U.S. DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
FINAL ENVIRONMENTAL ASSESSMENT
and
FINDING OF NO SIGNIFICANT IMPACT

Special Permit Information:

Docket Number:	PHMSA-2016-0009
Requested by:	NEXUS Gas Transmission, LLC[1]
Date Requested:	January 12, 2016
Original Issuance Date:	June 29, 2018
Effective Dates:	June 29, 2018 to June 29, 2028
Code Section(s):	49 CFR 192.625

I. Background

The National Environmental Policy Act (NEPA), 42 United States Code (USC) §§ 4321 – 4375, Council on Environmental Quality regulations, 40 Code of Federal Regulations (CFR) 1500-1508, and U.S. Department of Transportation (DOT) Order 5610.1C, requires the Pipeline and Hazardous Materials Safety Administration (PHMSA) Office of Pipeline Safety (OPS)[2] to analyze a proposed action to determine whether the action will have a significant impact on the human environment. PHMSA analyzes special permit requests for potential risks to public safety and the environment that could result from our decision to grant, grant with additional conditions, or deny the request. As part of this analysis, PHMSA evaluates whether a special permit would impact the likelihood or consequence of a pipeline failure as compared to the operation of the pipeline in full compliance with the Pipeline Safety Regulations. PHMSA

[1] NEXUS Gas Transmission, LLC is co-owned by DTE NEXUS, LLC and Spectra NEXUS Gas Transmission, LLC, an indirect wholly-owned subsidiary of Spectra Energy Partners, LP ("SEP"). On February 27, 2017, Enbridge Inc. and Spectra Energy Corp closed their merger transaction. Enbridge Inc. now indirectly wholly-owns SEP's general partner and partially-owns SEP.

[2] References to PHMSA in this document means PHMSA OPS.

developed this assessment to determine what effects, if any, our decision would have on the environment.

Pursuant to 49 U.S.C. § 60118(c) and 49 CFR 190.341, PHMSA may only grant special permit requests that are not inconsistent with pipeline safety. PHMSA will impose conditions in the special permit if we conclude they are necessary for safety, environmental protection, or are otherwise in the public interest. If PHMSA determines that a special permit would be inconsistent with pipeline safety or is not justified, the application will be denied.

The purpose of this environmental assessment is to comply with NEPA for the NEXUS Gas Transmission, LLC [3] (NEXUS, NEXUS pipeline, or NEXUS project) application for a pipeline special permit. This is the final environmental assessment (FEA) and finding of no significant impact (FONSI). This FEA/FONSI is prepared by PHMSA to assess the pipeline special permit request, in accordance with 49 CFR 190.341, and is intended to specifically analyze any environmental impact associated with the waiver of certain Pipeline Safety Regulations found in 49 CFR Part 192. This special permit request is for waiving the odorant requirements in 49 CFR 192.625 for 10.93 miles of pipeline from Mile Post (MP) 245.16 to MP 256.09 located at the downstream section of the NEXUS pipeline in Washtenaw County, Michigan. This permit, if approved, would implement additional conditions on the design, construction, operations, and maintenance of the 256.09-mile, 36-inch-diameter natural gas transmission pipeline. The NEXUS pipeline will consist of 256.09 miles of 36-inch pipeline, four (4) compressor stations and six (6) meter stations with a design flow capacity of 1.5 Billion cubic feet per day of natural gas.

This "Final Environmental Assessment and Finding of No Significant Impact" includes the following sections:

- Section I – Background
- Section II – Introduction
- Section III – Regulatory Background

[3] NEXUS Gas Transmission, LLC is co-owned by DTE NEXUS, LLC and Spectra NEXUS Gas Transmission, LLC, an indirect wholly-owned subsidiary of Spectra Energy Partners, LP (SEP). On February 27, 2017, Enbridge Inc. and Spectra Energy Corp closed their merger transaction. Enbridge Inc. now indirectly wholly-owns SEP's general partner and partially-owns SEP.

- Section IV – Purpose and Need
- Section V – Site Description
- Section VI – Proposed Special Permit Segment and Special Permit Inspection Area
- Section VII – Additional Design, Construction, Operations & Maintenance Requirements
- Section VIII – Alternatives
- Section IX – Affected Resources and Environmental Consequences
- Section X – Consultation and Coordination
- Section XI – Response to Public Comments Placed on Docket PHMSA-2016-0009
- Section XII – Finding of No Significant Impact
- Section XIII – Acronyms
- Section XIV – References
- Section XV – List of Appendices

II. Introduction

On November 20, 2015, NEXUS submitted an application to the Federal Energy Regulatory Commission (FERC) for approval to construct and operate a new 36-inch diameter natural gas transmission pipeline ("the NEXUS pipeline" or "the NEXUS system") system originating from Utica and Marcellus shale production areas and from the Spectra Energy Partners, LP (SEP) Texas Eastern Transmission, LP pipeline in eastern Ohio, and ending at the DTE Gas Company Willow Run facility in Washtenaw County, Michigan. In conjunction with its certificate application to FERC and pursuant to 49 U.S.C. § 60118(b) and 49 CFR 190.341, NEXUS submitted a special permit petition to PHMSA on January 12, 2016, requesting that it waive the odorant requirements in 49 CFR 192.625 for the natural gas transported through a portion of the transmission pipeline from MP 246.25 to 256.09 (i.e., the last 9.84 miles of the pipeline). PHMSA may issue a special permit to waive certain regulatory requirements where it is not inconsistent with pipeline safety and which is typically contingent on the performance of additional measures beyond minimum PHMSA pipeline safety regulations in accordance with 49 CFR 190.341. As part of its review of the special permit application, PHMSA must comply with the National Environmental Policy Act (NEPA). PHMSA's environmental review associated with the special permit application is limited to impacts that would result from

granting or denying the special permit, while the environmental review associated with pipeline routing, general construction and operation impacts of the entire NEXUS pipeline has been properly analyzed by FERC as the lead agency under the NEPA, 42 U.S.C. § 4321 et seq.

III. Regulatory Background

PHMSA regulations at 49 CFR 192.625 require introduction of odorant into the NEXUS pipeline in certain Class 3 locations along the last 9.84 miles of the pipeline route. While there is an exemption for gas transmission pipelines where 50% or more of the line downstream is in Class 1 or 2 locations, this portion of the NEXUS pipeline contains only roughly 47% downstream Class 1 and 2 locations **(see Table 2 - Proposed "Special Permit Segment Areas" below)**. Odorization of gas pipelines is required for distribution pipelines and certain transmission pipelines to facilitate detection of leaks by the public. Without odorization, natural gas is typically odorless. Gas leaks can lead to the build-up of natural gas in enclosed areas (such as near dwellings for human occupancy), which if subject to an ignition source, may explode causing death, injury, and destruction of property and natural resources. Odorization does not decrease the potential for a release or rupture of natural gas, but it is intended to facilitate the early detection of leaks by the public. *Notice of Proposed Rulemaking, 38 Fed. Reg. 22044 (Aug. 15, 1973)* ("Odorization allows the early detection of leaks…").

Below is the relevant text of 49 CFR 192.625.

> *(a) A combustible gas in a distribution line must contain a natural odorant or be odorized so that at a concentration in air of one-fifth of the lower explosive limit, the gas is readily detectable by a person with a normal sense of smell.*
>
> *(b) After December 31, 1976, a combustible gas in a transmission line in a Class 3 or Class 4 location must comply with the requirements of paragraph (a) of this section unless:*
>
> > *At least 50 percent of the length of the line downstream from that location is in a Class 1 or Class 2 location.*

IV. PURPOSE AND NEED

The purpose of NEXUS' special permit application submitted to PHMSA is to request that PHMSA waive the odorant requirements of 49 CFR 192.625 for the natural gas transported for approximately 9.84 miles of the NEXUS pipeline, from MP 246.25 to 256.09 in light of (1) significant technical and operational problems that receipt of odorized gas presents for downstream pipelines and storage fields, wherein odorization is not required by law; and (2) additional design, materials, construction, operations and maintenance measures that are expected to increase the level of safety to a greater extent than would be achieved by introducing odorant.[4] This request is related to the natural gas pipeline expansion and construction project known as the NEXUS pipeline. NEXUS has received a Certificate of Public Convenience and Necessity[5] from FERC for construction of the project, as described in **Appendix J – Relevant NEXUS Pipeline FERC Reports and Filings**, which summarizes the relevant NEXUS FERC reports and filings with links to the FERC docket. The FERC final environmental impact statement ("FEIS") is available at: http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14411409.[6]

As further described in **Section VI - Proposed Special Permit Segment and Special Permit Inspection Area**, the proposed "***special permit segment areas 1 to 8***" includes a total of eight (8) distinct segments: seven (7) of which are non-contiguous segments of pipe, comprising 5.24 miles of Class 3 location pipe within the last 9.84 miles of the NEXUS pipeline, that do not meet the odorization exemption criterion of 49 CFR 192.625(b)(1) and one (1) segment of pipe, comprising 1.09 miles of Class 2 location pipe, that meets odorization exemption criteria but is

[4] The NEXUS pipeline is not being routed within 50 feet of dwellings for human occupancy from MP 245.16 to MP 256.09 which also reduces the need for odorant to meet 49 CFR 192.625. The one current structure within 50 feet is a DTE structure that will be demolished prior to the NEXUS pipeline being placed into natural gas service. The nearest dwelling intended for human occupancy for this section of pipeline is at approximate MP 253.17, and is approximately 64 feet from the NEXUS pipeline.

[5] NEXUS has received the Certificate of Public Convenience and Necessity from FERC which can be reviewed at: https://www.ferc.gov/CalendarFiles/20170825170323-CP16-22-000.pdf.

[6] FERC's November 30, 2016, FEIS concluded that while construction will temporarily affect the environment, the environmental impacts would be less significant considering the project's proposed mitigation and other mitigation measures recommended by FERC. Specifically, FERC concluded that the NEXUS project would not have significant cumulative impacts on safety and reliability or significant impacts to air quality, groundwater resources, surface water resources, noise, geologic and vegetative resources, among other resources.

being included within the special permit in an abundance of caution due to a cluster of structures intended for human occupancy.[7] In sum, the proposed ***special permit segment 1***[8] includes the 10.93 miles of pipeline from MP 245.16 to MP 256.09 located at the end of the NEXUS pipeline in Washtenaw, County, Michigan. As proposed, the special permit would include additional design, materials, construction, and operations and maintenance requirements, many of which are applicable to a larger "***special permit inspection area***" which extends from MP 0 to MP 256.09 and additional safety requirements for the ***special permit segment 1***.

Introduction of odorant would cause significant technical and operational problems for downstream pipelines (including DTE Gas Company, a subsidiary of DTE Energy Company), and storage fields. Deodorizing 1.5 billion cubic feet ("Bcf") per day is not a technically viable option for the NEXUS pipeline. Likewise, rerouting the NEXUS pipeline to avoid the Class 3 areas is not feasible, as the route must terminate at the interconnect with DTE Gas Company to utilize existing DTE Gas Company and Vector pipelines (a joint venture between Enbridge Inc. and DTE Energy Company) to meet the commercial requirement of NEXUS. To provide an equivalent level of safety in the absence of odorization, PHMSA will require NEXUS to implement additional design, materials, construction, operations and maintenance to grant relief from the odorization requirement, as specified in the special permit and detailed in **Section VII - ADDITIONAL DESIGN, CONSTRUCTION, OPERATIONS & MAINTENANCE REQUIREMENTS** below.

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[7] This pipeline segment is in a Class 2 location that does not require odorization under 49 CFR 192.625. NEXUS has proposed including it as a ***special permit segment area 8*** and would be included in the ***special permit segment***, however, as a proactive measure and in an abundance of caution, due to a cluster of 49 CFR 192.5 structures intended for human occupancy within the potential impact radius ("PIR") of the NEXUS pipeline. As a result, the portion of the NEXUS pipeline that requires a waiver from PHMSA odorization requirements is approximately 5.24 miles of Class 3 location pipe that is located within the last 9.84 miles of the NEXUS pipeline, while the length of the ***Special Permit Segment Areas 1 through 8*** is approximately 6.33 miles of pipe within the last 10.93 miles of the NEXUS pipeline due to this Class 2 location 1.09-mile pipeline segment. ***Special Permit Segment Areas 1 through 8*** are summarized in **Table 2 - Proposed "*Special Permit Segment Areas*."**

[8] ***Special permit segment 1*** includes all the NEXUS proposed "***Special Permit Segments 1 through 8***" plus additional mileage. ***Special permit segment 1*** – is defined as 10.93 miles of NEXUS pipeline from MP 245.16 to MP 256.09 (end of the NEXUS pipeline) located at the downstream section of the NEXUS pipeline in Washtenaw County, Michigan.

PHMSA believes that these conditions will achieve an equivalent or higher level of safety by significantly decreasing the likelihood of a release of natural gas along the entire pipeline route (***special permit inspection area)*** and in the ***special permit segment 1***. The special permit conditions include: enhanced pipe materials requirements (reducing the risk of a material related failure); additional construction requirements, inspection and testing (decreasing the risk of a construction related failure); use of coatings on the pipe and girth welds that do not shield against cathodic protection (CP), increased post-construction testing, inline inspection (smart pigging), inspection, and repair criteria (reducing the risk of failure due to mechanical damage and corrosion); and increased patrolling and line of sight markers (reducing the risk of in-service mechanical damage).

Natural gas is typically odorless, and thus gas without odorant could build-up within a closed structure without being detected. For ignition of leaking gas to occur, a sufficient concentration is required. Because natural gas dissipates in air, typically enclosed spaces are at much greater risk for ignition than open air. However, NEXUS pipeline will be installed to maximize the separation from any enclosed structures[9,10] and will not have a direct connection to any of the structures within the proposed ***special permit segment 1***, so migration of gas released from a leak

[9] Between MP 256 and MP 256.09 (end point of the pipeline), there is one (1) 49 CFR 192.5 structure intended for human occupancy within 50-feet of the proposed pipeline centerline. This structure is owned by DTE Gas Company, and is scheduled for demolition prior to the NEXUS pipeline being placed into service. The NEXUS pipeline is not being routed within 50 feet of dwellings for human occupancy from MP 245.16 to MP 256.09 which also reduces the need for odorant to meet 49 CFR 192.625. The nearest dwelling intended for human occupancy for this section of pipeline is at approximate MP 253.17, and is approximately 64 feet from the NEXUS pipeline.

[10] There are 4 school buildings near the NEXUS pipeline. Two of these schools have a portion of the school building within the PIR. The other two are outside of the PIR, but near it. The information on these schools is summarized below. Distances from the pipeline shown below are to the nearest point of the school.

- .Brick Elementary School (8970 Whittaker Rd. @ MP 246.28) is 669 ft. from NEXUS pipeline (a portion of the school is within the PIR);
- Bishop Elementary School (8888 Whittaker Rd. @ MP 246.38) is 1135 ft. from NEXUS pipeline (the school is outside the PIR);
- Model Elementary School (8850 Whittaker Rd. @ MP 246.43) is 913 ft. from NEXUS pipeline (a portion of the school is within the PIR); and
- Rawsonville Elementary School (3110 S Grove St @ MP 251.81) is 1068 ft. from NEXUS pipeline (the school is outside the PIR).
- The Special Permit Condition B.6 requires Class 3 location pipe with a design factor of 0.5. The existing 49 CFR 192.5, 192.105, and 192.619 requirements may be Class 1 or 2 for some of these locations due to the Class location requirements as defined in 192.5. **Appendix D** shows the class locations by MP for the NEXUS pipeline.

would not have a direct path to any structure, which minimizes the risk of natural gas build up in an enclosed structure. Furthermore, PHMSA believes that undertaking additional measures designed to prevent leaks will provide an equivalent or higher level of public safety in the ***special permit segment 1*** than would be achieved by introducing odorant in the pipeline, and that this will offset any potential increased risk of an unidentified leak or build-up of natural gas in an enclosed area.

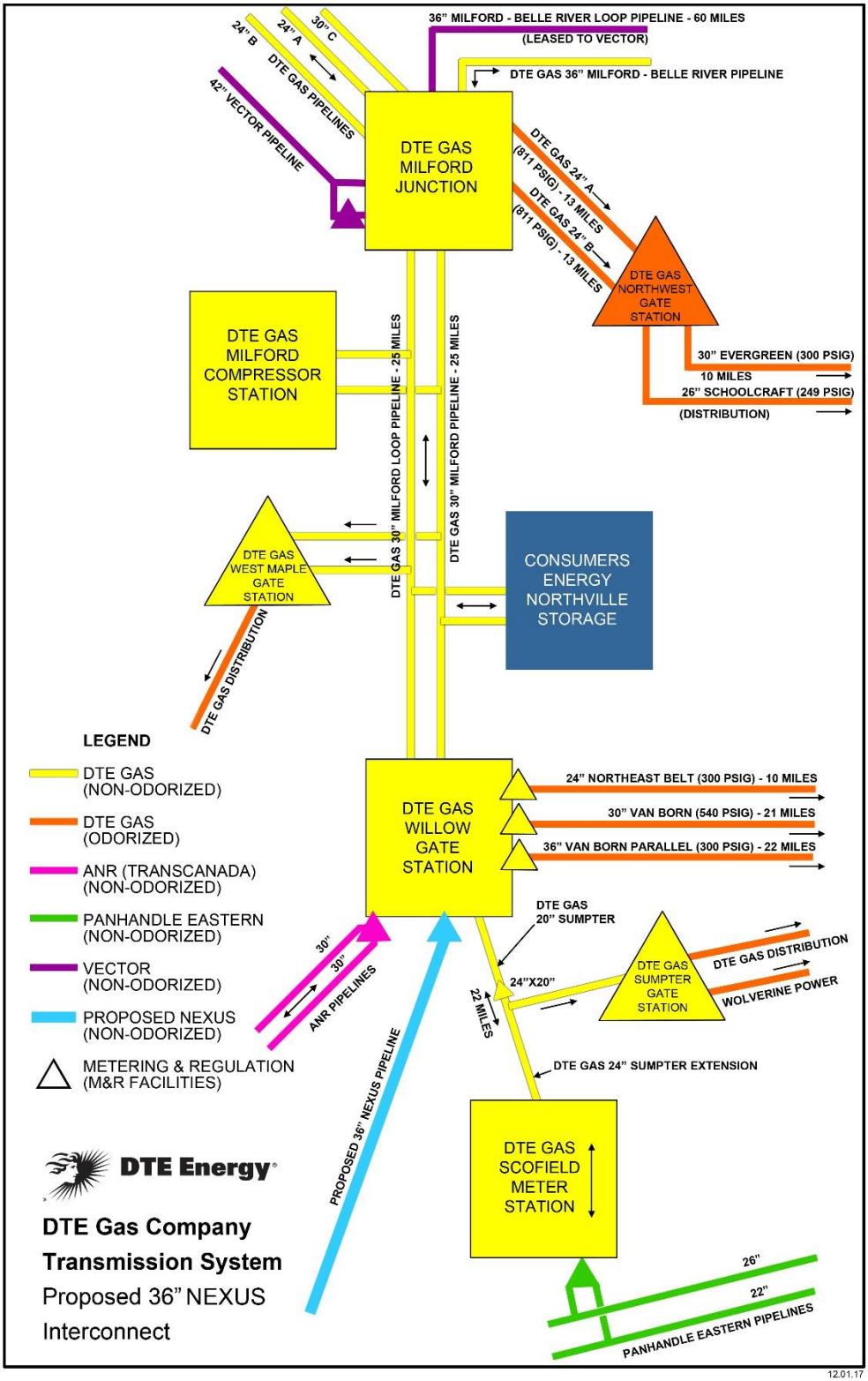
NEXUS requested that these odorization requirements be waived for the following reasons:

1. Certain gas transmission pipelines, including some DTE Gas Company pipelines and the Vector Pipeline, immediately downstream of the NEXUS pipeline do not presently contain or require odorant because they are either not located in Class 3 or 4 locations or they qualify for an exemption from odorization requirements under 49 CFR 192.625, including where 50% of the line downstream from the location is in a Class 1 or 2 location. See **Figure 1 - NEXUS Pipeline DTE Gas Company Interconnect Schematic - and Appendix A – NEXUS Pipeline Area Overview Map - and Appendix B - NEXUS Pipeline DTE Gas Company Interconnect Schematic** - below for a project overview and a schematic illustrating the DTE Gas Company system of unodorized and odorized pipelines and the interconnected interstate pipelines near the terminus of the proposed NEXUS pipeline. Note that only the DTE Gas Company pipelines depicted in orange as shown in **Figure 1 and Appendix B -NEXUS Pipeline DTE Gas Company Interconnect Schematic** - are currently odorized, and all supplies to those pipelines are unodorized, allowing for precise control of odorization.

2. Further downstream of the NEXUS pipeline, DTE Gas Company currently adds odorant to all deliveries of natural gas to its distribution systems and its odorized transmission systems as required by 49 CFR 192.625 (i.e., those pipelines located in Class 3 and 4 areas where odorization exemptions do not apply, such as where 50% of the line downstream is not located in a Class 1 or 2 location). See **Figure 1 below (also included as Appendix B - NEXUS Pipeline DTE Gas Company Interconnect Schematic)** for a schematic illustrating the DTE Gas Company system of unodorized and odorized pipelines and the interconnected interstate pipelines near the terminus of the proposed NEXUS pipeline. Note that all current receipts into or deliveries out of the DTE Gas Company Willow Gate

Station are unodorized, except for the three (3) DTE Gas Company pipelines used solely for market deliveries to the Detroit/Ann Arbor, Michigan metropolitan area (these pipelines are illustrated leaving the Willow Gate Station on the right-hand side and are colored orange). Other than these three (3) odorized pipelines, the remaining pipelines currently interconnected at Willow Gate Station are transmission pipelines exempt from odorization in accordance with 49 CFR 192.625(b)(1) or 192.625(b)(2)(i), or both.

Figure 1 (also included as Appendix B)
NEXUS Project DTE Gas Company Interconnect Schematic



DTE Gas Company has informed NEXUS that receipt of odorized gas from the NEXUS pipeline would interfere with its current ability to effectively and reliably odorize gas delivered into the three (3) pipelines used for market deliveries to the Detroit/Ann Arbor area from the Willow Gate Station and at other downstream market delivery points. The daily and seasonal changes in volume received from or delivered to the interstate pipelines and the DTE Gas Company system of transmission pipelines and gas storage facilities, combined with the continuously varying market deliveries at Willow Gate Station would require variable additions of odorant to the three (3) market delivery pipelines based on the source of the gas (i.e., based on whether the source was odorized, unodorized or a known blend of odorized and unodorized gas). Controlling proper odorant levels would be very difficult when the source gas changed from unodorized to partially odorized to odorized gas, as receipts from the non-odorized pipelines fell and market requirements increased. This scenario would be typical of a cold winter morning, when nominations from the unodorized interstate pipelines fall at the beginning of the gas day (10:00 am EST) or even reverse to require deliveries from DTE Gas Company to either ANR Pipeline or Panhandle Eastern Pipeline or both. Under this scenario, NEXUS receipts at Willow Gate Station could go from 0% of supply for the three (3) market delivery pipelines to 100% or somewhere in between. The volumes received or delivered by DTE Gas Company at Willow Gate Station from or to its unodorized transmission pipelines are not individually metered, making calculation of relative volumes of unodorized and odorized gas supplies difficult to impossible. Lastly, even if these relative volumes were known, the piping configuration of the Willow Gate Station does not provide for uniform mixing of all receipts prior to the supply headers for the three (3) market delivery pipelines.

Deliveries into the DTE Gas odorized system of pipelines from Willow Gate Station alone exceed 85 Bcf annually. Accurate odorization of these volumes is critical to the safety of the more than 650,000 customers served by those DTE Gas Company pipelines. The industry standard approach to controlling proper odor intensity is to inject odorant at rates directly proportional to flow rate. Equipment for monitoring odorant concentration typically relies on detection of sulphur and/or mercaptan levels. The resulting indications of odorant concentration are very difficult to correlate to other operational parameters and

erroneous indications can be difficult to rapidly identify. As a result, using such information to control the rate of odorant injection has a greater risk of both significant over and under odorization, relative to odorization proportional to flow. Under odorization makes detection of leaks more difficult while over odorization increases the number of false leak reports, straining the resources needed to respond to each and every one, which increases the chance of an untimely response to an actual leak.

3. DTE Gas Company has informed NEXUS that gas received from the NEXUS pipeline would reach downstream storage facilities owned and operated by DTE Gas and other DTE affiliates, as well as those of other interconnected operators (such as Consumers Energy's Northville facility) and thus gas withdrawn from storage would have variable odorant levels and make effective and reliable odorization of gas delivered to the DTE distribution system more difficult. As discussed above, any erroneous indications of odorant concentration measured by sulphur or mercaptan monitoring equipment that would determine the level of supplemental odorization of gas going to the distribution market would be difficult to rapidly identify. The control of odorant injection rates in a changing gas blending situation comes with inherent risk of over or under odorization.

4. Except for the DTE Gas Company pipelines used solely for market deliveries (these pipelines are colored orange in **Figure 1 and Appendix B - NEXUS Pipeline DTE Gas Company Interconnect Schematic**), the DTE Gas Company and the Vector Pipeline transmission system downstream of NEXUS (see Figure 1 and Appendices A and B) are not currently handling odorized gas and would require a major overhaul of components (e.g., piping vents, gas powered valve actuators, control valve bleed gas, storage facilities, maintenance equipment, etc.). Without such modifications, normal facility operations are likely to generate false leak reports (due to venting of odorized or partially odorized gas), which consumes resources to respond to each and every one as discussed above.

5. DTE Gas Company has several bi-directional interconnects with other pipelines that are not odorized or designed to receive odorized gas, as illustrated in **Figure 1 and Appendix B**. These include those with ANR Pipeline, Panhandle Eastern Pipeline, the Consumers Energy Northville gas storage facility and the Vector Pipeline, among others. Odorization of the gas delivered from the NEXUS pipeline to DTE Gas Company would extend

odorization operational problems to those other pipeline systems. These include replacement of equipment that is not designed to handle odorized gas and possible impacts to the effective and reliable odorization to distribution systems. Gas received from NEXUS at Willow Gate Station could travel hundreds of miles on pipelines operated by DTE Gas and other interconnecting parties that are not required to be odorized due to exemptions under 49 CFR 192.625 discussed above. Any interconnecting party that subsequently odorizes gas received from DTE Gas would confront the same difficulties with accurate odorization discussed above, as well as the need to modify equipment currently handling non-odorized gas to reduce false leak reports during normal equipment operation.

V. SITE DESCRIPTION

The NEXUS pipeline will consist of approximately 256 miles of new 36-inch pipeline, four (4) new compressor stations and six (6) new meter stations with a design capacity of 1.5 Bcf per day. SEP has begun surveying, and will construct and operate the NEXUS pipeline. The NEXUS pipeline route passes through primarily Class 1 areas for the first 246 miles; however, in Washtenaw County, Michigan, approximately 53% (~5.22 miles) of the last 9.84 miles (MP 246.25 to 256.09) leading up to the DTE Gas Company interconnect will pass through areas that are more than 50 percent Class 3. **Appendices A through I** illustrate the class locations, mainline valves, and in-line inspection ("ILI") launchers and receivers along the entire 256-mile NEXUS pipeline route. **Appendix F - NEXUS Pipeline Special Permit Maps with HCAs and Class Location Design Factors -** provides the potential impact radius (PIR)[11] for the section of the NEXUS pipeline from approximate MP 228 to MP 256.09, including the ***special permit segment 1*** from MP 245.16 to MP 256.09

Most the 10.93-mile portion of the NEXUS pipeline route which contains ***special permit segment 1***, extends through forested, agricultural, and open land in the general vicinity and adjacent to commercial/industrial and residential tracts. **Table 1 - Existing Population Levels and Trends for the Special Permit Segment of the NEXUS Pipeline in Michigan -** provides existing population levels and trends for the ***special permit segment 1***. Maps of the ***special***

[11] PIR is defined in 49 CFR 192.903 as the radius of a circle within which the potential failure of a pipeline could have significant impact on people or property. The PIR of the NEXUS pipeline is 942.6 feet.

permit segment 1 depicting dwellings (human) in the class location unit (220 yards or 660 feet) are included in **Appendix E - NEXUS Pipeline Class Location and Design Factor Maps** - and maps of the PIR of the pipeline in the ***special permit segment 1*** are included in **Appendix F - NEXUS Pipeline Special Permit Maps with HCAs and Class Location Design Factors**.

There are five hundred fifty-nine (559) family dwellings, thirty-seven (37) businesses, two (2) schools, and two (2) well defined outside areas of assembly within the PIR of the NEXUS pipeline between MP 245.16 and MP 256.09. This information is based on a 942.6 foot PIR at the planned maximum allowable operating pressure ("MAOP") of 1,440 psig, calculated as defined in 49 CFR 192.903. The collection of data for class location and HCA analyses was completed using a combination of desktop level review of project aerial imagery (where available), ESRI's Online Resources World Imagery, Google Earth™ imagery, and field reconnaissance.

TABLE 1 - Existing Population Levels and Trends for the Special Permit Segment of the NEXUS Pipeline in Michigan

Location	2000 Population a/	2010 Population b/	2013 Population Estimate c/	Population Density (persons/sq. mi.) (2010) b/	Change in Population 2000-2013 (%)	Change in Population 2010-2013 (%)
FEDERAL						
U.S.	281,421,906	308,746,065	311,536,594	87.4	10.7	0.9
STATE						
Michigan	9,938,444	9,883,706	9,886,095	174.8	-0.5	0.0
COUNTY						
Washtenaw	322,895	344,791	348,560	488.4	7.9	1.1
LOCAL						
Belleville City	3,997	3,991	3,941	3,511.8	-1.4	-1.3
Van Buren Charter Township	23,559	28,821	28,545	848.4	21.2	-1.0
Ypsilanti Charter Township	49,182	53,362	53,626	1,782.8	9.0	0.5
Ypsilanti City	22,362	19,435	19,647	4,489.0	-12.1	1.1

Sources:
a/ U.S. Census Bureau 2000a and 2000b.
b/ U.S. Census Bureau 2010a, 2010b, and 2010d.
c/ U.S. Census Bureau 2013c.
d/ U.S. Census Bureau 2013b.
e/ U.S. Census Bureau 2014a.
f/ U.S. Census Bureau 2010c.
- Data unavailable.

Where possible the NEXUS pipeline is co-located with existing pipelines, electric transmission lines and railroads (approximately 42% of the route). As a result, 87% of the proposed pipeline route is sited to avoid conversion of existing land uses. NEXUS followed relevant Pipelines and Informed Planning Alliance ("PIPA") recommended practices where possible in routing the pipeline, which are intended to reduce risks and improve the safety of affected communities and transmission pipelines. Rerouting the NEXUS pipeline to avoid the populated areas in the ***special permit segment 1*** is not practicable due to the long, continuous east to west orientation of high population density between Ann Arbor to the west and Detroit to the east of the NEXUS pipeline route, as reflected in the map provided in **Appendix C**. The route must terminate at the existing DTE Gas Company Willow Gate Station to allow the utilization of existing DTE Gas and Vector Pipeline transmission systems as part of the overall NEXUS project.

VI. Proposed Special Permit Segment and Special Permit Inspection Area

NEXUS applied (also referred to as a petition) to PHMSA for a special permit waiving the odorization requirements of 49 CFR 192.625 for the natural gas transported approximately 9.84 miles of the NEXUS pipeline (from MP 246.25 to 256.09). Based on the current Class location analysis, the proposed ***special permit segment 1*** includes all seven (7) segments of pipe in Class 3 areas that do not meet the exemption criterion of 49 CFR 192.625(b)(1), plus one (1) segment of pipe in a Class 2 location area to be included in the Special Permit.[12] Together, these eight (8) distinct segments total 6.33 miles ("proposed ***special permit segment Areas***" or "proposed ***special permit segment areas 1 through 8***") which are located within the last 10.93 miles of the NEXUS pipeline (referred to as the "***special permit segment 1***"). The start and end mileposts of these eight (8) proposed ***Special Permit Segment Areas*** are summarized in **Table 2 - Proposed "Special Permit Segment Areas"**, which also provides the percentage of Class 3 location area downstream of these segments, based on the start milepost of each ***special permit segment(s)***.

[12] For the reasons discussed supra in footnote 5, while this ***special permit segment area 8*** does not require odorization under 49 CFR 192.625. It is included in the special permit as part of the ***special permit segment 1*** due to a cluster of 49 CFR 192.5 structures intended for human occupancy within the NEXUS pipeline PIR.

Table 2 - Proposed "Special Permit Segment Areas"					
Special Permit Segment Areas	**MILE POST BEGIN**	**MILE POST END**	**CLASS LOCATION**	**Length (Mile)**	**Downstream % Class 3**
8	245.16	246.25	Class 2[13]	1.09	47.9
7	246.25	246.39	Class 3	0.13	53.2
6	248.72	250.18	Class 3	1.46	69.2
5	250.67	251.08	Class 3	0.41	67.1
4	251.11	251.40	Class 3	0.29	64.8
3	251.90	254.43	Class 3	2.53	70.1
2	254.82	255.04	Class 3	0.22	31.9
1	255.85	256.03	Class 3	0.18	74.2

The ***special permit inspection area*** extends from MP 0 to MP 256.09 and includes ***special permit segment 1*** and ***special permit segment 2***.[14] The ***special permit segment 1*** described herein are comprised of 6.33 miles of pipe that extend, albeit not continuously, along a larger "10.93-mile area of the NEXUS pipeline from MP 245.16 to the terminus of the pipeline at MP 256.09" ***(special permit segment 1)***. The special permit would allow for adjustments to the boundaries of the proposed ***special permit segment 1*** to account for class location changes that may occur due to final pipeline route adjustments and due to new population development prior to construction. In addition, future development may occur along the NEXUS pipeline route that would cause future changes to the boundaries of the ***special permit segment 1*** and may create new Class 3 locations that do not meet the exemption criterion specified in 49 CFR 192.625(b)(1). The special permit will allow for future changes to the boundaries of the ***special permit segment 1*** and allow for extensions into ***special permit segment 2*** under the special permit with a notification to PHMSA. See **Appendices D through F** depicting class locations, the potential impact radius (PIR), high consequence areas (HCA), and pipe design

[13] For the reasons discussed supra in footnotes 5 and 8, this ***special permit segment area 8*** from MP 245.16 to MP 246.25 does not require odorization under 49 CFR § 192.625, but it is included in the Special Permit due to a cluster of 49 CFR 192.5 structures intended for human occupancy within the NEXUS pipeline PIR.

[14] ***Special permit segment 2*** is defined as 7.28 miles of NEXUS pipeline from MP 237.88 (Washtenaw County, Michigan county line) to MP 245.16 located in Washtenaw County, Michigan.

factors for approximate MP 228.0 to 256.09, including the ***special permit inspection area***. If the pipeline areas from MP 235.09 to MP 256.09 should become Class 3 locations, to be applicable under this proposed special permit these ***special permit segment areas*** must have either Class 2 or Class 3 design factor pipe in the PIR and must meet the other special permit conditions.

VII. ADDITIONAL DESIGN, CONSTRUCTION, OPERATIONS & MAINTENANCE REQUIREMENTS

To provide an equivalent level of safety in the absence of odorization, the special permit has additional design, materials, construction, operations and maintenance requirements (conditions) which are intended to decrease the likelihood of a release of gas. PHMSA believes that these additional measures designed to prevent leaks will ensure an equivalent level of safety and increase the level of safety to a greater extent than simply introducing odorant into the gas stream. The special permit conditions are reviewed below in Section VII. A, B, C, and D.

States of Ohio and Michigan

- ***Ohio Counties of Columbiana, Stark, Summit, Wayne, Medina, Lorain, Huron, Erie, Sandusky, Wood, Lucas, Henry, and Fulton***
- ***Michigan Counties of Lenawee, Monroe, and Washtenaw***

On the condition that NEXUS complies with the terms and conditions set forth below, the special permit waives compliance from 49 CFR 192.625 for 10.93 miles of ***special permit segment 1*** as described below and in **Appendix A - NEXUS Pipeline – Overview Map**. The special permit allows NEXUS to operate ***special permit segment 1*** without odorized gas and at its maximum allowable operating pressure (MAOP) of 1440 pound per square inch gauge (psig)[15] when the conditions of this special permit are implemented. The Federal pipeline safety regulations in 49 CFR 192.625 require natural gas pipeline operators to odorize natural gas when over 50 percent of the downstream mileage is in a Class 3 or 4 location as defined by 49 CFR 192.5. The special permit prescribes additional terms and conditions outside of ***special permit segment 1***, in ***special permit segment 2*** and the ***special permit inspection area*** as defined below.

[15] The NEXUS pipeline will have a potential impact radius of 942.6 feet as determined by 49 CFR 192.903 for gas transmission pipeline integrity management determination of high consequence areas.

- ***Special permit segment 1*** – is defined as 10.93 miles of NEXUS pipeline from MP 245.16 to MP 256.09 (end of the NEXUS pipeline) located at the downstream section of the NEXUS pipeline in Washtenaw County, Michigan**.**
- ***Special permit segment 2*** – is defined as 7.28 miles of NEXUS pipeline from MP 237.88 (Washtenaw County, Michigan county line) to MP 245.16 located in Washtenaw County, Michigan**.**
- ***Special permit inspection area***[16] – is defined as the NEXUS pipeline from MP 0 in Columbiana County, Ohio to MP 256.09 in Washtenaw County, Michigan**.**

The NEXUS pipeline ***special permit inspection area*** totals 256.09 miles of 36-inch pipe as described in Attachment A and includes ***special permit segment 1*** and ***special permit segment 2.*** The ***special permit inspection area*** is in the Ohio and Michigan counties listed above. The NEXUS pipeline system consists of the NEXUS pipeline, four (4) compressor stations, six (6) meter stations and associated facilities located in the Ohio and Michigan counties listed above.

A. Additional Design Requirements for the NEXUS pipeline (MP 0 to MP 256.09)

1. **Pipeline Internal Inspection**: The NEXUS pipeline (***special permit inspection area***[17]) must be capable of internal inspection in accordance with 49 CFR 192.150 and must include permanently installed launchers and receivers capable of running in-line inspection (ILI) tools. Launchers and receivers must be installed at the below mileposts (MP):

Launcher/Receiver	MP	County	State
Launcher	0.0	Columbiana	Ohio
Receiver	63.6	Medina	Ohio
Launcher	63.6	Medina	Ohio
Receiver	184.6	Lucas	Ohio
Launcher	184.6	Lucas	Ohio
Receiver	256.09	Washtenaw	Michigan

[16] ***Special permit inspection areas*** throughout these conditions include ***special permit segments*** unless specifically defined as not applicable or if the ***special permit segment*** has more stringent conditions.

[17] The ***special permit inspection area*** includes ***special permit segment 1*** and ***special permit segment 2*** when referenced in these special permit conditions.

2. **Mainline Valve – Monitoring and Remote Control**: All mainline valves on the NEXUS pipeline within the ***special permit inspection area*** must be equipped for remote operation, monitoring and control, or remote monitoring and automatic control in accordance 49 CFR 192.620(d)(3)(iii). **Appendix G** is a table of the mainline valves by milepost located on the NEXUS pipeline route, all of which must be remote controlled valves with operating pressure monitored upstream and downstream of the mainline valve. Closure of the appropriate valves following a pipeline rupture[18] must occur as soon as practicable from the time the pipeline rupture and its location are confirmed[19], not to exceed 30 minutes from such confirmation. NEXUS procedures must include operational criteria for prompt remote valve closure and pipeline shut-down.

B. Proposed Additional Material Requirements for the NEXUS pipeline

1. **Pipe Manufacturing Specification**: The 36-inch mainline pipe within the ***special permit inspection area*** must be manufactured using American Petroleum Institute Standard 5L *"Specification for Line Pipe"* (API 5L)[20] product specification Level 2. This type of pipe conforms to more stringent manufacturing specifications (as compared to standard API 5L Level 1 specifications) with respect to chemical composition, notch toughness, strength properties, and nondestructive evaluation.

2. **Pipe Diameter to Wall Thickness**: The ratio of the specified outside pipe diameter of the pipe to the specified wall thickness (d/t) must be less than 100 for the pipeline within the ***special permit inspection area***.

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[18] Condition D.10.c.i below defines a pipeline rupture and response timing for a large-volume rupture event.

[19] The pipeline valve section location to be closed and isolated (if there should be a rupture) will be confirmed by NEXUS through Gas Control or other field operations personnel monitoring of the appropriate pipeline pressures, pressure changes, or flow rate changes through a compressor discharge section or by location confirmation from responsible persons.

[20] API 5L editions and other industry standards "incorporated by reference" are listed in 49 CFR 192.7. If PHMSA adopts a revised edition of a referenced standard such as API, NACE International (NACE) or ASME standards into 49 CFR Part 192, the referenced requirements of those revised standards are automatically incorporated into these special permit conditions unless noted otherwise.

3. **Pipe Toughness for Fracture Arrest**: The toughness properties for pipe must ensure at least ninety-nine percent (99%) probability of fracture arrest within eight pipe lengths with a probability of not less than ninety percent (90%) within five pipe lengths as defined in 49 CFR 192.112(b) for the pipeline within the ***special permit inspection area***. The Battelle Two Curve Method (BTCM), assuming conservative gas composition data and the application of a Leis Correction Factor (1.3x), is an acceptable method of confirming fracture control. Pipe fracture arrest meeting Condition B.3 must be confirmed prior to placing the NEXUS pipeline into operational service.

4. **Pipe Mill Inspection of Pipe Seams**: All the pipe seams on pipeline to be installed in the ***special permit inspection area*** must be ultrasonically tested after cold expansion and/or mill hydrostatic testing. Defective pipe seams found in the pipe mill after cold expansion and/or mill hydrostatic testing must be cut-out.

5. **Pipe Mill Pressure Test**: All pipe to be used within the ***special permit inspection area*** must be hydrostatically tested at the mill at a test pressure corresponding to a hoop stress of 95 percent specified minimum yield strength (SMYS) for 10 seconds.

6. **Pipeline Design Factor**: Pipe must be installed with a design factor and design pressure appropriate for a Class 3 location in accordance with 49 CFR 192.111 in the ***special permit segment 1***.

C. Additional Construction Requirements for the NEXUS pipeline

1. **Pipeline Girth Weld Quality Assurance**: Within the ***special permit inspection area*** welding of pipeline girth welds in accordance with 49 CFR Part 192, Subpart E must include:

    a. Welding procedures must be developed utilizing sound engineering practices and must minimize the potential for hydrogen cracking;

    b. No pipe movement shall be allowed until the root bead is completed;

c. Weld procedures must include adequate preheat to prevent hydrogen cracking. Temperature must be monitored and maintained throughout the welding process. The following conditions apply:

   i. For low-hydrogen welding processes (i.e. mechanized gas metal arc welding (GMAW), hybrid shielded metal arc welding (SMAW)/ flux-cored arc welding (FCAW), and low hydrogen SMAW welding (E6010 root/8010 hot pass/8018 fill and cap)), preheat measurement must be monitored periodically;[21]

   ii. For manual SMAW welds completed using cellulosic electrodes, preheat measurement must be verified and documented for all weld passes where propane heating is being used. Where preheat is by induction heating, heat must be verified at the start of welding;[22]

d. One hundred percent (100%) non-destructive examination (NDE) of all girth welds;

e. All girth weld NDE results must include reviews by both ASNT certified Level II and III NDE technicians;

f. Girth weld NDE must use technology optimized for crack detection. Automatic Ultrasonic Testing (AUT) presents a high probability of detection (POD) of cracks whereas utilizing manual radiography without optimizing the radiographic procedure for crack detection presents a lower POD. In areas where manual radiographic procedures are implemented D4 film or a film of better quality must be used; [23]

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[21] Periodic preheat monitoring must be conducted by welding inspection staff as a documented activity not less than once per welding rig per day. Compliance checks must be daily, at random times, and not announced by an independent welding inspector. Records of this inspection activity must be documented and maintained for 5-years.

[22] The induction heating element maintains the heat throughout the welding process and additional heating checks will not need to be conducted.

[23] NEXUS installed a road bore at approximate MP 251.27 to MP 251.32 prior to finalization of the special permit conditions. D5 film was used for the NDE of these five (5) girth welds, and due to accessibility of being in a road bore will not be required to re-examine with D4 film. The D5 film must be examined by a NDE Level 3 technician for quality and acceptability.

g. For manual SMAW welds in ***special permit segments 1 and 2***, one of the following additional requirements will apply:

   i. Final girth weld NDE must be delayed a minimum of 24-hours following weld completion; [24] or

   ii. Following weld completion, post-weld heating at a minimum temperature of 400° F will be applied for a minimum of 20 minutes, followed by installation of an insulating blanket over the weld for a period of one (1) hour. Girth weld NDE will be performed following removal of the insulating blanket.

h. The ***special permit inspection area*** must be inline inspected within six (6) months after placement into service with an ILI Tool set-up to detect possible girth weld cracks and any girth weld cracking findings must be remediated within six (6) months after receipt of the ILI vendor report. If environmental permitting or right-of-way factors beyond NEXUS' control should prevent the completion of remediation within six (6) months, NEXUS must submit a letter justifying the delay and providing the anticipated date of completion to the appropriate PHMSA Central or Eastern Region Director. NEXUS must submit a request to the appropriate PHMSA Central or Eastern Region Director for any extended evaluation and remediation schedules. NEXUS must receive a letter of "no objection" for any extended remediation schedules; [25] and

i. Any girth weld pressure test failure or girth weld cracks discovered during construction must undergo a root cause investigation, with lessons learn utilized on the NEXUS pipeline and any future pipeline construction projects.

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[24] This requirement does not apply to five (5) girth welds located in a road bore at approximate MP 251.27 to MP 251.32.

[25] For any special permit condition that requires NEXUS to provide a notice for a "no objection" response from PHMSA, other notice, annual report, or documentation to the appropriate PHMSA Central or Eastern Region Director , NEXUS must also send a copy to the PHMSA Director of State Programs and the appropriate state authorities, including the Michigan Public Service Commission, Manager of Gas Operations, or the Public Utility Commission of Ohio, Service Monitoring and Enforcement Department, Gas Pipeline Safety Program Manager, which are the authorities of the states along the NEXUS pipeline route that have interstate agent agreements with PHMSA.

2. **Post Construction In-line Inspection**: NEXUS must run a post construction high resolution (HR) deformation/caliper inline inspection (ILI) tool[26] within the ***special permit inspection area*** prior to placing the pipeline into service. Based on the results of the high-resolution deformation tool, NEXUS must:
    a. Excavate, investigate and remediate, as necessary, all dents greater than two percent (2%) depth within the ***special permit inspection area*** prior to placing the pipeline into service.
    b. Additionally, within the ***special permit segment 1*** and ***special permit segment 2***, excavate, investigate and remediate, as necessary:
        i. All dent plus ovality indications greater than six percent (6%); and
        ii. All plain ovality indications greater than five percent (5%).

3. **Post Construction Backfill Coating Verification**: NEXUS must conduct a post backfill direct current voltage gradient (DCVG) or alternating current voltage gradient (ACVG) survey within the ***special permit inspection area*** no later than three (3) months after placing the pipeline into gas service. The DCVG or ACVG survey shall not be required where the survey is impractical, such as water crossings, horizontal directional drills, and road bores. Any construction damaged coating with a voltage drop classified as moderate or severe (IR drop greater than thirty-five percent (35%) for DCVG or 50 dBµV for ACVG)[27] or severe based on NACE International Standard Practice 0502-2008, "Pipeline External Corrosion Direct Assessment Methodology", (NACE SP 0502-2008) must be investigated and repaired.[28] A minimum of two (2) coating holiday indications must be excavated, classified and/or remediated per each survey crew per each time the survey is performed.

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[26] The (HR) deformation/caliper ILI tool assessment shall be done using NEXUS Company Procedure IP-MP2.5 and using HR deformation/caliper ILI tools that achieve a +/- 0.5% tool tolerance capability using individual finger sensors that are outside of cup-type sensors. The ILI tool tolerance shall not be applied for anomaly sizing purposes.

[27] If PHMSA adopts a revised edition of a referenced standard such as NACE International (NACE) or ASME standard into 49 CFR Part 192, the referenced requirements of those revised standards are automatically incorporated into these special permit conditions.

[28] The terms "repair", "remediate", or "remediation" of pipe coating must include repair of damaged external pipe coating, where required to maintain cathodic protection of the pipeline in accordance with 49 CFR 192.463.

4. **Pressure Testing**: The ***special permit segment 1*** pipe must be hydrostatically tested to a pressure that equals two (2) times MAOP. [29,30]

5. **Pipeline Depth of Cover**: The NEXUS pipeline within the ***special permit segment 1*** and ***special permit segment 2*** must be installed with a minimum depth of cover of 36 inches. The minimum depth of cover in roadside ditches, roadways, highways, and stream crossings must be 60 inches. Any pipe in the ***special permit segment 1*** and ***special permit segment 2*** that does not meet this Condition must have additional safety measures implemented in areas with reduced depth of cover based upon the threat, such as lowering the pipeline, increased pipeline patrols, protective concrete slabs, or additional line markers.

6. **Non-Shielding Pipe Coating**: Coatings that can shield cathodic protection ("CP"), such as polyethylene coatings (shrink sleeves and tape coatings), must not be used within the ***special permit inspection area***.

7. **Construction Quality Management and Assurance Plan**: The NEXUS pipeline within the ***special permit segment 1*** and ***special permit segment 2*** must be constructed with a construction quality management and assurance plan that includes the applicable conditions of this special permit and the following requirements:

    a. The quality assurance plan must address pipe inspection, hauling and stringing, field bending, welding, non-destructive examination of girth welds, applying and testing field applied coating, lowering of the pipeline into the ditch, padding and backfilling, and hydrostatic pressure testing.
    b. The quality assurance plan for applying and testing field applied coating to girth welds must be:
        i. Equivalent to that required under 49 CFR 192.112(f)(3) for pipe; and

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[29] The mainline valve assembly located at MP 248.5 must be tested to a pressure of at least 1.5 x MAOP (not 2 x MAOP), since a higher test pressure would exceed the test pressure rating of the valves and ANSI 600 fittings. If the valve assembly at MP 248.5 is not tested in the pipeline ditch, but is either hauled by truck and/or lifted into the pipeline ditch for tie-ins, the valve assembly must be inspected for damage and tie-in welds must have tie-in pipe excavated to minimize lateral and longitudinal line-up stresses on the tie-in girth welds.

[30] To prevent the potential for excessive combined stress, NEXUS may limit the post-installation hydrostatic test pressure for horizontal directional drills (HDD) in ***special permit segment 1*** to 1.8 x MAOP, provided a 49 CFR Part 192, Subpart J hydrostatic test to 2 x MAOP was conducted on the HDD pipe prior to installation.

ii. Performed by an individual with the knowledge, skills, and ability to assure effective coating application.

8. **Pipe Warning Tape**: Warning tape must be installed approximately one (1) foot above the pipeline within the ***special permit segment 1*** and ***special permit segment 2,*** except for locations where is impracticable to install warning tape, such as road bores and horizontal direction drills.

D. Additional Operations and Maintenance Requirements

1. **Baseline Assessment**: A baseline assessment of the NEXUS pipeline within the ***special permit segment 1*** and ***special permit segment 2*** using a high resolution (HR) magnetic flux leakage ("MFL") ILI tool must be conducted within three (3) years of the NEXUS pipeline in-service date. Anomalies must be remediated in accordance with Condition D.3 below.

2. **Integrity Management Program**: NEXUS must incorporate the requirements of this special permit into its written integrity management program (IMP) and standard operating procedures (SOPs).[31] NEXUS must treat ***special permit segments 1 and 2*** as *"covered segment"* in a *"high consequence area (HCA)"* in accordance with 49 CFR Part 192, Subpart O. Reassessments of the NEXUS pipeline within the ***special permit inspection area*** using HR MFL and HR Deformation ILI must be conducted at the frequency specified for HCAs in 49 CFR 192, Subpart O.[32] If NEXUS identifies threats within the ***special permit inspection area*** that require the running of additional ILI Tools, pursuant to 49 CFR Part 192, Subpart O, such as for crack detection[33] or pipe movement from soil or geologic stresses, NEXUS must use the appropriate ILI tools or other evaluation methods for pipeline assessments.

3. **Anomaly Response and Repair**: Anomaly response and repair for the NEXUS pipeline within ***special permit segments 1 and 2*** and the ***special permit inspection area*** must be conducted as required by 49 CFR 192, Subpart O and the below additional evaluation and

[31] Pipeline operating procedures such as NEXUS SOP's are required by 49 CFR 192.603(b) and 192.605.

[32] If 49 CFR 192.939(a) integrity management reassessment intervals should change from seven (7) years to some other reassessment interval under eight (8) years, NEXUS may use that reassessment interval instead of seven (7) years.

[33] "Pipe Crack" activity shall be defined as over both 10 percent wall thickness depth and 2-inches in length.

remediation criteria regardless of HCA[34] status. The required timing for excavation, investigation, and remediation of anomalies based on ILI data or excavation results must be in accordance with 49 CFR 192.485 and 192.933, and must incorporate the appropriate class location design factors and wall loss criteria in the anomaly repair criteria as follows:

a. ***Special permit segments 1****:*

i. **Immediate response:** Any anomaly within ***special permit segment 1*** that meets either: (1) a failure pressure ratio[35] (FPR) equal to or less than 1.1; or (2) an anomaly depth equal to or greater than 80% wall thickness loss.

ii. **One-year response:** Any anomaly within ***special permit segment 1*** that meets either: (1) an FPR less than 2.00; or (2) an anomaly depth greater than 40% wall thickness loss.

iii. **Monitored response:** Any anomaly within a ***special permit segment 1*** that meets both: (1) an FPR equal to or greater than 2.00; or (2) an anomaly depth less than or equal to 40% wall thickness loss. The schedule for the response must take tool tolerance[36] and corrosion growth rates into account.

b. ***Special permit segment 2 and special permit inspection area****:*

i. **Immediate response:** Any anomaly within ***special permit segment 2*** and ***special permit inspection area*** operating up to 72% SMYS that meets either: (1) an FPR equal to or less than 1.1; (2) an anomaly depth equal to or greater than 80% wall thickness loss.

ii. **One-year response:** Any anomaly within ***special permit segment 2*** and ***special permit inspection area*** that meets either: (1) an FPR less than design factor – for Class 1 location- FPR less than 1.39; Class 2 location – FPR less than 1.67; and for Class 3 location – FPR less than 2.0; or (2) an anomaly depth greater than 60% wall thickness loss.

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[34] HCAs in the ***special permit inspection area*** and ***special permit segments 1 and 2*** must have anomalies evaluated and repaired based upon the most stringent requirements of either: this special permit, 49 CFR Part 192, Subpart O, and NEXUS' Integrity Management Plan.

[35] Failure pressure ratio is the pipeline anomaly failure pressure divided by the maximum operating pressure of the pipeline.

[36] Tool tolerance shall be applied only to FPR calculations, not to the anomaly depth criteria.

Any anomaly for Class location changes from original Class 1 to 2 location or original Class 2 to 3 location in accordance with 49 CFR 192.5 and 192.611 that meets either: (1) an anomaly FPR less than the FPR of the original Class location; or (2) an anomaly depth greater than 50% wall thickness loss.

iii. **Monitored response:** Any anomaly within ***special permit segment 2*** and ***special permit inspection area*** that meets both: (1) an FPR less than design factor – for Class 1 location – FPR equal to or greater than 1.39; Class 2 location – FPR equal to or greater than 1.67; and for Class 3 location – FPR equal to or greater than 2.0; or (2) an anomaly depth less than or equal to 60% wall thickness loss.
Any anomaly repairs for Class location changes from original Class 1 to 2 location or original Class 2 to 3 location in accordance with 49 CFR 192.5 and 192.611 that meets both: (1) an anomaly FPR equal to or greater than the FPR of the original Class location; or (2) an anomaly depth equal to or less than 50% wall thickness loss.

c. **Tool tolerance and corrosion growth rates:** The schedule for the response must take tool tolerance and corrosion growth rates into account for immediate, one-year and monitored responses.

i. NEXUS must demonstrate ILI Tool tolerance accuracy for each ILI Tool run by usage of calibration excavations[37] and unity plots that demonstrate ILI Tool accuracy to meet the tool accuracy specification provided by the vendor (typical for depth within +10% accuracy for 80% of the time).

ii. The unity plots must show: a) actual anomaly depth versus predicted depth and b) actual failure pressure/MAOP versus predicted failure pressure/MAOP.

iii. ILI Tool evaluations for metal loss must use "6t x 6t" [38] interaction criteria or more conservative criteria for determining anomaly failure pressures and response timing with "6t" being pipe wall thickness times six.

[37] Calibration excavations may include previously excavated anomalies or other anomalies with known dimensions that were field measured for length, depth and width.

[38] "6t" means pipe wall thickness times six.

iv. Discovery date[39] must be within 90 days of an ILI Tool run for each type ILI Tool (HR-geometry, HR-deformation or high resolution HR-MFL).

4. **Close Interval Surveys**: A close-interval survey ("CIS") must be conducted and areas of inadequate cathodic protection in ***special permit segment 1*** and ***special permit segment 2*** must be remediated[40] within one (1) year of the pipeline in-service date**.** If environmental permitting or right-of-way factors beyond NEXUS' control should prevent the completion of the CIS within one (1) year from the issuance of this special permit, a CIS and subsequent remediation including coating repair must be completed as soon as practicable and a letter justifying the delay and providing the anticipated date of completion must be submitted to the appropriate PHMSA Central or Eastern Region Director[41] no later than one (1) month prior to the end of one (1) year after the issuance of this special permit and must receive a letter of "no objection" from the appropriate PHMSA Central or Eastern Region Director for a delay. CIS remediation activities must be completed within one (1) year of the finding. Any extended evaluation and remediation schedules submitted to PHMSA from NEXUS must receive a letter of "no objection" from the appropriate PHMSA Central or Eastern Region Director prior to implementing an extended CIS and remediation interval.

5. **Close Interval Surveys – Reassessment Interval**: CIS reassessments must be conducted on ***special permit segment 1*** and ***special permit segment 2*** at a frequency consistent with the reassessment intervals specified in 49 CFR 192, Subpart O for HCAs with reassessment

[39] Discovery date is the day, month and year that an Operator receives the ILI Tool run results from the ILI Tool service provider.

[40] The terms "remediate" or "remediation" of pipe coating must include repair of damaged external pipe coating, where required to maintain cathodic protection of the pipeline in accordance with 49 CFR 192.463.

[41] For any special permit condition that requires NEXUS to provide a notice for a "no objection" response from PHMSA, other notice, annual report, or documentation to the appropriate PHMSA Central or Eastern Region Director , NEXUS must also send a copy to the PHMSA Director of State Programs and the appropriate state authorities, including the Michigan Public Service Commission, Manager of Gas Operations, or the Public Utility Commission of Ohio, Service Monitoring and Enforcement Department, Gas Pipeline Safety Program Manager, which are the authorities of the states along the NEXUS pipeline route that have interstate agent agreements with PHMSA.

intervals not exceeding seven (7) years.[42] Any areas of low CP levels as specified in 49 CFR 192, Subpart I, shall be remediated in accordance with Condition D.7.

6. **Cathodic Protection Test Station – Location**: Cathodic protection (CP) pipe-to-soil test stations must be located within the ***special permit segment 1*** and ***special permit segment 2*** with a maximum spacing between test stations of one-half mile. In cases where obstructions or restricted areas prevent test station placement, the test station must be placed in the closest practical location. Within six (6) months of completing a close-interval survey, Nexus must utilize the data gained from this survey to place external corrosion control test stations at identifiable and significant dips in electric potential in accordance with 49 CFR 192.469, in conjunction to the previously agreed upon test stations placed at half-mile intervals. Nexus will utilize the data gained from the CIS to place external corrosion control test stations at identifiable and significant dips in CP potential[43] in accordance with 49 CFR 192.469. However, placement of a test station at areas of significant dips shall not be required if NEXUS identifies and remediates the cause of the significant dip, and confirms successful remediation by a follow-up CP survey.

7. **Cathodic Protection – Low Potential Remediation**: Any areas of low CP potential within the ***special permit segment 1*** and ***special permit segment 2*** must be remediated within one (1) year of the finding unless it is impracticable to meet this schedule due permitting interval. Permit applications must be submitted within four (4) months of any low CP potential findings. If the schedule cannot be met due to circumstances beyond NEXUS' control, NEXUS must notify the appropriate Director, PHMSA Central or Eastern Region explaining the reasons the

[42] If 49 CFR 192.939(a) integrity management reassessment intervals should change from seven (7) years to some other reassessment interval under eight (8) years, NEXUS may use that reassessment interval instead of seven (7) years.

[43] A significant dip is defined as a dip in a potential reading (either an "on" or "off" potential) that is greater in magnitude than 200 mV, occurring within any 100-ft. sample area.

schedule cannot be met and obtain a letter of "no objection" [44] from PHMSA prior to implementing the schedule change.

8. **Right-of-Way Patrols:** In addition to the requirements of 49 CFR 192.705 and 192.706, NEXUS must perform right-of-way patrols as follows:

    a. Ground patrols using instrumented leakage detection equipment that can detect gas leaks along the ***special permit segment 1 and special permit segment 2*** at an interval of between every five (5) months to seven and one-half (7-½) months, not to exceed seven and one-half (7-½) months, but at least two (2) times per calendar year.

    b. Aerial flyover patrols or ground patrols by walking or driving of the ***special permit inspection area*** right of way every week, not to exceed 10-days, contingent on weather conditions. Should mechanical availability of the patrol aircraft or weather conditions become an extended issue, the ***special permit inspection area*** pipeline aerial flyover patrol must be completed within 21-days of the past patrol by other methods such as walking or driving the pipeline route, as feasible.

    c. If the either the ground patrols or aerial flyover patrols schedule cannot be met due to circumstances beyond NEXUS' control, NEXUS must notify the appropriate Director, PHMSA Central or Eastern Region of the reasons the schedule cannot be met and obtain a letter of "no objection" [45] within three (3) working days of the exceedance.

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[44] In the case of any special permit condition that requires NEXUS to provide a notice for "no objection", other notice, annual report, or documentation to the appropriate PHMSA Central or Eastern Region Director, NEXUS must also send a copy to the PHMSA Director of State Programs and the appropriate state authorities either Michigan Public Service Commission, Manager of Gas Operations, or Public Utility Commission of Ohio, Service Monitoring and Enforcement Department, Gas Pipeline Safety Program Manager, which are the states along the NEXUS pipeline route that have interstate agent agreements with PHMSA.

[45] In the case of any special permit condition that requires NEXUS to provide a notice for "no objection", other notice, annual report, or documentation to the appropriate PHMSA Central or Eastern Region Director, NEXUS must also send a copy to the PHMSA Director of State Programs and the appropriate state authorities either Michigan Public Service Commission, Manager of Gas Operations, or Public Utility Commission of Ohio, Service Monitoring and Enforcement Department, Gas Pipeline Safety Program Manager, which are the states along the NEXUS pipeline route that have interstate agent agreements with PHMSA.

9. **Line-of-Sight Markers**: Line-of-sight markers must be installed and maintained within the ***special permit segment 1 and special permit segment 2*** in accordance with 49 CFR 192.620(d)(4)(iv) to the extent practical. Any removed or missing line-of-sight markers must be replaced within 30 days of discovering the marker is removed or missing.

10. **Mainline Valve – Monitoring and Remote Control for Leaks or Ruptures**: All mainline valves for the NEXUS pipeline within the ***special permit inspection area*** must be controlled by a supervisory control and data acquisition (SCADA) system and must be equipped for remote monitoring and control, or remote monitoring and automatic control in accordance 49 CFR 192.620(d)(3)(iii) and the below requirements:

    a. If any crossover or lateral pipe for gas receipts or deliveries connects to the isolated segment between the upstream and downstream mainline valves, the nearest valve on the crossover connection(s) or lateral(s) must be isolated, such that, when all valves are closed, there is no flow path for gas to be transported to the leak or rupture site (except for residual gas already in the shut-off segment);

    b. Mainline valves must be monitored for valve status (open, closed, or partial closed/open), upstream pressure, and downstream pressure;

    c. Closure of the appropriate valves following a pipeline leak or rupture meeting the criteria of Condition D.10.c.i must occur as soon as practicable from the time the pipeline leak or rupture and its location are confirmed, not to exceed 30 minutes from such confirmation; [46]

        i. "Rupture" means a significant breach of a pipeline that results in a large-volume, uncontrolled release of gas. For purposes of this special permit, NEXUS must treat any of the following as ruptures unless and until determined otherwise:

[46] The pipeline valve section location to be closed and isolated (if there should be a rupture) must be confirmed by NEXUS through Gas Control or other field operations personnel monitoring of the appropriate pipeline pressures, pressure changes, or flow rate changes through a compressor discharge section or by location confirmation from responsible persons.

1. An unanticipated or unplanned pressure loss of 10 percent or greater, occurring within a time interval of 15 minutes or less, unless the operator has documented the need for a higher pressure-change threshold in advance due to pipeline flow dynamics that cause fluctuations in gas demand that are typically higher than a pressure loss of 10 percent in a time interval of 15 minutes or less;

2. An unexplained flow rate change, pressure change, instrumentation indication, or equipment function that in the operator's experience may be representative of a large-volume, uncontrolled release or failure; or

3. An apparent large-volume, uncontrolled release or failure observed by either operator personnel, the public, or public authorities, and that is reported to the operator.

ii. Within five (5) minutes of the initial notification to NEXUS, NEXUS must evaluate and identify a rupture, as defined above, as being either an actual leak event, rupture event or non-rupture event in accordance with operating procedures and 49 CFR 192.615.

d. The NEXUS Gas Control Center must monitor the pipeline 24 hours a day, 7 days a week and will confirm the existence of a leak or rupture as soon as practicable, based upon NEXUS pipeline operating procedures;

e. NEXUS must maintain remote monitoring and automatic control equipment, mainline valves, mainline valve operators, and pressure sensors in accordance with 49 CFR 192.631 and 192.745. All remote monitoring and automatic control equipment including pressure sensors must have backup power to maintain communications and control to the NEXUS Gas Control Center during power outages;

f. NEXUS must conduct a point-to-point verification between SCADA displays and the mainline valve, sensors, and communications equipment in accordance with 49 CFR 192.631(c) and (e), or an equivalent verification;

g. All valves used to isolate a leak or rupture must be maintained in accordance with these conditions and 49 CFR 192.745;

h. NEXUS must take remedial measures to correct any valve used to isolate a leak or rupture that is found to be inoperable or unable to maintain shut-off, as follows:

   i. Repair or replace the valve as soon as practicable but no later than six (6) months after the finding;

   ii. Designate an alternative valve within seven (7) calendar days of the finding while repairs are being made. Repairs must be completed within six (6) months; and

   iii. If valve repair or replacement cannot be met due to circumstances beyond NEXUS' control, NEXUS must notify the appropriate Director, PHMSA Central or Eastern Region of the reasons the schedule cannot be met and obtain a letter of "no objection"[47] from PHMSA prior to implementing the schedule change.

i. NEXUS must establish and maintain adequate means of communication with the appropriate public safety access point (9-1-1 emergency call center) and must notify them if there is a leak or rupture, as well other emergency responders as required in 49 CFR 192.615;

j. NEXUS must immediately and directly notify the appropriate public safety access point (9-1-1 emergency call center) or other coordinating agency for the communities and jurisdictions in which the pipeline is located when a release is indicated; [48] and

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[47] For any special permit condition that requires NEXUS to provide a notice for a "no objection" response from PHMSA, other notice, annual report, or documentation to the appropriate PHMSA Central or Eastern Region Director , NEXUS must also send a copy to the PHMSA Director of State Programs and the appropriate state authorities, including the Michigan Public Service Commission, Manager of Gas Operations, and the Public Utility Commission of Ohio, Service Monitoring and Enforcement Department, Gas Pipeline Safety Program Manager, which are the authorities of the states along the NEXUS pipeline route that have interstate agent agreements with PHMSA.

[48] NEXUS must designate the pipeline controller or the appropriate operator emergency response coordinator in its operating procedures and train the pipeline controller or the appropriate operator emergency response coordinator for coordinating with emergency responders.

k. NEXUS must establish actions required to be taken by a pipeline controller, or the appropriate emergency response coordinator, during an emergency in accordance with these special permit conditions and as required in 49 CFR 192.615 and 192.631.

11. **Interference Currents Control**: Within one (1) year of construction, NEXUS must perform surveys and remediation, with corrosion control implemented, for induced currents from electric transmission lines and other known sources of potential interference within the ***special permit segment 1*** and ***special permit segment 2***. An induced alternating current (AC) or direct current (DC) program and remediation plan to protect the pipeline from corrosion caused by stray currents must be written and implemented within one (1) year of the date of this special permit.
    a. At least once every seven (7) years not exceeding 90 months, NEXUS must perform an engineering analysis on the effectiveness of the AC and DC mitigation measures and must evaluate and remediate any AC interference between 20 and 50 Amps per meter squared. In evaluating such interference, NEXUS must integrate AC interference data with the most recent ILI results to determine remediation measures. Any discovered AC interference between 20 and 50 Amps per meter squared must be remediated within six (6) months of the finding. If NEXUS decides to not remediate AC interference between 20 and 50 Amps per meter squared, NEXUS must provide a written engineering justification for not remediating such interference to the appropriate PHMSA Region Director[49] and obtain a letter of "no objection" from PHMSA prior to implementing the change. If NEXUS does not receive a "no objection" from PHMSA, NEXUS must remediate the interference.
    b. In locations in ***special permit segment 1*** and ***special permit segment 2*** with co-located high voltage alternating current (HVAC) power lines, NEXUS must take interference readings (continuous 24-hour recordings) during the calendar quarter of

[49] For any special permit condition that requires NEXUS to provide a notice for a "no objection" response from PHMSA, other notice, annual report, or documentation to the appropriate PHMSA Central or Eastern Region Director , NEXUS must also send a copy to the PHMSA Director of State Programs and the appropriate state authorities, including the Michigan Public Service Commission, Manager of Gas Operations, or the Public Utility Commission of Ohio, Service Monitoring and Enforcement Department, Gas Pipeline Safety Program Manager, which are the authorities of the states along the NEXUS pipeline route that have interstate agent agreements with PHMSA.

the known or anticipated highest voltage reading. If there are any significant increases to the amount of electricity/current flowing in any co-located high voltage alternating current (HVAC) power lines, such as from additional generation, a voltage up-rating, additional lines, or new or enlarged substations, NEXUS must perform an AC mitigation survey along the entire co-located pipeline ***special permit segment 1*** and ***special permit segment 2*** right of way within six (6) months of any such change.

c. Within six (6) months of the engineering analysis, as required in Condition D.11.a. above, NEXUS must remediate any AC interference greater than 50 Amps per meter squared. Remediation means the implementation of performance measures including, but not limited to, additional grounding along the pipeline to reduce interference currents. Any DC interference that results in CP levels that do not meet the requirements of 49 CFR Part 192, Subpart I, must be remediated within six (6) months of the engineering analysis.

d. If environmental permitting or right-of-way factors beyond NEXUS control prevent the completion of remediation within six (6) months of the completion of the engineering evaluation, NEXUS must complete remediation as soon as practicable. NEXUS must also submit a letter justifying the delay and providing the anticipated date of completion to the appropriate PHMSA Region Director no later than one (1) month prior to the end of the six (6) months completion date. Any extended evaluation and remediation schedules submitted to PHMSA from NEXUS must receive a letter of "no objection" from the appropriate PHMSA Central or Eastern Region Director[50] prior to extending the evaluation or remediation schedule.

[50] For any special permit condition that requires NEXUS to provide a notice for a "no objection" response from PHMSA, other notice, annual report, or documentation to the appropriate PHMSA Central or Eastern Region Director , NEXUS must also send a copy to the PHMSA Director of State Programs and the appropriate state authorities, including the Michigan Public Service Commission, Manager of Gas Operations, or the Public Utility Commission of Ohio, Service Monitoring and Enforcement Department, Gas Pipeline Safety Program Manager, which are the authorities of the states along the NEXUS pipeline route that have interstate agent agreements with PHMSA.

12. **Landowner Communications**: NEXUS must provide pipeline safety awareness material to residents within the PIR of the ***special permit segment 1*** and ***special permit segment 2*** each calendar year.

13. **Annual Report to PHMSA**: Annually,[51] after issuance of this special permit, NEXUS will submit an annual pipeline integrity report[52] to the appropriate PHMSA Central and Eastern Region Director with copies to the Deputy Associate Administrator, PHMSA Field Operations; Deputy Associate Administrator, PHMSA Policy and Programs; Director, PHMSA Engineering and Research Division; Director, PHMSA Standards and Rulemaking Division; Director, PHMSA State Programs; and Michigan Public Service Commission, Manager of Gas Operations; and Public Utility Commission of Ohio, Service Monitoring and Enforcement Department, Gas Pipeline Safety Program Manager summarizing the following or any other significant integrity threats:
    a. Any new integrity threats identified during the previous year in the ***special permit inspection area***, and the results of any ILI or direct assessments performed (including any remediated anomalies with their wall loss, length, and unrepaired failure pressure; any un-remediated anomalies over 30% pipe wall loss and their wall loss, length and failure pressure; cracking found in the pipe body; weld seam or girth welds; and dents with metal loss, cracking or stress riser) during the previous year in the ***special permit inspection area***;
    b. Summaries of any close interval surveys that find low cathodic protection levels in the ***special permit inspection area*** and a remediation schedule;
    c. Any reportable incident or any leak normally indicated on the DOT Annual Report, and all repairs on the pipeline that occurred during the previous year in the ***special permit inspection area***;
    d. Any pressure test leaks or failures with a description of the cause in the ***special permit inspection area***;

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[51] Annual reports must be received by PHMSA by the last day of the month in which the Special Permit is dated. For example, the annual report for a modified Special Permit dated January, 2018, must be received by PHMSA no later than January 31, each year beginning in 2019.

[52] NEXUS must place a copy of the NEXUS annual pipeline integrity report on the PHMSA docket, PHMSA-2016-0009, at regulations.gov.

e. Any mergers, acquisitions, transfer of assets, or other events affecting the regulatory responsibility of the company operating the pipeline;
f. Any population changes in ***special permit segment 1*** that would cause any extensions of ***special permit segment 1*** boundaries into ***special permit segment 2*** from MP 245.16 to MP 237.88; and
g. Any emergency events that cause closure of mainline valves as described in Condition D.10, including the location (County, State and MP) of valves and closure times.

14. **Data Integration**: NEXUS must maintain data integration of special permit condition findings and remediation in the ***special permit segment 1*** and ***special permit segment 2***. Data integration must include the following information: Pipe diameter, wall thickness, grade, and seam type; pipe coating; maximum allowable operating pressure (MAOP); class location (including boundaries on aerial photography); high consequence areas (HCAs) (including boundaries on aerial photography); hydrostatic test pressure including any known test failures; casings; any in-service ruptures or leaks; in-line inspection (ILI) survey results including HR-MFL, HR-geometry/caliper or deformation tools; close interval survey (CIS) surveys – most recent; rectifier readings; cathodic protection test point survey readings; AC/DC interference surveys; pipe coating surveys; pipe coating and anomaly evaluations from pipe excavations; stress corrosion cracking (SCC) excavations and findings; and pipe exposures from encroachments. Data integration must be outlined on pipeline route drawings with parallel sections for each integrity category and recent aerial or satellite photography (photography must be taken within three (3) years of initial filing and every three (3) years thereafter).
    a. Data integration documentation and drawings to meet Condition D.14.b must be completed beginning with the 2nd annual report of this special permit and must include four (4) years of prior data. Annual data integration documentation must be submitted to PHMSA with NEXUS' annual report, if requested by PHMSA.
    b. Data integration must be updated on an annual basis, and, at a minimum NEXUS must conduct an annual review of integrity issues to be remediated.

15. **Pipeline System Flow Reversals**: For long term pipeline system flow reversals exceeding 90 days in a ***special permit segment 1*** and ***special permit segment 2***, NEXUS must prepare a written plan that corresponds to those applicable criteria identified in PHMSA Advisory Bulletin (ADB-2014-04), "Guidance for Pipeline Flow Reversals, Product Changes and Conversion of Service" issued on September 18, 2014 (79 FR 56121, Docket PHMSA-2014-0400). The written flow reversal plan must be submitted to the appropriate PHMSA Region Director with a copy of the plan[53] submitted to the Federal Docket for this special permit at www.regulations.gov. NEXUS must receive a letter of "no objection" from the appropriate PHMSA Region Director prior to implementing the pipeline system flow reversal through the ***special permit segment 1*** and ***special permit segment 2.***

16. **Environmental Assessments and Permits**: NEXUS must evaluate the potential environmental consequences and affected resources of any land disturbances and water body crossings needed to implement the special permit conditions for ***special permit segment 1***, ***special permit segment 2,*** or ***special permit inspection area*** prior to the disturbance. If a land disturbance or water body crossings is required, NEXUS must obtain and adhere to all applicable (Federal, State, and Local) environmental permit requirements when conducting the special permit conditions activity.

17. **Root Cause Analysis for Failure or Leak**: If a leak or rupture (incident as defined by 49 CFR 191.3) occurs in any of the ***special permit inspection areas,*** NEXUS must notify PHMSA's Central or Eastern Region Director within five (5) days of the leak or rupture. A 'root cause analysis' must be performed to determine the cause of the failure and must be sent

[53] In the case of any special permit condition that requires NEXUS to provide a notice for a "no objection", other notice, annual report, or documentation to the appropriate PHMSA Central or Eastern Region Director, NEXUS must also send a copy to the PHMSA Director of State Programs and the appropriate state authorities either Michigan Public Service Commission, Manager of Gas Operations, or Public Utility Commission of Ohio, Service Monitoring and Enforcement Department, Gas Pipeline Safety Program Manager, which are the states along the NEXUS pipeline route that have interstate agent agreements with PHMSA.

to appropriate PHMSA Region Director and Director of Engineering and Research Division[54] within 90 days of the incident. If a root cause analysis cannot be performed within 90 days of the incident, NEXUS must submit to PHMSA's Central or Eastern Region Director a request for extension of time. NEXUS must receive a letter of "no objection" from the appropriate PHMSA Central or Eastern Region Director prior to implementing an extended root cause analysis timeframe. PHMSA will review the 'root cause analysis' report to determine if revocation, suspension, or modification of the special permit is warranted based upon incident findings.

1. **Extension of Special Permit Segment**: NEXUS may request to extend the ***special permit segment 1*** to include new or extended contiguous segments in ***special permit segment 2*** from MP 245.16 to MP 237.88 (Washtenaw County, Michigan county line). NEXUS must:
    a. Provide written notice to the appropriate Director, PHMSA Central or Eastern Region; Director, PHMSA Standards and Rulemaking Division; and Director, PHMSA Engineering and Research Division[55] of a requested ***special permit segment extension***[56] based on actual class locations. NEXUS must include a schedule of inspections, a schedule of any anticipated remedial actions and the location of the new request including survey stationing. All requests for a ***special permit segment 1 extension*** must be submitted in the first six (6) months of the 49 CFR 192.611(d) class location change timing limits, and must include data integration in accordance with Condition D.14 above and information on the potential environmental impacts of the extension to determine whether an environmental

[54] For any special permit condition that requires NEXUS to provide a notice for a "no objection" response from PHMSA, other notice, annual report, or documentation to the appropriate PHMSA Central or Eastern Region Director , NEXUS must also send a copy to the PHMSA Director of State Programs and the appropriate state authorities, including the Michigan Public Service Commission, Manager of Gas Operations, or the Public Utility Commission of Ohio, Service Monitoring and Enforcement Department, Gas Pipeline Safety Program Manager, which are the authorities of the states along the NEXUS pipeline route that have interstate agent agreements with PHMSA.

[55] For any special permit condition that requires NEXUS to provide a notice for a "no objection" response from PHMSA, other notice, annual report, or documentation to the appropriate PHMSA Central or Eastern Region Director , NEXUS must also send a copy to the PHMSA Director of State Programs and the appropriate state authorities, including the Michigan Public Service Commission, Manager of Gas Operations, or the Public Utility Commission of Ohio, Service Monitoring and Enforcement Department, Gas Pipeline Safety Program Manager, which are the authorities of the states along the NEXUS pipeline route that have interstate agent agreements with PHMSA.

[56] For a ***special permit segment extension*** to be considered by PHMSA, NEXUS must notify PHMSA's Director of Standards and Rulemaking Division to determine the need for a draft environmental assessment.

assessment and federal register notice are required for the proposed ***special permit segment 1 extension***;

b. Complete all inspections and remediation of the proposed ***special permit segment extension*** to the extent required for ***special permit segment 1***;

c. Comply with all conditions in this special permit for ***special permit segment 1*** for the new ***special permit segment 1 extension*** required for implementation, including submittal of documents to PHMSA required in these special permit conditions and 49 CFR 190.341; and

d. NEXUS must obtain a letter of "no objection" and/or revised special permit from PHMSA prior to implementing any ***special permit segment extensions***.

2. **Documentation**: NEXUS must maintain the following records for each ***special permit segment*** and ***special permit inspection areas:***

   a. Documentation showing that ***special permit segment 1, special permit segment 2,*** and the ***special permit inspection area*** have received a 49 CFR 192.505, Subpart J, hydrostatic test for eight (8) continuous hours and at a minimum pressure of:

Class Location	Design Factor	Minimum Pressure Test Factor
Class 1	0.72	1.39 x MAOP (100% SMYS)
Class 2	0.60	1.5 x MAOP
Class 3	0.50	1.5 x MAOP
MP 245.16 to MP 256.09 (*Special Permit Segment 1*)	0.50	2.0 x MAOP

   b. Documentation of mechanical and chemical properties including pipe toughness (mill test reports) showing that the pipe in each ***special permit segment 1, special permit segment 2,*** and ***special permit inspection area*** meets the wall thickness, yield strength, tensile strength and chemical composition of either the American Petroleum Institute Standard 5L, *"Specification for Line Pipe"* (API 5L), referenced in the 49 CFR Part 192 code at the time of manufacturing.

c. Documentation of compliance with all the conditions of this special permit must be kept for the applicable life of this special permit for the referenced ***special permit segment 1, special permit segment 2,*** and ***special permit inspection areas.***

3. **Certification**: A senior executive officer, vice president or higher, of NEXUS must certify in writing the following:
    a. NEXUS pipeline ***special permit inspection areas*** and ***special permit segments*** meet the conditions described in this special permit,
    b. The written manual of O&M procedures required by 49 CFR 192.605 for the NEXUS pipeline has been updated to include all requirements of this special permit; and
    c. NEXUS has implemented all Conditions as required by this special permit.

NEXUS must send the certifications required in Condition D.20(a) through (c) with completion date, compliance documentation summary, and the required senior executive signature and date of signature to the PHMSA Associate Administrator with copies to the Deputy Associate Administrator, PHMSA Field Operations; Deputy Associate Administrator, PHMSA Policy and Programs; appropriate PHMSA Central and/or Eastern Region Director; Director, PHMSA Standards and Rulemaking Division; Director, PHMSA Engineering and Research Division[57]; and to the Federal Register Docket (PHMSA-2016-0009) at www.Regulations.gov within one (1) year of the in-service date of the NEXUS pipeline.

VIII. ALTERNATIVES

PHMSA's review of the potential alternatives is limited to review of the special permit and possible alternatives as well as associated impacts to ***Special Permit Segment,***[58] while FERC is

[57] In the case of any special permit condition that requires NEXUS to provide a notice for "no objection", other notice, annual report, or documentation to the appropriate PHMSA Central or Eastern Region Director, NEXUS must also send a copy to the PHMSA Director of State Programs and the appropriate state authorities either Michigan Public Service Commission, Manager of Gas Operations, or Public Utility Commission of Ohio, Service Monitoring and Enforcement Department, Gas Pipeline Safety Program Manager, which are the states along the NEXUS pipeline route that have interstate agent agreements with PHMSA.

[58] ***Special Permit Segment*** refers to the last 9.84 miles of the NEXUS pipeline from MP 246.25 to 256.09.

the lead agency tasked with review of alternatives to the construction and proposed siting and routing of the entire NEXUS pipeline (as discussed in Section I). In terms of the potential alternatives for PHMSA action, the options include **(1)** do nothing/PHMSA denies the requested special permit, in which case the NEXUS pipeline and its operation would need to be fully compliant with Part 192 or **(2)** grant the requested special permit and impose numerous additional design, material, construction and operations and maintenance including integrity management activities beyond those required under Part 192. PHMSA believes implementation of the additional measures outlined above to prevent leaks would provide an equivalent or higher level of safety would be achieved simply by the introduction of odorant for the last 9.84 miles of the NEXUS pipeline. Further, natural gas currently delivered to end users by DTE Gas Company within this region currently contains the odorant required by 49 CFR 192.625(a) whether a special permit is or is not issued to NEXUS.

i. Alternative 1: "Do Nothing" Alternative

Under this alternative, PHMSA would deny the special permit and require NEXUS to odorize the natural gas transported through the last 9.84 miles of the pipeline, as required by 49 CFR 192.625. Odorization of pipelines is intended to provide for early detection of gas leaks by the public where pipelines are in proximity to populated/frequently occupied areas. Odorization does not prevent leaks or decrease the likelihood that they will occur. If the special permit is not granted, there would be significant impacts to the operation of DTE Gas Company facilities, DTE affiliate facilities, and other interconnected operator's facilities downstream of the NEXUS pipeline. With respect to the NEXUS pipeline, this would require installation of both odorization equipment/facilities and, due to the operational impediments to providing odorized gas to DTE Gas Company and other downstream facilities (explained in **Section IV- Purpose and Need** and **Section IX – Affected Resources and Environmental Consequences**), additional facilities to subsequently deodorize the natural gas before downstream pipelines and facilities receive it. Enbridge/SEP has one pipeline interconnection with another pipeline system that

transports odorized gas for further transportation by non-odorized transmission pipelines.[59, 60]

Even though such a process has not been designed or constructed for large volumes of natural gas like that which are at issue for NEXUS, the most plausible deodorization method would require acquisition of a 40 acre site and installation of a large processing plant with multiple mole sieve contactor towers, numerous large indirect fired natural gas heaters to regenerate the contactor towers at 600° Fahrenheit (F) (with associated emissions and air permits), regeneration gas coolers, high electrical consumption for cooling fans, office and control building, a large natural gas emergency backup generator, product and waste storage, process and domestic water consumption, disposal of chemical waste products, etc. As such, that process is not feasible on this project due to operational, technical, and environmental challenges.

ii. Alternative 2: NEXUS-Preferred Alternative

Under the NEXUS-preferred alternative, PHMSA would approve a special permit waiving the odorization requirements of 49 CFR 192.625 for the natural gas transported through the last 9.84 miles of the NEXUS project, with consideration for the additional design, material, construction, and operations and maintenance requirements that NEXUS would implement within the ***Special Permit Segment***. Among other things, with these additional requirements, the NEXUS pipeline can operate safely, undertake increased measures designed to prevent leaks, and meet the intent of the requirements identified in 49 CFR 192.625 to provide for the timely detection of gas releases. Further, this option avoids the

[59] NEXUS reported one situation where odorized gas from their Texas Eastern Transmission Limited Partnership (TETLP) pipeline is delivered to a non-odorized pipeline. As part of its 2010 TEMAX project, TETLP installed a pipeline lateral to a new interconnect with Transcontinental Gas Pipeline (Transco). TETLP's gas is odorized at this location, but Transco's pipeline system is not odorized at the interconnect point. Transco modified their pipeline system to accommodate the odorized gas. This was a limited amount of work, since Transco had a multi-line system at the interconnect point and they odorize at the next downstream compressor station, so the receipt of odorized gas impacted a short section of Transco's pipeline system. Odorized gas would have much more significant impact on DTE Gas Company and other connecting pipelines as the amount of those systems impacted would be much greater.

[60] NEXUS stated they are not aware of anyone that de-odorizes 1.5 Bcf/d of natural gas. NEXUS contacted several vendors that supply de-odorization equipment to verify that vendors had not quoted such equipment.

requirement to install and operate deodorization facilities, which are not yet supported by technology.

IX. AFFECTED RESOURCES AND ENVIRONMENTAL CONSEQUENCES

Although odorization provides important safety benefits to natural gas pipelines, odorization principally allows for detection of natural gas in enclosed spaces where it can reach concentrations that allow for ignition and explosion. Because there are no enclosed occupied spaces along the ***Special Permit Segment,*** the safety benefits provided by odorization of the natural gas transported through the last 9.84 miles of the NEXUS pipeline are less significant than safety protections proposed as part of the special permit. If PHMSA grants a special permit, there would be no additional impacts to certain affected resources beyond what is already accounted for in the FERC Resource Reports and the FERC FEIS with respect to the construction and operation of the NEXUS pipeline (e.g., aesthetics, agricultural, air quality/climate change, cultural, geology, transportation, biological resources, land use, noise, recreation, water resources, etc.).

In addition, PHMSA believes that a denial of the proposed special permit would lead to greater environmental impacts, as it would require construction and installation of additional aboveground odorization and deodorization facilities. Odorizing such a large volume of gas would require disturbance of 1.5 acres for the odorization facilities, including installation of three 8,000-gallon storage tanks with secondary containment, rain sheds, odorant pumps, injection volume control equipment, and a circular driveway sized for a large odorant delivery tanker truck. This land disturbance is in addition to the 40-acre site required for the deodorization facility described in Alternative 1 – "Do Nothing" Alternative. This is anticipated to cause additional disruptive impacts to these resources located in the ***Special Permit Area***, as summarized below. Socioeconomics, topography, and Indian trust assets are not anticipated to be impacted by the above Alternatives.

The NEXUS project FERC Application contains a comprehensive Environmental Report consisting of eleven Resource Reports: Resource Report 1 – General Project Description; Resource Report 2 – Water Use and Quality, Resource Report 3 – Fish, Wildlife, and Vegetation Resource Report 4 – Cultural Resources, Resource Report 5 – Socioeconomics,

Resource Report 6 – Geological Resources, Resource Report 7 – Soils, Resource Report 8 – Land Use, Recreation and Aesthetics, Resource Report 9 – Air and Noise Quality, Resource Report 10 – Alternatives, and Resource Report 11 – Reliability and Safety. These Resource Reports can be found at the website links listed in **Appendix J** and the FERC docket is available at http://elibrary.ferc.gov/idmws/docket_search.asp by searching for the NEXUS project docket number CP16-22.

A. Safety

The granting of a special permit would reduce the already low risk of a pipeline release because it would increase the operational safety and longevity of the NEXUS pipeline, both along the entire route and in the ***Special Permit Area***. The proposed special permit conditions are summarized in Section VI and Resource Report 11 to the FERC Application contains a detailed explanation, not including any conditions that may be imposed by PHMSA, of the reliability and safety associated with the NEXUS project, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051755. If the special permit is not granted, the additional special permit conditions would not be implemented, thereby increasing the probability of a rupture or failure, and increasing the ability for the public in ***Special Permit Area*** near the pipeline to detect a release. PHMSA believes that the conditions provide a higher degree of safety by preventing a release than by simply adding odorant to a portion of the pipeline.

1. ***Change to the risk of a rupture or failure if PHMSA grants the Special Permit***

The risk of a rupture or failure of a modern, large-diameter natural gas pipeline is extremely low. The additional measures NEXUS would be required to undertake in the special permit would reduce the already low risk of a pipeline rupture or failure. These measures, which would not be required if the special permit request were denied, include:

a. Enhanced pipe material requirements to reduce the risk of a material related failure;

b. Enhanced construction requirements to reduce the risk of a construction related failure;

c. High Resolution (HR)-Deformation In-Line Inspection (ILI) tool and Direct Current Voltage Gradient (DCVG) surveys to reduce the risk of a rupture or failure due to mechanical damage that may have occurred during construction;

d. More frequent (weekly where possible) aerial patrols and increased line-of-sight markers to reduce the risk of a mechanical damage related failure after the pipeline is placed in service; and

e. Close Interval Surveys (CIS), High Resolution-Magnetic Flux Leakage (HR-MFL) ILI tool runs and explicit anomaly response and repair criteria to reduce the risk of a corrosion or mechanical damage related failure. Other ILI Tools or assessment methods will be used for assessments, if threats that cannot be assessed by the above tools are found.

2. *Change in the consequence of a failure if PHMSA grants the Special Permit – Change in the risk of a failure*

Odorization of natural gas, as required under 49 CFR 192.625, is intended to provide an enhanced ability to detect natural gas releases into the atmosphere. Odorization is also important for preventing buildups of natural gas in enclosed spaces from going undetected. If natural gas leaks from equipment or piping that delivers natural gas to a home or business, the gas can build up because it is not able to dissipate in an enclosed space. In non-enclosed or outdoor spaces, natural gas quickly dissipates because it is lighter than air. The NEXUS pipeline will not be connected to any structures intended for human occupancy because the pipeline is merely transporting natural gas to another downstream pipeline. Therefore, there is very little, if any, opportunity for a build-up of natural gas to occur in an enclosed structure, wherein odorization would alert community members of the presence of natural gas. Furthermore, NEXUS reports that there is only one (1) 49 CFR 192.5 structure intended for human occupancy within 50 feet of the pipeline centerline from MP 245.16 to MP 256.09[61] and that the structure will be demolished prior to the NEXUS pipeline being placed into service.

[61] Between MP 256 and MP 256.09 (end point of the pipeline), there is one (1) 49 CFR 192.5 structure intended for human occupancy within 50-feet of the proposed pipeline centerline. This structure is owned by DTE Gas

However, in the event of a pipeline leak, the lack of odorization could potentially allow a greater volume of gas to be released from the pipeline without detection. If a leak were to occur without ignition, the lack of odorization could allow the leak to go undetected for a longer period, which could increase the chance of ignition. The NEXUS pipeline will be equipped with remote control shutoff valves which will be monitored 24 hours a day, 7 days a week by the NEXUS Gas Control Center. In the event of an emergency such as a large natural gas leak or rupture, the NEXUS Gas Control Center can detect these events through the monitoring of pipeline pressures at compressor stations, mainline valves, measuring stations, and the delivery point to DTE Gas Company at MP 256.09. Flow volumes and any changes in these flow delivery volumes and pressures would be monitored. A large natural gas leak or rupture would be evidenced by a sudden loss of pressure on the pipeline and a change of flow deliveries to DTE Gas Company at MP 256.09. The NEXUS Gas Control Center would be able to isolate a large natural gas leak or rupture by closure of remotely operated shutoff valves. This allows the section of pipeline to be isolated from the rest of the pipeline system, thereby reducing the potential consequences of an incident. Furthermore, the NEXUS pipeline does not deliver gas to public dwellings or buildings and will have a 50-foot buffer or greater between all structures from MP 244 to MP 256.09 at the time the pipeline goes into service. If the special permit is granted, the additional measures (conditions) PHMSA proposes to implement under the special permit would reduce the risk of an initial rupture or failure using advanced pipe materials, additional construction inspection and testing requirements, and additional operational inspection, testing, and repair requirements. The significant decreased risk of an initial failure offsets any increased risk of a larger volume of gas being released in the reduced event of a failure. In addition, Special Permit conditions with respect to remote controlled valves and more frequent aerial surveys may

Company, and is scheduled for demolition prior to the NEXUS pipeline being placed into service. The NEXUS pipeline is not being routed within 50 feet of dwellings for human occupancy from MP 245.16 to MP 256.09 which also reduces the need for odorant to meet 49 CFR 192.625. The nearest dwelling intended for human occupancy for this section of pipeline is at approximate MP 253.17, and is approximately 64 feet from the NEXUS pipeline.

also further reduce the consequences of a leak along the entire pipeline and in the ***Special Permit Area***.

3. ***Change in the Potential Impact Radius (PIR) and change in potential human impact if the Special Permit is granted***

   The proposed NEXUS pipeline will be a 36-inch diameter pipeline with a MAOP of 1,440 psig and a PIR of 942.6 feet. Since neither the diameter nor the MAOP of the pipeline will change under the proposed special permit, the PIR will not change. Thus, there would be no change in the potential human impact in the event of a failure if the special permit is granted.

4. ***Impact on pipeline longevity and life cycle or maintenance issues***

   Properly maintained natural gas transmission pipelines can operate safely for many decades. Applying the more rigorous operation and maintenance ("O&M") requirements to the NEXUS pipeline in the special permit petition (outlined in Section D), will lead to improved safety performance and result in a lower likelihood of corrosion and mechanical damage. In lieu of simply adding odorant to the natural gas transported through the last 9.84 miles of the NEXUS pipeline, PHMSA would require additional and more frequent inspection, testing and repairs than required under 49 CFR Part 192. This would improve the longevity of the NEXUS pipeline and reduce the number of required pipeline excavations and repairs. In contrast, if the proposed special permit is not granted, NEXUS and its customers will experience a significant increase in facility modifications and O&M activities necessary to manage the variable concentration of odorization in the gas, as described in the special permit petition.

B. Aesthetics

A special permit would not create additional impacts to aesthetic affects, whether visual or scenic resources or ambient noise levels anticipated within the immediate vicinity under review for the special permit (see Section 8.6 of Resource Report 8 of the FERC Application for analysis on impacts to aesthetics, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051747). In contrast, if a special permit is not granted, construction and operation of an aboveground deodorization

processing plant is anticipated to permanently change the visual quality of the landscape due to the industrial facility with contactor towers and multiple tall exhaust stacks, increase noise levels, and create sulfur emissions impacting the aesthetics near those facilities.

C. Agricultural Resources

It is not anticipated that the granting of a special permit would create additional impacts to agricultural resources beyond those already accounted for in the FERC Resource Report filings (see Resource Report 8, Section 8.2.3.2 for a description of agricultural land use at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051747 and Resource Report 1, Section 1.7.1.6 for a description of construction methods through agricultural lands (https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051727). Construction and operation of aboveground deodorization facilities that would be required if the special permit is not granted could cause additional impacts to agricultural land near those facilities. The plant has not been designed, but the site area required would be in the range of 40 acres, and due to limited available space adjacent to the proposed NEXUS pipeline, an additional mile or two of pipeline corridor may be required between the plant and pipeline.

D. Air Quality & Climate Change

If the special permit is granted, there will be no additional construction of aboveground facilities required and no further impacts to air quality, emissions of criteria pollutants and/or greenhouse gases, beyond that which is already accounted for in the FERC filings (described in FERC Resource Report 9, Section 9.2, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051754). Construction and operation of deodorization facilities are anticipated to increase air emissions and/or greenhouse gases near those facilities. Because a deodorization facility of this nature and size does not exist and may not be technologically feasible, there is no reliable estimate of air emissions from the contact towers, natural gas heaters, etc.

E. Cultural Resources & Topography

If PHMSA grants the special permit, there will be no additional ground disturbing activities required for aboveground facilities with potential to impact cultural resources or topography in the ***Special Permit Area***. Following background research, NEXUS conducted systematic

archaeological field surveys of the project corridor and other facilities and due to access restrictions, these surveys are ongoing. A detailed description of cultural resources within the ***Special Permit Area*** is in Resource Report 4, Section 4.5, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051729. If the special permit is denied, additional impacts to cultural resources may be possible due to construction of aboveground deodorization facilities.

F. Geology, Soils, and Mineral Resources

If the special permit is granted, there will be no further impacts to geology, soils or mineral resources beyond that which is already accounted for in the FERC filings. For a detailed description of the geology of the NEXUS project area and limited seismic activity and other similar risks, see Resource Report 6, Sections 6.2 and 6.5, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051761. For a detailed description of soils crossed by the NEXUS pipeline facilities see Resource Report 7, Section 7.2, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051737. If the special permit is denied, PHMSA anticipates additional impacts to geology and soils from construction of aboveground deodorization facilities.

G. Transportation

With the granting of the special permit, there will be no additional anticipated impacts to the transportation associated with the project other than what is already accounted for (see Section 5.3.8 of Resource Report 5 of the FERC Application, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051731). If the special permit is denied, PHMSA anticipates additional impacts to transportation due to construction of aboveground deodorization facilities, including transportation of construction equipment and materials and the daily commuting of employees to and from the construction work areas which may slightly increase traffic volumes.

H. Biological Resources

With respect to biological resources, if PHMSA grants a special permit, there would be no additional impacts beyond what is already accounted for in the FERC Resource Reports and FEIS (**see Appendix J for relevant website links**). Below is a summary of the biological

resources that are anticipated to be impacted by construction of the NEXUS pipeline in the ***Special Permit Segment***. Denial of the special permit would necessitate construction and operation of additional aboveground deodorization facilities that could further disrupt biological resources in vicinity of those facilities within the ***Special Permit Segment*** (and for which deodorization does not appear to even be technologically feasible).

I. Fishery Resources

Fishery resources are broadly defined as fish, aquatic invertebrates including mollusks and aquatic animals. Fishery resources are supported year-round by perennial water bodies; however, depending on their proximity and characteristics, intermittent or ephemeral streams may be used by fishery resources when water is present. NEXUS has consulted with the U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NMFS), Ohio Department of Natural Resources (ODNR), Michigan Natural Features Inventory (MNFI) and the Michigan Department of Natural Resources (MDNR) to identify fishery resources in water bodies crossed by the project on the proposed route.

All the water bodies crossed by the proposed pipeline in the ***Special Permit Area*** are part of the Lake Erie drainage basin and are primarily associated with the drainage network of the River Raisin and Ford Lake/Huron River. Representative fish species known to occur in waterbodies crossed by the proposed pipeline in Michigan consist of bluntnose minnow *Pimephales notatus)*, black crappie (*Poxomis nigromaculatus)*, blacknose dace (*Rhinichthys atratulus)*, blacknose shiner (*Notropis heterolepis)*, common shiner (*Luxilus cornutus)*, creek chub (*Semotilus atromaculatus)*, emerald shiner (*Notropis atherinoides)*, grass pickerel (*Esox americanus vermiculatus)*, hornyhead chub (*Nocomis biguttatus)*, largemouth bass (*Micropterus salmoides salmoides)*, rock bass (*Ambloplites rupestris)*, smallmouth bass (*Micropterus dolomieu)*, spotfin shiner (*Cyprinella spiloptera)*, stonecat madtom (*Noturus flavus)*, sunfish bluegill (*Lepomis macrochirus)*, white crappe (*Poxomis annularis)*, white sucker (*Catostomus commersonii)* and yellow perch (*Perca flavescens)*. While the ***Special Permit Segment*** contains one fishery of special concern, the Huron River, due to confirmed occurrence of protected species, it should be unaffected by whether PHMSA denies or grants a special permit. Section 3.2 of Resource

Report 3 has a detailed description of the fishery resources within the ***Special Permit Segment***, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051750.

J. Vegetation

The types of vegetation along the proposed NEXUS project, including the ***Special Permit Segment***, are generally common plant communities found in Michigan. Many of the vegetative communities traversed by the proposed project have been considerably altered by forest conversion and fragmentation and the historic draining of saturated areas primarily for agricultural purposes. The natural vegetation communities that occur within the ***Special Permit Area*** are generally characterized as small upland forests (less than 20 acres in size), abandoned agricultural land in various degrees of succession ranging from open fields to shrub lands; and emergent, scrub-shrub, and forested wetlands.

The proposed NEXUS pipeline route in the ***Special Permit Segment*** traverses the Michigan Huron/Erie Lake Plains Ecoregion. This portion of the pipeline is located on flat lake plains adjacent to Lake Erie. Terrain currently consists of broad, nearly flat plains with low gradient perennial streams and rivers (Wiken, 2011). The NEXUS pipeline Willow Run metering and regulation ("M&R") Station (MR04) is located at the northern terminus of the proposed pipeline in Washtenaw County, Michigan, within the ***Special Permit Segment***. The site is located within a highly industrial and commercial area (40 percent) and an upland open land area (40 percent). The remaining area of 0.2 acres (20 percent) is comprised of low quality emergent wetland with high percentages of invasive species. No forested areas or water resources are located within the site identified for MR04.

Several plant species considered to be non-native or nuisance plant species in the Great Lakes Region of the United States have been identified along the proposed pipeline corridor and at aboveground facility sites in Michigan. Species identified within the project corridor include Canada thistle, wild parsnip (*Pastinaca sativa*), buckthorn species (*Rhamnus spp.*), garlic mustard, Japanese honeysuckle (*Lonicera japonica*), purple loosestrife (*Lythrum salicaria*) and phragmites. None of these species are listed on the List of Federal Noxious Weeds (USDA, 2010) pursuant to the Federal Noxious Weed Act of 1974. Section 3.3 of Resource Report 3 in the FERC Application has a detailed description of the vegetation within the ***Special Permit Segment***, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051750.

K. Wildlife

In the ***Special Permit Segment***, the NEXUS project traverses terrestrial and wetland habitats that support a diversity of wildlife species in a variety of ways. Dominant wildlife habitat types have been identified along the proposed pipeline route and at the Willow Run aboveground MR04 Station facility locations based on field surveys and review of available resource material. These habitat types include upland forest, open uplands (early successional scrub-shrub and herbaceous vegetation cover), forested wetlands, scrub-shrub wetlands, emergent wetlands, urban and open water habitats. Section 3.4 of FERC Resource Report 3 has a detailed description of all the wildlife found in the ***Special Permit Segment***, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051750.

L. Upland Forest

Upland forests are found throughout the project area and mostly occur along existing ROWs. Upland forests provide year-round food resources, cover, and nesting habitat for a variety of wildlife species. Mast-producing oaks generate an abundance of seeds and nuts, which are utilized by a diverse group of forest species. Even in relatively developed and urbanized areas, forested patches may be inhabited by several wildlife species. Large wildlife species such as the white-tailed deer (*Odocoileus virginianus*) use these forested habitats for food and cover. Small mammals including the gray squirrel (*Sciurus carolinensis*), Virginia opossum (*Didelphis virginiana*), and the common raccoon (*Procyon lotor*) capitalize on the availability of the numerous nest cavities in the form of snags and felled logs. The abundant small mammal population in upland forests provides prey for owls and hawks. Characteristic resident bird species in oak forests include red-bellied woodpecker (*Melanerpes carolinus*) and wild turkey (*Meleagris gallopavo*). Migratory species may include great crested flycatcher (*Myiarchus crinitus*) and wood thrush (*Hylocichla mustelina*).

M. Open Uplands

The early successional habitat types in the ***Special Permit Segment*** include successional scrub-shrub areas, fields, and disturbed and/or maintained areas, such as existing utility ROWs or other open spaces. Early successional and grassland habitats are attractive to many wildlife species including ground-nesting birds such as eastern meadowlark (*Sturnella magna*), killdeer

(*Charadrius vociferus*), and song sparrow (*Melospiza melodia*). Species such as eastern cottontail (*Sylvilagus floridanus*) frequently prefer shrubby, overgrown open habitats.

Species utilizing forest edge habitats include coyote (*Canis latrans*), eastern cottontail, gray fox *(Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), white-tailed deer, and wild turkey. Eastern box turtles (*Terrapene carolina*) can travel between forest, forest edge, and open habitats. Bird species that are forest edge specialists, including blue-winged warbler (*Vermivora cyanoptera*), field sparrow (*Spizella pusilla*), prairie warbler (*Setophaga discolor*) and eastern towhee (*Pipilo erythrophthalmus*), are often present where the upland fields border forested areas and along utility ROWs. Corridors and edges are also used by hunting raptors, such as American kestrels (*Falco sparverius*), red-tailed hawks (*Buteo jamaicensis*) and sharp-shinned hawks (*Accipiter striatus*), which feed on small mammals and birds.

N. Forested, Scrub-shrub, and Emergent Wetlands

Forested wetlands have a diverse assemblage of plant species that provide important food, shelter, migratory and overwintering areas, and breeding areas to a variety of fauna. Typical wildlife in forested wetlands include wood frog (*Lithobates sylvaticus*), red-spotted newt (*Notophthalmus viridescens*), garter snake (*Thamnophis sirtalis sirtalis)*, little brown bat (*Myotis lucifugus*), the common raccoon, white-tailed deer, wild turkey, and wood duck (*Aix sponsa*).

Scrub-shrub wetland habitats are typically not as structurally diverse as forested wetlands. Plant species occurring within scrub-shrub wetlands offer nesting sites for birds, including many species of warblers. Common species found in these wetlands include pickerel frog (*Rana palustris*), red-winged blackbird (*Agelaius phoeniceus*), and spring peeper (*Pseudacris crucifer*).

Freshwater emergent wetlands include wet meadows and emergent marshes, which are characterized by a variety of grasses, sedges and rushes. Common species of birds associated with emergent wetlands include common grackle (*Quiscalus quiscula*), killdeer, and red-winged blackbird. Mammals typically associated with this habitat type include American mink (*Neovison vison*), muskrat (*Ondatra zibethicus*), raccoon, and star-nosed mole (*Condylura cristata*). White-tailed deer also frequent these areas and capitalize on the abundance of grasses and forbs. A large variety of amphibians and reptiles are also identified within these areas.

These include American bullfrogs (*Rana catesbeiana*), common snapping turtle (*Chelydra s. serpentina*), painted turtle (*Chrysemys picta*), and pickerel frog.

O. Urban

Urban environments are characterized by a low diversity of wildlife species that have become tolerant of human development and activity. The mammal species that are commonly found in urban areas include raccoon, striped skunk (*Mephitis mephitis*), squirrels and rat species (*Rattus spps.*). Common bird species in cities and residential areas include European starlings (*Sturnus vulgaris*), house sparrows (*Passer domesticus*), mourning doves (*Zenaidura macroura*), northern mockingbirds (*Mimus polyglottos*), and rock pigeons (*Columba livia*). Some urban environments do occur within the ***Special Permit Segment*** vicinity.

P. Endangered and Threatened Species

Threatened and endangered species surveys have been initiated for the project area and now no state or federally endangered or threatened species have been **located** in the ***Special Permit Segment***. Surveys will continue again during the upcoming field season and additional consultation with the applicable natural resource agencies will be completed as needed as part of the FERC review process.

The following species are federally listed and have potential to occur in the vicinity of the ***Special Permit Segment***, within Monroe and/or Washtenaw County Michigan: Karner blue butterfly *(Lycaeides melissa samuelis),* Mitchell's satyr butterfly *(Neonympha mitchelli mitchelli),* Poweshiek skipperling *(Oarisma poweshiek),* Indiana bat *(Myotis sodalis*), Northern long-eared bat *(Myotis septentrionalis),* Northern riffleshell mussel *(Epioblasma torulosa rangiana),* Rayed bean *(Villosa fabalis),* Snuffbox mussel *(Epioblasma triquetra),* Eastern prairie fringed orchid *(Platanthera leucophaea),* Lakeside daisy *(Hymenoxys herbacea),* and Eastern massasauga *(Sistrurus catenatus catenatus).* The following species are state threatened and/or endangered species which have potential to occur within Monroe and/or Washtenaw County Michigan: Blanchard's cricket frog *(Acris crepitans blanchardi),* Regal fritillary *(Speyeria idalia),* Evening bat *(Nycticeius humeralis),* Least shrew *(Cryptotis parva),* Black sandshell *(Ligumia recta),* Eastern pondmussel *(Ligumia nausta),* Fawnsfoot *(Truncilla donaciformis),* Hickorynut *(Obovaria olivaria),* Lilliput *(Toxolasma parvus),* Purple lilliput

(*Toxolasma lividus*), Purple wartyback *(Cyclonaias tuberculata)*, Salamander mussel *(Simpsonaias ambigua)*, Slippershell *(Alasmidonta viridis)*, Threehorn wartyback *(Obliquaria reflexa)*, Wavyrayed lampmussel (*Lampsilis fasciola)*, eastern prairie fringed orchid *(Platanthera leucophaea)*, purple milkweed (*Asclepias purpurascens*), Canadian milk vetch (*Astragalus canadensis*), cup plant (*Silphium perfoliatum*), compass plant (*Silphium laciniatum*), ginseng (*Panax quinquefolius*), hairy wild petunia (*Ruellia humilis*), water willow (*Justicia americana*), weak stellate sedge (*Carex seorsa*), and white gentian (*Gentiana flavida*). Section 3.5 of FERC Resource Report 3 provides a detailed description of each state and/or federally listed species listed above and whether the species is located in the ***Special Permit Segment***, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051750.

Q. Environmental Justice

Minority and/or low income populations (i.e., environmental justice populations) represent thirty-seven percent (37 %) of the total population that would be crossed in the last 10.93[62] mile segment of the proposed NEXUS pipeline that comprises the ***Special Permit Segment.***

The FERC evaluated the potential for adverse effects on environmental justice populations in its FEIS issued on November 30, 2016. The FEIS indicates that minorities comprise 20.7 percent of the total population in Michigan. The percentage of minorities in the Michigan census tracts near the NEXUS pipeline facilities within the Special Permit Area ranges from 0.0 to 77.6 percent. Eleven (11) of the 17 census tracts in Michigan within a 1-mile radius of the NEXUS project facilities in the ***Special Permit Segment*** has a meaningfully greater percentage of minority or ethnic persons than the comparison group. Meaningfully greater was defined in the FEIS as minority or ethnic populations that are at least 10 percentage points more than in the comparison group, which was the population of the State where the census tract was located. Based on the FEIS analysis, a low-income population exists when the percentage of all persons living below the poverty level is greater than the percentage for the state where the census tract is located. In Michigan, 16.8 percent of all persons live below the poverty level. Ten (10) of the 17 census tracts in Michigan within a 1-mile radius of NEXUS project facilities within the

[62] The percent of the total population crossed and comprised of environmental justice populations in the ***Special Permit Segment Area*** was calculated by dividing the total length of environmental justice census tracts crossed by the current route length in the ***Special Permit Segment*** (the last 10.93 miles of the NEXUS pipeline).

Special Permit Segment have a higher percentage of persons living below poverty-level when compared to the state.

The FERC concludes in Section 4.10.10, Environmental Justice, of the FEIS that potentially adverse environmental effects associated with the NEXUS project would be minimized and/or mitigated, as applicable, and are not characterized as high and adverse.

Environmental justice populations in the ***Special Permit Segment*** would experience the same potential effects as the general, non-environmental justice populations in the ***Special Permit Segment***. Just as there would be no disproportionately high and adverse effects to those environmental justice populations from the construction and operation of the project, there would be no disproportionately high or adverse effects to those environmental justice populations if a special permit were approved.

PHMSA believes that undertaking additional measures designed to prevent leaks will provide a higher level of public safety in the ***Special Permit Segment*** than would be achieved by introducing odorant in the pipeline and that this will offset any potential increased risk of an unidentified build-up of natural gas in an enclosed area. Aerial, driving or foot patrols will be used to physically inspect the pipeline facilities, with weekly aerial flyovers where weather permits. When performing patrols, technicians will observe the surface conditions on and adjacent to the ROW for indications of leaks, construction activity and other factors affecting safety and operation. The pipeline will be monitored 24 hours a day, 7 days a week from the NEXUS Gas Control Center, including pressure on both sides of remote control valves which can be closed in the event of a leak. The NEXUS Gas Control Center monitors and reacts to anomalies and where necessary dispatches employees who live and work along the pipeline to respond. In addition, these environmental justice communities would be less impacted if the special permit were granted by PHMSA because it would eliminate the need to construct and operate an aboveground deodorization plant (for which as explained in Section II there is no technical basis to support the ability to deodorize large amount of natural gas at issue).

The pipeline crossing location of the relevant environmental justice populations within the ***Special Permit Segment*** would be located within or adjacent to existing utility and road ROWs. Forest/woodland, cropland or other productive land uses acquired through an easement adjacent

to or overlapping existing ROWs would be compensated for at the same value per acre for landowners that are members of environmental justice populations as those compensated in the general population. The primary effects associated with the construction of the project will be the temporary construction noise, fugitive dust, and traffic effects of short duration, none of which are considered significant given the nature of the effects and the measures that will be implemented to minimize such effects. These effects will occur along the entire project route, including within the ***Special Permit Segment***, and the affected areas will be small as the corridor width is narrow and spread along an array of land use and socioeconomic types. As such, the project will not result in any disproportionately high or adverse environmental and human health effects to low-income and minority populations within the ***Special Permit Segment***.

The NEXUS pipeline Willow Run M&R Station is located within an environmental justice population census tract. The construction and operation of this aboveground facility would be in a previously disturbed existing industrialized area. There would be no temporary effects to environmental justice populations during construction of MR04 such as the sights and sounds of construction vehicles or increased traffic related to the issuance of this permit. For a detailed description of FERC's conclusions and analysis regarding environmental justice populations along the project, see the FERC FEIS at the following link https://www.ferc.gov/industries/gas/enviro/eis/2016/11-30-16-eis.asp.

R. Indian Trust Assets

There are no Indian Trust Assets within the ***Special Permit Segment***, nor are there any Tribal Reservations within the vicinity of the ***Special Permit Area***. As part of the process to obtain approval from FERC to construct the pipeline, NEXUS, as authorized by the FERC, contacted 42 federally-recognized Native American groups located along the entire project to provide them an opportunity to identify any concerns related to properties of traditional religious or cultural significance that may be affected by the project. For a detailed description of all the tribes contacted and which tribes have responded see
Section 4.3.4 of Resource Report 4 of the FERC Application, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051729.

S. Land Use

PHMSA anticipates that granting of the special permit would not impose additional land use impacts beyond that which are already accounted for in the FERC filings and it would eliminate the need for additional aboveground odorization and deodorization facilities. If PHMSA denied the special permit, NEXUS would have to construct and operate additional aboveground facilities to odorize large amounts of the natural gas and subsequently deodorize it due to the operational impacts on downstream pipelines. Such a facility has not been designed, but is estimated to require a site area in the range of 40 acres, and due to limited available space adjacent to the proposed NEXUS pipeline, an additional mile or two of pipeline corridor may be required between the plant and pipeline. Current studies indicate that it may not be technically feasible to deodorize such large amounts of gas. See Section 8.2 of Resource Report 8 of the FERC Application for a detailed description of the land use for the NEXUS project, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051747. The following sections provide a brief discussion of the land use associated with the project in the ***Special Permit Segment***. The amount of each land use type affected by the project was determined through review of recent aerial photography; LiDAR imagery; and from observations made during field surveys performed in 2014 and 2015. For land use in locations where survey access has not been granted, NEXUS utilized current aerial photography and LiDAR imagery to determine effected land use.

1. ***Open Land:*** Open land is defined as utility ROWs, open fields, pasture, vacant land, herbaceous and scrub-shrub uplands, non-forested lands, emergent wetland, scrub-shrub wetland, golf courses, and open land portions of municipal, county, state, and federal lands.

2. ***Agricultural Land:*** Agricultural land in the project area is used predominantly for row crops (corn, soybeans, wheat, and winter wheat) and hay crops. Specialty crops crossed by the project include alfalfa, oats, rye, spelt, clover, assorted vegetables, strawberries, tomatoes, elderberry, fruit trees, Christmas trees, sunflowers and apiaries used for producing honey.

3. ***Forest/Woodland:*** Forested area in the project is either forested wetland or upland forested areas, usually located between agricultural fields. Most forested areas crossed

are small, segmented woodlots that are not conducive to major logging operations. These woodlots are used for residential firewood, local recreation, and smaller cutting operations.

4. ***Commercial/Industrial Land****:* Commercial/Industrial land is characterized as commercial buildings, industrial areas, railroads, and public roadways. The associated roads range from maintained dirt and gravel private and municipal roads to state highways and interstate highways. Active and inactive railroads are included in this land use type.

5. ***Residential Land:*** Residential land consists of any active residential area. This includes residential structures, maintained lawns and driveways.

6. ***Open Water:*** Open water includes water bodies greater than 100 feet in width and streams visible on aerial photography but less than 100 feet in width.

7. ***Special Land Uses:*** Special land uses include areas such as land associated with schools, parks, places of worship, cemeteries, sports facilities, campgrounds, golf courses, ball fields, and areas protected under easements. The eastern side of a parcel of land owned by the Community Free Will Baptist Church will be crossed by the NEXUS pipeline at MP 249.1 in Ypsilanti Township, Washtenaw County, Michigan. The proposed pipeline is located east of the church structures and associated parking lot by approximately 750 feet and 630 feet, respectively, in an open field. A forested area is located to the west of the proposed pipeline location between the pipeline and the church and would provide some screening. NEXUS will consult and coordinate with the landowners regarding construction of the pipeline and continued operation of pipeline facilities.

T. Noise

In general, the operation of the NEXUS pipeline M&R stations associated with the project will result in an increase in noise levels near the respective facilities over the life of the facilities. In addition, the installation of the new pipeline segments for the project and other project-related construction activities will result in short-term increases in noise near those activities. If PHMSA granted the special permit, there are no anticipated noise level changes from what is already accounted for which and it would eliminate the need to construct additional aboveground

deodorization facilities. Without a special permit, NEXUS will have to construct and install deodorization facilities which will result in additional noise impacts.

The local noise regulations identified in the counties in which NEXUS project M&R stations would be located are in Ypsilanti Charter Township. These regulations specify 75 decibels daytime/70 decibels nighttime at the property line of the proposed NEXUS pipeline Willow Run M&R Station. The FERC noise standard of 55 dBA (L_{dn}) is considered more stringent than the local ordinance; therefore, NEXUS will comply with the local noise ordinance by meeting the FERC noise standard at nearby noise sensitive areas ("NSA"). Local noise regulations related to other NEXUS project facilities in Michigan, if any, will be addressed through consultations with the local governing authority and will demonstrate compliance with the FERC noise standard of 55 dBA (L_{dn}) at nearby NSAs. A detailed analysis on the noise quality of the NEXUS project can be found in Section 9.3 of Resource Report 9 of the FERC Application, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051754.

U. Recreation

No federally designated or state protected lands are crossed by the NEXUS project in the ***Special Permit Segment***. There are two county/municipal lands in the ***Special Permit Segment***, which are explained below. Since the granting of the special permit will eliminate the need for additional aboveground facilities (which are explained above in **Section IX)** would require a site in the range of 40 acres), there will be no anticipated additional impacts to recreational resources in the immediate vicinity. A detailed description of anticipated potential impacts to recreational resources is provided in Section 8.4 of Resource Report 8 of the FERC Application, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051747.

1. ***Draper-Houston Meadows Preserve***

   Managed by the Washtenaw County Parks and Recreation Department, the Draper-Houston Meadows Preserve protects over 0.5 mile of Saline River shoreline west of the City of Milan in Washtenaw County, Michigan. The preserve contains floodplain forest habitat with oak, walnut, butternut, and sycamore trees. Of particular interest is a significant stand of pawpaw, a small, understory tree with banana-like fruit, which is uncommon in Washtenaw County (Washtenaw County Parks and Recreation, 2015). The

preserve is open to the public for wildlife watching and botanizing. The NEXUS pipeline does not cross the Draper-Houston Meadows Preserve but abuts the property south of Mooreville Road in Washtenaw County, Michigan. NEXUS has minimized effects on the preserve by avoiding the preserve boundary and will implement the NEXUS pipeline Erosion and Sedimentation Control Plan and the FERC Plan and Procedures, which include construction and mitigation measures to minimize potential environmental consequences (available at https://www.ferc.gov/industries/gas/enviro/guidelines.asp), to prevent disturbance to abutting areas of the preserve.

2. North and South Hydro Parks

The North and South Hydro Parks are located to the east of the Ford Lake Dam in the Township of Ypsilanti, Michigan. The 46-acre North Hydro Park is located on the north shore of the Huron River and the 29-acre South Hydro Park is just south of the Huron River. The NEXUS pipeline will cross the North Hydro Park property from MP 250.9 to 251.1. The NEXUS pipeline does not cross the South Hydro Park but a portion of a staging area associated with the project is in an open area of the park near MP 250.3. No forest clearing is proposed in either of the parks. The NEXUS pipeline will avoid surface impacts to the North Hydro Park by installing the pipeline via horizontally directional drilling ("HDD"). The temporary staging area to be used during construction at the South Hydro Park will be seeded and allowed to re-vegetate with no further maintenance or disturbance associated with the pipeline. NEXUS will notify the Township of Ypsilanti in advance of construction activities and will continue to consult and coordinate with the township to address any specific issues related to construction of the pipeline through the properties and continued operation of pipeline facilities.

V. Water Resources

In the ***Special Permit Segment***, NEXUS pipeline facilities cross limited water bodies, wetlands and aquifers, which are summarized below. With the granting of the special permit, there will be no additional anticipated impacts to water resources beyond what is already accounted for in the FERC Resource Reports. If the special permit is denied, it is possible that the required aboveground deodorization facilities would impose additional impacts to water resources in the ***Special Permit Segment***. This may include sites within wetland areas and additional pipeline

crossings of wetland areas, as well as water usage for the deodorization process. PHMSA believes that denial of the special permit could lead to greater environmental impact, including to water resources, given the construction and operation of a deodorization facility that would take place to allow delivery of natural gas to downstream facilities.

1. Surface Waters

A waterbody, as defined by the FERC, is "any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes." The term "waterbody" is inclusive of all "waters of the U.S.," other than wetlands, that are jurisdictional to the United States Army Corps of Engineers (USACE), and all waterbodies as defined by the FERC. The NEXUS pipeline facilities will cross 3 Michigan water bodies in the ***Special Permit Segment***. This includes the Huron River (MP 250.92) which is designated by the National Rivers Inventory and listed as having the following outstandingly remarkable values: recreation, fish and history. The other two waterbodies include a tributary to North Branch Swan Creek (MP 248.44 and 248.89) and a tributary to Willow Run (MP 251.83 and 253.40), which range from 9 to 18 feet wide. None of these 3 waterbodies are listed by the Michigan Department of Environmental Quality as impaired. For a more detailed description of surface waters along the NEXUS project, see Section 2.3 of Resource Report 2 of the FERC Application, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051728.

2. Wetlands

Wetlands are defined as areas inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted to saturated and anaerobic soil conditions. Typical wetlands include swamps, marshes, wet meadows, and similar areas. The U. S. Fish and Wildlife Service wetland classification system described by Cowardin et al. was used to classify wetlands crossed or affected by the project. The wetlands in the ***Special Permit Area*** were classified as Palustrine Forested (PFO), Palustrine Scrub-Shrub (PSS), and Palustrine Emergent (PEM).

3. Palustrine Forested Wetlands

Palustrine forested wetlands are characterized by woody vegetation that is 6 meters (approximately 20 feet) tall or taller and normally include an overstory of trees, an understory of young trees or shrubs, and an herbaceous layer (Cowardin et al., 1979). Among the many types of forested wetlands in the U.S. are maple swamps, floodplain or bottomland hardwood swamps, forested bogs, cypress-gum (tupelo) swamps, bay swamps, wet flatwoods, and pine swamps and lowlands (Tiner, 1999). Most forested wetlands along the NEXUS project are classified as palustrine forested broad-leaved deciduous. The forested wetlands along the route were typically found along floodplains and poorly drained basins (depressions). Generally, these wetlands have seasonally flooded inorganic, poorly drained mineral soils. Plants often associated with forested wetland communities in Ohio and Michigan are: red maple (*Acer rubrum*), slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*) green ash (*Fraxinus pennsylvanica*), black willow (*Salix nigra*), eastern cottonwood (*Populus deltoides*), pin oak (*Quercus palustris*), shagbark hickory (*Carya ovata*), silver maple (*Acer sacharinum*), and box elder (*Acer negundo*). Shrub species observed in PFO wetlands can consist of spice bush (*Lindera benzoin*), multiflora rose (*Rosa multiflora*) and redoiser dogwood (*Cornus sericea*). Depending on canopy cover, hydrology and soil characteristics, the following species can be observed as an herb layer in PFO wetlands: skunk cabbage (*Symplocarpus foetidus*), fowl mannagrass (*Glyceria striata*), stout wood reed (*Cinna arundinacea*), garlic mustard (Allaria petiolata), white avens (*Geum canadense*), sensitive fern (*Onoclea sensibilis*), poison ivy (*Toxidendron redicans*), jewel weed (*Impatiens capensis*) and various *Carex* species.

4. Palustrine Scrub-Shrub Wetlands

Scrub-shrub wetlands are dominated by woody vegetation less than 20 feet in height (Cowardin et al., 1979). The species found in PSS wetlands include true shrubs, saplings, young trees, and trees or shrubs that are small or stunted because of environmental conditions. Scrub-shrub wetlands may include habitats where the climax community consists of shrub species such as a buttonbush swamp, or where secondary-growth habitat composed of shrub or sapling species is present due to recent disturbance.

In cases of disturbance or where individuals do not reach 20 feet due to other environmental conditions, sapling species composition for scrub-shrub wetlands may overlap with species described above for forested wetlands. These shrubs dominated wetlands are commonly called bogs, pocosins, shrub-carrs, or simply shrub swamps (Tiner, 1999). Vegetation communities for PSS wetlands in Michigan consisted of the following species: steeple bush (*Spiraea latifolia*), buttonbush (*Cephalanthus occidentalis*), redoiser dogwood, gray dogwood (*Cornus racemosa*), silky dogwood (*Cornus amomum*), green ash, red maple, black raspberry (*Rubus occidentalis*), red raspberry (*Rubus idaeus*), multiflora rose and various species of willow (*Salix* sp).

5. Palustrine Emergent Wetlands

PEM wetlands are non-tidal wetlands characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. PEM wetlands usually are dominated by perennial plants (Cowardin et al., 1979). These wetlands are commonly referred to by a host of terms, including marsh, wet meadow, sloped seeps, fen, and vernal pool. Marshes represent emergent wetlands that are flooded for all or most of the year. These wetlands are often associated with utility ROWs, currently active or fallow agricultural areas, abandoned or reclaimed mined areas, slopes, depressions, and the edges of open waterbodies. The PEM wetland cover type exists on its own as well as in conjunction with other wetland types, creating a more heterogeneous wetland system within the NEXUS pipeline area.

This specific wetland type has a variety of species that occupy it, and the following list of species are the most common species observed in PEM wetlands throughout Ohio and Michigan: jewel weed, deer tongue grass (*Dichanthelium clandestinum*), tearthumb (*Polygonum sp.*), Joe pye weed (*Eupatorium purpureum*), reed canary grass (*Phalaris arundinacae*), rice cut grass (*Leersia oryzoides*), white cutgrass (*leersia oryzoides*), common rush (*Juncus effusus*), fowl mannagrass, woolgrass (*Scirpus cyperinus*), Canada goldenrod (*Solidago canadensis*), gray goldenrod (*S.nemoralis*), sensitive fern, narrowleaf cattail (*Typha angustifolia*), bluejoint grass (*Calamagrostis canadensis*), gray's sedge (*Carex grayii*), fox sedge (*Carex vulpinoidea*), poison ivy (*Toxidendron radicans*), Frank's sedge (*Carex frankii*), green bulrush (*Scirpus atrovirens*) and common

reed (*Phragmites australis*). Common species observed in AG-PEM wetlands throughout Ohio and Michigan include: barnyard grass (*Echinochloa spp*), yellow foxtail grass (*Setaria pumila*), fall panicgrass (*Panicum dichotomiflorum*), cattails, reed canary grass, as well as stressed corn (*Zea mays*) and soybean (*Glycine max*) row crops.

6. Aquifers

The Michigan region averages approximately 20 to 40 inches of precipitation annually, and a small portion of that water infiltrates into Michigan aquifers. According to the USGS, approximately 50 to 55 percent of the Michigan population uses groundwater for their water source (USGS, 1995b). The NEXUS pipeline also crosses carbonate aquifers in Michigan, but the surface aquifers crossed in Michigan are estimated between 50 to 100 feet in depth and can yield approximately 0 to 70 gpm. Most the project crosses confining bedrock units that are impermeable to water and therefore are not considered principal aquifers in Michigan. In Michigan, the Silurian-Devonian aquifer consists mostly of dolomite and limestone (carbonate bedrock). Silurian-Devonian bedrock is about 300-400 feet thick and typically yields less than 50 gpm. Portions of the aquifer are unconfined and are overlain by surface aquifers and can be susceptible to contamination from the land surface through overlying glacial deposits. Where confined, the Silurian-Devonian aquifers are protected from contamination by overlying confining units (USGS, 1995c).

A portion of the NEXUS pipeline in the ***Special Permit Segment*** is located along the Silurian-Devonian bedrock aquifer that is primarily consolidated (MP 245.16 - 251.37 and MP 251.37 – 255.1). Refer to Resource Report 2, Figure 2.2-1 and Table 2.2-1 for additional explanation, including MP ranges crossed, thickness, average water depths, and gallons per minute, available at https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051728.

X. CONSULTATION AND COORDINATION

NEXUS Pipeline

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XI. Response to Public Comments Placed on Docket PHMSA-2016-0009

PHMSA published the special permit request in the Federal Register (82 FR 38758) on August 15, 2017, and the public comment period ended on October 16, 2017 with all comments received through November 15, 2017 being reviewed and considered. The special permit application from NEXUS, pipeline route maps, public comments, environmental assessment, and special permit conditions are available in Docket No. PHMSA-2016-0009 at: www.regulations.gov. The FERC's FEIS and other relevant documents for the NEXUS pipeline can be assessed at internet links in **Appendix J – Relevant NEXUS Pipeline FERC Reports and Filings**.

PHMSA received over 118 stakeholder comments on the proposed NEXUS pipeline special permit. All comments received were for denial of the special permit request except for one supporting request. A summary of the stakeholders posting comments are:

- **Stakeholder Comments Requesting PHMSA to Deny the NEXUS Special Permit: 117**
    - Private Citizens - 112
    - Sierra Club - 1
    - Townships/Municipalities - 3
        - Michigan Drain Commissioners Office
        - Water Resources Commissioner
        - Letter between DOT Liaison and Township
    - Member of Congress – 1
- **Stakeholder Comments in support of the NEXUS Special Permit: 1**

  Letter from DTE Gas Company

PHMSA is summarizing the comments submitted and how the concerns are being handled:

- **1. Stakeholder Comment:** require the NEXUS pipeline to odorize the gas;

- **PHMSA Response:** The NEXUS pipeline is not connected to any dwellings for human occupancy or within 64-feet from a structure from MP 245.16 to MP 256.09.[63] Odorant would not be an effective method to improve the safety of the pipeline. PHMSA has structured special permit conditions that exceed PHMSA pipeline safety code requirements for the NEXUS pipeline life-cycle that included design, construction, operations, maintenance and emergency response. The special permit conditions are summarized in **Section VII** and can be fully reviewed in the special permit. Denial of the special permit would result in additional construction and environmental impacts. Also, the proposed special permit conditions that increase the level of safety would not be implemented.

- **2. Stakeholder Comment:** require quarterly walking inspections of the route by qualified workers with gas detection equipment;
    - **PHMSA Response:** Special Permit Condition D.8 requires NEXUS to conduct ground patrols using instrumented leakage detection equipment that can detect gas leaks along the ***special permit segment 1 and special permit segment 2*** at an interval of between every five (5) months to seven and one-half (7-½) months, not to exceed seven and one-half (7-½) months, but at least two (2) times per calendar year.
- **3. Stakeholder Comment:** require more frequent (monthly or bi-weekly) aerial inspections;
    - **PHMSA Response:** Special Permit Condition D.8 requires NEXUS to conduct aerial flyover patrols or ground patrols by walking or driving of the ***special permit inspection area*** right of way every week, not to exceed 10-days, contingent on weather conditions. Should mechanical availability of the patrol aircraft or weather conditions become an extended issue, the ***special permit inspection area***

[63] The one current structure within 50 feet of the NEXUS pipeline is a DTE Gas Company structure that will be demolished prior to the NEXUS pipeline being placed into natural gas service. The nearest dwelling intended for human occupancy for this section of the pipeline is at approximate MP 253.17, and is approximately 64 feet from the NEXUS pipeline.

pipeline aerial flyover patrol must be completed within 21-days of the past patrol by other methods such as walking or driving the pipeline route, as feasible.

- **4. Stakeholder Comment:** requir**e** inline remote sensing, monitoring and electronic controls along 24-hours a day / 7-days a week control center oversight of the same;
    - **PHMSA Response:** Special Permit Condition D.10 requires NEXUS to monitor the pipeline at flow measuring stations and all mainline valves within the ***special permit inspection area*** by a supervisory control and data acquisition (SCADA) system. All mainline valves must be equipped for remote monitoring and control, or remote monitoring and automatic control in accordance 49 CFR § 192.620(d)(3)(iii). Mainline valves must be monitored for valve status (open, closed, or partial closed/open), upstream pressure, and downstream pressure. The NEXUS Gas Control Center must monitor the pipeline 24 hours a day, 7 days a week and will confirm the existence of a leak or rupture as soon as practicable, based upon NEXUS pipeline operating procedures.
- **5. Stakeholder Comment:** require alternative power sources to ensure functioning of sensors and controls in the event of a power outage;
    - **PHMSA Response:** Special Permit Condition D.10 requires NEXUS to install and maintain remote monitoring and automatic control equipment including pressure sensors and backup power to maintain communications and control to the NEXUS Gas Control Center during power outages.
- **6. Stakeholder Comment:** require 24/7 on call operations staff physically located within 20 to 30 minutes of all control valves and other appurtenances relevant for emergency response;
    - **PHMSA Response:** Special Permit Condition D.10 requires NEXUS to close the appropriate mainline valves following a pipeline leak or rupture as soon as

practicable from the time the pipeline leak or rupture and its location are confirmed[64], not to exceed 30 minutes from such confirmation.

- **7. Stakeholder Comment:** require any other safety or other measures frequently required when such a waiver is granted and all other applicable PHMSA requirements, preferably for the entire length of pipeline in Washtenaw County as well as the approximately 10-mile section which would normally require odorization without the waiver; [65]
    - **PHMSA Response:** Special Permit Conditions that include special permit inspection area will include other segments in Washtenaw County, Michigan as well as all other segments from MP 0 to MP 256.09 in Michigan and Ohio.
- **8. Stakeholder Comment:** The pipeline will traverse the American Center for Mobility, which represents both a major economic growth for the benefit not only of the State of Michigan and Washtenaw County, but also the United States of America.
    - **PHMSA Response:** The NEXUS pipeline from MP 254.4 to MP 255.2 in Washtenaw County, Michigan is located on The American Center for Mobility (ACM)[66] property. NEXUS has engaged in coordination and communication with the site owner and developer. NEXUS also has FERC-approved site-specific work plans in place for the pipeline routing on this site, as well as additional permitting and coordination through the Ypsilanti Community Utility Authority and the Michigan Department of Environmental Quality.
- **9. Stakeholder Comment**: do not allow NEXUS to "not odorize" the gas to save money.
    - **PHMSA Response**: PHMSA has considered the public comments and has developed special permit conditions to maintain and improve safety. These conditions are summarized in the below "Operational Integrity Compliance" section. The conditions include design, material, construction, hydrostatic

[64] The pipeline valve section location to be closed and isolated (if there should be a rupture) will be confirmed by NEXUS through Gas Control or other field operations personnel monitoring of the appropriate pipeline pressures, pressure changes, or flow rate changes through a compressor discharge section or by location confirmation from responsible persons

[65] Washtenaw County Line is at NEXUS pipeline MP 237.88.

[66] ACM is repurposing the site of an old General Motors plant into a test track environment for self-driving cars.

pressure testing, operations and maintenance activities to maintain safety in ***special permit segment 1***.

- **10. Stakeholder Comment:** concerns with NEXUS pipeline being routed near their home due to the Enbridge/SEP Texas Eastern Transmission, LP (Texas Eastern) 30-inch diameter pipeline incident/rupture near Delmont, Westmoreland County, Pennsylvania on April 29, 2016.
    - **PHMSA Response:** The Texas Eastern 30-inch pipeline incident was due to a girth weld failure from corrosion. The pipeline girth weld corrosion was due to the usage of a tape coating system at the girth welds. The tape coating failed to properly stay bonded to the pipe and allowed moisture around the steel pipe and shielded the pipe from cathodic protection currents that reduce corrosion of the pipe. The special permit conditions will not allow usage of coating systems (such as tape) that will shield cathodic protection currents, will require post construction backfill coating verification surveys and remediation, inline inspection (smart pigging) and remediation of anomalies. The special permit conditions require the NEXUS pipeline to be controlled by a supervisory control and data acquisition (SCADA) system and to be equipped with equipment and valves for remote monitoring and control to detect and shut-off gas flow when a large volume leak or rupture is detected.

- **PHMSA Overall Response and Considerations of Public Safety Concerns:** PHMSA has reviewed the public comments on docket PHMSA-2016-0009 at regulations.gov and e-mails sent to PHMSA through November 15, 2017. Based upon the concerns in the comments as overviewed above, PHMSA has added an additional ***special permit segment 2*** from NEXUS pipeline MP 237.88 (Washtenaw County, Michigan county line) to MP 245.16 located in Washtenaw County, Michigan and will require additional safety conditions in this pipeline segment. These additional safety conditions can be reviewed in Section VII – Additional Design, Materials, Construction, Operations & Maintenance Requirements. The implementation of the special permit

conditions along all segments of the pipeline will enhance the overall safety of the pipeline.

PHMSA developed the special conditions to achieve an equivalent or higher level of safety by significantly decreasing the likelihood of a release of natural gas in the ***special permit segment 1*** and along the entire pipeline route in the ***special permit inspection area*** and in s***pecial permit segment 2***. The special permit conditions include: enhanced pipe materials requirements (reducing the risk of a material related failure); additional construction quality requirements, additional inspection, higher hydrostatic pressure testing (decreasing the risk of a construction related failure); use of coatings on the pipe and girth welds that do not shield against cathodic protection, increased post-construction testing, inline inspection (smart pigging), cathodic protection inspections and defined repair criteria (reducing the risk of failure due to mechanical damage and corrosion); and increased patrolling and line of sight markers (reducing the risk of in-service mechanical damage). The special permit conditions require the entire NEXUS pipeline to be controlled and monitored by a supervisory control and data acquisition (SCADA) system and to be equipped with equipment and valves for remote monitoring and control to detect and shut-off gas flow when a large volume leak or rupture is detected.

XII. FINDING OF NO SIGNIFICANT IMPACT

In consideration of the safety conditions explained above, PHMSA finds that no significant negative impact will result from the issuance of the above-described special permit to waive odorant requirements on the NEXUS Pipeline for ***special permit segment 1*** (10.93 miles of 36-inch diameter pipeline from MP 245.16 to MP 256.09) located at the downstream section of the NEXUS pipeline in Washtenaw County, Michigan. PHMSA believes that the issuance of the special permit, which includes safety conditions that exceed current pipeline safety requirements in 49 CFR Part 192, will have a positive impact on the human environment because implementation of the permit would reduce the overall risk of failure that could result in serious harm to human health.

XIII. ACRONYMS

ACM	American Center for Mobility
APE	Area of Potential Effects
API	American Petroleum Institute
AQCR	Air Quality Control Region
Bcf/d	Billion Cubic Feet per Day
CAA	Clean Air Act
CH_4	Methane
CIS	Close-interval Survey
CLA	Class Location Analysis
CP	Cathodic Protection
DCVG	Direct Current Voltage Gradient
DTE	DTE Energy Company
FERC	Federal Energy Regulatory Commission
GPM	Gallons per Minute
HCA	High Consequence Area
ILI	In-line Inspection Tool
M&R	Metering and Regulation
MAOP	Maximum Allowable Operating Pressure
MDNR	Michigan Department of Natural Resources
MFL	Magnetic Flux Leakage
MNFI	Michigan Natural Features Inventory
MP	Mile Post
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Protection Agency
NEXUS	NEXUS Gas Transmission, LLC
NMFS	National Oceanic and Atmospheric Administration-National Marine Fisheries Service
NSA	Noise Sensitive Area
NWI	National Wetlands Inventory
O&M	Operation and Maintenance
ODNR	Ohio Department of Natural Resources
PEM	Palustrine Emergent
PFO	Palustrine Forested
PHMSA	Pipeline and Hazardous Materials Safety Administration
PIR	Potential Impact Radius
PSS	Palustrine Scrub-Shrub
PUB	Palustrine Unconsolidated Bottom
ROW	Right-of-Way
SEP	Spectra Energy Partners, LP
SHPO	State Historic Preservation Office
SMYS	Specified Minimum Yield Strength
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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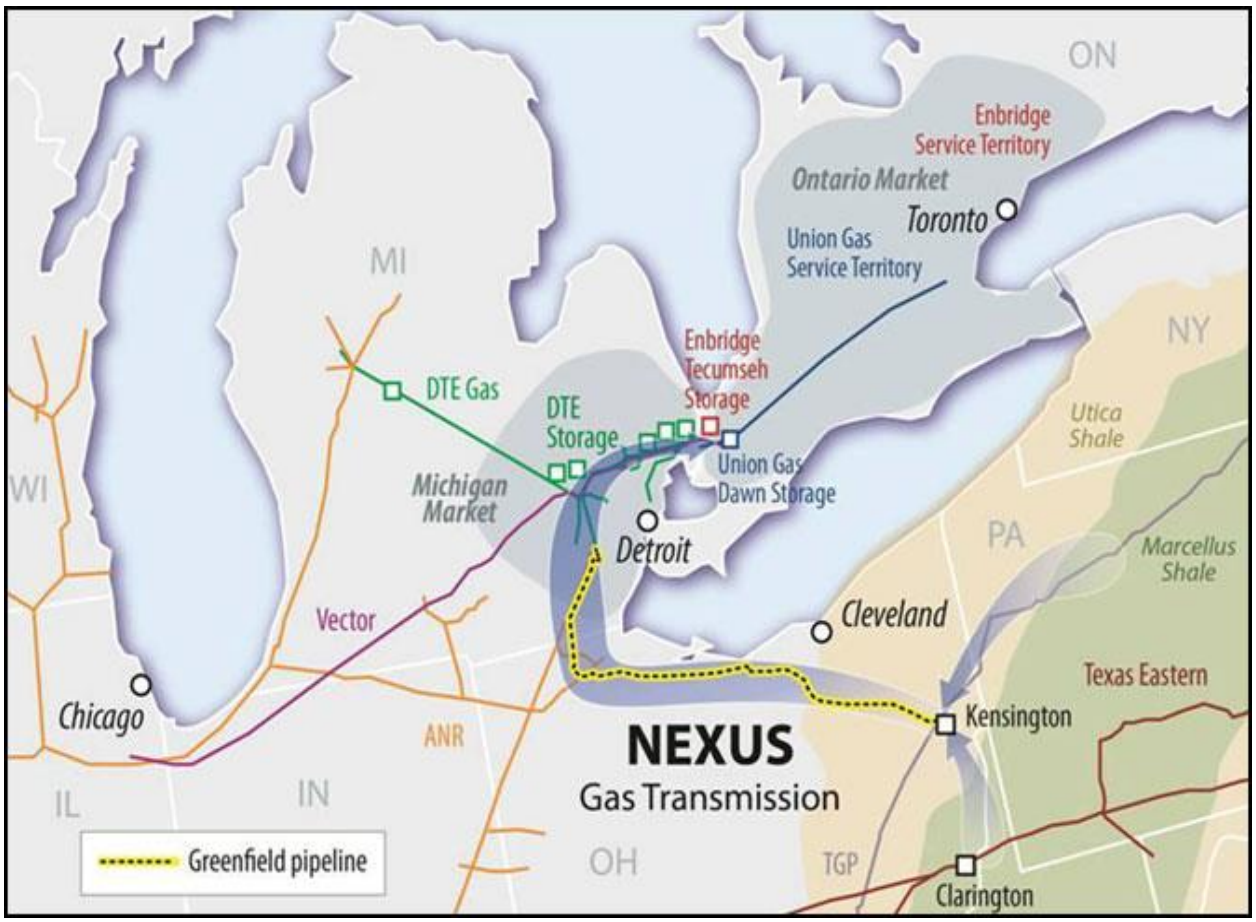
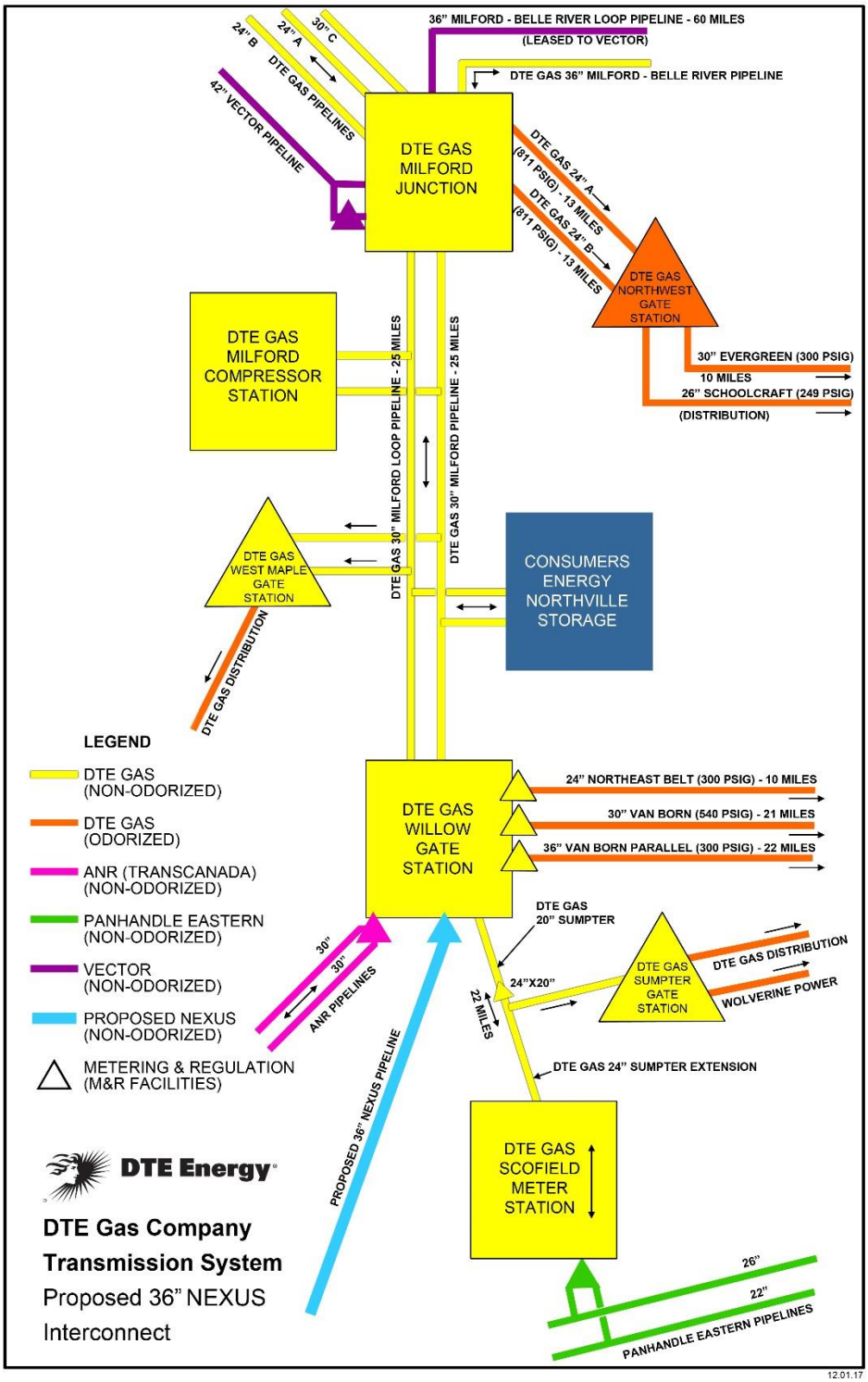
Appendix A

NEXUS Pipeline Area Overview Map



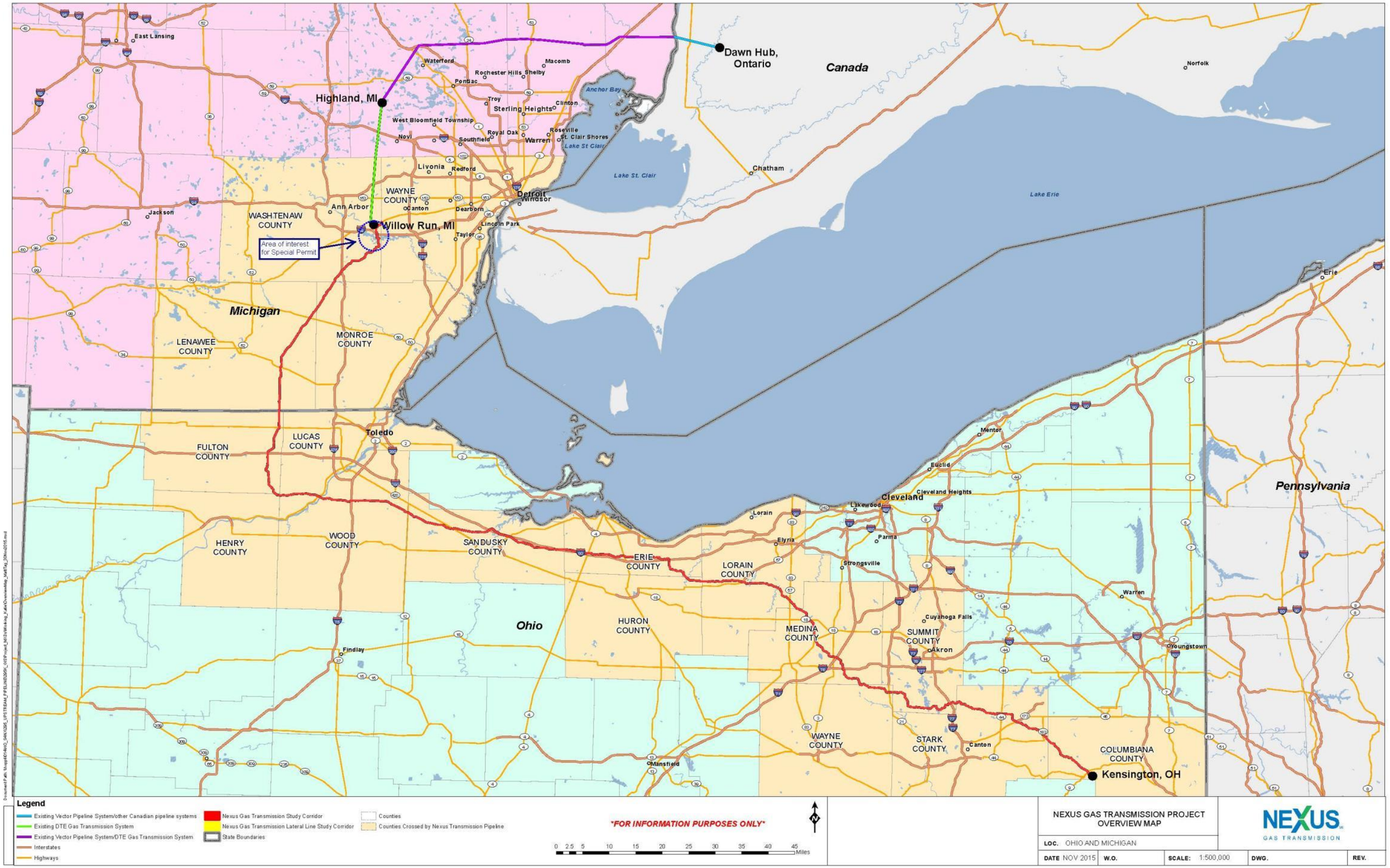
Appendix B

NEXUS Pipeline DTE Gas Company Interconnect Schematic



Appendix C

NEXUS Pipeline Overview Map



APPENDIX D:
NEXUS Pipeline Class Location with Design Factor

STATIONING BEGIN	*STATIONING END*	*MILE POST BEGIN*	*MILE POST END*	*CLASS LOCATION*	*DESIGN FACTOR*
0+00	*5+15*	*0.0*	*0.1*	*Class 1*	*0.72*
5+15	*11+64*	*0.1*	*0.2*	*Class 2*	*0.6*
11+64	*27+16*	*0.2*	*0.5*	*Class 3*	*0.5*
27+16	*183+46*	*0.5*	*3.5*	*Class 2*	*0.6*
183+46	*244+42*	*3.5*	*4.6*	*Class 1*	*0.72*
244+42	*431+95*	*4.6*	*8.2*	*Class 2*	*0.6*
431+95	*513+38*	*8.2*	*9.7*	*Class 1*	*0.72*
513+38	*782+73*	*9.7*	*14.8*	*Class 2*	*0.6*
782+73	*930+77*	*14.8*	*17.6*	*Class 1*	*0.72*
930+77	*1033+37*	*17.6*	*19.6*	*Class 2*	*0.6*
1033+37	*1109+73*	*19.6*	*21.0*	*Class 1*	*0.72*
1109+73	*1182+04*	*21.0*	*22.4*	*Class 2*	*0.6*
1182+04	*1383+97*	*22.4*	*26.2*	*Class 1*	*0.72*
1383+97	*1443+95*	*26.2*	*27.3*	*Class 2*	*0.6*
1443+95	*1536+61*	*27.3*	*29.1*	*Class 1*	*0.72*
1536+61	*1659+16*	*29.1*	*31.4*	*Class 2*	*0.6*
1659+16	*1668+83*	*31.4*	*31.6*	*Class 1*	*0.72*
1668+83	*1807+61*	*31.6*	*34.2*	*Class 3*	*0.5*
1807+61	*1917+05*	*34.2*	*36.3*	*Class 2*	*0.6*
1917+05	*1983+66*	*36.3*	*37.6*	*Class 3*	*0.5*
1983+66	*2246+73*	*37.6*	*42.6*	*Class 2*	*0.6*
2246+73	*2317+38*	*42.6*	*43.9*	*Class 3*	*0.5*
2317+38	*2507+39*	*43.9*	*47.5*	*Class 2*	*0.6*
2507+39	*2571+39*	*47.5*	*48.7*	*Class 1*	*0.72*
2571+39	*2676+99*	*48.7*	*50.7*	*Class 3*	*0.5*
2676+99	*2690+76*	*50.7*	*51.0*	*Class 1*	*0.72*
2690+76	*2762+49*	*51.0*	*52.3*	*Class 2*	*0.6*
2762+49	*2773+61*	*52.3*	*52.5*	*Class 1*	*0.6*[67]
2773+61	*2891+95*	*52.5*	*54.8*	*Class 3*	*0.5*
2891+95	*3031+74*	*54.8*	*57.4*	*Class 2*	*0.6*
3031+74	*3041+77*	*57.4*	*57.6*	*Class 3*	*0.5*
3041+77	*3103+17*	*57.6*	*58.8*	*Class 2*	*0.6*
3103+17	*3131+40*	*58.8*	*59.3*	*Class 1*	*0.72*
3131+40	*3197+35*	*59.3*	*60.6*	*Class 2*	*0.6*
3197+35	*3525+52*	*60.6*	*66.8*	*Class 1*	*0.72*

[67] A 0.6 design factor is being utilized at this location to facilitate hydrostatic testing. A Class 1 location Part 192 required minimum design factor is 0.72.

APPENDIX D:
NEXUS Pipeline Class Location with Design Factor

STATIONING BEGIN	*STATIONING END*	*MILE POST BEGIN*	*MILE POST END*	*CLASS LOCATION*	*DESIGN FACTOR*
3525+52	*3545+55*	*66.8*	*67.2*	*Class 2*	*0.6*
3545+55	*3558+22*	*67.2*	*67.4*	*Class 3*	*0.5*
3558+22	*3565+45*	*67.4*	*67.5*	*Class 3*	*0.5*
3565+45	*3594+11*	*67.5*	*68.1*	*Class 2*	*0.6*
3594+11	*3628+85*	*68.1*	*68.7*	*Class 1*	*0.72*
3628+85	*3949+35*	*68.7*	*74.8*	*Class 2*	*0.6*
3949+35	*4025+09*	*74.8*	*76.2*	*Class 1*	*0.72*
4025+09	*4103+47*	*76.2*	*77.7*	*Class 2*	*0.6*
4103+47	*4149+82*	*77.7*	*78.6*	*Class 1*	*0.72*
4149+82	*4218+27*	*78.6*	*79.9*	*Class 2*	*0.6*
4218+27	*4373+72*	*79.9*	*82.8*	*Class 1*	*0.72*
4373+72	*4444+68*	*82.8*	*84.2*	*Class 2*	*0.6*
4444+68	*4967+73*	*84.2*	*94.1*	*Class 1*	*0.72*
4967+73	*4976+09*	*94.1*	*94.2*	*Class 3*	*0.5*
4976+09	*4988+42*	*94.2*	*94.5*	*Class 2*	*0.6*
4988+42	*5078+68*	*94.5*	*96.2*	*Class 3*	*0.5*
5078+68	*5230+39*	*96.2*	*99.1*	*Class 1*	*0.72*
5230+39	*5404+56*	*99.1*	*102.4*	*Class 2*	*0.6*
5404+56	*5905+86*	*102.4*	*111.9*	*Class 1*	*0.72*
5905+86	*5975+28*	*111.9*	*113.2*	*Class 2*	*0.6*
5975+28	*6196+18*	*113.2*	*117.4*	*Class 1*	*0.72*
6196+18	*6252+99*	*117.4*	*118.4*	*Class 2*	*0.6*
6252+99	*6677+84*	*118.4*	*126.5*	*Class 1*	*0.72*
6677+84	*6833+20*	*126.5*	*129.4*	*Class 2*	*0.6*
6833+20	*6887+27*	*129.4*	*130.4*	*Class 1*	*0.72*
6887+27	*6997+71*	*130.4*	*132.5*	*Class 2*	*0.6*
6997+71	*7746+05*	*132.5*	*146.7*	*Class 1*	*0.72*
7746+05	*7796+56*	*146.7*	*147.7*	*Class 2*	*0.6*
7796+56	*7825+80*	*147.7*	*148.2*	*Class 1*	*0.72*
7825+80	*7891+85*	*148.2*	*149.5*	*Class 2*	*0.6*
7891+85	*8161+75*	*149.5*	*154.6*	*Class 1*	*0.72*
8161+75	*8172+47*	*154.6*	*154.8*	*Class 2*	*0.6*
8172+47	*8239+34*	*154.8*	*156.0*	*Class 3*	*0.5*
8239+34	*8361+26*	*156.0*	*158.4*	*Class 1*	*0.72*
8361+26	*8414+83*	*158.4*	*159.4*	*Class 2*	*0.6*
8414+83	*8646+19*	*159.4*	*163.8*	*Class 1*	*0.72*
8646+19	*8757+16*	*163.8*	*165.9*	*Class 2*	*0.6*
8757+16	*8766+11*	*165.9*	*166.0*	*Class 3*	*0.5*
8766+11	*8780+34*	*166.0*	*166.3*	*Class 2*	*0.6*
8780+34	*9180+46*	*166.3*	*173.9*	*Class 1*	*0.72*

APPENDIX D:
NEXUS Pipeline Class Location with Design Factor

STATIONING BEGIN	*STATIONING END*	*MILE POST BEGIN*	*MILE POST END*	*CLASS LOCATION*	*DESIGN FACTOR*
9180+46	*9247+06*	*173.9*	*175.1*	*Class 2*	*0.6*
9247+06	*9645+28*	*175.1*	*182.7*	*Class 1*	*0.72*
9645+28	*9658+48*	*182.7*	*182.9*	*Class 3*	*0.5*
9658+48	*9939+83*	*182.9*	*188.3*	*Class 1*	*0.72*
9939+83	*10011+88*	*188.3*	*189.6*	*Class 3*	*0.5*
10011+88	*10012+37*	*189.6*	*189.6*	*Class 1*	*0.72*
10012+37	*10106+59*	*189.6*	*191.4*	*Class 2*	*0.6*
10106+59	*10225+71*	*191.4*	*193.7*	*Class 1*	*0.72*
10225+71	*10296+65*	*193.7*	*195.0*	*Class 2*	*0.6*
10296+65	*10331+30*	*195.0*	*195.7*	*Class 1*	*0.72*
10331+30	*10426+31*	*195.7*	*197.5*	*Class 2*	*0.6*
10426+31	*10830+50*	*197.5*	*205.1*	*Class 1*	*0.72*
10830+50	*10885+26*	*205.1*	*206.2*	*Class 2*	*0.6*
10885+26	*12920+33*	*206.2*	*244.7*	*Class 1*	*0.72*
12920+33	*12944+46*	*244.7*	*245.1*	*Class 2*	*0.6*
12944+46	*13002+26*	*245.1*	*246.3*	*Class 2*	*0.5*[68]
13002+26	*13009+27*	*246.3*	*246.4*	*Class 3*	*0.5*
13009+27	*13026+91*	*246.4*	*246.7*	*Class 2*	*0.5*
13026+91	*13108+94*	*246.7*	*248.3*	*Class 1*	*0.5*
13108+94	*13132+31*	*248.3*	*248.7*	*Class 2*	*0.5*
13132+31	*13209+59*	*248.7*	*250.2*	*Class 3*	*0.5*
13209+59	*13235+21*	*250.2*	*250.7*	*Class 2*	*0.5*
13235+21	*13257+12*	*250.7*	*251.1*	*Class 3*	*0.5*
13257+12	*13258+85*	*251.1*	*251.1*	*Class 2*	*0.5*
13258+85	*13274+04*	*251.1*	*251.4*	*Class 3*	*0.5*
13274+04	*13277+68*	*251.4*	*251.5*	*Class 2*	*0.5*
13277+68	*13300+42*	*251.5*	*251.9*	*Class 1*	*0.5*
13300+42	*13434+05*	*251.9*	*254.4*	*Class 3*	*0.5*
13434+05	*13454+38*	*254.4*	*254.8*	*Class 1*	*0.5*
13454+38	*13466+20*	*254.8*	*255.0*	*Class 3*	*0.5*
13466+20	*13484+12*	*255.0*	*255.4*	*Class 1*	*0.5*
13484+12	*13508+66*	*255.4*	*255.8*	*Class 2*	*0.5*
13508+66	*13518+33*	*255.8*	*256.0*	*Class 3*	*0.5*
13518+33	*13521+69*	*256.0*	*256.1*	*Class 2*	*0.5*[69]

[68] Nexus pipeline from MP 245.16 to MP 256.09 (10.93 miles) is required by the special permit to install Class 3 location pipe with a design factor of 0.5 unless 49 C.F.R.§§ 192.5, 192.105, 192.111, or 192.619 requires Class 4 location pipe for the pipeline MAOP. Class 1 location requirements for design factor are 0.72 and class 2 location requirements for design factor are 0.60.

[69] Nexus pipeline from MP 245.1 to MP 256.1 is required by the special permit to install Class 3 location pipe with a design factor of 0.5 unless 49 C.F.R.§§ 192.5, 192.105, 192.111, or 192.619 requires Class 4 location pipe for the pipeline MAOP.

Appendix E

NEXUS Pipeline Class Location and Design Factor Maps

(See next seven pages)

FOR INFORMATIONAL USE ONLY

0 0.125 0.25 0.5 0.75 1

Miles

Class 1 (DF = 0.72)
Class 2 (DF = 0.6)
Class 3 (DF = 0.5)
Class 3 Pipe MP 245.16 to End

Mainline Valve Site
Current Route (August 2016) Mile Post
Route 660 Ft. Buffer
Class 3 100 Yd. Buffer

Categories
Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
DOT Structures
Non-DOT Structures

FLUOR

NEXUS GAS TRANSMISSION
Line Class Location Maps
August 2016 Freeze Route

LOC. MICHIGAN

YEAR 2017 | W.O. | SCALE: 1:18,000 | DWG. 52 of 58 | REV. I

NEXUS GAS TRANSMISSION

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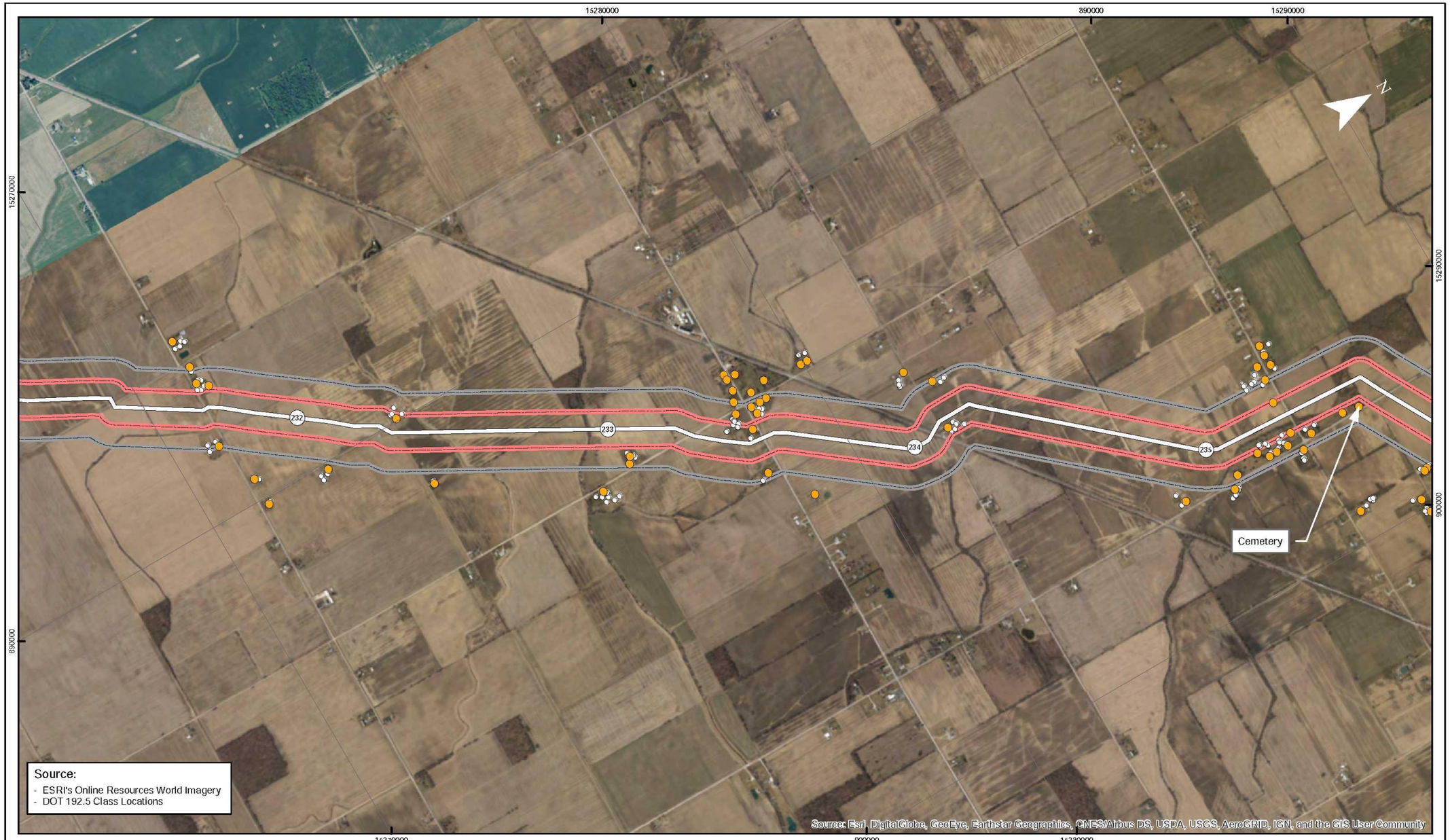
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233
234
235
Cemetery
Source:
- ESRI's Online Resources World Imagery
- DOT 192.5 Class Locations
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
FOR INFORMATIONAL USE ONLY
0 0.125 0.25 0.5 0.75 1
Miles
Class 1 (DF = 0.72)
Class 2 (DF = 0.6)
Class 3 (DF = 0.5)
Class 3 Pipe MP 245.16 to End
Mainline Valve Site
Current Route (August 2016) Mile Post
Route 660 Ft. Buffer
Class 3 100 Yd. Buffer
Categories
Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
DOT Structures
Non-DOT Structures
FLUOR
NEXUS GAS TRANSMISSION
Line Class Location Maps
August 2016 Freeze Route
NEXUS GAS TRANSMISSION
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YEAR: 2017
W.O.:
SCALE: 1:18,000
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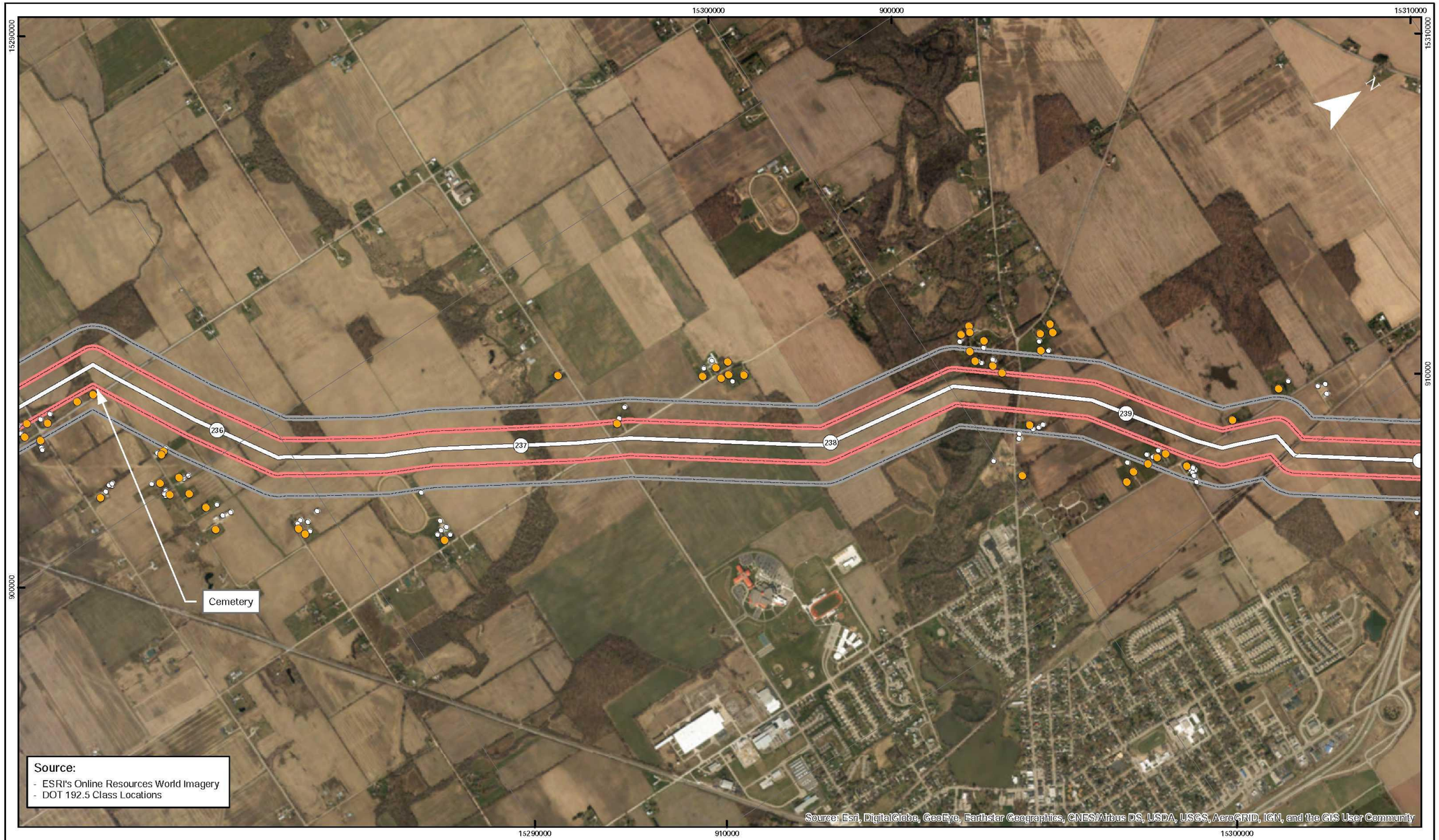
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236
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238
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Cemetery
Source:
- ESRI's Online Resources World Imagery
- DOT 192.5 Class Locations
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
15290000
910000
15300000
FOR INFORMATIONAL USE ONLY
0 0.125 0.25 0.5 0.75 1
Miles
Class 1 (DF = 0.72)
Class 2 (DF = 0.6)
Class 3 (DF = 0.5)
Class 3 Pipe MP 245.16 to End
Mainline Valve Site
Current Route (August 2016) Mile Post
Route 660 Ft. Buffer
Class 3 100 Yd. Buffer
Categories
Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
DOT Structures
Non-DOT Structures
FLUOR.
NEXUS GAS TRANSMISSION
Line Class Location Maps
August 2016 Freeze Route
LOC: MICHIGAN
YEAR 2017
W.O.
SCALE: 1:18,000
DWG: 54 of 58
REV. 1
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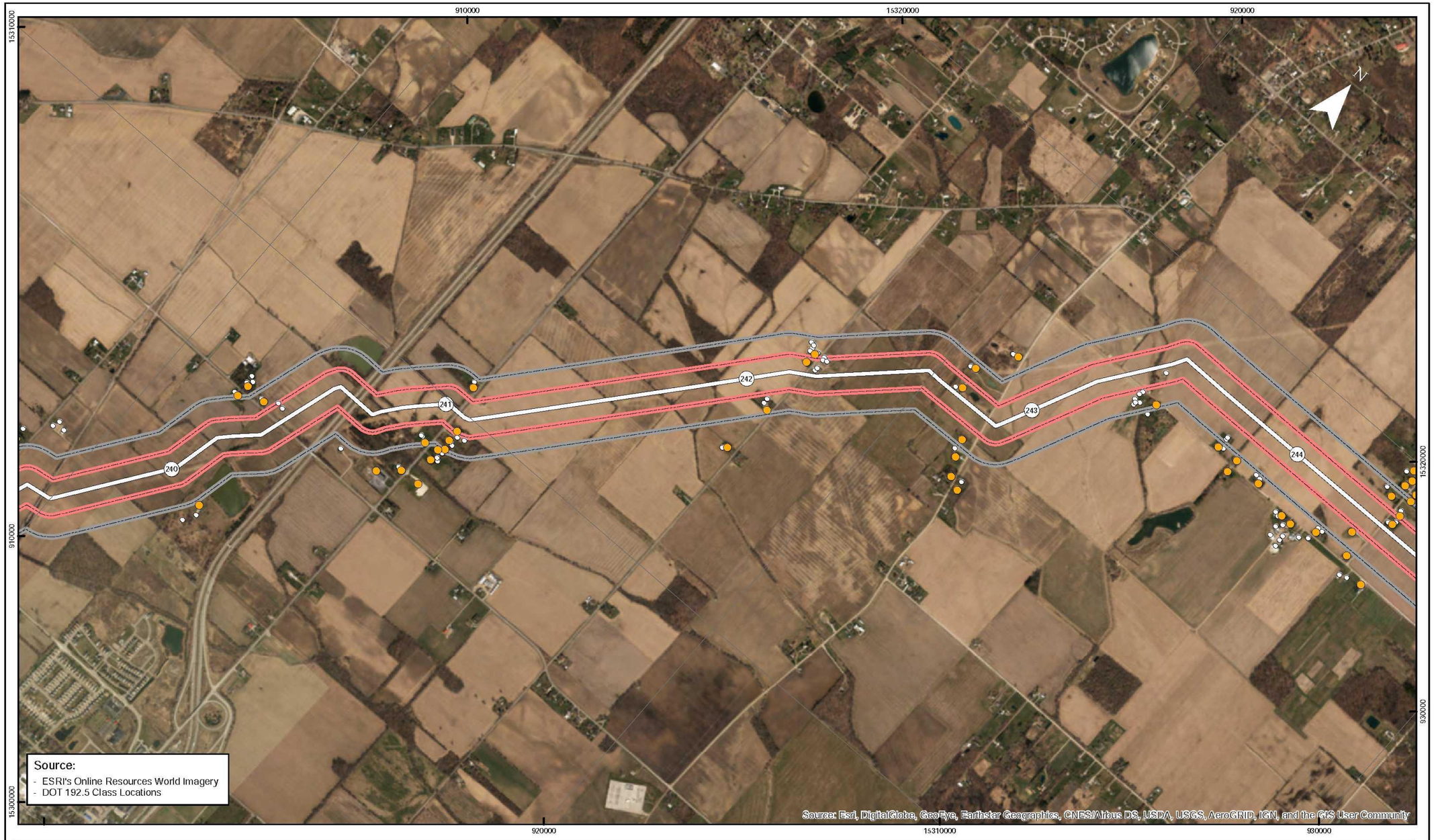

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0 0.125 0.25 0.5 0.75 1

Miles

Class 1 (DF = 0.72)
Class 2 (DF = 0.6)
Class 3 (DF = 0.5)
Class 3 Pipe MP 245.16 to End

Mainline Valve Site
Current Route (August 2016) Mile Post
Route 660 Ft. Buffer
Class 3 100 Yd. Buffer

Categories
Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
DOT Structures
Non-DOT Structures

FLUOR

NEXUS GAS TRANSMISSION
Line Class Location Maps
August 2016 Freeze Route

NEXUS GAS TRANSMISSION

LOC: MICHIGAN

YEAR: 2017 | W.O. | SCALE: 1:18,000 | DWG: 55 of 58 | REV: I

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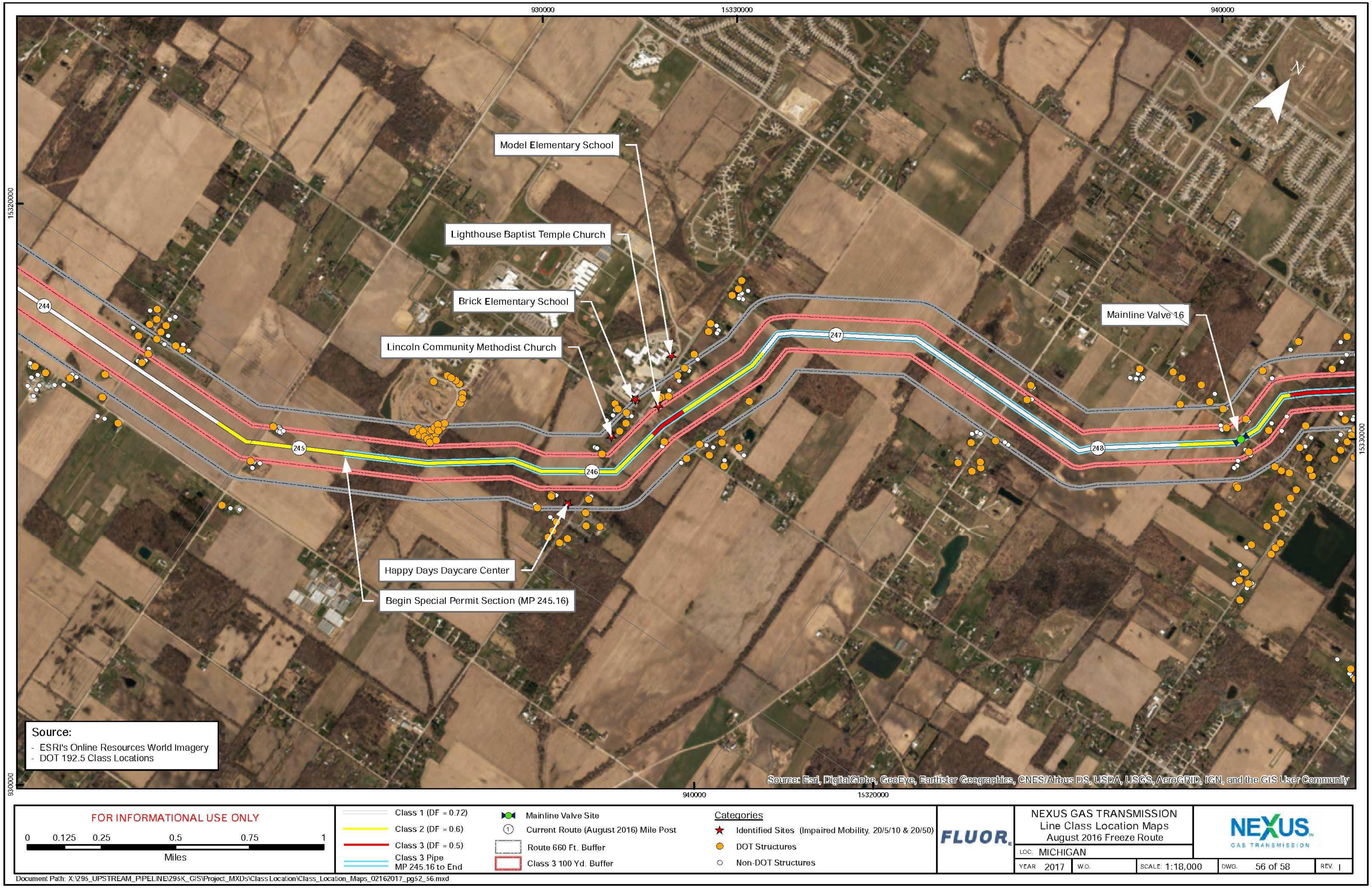
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Model Elementary School
Lighthouse Baptist Temple Church
Brick Elementary School
Lincoln Community Methodist Church
Mainline Valve 16
Happy Days Daycare Center
Begin Special Permit Section (MP 245.16)
244
245
246
247
248
N
Source:
- ESRI's Online Resources World Imagery
- DOT 192.5 Class Locations
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
FOR INFORMATIONAL USE ONLY
0 0.125 0.25 0.5 0.75 1
Miles
Class 1 (DF = 0.72)
Class 2 (DF = 0.6)
Class 3 (DF = 0.5)
Class 3 Pipe MP 245.16 to End
Mainline Valve Site
Current Route (August 2016) Mile Post
Route 660 Ft. Buffer
Class 3 100 Yd. Buffer
Categories
Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
DOT Structures
Non-DOT Structures
FLUOR
NEXUS GAS TRANSMISSION
Line Class Location Maps
August 2016 Freeze Route
LOC: MICHIGAN
YEAR 2017
W.O.
SCALE: 1:18,000
DWG. 56 of 58
REV. I
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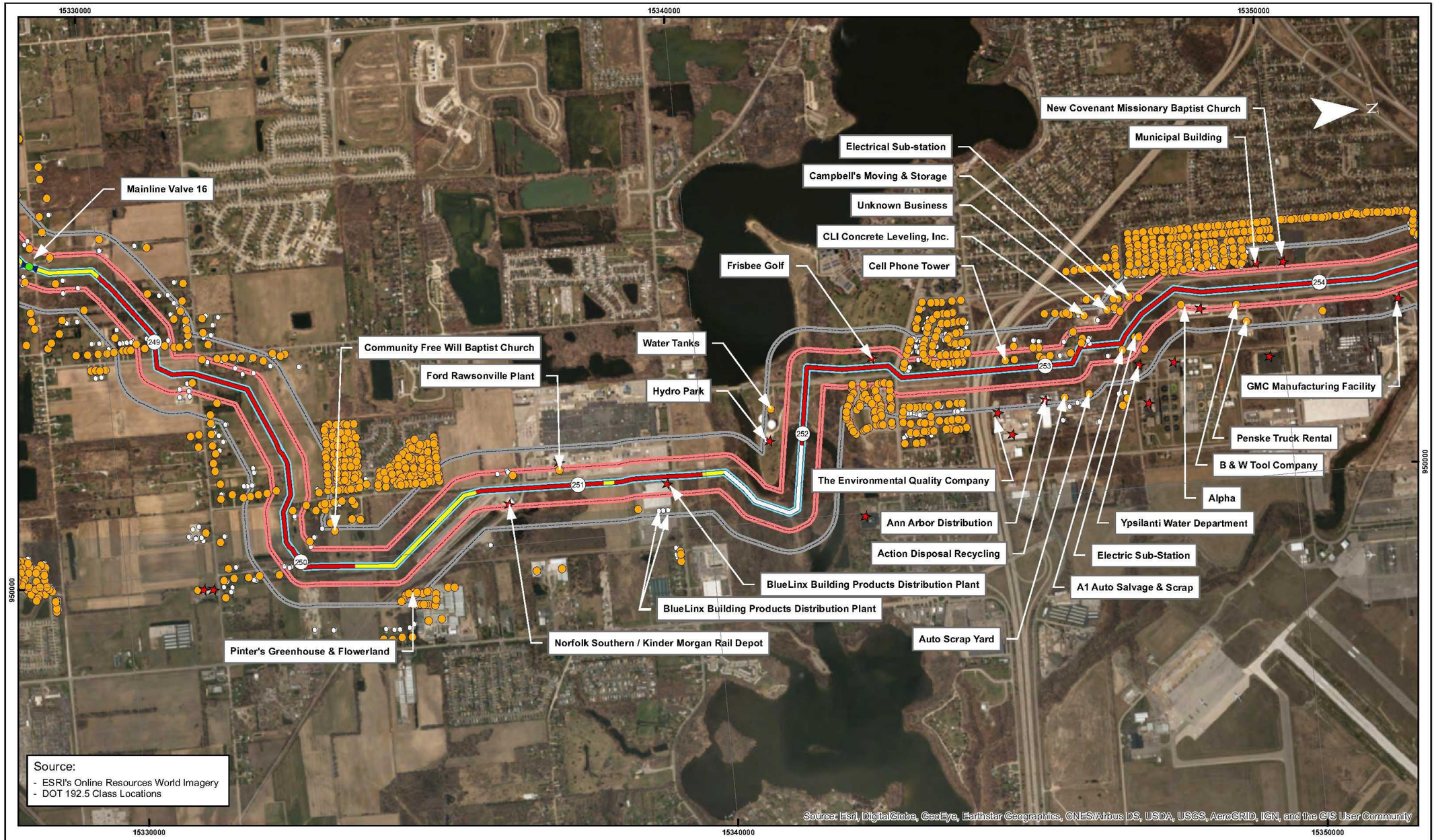

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0 0.125 0.25 0.5 0.75 1
Miles

Class 1 (DF = 0.72)
Class 2 (DF = 0.6)
Class 3 (DF = 0.5)
Class 3 Pipe MP 245.16 to End

Mainline Valve Site
Current Route (August 2016) Mile Post
Route 660 Ft. Buffer
Class 3 100 Yd. Buffer

Categories
Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
DOT Structures
Non-DOT Structures

FLUOR.

NEXUS GAS TRANSMISSION
Line Class Location Maps
August 2016 Freeze Route

LOC. MICHIGAN
YEAR 2017 | W.O. | SCALE: 1:18,000 | DWG. 57 of 58 | REV. I

NEXUS GAS TRANSMISSION

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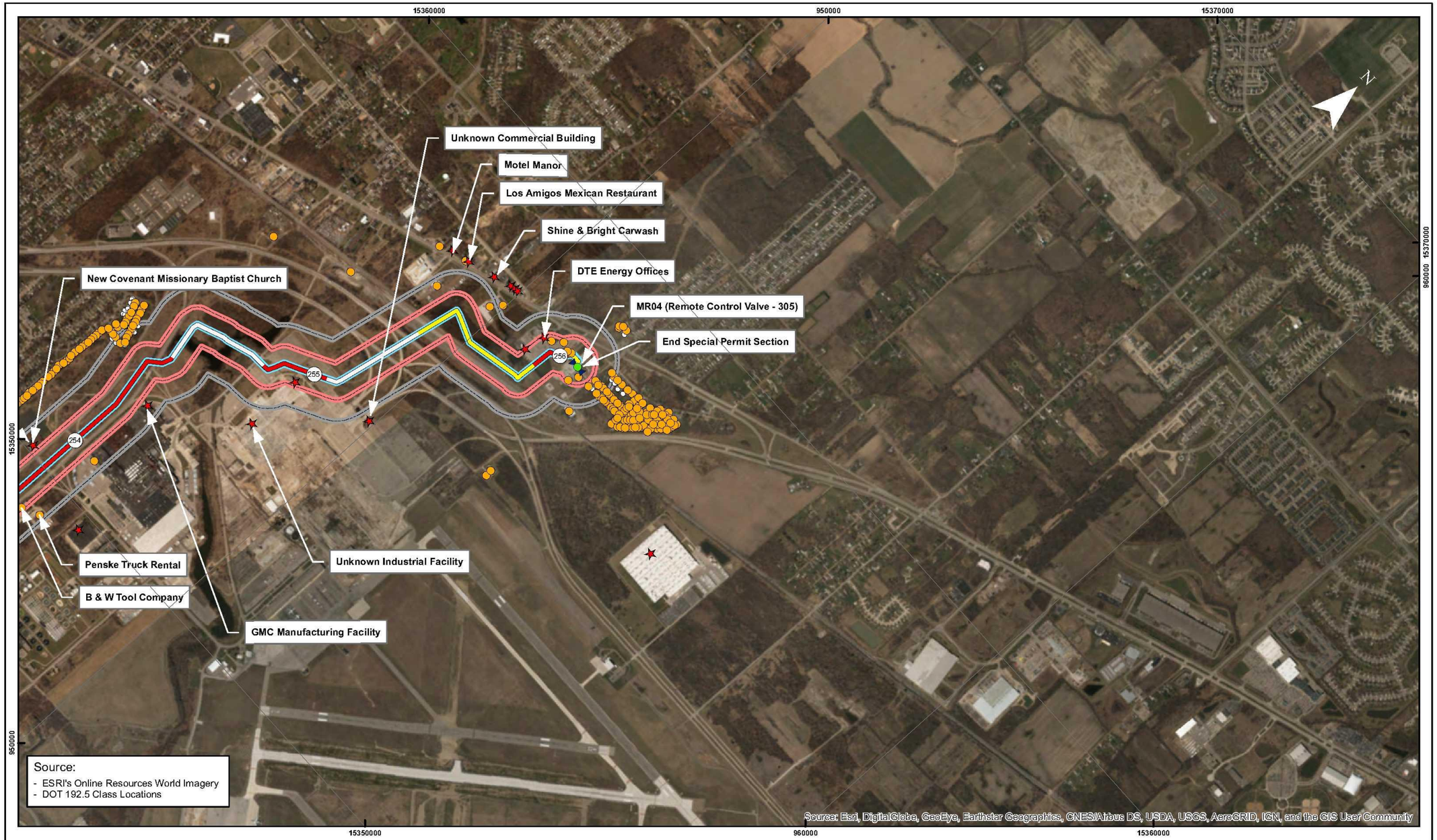

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0 0.125 0.25 0.5 0.75 1
Miles

Class 1 (DF = 0.72)
Class 2 (DF = 0.6)
Class 3 (DF = 0.5)
Class 3 Pipe MP 245.16 to End

Mainline Valve Site
Current Route (August 2016) Mile Post
Route 660 Ft. Buffer
Class 3 100 Yd. Buffer

Categories
Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
DOT Structures
Non-DOT Structures

FLUOR

NEXUS GAS TRANSMISSION
Line Class Location Maps
August 2016 Freeze Route

NEXUS GAS TRANSMISSION

LOC. MICHIGAN				
YEAR 2017	W.O.	SCALE: 1:18,000	DWG. 58 of 58	REV. I

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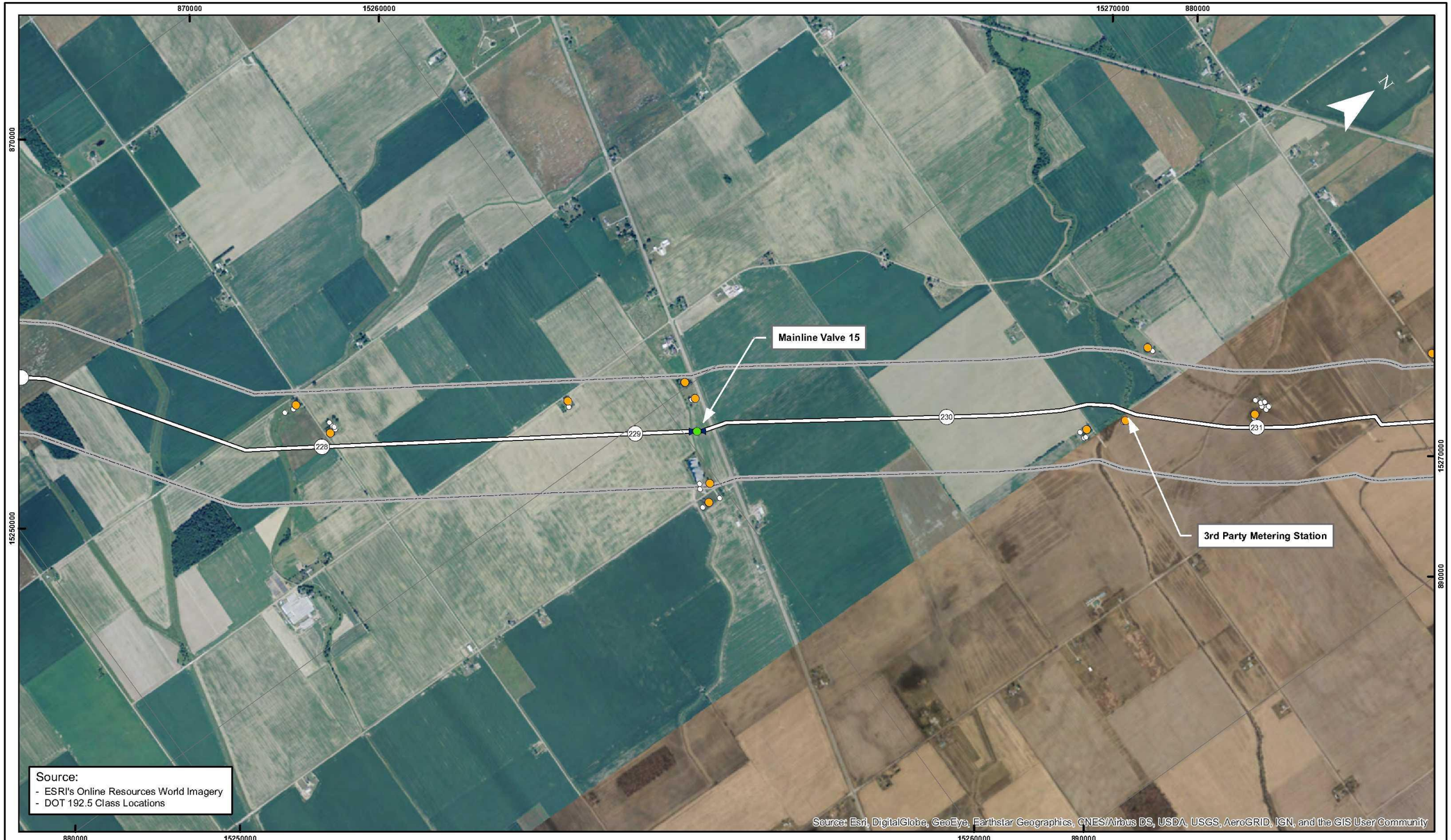
Appendix F

NEXUS Pipeline Special Permit Maps with HCAs and Class Location Design Factors

(See next seven pages)



FOR INFORMATIONAL USE ONLY

0 0.125 0.25 0.5 0.75 1

Miles

- Non HCA
- HCA
- Class 3 Pipe MP 245.16 To End
- Mainline Valve Site
- Current Route (August 2016) Mile Post
- Potential Impact Radius Buffer (942.61 ft)

Categories

- Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
- DOT Structures
- Non-DOT Structures

FLUOR.

NEXUS GAS TRANSMISSION
High Consequence Area Maps
August 2016 Freeze Route

LOC. MICHIGAN

YEAR 2017 | W.O. | SCALE: 1:18,000 | DWG. 52 of 58 | REV. F

NEXUS GAS TRANSMISSION

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890000

15290000

900000

N

232 233 234 235

Cemetery

Source:
- ESRI's Online Resources World Imagery
- DOT 192.5 Class Locations

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

15270000 900000 15280000

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0 0.125 0.25 0.5 0.75 1

Miles

Non HCA
HCA
Class 3 Pipe MP 245.16 To End

Mainline Valve Site
Current Route (August 2016) Mile Post
Potential Impact Radius Buffer (942.61 ft)

Categories
- Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
- DOT Structures
- Non-DOT Structures

FLUOR.

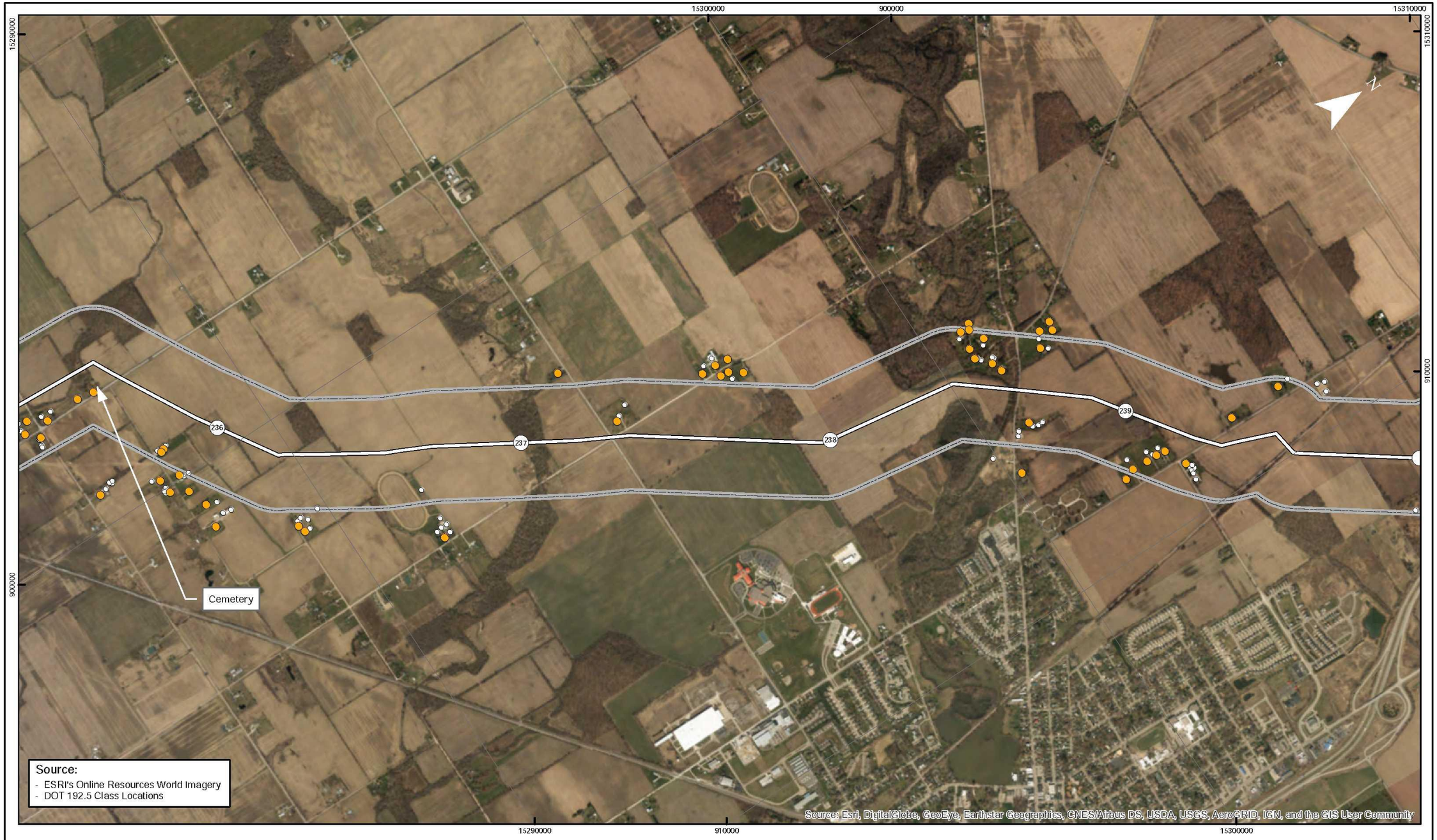
NEXUS GAS TRANSMISSION
High Consequence Area Maps
August 2016 Freeze Route

LOC: MICHIGAN

YEAR: 2017 | W.O. | SCALE: 1:18,000 | DWG: 53 of 58 | REV: F

NEXUS GAS TRANSMISSION

Document Path: X:\295_UPSTREAM_PIPELINE\295K_GIS\Project_MXDs\HCA\HCA_Maps_02162017_pg52_56.mxd



FOR INFORMATIONAL USE ONLY

0 0.125 0.25 0.5 0.75 1

Miles

Non HCA

HCA

Class 3 Pipe
MP 245.16 To End

Mainline Valve Site

Current Route (August 2016)
Mile Post

Potential Impact Radius Buffer
(942.61 ft)

Categories

- Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
- DOT Structures
- Non-DOT Structures

FLUOR.

NEXUS GAS TRANSMISSION
High Consequence Area Maps
August 2016 Freeze Route

NEXUS GAS TRANSMISSION

LOC. MICHIGAN				
YEAR 2017	W.O.	SCALE: 1:18,000	DWG. 54 of 58	REV. F

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242
243
244
Source:
- ESRI's Online Resources World Imagery
- DOT 192.5 Class Locations
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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Miles
Non HCA
HCA
Class 3 Pipe
MP 245.16 To End
Mainline Valve Site
1 Current Route (August 2016) Mile Post
Potential Impact Radius Buffer (942.61 ft)
Categories
Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
DOT Structures
Non-DOT Structures
FLUOR.
NEXUS GAS TRANSMISSION
High Consequence Area Maps
August 2016 Freeze Route
LOC: MICHIGAN
YEAR 2017
W.O.
SCALE: 1:18,000
DWG. 55 of 58
REV. F
NEXUS GAS TRANSMISSION
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Model Elementary School
Lighthouse Baptist Temple Church
Brick Elementary School
Lincoln Community Methodist Church
Mainline Valve 16
Happy Days Daycare Center
Begin Special Permit Section (MP 245.16)
244
245
246
247
248
Source:
- ESRI's Online Resources World Imagery
- DOT 192.5 Class Locations
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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Miles
Non HCA
HCA
Class 3 Pipe
MP 245.16 To End
Mainline Valve Site
Current Route (August 2016)
Mile Post
Potential Impact Radius Buffer
(942.61 ft)
Categories
Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
DOT Structures
Non-DOT Structures
FLUOR.
NEXUS GAS TRANSMISSION
High Consequence Area Maps
August 2016 Freeze Route
LOC: MICHIGAN
YEAR 2017
W.O.
SCALE: 1:18,000
DWG. 56 of 58
REV. F
NEXUS GAS TRANSMISSION
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Mainline Valve 16

Community Free Will Baptist Church

Ford Rawsonville Plant

Water Tanks

Hydro Park

Frisbee Golf

Electrical Sub-station

Campbell's Moving & Storage

Unknown Business

CLI Concrete Leveling, Inc.

Cell Phone Tower

Municipal Building

GMC Manufacturing Facility

Penske Truck Rental

B & W Tool Company

Alpha

Ypsilanti Water Department

Electric Sub-Station

A1 Auto Salvage & Scrap

The Environmental Quality Company

Ann Arbor Distribution

Action Disposal Recycling

BlueLinx Building Products Distribution Plant

BlueLinx Building Products Distribution Plant

Auto Scrap Yard

Norfolk Southern / Kinder Morgan Rail Depot

Pinter's Greenhouse & Flowerland

249 250 251 252 253 254

950000

Source:
- ESRI's Online Resources World Imagery
- DOT 192.5 Class Locations

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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0 0.125 0.25 0.5 0.75 1

Miles

Non HCA
HCA
Class 3 Pipe MP 245.16 To End

Mainline Valve Site
Current Route (August 2016) Mile Post
Potential Impact Radius Buffer (942.61 ft)

Categories
- Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
- DOT Structures
- Non-DOT Structures

FLUOR

NEXUS GAS TRANSMISSION
High Consequence Area Maps
August 2016 Freeze Route

LOC. MICHIGAN

YEAR 2017 | W.O. | SCALE: 1:18,000 | DWG. 57 of 58 | REV. F

NEXUS GAS TRANSMISSION

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960000 15370000

15350000

950000

Unknown Commercial Building

Motel Manor

Los Amigos Mexican Restaurant

Shine & Bright Carwash

DTE Energy Offices

MR04 (Remote Control Valve - 305)

End Special Permit Section

New Covenant Missionary Baptist Church

Penske Truck Rental

B & W Tool Company

GMC Manufacturing Facility

Unknown Industrial Facility

254 255 256

N

Source:
- ESRI's Online Resources World Imagery
- DOT 192.5 Class Locations

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Miles

Non HCA
HCA
Class 3 Pipe
MP 245.16 To End

Mainline Valve Site
Current Route (August 2016)
Mile Post
Potential Impact Radius Buffer
(942.61 ft)

Categories
Identified Sites (Impaired Mobility, 20/5/10 & 20/50)
DOT Structures
Non-DOT Structures

FLUOR.

NEXUS GAS TRANSMISSION
High Consequence Area Maps
August 2016 Freeze Route

NEXUS GAS TRANSMISSION

LOC. MICHIGAN

YEAR 2017 | W.O. | SCALE: 1:18,000 | DWG. 58 of 58 | REV. F

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Appendix G

NEXUS Pipeline Mainline Valves by Milepost

Name[70]	MP	Stationing
Kensington Metering Station MR02 Valve	0.0	0+00
Kensington Metering Station MR03 Valve	0.0	0+00
Hanoverton Compressor Station Valve	1.4	72+13
MLV01	16.7	881+31
MLV02	32.6	1720+06
MLV03	40.1	2116+12
MLV04	50.5	2666+78
MLV05	58.1	3069+94
Wadsworth Compressor Station Valve	63.6	3355+97
MLV06	74.6	3938+67
MLV07	89.9	4745+41
MLV08	97.5	5147+50
MLV09	117.2	6187+87
MLV10	125.7	6636+48
Clyde Compressor Station Valve	134.9	7122+14
MLV11	152.8	8067+25
MLV12	168.8	8914+50
Waterville Compressor Station Valve	184.6	9744+57
MLV13	190.3	10047+32
MLV14	210.0	11087+20
MLV15	229.2	12101+73
MLV16	248.5	13120+13
Willow Run Metering Station MR04 Valve	256.1	13521+69

[70] Mainline valves listed in **Appendix G, NEXUS Pipeline Mainline Valves by Milepost**, will be required by Special Permit Condition D.10 - Mainline Valve – Monitoring and Remote Control for Leaks or Ruptures - to have either remote controlled or automatic closure valves installed at these valve locations.

Appendix H

NEXUS Project Minimum Pressure Test Factors

Class Location	**Design Factor**	**Min Pressure Test Factor**
Class 1	0.72	1.39 x MAOP (100% SMYS)
Class 2	0.6	1.5 x MAOP
Class 3	0.5	1.5 x MAOP
MP 245.16 to MP 256.09 (***Special Permit Segment 1***)	0.5	2.0 x MAOP

Appendix I

NEXUS Pipeline ILI Tool Launcher/Receiver Locations

Launcher/Receiver	MP
Launcher	0.0
Receiver	63.6
Launcher	63.6
Receiver	184.6
Launcher	184.6
Receiver	256.1

Appendix J

RELEVANT NEXUS PIPELINE FERC REPORTS AND FILINGS

No.	Document	Location
1.	FERC Certificate Application Docket for the NEXUS Project, CP16-22	http://elibrary.ferc.gov/idmws/docket_sheet.asp
2.	Resource Report 1 - General Project Description to FERC Certification Application	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051727
3.	Resource Report 1 - General Project Description APP1C2	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051749
4.	Resource Report 2 - Water Use and Quality	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051728
5.	Resource Report 3 – Fish, Wildlife, and Vegetation	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051750
6.	Resource Report 4 – Cultural Resources	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051729
7.	Resource Report 5 – Socioeconomics	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051731
8.	Resource Report 6 – Geological Resources	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051761
9.	Resource Report 7 – Soils	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051737
10.	Resource Report 7 – Soils (APP 7B 1 of 4)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051732
11.	Resource Report 7 – Soils (APP 7B 2 of 4)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051733
12.	Resource Report 7 – Soils (APP 7B 3 of 4)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051734
13.	Resource Report 7 – Soils (APP 7B 4 of 4)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051736
14.	Resource Report 8 – Land Use, Recreation and Aesthetics	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051747
15.	Resource Report 8 – Land Use, Recreation and Aesthetics (APP 8A 1 of 6)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051738
16.	Resource Report 8 – Land Use, Recreation and Aesthetics (APP 8A 2 of 6)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051739
17.	Resource Report 8 – Land Use, Recreation and Aesthetics (APP 8A 3 of 6)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051740

No.	Document	Location
18.	Resource Report 8 – Land Use, Recreation and Aesthetics (APP 8A 4 of 6)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051742
19.	Resource Report 8 – Land Use, Recreation and Aesthetics (APP 8A 5 of 6)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051751
20.	Resource Report 8 – Land Use, Recreation and Aesthetics (APP 8A 6 of 6)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051752
21.	Land Use, Recreation and Aesthetics (APP 8C 1 of 7)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051762
22.	Land Use, Recreation and Aesthetics (APP 8C 2 of 7)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051763
23.	Land Use, Recreation and Aesthetics (APP 8C 3 of 7)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051765
24.	Land Use, Recreation and Aesthetics (APP 8C 4 of 7)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051766
25.	Land Use, Recreation and Aesthetics (APP 8C 5 of 7)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051768
26.	Land Use, Recreation and Aesthetics (APP 8C 6 of 7)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051744
27.	Land Use, Recreation and Aesthetics (APP 8C 7 of 7)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051746
28.	Resource Report 9 – Air and Noise Quality	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051754
29.	Resource Report 10 – Alternatives	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051760
30.	Resource Report 10 – Alternatives (Figure 10.5-1)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051756
31.	Resource Report 10 – Alternatives (Figure 10.5-2)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051757
32.	Resource Report 10 – Alternatives (Figure 10.6-1)	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051759
33.	Resource Report 11 – Reliability and Safety	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051755
34.	Resource Report 12 – PCB Contamination	https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=14051748
35.	NEXUS Draft Environmental Impact Statement (DEIS) Page	https://www.ferc.gov/industries/gas/enviro/eis/2016/07-08-16-eis.asp
36.	NEXUS DEIS Volume I	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14299637
37.	NEXUS DEIS Volume II 1 of 4 Appendices A to D	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14299638

No.	Document	Location
38.	NEXUS DEIS Volume II 2 of 4 Appendix E Part 1	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14299639
39.	NEXUS DEIS Volume II 3 of 4 Appendix E Part 2	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14299640
40.	NEXUS DEIS Volume II 4 of 4 Appendices F to P	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14299641
41.	FERC Final Environmental Impact Statement (FEIS)	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14411409
42.	FERC FEIS Appendices A-D	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14411410
43.	FERC FEIS Appendix E1-E4	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14411411
44.	FERC FEIS Appendix E5 Part 1	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14411412
45.	FERC FEIS Appendix E5 Part 2	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14411413
46.	FERC FEIS Appendices F-Q	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14411414
47.	FERC FEIS Appendix R Part 1	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14411416
48.	FERC FEIS Appendix R Part 2	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14411418
49.	FERC FEIS Appendix R Part 3	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14411419
50.	FERC FEIS Appendix R Part 4	http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14411420

Completed by PHMSA in Washington, DC on: June 29, 2018.