

June 27, 2014

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City of Lewes
Lewes Planning Commission
P.O. Box 227
Lewes, DE 19958

RE: PLUS Review 2014-05-03, Harbor Point

Dear Chairman Mahaffie and Members of the Lewes Planning Commission:

On behalf of the Developer, Jack Lingo Asset Management, LLC, we are providing a written response to the P.L.U.S. comments received on June 25, 2014. We would like to clarify that we are seeking a subdivision review for the development of 69 residential units on 108 acres in Sussex County under the purview of the City of Lewes. Harbor Point is in the annexation process and one of the requirements for annexation is Preliminary Consent from the Lewes Planning Commission. The project as presented to P.L.U.S. complies with the regulations / restrictions set forth by the City of Lewes.

The conceptual plan under review by the Lewes Planning Commission is the same plan that was reviewed by P.L.U.S. Addressing all of the comments made during P.L.U.S. is not possible until final engineering is complete and construction drawings are prepared. The conceptual plan was prepared with a conceptual design as it relates to stormwater and grading and preliminary consent is not final approval as more detailed work is still required.

We would also like to note for the Lewes Planning Commission that P.L.U.S. previously reviewed the project when the project was first submitted to Sussex County and the Developer provided a revised response when the preliminary consent application was filed with the City of Lewes. We further note, that most of these comments are the same as the original review with some new information provided by DelDOT, DNREC and SHPO based on information supplied by the Developer. The proposed subdivision meets both Sussex County and City of Lewes standards which is why the P.L.U.S. comments have been interchangeable.

We offer our response to the State Comments. The original comments are italicized and the response is in red.

Strategies for State Policies and Spending

- *This project is located in Investment Level 3 according to the Strategies for State Policies and Spending. This site is also located in the Sussex County Growth Zone. Investment Level 3 reflects areas where growth is anticipated by local, county, and state plans in the longer term future, or areas that may have environmental or other constraints to development. State investments may support future growth in these areas, but please be advised that the State has other priorities for the near future. The State encourages you to design the site with respect for the environmental features which are present.*

We acknowledge that a portion of the project is located in Investment Level 1 with the remainder located in Investment Level 3. The project is designed with respect for the environmental features of the site clustering homes on the upland portion of the project, preserving all existing trees and woodlands and providing a voluntary 50' buffer from all federal wetlands.

Code Requirements/Agency Permitting Requirements

State Historic Preservation Office – Contact Terrence Burns 736-7404

- *Since SHPOs initial review of this PLUS project (then under the name “Point Farm”) in 2013, additional information has come to light concerning previous cultural resource investigations of the project area. SHPO has confirmed that there are recorded archaeological sites within the area proposed for development. Further discussion is needed to fully assess the findings of these investigations and their implications for the development’s impacts on cultural resources.*

Davis, Bowen & Friedel, Inc. was contacted by SHPO regarding additional information that became available after the first P.L.U.S. review. Our office met with Gwen Davis to obtain the additional information to further evaluate the impacts of the site. This information was shared with Dr. Ed Otter, from Edward Otter, Inc. in completing a Phase 1 investigation of the site. This information was reviewed and referenced by Dr. Otter in the Phase I report.

- *As described in a 1965 report, an earlier archaeological survey recovered Native American artifacts from several locations on the parcel; SHPO has assigned an archaeological site number (S12268, 7S-D-096) to this area. Subsequent work conducted in the early 1990s found additional such material, as well as historic period artifacts. At that time, the investigator apparently considered these finds to be part of a known archaeological site – called the Russell Site (S00527, 7S-D-007) – located to the south. The investigator also identified another site with both*

Native American and historic period artifacts. A section of the Beebe Site (S-9146, 7S-D-073), which was investigated in the late 1990s for the Canary Creek development, extends into the subject area. Both the Russell and Beebe Sites have been determined eligible for listing in the National Register of Historic Places.

Davis, Bowen & Friedel, Inc. obtained information about the sites identified above to include the 1965 Salwen report and the Archaeological Study performed for Canary Creek. This information was passed onto Dr. Otter for his use during the Phase I investigation. This information was reviewed and referenced by Dr. Otter in the Phase I Report.

- *Recently, another investigation was conducted, apparently on behalf of the applicant. Our preliminary review of the report indicates that the work included a summary of previous findings, further research on the history of the parcel, and a field survey. Scattered Native American and historic period artifacts were found on the parcel. The investigator concluded that these finds were not significant. SHPO has several questions about some aspects of this work. At this point, there is not sufficient information to concur with the report's conclusion. SHPO will provide the applicant with more detailed comments on the report for consideration.*

Dr. Ed Otter from Edward Otter, Inc. completed a Phase I investigation on behalf of the Developer. The report was not formally submitted to SHPO by the Developer and thanks SHPO for their review of the report. The Developer has not received detailed comments from SHPO at the time of the P.L.U.S. review and date of these comments.

- *It must be noted that all of the archaeological investigations, including the most recent one, conducted on the parcel to date are considered reconnaissance-level work, consisting primarily of surface inspections. This level of work is often sufficient to identify sites, but is not designed to fully assess their boundaries or significance. Based on the information available, it does not appear that the area has been subject to sufficient sub-surface testing to identify intact archaeological features below the plow level. Such features may include unmarked human remains. The potential for burials to be present on the subject parcel must be taken seriously, considering that the Russell Site proper, just south of this area, did have a burial. Therefore, SHPO reiterates its previous cautions to the applicant concerning Chapter 54 of Title 7 of the Delaware Code, which pertains to Delaware's Unmarked Human Burials and Human Skeletal Remains Law, and request further consultation with the applicant on this matter.*

Abandoned or unmarked family cemeteries are very common in the State of Delaware. They are usually in rural or open space areas, and sometimes near or within the boundary of an historic farm site. Even a marked cemetery can frequently have unmarked graves or burials outside of the known boundary line or limit. Disturbing unmarked graves or burials triggers the Delaware's Unmarked Human Burials and Human Skeletal Remains Law ([Delaware Code Title 7, Chapter 54](#)), and such remains or discoveries can result in substantial delays while the procedures required under this law are carried out. If there is a discovery of any unmarked graves, burials or a cemetery, it is very costly to have them archaeologically excavated and the burials moved. In the event of such a discovery, the Division of Historical & Cultural Affairs also recommends that the plans be re-drawn to leave the full extent of the cemeteries or any burials on its own parcel or in the open space area of the development, with the responsibility for its maintenance lying with the landowner association or development. If you would like more information pertaining to unmarked human remains or cemeteries, please check the following websites for additional information: www.history.delaware.gov/preservation/umhr.shtml and www.history.delaware.gov/preservation/cemeteries.shtml.

We acknowledge that all of the investigations completed to date are for reconnaissance purposes with limited subsurface exploration. The Developer is aware of Delaware's Unmarked Human Burials and Human Skeletal Remains Law. We thank the Office for providing the websites with additional information.

- If there is any federal involvement with the project, in the form of licenses, permits, or funds, the federal agency, often through its client, is responsible for complying with Section 106 of the National Historic Preservation Act (36 CFR 800) and must consider the project's effects on any known or potential cultural or historic resources. Owners and developers who may plan to apply for an Army Corps of Engineers permit or for federal funding, such as HUD or USDA grants, should be aware of the National Historic Preservation Act of 1966 (as amended). Regulations promulgated for Section 106 of this Act stipulate that no ground-disturbing or demolition activities should take place before the Corps or other involved federal agency determines the area of potential effect of the project undertaking. These stipulations are in place to allow for comment from the public, the Delaware State Historic Preservation Office, and the Advisory Council for Historic Preservation about the project's effects on historic properties. Conducting construction activities without adherence to these stipulations may jeopardize the issuance of any federal permit or funds. If you need further information or additional details pertaining to the Section 106 process and the Advisory Council's role, please review the Advisory Council's website at www.achp.gov.*

Federal involvement is not anticipated for this project. If there is, we are aware and will comply with the Section 106 requirements.

SHPO requests further consultation with the applicant and their archaeological consultant, to clarify aspects of the recent survey and discuss the potential need for further investigation or monitoring. At a minimum, SHPO recommends that the area of the Beebe Site be avoided, with no grading or ground-disturbance in that part of the parcel.

The Developer will contact SHPO to set up a meeting to review the report and further discussion of the project. The meeting will be scheduled prior to commencing design of the project. The only grading and land disturbance near the Beebe Site preliminarily proposed is for the construction of a drainage swale for the project. The grading can be re-evaluated during the design development of the project to further mitigate grading or land disturbance near the Beebe Site.

Department of Transportation – Contact Bill Brockenbrough 760-2109

- *The proposed development meets DelDOT's volume-based criteria, found in Section 2.3.2 of the Standards and Regulations for Subdivision Streets and State Highway Access, for recommending that a Traffic Impact Study (TIS) be required (400 vehicle trips per day or 50 vehicle trips per hour). The developer's engineer submitted a TIS on March 7, 2014 and they provided comments on March 27, 2014. A copy of that letter is enclosed.*

The Developer has received a copy of the Final TIS letter from DelDOT.

- *Presently, Park Road is maintained by the City of Lewes from New Road to Samantha Drive and by the Department of Natural Resources and Environmental Control (DNREC) from Samantha Drive to Pilottown Road. DNREC has a project to improve part of the section they maintain, from the causeway to Pilottown Road. As DelDOT understands it, the developer seeks to have maintenance responsibility for Park Road between Samantha Drive and the causeway transferred to DelDOT and to improve the road to DelDOT standards. DelDOT expects the City of Lewes to request responsibility for Park Road from New Road to the causeway, and also from the causeway to Pilottown Road, once the road is improved. The following comments assume that the transfer of maintenance responsibility from DNREC will occur:*

The Developer has reviewed the above comment. The Developer will improve Park Road from Samantha Drive to the causeway to meet DelDOT standards with the City of Lewes ultimately responsible for the maintenance between New Road and the Causeway. The additional maintenance noted above is a discussion that

needs to occur between the City and DelDOT and has no bearing on this application.

- *The site entrance must be designed in accordance with DelDOT's Standards and Regulations for Subdivision Streets and State Highway Access, which is available at http://www.deldot.gov/information/pubs_forms/manuals/subdivisions/pdf/Subdivision_Manual_Revision_1_proposed_060110.pdf.*

Further in this regard, please be advised that DelDOT has advertised for comment a comprehensive revision of the Standards and Regulations. The comment period runs through June 30 and DelDOT could adopt this revision as soon as August 2014. Implementation guidance has not been developed but DelDOT recommend that the developer's engineer become familiar with the proposed changes and assess whether any of them could be relevant to this project. Information on the proposed revision is available in the Register of Regulations and at http://www.deldot.gov/information/pubs_forms/revisions_to_ASR/index.shtml.

We acknowledge that the entrance onto Park Road must conform to DelDOT requirements and are familiar with the process and design requirements. We also acknowledge that the Subdivision regulations are currently under review and are reviewing them as part of the public process.

- *In accordance with 17 Del. Code §132, the design and construction of the improvements to Park Road would be subject to DelDOT's review and inspection.*

The improvements to Park Road must be designed in accordance with DelDOT's Road Design Manual and Design Guidance Memoranda, which are, respectively, available at http://www.deldot.gov/information/pubs_forms/manuals/road_design/index.shtml and http://www.deldot.gov/information/pubs_forms/manuals/dgm/index.shtml.

More specifically, Park Road must meet DelDOT standards for Local Roads, including 11-foot wide travel lanes, 5-foot wide shoulders and an overlay of the entire pavement width to provide an adequate pavement section.

Park Road will be designed to meet Local Road Standards and will be reviewed and inspected by DelDOT. The same process used for Park Road during the Canary Creek project will be used for this section of roadway. Our office has had preliminary conversations with Jim Osborne in DelDOT's South District.

- In accordance with Section 3.6.4 of the Standards and Regulations for Subdivision Streets and State Highway Access, DelDOT will require the applicant to furnish and place right-of-way monuments along Park Road between Samantha Drive and the causeway. DelDOT recommends that monuments be furnished and placed along the subdivision street rights-of-way as well.

Right-of-way monuments along Park Road will be provided by the Developer in accordance with DelDOT. Monuments within the Subdivision will be installed in accordance with the City of Lewes standards.

- *In accordance with Section 5.4 of the Standards and Regulations for Subdivision Streets and State Highway Access, a sight distance triangle is required for the site entrance and shall be established in accordance with American Association of State Highway and Transportation Officials (AASHTO) standards. A spreadsheet has been developed to assist with this task. It can be found at*

<http://www.deldot.gov/information/business/subdivisions/Intersection-Sight-Distance.xls>.

The sight triangle distance will be calculated using the spreadsheet and the sight triangle will be shown on the Record Plat and entrance plans.

- *In accordance with Section 3.4 of the Standards and Regulations for Subdivision Streets and State Highway Access, a site plan shall be prepared prior to issuing "Letter of No Objection". The following information will be required for the "Letter of No Objection" review:*
 - *Copy of the Initial Stage Fee Calculation Form*
 - *Copy of the Initial Stage Review Fee*
 - *Gate-Keeping Checklist – Site Plan*
 - *Design Checklist – Record Plan**
 - *Owners and Engineer's name and e-mail address*
 - *Three (3) paper sets of the Record Plan*
 - *Conceptual Entrance Plan*
 - *CD with a pdf of the Site Plan*

**For the design checklist for the site plan, please refer to the Standards and Regulations for Subdivision Streets and State Highway Access, Appendix D, Plan Review Checklist, pages D-2 and D-3.*

A Record Plat will be prepared meeting the requirements outlined above to include all fees, checklists, computations and supporting documentation.

- *Referring to Section 4.4 of the Standards and Regulations for Subdivision Streets and State Highway Access, an entrance plan shall be prepared prior to issuing entrance approval. The following information will be required for Entrance Plan review;*
 - *Copy of the Construction Stage Fee Calculation Form*
 - *Copy of the Construction Review Fee*
 - *Gate-Keeping Checklist – Entrance Plan*
 - *Design Checklist – Entrance Plan***
 - *Three (3) paper sets of the Entrance Plan*
 - *SWM Report and Calculations (if applicable)*
 - *CD with a pdf of the Entrance Plan*

***For the design checklist for the entrance plan, please refer to the Standards and Regulations for Subdivision Streets and State Highway Access, Appendix D, Plan Review Checklist, pages D-9 and D-13.*

The entrance plan and Park Road Improvement plans will be prepared meeting the requirements outlined above to include all fees, checklists, computations and supporting documentation.

Department of Natural Resources and Environmental Control – Contact Bahareh Van Boekhold 735-3495

Wetlands

- *State regulated wetlands do not appear to be directly impacted on this portion of the property based on a review of the State wetland maps. However, DNREC recommends a Jurisdictional Determination to be sure wetlands are not physically impacted. Also, a review of County setback requirements regarding wetlands will be necessary.*

A wetlands investigation was completed by Environmental Resources, Inc. The State wetlands do not extend beyond the Section 404 wetlands. Environmental Resources, Inc. submitted a jurisdictional determination to the U.S. Army Corps of Engineers for a jurisdictional determination. The State wetlands as shown on State Wetland Map 85 are shown on the preliminary plan submitted to P.L.U.S. The project is currently being reviewed by the City of Lewes. The City of Lewes Code does not require setbacks from State or Federal Wetlands. The Developer is providing a voluntary 50' buffer from Federal Wetlands of which 25' will be completely undisturbed.

- *State regulated wetlands are those wetlands identified on the State's official State Regulated Wetland Maps. State regulated wetlands are located adjacent to this property based on a review of the State wetland maps. Please refer to State Wetland map number 85. Any activity in State regulated wetlands may require a permit from DNREC's Wetlands and Subaqueous Lands Section. There are lots on this parcel that are very close to the mapped wetland line; therefore, any construction in this area should remain clear of impacting the wetlands.*

The State wetlands located on this property and adjacent to the developable lands are shown on the Preliminary Plan as delineated on Map 85. The Developer does not propose any activity at this time in lands regulated by the State. Reinforced or Super silt fence will be used to delineate the limit of disturbance to prevent impacts to the wetlands.

- *State regulated subaqueous lands are likely to be located adjacent to this property based on a review of aerial photographs, SWMP maps, Soil Surveys and USGS topographic maps. An on-site inspection by a representative of the Wetlands and Subaqueous Lands Section or an environmental consultant is recommended to determine the limits of jurisdictional State subaqueous lands.*

Environmental Resources, Inc. completed a wetlands delineation of the project. The limits of the state subaqueous lands do not extend past the federal wetlands. A voluntary undisturbed 25' buffer is provided from federal wetland along with an

additional voluntary 25' buffer after construction for a total amount of 50' from federal wetlands.

Flood Plain and Sea Level Rise

- *A significant portion of the planned development area (including homes and access roads) lies within the mapped 1% and 0.2% annual chance flood zone as mapped by FEMA on the effective Flood Insurance Rate Maps (FIRMs). These FIRMs have been recently updated by FEMA, are currently preliminary, and will become effective in 2015. The updated preliminary FIRMs indicate that the base flood elevation has been reduced, however more of the property has been mapped as a Special Flood Hazard Area, prone to flooding.*

Davis, Bowen & Friedel, Inc. has reviewed the current FIRM and the proposed FIRM. We concur with the statement that the base flood elevation is being reduced but more of the parcel will be included in the SFHA. Development within SFHA is permitted by both FEMA and the City of Lewes. The roads will be designed to be located at or above the base flood elevation. Home construction will consist of slab on grade construction or with crawl spaces. The crawl space elevation will be designed so that the elevation of the crawl space will be at or above the base flood elevation. We will use the current base flood elevation for the design of the site. This will allow for freeboard using the new base flood elevation that will make the project sustainable in the future. The Developer and / or Homeowners have the option to file Letters of Map Amendments upon completion of construction to remove portions of the project from the SFHA.

- *In addition, a significant portion of the planned development area lies within an area that will be subject to direct and permanent inundation from sea level rise. Sea levels in Lewes have risen by about a foot over the past century; this rate of sea level rise is likely to accelerate in the coming decades as a result of global climate change and local subsidence. Accelerated sea level rise will result in permanent flooding of low-lying coastal areas and increased risk of flood damage during storms.*

We will use the current base flood elevation (elevation 10) for the design of the site. This will allow for freeboard using the new base flood elevation (elevations 9 and 8) that will make the project sustainable in the future and provides additional freeboard for sea level rise.

- *State maps depicting future inundation risk from sea level rise indicate that approximately half of the upland portion of this site could be inundated by sea level rise by 2100. In the short-term, sea level rise on this parcel, combined with periodic coastal flooding events, may result in repetitive flood damage to homes within this*

neighborhood and significant difficulties maintaining stormwater and drainage infrastructure. In the long-term, this increased flood and inundation risk could result in costly public and private flood abatement and drainage projects and an eventual abandonment of homes.

Davis, Bowen, & Friedel, Inc. has reviewed the state map showing future inundation risk from sea level rise. The map includes various caveats as to how they were developed and possible inundation depths from 1.64 feet to 4.92'. The areas that will not be inundated are those areas that have an existing elevation 8 or higher. The proposed design will raise the site so that roadways and lot elevations are greater than elevation 10. This would make the project sustainable for sea level rise and SFHA by providing freeboard for the future.

- *The proposed access road is also located within a mapped floodplain and mapped future sea level rise area. If built at grade, this road will be subject to periodic and increasing flood risk, potentially resulting in evacuation issues for residents and town emergency managers.*

Recommendations:

- *Lots within flood prone areas should be eliminated.*

Removing lots from the flood prone areas would cause the project to become non-existent. Our office has reviewed the existing and proposed flood maps as well as the sea level rise maps. This project can be built within flood prone areas according to FEMA and the Code of the City of Lewes.

- *Any structure built within a mapped floodplain should be constructed with 18" of freeboard. Any structures that are built within an area mapped as both floodplain and sea level rise zone should be constructed with 18" of freeboard plus additional freeboard to accommodate future sea levels.*

The project will use the proposed flood maps to delineate which properties are located within the SFHA. However, the design will use the current base flood elevation to design the roads and structures that will provide freeboard in the future while making the subdivision sustainable. Additional freeboard for the structures is limited by how building height is defined in the Code of City of Lewes. The building height is measured from the centerline of the roadway which does not lend itself to providing freeboard without limited the actual height of a residential unit.

- *Access roads should be designed to be flood resilient for the entirety of its design life span. This includes ensuring that the roadway functions for the 1% chance flood plus anticipated future sea level rise.*

The access road will be elevated to the maximum extent practicable that will allow it to tie-in to Park Road and the surrounding elevations without disturbing trees and / or wetlands.

Sea Level Rise maps for the state area available online: <http://de.gov/slrmap>
FIRM maps for Sussex County are also available online:
<http://maps.riskmap3.com/DE/sussex/>

TMDLs

- *The project is located in the greater Delaware River and Bay drainage area, specifically within the Broadkill River watershed. The TMDL for the Broadkill River watershed calls for a 40% reduction in nitrogen and phosphorus from baseline conditions. The TMDL also calls for a 75% reduction in bacteria from baseline conditions.*

The project is utilizing filtration practices to meet the TMDL requirements and will be reviewed as part of the Sussex Conservation District stormwater review and approval.

- *A nutrient management plan is required under the Delaware Nutrient Management law (3 Del. Chapter 22) for all persons or entities who apply nutrients to lands or areas of open space in excess of 10 acres. This project's open space may exceed this 10-acre threshold. Please contact the Delaware Nutrient Management Program at 739-4811 for further information concerning compliance requirements or view the following web link for additional information:
<http://dda.delaware.gov/nutrients/index.shtml>*

The Developer will contact the Delaware Nutrient Management Program if they intend to apply nutrients on over 10 acres of open space.

Water Supply

- *The project information sheets state water will be provided to the project by the City of Lewes Board of Public Works via a public water system. Our records indicate that the project is located within the public water service area granted to Lewes Board of Public Works under Certificate of Public Convenience and Necessity 01-CPCN-07.*

The Board of Public Works has provided the Developer with a willing and able letter. A water main was extended to this project for future connection.

- *Should dewatering points be needed during any phase of construction, a dewatering well construction permit must be obtained from the Water Supply Section prior to construction of the well points. In addition, a water allocation permit will be needed if the pumping rate will exceed 50,000 gallons per day at any time during operation.*

The contractor will apply for dewater permits should they be needed during construction.

- *All well permit applications must be prepared and signed by licensed water well contractors, and only licensed well drillers may construct the wells. Please factor in the necessary time for processing the well permit applications into the construction schedule. Dewatering well permit applications typically take approximately four weeks to process, which allows the necessary time for technical review and advertising*

The well permit applications will be prepared and signed by a licensed well contractor. The contractors are aware of the timeframe to obtain the permits.

Sediment and Stormwater Program

- *A detailed sediment and stormwater plan will be required prior to any land disturbing activity taking place on the site. Contact the reviewing agency to schedule a project application meeting to discuss the sediment and erosion control and stormwater management components of the plan as soon as practicable. The site topography, soils mapping, pre- and post- development runoff, and proposed method(s) and location(s) of stormwater management should be brought to the meeting for discussion. The plan review and approval as well as construction inspection will be coordinated through the Sussex Conservation District. Contact Jessica Watson at the Sussex Conservation District at (302) 856-2105 for details regarding submittal requirements and fees.*

Davis, Bowen & Friedel, Inc. conducted a pre-application meeting with the District and will comply with all Sediment and Stormwater Rules and Regulations. The plans, calculations, applications and fees will be prepared meeting the Sussex Conservation District Requirements.

Hazardous Waste Sites

- *If it is determined by the Department that there was a release of a hazardous substance on the property in question and the Department requires remediation pursuant to the Hazardous Substance Cleanup Act, the provisions of 7 Del.C.,*

Chapter 91, Delaware Hazardous Substance Cleanup Act and the Delaware Regulations Governing Hazardous Substance Cleanup shall be followed.

A transaction screen was performed when the Owner originally purchased the property and nothing significant was found. Hazardous wastes have not been located or disposed of on-site while owned by the current owner. The Developer will comply with this requirement should remediation be required if a release has been determined.

Air Quality

- *The applicant shall comply with all applicable Delaware air quality regulations. Please note that the following regulations in Table 1 – Potential Regulatory Requirements may apply to your project:*

<i>Table 1: Potential Regulatory Requirements</i>	
<i>Regulation</i>	<i>Requirements</i>
<i>7 DE Admin. Code 1106 - Particulate Emissions from Construction and Materials Handling</i>	<i>Use dust suppressants and measures to prevent transport of dust off-site from material stockpile, material movement and use of unpaved roads.</i> <i>Use covers on trucks that transport material to and from site to prevent visible emissions.</i>
<i>7 DE Admin. Code 1113 – Open Burning</i>	<i>Prohibit open burns statewide during the Ozone Season from May 1-Sept. 30 each year.</i> <i>Prohibit the burning of land clearing debris.</i> <i>Prohibit the burning of trash or building materials/debris.</i>
<i>7 DE Admin. Code 1135 – Conformity of General Federal Actions to the State Implementation Plan</i>	<i>Require, for any “federal action,” a conformity determination for each pollutant where the total of direct and indirect emissions would equal or exceed any of the de minimus levels (See Section 3.2.1)</i>
<i>7 DE Admin. Code 1141 – Limiting Emissions of Volatile Organic Compounds from Consumer and Commercial Products</i>	<i>Use structural/ paint coatings that are low in Volatile Organic Compounds.</i> <i>Use covers on paint containers when paint containers are not in use.</i>

7 DE Admin. Code 1144 – Control of Stationary Generator Emissions	<i>Ensure that emissions of nitrogen oxides (NO_x), non-methane hydrocarbons (NMHC), particulate matter (PM), sulfur dioxide (SO₂), carbon monoxide (CO), and carbon dioxide (CO₂) from emergency generators meet the emissions limits established. (See section 3.2).</i> <i>Maintain recordkeeping and reporting requirements.</i>
7 DE Admin. Code 1145 – Excessive Idling of Heavy Duty Vehicles	<i>Restrict idling time for trucks and buses having a gross vehicle weight of over 8,500 pounds to no more than three minutes.</i>

For a complete listing of all Delaware applicable regulations, please look at our website: <http://www.awm.delaware.gov/AQM/Pages/AirRegulations.aspx>.

The Developer will comply with all applicable Air Quality Regulations as they apply to the development of the project.

Delaware State Fire Marshall's Office – Contact Duane Fox 739-4394

At the time of formal submittal, the applicant shall provide; completed application, fee, and three sets of plans depicting the following in accordance with the Delaware State Fire Prevention Regulation:

- ***Fire Protection Water Requirements:***
 - *Where a water distribution system is proposed for single-family dwellings it shall be capable of delivering at least 500 gpm for 1-hour duration, at 20-psi residual pressure. Fire hydrants with 1000 feet spacing on centers are required.*
 - *The infrastructure for fire protection water shall be provided, including the size of water mains.*

The project will be designed meeting the requirements for fire flow and spacing and all water main sizes will be provided.

- ***Accessibility:***
 - *All premises, which the fire department may be called upon to protect in case of fire, and which are not readily accessible from public roads, shall be provided with suitable gates and access roads, and fire lanes so that all*

buildings on the premises are accessible to fire apparatus. This means that the access road to the subdivision from the main thoroughfare must be constructed so fire department apparatus may negotiate it. If a "center island" is placed at an entrance into the subdivision, it shall be arranged in such a manner that it will not adversely affect quick and unimpeded travel of fire apparatus into the subdivision.

- *Fire department access shall be provided in such a manner so that fire apparatus will be able to locate within 100 ft. of the front door.*
- *Any dead end road more than 300 feet in length shall be provided with a turn-around or cul-de-sac arranged such that fire apparatus will be able to turn around by making not more than one backing maneuver. The minimum paved radius of the cul-de-sac shall be 38 feet. The dimensions of the cul-de-sac or turn-around shall be shown on the final plans. Also, please be advised that parking is prohibited in the cul-de-sac or turn around.*
- *The local Fire Chief, prior to any submission to our Agency, shall approve in writing the use of gates that limit fire department access into and out of the development or property.*
- *The use of speed bumps or other methods of traffic speed reduction must be in accordance with Department of Transportation requirements.*

The project will not use gates or speed bumps within the project. Access to the front of the houses will be provided as requested and the cul-de-sac will be designed to meet the turnaround requirements as listed in the Fire Prevention Regulations.

- ***Gas Piping and System Information:***

- *Provide type of fuel proposed, and show locations of bulk containers on plan.*

This information will be shown or noted on the Record Plat and / or Water Distribution / Fire Protection plans.

- ***Required Notes:***

- *Provide a note on the final plans submitted for review to read " All fire lanes, fire hydrants, and fire department connections shall be marked in accordance with the Delaware State Fire Prevention Regulations"*
- *Name of Water Supplier*
- *Proposed Use*

- *National Fire Protection Association (NFPA) Construction Type*
- *Maximum Height of Buildings (including number of stories)*
- *Provide Road Names, even for County Roads*

All notes to include road names will be shown on the Water Distribution / Fire Protection Plans.

Recommendations/Additional Information

*This section includes a list of site specific suggestions that are intended to enhance the project. These suggestions have been generated by the State Agencies based on their expertise and subject area knowledge. **These suggestions do not represent State code requirements.** They are offered here in order to provide proactive ideas to help the applicant enhance the site design, and it is hoped (**but in no way required**) that the applicant will open a dialogue with the relevant agencies to discuss how these suggestions can benefit the project.*

Department of Transportation – Contact Bill Brockenbrough 760-2109

- *Because the proposed development would generate more than 200 vehicle trips per day, the developer should expect a Pre-Submittal Meeting to be required before of plans are submitted for review. Guidance on what will be covered at this meeting and how to prepare for is located at http://www.deldot.gov/information/business/subdivisions/Pre-Submittal_Meeting_Requirements.doc. The form needed to request this meeting is available at http://www.deldot.gov/information/business/subdivisions/Meeting_Request_Form.doc.*

Davis, Bowen & Friedel, Inc. will conduct a Pre-Submittal meeting with Mr. John Fiori.

- *DelDOT's Shared-Use Path and/or Sidewalk Process policy (available at http://www.deldot.gov/information/business/subdivisions/SUP_Sidewalk_Process.pdf) requires that a path or sidewalk be installed along the State-maintained road frontage of any development in a Level 1 or 2 Investment area, as defined in the Strategies for State Policies and Spending, and along the State-maintained road frontage of any development in a Level 3 or 4 Investment Area that abuts an existing facility. The policy requires some interpretation in this case in that Harbor Point is in Levels 1 and 3 and while it abuts Canary Creek, neither development directly fronts on the State-maintained road that would provide their access. Nonetheless, the applicant should expect a requirement that they provide a 5-foot wide sidewalk along the south side of Park Road from Samantha Drive to*

the site entrance. DelDOT understands from the applicant that DNREC has already built a 10-foot wide shared use path along the north side of Park Road from Samantha Drive to the beginning of the causeway.

Davis, Bowen & Friedel, Inc. will discuss the sidewalk connection as part of the Pre-Submittal Meeting.

- *Be advised that the standard general notes have been updated and posted to the DelDOT website. Please begin using the new versions and look for the revision date of November 26, 2013. The notes can be found at*

http://www.deldot.gov/information/business/subdivisions/DelDOT_Development_Coordination_Plan_Sheet_Notes.doc

Our office will use the most current notes and regularly checks DelDOT's website for updates.

The applicant should expect a requirement that all PLUS and/or TAC comments be addressed prior to submitting record, subdivision or entrance plans for review.

All P.L.U.S. comments will be addressed prior to submitting the record plat and entrance plans for review. The City of Lewes does not have a TAC process.

Department of Natural Resources and Environmental Control – Contact Bahareh Van Boekhold 735-3495

- ***Soils Assessment***

Based on soils survey mapping update, the Transquaking and Mispillion (TP) soil mapping unit is the main soil mapping unit in the immediate vicinity of the proposed project; DNREC strongly recommends the applicant avoid this mapping unit. TP is a very poorly-drained wetland associated (hydric) soil that is considered to have severe limitations for development (i.e., considered unsuitable). The TP soil mapping unit is indicative of tidal wetland presence.



Figure 1: NRCS soil mapping update in the immediate vicinity of the proposed project

The development of Harbor Point is proposed to be completed on the excessively or somewhat excessively well drained soils. These soils are conducive to the type of development that is proposed for Harbor Point.

Additional information on TMDLs and water quality

- *In response to concerns about the need for reducing nonpoint source nutrient (nitrogen and phosphorus) and bacterial pollutants to levels sufficient to meet the prescribed TMDL reduction requirements in Delaware’s portion of the Broadkill River Basin, a multifaceted and comprehensive process known as a Pollution Control Strategy (PCS) has been developed to enable such reductions. Specifically, a PCS is a combination of best management practices and control technologies that reduce nutrient and bacterial pollutant runoff loading in waters of a given watershed to level(s) consistent with the TMDL(s) reduction levels specified for that watershed. The PCS for the Broadkill River watershed consists of recommendations from the following three areas: Agriculture, stormwater, and wastewater. Additional information about Broadkill River PCS is available from the follow web link: <http://www.dnrec.delaware.gov/swc/wa/Pages/WatershedManagementPlans.aspx>*

Our office has reviewed the Broadkill River TMDL and PCS. The project incorporates Green Technology BMPs (filter strips, bio-retention areas and buffers) along with tree preservation. The project will comply with the TMDL.

- *DNREC strongly encourages the applicant reduce nutrient and bacterial pollutants through voluntary implementation of the following recommended BMPs:*
 - *Based on a review of existing buffer research by Castelle et al. (Castelle, A. J., A. W. Johnson and C. Conolly. 1994. Wetland and Stream Buffer Requirements – A Review. J. Environ. Qual. 23: 878-882.), an adequately-sized buffer that effectively protects wetlands and streams, in most circumstances, is about 100 feet in width. In recognition of this research and the need to protect water quality, the Watershed Assessment Section recommends that the applicant maintain/establish a minimum 100-foot upland buffer (planted in native vegetation) from all water bodies (including ditches) and wetlands (field delineated and approved by the USACE).*

The Developer has considered the request for a 100 foot buffer. A 100 foot buffer would significantly impact the developable area based on the configuration of the property and the lot dimension requirements. The City of Lewes does not require buffers from wetlands. The Developer recognizes the importance of wetlands buffers and voluntarily proposes a 50' buffer of which 25' will be undisturbed. The buffer width varies with some buffer areas extending more than 50'. The back yards and disconnected roof runoff is proposed to discharge through the buffers into the wetlands.

- *Applicant should calculate post-construction surface imperviousness with all forms of created surface imperviousness (e.g., rooftops, driveways, parking lots, sidewalks, open-water storm water management structures, and roads) included in the calculation.*

Our office has preliminarily calculated the post-construction impervious area to be approximately 35% including rooftops, driveways, roads, sidewalks and permanent pool of the pond.

- *The applicant's intention to site an open-water management structure(s) and include it as part of the County's total open space requirements is not considered an acceptable best management practice and is strongly discouraged.*

Stormwater management structure (s) are permitted to be included in the City's total open space requirements. We understand that the proposed open-water structure is strongly discouraged but in this case is part of a larger treatment train

that also acts as an open space amenity. The remainder of the storm water management system uses bio-filtration swales and filter strip practices.

- *DNREC encourages the use of green-technology storm water management (in lieu of open-water management structures) and raingardens as BMPs to reduce nutrient pollutant impacts. Please contact Lara Allison at 739-9939 for further information about siting a raingarden(s) in this parcel.*

The project includes the use of bio-filtration swales, filter strips and wetland buffers to provide water quality. Rain gardens are low impact practices but they are not stand alone practices and are part of a larger treatment train. While there are benefits to rain gardens some of the negatives are the maintenance and inspection of the BMP and how to ensure that homeowners do not remove the rain garden. For this project, if the home builder were to construct rain gardens, there would be at least 69 rain gardens if only used in the front yard and 138 if used in the back yard as well. Rain gardens are just one of numerous BMPs available to treat stormwater, and in this case, the project incorporates other BMPs into the storm water management design.

- *Since this project will create additional impervious surface that will increase the probability for increased pollutant load runoff to adjoining streams and wetlands, DNREC strongly encourages the use of pervious paving materials (instead of conventional asphalt and concrete) to mitigate the negative impacts from pollutant runoff.*

The project is located in an area where there is high groundwater and fill may be required. Pervious paving would require the use of underdrains, because infiltration is not permitted in fill, and would require special maintenance to be performed by the City of Lewes. Pervious pavement for this project while beneficial would not be as beneficial as using other BMPs.

- *DNREC encourages the use of rain gardens, and green-technology storm water management structures (in lieu of open-water management structures) as BMPs to reduce nutrient pollutant impacts.*

The project includes the use of bio-filtration swales, filter strips and wetland buffers to provide water quality. Rain gardens are low impact practices but they are not stand alone practices and are part of a larger treatment train. While there are benefits to rain gardens some of the negatives are the maintenance and inspection of the BMP and how to ensure that homeowner's do not remove the rain garden. For this project, if the home builder were to construct rain gardens, there would be at least 69 rain gardens if only used in the front yard and 138 if

used in the back yard as well. Rain gardens are just one of numerous BMPs available to treat stormwater.

- The applicant should voluntarily assess nutrient and bacterial pollutant loading at the preliminary project design phase. To this end, the Watershed Assessment Section has developed a methodology known as the “Nutrient Load Assessment protocol.” The protocol is a tool used to assess changes in nutrient loading (e.g., nitrogen and phosphorus) that result from the conversion of individual or combined land parcels to a different land use(s), while providing applicants with quantitative information about their project’s impact(s) on baseline water quality. DNREC strongly encourages the applicant/developer use this protocol to help them design and implement the most effective BMPs. Please contact Lyle Jones at 302-739-9939 for more information on the protocol.

Our office is familiar with the Nutrient Load Assessment Protocol and the project design implements the most effective BMPs for the proposed improvements.

- ***State-Endangered and State-Rare Species***

According to DNRECs current database, the following state-rare and Species of Greatest Conservation Need¹ (SGCN) have been documented adjacent to this project and could be utilizing the wetlands for nesting and foraging:

Scientific Name	Common Name	Taxon	State Rank	State Status	SGCN Tier	Federal Status
<i>Accipiter cooperii</i>	Cooper’s hawk	Bird	S1B	E	Tier 1	
<i>Buteo platypterus</i>	Broad-winged hawk	Bird	S1B	-	Tier 1	
<i>Circus cyaneus</i>	Northern harrier	Bird	S1B/S4N	E	Tier 1	

State Rank: S1- extremely rare within the state (typically 5 or fewer occurrences); S2- very rare within the state (6 to 20 occurrences); S3-rare to uncommon in Delaware, B - Breeding; N - Nonbreeding; SX-Extirpated or presumed extirpated from the state. All historical locations and/or potential habitat have been surveyed; SH- Historically known, but not verified for an extended period (usually 15+ years); there are expectations that the species may be rediscovered; SE-Non-native in the state (introduced through human

¹ Species of greatest conservation need (SGCN) are indicative of the overall diversity and health of the State’s wildlife resources. Some may be rare or declining, others may be vital components of certain habitats, and still others may have a significant portion of their population in Delaware. SGCN are identified in the Delaware Wildlife Action Plan (DEWAP) which is a comprehensive strategy for conserving the full array of native wildlife and habitats-common and uncommon- as vital components of the state’s natural resources. Congress challenged the states to demonstrate comprehensive wildlife conservation. Delaware, along with all of the other states and provinces throughout the country are working to implement their wildlife action plans. This document can be viewed via the Division of Fish and Wildlife’s website at <http://www.fw.delaware.gov/dwap/Pages/default.aspx>.

*influence); not a part of the native flora or fauna., SNR-not yet ranked in Delaware, SNA-occurrences in DE of limited conservation value, **of concern due to a restricted range; SU-Status uncertain within the state. Usually an uncommon species which is believed to be of conservation concern, but there is inadequate data to determine the degree of rarity.*

State Status: E – endangered, i.e. designated by the Delaware Division of Fish and Wildlife as seriously threatened with extinction in the state pursuant to State of Delaware Code (7 Del. §601 et seq.) and implementing regulation (Title 7, 3900, 16.0 Endangered Species) ; n/a-plants are not included in Title 7.

SGCN Tiers: Tier 1 Species of Greatest Conservation Need (SGCN) are those that are most in need of conservation action in order to sustain or restore their populations. They are the focus of the Delaware Wildlife Action Plan (DEWAP), which is based on analyzing threats to their populations and their habitats, and on developing conservation actions to eliminate, minimize or compensate for these threats. **Tier 2** SGCN are also in need of conservation action, although not with the urgency of Tier 1 species. Their distribution across the landscape will help determine where DEWAP conservation actions will be implemented on the ground. n/a-plants are not addressed in DEWAP

In addition to the species noted above, there could be additional species of marsh nesting birds utilizing the surrounding wetlands.

We thank the Department for the information regarding State-Endangered and State-Rare Species.

Wildlife Habitat

- *This project will result in an increase in the percentage of impervious surface and introduce human disturbance which can degrade water quality and eliminate wildlife habitat. Also, cumulative impacts should also be considered given this project abuts “Canary Creek”, a housing development project that removed more than 50% of the forested buffer along the marsh and also sited roadways and stormwater management areas within 100 feet of the wetlands. The site plan provided for this project is blurry and as such it is difficult to determine how much buffered area exists between the project site and the surrounding marsh area to protect water quality and provide wildlife habitat. Buffers are an integral component of aquatic and wetland habitats, reducing the amount of sediments, pollutants, and other non-point source material that may affect the function and integrity of habitat and the condition and survivability of wetland dependent species. It is highly recommended that there is at least a 100-foot buffer between the edge of the wetlands and the project site. Consideration could then be given to improving the buffer by allowing succession within the buffer area or planting Delaware native trees, shrubs, grasses or wildflowers.*

We apologize for the blurriness of the site plan but our office submitted a pdf copy of full size (24" x 36") preliminary plans with the P.L.U.S. application. The development of Harbor Point will not remove any of the existing forested buffer along the marsh and the voluntary buffer adds additional protection for the marsh as the current agriculture use is tilled and planted up to the existing forested buffer. Harbor Point voluntarily proposes a 50' buffer from federal wetlands. The non tidal buffer is further inland than a tidal buffer and the forested buffer will remain completely undisturbed. The buffer could be planted with Delaware native grasses or wildflowers.

Additional information on hazardous waste sites

- *DNREC's Site Investigation and Restoration Section (SIRS) strongly recommends that the land owner perform environmental due diligence of the property by performing a Phase I Environmental Site Assessment (including a title search to identify environmental covenants) and a Phase II or Facility Evaluation in accordance to Section 9105(c) (2) of the Delaware Hazardous Substance Cleanup Act (HSCA) and the HSCA Guidance Section 2, part 2.3 (page 2-1). While this is not a requirement under HSCA, it is good business practice and failure to do so will prevent a person from being able to qualify for a potential affirmative defense under Section 9105(c) (2) of HSCA.*

Additional remediation may be required if the project property or site is re-zoned by the county or city.

Should a release or imminent threat of a release of hazardous substances be discovered during the course of development (e.g., contaminated water or soil), construction activities should be discontinued immediately and DNREC should be notified at the 24-hour emergency number (800-662-8802). SIRS should also be contacted as soon as possible at 302-395-2600 for further instructions.

A transaction screen was performed when the Owner originally purchased the property and nothing significant was found. Hazardous wastes have not been located or disposed of on-site while owned by the current owner. The Developer will comply with this requirements should remediation be required if a release has been determined.

Additional information on air quality

- *New homes and businesses may emit, or cause to be emitted, air contaminants into Delaware's air, which will negatively impact public health, safety and welfare. These negative impacts are attributable to:*

- *Emissions that form ozone and fine particulate matter; two pollutants relative to which Delaware currently violates federal health-based air quality standards,*
- *The emission of greenhouse gases which are associated with climate change, and*
- *The emission of air toxics.*

Air emissions generated from commercial spaces include emissions from the following activities:

- *Area sources such as painting, maintenance equipment and the use of consumer products like roof coatings and roof primers.*
- *The generation of electricity needed to support the commercial space, and*
- *All transportation activity.*

Based on the information provided, the three air emissions components (i.e., area, electric power generation, and mobile sources) for the development were quantified. Table 2 represents the actual impact the development may have on air quality.

<i>Emissions Attributable to Harbor Point (Tons per Year)</i>	<i>Volatile Organic Compounds (VOC)</i>	<i>Nitrogen Oxides (NOx)</i>	<i>Sulfur Dioxide (SO₂)</i>	<i>Fine Particulate Matter (PM_{2.5})</i>	<i>Carbon Dioxide (CO₂)</i>
<i>Mobile emissions</i>	3.2	3.3	0.1	*	2,039.3
<i>Power emissions</i>	*	0.8	2.9	*	434.3
<i>Area Source emissions</i>	2.1	0.2	0.2	0.3	8.7
<i>Total emissions</i>	5.3	4.3	3.2	0.3	2,482.3

() Indicates data is not available.*

- *Note that emissions associated with the actual construction of the road, including automobile and truck traffic from working in, or delivering products to the site, as well as site preparation, earth moving activities, road paving and other miscellaneous air emissions, are not reflected in the table above.*
- *DNREC encourages sustainable growth practices that:*
 - *Control sprawl;*

- *Preserve rural and forested areas;*
- *Identify conflicting land use priorities;*
- *Encourage growth on previously developed sites and denser communities while at the same time protect our diminishing land base;*
- *Coordinate transportation, housing, environment, and climate protection plans with land use plans; and*
- *Demonstrate that communities can achieve the qualities of privacy, community, and contact with nature without degrading the natural environment or generating unacceptable environmental costs in terms of congestion, use of natural resources, or pollution.*
- *Additional measures may be taken to substantially reduce the air emissions identified above. These measures include:*
 - *Constructing with only energy efficient products. Energy Star qualified products are up to 30% more energy efficient. Savings come from building envelope upgrades, high performance windows, controlled air infiltration, upgraded heating and air conditioning systems, tight duct systems and upgraded water-heating equipment. Every percentage of energy efficiency translates into a percent reduction in pollution. The Energy Star Program is excellent way to save on energy costs and reduce air pollution.*
 - *Offering geothermal and/or photo voltaic energy options. These systems can significantly reduce emissions from electrical generation, and from the use of oil or gas heating equipment.*
 - *Providing tie-ins to the nearest bike paths and links to any nearby mass transport system. These measures can significantly reduce mobile source emissions. For every vehicle trip that is replaced by the use of a sidewalk, a bike path or mass transit, 7 pounds of VOC and 11.5 pounds of NO_x are reduced each year.*
 - *Using retrofitted diesel engines during construction. This includes equipment that are on-site as well as equipment used to transport materials to and from site.*
 - *Using pre-painted/pre-coated flooring, cabinets, fencing, etc. These measures can significantly reduce the emission of VOCs from typical architectural coating operations.*

- *Planting trees in vegetative buffer areas. Trees reduce energy emissions by cooling during the summer and by providing wind breaks in the winter, thereby reducing air conditioning needs by up to 30 percent and saving 20 to 50 percent on fuel costs.*

This is a partial list, and there are additional things that can be done to reduce the impact of the development. The applicant should submit a plan to the DNREC DAQ which address the above listed measures, and that details all of the specific emission mitigation measures that will be incorporated into this project.

The Developer thanks the Department for the additional information for air quality. We have read through the comments and the Developer will plan the right tree for the right place, encourage the home builder to use Energy Star appliances and the development will not preclude the use of geo-thermal wells, solar power or wind power. The project includes construction of sidewalks within the community and connects to the shared use path on Park Road.

Delaware State Fire Marshall's Office – Contact Duane Fox 739-4394

- *Preliminary meetings with fire protection specialists are encouraged prior to formal submittal. Please call for appointment. Applications and brochures can be downloaded from our website: www.statefiremarshal.delaware.gov, technical services link, plan review, applications or brochures.*

Our office will conduct a pre-application meeting with the fire protection specialist before formally submitting the plans for review.

On behalf of the Developer we thank the Office of State Planning and other State Departments for their comments. If the Lewes Planning Commission has any questions, please contact me at 302-424-1441.

Sincerely,
Davis, Bowen & Friedel, Inc.



Ring W. Lardner, P.E.
Principal

P:\JG Townsend\2261A004 Point Farm\Documents\Harbor Point 2014-06-25 PLUS Response Submission.docx

CC: **Constance C. Holland, AICP, Office of State Planning**
Henry Baynum, City of Lewes Building Official
Nick Hammonds, Jack Lingo Asset Management, LLC
Gene Bayard, Morris James Wilson Halbrook & Bayard, L.P.



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

March 27, 2014

SHAILEN P. BHATT
SECRETARY

Mr. D.J. Hughes
Davis, Bowen & Friedel, Inc.
23 N. Walnut Street
Milford, DE 19963

Dear Mr. Hughes,

The Department has completed its review of the Traffic Impact Study (TIS) for the Harbor Point residential development (f.k.a. Point Farm), prepared by Davis, Bowen & Friedel, Inc. (DBF) and dated March 7, 2014. DBF prepared the report in a manner generally consistent with DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*.

The TIS evaluates the impacts of Harbor Point, proposed to be located on the west side of Park Road, north of Canary Creek, in Sussex County, with annexation into the City of Lewes proposed.

The proposed development would consist of 69 single-family detached homes, to be developed on approximately 80 acres of a 635.8-acre parcel of land (Tax Parcel 335-7.00-1.00). One access point is proposed, via a permanent easement to Park Road through lands owned by the State of Delaware. Construction is anticipated to be complete by 2016.

The land is currently zoned as AR-1 (Agricultural Residential) in Sussex County, and the developer proposes an annexation into the City of Lewes with R-3 (Residential Beach) zoning.

DelDOT currently has no relevant projects in the study area. However, it is noted that the Delaware Department of Natural Resources and Environmental Control (DNREC) has one relevant project within the study area along Park Road. DNREC's project involves improving Park Road from Samantha Drive (Canary Creek site access) to Pilottown Road via a new road north of the causeway. The new road is intended to divert traffic from local roads and re-route through traffic around the campus of the University of Delaware's College of Marine Studies; in particular, to re-direct boat-trailer traffic away from the intersection of Pilottown Road and New Road.

As discussed in DelDOT's comments from the Preliminary Land Use Service (PLUS) review dated February 28, 2013, the developer has expressed interest in having a segment of Park Road transferred from DNREC to DelDOT. As part of this arrangement, the developer would improve Park Road, from just north of Samantha Drive to the causeway, subject to DelDOT's review and inspection, and ultimately the City of Lewes would accept the road for City maintenance.



Based on our review, we have the following comments and recommendations:

All intersections included in the scope of this TIS meet the level of service (LOS) requirements in the *Standards and Regulations for Subdivision Streets and State Highway Access*.

Should the City of Lewes choose to approve the proposed development, the following items should be incorporated into the site design and reflected on the record plan by note or illustration. All applicable agreements (i.e. letter agreements for off-site improvements and traffic signal agreements) should be executed prior to entrance plan approval for the proposed development.

1. The developer should construct the site entrance on Park Road. The proposed configuration is shown in the table below.

Approach	Current Configuration	Proposed Configuration
Northbound Park Road	One through lane	One shared left-turn / through lane
Southbound Park Road	One through lane	One shared through / right-turn lane
Eastbound Site Entrance	Approach does not exist	One shared left-turn / right-turn lane

2. The developer should improve Park Road between a point just north of Samantha Drive to the south end of the causeway on Park Road in order to meet DelDOT's local road standards. These standards include but are not limited to eleven-foot travel lanes and five-foot shoulders. The developer should provide a bituminous concrete overlay to the existing lanes' pavement section and recommend an overlay thickness to the developer's engineer if necessary.
3. The following bicycle and pedestrian improvements should be included:
 - a. A multi-use pathway should be added on the northbound side of Park Road at the start of the site entrance to the beginning of the causeway, located approximately 1,000 feet northeast of the site.
 - b. Utility covers should be made flush with the pavement.
 - c. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.
 - d. Internal sidewalks for pedestrian safety and to promote walking as a viable transportation alternative should be constructed within the property. These sidewalks should each be a minimum of five feet wide and should meet current AASHTO and ADA standards. These internal sidewalks should connect to the multi-use pathway on Park Road.

Mr. D.J. Hughes
March 27, 2014
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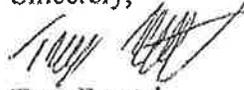
Improvements in this TIS may be considered “significant” under DelDOT’s *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DelDOT’s website at http://www.deldot.gov/information/pubs_forms/manuals/de_muted/index.shtml. For any additional information regarding the work zone impact and mitigation procedures during construction please contact Mr. Adam Weiser of DelDOT’s Traffic Section. Mr. Weiser can be reached at (302) 659-4073 or by email at Adam.Weiser@state.de.us.

Please note that this review generally focuses on capacity and level of service issues; additional safety and operational issues will be further addressed through DelDOT’s subdivision review process.

Mr. D.J. Hughes
March 27, 2014
Page 4 of 19

Additional details on our review of this TIS are attached. If you have any questions concerning this review, please contact me at (302) 760-2167 or Mr. Claudy Joinville at (302) 760-2124. My email is Troy.Brestel@state.de.us and Mr. Joinville's email is Claudy.Joinville@state.de.us.

Sincerely,



Troy Brestel
Project Engineer

TEB:cjm

Enclosures

cc with enclosures:

Mr. Ring Lardner, Davis, Bowen & Friedel, Inc.
Mr. Lawrence Lank, Sussex County Planning and Zoning
Mr. Shane Abbott, Sussex County Planning & Zoning
Mr. Paul Eckrich, City Manager, City of Lewes
Mr. Robert McCleary, Director, Transportation Solutions (DOTS)
Mr. Drew Boyce, Director, Planning
Mr. Mark Luszcz, Chief Traffic Engineer, Traffic, DOTS
Mr. Michael Simmons, Assistant Director, Project Development South, DOTS
Mr. J. Marc Coté, Assistant Director, Development Coordination
Mr. T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Mr. Thomas E. Meyer, Traffic Studies Manager, Traffic, DOTS
Ms. Lisa Collins, Service Development Planner, Delaware Transit Corporation
Mr. Marco Boyce, Planning Supervisor, Statewide & Regional Planning
Ms. Donna Robinson, Administrative Assistant, Statewide & Regional Planning
Mr. Todd Sammons, Subdivision Engineer, Development Coordination
Mr. Steven Sisson, Sussex County Subdivision Coordinator, Development Coordination
Mr. John Fiori, Subdivision Manager, Development Coordination
Mr. Chris Sylvester, Traffic Engineer, Traffic, DOTS
Mr. Claudy Joinville, Project Engineer, Development Coordination

General Information

Report date: March 7, 2014

Prepared by: Davis, Bowen & Friedel, Inc. (DBF)

Prepared for: Harbor Point (f.k.a. Point Farm)

Tax parcels: 335-7.00-1.00

Generally consistent with DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*: Yes

Project Description and Background

Description: The proposed Harbor Point (f.k.a. Point Farm) reservation development would consist of 69 single-family detached homes.

Location: Harbor Point is proposed to be located on the west side of Park Road, north of the Canary Creek residential development, in Sussex County, with annexation into the City of Lewes proposed. A site location map is included on Page 6.

Amount of land to be developed: approximately 80 acres of a 635.8-acre parcel of land

Land use approval(s) needed: Subdivision approval, City of Lewes land use approval

Proposed completion date: 2016

Proposed access locations: One full access via a permanent easement to Park Road

Daily Traffic Volumes (per DBF ATR traffic counts dated July 2013):

- 2013 Average Annual Daily Traffic on Park Road: 171 vpd

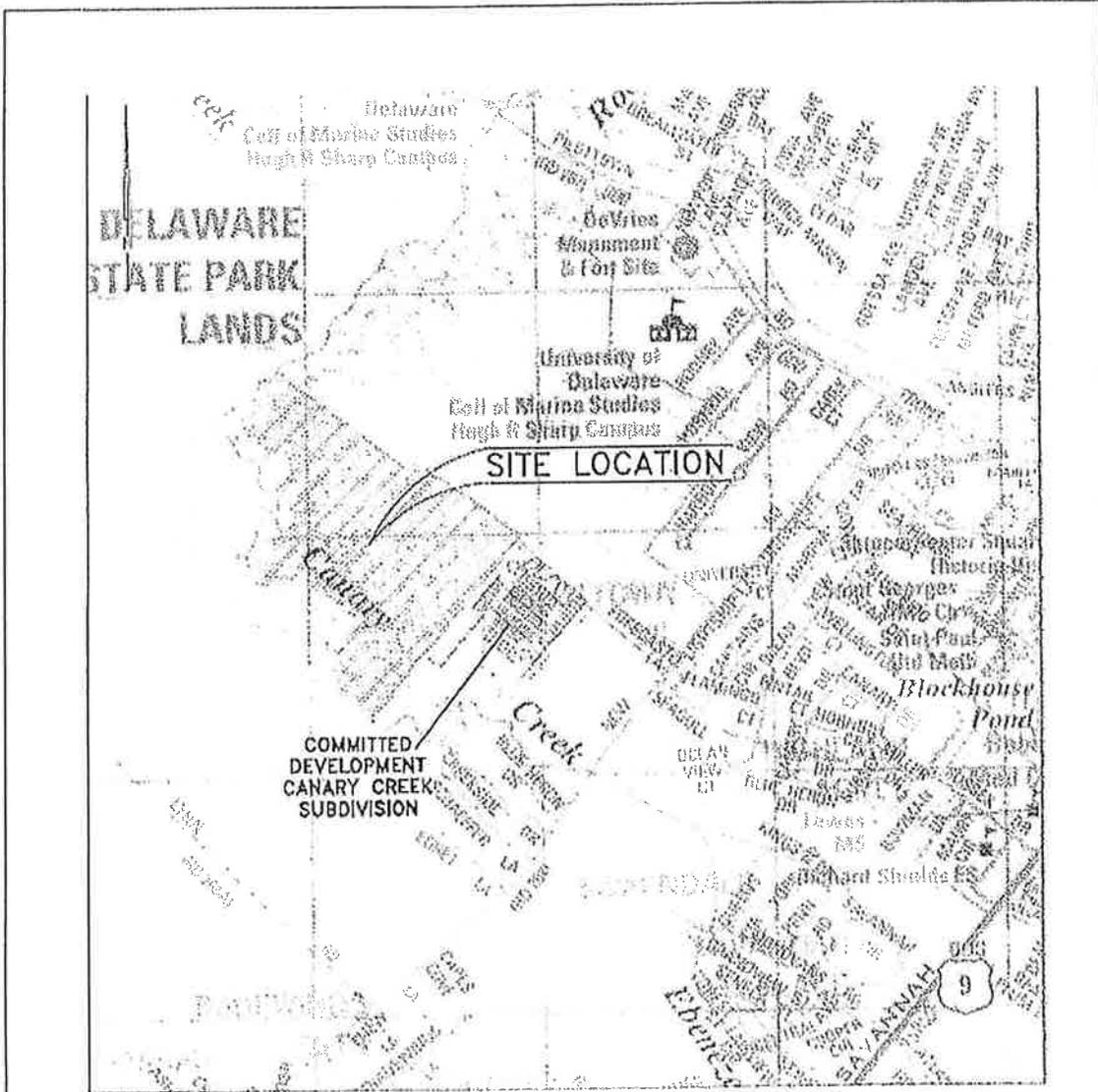


FIGURE 20

COMMITTED DEVELOPMENTS MAP



DAVIS, BOWEN & FRIEDEL, INC.
 ARCHITECTS, ENGINEERS & SURVEYORS

SALISBURY, MARYLAND 410-543-9204
 WILFORD, DELAWARE 302-424-1411

POINT FARM
 TRAFFIC IMPACT STUDY
 SUSSEX COUNTY, DELAWARE

Date: 2/13 Scale: 1" = 1500' Project No.: 2261A004.E01

Delaware Strategies for State Policies and Spending – 2010 Update

Location with respect to the Strategies for State Policies and Spending Map of Delaware:
The proposed Harbor Point development is located within Investment Level 1 and Level 3 areas, with the majority of the site in Level 3.

Investment Level 1

Investment Level 1 Areas are areas of the state that are most prepared for growth and where the state can make cost-effective infrastructure investments for schools, roads, and public safety. In these areas, state investments and policies should support and encourage a wide range of uses and densities, promote other transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Investment Level 1 Areas are often municipalities, towns, or urban / urbanizing places in counties. Density is generally higher than in the surrounding areas. Overall, it is the state's intent to use its spending and management tools to maintain and enhance community character, to promote well-designed and efficient new growth, and to facilitate redevelopment in Investment Level 1 Areas.

Investment Level 3

Investment Level 3 Areas generally fall into two categories. The first category covers lands that are in the long-term growth plans of counties or municipalities where development is not necessary to accommodate expected population growth. The second category includes lands that are adjacent to or intermingled with fast-growing areas within the counties or municipalities that are otherwise categorized as Investment Levels 1 and 2. These lands are most often impacted by environmentally sensitive features, agricultural-preservation issues, or other infrastructure issues.

Level 3 Areas are characterized by low density and rural homes, which may or may not be served by public utilities. New housing development in the short term would, in most cases, represent leap-frog development while in the longer term these areas may be desirable for a variety of housing types, styles and densities in conjunction with local government comprehensive plans.

The priorities in the Level 3 Areas are for the Department to focus on regional movements between towns and other population centers. In these areas, local roadway improvements will be made by developers and property owners as development occurs.

Proposed Development's Compatibility with Strategies for State Policies and Spending:

The proposed Harbor Point development is located within Investment Level 1 and 3 areas, and is to be developed as 69 single-family detached homes. This type of development is consistent with the character of Investment Level 1 and 3 areas. It is therefore concluded that the proposed development generally complies with the policies stated in the 2010 update of the "Strategies for State Policies and Spending."

Comprehensive Plan

City of Lewes Comprehensive Plan:

(Source: City of Lewes Comprehensive Plan Adopted and Certified in October 2005)

The proposed Harbor Point development is located in an area with future land use designated as “Pursuing Preservation measures but to be rezoned Residential.”

The parcel is currently zoned AR-1 (Agricultural Residential), and the developer proposes an annexation into the City of Lewes with R-3 (Residential Beach) zoning. According to Section 197-28 the City of Lewes Code Book, characteristics of R-3 zoning are as follows:

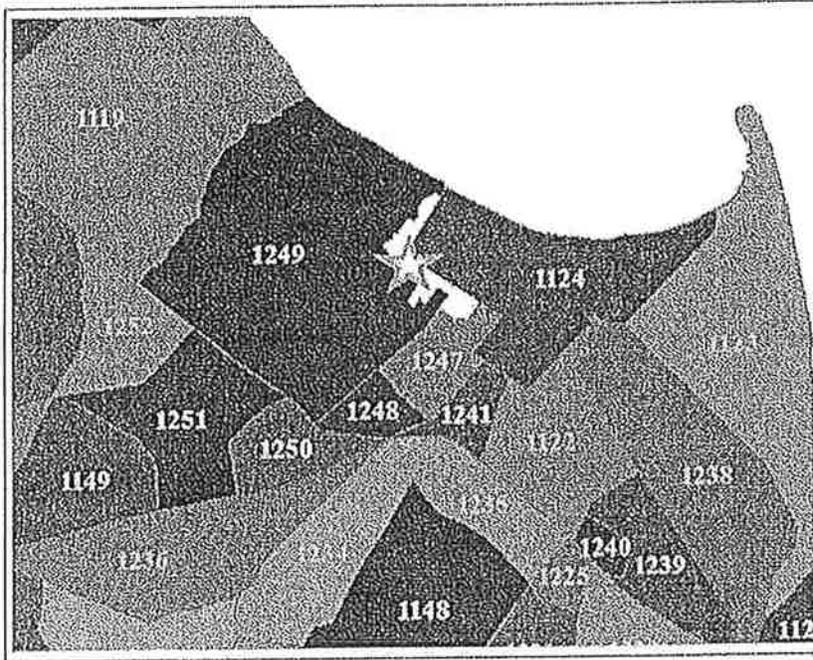
- This district provides for residential development in the City’s beachfront area.
- This district preserves the distinctive residential character of the City’s beachfront area.
- This district preserves physical and visual access to nearby beaches and marshes.

Proposed Development’s Compatibility with Comprehensive Plan: The proposed Harbor Point residential development is planned as 69 single-family detached homes. Given that the site’s future land use designation and R-3 zoning are both residential in nature, the proposed land use (single-family detached homes) is residential; this development is consistent with the City of Lewes Comprehensive Plan.

Transportation Analysis Zones (TAZ)

Transportation Analysis Zones (TAZ) where development would be located: 1124 and 1249

TAZ Boundaries:



Current employment estimate for TAZ: 3828 jobs in 2013

Future employment estimate for TAZ: 4772 jobs in 2035

Current population estimate for TAZ: 3358 people in 2013

Future population estimate for TAZ: 4366 people in 2035

Current household estimate for TAZ: 1559 houses in 2013

Future household estimate for TAZ: 2027 houses in 2035

Relevant committed developments in TAZ: Canary Creek (residential development)

Would the addition of committed developments to current estimates exceed future projections: No

Would the addition of committed developments and the proposed development to current estimates exceed future projections: No

Relevant Projects in the DelDOT Capital Transportation Program (FY 2013 – FY 2018)

DelDOT currently has no relevant projects in the study area.

Trip Generation

Trip generation for the proposed development was computed using comparable land uses and equations contained in Trip Generation, Ninth Edition, published by the Institute of Transportation Engineers (ITE). The following land uses were utilized to estimate the amount of new traffic generated for this development:

- Single-Family Detached Housing (ITE Land Use Code 210)

Table 1
 HARBOR POINT PEAK HOUR TRIP GENERATION

Land Use	Weekday PM Peak Hour			Saturday Peak Hour		
	In	Out	Total	In	Out	Total
69 Single-family detached homes	15	43	58	38	32	70
TOTAL TRIPS	15	43	58	38	32	70

Table 2
 HARBOR POINT DAILY TRIP GENERATION

Land Use	Weekday ADT			Saturday ADT		
	In	Out	Total	In	Out	Total
69 Single-family detached homes	373	373	746	360	359	719
TOTAL TRIPS	373	373	746	360	359	719

Overview of TIS

Intersections examined:

- 1) Park Road / Site Entrance
- 2) Park Road / Samantha Drive (Canary Creek Site Access)
- 3) Park Road / New Road (Sussex Road 266)
- 4) New Road / Pilottown Road
- 5) New Road / Nassau Road (Sussex Road 266B)

Conditions examined:

- 1) 2013 existing conditions (Case 1)
- 2) 2016 without Harbor Point (Case 2)
- 3) 2016 with Harbor Point (Case 3)

Peak hours evaluated:

Weekday evening and Saturday midday peak hours. As this TIS is for a residential development located in the vicinity of a resort area, evening traffic counts were conducted from 4:00 PM to 6:00 PM to reflect traffic conditions when evening traffic is at its peak. Additionally, the Saturday peak period designated for traffic counts was 9:00 AM to 2:00 PM to reflect traffic conditions when Saturday traffic is at its peak.

Committed development considered:

- 1) Canary Creek (30 single-family detached houses and 72 townhomes)

Intersection Descriptions

- 1) **Park Road & Site Entrance**
Type of Control: proposed two-way stop-controlled (rights-in/rights-out/lefts-in/lefts-out T-intersection)
Northbound approach: (Park Road) existing one through lane; proposed one shared left-turn lane / through lane
Southbound approach: (Park Road) existing one through lane; proposed one shared through / right-turn lane
Eastbound approach: (Proposed Site Entrance) proposed one shared left-turn / right-turn lane, stop-controlled

- 2) **Park Road & Samantha Drive**
Type of Control: existing two-way stop-controlled (four-leg intersection)
Northbound approach: (Park Road) one shared left-turn / through / right-turn lane
Southbound approach: (Park Road) one shared left-turn / through / right-turn lane
Eastbound approach: (Samantha Drive / Canary Creek Entrance) one shared left-turn / through / right-turn lane, stop-controlled
Westbound approach: (Unnamed street) one shared left-turn / through / right-turn lane, stop-controlled

- 3) **Park Road & New Road**
Type of Control: two-way stop-controlled (rights-in/rights-out/lefts-in/lefts-out T-intersection)
Southbound approach: (Park Road) one shared left-turn / right-turn lane, stop-controlled
Eastbound approach: (New Road) one shared left-turn lane / through lane
Westbound approach: (New Road) one through lane and one right-turn lane

- 4) **New Road & Pilottown Road**
Type of Control: two-way stop-controlled (rights-in/rights-out/lefts-in/lefts-out T-intersection)
Northbound approach: (Pilottown Road) one shared left-turn lane / through lane
Southbound approach: (Pilottown Road) one shared through / right-turn lane
Eastbound approach: (New Road) one shared left-turn / right-turn lane, stop-controlled

- 5) **New Road & Nassau Road**
Type of Control: two-way stop-controlled (rights-in/rights-out/lefts-in/lefts-out T-intersection)
Northbound approach: (Nassau Road) one shared through / right-turn lane
Southbound approach: (Nassau Road) one shared left-turn lane / through lane
Westbound approach: (New Road) one shared left-turn / right-turn lane, stop-controlled

Safety Evaluation

Crash Data: Crash data was obtained for January 2011 through January 2014 for the intersections and roadway segments within the study area. This included a total of one (1) crash, which occurred at the intersection of New Road at Nassau Road. The crash involves a collision between vehicle and a utility pole. There were no injuries or fatal crashes reported in the study area during this three-year period.

Sight Distance: The proposed entrance on Park Road would be located on the outside of a horizontal curve, which presents potential sight distance and safety concerns especially for left-turning vehicles to and from the site. The proposed location of the Park Road site entrance, as well as the lane configurations and allowed movements at that intersection, may require a closer evaluation from a safety perspective.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: The Delaware Transit Corporation (DTC) does not currently have any transit route serving the proposed Harbor Point residential development.

Planned transit service: Mr. Wayne Henderson, a Service Development Planner for the DTC, provided comments on March 12, 2014 regarding DTC's future plans for transit services in this area. Mr. Henderson confirmed that no transit routes are planned within the study area in the near future.

Existing bicycle and pedestrian facilities: According to the bicycle level of service (BLOS) calculator developed by the *League of Illinois Bicyclists* Park Road operates at BLOS B. There is currently a multi-use pathway located along the northeast side of Park Road extending from New Road to just beyond the entrance to the Canary Creek development at Samantha Drive. In addition, there is an existing multi-use pathway along the westbound side of New Road extending for a short distance on both sides of the intersection of Park Road and New Road. There are no sidewalks or bicycle lanes along the section of Park Road where the site access is proposed to be located. There are existing crosswalks on all approaches at the intersection of Samantha Drive and Park Road, and along the westbound side of New Road at Park Road.

Planned bicycle and pedestrian facilities: Marco Boyce of DelDOT's Statewide & Regional Planning Section responded to DBF via an e-mail dated January 25, 2014, with comments regarding planned or requested bicycle and pedestrian facilities in the study area of this proposed development. Mr. Boyce stated that a multi-use pathway from the Harbor Point development should connect to the existing pathway along the east side of Park Road. Additionally, from within the development, a network of sidewalks should feed directly and logically to this multi-use pathway extension. Bikes can ride on-road within the proposed development to the multi-use pathway extension. Crosswalks should be added across all approaches at the site entrance along Park Road.

Previous Comments

All comments from DelDOT's Scoping Letter, Traffic Count Review, and Preliminary TIS (PTIS) Review were addressed in the Final TIS submission.

General HCS Analysis Comments

(see table footnotes on the following pages for specific comments)

- 1) For unsignalized intersections, the TIS and DelDOT applied heavy vehicle (HV) percentages by movement. For future conditions, the TIS and DelDOT generally assumed future HV percentages to be the same as existing HV percentages.
- 2) For existing conditions at unsignalized intersections, the TIS and DelDOT determined and applied, for each intersection, the peak hour factor (PHF) by movements. For future conditions, the TIS assumed future PHF for some movements that were generally different from the PHF DelDOT applied. DelDOT used future PHF of 0.92 for movements that had significant increase in trips for future conditions.
- 3) Neither the TIS nor DelDOT included percent grade in their analyses.

Table 3
 PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Harbor Point
Report dated March 7, 2014
 Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection ¹ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per DelDOT	
	Weekday PM	Saturday Mid-day	Weekday PM	Saturday Mid-day
Park Road & Site Entrance				
2016 with Harbor Point (Case 3)				
Eastbound Site Entrance	A (8.6)	A (8.5)	A (8.6)	A (8.5)
Northbound Park Road – Left	A (7.4)	A (7.3)	A (7.4)	A (7.3)

¹ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds.

Table 4
 PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Harbor Point
Report dated March 7, 2014
 Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection ² Two-Way Stop Control (four-leg intersection) ³	LOS per TIS		LOS per DelDOT	
	Weekday PM	Saturday Mid-day	Weekday PM	Saturday Mid-day
Park Road & Samantha Drive				
2013 Existing (Case 1)				
Northbound Park Road	A (7.3)	A (7.3)	A (7.3)	A (7.3)
Eastbound Samantha Drive	A (8.5)	A (8.6)	A (8.5)	A (8.6)
Southbound Park Road	A (7.2)	A (7.2)	A (7.2)	A (7.2)
Westbound - unnamed street	A (9.4)	A (9.3)	A (9.3)	A (9.3)
2016 without Harbor Point (Case 2)				
Northbound Park Road	A (7.4)	A (7.3)	A (7.4)	A (7.3)
Eastbound Samantha Drive	A (8.6)	A (8.6)	A (8.5)	A (8.6)
Southbound Park Road	A (7.2)	A (7.2)	A (7.2)	A (7.2)
Westbound -unnamed Street	A (9.9)	A (9.3)	A (9.8)	A (9.5)
2016 with Harbor Point (Case 3)				
Northbound Park Road	A (7.4)	A (7.4)	A (7.4)	A (7.4)
Eastbound Samantha Drive	A (8.7)	A (8.9)	A (8.7)	A (8.9)
Southbound Park Road	A (7.4)	A (7.3)	A (7.3)	A (7.3)
Westbound -unnamed Street	B (10.6)	B (10.1)	B (10.4)	B (10.1)

² For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds.

³ The TIS and DelDOT analyze this intersection utilizing a westbound through volume of one (1) for the unnamed street as input in order for HCS to report a delay for this approach.

Table 5
 PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Harbor Point
Report dated March 7, 2014
 Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection ⁴ Two-Way Stop Control (T-intersection)	LOS per TIS ⁵		LOS per DelDOT	
	Weekday PM	Saturday Mid-day	Weekday PM	Saturday Mid-day
Park Road & New Road				
2013 Existing (Case 1)				
Southbound Park Road	A (9.2)	A (9.4)	A (9.4)	A (9.9)
Eastbound New Road	A (7.5)	A (7.5)	A (7.5)	A (7.5)
2016 without Harbor Point (Case 2)				
Southbound Park Road	A (9.4)	A (9.8)	A (9.7)	B (10.2)
Eastbound New Road	A (7.6)	A (7.6)	A (7.6)	A (7.6)
2016 with Harbor Point (Case 3)				
Southbound Park Road	A (9.8)	B (10.2)	B (10.2)	B (10.6)
Eastbound New Road	A (7.7)	A (7.6)	A (7.7)	A (7.7)

⁴ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds.

⁵ The TIS analyzes this intersection applying peak hour factors (PHF) that are generally different from the PHF DelDOT applied, resulting in slightly higher control delays and poorer level of service.

Table 6
 PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Harbor Point
Report dated March 7, 2014
 Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection ⁶ Two-Way Stop Control (T-intersection)	LOS per TIS ⁷		LOS per DeIDOT	
	Weekday PM	Saturday Mid-day	Weekday PM	Saturday Mid-day
New Road & Pilottown Road				
2013 Existing (Case 1)				
Northbound Pilottown Road	A (7.6)	A (7.5)	A (7.6)	A (7.6)
Eastbound New Road	A (9.4)	A (9.6)	A (9.4)	A (9.9)
2016 without Harbor Point (Case 2)				
Northbound Pilottown Road	A (7.6)	A (7.6)	A (7.6)	A (7.6)
Eastbound New Road	A (9.6)	A (9.7)	A (9.5)	A (9.9)
2016 with Harbor Point (Case 3)				
Northbound Pilottown Road	A (7.6)	A (7.6)	A (7.6)	A (7.6)
Eastbound New Road	A (9.6)	A (9.7)	A (9.6)	A (10.0)

⁶ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds.

⁷ The TIS analyzes this intersection applying peak hour factors (PHF) that are generally different from the PHF DeIDOT applied, resulting in slightly higher control delays and poorer level of service.

Table 7
 PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Harbor Point
Report dated March 7, 2014
 Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection ⁸ Two-Way Stop Control (T-intersection)	LOS per TIS ⁹		LOS per DeIDOT	
	Weekday PM	Saturday Mid-day	Weekday PM	Saturday Mid-day
New Road & Nassau Road				
2013 Existing (Case 1)				
Southbound Nassau Road	A (7.5)	A (7.7)	A (7.6)	A (7.7)
Westbound New Road	B (10.5)	B (10.6)	B (10.7)	B (11.0)
2016 without Harbor Point (Case 2)				
Southbound Nassau Road	A (7.6)	A (7.7)	A (7.6)	A (7.7)
Westbound New Road	B (10.7)	B (10.8)	B (10.9)	B (11.0)
2016 with Harbor Point (Case 3)				
Southbound Nassau Road	A (7.7)	A (7.8)	A (7.7)	A (7.8)
Westbound New Road	B (11.1)	B (11.0)	B (11.0)	B (11.1)

⁸ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds.

⁹ The TIS analyzes this intersection applying peak hour factors (PHF) that are generally different from the PHF DeIDOT applied, resulting in slightly higher control delays and poorer level of service.