FEASIBILITY STUDY FOR PROPOSED ROADWAYS

MDOT Project No. STP-0045-00(31)LPA 107928-711000

Prepared for:

City of Diamondhead

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INTRODUCTION

Study Description

The City of Diamondhead (City) tasked Digital Engineering & Imaging, Inc. (DE) with performing a feasibility study for the preliminary planning of eight (8) proposed roadway projects. The purpose of the study is to provide the City with an evaluation on the constructability of each project and identify key considerations for further planning, design, and construction.

The study included an evaluation of the following items for each proposed project:

- Right-of-Way Requirements
- Traffic Considerations
- Pedestrian Facilities
- Utilities (Drainage, Water, Sewer, Electric)
- Environmental (Flood Zones, Wetlands, Soils)

The study included the development of the following for each proposed project:

- Proposed Roadway Layout
- Proposed Roadway Cross Section
- Opinion of Probable Costs

This report summarizes the findings of the feasibility study and has been compiled in such a manner that each project evaluation can be separated from the others and be utilized to apply for grants to fund the design and/or construction of the project.

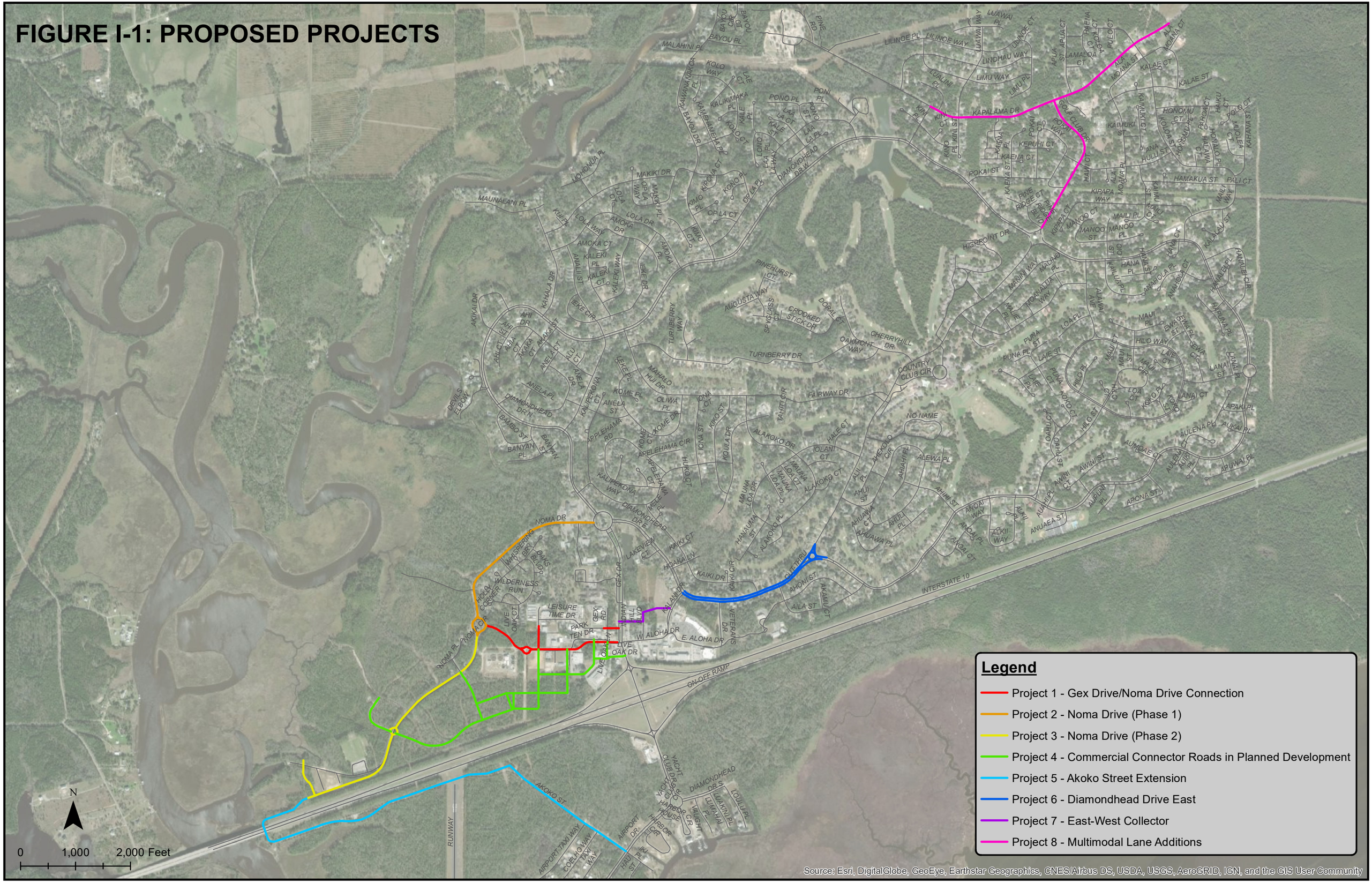
Proposed Projects

This feasibility study includes the evaluation of the following projects:

Project 1 – Gex Drive/Noma Drive Connection
Project 2 – Noma Drive (Phase 1)
Project 3 – Noma Drive (Phase 2)
Project 4 – Commercial Connector Roads in Planned Development
Project 5 – Akoko Street Extension
Project 6 – Diamondhead Drive East
Project 7 – East-West Collector
Project 8 – Multimodal Lane Additions

A map showing the proposed projects is provided in Figure I-1.

FIGURE I-1: PROPOSED PROJECTS



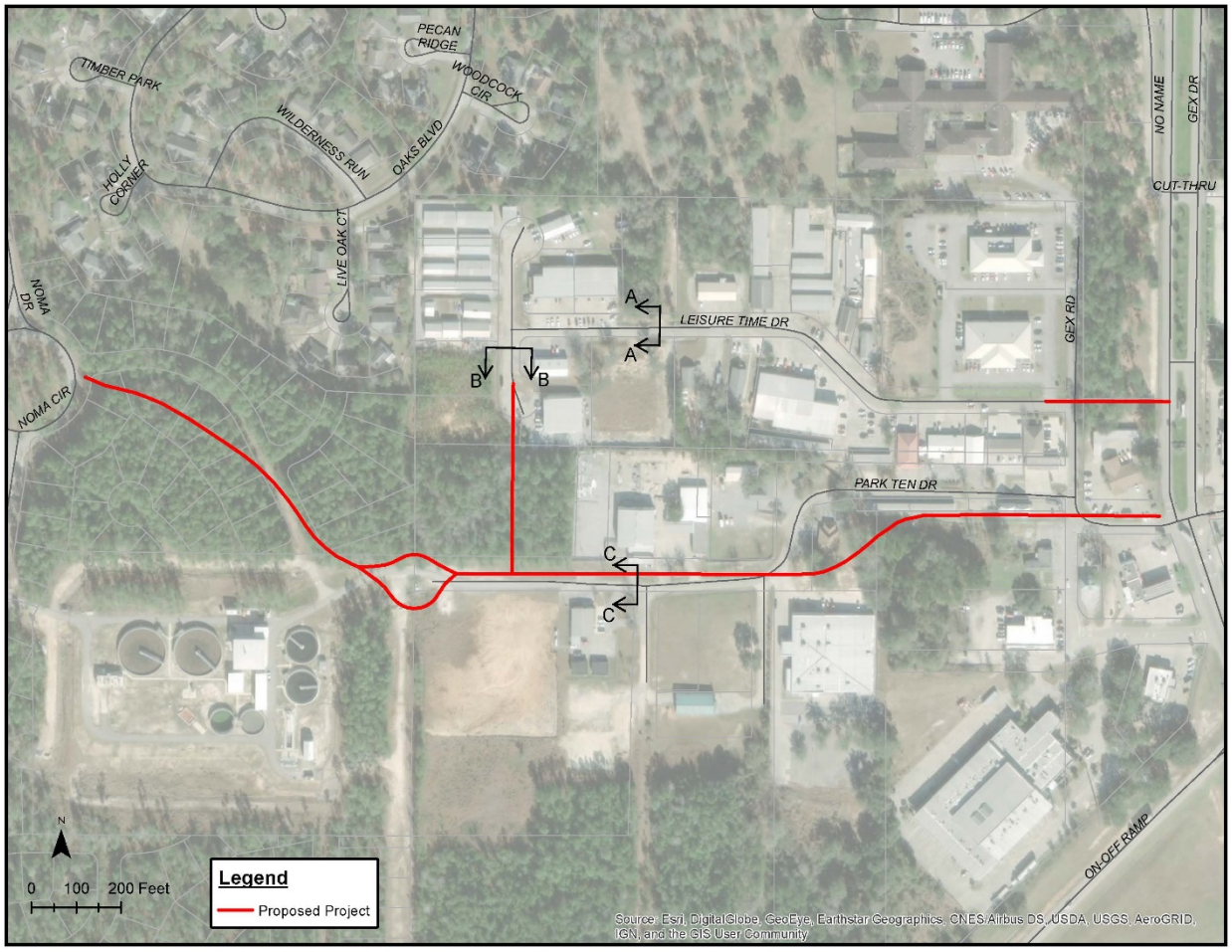
The goal of the proposed projects is to provide more connectivity throughout the City, either by vehicle, golf cart, bicycle or walking. Six of the projects (Projects 1, 2, 3, 4, 5, and 7) will be constructed within or in close vicinity to the proposed Town Center, which is located in the vacant land located north of I-10 and south/west of the existing commercial area west of Gex Drive. The Town Center, and these roadway projects, are part of the City's Master Plan for developing this area into planned landuse districts, including a mixed-use town center, multifamily, residential, condo/entertainment and greenspace. For reference, a map of the master plan is provided in Appendix A. The proposed roads located in this area will provide connections between roads located in the existing commercial area and provide access to and within the proposed development area. These projects include two lane roadways with planting strips and either a sidewalk or a multimodal lane for walking, bicycling and golf cart use. The remaining two projects (Projects 6 and 8) include the modification of highly traveled roadways to include multimodal lanes to make them more accessible for walking, bicycling and golf cart use.

PROJECT 1 – GEX DRIVE/NOMA DRIVE CONNECTION

Project Purpose & Description

Project 1 – Gex Drive/Noma Drive Connection includes the modification of existing roadway and the construction of new roadway to provide a connection between Gex Drive and Noma Drive. This will provide more accessibility throughout the commercial area located between these two streets and provide connections to the proposed Town Center located south of the project. (Appendix A includes a map showing the planned development area as specified in the City of Diamondhead's Master Plan.) The project will include the modification of approximately 2,120 feet of Park Ten Drive, the construction of approximately 760 feet of roadway to extend Park Ten Drive to Noma Circle, the construction of approximately 425 feet of roadway to extend Leisure Time Lane to Park Ten Drive and the construction of approximately 275 feet of roadway to connect Gex Drive to Leisure Time Drive. A map of the proposed project is provided in Figure 1-1.

Figure 1-1: Gex Drive/Noma Drive Connection – Project Map



Existing Conditions

The commercial area west of Gex Drive, which consists of Gex Road, Leisure Time Drive/Lane and Park Ten Drive, can only be accessed through one intersection off of Gex Drive. All three streets are dead-end streets and have no connection between them aside from Gex Road. The existing streets are two-lane asphalt roads with no pedestrian facilities. Cross sections for each of the existing roadways are provided in Figures 1-2, 1-3 and 1-4 (cross section locations are noted in Figure 1-1 above).

Figure 1-2: Gex Drive/Noma Drive Connection – Leisure Time Drive (Section A-A)
Existing Roadway Section

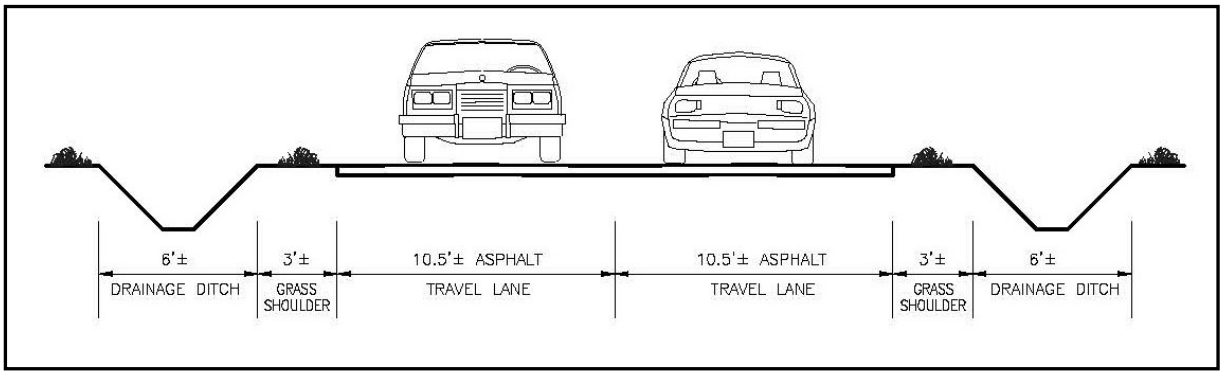


Figure 1-3: Gex Drive/Noma Drive Connection – Leisure Time Lane (Section B-B)
Existing Roadway Section

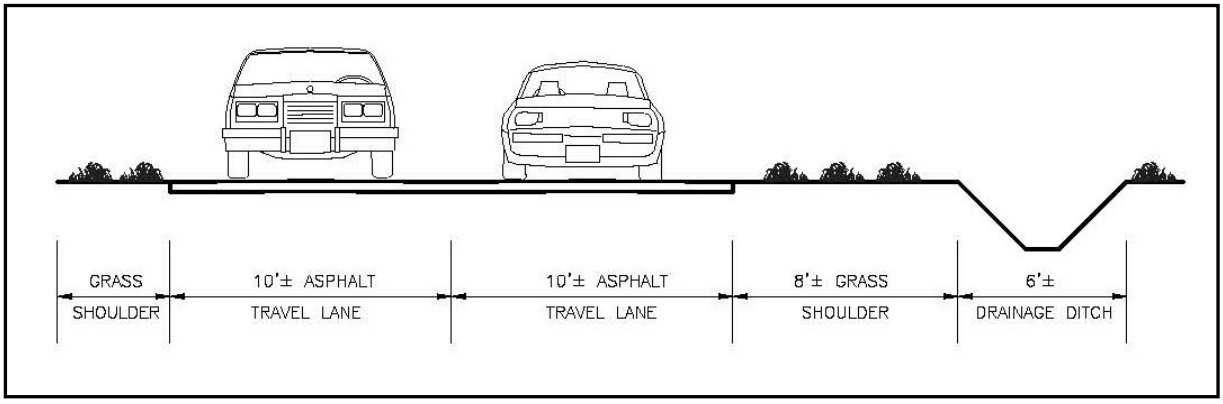
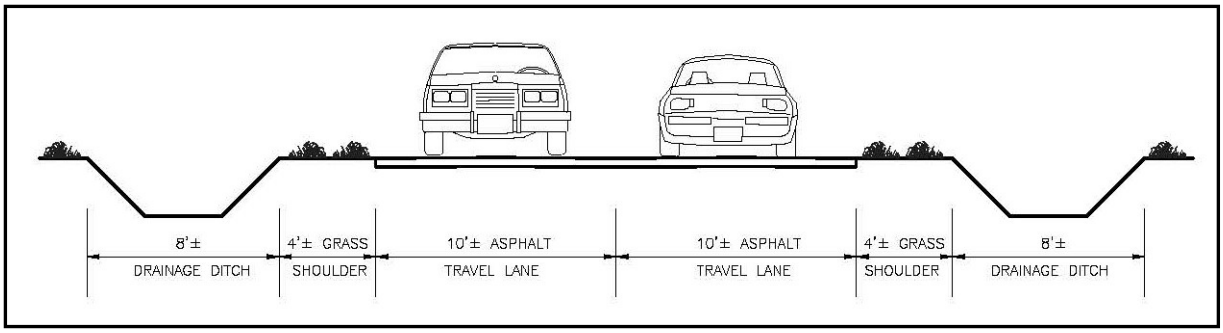


Figure 1-4: Gex Drive/Noma Drive Connection – Park Ten Drive (Section C-C)
Existing Roadway Section



Proposed Conditions

The proposed project will include the modification of Park Ten Drive to a two-lane asphalt boulevard, with 12-foot vehicle lane widths, 8-foot parking lanes and a 12-foot grass median. A 10-foot multimodal lane will run along both sides of the road, separated from the parking lane by a 4-foot planting strip. The Park Ten Drive boulevard will begin at Gex Drive and continue to a new roundabout that will be constructed where Park Ten Drive currently ends. Park Ten Drive will be extended from this new roundabout to the existing Noma Circle. The construction of the roundabout is required to convey traffic around an existing sewer pump station that would otherwise obstruct the connection of Park Ten Drive to Noma Circle. The Park Ten Extension to Noma Drive will be a two-lane asphalt roadway with 10-foot vehicle lane widths and 8-foot parking lanes. A 7-foot sidewalk will run along both sides of the road, separated from the parking lane by a 5-foot planting strip. An extension, consisting of a two-lane asphalt roadway with 11-foot vehicle lane widths, a planting strip and a 10-foot multimodal lane will be constructed from the south end of Leisure Time Lane and connect to the newly constructed Park Ten Drive Boulevard. Leisure Time Drive will be extended through Gex Road and connect to Gex Drive with a two-lane asphalt roadway with 11-foot vehicle lane widths, a planting strip and a 10-foot multimodal lane.

The layout of the proposed roadways is provided in Figure 1-5 and cross sections for the proposed roadways are provided in Figures 1-6, 1-7 and 1-8. Roadway section numbers have been noted that correspond with the City's Master Plan (Appendix A).

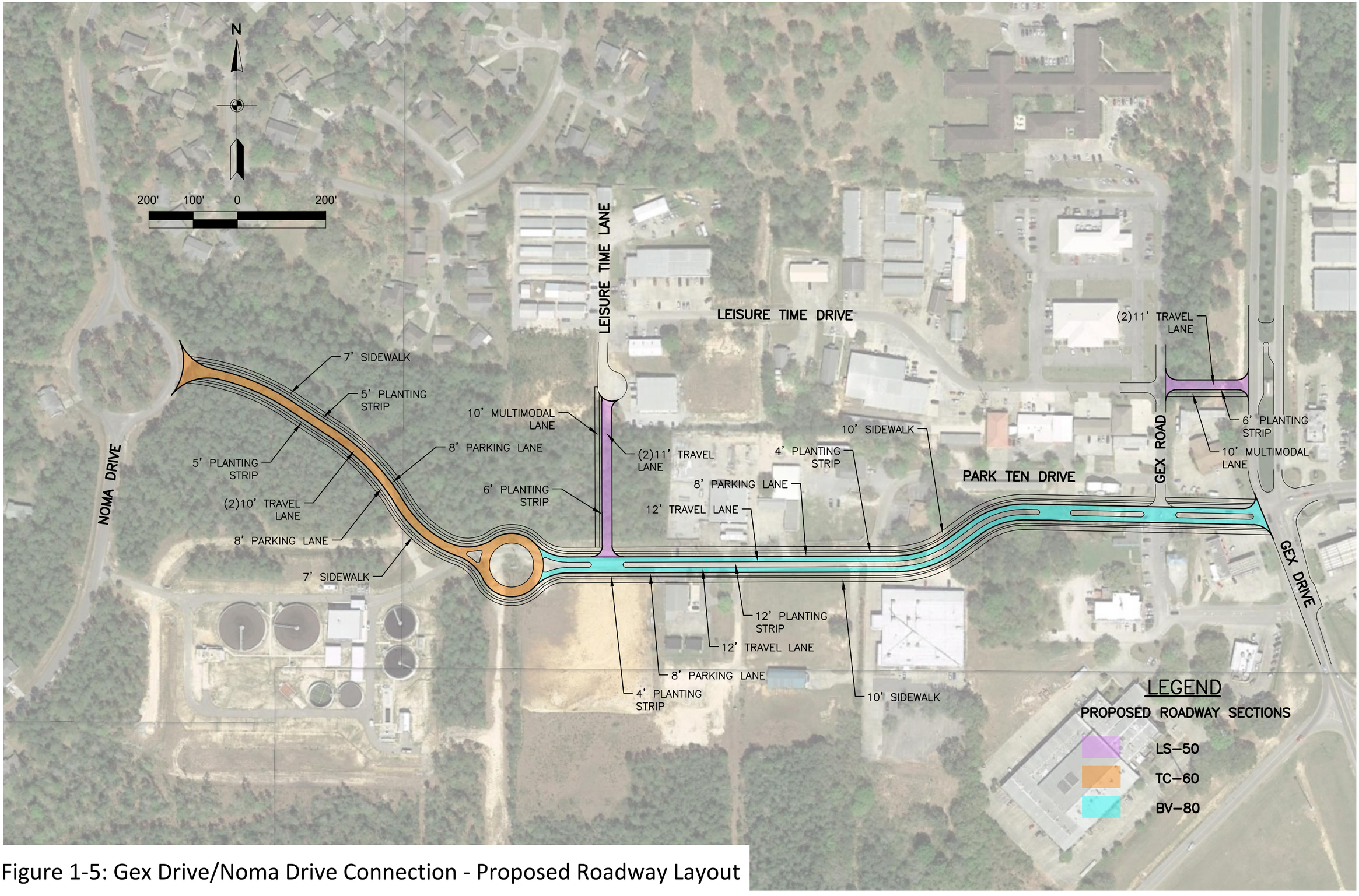


Figure 1-5: Gex Drive/Noma Drive Connection - Proposed Roadway Layout

Figure 1-6: Gex Drive/Noma Drive Connection – Park Ten Drive (Gex Drive to Roundabout)
Proposed Roadway Section BV-80

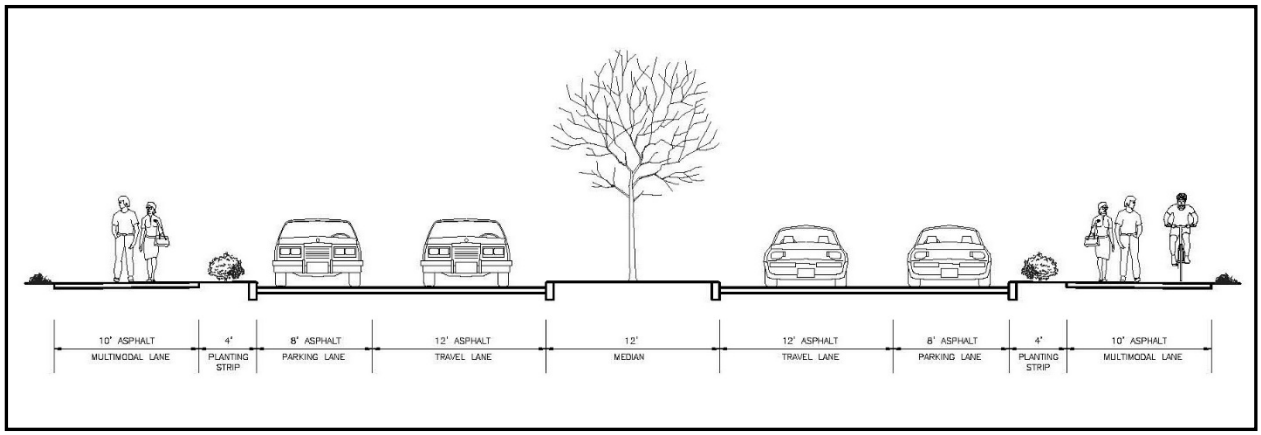


Figure 1-7: Gex Drive/Noma Drive Connection – Park Ten Drive (Roundabout to Noma Circle)
Proposed Roadway Section TC-60

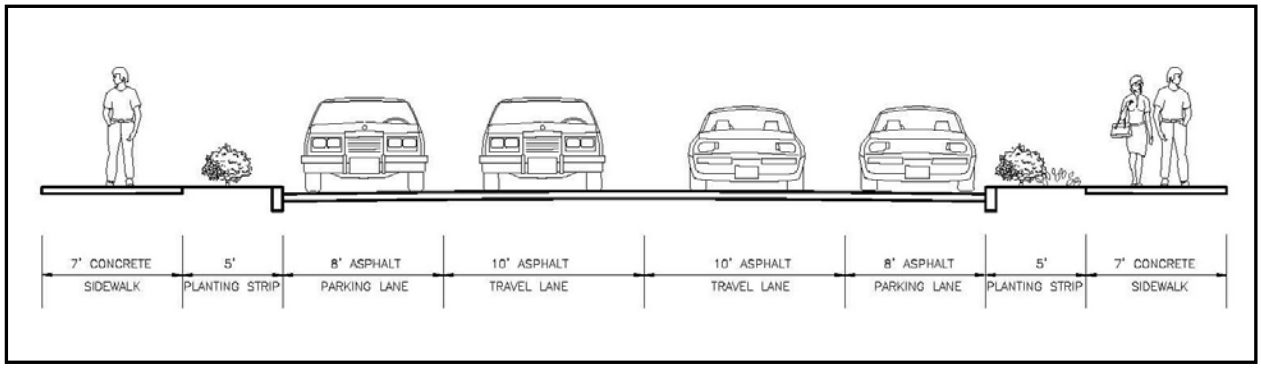
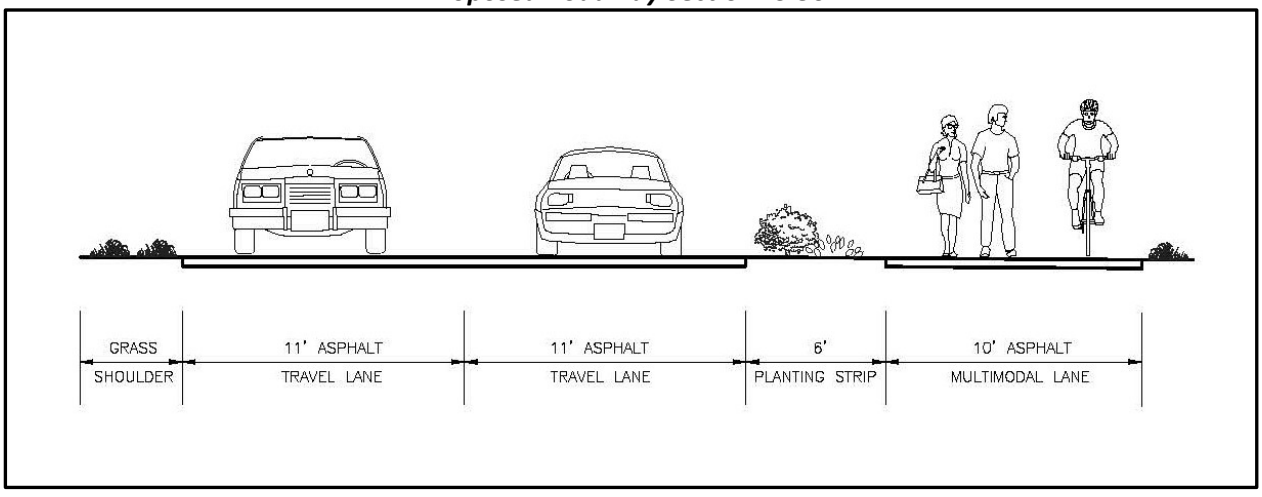


Figure 1-8: Gex Drive/Noma Drive Connection – Leisure Time Drive & Leisure Time Lane Extension
Proposed Roadway Section LS-50



Right-of-Way Requirements

Park Ten Drive

The existing right-of-way for Park Ten Drive is 80 feet in width. A right-of-way of 80 feet is required for the proposed boulevard roadway section from Gex Drive to the roundabout. Therefore, the portion of the proposed roadway that is located within the existing alignment of the road can be constructed within the existing right-of-way and no land acquisition will be required. However, right-of-way will be required where the proposed roadway veers from the existing roadway alignment. A right-of-way of 60 feet is required for the proposed roadway from the roundabout to Noma Circle. A small portion of this roadway lies within the existing right-of-way, but land acquisition will be required for the majority of the proposed alignment. Right-of-way will also be required for the construction of the new roundabout. A total of approximately 89,600 square feet, or 2.1 acres, of land acquisition will be required.

Leisure Time Drive Extension

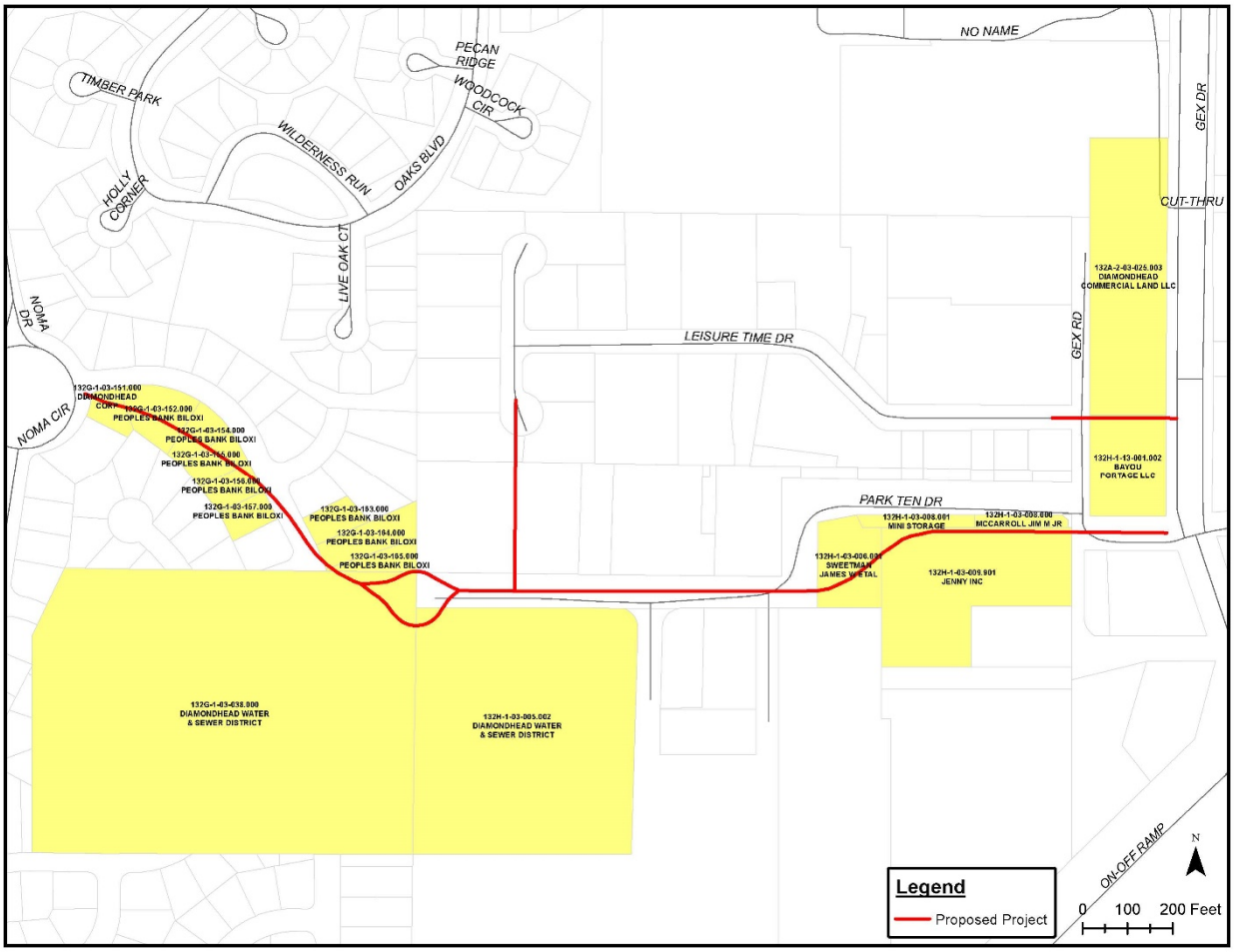
No right-of-way exists for the extension from Leisure Time Drive to Gex Drive. To provide a right-of-way of 50 feet along the entire length of the proposed roadway, approximately 13,750 square feet, 0.3 acres, of land acquisition will be required.

Leisure Time Lane Extension

The City recently purchased a 50-foot right-of-way for the construction of the roadway from Leisure Time Lane to Park Ten Drive. No further land acquisition will be required for the construction of this proposed roadway.

A map highlighting the parcels that will likely be impacted by the proposed project is provided in Figure 1-9. The parcel numbers and owners noted in the figure were obtained from the GIS data provided by Hancock County in 2020. It should be noted that the exact location and area of required right-of-way will depend on the alignment of the proposed roadways and cannot be precisely detailed until the roadway alignment has been finalized.

Figure 1-9: Gex Drive/Noma Drive Connection – Right-of-Way Impacts



Traffic Considerations

All the roads located within the commercial area to the west of Gex Drive are classified as local streets. Because these are dead-end streets, and not through-streets, current travel is only to access the businesses located on these streets. Traffic counts taken just west of the intersection of Gex Drive and Gex Road by the Gulf Regional Planning Commission in 2020 indicate that there is an annual average daily traffic count of 700. It can be expected, if connector roads are constructed and development occurs as planned, that traffic volumes in this area will increase.

Pedestrian Facilities

Currently there are no pedestrian facilities in the commercial area where the proposed project is located. The project will include the construction of either a 10-foot wide multimodal lane or a 7-foot sidewalk along both sides of Park Ten Drive. This will provide pedestrian access between Gex Drive and Noma Drive. The multimodal lane will also provide adequate space for biking and use of a golf-cart. The extensions of Leisure Time Lane and Leisure Time Drive will also include the construction of a 10-foot wide multimodal lane, providing adequate space for walking, biking and the use of a golf-cart.

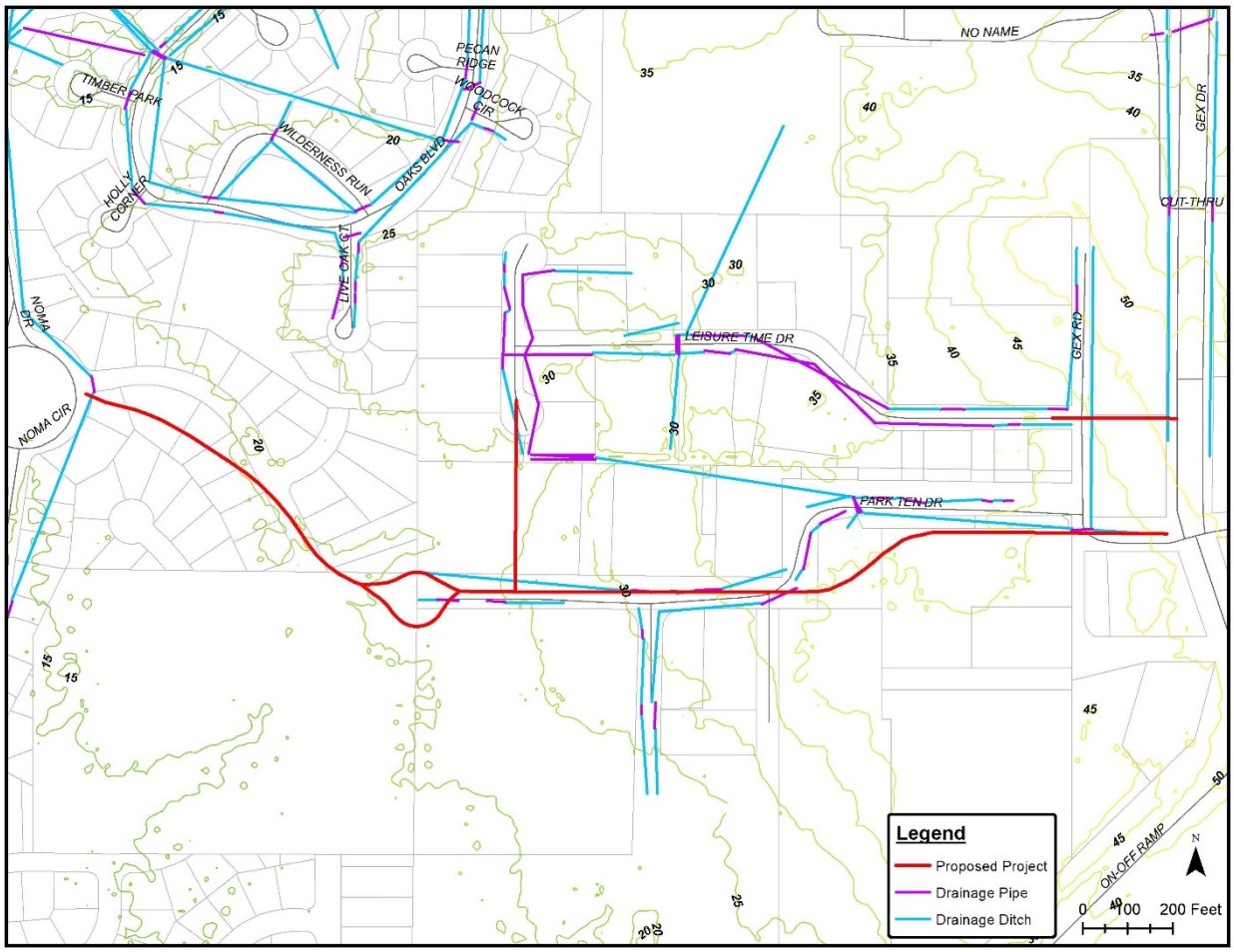
Utilities

An investigation was conducted to determine the utilities located in the project area. Below is a summary of the available utility information.

Drainage

The City of Diamondhead Public Works Department maintains the drainage system in the City. Based on the City's GIS records, the drainage system in the proposed project area consists of roadside ditches and driveway culverts. Ditches and culverts that are impacted by the modifications made to Park Ten Drive will need to be relocated along the new roadway alignment. Drainage will need to be assessed during design to verify the extent of the required drainage modifications and to determine required drainage facilities for the new roadways. It is anticipated that subsurface drainage and low impact development (LID) drainage practices will be implemented and connected to the existing drainage system. A map of the drainage facilities and the ground surface elevations in the project vicinity is provided in Figure 1-10.

Figure 1-10: Gex Drive/Noma Drive Connection – Drainage & Contour Map

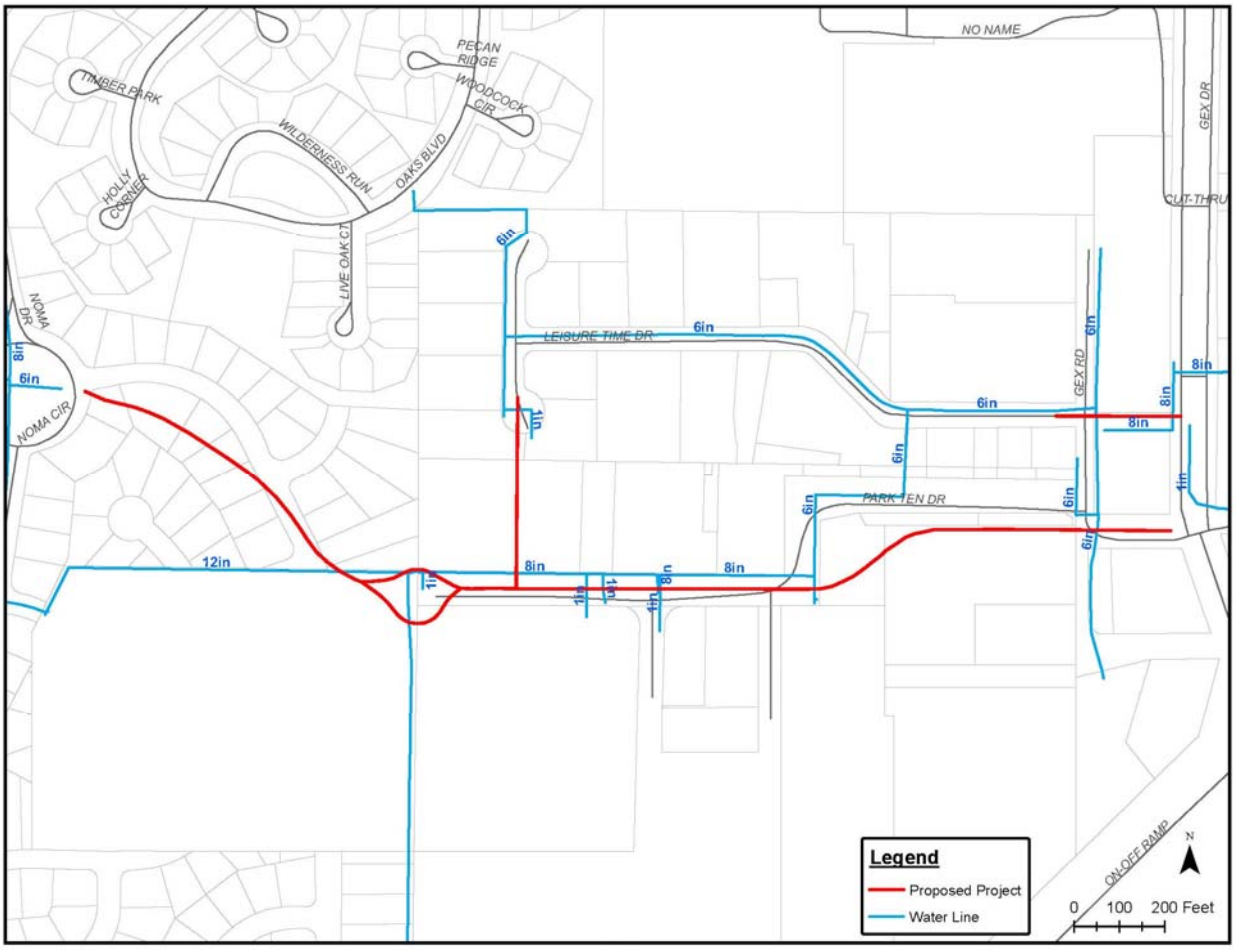


Water and Sewer

The Diamondhead Water and Sewer District (DWSD) owns and operates the water and sewer system in the City of Diamondhead. The DWSD provided a GIS file with locations and data for the water and sewer utilities. It should be noted that the locations indicated in the database were not surveyed, and only provide a general location of where the utilities are located. While the water and sewer utilities should not conflict with the proposed project, as they are located underground, care will need to be taken during construction to not damage the existing utilities. Some facilities, such as manholes, valves, or fire hydrants, may require adjusting if they interfere with the alignment of the new roadway.

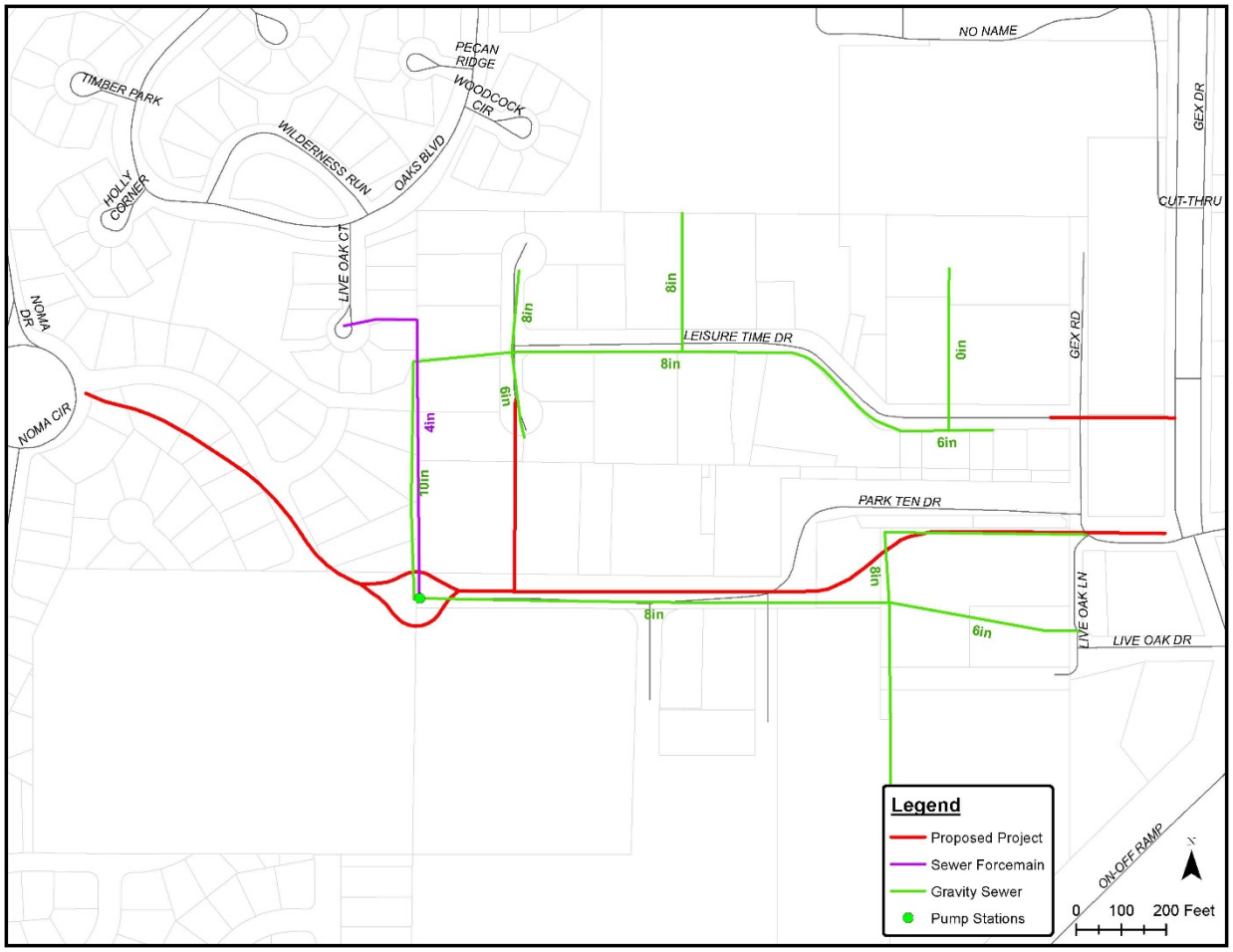
A water main, with a diameter ranging from 6-inch to 12-inch and with multiple tie-ins, runs along or near the proposed Park Ten Drive alignment. A 6-inch water main runs along Leisure Time Lane, with a 1-inch connection located at the south end of Leisure Time Lane, where the roadway extension begins. Multiple water mains, either 6-inch or 8-inch in diameter are located in close vicinity to the roadway extension from Leisure Time Drive to Gex Drive. It is anticipated that additional water facilities will be required to serve future development in the project area. However, a conceptual layout and the associated costs have not been developed for this study, as the required facilities will depend on the type and extent of the development and its impact on the existing water system. A map of the existing water lines located in the project vicinity is provided in Figure 1-11.

Figure 1-11: Gex Drive/Noma Drive Connection – Water Map



An 8-inch gravity sewer line runs along or near the proposed Park Ten Drive alignment and connects to the pump station located in the middle of the proposed roundabout. A 10-inch gravity sewer line flows south and also connects to the pump station. A 4-inch forcemain flows north from the pump station to live Oak Court. A 6-inch gravity sewer line runs along the south end of Leisure Time Lane, where the roadway extension begins. No sewer lines are located in close vicinity to the Leisure Time Drive extension. It is anticipated that additional sewer facilities will be required to serve future development in the project area. However, a conceptual layout and the associated costs have not been developed for this study, as the required facilities will depend on the type and extent of the development and its impact on the existing sewer system. A map of the existing sewer lines located in the project vicinity is provided in Figure 1-12.

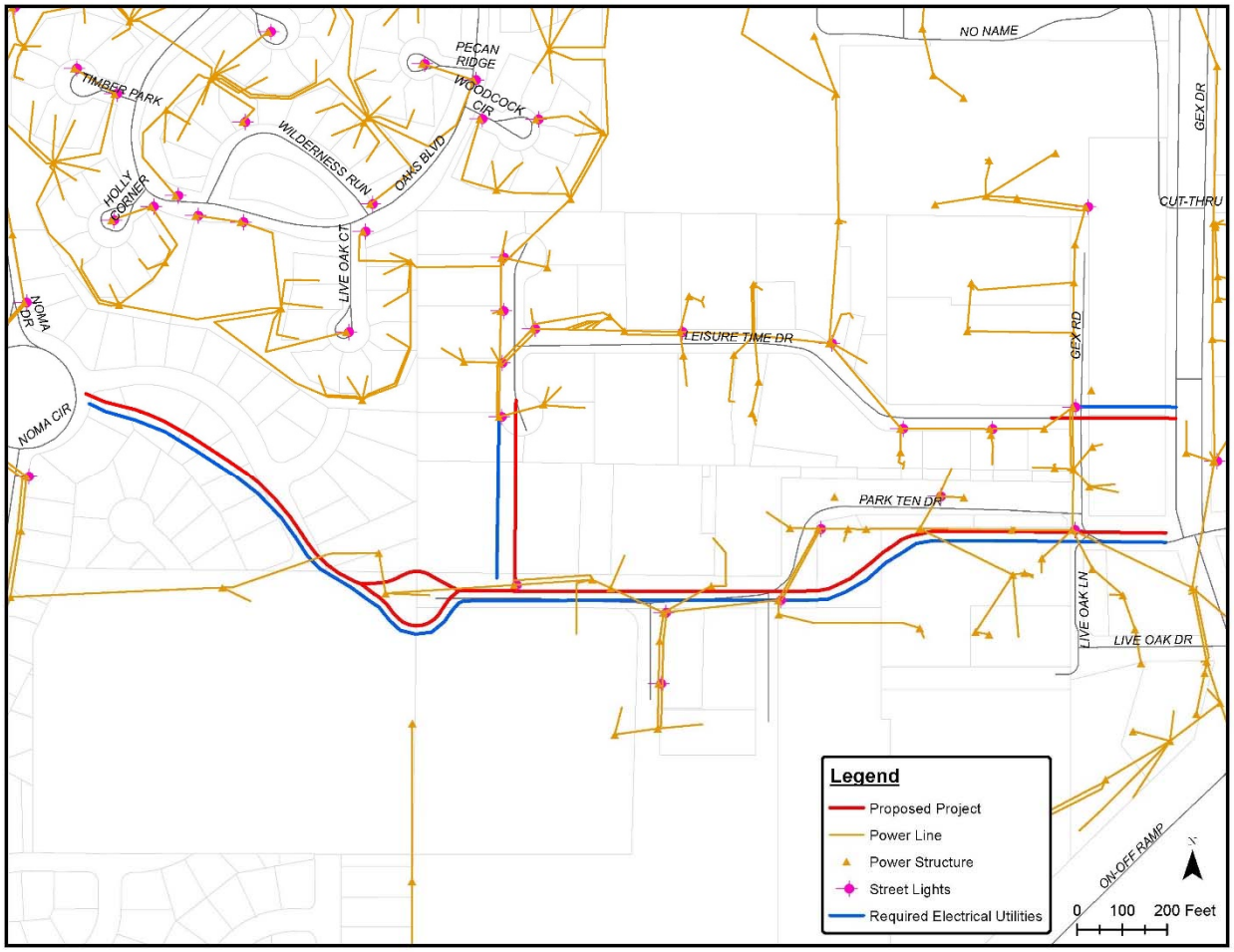
Figure 1-12: Gex Drive/Noma Drive Connection – Sewer Map



Electric

Coast Electric provides power and street lighting to the City of Diamondhead. Based on the latest information provided by Coast Electric, there are electric facilities, including power lines, poles, pedestals and street lights, that run along or near the proposed Park Ten Drive alignment. Electric facilities are also located at each end of the proposed Leisure Time Lane extension and at the beginning of the Leisure Time Drive extension. Modifications will be required to move the existing utilities underground in the project area. New underground utilities will be required along the proposed roadways where no such utilities exist currently. In addition, decorative lighting will be required along all proposed roadways in the project. A map of the existing electrical utilities located in the project vicinity is provided in Figure 1-13. The location where new electrical utilities will likely be required has also been identified.

Figure 1-13: Gex Drive/Noma Drive Connection – Electrical Map



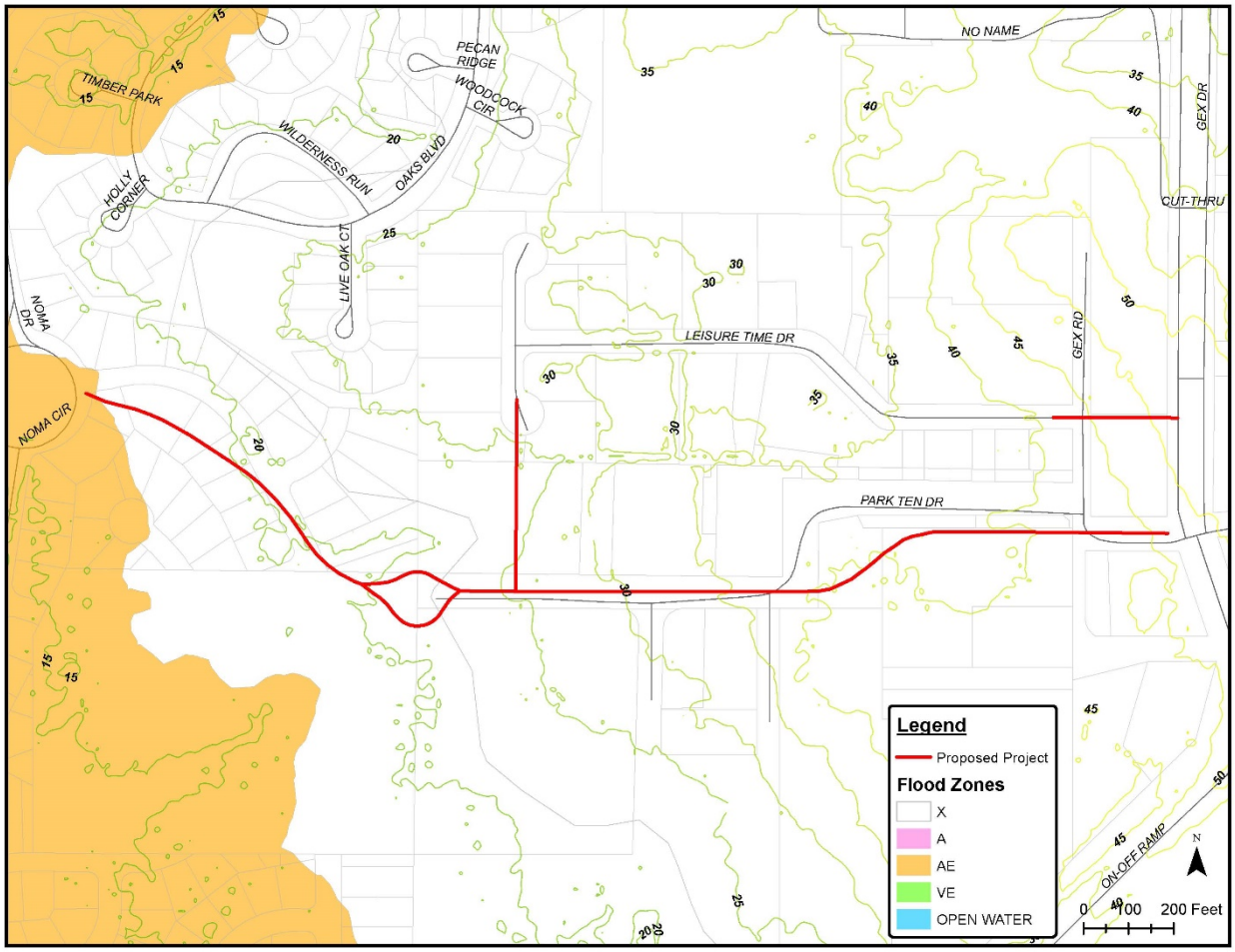
Environmental Considerations

An investigation into the environmental considerations for constructing the project was conducted. Below is a summary of the available information in the project area.

Flood Zones

The project is located in Flood Zone X and is a moderate risk area within the 0.2-percent-annual-chance floodplain, with the exception where the Park Ten Drive extension ties into Noma Circle. This area is located in Flood Zone AE and is subject to inundation by the 1-percent-annual-chance flood event. A base flood elevation (BFE) of 17 is specified for this area. A map of the flood zones and ground surface elevations in the project vicinity is provided in Figure 1-14.

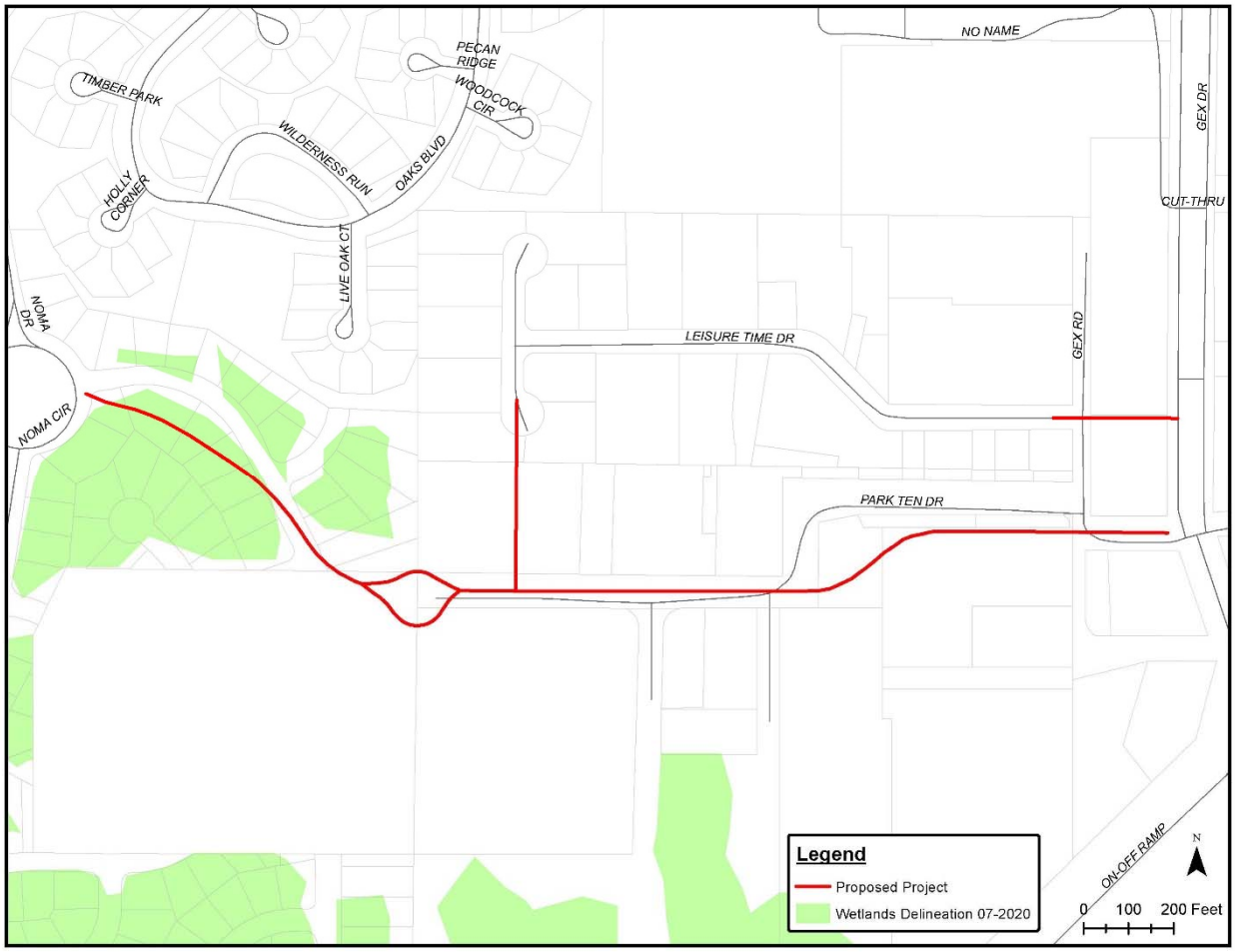
Figure 1-14: Gex Drive/Noma Drive Connection – Flood Zone Map



Wetlands

A wetlands delineation performed by Culpepper & Associates in July 2020 identified wetlands in the area between Noma Circle and the proposed roundabout. According to this delineation, it is estimated that approximately 0.5 acres of wetlands will be impacted by the project and will likely require mitigation. However, a Jurisdictional Determination (JD) from the US Army Corps of Engineers will be required to confirm wetland boundaries and determine mitigation requirements. A Joint Application and Notification will need to be completed and submitted in order to obtain the JD. A map showing the location of these wetlands is provided in Figure 1-15.

Figure 1-15: Gex Drive/Noma Drive Connection – Wetlands Map



Opinion of Probable Costs

An opinion of probable costs, including construction costs and professional services costs, was prepared for the proposed project. Because this is a preliminary plan, a 25% contingency was included in the estimated construction costs. The costs for professional services are based on a percentage of the estimated construction costs. A breakdown of these costs is provided in Table 1-1.

Table 1-1: Gex Drive/Noma Drive Connection – Opinion of Probable Costs

Description	Quantity	Unit	Unit Cost	Total Cost
Construction				
Asphalt Pavement	5,890	TON	$100.00	$589,000.00
Base Course	4,620	CY	$75.00	$346,500.00
Geotextile	16,560	SY	$5.00	$82,800.00
Concrete Sidewalk	1,190	SY	$40.00	$47,600.00
Grassing/Landscaping	7,150	SY	$5.00	$35,750.00
Drainage Modifications	1	LS	$50,000.00	$50,000.00
Electrical - Underground	1	LS	$800,000.00	$800,000.00
Sediment & Erosion Control	1	LS	$25,000.00	$25,000.00
Traffic Control	1	LS	$15,000.00	$15,000.00
Mobilization	1	LS	$99,590.00	$99,590.00
			Construction Subtotal	$2,091,240.00
			Contingency (25%)	$522,810.00
			Construction Total	$2,614,050.00
Professional Services				
Engineering (Geotechnical, Survey, Design)	1	LS	$190,220.00	$190,220.00
Resident Inspection	1	LS	$84,660.00	$84,660.00
Land Acquisition	103,350	SF	$2.50	$258,375.00
Permitting	1	LS	$10,000.00	$10,000.00
Wetlands Mitigation	0.5	AC	$25,000.00	$12,500.00
			Professional Services Total	$555,755.00
			PROJECT TOTAL	**$3,169,805.00**

Recommendations

To advance the proposed project from the preliminary planning phase to the design phase and make the project more ready for construction, the following next steps are recommended:

1. Perform topographical survey of the project area to determine the alignment of the proposed roadway and the impact to existing utilities. Notify utility owner(s) of any impacts.

2. Perform geotechnical investigation to obtain recommendations for roadway section (base, pavement).

3. Perform drainage analysis to determine required modifications to existing drainage facilities and required implementation of new drainage facilities.

4. Complete and submit a Joint Application and Notification for review and approval by the US Army Corps of Engineers, Mississippi Department of Marine Resources (DMR) and the Mississippi Department of Environmental Quality (MDEQ). As part of this application, comments will also be received from the US Fish and Wildlife Service (USFWS), the Mississippi Department of Archives and History (MDAH), the Mississippi Natural Heritage Program (MNHP), the Environmental Protection Agency (EPA) and NOAA (National Oceanic and Atmospheric Administration) Fisheries (for coastal projects). A copy of the Joint Application and Notification is provided in Appendix C and can be accessed at https://dmr.ms.gov/wp-content/uploads/2019/07/joint-application-notification-form2.pdf.

5. If it is anticipated that MDOT will provide funding for the proposed project, complete and submit Form ENV-160-LPA, MDOT Environmental Division Environmental Class of Action Determination. A copy of this form is included in Appendix D and can be accessed at http://sp.mdot.ms.gov/Environmental/Forms%20and%20Templates/ENV-160/ENV-160%20LPA.pdf.

6. If new electrical facilities are to be installed as part of the proposed project, correspond with Coast Electric to begin the design process.

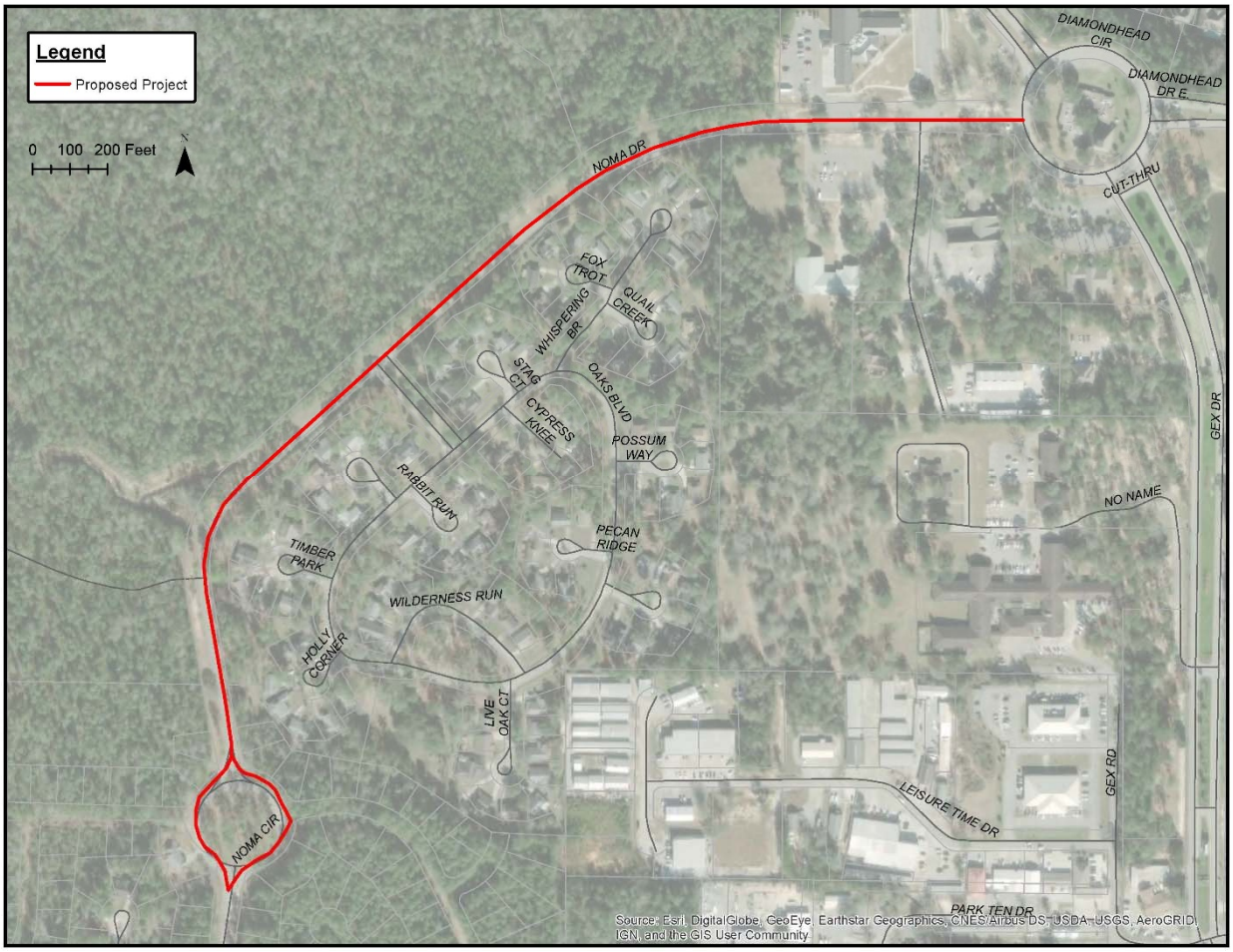
7. If new sewer and water facilities are to be installed as part of the proposed project, correspond with DWSD to begin the design process.

PROJECT 2 – NOMA DRIVE (PHASE 1)

Project Purpose & Description

Project 2 – Noma Drive (Phase 1) includes the modification of approximately 4,110 feet of Noma Drive, from Diamondhead Circle to Noma Circle. This project provides a more aesthetically pleasing roadway with pedestrian facilities that can accommodate the anticipated increase in traffic to and from the proposed Town Center located south and southeast of the project. (Appendix A includes a map showing the planned development area as specified in the City of Diamondhead's Master Plan.) A map of the proposed project is provided in Figure 2-1.

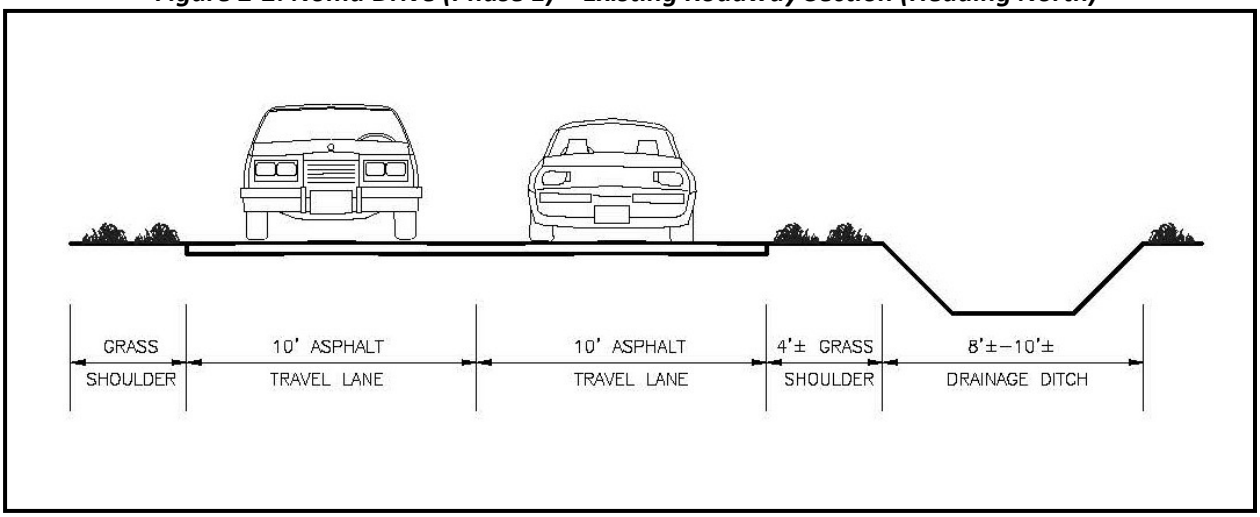
Figure 2-1: Noma Drive (Phase 1) – Project Map



Existing Conditions

The existing Noma Drive is an asphalt two-lane roadway with an approximate width of 20 feet. A drainage ditch runs along the south/southeast side of the road. There are no pedestrian facilities. A cross section of the existing roadway section is provided in Figure 2-2.

Figure 2-2: Noma Drive (Phase 1) – Existing Roadway Section (Heading North)



Proposed Conditions

The proposed Noma Drive roadway will be a two-lane asphalt boulevard, with 11-foot vehicle lane widths and a 12-foot grass median. A 10-foot multimodal lane will run along the north/northwest edge of the road, separated from the road by a 6-foot planting strip. The layout for the proposed roadway is provided in Figure 2-3. A cross section of the proposed roadway is provided in Figure 2-4.

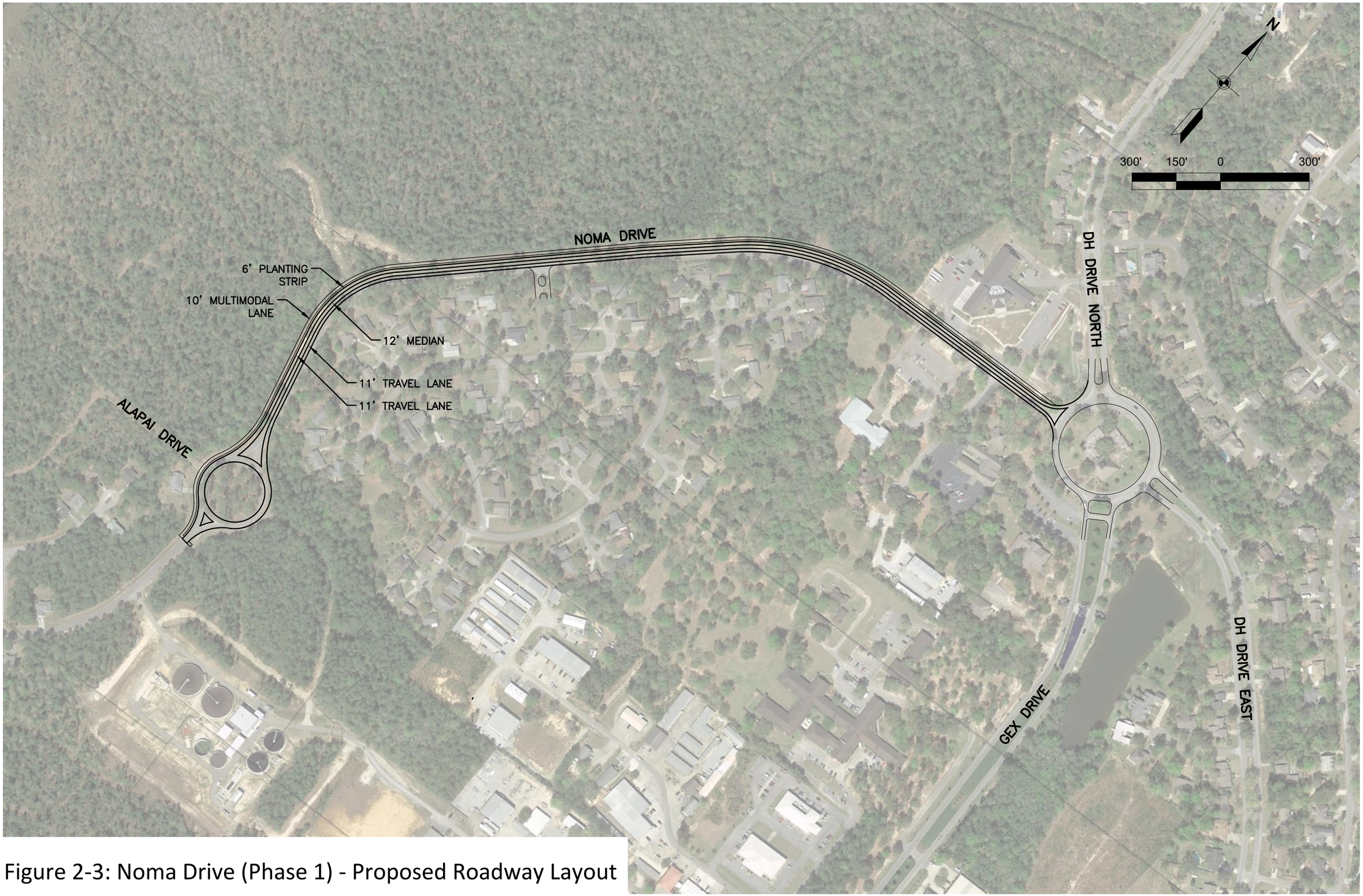
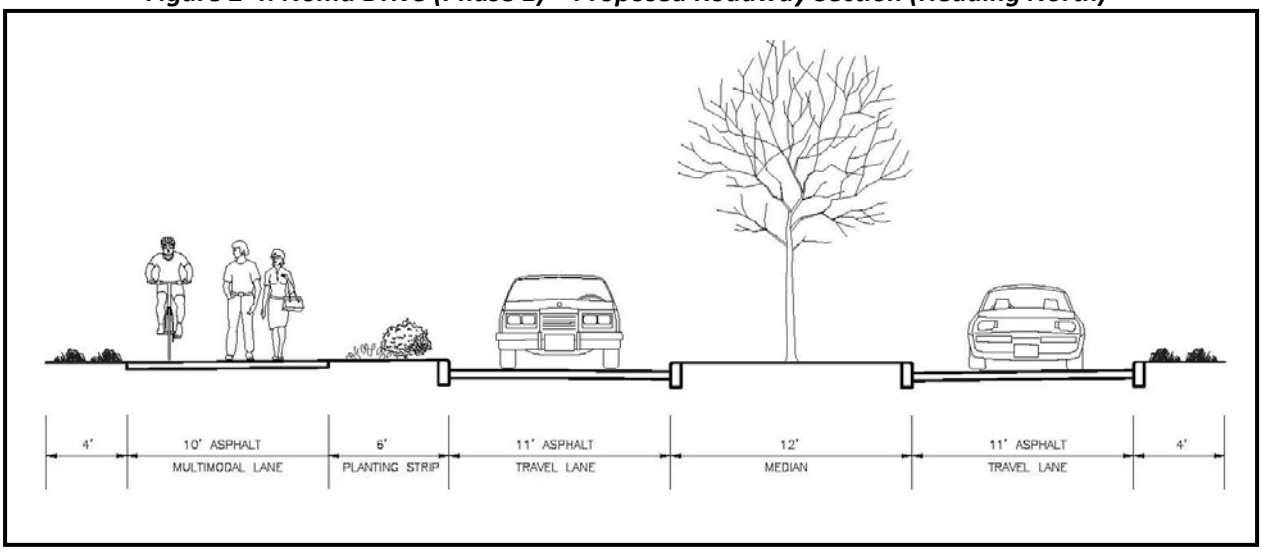


Figure 2-3: Noma Drive (Phase 1) - Proposed Roadway Layout

Figure 2-4: Noma Drive (Phase 1) – Proposed Roadway Section (Heading North)



Right-of-Way Requirements

According to plat records, the existing right-of-way for Noma Drive in the vicinity of the proposed project is 80 feet in width. The proposed roadway section shown above is 58 feet in width. Therefore, the proposed roadway can be constructed within the existing right-of-way and no land acquisition will be required.

Traffic Considerations

Noma Drive is classified as a local street. It is not currently a highly traveled road as it is primarily used to access The Oaks, the residential area located on the south side of Noma Drive, and the athletic fields located at the southern end of Noma Drive, outside of the project limits. Traffic counts taken by the Gulf Regional Planning Commission in 2020 indicate that there is an annual average daily traffic count of 1,300. However, these counts were taken in front of City Hall, which experiences a heavier traffic volume than the southern end of the road. It can be expected, if connector roads are constructed and development occurs as planned, that traffic volumes on Noma Drive will increase.

Pedestrian Facilities

Currently there are no pedestrian facilities along Noma Drive. The project will include the construction of a 10-foot wide multimodal lane that will provide adequate space for walking, biking and use of a golf-cart.

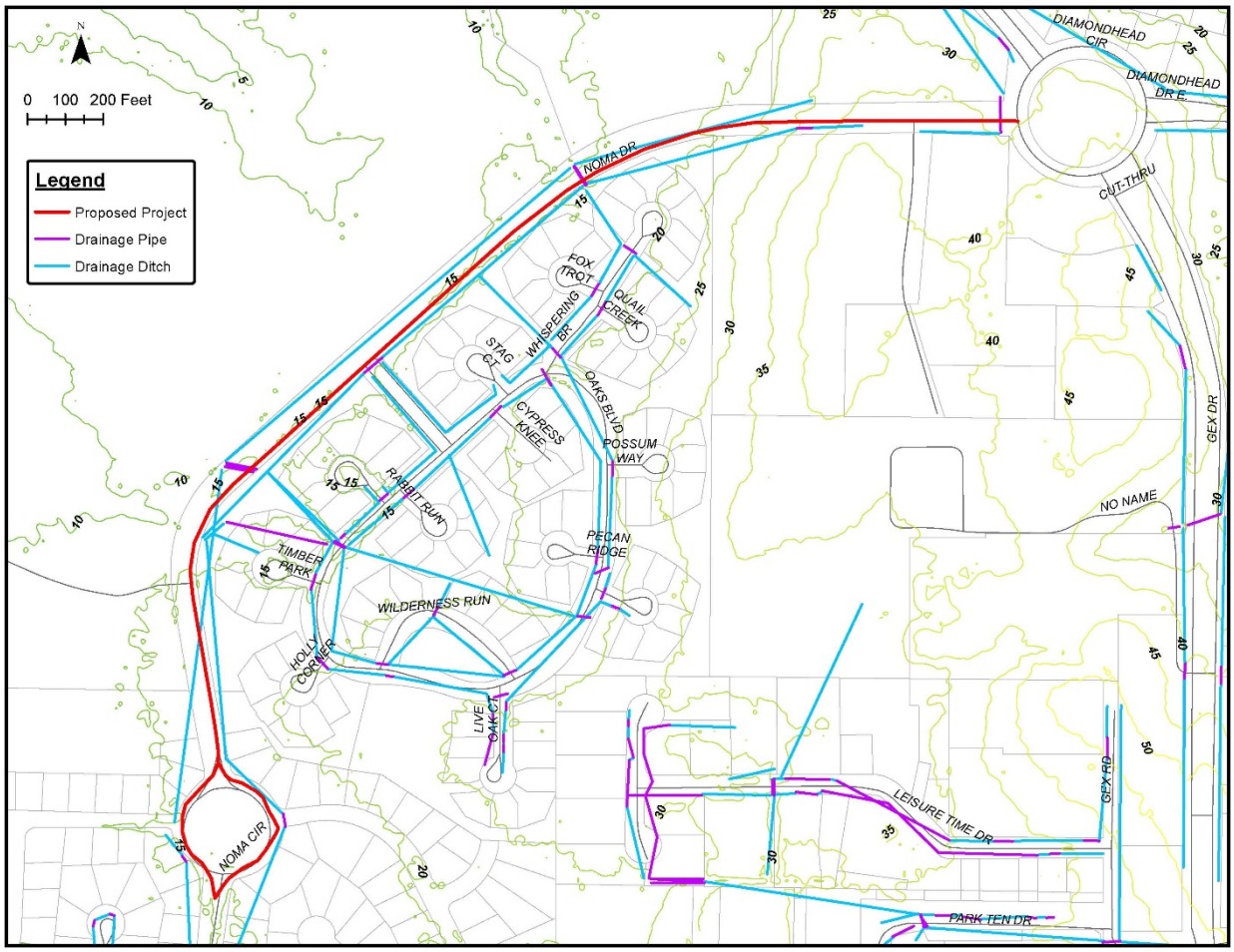
Utilities

An investigation was conducted to determine the utilities located in the project area. Below is a summary of the available utility information.

Drainage

The City of Diamondhead Public Works Department maintains the drainage system in the City. Based on the City's GIS records, the drainage system in the proposed project area consists primarily of roadside ditches, with the occasional driveway culvert. There are multiple drainage pipes crossing under the roadway. Care will be required during construction to not cause damage to these cross drains. Roadside drainage impacted by the modifications made to Noma Drive will need to be relocated and/or modified. Drainage will need to be assessed during design to verify the extent of the required drainage modifications. A map of the drainage facilities and ground surface elevations in the project vicinity is provided in Figure 2-5.

Figure 2-5: Noma Drive (Phase 1) – Drainage & Contour Map

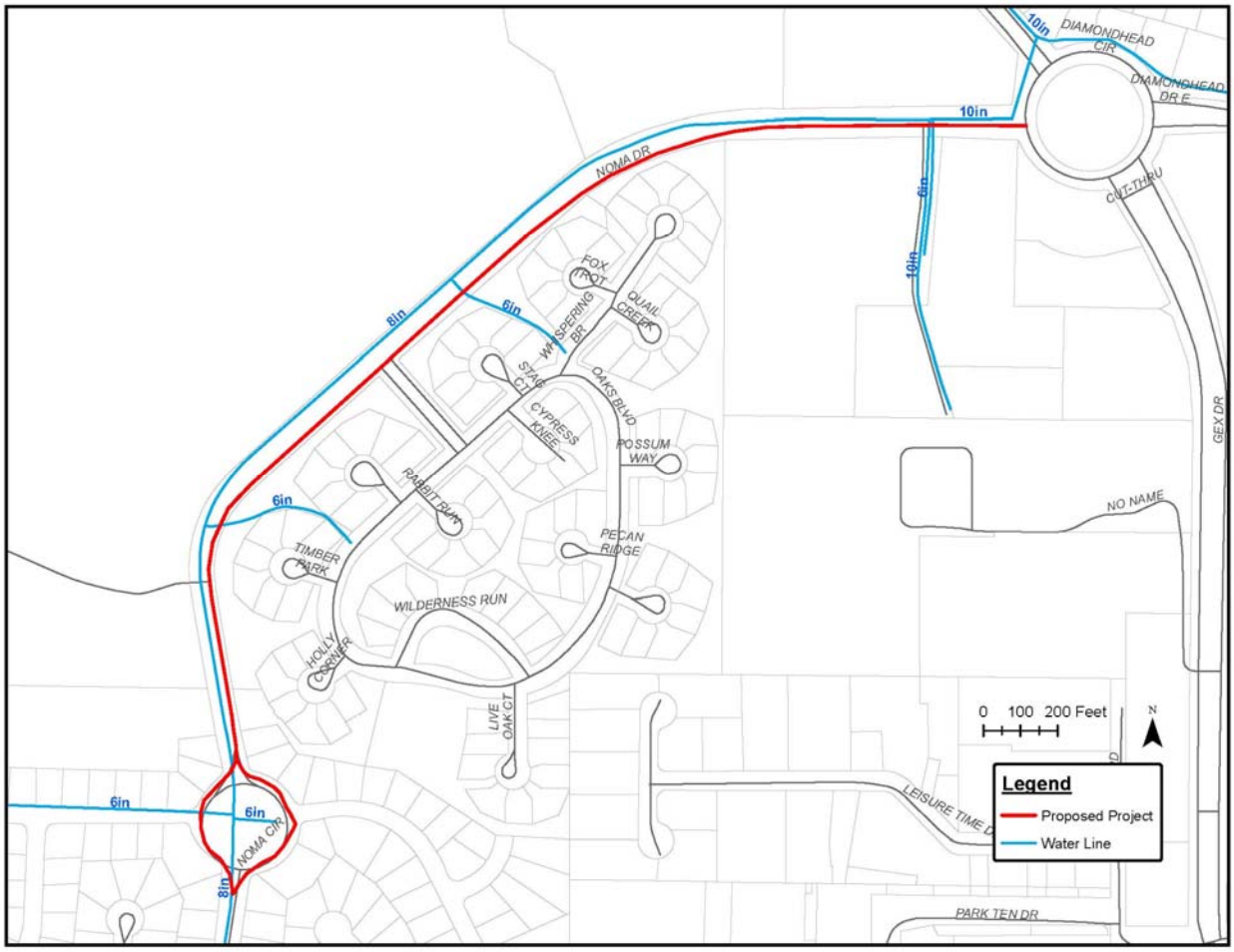


Water and Sewer

The Diamondhead Water and Sewer District (DWSD) owns and operates the water and sewer system in the City of Diamondhead. The DWSD provided a GIS file with locations and data for the water and sewer utilities. It should be noted that the locations indicated in the database were not surveyed, and only provide a general location of where the utilities are located. While the water and sewer utilities should not conflict with the proposed project, as they are located underground, care will need to be taken during construction to not damage the existing utilities. Some facilities, such as sewer manholes, valves, or fire hydrants, may require adjusting if they interfere with the alignment of the new roadway.

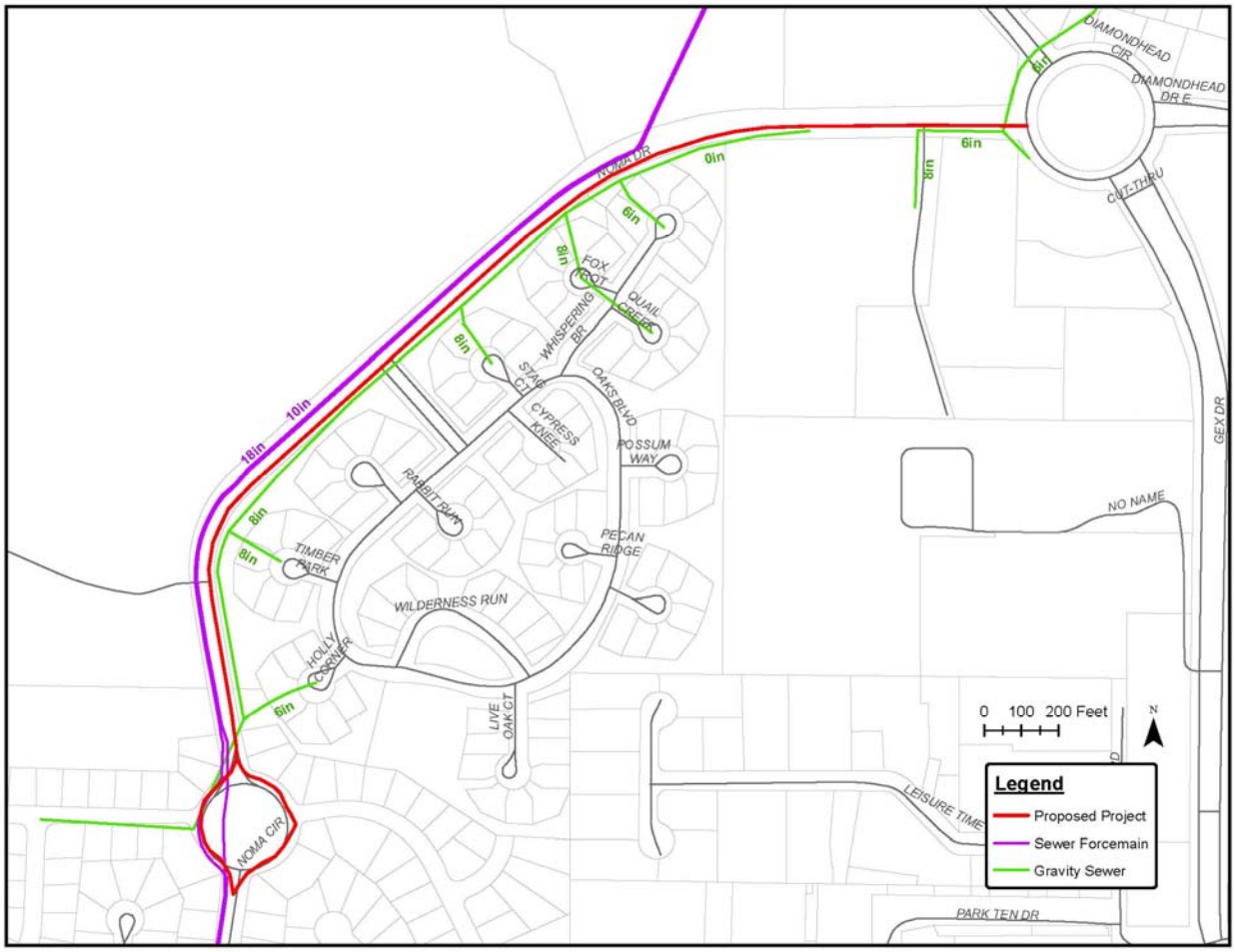
A water main, with multiple tie-ins, runs along Noma Drive for the entire length of the project. The main is 8-inch in diameter for the majority of the project length and increases to 10-inch in diameter just west of Diamondhead Circle. While the need for new water facilities has not been considered for this study, it is anticipated that new water lines will not be required along the project alignment, as they already exist. However, the need for any additional water facilities will need to be assessed once the type and extent of future development in the project vicinity is determined. A map of the existing water lines located in the project vicinity is provided in Figure 2-6.

Figure 2-6: Noma Drive (Phase 1) – Water Map



There is a 10-inch sewer forcemain, an 18-inch sewer forcemain and an 8-inch gravity sewer line running along Noma Drive for the entire length of the project. While the need for new sewer facilities has not been considered for this study, it is anticipated that new sewer lines will not be required along the project alignment, as they already exist. However, the need for any additional sewer facilities will need to be assessed once the type and extent of future development in the project vicinity is determined. A map of the existing sewer lines located within in the project vicinity is provided in Figure 2-7.

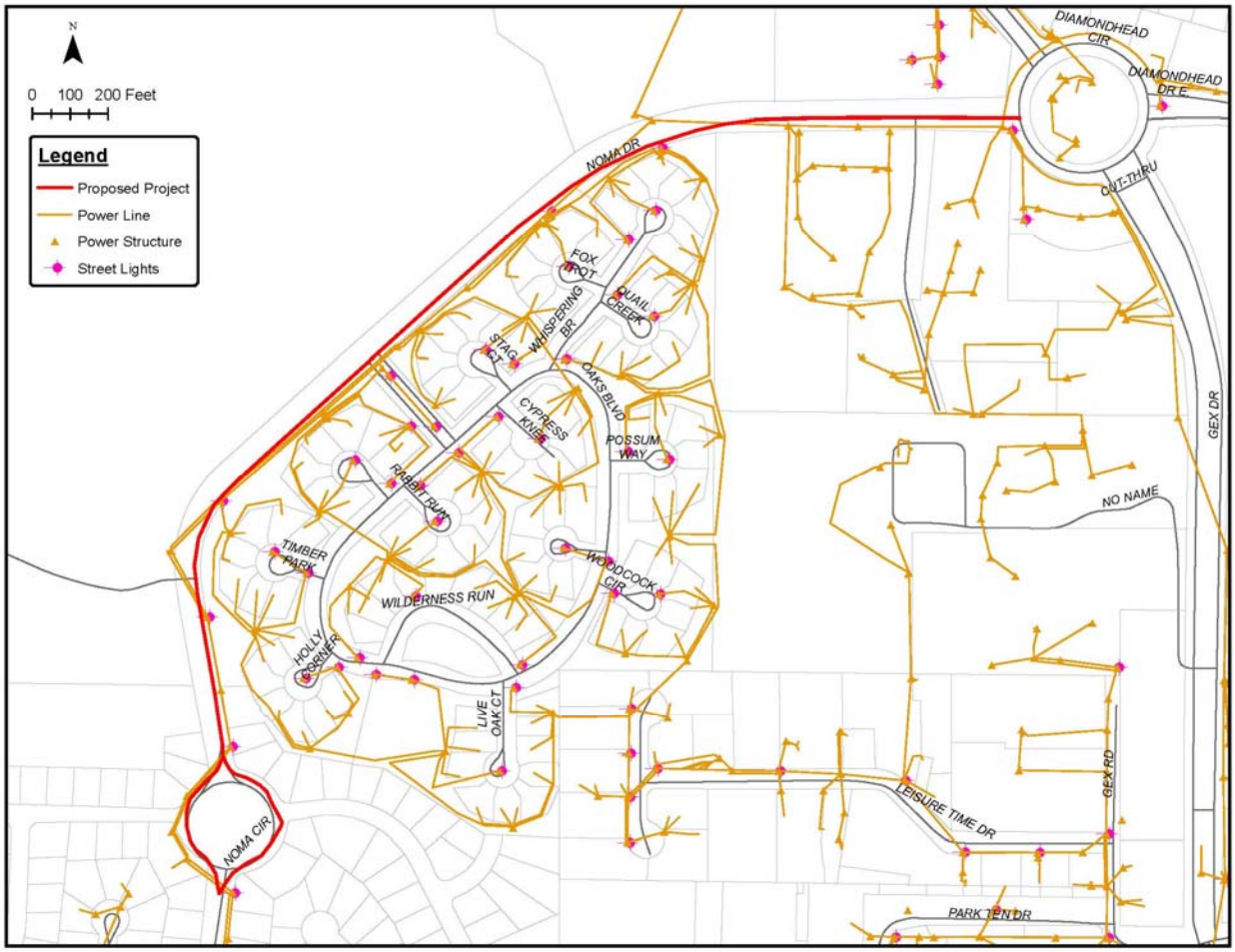
Figure 2-7: Noma Drive (Phase 1) – Sewer Map



Electric

Coast Electric provides power and street lighting to the City of Diamondhead. Based on the latest information provided by Coast Electric, there are electric facilities, including power lines, poles, pedestals and street lights, located along Noma Drive for the entire length of the project. These facilities are located within the existing right-of-way and may need to be relocated if they interfere with the proposed roadway. A map of the electrical utilities located in the project vicinity is provided in Figure 2-8.

Figure 2-8: Noma Drive (Phase 1) – Electrical Map



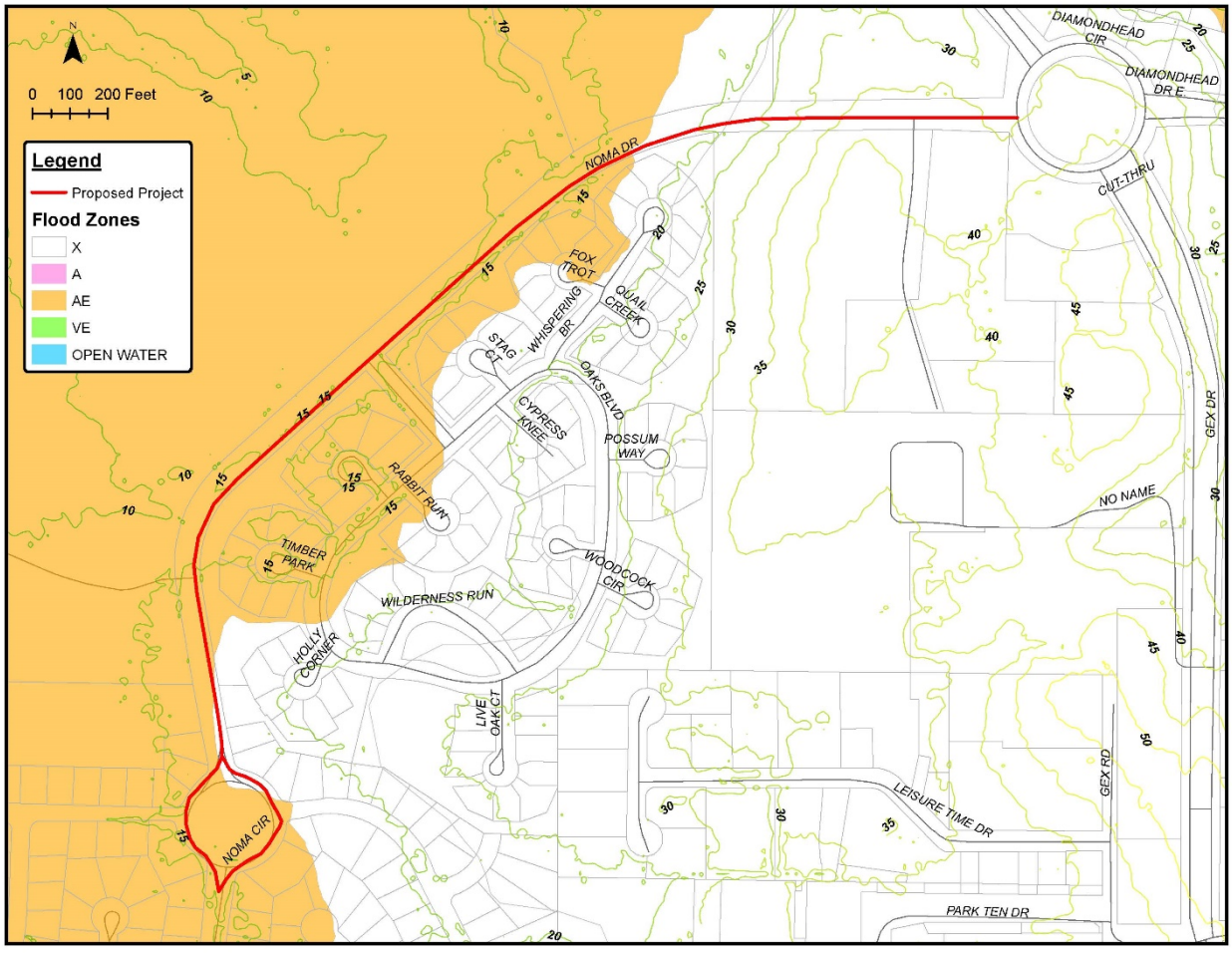
Environmental Considerations

An investigation into the environmental considerations for constructing the project was conducted. Below is a summary of the available information in the project area.

Flood Zones

The majority of the project is located in Flood Zone AE. This area is subject to inundation by the 1-percent-annual-chance flood event. A base flood elevation (BFE) of 17 is specified for this area. The northeastern portion of the project is located in Flood Zone X and is a moderate risk area within the 0.2-percent-annual-chance floodplain. A map of the flood zones and ground surface elevations in the project vicinity is provided in Figure 2-9.

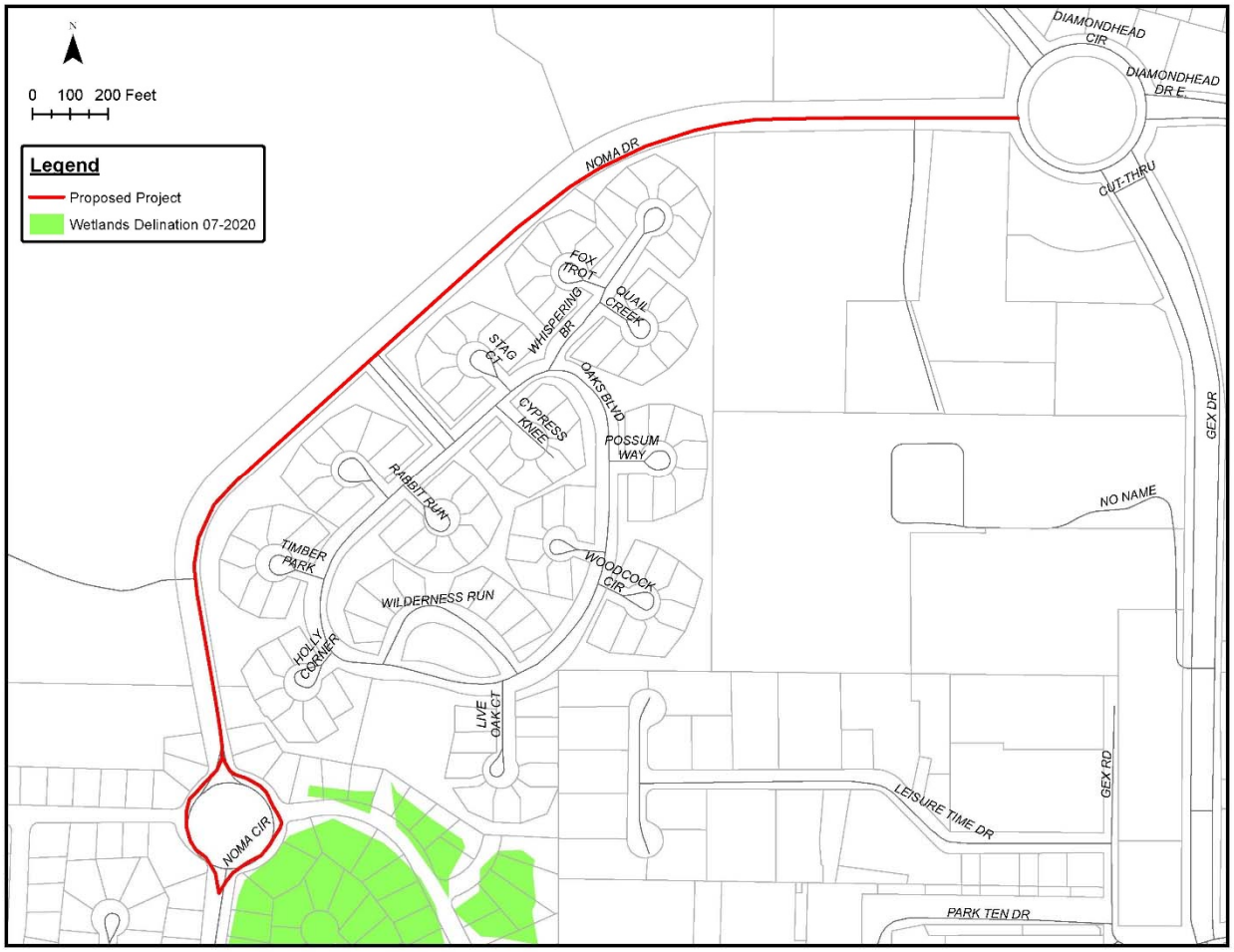
Figure 2-9: Noma Drive (Phase 1) – Flood Zone Map



Wetlands

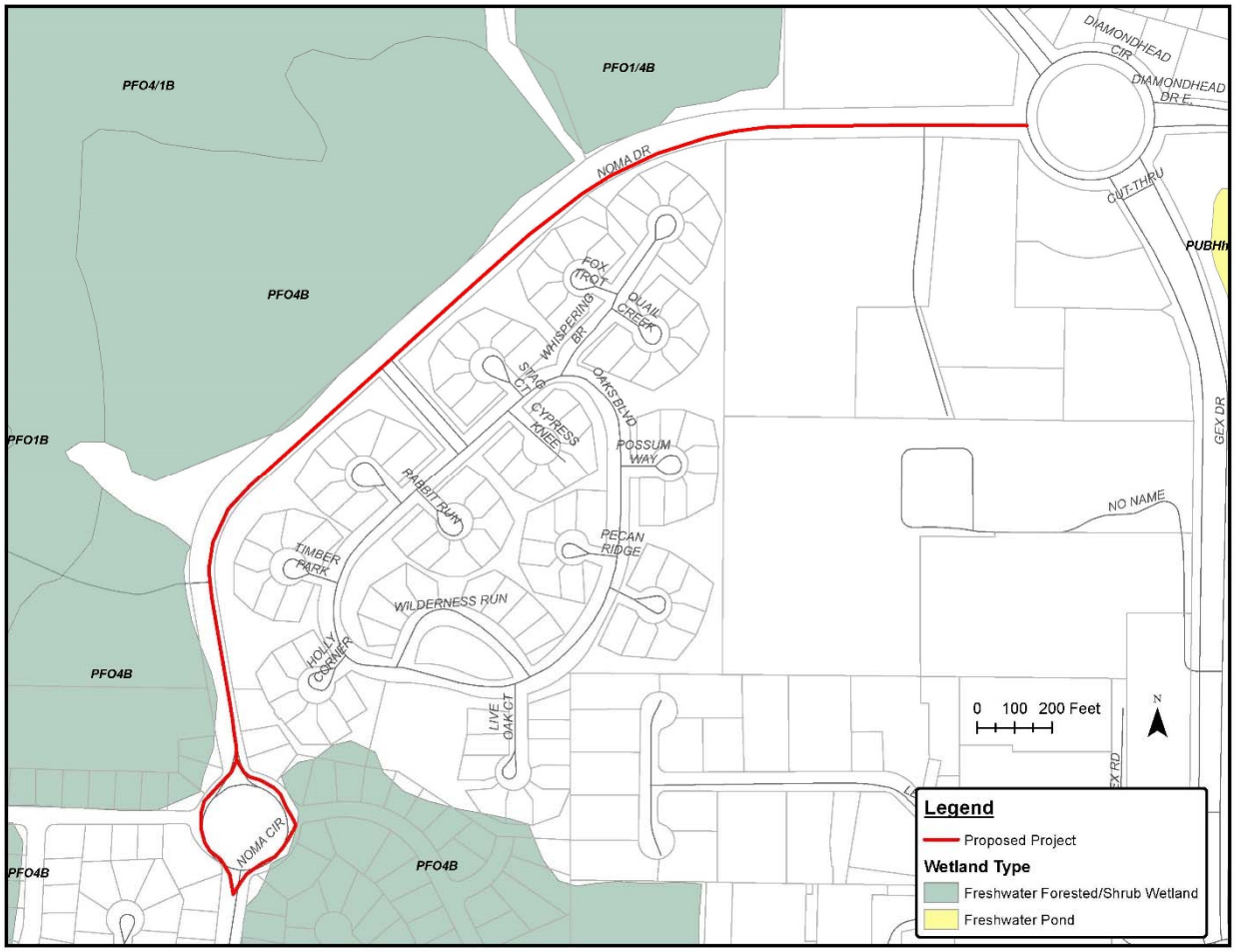
While a wetlands delineation has not been completed for the project area, a wetlands delineation was performed by Culpepper & Associates in July 2020 just outside the project area. This delineation identified wetlands to the east of Noma Circle at the south end of the project. A map showing the location of these wetlands is provided in Figure 2-10.

Figure 2-10: Noma Drive (Phase 1) – July 2020 Wetlands Delineation Map



The US Fish and Wildlife Service National Wetlands Inventory (NWI) identifies approximate boundaries for wetlands that can be used as an initial assessment of potential wetlands. A complete wetlands delineation is still required to determine a more accurate boundary for the wetlands. According to the NWI, there are wetlands located along the north/northwest boundary of the project. A map of the NWI wetlands in the project vicinity is provided in Figure 2-11.

Figure 2-11: Noma Drive (Phase 1) – US Fish and Wildlife Service NWI Wetlands Map



The wetlands are freshwater forested/shrub wetlands with a classification code of either PFO4B or PFO1/4B. An explanation of this code, as specified on the USFWS NWI website, is provided below:

> System Palustrine (P) – The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 20 acres; (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 8.2 feet at low water; and (4) salinity due to ocean-derived salt is less than 0.5 ppt.
>
> Class Forested (FO) – Characterized by woody vegetation that is 19.7 feet or taller

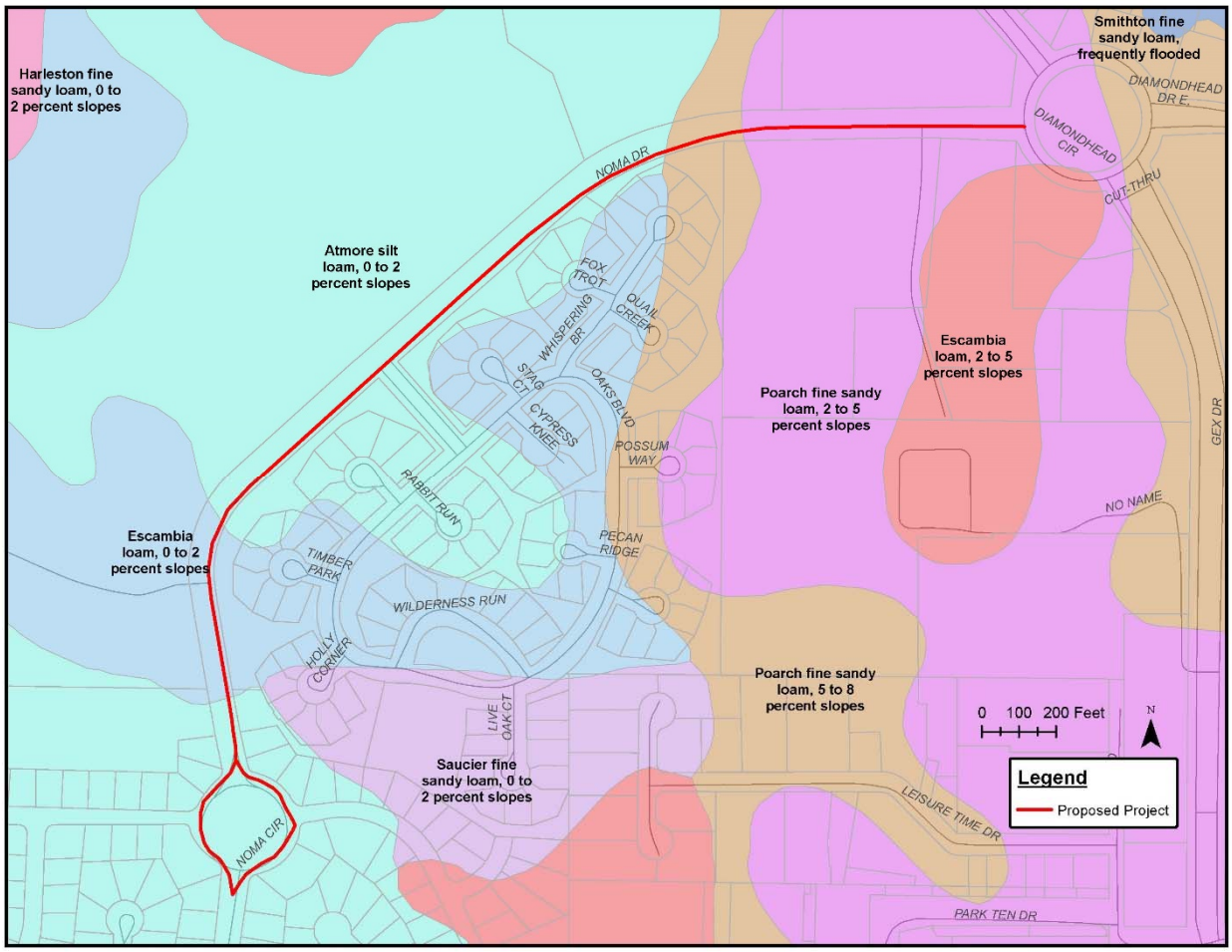
Subclass Broad-Leaved Deciduous (1) – Woody angiosperms (trees or shrubs) with relatively wide, flat leaves that are shed during the cold or dry season

Subclass Needle-Leaved Evergreen (4) – The dominant species in Needle-leaved Evergreen wetlands are young or stunted trees such as black spruce or pond pine.

Water Regime Seasonally Saturated (B) – The substrate is saturated at or near the surface for extended periods during the growing season, but unsaturated conditions prevail by the end of the season in most years. Surface water is typically absent, but may occur for a few days after heavy rain and upland runoff.

Soils data for the project area was obtained from US Department of Agriculture National Resources Conservation Service (NRCS). A map of the soils located in the project vicinity is provided in Figure 2-12. A complete description of each type of soil is provided in Appendix B.

Figure 2-12: Noma Drive (Phase 1) – Soils Map



Hydric soils are those soils that are sufficiently wet in the upper part to develop anaerobic conditions during the growing season. While not a substitution for performing an onsite investigation, hydric soils can indicate the possibility of wetlands. Of the soils located within the project area, the following are listed as hydric soils by NRCS:

- Atmore silt loam, 0 to 2% slopes
- Escambia loam, 0-2% slopes
- Poarch fine sandy loam, 5-8% slopes

Due to the close proximity of known wetlands and the project being located in an area of hydric soils, it is recommended that a complete wetlands delineation be performed for this project to confirm if any wetlands are located within the project limits. Once the delineation is complete, a Jurisdictional Determination (JD) from the US Army Corps of Engineers will be required to confirm wetland boundaries and determine mitigation requirements. A Joint Application and Notification will need to be completed and submitted in order to obtain the JD.

Opinion of Probable Costs

An opinion of probable costs, including construction costs and professional services costs, was prepared for the proposed project. Because this is a preliminary plan, a 25% contingency was included in the estimated construction costs. The costs for professional services are based on a percentage of the estimated construction costs. A breakdown of these costs is provided in Table 2-1.

Table 2-1: Noma Drive (Phase 1) – Opinion of Probable Costs

Description	Quantity	Unit	Unit Cost	Total Cost
Construction				
Asphalt Pavement	4,330	TON	$100.00	$433,000.00
Base Course	3,560	CY	$75.00	$267,000.00
Geotextile	12,790	SY	$5.00	$63,950.00
Grassing/Landscaping	11,880	SY	$5.00	$59,400.00
Drainage Modifications	1	LS	$50,000.00	$50,000.00
Electrical Modifications	1	LS	$100,000.00	$100,000.00
Sediment & Erosion Control	1	LS	$25,000.00	$25,000.00
Traffic Control	1	LS	$5,000.00	$5,000.00
Mobilization	1	LS	$50,170.00	$50,170.00
			Construction Subtotal	$1,053,520.00
			Contingency (25%)	$263,380.00
			Construction Total	$1,316,900.00
Professional Services				
Engineering (Geotechnical, Survey, Design)	1	LS	$103,340.00	$103,340.00
Resident Inspection	1	LS	$44,360.00	$44,360.00
Wetlands Delineation	1	LS	$2,500.00	$2,500.00
Permitting	1	LS	$10,000.00	$10,000.00
			Professional Services Total	$160,200.00
			PROJECT TOTAL	**$1,477,100.00**

Recommendations

To advance the proposed project from the preliminary planning phase to the design phase and make the project more ready for construction, the following next steps are recommended:

1. Complete a wetlands delineation to verify if wetlands are located within the project area.

2. Perform topographical survey of the project area to determine the alignment of the proposed roadway and the impact to existing utilities. Notify utility owner(s) of any impacts.

3. Perform geotechnical investigation to obtain recommendations for roadway section (base, pavement).

4. Perform drainage analysis to determine required modifications.

5. Complete and submit a Joint Application and Notification for review and approval by the US Army Corps of Engineers, Mississippi Department of Marine Resources (DMR) and the Mississippi Department of Environmental Quality (MDEQ). As part of this application, comments will also be received from the US Fish and Wildlife Service (USFWS), the Mississippi Department of Archives and History (MDAH), the Mississippi Natural Heritage Program (MNHP), the Environmental Protection Agency (EPA) and NOAA (National Oceanic and Atmospheric Administration) Fisheries (for coastal projects). A copy of the Joint Application and Notification is provided in Appendix C and can be accessed at https://dmr.ms.gov/wp-content/uploads/2019/07/joint-application-notification-form2.pdf.

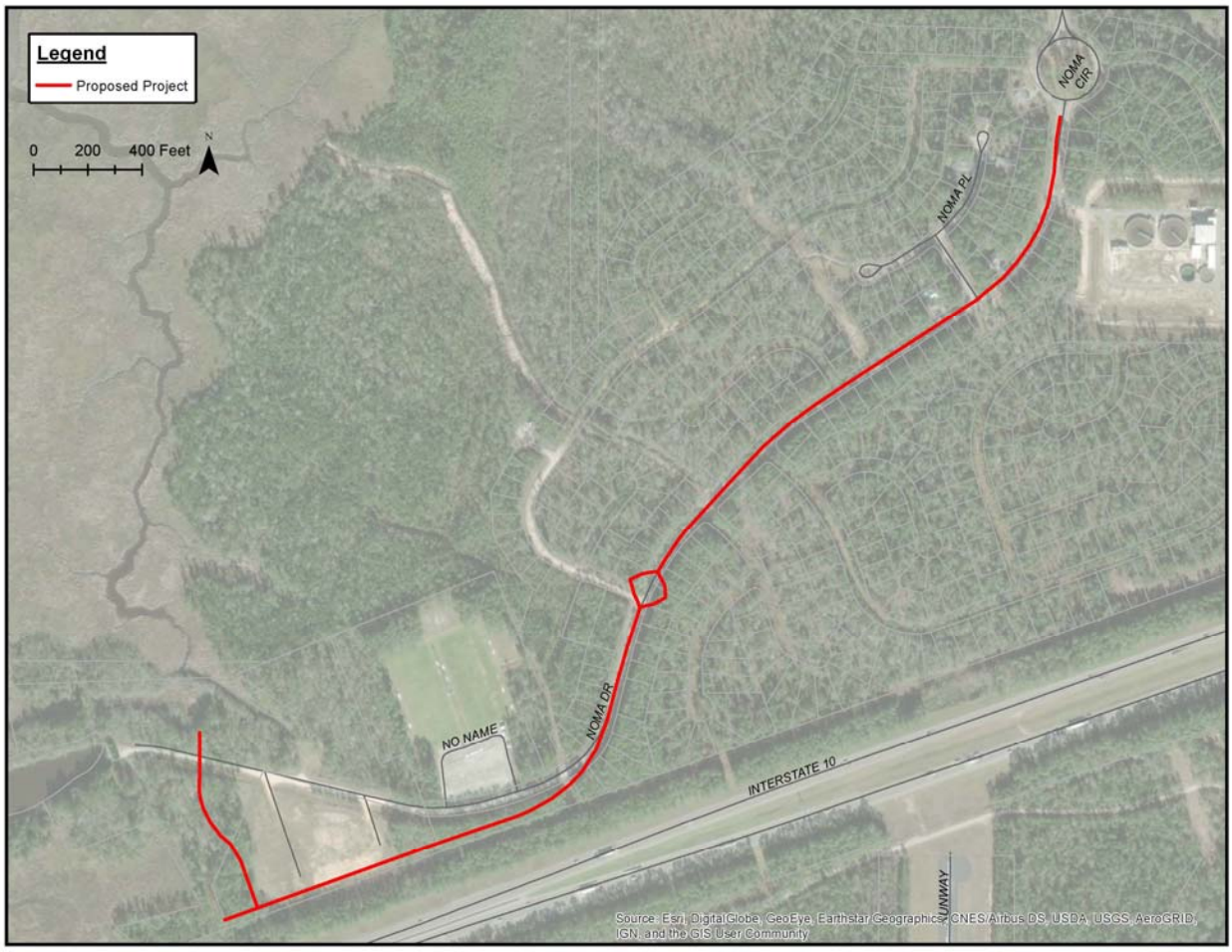
6. If it is anticipated that MDOT will provide funding for the proposed project, complete and submit Form ENV-160-LPA, MDOT Environmental Division Environmental Class of Action Determination. A copy of this form is included in Appendix D and can be accessed at http://sp.mdot.ms.gov/Environmental/Forms%20and%20Templates/ENV-160/ENV-160%20LPA.pdf.

PROJECT 3 – NOMA DRIVE (PHASE 2)

Project Purpose & Description

Project 3 – Noma Drive (Phase 2) includes the modification of approximately 4,850 feet of Noma Drive, from Noma Circle to the frontage road north of I-10 and the construction of approximately 710 feet of new road from Noma Drive to the proposed condo/entertainment district at the southwest end of Noma Drive. This project provides a more aesthetically pleasing roadway with pedestrian facilities that can accommodate the anticipated increase in traffic to and from the proposed Town Center located east of the project. (Appendix A includes a map showing the planned development area as specified in the City of Diamondhead's Master Plan.) A map of the proposed project is provided in Figure 3-1.

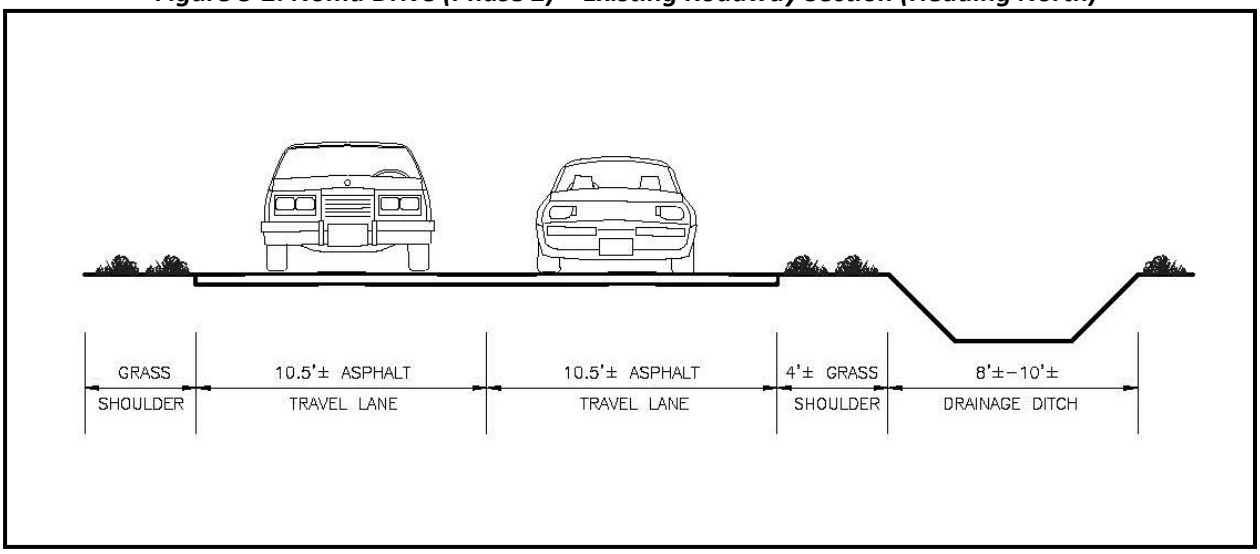
Figure 3-1: Noma Drive (Phase 2) – Project Map



Existing Conditions

The existing Noma Drive is a dead-end street surrounded primarily by wooded, vacant land. It is an asphalt two-lane roadway with an approximate width of 21 feet. A drainage ditch runs along the south/southeast side of the road. There are no pedestrian facilities. A cross section of the existing roadway section is provided in Figure 3-2.

Figure 3-2: Noma Drive (Phase 2) – Existing Roadway Section (Heading North)



Proposed Conditions

The proposed Noma Drive will follow the alignment of the existing roadway for the majority of the project, and then veer off this alignment to create a new frontage road north of I-10. Noma Drive will be a two-lane asphalt road, with 11-foot vehicle lane widths. A 10-foot multimodal lane will run along the south/southeast edge of the road, separated from the road by a 6-foot planting strip. The proposed connector road from Noma Drive to the proposed condo/entertainment district will be a two-lane asphalt road with 11-foot vehicle lane widths and 5-foot wide sidewalks on each side of the road.

The layout of the proposed roadways is provided in Figure 3-3 and cross sections for the proposed roadways are provided in Figures 3-4 and 3-5. Where applicable, roadway section numbers have been noted that correspond with the City's Master Plan (Appendix A).

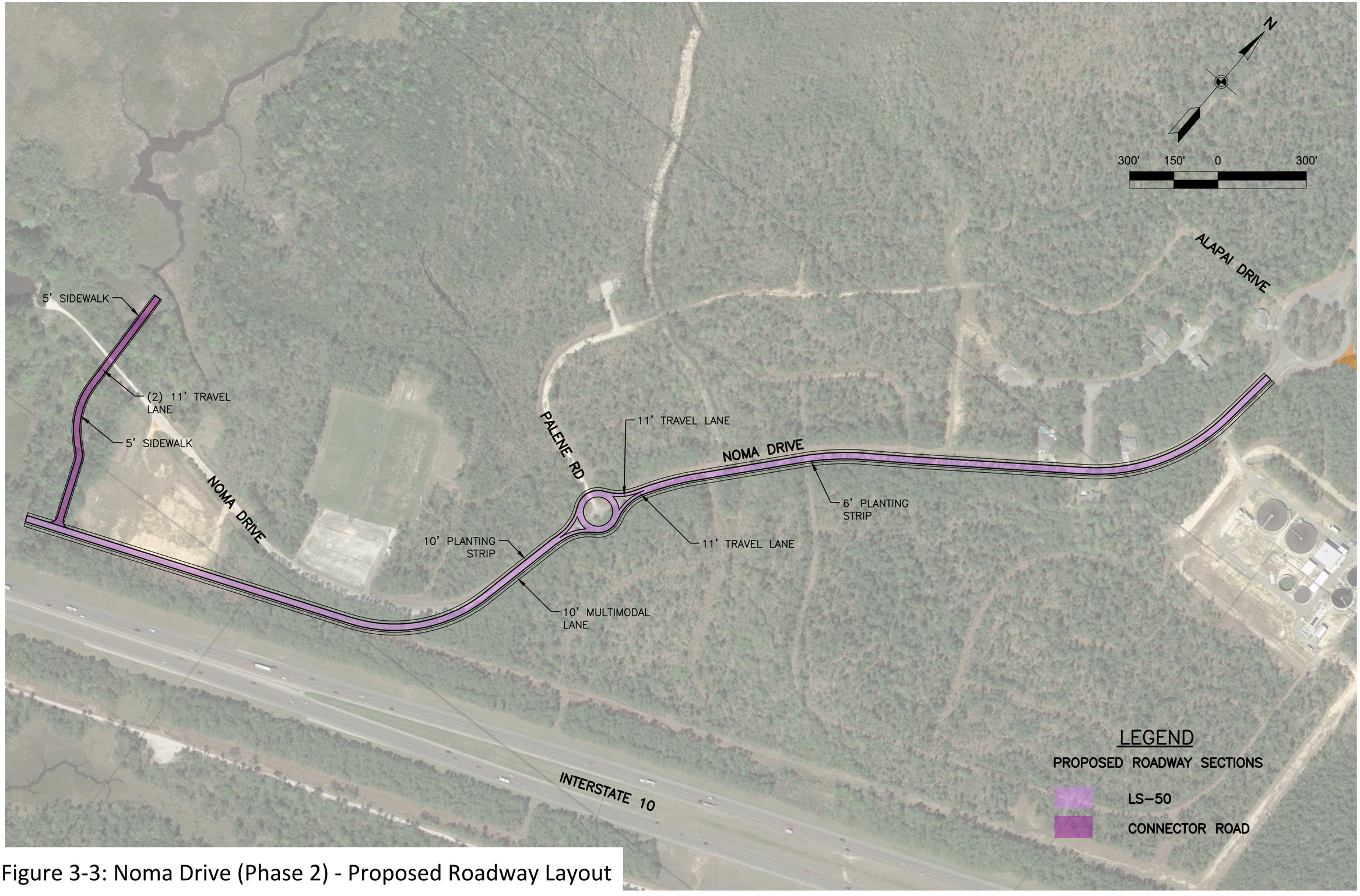


Figure 3-3: Noma Drive (Phase 2) - Proposed Roadway Layout

Figure 3-4: Noma Drive (Phase 2) – Noma Drive Proposed Roadway Section (LS-50)

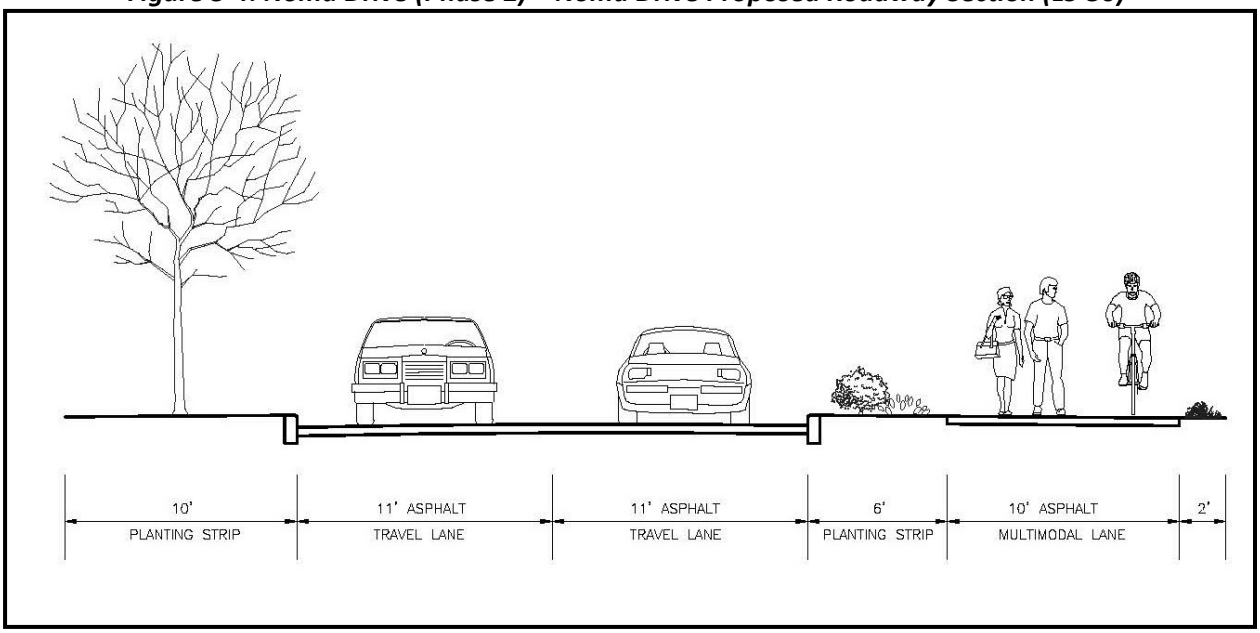
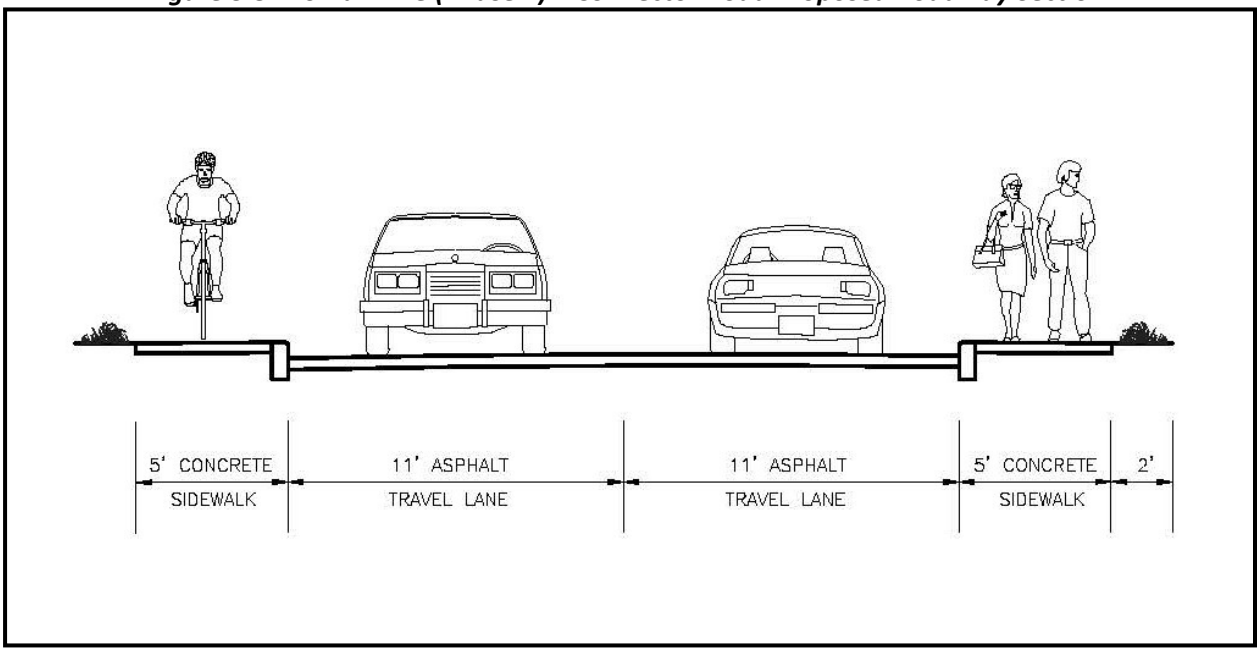


Figure 3-5: Noma Drive (Phase 2) – Connector Road Proposed Roadway Section



Right-of-Way Requirements

Noma Drive

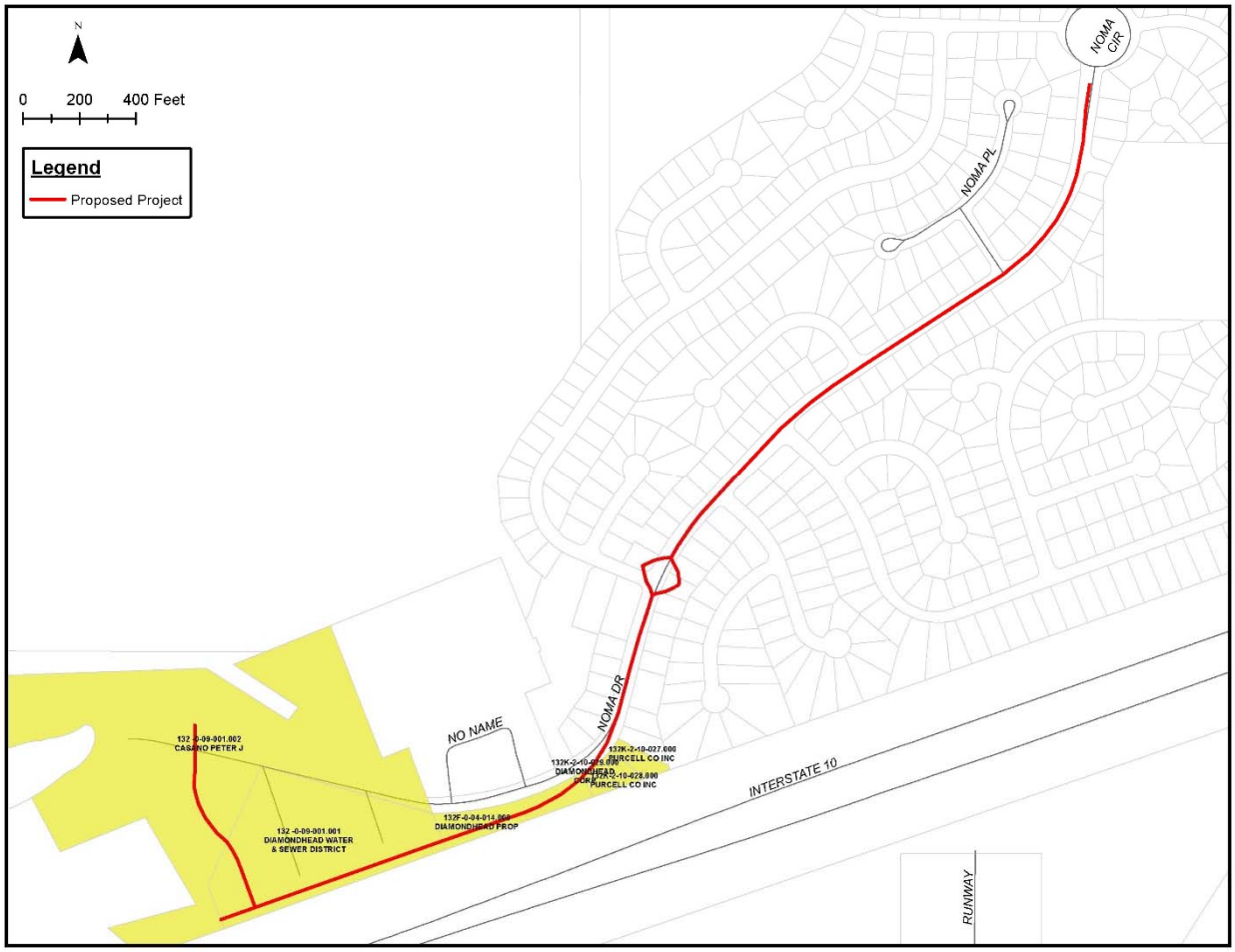
According to plat records, the existing right-of-way for Noma Drive in the vicinity of the proposed project is 60 feet in width. The proposed roadway section shown above is 50 feet in width. Therefore, the proposed roadway can be constructed within the existing right-of-way and no land acquisition will be required where the proposed roadway follows the alignment of the existing right-of-way. However, right-of-way will be required at the location of the proposed roundabout, as well as where the proposed roadway veers from the existing Noma Drive alignment. To maintain the 60-foot right-of-way along the entire length of Noma Drive and to provide adequate right-of-way around the roundabout, approximately 109,000 square feet, or 2.5 acres, of land acquisition will be required.

Connector Road

No right-of-way exists for the proposed connector road from Noma Drive to the proposed condo/entertainment district. The proposed roadway section provided above is 36 feet in width. Therefore, it is anticipated that a minimum right-of-way of 40 feet will be required and a minimum of approximately 28,400 square feet, or 0.7 acres, of land acquisition will be required.

A map highlighting the parcels that will likely be impacted by the proposed project is provided in Figure 3-6. The parcel numbers and owners noted in the figure were obtained from the GIS data provided by Hancock County in 2020. It should be noted that the exact location and area of required right-of-way will depend on the alignment of the proposed roadways and cannot be precisely detailed until the roadway alignment has been finalized.

Figure 3-6: Noma Drive (Phase 2) – Right-of-Way Impacts



Traffic Considerations

Noma Drive is classified as a local street. It is not currently a highly traveled road as it is primarily used to access The Oaks, the residential area located north of the project area, and the athletic fields located at the southern end of Noma Drive. Traffic counts taken by the Gulf Regional Planning Commission in 2020 indicate that there is an annual average daily traffic count of 1,300. However, these counts were taken in front of City Hall, which experiences a heavier traffic volume than the southern end of the road. It can be expected, if connector roads are constructed and development occurs as planned, that traffic volumes on Noma Drive will increase.

Pedestrian Facilities

Currently there are no pedestrian facilities along Noma Drive. The project will include the construction of a 10-foot wide multi-modal lane on Noma Drive that will provide adequate space for walking, biking and use of a golf-cart. Sidewalks, 5-foot in width, will be constructed on each side of the connector road from Noma Drive to the proposed condo/entertainment district.

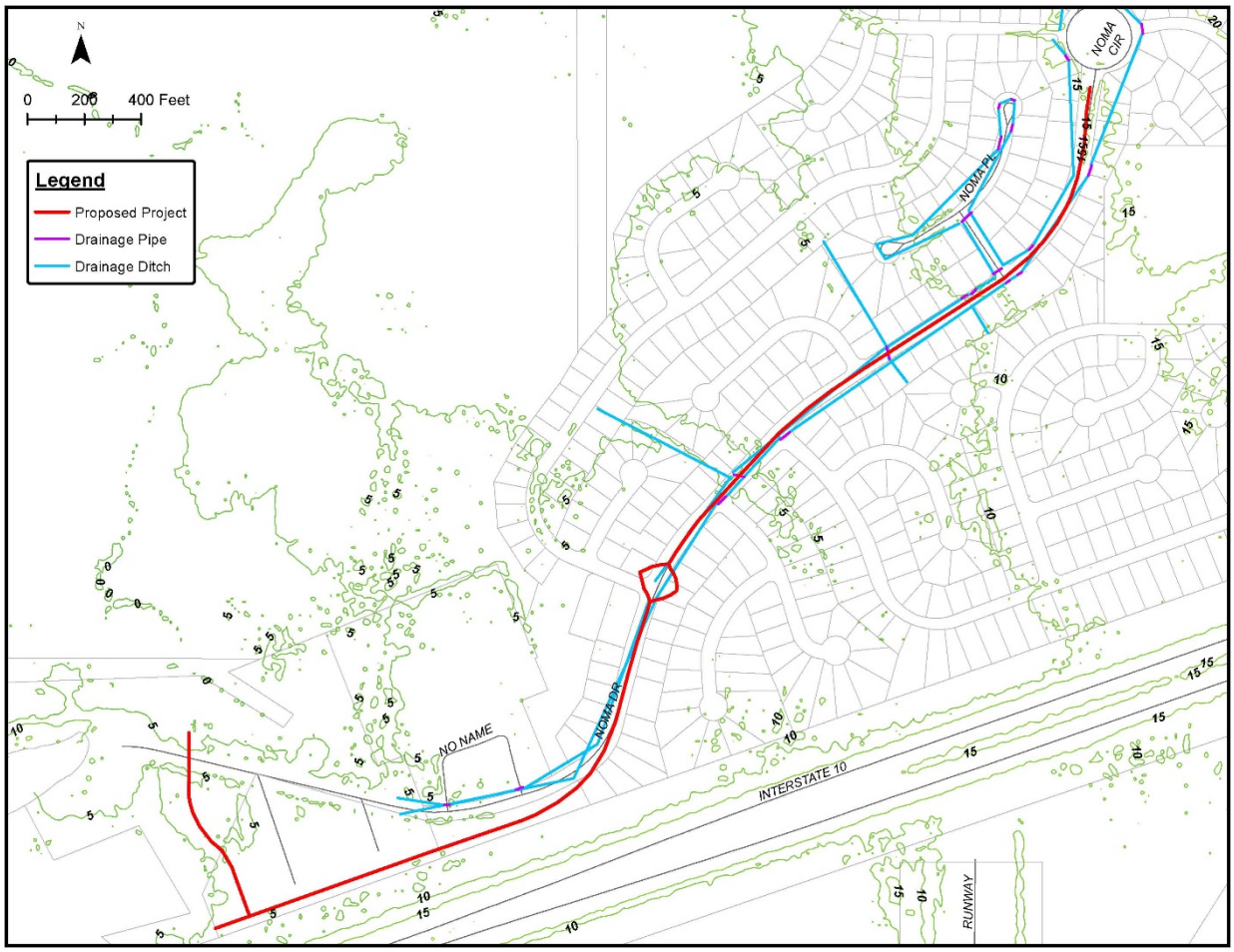
Utilities

An investigation was conducted to determine the utilities located in the project area. Below is a summary of the available utility information.

Drainage

The City of Diamondhead Public Works Department maintains the drainage system in the City. Based on the City's GIS records, the drainage system in the proposed project area consists primarily of roadside ditches, with the occasional culvert for a driveway or roadway crossing. Care will be required during construction to not cause damage to any subsurface piping. Any roadside drainage impacted by the modifications made to Noma Drive will need to be relocated and/or modified. The City reported that Noma Drive, in the area of the project, floods during a heavy rain event. Drainage should be assessed during design to identify solutions for preventing such flooding. Drainage for the newly aligned portion of Noma Drive and the connector road will also need to be assessed during design. It is anticipated that roadside ditches and culverts can be implemented and connected to the existing drainage system. A map of the drainage facilities and the ground surface elevations in the project vicinity is provided in Figure 3-7.

Figure 3-7: Noma Drive (Phase 2) – Drainage & Contour Map

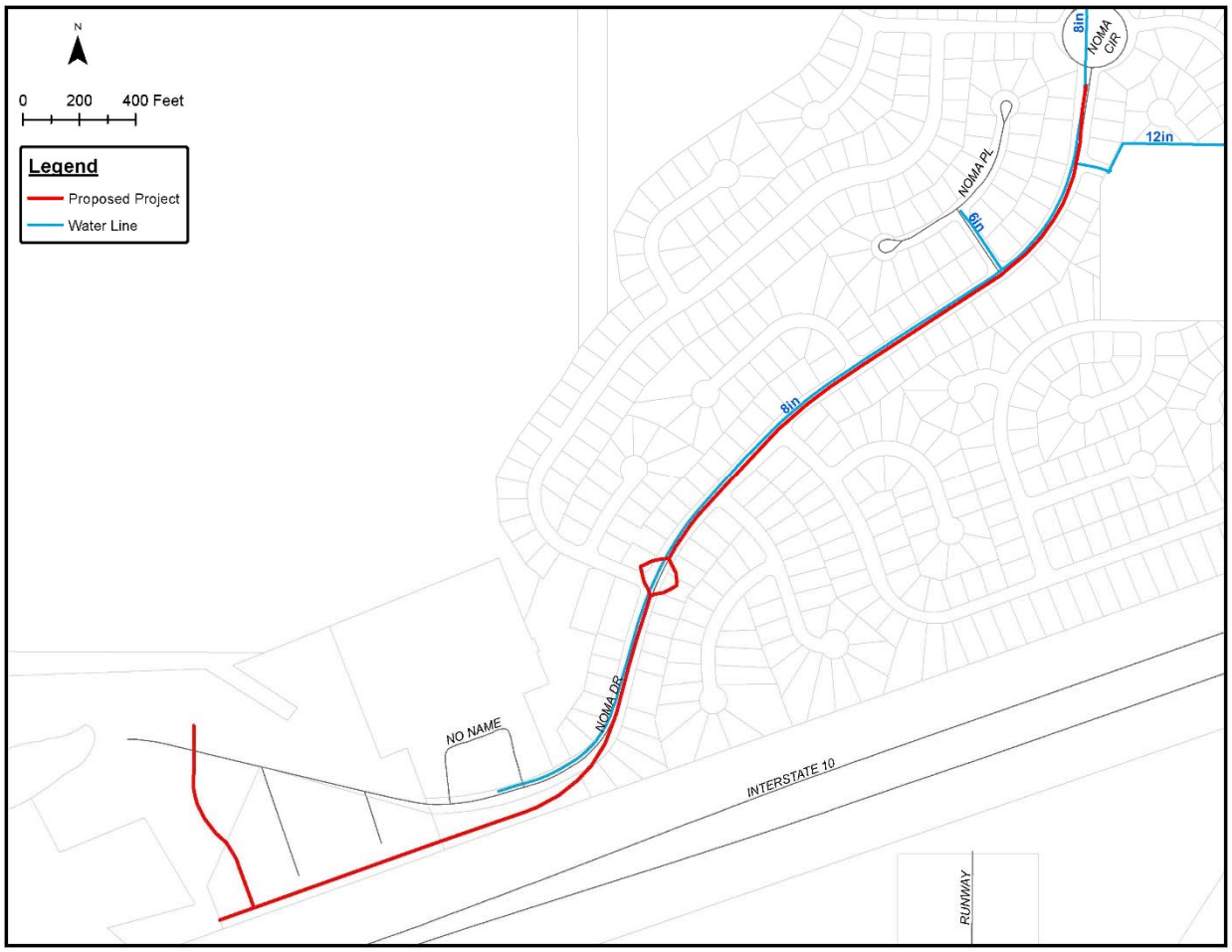


Water and Sewer

The Diamondhead Water and Sewer District (DWSD) owns and operates the water and sewer system in the City of Diamondhead. The DWSD provided a GIS file with locations and data for the water and sewer utilities. It should be noted that the locations indicated in the database were not surveyed, and only provide a general location of where the utilities are located. While the water and sewer utilities should not conflict with the proposed project, as they are located underground, care will need to be taken during construction to not damage the existing utilities. Some facilities, such as sewer manholes, valves, or fire hydrants, may require adjusting if they interfere with the alignment of the new roadway.

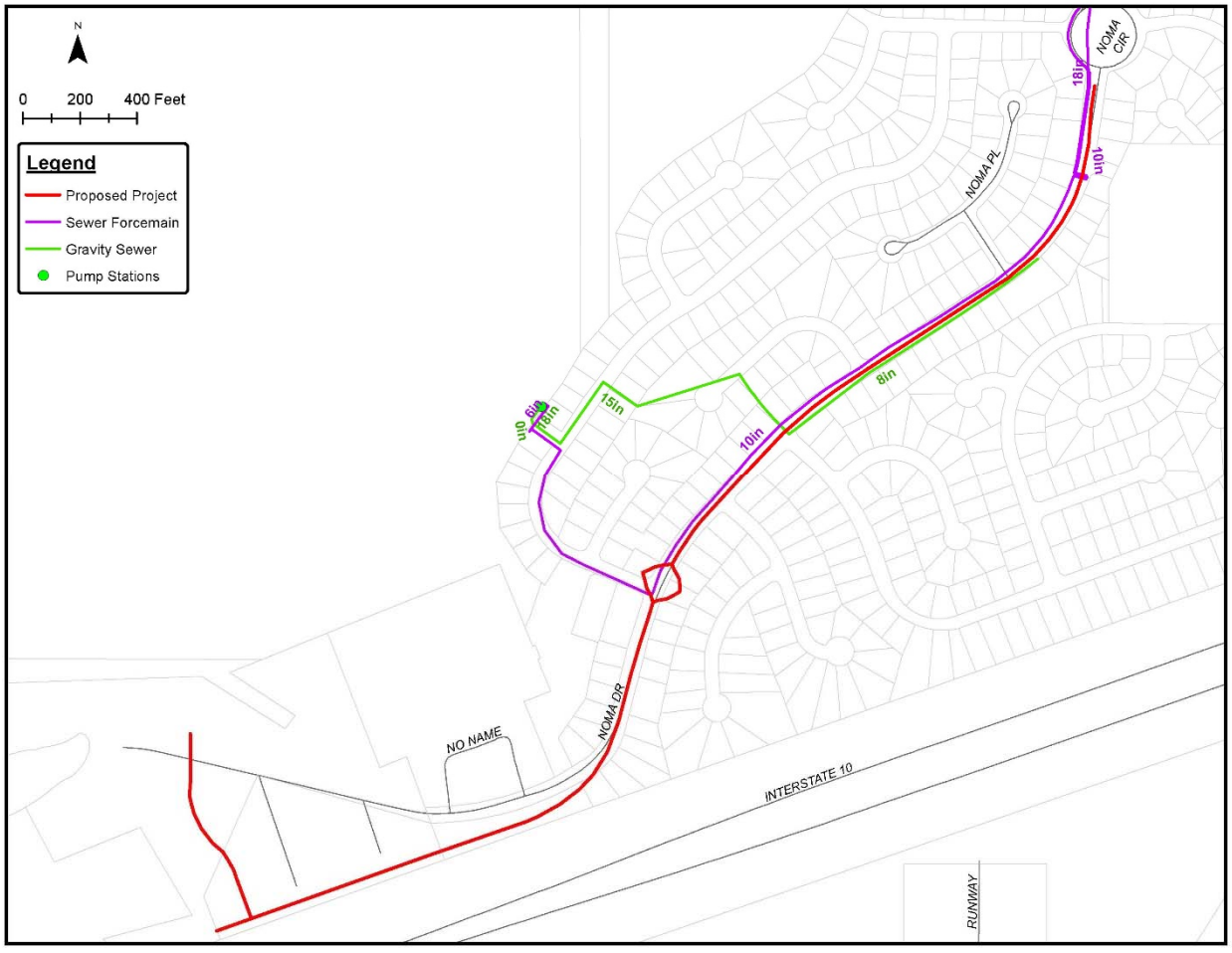
An 8-inch water main, with multiple tie-ins, runs along Noma Drive. It is anticipated that additional water facilities will be required to serve future development in the project area. However, a conceptual layout and the associated costs have not been developed for this study, as the required facilities will depend on the type and extent of the development and its impact on the existing water system. A map of the existing water lines located in the project vicinity is provided in Figure 3-8.

Figure 3-8: Noma Drive (Phase 2) – Water Map



There is a 10-inch sewer forcemain that begins at the pump station (#29) located northwest of Noma Drive, follows a platted road to Noma Drive, runs north along Noma Drive, and then runs east to the wastewater treatment plant. Two sewer forcemains, 10-inch and 18-inch in diameter, run south along Noma Drive from a pump station located north of the project boundary and turn east to the wastewater treatment plant. An 8-inch gravity sewer line runs along the central portion of Noma Drive to pump station #29. It should also be noted that there are several abandoned sewer forcemains located in or within close vicinity to the project – along Noma Drive and running north of and parallel to I-10. It is anticipated that additional sewer facilities will be required to serve future development in the project area. However, a conceptual layout and the associated costs have not been developed for this study, as the required facilities will depend on the type and extent of the development and its impact on the existing sewer system. A map of the existing sewer lines located in the project vicinity is provided in Figure 3-9.

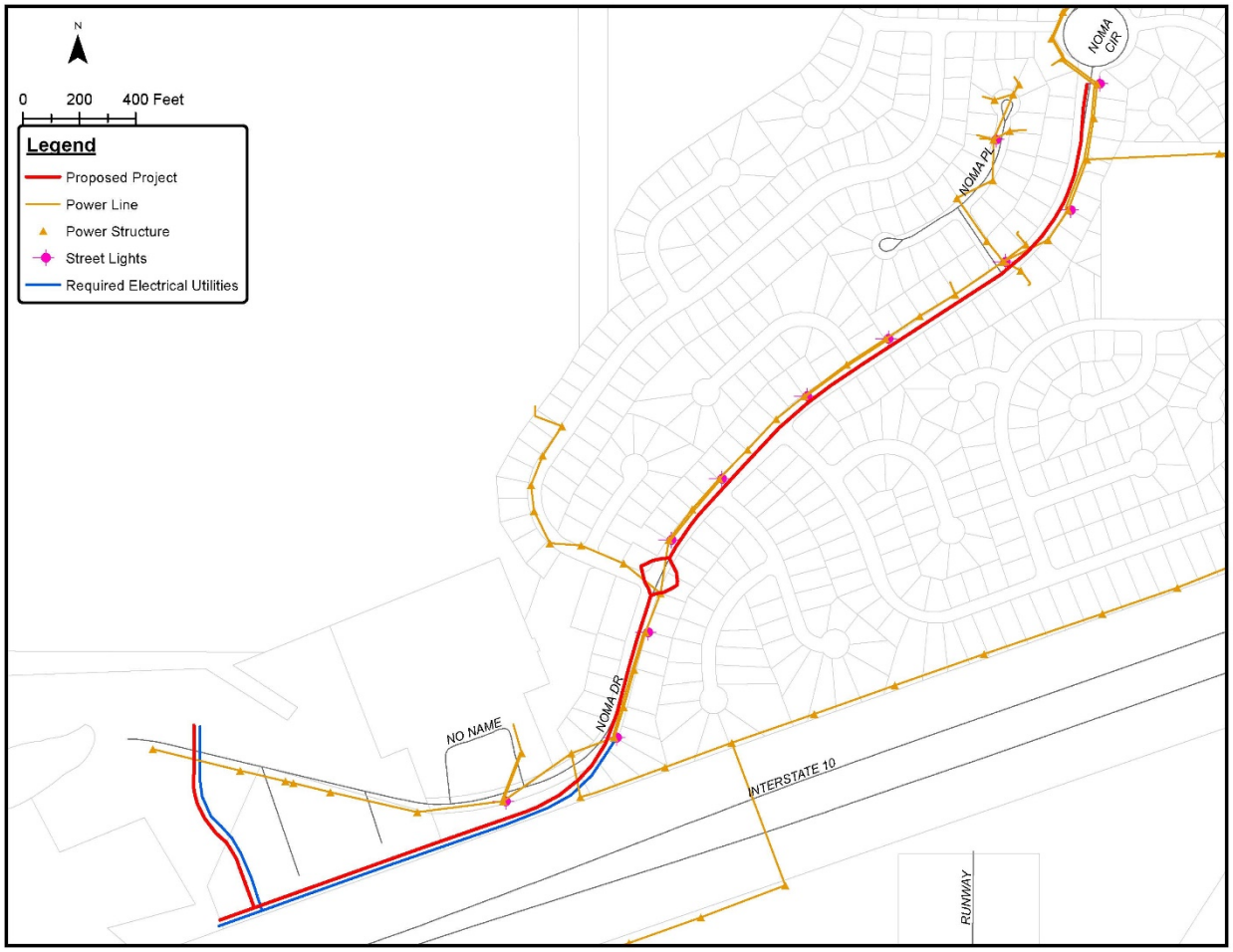
Figure 3-9: Noma Drive (Phase 2) – Sewer Map



Electric

Coast Electric provides power and street lighting to the City of Diamondhead. Based on the latest information provided by Coast Electric, there are electric facilities, including power lines, poles, pedestals and street lights, located along Noma Drive. These facilities are located within the existing right-of-way and may need to be relocated if they interfere with the proposed roadway. It is anticipated that electrical facilities will be required along the newly aligned portion of Noma Drive and the new proposed connector road to serve future development in the area. A map of the existing electrical utilities located in the project vicinity is provided in Figure 3-10. The location where new electrical utilities will likely be required has also been identified.

Figure 3-10: Noma Drive (Phase 2) – Electrical Map



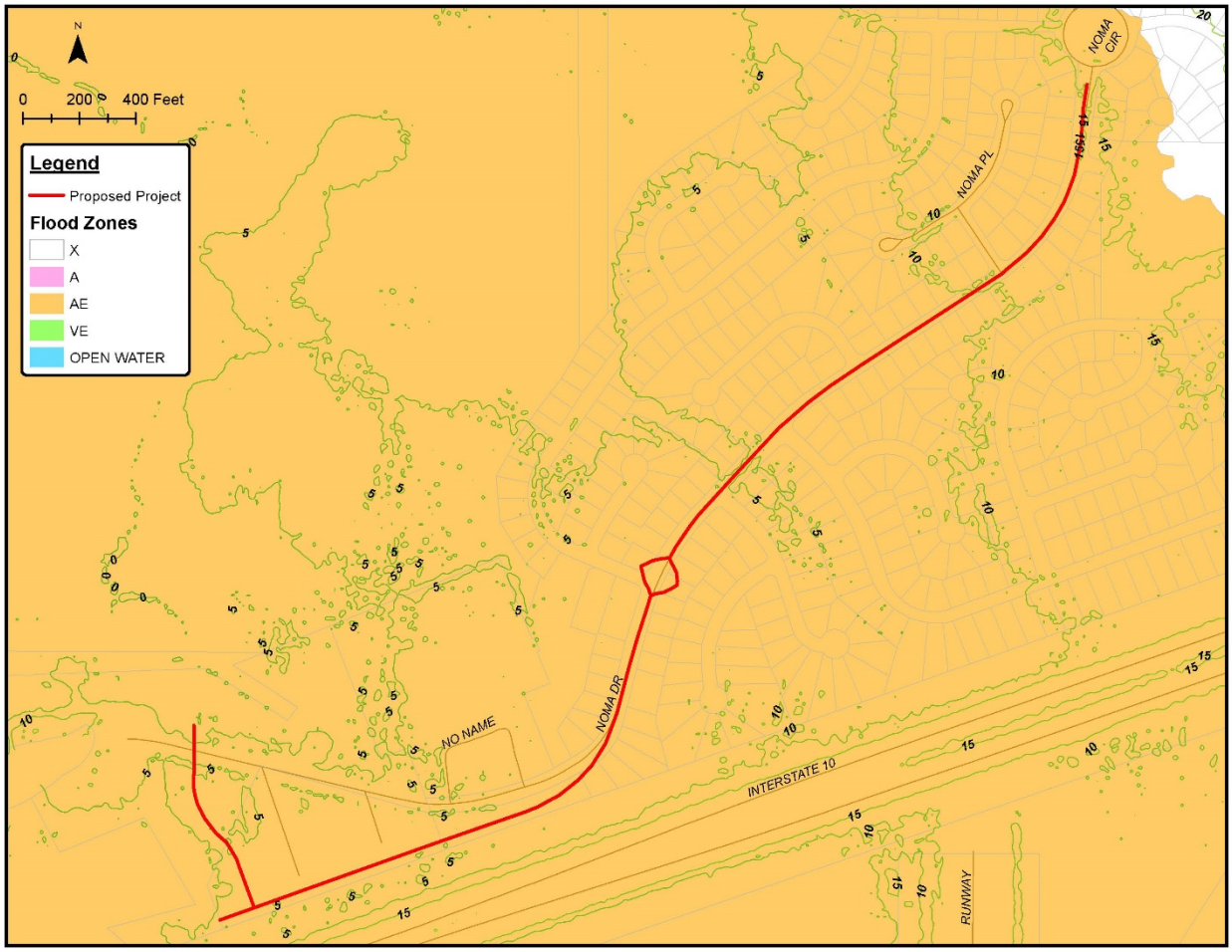
Environmental Considerations

An investigation into the environmental considerations for constructing the project was conducted. Below is a summary of the available information in the project area.

Flood Zones

The entire project is located in Flood Zone AE. This area is subject to inundation by the 1-percent-annual-chance flood event. As stated previously, the portion of Noma Drive included in this project will flood during a heavy rain event. A base flood elevation (BFE) of 17 is specified for this area. A map of the flood zones and ground surface elevations in the project vicinity is provided in Figure 3-11.

Figure 3-11: Noma Drive (Phase 2) – Flood Zone Map



Wetlands

A wetlands delineation performed by Culpepper & Associates in July 2020 identified wetlands within and in close vicinity of the project area. According to this delineation, it is estimated that approximately 2.4 acres of wetlands will be impacted by the project and will likely require mitigation. However, a Jurisdictional Determination (JD) from the US Army Corps of Engineers will be required to confirm wetland boundaries and determine mitigation requirements. A Joint Application and Notification will need to be completed and submitted in order to obtain the JD. A map showing the location of these wetlands is provided in Figure 3-12.

Figure 3-12: Noma Drive (Phase 2) – Wetlands Map

Opinion of Probable Costs

An opinion of probable costs, including construction costs and professional services costs, was prepared for the proposed project. Because this is a preliminary plan, a 25% contingency was included in the estimated construction costs. The costs for professional services are based on a percentage of the estimated construction costs. A breakdown of these costs is provided in Table 3-1.

Table 3-1: Noma Drive (Phase 2) – Opinion of Probable Costs

Description	Quantity	Unit	Unit Cost	Total Cost
Construction				
Asphalt Pavement	5,680	TON	$100.00	$568,000.00
Base Course	4,650	CY	$75.00	$348,750.00
Geotextile	17,300	SY	$5.00	$86,500.00
Concrete Sidewalk	790	SY	$40.00	$31,600.00
Grassing/Landscaping	10,020	SY	$5.00	$50,100.00
Drainage - Modifications to Existing	1	LS	$50,000.00	$50,000.00
Drainage - New Installation	1	LS	$50,000.00	$50,000.00
Electrical- Modifications to Existing	1	LS	$100,000.00	$100,000.00
Electrical - New Installation	1	LS	$80,000.00	$80,000.00
Sediment & Erosion Control	1	LS	$25,000.00	$25,000.00
Traffic Control	1	LS	$5,000.00	$5,000.00
Mobilization	1	LS	$69,750.00	$69,750.00
			Construction Subtotal	$1,464,700.00
			Contingency (25%)	$366,175.00
			Construction Total	$1,830,875.00
Professional Services				
Engineering (Geotechnical, Survey, Design)	1	LS	$137,930.00	$137,930.00
Resident Inspection	1	LS	$60,730.00	$60,730.00
Land Acquisition	137,400	SF	$2.50	$343,500.00
Permitting	1	LS	$10,000.00	$10,000.00
Wetlands Mitigation	2.4	AC	$25,000.00	$60,000.00
			Professional Services Total	$612,160.00
			PROJECT TOTAL	**$2,443,035.00**

Recommendations

To advance the proposed project from the preliminary planning phase to the design phase and make the project more ready for construction, the following next steps are recommended:

1. Perform topographical survey of the project area to determine the alignment of the proposed roadway and the impact to existing utilities. Notify utility owner(s) of any impacts.

2. Perform geotechnical investigation to obtain recommendations for roadway section (base, pavement).

3. Perform drainage analysis to determine required modifications to existing drainage facilities and required implementation of new drainage facilities.

4. Complete and submit a Joint Application and Notification for review and approval by the US Army Corps of Engineers, Mississippi Department of Marine Resources (DMR) and the Mississippi Department of Environmental Quality (MDEQ). As part of this application, comments will also be received from the US Fish and Wildlife Service (USFWS), the Mississippi Department of Archives and History (MDAH), the Mississippi Natural Heritage Program (MNHP), the Environmental Protection Agency (EPA) and NOAA (National Oceanic and Atmospheric Administration) Fisheries (for coastal projects). A copy of the Joint Application and Notification is provided in Appendix C and can be accessed at https://dmr.ms.gov/wp-content/uploads/2019/07/joint-application-notification-form2.pdf.

5. If it is anticipated that MDOT will provide funding for the proposed project, complete and submit Form ENV-160-LPA, MDOT Environmental Division Environmental Class of Action Determination. A copy of this form is included in Appendix D and can be accessed at http://sp.mdot.ms.gov/Environmental/Forms%20and%20Templates/ENV-160/ENV-160%20LPA.pdf.

6. If new electrical facilities are to be installed as part of the proposed project, correspond with Coast Electric to begin the design process.

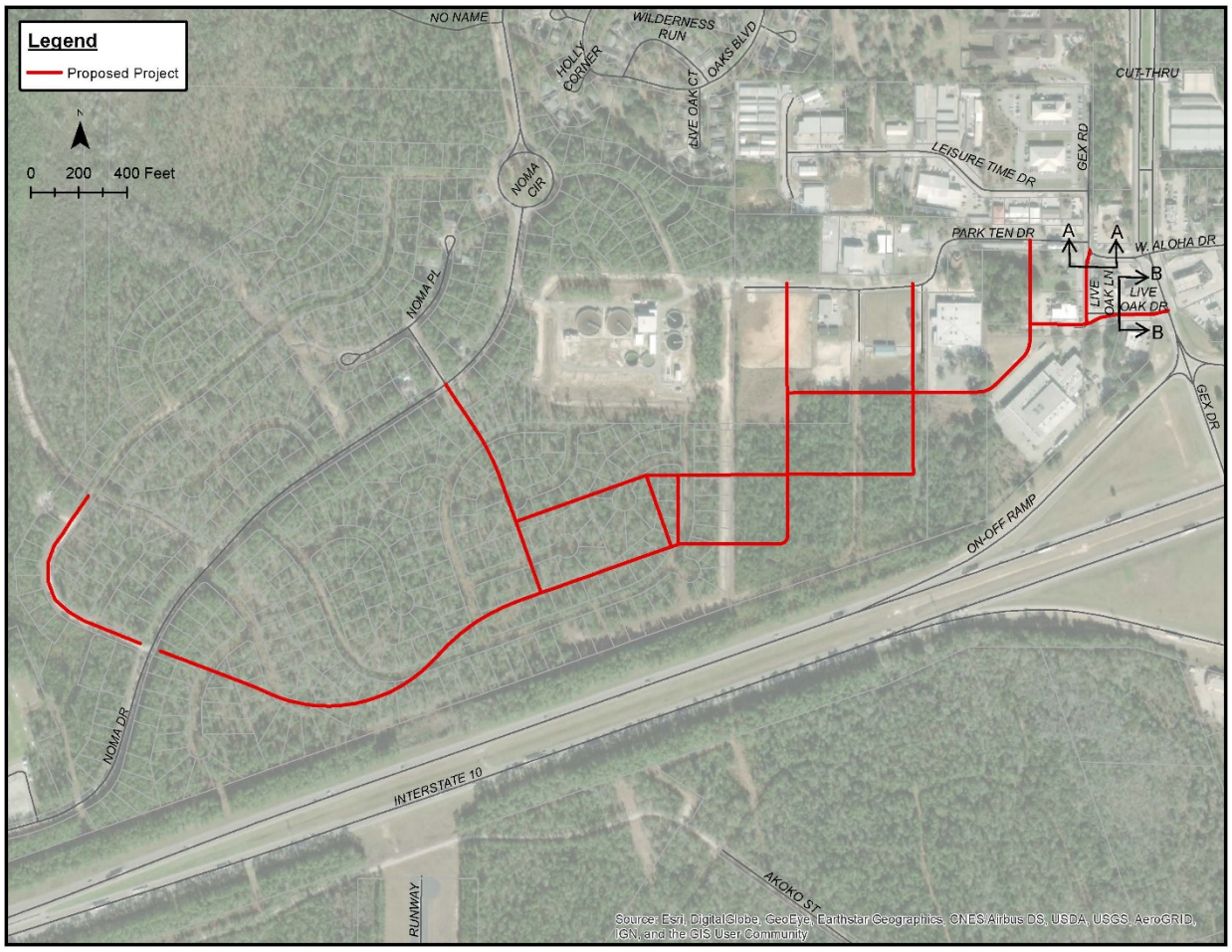
7. If new sewer and water facilities are to be installed as part of the proposed project, correspond with DWSD to begin the design process.

PROJECT 4 – COMMERCIAL CONNECTOR ROADS IN PLANNED DEVELOPMENT

Project Purpose & Description

Project 4 – Commercial Connector Roads in Planned Development includes the construction of approximately 11,300 feet of roadway to create blocks within the proposed planned development area and connect the existing commercial area to Noma Drive. (Appendix A includes a map showing the planned districts as specified in the City of Diamondhead's Master Plan.) This project will provide the infrastructure needed to encourage developers and contractors to begin development in this area. Once constructed, this project will provide connectivity in the City for vehicles, golf carts, bicycles, and pedestrian use. A map of the proposed project is provided in Figure 4-1.

Figure 4-1: Commercial Connector Roads in Planned Development – Project Map



Existing Conditions

The proposed project is located primarily in a vacant, wooded area that was platted for a subdivision that was never developed. A portion of the project is located south of Park Ten Drive in the existing commercial area. This area is sparsely developed, with the major businesses consisting of a hotel, bowling alley, and the Diamondhead Water and Sewer District. With the exception of two of the proposed roadways in the

northeastern corner of the project, all of the proposed roadways are located where no roads currently exist. Live Oak Lane is an existing asphalt roadway with parking on both sides of the road. Live Oak Drive is an existing two-lane asphalt roadway with a middle turning lane. Both of these existing roads provide access to businesses in the area. Cross sections of the existing roadway sections are provided in Figure 4-2 and 4-3.

Figure 4-2: Commercial Connector Roads in Planned Development – Live Oak Lane (Section A-A) Existing Cross Section

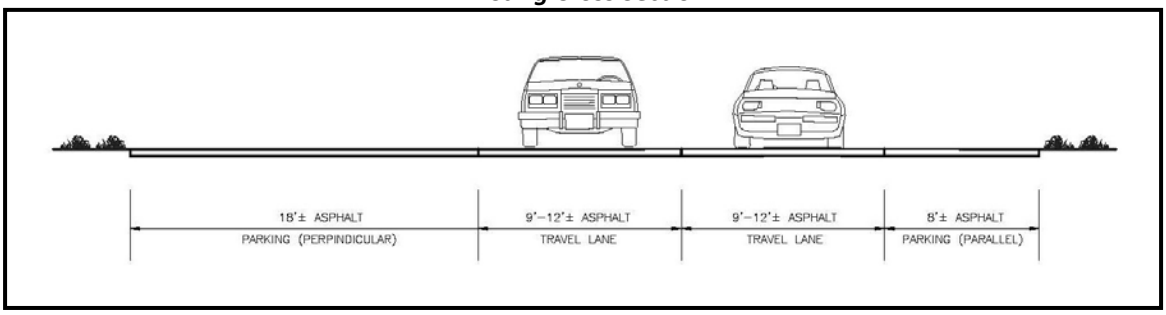
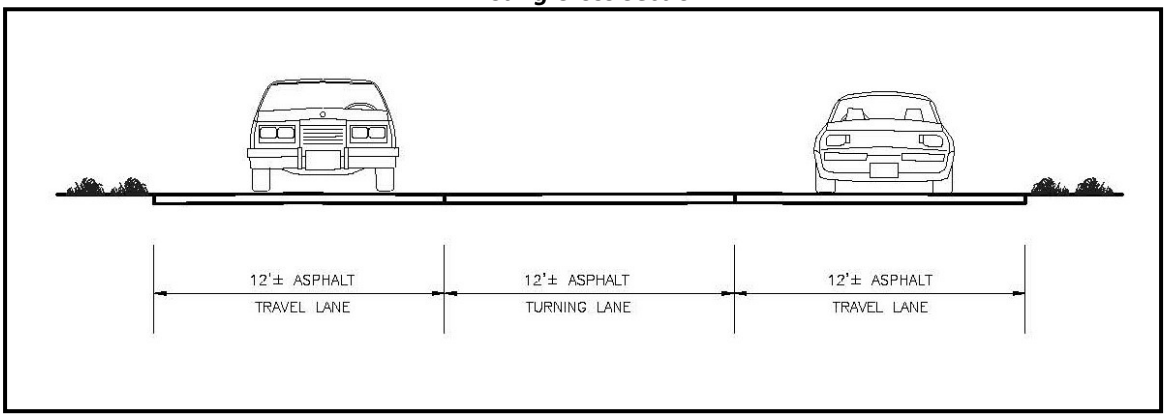


Figure 4-3: Commercial Connector Roads in Planned Development – Live Oak Drive (Section B-B) Existing Cross Section



Proposed Conditions

The proposed connector roads will tie into the existing commercial area at multiple locations on Park Ten Drive and Gex Road. Blocks will be created to encourage the planned development for the area and extend south/southwest to tie-in with Noma Drive. As specified in the City of Diamondhead's Master Plan, the development will include multiple landuse districts, including a mixed-use town center, multifamily, residential, condo & entertainment, and greenspace (see Appendix A). Proposed roadway sections vary to complement the landuse district, but generally consist of two-lane asphalt roadways with parking lanes and sidewalks.

The layout of the proposed roadways is provided in Figure 4-4 and cross sections for the proposed roadways are provided in Figures 4-5 through 4-9. Roadway section numbers have been noted that correspond with the City's Master Plan (Appendix A).

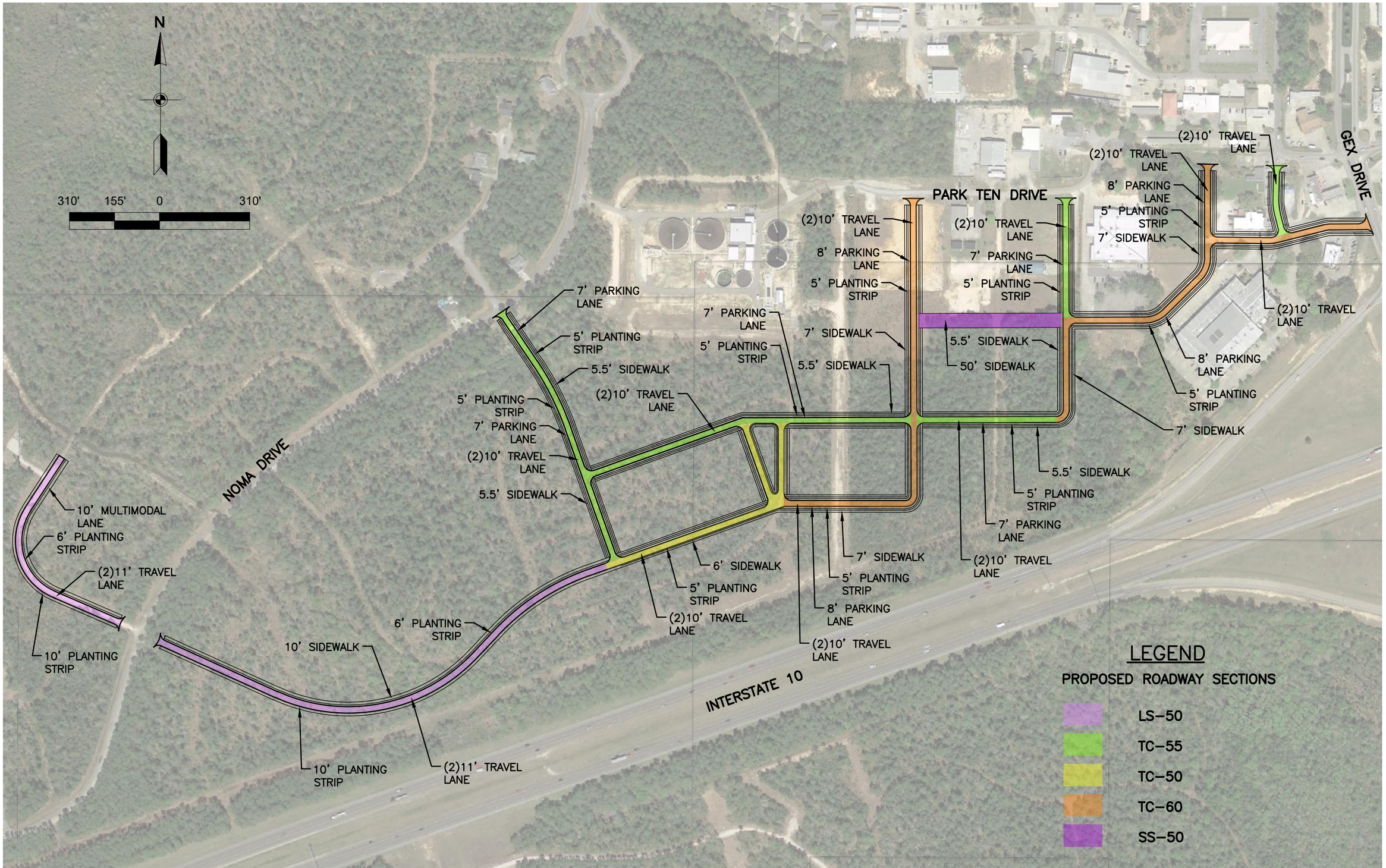


Figure 4-4: Commercial Connector Roads in Planned Development - Proposed Roadway Layout

Figure 4-5: Commercial Connector Roads in Planned Development – Proposed Roadway Section LS-50

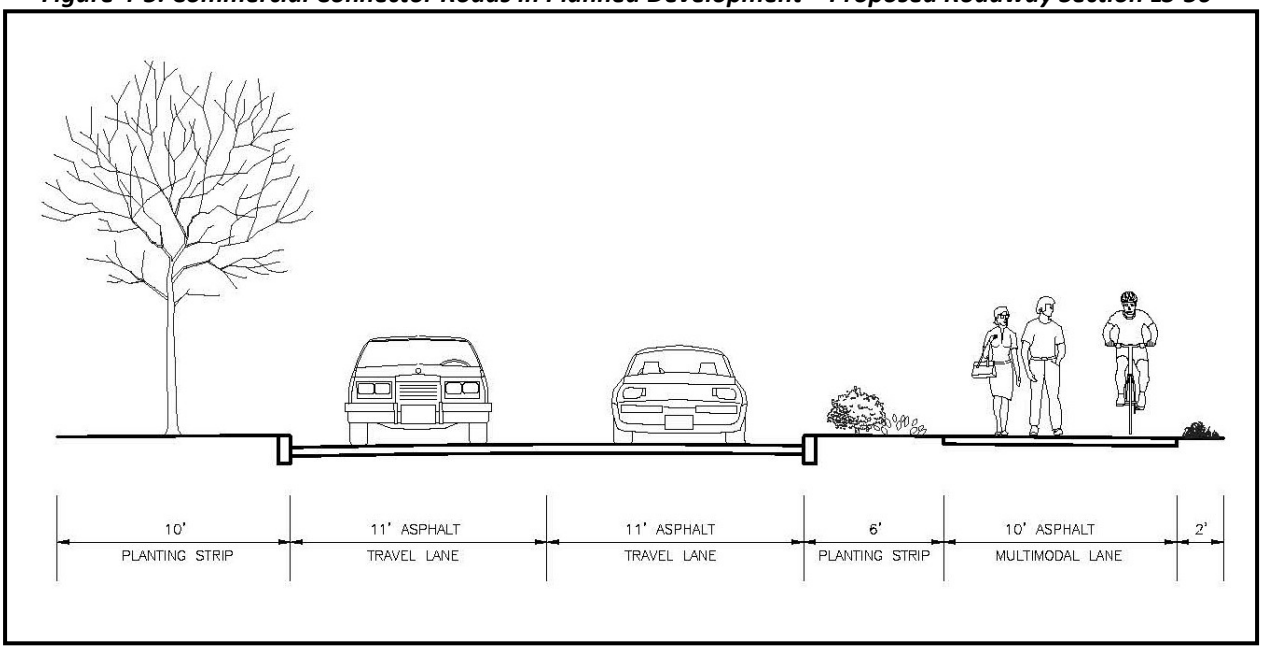


Figure 4-6: Commercial Connector Roads in Planned Development – Proposed Roadway Section TC-55

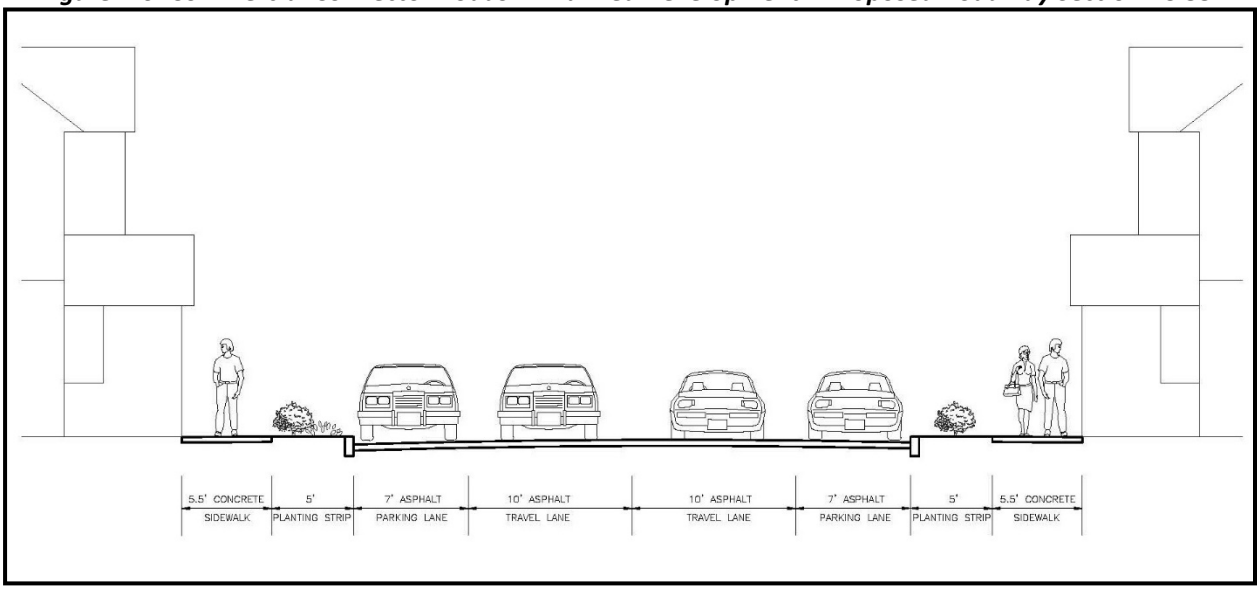


Figure 4-7: Commercial Connector Roads in Planned Development – Proposed Roadway Section TC-50

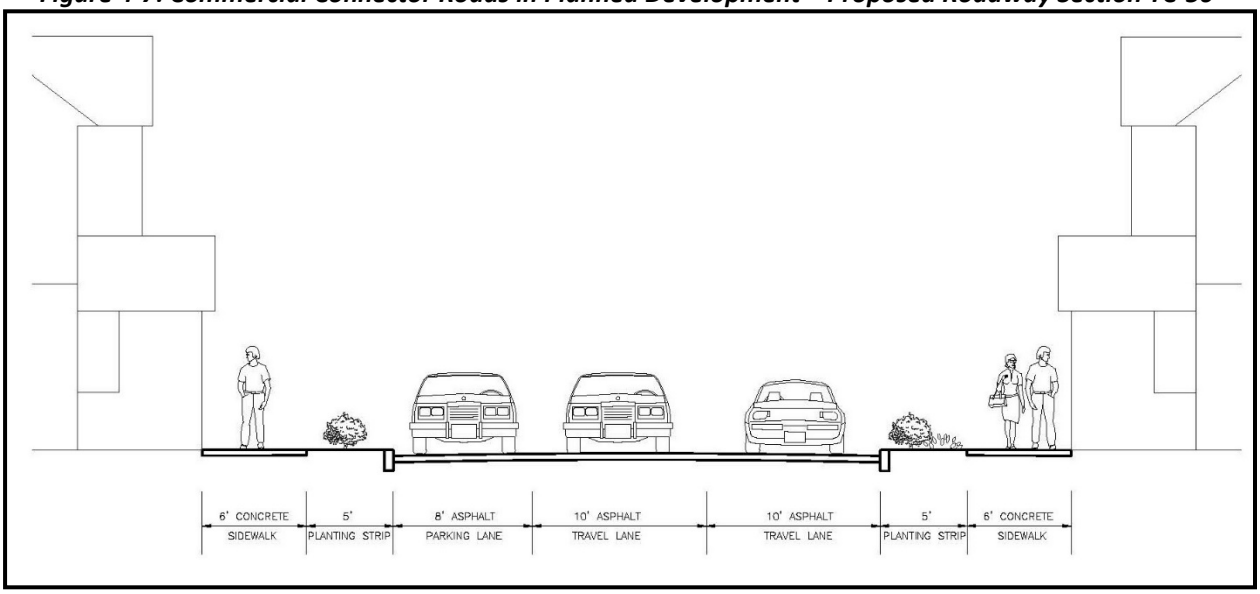


Figure 4-8: Commercial Connector Roads in Planned Development – Proposed Roadway Section TC-60

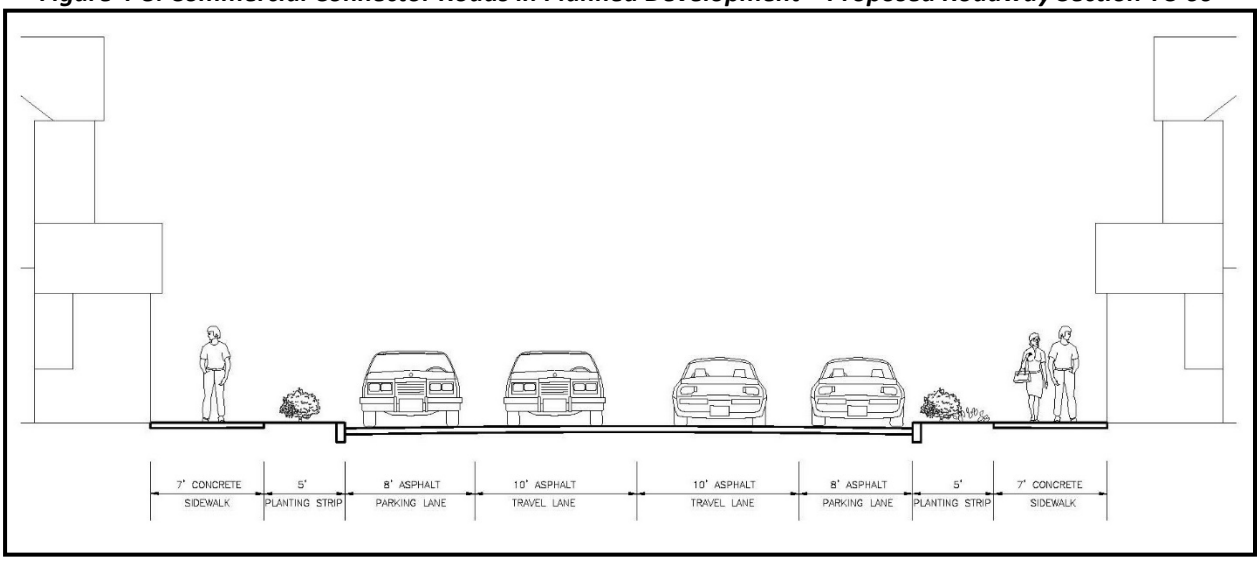
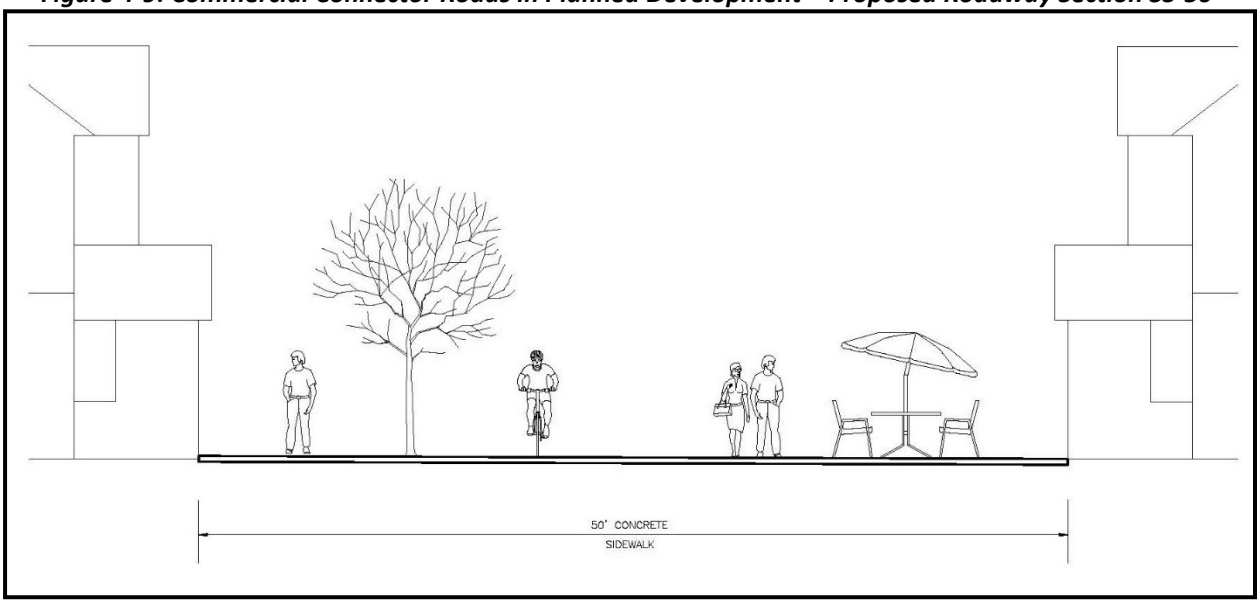


Figure 4-9: Commercial Connector Roads in Planned Development – Proposed Roadway Section SS-50



Right-of-Way Requirements

Section LS-50 Roadways

A minimum right-of-way width of 50 feet is required for Section LS-50 roadways. The portion of proposed Section LS-50 roadway located west of Noma Drive is located within the platted roadway, which has a right-of-way width of 50 foot. Therefore, no right-of-way is required for this portion of the road. Approximately 93,500 square feet, or 2.2 acres, of land acquisition will be required for the 1,870 feet of Section LS-50 roadway located to the east of Noma Drive.

Section TC-55 Roadways

A minimum right-of-way width of 60 feet is required for Section TC-55 roadways. No Section TC-55 roadways, except one, are located within an existing right-of-way and will therefore require land acquisition. The exception is the Section TC-55 roadway proposed at the northeast corner of the project that connects to Park Ten Drive. There is an existing 30-foot right-of-way, which is currently used to access nearby businesses, that will need to be increased for the proposed roadway. A total of approximately 195,360 square feet, or 4.5 acres, of land acquisition will be required for the 3,410 feet of Section TC-55 roadways.

Section TC-50 Roadways

A minimum right-of-way width of 60 feet is required for Section TC-50 roadways. No Section TC-50 roadways are located within an existing right-of-way and will therefore require land acquisition A total of approximately 72,480 square feet, or 1.7 acres, of land acquisition will be required for the 1,210 feet of Section TC-50 roadways.

Section TC-60 Roadways

A minimum right-of-way width of 70 feet is required for Section TC-60 roadways. No Section TC-60 roadways, except one, are located within an existing right-of-way and will therefore require land acquisition. The exception is the Section TC-60 roadway proposed at the northeast corner of

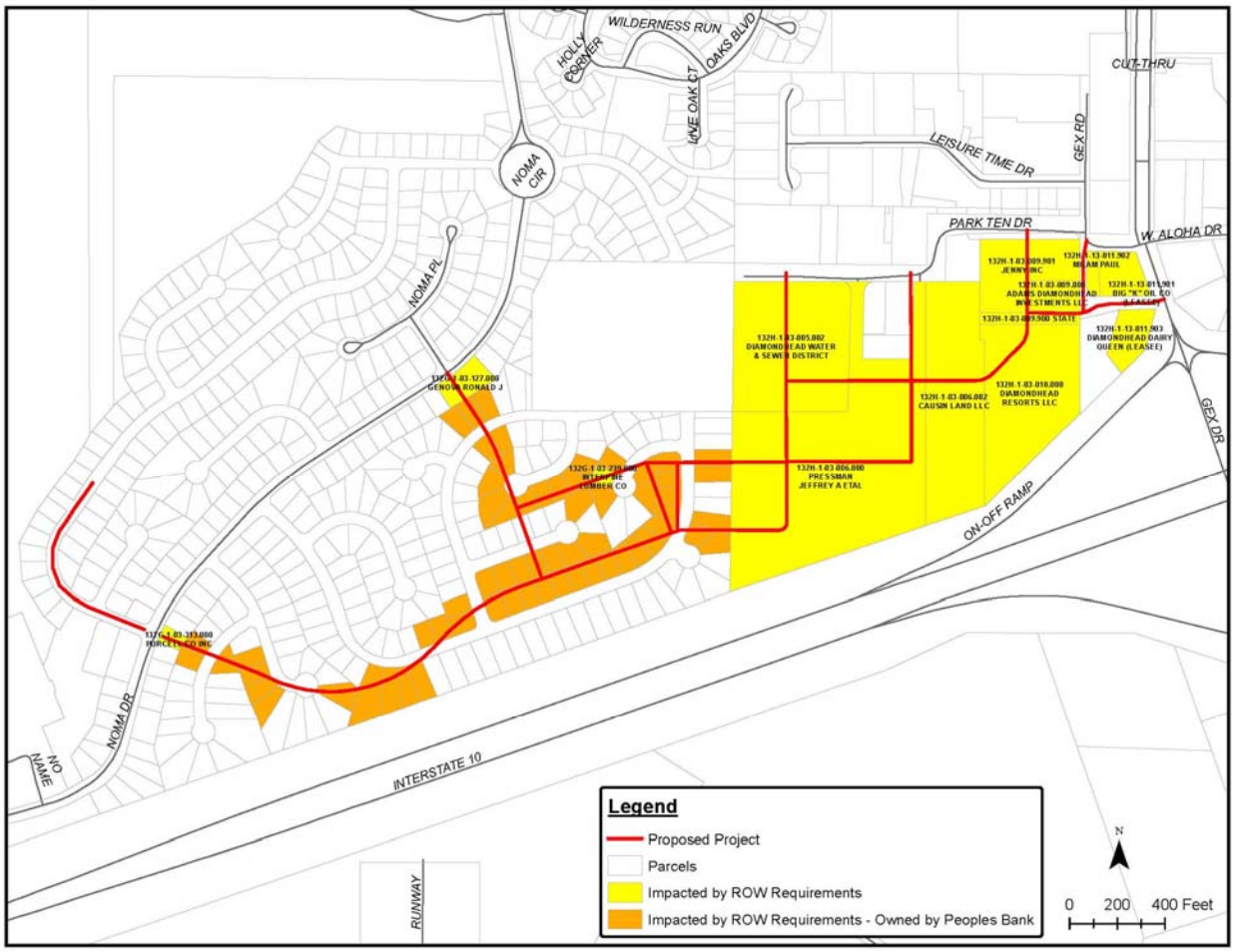
the project that connects to Gex Drive. There is an existing 60-foot right-of-way, which is currently used to access nearby businesses, that will need to be increased for the proposed roadway. A total of approximately 207,380 square feet, or 4.8 acres, of land acquisition will be required for the 3,465 feet of Section TC-60 roadways.

Section SS-50 Roadways

A minimum right-of-way width of 60 feet is required for the Section SS-50 roadway. The Section SS-50 roadway is not located within an existing right-of-way and will therefore require approximately 31,500 square feet, or 0.7 acres, of land acquisition for the 525 feet of roadway.

A total of approximately 600,220 square feet, or 13.8 acres, of land acquisition will be required for the proposed project. A map highlighting the parcels that will likely be impacted by the proposed project is provided in Figure 4-10. The parcel numbers and owners noted in the figure were obtained from the GIS data provided by Hancock County in 2020. It should be noted that the exact location and area of required right-of-way will depend on the alignment of the proposed roadways and cannot be precisely detailed until the roadway alignment has been finalized.

Figure 4-10: Commercial Connector Roads in Planned Development – Right-of-Way Impacts



Traffic Considerations

With the exception of Live Oak Lane and Live Oak Drive, the proposed roadways do not currently exist. The existing roads that these proposed roadways will connect to are classified as local streets. Traffic counts were taken by the Gulf Regional Planning Commission in 2020 at two locations outside of the project area. These traffic counts indicate that there is an annual average daily traffic (AADT) count of 700 in the existing commercial area and an AADT count of 1,300 at the northern most portion of Noma Drive. It can be expected, if connector roads are constructed and development occurs as planned, that traffic volumes will be higher than these AADT counts.

Pedestrian Facilities

Currently there are no pedestrian facilities located in the proposed project area. The project will include the construction of either sidewalks on both sides of the road or a multimodal lane, providing pedestrians and bicyclists with connections between the landuse districts in the planned development area. Golf cart use will be permitted on the multimodal lane and on all streets.

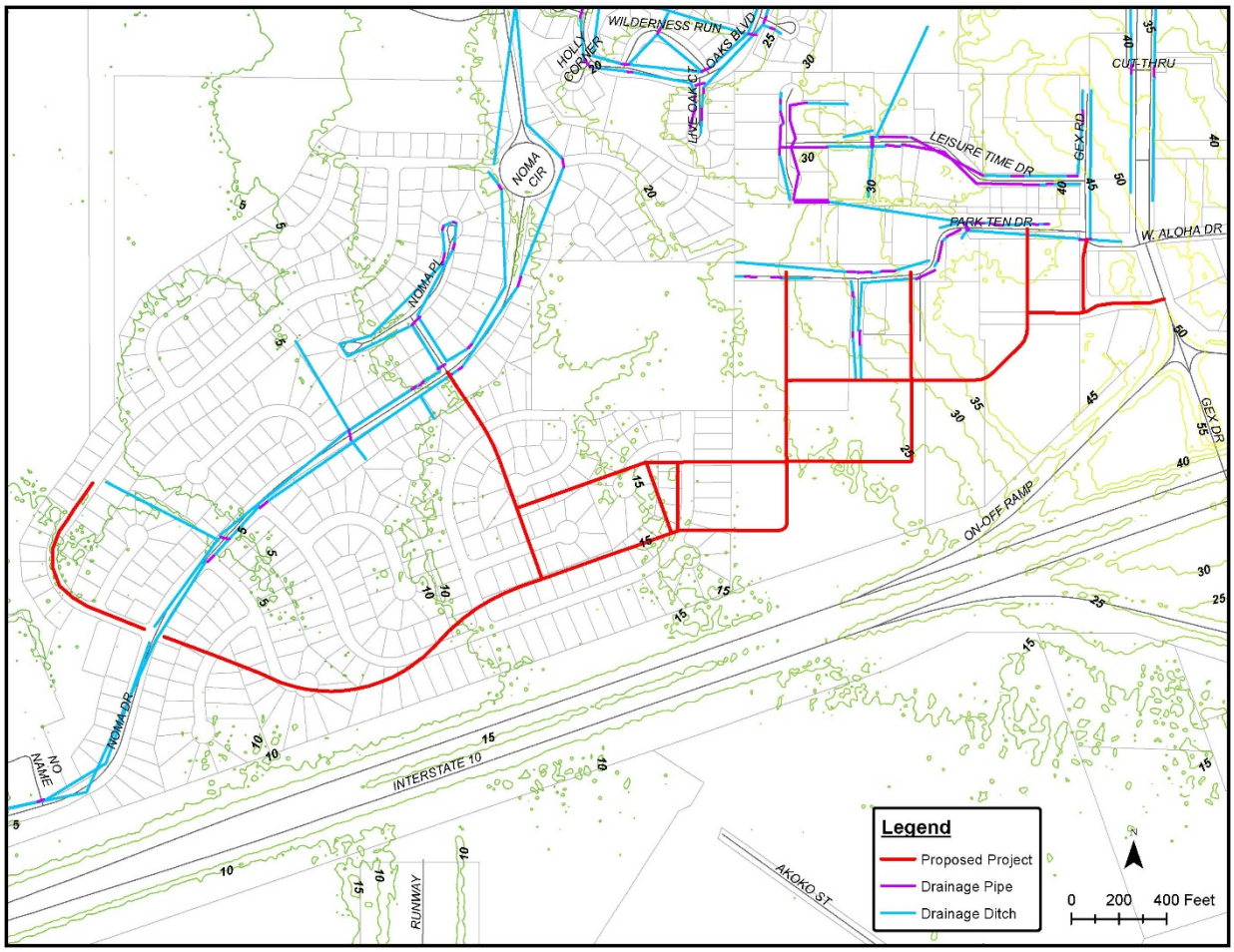
Utilities

An investigation was conducted to determine the utilities located in the project area. Below is a summary of the available utility information.

Drainage

The City of Diamondhead Public Works Department maintains the drainage system in the City. Based on the City's GIS records, the only drainage system located in the project vicinity is where the proposed roadways tie into existing roadways and it consists primarily of roadside ditches and culverts at driveways and roadway crossings. Any ditches and culverts impacted by the project will need to be modified. Drainage will need to be assessed during design to verify the extent of these drainage modifications and to determine required drainage facilities for the new roadways. It is anticipated that subsurface drainage and low impact development (LID) drainage practices will be implemented and connected to the existing drainage system. A map of the drainage facilities and ground surface elevations in the project vicinity is provided in Figure 4-11.

Figure 4-11: Commercial Connector Roads in Planned Development – Drainage & Contour Map

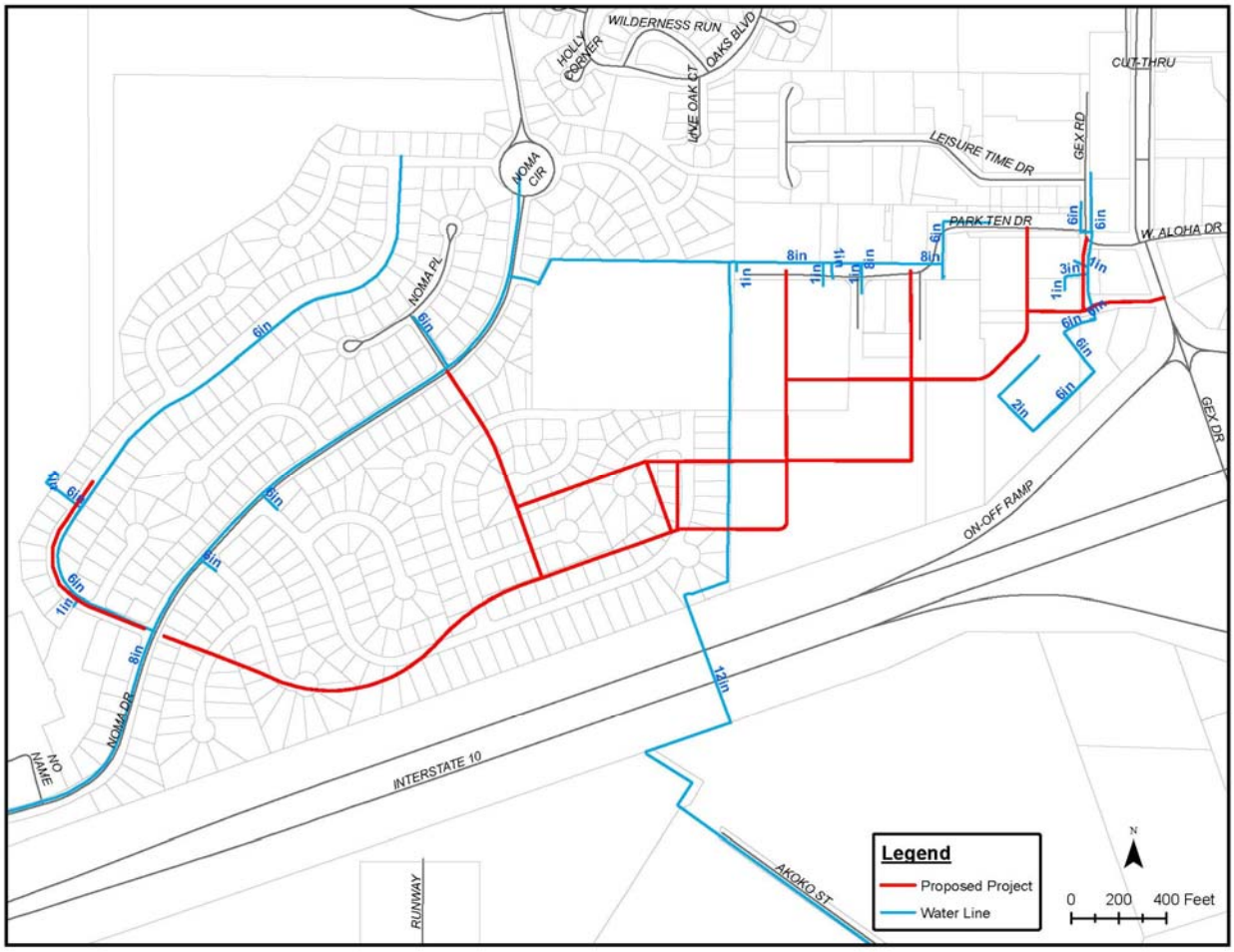


Water and Sewer

The Diamondhead Water and Sewer District (DWSD) owns and operates the water and sewer system in the City of Diamondhead. The DWSD provided a GIS file with locations and data for the water and sewer utilities. It should be noted that the locations indicated in the database were not surveyed, and only provide a general location of where the utilities are located. While the water and sewer utilities should not conflict with the proposed project, as they are located underground, care will need to be taken during construction to not damage the existing utilities. Some facilities, such as the manholes, valves, or fire hydrants, may require adjusting if they interfere with the alignment of the new roadway.

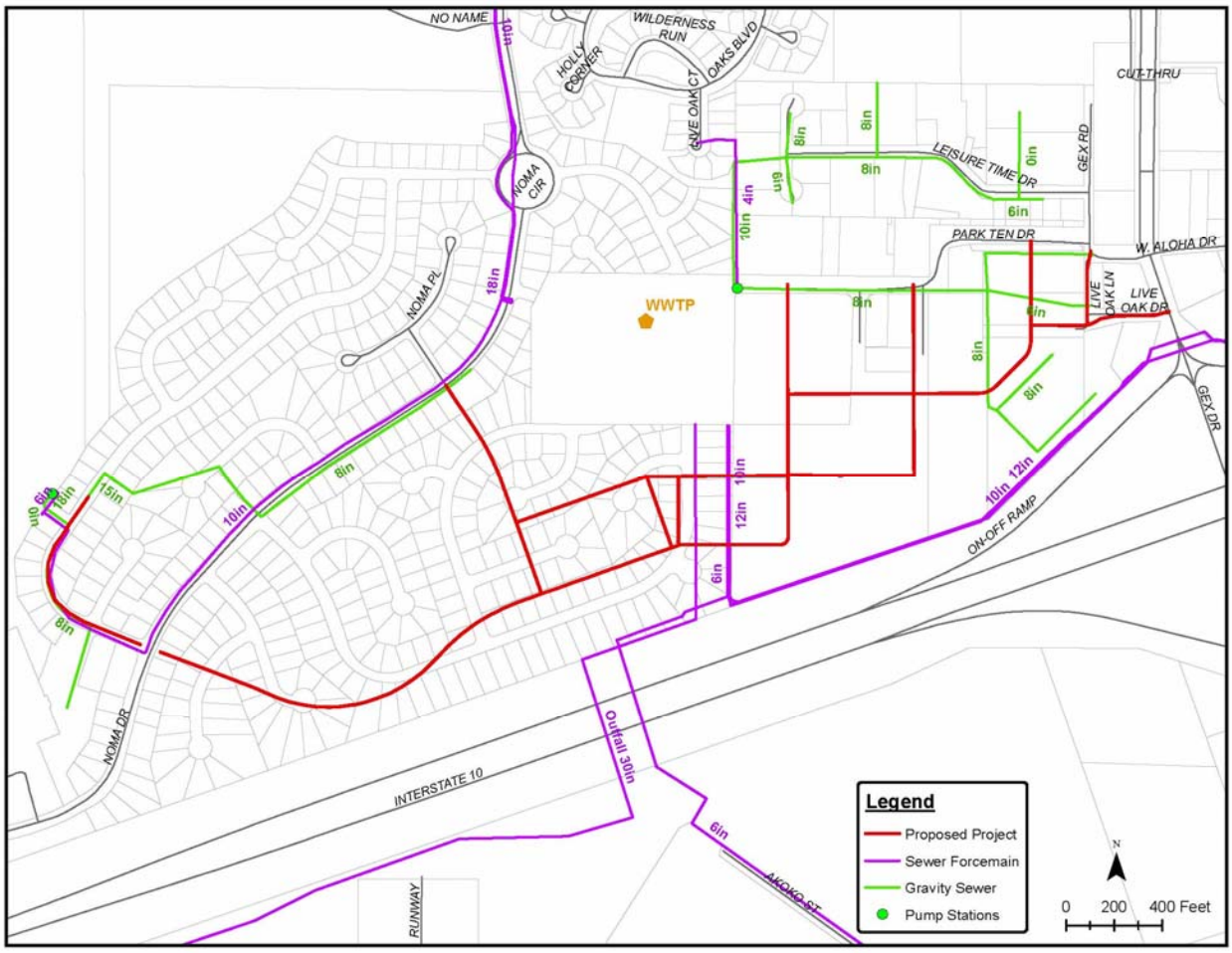
There are several water lines, ranging in size from 1-inch to 8-inch in diameter, located in the vicinity of where the proposed roadways connect to existing roads in the commercial district. There is a 12-inch water main that crosses north-south through the project area from I-10 to Park Ten Drive. An 8-inch water main runs along Noma Drive and a 6-inch water main with multiple tie-ins is located along the proposed alignment of the roadway west of Noma Drive. It is anticipated that additional water facilities will be required to serve future development in the project area. However, a conceptual layout and the associated costs have not been developed for this study, as the required facilities will depend on the type and extent of the development and its impact on the existing water system. A map of the existing water lines located in the project vicinity is provided in Figure 4-12.

Figure 4-12: Commercial Connector Roads in Planned Development – Water Map



There are several gravity sewer lines, ranging in size from 6-inch to 10-inch in diameter, located in the vicinity of where the proposed roadways connect to existing roads in the commercial district. There are multiple sewer forcemains, ranging in size from 6-inch to 12-inch in diameter, that cross north-south through the project area from I-10 to the wastewater treatment plant (WWTP) located southwest of Park Ten Drive. There are sewer forcemains, 10-inch and 18-inch in diameter, that run along Noma Drive and flow to the WWTP. An 8-inch gravity sewer runs along a portion of Noma Drive. There is a sewer forcemain and multiple gravity sewer lines located along the proposed alignment of the roadway west of Noma Drive. It should also be noted that there are several abandoned sewer forcemains located in or within close vicinity to the project – along Noma Drive and running north of and parallel to I-10. It is anticipated that additional sewer facilities will be required to serve future development in the project area. However, a conceptual layout and the associated costs have not been developed for this study, as the required facilities will depend on the type and extent of the development and its impact on the existing sewer system. A map of the existing sewer lines located in the project vicinity is provided in Figure 4-13.

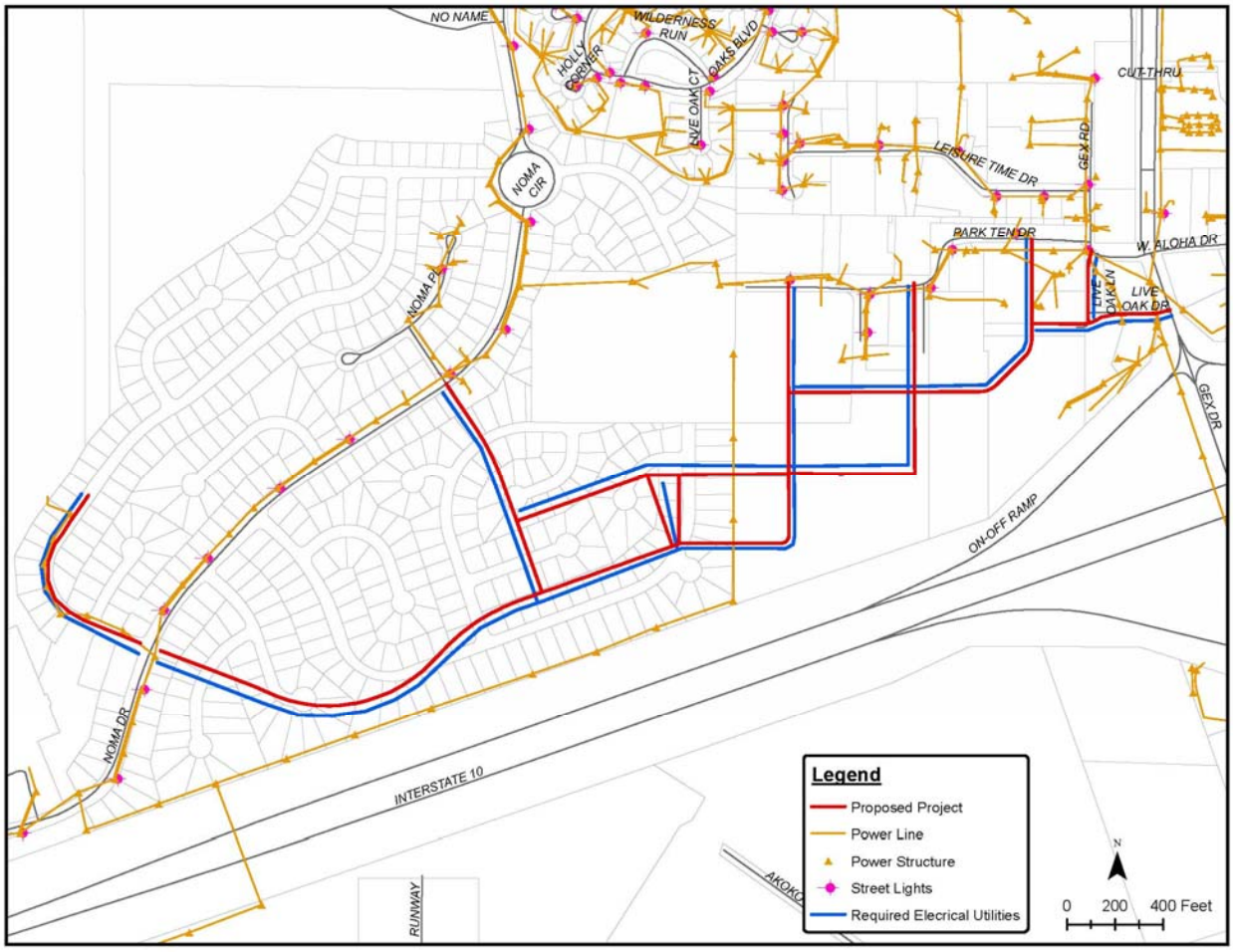
Figure 4-13: Commercial Connector Roads in Planned Development – Sewer Map



Electric

Coast Electric provides power and street lighting to the City of Diamondhead. Based on the latest information provided by Coast Electric, there are electric facilities, including power lines, poles, pedestals and street lights, located in the vicinity of where the proposed roadways connect to existing roads in the commercial district. A power line crosses north-south through the project area from I-10 to Park Ten Drive. There are electric facilities located along Noma Drive and along the proposed alignment of the roadway west of Noma Drive. Modifications will be required to move the existing utilities underground in the project area. New underground utilities will be required along the proposed roadways where no such utilities exist currently. In addition, decorative lighting will be required along all proposed roadways in the project. A map of the existing electrical utilities located in the project vicinity is provided in Figure 4-14. The location where new electrical utilities will likely be required has also been identified.

Figure 4-14: Commercial Connector Roads in Planned Development – Electrical Map



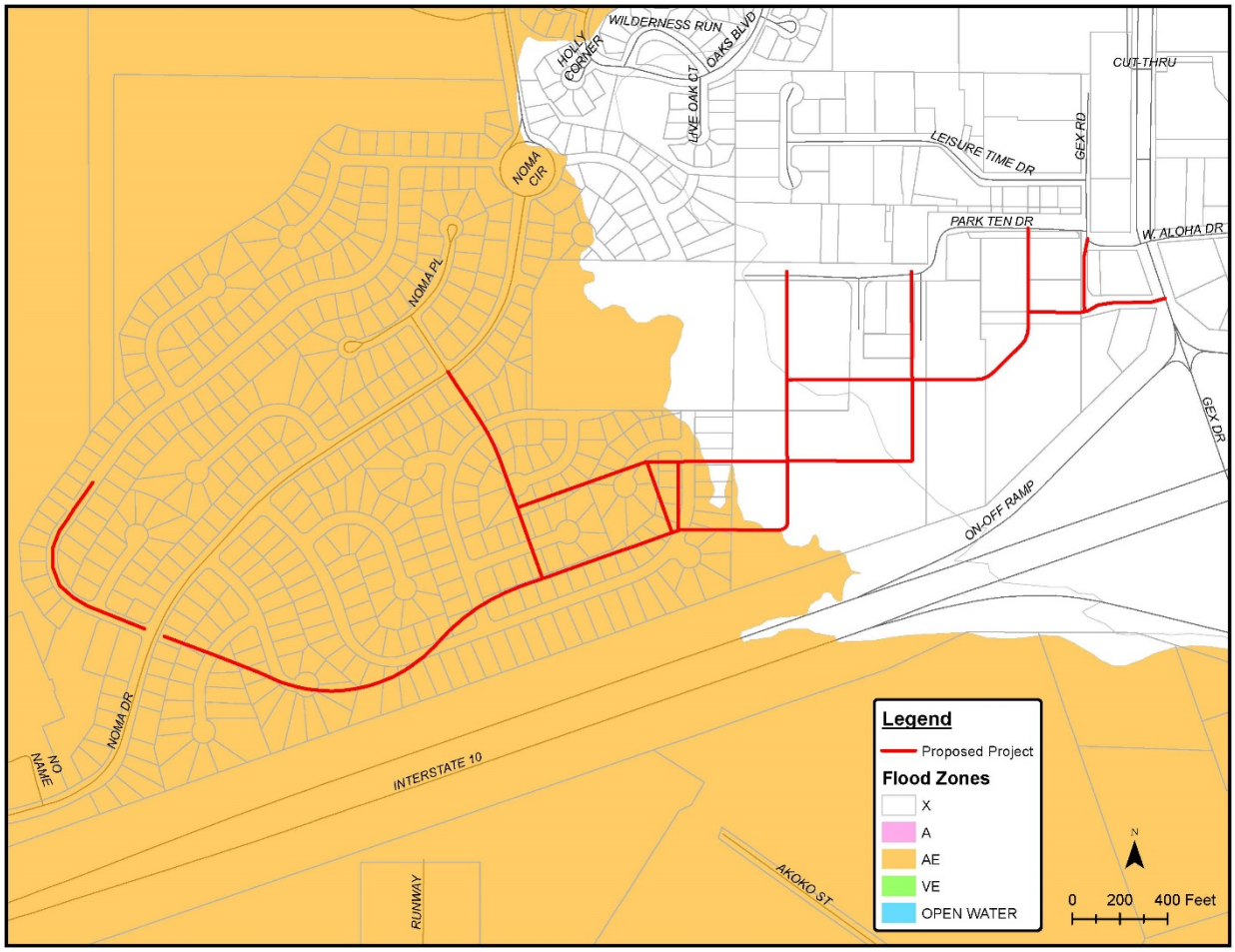
Environmental Considerations

An investigation into the environmental considerations for constructing the project was conducted. Below is a summary of the available information in the project area.

Flood Zones

The western portion of the project is located in Flood Zone AE and is subject to inundation by the 1-percent-annual-chance flood event. A base flood elevation (BFE) of 17 is specified for this area. The eastern portion of the project is located in Flood Zone X and is a moderate risk area within the 0.2-percent-annual-chance floodplain. A map of the flood zones in the project vicinity is provided in Figure 4-15.

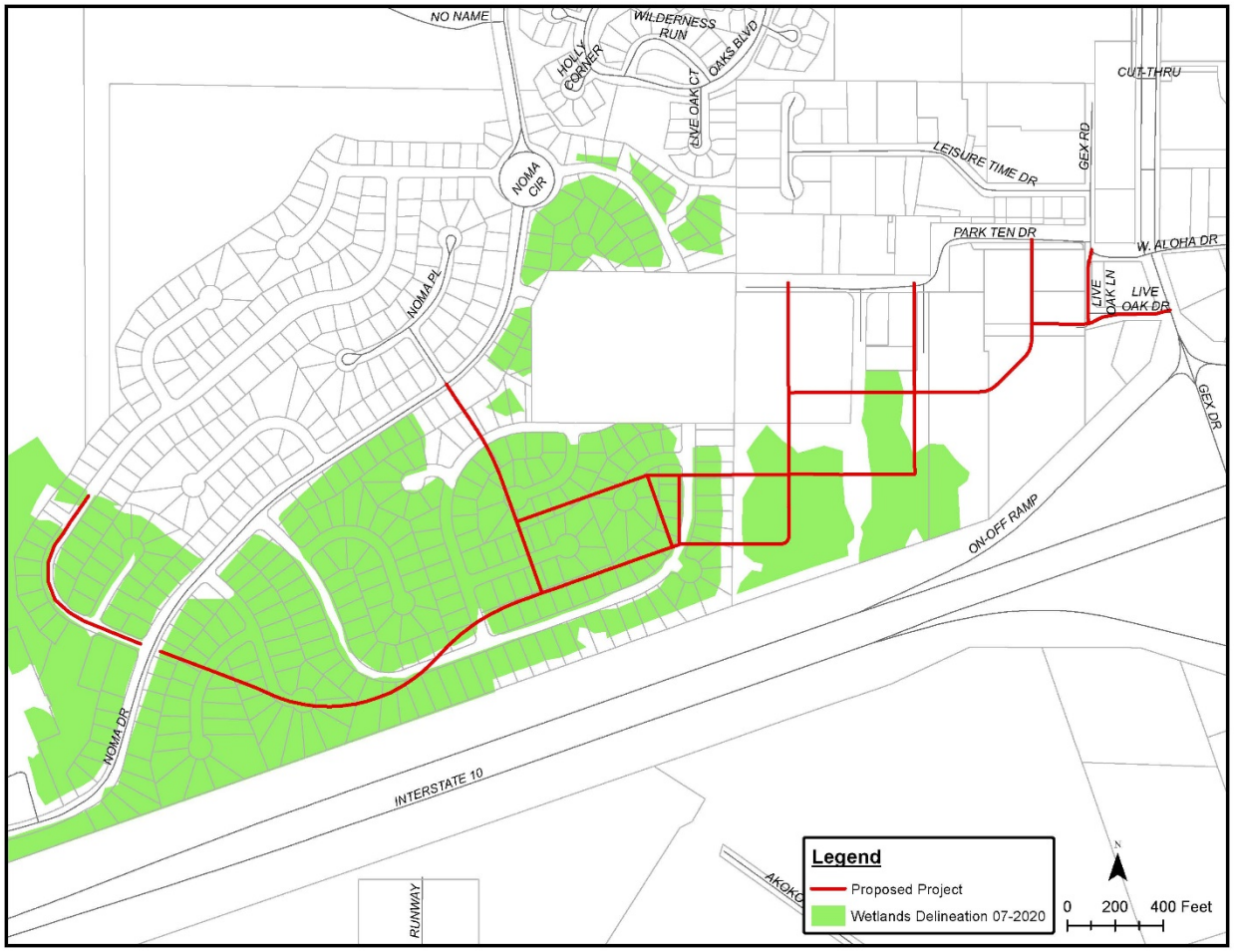
Figure 4-15: Commercial Connector Roads in Planned Development– Flood Zone Map



Wetlands

A wetlands delineation performed by Culpepper & Associates in July 2020 identified wetlands throughout most of the southwestern portion of the project area. According to this delineation, it is estimated that approximately 7.8 acres of wetlands will be impacted by the project and will likely require mitigation. However, a Jurisdictional Determination (JD) from the US Army Corps of Engineers will be required to confirm wetland boundaries and determine mitigation requirements. A Joint Application and Notification will need to be completed and submitted in order to obtain the JD. A map showing the location of these wetlands is provided in Figure 4-16.

Figure 4-16: Commercial Connector Roads in Planned Development – Wetlands Map



Opinion of Probable Costs

An opinion of probable costs, including construction costs and professional services costs, was prepared for the proposed project. Because this is a preliminary plan, a 25% contingency was included in the estimated construction costs. The costs for professional services are based on a percentage of the estimated construction costs. A breakdown of these costs is provided Table 4-1.

Table 4-1: Commercial Connector Roads in Planned Development – Opinion of Probable Costs

Description	Quantity	Unit	Unit Cost	Total Cost
Construction				
Asphalt Pavement	16,280	TON	$100.00	$1,628,000.00
Base Course	9,400	CY	$75.00	$705,000.00
Geotextile	41,800	SY	$5.00	$209,000.00
Concrete Sidewalk	14,090	SY	$40.00	$563,600.00
Grassing/Landscaping	14,320	SY	$5.00	$71,600.00
Drainage	1	LS	$100,000.00	$100,000.00
Electrical - Underground	1	LS	$2,000,000.00	$2,000,000.00
Sediment & Erosion Control	1	LS	$50,000.00	$50,000.00
Traffic Control	1	LS	$15,000.00	$15,000.00
Mobilization	1	LS	$267,110.00	$267,110.00
			Construction Subtotal	$5,609,310.00
			Contingency (25%)	$1,402,328.00
			Construction Total	$7,011,638.00
Professional Services				
Engineering (Geotechnical, Survey, Design)	1	LS	$405,620.00	$405,620.00
Resident Inspection	1	LS	$196,250.00	$196,250.00
Land Acquisition	600,220	SF	$2.50	$1,500,550.00
Permitting	1	LS	$10,000.00	$10,000.00
Wetlands Mitigation	7.8	AC	$25,000.00	$195,000.00
			Professional Services Total	$2,307,420.00
			PROJECT TOTAL	**$9,319,058.00**

Recommendations

To advance the proposed project from the preliminary planning phase to the design phase and make the project more ready for construction, the following next steps are recommended:

1. Perform topographical survey of the project area to determine the alignment of the proposed roadway and the impact to existing utilities. Notify the utility owner(s) of any impacts.

2. Perform geotechnical investigation to obtain recommendations for roadway section (base, pavement).

3. Perform drainage analysis to determine required modifications to existing drainage facilities and required implementation of new drainage facilities.

4. Complete and submit a Joint Application and Notification for approval by the US Army Corps of Complete and submit a Joint Application and Notification for review and approval by the US Army Corps of Engineers, Mississippi Department of Marine Resources (DMR) and the Mississippi Department of Environmental Quality (MDEQ). As part of this application, comments will also be received from the US Fish and Wildlife Service (USFWS), the Mississippi Department of Archives and History (MDAH), the Mississippi Natural Heritage Program (MNHP), the Environmental Protection Agency (EPA) and NOAA (National Oceanic and Atmospheric Administration) Fisheries (for coastal projects). A copy of the Joint Application and Notification is provided in Appendix C and can be accessed at https://dmr.ms.gov/wp-content/uploads/2019/07/joint-application-notification-form2.pdf.

5. If it is anticipated that MDOT will provide funding for the proposed project, complete and submit Form ENV-160-LPA, MDOT Environmental Division Environmental Class of Action Determination. A copy of this form is included in Appendix D and can be accessed at http://sp.mdot.ms.gov/Environmental/Forms%20and%20Templates/ENV-160/ENV-160%20LPA.pdf.

6. If new electrical facilities are to be installed as part of the proposed project, correspond with Coast Electric to begin the design process.

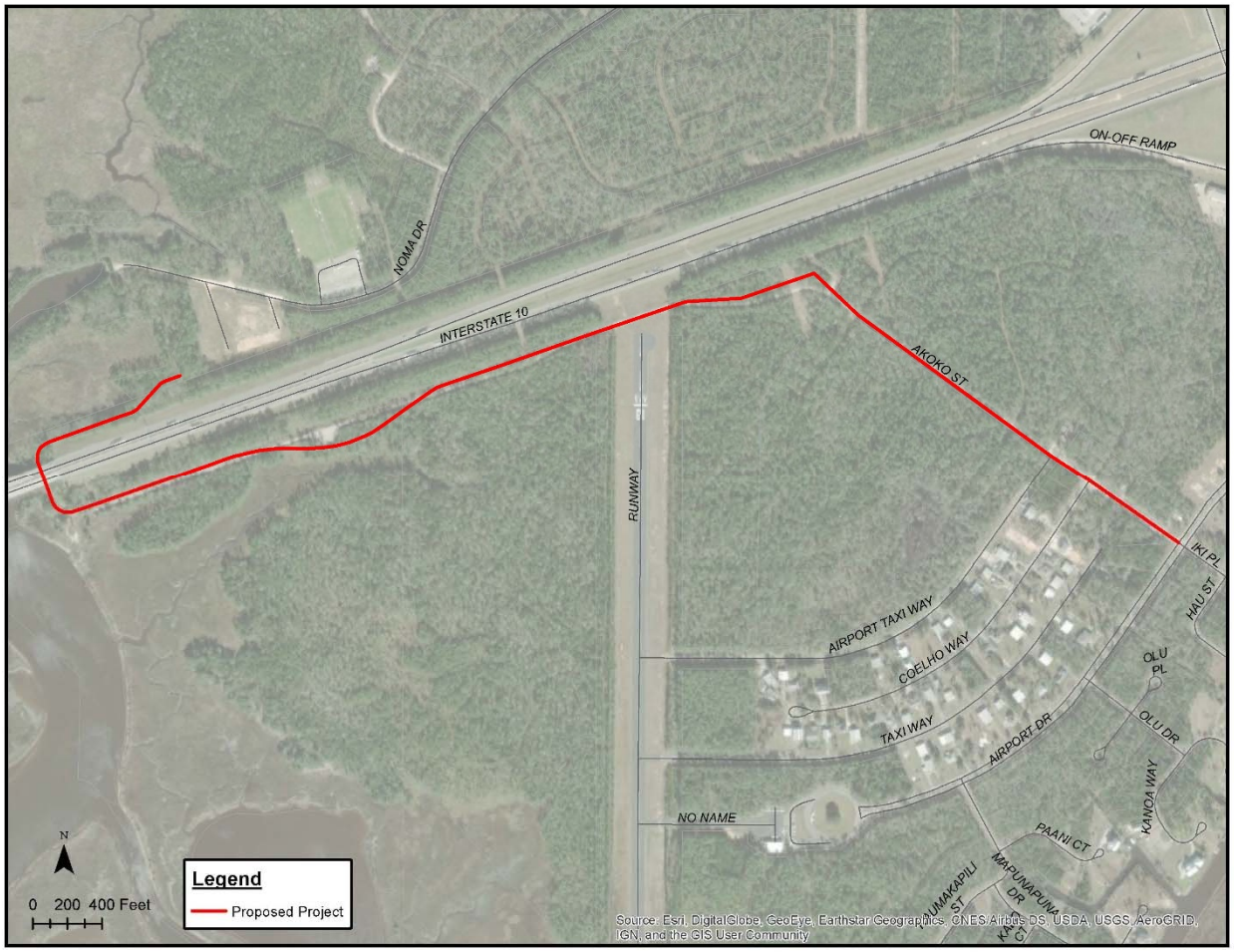
7. If new sewer and water facilities are to be installed as part of the proposed project, correspond with DWSD to begin the design process.

PROJECT 5 – AKOKO STREET EXTENSION

Project Purpose & Description

Project 5 – Akoko Street Extension includes the construction of approximately 7,975 feet of roadway that connects the proposed Town Center on the north side of I-10 to the area on the south side of I-10. (Appendix A includes a map showing the planned development area as specified in the City of Diamondhead's Master Plan.) Currently, the north and south sides of the city are only connected by the I-10 crossing where the I-10 exits are located. Pedestrian and bicycle use over the I-10 bridge is unsafe due to the amount of traffic and golf cart use is not permitted by the City. The project will provide an alternate connection between the two sides of the city that avoids traffic congestion from the I-10 exits and provides safe access for pedestrians, bicycles and golf cart use. A map of the proposed project is provided in Figure 5-1.

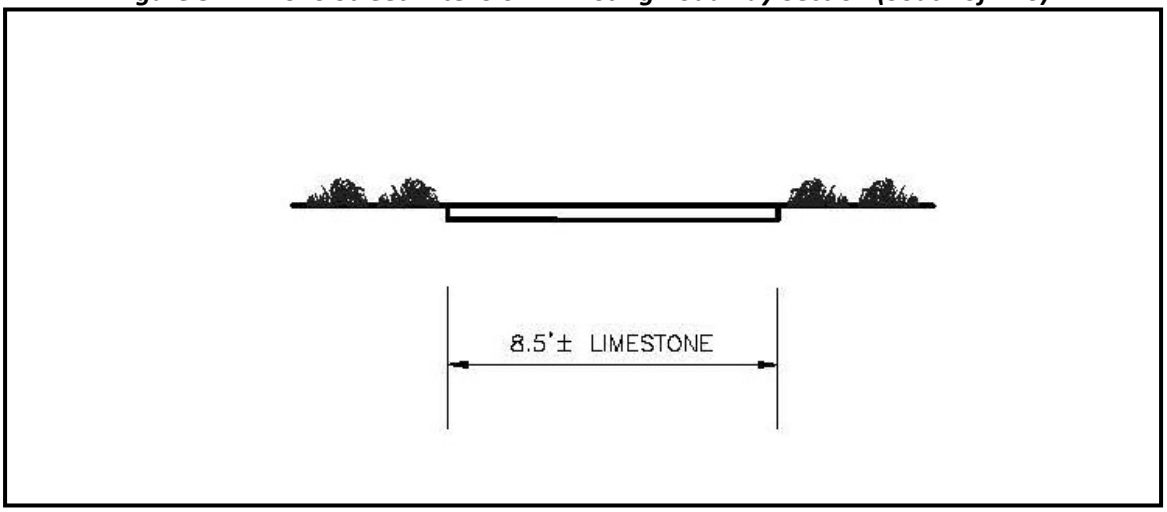
Figure 5-1: Akoko Street Extension – Project Map



Existing Conditions

The proposed project is located on both sides of I-10 on vacant land that is primarily wooded. There is an existing limestone road base that runs parallel to and just south of I-10. The runway for the Diamondhead Property Owners Association Airport is south of and runs perpendicular to the limestone road. A cross section of the existing limestone roadway south of I-10 is provided in Figure 5-2.

Figure 5-2: Akoko Street Extension – Existing Roadway Section (South of I-10)



Just west of the project is the I-10 bridge that crosses over the Jourdan River. The east embankment of the river slopes down from the I-10 bridge to the river's edge. This embankment is primarily overgrown with vegetation but also has areas of eroded soil where water runs down to the river. Pictures of the bridge in the area of the proposed project are provided in Figures 5-3 and 5-4.

Figure 5-3: Akoko Street Extension – Existing I-10 Bridge (Looking North)

Figure 5-4: Akoko Street Extension – Existing I-10 Bridge (Looking South)

Proposed Conditions

The proposed road will tie into the proposed end of Noma Drive on the north side of I-10, cross under I-10, continue east along the existing limestone road to tie into Akoko Street and end where Akoko Street intersects with Coelho Way. The proposed road will be a two-lane asphalt road, with 11-foot vehicle lane widths. A 10-foot multimodal lane will run along one edge of the road, separated from the road by a 6-foot planting strip. The multimodal lane will continue past the end of the newly constructed road to tie into the shared use lane on Airport Drive.

Coordination with the Federal Aviation Administration (FAA) will be required and FAA clearance regulations must be followed. It is anticipated that the clearance regulations can be met as long as the proposed roadway does not move any closer to the existing airport runway than the existing limestone roadway.

Coordination with Mississippi Department of Transportation (MDOT) will also be required for the construction of the road under the I-10 bridge and applicable MDOT bridge and roadway design requirements must be met. MDOT provided the following initial comments that shall be considered in design of this project:

- Per the Roadway Design Manual, a minimum vertical clearance of 14.5 feet will be required. The desired vertical clearance is 16 feet.
- A vertical clearance apparatus is required in front of the bridge to ensure no over height vehicles try to go under the interstate bridge.
- A soil nail wall shall be provided at the end bent to cut off the spill through slope.
- Fill will potentially need to be added around Bent 25 because of roadway construction and the existing scouring.
- The overall hydraulic opening should not be reduced. The bridge is already too short on the east approach and any reduction of the hydraulic opening will exacerbate any existing problems.
- If the proposed road cuts into the northern side slopes of the bridge, retaining walls will be required on the north side of the interstate. Otherwise, the road alignment will need to go through the marsh to tie into Noma Drive.

The layout of the proposed roadway is provided in Figure 5-5 and a cross section for the proposed roadway is provided in Figure 5-6.

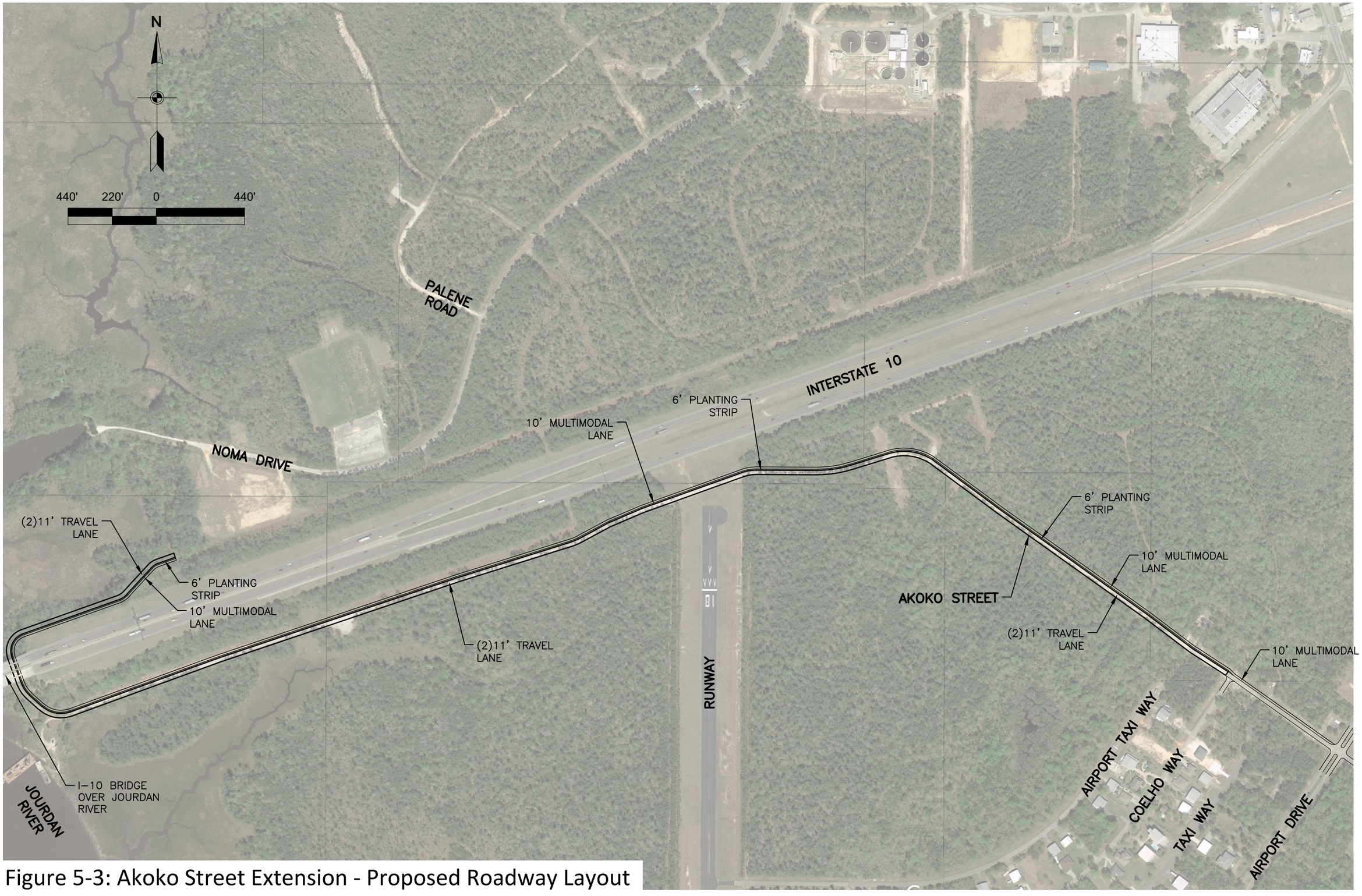
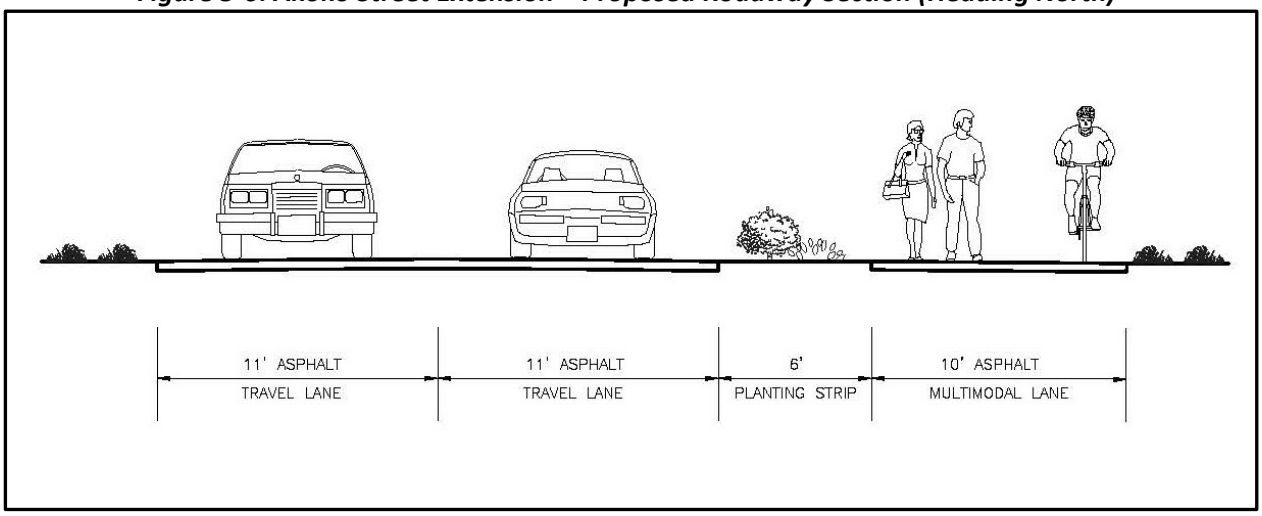


Figure 5-3: Akoko Street Extension - Proposed Roadway Layout

Figure 5-6: Akoko Street Extension – Proposed Roadway Section (Heading North)

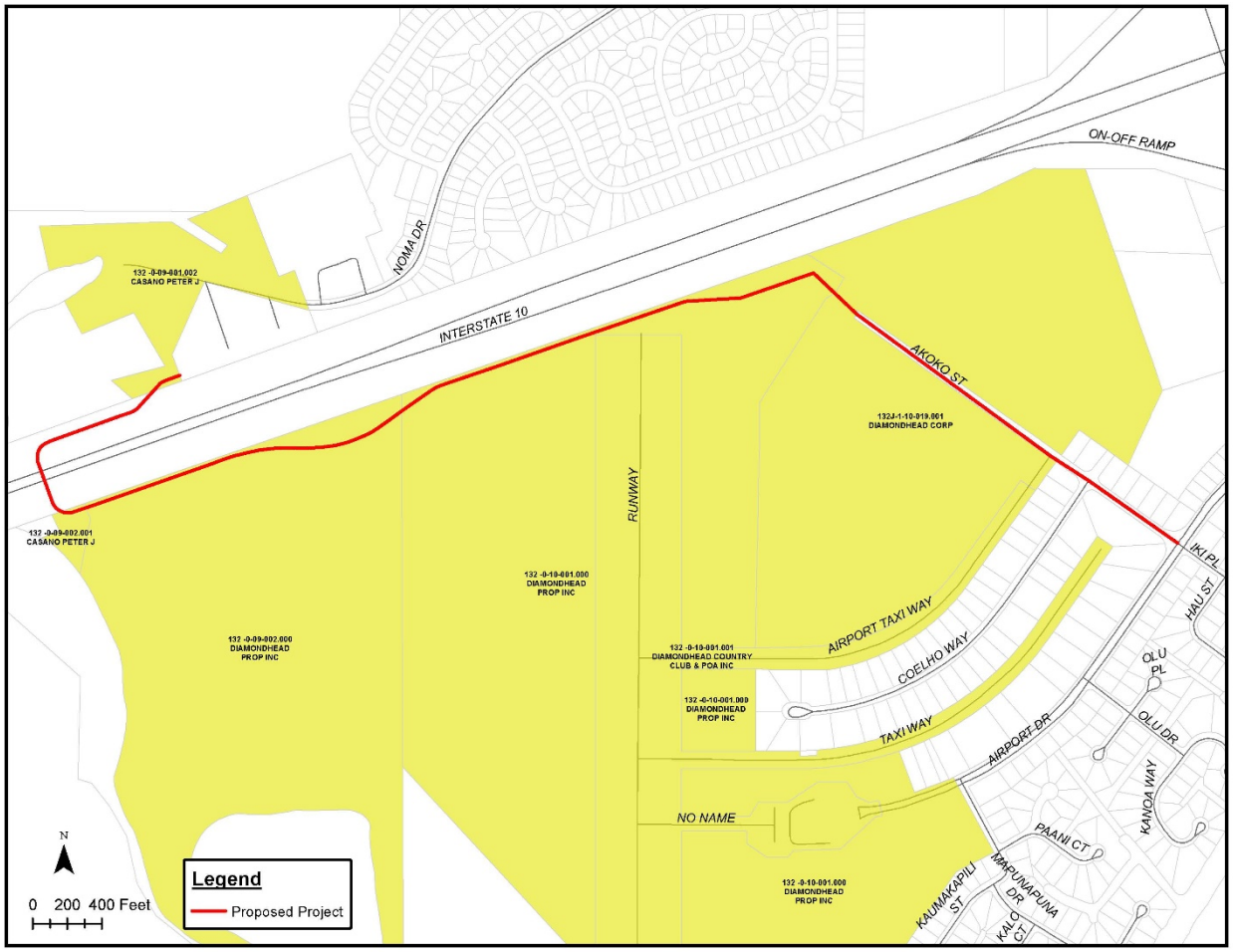


Right-of-Way Requirements

Approximately 6,300 linear feet of the proposed roadway is not located within an existing right-of-way. A minimum right-of-way width of 40 feet will be required in this area. Akoko Street has a right-of-way width of 50 feet, so no land acquisition will be required for the portion of newly constructed roadway located within this area. The Mississippi Department of Transportation (MDOT) will need to approve the I-10 crossing and will likely require a permit for encroaching on the MDOT right-of-way. Approximately 252,100 square feet, or 5.8 acres, of land acquisition will be required.

A map highlighting the parcels that will likely be impacted by the proposed project is provided in Figure 5-7. The parcel numbers and owners noted in the figure were obtained from the GIS data provided by Hancock County in 2020. It should be noted that the exact location and area of required right-of-way will depend on the alignment of the proposed roadways and cannot be precisely detailed until the roadway alignment has been finalized.

Figure 5-7: Akoko Street Extension – Right-of-Way Impacts



Traffic Considerations

With the exception of Akoko Street, the proposed roadway does not currently exist. The existing roads that the proposed roadway will connect to (Noma Drive, Akoko Street, Coelho Way and Airport Drive) are classified as local streets. No traffic counts have been taken in the project area. However, traffic counts were taken by the Gulf Regional Planning Commission in 2020 at streets that will provide access to the project area. These traffic counts indicate that there is an annual average daily traffic (AADT) count of 1,300 at the northern most portion of Noma Drive and an AADT count of 440 at the eastern end of Airport Road. It can be expected, if connector roads are constructed and development occurs as planned, that traffic volumes will be higher than these AADT counts.

Pedestrian Facilities

Currently there are no pedestrian facilities located in the proposed project area. The project will include the construction of a 10-foot wide multimodal lane that will provide a connection between the north and south sides of the city for walking, biking and use of a golf-cart. The proposed multimodal lane will connect to the proposed multimodal lane on Noma Drive, which will extend to City Hall and to the proposed Town Center (Appendix A), and to the existing shared use lane on Airport Drive.

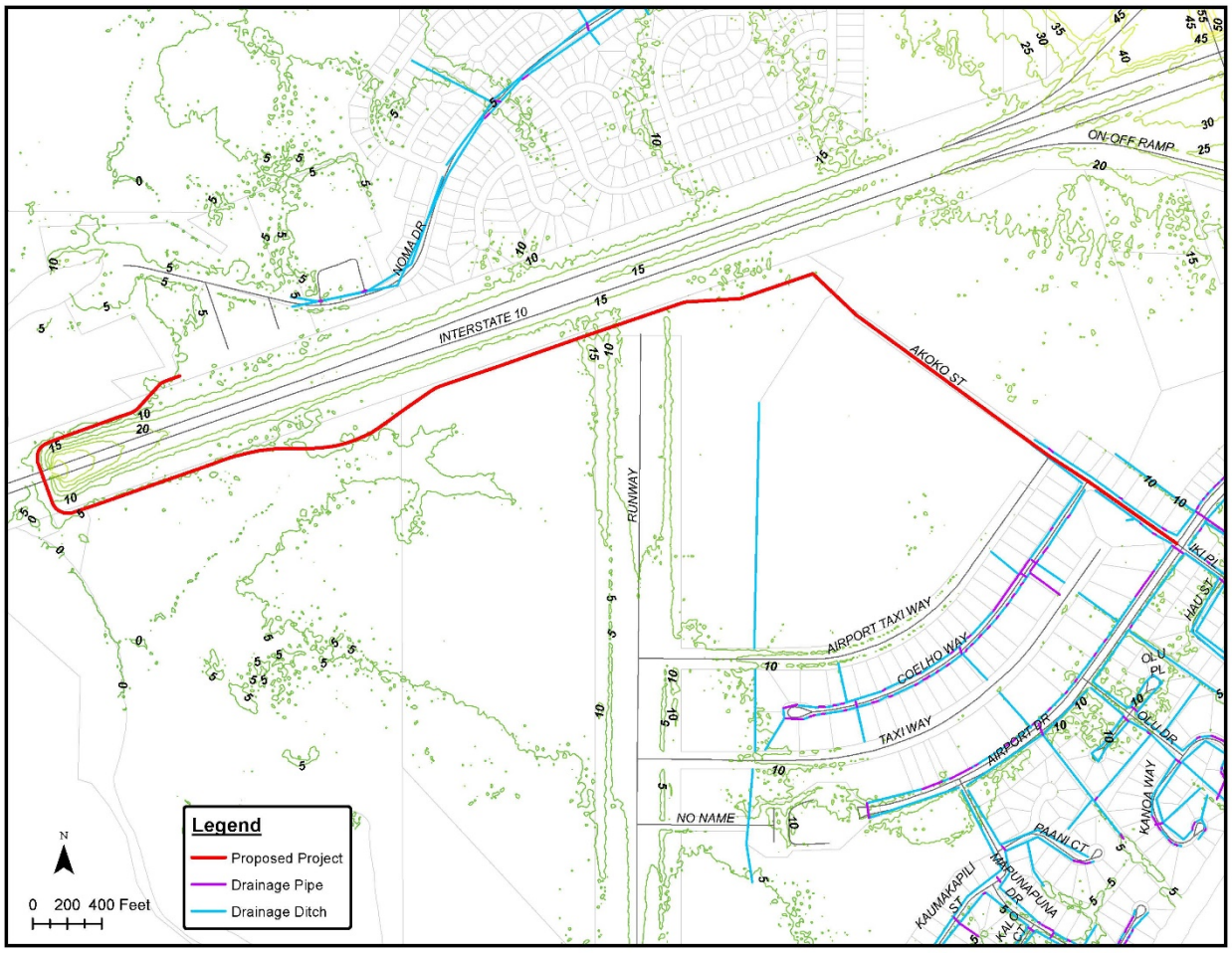
Utilities

An investigation was conducted to determine the utilities located in the project area. Below is a summary of the available utility information.

Drainage

The City of Diamondhead Public Works Department maintains the drainage system in the City. Based on the City's GIS records, there are no existing drainage utilities located in the project area except on the southern end of Akoko Street where there are drainage ditches on each side of the street. Contour data indicates that water flows from east to west on both sides of I-10. Existing drainage patterns will be impacted by the project and therefore, drainage facilities will need to be designed and implemented. It is anticipated that drainage swales and low impact development practices would provide adequate storage and conveyance of runoff. A map of the drainage facilities and ground surface elevations in the project vicinity is provided in Figure 5-8.

Figure 5-8: Akoko Street Extension – Drainage & Contour Map

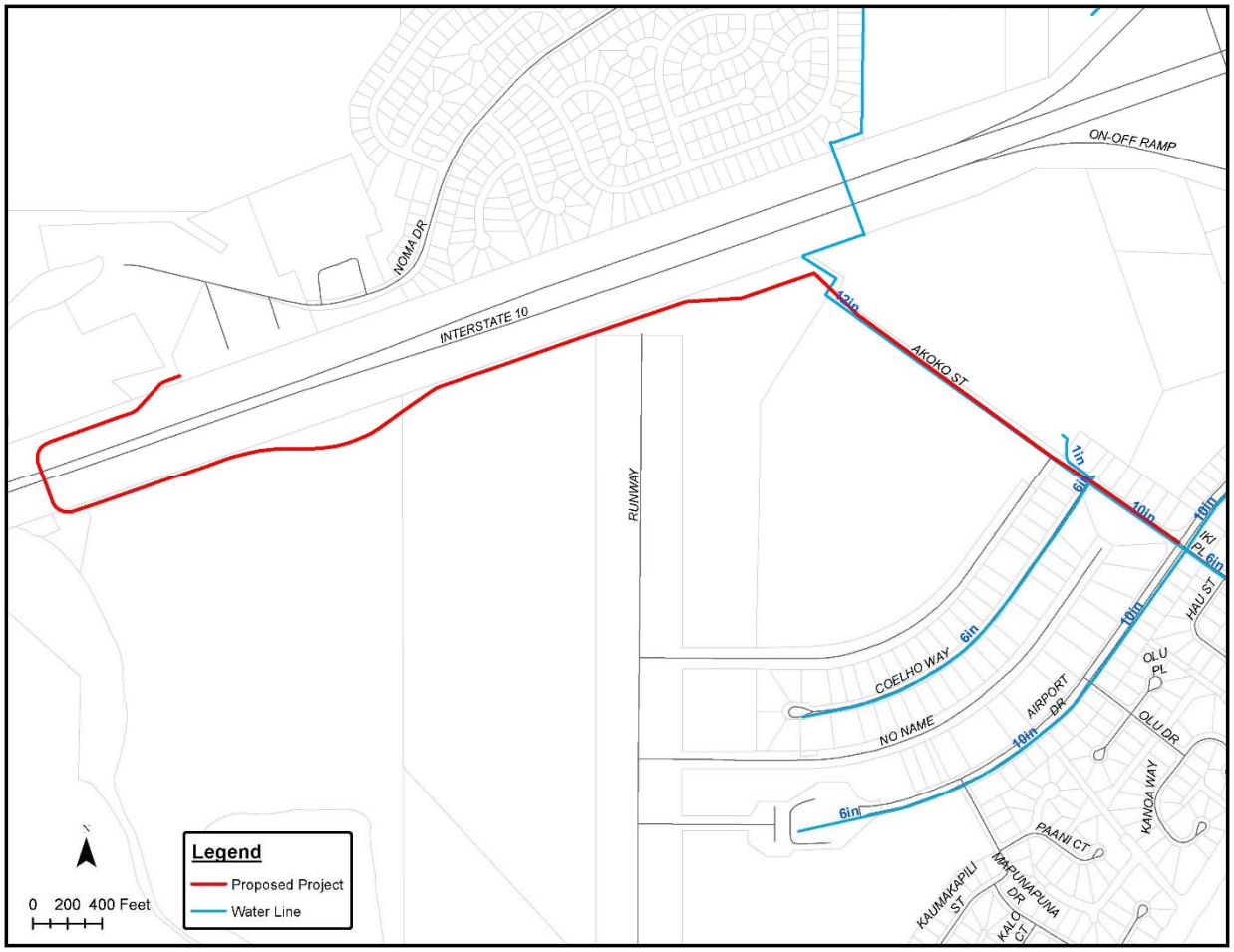


Water and Sewer

The Diamondhead Water and Sewer District (DWSD) owns and operates the water and sewer system in the City of Diamondhead. The DWSD provided a GIS file with locations and data for the water and sewer utilities. It should be noted that the locations indicated in the database were not surveyed, and only provide a general location of where the utilities are located. While the water and sewer utilities should not conflict with the proposed project, as they are located underground, care will need to be taken during construction to not damage the existing utilities. Some facilities, such as the manholes, valves, or fire hydrants, may require adjusting if they interfere with the alignment of the new roadway.

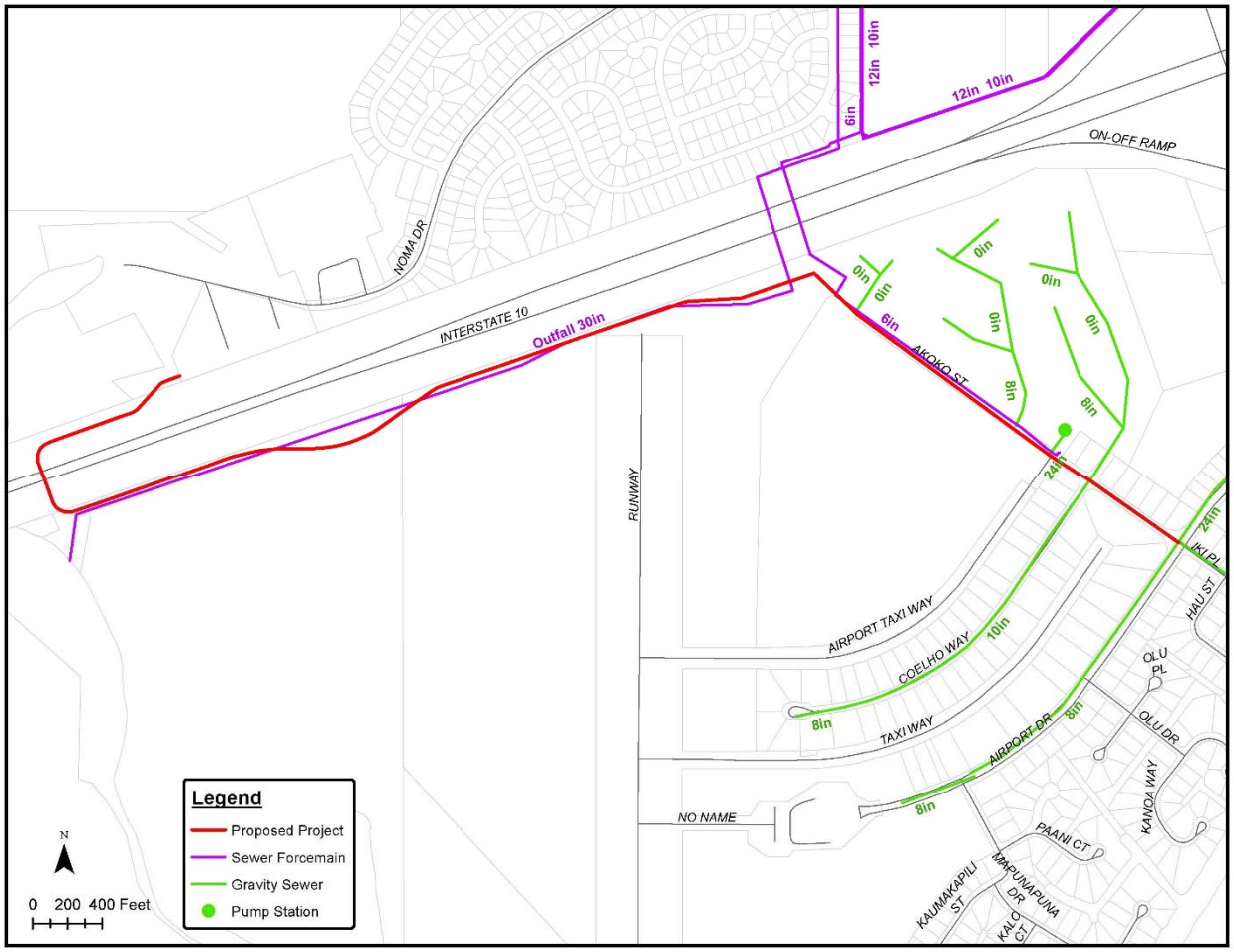
There is a water main with a diameter ranging from 10-inch to 12-inch that runs along Akoko Street and crosses under I-10. There are water mains of varying sizes on Coelho Way and Airport Drive that tie into the Akoko Street water main. It is anticipated that additional water facilities will be required to serve future development in the project area. However, a conceptual layout and the associated costs have not been developed for this study, as the required facilities will depend on the type and extent of the development and its impact on the existing water system. A map of the existing water lines located in the project vicinity is provided in Figure 5-9.

Figure 5-9: Akoko Street Extension – Water Map



There are no sewer facilities located in the project vicinity on the north side of I-10. The outfall from the wastewater treatment plant crosses under I-10 and runs parallel to I-10 along the proposed roadway alignment and discharges to the Jourdan River. There is a 6-inch sewer forcemain that runs from the pump station on the east side of the intersection of Akoko Street and the airport taxi way and then north along Akoko Street and then crosses under I-10. There are also gravity sewer lines of varying sizes located near the proposed project alignment along Akoko Street, Coelho Way and Airport Drive. It is anticipated that additional sewer facilities will be required to serve future development in the project area. However, a conceptual layout and the associated costs have not been developed for this study, as the required facilities will depend on the type and extent of the development and its impact on the existing sewer system. A map of the existing sewer lines located in the project vicinity is provided in Figure 5-10.

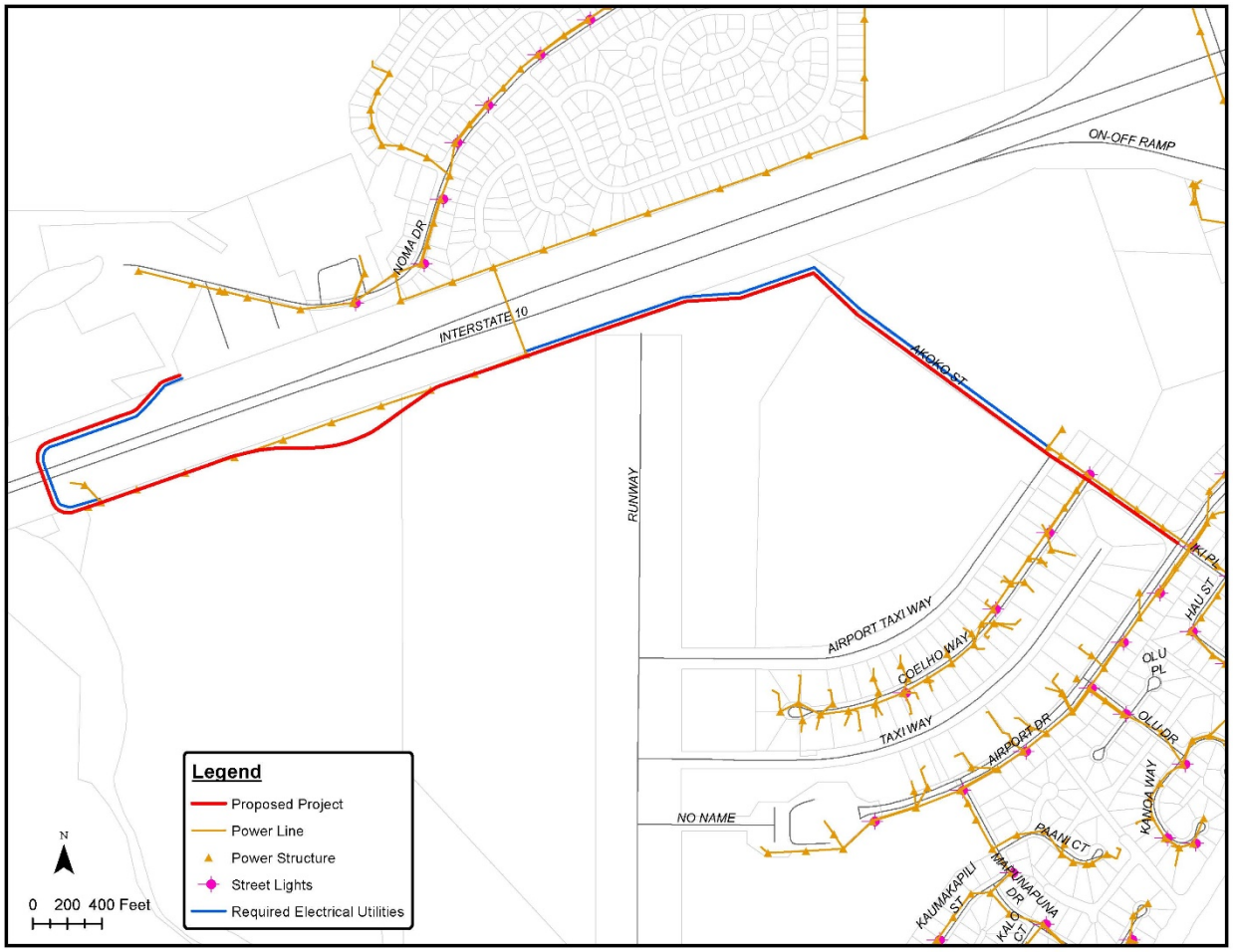
Figure 5-10: Akoko Street Extension – Sewer Map



Electric

Coast Electric provides power and street lighting to the City of Diamondhead. Based on the latest information provided by Coast Electric, there is a power line that runs along the proposed alignment on the south side of I-10 for approximately 2,700 feet. There is also a power line on Akoko Street that begins north of Coelho Way and runs south to tie into the electrical facilities on Airport Drive. These existing electrical facilities may need to be relocated if they interfere with the proposed roadway. It is anticipated that electrical utilities will be required along the portion of the proposed roadway that does not currently have electric facilities. A map of the existing electrical utilities located in the project vicinity is provided in Figure 5-11. The location where new electrical utilities will likely be required has also been identified.

Figure 5-11: Akoko Street Extension – Electrical Map



Environmental Considerations

An investigation into the environmental considerations for constructing the project was conducted. Below is a summary of the available information in the project area.

Flood Zones

With exception of the area just north of Airport Drive, the entire project area is located in Flood Zone AE and is subject to inundation by the 1-percent-annual-chance flood event. Approximately 130 linear feet of the proposed multimodal lane at the south end of Akoko Street is located in Flood Zone VE and is subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. Base flood elevations (BFE) range from 17 to 20 in the project area. With an increased risk of flooding in the area, the required elevation of the proposed roadway will need to be assessed during design to mitigate flooding of the new roadway and to prevent increased flooding to neighboring properties. A map of the flood zones in the project vicinity is provided in Figure 5-12. A map of the base flood elevations and ground surface elevations for the project area is provided in Figure 5-13.

Figure 5-12: Akoko Street Extension – Flood Zone Map

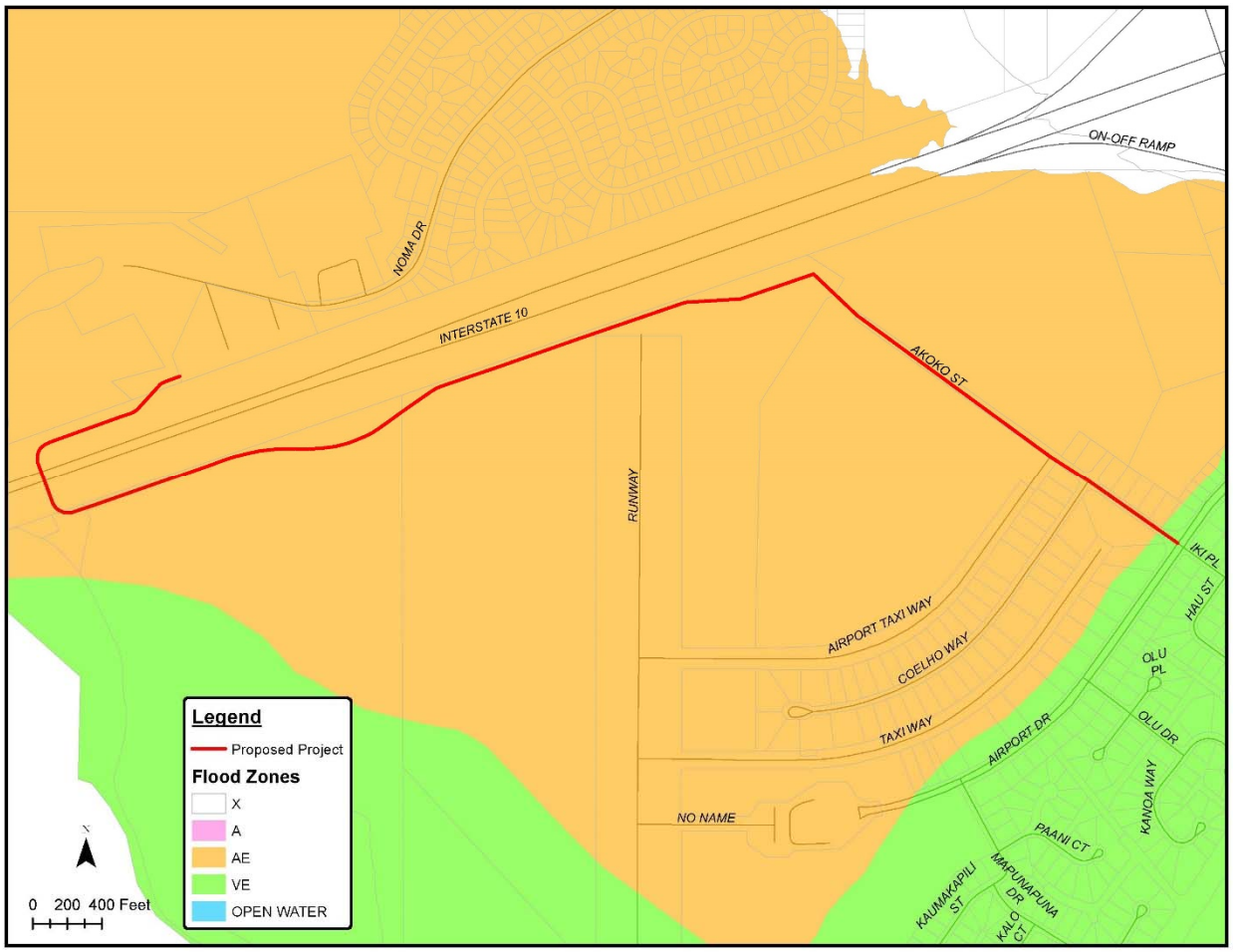
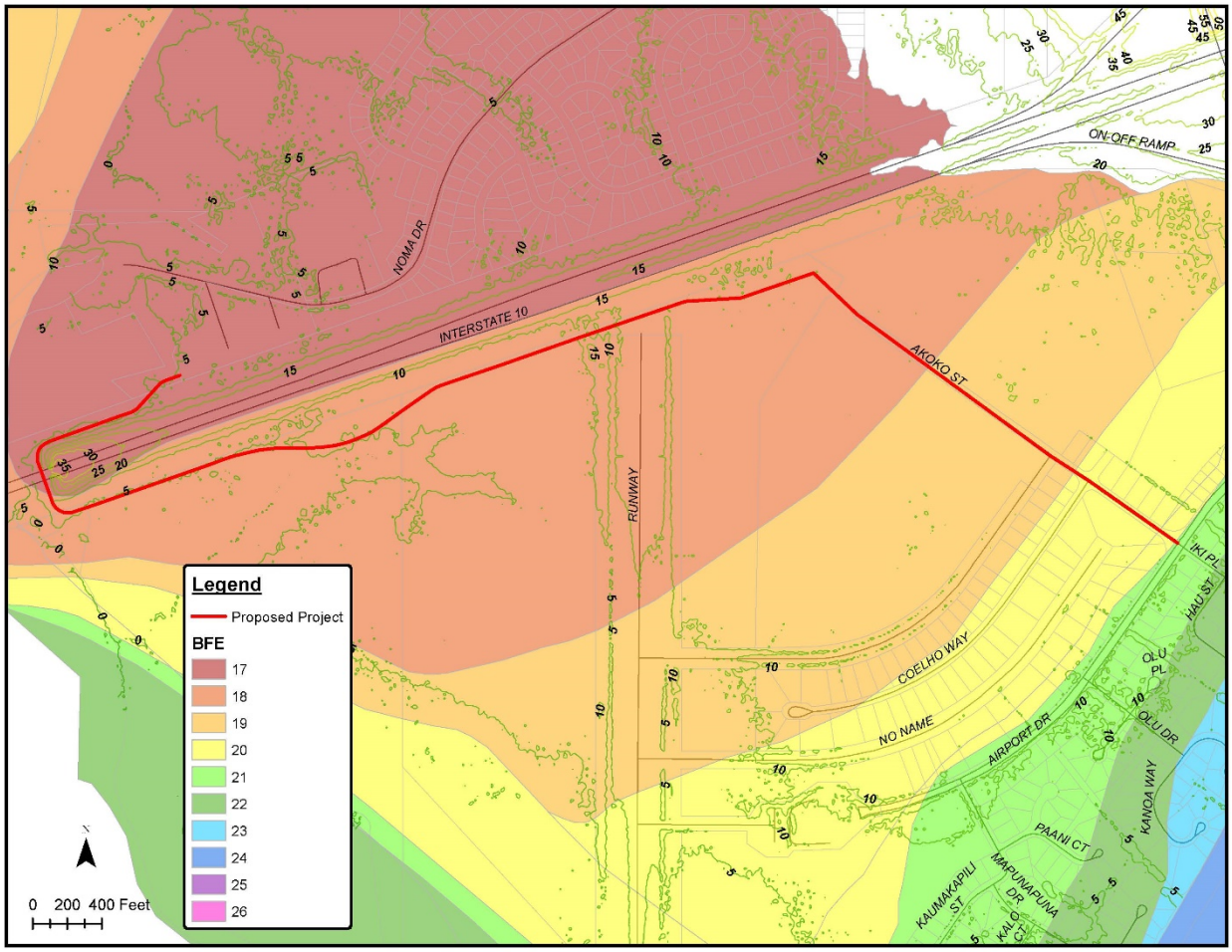


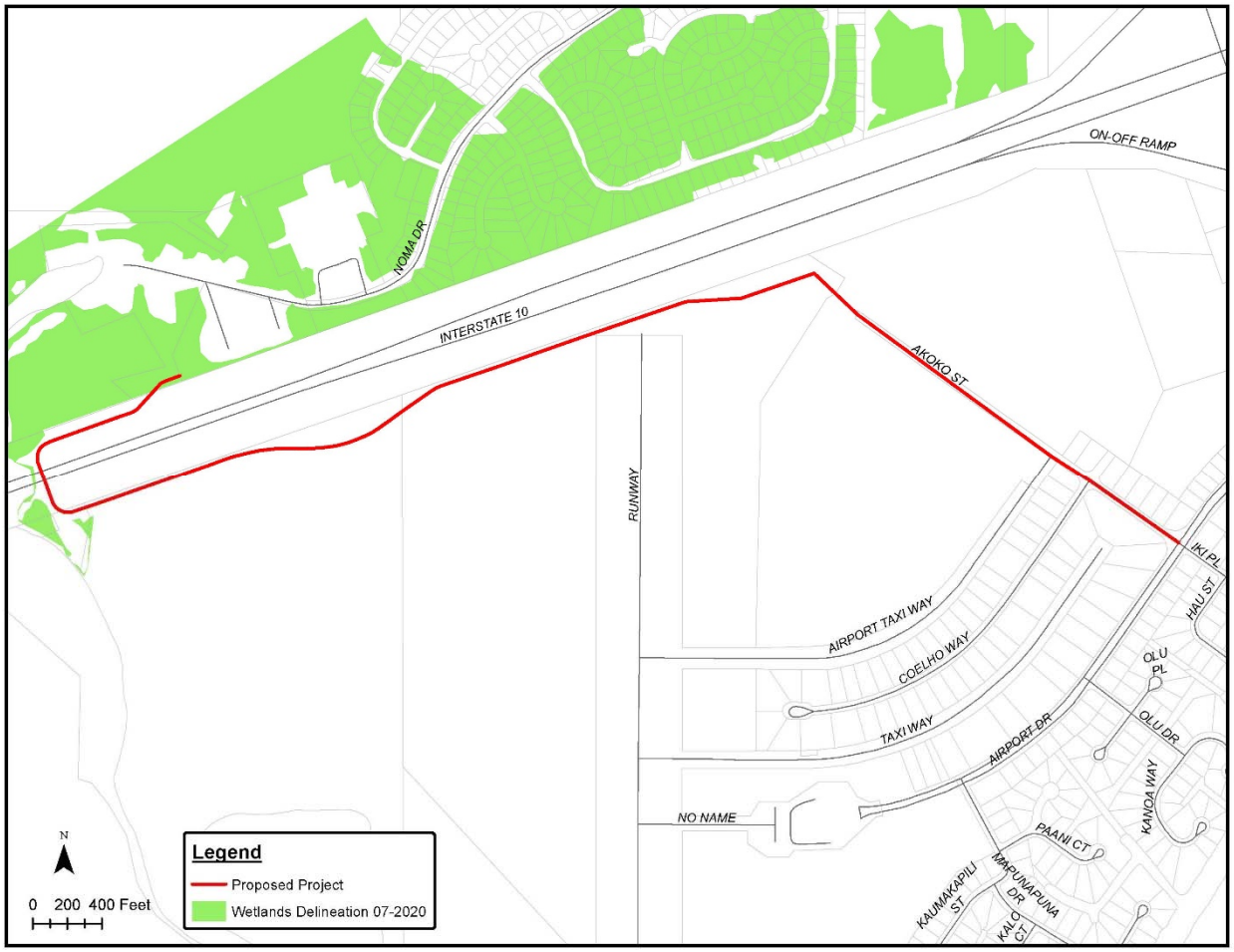
Figure 5-13: Akoko Street Extension – Base Flood Elevation (BFE) Map



Wetlands

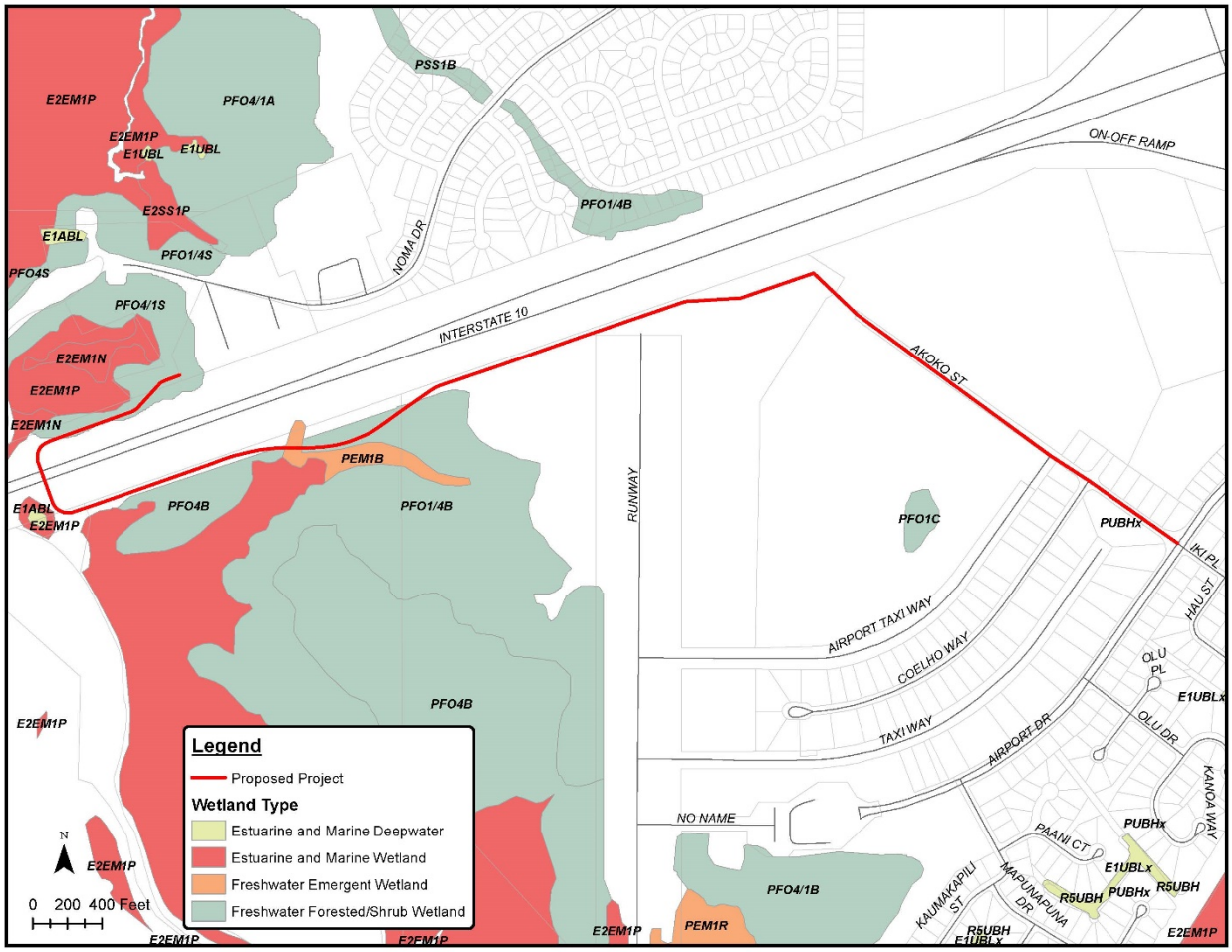
While a wetlands delineation has not been completed for the entire project area, a wetlands delineation was performed by Culpepper & Associates in July 2020 that included a small portion of the project area. This delineation identified wetlands north of I-10, near where the proposed roadway begins, and to the west of the proposed I-10 crossing. A map showing the location of these wetlands is provided in Figure 5-14.

Figure 5-14: Akoko Street Extension – July 2020 Wetlands Delineation Map



The US Fish and Wildlife Service National Wetlands Inventory (NWI) identifies approximate boundaries for wetlands that can be used as an initial assessment of potential wetlands. A complete wetlands delineation is still required to determine a more accurate boundary for the wetlands. According to the NWI, there are also wetlands located on the south side of I-10. Approximately 2,500 linear feet of the proposed roadway is located near these wetlands. A map of the NWI wetlands in the project vicinity is provided in Figure 5-15.

Figure 5-15: Akoko Street Extension – US Fish and Wildlife Service NWI Wetlands Map



There are freshwater forested/shrub wetlands with classification codes PFO4B, PFO1/4B, and PFO4/1S and freshwater emergent wetlands with classification code PEM1B located within the project vicinity. An explanation of the codes, as specified on the USFWS NWI website, is provided below:

System *Palustrine (P)* – The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 20 acres; (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 8.2 feet at low water; and (4) salinity due to ocean-derived salt is less than 0.5 ppt.

Class *Forested (FO)* – Characterized by woody vegetation that is 19.7 feet or taller

Subclass *Broad-Leaved Deciduous (1*) – Woody angiosperms (trees or shrubs) with relatively wide, flat leaves that are shed during the cold or dry season

Subclass *Needle-Leaved Evergreen (4)* – The dominant species in Needle-leaved Evergreen wetlands are young or stunted trees such as black spruce or pond pine.

Water Regime *Seasonally Saturated (B)* – The substrate is saturated at or near the surface for extended periods during the growing season, but unsaturated conditions prevail by the end of the season in most years. Surface water is typically absent, but may occur for a few days after heavy rain and upland runoff.

There are also freshwater emergent wetlands with classification code PEM1B located within the project area. An explanation of the codes, as specified on the USFWS NWI website, is provided below:

System *Palustrine (P)* – The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 20 acres; (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 8.2 feet at low water; and (4) salinity due to ocean-derived salt is less than 0.5 ppt.

Class *Emergent (EM)* – Characterized by erect, rooted, herbaceous hydrophytes excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.

Subclass *Persistent (1*) – Dominated by species that normally remain standing at least until the beginning of the next growing season.

Water Regime *Seasonally Saturated (B)* – The substrate is saturated at or near the surface for extended periods during the growing season, but unsaturated conditions prevail by the end of the season in most years. Surface water is typically absent, but may occur for a few days after heavy rain and upland runoff.

There are estuarine and marine wetlands with classification codes E2EM1P and E2EM1N, and estuarine and marine deepwater wetlands with classification code E1ABL. An explanation of the codes, as specified on the USFWS NWI website, is provided below:

System *Estuarine (E)* – The Estuarine System consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of open ocean by evaporation. Along some low-energy coastlines, there is appreciable dilution of sea water. Offshore areas with typical estuarine plans and animals are also included in the Estuarine System.

Subsystem *Subtidal (1)* – The substrate in these habitats is continuously covered with tidal water (i.e., located below extreme low water).

Subsystem *Intertidal (2)* – The substrate in these habitats is flooded and exposed by tides; includes the associated splash zone.

Class *Emergent (EM)* – Characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.

Class *Aquatic Bed (AB)* – Includes wetlands and deepwater habitats dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years.

Subclass *Persistent (1)* – Dominated by species that normally remain standing at least until the beginning of the next growing season.

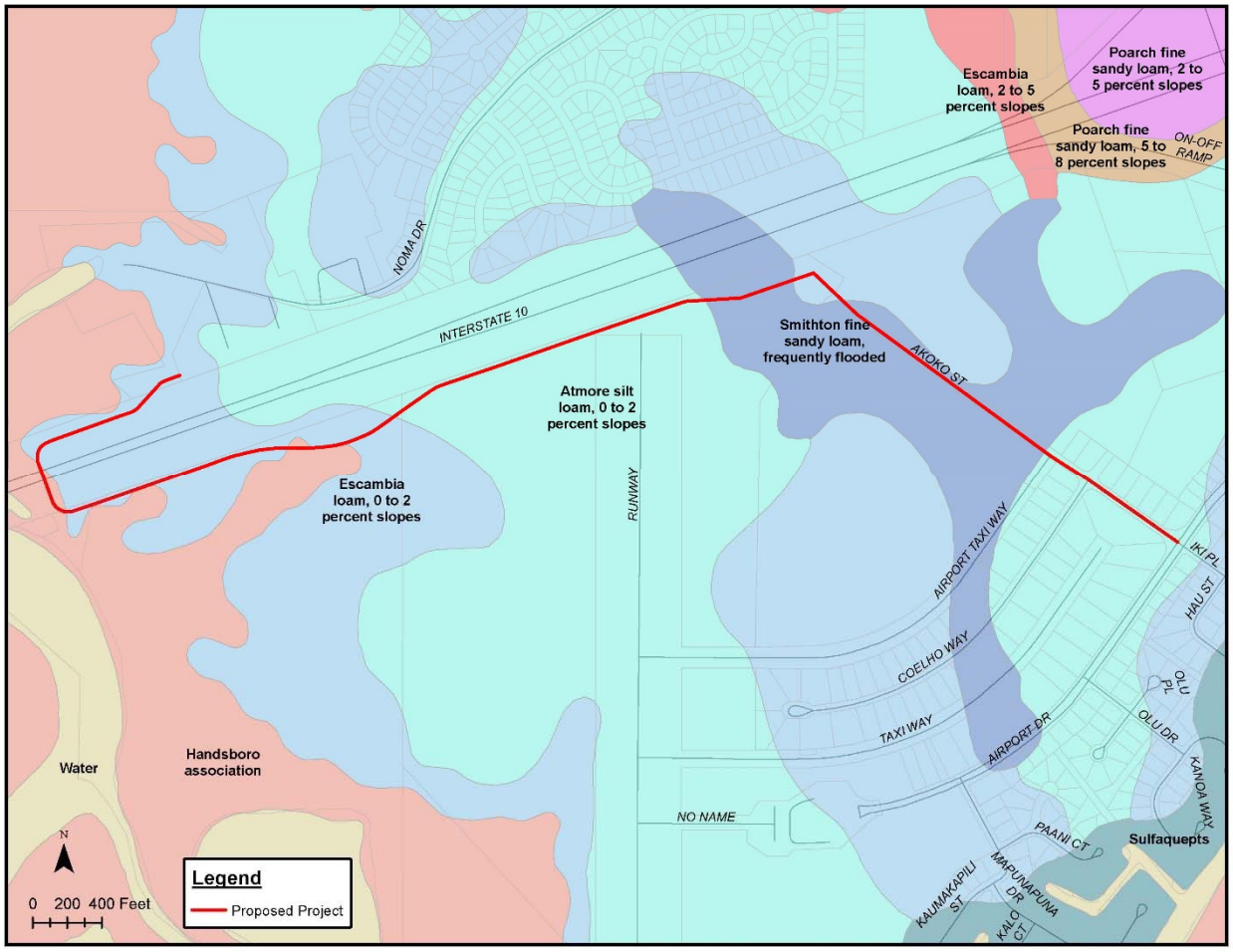
Water Regime *Subtidal (L)* – Tidal salt water continuously covers the substrate.

Water Regime *Regularly Flooded (N)* – Tides alternately flood and expose the substrate at least once daily.

Water Regime *Irregularly Flooded (P)* – Tides flood the substrate less often than daily.

Soils data for the project area was obtained from US Department of Agriculture National Resources Conservation Service (NRCS). A map of the soils located in the project vicinity is provided in Figure 5-16. A complete description of each type of soil is provided in Appendix B.

Figure 5-16: Akoko Street Extension – Soils Map



Hydric soils are those soils that are sufficiently wet in the upper part to develop anaerobic conditions during the growing season. While not a substitution for performing an onsite investigation, hydric soils can indicate the possibility of wetlands. The following, which are all located in the project vicinity, are listed as hydric soils by NRCS:

- Atmore silt loam, 0 to 2% slopes
- Escambia loam, 0-2% slopes
- Handsboro association
- Smithton fine sandy loam, frequently flooded

Due to the close proximity of known wetlands and the project being located in an area of suspected wetlands and hydric soils, it is recommended that a complete wetlands delineation be performed for the full project area to confirm the extent of wetlands located within the project limits. Once the delineation is complete, a Jurisdictional Determination (JD) from the US Army Corps of Engineers will be required to confirm wetland boundaries and determine mitigation requirements. A Joint Application and Notification will need to be completed and submitted in order to obtain the JD.

Opinion of Probable Costs

An opinion of probable costs, including construction costs and professional services costs, was prepared for the proposed project. Because this is a preliminary plan, a 25% contingency was included in the estimated construction costs. The costs for professional services are based on a percentage of the estimated construction costs. A breakdown of these costs is provided Table 5-1.

Table 5-1: Akoko Street Extension – Opinion of Probable Costs

Description	Quantity	Unit	Unit Cost	Total Cost
Construction				
Embankment Fill	1	LS	$500,000.00	$500,000.00
Asphalt Pavement	8,540	TON	$100.00	$854,000.00
Base Course	6,640	CY	$75.00	$498,000.00
Geotextile	23,040	SY	$5.00	$115,200.00
Grassing/Landscaping	9,570	SY	$5.00	$47,850.00
Drainage	1	LS	$100,000.00	$100,000.00
Electrical - Modifications to Existing	1	LS	$100,000.00	$100,000.00
Electrical - New Installation	1	LS	$200,000.00	$200,000.00
Sediment & Erosion Control	1	LS	$50,000.00	$50,000.00
Traffic Control	1	LS	$2,500.00	$2,500.00
Mobilization	1	LS	$123,380.00	$123,380.00
			Construction Subtotal	$2,590,930.00
			Contingency (25%)	$647,733.00
			Construction Total	$3,238,663.00
Professional Services				
Engineering (Geotechnical, Survey, Design)	1	LS	$232,000.00	$232,000.00
Resident Inspection	1	LS	$102,870.00	$102,870.00
Land Acquisition	252,080	SF	$2.50	$630,200.00
Wetlands Delineation	1	LS	$2,500.00	$2,500.00
Permitting	1	LS	$10,000.00	$10,000.00
Wetlands Mitigation	1	LS	$200,000.00	$200,000.00
			Professional Services Total	$1,177,570.00
			PROJECT TOTAL	**$4,416,233.00**

Recommendations

To advance the proposed project from the preliminary planning phase to the design phase and make the project more ready for construction, the following next steps are recommended:

1. Complete a wetlands delineation to verify the extent of wetlands located within the project area.

2. Perform topographical survey of the project area to determine the alignment of the proposed roadway and the impact to existing utilities. Notify the utility owner(s) of any impacts.

3. Perform geotechnical investigation to obtain recommendations for roadway section (base, pavement).

4. Perform drainage analysis to determine required drainage facilities.

5. Complete and submit a Joint Application and Notification for review and approval by the US Army Corps of Engineers, Mississippi Department of Marine Resources (DMR) and the Mississippi Department of Environmental Quality (MDEQ). As part of this application, comments will also be received from the US Fish and Wildlife Service (USFWS), the Mississippi Department of Archives and History (MDAH), the Mississippi Natural Heritage Program (MNHP), the Environmental Protection Agency (EPA) and NOAA (National Oceanic and Atmospheric Administration) Fisheries (for coastal projects). A copy of the Joint Application and Notification is provided in Appendix C and can be accessed at https://dmr.ms.gov/wp-content/uploads/2019/07/joint-application-notification-form2.pdf.

6. If it is anticipated that MDOT will provide funding for the proposed project, complete and submit Form ENV-160-LPA, MDOT Environmental Division Environmental Class of Action Determination. A copy of this form is included in Appendix D and can be accessed at http://sp.mdot.ms.gov/Environmental/Forms%20and%20Templates/ENV-160/ENV-160%20LPA.pdf.

7. Begin coordination with MDOT and FAA to receive comments that will impact the design of the project.

8. If new electrical facilities are to be installed as part of the proposed project, correspond with Coast Electric to begin the design process.

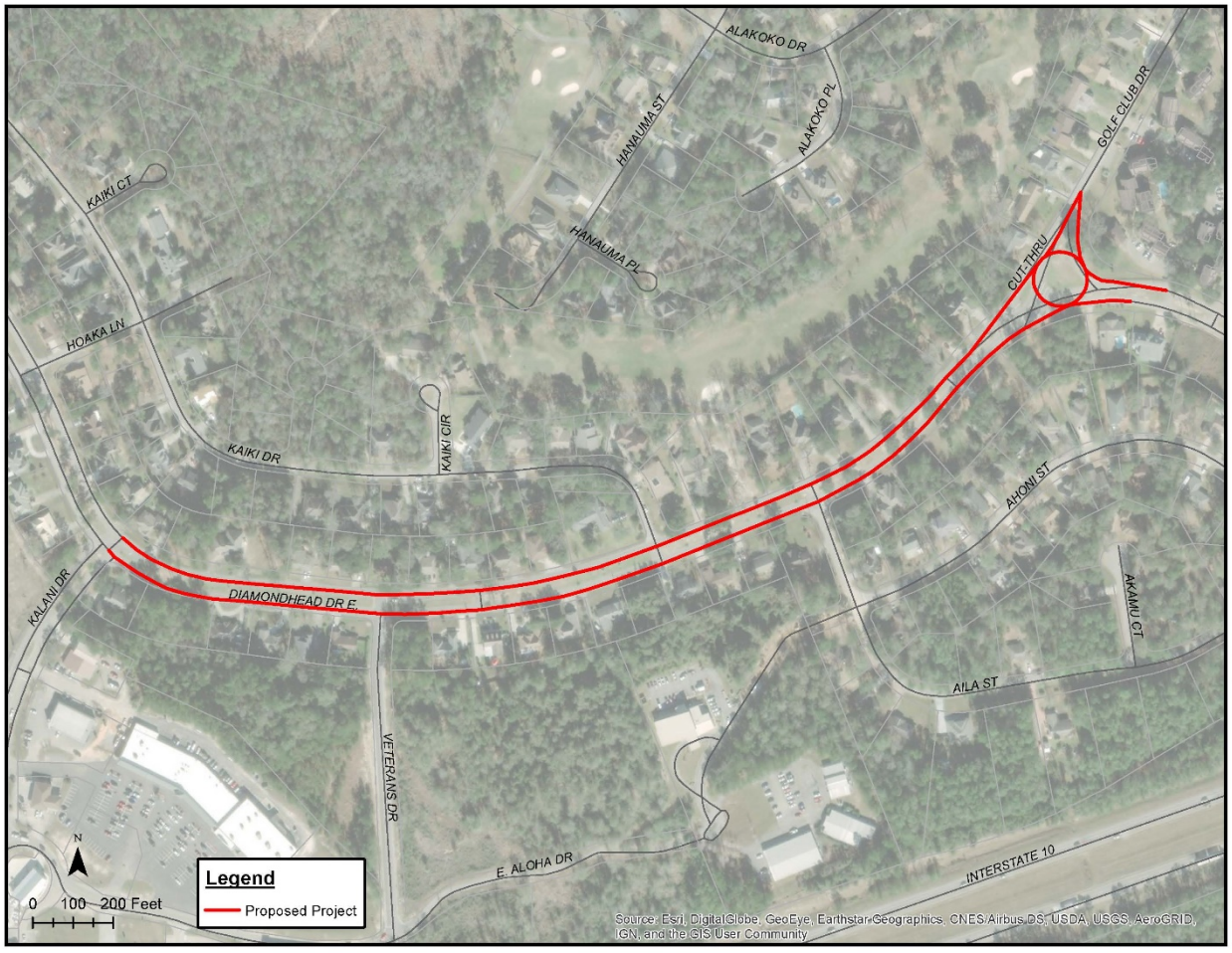
9. If new sewer and water facilities are to be installed as part of the proposed project, correspond with DWSD to begin the design process.

PROJECT 6 – DIAMONDHEAD DRIVE EAST

Project Purpose & Description

Project 6 – Diamondhead Drive East includes the modification of approximately 2,600 feet of roadway in each travel direction of Diamondhead Drive East, between Kalani Drive and Golf Club Drive, and the construction of a roundabout at the intersection of Diamondhead Drive East and Golf Club Drive. Diamondhead Drive East, North and West create a 6-mile loop through the City. The two-lane roadway with asphalt shoulder along this loop provides a shared use lane that is utilized by pedestrians, bicyclists and golf carts. However, Diamondhead Drive East, in the area of the proposed project, is a four-lane boulevard with no asphalt shoulder. This project will provide a safe travel lane for pedestrian, bicycle and golf cart use that will tie into the existing shared use lanes on Diamondhead Drive East. In addition, the project will connect to pedestrian use paths that are to be constructed on Kalani Drive in the near future and ultimately to proposed multimodal use lanes in the proposed Town Center located southwest of the project. (Appendix A includes a map showing the planned development area as specified in the City of Diamondhead's Master Plan.) A map of the proposed project is provided in Figure 6-1.

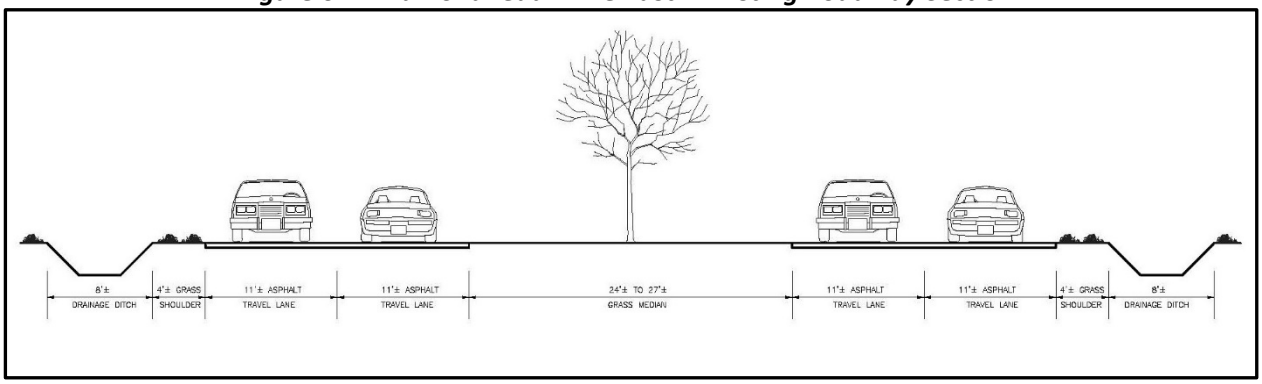
Figure 6-1: Diamondhead Drive East – Project Map



Existing Conditions

The existing Diamondhead Drive East, in the area of the proposed project, is a four-lane asphalt boulevard with approximately 11-foot vehicle lane widths and a grass median. Shallow drainage ditches and culverts run along each side of the road. There are no pedestrian facilities. A cross section for the existing roadway is provided in Figure 6-2.

Figure 6-2: Diamondhead Drive East – Existing Roadway Section



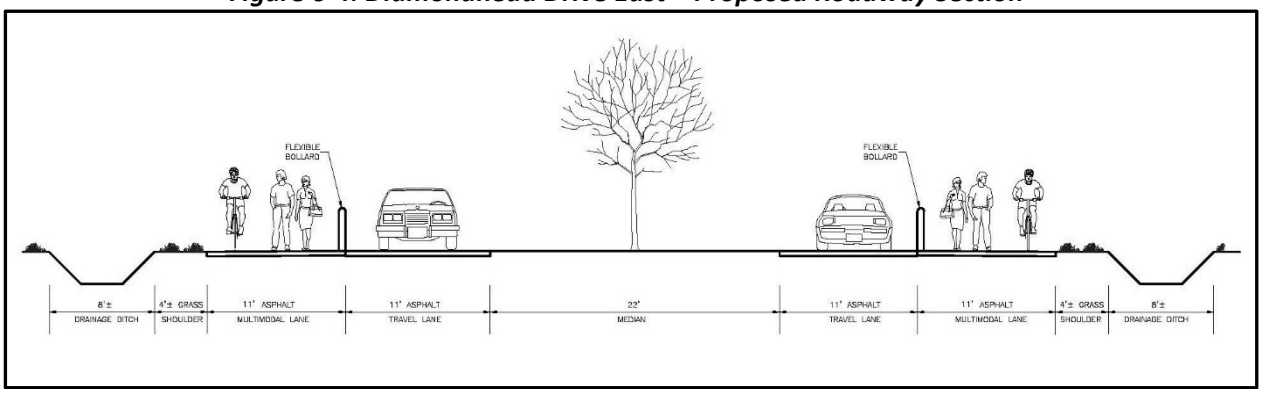
Proposed Conditions

The proposed project will modify Diamondhead Drive East, between Kalani Drive and Golf Club Drive, to convert the outside lane in each travel direction to a multimodal lane. A roundabout will be constructed at the intersection of Diamondhead Drive East and Golf Club Drive to facilitate vehicle and pedestrian use through the intersection. It is proposed that flexible bollards be installed between the vehicle travel lane and the multimodal lane at a maximum spacing of 50 feet on straight sections of roadway and with a maximum spacing of 5 feet on curves and at intersections. Other physical barriers, such as a removable curb, could also be utilized. However, the flexible bollards will provide protection to the multimodal lane users with their tall profile and ability to be wrapped in reflective tape that can be visible to drivers during dark or rainy weather. In addition, the durable polyurethane material of the flexible bollard allows it to bend upon impact and immediately return to its original form without causing damage to a vehicle.

The layout of the proposed roadway is provided in Figure 6-3 and a cross section for the proposed roadway is provided in Figure 6-4.

Figure 6-3: Diamondhead Drive East - Proposed Roadway Layout

Figure 6-4: Diamondhead Drive East – Proposed Roadway Section



Right-of-Way Requirements

According to plat records, the existing right-of-way for Diamondhead Drive East is 80 feet. The proposed project will be constructed entirely in the existing right-of-way. Therefore, no land acquisition will be required.

Traffic Considerations

Diamondhead Drive East is classified as a local street. The Gulf Regional Planning Commission recorded traffic counts throughout the City in 2020. Traffic counts taken at the north end of Kalani Drive indicate that there is an annual average daily traffic count of 8,700. Traffic counts taken on Golf Club Drive, approximately 4,200 feet north of the proposed project, indicate that there is an annual average daily traffic count of 7,100.

A more in-depth traffic study of the intersection at Kalani Drive and Diamondhead Drive East is recommended. This intersection, which currently gives right of way to the westbound Diamondhead Drive East traffic, is confusing to drivers. While a roundabout would be more ideal, there is not adequate space in the existing right-of-way to construct a properly designed roundabout. Discussions with the City determined that it is not likely that the City will purchase property for the construction of a roundabout in this location. Another alternative may be to modify the signaling of the intersection, either with a traffic light or different signage. A traffic study will provide the City with the options and recommendations for improving the use of this intersection.

Pedestrian Facilities

Currently there are no pedestrian facilities along Diamondhead Drive East in the area of the proposed project. The project will provide a 10-foot wide multi-modal lane in each travel direction that will provide adequate space for walking, biking and use of a golf-cart. This will provide a connection between the existing shared use lanes on Diamondhead Drive East and the proposed pedestrian use lanes on Kalani Drive, and ultimately to the proposed Town Center that is part of the City's Master Plan.

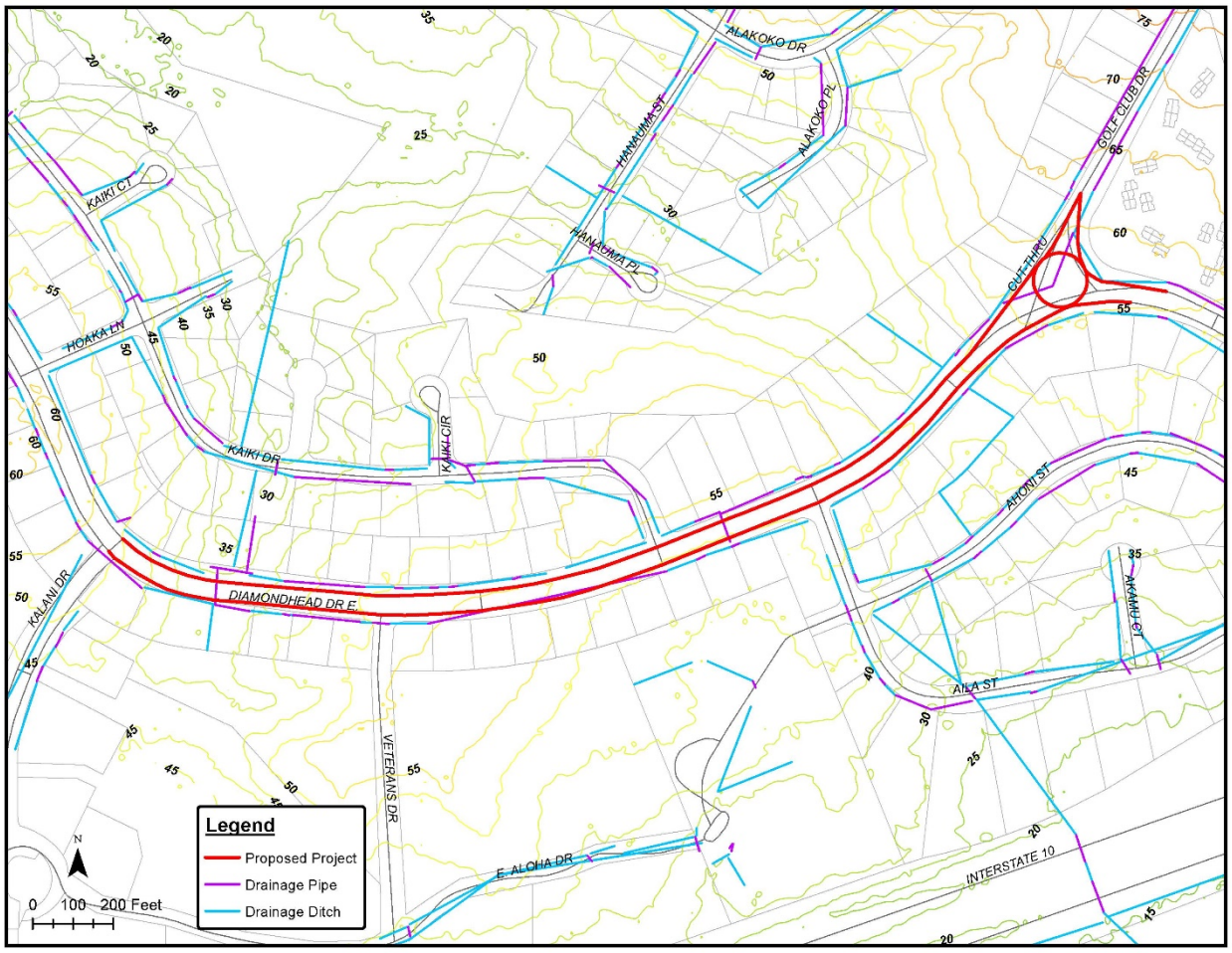
Utilities

An investigation was conducted to determine the utilities located in the project area. Below is a summary of the available utility information.

Drainage

The City of Diamondhead Public Works Department maintains the drainage system in the City. Based on the City's GIS records, the drainage system in the proposed project area consists of roadside ditches and driveway culverts. The ditches and culverts along Diamondhead Drive East, where the outside lanes are to be converted to a multimodal lane, will not be impacted by the project. However, the drainage at the intersection of Diamondhead Drive East and Golf Club Drive will need to be assessed during design to determine if any modifications will be required to construct the proposed roundabout. A map of the drainage facilities and the ground surface elevations in the project vicinity is provided in Figure 6-5.

Figure 6-5: Diamondhead Drive East – Drainage & Contour Map

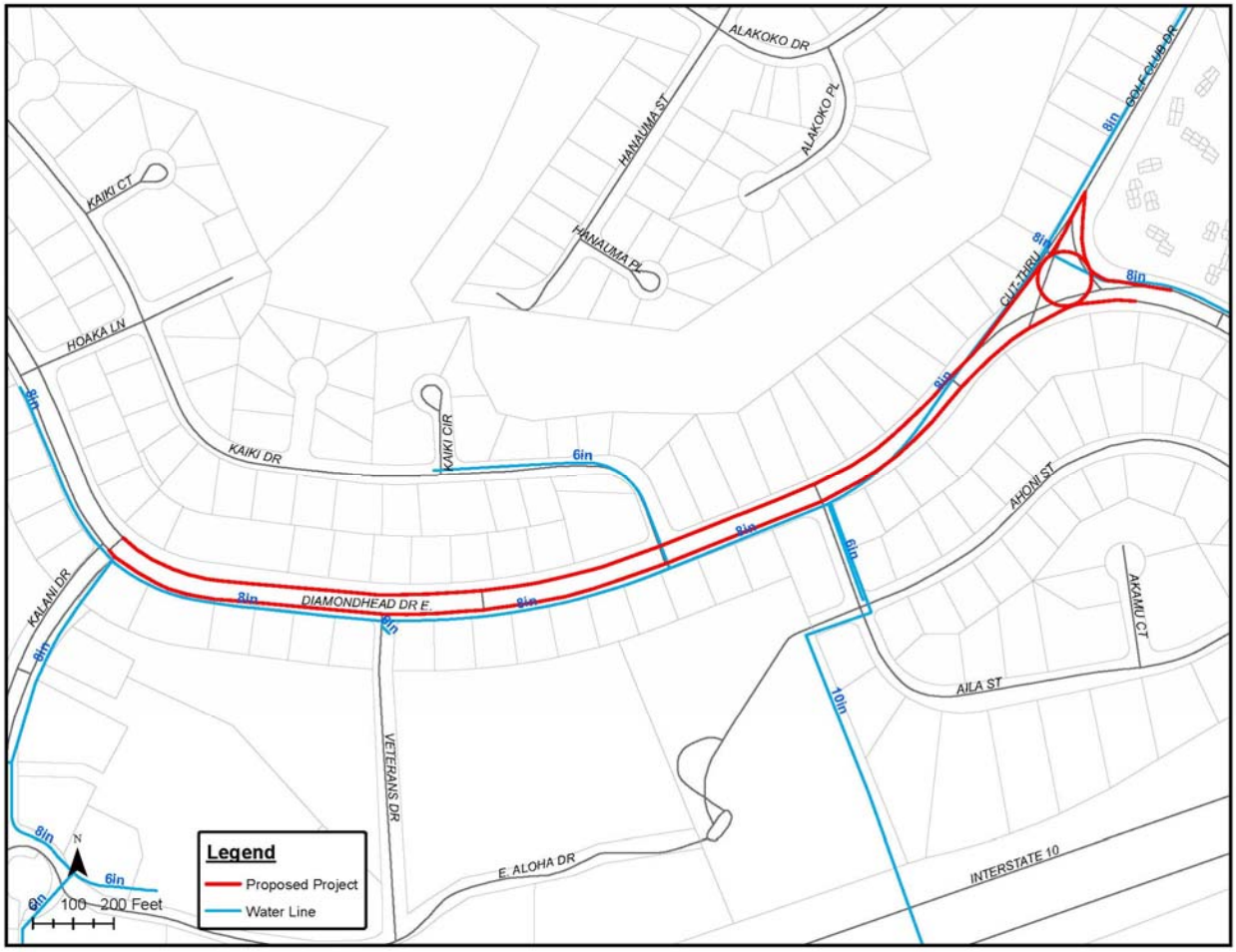


Water and Sewer

The Diamondhead Water and Sewer District (DWSD) owns and operates the water and sewer system in the City of Diamondhead. The DWSD provided a GIS file with locations and data for the water and sewer utilities. It should be noted that the locations indicated in the database were not surveyed, and only provide a general location of where the utilities are located. While the water and sewer utilities should not conflict with the proposed project, as they are located underground, care will need to be taken during construction to not damage the existing utilities. Some facilities, such as the manholes, valves, or fire hydrants, may require adjusting if they interfere with the alignment of the new roadway.

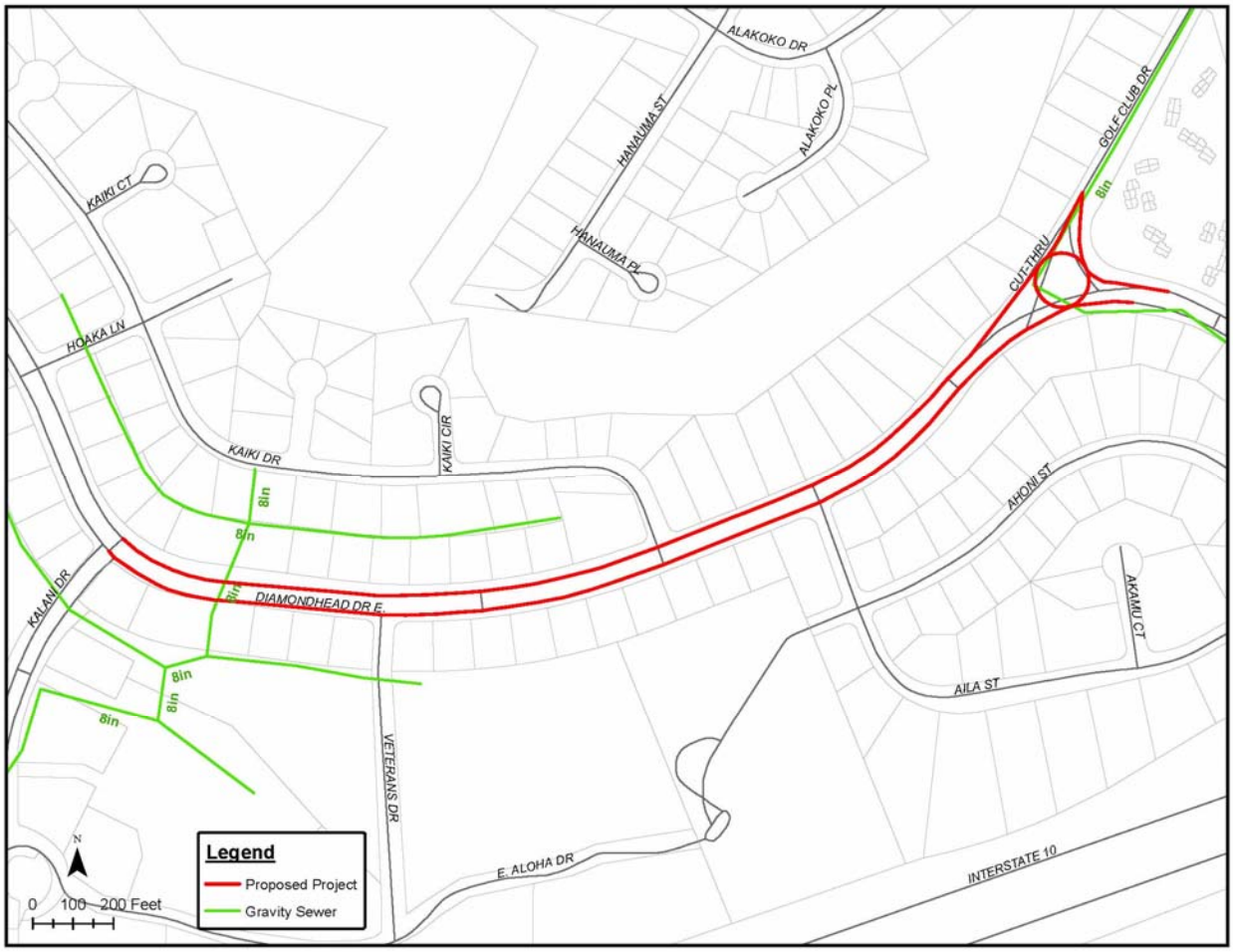
An 8-inch water main, with multiple tie-ins, runs along Diamondhead Drive East for the entire length of the project. A map of the water lines located in the project vicinity is provided in Figure 6-6.

Figure 6-6: Diamondhead Drive East – Water Map



An 8-inch gravity sewer line crosses Diamondhead Drive East approximately 300 feet east of Kalani Drive. There are 8-inch gravity sewer lines located on Golf Club Drive and Diamondhead Drive, just northeast of where the project ends. No sewer lines run along the project alignment. A map of the sewer lines located in the project vicinity is provided in Figure 6-7.

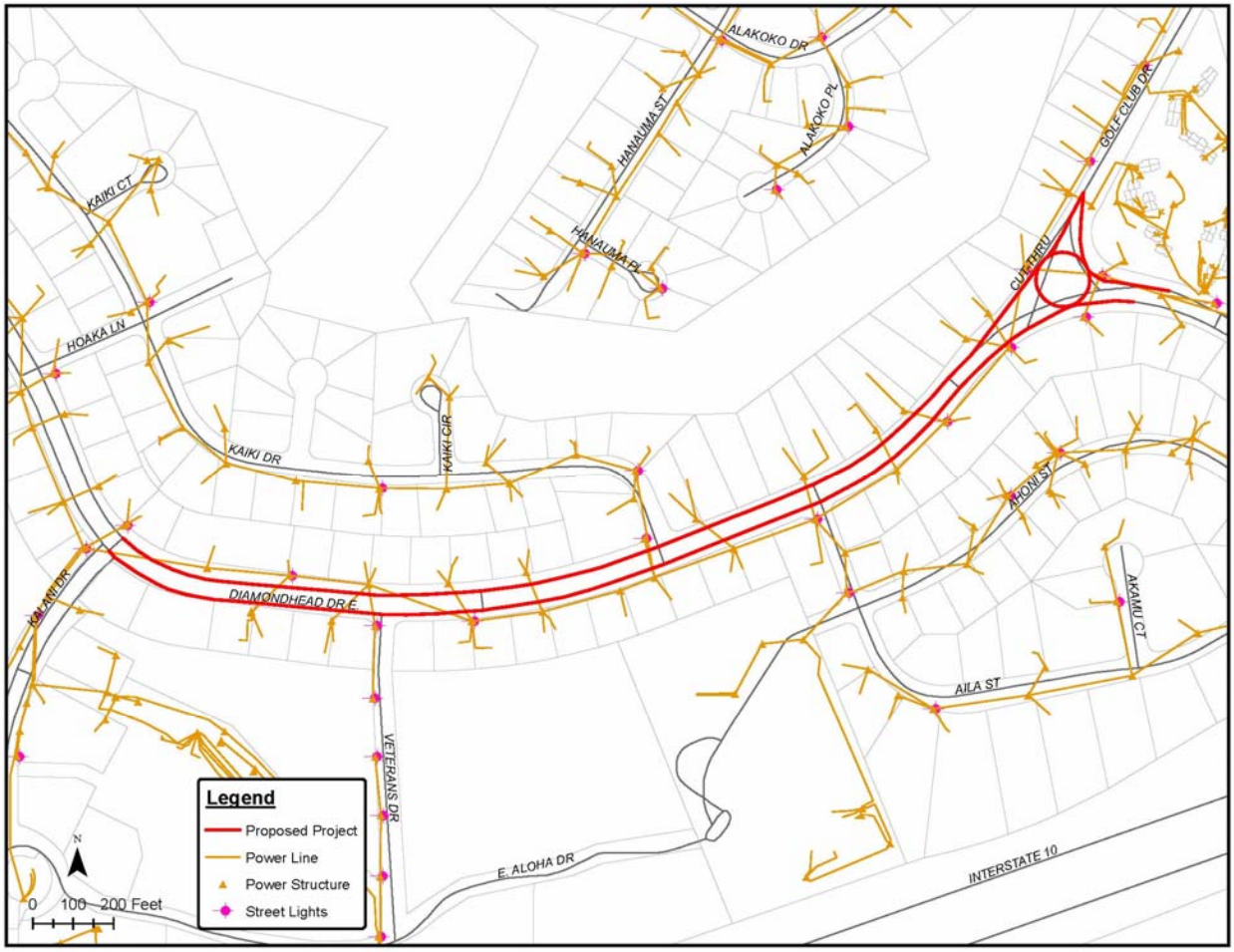
Figure 6-7: Diamondhead Drive East – Sewer Map



Electric

Coast Electric provides power and street lighting to the City of Diamondhead. Based on the latest information provided by Coast Electric, there are electric facilities, including power lines, poles, pedestals and street lights, that run along the project alignment. It is not anticipated that any modifications to the electrical facilities will be required along Diamondhead Drive East where the outside travel lane will be converted to a multimodal lane. However, modifications may be required to the electrical facilities at the intersection of Diamondhead Drive East and Golf Club Drive if they interfere with the construction of the proposed roundabout. A map of the electrical utilities located in the project vicinity is provided in Figure 6-8.

Figure 6-8: Diamondhead Drive East – Electrical Map



Environmental Considerations

An investigation into the environmental considerations for constructing the project was conducted. Below is a summary of the available information in the project area.

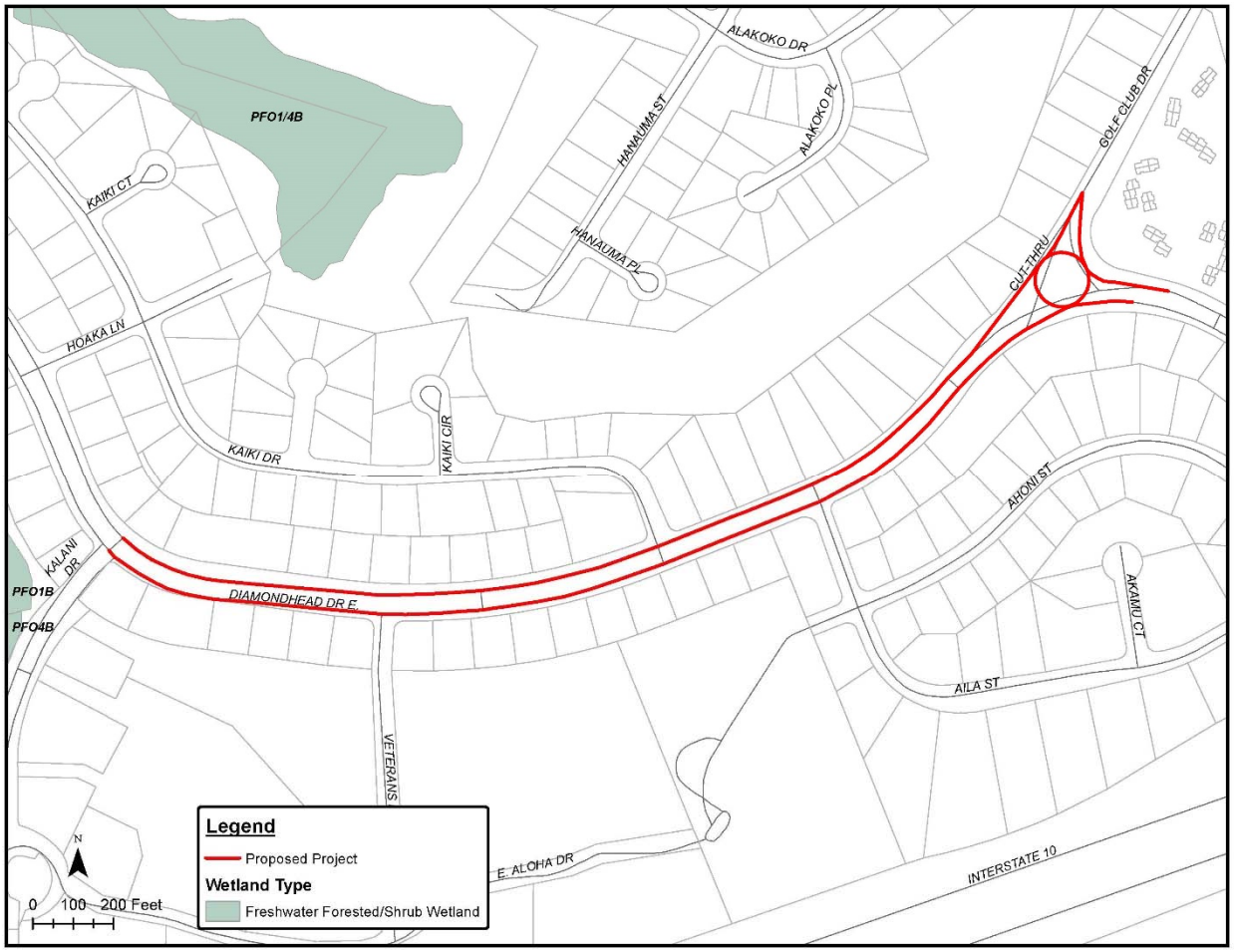
Flood Zones

The entire project is located in Flood Zone X and is a moderate risk area within the 0.2-percent-annual-chance floodplain.

Wetlands

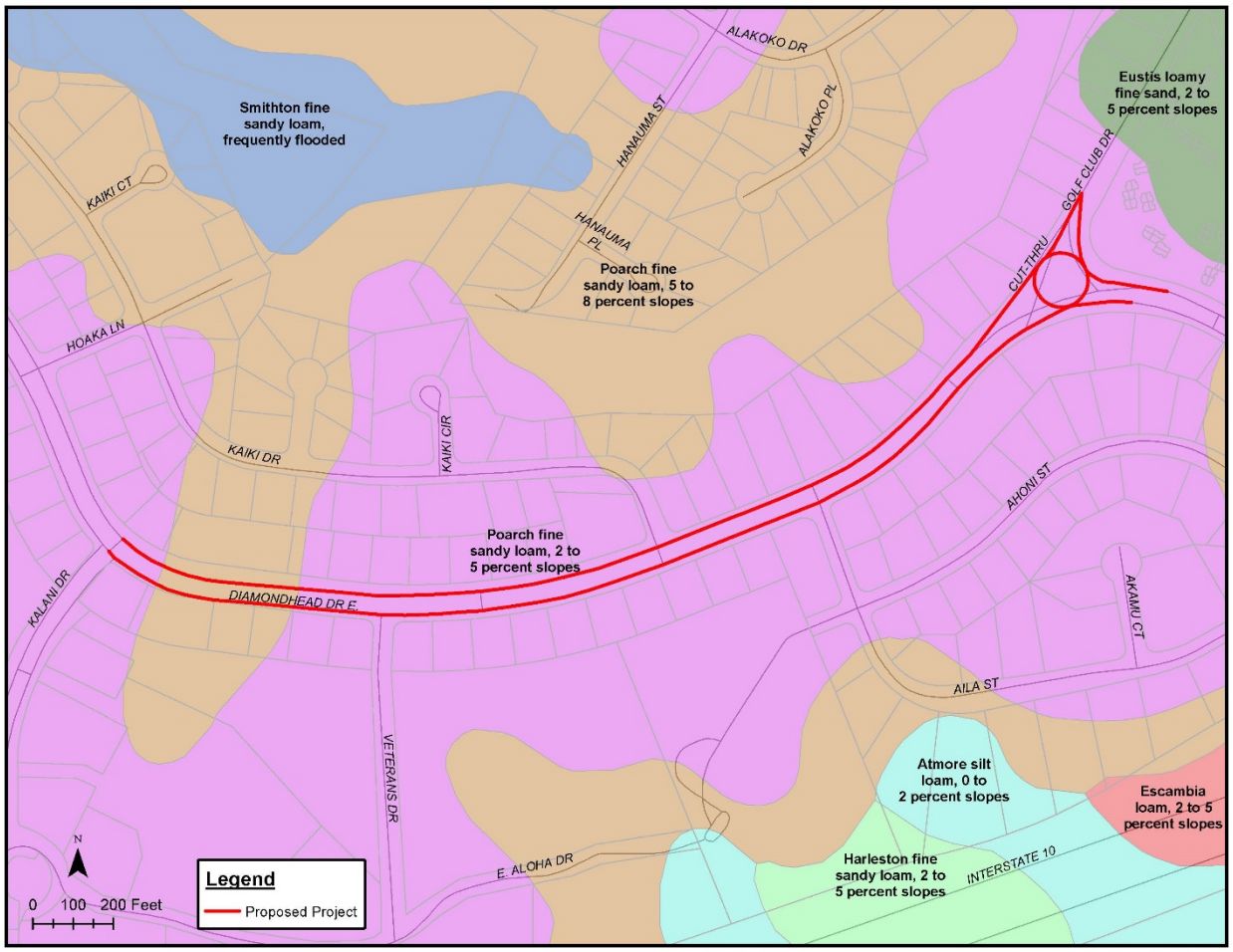
No wetlands delineation has been performed for the project area. The US Fish and Wildlife Service National Wetlands Inventory (NWI) identifies approximate boundaries for wetlands that can be used as an initial assessment of potential wetlands. A complete wetlands delineation is still required to determine a more accurate boundary for the wetlands. According to the NWI, there are no wetlands located within the project area. A map of the NWI wetlands in the project vicinity is provided in Figure 6-9.

Figure 6-9: Diamondhead Drive East – US Fish and Wildlife Service NWI Wetlands Map



Soils data for the project area was obtained from US Department of Agriculture National Resources Conservation Service (NRCS). A map of the soils located in the project vicinity is provided in Figure 6-10. A complete description of each type of soil is provided in Appendix B.

Figure 6-10 Diamondhead Drive East – Soils Map



Hydric soils are those soils that are sufficiently wet in the upper part to develop anaerobic conditions during the growing season. While not a substitution for performing an onsite investigation, hydric soils can indicate the possibility of wetlands. Of the soils located within the project area, the following is listed as a hydric soil by NRCS:

- Poarch fine sandy loam, 5-8% slopes

While there are hydric soils located in the project area, they are only located where the outside travel lane will be converted to a multimodal lane, and no impact would be made to potential wetlands. The only area in the project that could impact wetlands is where the proposed roundabout will be constructed, and there are no NWI wetlands or hydric soils located in this area. No impact to wetlands is anticipated and therefore, it is anticipated that no permitting will be required for wetland mitigation.

Opinion of Probable Costs

An opinion of probable costs, including construction costs and professional services costs, was prepared for the proposed project. It is likely that the project will be constructed in two phases, and therefore a cost estimate was prepared for each phase – multimodal lane and roundabout construction. Because this is a preliminary plan, a 25% contingency was included in the estimated construction costs. The costs for professional services are based on a percentage of the estimated construction costs. A breakdown of these costs is provided in Tables 6-1 and 6-2.

Table 6-1: Diamondhead Drive East, Multimodal Lane – Opinion of Probable Costs

Description	Quantity	Unit	Unit Cost	Total Cost
Construction				
Flexible Bollards	340	EA	$400.00	$136,000.00
Traffic Control	1	LS	$15,000.00	$15,000.00
Mobilization	1	LS	$7,550.00	$7,550.00
			Construction Subtotal	$158,550.00
			Contingency (25%)	$39,638.00
			Construction Total	$198,188.00
Professional Services				
Engineering (Survey, Design)	1	LS	$21,880.00	$21,880.00
Resident Inspection	1	LS	$9,140.00	$9,140.00
			Professional Services Total	$31,020.00
			PROJECT TOTAL	**$229,208.00**

Table 6-2: Diamondhead Drive East, Roundabout Construction – Opinion of Probable Costs

Description	Quantity	Unit	Unit Cost	Total Cost
Construction				
Asphalt Pavement	760	TON	$100.00	$76,000.00
Base Course	640	CY	$75.00	$48,000.00
Geotextile	1,950	SY	$5.00	$9,750.00
Grassing/Landscaping	260	SY	$5.00	$1,300.00
Electrical - Modifications to Existing	1	LS	$25,000.00	$25,000.00
Drainage - Modifications to Existing	1	LS	$10,000.00	$10,000.00
Sediment & Erosion Control	1	LS	$10,000.00	$10,000.00
Traffic Control	1	LS	$15,000.00	$15,000.00
Mobilization	1	LS	$9,760.00	$9,760.00
			Construction Subtotal	$204,810.00
			Contingency (25%)	$51,203.00
			Construction Total	$256,013.00
Professional Services				
Engineering (Geotechnical, Survey, Design)	1	LS	$27,080.00	$27,080.00
Resident Inspection	1	LS	$11,350.00	$11,350.00
			Professional Services Total	$38,430.00
			PROJECT TOTAL	**$294,443.00**

Recommendations

To advance the proposed project from the preliminary planning phase to the design phase and make the project more ready for construction, the following next steps are recommended for the two phases of the project:

Multimodal Lane

1. Perform traffic study for the intersection at Kalani Drive and Diamondhead Drive East to determine intersection modifications.

2. Perform design/layout of flexible bollards (or other physical barrier). Determine if project can be performed by Public Works personnel or if a contractor will be required.

Roundabout Construction

1. Perform topographical survey of the Diamondhead Drive East and Golf Club Drive intersection to determine the geometry of the proposed roundabout and the impact to existing utilities. Notify utility owner(s) of any impacts.

2. Perform geotechnical investigation to obtain recommendations for roundabout roadway section (base, pavement).

3. Perform drainage analysis to determine required modifications.

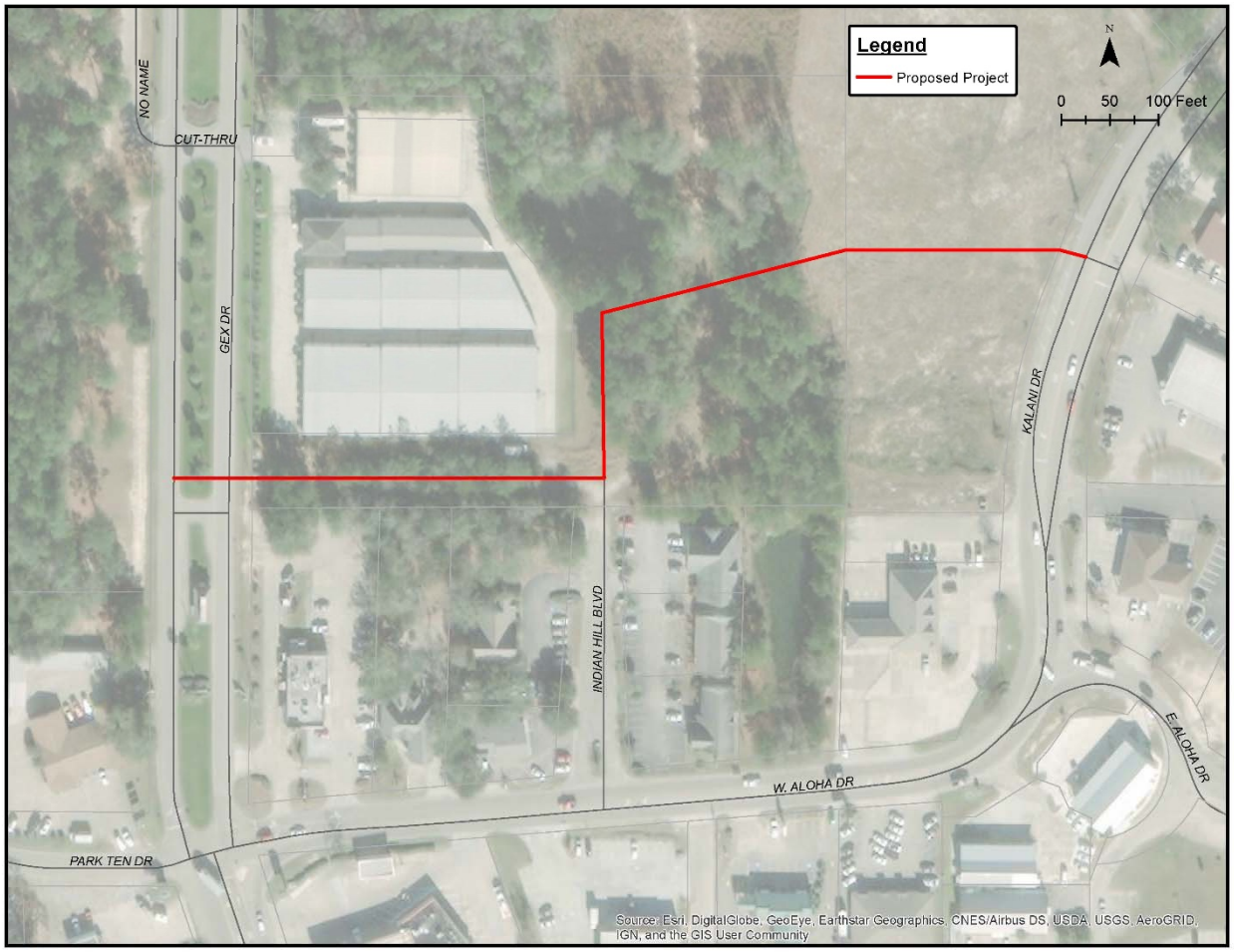
4. If it anticipated that MDOT will provide funding for the proposed project, complete and submit Form ENV-160-LPA, MDOT Environmental Division Environmental Class of Action Determination. A copy of this form is included in Appendix D and can be accessed at http://sp.mdot.ms.gov/Environmental/Forms%20and%20Templates/ENV-160/ENV-160%20LPA.pdf.

PROJECT 7 – EAST-WEST COLLECTOR

Project Purpose & Description

Project 7 – East-West Collector includes the construction of approximately 1,110 feet of roadway to provide an additional connection between Kalani Drive and Gex Drive that avoids the traffic congestion at the four-way intersection at Gex Drive, Park Ten Drive and West Aloha Drive. Currently, Gex Drive provides the only access from I-10 to the portion of Diamondhead on the north side of I-10, which is where the majority of the residences and businesses are located. Because of this, the existing four-way stop is heavily congested, especially in the morning and early evening. In addition, Kalani Drive is heavily congested due to the number of businesses located in the area. The addition of the East-West Collector will relieve some of this congestion by removing vehicles that do not need to access I-10. The project will also provide a safe connection for pedestrian, bicycle and golf cart use between the proposed Town Center located to the southwest of the project (Appendix A includes a map showing the planned development as specified in the City of Diamondhead's Master Plan.) and the proposed sidewalk and bike lane on Kalani Drive, which will be constructed as part of the City's East Aloha Improvements project that is expected to bid by the end of 2020. A map of the proposed project is provided in Figure 7-1.

Figure 7-1: East-West Collector – Project Map



Existing Conditions

The proposed roadway is located in vacant and mostly wooded property on the north side of the businesses on West Aloha Drive and Indian Hill Blvd. At the connection with the proposed roadway, Gex Drive is a boulevard with a 16-foot asphalt travel lane and a 6-foot asphalt bike lane on the northbound side of the grass median and a 20-foot asphalt travel lane on the southside of the median. A 22-foot wide cut-thru road that provides access between the northbound and southbound lanes is located just south of the proposed roadway. At the connection with the proposed roadway, Kalani Drive is an asphalt road with two 11-foot northbound travel lanes, one 11-foot southbound travel lane and a 12-foot turn lane for southbound traffic turning into the shopping center located east of Kalani Drive.

Proposed Conditions

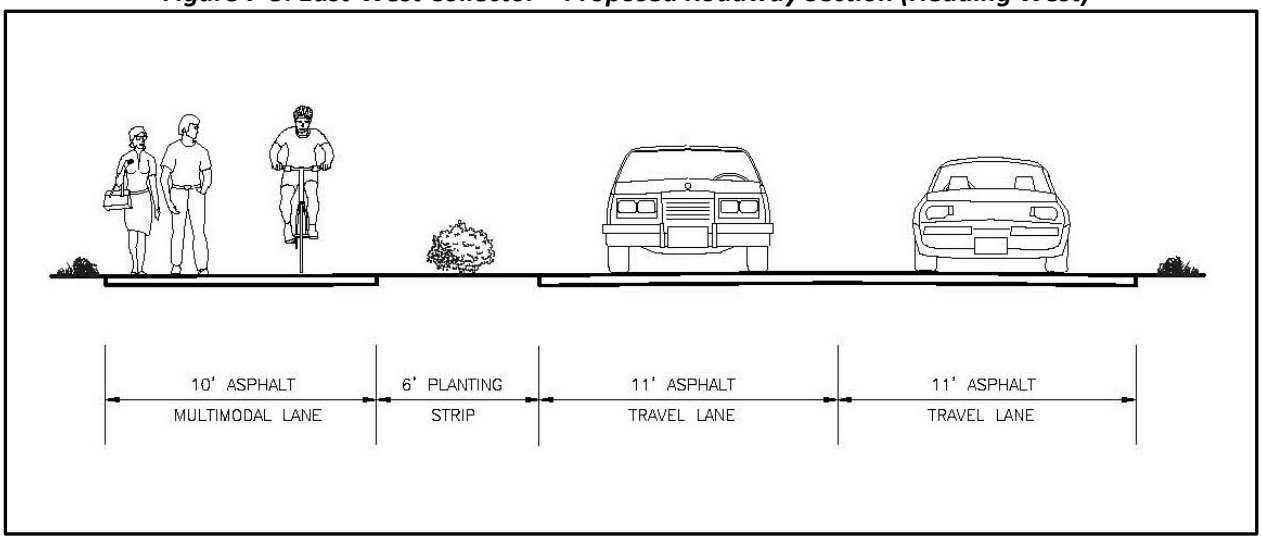
The proposed project will provide a connection between Kalani Drive and Gex Drive, providing more direct access to the businesses on Kalani Drive and East Aloha Drive from the north side of Gex Drive without entering the four-way stop at Gex Drive, Park Ten Drive and West Aloha Drive. This will reduce the number of vehicles entering the intersection and decrease the amount of traffic that backs up during peak times.

Due to the planned construction of a new Dollar General in the vacant lot on the west side of Kalani Drive and just north of the businesses on West Aloha Drive, the proposed road cannot make a direct connection east-west between Gex Drive and Kalani Drive. Instead, the proposed road will begin at Gex Drive and run east to tie into the north end of Indian Hill Blvd. At Indian Hill Blvd the proposed road will turn north and continue for approximately 200 feet before it veers northeast to run parallel to and just north of the property line for the empty parcel located north of the new Dollar General. The proposed road will connect to Kalani Drive at the cut-thru road that connects to the road between the Fire Department and CVS. The proposed roadway will be a two-lane asphalt road with 11-foot vehicle lane widths. A 10-foot multimodal lane will be constructed, separated from the south edge of the roadway by a 6-foot planting strip. The cut-thru road on Gex Drive will be moved north to align with the newly constructed roadway.

The layout of the proposed roadway is provided in Figure 7-2 and a cross section for the proposed roadway is provided in Figure 7-3.

Figure 7-2: East-West Collector - Proposed Roadway Layout

Figure 7-3: East-West Collector – Proposed Roadway Section (Heading West)

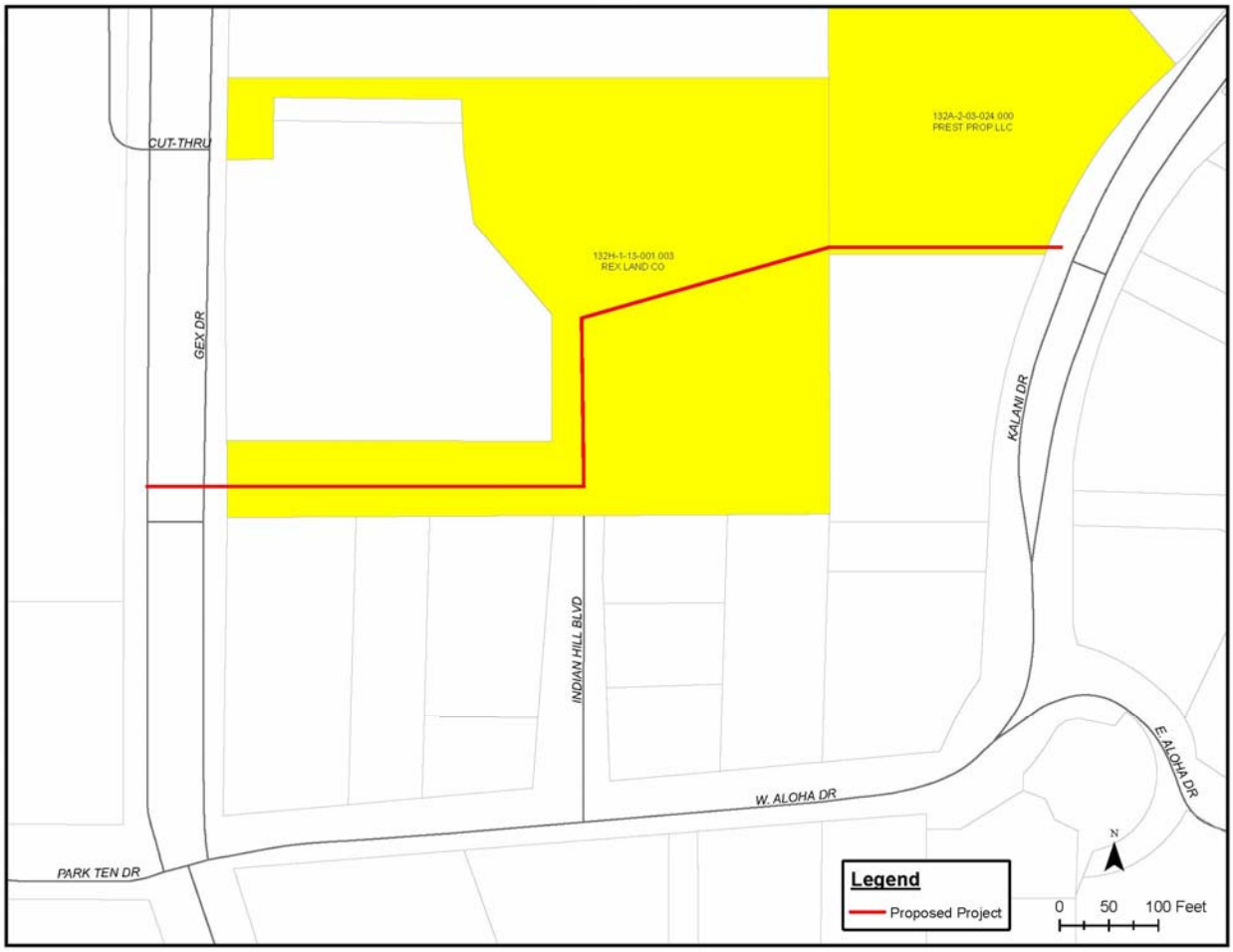


Right-of-Way Requirements

A minimum right-of-way width of 40 feet is required for the proposed connector road. The proposed roadway is not located within an existing right-of-way and will therefore require approximately 44,400 square feet, or 1.0 acres, of land acquisition. No land acquisition will be required for the modifications to the cut-thru in the Gex Drive median.

A map highlighting the parcels that will likely be impacted by the proposed project is provided in Figure 7-4. The parcel numbers and owners noted in the figure were obtained from the GIS data provided by Hancock County in 2020. It should be noted that the exact location and area of required right-of-way will depend on the alignment of the proposed roadways and cannot be precisely detailed until the roadway alignment has been finalized.

Figure 7-3: East-West Collector – Right-of-Way Impacts



Traffic Considerations

The proposed roadway does not currently exist. The existing roads in the vicinity of the proposed roadway (Gex Drive, Kalani Drive, Park Ten Drive, West Aloha Drive, East Aloha Drive) are all classified as local streets. Traffic counts were taken in the project area by the Gulf Regional Planning Commission in 2020. These traffic counts indicate that there is an annual average daily traffic (AADT) count of 16,555 on Gex Drive (between I-10 and the four-way intersection), an AADT count of 700 on Park Ten Drive, an AADT count of 5,800 on Gex Drive (north of the four-way intersection), an AADT count of 12,000 on West Aloha Drive, and an AADT count of 8,700 on Kalani Drive.

Pedestrian Facilities

Currently there are no pedestrian facilities on any of the streets in the project area, with the exception of the bike lane on the northbound lane of Gex Drive. Sidewalks and bike lanes will soon be constructed on Kalani Drive and East Aloha Drive as part of the City's East Aloha Improvements project, which is anticipated to bid by the end of 2020. The proposed East-West Collector project will include the construction of a 10-foot wide multimodal lane that will provide adequate space for walking, biking and use of a golf-cart along the proposed roadway. This will allow pedestrian use to tie into the proposed sidewalks and bike lanes on Kalani Drive, the existing bike lane on Gex Drive bike lane and ultimately to

the proposed pedestrian use located in the proposed Town Center on the west side of Gex Drive. (Appendix A includes a map showing the planned development as specified in the City of Diamondhead's Master Plan.)

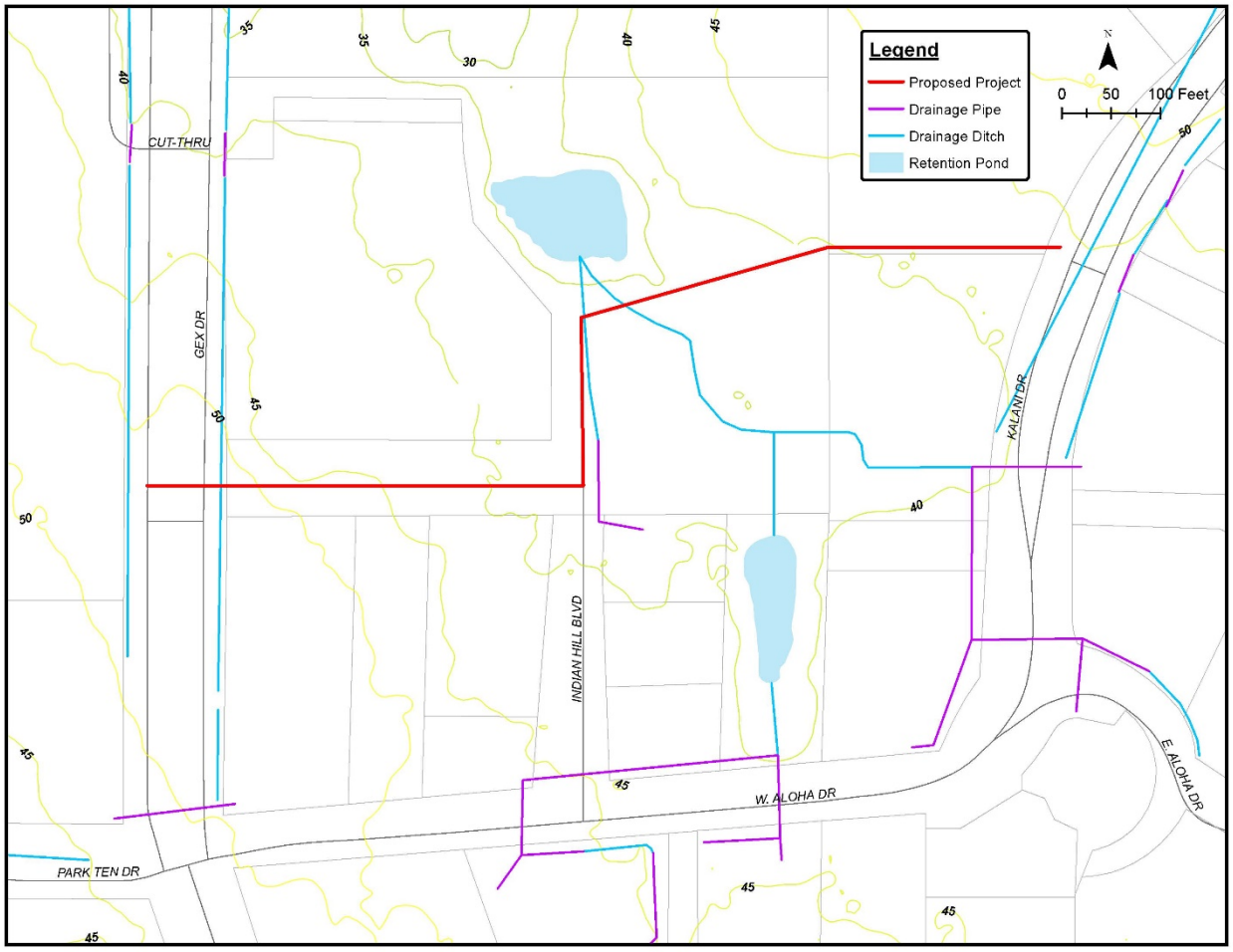
Utilities

An investigation was conducted to determine the utilities located in the project area. Below is a summary of the available utility information.

Drainage

The City of Diamondhead Public Works Department maintains the drainage system in the City. Based on the City's GIS records, the drainage system in the proposed project area generally consists of sheet flow to ditches and retention areas. There are roadside ditches and driveway culverts on the existing streets that the proposed roadway connects. Drainage for the new roadway will need to be assessed during design. Modifications may be required to the existing drainage ditches that the proposed roadway crosses and to the drainage facilities located where the proposed roadway ties into Kalani Drive and Gex Drive. It is anticipated that ditches, culverts and low impact design practices can be implemented and connected to the existing drainage system. A map of the drainage facilities and the ground surface elevations in the project vicinity is provided in Figure 7-4.

Figure 7-4: East-West Collector – Drainage & Contour Map

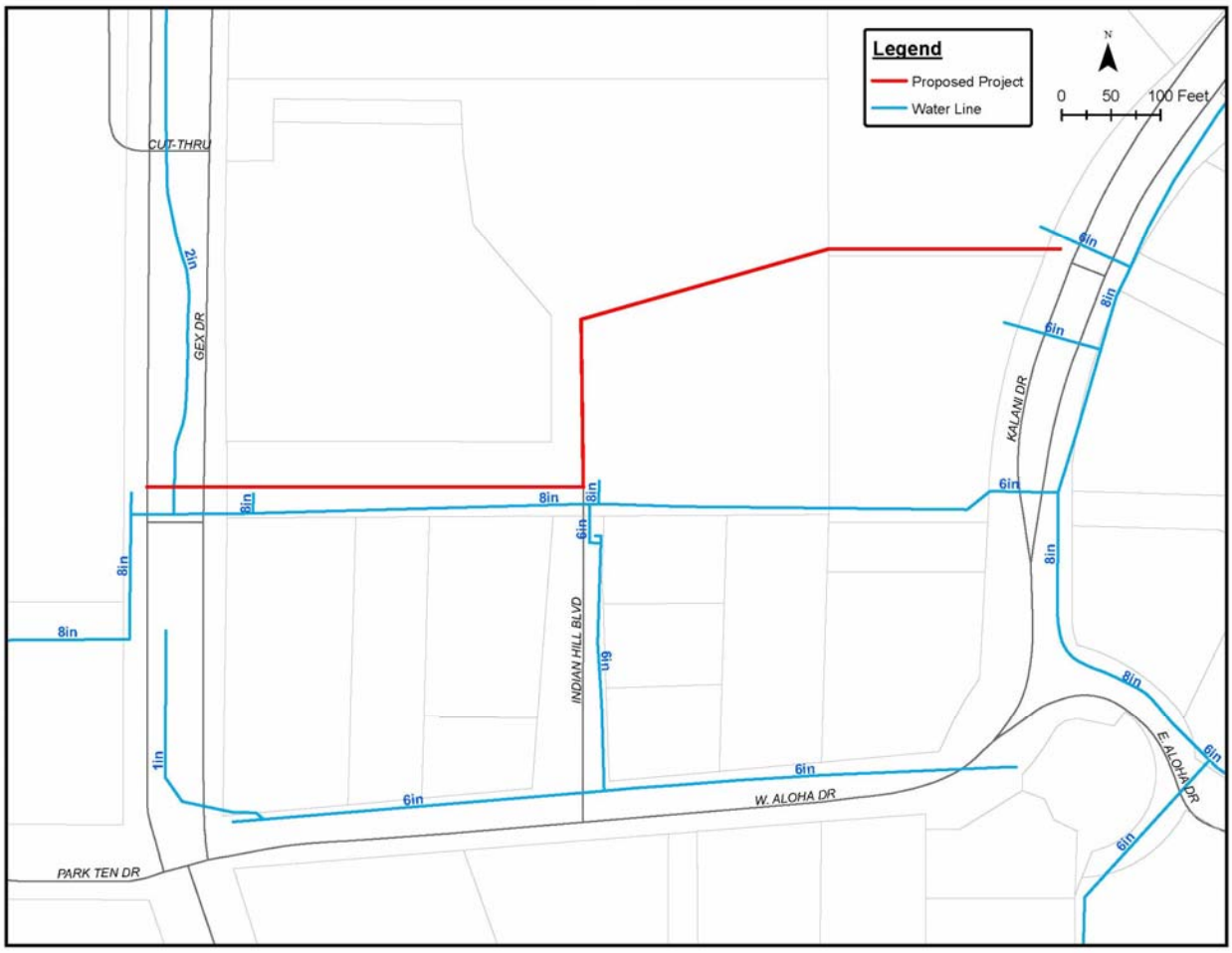


Water and Sewer

The Diamondhead Water and Sewer District (DWSD) owns and operates the water and sewer system in the City of Diamondhead. The DWSD provided a GIS file with locations and data for the water and sewer utilities. It should be noted that the locations indicated in the database were not surveyed, and only provide a general location of where the utilities are located. While the water and sewer utilities should not conflict with the proposed project, as they are located underground, care will need to be taken during construction to not damage the existing utilities. Some facilities, such as the manholes, valves, or fire hydrants, may require adjusting if they interfere with the alignment of the new roadway.

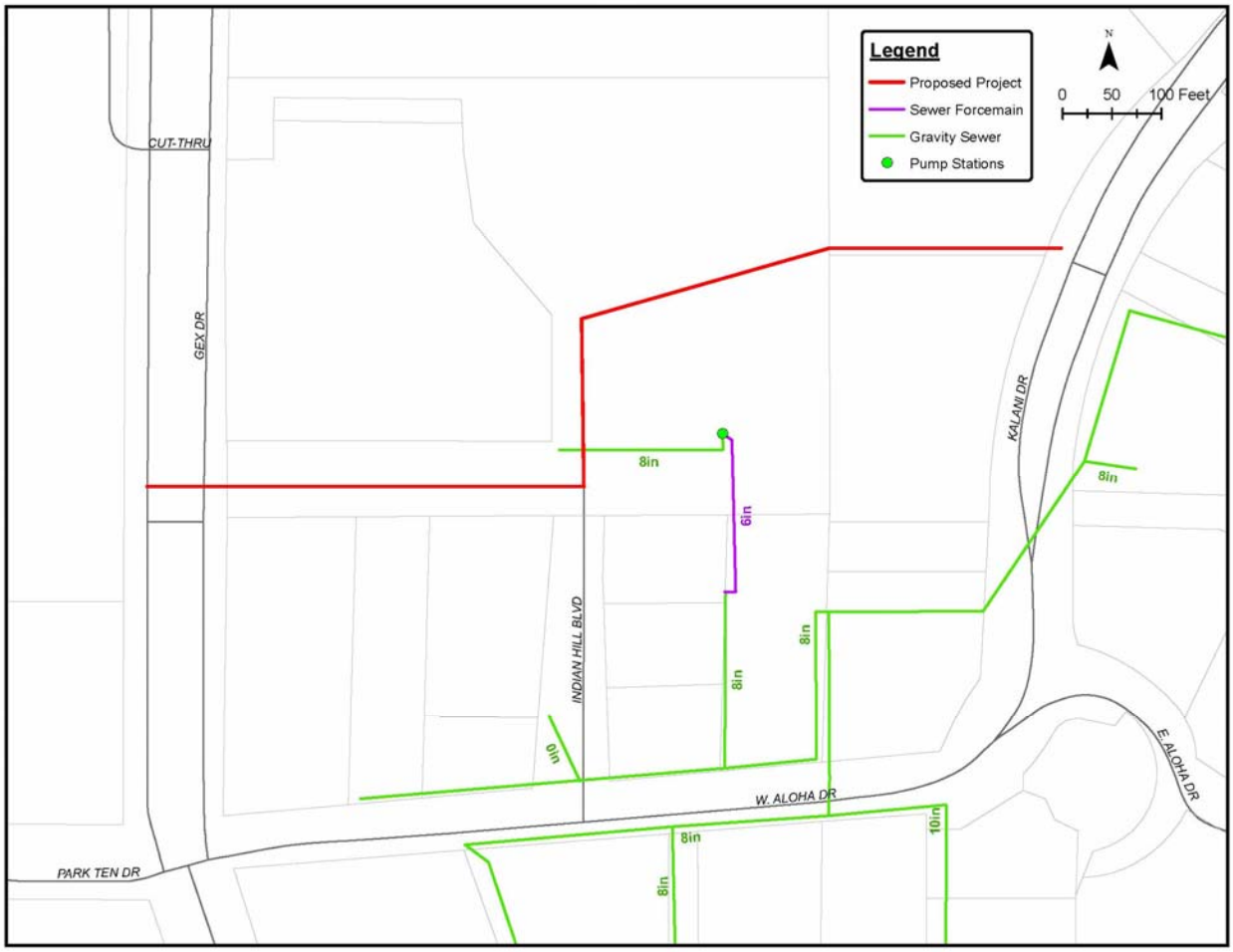
An 8-inch water main runs along the proposed alignment of the collector road from Gex Drive to Indian Hill Blvd. A 2-inch line ties into the 8-inch water main and runs north in the Gex Drive median. There are two 6-inch water lines that cross Kalani Drive in the area where the proposed roadway connects to Kalani Drive. A map of the existing water lines located in the project vicinity is provided in Figure 7-5.

Figure 7-5: East-West Collector – Water Map



The only sewer line that is located near the project is an 8-inch gravity sewer line that crosses the proposed roadway alignment north of Indian Hill Blvd. This gravity line flows east to the pump station located east of the proposed roadway. A map of the existing sewer lines located in the project vicinity is provided in Figure 7-6.

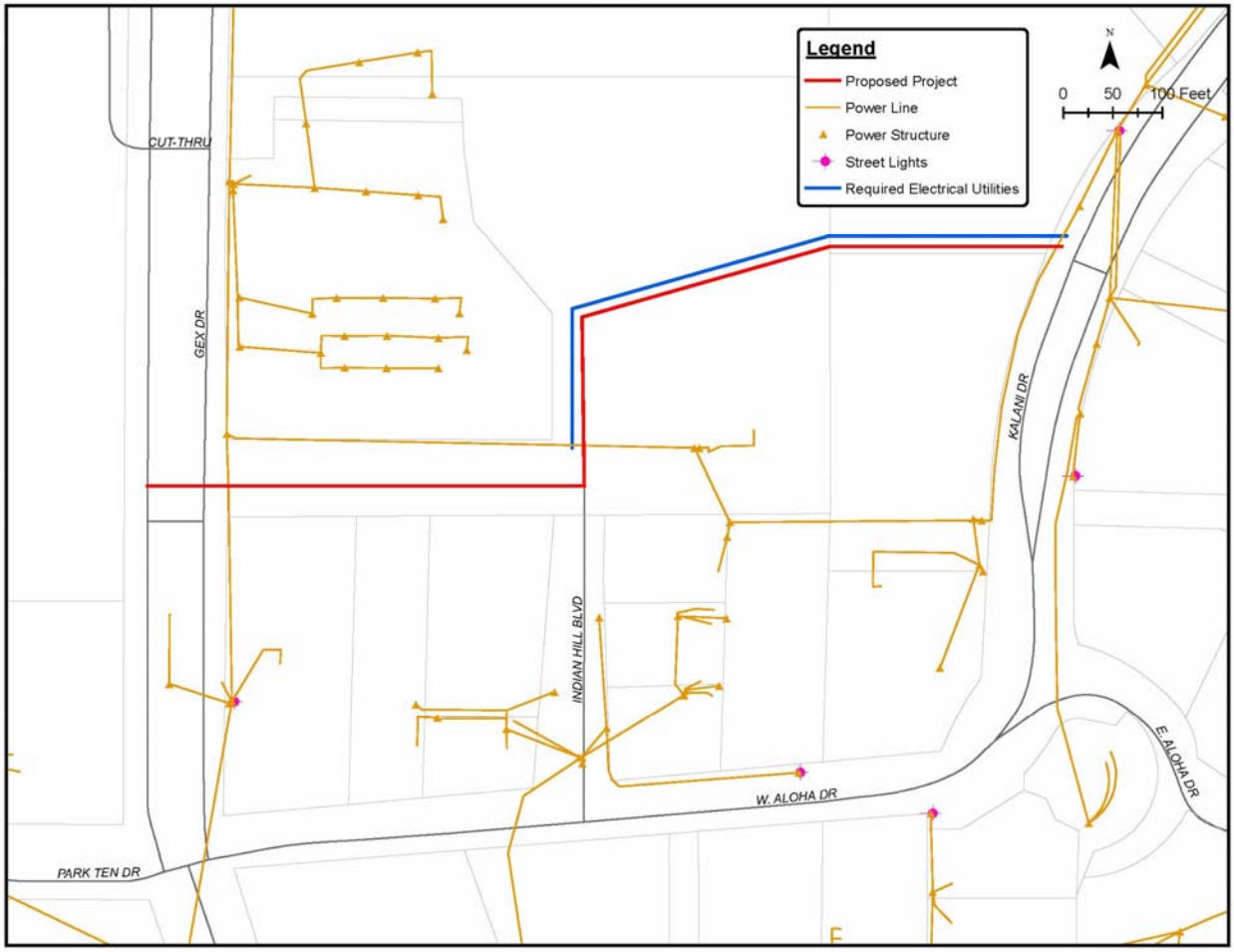
Figure 7-6: East-West Collector – Sewer Map



Electric

Coast Electric provides power and street lighting to the City of Diamondhead. Based on the latest information provided by Coast Electric, there are electric facilities, including power lines, poles, pedestals and street lights, that run along the north side of the proposed alignment of the collector road from Gex Drive to Indian Hill Blvd. Electric facilities are also located along Gex Drive and Kalani Drive, near where the proposed roadway will connect to these existing roads. These existing electrical facilities may need to be relocated if they interfere with the proposed roadway. It is anticipated that electrical utilities will be required along the portion of the proposed roadway that does not currently have electric facilities. A map of the existing electrical utilities located in the project vicinity is provided in Figure 7-7. The location where new electrical utilities will likely be required has also been identified.

Figure 7-7: East-West Collector – Electrical Map



Environmental Considerations

An investigation into the environmental considerations for constructing the project was conducted. Below is a summary of the available information in the project area.

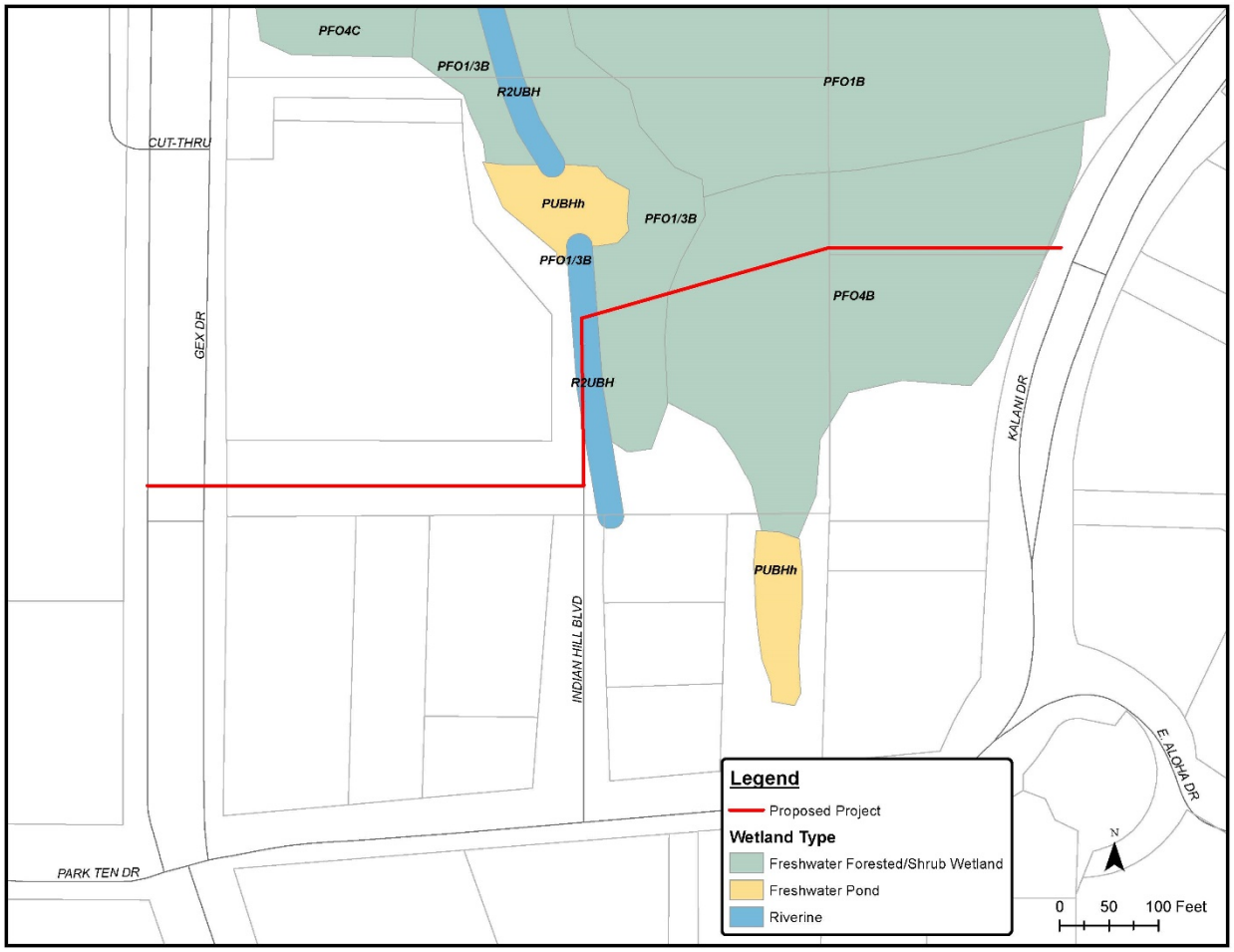
Flood Zones

The entire project is located in Flood Zone X and is a moderate risk area within the 0.2-percent-annual-chance floodplain.

Wetlands

No wetlands delineation has been performed for the project area. The US Fish and Wildlife Service National Wetlands Inventory (NWI) identifies approximate boundaries for wetlands that can be used as an initial assessment of potential wetlands. A complete wetlands delineation is still required to determine a more accurate boundary for the wetlands. According to the NWI, there are wetlands located in the eastern portion of the project. A map of the NWI wetlands in the project vicinity is provided in Figure 7-8.

Figure 7-8: Diamondhead Drive East – US Fish and Wildlife Service NWI Wetlands Map



There are three types of wetlands in the project vicinity – freshwater pond wetlands with classification code PUBHh, freshwater forested/shrub wetlands with classification codes PFO1B, PFO4B and

PFO1/3B, and riverine wetlands with classification code R2UBH. An explanation of the codes, as specified on the USFWS NWI website, is provided below:

System Palustrine (P) – The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 20 acres; (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 8.2 feet at low water; and (4) salinity due to ocean-derived salt is less than 0.5 ppt.

System *Riverine (R)* – The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergent, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts of 0.5 ppt or greater. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water.

Subsystem *Lower Perennial (2)* – Characterized by a low gradient. There is no tidal influence, and some water flows all year, except during years of extreme drought. The substrate consists mainly of sand and mud. Oxygen deficits may sometimes occur. The fauna is composed mostly of species that reach their maximum abundance in still water, and true planktonic organisms are common.

Class *Forested (FO)* – Characterized by woody vegetation that is 19.7 feet or taller

Class *Unconsolidated Bottom (UB)* – Includes all wetlands and deepwater habitat with at least 25% cover of particles smaller than stones (less than 6-7 cm), and a vegetative cover less than 30%

Subclass *Broad-Leaved Deciduous (1*) – Woody angiosperms (trees or shrubs) with relatively wide, flat leaves that are shed during the cold or dry season

Subclass *Broad-Leaved Evergreen (3*) – Woody angiosperms (trees or shrubs) with relatively wide, flat leaves that generally remain green and are usually persistent for a year or more

Subclass *Needle-Leaved Evergreen (4)* – The dominant species in Needle-leaved Evergreen wetlands are young or stunted trees such as black spruce or pond pine.

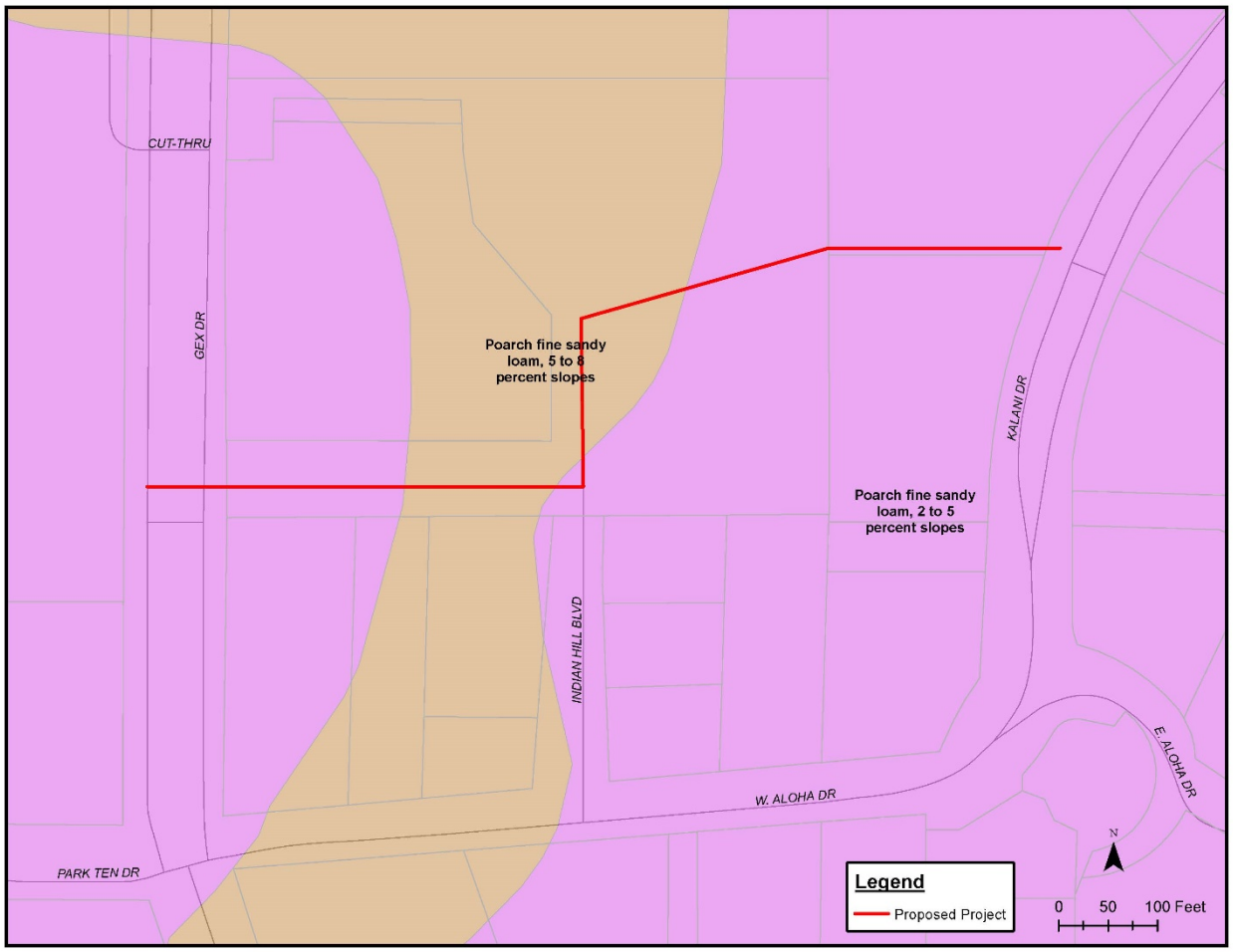
Water Regime *Seasonally Saturated (B)* – The substrate is saturated at or near the surface for extended periods during the growing season, but unsaturated conditions prevail by the end of the season in most years. Surface water is typically absent, but may occur for a few days after heavy rain and upland runoff.

Water Regime *Permanently Flooded (H)* – Water covers the substrate throughout the years in all years

Special Modifier *Diked/Impounded (h)* – These wetlands have been created or modified by a man-made barrier or dam that obstructs the inflow or outflow of water

Soils data for the project area was obtained from US Department of Agriculture National Resources Conservation Service (NRCS). A map of the soils located in the project vicinity is provided in Figure 7-9. A complete description of each type of soil is provided in Appendix B.

Figure 7-9 East-West Collector – Soils Map



Hydric soils are those soils that are sufficiently wet in the upper part to develop anaerobic conditions during the growing season. While not a substitution for performing an onsite investigation, hydric soils can indicate the possibility of wetlands. Of the soils located within the project area, the following is listed as a hydric soil by NRCS:

- Poarch fine sandy loam, 5-8% slopes

Due to the project being located near or in an area of listed wetlands and in an area of hydric soils, it is recommended that a complete wetlands delineation be performed for this project to confirm the extent of wetlands located within the project limits. Once the delineation is complete, a Jurisdictional Determination (JD) from the US Army Corps of Engineers will be required to confirm wetland boundaries and determine mitigation requirements. A Joint Application and Notification will need to be completed and submitted in order to obtain the JD.

Opinion of Probable Costs

An opinion of probable costs, including construction costs and professional services costs, was prepared for the proposed project. Because this is a preliminary plan, a 25% contingency was included in the estimated construction costs. The costs for professional services are based on a percentage of the estimated construction costs. A breakdown of these costs is provided in Table 7-1.

Table 7-1: East-West Collector – Opinion of Probable Costs

Description	Quantity	Unit	Unit Cost	Total Cost
Construction				
Asphalt Pavement	1,170	TON	$100.00	$117,000.00
Base Course	910	CY	$75.00	$68,250.00
Geotextile	3,210	SY	$5.00	$16,050.00
Grassing/Landscaping	1,240	SY	$5.00	$6,200.00
Drainage	1	LS	$100,000.00	$100,000.00
Electrical - Modifications to Existing	1	LS	$25,000.00	$25,000.00
Electrical - New Installation	1	LS	$25,000.00	$25,000.00
Sediment & Erosion Control	1	LS	$25,000.00	$25,000.00
Traffic Control	1	LS	$5,000.00	$5,000.00
Mobilization	1	LS	$19,380.00	$19,380.00
			Construction Subtotal	$406,880.00
			Contingency (25%)	$101,720.00
			Construction Total	$508,600.00
Professional Services				
Engineering (Geotechnical, Survey, Design)	1	LS	$46,960.00	$46,960.00
Resident Inspection	1	LS	$19,800.00	$19,800.00
Land Acquisition	44,400	SF	$2.50	$111,000.00
Wetlands Delineation	1	LS	$2,500.00	$2,500.00
Permitting	1	LS	$10,000.00	$10,000.00
Wetlands Mitigation	1	LS	$25,000.00	$25,000.00
			Professional Services Total	$215,260.00
			PROJECT TOTAL	**$723,860.00**

Recommendations

To advance the proposed project from the preliminary planning phase to the design phase and make the project more ready for construction, the following next steps are recommended:

1. Complete a wetlands delineation to verify the extent of wetlands located within the project area.

2. Perform topographical survey of the project area to determine the alignment of the proposed roadway and the impact to existing utilities. Notify utility owner(s) of any impacts.

3. Perform geotechnical investigation to obtain recommendations for roadway section (base, pavement).

4. Perform drainage analysis to determine required modifications to existing drainage facilities and required implementation of new drainage facilities.

5. Complete and submit a Joint Application and Notification for review and approval by the US Army Corps of Engineers, Mississippi Department of Marine Resources (DMR) and the Mississippi Department of Environmental Quality (MDEQ). As part of this application, comments will also be received from the US Fish and Wildlife Service (USFWS), the Mississippi Department of Archives and History (MDAH), the Mississippi Natural Heritage Program (MNHP), the Environmental Protection Agency (EPA) and NOAA (National Oceanic and Atmospheric Administration) Fisheries (for coastal projects). A copy of the Joint Application and Notification is provided in Appendix C and can be accessed at https://dmr.ms.gov/wp-content/uploads/2019/07/joint-application-notification-form2.pdf.

6. If it is anticipated that MDOT will provide funding for the proposed project, complete and submit Form ENV-160-LPA, MDOT Environmental Division Environmental Class of Action Determination. A copy of this form is included in Appendix D and can be accessed at http://sp.mdot.ms.gov/Environmental/Forms%20and%20Templates/ENV-160/ENV-160%20LPA.pdf.

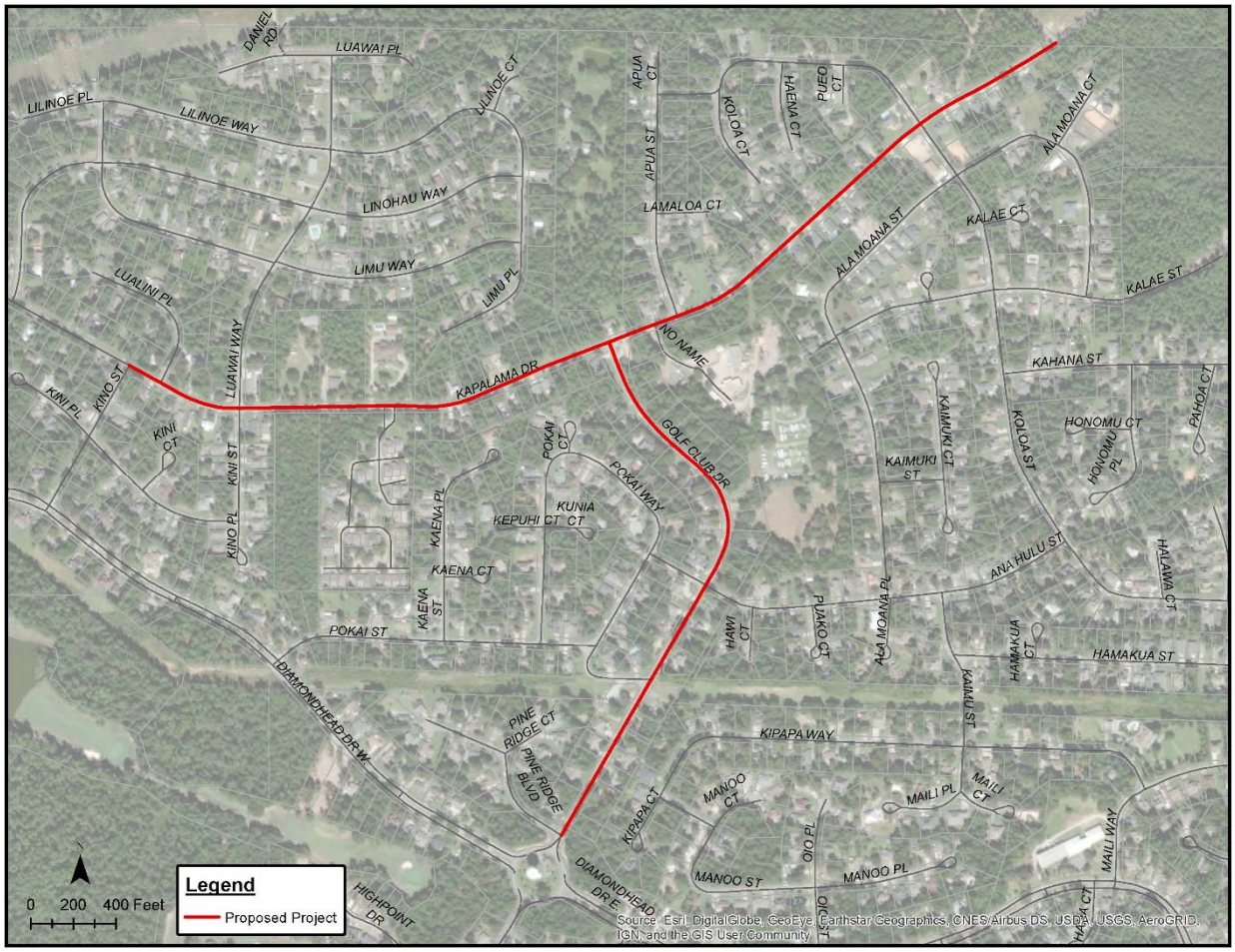
7. If new electrical facilities are to be installed as part of the proposed project, correspond with Coast Electric to begin the design process.

PROJECT 8 – MULTIMODAL LANE ADDITIONS

Project Purpose & Description

Project 8 – Multimodal Lane Additions includes the modification of approximately 4,910 feet of roadway along Golf Club Drive and approximately 2,725 feet of roadway along Kapalama Drive to provide a multimodal lane for pedestrian, bicycle and golf cart use. The project will connect to existing pedestrian, bicycle and golf cart access on Diamondhead Drive and provide additional access to the northern portion of the City where no such facilities currently exist. Additionally, the City will coordinate with and encourage Hancock County to extend the multimodal lane from the City limits to the commercial area located further north on Kapalama Drive. A map of the proposed project is provided in Figure 8-1.

Figure 8-1: Multimodal Lane Additions – Project Map



Existing Conditions

Golf Club Drive, between Diamondhead Drive and Kapalama Drive, is a two-lane asphalt roadway with 11-foot travel lanes and roadside drainage ditches. Kapalama Drive, from Kino Street to the northern City limits, is a two-lane asphalt roadway with 10.5-foot travel lanes and roadside drainage ditches. No pedestrian facilities exist on either road. Cross sections for the existing roadways are provided in Figures 8-2 and 8-3.

Figure 8-2: Multimodal Lane Additions – Golf Club Drive Existing Cross Section

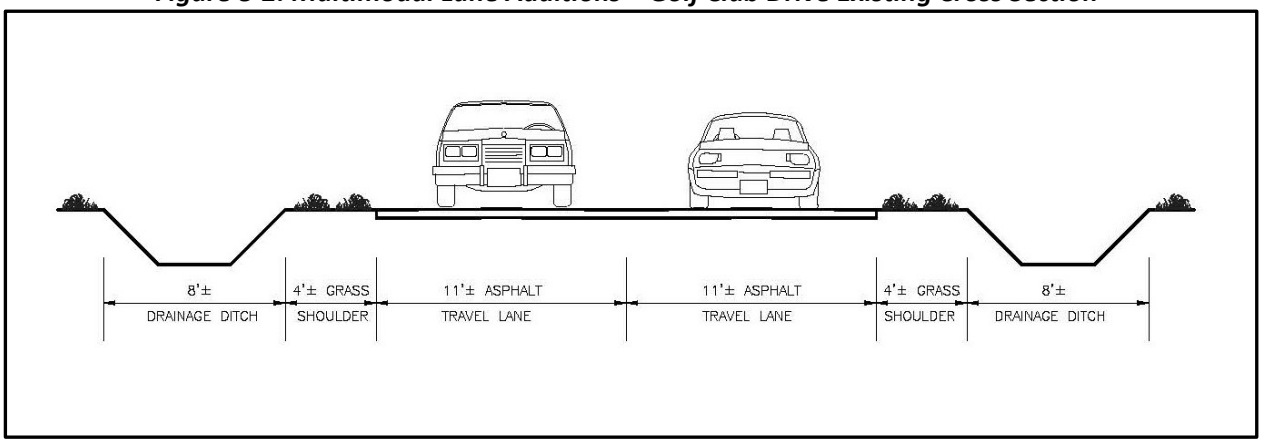
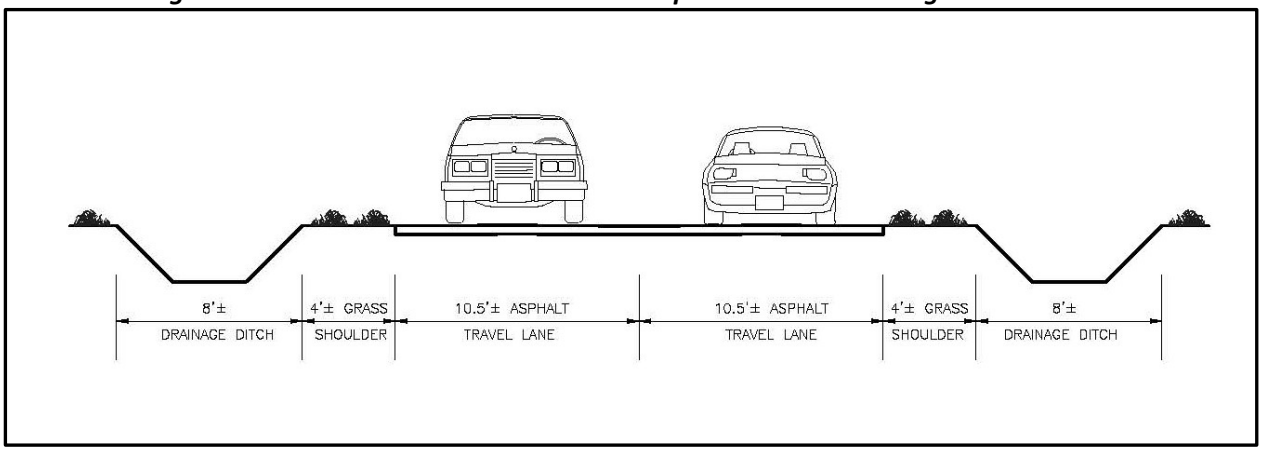


Figure 8-3: Multimodal Lane Additions – Kapalama Drive Existing Cross Section



Proposed Conditions

For both Golf Club Drive and Kapalama Drive, the existing asphalt roadway will remain. Modifications will be made to replace the drainage ditch on one side of the road with subsurface piping that a 10-foot multimodal lane will then be constructed above. Because the dimensions of the drainage ditches are approximately the same on both sides of the road, the modifications can be made to either side. For the purpose of this study, it has been assumed that the new multimodal lane will be constructed on the east side of Golf Club Drive and on the north side of Kapalama Drive. During design it may be determined that the modifications should be moved to the other side(s) of the road. Factors that could contribute to determining the ideal location for the multimodal road are the extent of the utilities impacted, the extent of the residential properties impacted (driveways, driveway culverts, mailboxes) and the required clearing of trees.

The layout of the proposed roadway is provided in Figure 8-4 and cross sections for the proposed roadways are provided in Figures 8-5 and 8-6.

Figure 8-4: Multimodal Lane Additions - Proposed Roadway Layout

Figure 8-5: Multimodal Lane Additions – Golf Club Drive Proposed Roadway Section

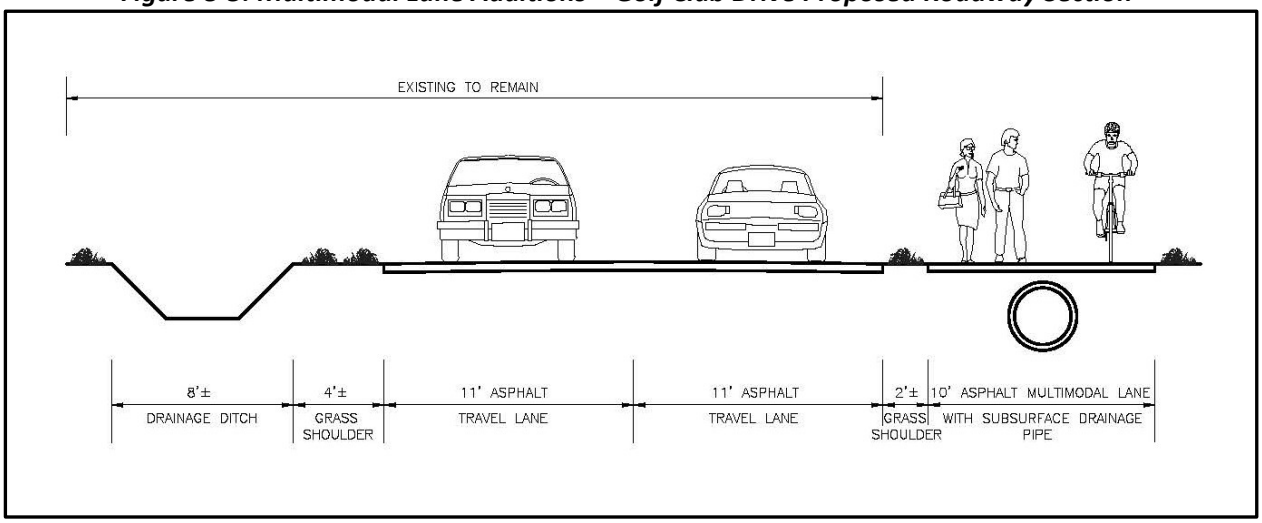
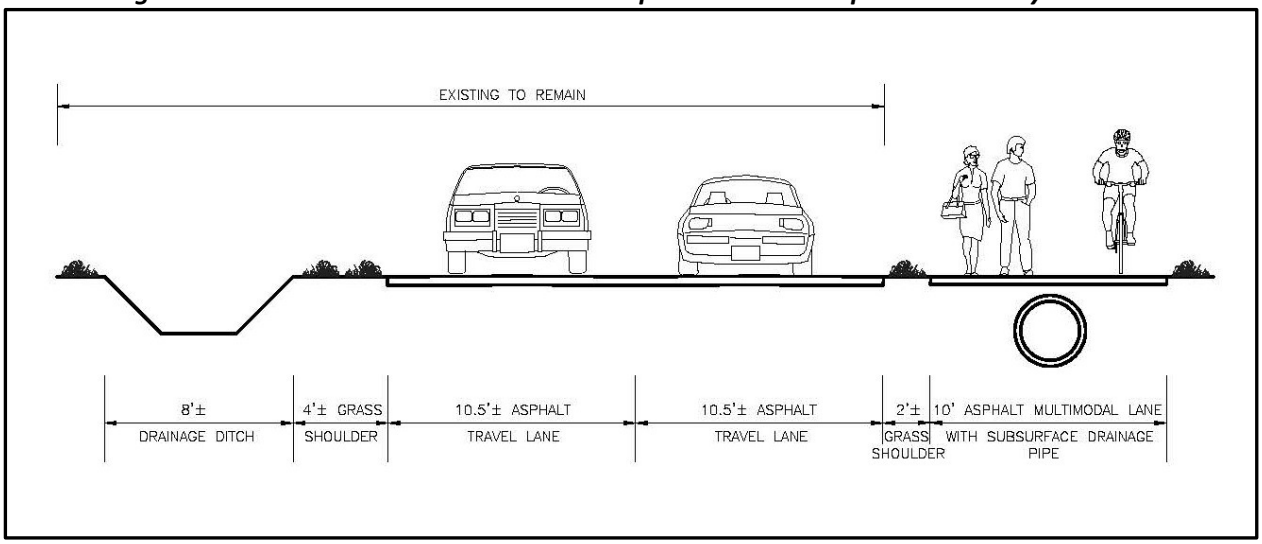


Figure 8-6: Multimodal Lane Additions – Kapalama Drive Proposed Roadway Section



Right-of-Way Requirements

Both Golf Club Drive and Kapalama Drive have an existing right-of-way width of 50 feet. The proposed roadway sections shown above have a total width of 46 feet. Assuming the existing roadway has been constructed in the center of the right-of-way, there is adequate space to modify the drainage and construct the proposed multimodal lane. Therefore, it is anticipated that no land acquisition will be required.

Traffic Considerations

Both Golf Club Drive and Kapalama Drive are classified as local streets. The Gulf Regional Planning Commission recorded traffic counts throughout the City in 2020. Traffic counts taken on Golf Club Drive, between Diamondhead Drive and Kapalama Drive, indicate that there is an annual average daily traffic count of 3,900. Traffic counts taken at the northern end of Kapalama Drive, near the City limits, indicate that there in an annual average daily traffic count of 7,300. No traffic counts were taken on the western end of Kapalama Drive.

Pedestrian Facilities

Currently there are no pedestrian facilities located on Golf Club Drive, between Diamondhead Drive and Kapalama Drive. The project will include the construction of a 10-foot wide multi-modal lane that will provide adequate space for walking, biking and use of a golf-cart. This will allow pedestrian use to tie into the existing walking, bicycle and golf cart lane on Diamondhead Drive.

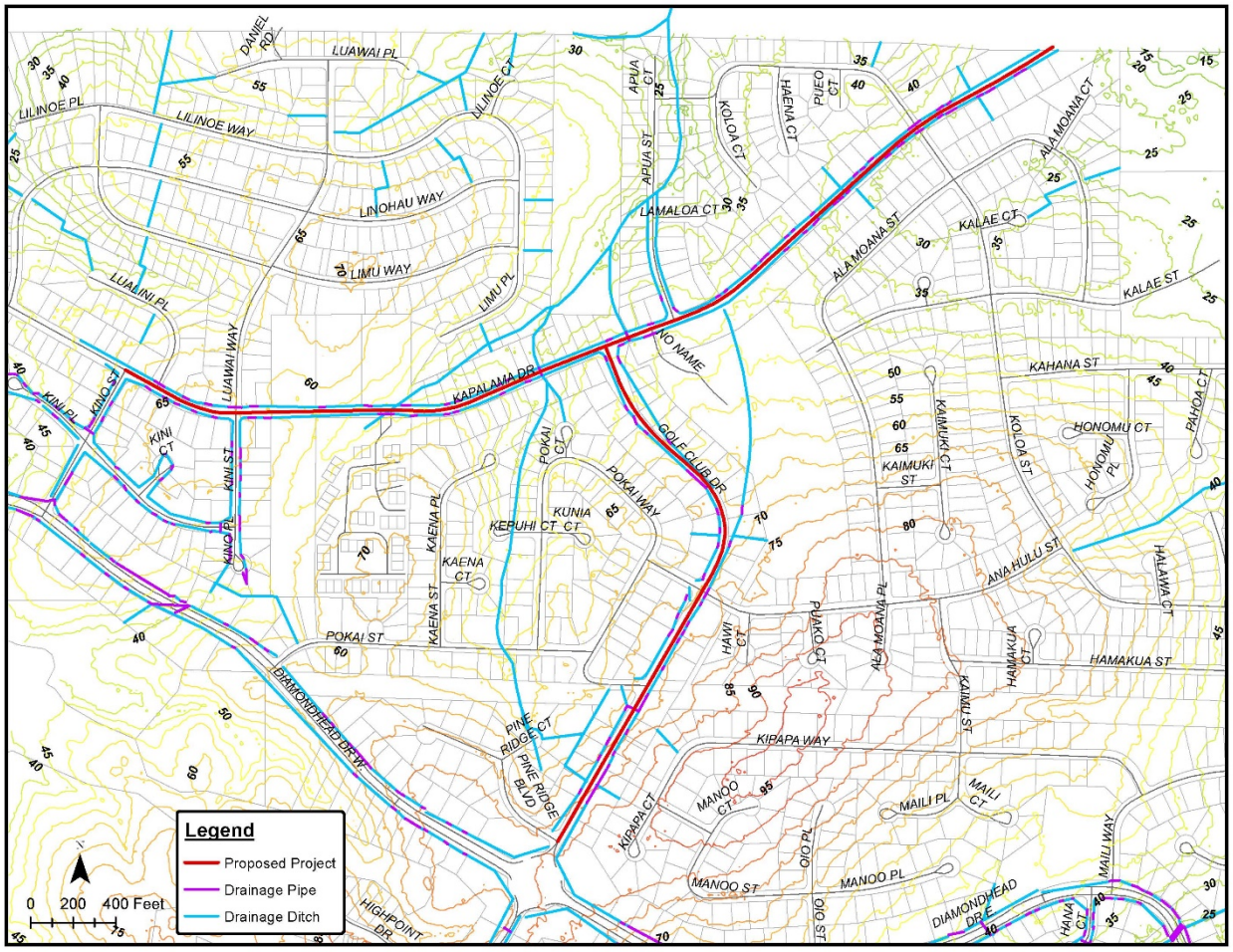
Utilities

An investigation was conducted to determine the utilities located in the project area. Below is a summary of the available utility information.

Drainage

The City of Diamondhead Public Works Department maintains the drainage system in the City. Based on the City's GIS records, the drainage system along Golf Club Drive and Kapalama Drive consists of roadside ditches and driveway culverts. For both roads, the existing ditch on one side of the road will need to be replaced with subsurface piping that ties into the existing drainage system on either end of the project limits. The sizing of the subsurface drainage and connections to existing drainage will need to be assessed during design. A map of the existing drainage facilities and the ground surface elevations in the project vicinity is provided in Figure 8-7.

Figure 8-7: Multimodal Lane Additions – Drainage & Contour Map

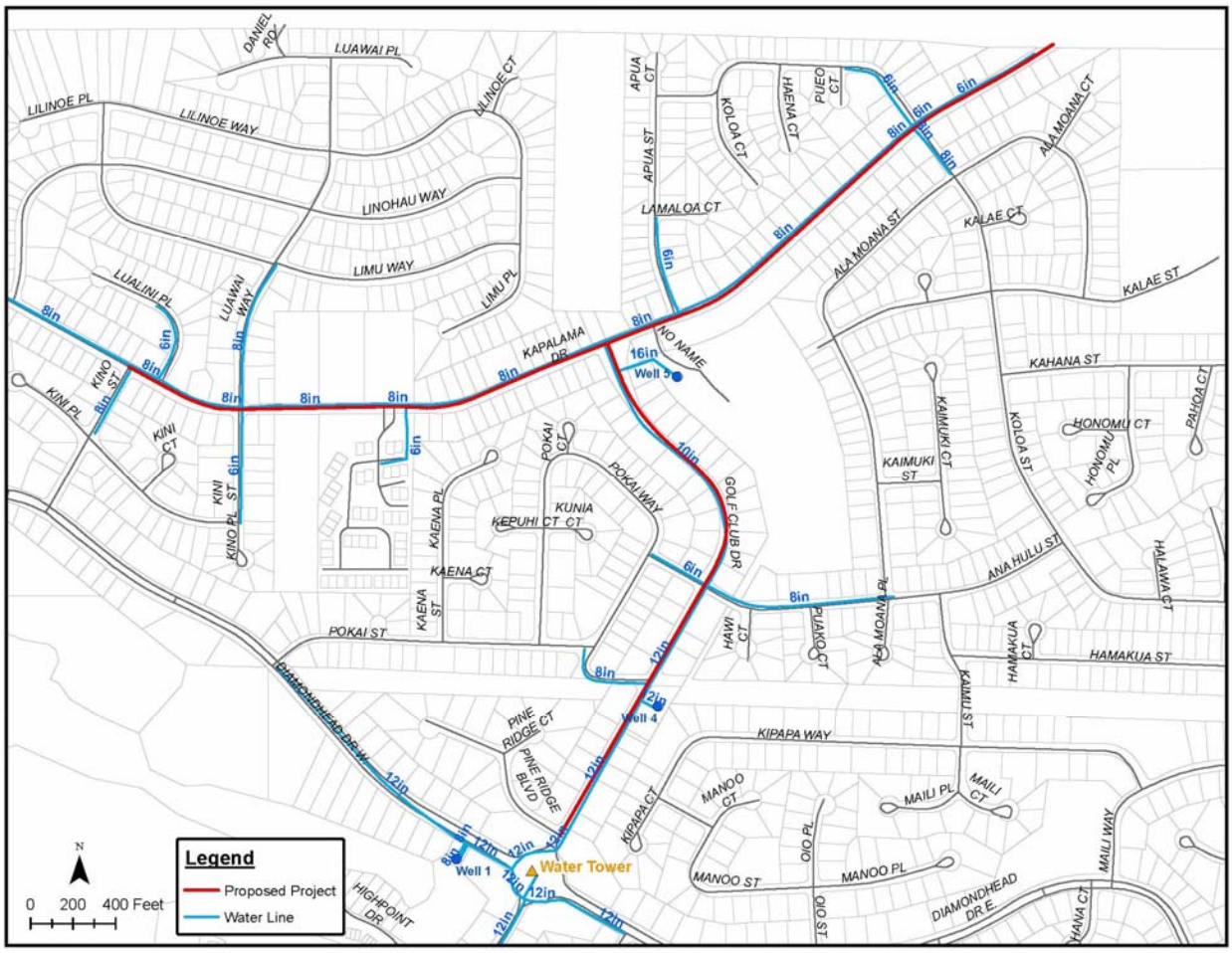


Water and Sewer

The Diamondhead Water and Sewer District (DWSD) owns and operates the water and sewer system in the City of Diamondhead. The DWSD provided a GIS file with locations and data for the water and sewer utilities. It should be noted that the locations indicated in the database were not surveyed, and only provide a general location of where the utilities are located. Modification of the water and sewer utilities may be required to construct the project. However, the extent of the impact on these existing utilities will need to be confirmed during design when the location of the utilities is surveyed.

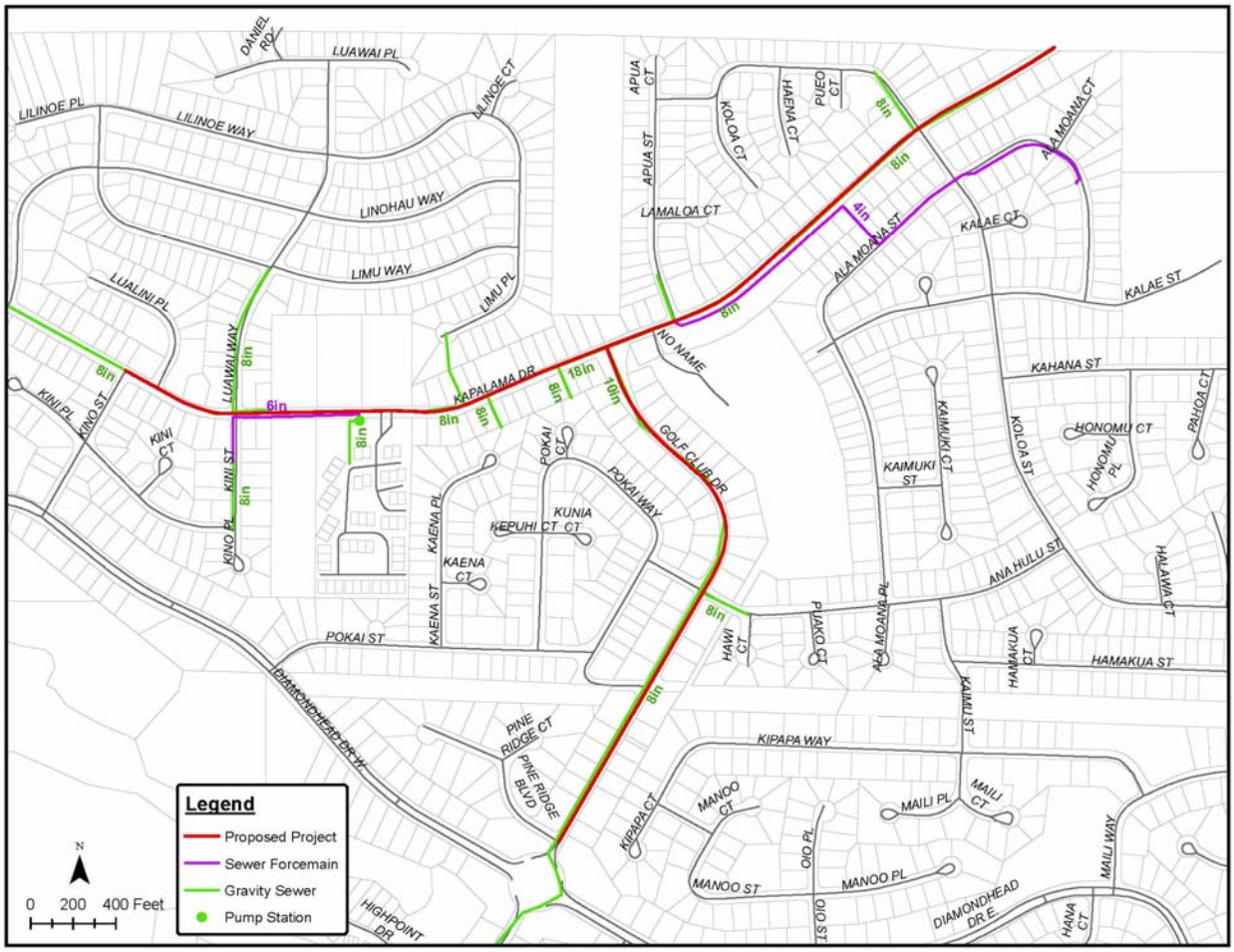
A water main, with a 12-inch and 10-inch diameter, runs from the water tower and along the entire length of the project on Golf Club Drive. There are multiple tie-ins, with varying diameters, that supply water to the streets that connect to Golf Club Drive. A water main, with an 8-inch and 6-inch diameter, runs along the entire length of the project on Kapalama Drive. There are multiple tie-ins, with varying diameters, that supply water to the streets that connect to Kapalama Drive. A map of the water lines located within and adjacent to the project area is provided in Figure 8-8.

Figure 8-8: Multimodal Lane Additions – Water Map



A gravity sewer line, with an 8-inch and 10-inch diameter, runs along the entire length of the project on Golf Club Drive. An 8-inch gravity sewer line on Ana Hulu Street ties into the Golf Club Drive line. A gravity sewer line, with an 8-inch and 18-inch diameter, with multiple 8-inch tie-ins, runs along the majority of the length of the project on Kapalama Drive. A pump station is located on the south side of Kapalama Drive, east of Kini Street, with a 6-inch diameter sewer forcemain that flows west to Kini Street. There is also a 4-inch forcemain that runs along Kapalama Drive between Koloa Street and Apua Street. A map of the sewer lines located within and adjacent to the project area is provided in Figure 8-9.

Figure 8-9: Multimodal Lane Additions – Sewer Map



Electric

Coast Electric provides power and street lighting to the City of Diamondhead. Based on the latest information provided by Coast Electric, there are electric facilities, including power lines, poles, pedestals and street lights, that run along the entire length of both Golf Club Drive and Kapalama Drive for the proposed project. Any electrical facilities located within the limits of the proposed multimodal lanes will need to be relocated. A map of the electrical utilities located in the project vicinity is provided in Figure 8-10.

Figure 8-10: Multimodal Lane Additions – Electrical Map

Environmental Considerations

An investigation into the environmental considerations for constructing the project was conducted. Below is a summary of the available information in the project area.

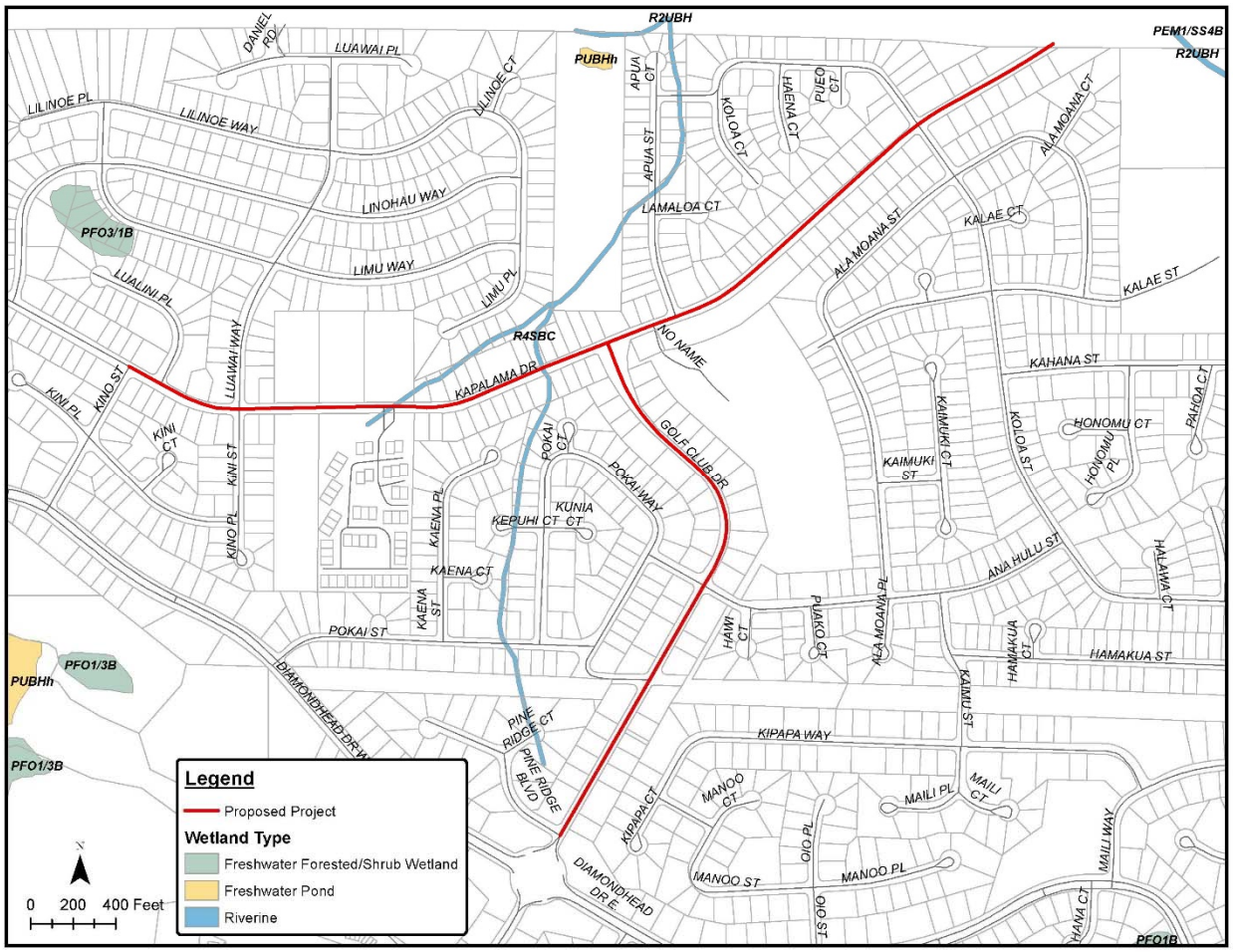
Flood Zones

The entire project is located in Flood Zone X and is a moderate risk area within the 0.2-percent-annual-chance floodplain.

Wetlands

No wetlands delineation has been performed for the project area. The US Fish and Wildlife Service National Wetlands Inventory (NWI) identifies approximate boundaries for wetlands that can be used as an initial assessment of potential wetlands. A complete wetlands delineation is still required to determine a more accurate boundary for the wetlands. According to the NWI, there are wetlands that cross the proposed project on Kapalama in two locations. A map of the NWI wetlands in the project vicinity is provided in Figure 8-11.

Figure 8-11: Multimodal Lane Additions – US Fish and Wildlife Service NWI Wetlands Map



There are riverine wetlands with classification code R4SBC located within the project vicinity. An explanation of the code, as specified on the USFWS NWI website, is provided below:

System *Riverine (R)* – The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergent, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts of 0.5 ppt or greater. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water.

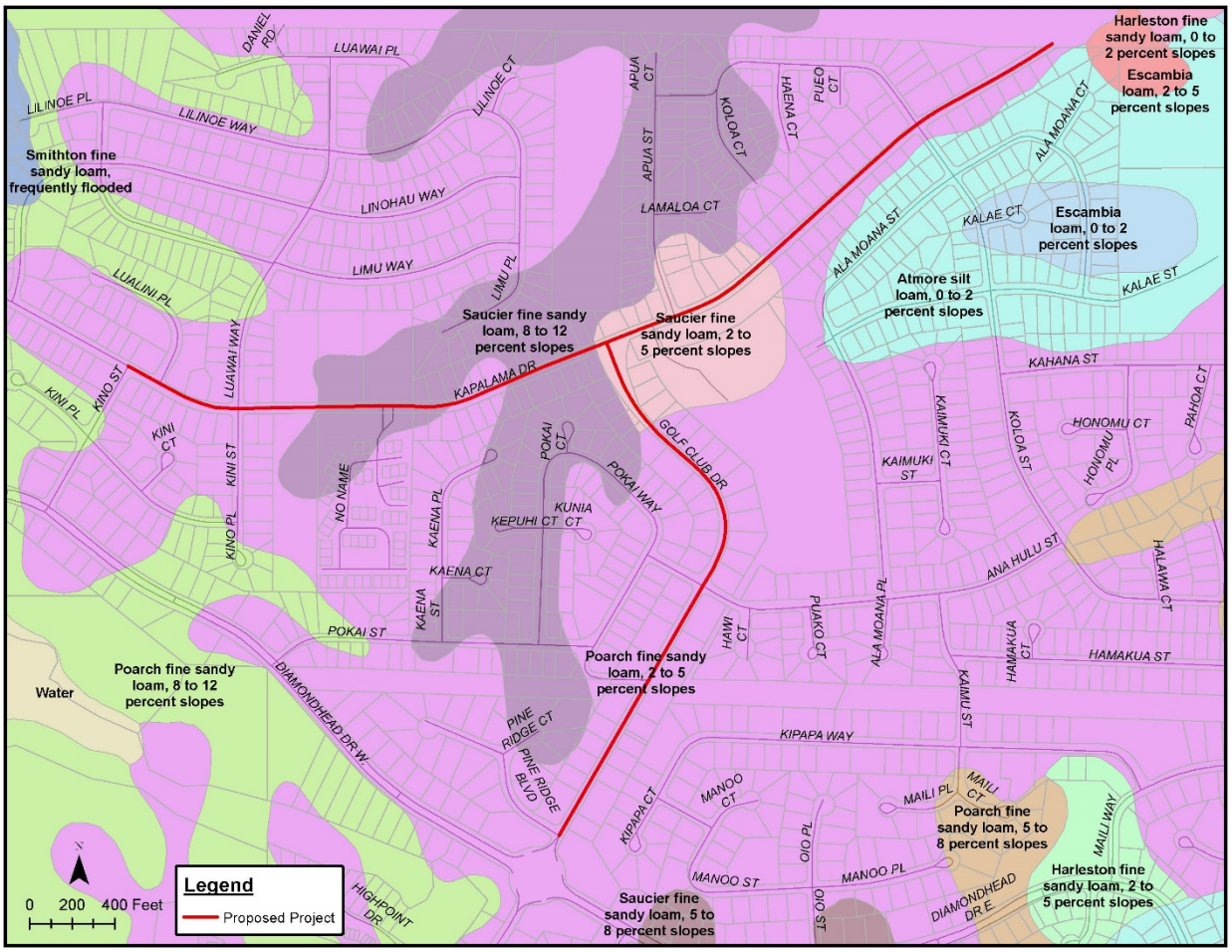
Subsystem *Intermittent (4)* – This subsystem includes channels that contain flowing water only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent.

Class *Streambed (SB)* – Includes all wetlands contained within the intermittent subsystem that are completely dewatered at low tide

Water Regime *Seasonally Flooded (C)* – Surface water is present for extended periods, especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.

Soils data for the project area was obtained from US Department of Agriculture National Resources Conservation Service (NRCS). A map of the soils located in the project vicinity is provided in Figure 7-9. A complete description of each type of soil is provided in Appendix B.

Figure 8-12: Multimodal Lane Additions – Soils Map



Hydric soils are those soils that are sufficiently wet in the upper part to develop anaerobic conditions during the growing season. While not a substitution for performing an onsite investigation, hydric soils can indicate the possibility of wetlands. Of the soils located within the project area, the following are listed as hydric soils by NRCS:

- Saucier fine sandy loam, 2-5% slopes
- Saucier fine sandy loam, 8-12% slopes

Due to the project being located near or in an area of listed wetlands and in an area of hydric soils, it is recommended that a complete wetlands delineation be performed for the full project area to confirm if any wetlands are located within the project limits. Once the delineation is complete, a Jurisdictional Determination (JD) from the US Army Corps of Engineers will be required to confirm wetland boundaries and determine mitigation requirements. A Joint Application and Notification will need to be completed and submitted in order to obtain the JD.

Opinion of Probable Costs

An opinion of probable costs, including construction costs and professional services costs, was prepared for each street in the proposed project. Because this is a preliminary plan, a 25% contingency was included in the estimated construction costs. The costs for professional services are based on a percentage of the estimated construction costs. A breakdown of these costs is provided in Tables 8-1 and 8-2.

Table 8-1: Multimodal Lane Additions, Golf Club Drive – Opinion of Probable Costs

Description	Quantity	Unit	Unit Cost	Total Cost
Construction				
Asphalt Pavement	670	TON	$100.00	$67,000.00
Base Course	610	CY	$75.00	$45,750.00
Grassing/Landscaping	1,210	SY	$5.00	$6,050.00
Replace Concrete Driveways	340	SY	$100.00	$34,000.00
Replace Drainage Ditch with Subsurface Piping	2,720	LF	$250.00	$680,000.00
Water & Sewer - Modifications to Existing	1	LS	$20,000.00	$20,000.00
Electrical - Modifications to Existing	1	LS	$35,000.00	$35,000.00
Removal of Trees/Vegetation	1	LS	$20,000.00	$20,000.00
Sediment & Erosion Control	1	LS	$20,000.00	$20,000.00
Traffic Control	1	LS	$10,000.00	$10,000.00
Mobilization	1	LS	$46,890.00	$46,890.00
			Construction Subtotal	$984,690.00
			Contingency (25%)	$246,173.00
			Construction Total	$1,230,863.00
Professional Services				
Engineering (Geotechnical, Survey, Design)	1	LS	$97,230.00	$97,230.00
Resident Inspection	1	LS	$41,570.00	$41,570.00
Wetlands Delineation	1	LS	$2,500.00	$2,500.00
Permitting	1	LS	$10,000.00	$10,000.00
			Professional Services Total	$151,300.00
			PROJECT TOTAL	**$1,382,163.00**

Table 8-2: Multimodal Lane Additions, Kapalama Drive – Opinion of Probable Costs

Description	Quantity	Unit	Unit Cost	Total Cost
Construction				
Asphalt Pavement	1,200	TON	$100.00	$120,000.00
Base Course	1,100	CY	$75.00	$82,500.00
Grassing/Landscaping	2,190	SY	$5.00	$10,950.00
Replace Concrete Driveways	670	SY	$100.00	$67,000.00
Replace Drainage Ditch with Subsurface Piping	4,910	LF	$250.00	$1,227,500.00
Water & Sewer - Modifications to Existing	1	LS	$35,000.00	$35,000.00
Electrical - Modifications to Existing	1	LS	$65,000.00	$65,000.00
Removal of Trees/Vegetation	1	LS	$35,000.00	$35,000.00
Sediment & Erosion Control	1	LS	$35,000.00	$35,000.00
Traffic Control	1	LS	$20,000.00	$20,000.00
Mobilization	1	LS	$84,900.00	$84,900.00
			Construction Subtotal	$1,782,850.00
			Contingency (25%)	$445,713.00
			Construction Total	$2,228,563.00
Professional Services				
Engineering (Geotechnical, Survey, Design)	1	LS	$164,310.00	$164,310.00
Resident Inspection	1	LS	$73,040.00	$73,040.00
Wetlands Delineation	1	LS	$2,500.00	$2,500.00
Permitting	1	LS	$10,000.00	$10,000.00
			Professional Services Total	$249,850.00
			PROJECT TOTAL	**$2,478,413.00**

Recommendations

To advance the proposed project from the preliminary planning phase to the design phase and make the project more ready for construction, the following next steps are recommended:

1. Complete a wetlands delineation to verify if wetlands are located within the project area.

2. Perform topographical survey of the project area to determine the alignment of the proposed roadway and the impact to existing utilities. Notify utility owner(s) of any impacts.

3. Perform geotechnical investigation to obtain recommendations for multimodal lane section (base, pavement).

4. Perform drainage analysis to determine required subsurface drainage facilities.

5. Complete and submit a Joint Application and Notification for review and approval by the US Army Corps of Engineers, Mississippi Department of Marine Resources (DMR) and the Mississippi Department of Environmental Quality (MDEQ). As part of this application, comments will also be received from the US Fish and Wildlife Service (USFWS), the Mississippi Department of Archives and History (MDAH), the Mississippi Natural Heritage Program (MNHP), the Environmental Protection Agency (EPA) and NOAA (National Oceanic and Atmospheric Administration) Fisheries (for coastal projects). A copy of the Joint Application and Notification is provided in Appendix C and can be accessed at https://dmr.ms.gov/wp-content/uploads/2019/07/joint-application-notification-form2.pdf.

6. If it is anticipated that MDOT will provide funding for the proposed project, complete and submit Form ENV-160-LPA, MDOT Environmental Division Environmental Class of Action Determination. A copy of this form is included in Appendix D and can be accessed at http://sp.mdot.ms.gov/Environmental/Forms%20and%20Templates/ENV-160/ENV-160%20LPA.pdf.

APPENDIX A

CITY OF DIAMONDHEAD MASTER PLAN MAPS

NORTH

0 200 400 600 feet

SCALE: 1" = 200'

DIAMONDHEAD PRELIMINARY MASTER PLAN
4-6-2020

BOULEVARD EXPANSION

NATURE TRAIL

RESIDENTIAL

EXISTING NOMA DRIVE CIRCLE

PROPOSED MDOT ROUNDABOUT

PROPOSED CONNECTION

EXISTING COMMERCIAL

PROPOSED CONNECTION

SEWER TREATMENT PLANT

MIXED USE

TOWNHOMES

HOTEL

COMMERCIAL PARKING BELOW

OFFICE WAREHOUSE

NATURE TRAIL

DOG PARK

MULTI-FAMILY

PARK EXPANSION

PARKING

EXERCISE EQUIPMENT TRACK

STORMWATER 1.9 AC.

STORMWATER 2.2 AC.

PROPOSED BOAT STORAGE BLD. BOAT LAUNCH

CHILDREN'S PLAYGROUND

KAYAK LAUNCH

EVENT LAWN

EXISTING FIELDS

M/F

GREENSPACE

INTERSTATE 10

FLOOD ZONE

EXISTING FORCE MAIN

AIRPORT RESTRICTIONS

EXISTING RUNWAY

PROPOSED RESTAURANT

PROPOSED CONDO'S

LANDUSE DISTRICTS

- MIXED USE TOWN CENTER
- MULTIFAMILY
- RESIDENTIAL
- CONDO ENTERTAINMENT
- GREENSPACE

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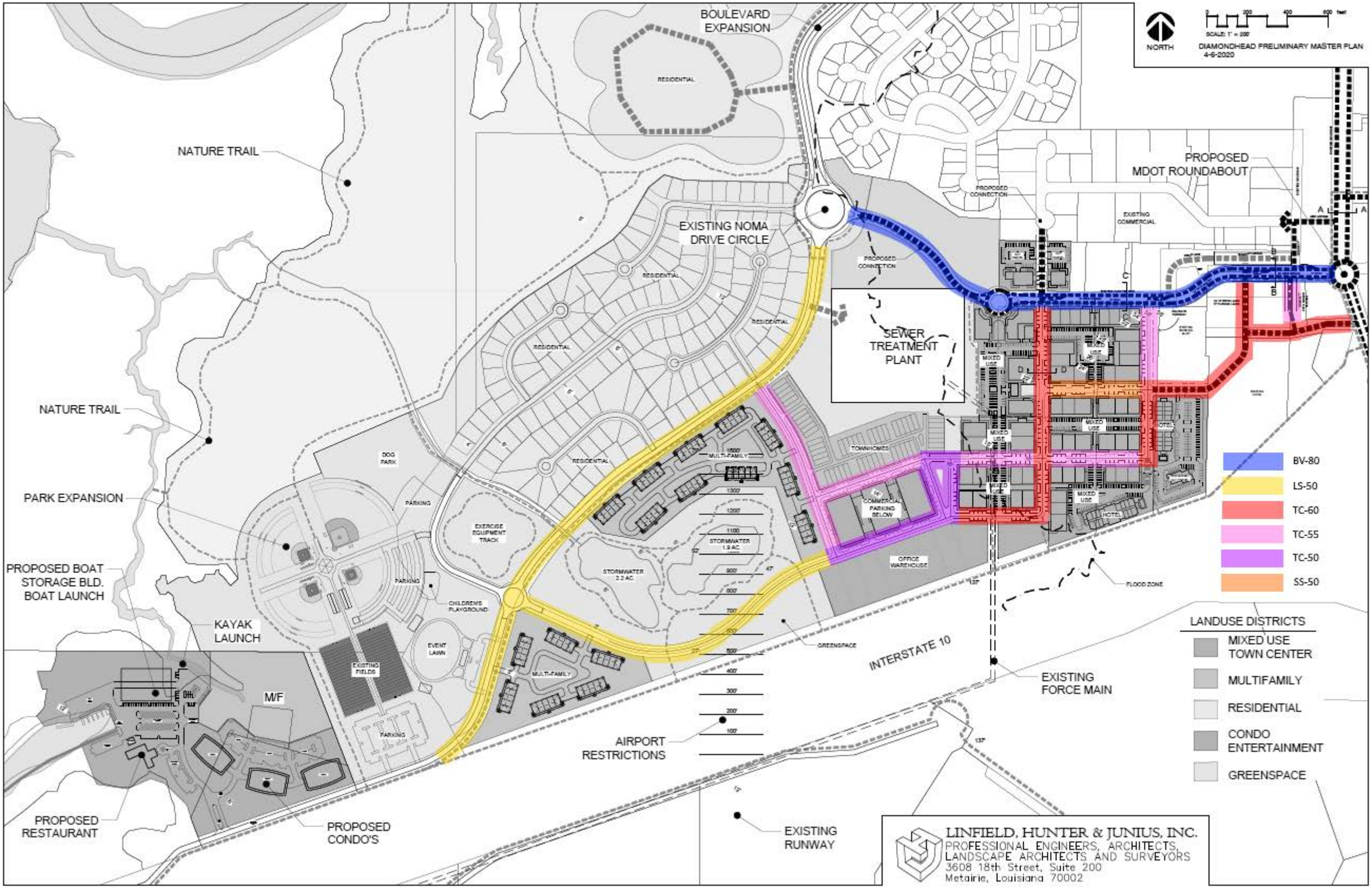
PROFESSIONAL ENGINEERS, ARCHITECTS, LANDSCAPE ARCHITECTS AND SURVEYORS
3608 18th Street, Suite 200
Metairie, Louisiana 70002


NORTH
SCALE: 1" = 200'
DIAMONDHEAD PRELIMINARY MASTER PLAN
4-6-2020
BOULEVARD EXPANSION
NATURE TRAIL
EXISTING NOMA DRIVE CIRCLE
PROPOSED MDOT ROUNDABOUT
PROPOSED CONNECTION
EXISTING COMMERCIAL
SEWER TREATMENT PLANT
NATURE TRAIL
PARK EXPANSION
PROPOSED BOAT STORAGE BLD. BOAT LAUNCH
KAYAK LAUNCH
DOG PARK
PARKING
EXERCISE EQUIPMENT TRACK
CHILDRENS PLAYGROUND
EVENT LAWN
EXISTING FIELDS
M/F
RESIDENTIAL
MULTI-FAMILY
TOWNHOMES
COMMERCIAL PARKING BELOW
MIXED USE
HOTEL
OFFICE WAREHOUSE
STORMWATER 2.2 AC.
STORMWATER 1.9 AC.
GREENSPACE
FLOOD ZONE
INTERSTATE 10
EXISTING FORCE MAIN
AIRPORT RESTRICTIONS
EXISTING RUNWAY
PROPOSED RESTAURANT
PROPOSED CONDO'S
BV-80
LS-50
TC-60
TC-55
TC-50
SS-50
LANDUSE DISTRICTS
MIXED USE TOWN CENTER
MULTIFAMILY
RESIDENTIAL
CONDO ENTERTAINMENT
GREENSPACE
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Metairie, Louisiana 70002

APPENDIX B

USDA NATIONAL RESOURCES CONSERVATION SERVICE (NRCS) SOILS DATA

Hancock County, Mississippi

At—Atmore silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2t42g
Elevation: 20 to 270 feet
Mean annual precipitation: 57 to 69 inches
Mean annual air temperature: 61 to 70 degrees F
Frost-free period: 215 to 270 days
Farmland classification: Not prime farmland

Map Unit Composition

Atmore and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Atmore

Setting

Landform: Flats on divides, terraces, depressions
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Silty alluvium over fine-loamy alluvium derived from sedimentary rock

Typical profile

A - 0 to 5 inches: silt loam
Eg - 5 to 9 inches: silt loam
E/Bg - 9 to 30 inches: silt loam
Btg - 30 to 39 inches: silt loam
Btgv1 - 39 to 51 inches: silt loam
Btgv2 - 51 to 78 inches: clay loam
2C - 78 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 24 to 50 inches to plinthite
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 1.28 in/hr)
Depth to water table: About 0 to 8 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Poarch

Percent of map unit: 5 percent
Landform: Fluviomarine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Escambia

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Harleston

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Hancock County, Mississippi
Survey Area Data: Version 16, Sep 13, 2019

Hancock County, Mississippi

EsA—Escambia loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: c4w6
Elevation: 20 to 200 feet
Mean annual precipitation: 42 to 75 inches
Mean annual air temperature: 61 to 70 degrees F
Frost-free period: 220 to 350 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Escambia and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Escambia

Setting

Landform: Coastal plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 33 inches: fine sandy loam
H3 - 33 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Poarch
Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Guyton
Percent of map unit: 3 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Saucier
Percent of map unit: 3 percent
Landform: Coastal plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Atmore
Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Harleston
Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Hancock County, Mississippi
Survey Area Data: Version 16, Sep 13, 2019

Hancock County, Mississippi

EsB—Escambia loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: c4w7
Elevation: 20 to 200 feet
Mean annual precipitation: 42 to 75 inches
Mean annual air temperature: 61 to 70 degrees F
Frost-free period: 220 to 350 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Escambia and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Escambia

Setting

Landform: Coastal plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 33 inches: fine sandy loam
H3 - 33 to 60 inches: loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Saucier
Percent of map unit: 4 percent
Landform: Coastal plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Atmore
Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Harleston
Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Guyton
Percent of map unit: 3 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Poarch
Percent of map unit: 2 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Hancock County, Mississippi
Survey Area Data: Version 16, Sep 13, 2019

Hancock County, Mississippi

HA—Handsboro association

Map Unit Setting

National map unit symbol: c4wb
Elevation: 0 feet
Mean annual precipitation: 38 to 75 inches
Mean annual air temperature: 59 to 70 degrees F
Frost-free period: 220 to 335 days
Farmland classification: Not prime farmland

Map Unit Composition

Handsboro and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Handsboro

Setting

Landform: Tidal flats
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Decomposed herbaceous plant remains and alluvium deposits

Typical profile

H1 - 0 to 2 inches: mucky silt loam
Oa - 2 to 46 inches: muck
H3 - 46 to 61 inches: stratified muck to loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Strongly saline (16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very high (about 14.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Bohicket

Percent of map unit: 10 percent
Landform: Tidal flats
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Hancock County, Mississippi
Survey Area Data: Version 16, Sep 13, 2019

Hancock County, Mississippi

HlA—Harleston fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2t42d
Elevation: 0 to 300 feet
Mean annual precipitation: 52 to 69 inches
Mean annual air temperature: 52 to 70 degrees F
Frost-free period: 215 to 270 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Harleston and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Harleston

Setting

Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium derived from sedimentary rock

Typical profile

A - 0 to 4 inches: fine sandy loam
E - 4 to 9 inches: fine sandy loam
BE - 9 to 13 inches: fine sandy loam
Bt1 - 13 to 24 inches: sandy loam
Bt2 - 24 to 43 inches: fine sandy loam
Bt3 - 43 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Stough

Percent of map unit: 5 percent
Landform: Terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Smithton

Percent of map unit: 5 percent
Landform: Drainageways on flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Bibb

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Hancock County, Mississippi
Survey Area Data: Version 16, Sep 13, 2019

Hancock County, Mississippi

PoB—Poarch fine sandy loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t42h
Elevation: 30 to 340 feet
Mean annual precipitation: 57 to 69 inches
Mean annual air temperature: 61 to 70 degrees F
Frost-free period: 215 to 270 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Poarch and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Poarch

Setting

Landform: Fluviomarine terraces
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy fluviomarine deposits derived from sedimentary rock

Typical profile

Ap - 0 to 7 inches: fine sandy loam
E - 7 to 12 inches: loam
Bt - 12 to 32 inches: loam
Btv1 - 32 to 66 inches: loam
Btv2 - 66 to 80 inches: fine sandy loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 39 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Malbis

Percent of map unit: 5 percent
Landform: Fluviomarine terraces
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Harleston

Percent of map unit: 5 percent
Landform: Marine terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Escambia

Percent of map unit: 5 percent
Landform: Terraces, interfluves
Landform position (two-dimensional): Toeslope, footslope, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: No

Data Source Information

Soil Survey Area: Hancock County, Mississippi
Survey Area Data: Version 16, Sep 13, 2019

Hancock County, Mississippi

PoC—Poarch fine sandy loam, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: c4wr
Elevation: 100 to 300 feet
Mean annual precipitation: 48 to 75 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 200 to 335 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Poarch and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Poarch

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

H1 - 0 to 7 inches: fine sandy loam
H2 - 7 to 35 inches: loam
H3 - 35 to 60 inches: loam

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 30 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Smithton

Percent of map unit: 7 percent
Landform: Terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Escambia

Percent of map unit: 4 percent
Landform: Coastal plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Harleston

Percent of map unit: 4 percent
Landform: Stream terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Hancock County, Mississippi
Survey Area Data: Version 16, Sep 13, 2019

Hancock County, Mississippi

SaA—Saucier fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2w8xw
Elevation: 20 to 340 feet
Mean annual precipitation: 57 to 69 inches
Mean annual air temperature: 61 to 70 degrees F
Frost-free period: 215 to 270 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Saucier and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saucier

Setting

Landform: Fluviomarine terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy fluviomarine deposits over clayey fluviomarine deposits

Typical profile

A - 0 to 5 inches: fine sandy loam
BA - 5 to 12 inches: fine sandy loam
Bt - 12 to 26 inches: loam
Btv - 26 to 38 inches: loam
2Btv - 38 to 48 inches: silty clay loam
2Bt - 48 to 72 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.04 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Poarch

Percent of map unit: 5 percent
Landform: Fluviomarine terraces
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Malbis

Percent of map unit: 5 percent
Landform: Fluviomarine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Escambia

Percent of map unit: 5 percent
Landform: Interfluves on fluviomarine terraces, flats on fluviomarine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Crest, tread, rise
Down-slope shape: Linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Atmore

Percent of map unit: 5 percent
Landform: Flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Hancock County, Mississippi
Survey Area Data: Version 16, Sep 13, 2019

Hancock County, Mississippi

SaB—Saucier fine sandy loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2w8xz
Elevation: 20 to 380 feet
Mean annual precipitation: 57 to 69 inches
Mean annual air temperature: 61 to 70 degrees F
Frost-free period: 215 to 270 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Saucier and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saucier

Setting

Landform: Fluviomarine terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy fluviomarine deposits over clayey fluviomarine deposits

Typical profile

A - 0 to 5 inches: fine sandy loam
BA - 5 to 12 inches: fine sandy loam
Bt - 12 to 26 inches: loam
Btv - 26 to 38 inches: loam
2Btv - 38 to 48 inches: silty clay loam
2Bt - 48 to 72 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.04 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water capacity: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Atmore

Percent of map unit: 5 percent
Landform: Flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Poarch

Percent of map unit: 5 percent
Landform: Fluviomarine terraces
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Malbis

Percent of map unit: 5 percent
Landform: Fluviomarine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Escambia

Percent of map unit: 5 percent
Landform: Interfluves on fluviomarine terraces, flats on fluviomarine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Crest, tread, rise
Down-slope shape: Linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Hancock County, Mississippi
Survey Area Data: Version 17, Jun 3, 2020

Hancock County, Mississippi

SaD—Saucier fine sandy loam, 8 to 12 percent slopes

Map Unit Setting

National map unit symbol: c4x1
Elevation: 0 to 300 feet
Mean annual precipitation: 48 to 75 inches
Mean annual air temperature: 63 to 70 degrees F
Frost-free period: 200 to 335 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Saucier and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saucier

Setting

Landform: Coastal plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy over clayey marine deposits

Typical profile

H1 - 0 to 9 inches: fine sandy loam
H2 - 9 to 40 inches: loam
H3 - 40 to 47 inches: silty clay loam
H4 - 47 to 60 inches: clay

Properties and qualities

Slope: 8 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Smithton

Percent of map unit: 6 percent
Landform: Terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Poarch

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Harleston

Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Malbis

Percent of map unit: 3 percent
Landform: Coastal plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Hancock County, Mississippi
Survey Area Data: Version 17, Jun 3, 2020

Hancock County, Mississippi

Su—Smithton fine sandy loam, frequently flooded

Map Unit Setting

National map unit symbol: c4x7
Elevation: 20 to 400 feet
Mean annual precipitation: 40 to 75 inches
Mean annual air temperature: 61 to 72 degrees F
Frost-free period: 220 to 350 days
Farmland classification: Not prime farmland

Map Unit Composition

Smithton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smithton

Setting

Landform: Terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 38 inches: sandy loam
H3 - 38 to 49 inches: loam
H4 - 49 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Plummer

Percent of map unit: 6 percent
Landform: Flats
Landform position (three-dimensional): Dip
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: Yes

Atmore

Percent of map unit: 3 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Guyton

Percent of map unit: 3 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Harleston

Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Hancock County, Mississippi
Survey Area Data: Version 16, Sep 13, 2019

APPENDIX C

JOINT APPLICATION AND NOTIFICATION

JOINT APPLICATION AND NOTIFICATION

U.S. ARMY CORPS OF ENGINEERS
MISSISSIPPI DEPARTMENT OF MARINE RESOURCES
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY/OFFICE OF P0LLUTION CONTROL

This form is to be used for proposed activities in waters of the United States in Mississippi and for the erection of structures on suitable sites for water dependent industry. Note that some items, as indicated, apply only to projects located in the coastal area of Hancock, Harrison and Jackson Counties.

1. Date

_____
month day year

2. Applicant name, mailing address, phone number and email address:

Agent name, mailing address, phone number and email address:

3. Official use only
COE _____
DMR _____
DEQ _____
A95 _____
DATE RECEIVED_____

4. Project location

Street Address_____ City/Community_____
Name of Waterway_____ Latitude_____ Longitude (if known)_____
Geographic location: Section_____ Township_____ Range_____ County_____

5. **Project description**

New work☐ **Maintenance work**☐

Dredging

☐Channel length_____ width_____ existing depth_____ proposed depth_____
☐Canal length_____ width_____ existing depth_____ proposed depth_____
☐Boat Slip length_____ width_____ existing depth_____ proposed depth_____
☐Marina length_____ width_____ existing depth_____ proposed depth_____
☐Other-Mooring Basin length_____ width_____ existing depth_____ proposed depth_____

Cubic yards of material to be removed_____ Type of material_____
Location of spoil disposal area_____
Dimensions of spoil area_____ Method of excavation_____
How will excavated material be contained?_____

Construction of structures

☐Bulkhead Total length_____ Height above water_____
☐Pier length_____ width_____ height_____
☐Boat Ramp length_____ width_____ slope_____
☐Boat House length_____ width_____ height_____

☐Structures on designed sites for water dependent industry (Coastal area only). Explain in item 11 or include as attachment.
☐Other (explain)_____

Filling

Dimensions of fill area_____
Cubic yards of fill_____ Type of fill_____

Other regulated activities (i.e. Seismic exploration, burning or clearing of marsh) Explain.

_____
_____
_____
_____

6. **Additional information relating to the proposed activity**

Does project area contain any marsh vegetation? Yes ☐ No ☐

(If yes, explain)_____

Is any portion of the activity for which authorization is sought now complete? Yes ☐ No ☐

(If yes, explain)_____

Month and year activity took place_____

If project is for maintenance work on existing structures or existing channels, describe legal authorization for the existing work. Provide permit number, dates or other form(s) of authorization._____

Has any agency denied approval for the activity described herein or for any activity that is directly related to the activity described herein?

Yes ☐ No ☐ (If yes, explain)_____

7. **Project schedule**

Proposed start date_____ Proposed completion date_____

Expected completion date (or development timetable) for any projects dependent on the activity described herein._____

8. **Estimated cost of the project**_____

9. **Describe the purpose of this project. Describe the relationship between this project and any secondary or future development the project is designed to support.**_____

Intended use: Private ☐ Commercial ☐ Public ☐ Other (Explain)_____

10. Describe the public benefits of the proposed activity and of the projects dependent on the proposed activity. Also describe the extent of public use of the proposed project.

11. **Narrative Project Description:**

12. Provide the names and addresses of the adjacent property owners. Also identify the property owners on the plan view of the drawing described in Attachment "A". (Attach additional sheets if necessary.)

1. ,

2. ,

13. List all approvals or certifications received or applied for from Federal, State and Local agencies for any structures, construction, discharges, deposits or other activities described in this application. Note that the signature in Item 14 certifies that application has been made to or that permits are not required from the following agencies. If permits are not required, place N/A in the space for Type Approval.

Agency	***Type Approval***	***Application Date***	***Approval Date***
Dept. of Environmental Quality			
Dept. of Marine Resources			
Army Corps of Engineers			
City/County_____			
Other_____			

14. Certification and signatures

Application is hereby made for authorization to conduct the activities described herein. I agree to provide any additional information/data that may be necessary to provide reasonable assurance or evidence to show that the proposed project will comply with the applicable state water quality standards or other environmental protection standards both during construction and after the project is completed. I also agree to provide entry to the project site for inspectors from the environmental protection agencies for the purpose of making preliminary analyses of the site and monitoring permitted works. I certify that I am familiar with and responsible for the information contained in this application, and that to the best of my knowledge and belief, such information is true, complete and accurate. I further certify that I am the owner of the property where the proposed project is located or that I have a legal interest in the property and that I have full legal authority to seek this permit.

U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willingly falsifies, conceals, or covers up by any trick, scheme or device a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than five years, or both.

Mississippi Coastal Program (Coastal area only)

I certify that the proposed project for which authorization is sought complies with the approved Mississippi Coastal Program and will be conducted in a manner consistent with the program.

_____ _____

Signature of Applicant or Agent Date

15. Fees

Payable to MS Dept. of Marine Resources
$50.00 Single-family residential application fee
$500.00 Commercial application fee
Public notice fee may be required

Please include appropriate fees for all projects proposed in coastal areas of Hancock, Harrison and Jackson Counties.

16. If project is in Hancock, Harrison or Jackson Counties, send one completed copy of this application form and appropriate fees listed in Item 15 to:

Department of Marine Resources
Bureau of Wetlands Permitting
1141 Bayview Avenue
Biloxi, MS 39530
(228) 374-5000

If project <u>IS NOT</u> in Hancock, Harrison or Jackson Counties, send one completed copy of this application form to each agency listed below:

District Engineer
Mobile District
Attn: CESAM-RD
P.O. Box 2288
Mobile, AL 36628-0001

District Engineer
Vicksburg District
Regulatory Branch
Attn: CEMVK-OD-F
4155 Clay Street
Vicksburg, MS 39183-3435

Director
Mississippi Dept. of Environmental Quality
Office of Pollution Control
P.O. Box 10385
Jackson, MS 39289

17. In addition to the completed application form, the following attachments are required:

Attachment "A" Drawings

Provide a vicinity map showing the location of the proposed site along with a written description of how to reach the site from major highways or landmarks. Provide accurate drawings of the project site with proposed activities shown in detail. All drawings must be to scale or with dimensions noted on drawings and must show a plan view and cross section or elevation. Use 8 1/2 x 11" white paper or drawing sheet attached.

Attachment "B" Authorized Agent

If applicant desires to have an agent or consultant act in his behalf for permit coordination, a signed authorization designating said agent must be provided with the application forms. The authorized agent named may sign the application forms and the consistency statement.

Attachment "C" Environmental Assessment *(Coastal Area Only)*

Provide an appropriate report or statement assessing environmental impacts of the proposed activity and the final project dependent on it. The project's effects on the wetlands and the effects on the life dependent on them should be addressed. Also provide a complete description of any measures to be taken to reduce detrimental offsite effects to the coastal wetlands during and after the proposed activity. Alternative analysis, minimization and mitigation information may be required to complete project evaluation.

Attachment "D" Variance or Revisions to Mississippi Coastal Program *(Coastal area only)*

If the applicant is requesting a variance to the guidelines in Section 2, Part III or a revision to the Coastal Wetlands Use Plan in Section 2, Part IV of the Rules, Regulations, Guidelines and Procedures of the Mississippi Coastal Program, a request and justification must be provided.

Attachment "A" Drawings

APPENDIX D

MISSISSIPPI DEPARTMENT OF TRANSPORTION (MDOT) FORM ENV-160-LPA

ENV-160-LPA
Rev. 10/2016

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL DIVISION
ENVIRONMENTAL CLASS OF ACTION DETERMINATION (LPA)

DISTRICT NO.:		F.A. NO. (EXTERNAL):		7. SUBMITTED BY:	
FMS PROJ. NO.:		HIGHWAY / ROUTE:		◯ MAYOR ◯ CONSULTING ENGINEER	
SECTION NO.:	*NA*	COUNTY:		◯ CITY OR COUNTY ENGINEER	

STIP REVIEWED ☐	RE-EVALUATION STATUS ☐	GOLD SHEET COMMITMENTS ☐	PROGRAMMATIC AGREEMENT ☐

1. PROJECT TERMINI:

(A.) EXISTING CONDITIONS:

(B.) PROPOSED IMPROVEMENTS:

(C.) PRELIMINARY PURPOSE & NEED:

(D.) NEW ROW REQUIRED: YES ◯ NO ◯

SUBMITTED AND APPROVED BY	DATE
DISTRICT ENGINEER	DATE
PLANNING ENGINEER	DATE
ENVIRONMENTAL ENGINEER\ADMINISTRATOR	DATE
8. FHWA CONCURRENCE: FHWA DIVISION ADMINISTRATOR	DATE
9. RE-EVALUATION APPROVAL Approved (FHWA Memo August 26, 2002)	DATE

2. ENVIRONMENTAL CONSEQUENCES EVALUATION (CHECK ONE)	SIGN.	MIN.	NONE	COMMENTS IDENTIFYING ISSUES WHICH MAKE IMPACT SIGNIFICANT OR MINIMAL
A. LAND USE IMPACTS	◯	◯	◯	
B. FARMLAND IMPACTS	◯	◯	◯	
C. SOCIAL / ENVIRONMENTAL JUSTICE IMPACTS	◯	◯	◯	
D. RELOCATION IMPACTS	◯	◯	◯	
E. ECONOMIC IMPACTS	◯	◯	◯	
F. JOINT DEVELOPMENT	◯	◯	◯	
G. CONSIDERATIONS RELATING TO PEDESTRIANS & BICYCLISTS	◯	◯	◯	
H. AIR QUALITY / CLIMATE CHANGE RELATED IMPACTS	◯	◯	◯	
I. NOISE IMPACTS	◯	◯	◯	
J. WATER QUALITY IMPACTS	◯	◯	◯	
K. PERMITS	◯	◯	◯	
L. WETLAND/STREAM IMPACTS	◯	◯	◯	
M. WATER BODY MODIFICATION & WILDLIFE IMPACTS	◯	◯	◯	
N. FLOODPLAIN IMPACTS	◯	◯	◯	
O. WILD & SCENIC RIVERS	◯	◯	◯	
P. COASTAL BARRIERS	◯	◯	◯	
Q. COASTAL ZONE IMPACTS	◯	◯	◯	
R. THREATENED OR ENDANGERED SPECIES	◯	◯	◯	
S. HISTORIC & ARCHAEOLOGICAL PRESERVATION / 4(f) LANDS	◯	◯	◯	
T. HAZARDOUS WASTE SITES	◯	◯	◯	
U. VISUAL IMPACTS	◯	◯	◯	
V. ENERGY	◯	◯	◯	
W. CONSTRUCTION IMPACTS	◯	◯	◯	
	◯	◯	◯	

3. PUBLIC INVOLVEMENT RECOMMENDATIONS:

4. ACTIONS REQUIRED:

CATEGORICAL EXCLUSION ☐		106 CONSULTATION ☐		ENDANGERED SPECIES ASSESSMENT ☐			
EA/FONSI ☐	EIS ☐	NOISE STUDY ☐		SHPO LETTER ☐		4(f) STATEMENT ☐	
CLASS DETERMINATION:							

5. WETLANDS/STREAMS FINDING (CEX ONLY):

6. OTHER REMARKS: