



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

March 27, 2014

SHAILEN P. BHATT
SECRETARY

Mr. Richard Rezer
Orth-Rodgers & Associates, Inc.
301 Lindenwood Drive
Suite 130
Malvern, PA 19355

Dear Mr. Rezer:

The enclosed Traffic Impact Study (TIS) review letter for the **Lands of I.M. Ellis** commercial development (Tax Parcels 135-14.00-37.00, 135-14.15-02.00, 03.00, 04.00, 05.00) has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS to conform to DelDOT's Standards and Regulations for Subdivision Streets and State Highway Access and other accepted practices and procedures for such studies. DelDOT accepts this review letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,

Troy Brestel
Project Engineer

TEB:km

Enclosures

cc with enclosures: Mr. Mark Parker, Becker Morgan, Inc.
Ms. Constance C. Holland, Office of State Planning Coordination
Mr. Eugene Dvornick, Jr., Town of Georgetown
Ms. Jocelyn Godwin, Town of Georgetown
Mr. Andrew Parker, McCormick Taylor, Inc.
DelDOT Distribution



DelDOT Distribution

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Marco Boyce, Planning Supervisor, Statewide & Regional Planning
Bryan Behrens, Project Engineer, Project Development South, DOTS
Claudy Joinville, Project Engineer, Development Coordination



March 27, 2014

Mr. Troy E. Brestel
Project Engineer
DelDOT Division of Planning
P.O. Box 778
Dover, DE 19903

RE: Agreement No. 1529
Traffic Impact Study Services
Task No. 19A Subtask 4A – Lands of I.M. Ellis

Dear Mr. Brestel:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Lands of I.M. Ellis commercial development prepared by Orth-Rodgers and Associates, Inc. (ORA), dated July 12, 2013. This review was assigned as Task Number 19A (Subtask 4A). ORA 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 the Lands of I.M. Ellis commercial development, proposed to be located on the southwest corner of US Route 113 (Sussex Road 113 / DuPont Boulevard) and Delaware Route 18/404 (Sussex Road 18 / Seashore Highway), within the Town of Georgetown in Sussex County, Delaware. The proposed development would consist of a 13,281 square-foot pharmacy with drive-through window, 31,500 square feet of general retail space, and a 4,000 square-foot fast food restaurant with drive-through window, all on approximately 11.5 acres of land. Three access points are proposed: one on Delaware Route 18/404 and two limited access points on southbound US Route 113. Construction is anticipated to be completed in two phases, with the pharmacy complete by 2016 and the full build out complete by 2018.

The land is currently zoned as HC (Highway Commercial) within the Town of Georgetown, and the developer does not propose to change the zoning.

DelDOT currently has three relevant projects in the study area. The first is the US Route 113, North/South Improvements project (a.k.a. US 113 North/South Study) (State Contract No. T200212701). The US 113 North/South Study seeks to address the existing and future transportation needs along the US Route 113 corridor while preserving environmental and historic resources, preserving the existing north/south corridor in Sussex County, and accommodating planned economic growth. The project team coordinates with Sussex and Kent Counties and the affected municipalities and continues to study viable alternatives for north/south capacity improvements throughout Sussex County. Many alternatives have been studied, both on and off existing alignments.

In June 2007, after evaluating input from the public, conducting analyses and working to refine the alternatives, DelDOT announced a Recommended Preferred Alternative for the Georgetown

Area of the US 113 North/South Study. For more information, please see the project web site at <http://www.deldot.gov/information/projects/us113/>. The Refined On-Alignment Alternative is the Recommended Preferred Alternative in the Georgetown Area. An Environmental Assessment was completed for this alternative in March 2012. Notable features of the Refined On-Alignment Alternative in the Georgetown Area include: widening US Route 113 to provide an additional lane northbound and southbound, building grade-separated intersections at several locations, and eliminating traffic signals and unsignalized crossovers along US Route 113. As currently planned, the design concept for this alternative would have direct impacts on the intersection of US Route 113 and Delaware Route 18/404. It would become a grade-separated intersection with realigned Delaware Route 18/404 and multiple ramps going through the Lands of I.M. Ellis property. Much of the proposed Lands of I.M. Ellis commercial development site would be impacted by the US 113 North/South Study construction footprint (according to the current design concept), including the proposed site access points on US Route 113 and Delaware Route 18/404. The DelDOT Project Manager for the US 113 North/South Study has indicated design of this grade-separated intersection will begin with Preliminary Engineering in FY 2017. Overall, the US Route 113 North/South Study is a long-term project with construction not expected to occur until at least 2020.

The second project is the Corridor Capacity Preservation Program (CCPP), which is a statewide program intended to manage and preserve the traffic capacity and safety of adopted highway corridors by various means such as limiting access points and using service roads for local vehicle trips. The general purpose of the program is to ensure that existing principal arterial roadways, such as US Route 113, are able to efficiently carry regional traffic without significant impedance from the effects of local development. The program was established in accordance with the provisions of Title 17, Section 145 of the Delaware Code. DelDOT's CCPP Manager has no objection to the proposed development, and stated that direct access to US Route 113 will be permitted via two rights-in and one rights-out. The entry/exit points must be spaced properly and adhere to DelDOT's design standards. Deceleration and acceleration lanes will be required for site access along US Route 113.

The third project is associated with DelDOT's Hazard Elimination Program (HEP). All of the intersections in this study area are within Sites E and J of the 2012 HEP. The HEP committee studied safety and operations in great detail at all the existing intersections within these two sites. The HEP Task I Report for these sites identified numerous issues of concern, along with recommendations for remedial improvements in the areas of signing, pavement markings, and signals. The Task I Report also identified the need for three additional studies to focus on safety and operational concerns with: 1) the eastbound right-turn movement from Delaware Route 18/404 to southbound US Route 113, 2) the intersection of US Route 113 and Ennis Road (Sussex Road 519) / North Street, and 3) the intersection of Delaware Route 18/404 and Carmean Way / Delaware Tech Entrance.

In the HEP Task II Report, these three intersections were studied more closely and significant improvement alternatives were evaluated for each. At the US Route 113 and Ennis Road / North Street intersection, the HEP committee considered two options: median channelization or installation of a traffic signal. A signal warrant analysis was completed and found that a signal would be warranted. However, the committee's recommendation was to leave the intersection unsignalized and to channelize the median by installing concrete islands, which would result in converting the side street to rights-in/rights-out only (prohibiting left turns and through traffic from the side streets) while continuing to allow all movements from the US Route 113 approaches. In subsequent discussions with the Town of Georgetown, it was found that they too prefer the channelization option. Based on these discussions and additional input from DelDOT's Traffic Section, a signal is not recommended for this location.

For the Delaware Route 18/404 and Carmean Way / Delaware Tech Entrance intersection, the HEP Task II Report evaluated the possibility of installing a fully-operational traffic signal but cited a recent traffic operational analysis (TOA) that found a signal is not warranted at this time. The TOA stated that a signal would likely be warranted upon development of the proposed Georgetown Commercial property (now known as Village of College Park and Shops of College Park), which is included in this Lands of I.M. Ellis TIS as a committed development. The HEP report also stated that southbound Carmean Way left-turn traffic volumes will likely temporarily decrease once the traffic signal at US Route 113 and College Park Drive is installed (scheduled for late 2013). As such, the HEP committee recommended no major improvements at this time for the intersection of Delaware Route 18/404 and Carmean Way / Delaware Tech Entrance, but they noted that Delaware Tech is evaluating consolidation of their access points on Delaware Route 18/404, and that consideration should be given to relocating Carmean Way further west.

For the eastbound Delaware Route 18/404 right-turn to southbound US Route 113, the HEP Task II Report evaluated three options to address crashes and queuing problems associated with this movement. All three options involved changing the eastbound right-turn movement from yield-controlled to signal-controlled. Option 1 includes an overlap phase (coinciding with northbound left turns), Option 1A includes the overlap phase and prohibits right-turns on red, and Option 2 includes the overlap phase, prohibits right-turns on red, and adds a second eastbound right-turn lane. The HEP committee's recommendation is to design and construct Option 2. Option 2 would require widening on the south side of Delaware Route 18/404 to provide a double right-turn lane with 650 feet of storage length. Concrete curb would be installed, the existing sidewalk would be reconstructed, the existing right-turn channelization island would be removed, and there would be changes to lane striping, crosswalks, and traffic signal equipment.

The improvements recommended by DelDOT's HEP Task II Report for 2012 Sites E and J, as described above, have recently entered into the project design process of DelDOT's Project Development Section. The anticipated schedule for design completion and construction is not known at this time.

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

The following intersections exhibit level of service (LOS) deficiencies without the implementation of physical roadway and/or traffic control improvements:

<i>Intersection</i>	<i>Situations for which deficiencies occur</i>
Delaware Route 18/404 and Site Entrance	2018 Saturday with Lands of I.M. Ellis (Cases 4A and 4B); 2018 PM and Saturday with Lands of I.M. Ellis (Case 4C)
US Route 113 and South Site Entrance	2016 Saturday with Lands of I.M. Ellis (Cases 3B and 3C); 2018 PM and Saturday with Lands of I.M. Ellis (Cases 4B and 4C)
US Route 113 and Delaware Route 18/404	2013 Existing PM and Saturday; 2016 PM and Saturday without and with Lands of I.M. Ellis; 2018 PM and Saturday with Lands of I.M. Ellis
Delaware Route 18/404 and Carmean Way / Delaware Tech Entrance	2013 Existing PM and Saturday; 2016 PM and Saturday without and with Lands of I.M. Ellis; 2018 PM and Saturday with Lands of I.M. Ellis
US Route 113 and First Crossover South of Site	2016 Saturday without and with Lands of I.M. Ellis; 2018 PM and Saturday with Lands of I.M. Ellis
US Route 113 and Ennis Road / North Street	2013 Existing PM and Saturday; 2016 PM and Saturday without and with Lands of I.M. Ellis; 2018 PM and Saturday with Lands of I.M. Ellis

Section 2.9.12 of DelDOT’s *Standards and Regulations for Subdivision Streets and State Highway Access*, regarding LOS Standards, states that intersections in Developed Areas should operate at LOS D or better. However, a local government, as part of its adopted comprehensive plan, may determine that acceptance of a lower LOS (E or F) for some portion of the day is necessary and appropriate for the pattern of development they seek to create. Section 2.9.12 recognizes such instances and states that DelDOT will consider that lower LOS standard to the extent that it does not result in substandard operations elsewhere.

On December 11, 2013, the Town of Georgetown (the local government in this case) adopted a comprehensive plan amendment by adding a new section titled ‘Impact of Development on Level of Service (LOS)’, which states that a reduced level of service at the intersection of US Route 113 and Delaware Route 18/404 “...is acceptable for limited portions of the day provided there are interior connector roads within the commercial development to permit travel within the development versus having to travel along impacted roadways”. The comprehensive plan amendment also states, “As funding becomes available, the limited access, on-alignment improvements should then be made”.

Related to the two preceding paragraphs, the intersection of US Route 113 and Delaware Route 18/404 exhibits LOS deficiencies (E or F) and lengthy queues under existing and future conditions. However, while we recommend that the developer contribute toward improvements at this intersection as described below in Item Nos. 5 and 6, those improvements do not

completely alleviate future LOS deficiencies and we do not recommend any other improvements be implemented by the developer specifically at this intersection. There are three primary reasons for this recommendation, as described immediately below.

First, the major improvements required to fully correct the LOS deficiencies (i.e., grade separation or the widening of US Route 113 to include three through lanes per direction) cannot be considered a reasonable developer improvement project.

Second, this intersection is within the US 113 North/South Study limits and as such, solutions to these deficiencies must ultimately occur as part of that larger process. The Recommended Preferred Alternative for the Georgetown Area of the US 113 North/South Study would address LOS deficiencies along US Route 113, in part by converting the intersection of US Route 113 and Delaware Route 18/404 to a grade-separated intersection.

Third, as mentioned above, the Town of Georgetown recently amended its comprehensive plan to accept a lower LOS for the US Route 113 and Delaware Route 18/404 intersection. Given that improvements associated with the US 113 North/South Study are not anticipated to be constructed before 2020, and absent a project in the meantime that would improve the intersection enough to eliminate the LOS deficiencies, the plan amendment was necessary to issue a Letter of No Objection for the proposed development.

Regarding the proposed site entrances for the Lands of I.M. Ellis property, we recommend a rights-in/rights-out/lefts-in access (no lefts-out) on Delaware Route 18/404 (as described below in Item No. 1), a rights-in-only access at the North Site Entrance on US Route 113 (as described below in Item No. 2), and a rights-in/rights-out/lefts-in access (no lefts-out) at the South Site Entrance on US Route 113 (as described below in Item No. 3). The proposed access on Delaware Route 18/404 was not included in the plans developed for two DelDOT projects: 1) the HEP project plans for the double-right turn lane on eastbound Delaware Route 18/404 at US Route 113, and 2) the US 113 North/South Study plans that include a grade-separated US Route 113 and Delaware Route 18/404 intersection with a realigned Delaware Route 18/404 and multiple ramps going through the Lands of I.M. Ellis property. However, DelDOT has agreed to modify the HEP project plans in coordination with proposed improvements on Delaware Route 18/404 as described in this letter, and improvements associated with the US 113 North/South Study are not anticipated to be constructed until 2020 at the very earliest. For these reasons, DelDOT has agreed to allow a limited-access site entrance on Delaware Route 18/404.

The intersection of US Route 113 and the first crossover south of the site exhibits LOS deficiencies under future conditions. In conjunction with the construction of the nearby South Site Entrance on US Route 113 described below in Item No. 3, we recommend closing this crossover as described below in Item No. 4.

The intersection of US Route 113 & Ennis Road / North Street exhibits LOS deficiencies under existing and future conditions. Other than the improvements described and shown below in Item No. 9, which are consistent with the HEP committee's recommendation, we do not recommend

additional improvements for this intersection. With the improvements described below, the only remaining LOS F condition for this intersection would occur on the westbound North Street approach during the Saturday peak hour, with an expected 95th percentile queue length of approximately 200 feet. The HEP committee considered signalization to eliminate the LOS deficiencies but determined that a new signal would not be desirable, especially on this CCPP corridor, in part because it would create a stop condition along the US Route 113 approaches that would increase potential for rear-end crashes. They favored the median channelization alternative described below since it addresses the largest clusters of crashes and accommodates the heaviest turning movements.

Should the Town of Georgetown choose to approve the proposed development, the following items should be incorporated into the site design and reflected on the record plan. 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 Delaware Route 18/404. This entrance driveway should be located approximately 500 feet west of US Route 113, as shown in the Conceptual Improvements Figure on Page 11. The proposed configuration is shown in the table below.

Approach	Current Configuration	Proposed Configuration
Northbound Site Entrance	Approach does not exist	One right-turn-only lane
Eastbound Delaware Route 18/404	One through lane	One through lane, one right-turn lane (for downstream rights at US Route 113), and a second right-turn lane (for rights at this site entrance)
Westbound Delaware Route 18/404	One through lane and one right-turn lane (for downstream rights at Carmean Way)	One left-turn lane, a second left-turn lane (for downstream lefts at Delaware Tech Entrance), and two through lanes

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DeIDOT's Subdivision Section to determine final turn-lane lengths during the site plan review process.

Approach	Left-Turn Lane	Right-Turn Lane
Northbound Site Entrance	N/A	N/A
Eastbound Delaware Route 18/404	N/A	225 feet*
Westbound Delaware Route 18/404	50 feet*	N/A

* turn-lane length based on the SR 18 Concept 2 plan prepared by Becker Morgan Group (dated 12/13/13) and agreed to by DeIDOT

At the proposed Site Entrance on Delaware Route 18/404, the developer should include a concrete channelization island on the site driveway to separate entering and exiting traffic. This island should be designed to limit exiting traffic to right turns only. The developer should coordinate with DeIDOT's Subdivision Section to determine an acceptable design for the channelization.

2. The developer should construct the rights-in-only North Site Entrance on southbound US Route 113. This entrance driveway should be located approximately 400 feet south of the Delaware Route 18/404 intersection with US Route 113, as shown in the Conceptual Improvements Figure on Page 11. The design of this entrance should include a separate right-turn lane on southbound US Route 113, with an initial recommended length of 400 feet (excluding taper). This initial length is based on DeIDOT's *Auxiliary Lane Worksheet*. The final turn-lane length will be limited by field conditions including proximity to Delaware Route 18/404.

To further reinforce that this access point is a one-way entrance only (not an exit from the site onto US Route 113), Do Not Enter signs (MUTCD R5-1) and arrow pavement markings shall be installed and oriented to face potential site exiting traffic along this entrance driveway. The developer should coordinate with DeIDOT's Subdivision Section to determine the exact location and design details, including final turn-lane length, for this rights-in-only entrance.

3. The developer should construct the South Site Entrance on US Route 113. This entrance driveway should be located approximately 400 feet south of the proposed North Site Entrance on southbound US Route 113, as shown in the Conceptual Improvements Figure on Page 11. The proposed configuration is shown in the table below.

Approach	Current Configuration	Proposed Configuration
Northbound US Route 113	Two through lanes	One left-turn lane and two through lanes
Southbound US Route 113	One U-turn lane (for downstream median crossover) and two through lanes	One left-turn lane, two through lanes, and one right-turn lane
Eastbound South Site Entrance	Approach does not exist	One right-turn-only lane

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DeIDOT’s Subdivision Section to determine final turn-lane lengths during the site plan review process.

Approach	Left-Turn Lane	Right-Turn Lane
Northbound US Route 113	175 feet*	N/A
Southbound US Route 113	175 feet*	325 feet*
Eastbound South Site Entrance	N/A	N/A

* turn-lane length based on the SR 18 Concept 2 plan prepared by Becker Morgan Group (dated 12/13/13) and agreed to by DeIDOT

At the proposed South Site Entrance on US Route 113, the developer should include concrete channelization islands on the site driveway to separate entering and exiting traffic. The island(s) should be designed to limit exiting traffic to right turns only. The developer should coordinate with DeIDOT’s Subdivision Section to determine an acceptable design for the channelization.

4. The developer should close the US Route 113 median crossover located immediately south of the proposed South Site Entrance intersection. This should be done in conjunction with the construction of the South Site Entrance as described above in Item No. 3. The developer should coordinate with DeIDOT’s Subdivision Section to determine how the closure should be implemented and details of the post-closure condition of this location.
5. The developer should participate in the construction of the improvements at the intersection of US Route 113 and Delaware Route 18/404. The proposed improvements include adding a second left-turn lane and a second right-turn lane to the eastbound approach of Delaware Route 18/404. While the second right-turn lane is included in the

design of DelDOT’s HEP Project at this intersection, the HEP Project includes only one eastbound left-turn lane. The dual eastbound left-turn lanes should have 300 feet of storage. The eastbound outside right-turn lane should have 375 feet of storage and the inside right-turn lane should extend back to the upstream intersection of Delaware Route 18/404 and Carmean Way / Delaware Tech Entrance (a distance of over 900 feet). A plan of the proposed changes is shown in the Conceptual Improvements Figure on Page 11. Other developers may be responsible for participation in the construction of the improvements. The developer should coordinate with DelDOT’s Subdivision Section to determine the exact design details, including final turn-lane lengths, and to discuss the implementation of these proposed improvements.

6. The developer should enter into a traffic signal agreement with DelDOT for the intersection of US Route 113 and Delaware Route 18/404. The agreement will cover the signal adjustments required by the physical improvements noted in Item No. 5. The agreement should include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT’s discretion. Other developers may enter into a traffic signal agreement for this intersection as well. The developer should coordinate with DelDOT on the implementation and equitable cost sharing of the traffic signal.

7. The developer should improve the intersection of Delaware Route 18/404 and Carmean Way / Delaware Tech Entrance, as shown in the Conceptual Improvements Figure on Page 11. The proposed configuration is shown in the table below. Other developers may be responsible for participation in the construction of the improvements. The developer should coordinate with DelDOT to determine design details and implementation of these proposed improvements.

Approach	Current Configuration	Proposed Configuration
Northbound Delaware Tech Entrance	One shared through/left-turn lane and one right-turn lane	One shared through/left-turn lane and one right-turn lane
Southbound Carmean Way	One shared through/left-turn lane and one right-turn lane	One shared through/left-turn lane and one right-turn lane
Eastbound Delaware Route 18/404	One left-turn, one through lane, and one right-turn lane	One left-turn, one through lane, and one right-turn lane
Westbound Delaware Route 18/404	One left-turn, one through lane, and one right-turn lane	Two left-turn lanes, two through lanes, and one right- turn lane

In conjunction with the above improvements, a second receiving lane will be required on westbound Delaware Route 18/404 and on the southbound Delaware Tech entrance driveway.

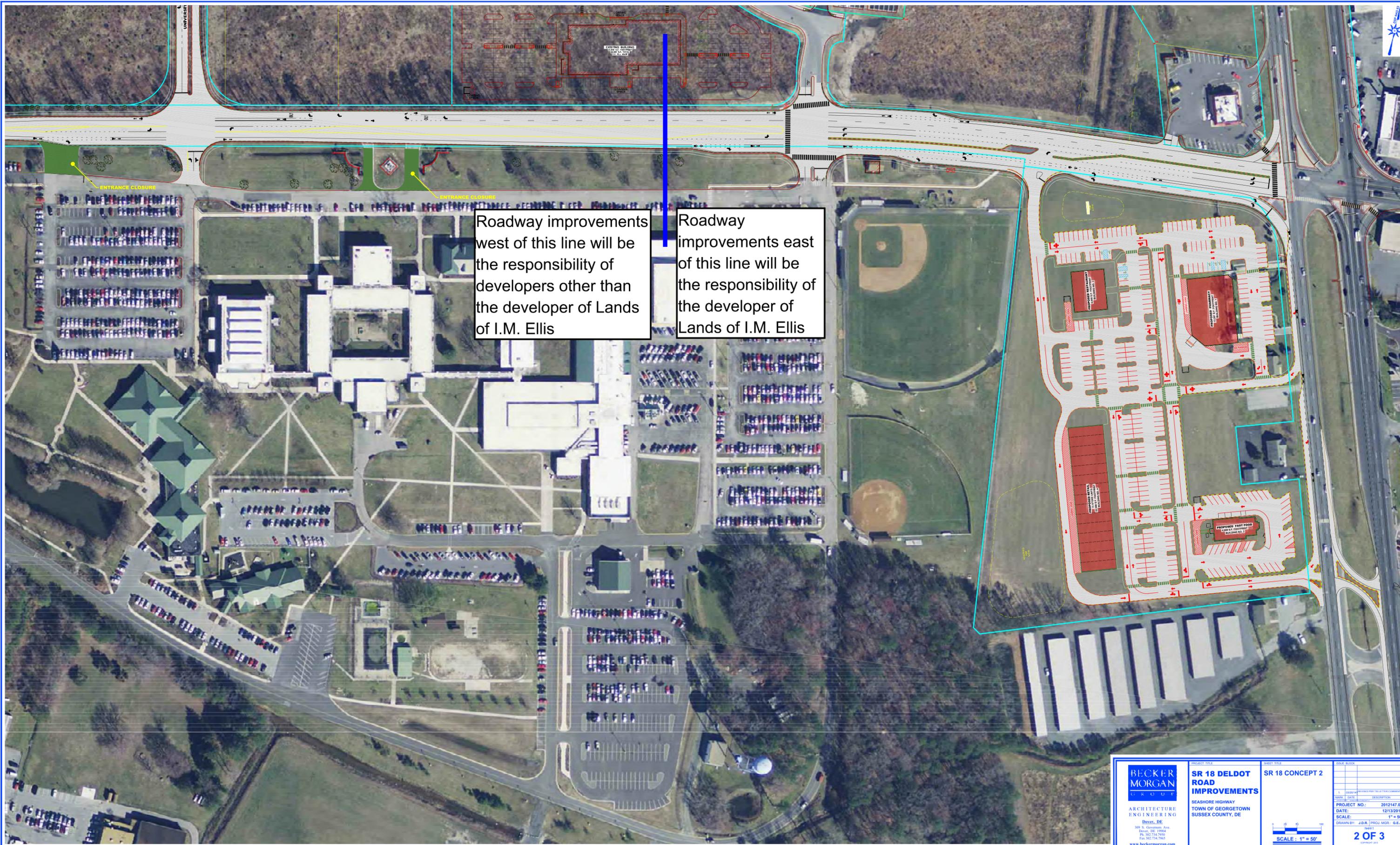
Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DelDOT’s Subdivision Section to determine final turn-lane lengths during the site plan review process.

Approach	Left-Turn Lane(s)	Right-Turn Lane
Northbound Delaware Tech Entrance	N/A	185 feet*
Southbound Carmean Way	N/A	145 feet*
Eastbound Delaware Route 18/404	150 feet**	125 feet**
Westbound Delaware Route 18/404	350 feet***	225 feet**

- * turn-lane length based on storage length per queuing analysis, although the turn lane length shown would be limited by proximity to the nearest internal intersection
- ** turn-lane length based on the SR 18 Concept 2 plan prepared by Becker Morgan Group (dated 12/13/13) and agreed to by DelDOT
- *** 350 feet for inside left-most left-turn lane, 550 feet for right-most left-turn lane. Turn-lane lengths based on the SR 18 Concept 2 plan prepared by Becker Morgan Group (dated 12/13/13) and agreed to by DelDOT.

8. The developer should enter into a traffic signal agreement with DelDOT for the intersection of Delaware Route 18/404 and Carmean Way / Delaware Tech Entrance. The agreement should include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT’s discretion. Other developers may enter into a traffic signal agreement for this intersection as well. The developer should coordinate their efforts with DelDOT on the implementation and equitable cost sharing of the traffic signal.

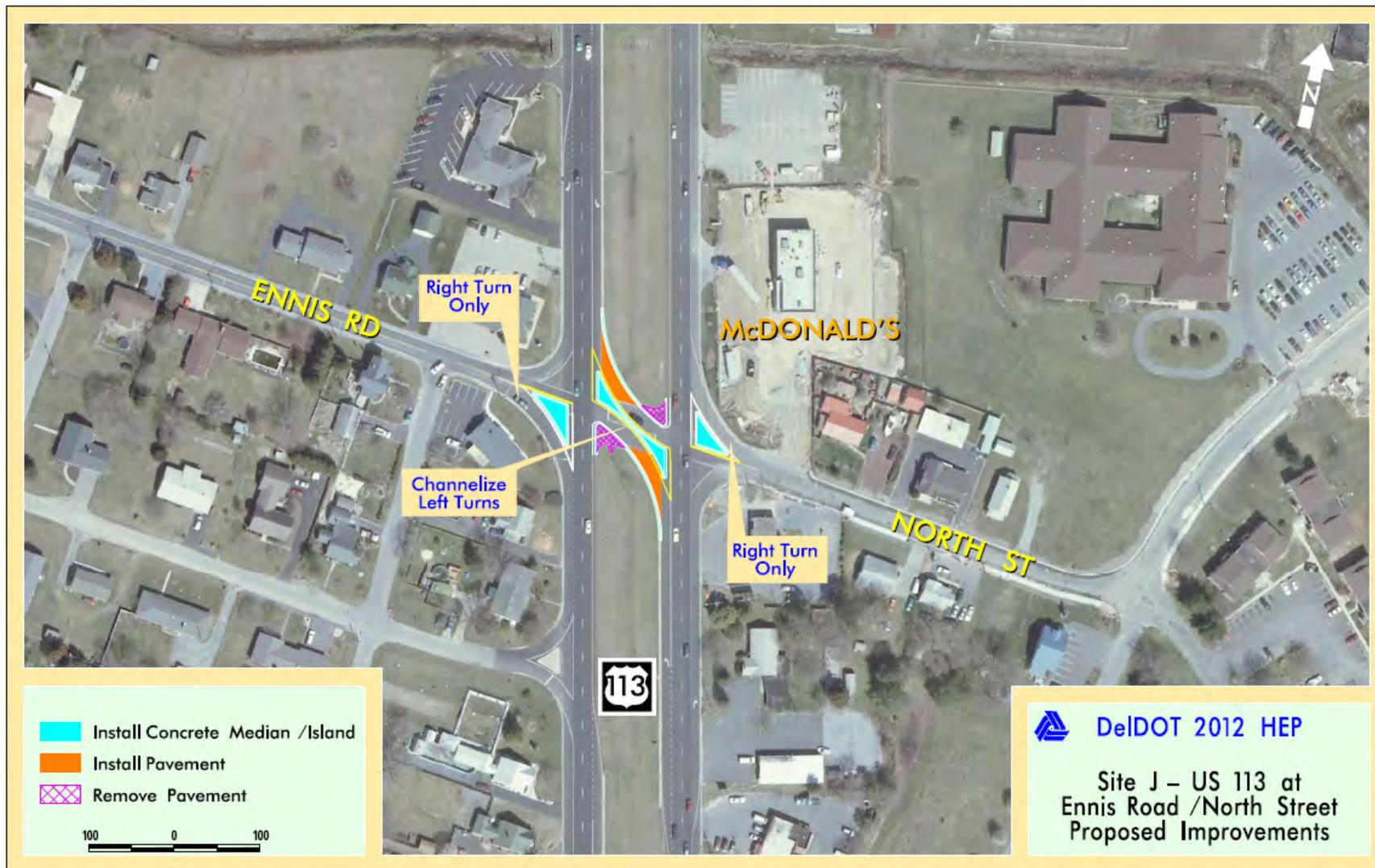
9. The developer should coordinate with DelDOT regarding an equitable share contribution toward DelDOT’s HEP Project at the intersection of US Route 113 and Ennis Road / North Street. As previously described, this intersection should be improved by installing concrete islands to limit traffic on the eastbound Ennis Road and westbound North Street approaches to right-turns only (left turns and through traffic prohibited). The eastbound and westbound through and left-turn demand would be accommodated via right turns followed by U-turns at nearby median crossovers on US Route 113. All movements from both directions of US Route 113 would still be permitted at this intersection. A concept plan of these proposed improvements is provided on Page 12. The developer should be required to make an equitable share contribution toward these improvements and to coordinate with DelDOT’s Subdivision Section regarding the amount thereof.



Roadway improvements west of this line will be the responsibility of developers other than the developer of Lands of I.M. Ellis

Roadway improvements east of this line will be the responsibility of the developer of Lands of I.M. Ellis

 BECKER MORGAN GROUP ARCHITECTURE ENGINEERING DAVENPORT, DE 300 S. Greenway Ave. Dover, DE 19904 P: 302.734.7900 F: 302.734.7905 www.beckermorgan.com	PROJECT TITLE SR 18 DELDOT ROAD IMPROVEMENTS SEASHORE HIGHWAY TOWN OF GEORGETOWN SUSSEX COUNTY, DE	SHEET TITLE SR 18 CONCEPT 2	ISSUE BLOCK <table border="1"> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>								
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10. The following bicycle, pedestrian, and transit improvements should be included:
 - a. In both directions of Delaware Route 18/404 from US Route 113 to just west of the proposed relocated Delaware Tech Western Access, a minimum of a five-foot bicycle lane should be dedicated and striped with appropriate markings for bicyclists to the right of the right-most through lane in order to facilitate safe and unimpeded bicycle travel. Where right-turn lanes are proposed for Delaware Route 18/404, the bicycle lane should run between the through lane and the right-turn lane.
 - b. A right-turn yield to bikes sign (MUTCD R4-4) should be added at the start of each right-turn lane proposed for Delaware Route 18/404 from US Route 113 to just west of the proposed relocated Delaware Tech Western Access.
 - c. Appropriate bicycle symbols, directional arrows, striping (including stop bars), and signing should be included along bicycle facilities and right-turn lanes within the project limits.
 - d. Bike parking should be provided near the building entrances within this development. Where the building architecture provides for an awning or other overhang, the bike parking should be covered.
 - e. Utility covers should be made flush with the pavement.
 - f. A 15-foot wide easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontage along US Route 113. Within this easement, a minimum of a five-foot wide sidewalk (with a minimum of a five-foot buffer from the roadway) that meets current AASHTO and ADA standards should be constructed along the site frontage. At the northern end, the sidewalk should connect to the sidewalk along Delaware Route 18/404. At the southern end, the sidewalk should connect to the shoulder of US Route 113.
 - g. A 15-foot wide easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontage along Delaware Route 18/404. Within this easement, the existing sidewalk should be removed and reconstructed consistent with DelDOT's HEP Project at the intersection of US Route 113 and Delaware Route 18/404. This includes construction of a minimum of a five-foot wide sidewalk (with a minimum of a five-foot buffer from the proposed edge of roadway) that meets current AASHTO and ADA standards along the site frontage. At the western end, the sidewalk should connect to the existing sidewalk along Delaware Route 18/404. At the eastern end, the sidewalk should connect to the proposed sidewalk along US Route 113. The sidewalk described herein should be built regardless of when the DelDOT HEP project is constructed. If the Lands of I.M. Ellis development goes to construction first, the developer should be required to construct the sidewalk per DelDOT's plans. Alternatively, if the DelDOT project goes to construction first, the developer should be required to contribute towards the DelDOT project. The developer should coordinate with DelDOT to determine design details, implementation, and/or contribution towards the construction of this sidewalk.
 - h. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.

- i. Internal sidewalks for pedestrian safety and to promote walking as a viable transportation alternative should be constructed within the site. These sidewalks should each be a minimum of seven feet wide (with a minimum of a five-foot buffer from the roadway) and should meet current AASHTO and ADA standards. These internal sidewalks should connect the building entrances to the frontage sidewalks along US Route 113 and Delaware Route 18/404.
- j. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to eliminate vehicular overhang onto the sidewalk.
- k. The developer should coordinate with the DelDOT and Delaware Transit Corporation (DTC) regarding a bus stop at this location. This should include an ADA-compliant 5' by 10' bus shelter and concrete pad, as well as a bus pull-off, to be installed along the Delaware Route 18/404 site frontage. Plans for adding a bus stop along the Delaware Route 18/404 site frontage will need to be coordinated with DelDOT's HEP Project that plans to add a second right-turn lane on the eastbound approach of Delaware Route 18/404 at US Route 113. Internal sidewalks should be connected to any new transit facilities and parking facilities for bicyclists should be included. The developer should coordinate with the DTC and DelDOT regarding the details and implementation of the transit-related improvements.

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_mutcd/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.

Additional details on our review of this TIS are attached. Please contact me at (302) 738-0203 or through e-mail at ajparker@mtmail.biz if you have any questions concerning this review.

Sincerely,

McCormick Taylor, Inc.



Andrew J. Parker, P.E., PTOE
Project Manager

Enclosure

General Information

Report date: July 12, 2013

Prepared by: Orth-Rodgers and Associates, Inc. (ORA)

Prepared for: Royal Farms

Tax parcels: 135-14.00-37.00, 135-14.15-02.00, 135-14.15-03.00, 135-14.15-04.00, and 135-14.15-05.00

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

Project Description and Background

Description: The proposed development would consist of a 13,281 square-foot pharmacy with drive-through window, 31,500 square feet of general retail space, and a 4,000 square-foot fast food restaurant with drive-through window.

Location: The Lands of I.M. Ellis commercial development is proposed to be located on the southwest corner of US Route 113 (Sussex Road 113 / DuPont Boulevard) and Delaware Route 18/404 (Sussex Road 18 / Seashore Highway), within the Town of Georgetown in Sussex County, Delaware. A site location map is included on Page 16.

Amount of land to be developed: 11.5 acres of land

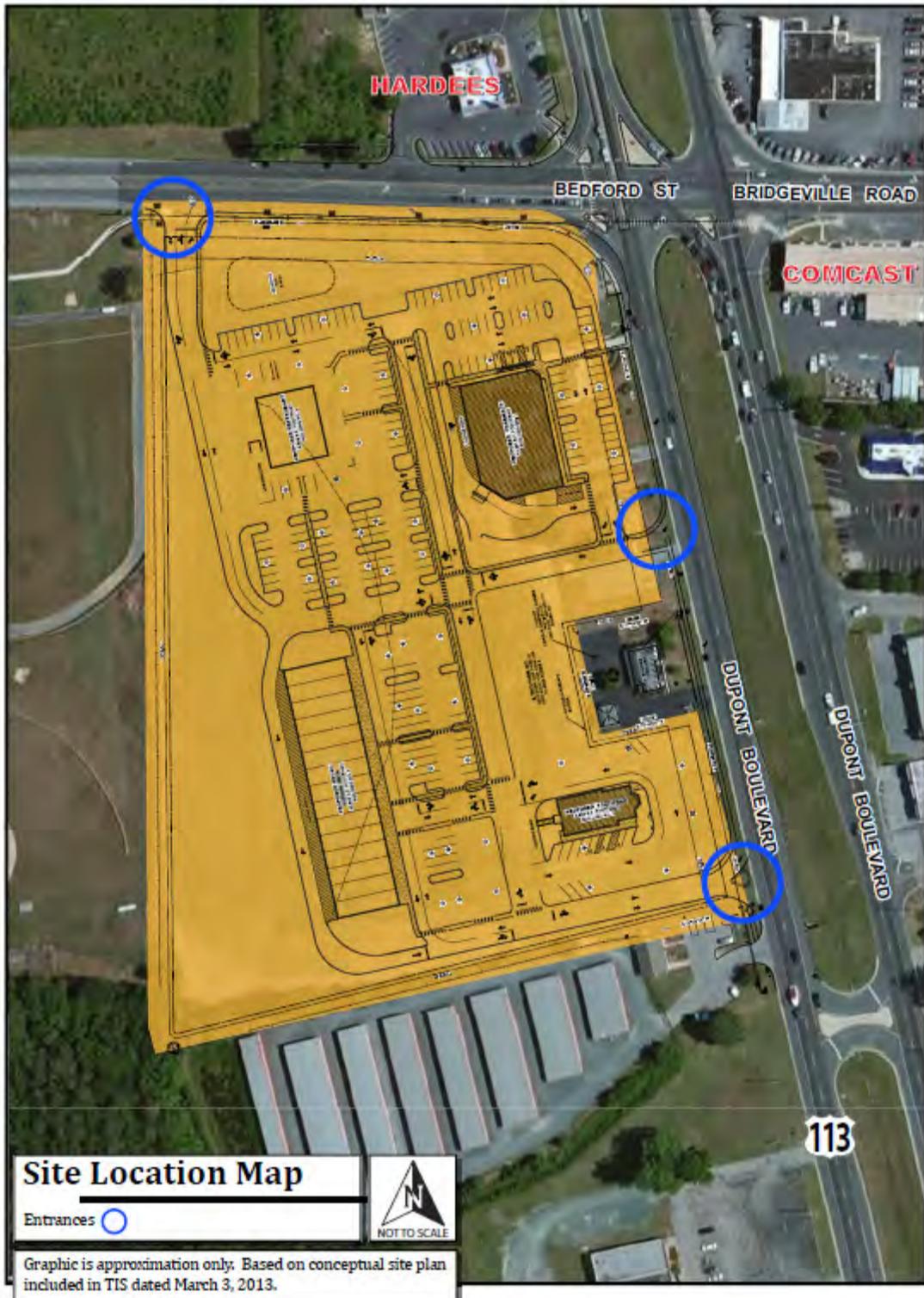
Land use approval(s) needed: Subdivision approval. The land is currently zoned as HC (Highway Commercial) within the Town of Georgetown, and the developer does not propose to change the zoning.

Proposed completion date: 2016 for the pharmacy, 2018 for the remainder of the development

Proposed access locations: Three access points are proposed: one on Delaware Route 18/404 and two limited access points on southbound US Route 113.

Daily Traffic Volumes (per DelDOT Traffic Summary 2012):

- 2011 Average Annual Daily Traffic on US Route 113: 23,945 vpd
- 2011 Average Annual Daily Traffic on Delaware Route 18/404: 11,385 vpd



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 Lands of I.M. Ellis is located within Investment Level 1.

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.

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

The proposed Lands of I.M. Ellis is located within Investment Level 1 and is to be developed as a shopping center including a pharmacy, retail space, and a restaurant. The *Strategies* document generally encourages efficient new growth and redevelopment in Investment Level 1 areas, and the proposed development is consistent with those goals. 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

Sussex County Comprehensive Plan:

(Source: Sussex County Comprehensive Plan Update, June 2008)

The Sussex County Comprehensive Plan Future Land Use Map indicates that the proposed Georgetown Crossing development is in the Town of Georgetown, a municipality. Sussex County strongly favors directing development to municipalities that desire it. The specific permitted uses and densities governing new construction within an incorporated municipality will continue to be governed by that municipality's zoning ordinance, its public water and sewer capacities, and its comprehensive planning policies.

Town of Georgetown Comprehensive Plan:

(Source: Town of Georgetown Comprehensive Plan, January 2010)

On the Existing Land Use Map (dated 2007), the proposed development is shown as Parks & Outdoor Recreation, Commercial, and Single-Family Dwelling. The Comprehensive Plan Map designates the area as Commercial. The Comprehensive Plan describes DelDOT's US Route 113 North/South Study and states that, "One goal is to make sure that Route 113's ability to handle through-traffic is not obstructed by poorly planned new strip commercial uses with multiple driveways. Also, there is a desire to avoid intense new development in locations that would inhibit the construction of needed improvements." With plans to make major improvements to the intersection of US Route 113 & Delaware Route 18/404 as part of the US Route 113 North/South Study, the Lands of I.M. Ellis property may be one of those locations.

The Comprehensive Plan goes on to note that, "The Town should work with developers of land west of Route 113 to construct north-south alternative connections." This would be done to relieve congestion on US Route 113 itself. The Comprehensive Plan also states that, "Overall, interconnected driveways and/or rear access connections that are shared among businesses are desirable along Route 113 to minimize the number of access points onto Route 113."

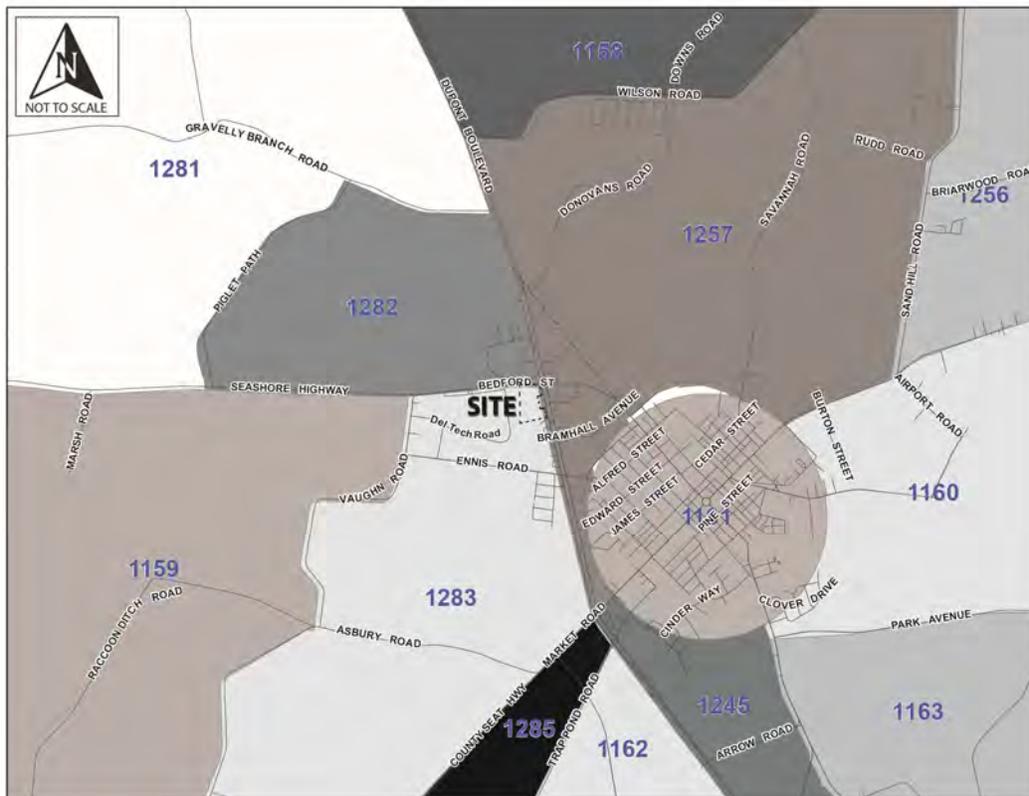
Proposed Development's Compatibility with Comprehensive Plans:

The proposed commercial development is currently zoned as HC (Highway Commercial) in the Town of Georgetown, where retail shops, restaurants, and pharmacies are permitted uses. However, the Town of Georgetown's Comprehensive Plan stresses the need for proposed developments to fit in with plans for DelDOT's US Route 113 North/South Study, to consider alternative connections, and minimize the number of access points onto US Route 113. Those are elements that should be considered for the Lands of I.M. Ellis property, given its location and proposed land use. As such, this development raises questions regarding consistency with the Town of Georgetown Comprehensive Plan, and thus requires additional discussion.

Transportation Analysis Zones (TAZ)

Transportation Analysis Zones (TAZ) where development would be located: 1283

TAZ Boundaries:



Current employment estimate for TAZ: 45 jobs in 2005

Future employment estimate for TAZ: 61 jobs in 2030

Current population estimate for TAZ: 259 people in 2005

Future population estimate for TAZ: 583 people in 2030

Current household estimate for TAZ: 79 houses in 2005

Future household estimate for TAZ: 180 houses in 2030

Relevant committed developments in TAZ: Georgetown Crossing

Would the addition of committed developments to current estimates exceed future projections: No for population and households. Yes for employment.

Would the addition of committed developments and the proposed development to current estimates exceed future projections: No for population and households. Yes for employment.

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

DelDOT currently has three relevant projects in the study area. The first is the US Route 113, North/South Improvements project (a.k.a. US 113 North/South Study) (State Contract No. T200212701). The US 113 North/South Study seeks to address the existing and future transportation needs along the US Route 113 corridor while preserving environmental and historic resources, preserving the existing north/south corridor in Sussex County, and accommodating planned economic growth. The project team coordinates with Sussex and Kent Counties and the affected municipalities and continues to study viable alternatives for north/south capacity improvements throughout Sussex County. Many alternatives have been studied, both on and off existing alignments.

In June 2007, after evaluating input from the public, conducting analyses and working to refine the alternatives, DelDOT announced a Recommended Preferred Alternative for the Georgetown Area of the US 113 North/South Study. For more information, please see the project web site at <http://www.deldot.gov/information/projects/us113/>. The Refined On-Alignment Alternative is the Recommended Preferred Alternative in the Georgetown Area. An Environmental Assessment was completed for this alternative in March 2012. Notable features of the Refined On-Alignment Alternative in the Georgetown Area include: widening US Route 113 to provide an additional lane northbound and southbound, building grade-separated intersections at several locations, and eliminating traffic signals and unsignalized crossovers along US Route 113. As currently planned, the design concept for this alternative would have direct impacts on the intersection of US Route 113 and Delaware Route 18/404. It would become a grade-separated intersection with realigned Delaware Route 18/404 and multiple ramps going through the Lands of I.M. Ellis property. Much of the proposed Lands of I.M. Ellis commercial development site would be impacted by the US 113 North/South Study construction footprint (according to the current design concept), including the proposed site access points on US Route 113 and Delaware Route 18/404. The DelDOT Project Manager for the US 113 North/South Study has indicated design of this grade-separated intersection will begin with Preliminary Engineering in FY 2017. Overall, the US Route 113 North/South Study is a long-term project with construction not expected to occur until at least 2020.

The second project is the Corridor Capacity Preservation Program (CCPP), which is a statewide program intended to manage and preserve the traffic capacity and safety of adopted highway corridors by various means such as limiting access points and using service roads for local vehicle trips. The general purpose of the program is to ensure that existing principal arterial roadways, such as US Route 113, are able to efficiently carry regional traffic without significant impedance from the effects of local development. The program was established in accordance

with the provisions of Title 17, Section 145 of the Delaware Code. DelDOT's CCPP Manager has no objection to the proposed development, and stated that direct access to US Route 113 will be permitted via two rights-in and one rights-out. The entry/exit points must be spaced properly and adhere to DelDOT's design standards. Deceleration and acceleration lanes will be required for site access along US Route 113. He also indicated concerns about the potential site access along Delaware Route 18/404 due to proposed improvements for the nearby intersection of US Route 113 and Delaware Route 18/404.

The third project is associated with DelDOT's Hazard Elimination Program (HEP). All of the intersections in this study area are within Sites E and J of the 2012 HEP. The HEP committee studied safety and operations in great detail at all the existing intersections within these two sites. The HEP Task I Report for these sites identified numerous issues of concern, along with recommendations for remedial improvements in the areas of signing, pavement markings, and signals. The Task I Report also identified the need for three additional studies to focus on safety and operational concerns with: 1) the eastbound right-turn movement from Delaware Route 18/404 to southbound US Route 113, 2) the intersection of US Route 113 and Ennis Road (Sussex Road 519) / North Street, and 3) the intersection of Delaware Route 18/404 and Carmean Way / Delaware Tech Entrance.

In the HEP Task II Report, these three intersections were studied more closely and significant improvement alternatives were evaluated for each. At the US Route 113 and Ennis Road / North Street intersection, the HEP committee considered two options: median channelization or installation of a traffic signal. A signal warrant analysis was completed and found that a signal would be warranted. However, the committee's recommendation was to leave the intersection unsignalized and to channelize the median by installing concrete islands, which would result in converting the side street to rights-in/rights-out only (prohibiting left turns and through traffic from the side streets) while continuing to allow all movements from the US Route 113 approaches. In subsequent discussions with the Town of Georgetown, it was found that they too prefer the channelization option. Based on these discussions and additional input from DelDOT's Traffic Section, a signal is not recommended for this location.

For the Delaware Route 18/404 and Carmean Way / Delaware Tech Entrance intersection, the HEP Task II Report evaluated the possibility of installing a fully-operational traffic signal but cited a recent traffic operational analysis (TOA) that found a signal is not warranted at this time. The TOA stated that a signal would likely be warranted upon development of the proposed Georgetown Commercial property (now known as Village of College Park and Shops of College Park), which is included in this Lands of I.M. Ellis TIS as a committed development. The HEP report also stated that southbound Carmean Way left-turn traffic volumes will likely temporarily decrease once the traffic signal at US Route 113 and College Park Drive is installed (scheduled for late 2013). As such, the HEP committee recommended no major improvements at this time for the intersection of Delaware Route 18/404 and Carmean Way / Delaware Tech Entrance, but they noted that Delaware Tech is evaluating consolidation of their access points on Delaware Route 18/404, and that consideration should be given to relocating Carmean Way further west.

For the eastbound Delaware Route 18/404 right-turn to southbound US Route 113, the HEP Task II Report evaluated three options to address crashes and queuing problems associated with this

movement. All three options involved changing the eastbound right-turn movement from yield-controlled to signal-controlled. Option 1 includes an overlap phase (coinciding with northbound left turns), Option 1A includes the overlap phase and prohibits right-turns on red, and Option 2 includes the overlap phase, prohibits right-turns on red, and adds a second eastbound right-turn lane. The HEP committee’s recommendation is to design and construct Option 2. Option 2 would require widening on the south side of Delaware Route 18/404 to provide a double right-turn lane with 650 feet of storage length (which goes beyond the limits of the Lands of I.M. Ellis property site frontage). Concrete curb would be installed, the existing sidewalk would be reconstructed, the existing right-turn channelization island would be removed, and there would be changes to lane striping, crosswalks, and traffic signal equipment.

The improvements recommended by DelDOT’s HEP Task II Report for 2012 Sites E and J, as described above, have recently entered into the project design process of DelDOT’s Project Development Section. The anticipated schedule for design completion and construction is not known at this time.

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:

- 13,281 square-foot pharmacy with drive-through (ITE Land Use Code 881)
- 31,500 square-foot shopping center (ITE Land Use Code 820)
- 4,000 square-foot fast-food restaurant with drive-through (ITE Land Use Code 934)

Table 1
LANDS OF I.M. ELLIS PEAK HOUR TRIP GENERATION

Land Use	PM Peak Hour			Saturday Mid-Day		
	In	Out	Total	In	Out	Total
13,281 sf pharmacy	66	66	132	53	56	109
Pass-by Trips	32	32	64	-	-	-
Net External Trips	34	34	68	53	56	109
31,500 sf shopping center	132	144	276	215	198	413
Pass-by Trips	73	79	152	73	67	140
Net External Trips	59	65	124	142	131	273
4,000 sf fast-food restaurant	68	63	131	120	116	236
Pass-by Trips	33	31	64	60	58	118
Net External Trips	35	32	67	60	58	118
TOTAL NEW TRIPS	128	131	259	255	245	500

Table 2
LANDS OF I.M. ELLIS DAILY TRIP GENERATION

Land Use	Weekday ADT			Saturday ADT		
	In	Out	Total	In	Out	Total
13,281 sf pharmacy	1389	1389	2778	1389	1389	2778
31,500 sf shopping center	1603	1603	3206	2231	2231	4462
4,000 sf fast-food restaurant	992	992	1984	1444	1444	2888
TOTAL TRIPS	3984	3984	7968	5064	5064	10128

Overview of TIS

Intersections examined:

- 1) Delaware Route 18/404 & Site Entrance
- 2) US Route 113 & North Site Entrance
- 3) US Route 113 & South Site Entrance
- 4) US Route 113 & Delaware Route 18/404
- 5) Delaware Route 18/404 & Carmean Way / Delaware Tech Entrance
- 6) US Route 113 & First Crossover South of Site
- 7) US Route 113 & Ennis Road / North Street

Conditions examined:

- 1) 2013 existing conditions (Case 1)
- 2) 2016 without Lands of I.M. Ellis (Case 2)
- 3) 2016 with Lands of I.M. Ellis pharmacy only
 - a. With left-in/right-in/right-out access on Delaware Route 18/404, right-in-only access at the US Route 113 north site entrance, and right-in/right-out access at the US Route 113 south site entrance (Case 3A)
 - b. With left-in/right-in/right-out access on Delaware Route 18/404, right-in-only access at the US Route 113 north site entrance, and left-in/right-in/right-out access at the US Route 113 south site entrance (Case 3B)
 - c. With full access on Delaware Route 18/404, right-in-only access at the US Route 113 north site entrance, and left-in/right-in/right-out access at the US Route 113 south site entrance (Case 3C)
- 4) 2018 with Lands of I.M. Ellis full-build
 - a. With left-in/right-in/right-out access on Delaware Route 18/404, right-in-only access at the US Route 113 north site entrance, and right-in/right-out access at the US Route 113 south site entrance (Case 4A)
 - b. With left-in/right-in/right-out access on Delaware Route 18/404, right-in-only access at the US Route 113 north site entrance, and left-in/right-in/right-out access at the US Route 113 south site entrance (Case 4B)
 - c. With full access on Delaware Route 18/404, right-in-only access at the US Route 113 north site entrance, and left-in/right-in/right-out access at the US Route 113 south site entrance (Case 4C)

Note: Case 3C and Case 4C were not included in the scope of this TIS (per DelDOT's Scoping Meeting Minutes dated January 4, 2013), but were added by ORA.

Peak hours evaluated: Weekday evening and Saturday mid-day peak hours

Committed developments considered:

- 1) Village of College Park (94 single-family detached houses, 271 townhouses, and 120 apartments)
- 2) Shops of College Park (17,600 square feet of general office space, a 76,500 square-foot shopping center, a 7,000 square-foot high-turnover restaurant, a 7,100 square-foot drive-in bank, a 116,000 square-foot home improvement superstore, a 12,900 square-foot pharmacy with drive-thru, a 3,600 square-foot donut shop, a 17,000 square-foot pet supply superstore, and a 72-room hotel)
- 3) Short Property (70-room hotel)
- 4) Georgetown Crossing (152,280 square feet of retail space, 8,440 square feet of fast-food restaurant (with drive-through) space, 10,000 square feet of high-turnover sit-down restaurant space, and a 5,000 square-foot bank. After the Lands of I.M. Ellis TIS was scoped, the proposed land use and phasing for Georgetown Crossing changed somewhat, with the biggest difference being that the large retail component is no longer being considered for Phase 1 of that development. That being said, the Lands of I.M. Ellis TIS assumed Georgetown Crossing as a committed development having the land use described herein.)

Intersection Descriptions

1) Delaware Route 18/404 & Site Entrance

Type of Control: proposed two-way stop-controlled (left-in/right-in/right-out T-intersection)

Northbound approach: (Proposed Site Entrance) proposed one right-turn-only lane, stop controlled

Eastbound approach: (Delaware Route 18/404) existing one through lane; proposed one through lane and one right-turn lane

Westbound approach: (Delaware Route 18/404) existing two through lanes; proposed one left-turn lane and two through lanes

Note: The limited access configuration described above reflects DelDOT's Scoping Meeting Minutes dated January 4, 2013. ORA also evaluated a full access configuration, and recommends the site entrance be constructed with full access.

- 2) **US Route 113 & North Site Entrance**
Type of Control: proposed right-in-only T-intersection
Northbound approach: (US Route 113) existing two left-turn lanes for downstream lefts at Delaware Route 18/404, two through lanes, and one right-turn lane for downstream rights at Delaware Route 18/404. The northbound lanes are separated from southbound lanes by a grass median. The proposed northbound configuration is the same as existing.
Southbound approach: (US Route 113) existing two through lanes; proposed two through lanes and one right-turn lane
Note: The site entrance is proposed as a one-way street heading away from US Route 113. This intersection would consist only of southbound through and right-turning traffic, and no HCS analysis is conducted for this type of intersection.

- 3) **US Route 113 & South Site Entrance**
Type of Control: proposed two-way stop-controlled (limited-access T-intersection)
Northbound approach: (US Route 113) existing two through lanes (separated from southbound lanes by grass median); proposed EITHER same as existing OR one left-turn lane and two through lanes. If the left-turn lane is added, the existing crossover just south of this proposed site entrance would be eliminated.
Southbound approach: (US Route 113) existing two through lanes; proposed two through lanes and one right-turn lane
Eastbound approach: (Proposed Site Entrance) proposed one right-turn-only lane, stop controlled

- 4) **US Route 113 & Delaware Route 18/404**
Type of Control: signalized four-leg intersection
Northbound approach: (US Route 113) two left-turn lanes, two through lanes and one right-turn lane
Southbound approach: (US Route 113) one left-turn lane, two through lanes and one right-turn lane
Eastbound approach: (Delaware Route 18/404) one left-turn lane, one through lane and one right-turn lane
Westbound approach: (Delaware Route 18/404) one left-turn lane, two through lanes and one right-turn lane
Note: If the DelDOT Project for 2012 HEP Sites E and J is completed as proposed, the configuration of the eastbound approach of Delaware Route 18/404 would be one left-turn lane, one through lane, and two right-turn lanes.

- 5) **Delaware Route 18/404 & Carmean Way / Delaware Tech Entrance**
Type of Control: two-way stop-controlled, with flashing beacon
Northbound approach: (Delaware Tech Eastern Access Driveway) one shared through/left-turn lane and one right-turn lane, stop-controlled with flashing red beacon
Southbound approach: (Carmean Way) one shared through/left-turn lane and one right-turn lane, stop-controlled with flashing red beacon
Eastbound approach: (Delaware Route 18/404) one left-turn lane, one through lane, and one right-turn lane, with flashing yellow beacon
Westbound approach: (Delaware Route 18/404) one left-turn lane, one through lane, and one right-turn lane, with flashing yellow beacon
- 6) **US Route 113 & First Crossover South of Site**
Type of Control: stop-controlled median crossover
Northbound approach: (US Route 113) one left-turn lane and two through lanes (separated from southbound lanes by grass median)
Southbound approach: (US Route 113) one left-turn lane and two through lanes (separated from northbound lanes by grass median)
Eastbound approach: (crossover) one left-turn-only lane, stop controlled
Westbound approach: (crossover) one left-turn-only lane, stop controlled
- 7) **US Route 113 & Ennis Road / North Street**
Type of Control: four-leg intersection with stop control on Ennis Road outer approaches and also within median
Northbound approach: (US Route 113) one left-turn lane, two through lanes and one right-turn lane
Southbound approach: (US Route 113) one left-turn lane, two through lanes and one right-turn lane
Eastbound approach: (Ennis Road) one shared through/right-turn lane with flared right-turn storage on outer approach, stop controlled; one shared through/left-turn lane within median, stop controlled
Westbound approach: (North Street) one shared through/right-turn lane with flared right-turn storage on outer approach, stop controlled; one shared through/left-turn lane within median, stop controlled

Safety Evaluation

Crash Data: Crash data was not requested because all the intersections in the study area are included in DelDOT's Hazard Elimination Program (HEP) 2012 Sites E and J. The HEP committee has recommended improvements to address safety and operational concerns.

Sight Distance: With generally straight and flat roadways, sight distance is adequate throughout the study area. No problematic sight distance issues have been reported, and none were observed during field observations in the area.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: The Delaware Transit Corporation (DTC) currently operates three transit routes near the proposed Georgetown Crossing Shopping Center. DART Routes 212 and 303 travel through the intersection of US Route 113 & Delaware Route 18/404, and DART Route 206 connects with these two routes at the Georgetown Transit Hub located approximately one mile south of the site. DART Route 212 connects Georgetown, Bridgeville, Seaford, and Laurel with 13 one-way trips on weekdays between 5 AM and 10:30 PM. DART Route 303 connects Georgetown and Dover, with numerous stops in between, with 21 one-way trips on weekdays between 5 AM and 9 PM. DART Route 206 connects Georgetown, Lewes and Rehoboth Beach with 19 one-way trips on weekdays between 6 AM and midnight. All three bus routes stop at the nearby Georgetown Transit Hub.

Planned transit service: DelDOT contacted Lisa Collins, a Service Development Planner for the DTC, via email on July 22, 2013 to solicit comments regarding this TIS and whether DTC has any plans to extend the existing transit system in the vicinity of the development. Ms. Collins replied on the same day, stating that the DTC has a FY 2015 Service Change that proposes adding another route in this area in the future. The planned future route (proposed DART Route 214) would connect Georgetown and Millsboro with approximately 15 round trips between approximately 6 AM and 10 PM. Additionally, Ms. Collins requested that plans for the site include a concrete pad for a 5' by 10' bus shelter and a bus pull-off to be located along Delaware Route 18/404.

Existing bicycle and pedestrian facilities: According to the bicycle level of service (BLOS) calculator developed by the *League of Illinois Bicyclists*, US Route 113 and Delaware Route 18/404 both operate at BLOS A. There are currently no designated bicycle lanes within the study area except along westbound Delaware Route 18/404 approaching US Route 113. There are sidewalks along the south side of Delaware Route 18/404 from west of the Delaware Tech driveway to US Route 113. There are sidewalks along the east side of the Delaware Tech driveway and along the west side of the Carmean Way approach to Delaware Route 18/404, along with crosswalks across the east and south legs of that intersection. There are sidewalks on both sides of Delaware Route 18/404 east of US Route 113, and along the northbound side of US Route 113 north of Delaware Route 18/404 (along the Royal Farms site frontage). There are no sidewalks along US Route 113 anywhere from Delaware Route 18/404 to south of the Ennis Road intersection. There are crosswalks across the east, west, and south legs of the intersection of US Route 113 & Delaware Route 18/404.

Planned bicycle and pedestrian facilities: McCormick Taylor contacted Marco Boyce and Anthony Aglio with DelDOT's Bicycle and Pedestrian Facilities Team via email on August 16 19, 2013 regarding planned or requested bicycle and pedestrian facilities in the area of this proposed development. Mr. Boyce provided pedestrian-related comments via email dated August 19, 2013. If the development does occur, the proposed sidewalks along Delaware Route 18/404, US Route 113, and the site entrance driveways (as shown in the concept site plan) should have wider buffers between the sidewalk and the adjacent road. He also advised integration of sidewalks with landscape buffers and street trees / parking lot trees. Bicycle-related comments have not yet been received from Mr. Aglio.

Previous Comments

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

- There were no indications that the applicant contacted DelDOT's Project Manager for the US Route 113 North / South Study.
- The TIS did not follow DelDOT's updated analysis parameter requirements regarding base saturation flow rates, peak hour factors and heavy vehicle percentages as found in Section 2.9.11.6 of DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*.

General HCS Analysis Comments

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

- 1) For unsignalized intersections, the TIS and McCormick Taylor applied heavy vehicle (HV) percentages by movement. For signalized intersections, the TIS and McCormick Taylor applied HV percentages by lane group. For future conditions, the TIS and McCormick Taylor generally assumed future HV percentages to be the same as existing HV percentages. On exception was for the intersection of Delaware Route 18/404 & Carmean Way / Delaware Tech Entrance, where the TIS used 2% HV for all movements under all future build scenarios in which they analyzed this as a signalized intersection. McCormick Taylor analyzed future HV to be the same as existing HV.
- 2) For existing conditions, the TIS generally applied peak hour factors (PHF) by lane group. For future conditions, the TIS generally assumed future PHF (by lane group) to be the same as existing PHF or, if the volume increased and the existing PHF was less than 0.92 (which was often the case), they set the future PHF to 0.92. McCormick Taylor determined, for each intersection, the overall intersection PHF for each peak hour and applied that value to both existing and future conditions.
- 3) For analyses of signalized intersections, the TIS used a base saturation flow rate of 1,900 pcphgpl. McCormick Taylor used a base saturation flow rate of 1,750 pcphgpl per DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access* because the study area is south of the C&D Canal.
- 4) The HCS analyses included in the TIS did not always reflect the lane widths observed in the field by McCormick Taylor. McCormick Taylor's HCS analyses incorporated the field-measured lane widths.
- 5) The TIS and McCormick Taylor used different cycle lengths and/or signal timing parameters when analyzing the signalized intersections in some cases.
- 6) The TIS input Right-Turn-on-Red (RTOR) volumes for signalized intersection analyses of existing and future conditions, although the RTOR volumes used by the TIS did not match RTOR data from the traffic counts. McCormick Taylor input existing RTOR volumes from the traffic counts for existing conditions analyses. Due in part to increased volumes and fewer available gaps, there would likely be fewer vehicles able to make

right turns on red, so McCormick Taylor conservatively input no RTOR volumes for future conditions analyses, but did analyze right-turn movements as overlapping protected left-turn phases.

Table 3
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Lands of I.M. Ellis
Report dated July 12, 2013
Prepared by Orth-Rodgers and Associates, Inc.

Unsignalized Intersection ¹ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday PM	Saturday Mid-day	Weekday PM	Saturday Mid-day
Delaware Route 18/404 & Site Entrance				
2016 with Lands of I.M. Ellis – pharmacy only (Cases 3A and 3B)				
Northbound Site Entrance – Right	B (14.5)	D (31.8)	C (16.2)	D (30.1)
Westbound Delaware Route 18/404 – Left	B (10.1)	C (17.4)	A (9.8)	B (14.8)
2016 with Lands of I.M. Ellis – pharmacy only (Case 3C)				
Northbound Site Entrance	C (20.9)	D (32.7)	C (23.4)	D (34.0)
Westbound Delaware Route 18/404 – Left	B (10.1)	C (17.4)	A (9.8)	B (14.8)
2018 with Lands of I.M. Ellis – full-build (Cases 4A and 4B)				
Northbound Site Entrance – Right	C (16.5)	F (113.2)	C (19.0)	F (86.7) ²
Westbound Delaware Route 18/404 – Left	B (10.7)	D (26.3)	B (10.2)	C (19.2)
2018 with Lands of I.M. Ellis – full-build (Case 4B) <i>With Improvement Option 1</i> ³				
Northbound Site Entrance – Right	N/A	N/A	A (9.2)	B (10.1)
Westbound Delaware Route 18/404 – Left	N/A	N/A	A (9.1)	B (10.9)
2018 with Lands of I.M. Ellis – full-build (Case 4C)				
Northbound Site Entrance	E (35.5)	F (517.8)	E (39.4)	F (249.7) ⁴
Westbound Delaware Route 18/404 – Left	B (10.8)	D (28.0)	B (10.3)	C (20.0)

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. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

² The 95th percentile queue length for the northbound approach (right turns only) during the Case 4A/4B Saturday peak hour is approximately 5 vehicles.

³ Improvement Option 1 consists of the following lane configurations: the northbound site driveway would have one right-turn-only lane, eastbound Delaware Route 18/404 would have one through lane, one right-turn lane for downstream rights, and a second right-turn lane for rights into the site, and westbound Delaware Route 18/404 would have one left-turn lane, a second left-turn lane for downstream lefts, and two through lanes.

⁴ The 95th percentile queue lengths for the northbound approach during the Case 4C Saturday peak hour are approximately 7 vehicles for the left-turn lane and 5 vehicles for the right-turn lane.

Table 4
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Lands of I.M. Ellis
Report dated July 12, 2013
Prepared by Orth-Rodgers and Associates, Inc.

Unsignalized Intersection ⁵ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday PM	Saturday Mid-day	Weekday PM	Saturday Mid-day
US Route 113 & South Site Entrance				
2016 with Lands of I.M. Ellis – pharmacy only (Case 3A)				
Eastbound Site Entrance – Right	B (10.5)	B (12.8)	B (10.1)	B (13.7)
2016 with Lands of I.M. Ellis – pharmacy only (Case 3B)				
Northbound US Route 113 – Left	D (27.1)	F (612.3)	C (22.9)	F (287.7)
Eastbound Site Entrance – Right	B (10.5)	B (12.8)	B (10.1)	B (13.7)
2016 with Lands of I.M. Ellis – pharmacy only (Case 3C)				
Northbound US Route 113 – Left	D (26.7)	F (612.3)	C (22.8)	F (287.7)
Eastbound Site Entrance – Right	B (10.4)	B (12.6)	B (10.0+)	B (13.5)

⁵ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 4 (continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Lands of I.M. Ellis
Report dated July 12, 2013
Prepared by Orth-Rodgers and Associates, Inc.

Unsignalized Intersection ⁶ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday PM	Saturday Mid-day	Weekday PM	Saturday Mid-day
US Route 113 & South Site Entrance				
2018 with Lands of I.M. Ellis – full-build (Case 4A)				
Eastbound Site Entrance – Right	B (11.5)	C (22.1)	B (12.0)	C (23.8)
2018 with Lands of I.M. Ellis – full-build (Case 4B)				
Northbound US Route 113 – Left	F (132.2)	F (5379)	F (89.0) ⁷	F (3148) ⁸
Eastbound Site Entrance – Right	B (11.5)	C (22.1)	B (12.0)	C (23.8)
2018 with Lands of I.M. Ellis – full-build (Case 4B) <i>With Improvement Option 1</i> ⁹				
Northbound US Route 113 – Left	N/A	N/A	C (18.8)	F (220.7) ¹⁰
Southbound US Route 113 – Left	N/A	N/A	C (22.0)	F (52.4)
Eastbound Site Entrance – Right	N/A	N/A	B (12.0)	D (27.3)
2018 with Lands of I.M. Ellis – full-build (Case 4C)				
Northbound US Route 113 – Left	F (127.6)	F (5379)	F (87.6) ⁷	F (3148) ⁸
Eastbound Site Entrance – Right	B (11.1)	C (18.2)	B (11.4)	C (19.9)

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. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

⁷ The 95th percentile queue length for the northbound left-turn/u-turn lane during the Case 4B/4C PM peak hour is approximately 6 vehicles.

⁸ The 95th percentile queue length for the northbound left-turn/u-turn lane during the Case 4B/4C Saturday peak hour is approximately 18 vehicles.

⁹ Improvement Option 1 consists of the following lane configurations: northbound US Route 113 would have one left-turn lane and two through lanes, southbound US Route 113 would have one left-turn lane, two through lanes, and one right-turn lane, and the eastbound site driveway would have one right-turn-only lane. The results with Improvement Option 1 are much better than without it due in part to a different way of conducting the analysis of the northbound left-turn/u-turn. For analyses without Improvement Option 1, McCormick Taylor's methodology was consistent with Orth-Rodgers' methodology that separated u-turn volumes from left-turn volumes, but treated all traffic in that lane as stop-controlled. For analyses with Improvement Option 1, McCormick Taylor's analyses methodology combined left-turn volumes and u-turn volumes and treated all treated in that lane as yield-controlled.

¹⁰ The 95th percentile queue length for the northbound left-turn/u-turn lane during the Case 4B Saturday peak hour (with Improvement Option 1) is approximately 9 vehicles.

Table 5
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Lands of I.M. Ellis
Report dated July 12, 2013
Prepared by Orth-Rodgers and Associates, Inc.

Signalized Intersection ¹¹	LOS per TIS		LOS per McCormick Taylor	
	Weekday PM	Saturday Mid-day	Weekday PM	Saturday Mid-day
US Route 113 & Delaware Route 18/404				
2013 Existing (Case 1)	F (105.0)	F (109.4)	E (70.0)	F (113.2)
2016 without Lands of I.M. Ellis (Case 2)	F (106.4)	F (179.5)	F (98.9)	F (211.2)
2016 with Lands of I.M. Ellis – pharmacy only (Case 3A)	F (106.0)	F (183.8)	F (87.1)	F (164.9)
2016 with Lands of I.M. Ellis – pharmacy only (Case 3B)	F (106.3)	F (180.7)	F (86.0)	F (162.1)
2016 with Lands of I.M. Ellis – pharmacy only (Case 3C)	F (107.9)	F (178.7)	F (83.3)	F (155.3)

¹¹ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 5 (continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Lands of I.M. Ellis
Report dated July 12, 2013
Prepared by Orth-Rodgers and Associates, Inc.

Signalized Intersection ¹²	LOS per TIS		LOS per McCormick Taylor	
	Weekday PM	Saturday Mid-day	Weekday PM	Saturday Mid-day
US Route 113 & Delaware Route 18/404				
2018 with Lands of I.M. Ellis – full-build (Case 4A)	F (119.7)	F (234.7)	F (107.9)	F (217.6)
2018 with Lands of I.M. Ellis – full-build (Case 4B)	F (116.1)	F (206.8)	F (97.7)	F (198.3)
2018 with Lands of I.M. Ellis – full-build (Case 4C)	F (115.9)	F (163.2)	F (98.4)	F (189.0)
2018 with Lands of I.M. Ellis – full-build (Case 4A) <i>With DelDOT HEP Improvements</i> ¹³	N/A	N/A	F (106.6)	F (189.5)
2018 with Lands of I.M. Ellis – full-build (Case 4A) <i>With Improvement Option 2</i> ¹⁴	N/A	N/A	E (70.8)	F (89.4)
2018 with Lands of I.M. Ellis – full-build (Case 4B) <i>With Improvement Option 3</i> ¹⁵	N/A	N/A	F (88.0)	F (159.3)

¹² For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

¹³ DelDOT HEP Improvements consist of adding a second right-turn lane on the eastbound approach of Delaware Route 18/404. This right-turn lane would be signalized and have an overlap phase with the northbound US Route 113 left-turn phase.

¹⁴ Improvement Option 2 includes the DelDOT HEP Improvements plus the addition of a second through lane on the eastbound approach of Delaware Route 18/404, a second left-turn lane on the southbound approach of US Route 113, and a third through lane on both approaches of US Route 113.

¹⁵ Improvement Option 3 includes the DelDOT HEP Improvements plus the addition of a second left-turn lane on the eastbound approach of Delaware Route 18/404.

Table 6
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Lands of I.M. Ellis
Report dated July 12, 2013
Prepared by Orth-Rodgers and Associates, Inc.

Unsignalized Intersection ¹⁶ Two-Way Stop Control	LOS per TIS		LOS per McCormick Taylor	
	Weekday PM	Saturday Mid-Day	Weekday PM	Saturday Mid-Day
Delaware Route 18/404 & Carmean Way / Delaware Tech Entrance				
2013 Existing (Case 1)				
Northbound Delaware Tech Entrance	F (*)	C (16.4) ¹⁷	F (1388)	C (16.2) ¹⁷
Southbound Carmean Way	F (*)	F (219.7)	F (*)	F (132.7)
Eastbound Delaware Route 18/404 – Left	C (15.3)	B (11.5)	B (13.1)	B (11.4)
Westbound Delaware Route 18/404 – Left	B (11.6)	A (9.9)	B (10.5)	A (9.9)
2016 without Lands of I.M. Ellis (Case 2)				
Northbound Delaware Tech Entrance	F (*)	C (18.7) ¹⁷	F (*)	C (18.5) ¹⁷
Southbound Carmean Way	F (*)	F (2867)	F (*)	F (1506)
Eastbound Delaware Route 18/404 – Left	B (13.9)	B (13.1)	B (13.9)	B (12.1)
Westbound Delaware Route 18/404 – Left	B (11.4)	B (10.5)	B (11.5)	B (10.5)

* HCS could not generate a result due to excessive delay

¹⁶ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

¹⁷ Delay and LOS is much better for Saturday peak hour (compared to PM peak hour) because there are zero vehicles making the northbound left-turn and through movements during the Saturday peak hour.

Table 6 (continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Lands of I.M. Ellis
Report dated July 12, 2013
Prepared by Orth-Rodgers and Associates, Inc.

Signalized Intersection ¹⁸	LOS per TIS		LOS per McCormick Taylor	
	Weekday PM	Saturday Mid-day	Weekday PM	Saturday Mid-day
Delaware Route 18/404 & Carmean Way / Delaware Tech Entrance				
2016 with Lands of I.M. Ellis – pharmacy only (Cases 3A, 3B, and 3C)	C (26.4)	C (24.3)	C (24.1)	C (23.7)
2018 with Lands of I.M. Ellis – full-build (Cases 4A, 4B, and 4C)	C (30.1)	C (29.3)	C (29.5)	C (27.6)
2018 with Lands of I.M. Ellis – full-build (Case 4B) <i>With Improvement Option 1</i> ¹⁹	N/A	N/A	D (37.4)	B (18.4)

¹⁸ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

¹⁹ Improvement Option 1 consists of adding a second through lane and a second left-turn lane on the westbound approach of Delaware Route 18/404.

Table 7
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Lands of I.M. Ellis
Report dated July 12, 2013
Prepared by Orth-Rodgers and Associates, Inc.

Unsignalized Intersection ²⁰ U-Turn only	LOS per TIS		LOS per McCormick Taylor	
	Weekday PM	Saturday Mid-Day	Weekday PM	Saturday Mid-Day
US Route 113 & First Crossover South of Site²¹				
2013 Existing (Case 1)				
Eastbound Median – Left (Southbound US Route 113 U-turns)	C (17.3)	D (29.7)	C (16.1)	D (25.5)
Westbound Median – Left (Northbound US Route 113 U-turns)	B (14.0)	C (17.9)	B (10.5)	B (14.7)
2016 without Lands of I.M. Ellis (Case 2)				
Eastbound Median – Left (Southbound US Route 113 U-turns)	C (21.0)	E (41.9)	C (21.3)	E (41.9)
Westbound Median – Left (Northbound US Route 113 U-turns)	C (16.7)	C (23.9)	B (10.9)	B (11.3)
2016 with Lands of I.M. Ellis – pharmacy only (Case 3A)				
Eastbound Median – Left (Southbound US Route 113 U-turns)	C (22.7)	E (46.2)	C (23.0)	E (46.2) ²²
Westbound Median – Left (Northbound US Route 113 U-turns)	C (17.5)	D (25.3)	B (10.3)	B (14.3)
2018 with Lands of I.M. Ellis – full-build (Case 4A)				
Eastbound Median – Left (Southbound US Route 113 U-turns)	E (39.4)	F (293.1)	E (40.4) ²³	F (293.1) ²⁴
Westbound Median – Left (Northbound US Route 113 U-turns)	C (18.5)	D (27.5)	B (10.4)	C (15.9)

²⁰ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

²¹ Cases 3B, 3C, 4B, and 4C are not presented for this intersection because this crossover would be eliminated under those scenarios due to the addition of a proposed median opening for a northbound US Route 113 left-turn movement into the site just north of this existing crossover.

²² The 95th percentile queue length for the southbound u-turn lane during the Case 3A Saturday peak hour is less than 2 vehicles.

²³ The 95th percentile queue length for the southbound u-turn lane during the Case 4A PM peak hour is approximately 4 vehicles.

²⁴ The 95th percentile queue length for the southbound u-turn lane during the Case 4A Saturday peak hour is approximately 11 vehicles.

Table 8
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Lands of I.M. Ellis
Report dated July 12, 2013
Prepared by Orth-Rodgers and Associates, Inc.

Unsignalized Intersection ²⁵ Two-Way Stop Control	LOS per TIS		LOS per McCormick Taylor	
	Weekday PM	Saturday Mid-Day	Weekday PM	Saturday Mid-Day
US Route 113 & Ennis Road / North Street				
2013 Existing (Case 1)				
Eastbound Ennis Road – outer approach	C (18.0)	F (79.7)	B (14.0)	F (53.9)
Eastbound Ennis Road – median approach (includes SB US Route 113 left turns)	F (*)	F (*)	F (200.1)	F (383.0)
Westbound North Street – outer approach	F (154.1)	F (230.0)	F (86.0)	F (105.3)
Westbound Ennis Road – median approach (includes NB US Route 113 left turns)	F (221.6)	F (223.7)	F (117.7)	F (85.3)
2016 without Lands of I.M. Ellis (Case 2)				
Eastbound Ennis Road – outer approach	C (22.9)	F (693.6)	D (33.4)	F (546.3)
Eastbound Ennis Road – median approach (includes SB US Route 113 left turns)	F (*)	F (*)	F (*)	F (*)
Westbound North Street – outer approach	F (300.0)	F (461.2)	F (300.0)	F (421.5)
Westbound Ennis Road – median approach (includes NB US Route 113 left turns)	F (423.5)	F (*)	F (874.2)	F (*)
2016 with Lands of I.M. Ellis – pharmacy only (Cases 3A, 3B, and 3C)				
Eastbound Ennis Road – outer approach	C (23.8)	F (792.9)	C (21.9)	F (603.4)
Eastbound Ennis Road – median approach (includes SB US Route 113 left turns)	F (*)	F (*)	F (*)	F (*)
Westbound North Street – outer approach	F (298.5)	F (482.0)	F (298.5)	F (440.0)
Westbound Ennis Road – median approach (includes NB US Route 113 left turns)	F (441.2)	F (*)	F (398.1)	F (*)
2018 with Lands of I.M. Ellis – full-build (Cases 4A, 4B, and 4C)				
Eastbound Ennis Road – outer approach	D (28.4)	F (1477)	D (26.6)	F (1065)
Eastbound Ennis Road – median approach (includes SB US Route 113 left turns)	F (*)	F (*)	F (*)	F (*)
Westbound North Street – outer approach	F (366.0)	F (574.0)	F (365.9)	F (523.1)
Westbound Ennis Road – median approach (includes NB US Route 113 left turns)	F (602.3)	F (*)	F (561.3)	F (*)

* HCS could not generate a result due to excessive delay

²⁵ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 8 (continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Lands of I.M. Ellis
Report dated July 12, 2013
Prepared by Orth-Rodgers and Associates, Inc.

Unsignalized Intersection ²⁶ Two-Way Stop Control	LOS per TIS		LOS per McCormick Taylor	
	Weekday PM	Saturday Mid-Day	Weekday PM	Saturday Mid-Day
US Route 113 & Ennis Road / North Street				
2016 with Lands of I.M. Ellis – pharmacy only (Cases 3A, 3B, and 3C) <i>With Improvement Option 1</i> ²⁷				
Northbound US Route 113 – Left	N/A	N/A	C (21.5)	D (28.6)
Southbound US Route 113 – Left	N/A	N/A	C (17.8)	E (38.1) ²⁸
Eastbound Ennis Road – Right	N/A	N/A	C (23.2)	D (33.2)
Westbound North Street – Right	N/A	N/A	D (33.7)	F (99.8) ²⁹
2018 with Lands of I.M. Ellis – full-build (Cases 4A, 4B, and 4C) <i>With Improvement Option 1</i> ²⁷				
Northbound US Route 113 – Left	N/A	N/A	C (24.3)	D (33.0)
Southbound US Route 113 – Left	N/A	N/A	C (19.3)	E (48.7) ³⁰
Eastbound Ennis Road – Right	N/A	N/A	D (25.3)	E (38.6) ³¹
Westbound North Street – Right	N/A	N/A	E (38.6) ³²	F (145.3) ³³

* HCS could not generate a result due to excessive delay

²⁶ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

²⁷ Improvement Option 1 consists of installing raised islands to limit traffic from the eastbound and westbound approaches to right turns only. The through and left-turn demand is accommodated via u-turns at nearby median crossovers on US Route 113. Left-turning traffic from both directions of US Route 113 would still be permitted at this intersection. These improvements are consistent with recommendations from DeIDOT's HEP Committee.

²⁸ The 95th percentile queue length for the southbound US Route 113 right-turn movement during the Case 3A-3C Saturday peak hour (with Improvement Option 1) is less than 2 vehicles.

²⁹ The 95th percentile queue length for the westbound North Street right-turn movement during the Case 3A-3C Saturday peak hour (with Improvement Option 1) is approximately 7 vehicles.

³⁰ The 95th percentile queue length for the southbound US Route 113 right-turn movement during the Case 4A-4C Saturday peak hour (with Improvement Option 1) is approximately 2 vehicles.

³¹ The 95th percentile queue length for the eastbound Ennis Road right-turn movement during the Case 4A-4C Saturday peak hour (with Improvement Option 1) is less than 2 vehicles.

³² The 95th percentile queue length for the westbound North Street right-turn movement during the Case 4A-4C PM peak hour (with Improvement Option 1) is approximately 4 vehicles.

³³ The 95th percentile queue length for the westbound North Street right-turn movement during the Case 4A-4C Saturday peak hour (with Improvement Option 1) is approximately 8 vehicles.