

Engineering has reviewed the plans for the Lidl Grocery project submitted March 14, 2016 and have the following comments:

Stormwater Management Permit Application Form:

- 1) III. Contact Information; line item 1(b): Attach a copy of the pending sales agreement.
- 2) IV. Project Information; line item #9:
 - a) Other (Site Concrete): There seems to be a slight discrepancy between the site concrete square footage listed in this table (7,872sf) and the total of the site concrete square footages listed on sheet C3.00 (2,548sf (HDC)+49sf (UBP)+5,325sf (Curbs)=7,922sf). Please verify and revise.
 - b) Total Onsite Newly Constructed Impervious Surface: This number will change due to previous comment.
- 3) IV. Project Information; line item #10: This number may change due to previous comments.
- 4) IV. Project Information; line item #12: Please add this information to the Site Plan Notes (sheet C3.00).
- 5) IV. Project Information; line item #13: This number may change due to previous comments.
- 6) IV. Project Information; line item #14: This table may require revisions due to previous comments.

Wet Detention Basin Supplement: (Note only: Please keep supplement separate from the stormwater narrative. It is preferred to be submitted with the application and O&M's, free from binding. I ask this because the supplement will be part of the stormwater permit and needs to remain separated from the calculation package.)

- 7) II. Design Information:
 - a) Site Characteristics; Impervious area, post development: Please revise the impervious area to match the application and stormwater narrative.
 - b) Site Characteristics; Design rainfall depth: This number should be 1.5" (for coastal counties). Please revise.
 - c) Storage Volume: Non-SA Waters: Please complete this section as the project drains to non-SA waters.
 - d) Storage Volume: SA Waters: This section does not require completion. The project isn't within ½ mile of nor does it drain to SA waters.
 - e) Peak Flow Calculations; Rational C, pre- development: Please change this value to an acceptable number in the range of 0.10-0.15 for sandy soils on flat slopes (0-2%) per the Technical Standards.
 - f) Peak Flow Calculations; Rainfall intensity: This value doesn't match the value provided in the NOAA Precipitation Frequency Data. Please clarify.
 - g) Elevations; SHWT elevation: Please provide seasonal high water table elevation determination. See comment under **General** section of review comments.
 - h) Additional volume stored above the state-required temporary pool: Should be "Y". The calculations show the 1.5" required volume to be at elevation 18.26'. The first weir is set at 18.40', therefore there is additional storage. The first weir would have to be nearer to 18.26' to answer "N". Please revise.
- 8) III. Design Information:
 - a) Please recheck this entire section as review comments for the Stormwater Narrative may affect the Wet Detention Basin Supplement information.
 - b) Please see Figure 3-2b of the Wet Detention Supplement for Driving Head as it relates to your particular design.

Operation and Maintenance Agreements:

- 9) Wet Detention Basin O&M: Please verify the bottom elevation and sediment cleanout elevation of the forebay.
No comments on the remaining BMP O&M's.

Stormwater Narrative:

Project Narrative:

- 10) Please revise the stream classification of Bradley Creek. Bradley Creek is a class SC; HQW stream.

Summary of Results:

- 11) BMP Drainage Area Breakdown: There appears to be a discrepancy regarding the amount of impervious and pervious area within the drainage area of the proposed pond. The stormwater model states there is 4.32 acres of impervious and 0.89 acres of pervious within the pond drainage area and the summary of results lists 4.00 and 1.21 acres, respectively. Please make sure all numbers in this section are accurate and that they are reflected throughout the submittal.

Hydrology:

- 12) Please provide documentation for the use of the 323 shape factor, instead of the 484 shape factor. 484 is the typical shape factor we see used in this area.

Conveyance Calculations:

- 13) Please note that the rainfall intensities used in your storm drainage calculations are much higher than the rainfall intensities presented in the city's Technical Standards. The 10-year and 50-year rainfall intensities listed in the TSSM are 7.23 & 8.87 in/hr, respectively. The use of these intensities would certainly improve any flooding of structures throughout your system. I am not requiring you to use them since your values are higher than what is in the TSSM. Just bringing it to your attention.

Post-developed Conclusions:

- 14) Per Section D(4) and Section H(1) of the city's TSSM; please analyze and the pond for the 50-year storm assuming the principal spillway is obstructed or not operating properly and provide the model. An emergency spillway shall be provided such that the elevation of the dam shall be a minimum of 0.5 feet above the peak surface elevation for the 50-year storm.

Appendix A: Stormwater Model:

- 15) See comment #12 for 323 vs. 484 shape factor.
16) Summary for Subcatchment 3S: Basin-1 (Post): See comment #11
17) Summary for Pond 6P: Pond-1: Please verify the length, the downstream invert and the slope of the 24" outlet pipe. The models don't match the plans.

Appendix B: Calculations:

- 18) See comment #13 regarding rainfall intensities.
19) Please make sure that the pipe lengths, upstream inverts and downstream inverts match from table to table to plan sheets.
20) Inlet Areas Drainage Exhibit:
21) Design of Riprap Outlet Protection – The city's Technical Standards require that energy dissipaters be designed for the 10-year storm at a minimum. Your design is based on the 50-year storm. You may resize your energy dissipater for the 10-year, if so desired.
22) Water Quality: Design Considerations: There appears to be a discrepancy with the built upon area (BUA) percentage. $4.00\text{ac}/5.21\text{ acres} = 77\%$, not 49%.
23) Water Quality: Design Considerations: Please clarify why you are designing for the difference between the 1-year pre- and post-development volumes. This project drains to Bradley Creek (SC;

HQW) which is a non-SA water per the NCDEQ stream classification website. Per the city's SW Ordinance, this development must comply with Section 18-760 and since it is near non-SA waters it must also comply with the requirements of Section 18-764.

- 24) Water Quality: Design Considerations; Depth of pond: Please note per Figure 10-2b of the Wet Detention Basin Supplement the depth of the pond is the distance between the bottom of the shelf and the bottom of the pond (excludes the sediment storage). Please revise.
- 25) Water Quality: Design Consideration: Recalculate average permanent pool depth based on revised depth of pond above.
- 26) Water Quality: Design Considerations: Recalculate required surface area.

Appendix C: Maps and Exhibits:

No comments

Appendix D: Details:

See Plans section for comments on details

Appendix E: References:

No comments

Exceptionally Designed Project Narrative:

27. The LID Site Plan is not up to date with the current design. Please update.

Appendix F: Offsite Analysis:

28. The Offsite North drainage area can be reduced...see attachment...the area to the north and east of the thick cyan line can be omitted from the drainage area per our records.

Plans:

- 29) C2.00 – Please quantify on the plan sheet the amount of existing offsite impervious pavement and sidewalk to be removed/demolished.
- 30) C2.01 – The conveyance measure for the jurisdictional stream is different than the conveyance measure shown on C3.00. Please clarify.
- 31) C3.00 – Layout Legend:
 - a) 1. “1’-6” concrete curb & gutter – see detail 11/C7.00”: the curbing detail is #12 and the detail does not contain a 1’-6” concrete curb & gutter. The 1’-6” C&G is not a city standard. Please add a detail for 1’-6” curb & gutter and revise the legend.
 - b) 2. Light duty asphalt: I don’t see the number label defining its location on the site plan...it would appear that light duty asphalt is not to be used. Please add label(s).
 - c) 3. Heavy duty asphalt. Is the loading dock area to be heavy duty asphalt as it is labeled? What about the dumpster pad? The dumpster detail calls for heavy duty concrete. Is the site plan labelling incorrect? Please clarify.
 - d) 4. Concrete Sidewalk: see detail 8/C7.01 – sidewalk detail is #10 on sheet C7.01. Please revise.
 - e) 5. Accessible striping and signage is not labeled on the site plan.

- f) 9. 24" wide painted bar. All bars appear to be labeled except the bar at the southwest corner of the proposed building. Also, a stop condition may be needed where traffic is heading east towards the dumpsters and loading docks in the northern most drive aisle.
 - g) 12. 6' tall sign – there isn't a sign symbol where the arrow is pointing at the western exit drive.
 - h) 16. Heavy duty concrete – see detail 8/C7.00 – Aren't the parking stalls to be pervious pavement? Please revise legend and detail on C7.00.
 - i) 21. Roadway Improvements. Not labeled on site plan. There is a #27 at the Cavalier Drive intersection without a legend description. Is that really #21 and not #27? Please clarify.
 - j) 22. Truncated Domes – listed as detail 12/C7.00, but detail is 13/C7.00. Please revise legend.
 - k) 24. 2'-6" concrete curb & gutter...see detail 11/C7.00. Detail 11/C7.00 is not a curb & gutter detail. Please add the NCDOT detail for the 2'-6" C&G to the detail sheets.
 - l) 25. Wheelstops – see detail 11/C7.00: Wheelstop detail is 14/C7.00. Please revise legend.
 - m) 26. "1'-6" mountable concrete curb & gutter – see detail 11/C7.00": the curbing detail is #12 and it does not contain a 1'-6" mountable concrete curb & gutter. However, the right-in/right out where the mountable curb & gutter is located should be revised to be a concrete island bisected by a 6 foot asphalt or concrete cut-through. The truncated domes should be removed and the striping for the crosswalk should continue through the island. NCDOT has a detail for concrete islands. Please revise accordingly.
- 32) C3.03 – Note only – I noticed that the site doesn't utilize heavy duty asphalt except in the loading dock area? I do think this is incorrect. The trash truck, WB-50 and fire truck will have be travelling on light duty asphalt as they drive through the site. My concern is that the trucks will eventually tear up the light duty asphalt. I suggest constructing the loading dock area and with the heavy duty concrete, which I think it is-it's just labeled incorrectly, heavy duty asphalt for the truck routes and light duty asphalt everywhere else except for the parking stalls which are pervious pavement. Just a suggestion.
- 33) C4.00 – Grading Plan:
- a) Please verify that the inlet drainage areas provided on the Inlet Areas Drainage Exhibit matches up with the finished grade spot elevations on this sheet. Some of the drainage areas look to be different than what the grading shows.
 - b) Please add enough spot elevations to accurately define the drainage pattern for each inlet, i.e. high points, grade breaks, crown transitions, etc. Also add more spot elevations to accurately portray what is happening where the entrances/exits tie in to Cavalier Drive and Eastwood Road.
 - c) Please show the energy dissipater for FES-1 in the plan view and label.
 - d) It appears there is an existing sanitary sewer manhole inside the banks of the pond with a rim elevation of 18.09'. This rim elevation must be raised to an acceptable elevation to keep rising stormwater from entering the manhole. Please coordinate with CFPUA as I believe this is a public manhole.
 - e) Please relook at grading between Eastwood and the Contech aluminum structure to ensure that low wet areas that can't drain to the throat inlets aren't created. It appears that there might be a low spot created by the proposed 18.00' contour. May want to add the 17.00' contour to show that this area can be drained by the inlet.
 - f) Please add existing spot elevations along Cavalier Drive in front of the pond to clearly show how the pond grading works with the grading along Cavalier Drive.
 - g) What does the thick dark line represent that starts at the existing grated inlet on Eastwood Road and ends at the radius of the exit drive?

- h) There appears to be a discrepancy regarding the outlet pipe from the pond outlet structure between the HydroCAD Stormwater Model and this sheet. The pipe length, slope and downstream invert don't match. Please clarify.
 - i) Since you are not providing the future stormdrain layout in the plan view on this sheet please remove the information for the future stormdrain layout from the Storm Drainage Table.
 - j) Please verify the invert of FES-1. The plans indicate an invert of 10.44, yet the calculations list an invert of 10.00'.
 - k) Please provide a detail showing how the 24" RCP pond outlet pipe will connect to the Contech aluminum structure.
 - l) Show the cleanout where the proposed sewer connects to the existing cleanout. What size is the existing cleanout? Is there adequate cover over the proposed 6" PVC SS line between the existing cleanout and SSMH #1? The line runs from 15.50' to 16.00 and the pond bank elevations over it at mid-run are at elevation 17.00'. Please verify adequate cover.
 - m) Please verify there is not a conflict between the proposed waterline and the Contech aluminum structure.
 - n) Please verify that the 15" storm drain pipe that runs from 14A to 14 does not conflict with the Contech aluminum structure.
 - o) Please explain the grading at the downstream end of the Contech aluminum structure. The structure has an invert elevation at 9.33', yet the finished grade contours range from 13 to 16. How does the stream function in conjunction with the structure with such differences in elevation? I also notice that the existing 48" RCP that comes under Eastwood has an invert of 10.79. How will this all work elevationally?
 - p) Explain how the roof leaders along the western front of the building operate? Are the roof leaders on the eastern side of the building supposed to spill out in the swale and aren't connected to the storm drain pipe that runs underneath the swale? If the roof leaders spill into swale, will erosion occur at the leader outlet?
- 34) C7.00 – Site Details:
- a) Please provide a section detail and basic construction sequence for the pervious pavement. I am assuming you are not taking credit for the pervious pavement, but you still need to show that it will work.
 - b) Please provide details of the rain gardens that are more legible. The current ones are difficult to read and understand.
- 35) C7.04 – Site Details:
- a) Does the rip rap apron at the end of the aluminum structure have specific dimensions, i.e. width, length, depth, type of material, etc.? If so, please add to detail sheet.
 - b) Provide dimension for width of top of forebay berm.
 - c) Control Structure #1 is a 5'x5' structure? Please add dimensions or top and side view to fully dimension control structure.

General:

- 36) Please add SHWT boring locations to the plans and label with existing grade and seasonal high water table elevation. The SHWT looks to be 28"-30" below existing grade at the two bore locations (B-1 & B-2) provided in the ECS report, but I can't decipher what the actual existing grade elevation is at those two locations to determine the SHWT elevation. Please provide and revise supplement.
- 37) Please remove any details that are duplicated or are not relevant to this project.
- 38) Please add any NCDOT details to the plans that pertain to stormwater.
- 39) Please add a detail for the grassed swales.

- 40) Please show how the landscape zone and maintenance access requirements in Section D(4)(g) and (h) of the Technical Standards have been met.
- 41) See standard detail SD 15-16 for typical stormwater facility landscaping plan requirements.
- 42) Stormwater Services is currently reviewing the Contech aluminum structure and may have further comments.

Please submit one complete set of plans, calculations, and any revised or new documentation to Engineering for additional review. Please call or email if there are any questions.