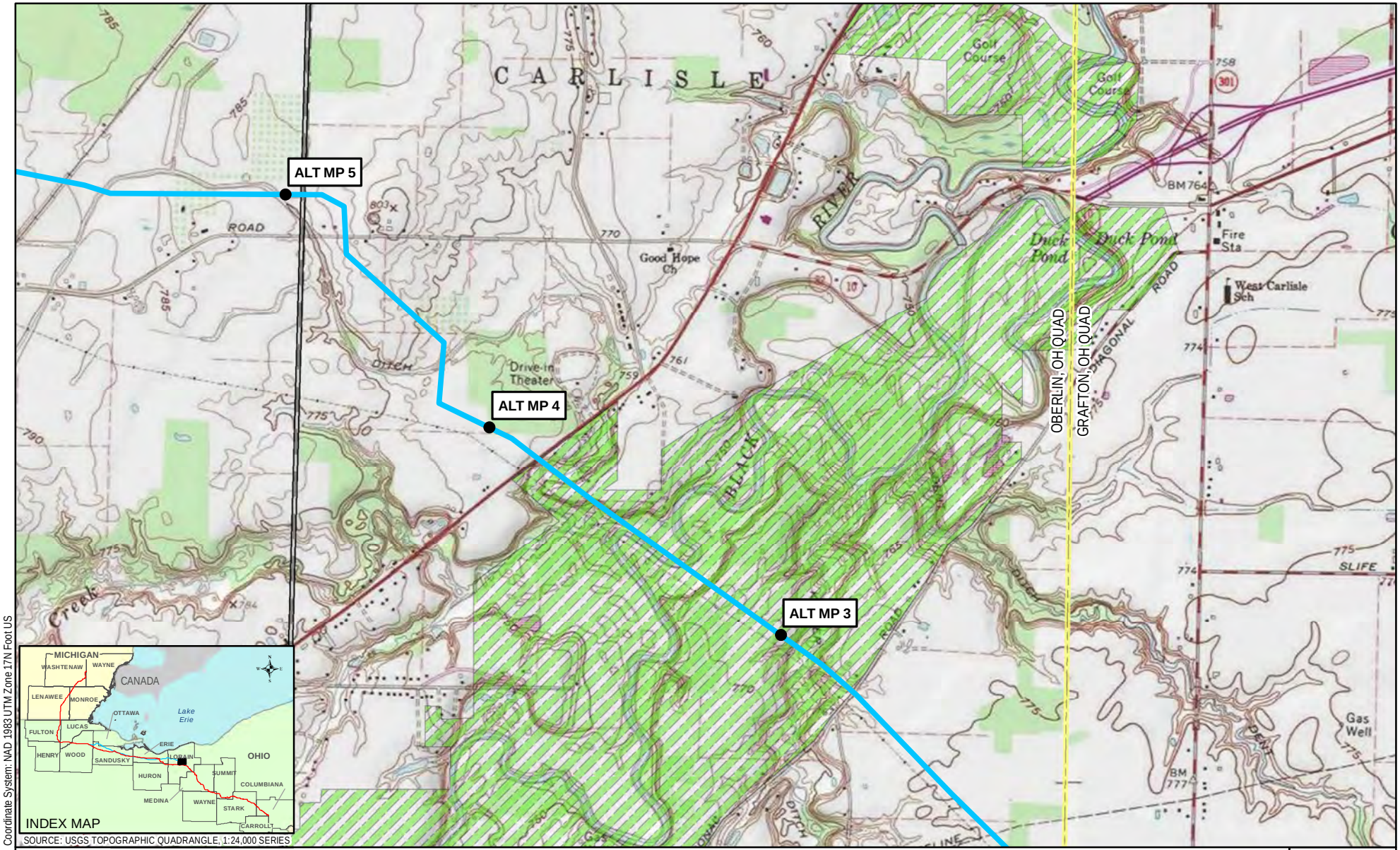
TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: LORAIN COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-14 REV E MAP 1 of 27

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

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TITLE:

NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: LORAIN COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

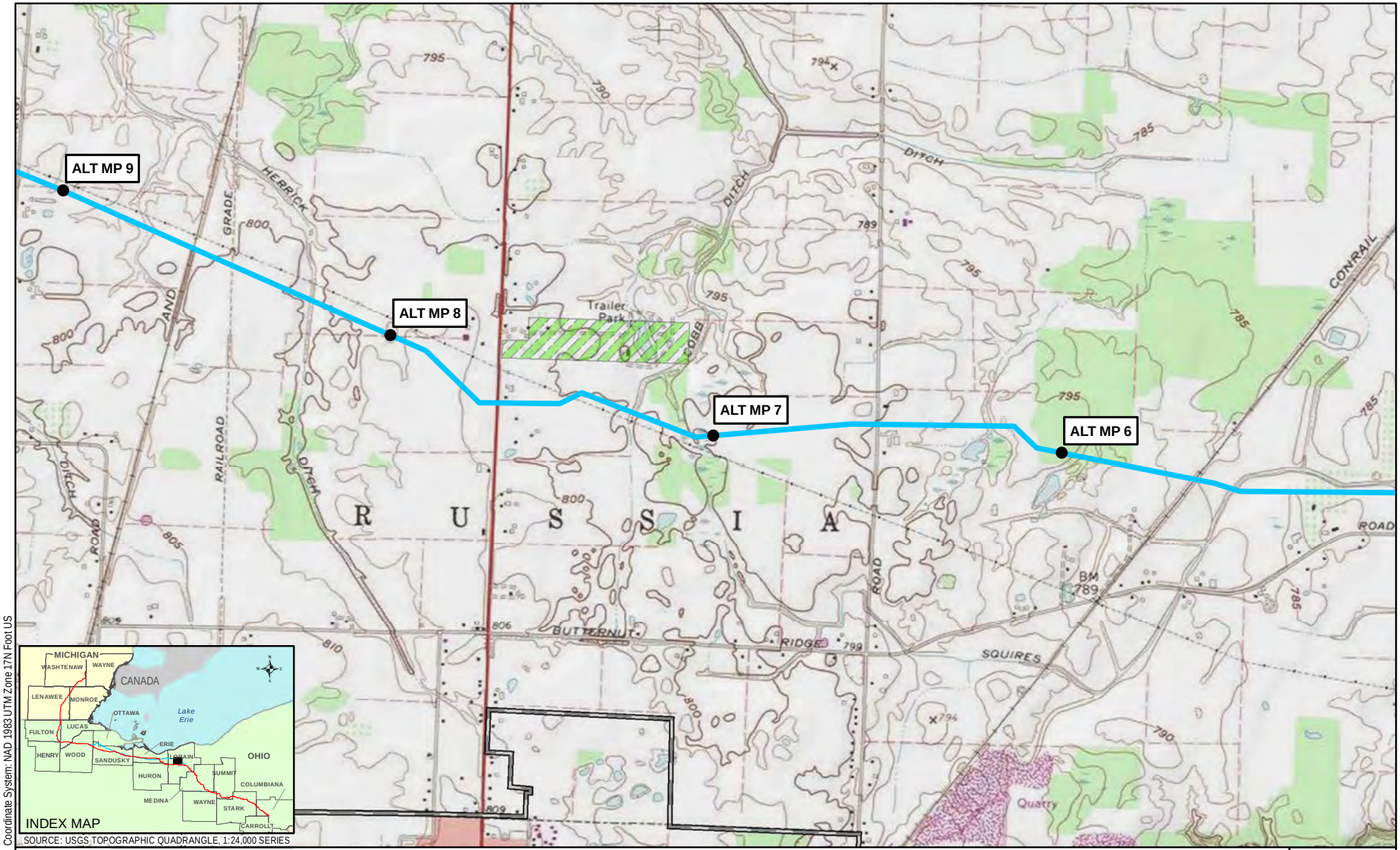
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-14 REV E

MAP 2 of 27

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

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NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: LORAIN COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

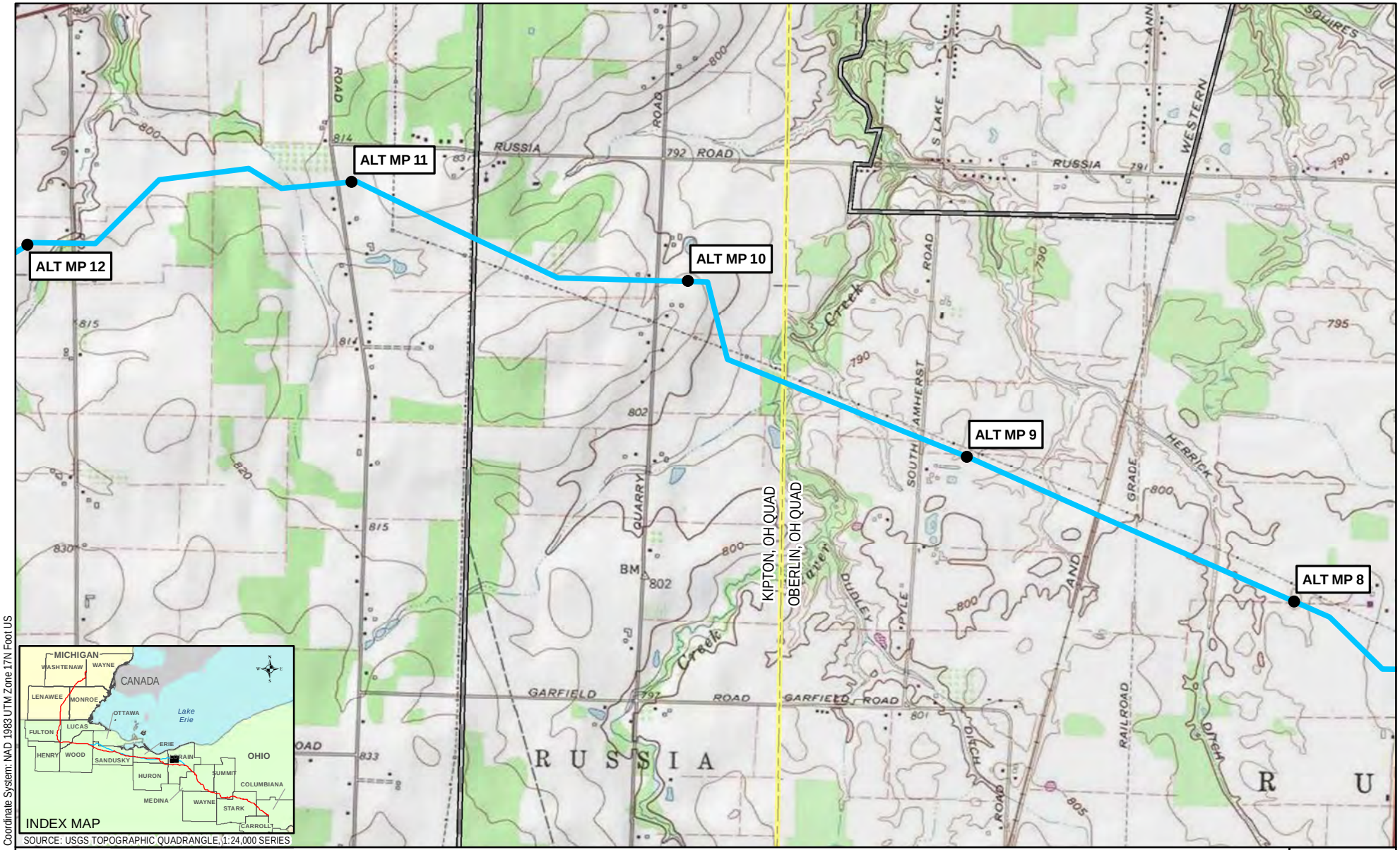
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-14 REV E

MAP 3 of 27

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
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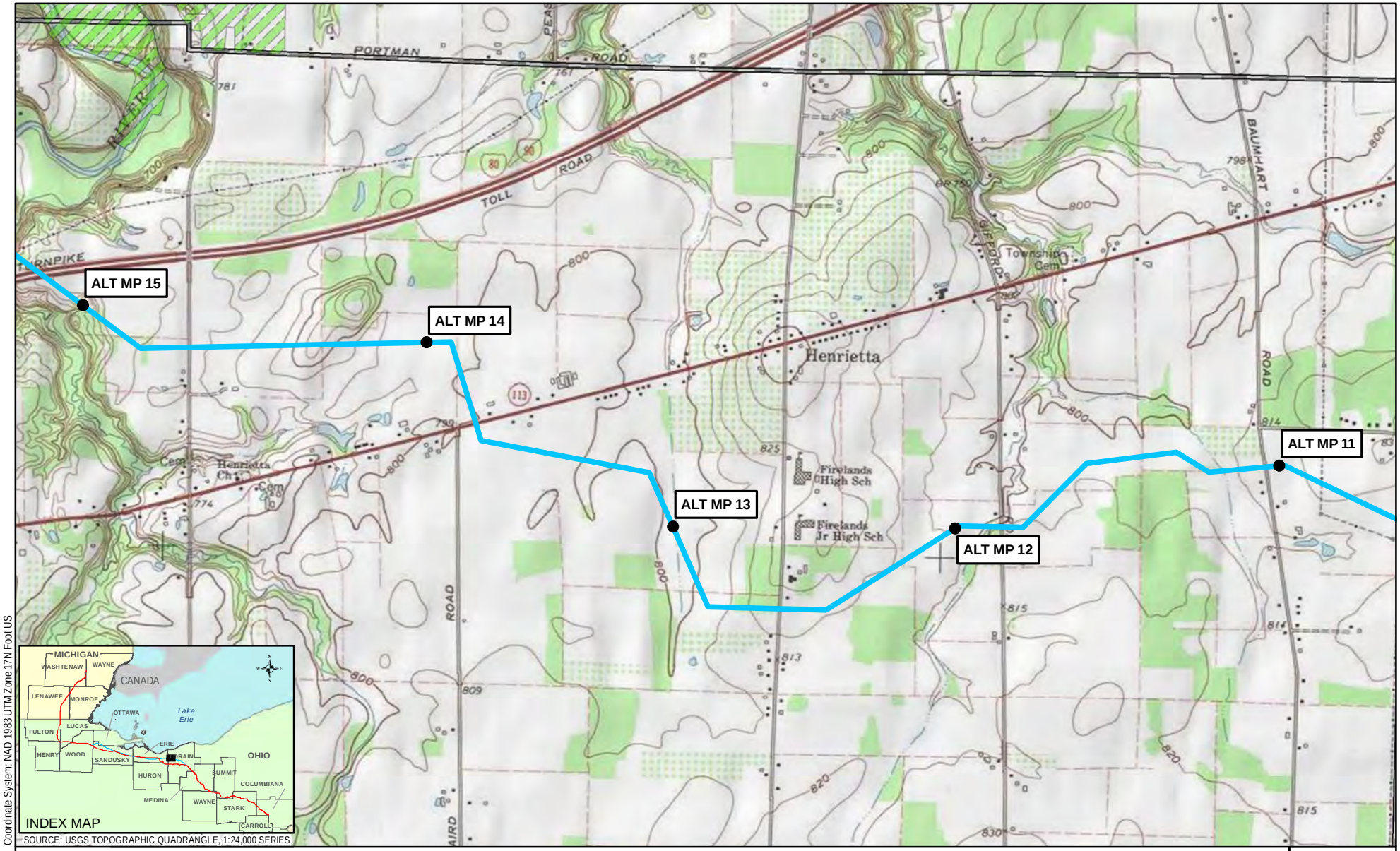
TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: LORAIN COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-14 REV E MAP 4 of 27

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

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TITLE:

NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: LORAIN COUNTY; ERIE COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

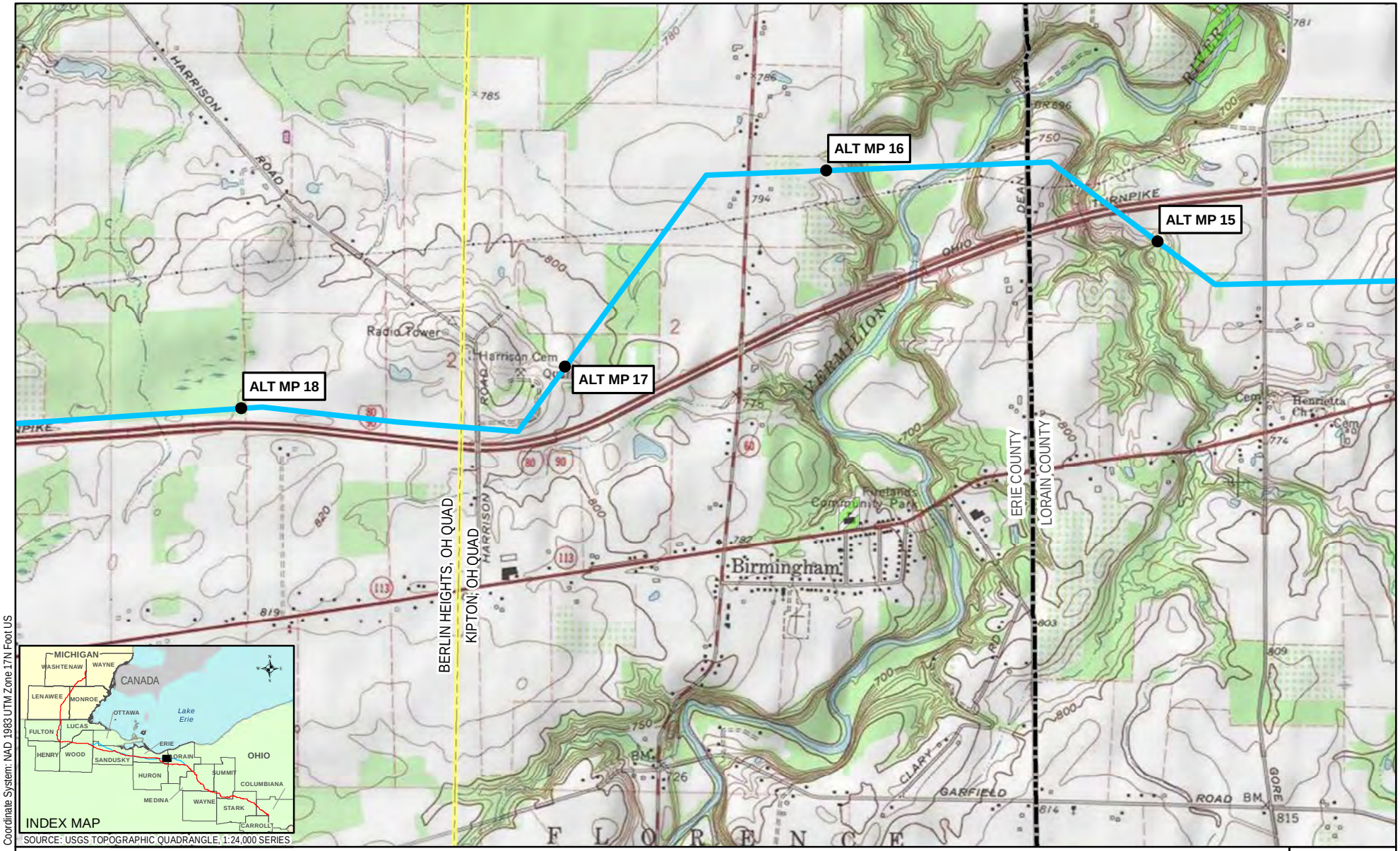
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-14 REV E

MAP 5 of 27

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

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TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: LORAIN COUNTY; ERIE COUNTY, OHIO

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DRN. BY: CPA

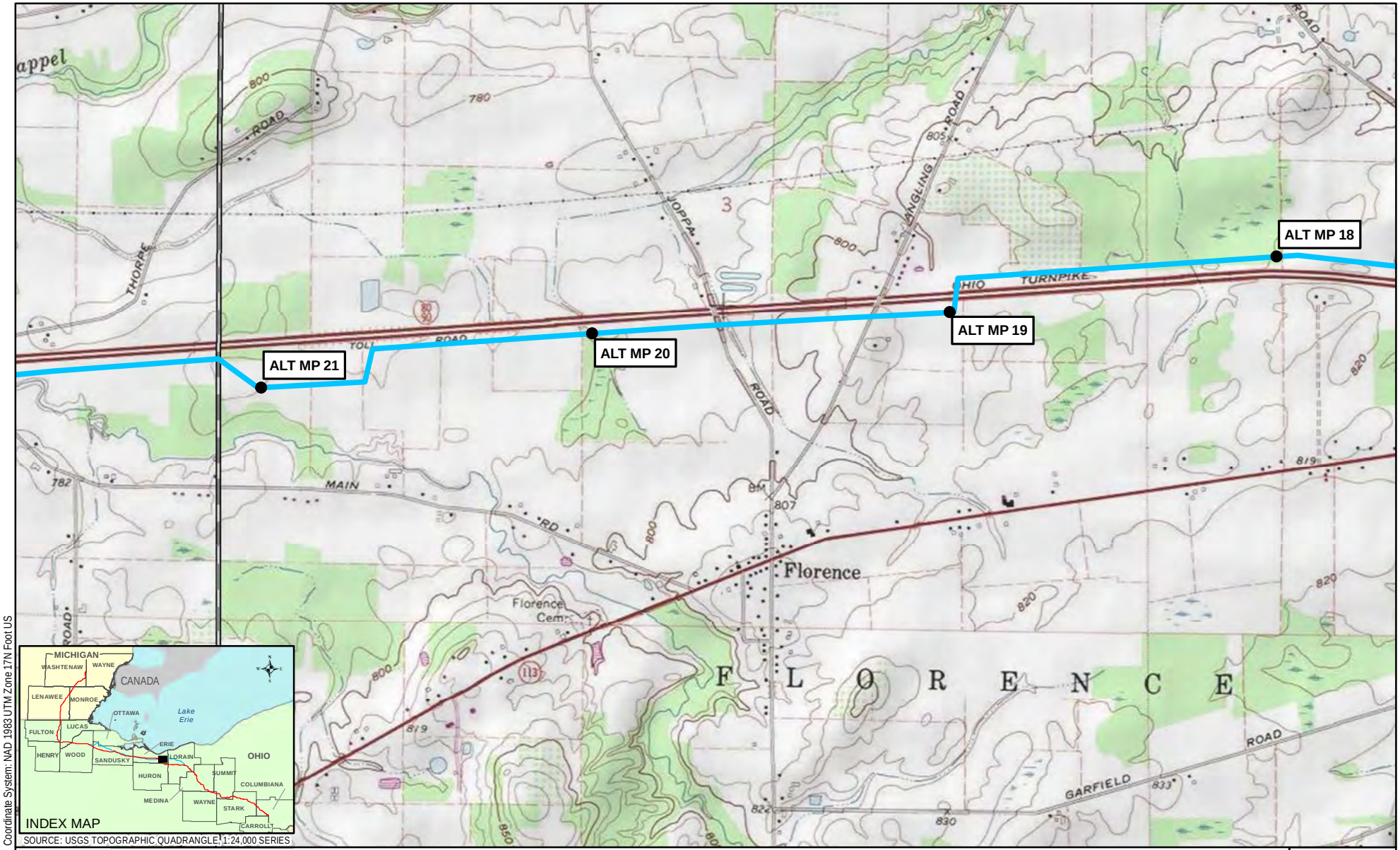
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-14 REV E

MAP 6 of 27

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
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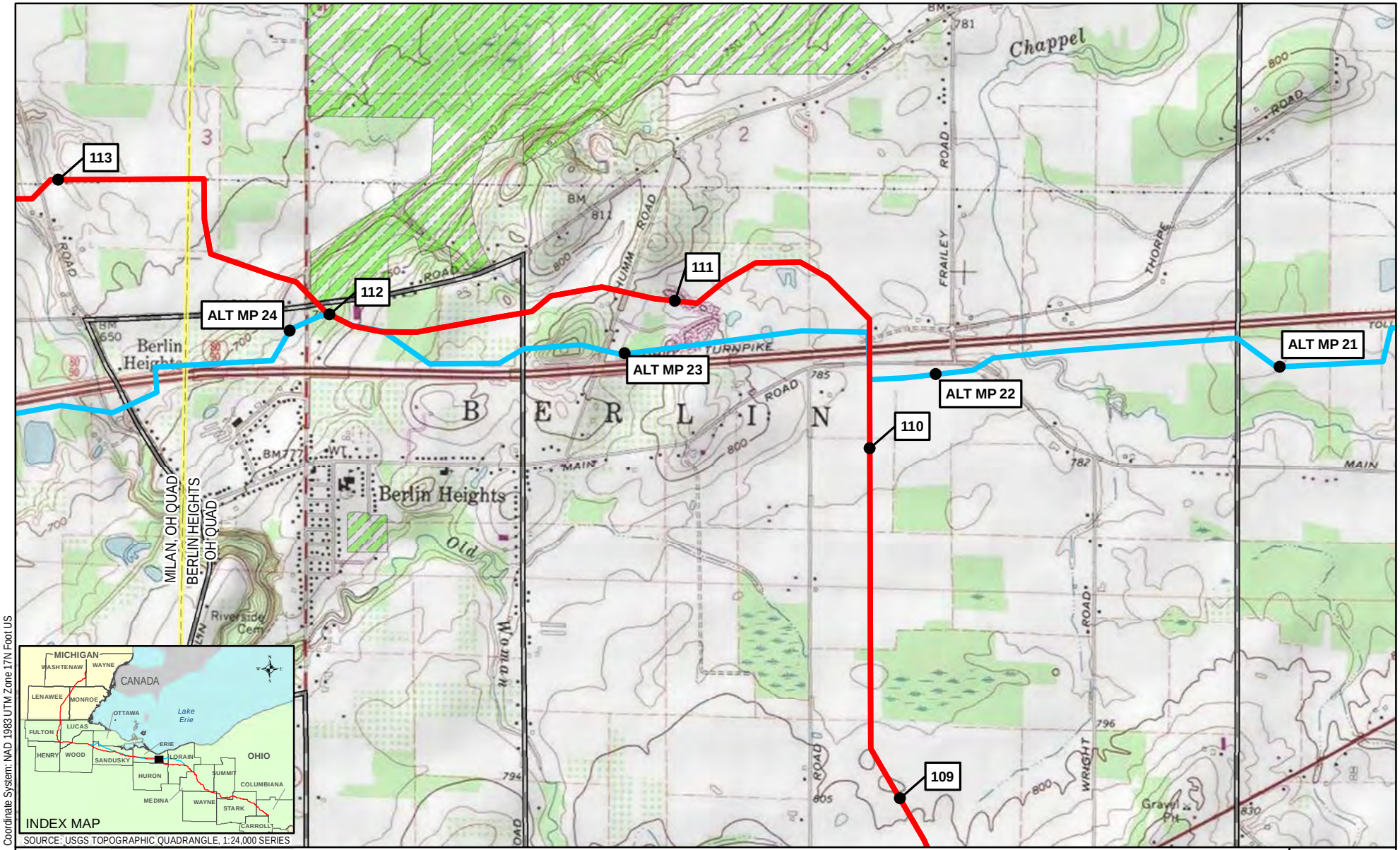
TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: ERIE COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-14 REV E MAP 7 of 27

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
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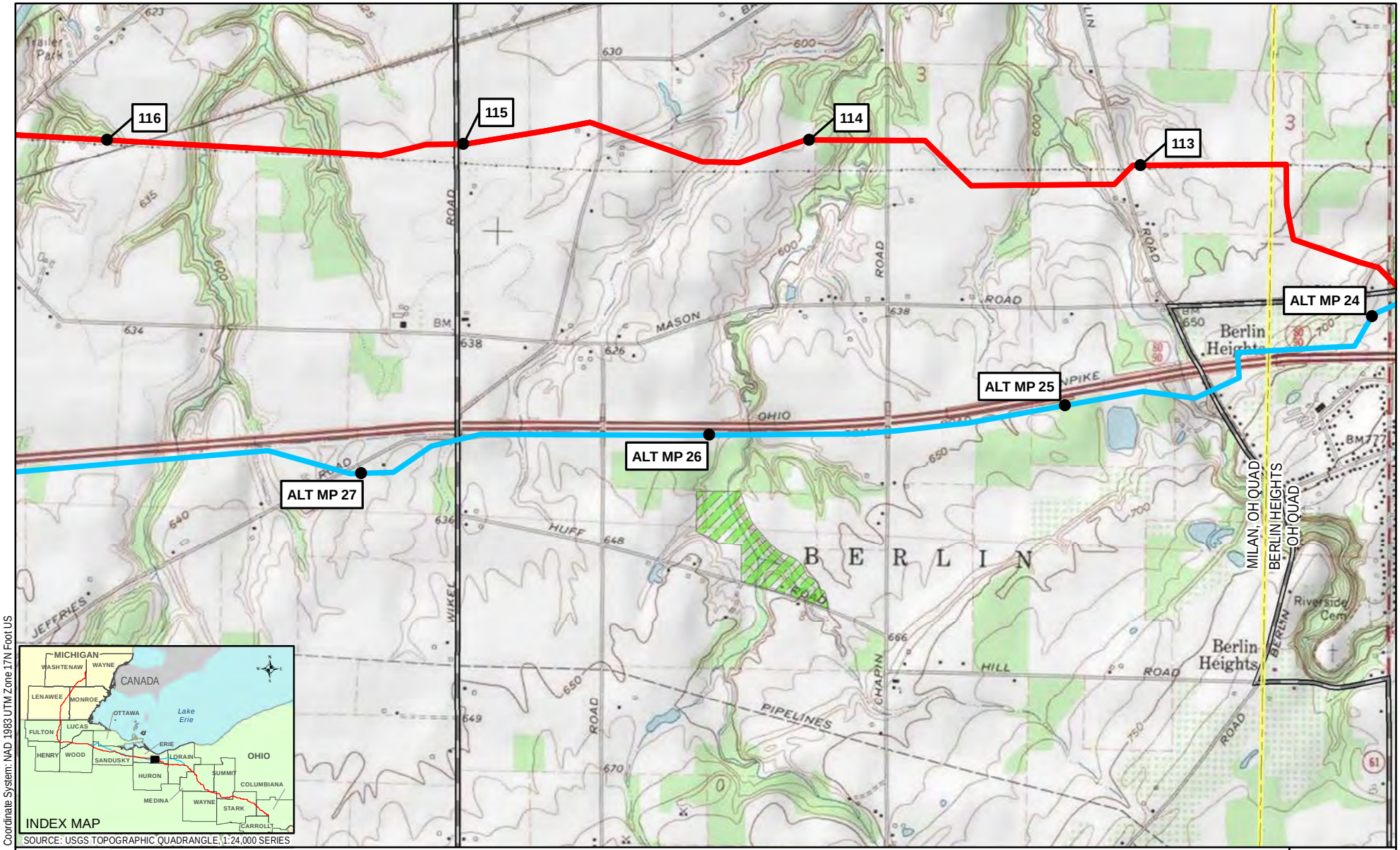
TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: ERIE COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-14 REV E MAP 8 of 27

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

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I.G.

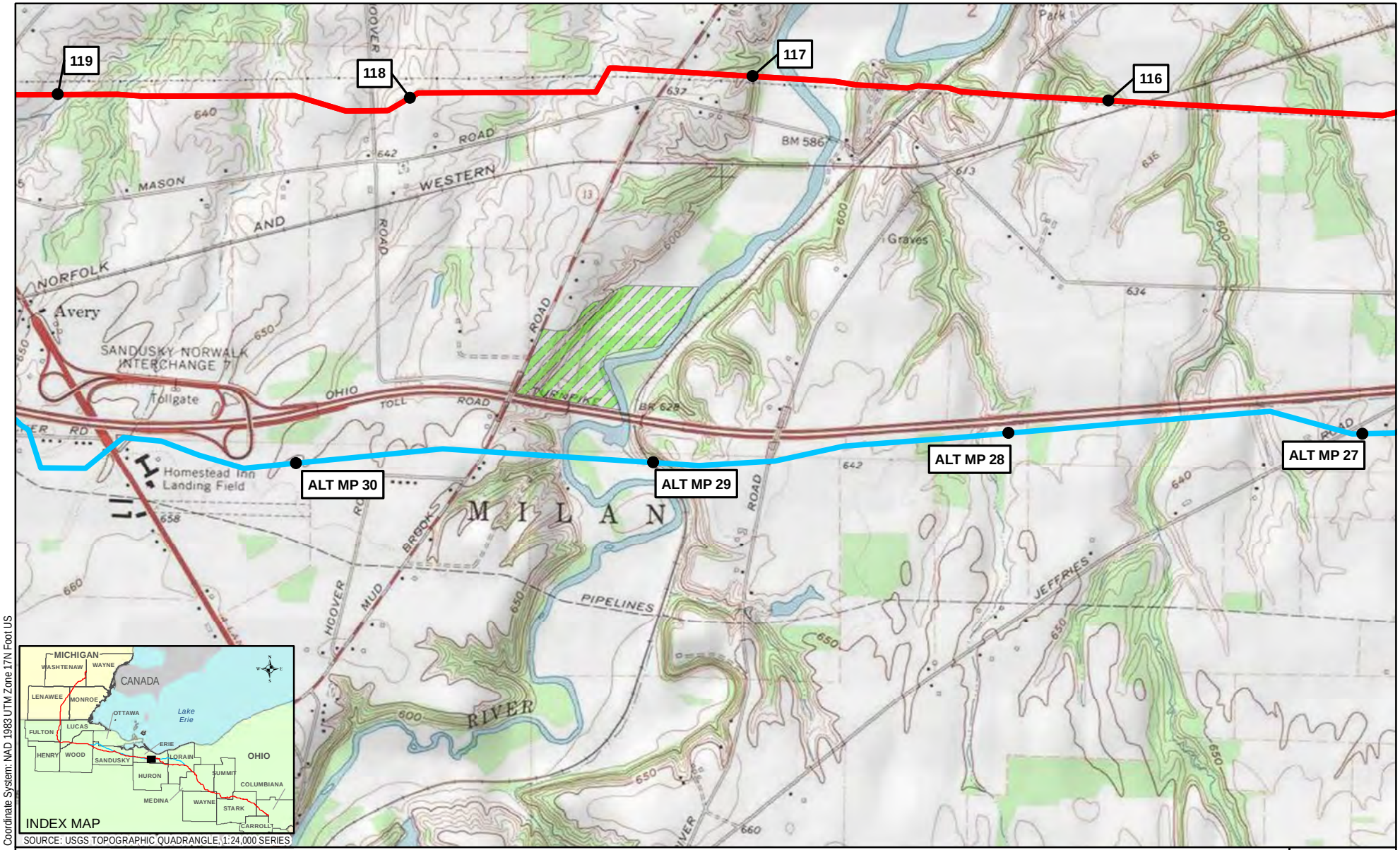
TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: ERIE COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-14 REV E MAP 9 of 27

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

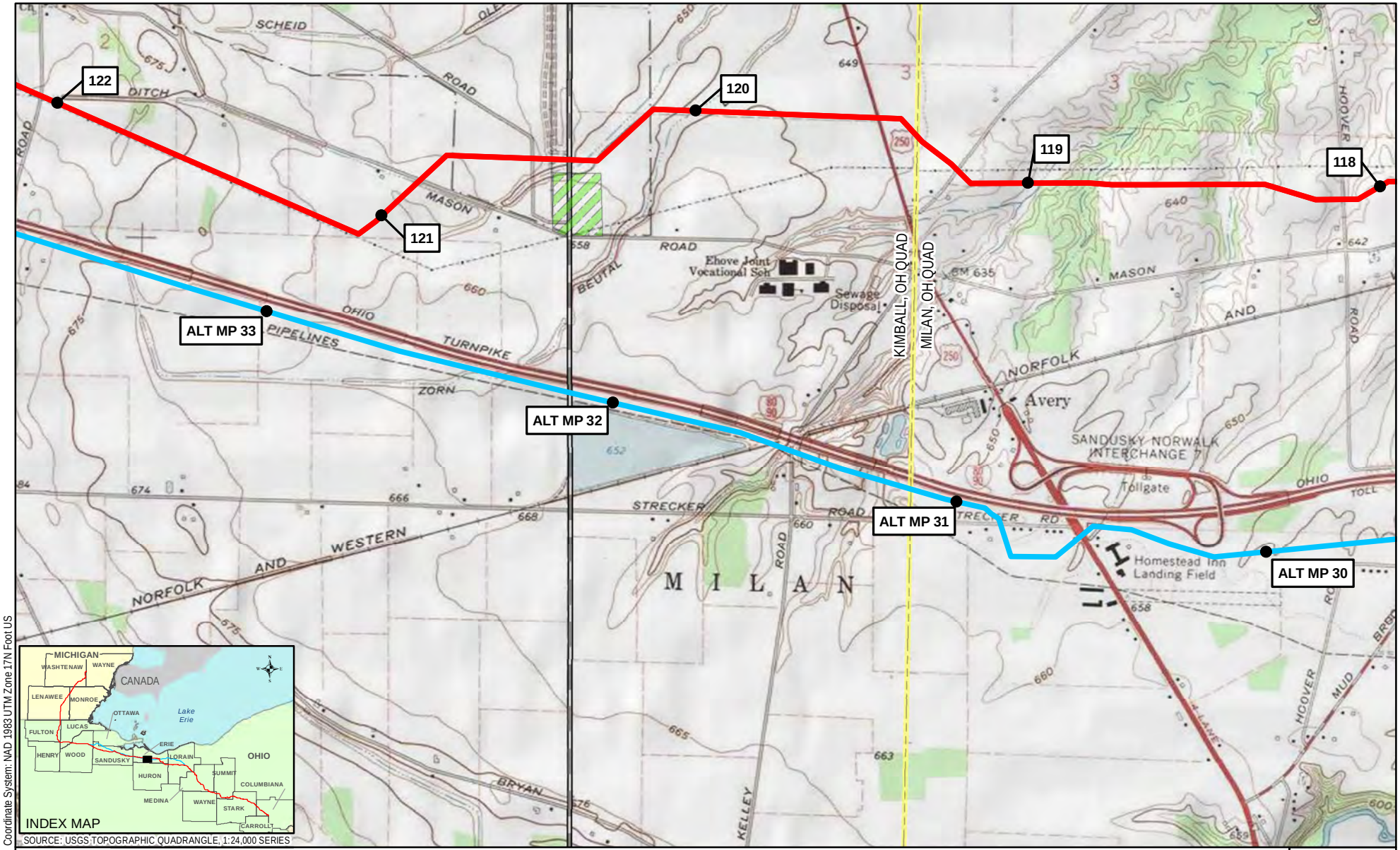
TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: ERIE COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-14 REV E MAP 10 of 27

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

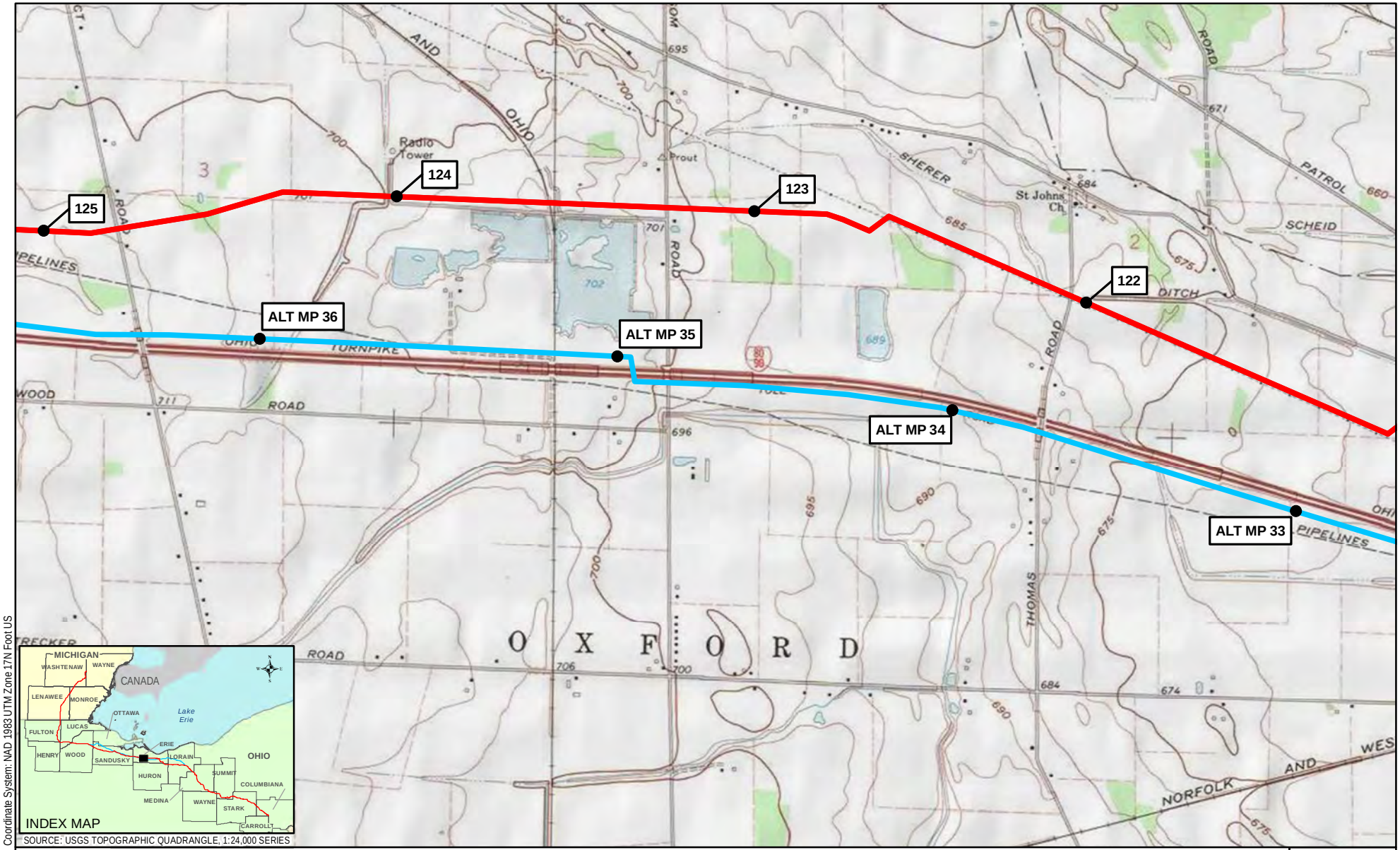
TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: ERIE COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-14 REV E MAP 11 of 27

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

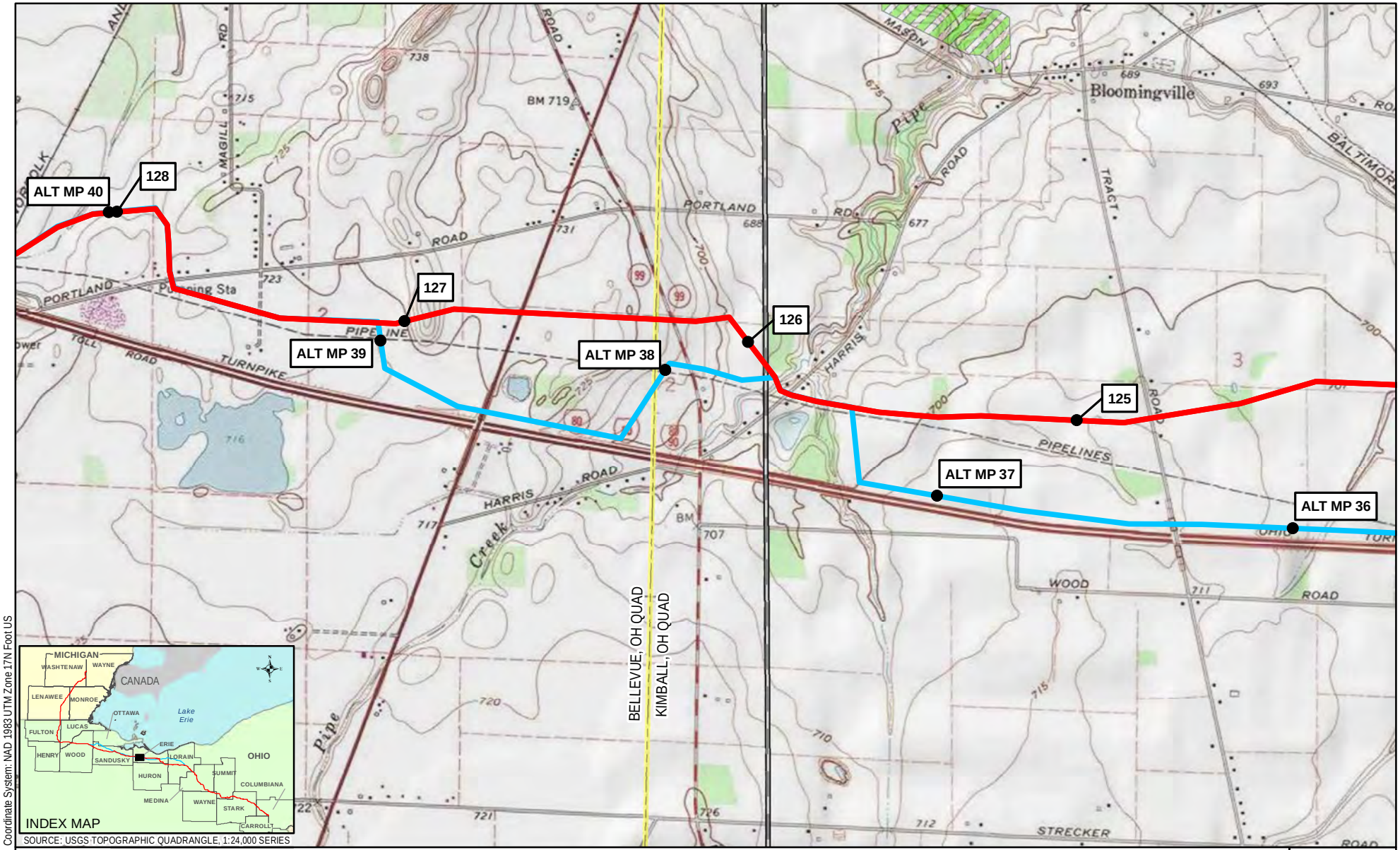
TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: ERIE COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-14 REV E MAP 12 of 27

NEXUS GAS TRANSMISSION



1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

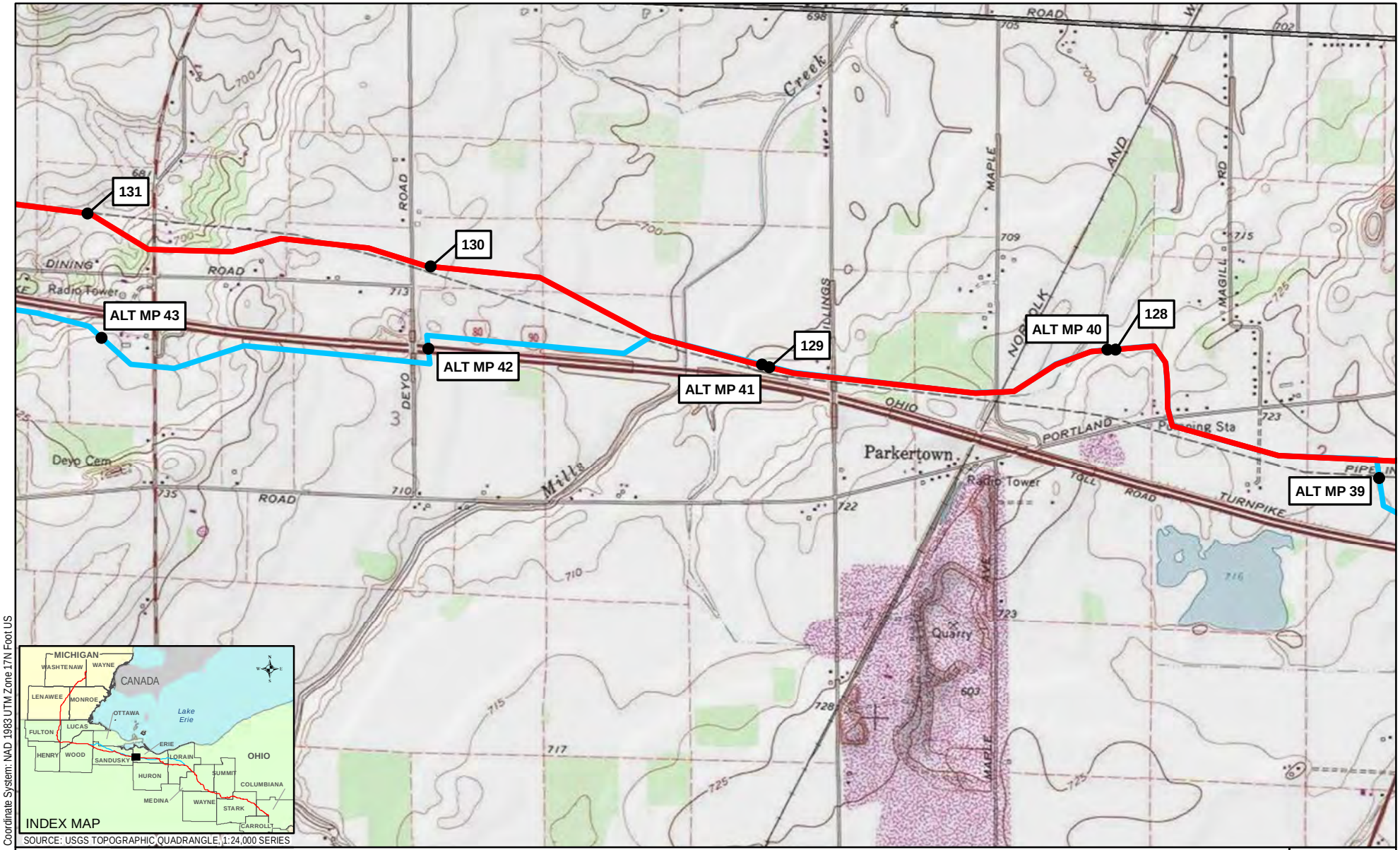
TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: ERIE COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-14 REV E MAP 13 of 27

NEXUS GAS TRANSMISSION



REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

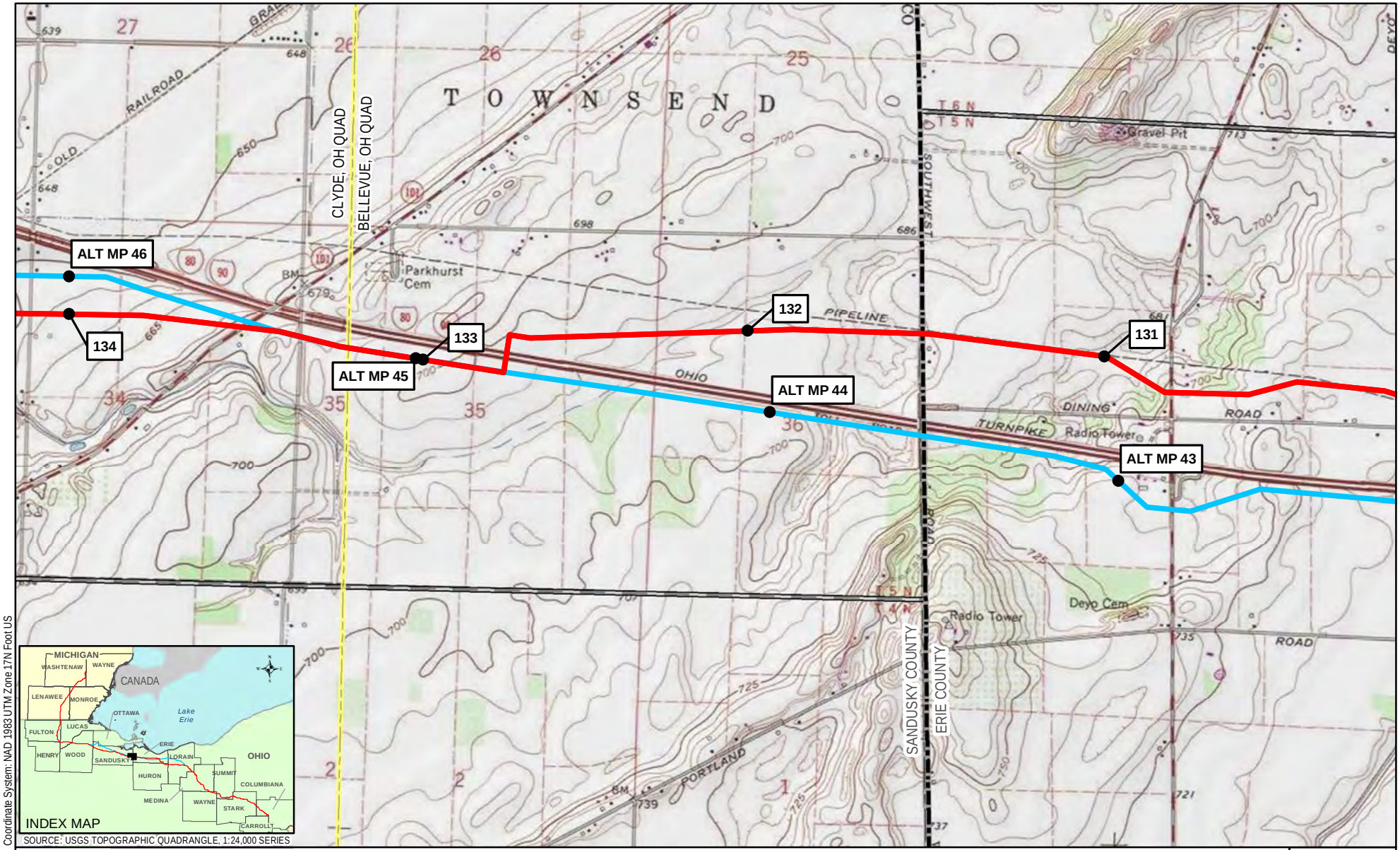
TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: ERIE COUNTY; SANDUSKY COUNTY, OHIO — MOC:

CKD. BY: KM — DRN. BY: CPA — DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet — FIGURE 10.5-14 — REV E — MAP 14 of 27

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: ERIE COUNTY; SANDUSKY COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

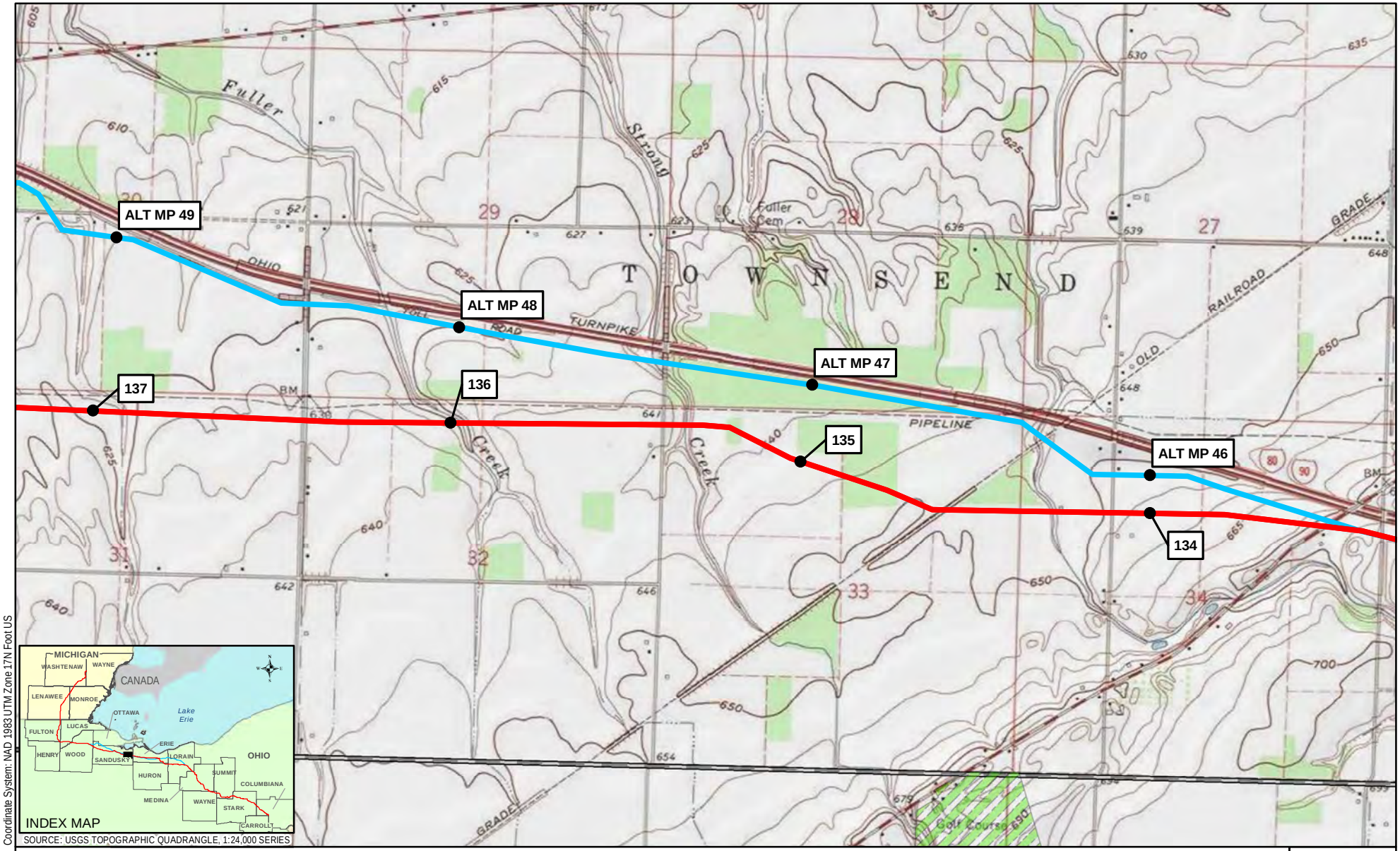
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-14 REV E

MAP 15 of 27

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

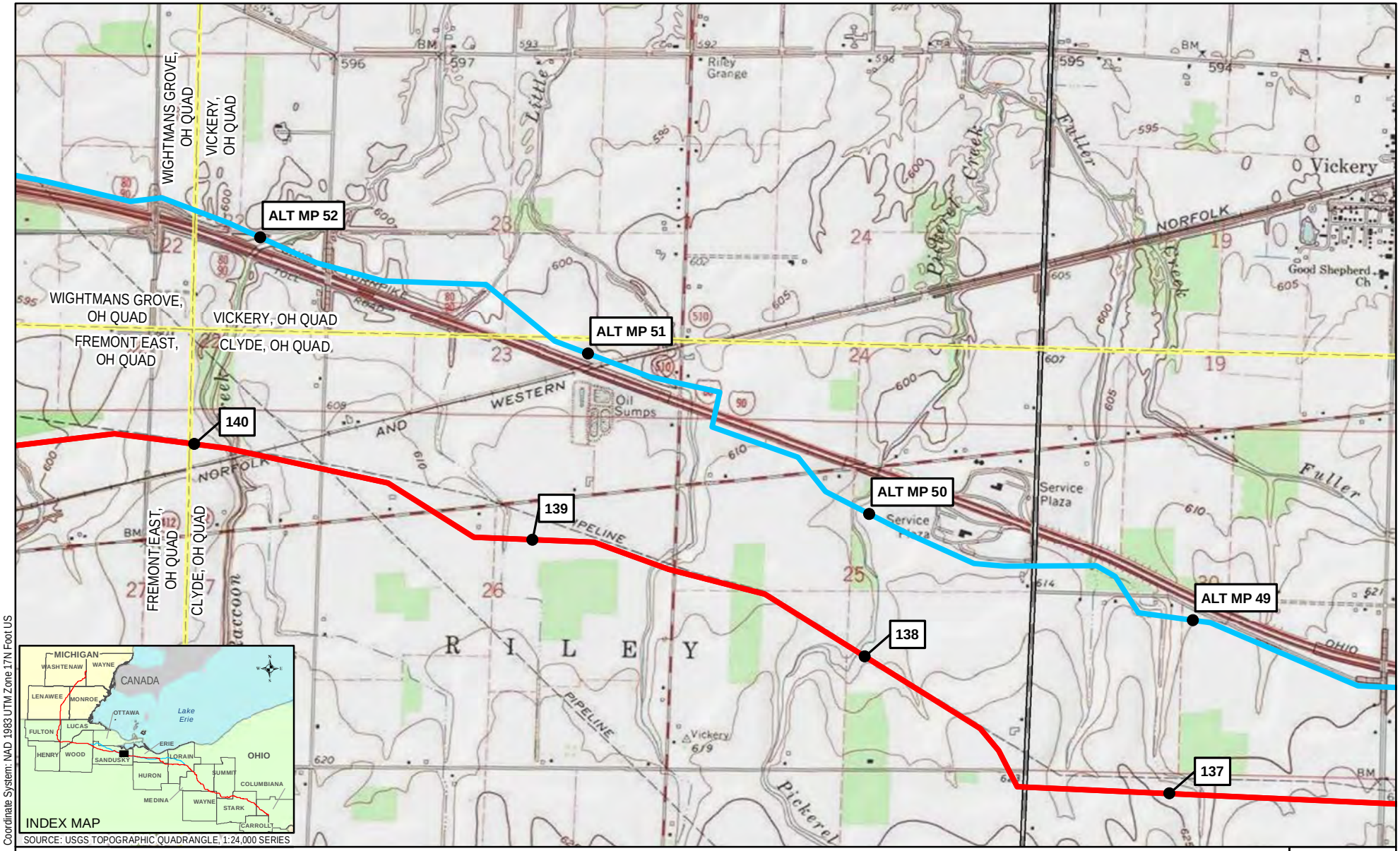
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-14 REV E

MAP 16 of 27

NEXUS GAS TRANSMISSION



REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

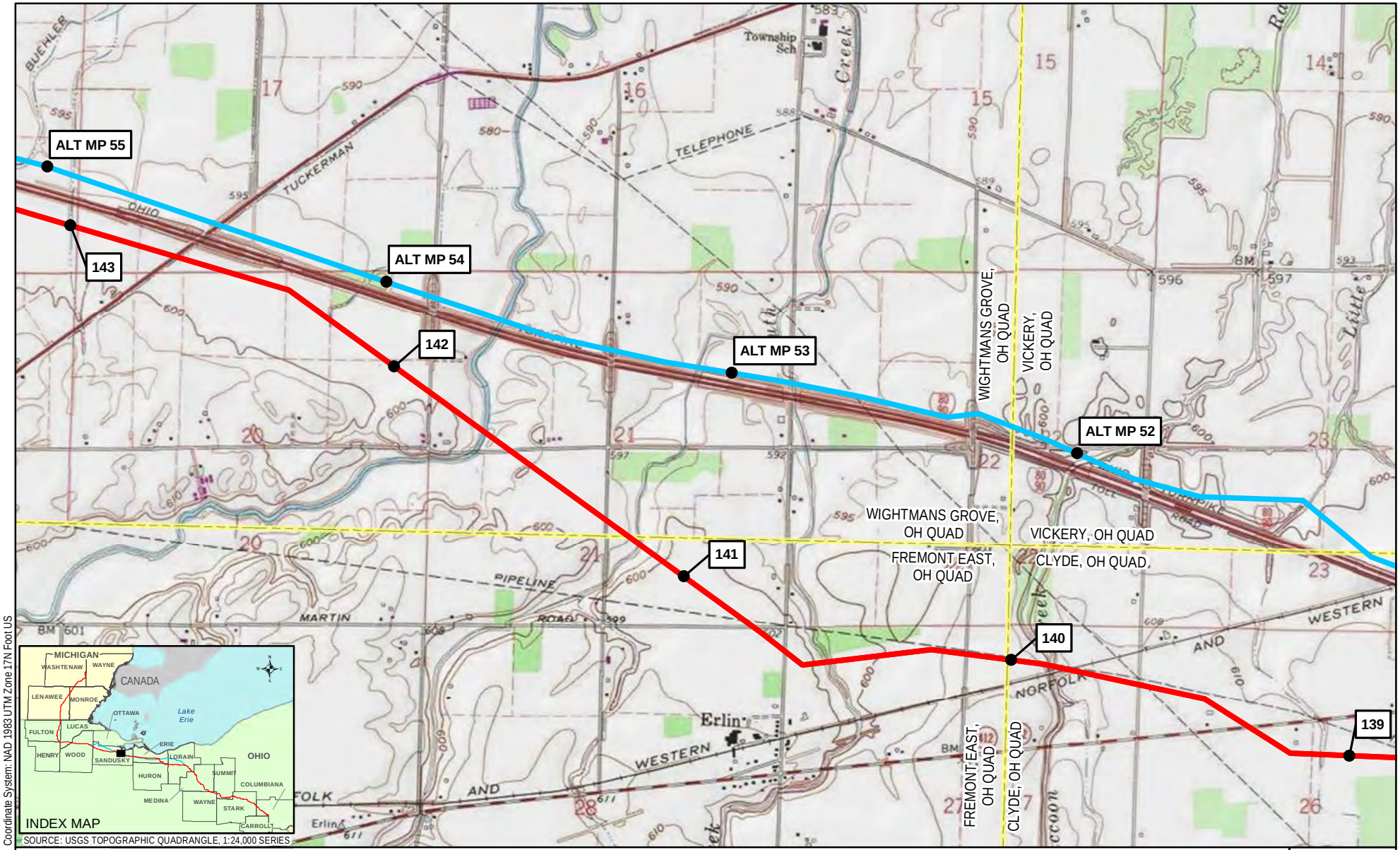
I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OHIO			MOC:
CKD. BY: KM	DRN. BY: CPA		DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-14	REV E	MAP 17 of 27

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

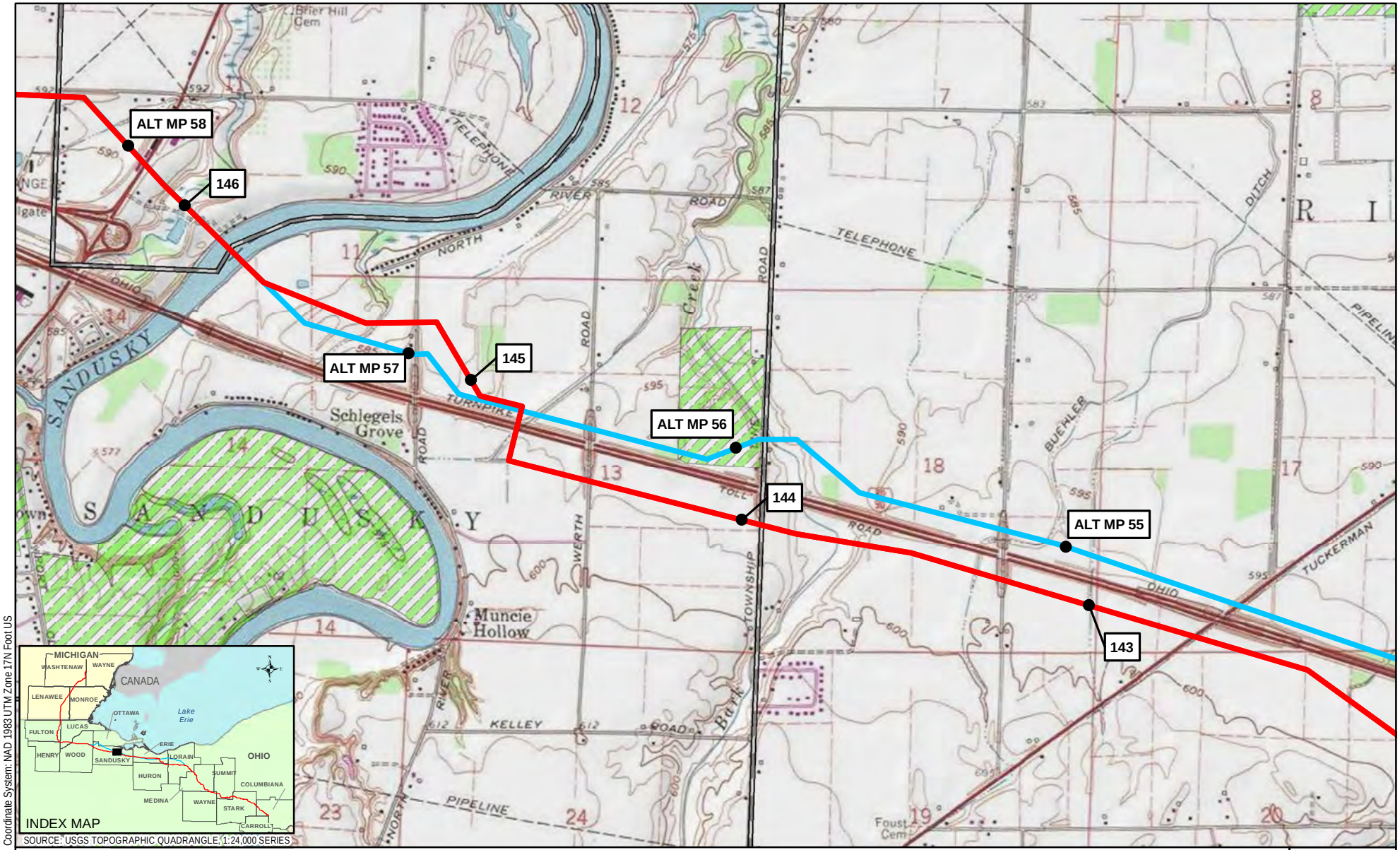
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-14 REV E

MAP 18 of 27

NEXUS SM GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

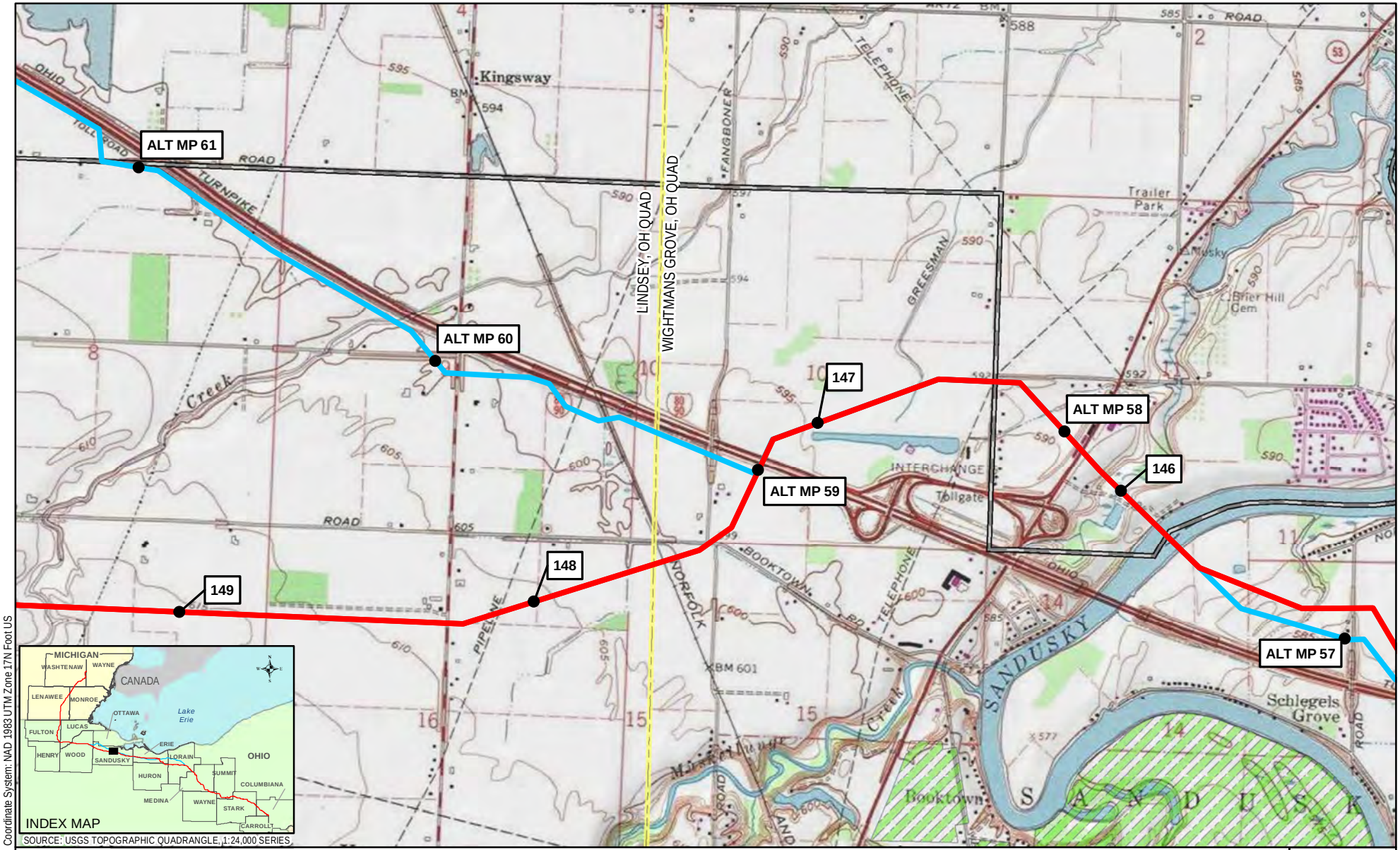
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-14 REV E

MAP 19 of 27

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-14 REV E MAP 20 of 27

NEXUS GAS TRANSMISSION

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

I.G.

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

TITLE:

NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

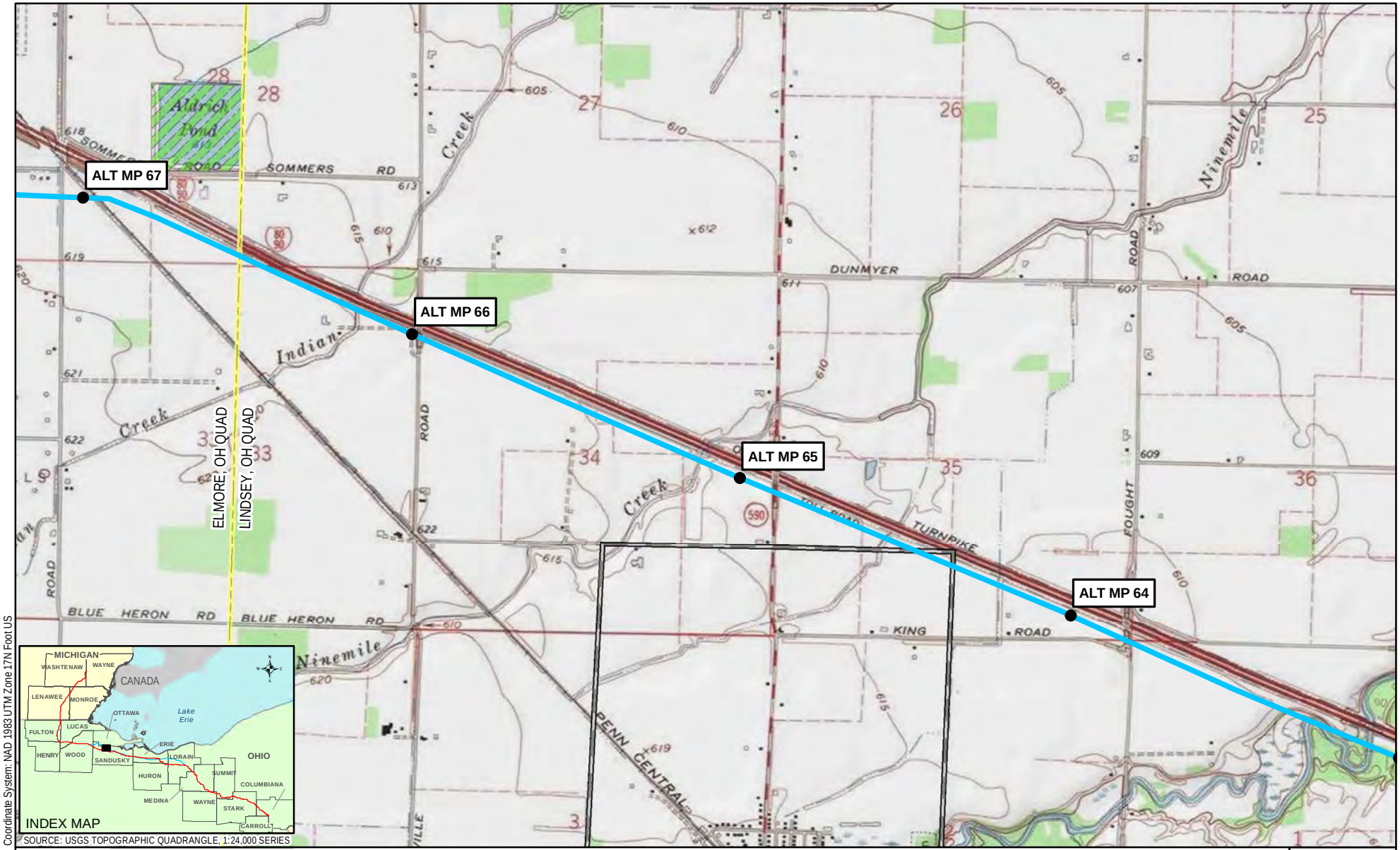
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-14 REV E

MAP 21 of 27

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

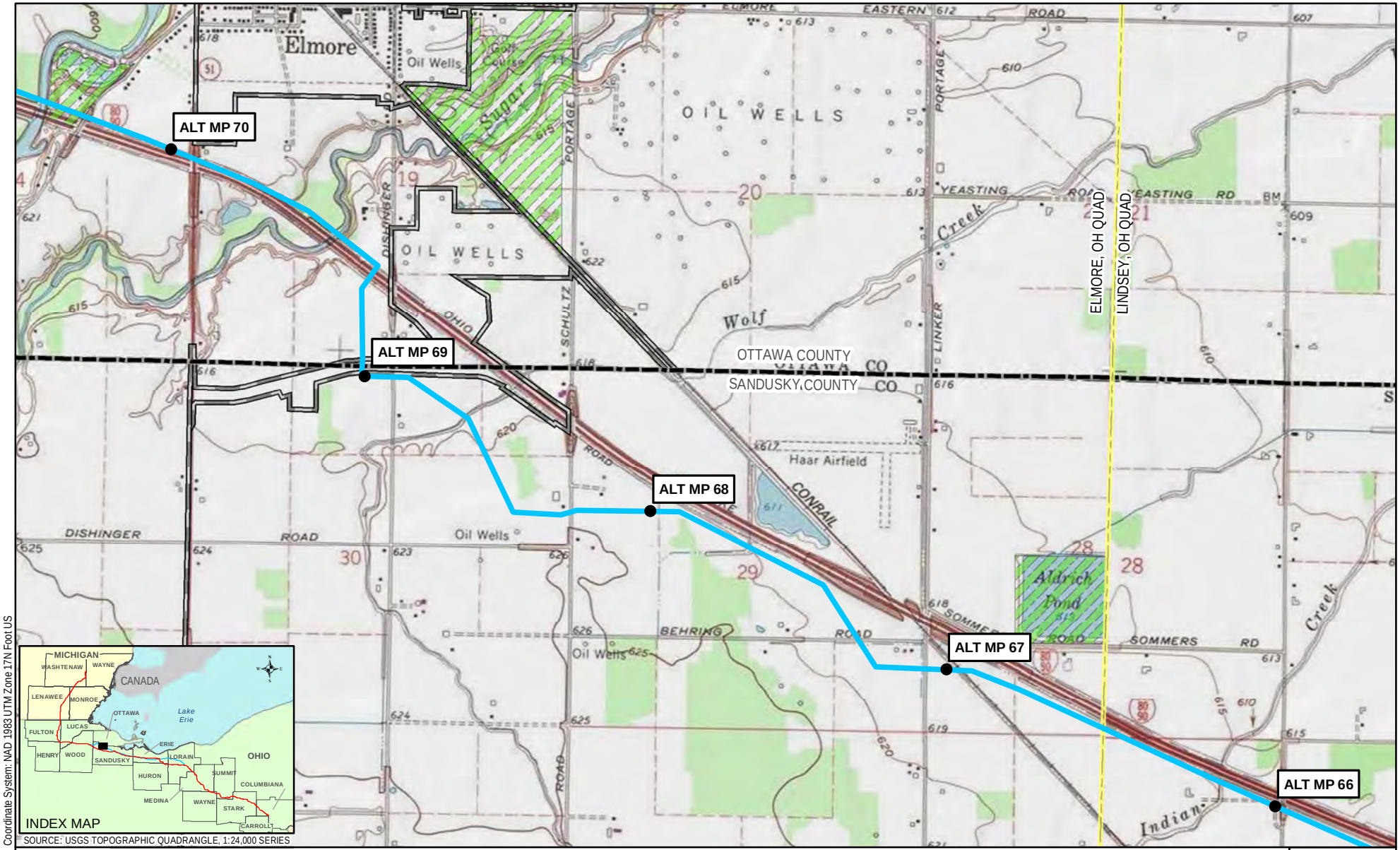
TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OHIO MOC:

CKD. BY: KM DRN. BY: CPA DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet FIGURE 10.5-14 REV E MAP 22 of 27

NEXUS GAS TRANSMISSION



REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

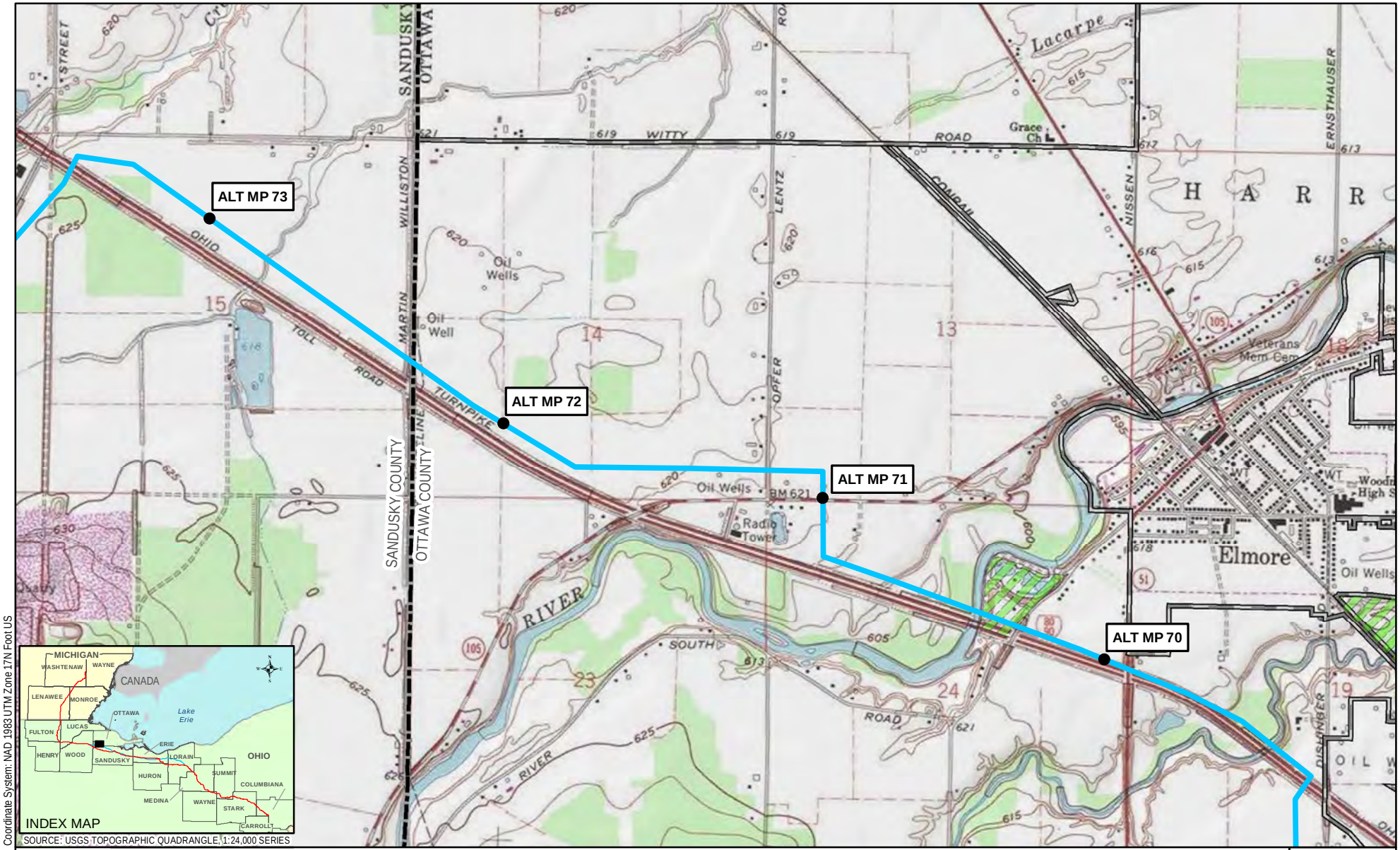
I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY; OTTAWA COUNTY, OHIO			MOC:
CKD. BY: KM	DRN. BY: CPA		DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-14	REV E	MAP 23 of 27

NEXUS GAS TRANSMISSION



1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: OTTAWA COUNTY; SANDUSKY COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

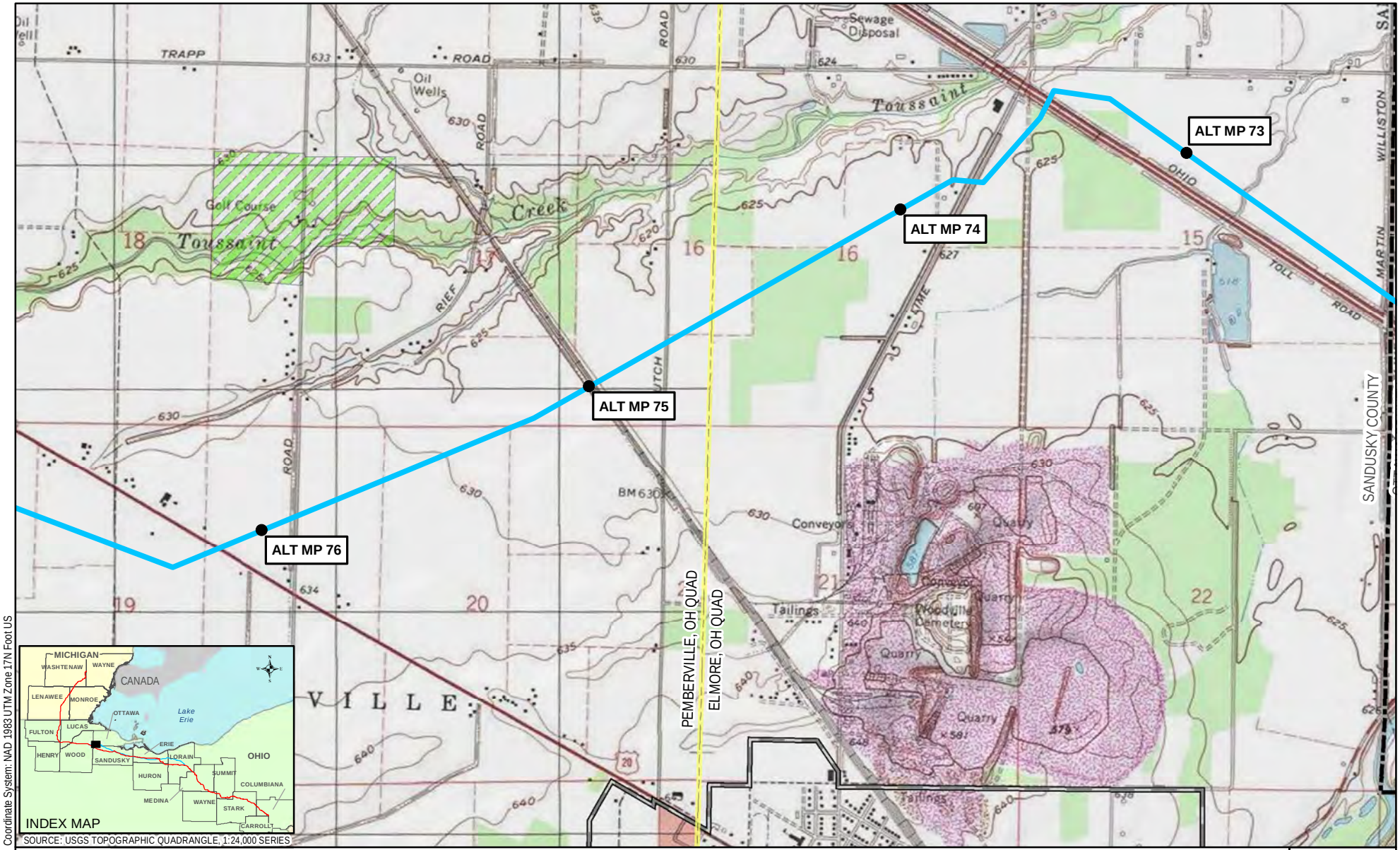
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-14 REV E

MAP 24 of 27

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

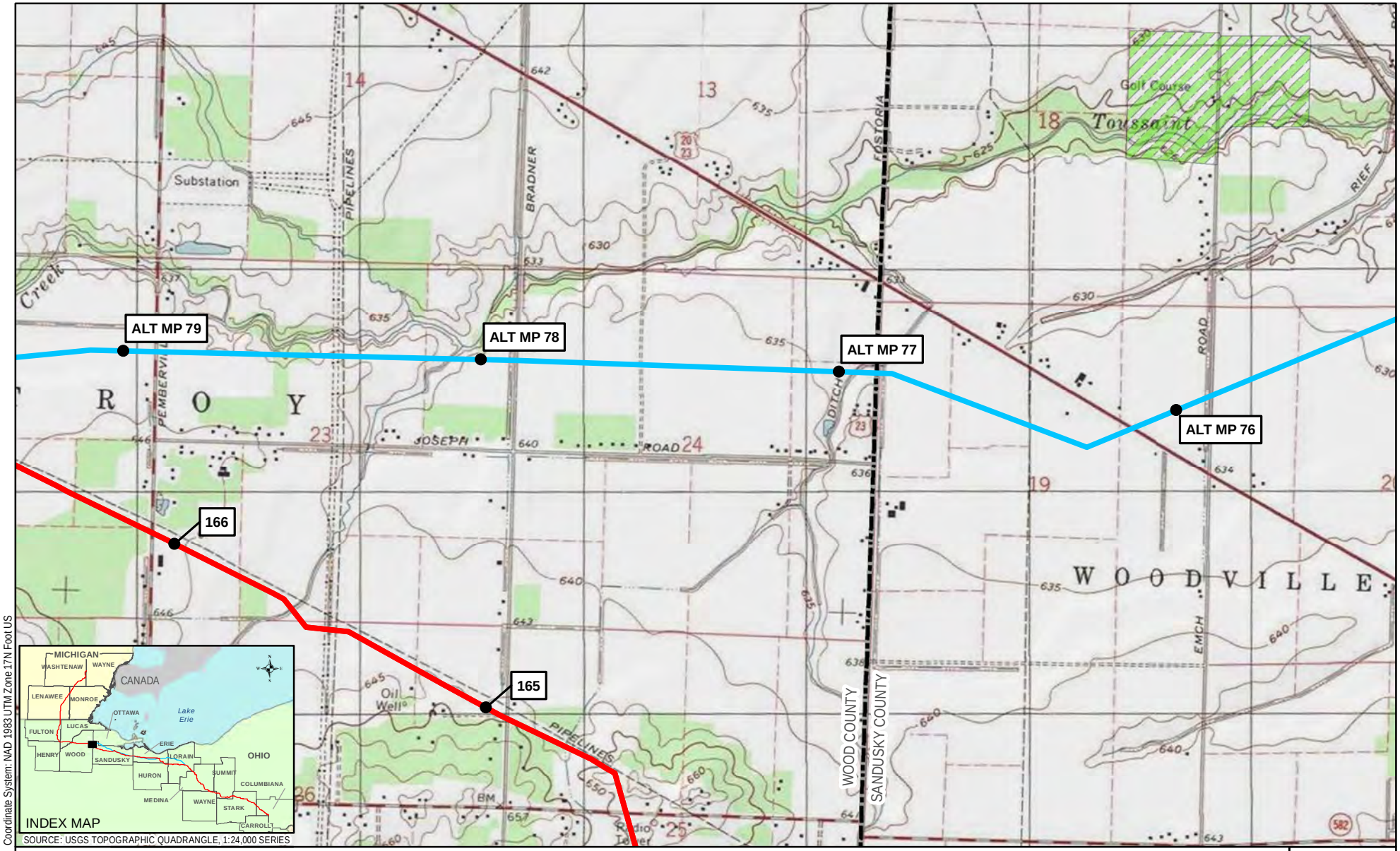
DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-14 REV E

MAP 25 of 27

NEXUS GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: SANDUSKY COUNTY; WOOD COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-14 REV E

MAP 26 of 27

NEXUS GAS TRANSMISSION

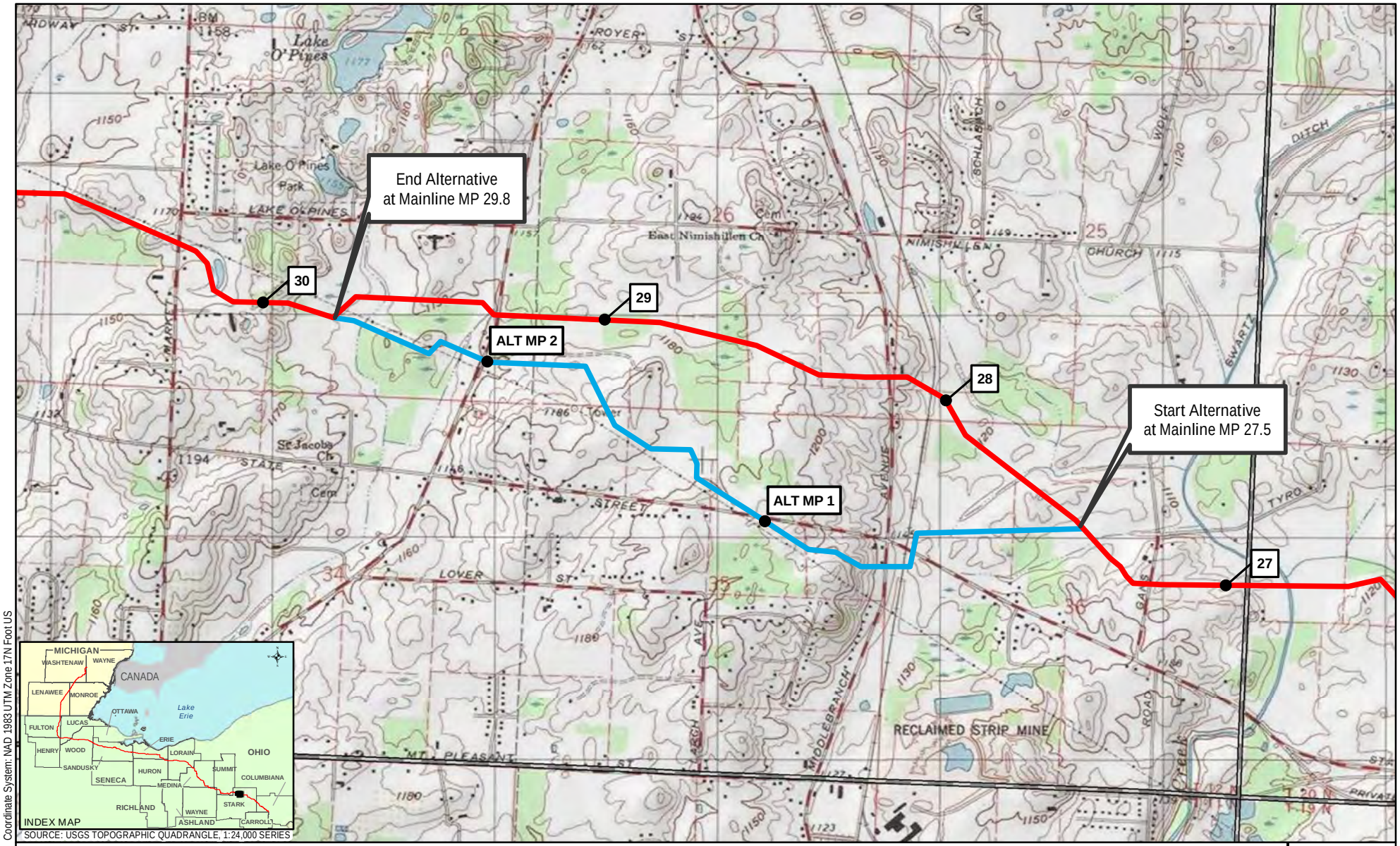
REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE: NEXUS GAS TRANSMISSION PROJECT
TURNPIKE ALTERNATIVE - USGS QUAD MAP

LOC.: WOOD COUNTY, OHIO			MOC:
CKD. BY: KM	DRN. BY: CPA		DATE: 07/27/2015
SCALE: 1 inch = 2,000 feet	FIGURE 10.5-14	REV E	MAP 27 of 27

NEXUS SM
GAS TRANSMISSION



Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

ALTERNATIVE ROUTE

USGS QUADRANGLE BOUNDARY

PUBLIC LANDS

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

0 1,000 2,000 Feet

N W E S

REVISION RECORD			
NO.	REVISION - DESCRIPTION	DATE	MOC#

I.G.

TITLE:

NEXUS GAS TRANSMISSION PROJECT
STAKEHOLDER POWERLINE ALTERNATIVE - USGS QUAD MAP

LOC.: STARK COUNTY, OHIO

MOC:

CKD. BY: KM

DRN. BY: CPA

DATE: 07/27/2015

SCALE: 1 inch = 2,000 feet

FIGURE 10.5-15

REV B

MAP 1 of 1

NEXUS GAS TRANSMISSION

- Mileposts (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- Proposed TGP Interconnect
- June Pre-filing Route
- Proposed Alternative Route
- Protected Public Lands
- County Boundary
- State Boundary

N

0 450 900

Feet

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA

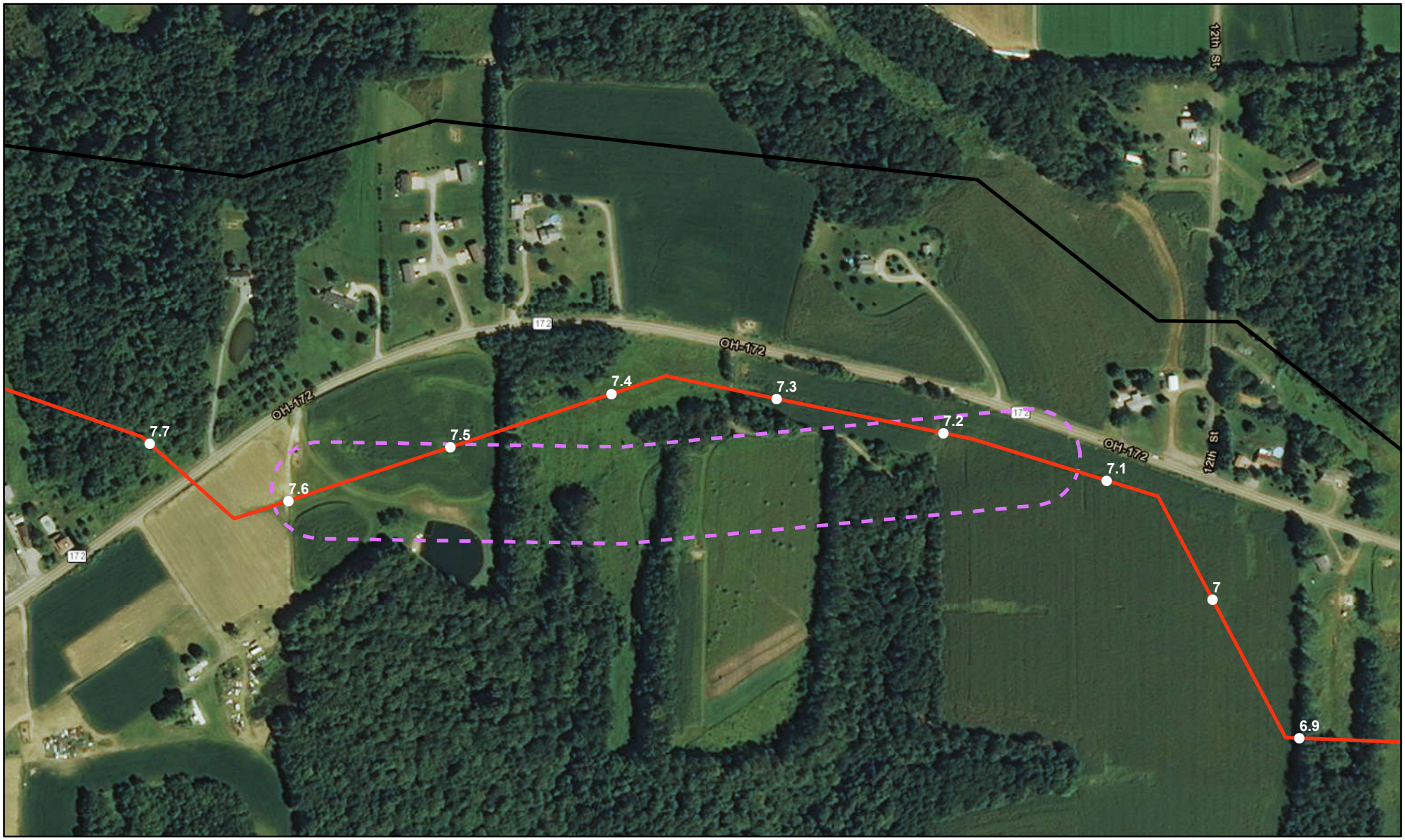
Figure 10.6.3-1

Landowner Requested Alternative

Columbiana County, OH

NEXUS GAS TRANSMISSION

11/10/2015



- Mileposts (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Area
- Protected Public Lands
- County Boundary
- State Boundary

N

0 450 900 Feet

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA

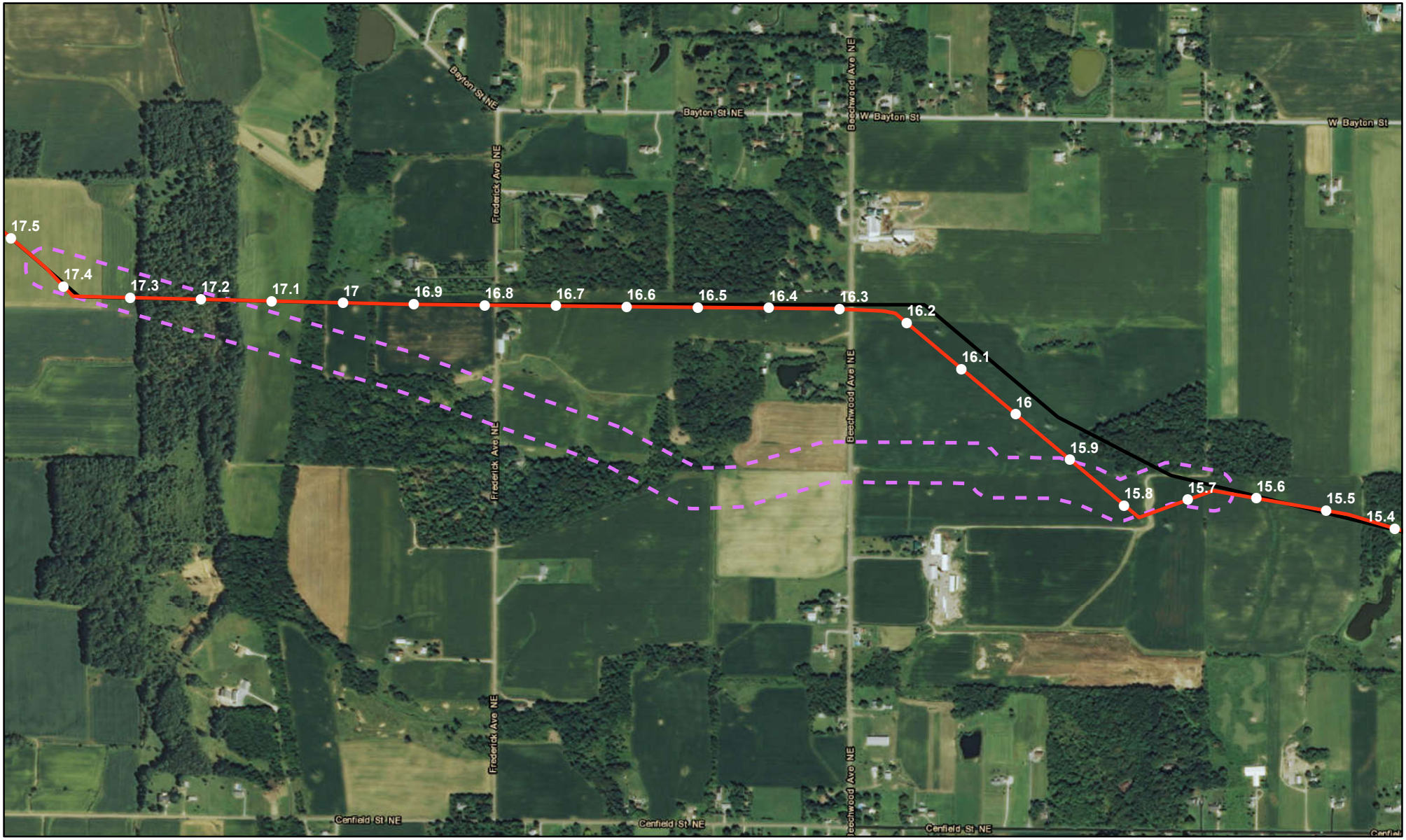
Figure 10.6.3-2

Cultural Resources Avoidance Alternative

Columbiana County, OH

NEXUS GAS TRANSMISSION

11/10/2015



- Milepost (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Area
- Protected Public Lands
- County Boundary
- State Boundary

N

0 1,000 2,000 Feet

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA, Ducks Unlimited, National Geographic

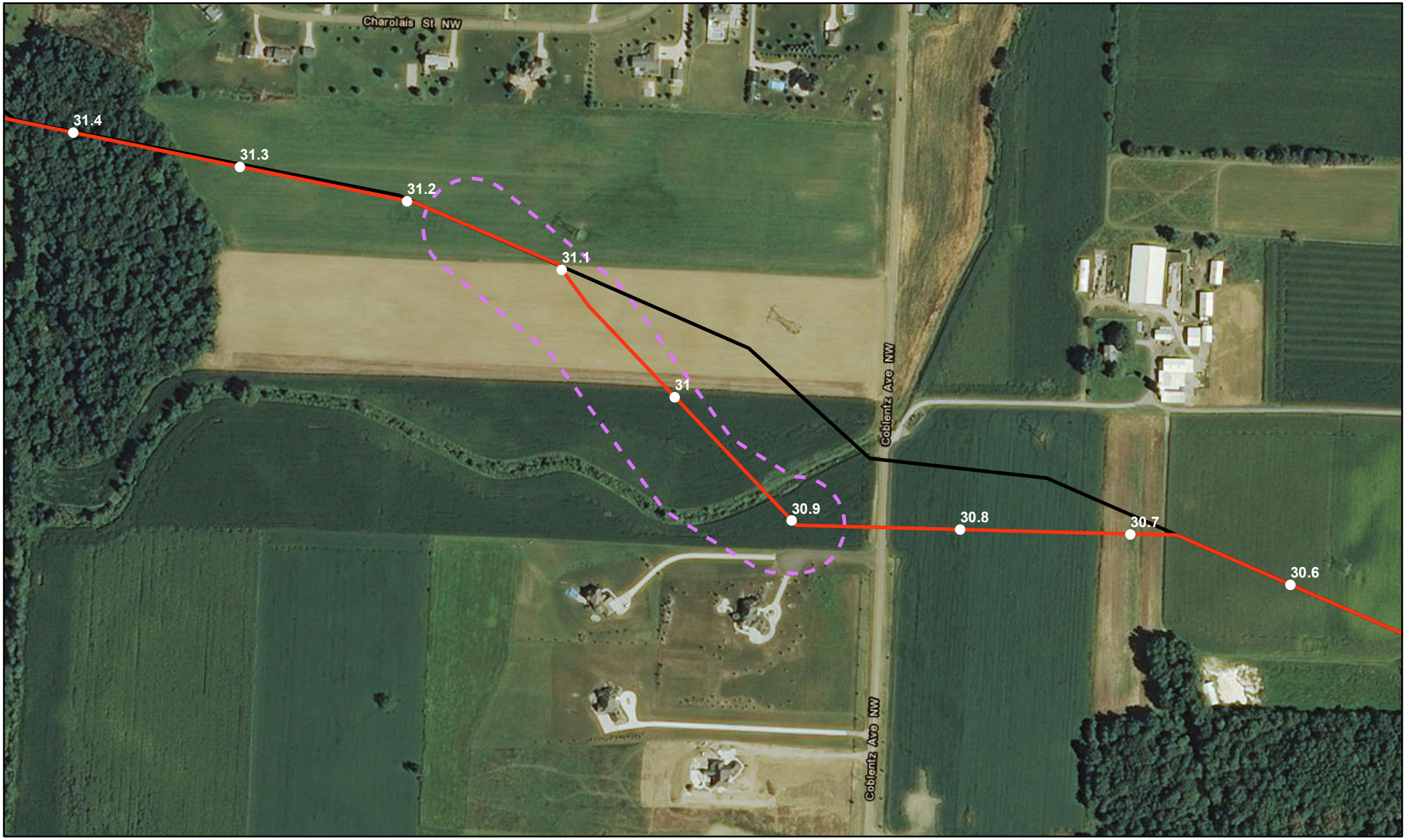
Figure 10.6.3-3

Landowner Requested and Cultural Resources Avoidance Alternative

Stark County, OH

NEXUS GAS TRANSMISSION

11/10/2015



- Mileposts (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Area
- Protected Public Lands
- County Boundary
- State Boundary

N

0 500 1,000 Feet

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA

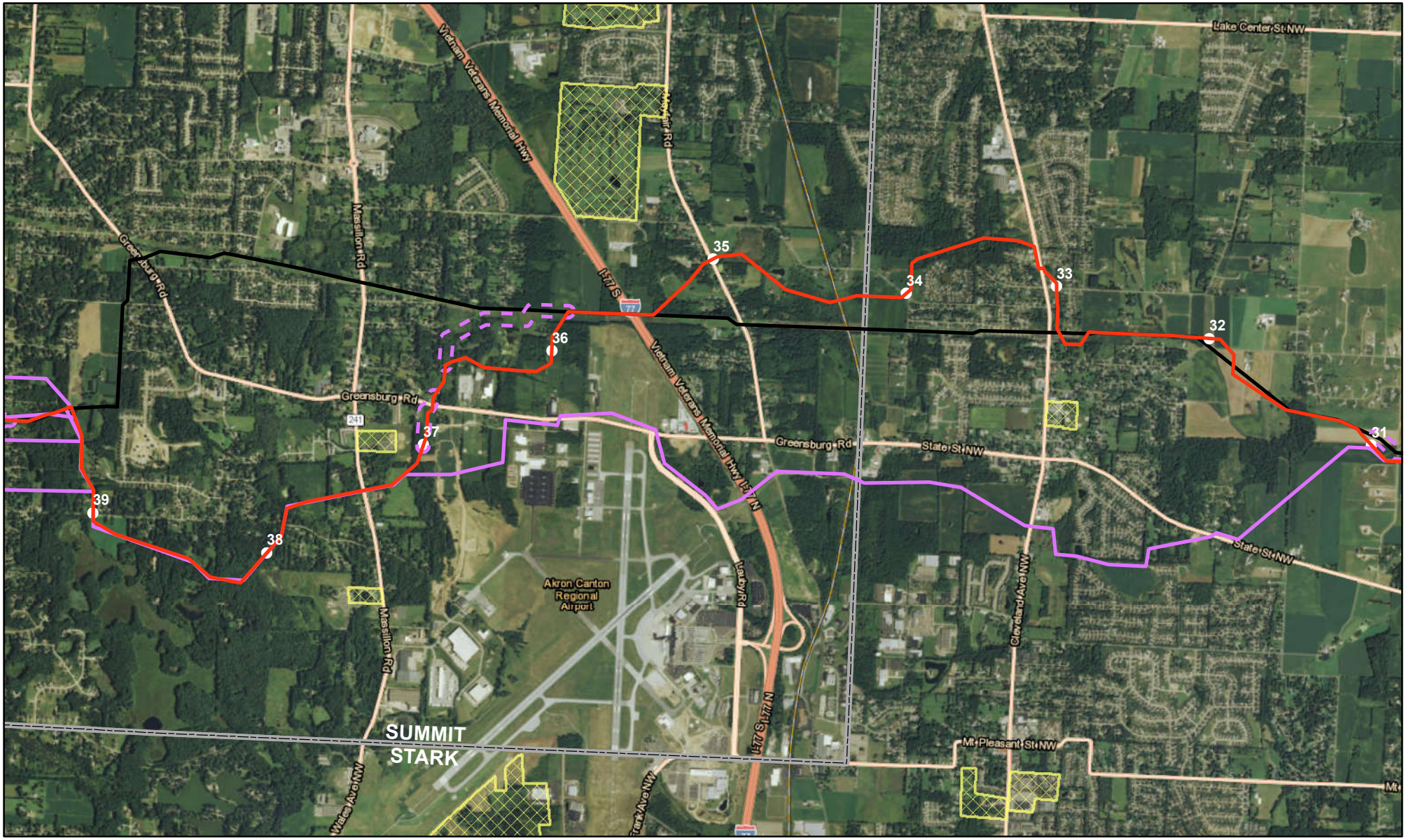
Figure 10.6.3-4

Cultural Resource Avoidance Alternative

Stark County, OH

NEXUS GAS TRANSMISSION

11/10/2015



- Mileposts (1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Routes
- Proposed Alternative Areas
- Protected Public Lands
- County Boundary
- State Boundary

N

0 0.5 1 Miles

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA, Ducks Unlimited.

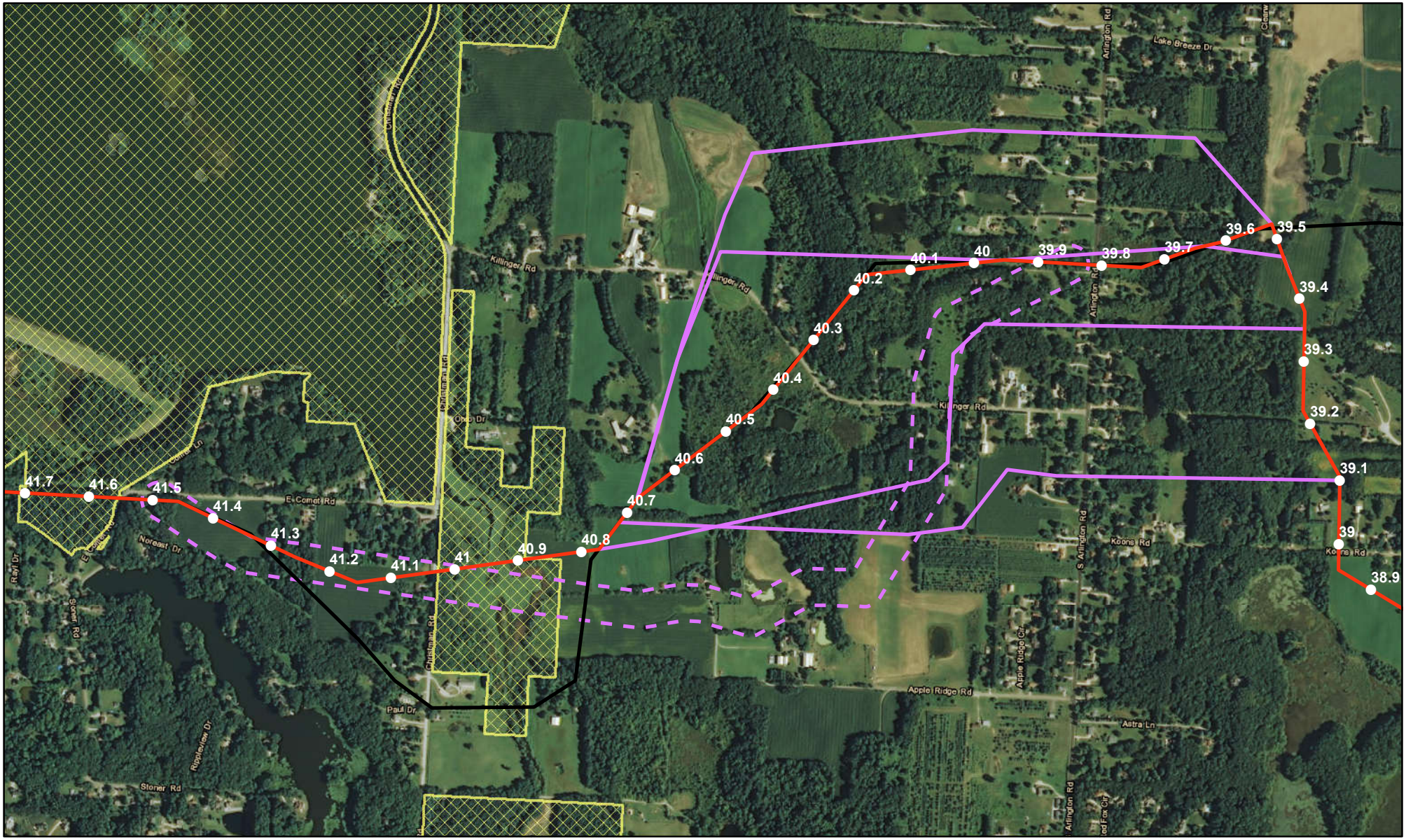
Figure 10.6.3-5

City of Green and Greentown Route Alternatives

Stark and Summit Counties, OH

NEXUS GAS TRANSMISSION

11/10/2015



Milepost (0.1 mile)
Proposed NEXUS Maineline Pipeline
June Pre-filing Route
Proposed Alternative Routes
Proposed Alternative Areas
Protected Public Lands
County Boundary
State Boundary

N

0 1,000 2,000 Feet

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA

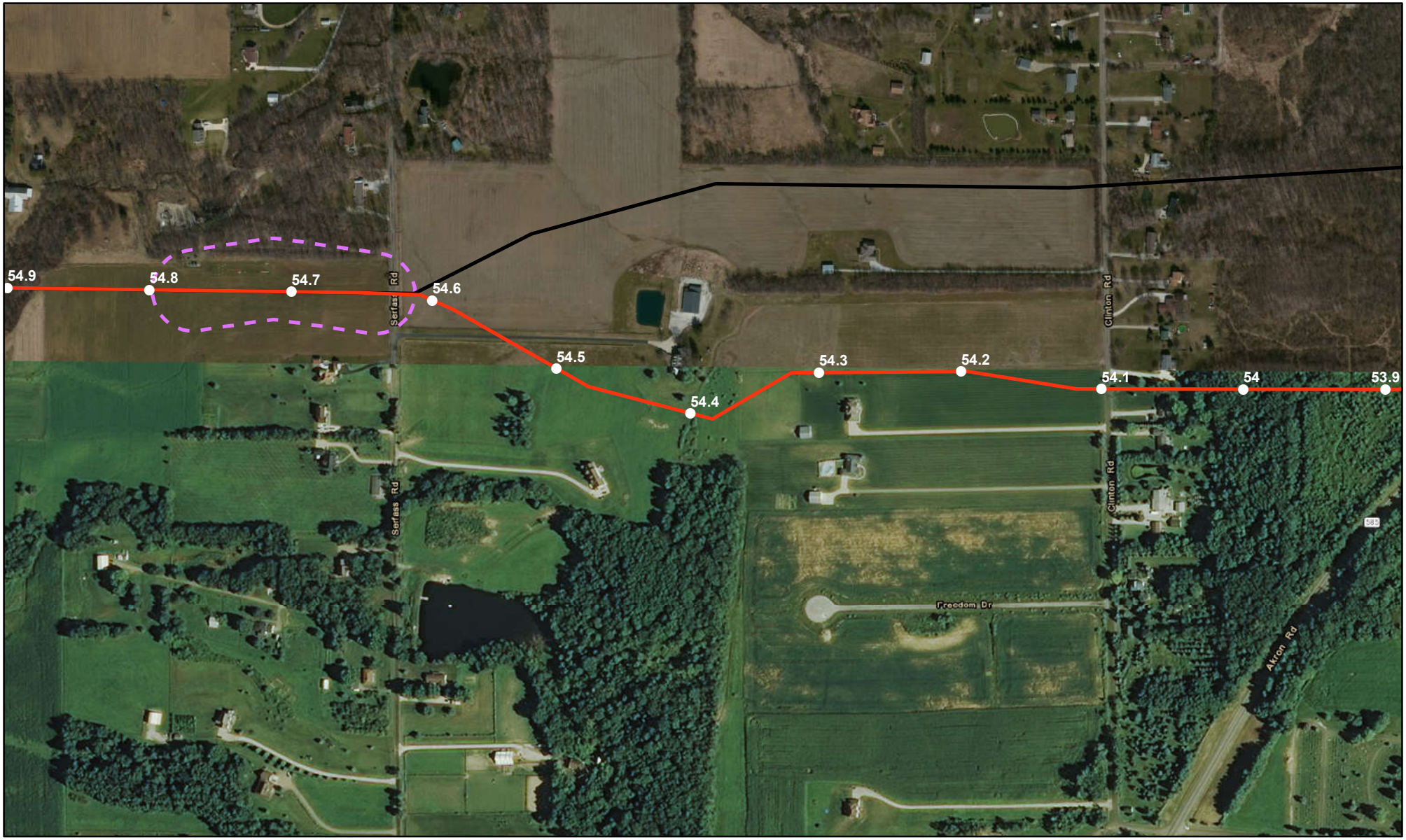
Figure 10.6.3-6

Landowner Requested and Category 3 Wetland Avoidance Alternatives

Summit County, OH

NEXUS GAS TRANSMISSION

11/10/2015



- Milepost (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Areas
- Protected Public Lands
- County Boundary
- State Boundary

N

0 450 900 Feet

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA

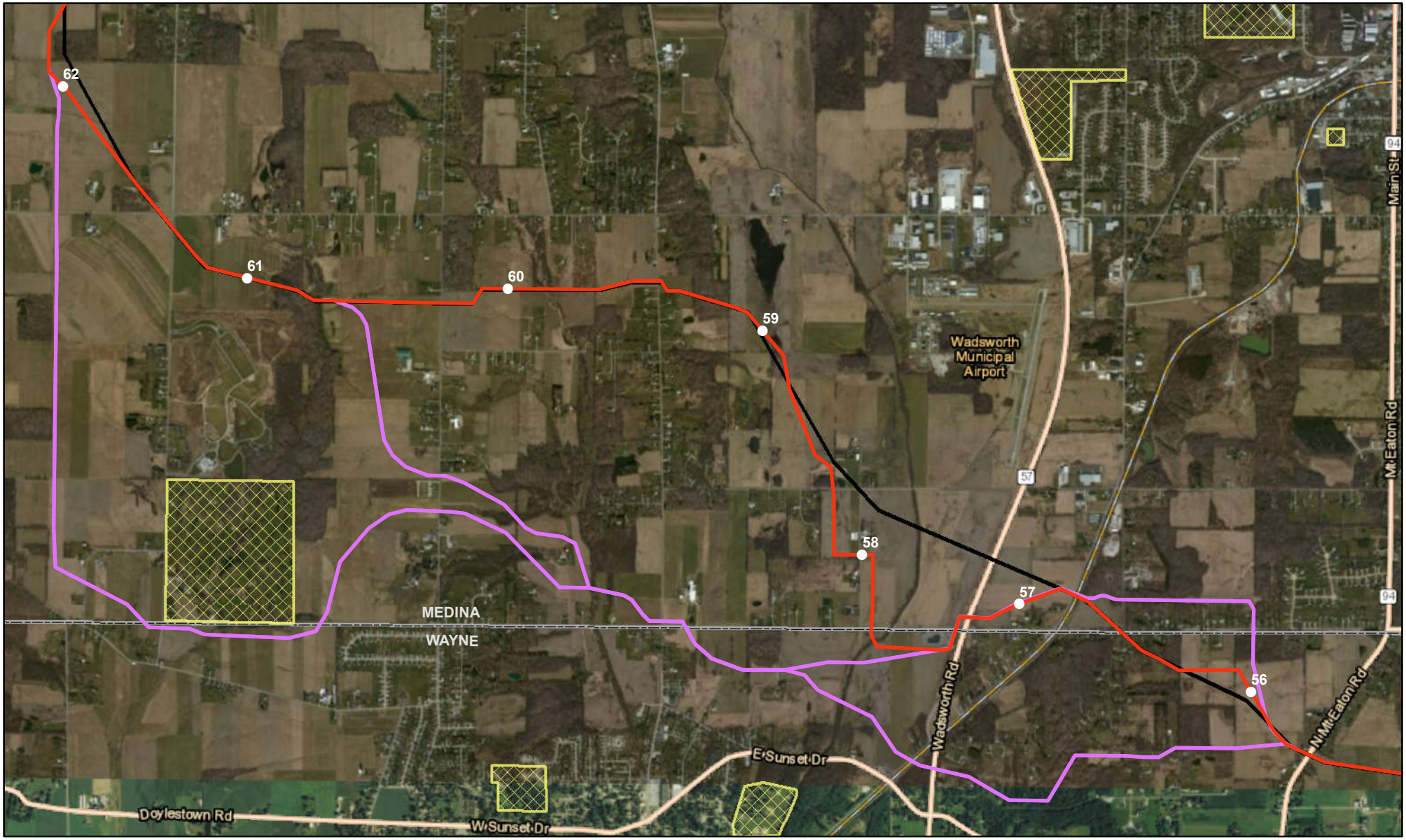
Figure 10.6.3-7

Landowner Requested Alternative

Wayne County, OH

NEXUS GAS TRANSMISSION

11/10/2015



- Mileposts (1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Routes
- Protected Public Lands
- County Boundary
- State Boundary

N

0 0.5 1 Miles

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA

Figure 10.6.3-8

Landowner Requested Alternatives

Medina and Wayne Counties, OH

NEXUS GAS TRANSMISSION

11/10/2015

- Mileposts (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Routes
- Protected Public Lands
- County Boundary
- State Boundary

N

0 0.25 0.5 Miles

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA, Ducks Unlimited, National Geographic

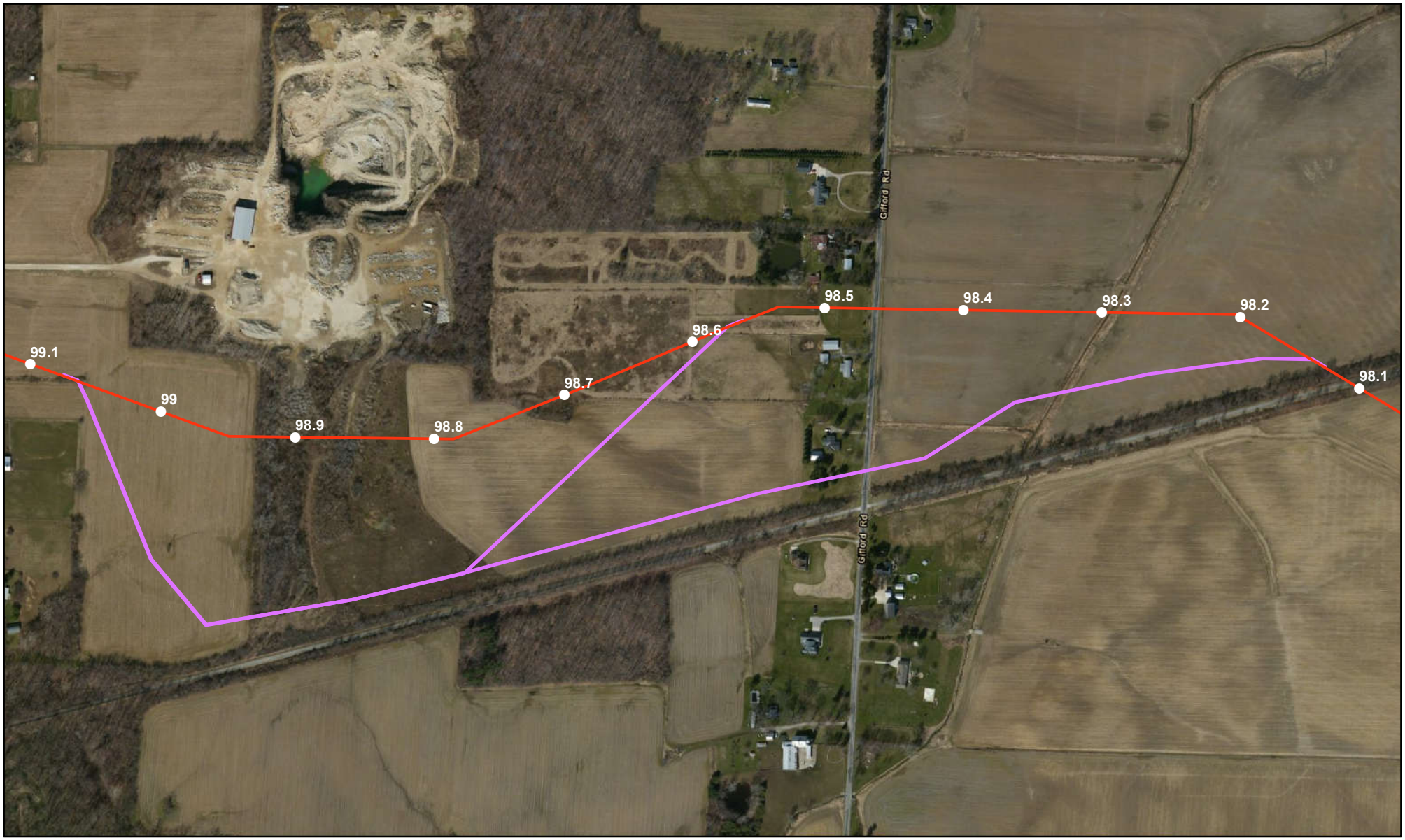
Figure 10.6.3-9

Category 3 Wetland Avoidance Alternative

Lorain County, OH

NEXUS GAS TRANSMISSION

11/10/2015



- Mileposts (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Routes
- Protected Public Lands
- County Boundary
- State Boundary

N

0 500 1,000 Feet

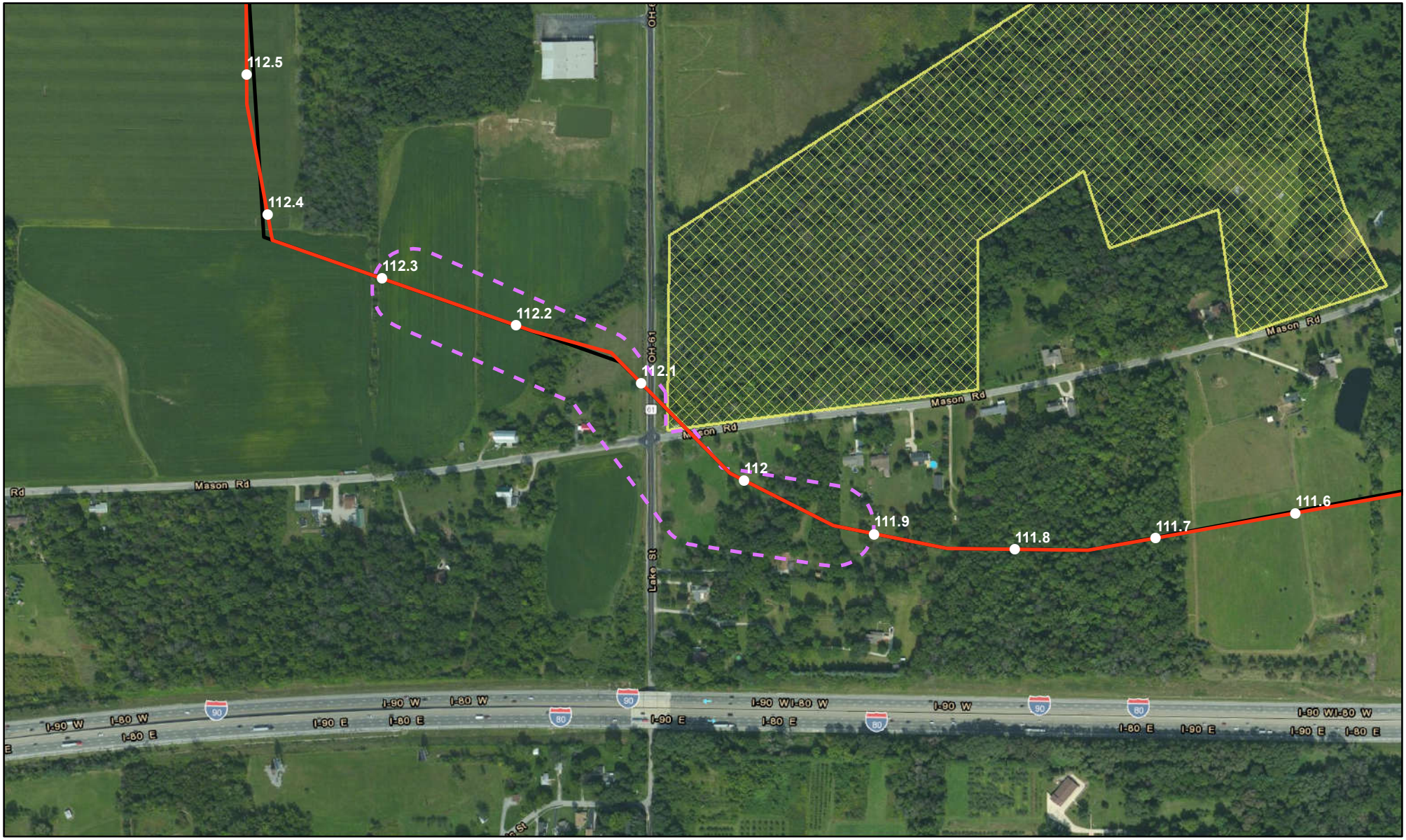
Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA, Ducks Unlimited, National Geographic

Figure 10.6.3-10

Landowner
Requested Alternatives
Lorain County, OH

NEXUS GAS TRANSMISSION

11/10/2015



- Mileposts (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Areas
- Protected Public Lands
- County Boundary
- State Boundary

N

0 500 1,000 Feet

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA, Ducks Unlimited, National Geographic

Figure 10.6.3-11

Edison Woods Metropark
Property Alternative

Erie County, OH

NEXUS GAS TRANSMISSION

11/10/2015

- Mileposts (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Routes
- Protected Public Lands
- County Boundary
- State Boundary

N

0 1,000 2,000 Feet

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA, Ducks Unlimited, National Geographic

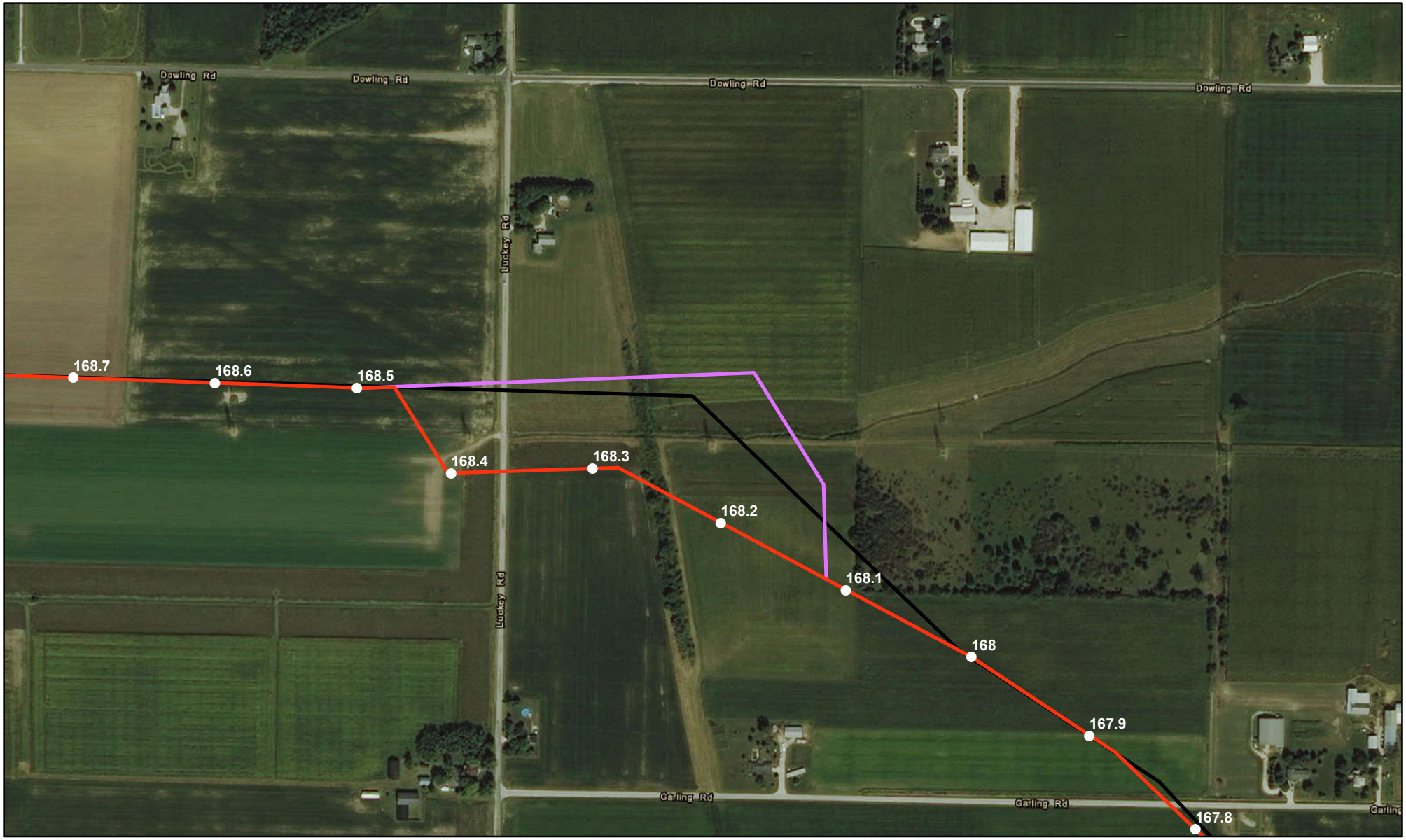
Figure 10.6.3-12

Cultural Resource Avoidance Alternative

Sandusky County, OH

NEXUS GAS TRANSMISSION

11/10/2015



- Mileposts (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Routes
- Protected Public Lands
- County Boundary
- State Boundary

N

0 500 1,000 Feet

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA, Ducks Unlimited, National Geographic

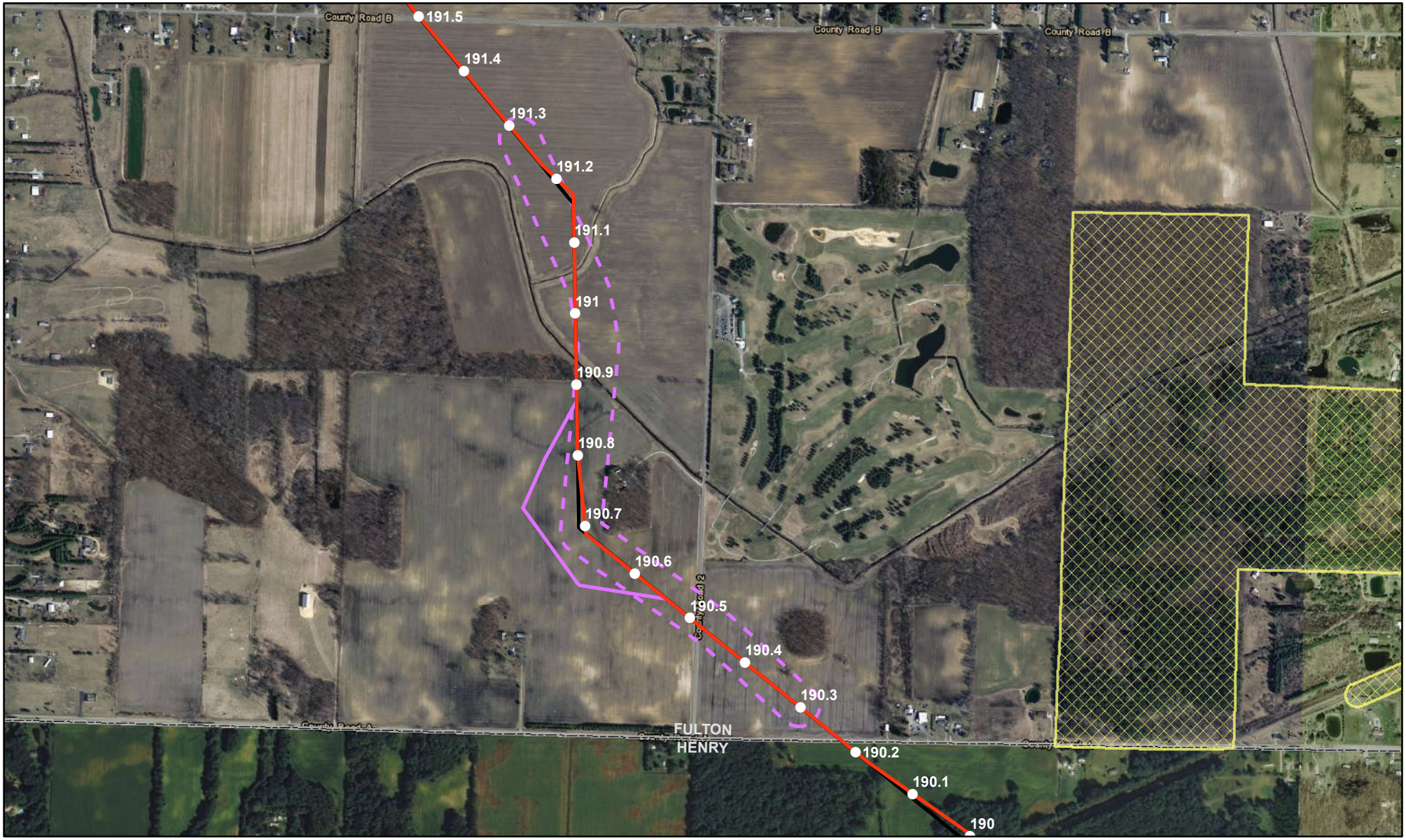
Figure 10.6.3-13

Landowner Requested Alternative

Wood County, OH

NEXUS GAS TRANSMISSION

11/9/2015



- Mileposts (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Routes
- Proposed Alternative Areas
- Protected Public Lands
- County Boundary
- State Boundary

N

0 1,000 2,000 Feet

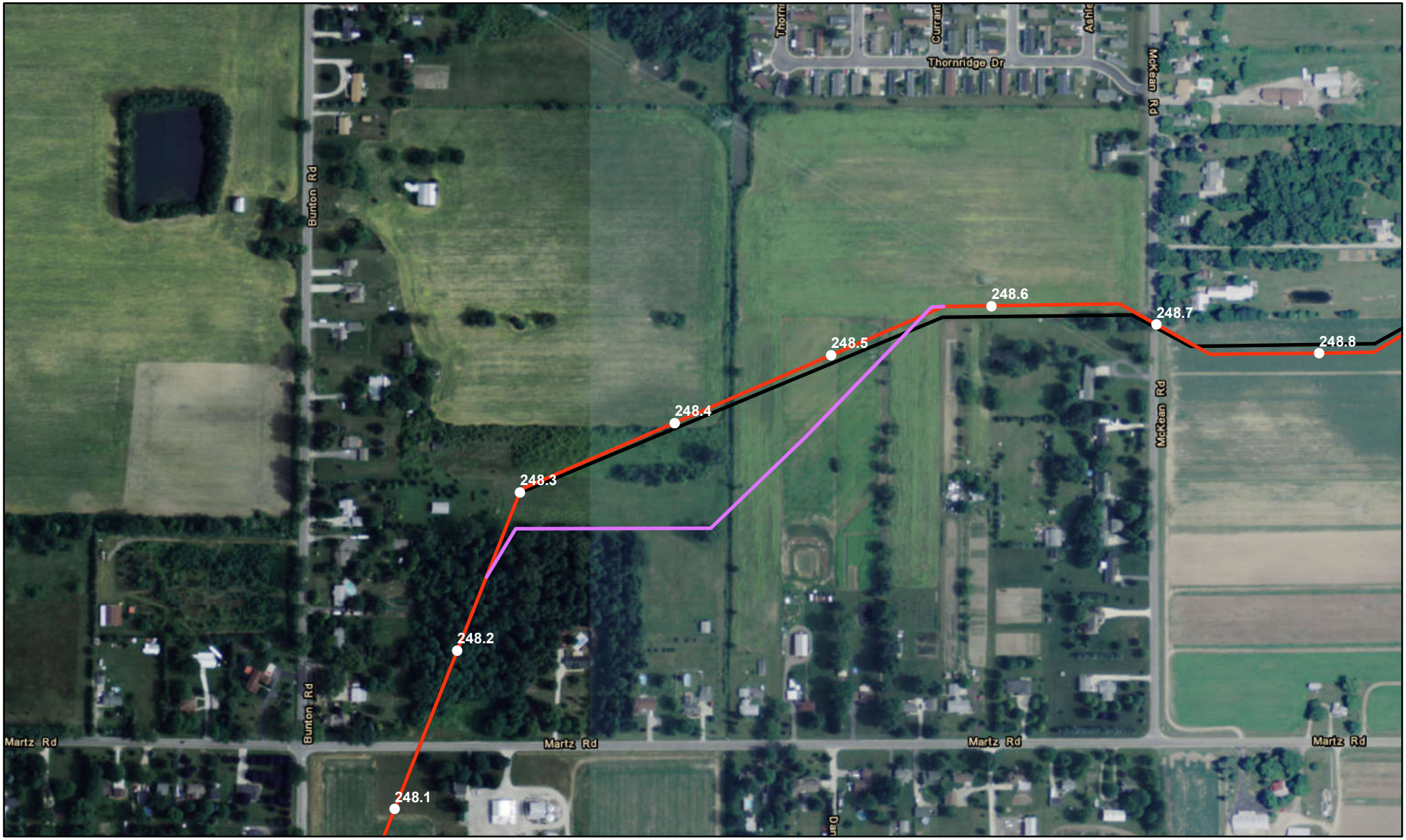
Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA, Ducks Unlimited, National Geographic

Figure 10.6.3-14

Landowner Requested
and Oaks Opening
Habitat Avoidance Alternatives
Fulton County, OH

NEXUS GAS TRANSMISSION

11/9/2015



- Mileposts (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Routes
- Protected Public Lands
- County Boundary
- State Boundary

N

0 450 900 Feet

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA, Ducks Unlimited, National Geographic

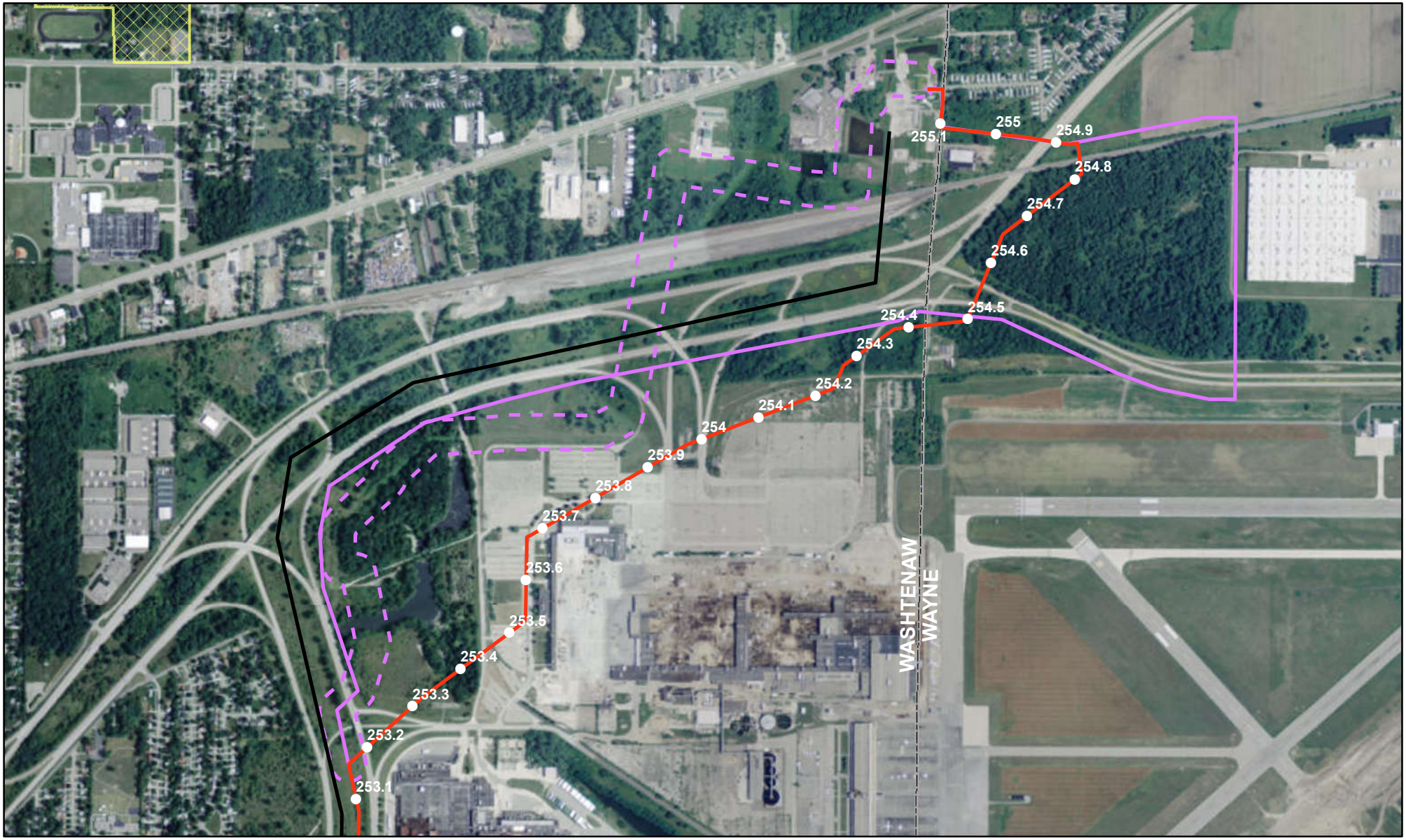
Figure 10.6.3-15

Landowner Requested Alternative

Washtenaw County, MI

NEXUS GAS TRANSMISSION

11/9/2015



- Mileposts (0.1 mile)
- Proposed NEXUS Mainline Pipeline
- June Pre-filing Route
- Proposed Alternative Routes
- Proposed Alternative Areas
- Protected Public Lands
- County Boundary
- State Boundary

N

0 1,000 2,000 Feet

Projection: NAD83, UTM Zone 17N US Survey Feet, Grid North. Sources: ESRI, TRC, SPECTRA, Ducks Unlimited, National Geographic

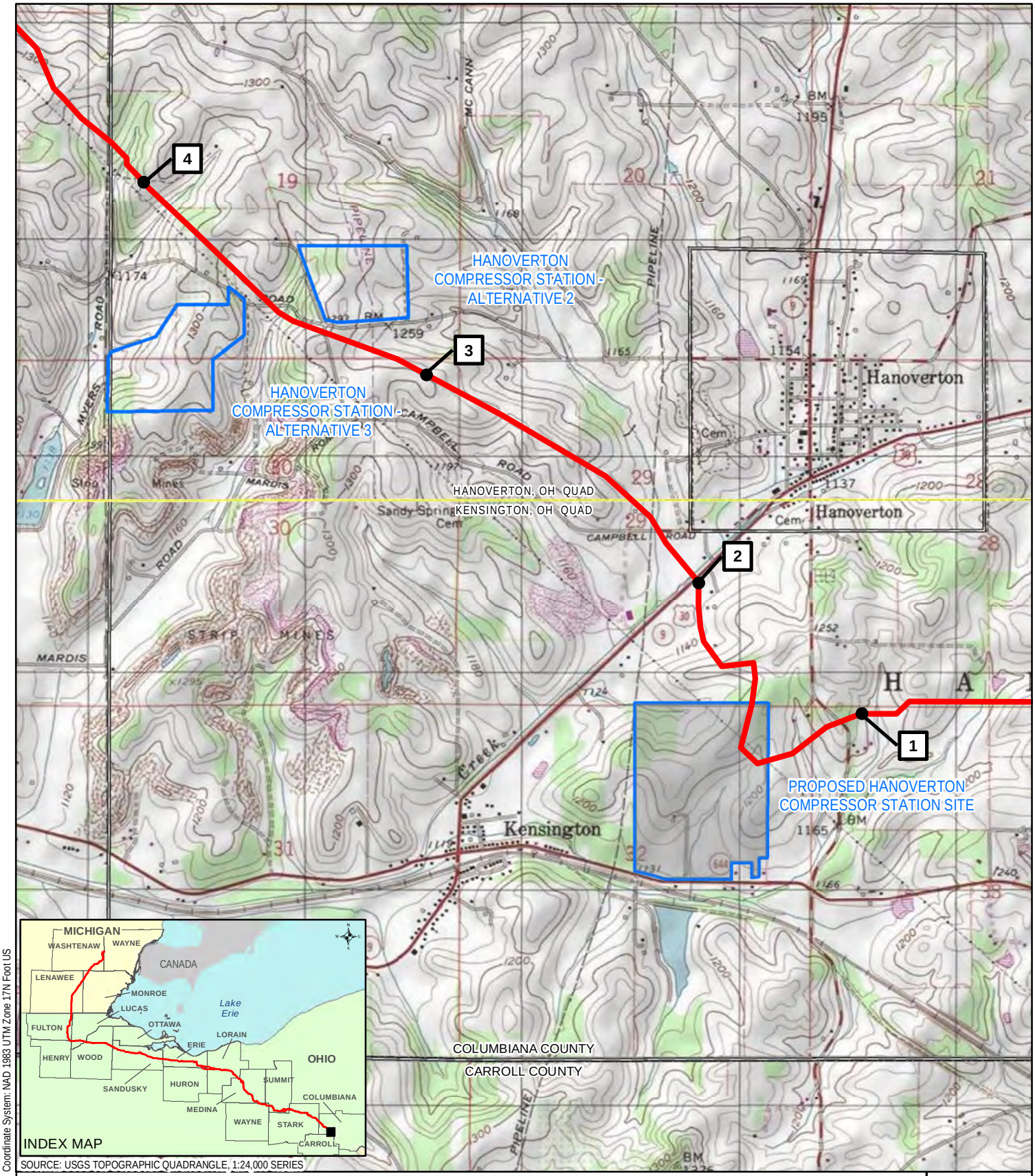
Figure 10.6.3-16

RACER Alternatives

Washtenaw and Wayne Counties, MI

NEXUS GAS TRANSMISSION

11/9/2015



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED INTERCONNECTING PIPELINE

PROPOSED MAINLINE PIPELINE

PROPOSED COMPRESSOR STATION SITE

ALTERNATIVE COMPRESSOR STATION SITE

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

USGS QUADRANGLE BOUNDARY

0 1,000 2,000 Feet

N W E S

TITLE:

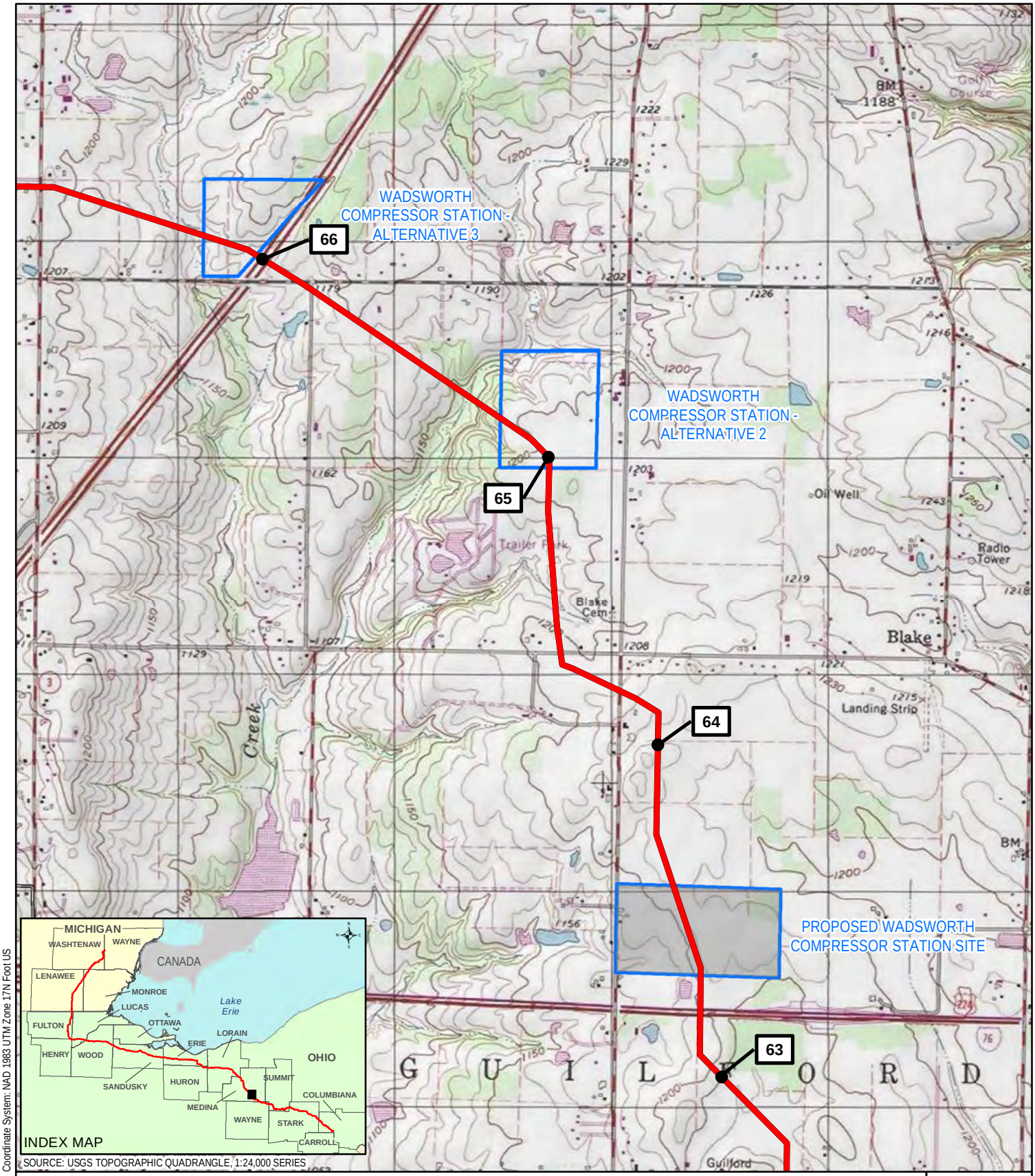
NEXUS GAS TRANSMISSION PROJECT
HANOVERTON COMPRESSOR STATION ALTERNATIVES

LOC.: COLUMBIANA COUNTY, OH

CKD. BY: CPA	ENG.	DATE: 7/27/2015	W.O.	
DRN. BY: KM	SCALE: 1 inch = 2,000 feet	FIGURE 10.7.1-1	REV A	MAP 1 OF 4

I.G.

NEXUS GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED MAINLINE PIPELINE

PROPOSED INTERCONNECTING PIPELINE

PROPOSED COMPRESSOR STATION SITE

ALTERNATIVE COMPRESSOR STATION SITE

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

USGS QUADRANGLE BOUNDARY

0 1,000 2,000 Feet

N W E S

TITLE:

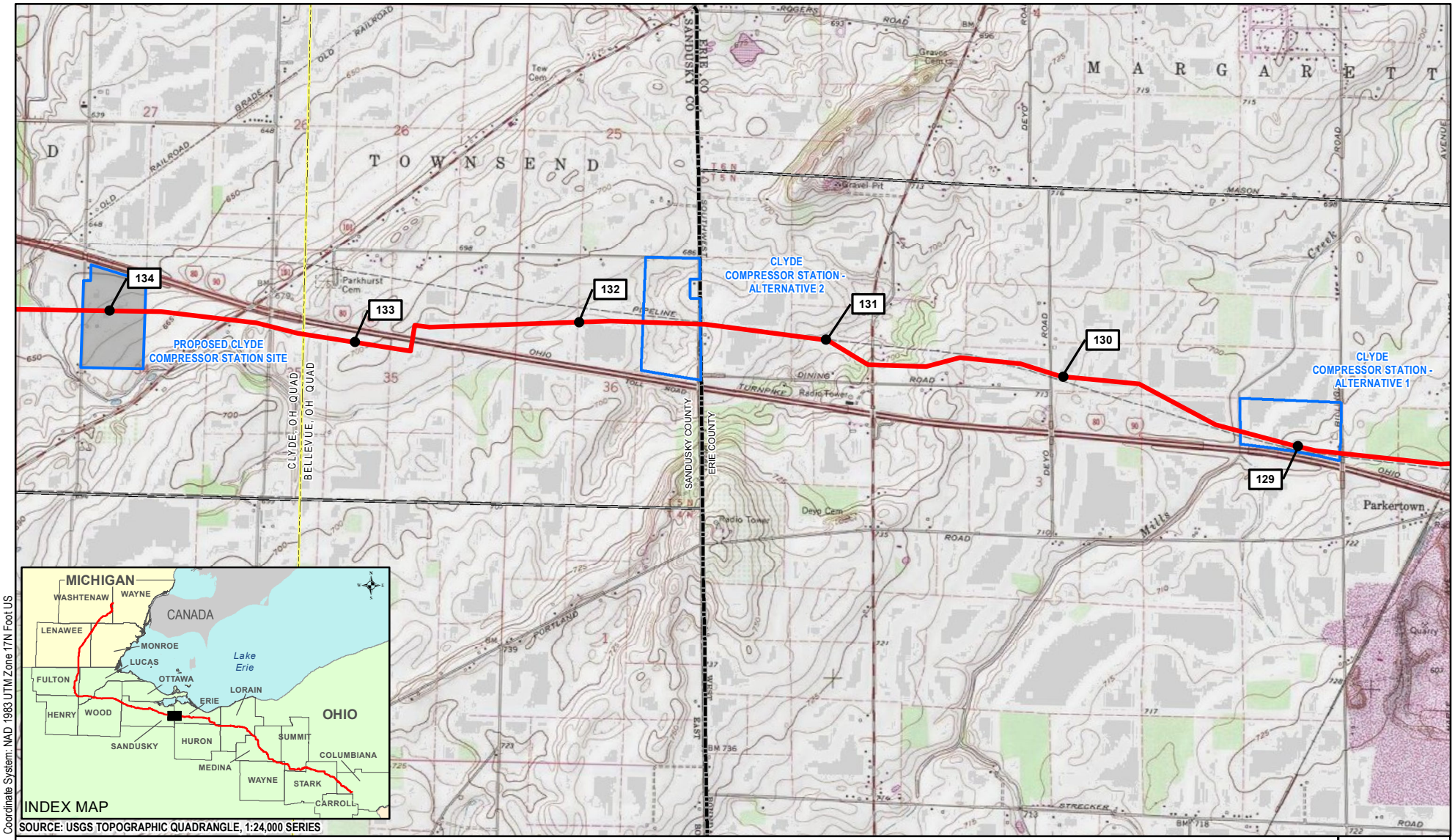
NEXUS GAS TRANSMISSION PROJECT
WADSWORTH COMPRESSOR STATION ALTERNATIVES

LOC.: MEDINA COUNTY, OH

CKD. BY: KM	ENG.	DATE: 7/27/2015	W.O.	
DRN. BY: CPA	SCALE: **1 inch = 2,000 feet**	FIGURE 10.7.1-2	REV A	MAP 2 OF 4

I.G.

NEXUS SM
GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST

PROPOSED INTERCONNECTING PIPELINE

PROPOSED MAINLINE PIPELINE

PROPOSED COMPRESSOR STATION SITE

ALTERNATIVE COMPRESSOR STATION SITE

COUNTY BOUNDARY

MUNICIPAL BOUNDARY

STATE BOUNDARY

USGS QUADRANGLE BOUNDARY

N W E S

0 1,000 2,000 3,000 Feet

I.G.

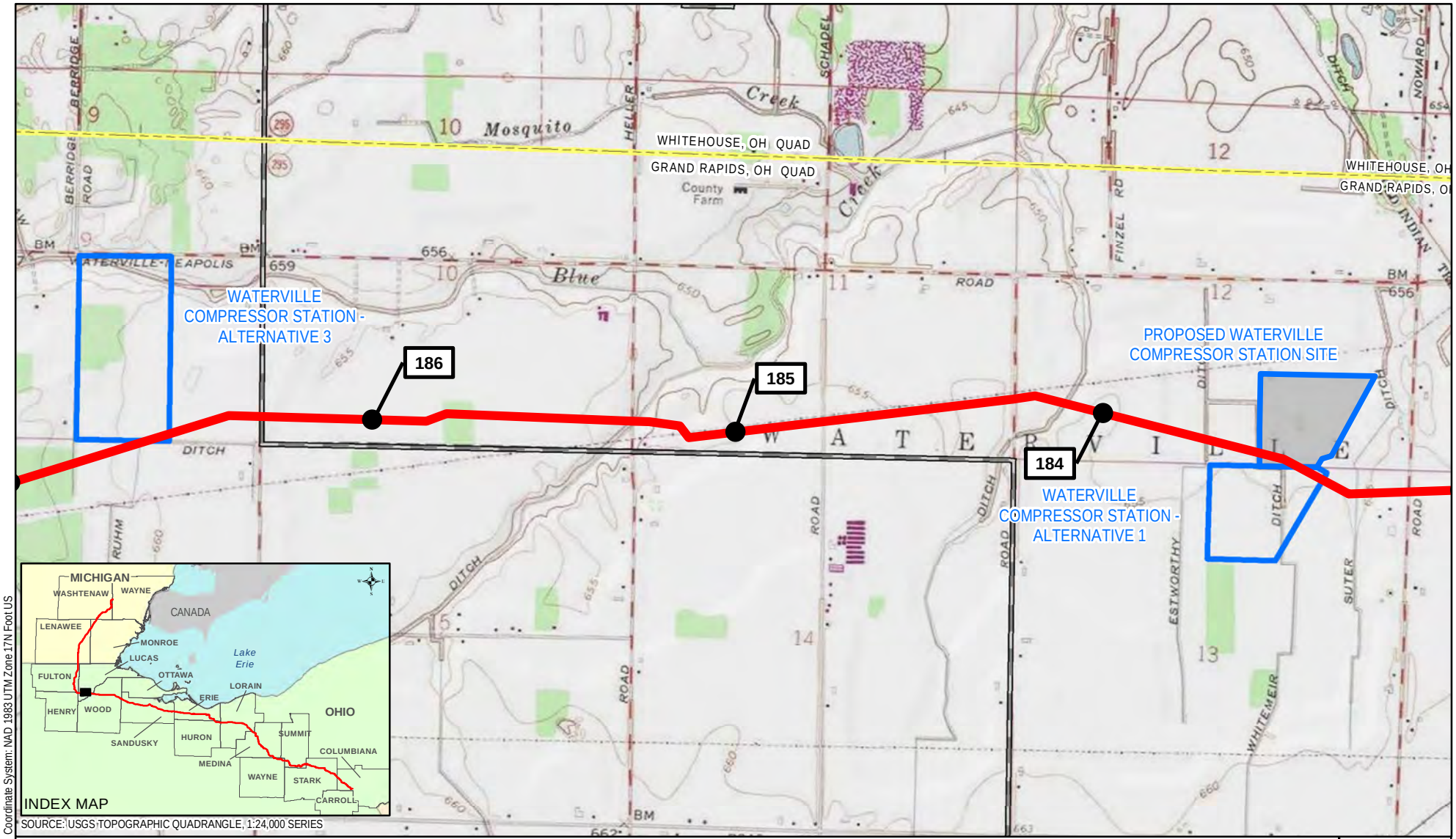
TITLE:

NEXUS GAS TRANSMISSION PROJECT
CLYDE COMPRESSOR STATION ALTERNATIVES

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

CKD. BY: CPA	ENG.	DATE: 7/27/2015	W.O.
DRN. BY: KM	SCALE: 1 inch = 3,000 feet	FIGURE 10.7.1-3	REV B MAP 3 OF 4

NEXUS SM
GAS TRANSMISSION



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

Coordinate System: NAD 1983 UTM Zone 17N Foot US

1 MILEPOST
PROPOSED INTERCONNECTING PIPELINE
PROPOSED MAINLINE PIPELINE
PROPOSED COMPRESSOR STATION SITE
ALTERNATIVE COMPRESSOR STATION SITE
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
STATE BOUNDARY
USGS QUADRANGLE BOUNDARY

0 1,000 2,000 Feet

N W E S

TITLE:

NEXUS GAS TRANSMISSION PROJECT
WATERVILLE COMPRESSOR STATION ALTERNATIVES

LOC.: LUCAS COUNTY, OH				
CKD. BY: CPA	ENG.	DATE: 7/27/2015	W.O.	
DRN. BY: KM	SCALE: 1 inch = 2,000 feet	FIGURE: 10.7.1-4	REV A	MAP 4 OF 4

I.G.

NEXUS GAS TRANSMISSION