



Engineer's Assessment

Marquette Greenway Trail

Town of Burns Harbor, IN

BHRDC 141429 | October 31, 2018

FINAL



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Engineer's Assessment

Marquette Greenway Trail

Prepared for Town of Burns Harbor Redevelopment Commission

1 Purpose of Report

The purpose of this report is to document the engineering assessment phase of project development including project location, project need and purpose and relevant background for the Town of Burns Harbor's portion of the Marquette Greenway Trail. In early 2017, the Town of Burns Harbor, Indiana engaged SEH to determine the most logical alignment for the Town's portion of the Marquette Greenway Trail. This report provides a description of the project area, challenges with designing and constructing the trail, alignment alternatives considered and their evaluation, the preferred alignment alternative, trail design elements and the estimate of cost to construct the trail alignment segments, environmental issues, and agency and public coordination efforts associated with the project.

2 Project Location

Figure 1 shows the general project location. The project as described is entirely located within the corporate limits of the Town of Burns Harbor, Indiana and is generally bounded by US 12 to the north, US 20 to the south, the corporate boundaries of Towns of Burns Harbor and Portage to the west, and the corporate boundary of the Town of Porter to the east. The proposed trail closely aligns with the Little Calumet River alignment.

The proposed trail will be divided into five (5) phases: Phase 1A, Phase 2, Phase 3, Phase 4, and a future phase. These phases are discussed in detail in Section 10 of this report. Phase 1A will begin at the eastern city limits of Burns Harbor at the intersection of W. Beam Street (CR 1275 N) and N. Babcock Road (CR 200 W), passing through the Indiana Dunes National Lakeshore property, west to Meadowbrook Road, with a second leg proceeding south to Stanley Street.

Phase 2 will begin at Stanley Street and will continue west and south to Max Mochal Highway/Westport Road (SR 149). Phase 3 will begin on the east side of Max Mochal Highway/Westport Road (SR 149), where it will cross to the west and follow Navaho Trail, ending slightly west of Navaho Trail.

Phase 4 will connect with Phase 3 at this point, and continue to meander west and south, generally following the Indiana Dunes National Lakeshore property to the city limits of Burns Harbor on the west.

A planned future phase will connect with Phase 1A at the railroad tracks north of Coan Street and meander west to connect to Phases 3 and 4 at the point where they meet. These phases are further discussed in Section 10 of this report.

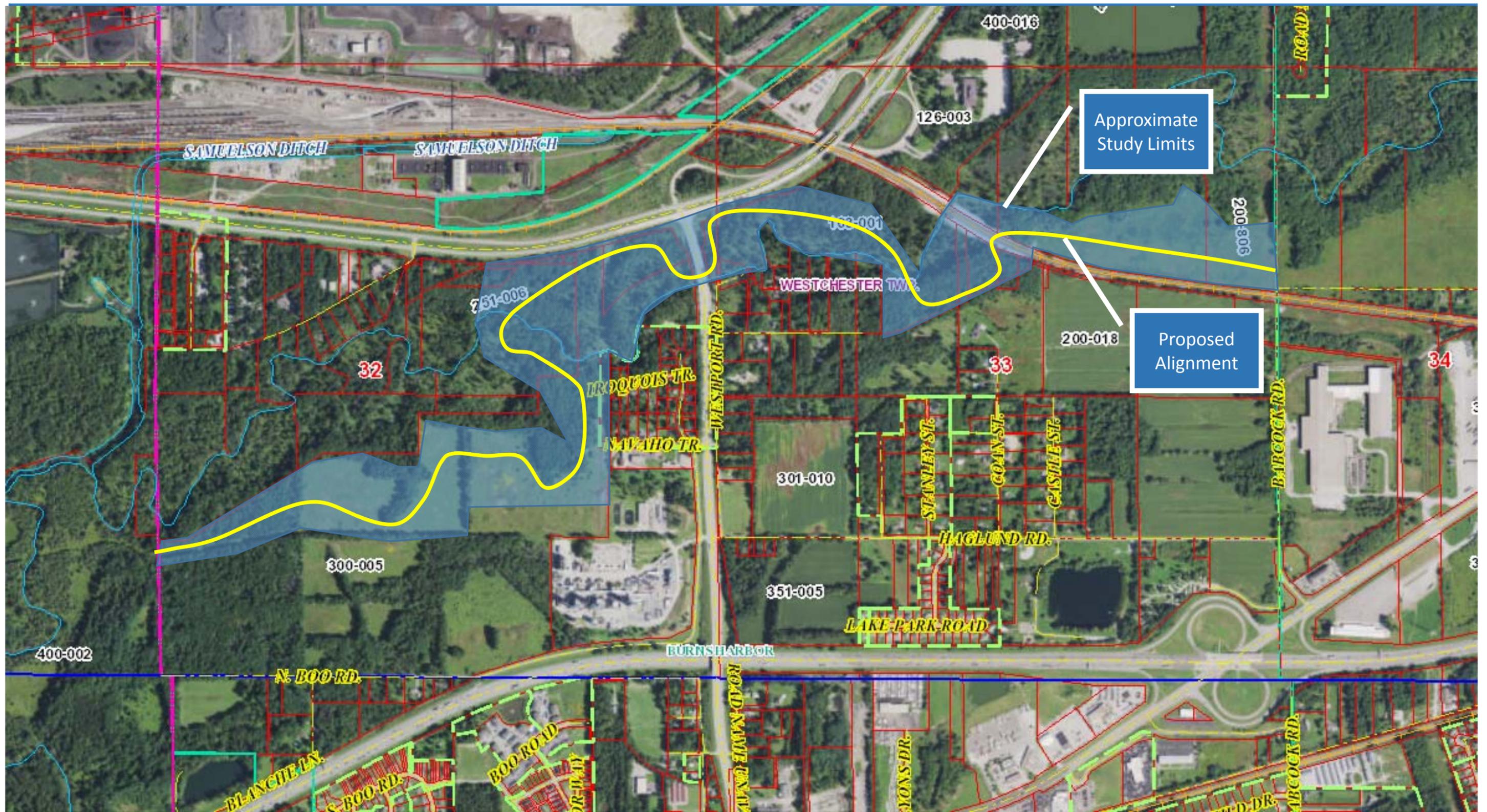


Figure 1 - Project Location

The Town of Burns Harbor is undertaking the task of planning, designing and constructing the segment of the Marquette Greenway Trail through the entirety of the Town. The east-west trail will be constructed between US 12 and US 20, in order to provide direct access to as much of the populated area of the Town as possible.

3 Project Purpose and Need

The purpose and need for the Marquette Greenway Trail, within the Town of Burns Harbor, is to create the Town's connection to the overall Marquette Greenway Trail system which is a key component of the Marquette Plan. The Marquette Greenway Trail is a designated State Priority Visionary Trail and is part of the Visionary Trail System. The Visionary Trail System is a collection of trail corridors that will connect trails throughout Indiana as part of the Indiana Statewide Comprehensive Outdoor Recreation Plan (SCORP) [Indiana Department of Natural Resources (IDNR) 2016]. This trail will ultimately connect with other trails that are also part of the Visionary Trail System. This trail is part of the SCORP 2016–2020 and part of the Indiana Trail Plan.

The Town of Burns Harbor is especially interested in the development of the Marquette Greenway Trail through the extent of the Town. Burns Harbor anticipates the Trail working as a recreational quality of life enhancement as well as an economic driver within the Town. By developing the Trail, Burns Harbor hopes that new development will begin in Burns Harbor's Town Center area.

4 Project History, Prior Studies

The development of the Marquette Greenway Trail to connect the east and west units of the Indiana Dunes National Lakeshore has been included in a number of different plans and studies. These plans and studies had a common goal of creating a multi-use trail to showcase the beauty of Lake Michigan and the Indiana Dunes.

4.1 The Marquette Plan – Phase I and Phase II

The Marquette Plan is a strategic vision for Lakeshore Reinvestment created to guide future decision making for the entire forty-six mile Lake Michigan shoreline. This comprehensive land use vision in the plan looks at each community individually and collectively, addressing both community-specific needs and broader regional objectives. The Plan was created to achieve tangible quality of life improvements for the residents of northwest Indiana.

The Phase 1 of the Marquette Plan titled The Lakeshore Reinvestment Strategy (January 2005) was a collaborative effort of the lakefront communities of East Chicago, Gary, Hammond, Portage and Whiting, the office of Congressman Pete Visclosky and the Indiana Department of Natural Resources to develop a comprehensive land use vision to guide reinvestment efforts to reclaim Indiana's lakefront – from the Indiana/ Illinois state line to the Burns Harbor International Port in Portage, Indiana – as a livable lakefront.

A key recommendation of Phase I was to extend the study east from the Burns Harbor International Port, Portage, Indiana to the Indiana / Michigan state line. The Northwestern Indiana Regional Planning Commission (NIRPC), northwest Indiana's Council of Governments (COG) and Metropolitan Planning Organization (MPO), recognizing the importance of this recommendation, successfully identified funding for the eastern reach or Phase II. The Phase II of the Marquette Plan was done in early 2008 and the study area included twenty-six miles of lakefront, comprised of a series of connected dune and swale landscapes, beaches, vast natural resources and attractions, and a range of diverse habitats that co-exists with the built environment. The area included two cities, eleven towns, two counties and serves as home to the Indiana Dunes National Lakeshore, Indiana Dunes State Park, and the Burns Harbor International Port in Portage, Indiana. There were many initiatives outlined in both phases of the Marquette Plan to create a Livable Lakefront. One of these initiatives included the expansion and connection of existing greenways. The development of Marquette Greenway Trail which will connect residents and visitors alike to the grandeur of the Indiana Dunes and other notable destinations across three states.

4.2 Town of Burns Harbor Comprehensive Plan - Place Making 20/20

In 2009, the Town of Burns Harbor received funding from the Indiana Department of Natural Resources Lake Michigan Coastal Program (LCMP), and the Northwest Indiana Regional Development Authority to update the Town's Comprehensive Plan, and to develop the Burns Harbor Downtown/US 20 Sub-Area Plan and the Marquette Greenway Trail Sub-Area Plan, both of which were to supplement the Town's Comprehensive Plan. These plans, particularly the Marquette Greenway Trail Sub Area Plan, illustrates the opportunities and constraints, the preferred plan for the train experience, the trail standards, and impacts of creating the trail as an economic development tool for the Town of Burns Harbor.

4.3 Burns Harbor Master Development & Revitalization Plan

In 2015, the Town of Burns Harbor worked with LiveWorkPlayLearn, Inc. to create a Master Development and Revitalization Plan. This plan focused on priority projects that can maximize the return on investment, as well as projected economic impact and quality of life uplift to the Town. As part of the plan, the Town created priority projects for guiding the future of the Town's development, which were intended to be completed within years one (1) to three (3). The Marquette Greenway East Branch Connector was included in the Priority Project List at Number 6. The report referenced previous studies on the trail and the economic impacts of trail completion.

5 Existing Facility

Currently, there is no dedicated pedestrian or bicycle route through the Town of Burns Harbor. The NIRPC trail map does identify US 12 from IN-249 to IN-149 and IN-149 from US 12 to the Prairie Duneland Trail as bike routes within the Town's Corporate Limits. The Town also lacks any sidewalks outside of the new residential developments in the Town. Pedestrian and bicyclist safety in the Town

is difficult due to the presence of east-west corridors US12, I-94 and US20 and the north-south corridor of IN-149.

6 Field Check

Prior to beginning any fieldwork for the environmental work or topographic survey, the SEH team walked the proposed trail alignment to determine that the trail was feasible and constructible as planned. SEH placed preliminary centerline stakes as a reference for the field crews to follow. During this walkthrough, alignment modifications were made based on a path of least resistance for construction of the trail.

6.1 Existing Utilities

There are a number of existing utilities in the trail corridor, as shown in **Figure 2**. Although no major relocations are anticipated, there will be a significant amount of coordination needed, especially with the multiple crossings and work within the BP Petroleum Pipeline Easement and the crossing of the Praxair Oxygen, Nitrogen and Argon Gas Lines. It is anticipated that the controlling agencies of the pipelines will require review during the preliminary stages on this project.

7 National Parks Service/Federal Lands Coordination

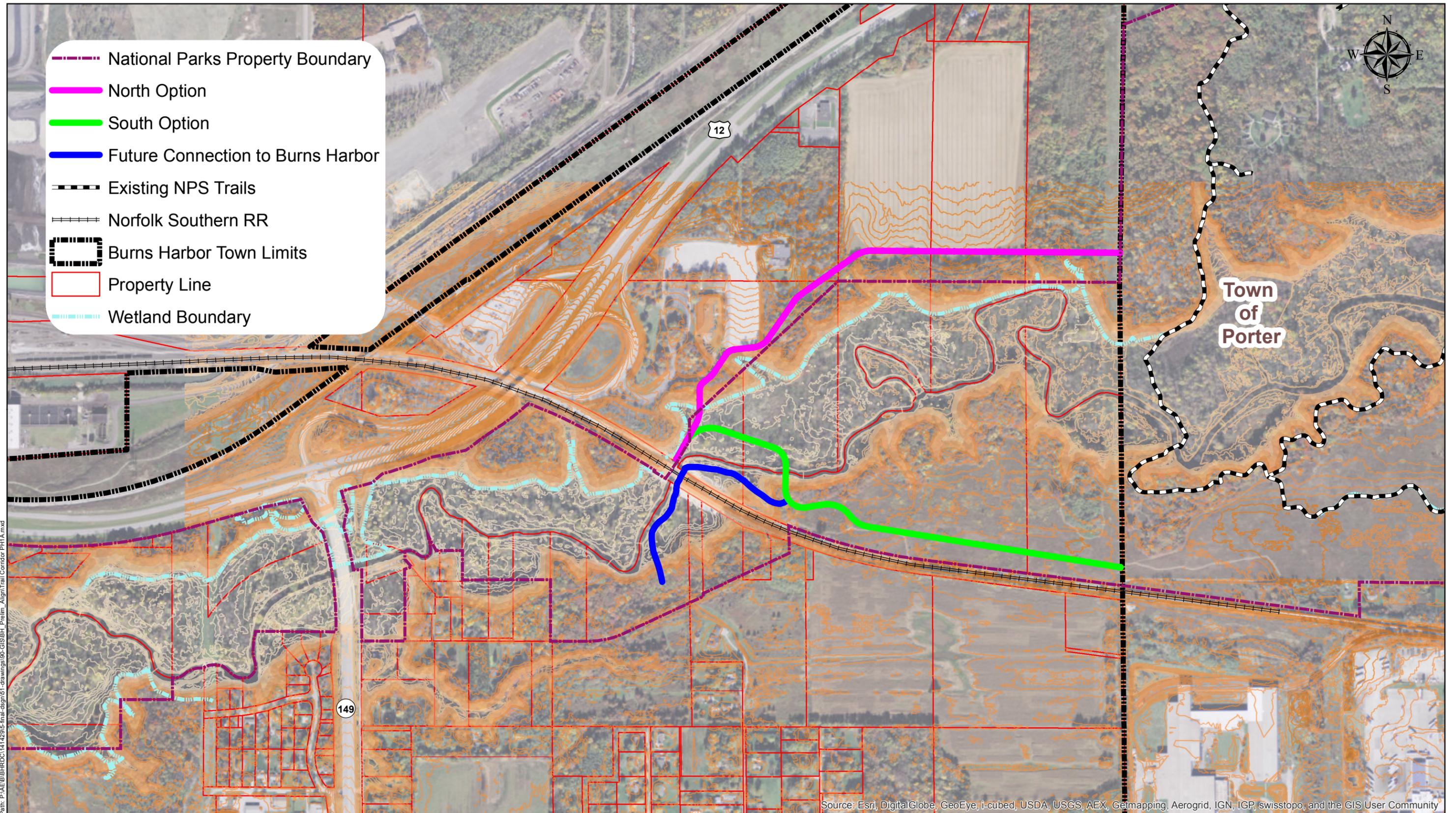
Since a portion of the trail alignment passes through National Park Service (NPS) property, the SEH team has coordinated with the Chief of Facility Management at NPS, early in the process, prior to starting any work. SEH facilitated meetings between NPS, the Town of Burns Harbor, and the other members of the SEH environmental team, ASC Group and Soil Solutions, Inc. to identify potential environmental, design, and construction issues, prior to advancing the project into preliminary engineering design.

7.1 Alignment Discussion

During the early stages of the project, a number of alignment alternatives were considered. The original trail alignment was located entirely within the Indiana Dunes National Lake Shore property. **Figure 3** shows the northern and southern trail alignment alternatives that were evaluated for the trail alignment through the Indiana Dunes National Lakeshore property. Modifications were made to the original trail alignment based on the findings of the wetland delineation and environmental assessment work. The trail alignment was also modified based on the input received in the meetings with NPS, Town of Burns Harbor, and NIRPC.

7.2 Land Use and Agreements

As part of the coordination with the NPS, the Marquette Greenway Trail will be constructed under a Memorandum of Understanding (MOU) between the Town of Burns Harbor and the National Park Service. The NPS has previously worked with other municipalities in the area to allow projects to be constructed and then had taken ownership of the final constructed product. The MOU has yet to be fully developed, but there has been verification that the NPS is in agreement with



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Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



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Figure 3 - Burns Harbor Marquette Greenway Trail Preliminary Trail Alignments

Exhibit

1

7

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the project and will begin working on the MOU following the acceptance of the Environmental Assessment.

8 Norfolk Southern Railroad Coordination

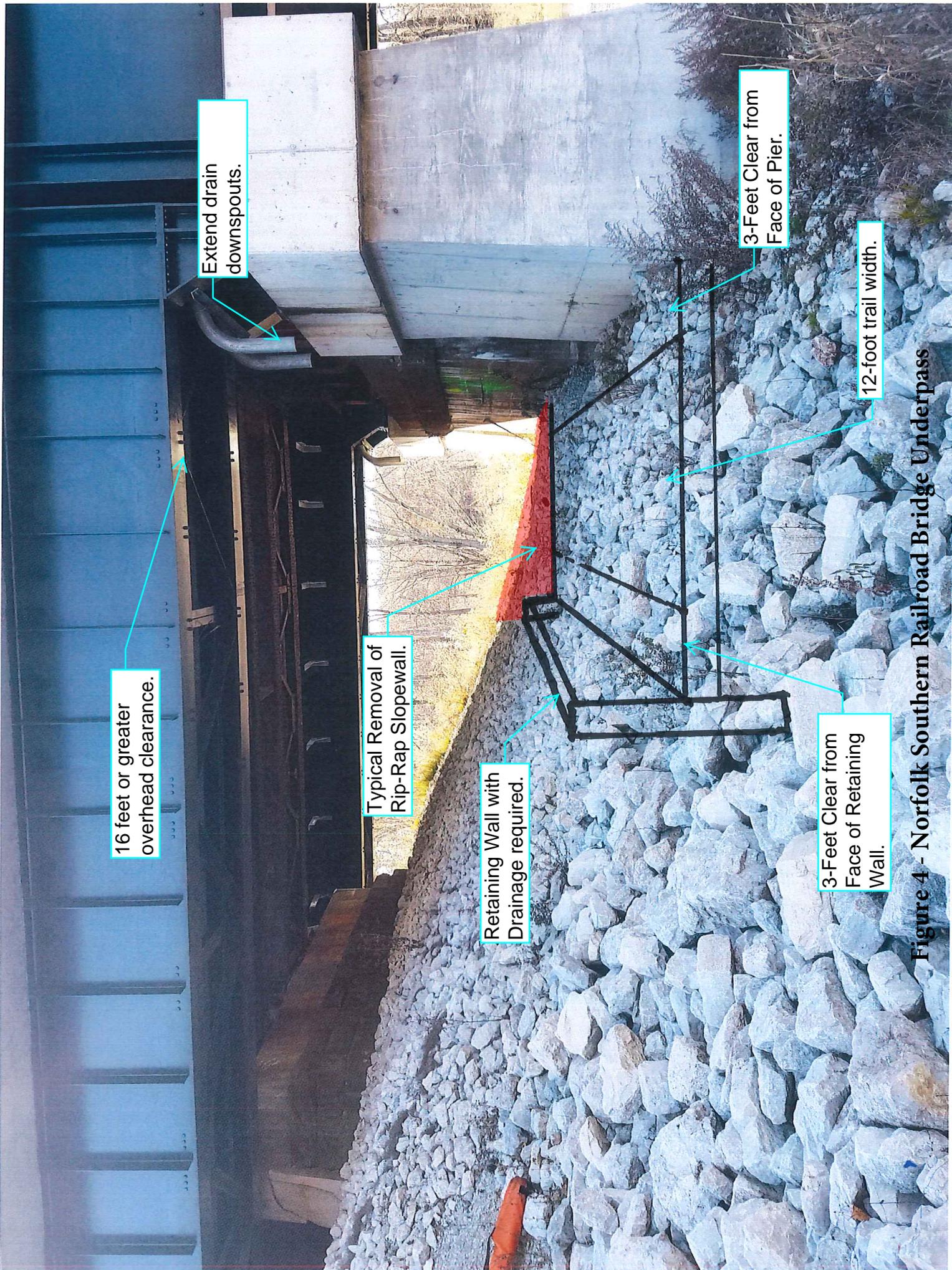
There is a Norfolk Southern railroad corridor, shown in **Figure 4**, which needs to be crossed in order to complete the trail. SEH is coordinating with Norfolk Southern Railroad on all project related issues. There is an existing railway bridge, Norfolk Southern Bridge CD-484.40, which was constructed in 2014. The three span railway bridge is large enough to accommodate a pedestrian crossing adjacent to the East pier. The SEH team will continue to coordinate with Norfolk Southern Railroad to justify utilizing this bridge and in determining the railroad's requirements for the project.

8.1 Previous Communications on Project Area

The National Park Service previously held discussions with Norfolk Southern in 2010, regarding Norfolk Southern's proposed bridge reconstruction over the East Arm of the Little Calumet River within the boundary of the Indiana Dunes National Lakeshore. The NPS raised an objection to Norfolk Southern's initial proposal because of a proposed center pier within the channel of the Little Calumet River, which would impact paddling and the increased probability of upstream flooding due to debris collecting on the center pier. NPS presented to Norfolk Southern's project representatives that there were plans for a future bike trail that would likely utilize this bridge as a means of grade separated railway crossing.

9 INDOT SR 149 Coordination

In order to traverse the Town of Burns Harbor, a safe pedestrian crossing of SR 149 will need to be established. **Figure 5** shows the location where the trail alignment will cross SR 149. SR 149 is owned and maintained by INDOT. This highway is four-laned, with areas of an added turn lane, which adds up to approximately 85 feet of pavement to cross. The Town had recently made a request to reduce the speed limit from 55 MPH to 45 MPH. SR 149 has an Average Annual Daily Traffic (AADT) between 5,500 and 6,500 vehicles per day (vpd). Preliminary coordination was held with INDOT, with no major red flags, but further coordination will be needed prior to final design of any work within INDOT's Right of Way.



16 feet or greater overhead clearance.

Extend drain downspouts.

Typical Removal of Rip-Rap Slopewall.

Retaining Wall with Drainage required.

3-Foot Clear from Face of Pier.

12-foot trail width.

3-Foot Clear from Face of Retaining Wall.

Figure 4 - Norfolk Southern Railroad Bridge Underpass



Figure 5 – SR 149 Crossing

9.1 Crossing Design Considerations

Per INDOT Design Memorandum No. 18-04, a roadway crossing of a roadway will need to follow the Indiana Design Manual. With SR 149 being a 4 lane roadway without a raised median and a speed limit of 45 MPH, with less than 12,000 average daily vehicles, there are two categories of criteria that can be considered. The crossing of SR 149 will need a combination of a Level 2 criteria and either a Level 3 or Level 4 criteria or just one of the Level 5 criteria. The Level 2, Level 3, Level 4 and Level 5 elements are listed below.

Level 1 Basic Crosswalk Treatment

- 1) Standard crosswalk (two transverse lines)

Level 2 Enhanced Crosswalk Treatment

- 1) Longitudinal crosswalk markings (“Piano Key” or “Continental” pattern)
- 2) Raised midblock crosswalk (crossing elevated to match top of curb across entire width and length of crosswalk, formed with concrete or HMA, a plan detail is required.)
- 3) For local projects, other high visibility crosswalk marking patterns such as diagonal crosswalk markings (“Zebra” pattern) may be used or textured pavement crosswalks with white retroreflective markings.

Level 3 Refuge Islands and Bulbouts

- 1) Median refuge islands
- 2) Split pedestrian crossover (SPXO – median refuge island with longitudinal offset between crosswalks)
- 3) Intersections bulbouts*
- 4) Midblock bulbouts*

*A bulbout is an extension of the sidewalk/curb area at a pedestrian or shared use path crossing and is designed to reduce the crossing length. A plan detail is required.

Level 4 Flashing Beacons and Flashing LED Signs

- 1) Ground-mounted flashing beacons
- 2) Overhead signs and flashing beacons
- 3) Pedestrian-activated flashing LED signs

Level 5 Traffic Signals and Grade Separation

- 1) Pedestrian hybrid beacon (“HAWK Signal”)
- 2) Pedestrian-actuated traffic signal
- 3) Grade-separated crossing

9.2 Proposed Crossing

With the potential for a highly used trail and the presence of semi-truck traffic on SR149, the safest and most logical crossing would be one of the Level 5 options mentioned above. The initial trail alignment was intended to utilize one of the additional bridge spans of SR 149 over the Little Calumet River to create a grade separated crossing. With the proposed re-alignment of the trail corridor, there will need to be a crossing of SR 149 at an alternate location. The intersection of Navajo Trail and SR 149 has been identified as a logical crossing point. It would be recommended that the Town pursue a Pedestrian Hybrid Beacon signal system for the at-grade crossing of SR 149, as shown in **Figure 6**.



Figure 6 - Example of Pedestrian Hybrid Beacon Signal

9.3 Other Potential Options for SR 149

Discussions with the Town have led to the possibility of a pedestrian bridge crossing structure of SR149 to create the highest level of pedestrian safety. With a crossing length of approximately 150 feet of the roadway, plus 50 to 100 feet of approach on each end, this bridge would likely be an expensive structure. With the existing grades at the potential crossing locations, the launch points are approximately 8-10 feet above the roadway, which allows for less approach and height change for any bridge crossing. The cost to construct a basic, pre-fabricated structure will likely be between \$600,000 and \$1,000,000. The construction cost for a custom bridge with aesthetic features will be between \$3 million to \$5 million. **Figures 7 and 8** below show examples of pre-fabricated and custom designed pedestrian bridge structures. The pre-fabricated bridge in **Figure 7** was used for Porter Brickyard Trail. The custom designed pedestrian bridge structure, shown in **Figure 8** was used in Wolf Lake Park in Hammond. Additionally, as the Town plans the development of the Town Center Development Area, direct access of the site off of SR 149 will likely be desired. A crossing of SR 149 with an at-grade crossing, either signalized or with a Pedestrian Hybrid Beacon signal and a refuge island, would be a desirable crossing.



Figure 7 - Example of Prefabricated Pedestrian Bridge – Porter Brickyard Trail



Figure 8 - Example of Custom Pedestrian Bridge – Wolf Lake Park, Hammond, IN

10 Discussion of Alternatives / Identification of Proposal

Through the initial stages of the Burns Harbor Marquette Greenway Trail, a number of alternatives have been identified and evaluated as the desired route. The trail was broken into two main phases, Phase 1 and Phase 2, for the purpose of this report, construction phasing, and further funding opportunities.

10.1 No Action Alternative

Under the current conditions of the Marquette Greenway Corridor, a pedestrian route does not exist through Burns Harbor. The no action alternative would continue to prohibit safe and accessible pedestrian and other non-motorized traffic through the Town of Burns Harbor.

10.2 Original Scoped Northern Alignment

During the initial funding application phase, the alignment shown in **Figure 9** was developed. This original trail alignment was broken into phases 1, 2, and 3. The alignment for Phase 1 of the trail began by crossing under the SR149 bridge, traversed along the East Arm of the Little Calumet River to the Norfolk Southern Railroad Bridge over the River, where the Trail would cross the river from West to East and again South to North, utilizing a boardwalk section. From the end of the boardwalk, the Trail followed the North boundary line of the Indiana Dunes National Lakeshore property to the Burns Harbor Corporate Boundary, near the NIPSCO high tension powerline easement.

10.3 Southern Alignment

After SEH began collecting base data for the Marquette Greenway Trail, it was determined that the original scoped alignment needed to be revised due to property concerns and field conditions of the proposed alignment. The Town of Burns Harbor originally planned to utilize the National Park owned property to eliminate the need for property acquisition during the project. The initial field visit found that the furthest north bend of the East Arm of the Little Calumet River does not allow enough space to run the trail entirely on National Park Service (NPS) property. Additionally, the existing terrain on the Northern NPS boundary are excessive and would require a significant amount of grade stabilization in order to construct the trail. Out of all the northern and southern trail alignment options (shown in **Figure 3**) through the NPS property that were considered, it was determined that the Southern Alignment was cost effective and relatively easier to construct.

The Southern Alignment begins at the same location as the original trail alignment, by crossing SR149 under the bridge and traversing along the East Arm of the Little Calumet River. As the alignment approaches the river, a pedestrian bridge would be utilized to cross the river from east to west on the south side of the Norfolk Southern Railroad Tracks. The trail would then utilize the railroad bridge as a grade separated crossing, before running up the slope on the north side of the railroad tracks and proceeding through the National Parks Service property (Mnoke Prairie), terminating near the apparent intersection of West



Figure 9 – Overall Trail – Preferred Alignment

Beam Street and Babcock Road, in the NIPSCO High Tension Power Line Easement. **Figure 10** through **Figure 13** show different versions of the Southern Alignment that were evaluated with respect to magnitude of cost and ease of construction. These versions included crossing options such as pedestrian bridges, underpass, railroad culverts and at-grade crossings. This evaluation coupled with the availability of funding led to the development of the Modified Southern Alignment which became the preferred trail alignment. This preferred alignment is discussed in the section below.

10.4 Modified Southern Alignment/Phased Construction Approach

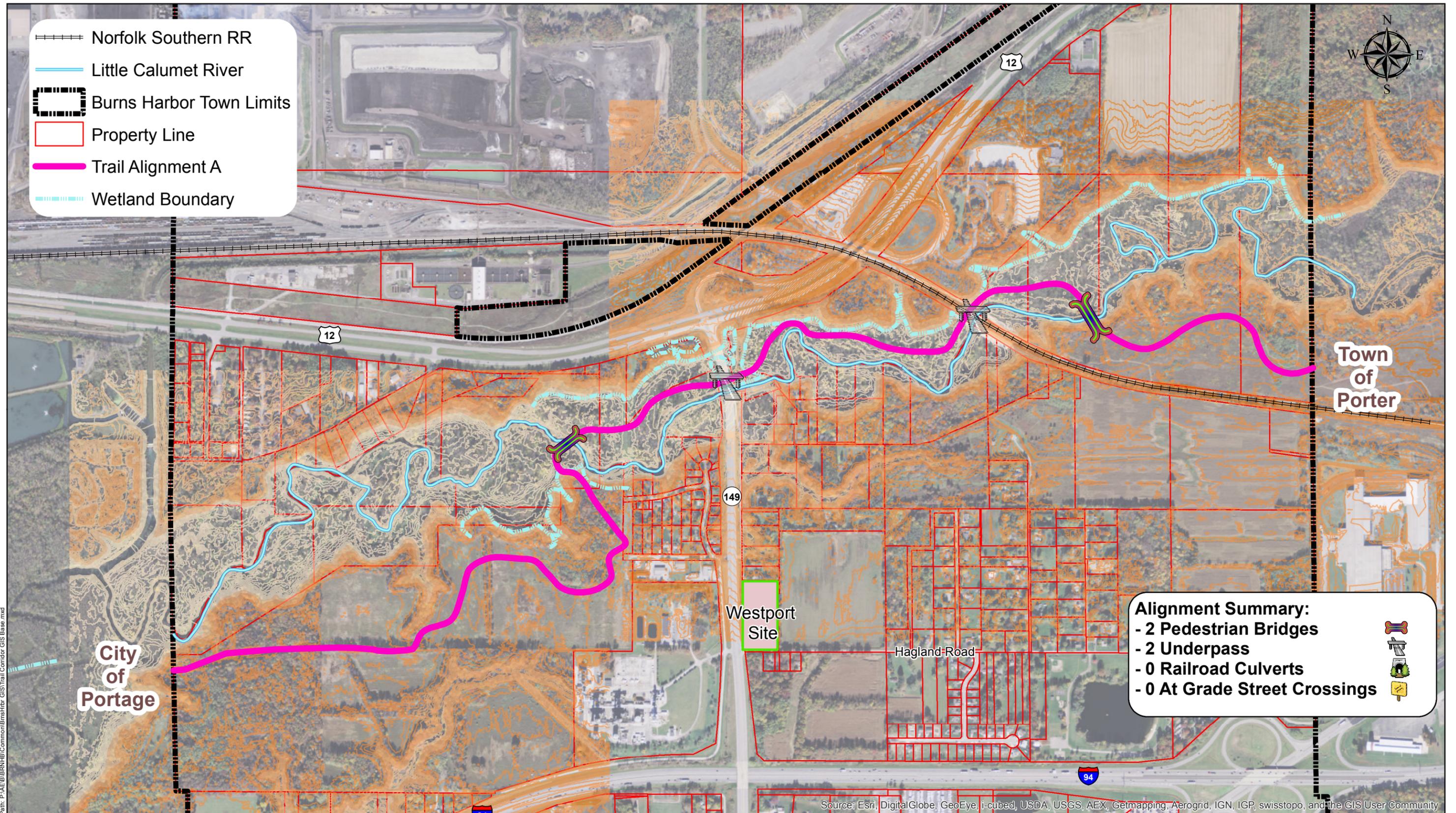
The Town identified that the ultimate goal of the trail is to be beneficial to the trail users as a recreational enhancement of quality of life, the National Parks Service, and to the Town as an economic development tool. Based on available funding from INDOT and other potential grant funding, the Town chose the phased construction approach for the preferred alignment. The Town would like for the trail to be incorporated into the proposed Town Center Development which was accomplished with this phased construction approach. **Figure 14** shows the preferred alignment developed for the phased construction of the Marquette Greenway Trail.

10.5 Phase 1A – Preferred Alignment to Town of Porter

A detailed walk through was performed for the original scoped alignment to identify the features along the corridor, determine the logical termini, and evaluate the feasibility of construction in a phased manner and its cost effectiveness. This evaluation resulted in the development of Phase 1A alignment as the most logical and cost effective route. Phase 1A begins on the East end of the Town, near the intersection of Babcock Road and Beam Street. This is in the National Parks Service boundary, in the area of Mnoke Prairie, which is bisected by the NIPSCO overhead electric lines, just north of the Norfolk Southern Railroad. From this start point, the trail will head West through the Mnoke Prairie toward the floodway of the East Arm of the Little Calumet River. As the trail approaches the River, there will be a grade change, likely to be built into the side of the ravine to the floodplain area. While in the floodplain, the trail will follow the river toward the Norfolk Southern Railway Trestle, which will likely be used as the grade separated crossing of the railway. On the south side of the rail corridor, there is a steeper grade change than the north side. The segment of trail from the railroad trestle to the top of the hill will be built into the hill, with a path of least resistance for construction. Once the trail reaches the top of the hill, the remainder of Phase 1A is dependent on which logical termini is chosen. Phase 1A of the Marquette Greenway Trail will be funded through INDOT (Des. No. 1601147).

10.5.1 Possible Logical Termini

Two logical termini were identified for Phase 1A of the trail. These termini, Stanley Street alternative (Option 2C) and Meadowbrook Road alternative (Option 2A), shown in **Figure 15**, were evaluated and discussed at a Public Input meeting to



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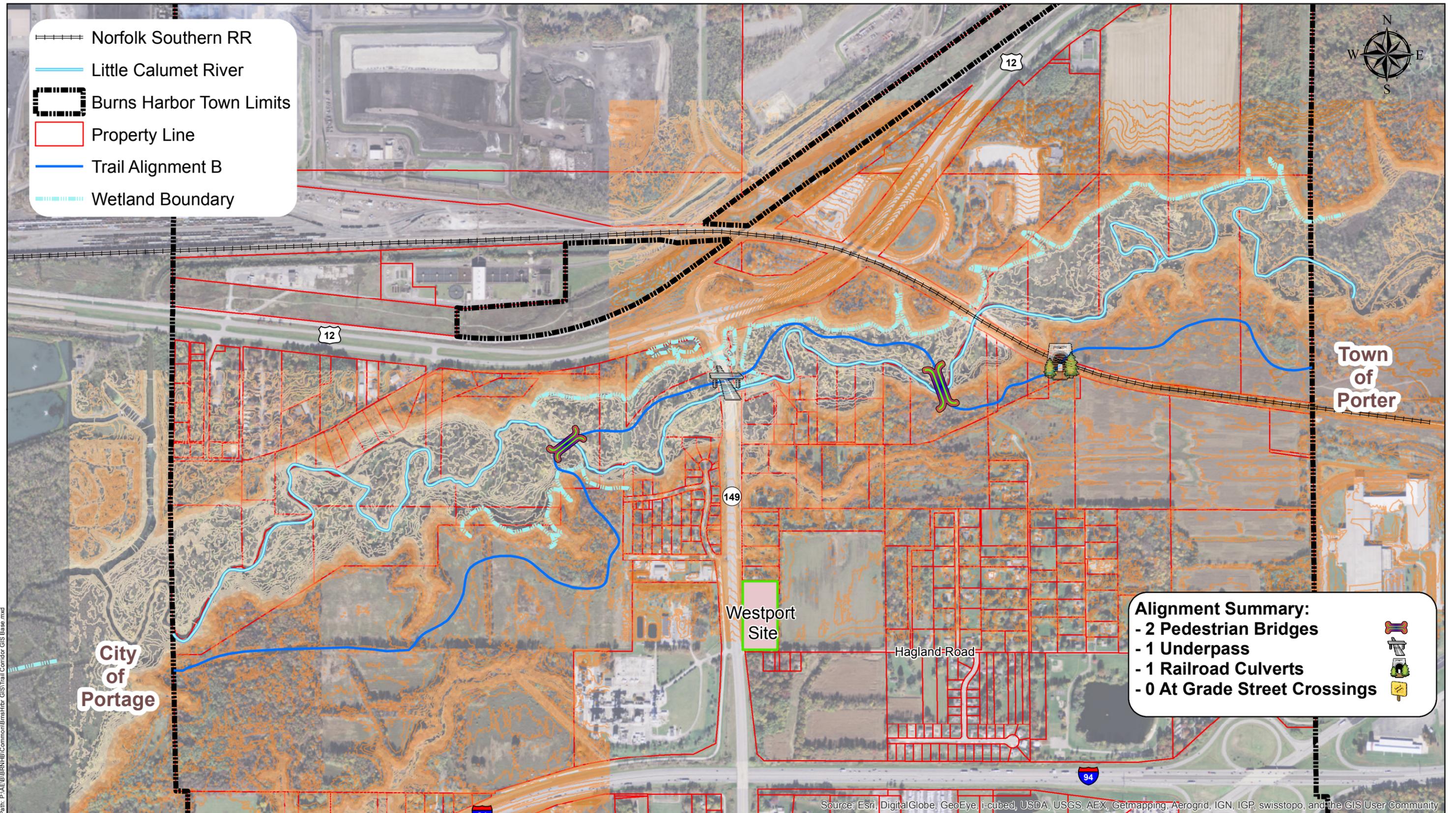


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Figure 10 - Burns Harbor Marquette Greenway Trail Preliminary Trail Alignments

Figure A



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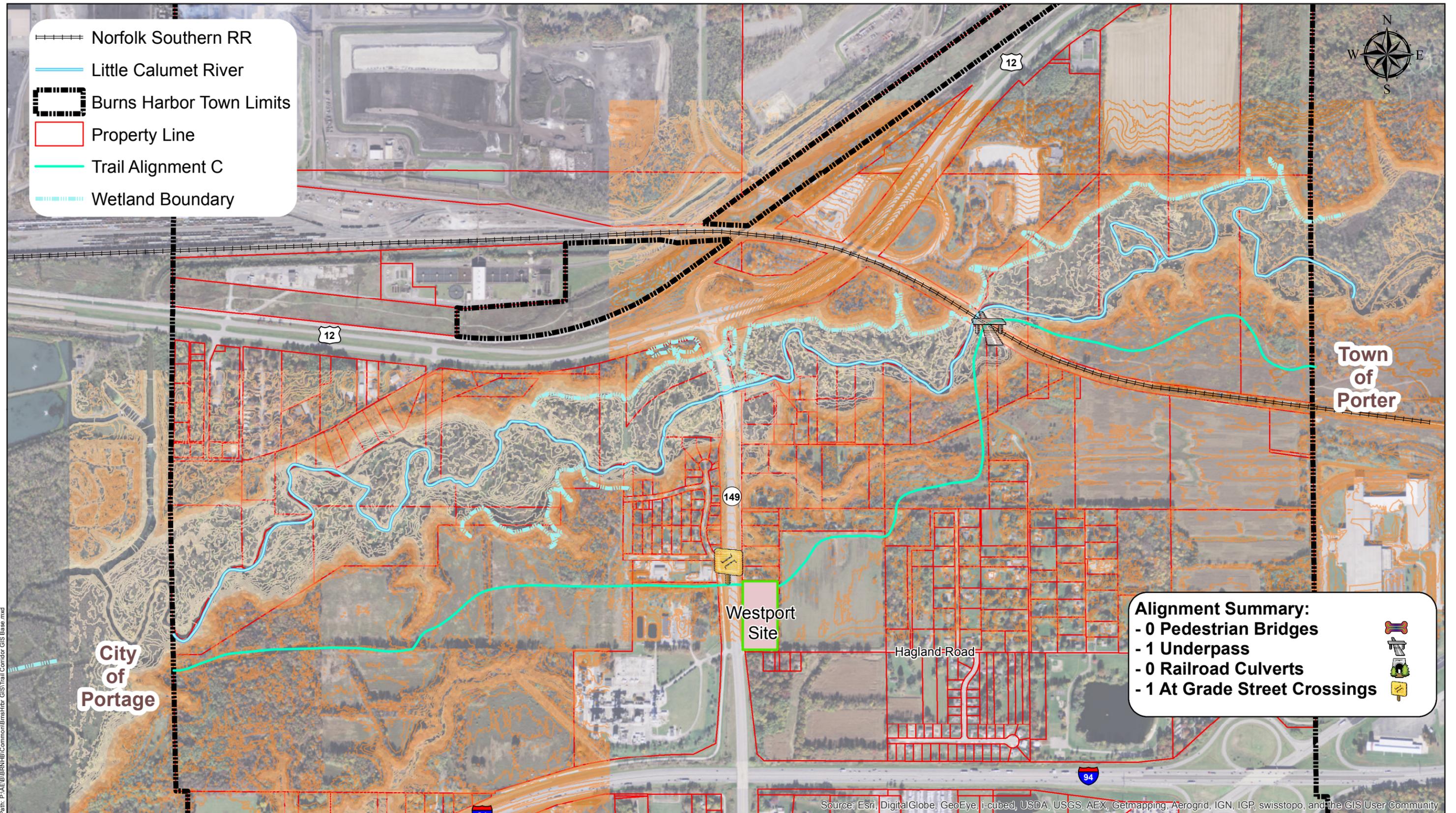
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Figure 11 - Burns Harbor Marquette Greenway Trail Preliminary Trail Alignments

Figure B

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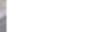


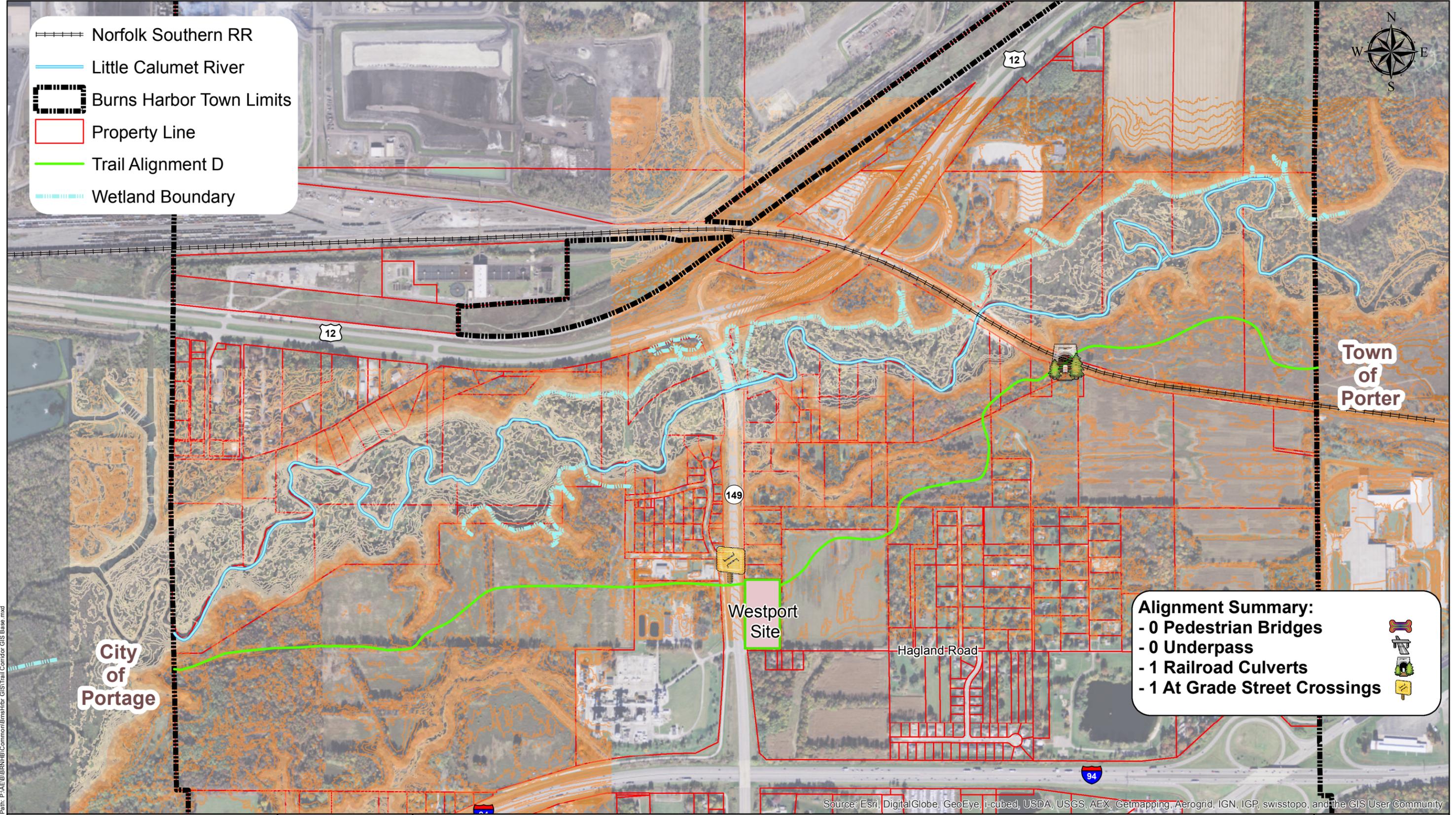
9200 CALUMET AVENUE, SUITE N300
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Project: BHRDC 141429
 Print Date: 5/25/2017

Figure 12 - Burns Harbor Marquette Greenway Trail Preliminary Trail Alignments

Figure C

-  Norfolk Southern RR
-  Little Calumet River
-  Burns Harbor Town Limits
-  Property Line
-  Trail Alignment D
-  Wetland Boundary



- Alignment Summary:**
- 0 Pedestrian Bridges 
 - 0 Underpass 
 - 1 Railroad Culverts 
 - 1 At Grade Street Crossings 

Path: P:\AEB\BRR\BCommon\BrrsHbr_GIS\Trail_Corridor_GIS_Base.mxd

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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**Figure 13 - Burns Harbor Marquette Greenway Trail
Preliminary Trail Alignments**

**Figure
D**

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

discuss the options for the trail project in preparation of a Grant Application for Phase 2 section of the trail.

10.5.1.1 Stanley Street Alternative

The Stanley Street alternative was a route that was initially identified by a resident at the Public Input meeting. The Stanley Street option (2C in **Figure 15**) heads directly south after the trail reaches the top of the hill after ascending from the river. The trail heads south through a privately owned property, which has the same owner as the Meadowbrook Road option, to the BP Pipeline easement. The trail then would head west in the pipeline easement to Stanley Street, where Phase 2 of the trail will begin.

10.5.1.2 Meadowbrook Road Alternative

Meadowbrook Road was the initial logical termini for Phase 1A, due to its proximity to the trail. Meadowbrook Road also provided an immediate access point to the trail, which could be used to access the trail corridor during construction and to allow trail users to access the trail until the remainder of the trail is constructed. Meadowbrook Road alternative had two options for meeting up to Phase 2: Option 2A (shown in **Figure 15**) was to head directly south from the eastern terminus of Meadowbrook Road, through privately owned property to a 3.5 acre parcel that the Town has acquired. Option 2B (shown in **Figure 15**) was to utilize and improve Meadowbrook Road and Westport Roads to accommodate a trail section to Navajo Trail. Both of these route options presented unique challenges and ultimately the Town determined that Stanley Street was the best alternative for the trail.

10.5.2 Phase 2 – Town Center Connector

Phase 2 of the Marquette Trail will be funded through the Indiana DNR's Recreational Trails Program Grant (Des. No. 1801757). Phase 2 of the trail, as shown in **Figure 16**, will begin in at the end of the right of way of Stanley Street, where it meets the BP Pipeline easement. The Trail will head west, through the pipeline easement to the unnamed roadway right of way, on the north end of Stanley Subdivision, where the trail will enter a property acquired by the Town in July 2018. Approximately two-thirds of this property is comprised of wetlands, per the Wetland Delineation Study completed for the project. Therefore, the trail will head west in the southern third of the property, before entering the 28-acre parcel, that is being purchased by the Town on contract from the Duneland School Corporation. This 28-acre parcel, along with the former Westport Community Center Property, are being referred to as the 32-acre Burns Harbor Town Center Development Area. Phase 2 of the trail will be the link of the Marquette Greenway Trail to the Town's proposed development. Phase 2 will end near the former Westport Community Center site at Westport Road. With the proposed development, where the trail approaches Westport Road, this is a logical location for a trailhead with parking and potentially other amenities, such as drinking fountains and restrooms.

10.5.3 Phase 3 – SR 149 Crossing to ArcelorMittal Property

Phase 3 section of the trail, shown in **Figure 14**, includes the crossing of SR 149 with the trail. The options for the trail crossing of SR 149 are described in section 9 of this report. Phase 3 will begin at the proposed trailhead where the trail meets Westport Road. From this point, the trail will head north to Navajo Trail, where the proposed Pedestrian Hybrid Beacon signal will be located to allow for safe pedestrian crossing of SR149. As the trail crosses SR149, the trail will continue west on the south side of Navajo Trail, on the north side of the Town’s existing municipal complex, where the trail will continue through the Praxair Pipeline easement and into Phase 4 of the project.

10.5.3.1 Possible Alternate Phase 3 Route

There are two different options that have been considered for the crossing of SR 149 – at-grade crossing at new entrance road to Town Center Development Area and a pedestrian bridge crossing of SR 149. Both of the options follow the same general route, heading south along Westport Road to the crossing location. These crossings are preferential methods/locations, but also have a significant cost associated with the associated improvements. **Figure 17** shows the potential crossing locations for crossing SR 149.

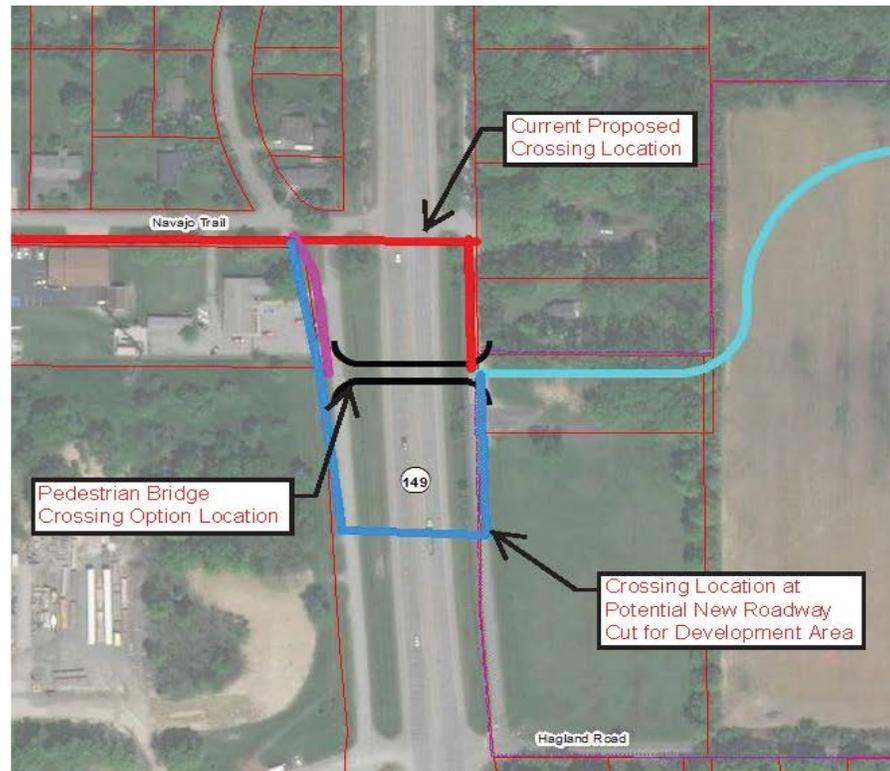


Figure 17 - Potential Crossing Locations

10.5.4 Phase 4 – ArcelorMittal Property to City of Portage

Phase 4 section of the Marquette Greenway Trail, shown in **Figure 14**, is the longest, but easiest to construct, section of the trail. This phase begins just west of the Praxair Pipeline easement, along Navajo Trail extended. The property where Phase 4 is planned is owned by ArcelorMittal Tow Path Valley Basin, but is currently listed for sale. The north property line of this property is the National Parks Service Boundary. When setting the proposed alignment of the trail, the tree line and ridgeline of the Little Calumet River was followed, to limit the amount of developable property needed to construct the trail. Where possible, wetlands were avoided in order to minimize impacts. As the trail moves west, there is a forested ravine, approximately halfway through the parcel, where the trail dips south, to avoid additional costs associated with crossing the ravine, before heading back north, along the NPS boundary. The ArcelorMittal property also has the BP Pipeline easement running through, east/west. There would be a proposed crossing of the easement near the Burns Harbor/Portage corporate boundary. The end point of the trail was chosen to accommodate multiple options heading into the City of Portage and connecting with Portage’s next phase of the Marquette Greenway Trail. SEH has identified two alternate routes, as shown in **Figure 18**, for the City of Portage and their section of the Trail as part of a design contract for Portage’s currently funded section of the Marquette Trail, through the Ameriplex Business Park.

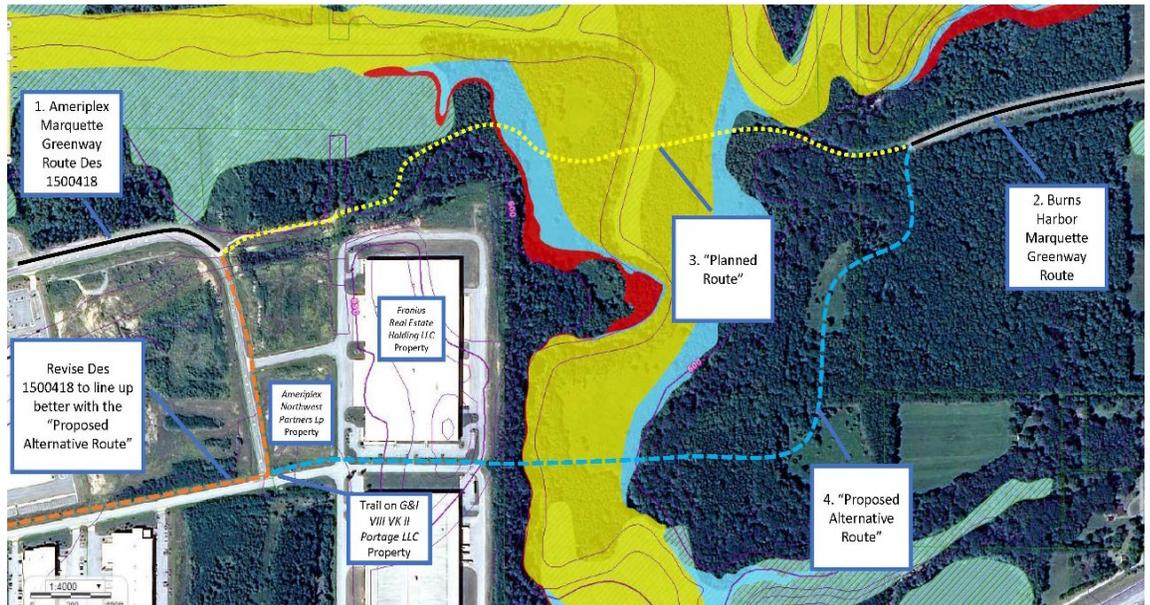


Figure 18 - Possible Routes to City of Portage

10.5.5 Future Phase – National Parks Bypass Route

The Future Phase of the Marquette Greenway Trail, shown in **Figure 14**, was evaluated and included into this report for the benefit of potential future funding and the potential desire of the National Parks Service to improve a trail in the corridor. This Phase, being referred to as the National Parks Bypass Route, was

the initial route that was planned, utilizing the National Parks Property to construct the trail. As the preliminary findings were discovered and the field check was done, it was determined that constructing a fully ADA accessible route along this corridor was going to be difficult and very costly, due to the steep embankments, construction within the floodway, potential boardwalk and two crossings of the East Arm of the Little Calumet River. A number of discussions were had on this segment of trail, which determined that the segment would be included in the Environmental Assessment and this report, so that limited rework would need to be done. With a redundant route that is fully ADA accessible planned with Phases 1 through 4, there are additional options, such as stairs, aggregate paths, and a smaller cross section that would be evaluated for the Future Phase of the Trail. The future phase would begin near the south side of the Norfolk Southern Railroad Tracks, heading south and east, likely on boardwalk to the first pedestrian bridge crossing of the Little Calumet River. After crossing the river, the trail would meander through the floodway of the River and cross SR149 under the existing highway bridge, where the trail would continue toward the East Arm of the Little Calumet River, West of the Praxair/Linde Dam. This would be the second pedestrian bridge, crossing the river and heading up the ravine on the South side, entering the ArcelorMittal Property.

11 Trail Design Elements

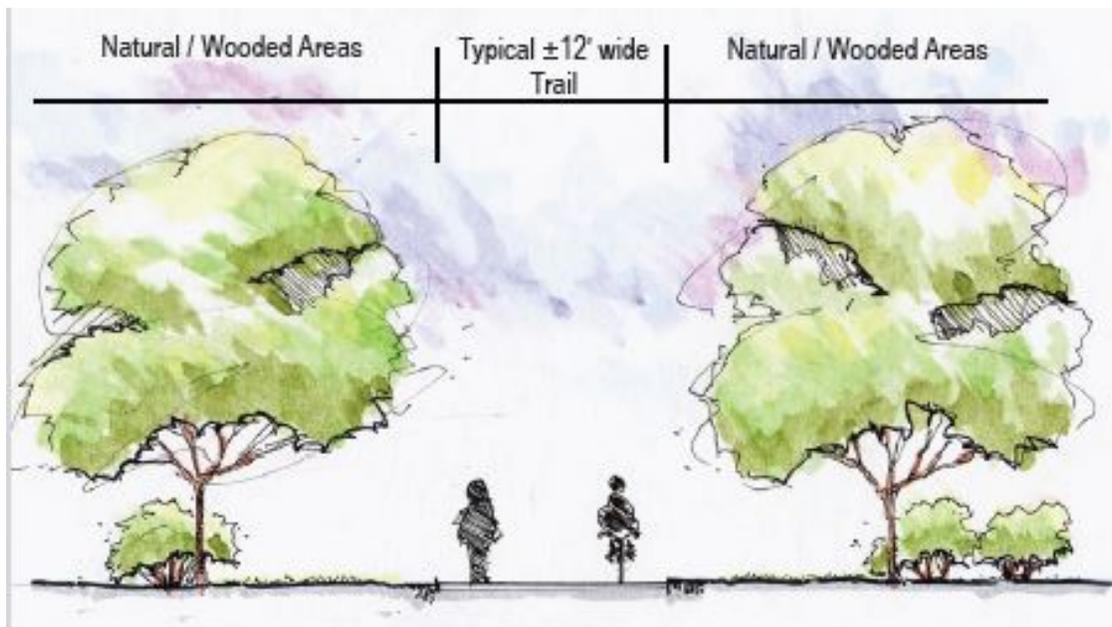
The design elements of the trail are based on the recommendations and guidelines set forth by the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities. This guide has been used as the design guideline for previous trails that have been designed and constructed by SEH. The 2009 Burns Harbor Marquette Greenway Sub-Area Plan included a number of design components, which will be incorporated into the final design of the trail. The renderings shown in **Figure 19**, give an overview of the aesthetics of what the proposed trail is intended to include.



Figure 19 - Renderings of Proposed Trail Corridor

11.1 Typical Cross Section

Per AASHTO guidelines, the minimum paved trail width for shared-use paths is 10 feet, but 10 to 14 feet is the recommended width, with wider section desired on higher volume trails. With Marquette Greenway Trail being a high priority trail, which projects to have significant traffic, sections that have been constructed are typically 12 feet of pavement, 10 feet of asphalt paving, with a 1 foot ribbon curb on either side. These constructed trail segments have been in developed areas, which have led to some of the segments being constructed with a 12 foot concrete section. **Figures 20** and **21** illustrate typical cross sections for the Trail, taken from the 2009 Burns Harbor Marquette Greenway Sub-Area Plan



Figures 20 - Typical 12 foot Trail Section in Natural or Wooded Areas

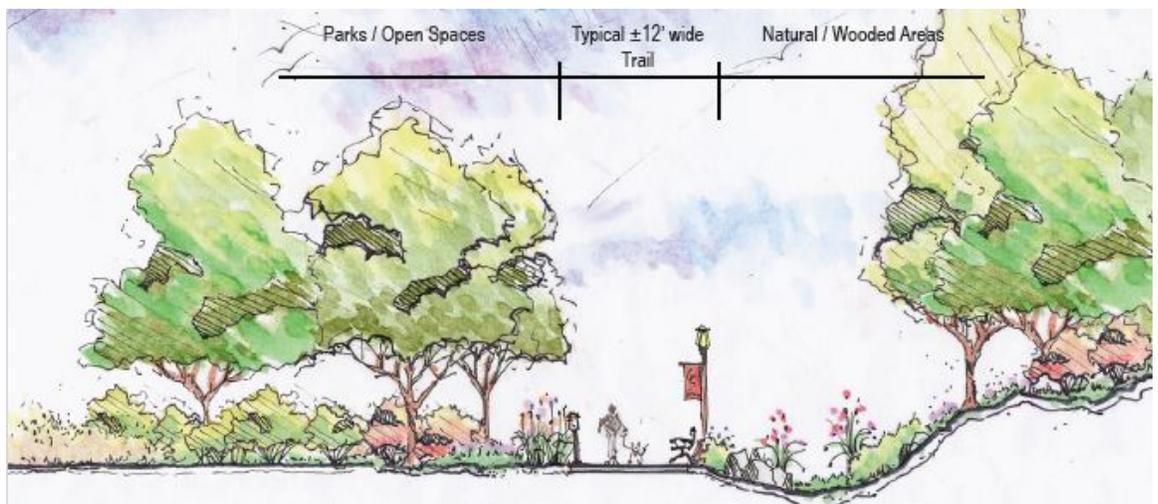


Figure 21 - Typical 12 foot Trail Section in Parks or Open Space

For the Burns Harbor corridor, most of the trail is in a rural or forested section, where concrete can be difficult to deliver. The proposed section of trail for the corridor would be 12 feet of asphalt trail. The trail would also have a 5 foot shoulder, with a maximum grade of 1:6 slope on each side to allow for a recovery area. This cross section is appropriate for a majority of the trail corridor. Minor changes may be necessary based on particular situations, which will be addressed at the time of final design documents. It is estimated that a 12 foot asphalt trail section with earthen shoulders on each side would cost \$65-85 per linear foot, depending on the underlying soils.

11.2 Steep Grade/Side Hill Traversing Trail

The trail on a side hill slope can be served with a retaining wall on the up-hill or down-hill side of the wall. This wall would typically be mechanically stabilized earth (MSE) or modular block wall. If the wall were placed on the down-hill side, there would be less disruption to the site and less costly to build, but will likely require a guard railing due to the drop height greater than 30 inches adjacent to the walk. If the wall were placed on the up-hill side, the guard railing would likely not be required, but the excavation to construct the wall and geogrid tieback reinforcement would be much more extensive and disruptive to existing slope vegetation. The geogrid reinforced MSE or modular block walls would cost approximately \$60 per square foot of wall face from a point 2 feet below grade, to the top of the wall. A pedestrian railing and wall cap would be needed at a cost of \$100 to \$150 per linear foot for galvanized steel with 4" max openings. **Figure 22** below shows an example of the modular block wall.



Figure 22 - Modular Block Retaining Wall Trail Section

Another option is a reinforced concrete walk, as shown in **Figure 23**, with a short down-hill integral lug and a low retaining wall on the up-hill side. With a drop of less than 30 inches on the down-hill side, no guard railing is needed but a simple roll off curb for wheel chairs and strollers is recommended. The steepness of the slope is limited to no more than 5 feet over the width of the walk. This system with integral lug, low wall and roll off curb is estimated to cost \$25/SF of walkway surface area. Cost for the wall or reinforce walk do not include site grading, excavation or backfill nor slope restoration and erosion control.



Figure 23 - Example of reinforced concrete walk option

11.3 Boardwalk

A treated timber boardwalk is the most common, economical and versatile type for marsh and small waterway crossings. A 12 foot clear span boardwalk provides easy access for a mixed use trail, and allows for a loading of up to 20,000-lb maintenance vehicles to access the trail corridor. This boardwalk can be supported on helical (screw into ground) or driven pile. With the nature of the areas adjacent to the boardwalk, helical pile would be the preferred foundation, since they can be installed with skid steer or small backhoe equipment with a

hydraulic torque drive head attachment, equipment which is more easily accessible to the area adjacent to the River.



Figure 24 - Timber Boardwalk Trail Section – Edina, MN



Figure 25 - Typical Timber Boardwalk Support Structure on Helical Piles - Edina, MN

Figures 24 and 25 show examples of timber boardwalk structures designed for trails. The timber boardwalk structures have a 50 year service life. The deck has high UV and abrasion exposure and treated timber plank decking typically has a lifespan of 20 years. Composite decking can also be used and may have a longer

life, but cannot carry the maintenance vehicles. The construction cost for treated timber boardwalk on helical pile is estimated to be \$900 per linear foot (\$75 per square foot for 12 foot clear width)



Figure 26 - Precast Concrete Boardwalk on Driven Piles, Wolf Lake, Hammond, Indiana

A precast concrete plank span on driven pile boardwalk offers a greater service life than standard timber boardwalk, but at higher cost. The construction of the concrete boardwalk also allows for less versatility with regards to field changes during construction, and requires larger equipment to install the pile foundations and boardwalk beams and planks. With the boardwalk being constructed adjacent to the East Arm of the Little Calumet River, providing access to the required equipment will also increase the cost to construct. **Figure 26** shows an example of the precast concrete boardwalk on driven piles. The construction cost for the concrete boardwalk is estimated to be \$1500-1800 per linear foot (\$125-150 per square foot for 12 foot clear width).

11.4 Pedestrian Bridges – River Crossings

A trail bridge typically 12 feet wide will also a 20,000-lb maintenance vehicle. Single spans between 50 and 200 feet are most commonly prefabricated weathering steel trusses with timber decks. Concrete decks can also be used, at additional cost. The abutments in these span lengths are typically concrete on helical or driven pile. Many truss shapes are available such as simple parallel chords (top and bottom primary longitudinal members), curved or bowstring top chords or through trusses with top chords and lateral bracing above the trail user, primarily for longer span bridges. The construction cost for a prefabricated

weathering steel parallel chord truss with treated timber deck and concrete abutments on helical or driven pile is estimated to have a construction cost of \$250/SF. An example of this prefabricated weathering steel truss on concrete abutments is shown in **Figure 27**. This bowstring truss bridge is 220 feet long with overlooks mid-span and has a concrete deck.



Figure 27 - 220' Prefabricated Steel Truss Bridge with Overlook – Dakota County, MN

11.5 Trailheads and Nodes

Any trailheads or trail nodes will include a variety of aesthetic features, including decorative concrete, decorative scoring patterns, and native landscaping, site furnishings, wayfinding and other features. Wayfinding for the trail would be consistent with the larger Marquette Greenway Trail. These nodes and trailheads would be located generally between phases of the trail or where other trail decision points may be in the future. **Figures 28** and **29** show examples of what potential trail nodes may look like along the trail.



Figure 28 - Roadside Trail Node – Dunes Kankakee Trail - Porter, Indiana



Figure 29 - Decision Point Node on Calumet Trail at Dunes Kankakee Trail Porter, Indiana

12 Cost Estimate

The engineer's estimate of probable construction cost for the proposed trail alignment segments are summarized in the table below. The full construction cost estimate breakdowns can be found in **Appendix A**.

Table 1 – Trail Segment Construction Cost Estimate Breakdown

Trail Segment	Estimated Construction Cost
Phase 1A	\$2,001,090
Phase 2	\$413,725
Phase 3	\$502,450
Phase 4	\$788,125
Future Phase	\$3,789,500
Total Trail Cost – Initial Route	\$3,705,390

It may be noted that these costs do not necessarily include other amenities, such as trail heads, parking lots, or other aesthetic improvements for the trail. Some costs may be covered by the 30% contingency that is included in the cost of each segment. The costs for these features could range from \$50,000 to \$250,000 depending on the types of items the Town would choose, budget dependent. Additional costs that may arise during the final stages of the project include wetland mitigation costs, additional right of way requirements or railroad work fees. The 30% contingency that was included in the cost was intended to absorb as many of these additional costs as possible.

13 Environmental Issues

Because of the nature of the Marquette Greenway Trail corridor, there are a number of environmental issues in the corridor. These environmental issues are discussed in the sections below. A number of permits are also anticipated for the project.

13.1 Indiana Dunes National Lakeshore – Environmental Assessment

The nature of the work, specifically the development of a new trail within the boundaries of the National Parks Service (NPS), triggered an Environmental Assessment Level of the NEPA document. SEH has hired ASC Group to complete all required field investigations, research and reporting, by the guidance of the NPS NEPA Handbook and the FHWA NEPA Handbook. For the purposes of the environmental document, National Parks Service and Federal Highway Administration are acting as Joint Leads on the project. The completed Environmental Documents will be used to supplement this report.

13.2 East Arm of the Little Calumet River

13.2.1 Permitting

The proposed trail will be designed to be serviceable for up to the 100-year flood level of the East Arm Little Calumet River. In order to provide a trail that is at or above this flood level, some portions of the trail will be constructed using fill, boardwalk and bridges in low areas. This construction will likely require permitting requirements as discussed in the following sections of this report.

13.2.2 Construction in the Floodway

The effective FEMA Flood Insurance Rate Maps for Porter County (Panel No. 18127C0126D & 18127C0107D) have been reviewed and compared to the proposed trail alignments to identify portions of the trail which are within the 100-yr Floodplain and Regulatory Floodway. **Figure 30** shows locations where the proposed trail alignment is within the Regulatory Floodway. Since there are areas of the proposed trail within the Regulatory Floodway, a permit for Construction in a Floodway will be required from the Indiana DNR Division of Water. This permit is required to evaluate and estimate the impacts of the project on the peak water surface elevations associated with the 100-year flood event. Throughout future design phases, the alignment and elevation of the proposed trail will need to be carefully selected to ensure the proposed construction satisfies the Construction in a Floodway permit requirements.

Although the Indiana DNR offers a non-modeling approach for the Construction in a Floodway permit application for projects with a negligible change in the cross sectional flow area of a Floodway, this option cannot be used for new stream crossings. With the proposed boardwalk and/or bridge crossings over the East Arm Little Calumet River, hydraulic modeling for permitting purposes will be required. Existing hydraulic models are available from the Indiana DNR for the East Arm Little Calumet River at the project location. However, most of these models were prepared in the early 1980s using coarse topographic data and outdated bridge modeling methodologies. It is recommended that the hydraulic analysis required for the proposed trail project be conducted with updated stream cross sectional data (based on LiDAR data) and updated bridge data for the Norfolk Southern Railroad Bridge and County Road 149 Bridge. Updates to the existing hydraulic models, and the evaluation of the proposed trail project, will need to be completed in accordance with the Indiana DNR hydraulic modeling guidelines.

13.2.3 Wetlands and Habitat

With the nature of the project area, there will be wetland impacts during the construction of the Marquette Greenway Trail. A wetland delineation survey was performed and jurisdictional determination has been received through the Army Corp of Engineers. As wetlands were flagged, segments of the trail alignment were modified during the preliminary centerline staking to minimize impacts to the wetlands. Prior to construction, it will be necessary to obtain the appropriate Army Corp 404 permit for construction within the wetlands. Exhibits of the Wetland Areas are included in **Appendix B**.

14 Survey Requirements

Global Engineering and Land Surveying was contracted to complete the topographic survey, INDOT Location Control Route Survey, a plat of survey, which ties the trail centerline to section corners and real world coordinates, and INDOT Plat Number 1, a summary of property ownership along the trail corridor.

14.1 Topographic Survey Corridor

For the purposes of collecting topographic survey data, SEH requested that Global collect a 100 foot corridor, 50 feet on each side of the proposed centerline alignment, which was provided by SEH following the adjustments based on the findings of this report. There were also additional areas that were requested an expanded scope of survey due to potential need, based on the trail design elements. Since the preferred alignment of the trail does not have any River crossings, cross sections of the East Arm of the Little Calumet River were not required.

15 Right-of-Way Impact

There are a number of right of way issues that will need to be resolved as the project progresses. With federal funding involved for Phase 1A and 2, any additional right of way need must wait until the NEPA document has been approved. Additionally, moving forward all Land Acquisition for the Marquette Greenway Trail should be evaluated against the Uniform Act for Land Acquisition. The identified issues are broken down below.

15.1 Construction within National Parks Property

Any construction within the boundaries of the National Parks Service will be require to be built under a Memorandum of Understanding (MOU), under which the Town will construct the trail and in turn donate the trail to NPS for public use. The MOU will be granted contingent upon the approval of the Environmental Assessment by the National Parks Service. Discussions with the Indiana Dunes National Lakeshore have been very favorable to the trail.

15.2 Phase 1A

15.2.1 Norfolk Southern Property

As the work for the trail moves through the NPS property, the trail will need to be constructed through the Norfolk Southern Railroad Property. The railroad ROW requirements will be handled during the Railroad Coordination Process, which is discussed in Section 8 of this report.

15.2.2 McCauley Property

Once the trail heads south out of the National Parks, there is a privately owned property, which is zoned Agricultural, which would need to be acquired to construct the trail. The trail would be constructed on the very East side of the property and would likely only require 15 feet of permanent Right of Way. Additional temporary ROW may be required to construct the trail. There may be some additional east/west ROW required for construction of the trail, both permanent and temporary, which will be at the very southern boundary of the property. This portion of the property that would need to be acquired is located within the BP Pipeline Easement.

15.3 Phase 2

Phase 2 of the trail will be constructed on property that is owned or controlled by the Town. A 3.5 acre parcel, referred to as the Latour Property, was acquired under the early acquisition procedure of the Uniform Act, in conjunction with the DNR RTP grant preparation. The property, which is land locked and encumbered by the BP Pipeline easement, was listed for sale by a realtor. Phase 2 also traverses the Duneland School Corporation parcel, which the Town is purchasing via contract and will take full ownership in February 2019. The trail ends at the former Westport Community Center site, which was acquired by the Town in 2013.

15.4 Phase 4 – ArcelorMittal

Phase 4 of the Marquette Greenway Trail will be constructed entirely on the property currently owned by ArcelorMittal Tow Path Valley Basin. SEH and Burns Harbor Redevelopment Commission consultant, have been coordinating with ArcelorMittal's local real estate representative. The company currently has the property offered for sale, all 187 acres of the parcel for \$2,900,000. The Town has approached ArcelorMittal with different property transfer options for the trail including a trail easement through the parcel and the transfer of the property North of and including the trail to the Town, either via donation or other method. These discussions are ongoing.

16 Related Projects, Consistency

With the Burns Harbor section of the Marquette Greenway Trail being a part of the larger, Tri-State Marquette Greenway Trail Plan, it is important to be consistent with the adjacent trails where this trail will be connecting in terms of cross-sectional elements, wayfinding and other trail branding.

16.1 Portage Marquette Greenway Trail

The City of Portage has constructed one segment of the Marquette Greenway Trail and is currently working with SEH on designing the next segment of the trail. The first section of the trail, which was finished constructing in 2013 features a 10 foot asphalt path, with 1 foot concrete ribbon curb on each side of the trail. This trail runs from NIRPC, at the intersection of Waypoint Drive and Southport Road, along Waypoint Drive, to Ameriplex Drive. From this intersection, the trail runs along Ameriplex Drive toward SR 249, where it crosses into the Ameriplex Business Park. There is also an aggregate loop trail spur, which provides a natural setting for trail users. This portion of the Marquette Greenway Trail includes some aesthetic features at crossing locations including decorative concrete scoring patterns and native plantings. The wetland areas of this portion of the trail were traversed by precast concrete boardwalk.

The second phase of this trail will have a mixture of asphalt and concrete sections, based on the adjacent land uses. This trail is still being finalized, but will have 12 feet of usable trail width. There will be minimal street furnishings and other aesthetic features on this portion of the trail. Following the completion of this portion of the trail, there will still be a gap that will need to be constructed in order to connect Portage to Burns Harbor.

16.2 Porter Brickyard Trail

The Porter Brickyard Trail is the closest trail to the Eastern Terminus of the proposed Burns Harbor section of the trail. The Brickyard Trail has a typical 8 foot asphalt pavement section, with a 1 foot usable aggregate shoulder on each side of the trail. This cross section has a minimum of 10 usable trail in all areas. A portion of the Brickyard Trail was constructed by the National Parks Service, near the Park's Headquarters on Mineral Springs Road, just north of Oak Hill Road. This trail was constructed purely as a function trail and did not include any wayfinding, site furnishings or other aesthetic features.

The trail does include two separate pedestrian bridges: one to cross US 20, which provides trail access to the Porter and Chesterton Downtown Business Districts, and one to cross US 12, which provides access to Dune Acres and the Calumet Trail. These two prefabricated elevated bridges use a series of switchbacks to provide safe pedestrian crossing of two busy US Highways.

16.3 Calumet Trail

The Calumet Trail, an existing aggregate trail in the NIPSCO easement, just north of the NICTD trail tracks, is a planned portion of the Marquette Greenway Trail system. The Calumet Trail runs from Mineral Springs Road in Porter to the Porter/La Porte County Line Road, near Michigan City. The trail is maintained by the Porter County Parks and Recreation Department, under a Memorandum of Understanding with NIPSCO. Porter County has Federal funding for construction of the trail from Mineral Springs Road to Tremont Road, just east of the Dune Park NICTD Station. The design of the trail was completed by SEH in 2014, but construction has been delayed for the foreseeable future due to NIPSCO's ongoing upgrades in the corridor. Porter County also has design funds available

for the project's phase IV and V, which run from just west of Broadway, in Beverly Shores, to County Line Road/US 12.

The proposed trail cross section for the Calumet Trail is a 10 foot asphalt trail with some areas having a 1 foot ribbon curb on each side, while other sections replace the curb with a 2 foot aggregate shoulder on each side. The minimum usable width for this trail is 12 feet. The proposed design of the Calumet Trail included a number of aesthetic features including decorative concrete elements with decorative scoring details, wayfinding signage, site furnishings and native landscaping. One major problem with the existing Calumet Trail is the drainage in the corridor, which was addressed during the proposed design of the trail, including the incorporation of grated trench drains to allow for amphibious and reptile crossings of the trail.

17 Coordination, Meetings, Concurrence

A number of coordination meetings with the Town of Burns Harbor and other stakeholders were held at the beginning of the project and have continued throughout the preliminary stages of the engineering analysis.

17.1 Stakeholders

The other stakeholders that have been involved during the project are listed below.

- National Parks Service, Indiana Dunes National Lakeshore
- City of Portage
- Town of Porter
- Norfolk Southern Railroad
- Northern Indiana Regional Plan Commission
- Indiana Department of Natural Resources, Division of Outdoor Recreation

17.2 Public Meetings

To date, there has been one public input meeting held for the project on April 24th 2018 at the Burns Harbor Town Hall. Public meetings will be held through the remaining portions of the trail plan development process.

17.3 DNR Recreational Trails Program Grant Meeting

Prior to the submittal of the Indiana DNR Recreation Trail Program Grant Application, the public input meeting held on April 24th, 2018 briefed the public on the status of the project and the alternatives for getting the trail to the Town Center Development Area. From this meeting, the original preferred alternative was modified based on the public input.

APPENDIX A

COST ESTIMATE FOR PROPOSED TRAIL SEGMENTS

Burns Harbor Marquette Greenways Trail

Preliminary Engineer's Estimate

10-Oct-18

Segment	Estimated Section Cost
Phase 1A - East Connector - Babcock Rd to Stanley St	\$ 2,001,090.00
Phase 2 - Town Center Connector - Stanley Street to Westport Road	\$ 413,725.00
Phase 3 - SR149 Crossing - Westport Road to Navajo Extended	\$ 502,450.00
Phase 4 - West Connector - Navajo Extended to West Town Boundary	\$ 788,125.00
Future Phase - National Parks Scenic Bypass	\$ 3,789,500.00
Project Total	\$ 7,494,890.00

Burns Harbor Marquette Greenways Trail

Preliminary Engineer's Estimate

Phase 1A - East Connector - Babcock Rd to Stanley St

Typical Section Element	Unit	Unit Cost	Estimated Quantity	Estimated Section Cost
Trail On Grade (Assumed 12' Paved, Earthen Shoulder on each side) Paving Section - 4" Asphalt, 6" Compacted Stone Base on Geotextiles	LFT	\$ 65.00	3720	\$ 241,800.00
Trail Cut Section - In Floodway (Assumed 12' Paved, Earthen Shoulder on each side) Paving Section - 4" Asphalt, 6" Compacted Stone Base on Geotextiles/Geogrid 1' Undercut, replace w/ No. 2 Stone	LFT	\$ 85.00		\$ -
Boardwalk (Assumed 12' Clear Timber Boardwalk with Helical Piles)	LFT	\$ 900.00	875	\$ 787,500.00
Prefabricated Bridge (Assumed 12' clear, 100-foot span, weathering steel trusses w/ timber decking, including approaches)	EA	\$ 450,000.00		\$ -
Reinforced Trail under Railroad	LFT	\$ 350.00	100	\$ 35,000.00
Switchback/Side Hill Traversing Trail Section (12' Clear reinforced concrete section, one side handrail)	LFT	\$ 500.00	950	\$ 475,000.00
Segment Total				\$ 1,539,300.00
30% Contingency				\$ 461,790.00
Total w/ Contingency				\$ 2,001,090.00
Alternatives				
Retaining wall sideslope	LFT	\$ 800.00	950	\$ 760,000.00
Meadowbrook Spur	LFT	\$ 65.00	1240	\$ 80,600.00
Precast Concrete Boardwalk on driven Piles	LFT	\$ 1,800.00	875	\$ 1,575,000.00

Burns Harbor Marquette Greenways Trail

Preliminary Engineer's Estimate

Phase 2 - Town Center Connector - Stanley Street to Westport Road

Typical Section Element	Unit	Unit Cost	Estimated Quantity	Estimated Section Cost
Trail On Grade (Assumed 12' Paved, Earthen Shoulder on each side) Paving Section - 4" Asphalt, 6" Compacted Stone Base on Geotextiles	LFT	\$ 65.00	2000	\$ 130,000.00
Trail Cut Section - In Floodway (Assumed 12' Paved, Earthen Shoulder on each side) Paving Section - 4" Asphalt, 6" Compacted Stone Base on Geotextiles/Geogrid 1' Undercut, replace w/ No. 2 Stone	LFT	\$ 85.00	450	\$ 38,250.00
Boardwalk (Assumed 12' Clear Timber Boardwalk with Helical Piles)	LFT	\$ 900.00		-
Prefabricated Bridge (Assumed 12' clear, 100-foot span, weathering steel trusses w/ timber decking, including approaches)	EA	\$ 450,000.00		-
Pedestrian Fence	LFT	\$ 50.00	1500	\$ 75,000.00
Switchback/Side Hill Traversing Trail Section (12' Clear reinforced concrete section, one side handrail)	LFT	\$ 500.00		-
Property Acquisition	LS	\$ 75,000.00	1	\$ 75,000.00
<hr/>				
			Segment Total	\$ 318,250.00
			30% Contingency	\$ 95,475.00
			Total w/ Contingency	\$ 413,725.00
<hr/>				
Alternatives				
Retaining wall sideslope	LFT	\$ 800.00	0	\$ -
Precast Concrete Boardwalk on driven Piles	LFT	\$ 1,800.00	0	\$ -

Burns Harbor Marquette Greenways Trail

Preliminary Engineer's Estimate

Phase 3 - SR149 Crossing - Westport Road to Navajo Extended

Typical Section Element	Unit	Unit Cost	Estimated Quantity	Estimated Section Cost
Trail On Grade (Assumed 12' Paved, Earthen Shoulder on each side) Paving Section - 4" Asphalt, 6" Compacted Stone Base on Geotextiles	LFT	\$ 65.00	2100	\$ 136,500.00
Trail Cut Section - In Floodway (Assumed 12' Paved, Earthen Shoulder on each side) Paving Section - 4" Asphalt, 6" Compacted Stone Base on Geotextiles/Geogrid 1' Undercut, replace w/ No. 2 Stone	LFT	\$ 85.00		\$ -
Boardwalk (Assumed 12' Clear Timber Boardwalk with Helical Piles)	LFT	\$ 900.00		
Prefabricated Bridge (Assumed 12' clear, 100-foot span, weathering steel trusses w/ timber decking, including approaches)	EA	\$ 450,000.00		\$ -
Pedestrian at Grade Highway Crossing	EA	\$ 250,000.00	1	\$ 250,000.00
Switchback/Side Hill Traversing Trail Section (12' Clear reinforced concrete section, one side handrail)	LFT	\$ 500.00		\$ -
Segment Total				\$ 386,500.00
30% Contingency				\$ 115,950.00
Total w/ Contingency				\$ 502,450.00
Alternatives				
Retaining wall sideslope	LFT	\$ 800.00	0	\$ -
Precast Concrete Boardwalk on driven Piles	LFT	\$ 1,800.00	0	\$ -

Burns Harbor Marquette Greenways Trail

Preliminary Engineer's Estimate

Phase 4 - West Connector - Navajo Extended to West Town Boundary

Typical Section Element	Unit	Unit Cost	Estimated Quantity	Estimated Section Cost
Trail On Grade (Assumed 12' Paved, Earthen Shoulder on each side) Paving Section - 4" Asphalt, 6" Compacted Stone Base on Geotextiles	LFT	\$ 65.00	3250	\$ 211,250.00
Trail Cut Section - In Floodway (Assumed 12' Paved, Earthen Shoulder on each side) Paving Section - 4" Asphalt, 6" Compacted Stone Base on Geotextiles/Geogrid 1' Undercut, replace w/ No. 2 Stone Boardwalk (Assumed 12' Clear Timber Boardwalk with Helical Piles)	LFT	\$ 85.00	2000	\$ 170,000.00
Prefabricated Bridge (Assumed 12' clear, 100-foot span, weathering steel trusses w/ timber decking, including approaches)	EA	\$ 450,000.00	-	-
Switchback/Side Hill Traversing Trail Section (12' Clear reinforced concrete section, one side handrail)	LFT	\$ 500.00	-	-
Segment Total				\$ 606,250.00
30% Contingency				\$ 181,875.00
Total w/ Contingency				\$ 788,125.00
Alternatives				
Retaining wall sideslope	LFT	\$ 800.00	0	-
Precast Concrete Boardwalk on driven Piles	LFT	\$ 1,800.00	250	\$ 450,000.00

Burns Harbor Marquette Greenways Trail

Preliminary Engineer's Estimate

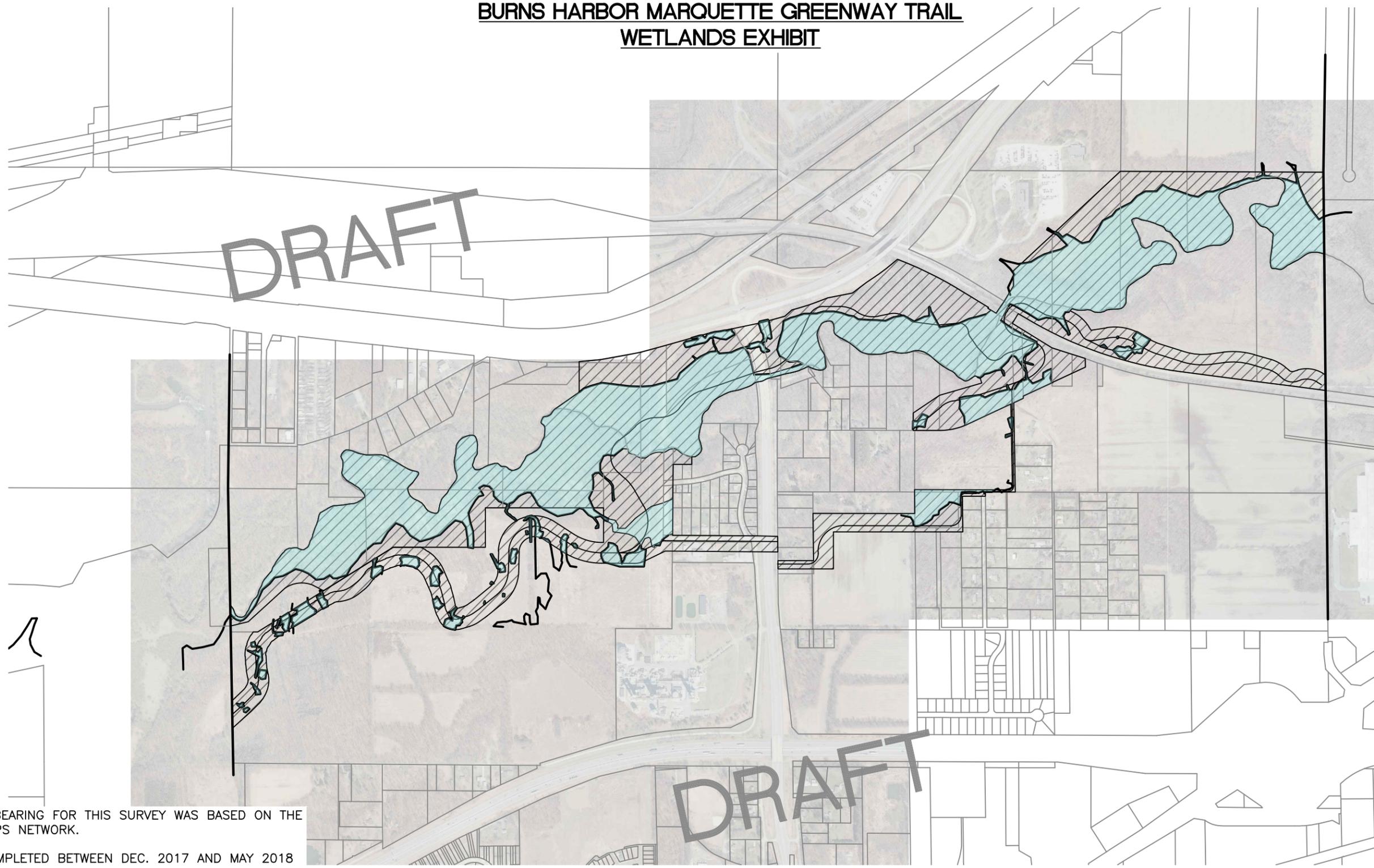
Future Phase - National Parks Scenic Bypass

Typical Section Element	Unit	Unit Cost	Estimated Quantity	Estimated Section Cost
Trail On Grade (Assumed 12' Paved, Earthen Shoulder on each side) Paving Section - 4" Asphalt, 6" Compacted Stone Base on Geotextiles	LFT	\$ 65.00		\$ -
Trail Cut Section - In Floodway (Assumed 12' Paved, Earthen Shoulder on each side) Paving Section - 4" Asphalt, 6" Compacted Stone Base on Geotextiles/Geogrid 1' Undercut, replace w/ No. 2 Stone Boardwalk (Assumed 12' Clear Timber Boardwalk with Helical Piles)	LFT	\$ 85.00	4000	\$ 340,000.00
Prefabricated Bridge (Assumed 12' clear, 100-foot span, weathering steel trusses w/ timber decking, including approaches)	EA	\$ 450,000.00	2	\$ 900,000.00
Switchback/Side Hill Traversing Trail Section (12' Clear reinforced concrete section, one side handrail)	LFT	\$ 500.00	650	\$ 325,000.00
Segment Total				\$ 2,915,000.00
30% Contingency				\$ 874,500.00
Total w/ Contingency				\$ 3,789,500.00
Alternatives				
Retaining wall sideslope	LFT	\$ 800.00	650	\$ 520,000.00
Precast Concrete Boardwalk on driven Piles	LFT	\$ 1,800.00	1500	\$ 2,700,000.00

APPENDIX B

BURNS HARBOR MARQUETTE TRAIL WETLANDS

**BURNS HARBOR MARQUETTE GREENWAY TRAIL
WETLANDS EXHIBIT**



NOTES:

THE BASIS OF BEARING FOR THIS SURVEY WAS BASED ON THE TRIMBLE VRS/GPS NETWORK.

FIELD WORK COMPLETED BETWEEN DEC. 2017 AND MAY 2018

X = WETLAND FLAG LOCATED IN THE FIELD

*THIS DRAWING IS NOT INTENDED TO BE REPRESENTED AS A RETRACEMENT OR ORIGINAL BOUNDARY SURVEY, A ROUTE SURVEY, OR A SURVEYOR LOCATION REPORT

GRAPHIC SCALE



(IN FEET)
1 inch = 1000 ft.

OVERALL MAP

GLOBAL
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601 FRANKLIN SQ. STE. 407 MICHIGAN CITY, IN 46360
PH. NO. (219)872-4444 FAX NO. (219)879-9920

*BH-MARQUETTE GREENWAY TRAIL
WETLANDS EXHIBIT*

*TOWN OF BURNS HARBOR
1240 NORTH BOO RD.
BURNS HARBOR, IN 46304*

PROJECT NAME:

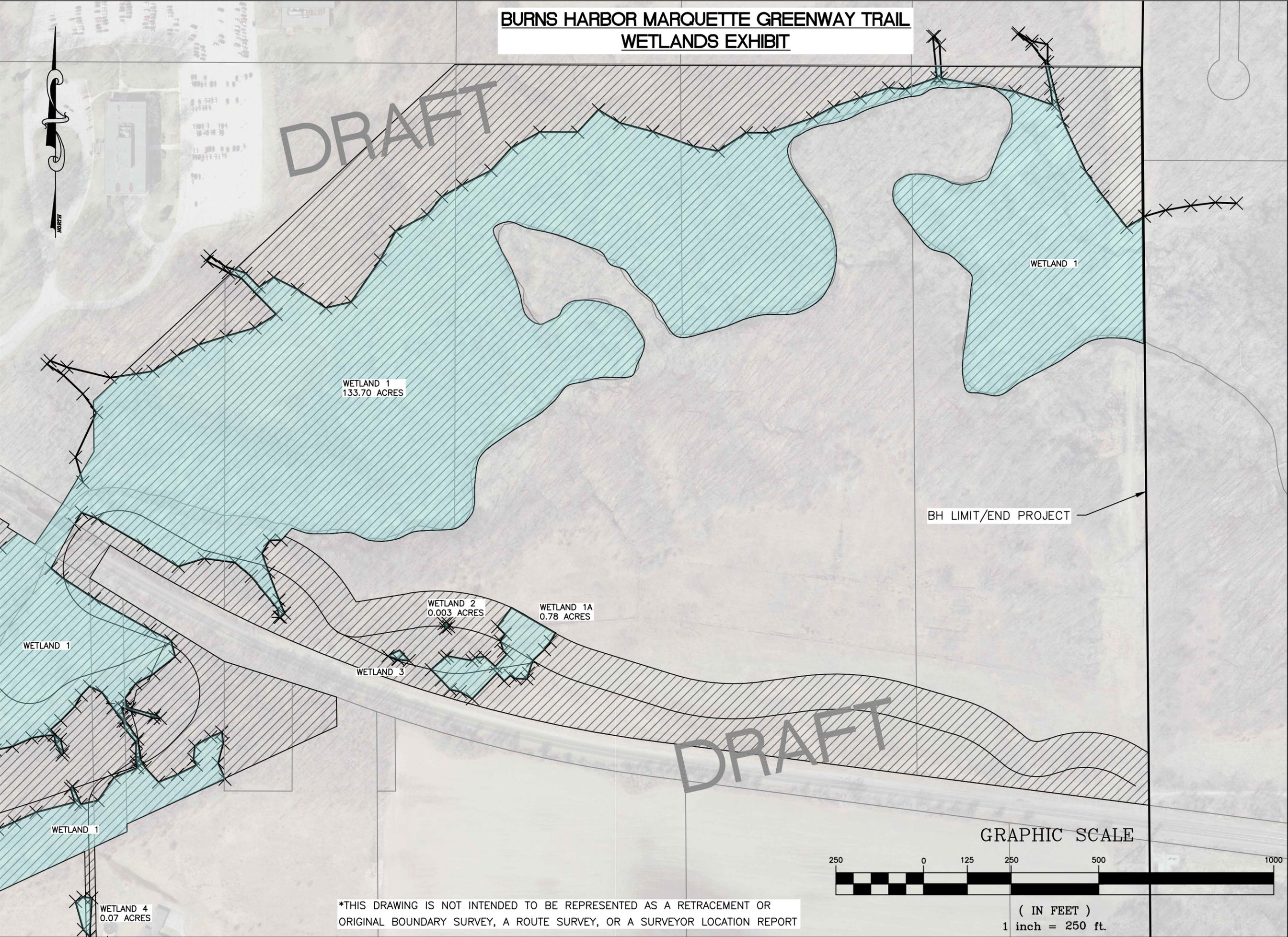
PROJECT OWNER:

DRAWING DATE: 7/12/18
DRAWING BY: SH

**SHEET
1 OF 5**

BURNS HARBOR MARQUETTE GREENWAY TRAIL
WETLANDS EXHIBIT

DRAFT



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PROJECT NAME: BH-MARQUETTE GREENWAY TRAIL
WETLANDS EXHIBIT

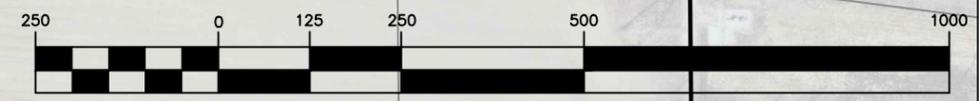
PROJECT OWNER: TOWN OF BURNS HARBOR
1240 NORTH BOO RD.
BURNS HARBOR, IN 46304

DRAWING DATE: 7/12/18
DRAWING BY: SH

**SHEET
2 OF 5**

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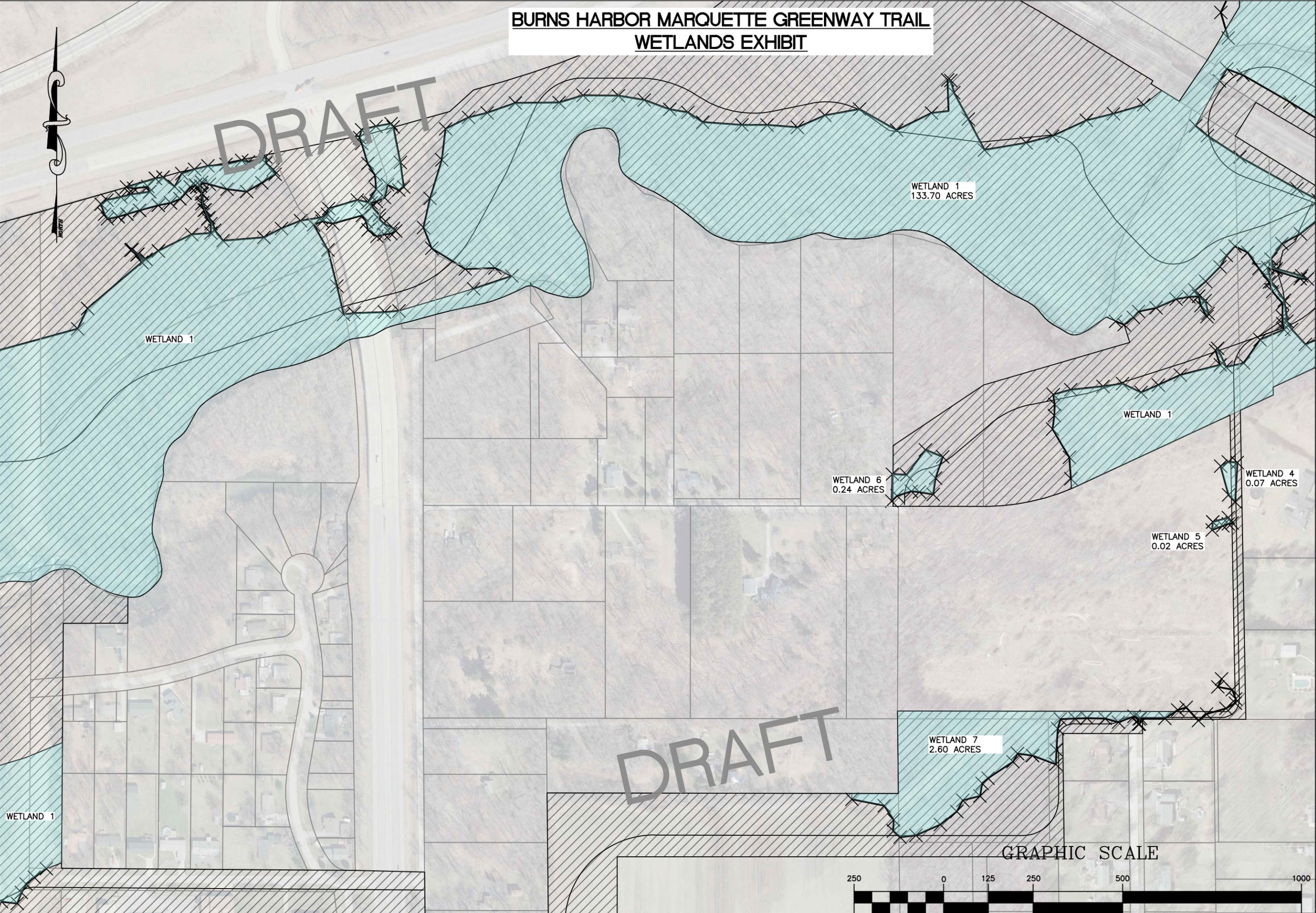
GRAPHIC SCALE



(IN FEET)
1 inch = 250 ft.

**BURNS HARBOR MARQUETTE GREENWAY TRAIL
WETLANDS EXHIBIT**

DRAFT



WETLAND 1
133.70 ACRES

WETLAND 1

WETLAND 6
0.24 ACRES

WETLAND 1

WETLAND 4
0.07 ACRES

WETLAND 5
0.02 ACRES

WETLAND 7
2.60 ACRES

WETLAND 1

DRAFT

GRAPHIC SCALE



(IN FEET)
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PROJECT NAME:
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WETLANDS EXHIBIT

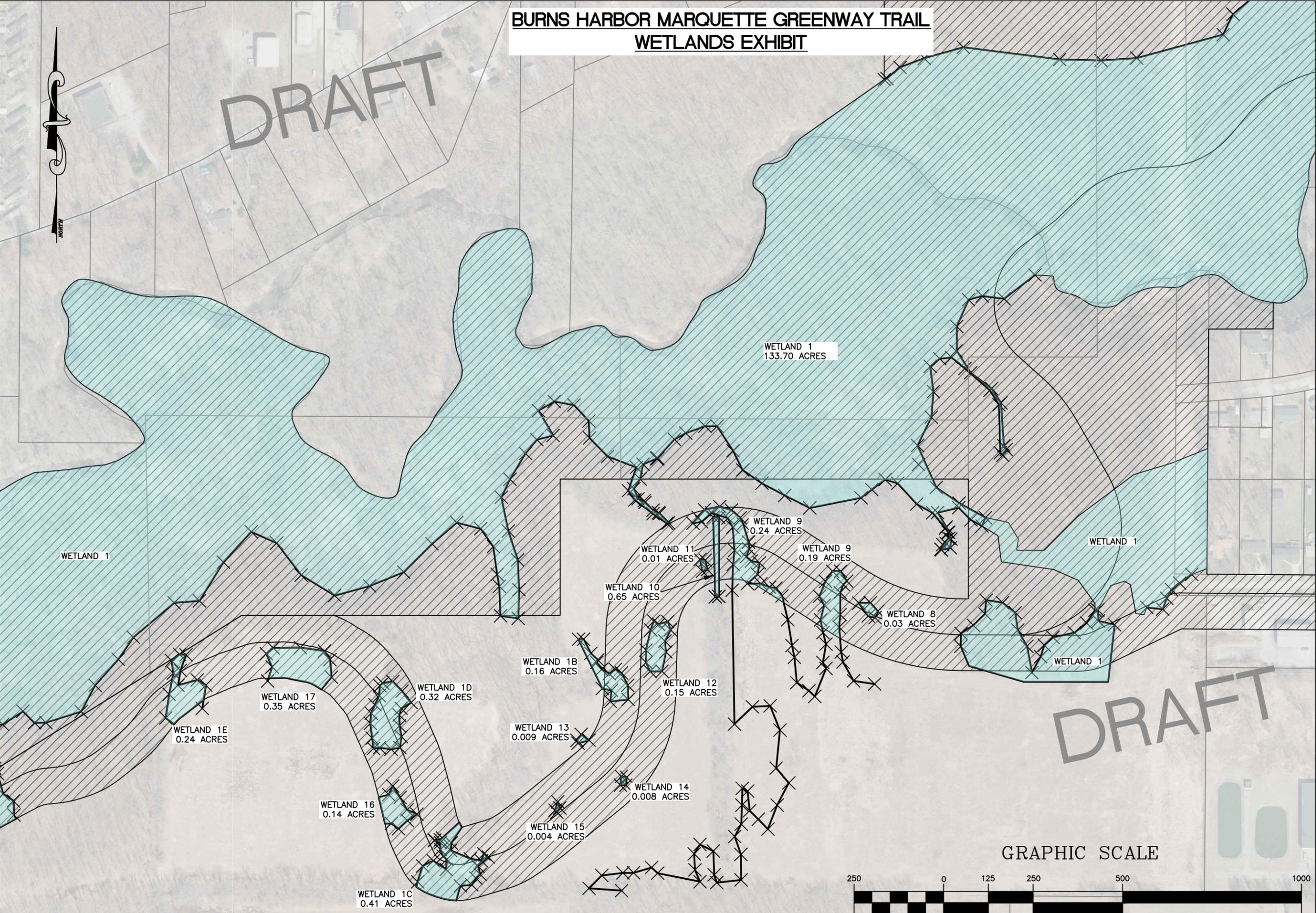
PROJECT OWNER:
TOWN OF BURNS HARBOR
1240 NORTH BOO RD.
BURNS HARBOR, IN 46304

DRAWING DATE: 7/12/18
DRAWING BY: SH

**SHEET
3 OF 5**

**BURNS HARBOR MARQUETTE GREENWAY TRAIL
WETLANDS EXHIBIT**

DRAFT



WETLAND 1
133.70 ACRES

WETLAND 1

WETLAND 1

WETLAND 11
0.01 ACRES

WETLAND 9
0.24 ACRES

WETLAND 9
0.19 ACRES

WETLAND 10
0.65 ACRES

WETLAND 8
0.03 ACRES

WETLAND 1B
0.16 ACRES

WETLAND 12
0.15 ACRES

WETLAND 17
0.35 ACRES

WETLAND 1D
0.32 ACRES

WETLAND 1E
0.24 ACRES

WETLAND 13
0.009 ACRES

WETLAND 14
0.008 ACRES

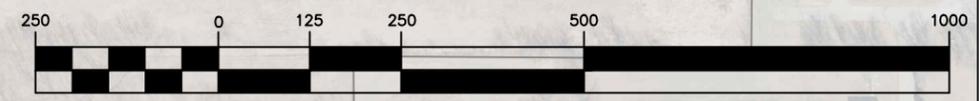
WETLAND 16
0.14 ACRES

WETLAND 15
0.004 ACRES

WETLAND 1C
0.41 ACRES

DRAFT

GRAPHIC SCALE



(IN FEET)
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WETLANDS EXHIBIT

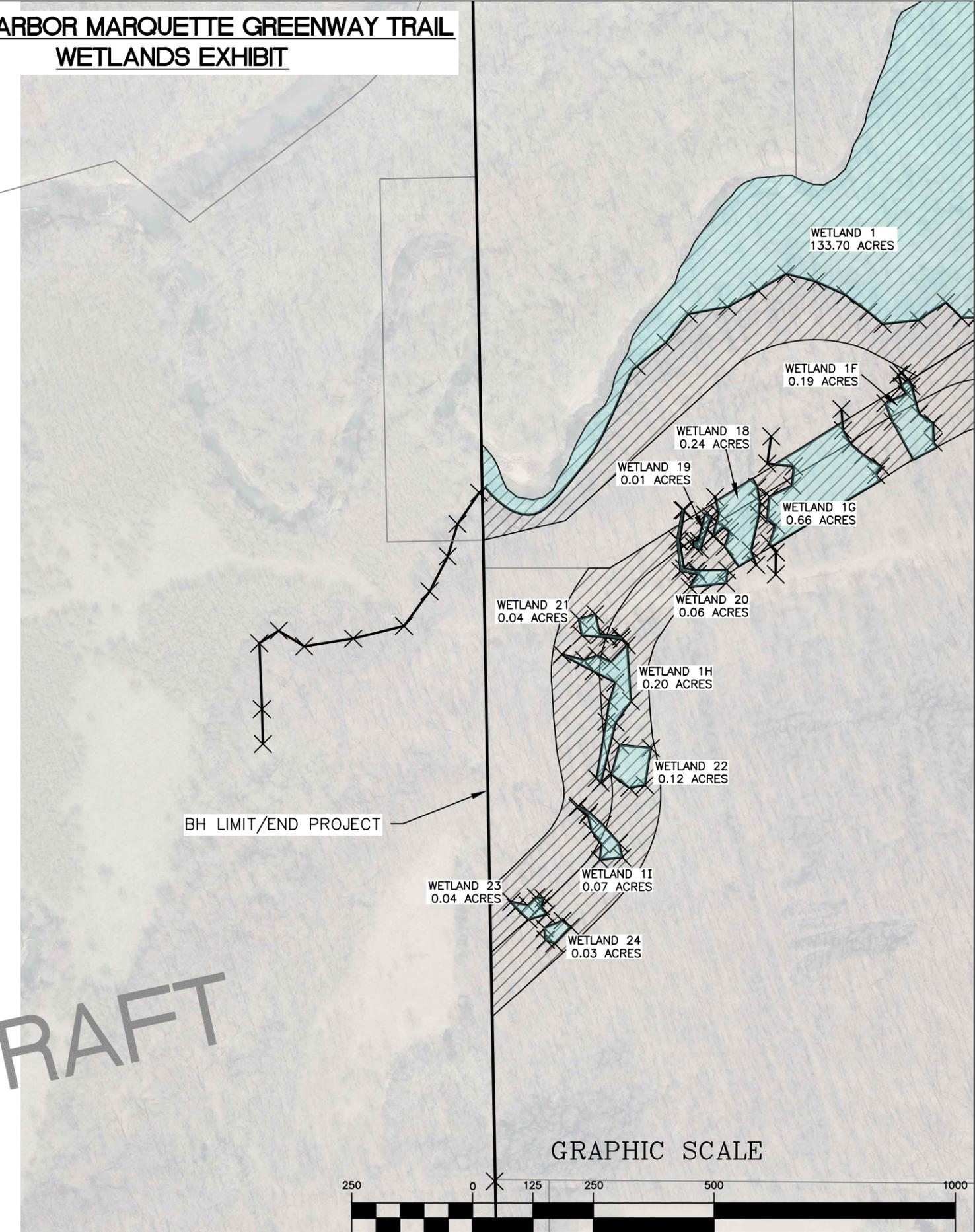
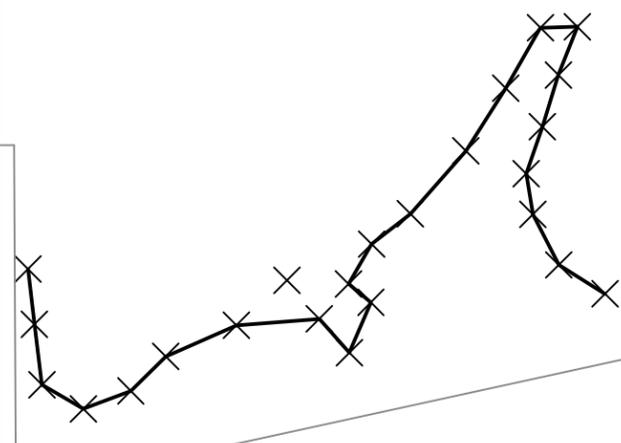
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BURNS HARBOR, IN 46304

DRAWING DATE: 7/12/18
DRAWING BY: SH

**SHEET
4 OF 5**

**BURNS HARBOR MARQUETTE GREENWAY TRAIL
WETLANDS EXHIBIT**

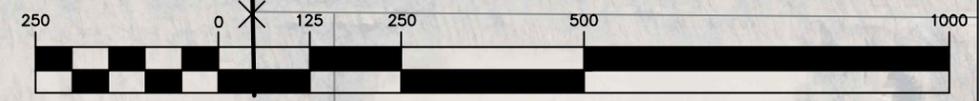
DRAFT



BH LIMIT/END PROJECT

DRAFT

GRAPHIC SCALE



(IN FEET)
1 inch = 250 ft.

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BH-MARQUETTE GREENWAY TRAIL
WETLANDS EXHIBIT

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BURNS HARBOR, IN 46304

PROJECT NAME:

PROJECT OWNER:

DRAWING DATE: 7/12/18
DRAWING BY: SH

**SHEET
5 OF 5**



Building a Better World for All of Us®

Building a Better World for All of Us®

Sustainable buildings, sound infrastructure, safe transportation systems, clean water, renewable energy and a balanced environment. Building a Better World for All of Us communicates a companywide commitment to act in the best interests of our clients and the world around us.

We're confident in our ability to balance these requirements.

