TOWN OF SEABROOK ISLAND

Planning Commission Regular Meeting
October 3, 2018 – 1:30 PM

Town Hall, Council Chambers
2001 Seabrook Island Road

AGENDA

CALL TO ORDER

APPROVAL OF MINUTES

1. **Special Called Meeting: September 26, 2018** *[Pages 2–6]*

OLD BUSINESS ITEMS

1. **Encroachment Permit Request: Kiawah Senior Living Facility** *[Pages 7–168]*

   Request from Atlantic Partners II, LLC, to approve an encroachment permit on Seabrook Island Road for access to and from a proposed 200-unit senior living facility

NEW BUSINESS ITEMS

There are no New Business Items

ITEMS FOR INFORMATION / DISCUSSION

There are no Items for Information / Discussion

ADJOURN

TOWN OF SEABROOK ISLAND

Planning Commission Special Called Meeting
September 26, 2018 – 1:30 PM

Town Hall, Council Chambers
2001 Seabrook Island Road

MINUTES

Present: Robert Driscoll (Chair), Lori Leary, Cathy Patterson, Wayne Billian, Ken Otstot, Joe Cronin (Town Administrator)

Absent: None

Guests: Mayor Ron Ciancio, Heather Paton (SIPOA), Stephanie Tillerson (Town of Kiawah Island), John Taylor (Town of Kiawah Island), Don Romano (Seabrook Island Club), Richard Marion (Seabrook Island Club), Six Town Residents

Chairman Driscoll called the meeting to order at 1:30 pm and welcomed everyone in attendance. Town Administrator Cronin confirmed that the requirements of the Freedom of Information Act were fulfilled, and the meeting agenda was properly posted.

APPROVAL OF MINUTES

1. **July 18, 2018:** Ms. Leary made a motion to approve the minutes from the July 18, 2018, meeting, as submitted. Mr. Otstot seconded the motion. The motion was approved by a vote of 4-0.

Ms. Patterson arrived at 1:33 pm.

2. **August 15, 2018:** Chairman Driscoll noted that he had spoken with Town Administrator Cronin prior to the meeting about an inconsistency in the August 15, 2018, minutes. Town Administrator Cronin stated that after re-listening to the audio from the meeting, the section of the minutes dealing with the Kiawah senior living project encroachment permit, specifically the discussion regarding the number of access points at Bishop Gadsden, should be amended. He then specified replacement language for this paragraph. Mr. Otstot made a motion to accept the amended language, as stated by Town Administrator Cronin. Ms. Leary seconded the motion. The motion to amend the minutes was approved by a vote of 5-0. Mr. Billian then made a motion to approve the minutes from the August 15, 2018, meeting, as amended. Ms. Leary seconded the motion. The motion to approve the amended minutes was approved by a vote of 5-0.

OLD BUSINESS ITEMS

1. **Architectural Review: Seabrook Island Club Equestrian Center Expansion (Amended)**: Town Administrator Cronin provided a brief overview of the request, the purpose of which was to review and approve revised plans for the expansion of the existing barn located at 2313 Seabrook Island Road. Town Administrator Cronin noted that the Planning Commission had previously approved plans for the project back in May 2018; however, the project scope was later changed due to budgetary constraints. Town Administrator Cronin added that the revised plans conform to the requirements of the DSO, and the proposed colors and materials are consistent with the existing building. Therefore, staff recommended in favor of approval.

   Mr. Don Romano of the Seabrook Island Club provided additional information in support of the request. Mr. Romano stated that exterior changes, including a reduction in the front addition and elimination of a second story balcony, were removed due to value engineering. He added that there were also some minor changes to the interior of the building, but that these were not within the scope of the Planning Commission's review. He stated that, overall, he believed the changes made the project better.

   Mr. Billian asked if the Club was planning any changes to the site lighting. Mr. Romano responded that nothing was planned at this time regarding the lighting.

   Mr. Otstot made a motion to approve the revised plans, as submitted. Mr. Billian seconded the motion. The motion was approved by a vote of 5-0.

NEW BUSINESS ITEMS

1. **Architectural Review: SIPOA Storage Building**: Town Administrator Cronin provided a brief overview of the request, the purpose of which was to review and approve plans for a proposed 30' x 40' storage building adjacent to the POA's existing maintenance shop at 2832 Seabrook Island Road (TM # 149-06-00-072). He stated that the proposed color (Lightstone) and materials (galvanized metal with silicone polyester coating) were consistent with surrounding commercial and storage buildings. Town Administrator Cronin added that the plans conform to the setback and dimensional requirements of the DSO, and that the building would be heavily screened from neighboring properties and the Seabrook Island Road right-of-way by existing vegetation. Therefore, staff recommended in favor of approval.

   Chairman Driscoll asked Ms. Heather Paton, Executive Director of SIPOA, if she had anything additional to add. Ms. Paton did not have any additional comments.

   Chairman Driscoll asked the purpose of the new building. Ms. Paton responded that it was the SIPOA's intent to store emergency generators and equipment in the new building.

   Ms. Leary made a motion to approve the proposed building plans, as submitted. Ms. Patterson seconded the motion. The motion was approved by a vote of 5-0.

2. **Text Amendment: Requirements for Walls and Fences**: Town Administrator Cronin provided an overview of the draft text amendment. He stated that the primary purpose of the ordinance was to remove inconsistencies between the town and SIPOA's requirements. In

addition to amending the permitted materials for walls and fences, the draft ordinance would: define setback requirements for new walls and fences; prohibit walls and fences in required marsh and beachfont setback areas; require walls and fences to be maintained in good repair; limit the maximum height to 6' (except for walls and fences used to screen public buildings, storage yards, utility structures and equipment, and storage areas); limit the maximum height to 3' in clear sight triangles; require any finished side to face outward from the property; and require that walls and fences not negatively impact drainage on the site or on adjacent properties.

Town Administrator Cronin then noted one public comment which was received during the public hearing held at the Town Council meeting the previous day. A resident recommended that the ordinance should contain provisions that would "grandfather" existing fences. If this was desired, Town Administrator Cronin recommended including the following paragraph: "Notwithstanding the requirements of this section, any fence or wall which was legally conforming as of the effective date of this ordinance may be repaired or replaced, provided the extent of any non-conformity may not be increased as a result of the repair or replacement." He also recommended that any fence or wall seeking to be replaced under this exception should be completed within 30-60 days of the non-conforming wall or fence being removed, as well as requiring that any non-conforming element may not be re-established after the non-conforming element has been discontinued.

Ms. Patterson stated that the Village may seek to replace its pool fence in the future and asked how this ordinance would impact the location of a replacement fence if it were located within a setback area. Town Administrator Cronin stated that the Village fence would likely qualify for a "existing non-conforming" exception if it were replaced, meaning it could go back in the same – or a more conforming location – but not in a less conforming location. Town Administrator Cronin asked whether it was a standalone fence, or if it was attached to a deck (in which case it would be classified as a "railing" rather than a "fence").

Mr. Billian asked if electric fences were prohibited. Town Administrator Cronin responded that they were not specifically included but noted that most permitted materials would not be conducive to electrification. He added that the Planning Commission could recommend an amendment to prohibit electric fences.

Mr. Billian made a motion to recommend in favor of approving the text amendment, with the amendment specified by the Town Administrator relating to non-conforming fences. Ms. Leary seconded the motion. The motion was approved by a vote of 4-1, with Ms. Patterson opposed.

ITEMS FOR INFORMATION / DISCUSSION

1. **Discussion of meeting format and voting procedure regarding the pending encroachment application**: Chairman Driscoll provided a brief overview of this item. He stated that the Planning Commission would be going into executive session for the purpose of receiving legal advice relating to the meeting format and voting procedure for the Kiawah senior living

project encroachment permit application. He stated for the record that no vote on the application would be taken during today's meeting.

Chairman Driscoll stated that the format of the meeting on October 3rd would be similar to the previous meetings and would include a presentation from the applicant, presentations from experts and consultants hired by the town, a discussion between members of the Planning Commission and the applicant, the receipt of comments from town residents and property owners, and ultimately, the Planning Commission would make a decision and vote on the applicant's request. He noted that the planning commission can approve the request as submitted, approve with conditions, or deny the request. He then briefly discussed the current plans for the proposed driveway.

Prior to requesting a motion to go into executive session, Chairman Driscoll recognized several residents in the audience. He opened the floor for questions.

A resident asked how much control the town had over the bike path. Chairman Driscoll responded that part of the pathway was located within the town's roadway easement, and part was on private property with a separate easement. The resident asked how strong the easement is on the private property. Chairman Driscoll responded that the easement with Atlantic Partners is strong. On that property, the pathway could be moved, but not eliminated. The easement on for the neighboring Haulover Creek property was significantly weaker, however, and the owner of that property could require the removal of the pathway. The resident stated that the town should strive to maintain a good relationship with the property owners to maintain access to the pathway.

Another resident stated that she didn't care where the bike path was as long as there was access to it.

A resident asked if the town would consider alternate designs, or only what has been presented by the applicant. Chairman Driscoll stated that there have been several alterations up until this point, and provided a summary of some of those changes. He added that the Planning Commission could also attach conditions to an approval, and gave examples of the types of conditions which may be attached, such as tree mitigation.

A resident asked if the encroachment permit would be permanent, and what would happen if there were safety issues or accidents. Chairman Driscoll stated that council may have some limited recourse, including declaring the situation a nuisance.

There being no further questions, Chairman Driscoll asked for a motion to go into executive session for the purpose of receiving legal advice related to the meeting format and voting procedure for the pending encroachment permit application for the Kiawah senior living project.

Ms. Patterson made a motion to enter into executive session for the purpose of receiving legal advice. Mr. Billian seconded the motion. The motion to enter into executive session was approved by a vote of 5-0. The Planning Commission entered executive session at 2:19 pm.

[EXECUTIVE SESSION]

Ms. Leary made a motion to return to open session. Mr. Billian seconded the motion. The motion to return to open session was approved by a vote of 5-0. The Planning Commission returned to open session at 3:42 pm.

2. **Upcoming Meeting Dates**: Town Administrator Cronin reminded members that a Comprehensive Plan Workshop will be held on October 3rd at 10:00 am, prior to the 1:30 pm Planning Commission meeting.

There being no further business, Ms. Leary made a motion to adjourn the meeting. Mr. Billian seconded the motion. The motion was approved by a vote of 5-0, and the meeting was adjourned at 3:43 pm.

Minutes Approved:

Joseph M. Cronin
Town Administrator

MEMORANDUM

TO: Planning Commission Members

FROM: Joseph M. Cronin, Town Administrator

SUBJECT: Encroachment Permit Application for Kiawah Senior Living Project

MEETING DATE: October 3, 2018

The town has received an encroachment permit application from Atlantic Partners II, LLC, to allow a vehicular access point to be constructed on Seabrook Island Road, located approximately midway between Andell Bluff Boulevard and the existing traffic circle at Freshfields Village. The driveway is intended to serve a planned 200-unit Senior Living Facility adjacent to the existing Freshfields Village development. The facility will be developed by Big Rock Partners, and will include up to 200 independent living, assisted living and memory care units. The proposed facility will be located on Charleston County Tax Map Number 205-00-00-014, which is located within the town limits of Kiawah Island and zoned PUD.

Seabrook Island Road is a 66' wide public right-of-way, which extends from Landfall Way to the bypass lane on Betsy Kerrison Boulevard. The right-of-way easement was transferred from SCDOT to the Town of Seabrook Island via a quit claim deed recorded on February 20, 1990. The land under the public right-of-way is believed to be owned by East Seabrook Limited Partnership, as successor to Andell Development Limited Partnership, which acquired the property from Margaret Beckett, Dorothy McKee and Elizabeth Stringfellow via a quit claim deed recorded on January 27, 1989. The right-of-way was annexed into the town limits of Seabrook Island on March 8, 1990 (Ord. 1990-01).

Under the town's Development Standards Ordinance, the Planning Commission is charged with reviewing and approving requests for encroachment permits. Pursuant to Section 13.60.20 of the Development Standards Ordinance:

> Completed permit applications, including any required studies, shall be referred to the Planning Commission for review and approval prior to issuance of the permit by the Town Administrator. In approving issuance of an encroachment permit, the Planning Commission may attach such conditions to approval as it deems are warranted to protect the interests of the Town, public streets or right of ways and drainage system and utilities, including without limitation requiring the applicant to:
>
> (a) Alter existing public streets, as specified by the Town, or alternatively, make payment to the Town to defray the entire cost of such alteration;
>
> (b) Place traffic signs and/or signals, as specified by the Town, or alternatively, make payment to the Town to defray the entire cost of placing such signs and/or signals;
>
> (c) Install replacements and/or modifications to existing roadway drainage systems, as specified by the Town, or alternatively, make payment to the Town to defray the entire cost of such replacements and/or modifications; and,

(d) Protect existing buried utilities, and/or repair and/or replace them as specified by the Town, or alternatively, make payment to the Town to defray the entire cost of doing the same or reach agreement regarding the costs with any utility not controlled by the Town.

Following their presentation to the Planning Commission on July 18th, the applicants revised their plans to include the addition of a left turn lane from Seabrook Island Road into the property. The plans for the pedestrian pathway was also modified to improve visibility and pedestrian safety. Lastly, the interior road configuration at the main driveway was modified to address safety concerns identified by town staff.

Following first consideration of the encroachment permit request on August 15th, the applicants incorporated additional changes to their plans and re-submitted modified drawings on August 24, 2018. The revised plans were reviewed by the town's independent transportation consultant, the Reveer Group. (A copy of the Reveer Group's full report is attached as back up information.) These changes included:

- Increasing the driveway radii and moving back the raised median to allow for ingress and egress of large vehicles and trucks. ***(Acceptable per Reveer Group)***

- Increasing the turn lane storage from 100' to 150' ***(Acceptable per Reveer Group)***

- Increasing the transition taper from 140' to 245' ***(Acceptable per Reveer Group)***

- Removal of three trees (Trees 5-7 on Tree Exhibit).
    - Note: The Tree Impact Statement provided justification for not removing additional trees, as this would be contrary to the spirit of the Town of Seabrook Island's tree preservation ordinance, Kiawah Island's buffer requirement, Charleston County's Zoning and Land Development Regulations, and precedent set by the proximity of trees along nearby roads. ***(The Reveer Group noted that this was a valid justification and rescinded its earlier comment to the contrary.)***

- No changes have been made to the stormwater drawings; however, it was discussed at the August 15th meeting that the drainage design was preliminary, and approval should be contingent upon a final drainage design and report. ***(Both the Reveer Group and G. Robert George & Associates recommend review and approval of final drainage plans.)***

- The multi-use path was revised to maintain a 10' width, rather than decreasing from 10' to 8' across the proposed driveway. ***(Acceptable per Reveer Group)***

- The transition from the existing pathway to the "arc" across the new driveway was modified to be less abrupt. ***(Acceptable per Reveer Group)***

Lastly, the applicants amended the traffic impact analysis to illustrate the impact to Seabrook Island Road and the traffic circle with and without a secondary access point. The Reveer Group noted the following findings from the updated TIA:

- **If new driveway is approved** on Seabrook Island Road, this increases delay on Seabrook Island Road by 5 seconds at the entry to the roundabout, and reduces Level of Service (LOS) from C to D; C/24 to D/29 [LOS/seconds of delay experienced]

- **If new driveway is denied** and all traffic goes through the roundabout, this increases delay on Seabrook Island Road by 1 second and reduces the LOS from C/24 to D/25. It also increases the delay on Betsy Kerrison Parkway's (BKP) entry into the roundabout by 4 seconds and reduces the LOS from

D/35 to E/39. Note: The upper limit of LOS D is 35 seconds, which is where BKP is predicted to be (during the AM peak hour) even without the new development and its further degradation to LOS E with the new development is deemed unacceptable by the Highway Capacity Manual.

Regarding the updated TIA, the Reveer Group offered the following comments:

- Summary language of the revised report states that traffic is not significantly impacted either way.

- However, there are additional benefits that the new driveway on SIR provides that are beyond the focus of traffic; three of which are 1) having a second point of entry could be beneficial during emergency response or similar situations, 2) providing a more formal and prominent entrance than could be perceived when entering through the roundabout and adjacent parking and retail along Farm Lake View Drive, and 3) allowing the proposed building to front on SIR that provides a better site layout, circulation, and overall relationship to the street and perspective from passing vehicles and pedestrians.

- If you consider the driveway solely based on traffic delay, the new driveway could be justified as a mitigation measure to keep BKP from achieving an LOS E during the AM peak-hour.

To assist with the Planning Commission's review of the encroachment permit application, the following materials have been included with the agenda packet:

- DSO Section 13.60 – Encroachment Permit Requirements
- DSO Section 16.10.40 – Design Standards for Arterial Streets
- Encroachment Permit Application (Atlantic Partners II, LLC)
- Encroachment Permit Application (Atlantic Partners II, LLC) – ***ADDENDUM (08-24-2018)***
- General Site Layout (Thomas & Hutton)
- Intersection Layout Plan (Thomas & Hutton) – ***UPDATED***
- Tree Impact Statement – ***NEW***
- Tree Impact Plan – ***NEW***
- Traffic Impact Analysis (Thomas & Hutton) – ***UPDATED***
- Reveer Group Transportation Report (Reveer Group) – ***UPDATED***
- Senior Facility Staffing Projections (Big Rock Partners)
- Project Schedule & Construction Traffic Plan (Balfour Beatty) – ***UPDATED***
- SCDHEC Notice of Intent (NOI)
- Stormwater Management Statement (Thomas & Hutton) – ***UPDATED***
- Stormwater Management Report (Thomas & Hutton) – ***UPDATED***
- Stormwater and Utility Plans (Thomas & Hutton – To Be Amended)
- Freshfields Village Master Drainage Plan (Thomas & Hutton)
- Email from G. Robert George Re: Stormwater Management Plans
- Seabrook Island Road Property Owners Map

In addition, the town's independent consultants are expected to be present during the Planning Commission meeting on October 3rd.

Staff Recommendation

This request is at the discretion of the Planning Commission.

Respectfully submitted,

Joseph M. Cronin
Town Administrator

Sec. 13.60. - Encroachment Permit Required.

An encroachment permit, issued by the Town, shall be required for any development (whether such development occurs within or outside the corporate limits of the Town) which intersects, abuts or in any manner impacts any public street or right of way within the Town, or under control of or in which the Town has any legal right or interests ("public street or right of way"), and/or which in any manner impacts drainage to, from or under any such public street or right of way, and/or which in any manner impacts utilities (whether owned and/or operated by the Town or others) located beneath the surface of any such public street or right of way.

§ 13.60.10. *Information Required for Encroachment Permit.* Encroachment permit applicants shall furnish information concerning the proposed encroachment as requested by the Town and may be required to take any or all of the following actions at no expense to the Town before an encroachment permit is considered:

(a) Conduct and submit to the Town a traffic flow and volume study to the Town's specifications;

(b) Conduct and submit to the Town a drainage study to the Town's specifications which identifies and quantifies drainage from the proposed development, including its impact on existing roadway drainage systems and compliance with all applicable provisions of the Town's stormwater program;

(c) Conduct and submit to the Town a study to the Town's specifications which identifies and quantifies impact of the proposed development on utilities located beneath the surface of any potentially affected public street or right of way.

§ 13.60.20. *Procedures and Conditions for Consideration and Issuance of Encroachment Permits.* Completed permit applications, including any required studies, shall be referred to the Planning Commission for review and approval prior to issuance of the permit by the Town Administrator. In approving issuance of an encroachment permit, the Planning Commission may attach such conditions to approval as it deems are warranted to protect the interests of the Town, public streets or right of ways and drainage system and utilities, including without limitation requiring the applicant to:

(a) Alter existing public streets, as specified by the Town, or alternatively, make payment to the Town to defray the entire cost of such alteration;

(b) Place traffic signs and/or signals, as specified by the Town, or alternatively, make payment to the Town to defray the entire cost of placing such signs and/or signals;

(c) Install replacements and/or modifications to existing roadway drainage systems, as specified by the Town, or alternatively, make payment to the Town to defray the entire cost of such replacements and/or modifications; and,

(d) Protect existing buried utilities, and/or repair and/or replace them as specified by the Town, or alternatively, make payment to the Town to defray the entire cost of doing the same or reach agreement regarding the costs with any utility not controlled by the Town.

§ 13.60.30. *Appeal of Planning Commission Action.* An encroachment permit applicant may appeal a final decision of the Planning Commission for de novo review by the Town Council of Seabrook Island. In approving issuance of an encroachment permit, the Town Council may attach such conditions to approval as it deems are warranted, including without limitation those stated in the immediately preceding Section 13.60.20.

(Ord. No. 1990-02, 5-10-1990; Ord. No. 1995-06, 6-8-1995; Ord. No. 2017-02, § 1, 7-25-2017)

Sec. 16.10.40. Arterial Streets.

§ 16.10.40.10. *Designation.* That portion of Seabrook Island Road (Road S-1875) lying between the end of Town maintenance at Land Fall Way and Kiawah Island Parkway is designated as an arterial street.

§ 16.10.40.20. *Design.* For arterial streets, the use of divided highways, with turning lanes, is preferred. Pursuant to § 16.10.40.30 the use of divided highways may warrant additional points of access provided that the safe and uncongested flow of vehicles is maintained.

§ 16.10.40.30. *Limited Accessibility.* It shall be the policy of the Town to minimize the number of points of access to arterial streets. The Town encourages the use of feeder streets and neighborhood road networks in order to minimize the number of roads and driveways intersecting with arterial streets.

(a) For purposes of this section, points of vehicular access shall be defined to include streets intersecting with (i.e., providing ingress to and egress from) an arterial street, driveways, and any other curb cut.
(b) To the extent feasible, properties abutting arterial streets shall not have direct access to such arterial streets, but shall be provided with street frontage on interior, collector roads.
(c) To the extent feasible, tract property abutting an arterial street shall be provided with one (1) point of vehicular access to the tract. Subdivision of property subsequent to the effective date of this section shall not entitle the owner(s) of subdivided property to direct access to arterial streets if alternative access through interior roads is either available or feasible.
(d) To the extent feasible, vehicular access to arterial streets shall be limited to no more than one (1) point of access per every half mile.

§ 16.10.40.40. *Alternatives.* In determining feasibility of alternative points of access to any given property, the criteria set forth Article 20 for consideration of a PD in this Ordinance shall apply.

§ 16.10.40.50. Studies and improvements required. For every new or modified road which intersects an arterial street within the Town, the Town may require the owner or developer to take any or all of the following actions before an encroachment permit is issued pursuant to Article 13:

(a) Conduct and submit to the Town a traffic flow and volume study, to the Town's specifications;
(b) Conduct and submit to the Town a drainage study, to the Town's specifications, to identify any drainage modifications, structures or improvements needed in the arterial street drainage system to accommodate flows from the new road/development;

(c) If warranted by the traffic study, widen the arterial street to construct turning lane(s) to/from the new or modified road, to the Town's specifications; or alternatively, make payment to the Town to defray the entire cost of the Town's construction of such improvements;

(d) Place signs and/or signals on the arterial street right-of-way, as determined by the Town and to the Town's specifications, to facilitate the safe and unimpeded flow of traffic; or alternatively, make payment to the Town to defray the entire cost of placing such signs and/or signals as deemed necessary by the Town;

(e) If warranted by the drainage study, place or modify drainage control structures or improvements in the arterial street right-of-way, as determined by the Town and to the Town's specifications, to handle any increased demand on the roadway drainage system that may be caused by the new road; or alternatively, make payment to the Town to defray the entire cost of such drainage improvements as deemed necessary by the Town.

KIAWAH PARTNERS

Ray C. Pantlik, PE
Director of Development

July 16, 2018

Joseph M. Cronin
Town Administrator/Zoning Administrator
Town Hall
2001 Seabrook Island Road
Seabrook Island, SC 29455

Re: Encroachment Permit Application
Proposed Senior Living Facility
Freshfields Village
Atlantic Partners II, LLC

Dear Joe,

Pursuant to Section 13.60 of the Town of Seabrook Island Development Standards Ordinance I am making application on behalf of Atlantic Partners II, LLC for an encroachment permit for a new driveway connection along Seabrook Island Road to serve as additional entrance into Freshfields Village. This new entrance will primarily serve a proposed senior living facility located to the west of the Seabrook-Kiawah roundabout.

I am enclosing the previously completed traffic study along with the signed application form and a construction plan showing the detailed location of the driveway connection and its geometric design. Please consider this plan as a preliminary design as there will be some refinement in the future of some of the details shown herein. However, the basic location and intended turn movements in and out of Freshfields will remain the same.

We do not anticipate any disruption to any of the existing utilities in the road right of way with the construction of the new entrance. We will be providing additional details on the drainage design of the entrance way to not interfere with the existing drainage patterns along the road. Obviously, we cannot avoid some minor disruption in the existing bike and further details will be provided to address the demolition and restoration of the path to safely tie into the new entrance way as well as detail to address entry signage and lighting.

Email: rpantlik@kiawah.com | Phone: 843.768.3418 | Web: KiawahPartners.com
Physical: 253 Gardeners Circle | Suite 250 | Kiawah Island, SC 29455
Postal: PO Box 12001 | Charleston, SC 29422

Please look over this submission and let me have any feedback as soon as it is convenient. Thanks for including this item for discussion at the upcoming Planning Commission meeting. I look forward to introducing the Commission to Richard Ackerman, Chairman & Senior Managing Principal of Big Rock Partners and Sean M. Nealon, Vice President of Operations for Big Rock Senior Living. Big Rock Partners is a well-financed, leading developer of Senior Living Facilities in Florida.

Sincerely,

Ray C. Pantlik, P.E.
Director of Development

APPLICATION FOR ENCROACHMENT PERMIT
Town of Seabrook Island

Street or Road: Seabrook Island Rd Subdivision: Freshfields Village Date: July 16, 2018

The undersigned applicant (owner) herby applies to the Town of Seabrook Island for a permit to encroach on a public right-of-way.

(Attach a print of the sketch of plan to each copy of this form)

[signature] AS AGENT FOR ATLANTIC PARTNERS II, LLC

(Applicant [Owner's [Signature)

July 16, 2018

(Date)

ENCROACHMENT PERMIT
PERMIT No: _____

Issued to: (Name) Atlantic Partners II, LLC Street or Road: Seabrook Island Rd.ad

Address: One Kiawah Island Parkway Subdivision: Freshfields Village

Kiawah Island, SC 29455

Telephone No: 843-768-3418

In Compliance with your request and subject to all the provisions, terms, conditions, and restrictions written herein, you are authorized and permitted to:

_____

_____

_____

_____

_____

_____

_____

_____

Town of Seabrook Island

By: _____ Date: July 16, 2018
Zoning Administrator, Town of Seabrook Island

(Note) This form is to be submitted to the Zoning Administrator, Town of Seabrook Island. When submitting the form the applicant shall sign the application for the encroachment permit and acceptance of the provision, etc on the back.

Provisions, Terms, Conditions and Restrictions

1. **PERMITTEE:** The word "Permittee" used herein shall mean the name of the person, firm or corporation to whom this permit is issued, his, her, its heirs, successors, and assigns.
2. **FUTURE MOVING OF ENCROACHMENT:** If, in the opinion of The Town of Seabrook Island it should become necessary to relocate or remove the encroachment, or any part thereof contemplated herein, on account of improvements, relocation or widening of the road or street, or for any other sufficient reason, such moving or removing shall be done on demand of the duly authorized representative of the Town of Seabrook Island at the expense of the Permittee.
3. **PROTECTION OF TRAVELING PUBLIC:** Adequate provision shall be made for the protection of the traveling public at all times such that, during the process of the work, all necessary detours, barricades, warning signs and watchmen shall be provided by and at the expense of the Permittee. The Permittee agrees to observe all rules and regulations of the Town of Seabrook Island while carrying on the work.
4. **RESPONSIBILITY:** The Permittee, its successors or assigns, assumes full responsibility for any accidents to persons or damage to property, including the street or road, that may be caused by the construction, maintenance, use, moving, or removing of the encroachment contemplated herein, and agrees to indemnify the Town of Seabrook Island for any liability incurred or injury or damage sustained by it.
5. **PERMIT SUBJECT TO INSPECTION:** This permit shall be kept at the site of the work at all times while said work is underway, and must be shown to any representative of the Town of Seabrook Island or Law Enforcement Officers on demand.
6. **STANDARDS OF CONSTRUCION:** All work shall conform to recognized standards of construction and shall be performed in a workman like manner. No pavement shall be cut, no tunneling shall be permitted and no excavation shall be made nearer than two feet to the edge of any type pavement unless specifically authorized herein. All trenches within the limits of the Roadway shall be backfilled with suitable material and thoroughly tamped in layers not greater than six inches in thickness. All pipes, conduit, cables, etc shall have a minimum cover of 30 inches.
7. **PERMITTEE** shall at all times comply with all provisions of the Town Code and Development Standards Ordinance of the Town of Seabrook Island.

I, we, accept the permit herein granted and agree to comply with all the provisions, terms, conditions and restrictions set out herein.

AS AGENT FOR

Date: July 16, 2018 Permittee: Atlantic Partners II, LLC

Joe Cronin

From: Ray Pantlik <rpantlik@Kiawah.com>
Sent: Friday, August 24, 2018 5:32 PM
To: Joe Cronin
Cc: Sean Nealon (snealon@bigrockpartners.com); Bill Fellers (fellers.b@thomasandhutton.com); Tony Woody (woody.t@thomas-hutton.com); Staton, Danny; Richard Ackerman (rackerman@bigrockpartners.com); Dana Reed
Subject: Updated Seabrook Island Intersection Design and related documents
Attachments: 27252-TIA-Seabrook Island August 2018 24.pdf; Seabrook Island Road Tree Impact Statement.pdf; Seabrook Island Road Intersection Plans 27316_0000-SiteDevelopment 8-24-18.pdf; Seabrook Island Road Intersection Plans 27316_0000-SiteDevelopment 8-24-18 Tree Impacts.pdf; Kiawah Logistics Narrative - Updated on 08.24.18.pdf

Dear Joe,

Following the Planning Commission meeting of last week, Thomas & Hutton have completed revisions to the plans in consideration of comments heard from the Commission and specifically the recommendations from the Reveer Report. I am attaching these updated plans so as to amend our application for the Encroachment Permit from the Town.

Additionally, Thomas & Hutton updated the traffic study to make mention of the resulting level of service and delay within the roundabout that would result from the Senior Living Center being constructed and the new intersection not being built. Also included is a more refined construction access plan prepared by Balfour Beatty.

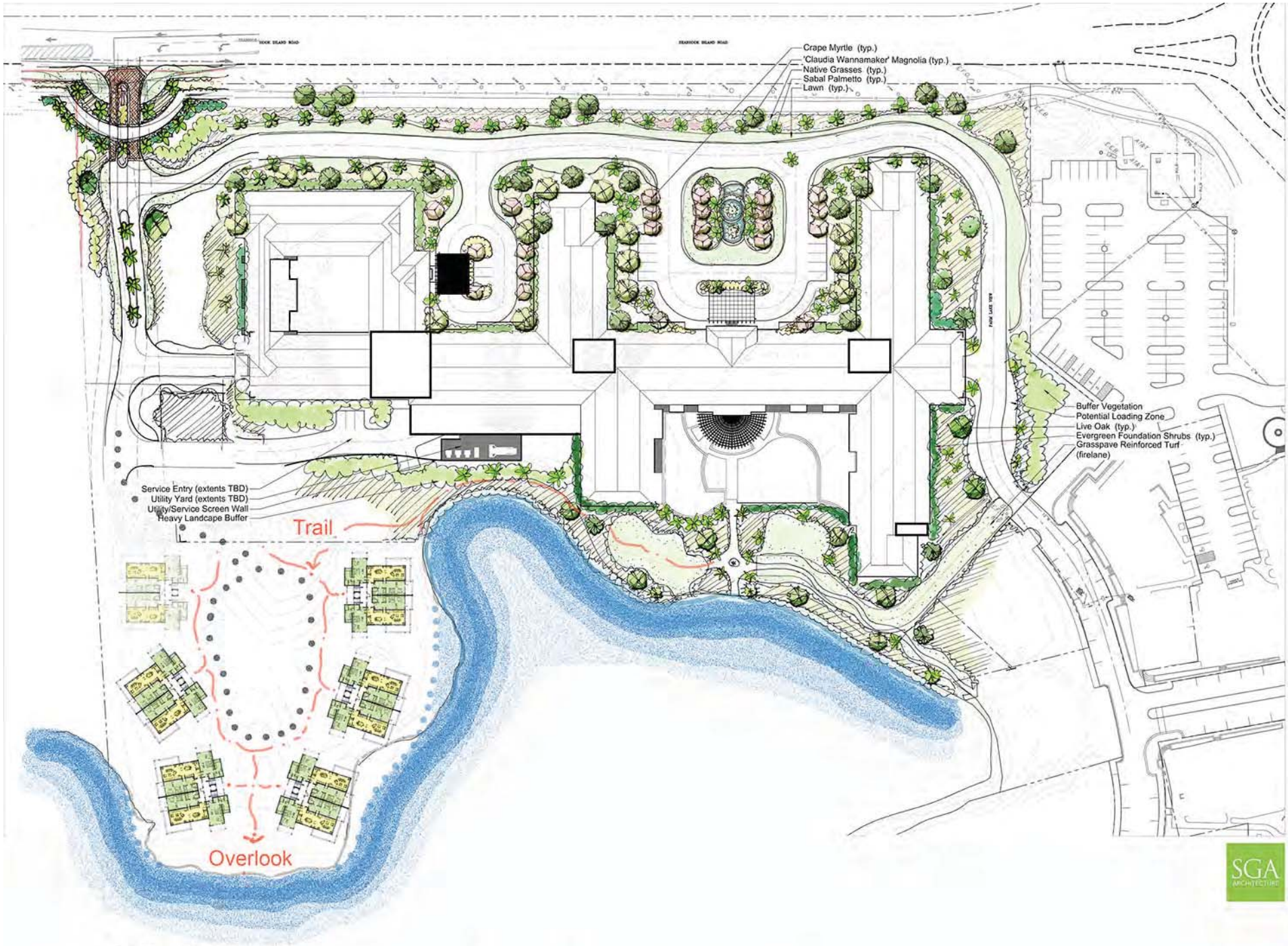
Lastly, I am including a tree impact statement and plan which sets forth a rationale to limit the number of live oak trees that need to be removed as part of the improvements proposed for the Seabrook Island Road. Please give me a call to discuss these findings if you have any questions.

KIAWAH PARTNERS

Ray Pantlik
Director of Development

1 Kiawah Island Parkway | Kiawah Island, SC 29455
Phone: 843-768-3418 Mobile: 843-814-3418
www.KiawahPartners.com
rpantlik@Kiawah.com

Kiawah Island: Home of the 1991 Ryder Cup Matches
Kiawah Island: Home of the 2012 & 2021 PGA Championships
ULI Award of Excellence for Community Planning



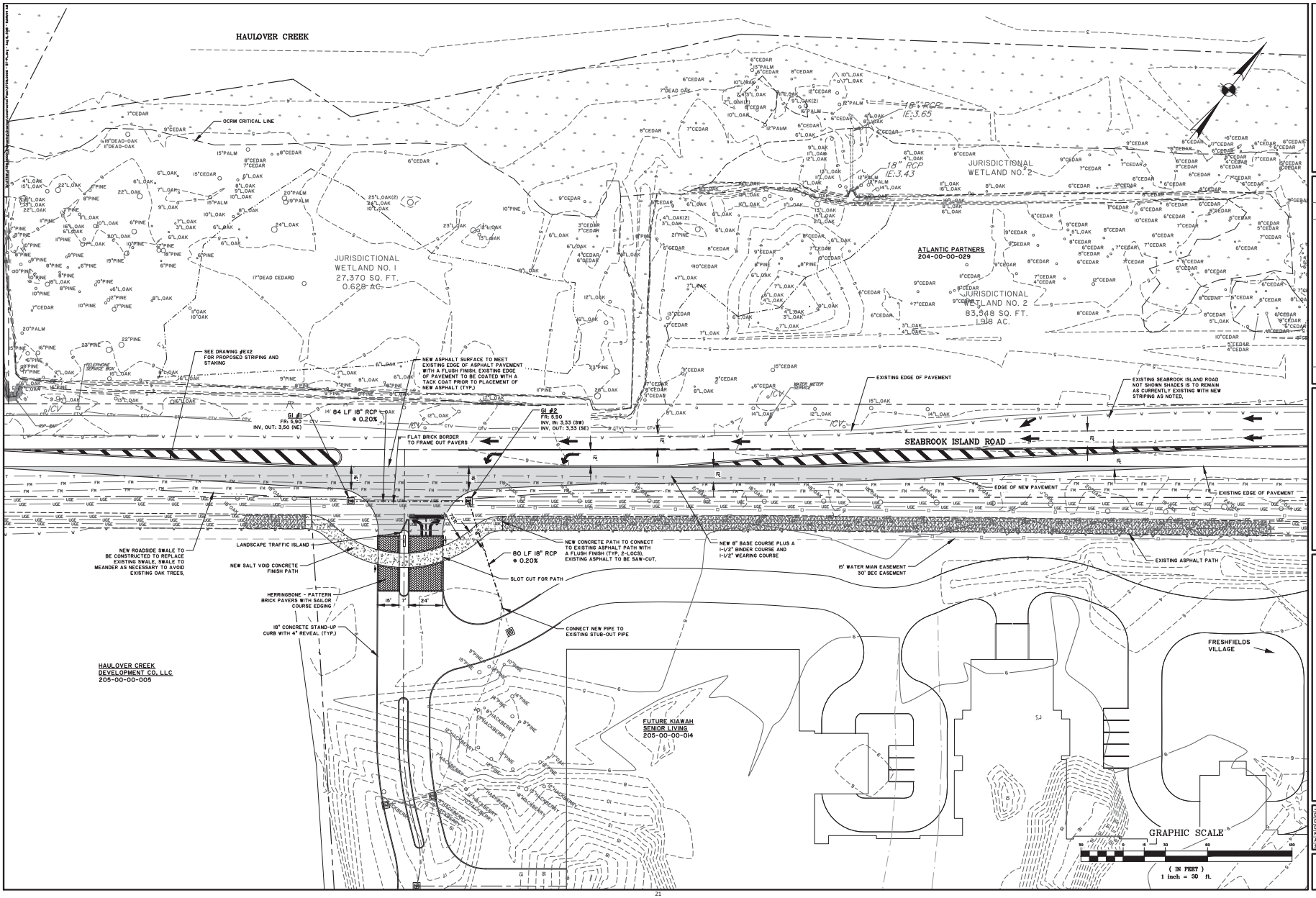
Residential Dwellings
40 - 50

NORTH SCALE: 1"=30-0'

Kiawah Senior Living Center

Conceptual Landscape Plan

7/31/18



NO.	REVISIONS	BY	DATE

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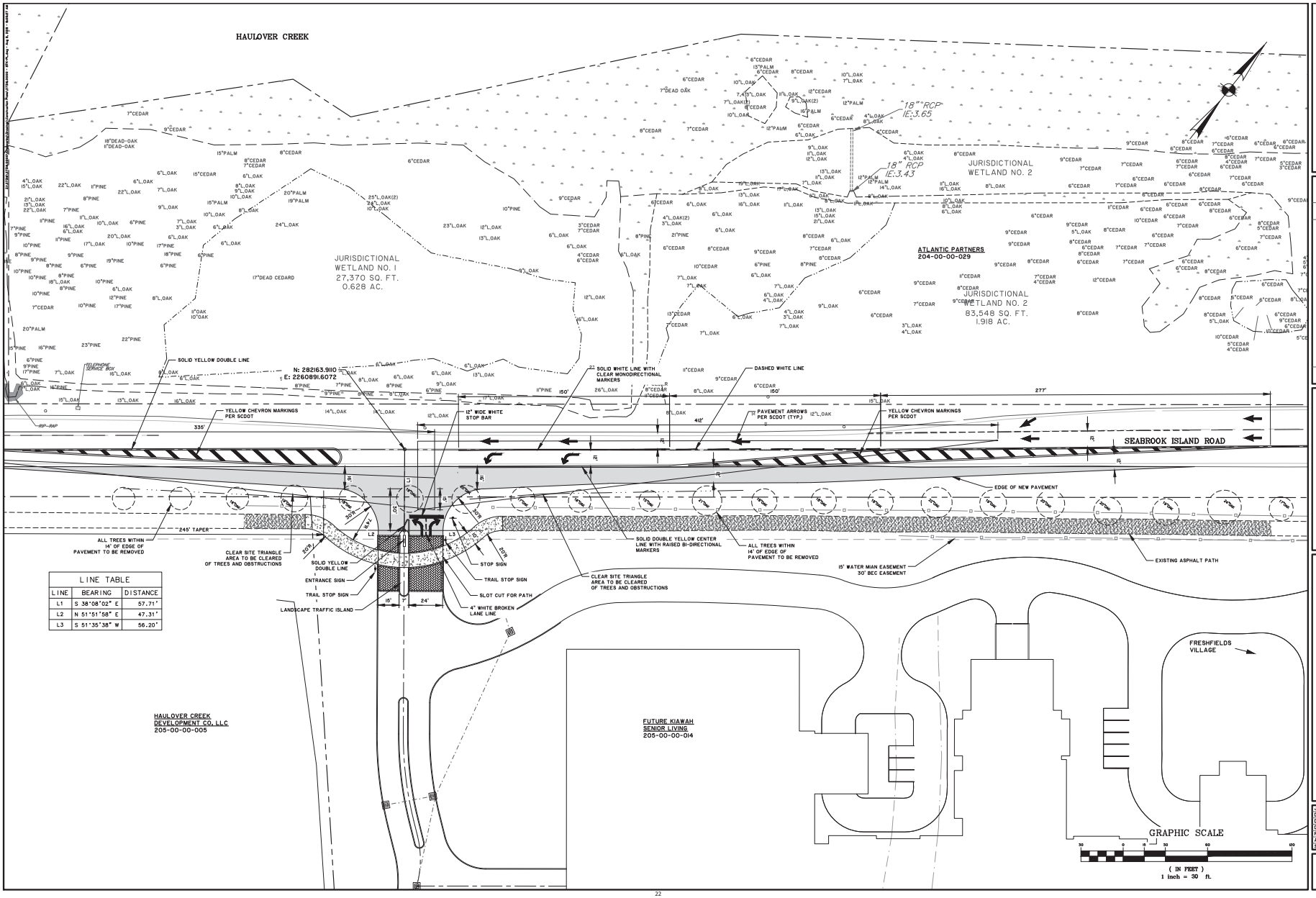
ATLANTIC PARTNERS, LLC
CHARLESTON COUNTY, SOUTH CAROLINA

SEABROOK ISLAND INTERSECTION

GENERAL LAYOUT

JOB NO:	J-27316,0000
DATE:	8/7/18
DRAWN:	BRW
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMM
SCALE:	1" = 30'

EX1



LINE TABLE		
LINE	BEARING	DISTANCE
L1	S 38°08'02" E	57.71'
L2	N 51°51'58" E	47.31'
L3	S 51°35'38" W	56.20'

REVISIONS	BY	DATE
NO.		

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ATLANTIC PARTNERS, LLC
CHARLESTON COUNTY, SOUTH CAROLINA
SEABROOK ISLAND INTERSECTION
STAKING AND SIGNAGE PLAN

JOB NO:	J-27316,0000
DATE:	8/7/18
DRAWN:	BRW
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMM
SCALE:	1" = 30'

EX2

Seabrook Island Road

Proposed Senior Living Center Intersection

Tree Impact Statement

August 24, 2018

Atlantic Partners II, LLC made application to the Town of Seabrook Island for an Encroachment Permit to construct a driveway connection to the Seabrook Island Road to facilitate access to the Big Rock Kiawah Senior Living Center on July 17, 2018. The ensuing technical review by the Town of Seabrook Island included a critique of the plans submitted to the Town on August 8, 2018 by The Reveer Group dated August 14, 2018. Following the Town's Planning Commission meeting of August 15th, Thomas & Hutton revised the proposed intersection plans in consideration of the recommendations made in the Reveer report which included increasing the turn lane and taper lengths and revision to the entranceway to accommodate certain truck traffic per SCDOT standards. These revised plans have been resubmitted to the Town as a further revision to the encroachment permit request.

Also noted in the Reveer report is reference to the provisioning of providing a 14-foot clearance from the edge of the roadway from any trees based on Table 9-18 of SCDOT's *Access and Roadside Management Standards* (attached). The Reveer report noted that application of this criteria would require the removal of a total of twelve live oak trees. However, attached Tree Impact Plan shows that strict adherence to this criterion as based on the updated design will now require the removal of *fourteen* live oak trees given the lengthening of the turn lane and taper recommended in the report.

It was recently noted that the proposed widening is planned solely on the south side of the existing Seabrook Island Road. Atlantic Partners did consider the partial widening to the northern side of the Road but as the Tree Impact Plan shows the existing SCDHEC-OCRM critical area within the Seabrook Island Road right of way does not make this a feasible option to widen the Road to the north.

It should be noted that none of the live oak trees suggested for removal are within the Town's right of way for Seabrook Island Road and thus they are outside of the corporate limits of the Town of Seabrook Island. However, were these trees subject to the Town's Development Standards Ordinance they would all be deemed as "protected" trees. The removal of these fourteen is contrary to the spirit of the Town's tree preservation ordinances.

Additionally, as most of these trees (noted as trees 5 through 15 on the plan) are located within the corporate limits of the Town of Kiawah Island their removal is subject to its Zoning Regulations which include the provisions of the Freshfields Village Planned Development (PD). The PD sets forth a buffer requirement of a fifty-foot width adjacent to the Seabrook Island Road right of way. Clearly, the recommended tree removal of ten live oak trees that are within the corporate limits of Kiawah Island is contrary to the spirit of the buffer requirement in the PD.

Moreover, the Reveer report cites as its reference for roadway design standards is from the SCDOT, yet the standards for road construction per the Town's Development Standards Ordinance are governed by the Charleston County Zoning and Land Development Regulations Road Construction Standards. These Standards make no mention of the use of Table 9-18 for determining clearances of obstructions. It is understandable why elsewhere within the Town of Seabrook Island there is no strict adherence to road tree clearances as extreme as fourteen feet.

Alternatively, if one applies the roadway clearance standards from the Town of Kiawah such trees can be as close as five feet as per Section 12-464 of the Town's Zoning Regulations. Under special conditions certain trees can remain as close as three feet to the edge of pavement. It appears that this standard is more typical of roadway construction in both the Town of Kiawah Island and Seabrook Island.

Should the Town of Seabrook Island's Planning Commission condition its approval of the intersection mandating the removal of the fourteen trees shown on the plan then Atlantic Partners will certainly abide by this condition. However, Atlantic Partners would suggest to the Commission its consideration of an alternative tree removal plan. The attached plan identifies in red numerals, trees 5, 6 & 7 as those that are minimally essential for removal for construction of the proposed intersection.

Beyond these three trees, trees 3, 4, 8 & 9 can remain and will need their canopies trimmed so that provide the appropriate vertical clearance for safety. This determination is derived from the location of the sight distance triangles shown on the plan. Using these triangles as the guiding criterion for tree removal for the proposed intersection as opposed to the SCDOT standard cited in the Reveer Report will greatly reduce the number of trees to be removed yet maintaining safe sight distance for traffic through this intersection.

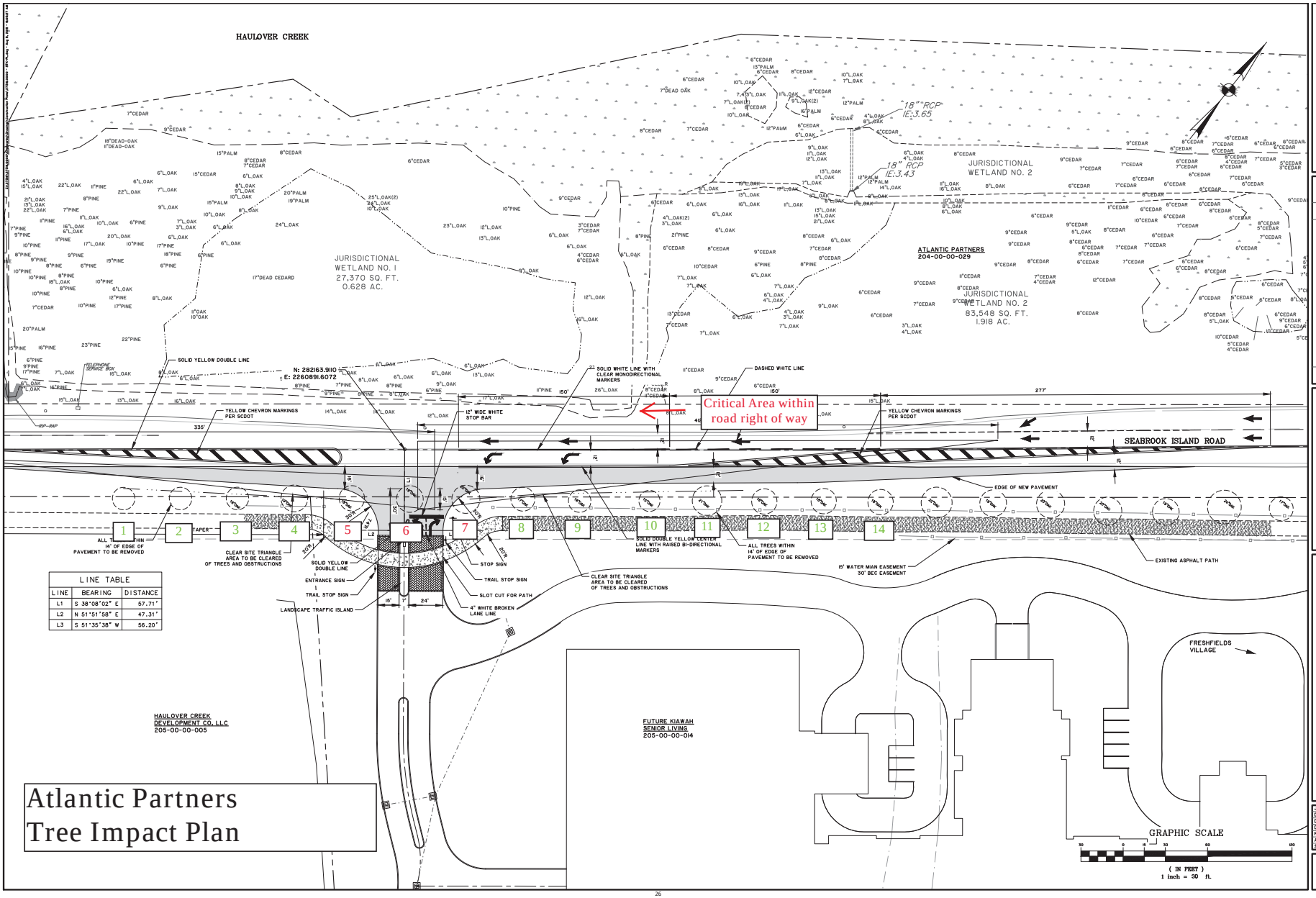
Table 9-18: Minimum Offset of Trees and Shrubs at Maturity

Roadside Feature	Roadway Design Speed	Offset from Edge of Travel way for Current Volume (ADT) of:	
		< 1,500	> 1,500
		ft.	ft.
Non-Interstate Routes			
Guardrail *	All speeds	4	4
Vertical face curb and gutter*	40 mph (60 km/hr) and less	1.5	1.5
	45 and 50 mph (70 and 80 km/h)	6	8
	55 mph (90 km/h)	10	12
6:1 or flatter cut slope ** (Metric 1:6)	40 mph (60 km/hr) and less	10	14
	45 and 50 mph (70 and 80 km/h)	14	18
	55 mph (90 km/h)	16	22
6:1 or flatter fill slope (Metric 1:6)	40 mph (60 km/hr) and less	10	14
	45 and 50 mph (70 and 80 km/h)	14	18
	55 mph (90 km/h)	16	22
4:1 to 5:1 cut slope (Metric 1:4 to 1:5)	40 mph (60 km/hr) and less	10	14
	45 and 50 mph (70 and 80 km/h)	12	18
	55 mph (90 km/h)	14	20
4:1 to 5:1 fill slope (Metric 1:4 to 1:5)	40 mph (60 km/hr) and less	12	16
	45 and 50 mph (70 and 80 km/h)	16	24
	55 mph (90 km/h)	20	26
3:1 cutnslope (Metric 1:3)	40 ph (60 km/hr) and less	10	14
	45 and 50 mph (70 and 80 km/h)	10	14
	55 mph (90 km/h)	10	16
3:1 fill slope*** (Metric 1:3)	40 mph (60 km/hr) and less	12	16
	45 and 50 mph (70 and 80 km/h)	16	24
	55 mph (90 km/h)	20	26
Interstate Routes			
Without Guardrail	All speeds	45 (for trees ≥ 4" caliper at maturity)	
	All Speeds	30 (for trees ≤ 4" caliper at maturity)	
With Guardrail	All speeds	4	

* Where vertical face curb or guardrail exists, offset is measured from face of curb or guardrail. Please note that a vertical face curb and gutter in the median does not allow a 4" or greater diameter tree to be planted

**Use for all medians with curbing.

*** The 3:1 fill slope is not to be used as part of the offset distance. Proper offset should be achieved by utilizing the distances specified as a total offset measured before and after the 3:1 fill



Atlantic Partners
Tree Impact Plan

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CHARLESTON COUNTY, SOUTH CAROLINA
SEABROOK ISLAND INTERSECTION
STAKING AND SIGNAGE PLAN

JOB NO:	J-27316.0000
DATE:	8/7/18
DRAWN:	BRW
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMW
SCALE:	1" = 30'

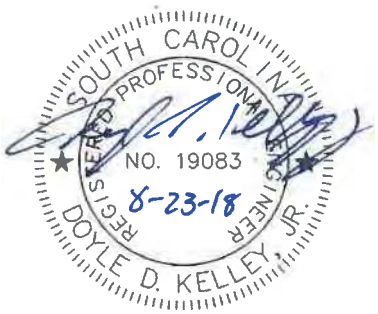
EX2

THOMAS & HUTTON

TRAFFIC IMPACT ANALYSIS

SEABROOK ISLAND ROAD
(FRESHFIELDS VILLAGE SENIOR LIVING)
CHARLESTON COUNTY, SOUTH CAROLINA

Prepared for:
KIAWAH RESORT ASSOCIATES, LP



J – 27252

JUNE 2018
REVISED: AUGUST 2018

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FIGURES

APPENDICES

1. INTRODUCTION

The Seabrook Island Road – Freshfields Village Senior Living development is proposed for a site southwest of the existing roundabout at Kiawah Island Parkway, Betsy Kerrison Parkway, Seabrook Island Road and Village Green Lane, in Seabrook Island, SC. A site location map is shown in **Figure 1**. The new development will consist of 128 units of independent living housing, 40 units of assisted living, 32 units of memory care housing, and 50 dwelling units of townhomes. The development is anticipated to be completed in 2023.

This study will examine the traffic impacts of the proposed development on the adjacent roadways. The original development plan includes two proposed access points: one at the proposed driveway on Seabrook Island Road, and the second at Farm Lake View Road using Village Green Lane. As requested by the Town of Seabrook Island, an alternative analysis will be evaluated to exclude the proposed driveway on Seabrook Island Road and analyze all proposed traffic to utilize Freshfields Village via Village Green Lane and Farm Lake View Road to the proposed development. The morning and afternoon peak hour traffic conditions will be evaluated with and without the proposed development. The following intersections will be included in the study:

- Kiawah Island Parkway, Betsy Kerrison Parkway, Seabrook Island Road and Village Green Lane (an existing roundabout)
- Seabrook Island Road and Andell Bluff Boulevard (stop controlled)
- Seabrook Island Road and the proposed project driveway (stop controlled)

2. EXISTING CONDITIONS

Roadway Conditions

Betsy Kerrison Parkway, State Road S-10-20, is a north-south minor arterial with a posted speed limit of 35 mph. There are two through lanes in each direction, and a center lane for left turns near the study roundabout. To the north, there are two through lanes in each direction and a grass median. Approximately two miles north of the roundabout, the 2016 ADT on Betsy Kerrison Parkway is 12,400.

Kiawah Island Parkway is an east-west, two-lane major collector roadway with a posted speed limit of 35 mph. On Kiawah Island Parkway, there are auxiliary turn lanes and painted median areas near major intersecting roads. The Freshfields bike path runs along the Kiawah Island Parkway on the south side of the road. It is separated from the road by a grass area.

Seabrook Island Road is an east-west, two-lane major collector roadway with a posted speed limit of 35 mph. Seabrook Island Road provides access to the Town of Seabrook Island.

Andell Bluff Boulevard is a north-south, two-lane roadway with a grass median at its intersection with Seabrook Island Road. There is no posted speed limit. This road provides access to a gated residential community and to a marina village. Andell Bluff Boulevard terminates at Seabrook Island Road at a stop controlled T-intersection.

Village Green Lane is a north-south, two-lane roadway with a 15 mph posted speed limit, Village Green Lane connects to Farm Lake View Road which provides access to the project site.

Traffic Conditions

Traffic operations at intersections are typically evaluated in terms of "Level of Service" or LOS. The LOS is a measurement of delay incurred at an intersection or for a particular movement. LOS is defined by the Transportation Research Board's Highway Capacity Manual (HCM) from which LOS A represents free flow conditions with minimal delays; LOS F represents congested conditions. Generally, a LOS D or better is considered acceptable.

Table 1 shows the HCM criteria for both roundabouts and unsignalized intersections.

Table 1. Level of Service definitions

LEVEL OF SERVICE	Control Delay per Vehicle (seconds)	
	Roundabout	Unsignalized Intersection
A	≤ 10	≤ 10
B	>10 and ≤ 15	>10 and ≤ 15
C	>15 and ≤ 25	>15 and ≤ 25
D	>25 and ≤ 35	>25 and ≤ 35
E	>35 and ≤ 50	>35 and ≤ 50
F	>50	>50

As discussed with the Town of Seabrook Island, peak hour traffic counts were taken at the study intersections on Tuesday, May 29, 2018 along with a 24-hour tube count on Seabrook Island Road just east of Andell Bluff Boulevard. The peak hours during the morning and afternoon are shown in **Figure 2**. Details of the count data are included in Appendix A.

There has been discussion regarding the need to factor the 2018 weekday traffic count data to reflect for Saturday conditions. The 2018 weekday traffic data, when compared to the Saturday summertime visitor count at the security gates southwest of the site, show that the May 29, 2018 count data that was collected on a Tuesday should not be factored. Specifically, the security gate (on Seabrook Island Road, westbound, west of the site) traffic counts indicate 1,175 visitors checked in on a Saturday. The May 29, 2018 count data indicates that 2,759 vehicles traveled westbound on Seabrook Island Road, just east of Andell Bluff Boulevard, in only eight hours (8am-6pm) and a total of 3,657 vehicles for the entire day. While there is one intersection (Landfall Way) between the 24-hour tube count location and the security gate, it is not likely that Saturday peak hour traffic volumes would be higher than the midweek peak hour volumes.

Using Synchro, capacity analyses were complete based on the 2018 counts. Results of the capacity analysis are shown in Table 2, and the Synchro reports are included in Appendix B.

Table 2. Current Levels of Service (2018)

Intersection	Control	2018 AM Peak Hour		2018 PM Peak Hour	
		LOS	DELAY (sec)	LOS	DELAY (sec)
Kiawah Island Pkwy, Betsy Kerrison Pkwy, Seabrook Island Rd and Village Green Ln	Round-about				
SE approach (Betsy Kerrison Pkwy)		D	27	A	6
NW approach (Village Green Ln)		B	14	A	10
NE approach (Seabrook Island Rd)		C	21	B	11
SW approach (Kiawah Island Pkwy)		A	1	A	1
Intersection Overall		**C**	**20**	**A**	**5**
Seabrook Island Rd and Andell Bluff Blvd	Stop				
SB approach (Andell Bluff Blvd)		B	12	B	14

Based on the current conditions, the study intersections are functioning at acceptable levels of service.

3. NO-BUILD CONDITIONS

The South Carolina Department of Transportation count station 723 is located on Seabrook Island Road, south of Andell Bluff Boulevard. Historical volumes, obtained for the SCDOT count station, are shown in Table 3.

Table 3. SCDOT Count Station Data

Count Station	2012 ADT	2013 ADT	2014 ADT	2015 ADT	2016 ADT	2017 ADT
#723 – Seabrook Island Road	5,900	6,000	5,400	5,600	4,600	5,600

Based on nearby SCDOT count station (#723) data, traffic volumes in the study area have fluctuated in the past several years. The 2014 through 2017 traffic volumes are lower than those counted in 2012 and 2013. Given this information, growth of 1% percent per year is determined to be an appropriate background growth rate. The 2018 peak hour volumes at the study intersections are raised by 1% annually to estimate the 2023 no-build conditions. The 2023 no-build traffic volumes are projected and shown in **Figure 3**.

This map was created using geothinQ | www.geothinQ.com | Mapping Smart Land Decisions

THOMAS & HUTTON

Seabrook Island Road

Freshfields Village Senior Living

06/18/2018

Figure 1

Site Location Map

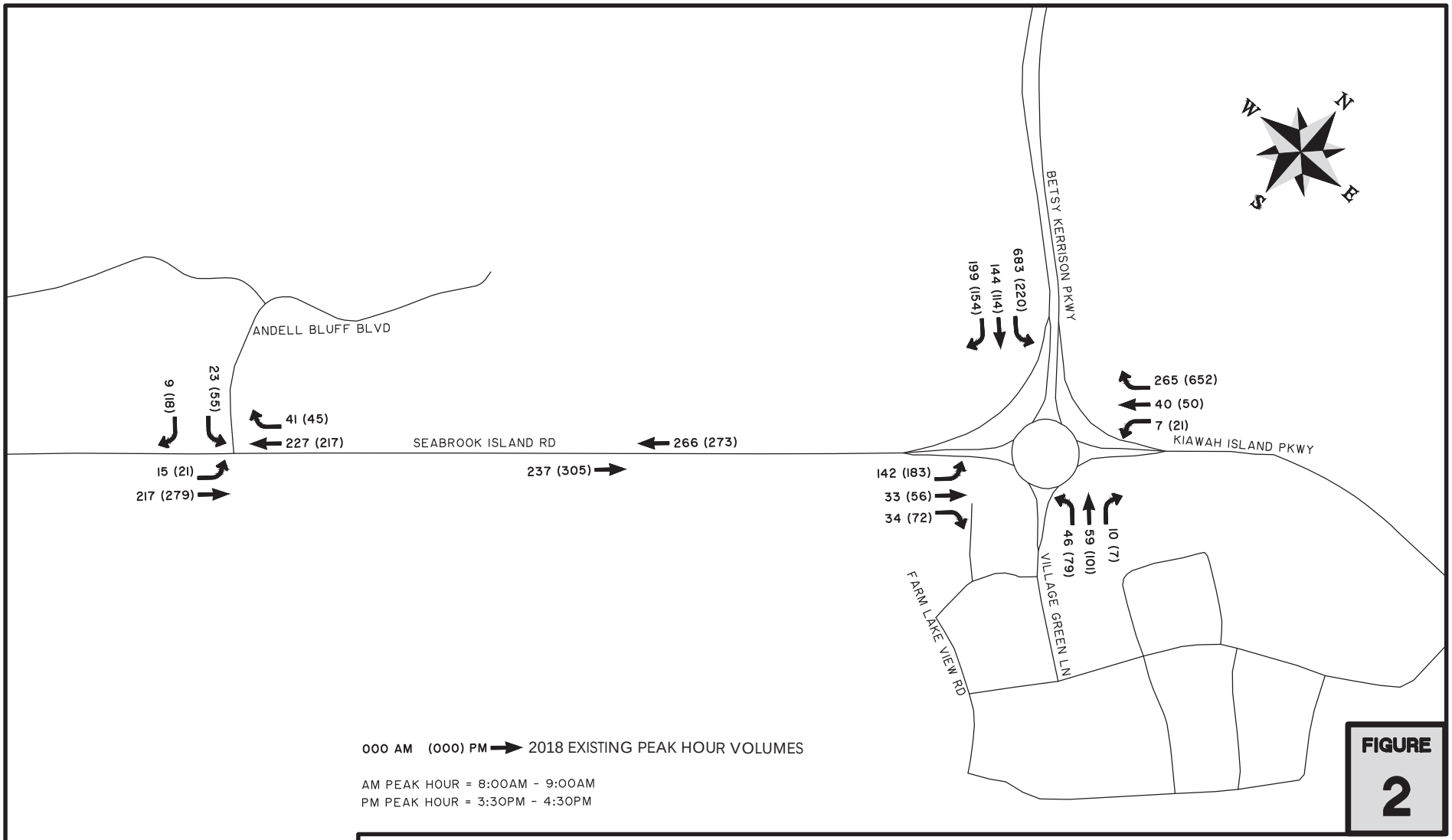

FIGURE 2

SEABROOK ISLAND ROAD

2018 EXISTING PEAK HOUR VOLUMES

CLIENT:

KIAWAH RESORT ASSOCIATES, LP

LOCATION: SEABROOK ISLAND, SOUTH CAROLINA

DATE: 6/18/18 DRAWN BY: DPE SHEET: FIGURE 2

JOB NUMBER: J-27252 REVIEWED BY: DDK SCALE: 1" = 400'

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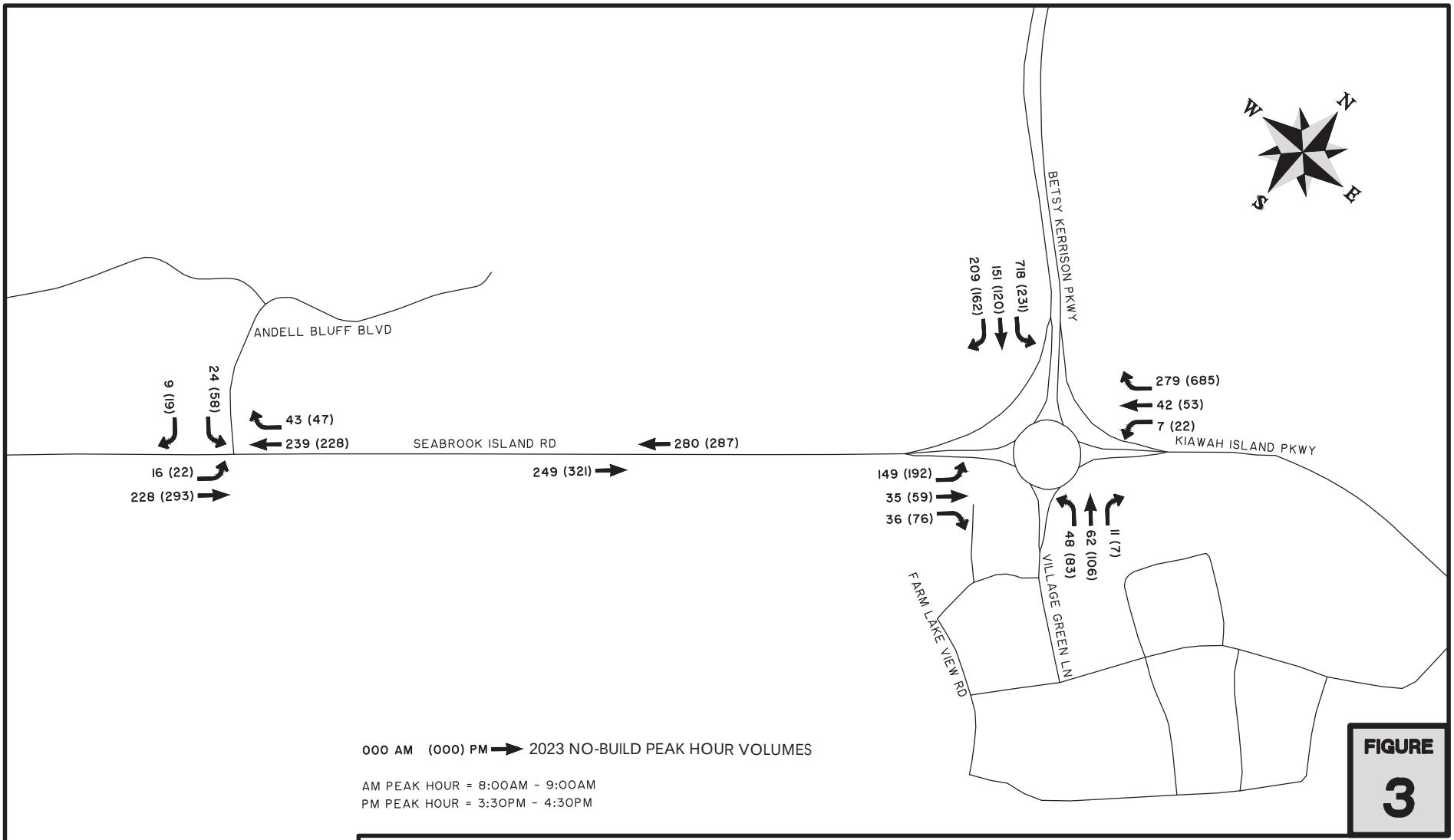

000 AM (000) PM → 2023 NO-BUILD PEAK HOUR VOLUMES

AM PEAK HOUR = 8:00AM - 9:00AM
PM PEAK HOUR = 3:30PM - 4:30PM

FIGURE 3

SEABROOK ISLAND ROAD

2023 NO-BUILD PEAK HOUR VOLUMES

CLIENT:

KIAWAH RESORT ASSOCIATES, LP

LOCATION: SEABROOK ISLAND, SOUTH CAROLINA

DATE: 8/2/18 | DRAWN BY: DPE | SHEET: FIGURE 3

JOB NUMBER: J-27252 | REVIEWED BY: DDK | SCALE: 1" = 400'

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4. TRIP GENERATION

Trips generated by the proposed development are estimated using the standard rates and equations from the Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012. Trip generation for the project are shown in Table 4 and included in Appendix C.

Table 4. Trip Generation

ITE Category	Land Use	Daily Trips	AM Peak		PM Peak	
			Enter	Exit	Enter	Exit
230	Residential Condominium/Townhouse 50 Dwelling Units	291	4	18	17	9
252	Senior Adult Housing - Attached 128 Dwelling Units	440	9	17	17	15
254	Assisted Living & Memory Care 72 Beds	192	7	3	7	9
Total Projected Trips		**923**	**20**	**38**	**41**	**33**

5. TRIP DISTRIBUTION

Based on existing traffic counts, the site generated vehicular trips distribution for each development are assumed as follows:

- 80% to/from the east via Betsy Kerrison Parkway to Seabrook Island Road
- 10% to/from the west via Andell Bluff Boulevard to Seabrook Island Road
- 10% to/from the Freshfields Village via Village Green Lane and Farm Lake View Road to the proposed development

The site generated trips are assigned to the study intersection and access points based on the trip distribution assumptions. Site trip distributions are shown in **Figure 4A.** Site generated trips are shown in **Figure 5A.**

As discussed with the Town of Seabrook Island, the site generated vehicular trips for the alternative analysis of all proposed traffic utilizing Freshfields Village via Village Green Lane and Farm Lake View Road to the proposed development are assumed 100% to/from Betsy Kerrison Parkway to Village Green Lane. Site trip distributions for this alternative are shown in **Figure 4B.** Site generated trips for this alternative are shown in **Figure 5B.**

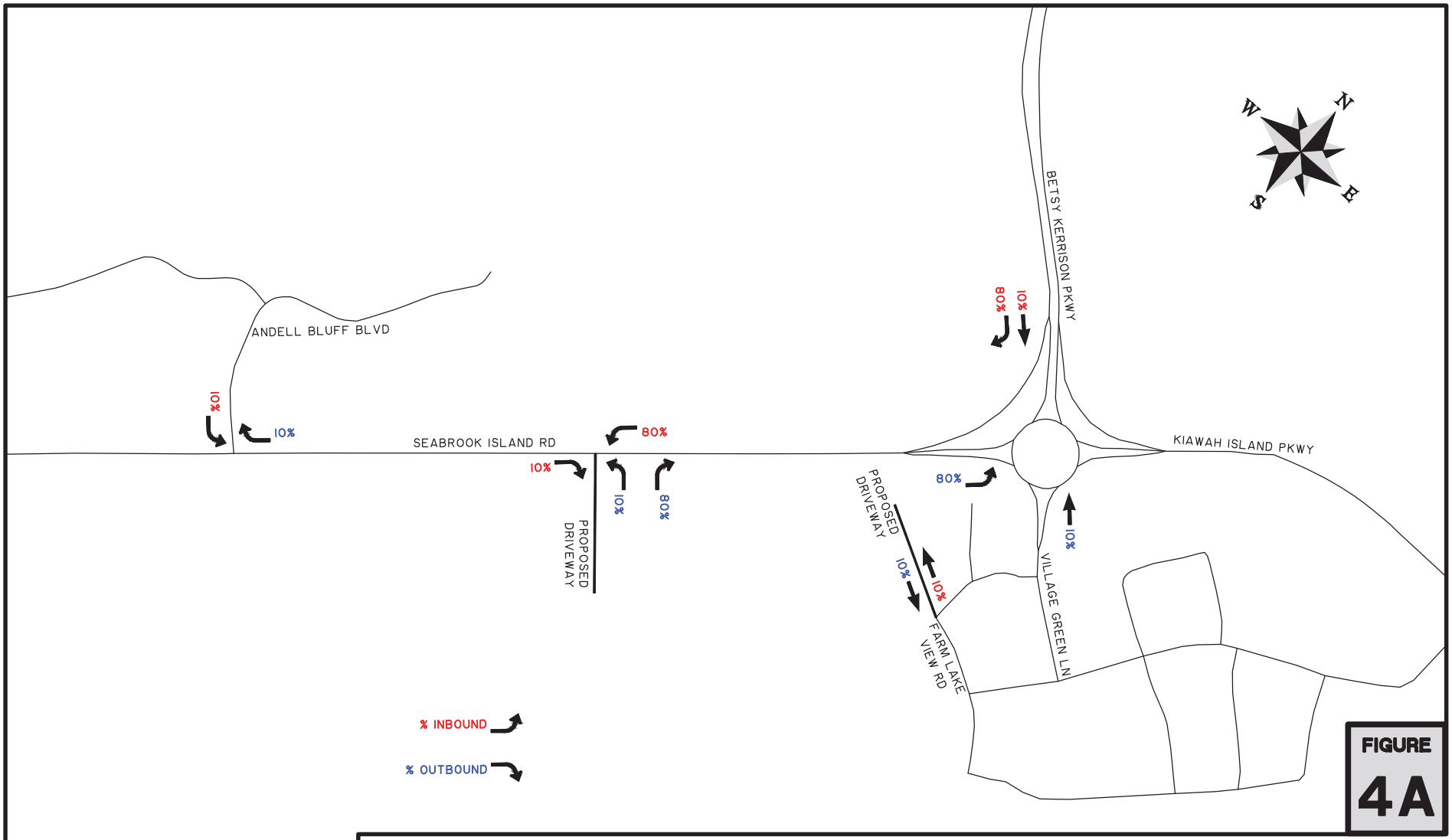

FIGURE 4A

SEABROOK ISLAND ROAD

SITE TRIP DISTRIBUTION

CLIENT:

KIAWAH RESORT ASSOCIATES, LP

LOCATION: SEABROOK ISLAND, SOUTH CAROLINA

DATE: 8/17/18 DRAWN BY: DPE SHEET: FIGURE 4A

JOB NUMBER: J-27252 REVIEWED BY: DDK SCALE: 1" = 400'

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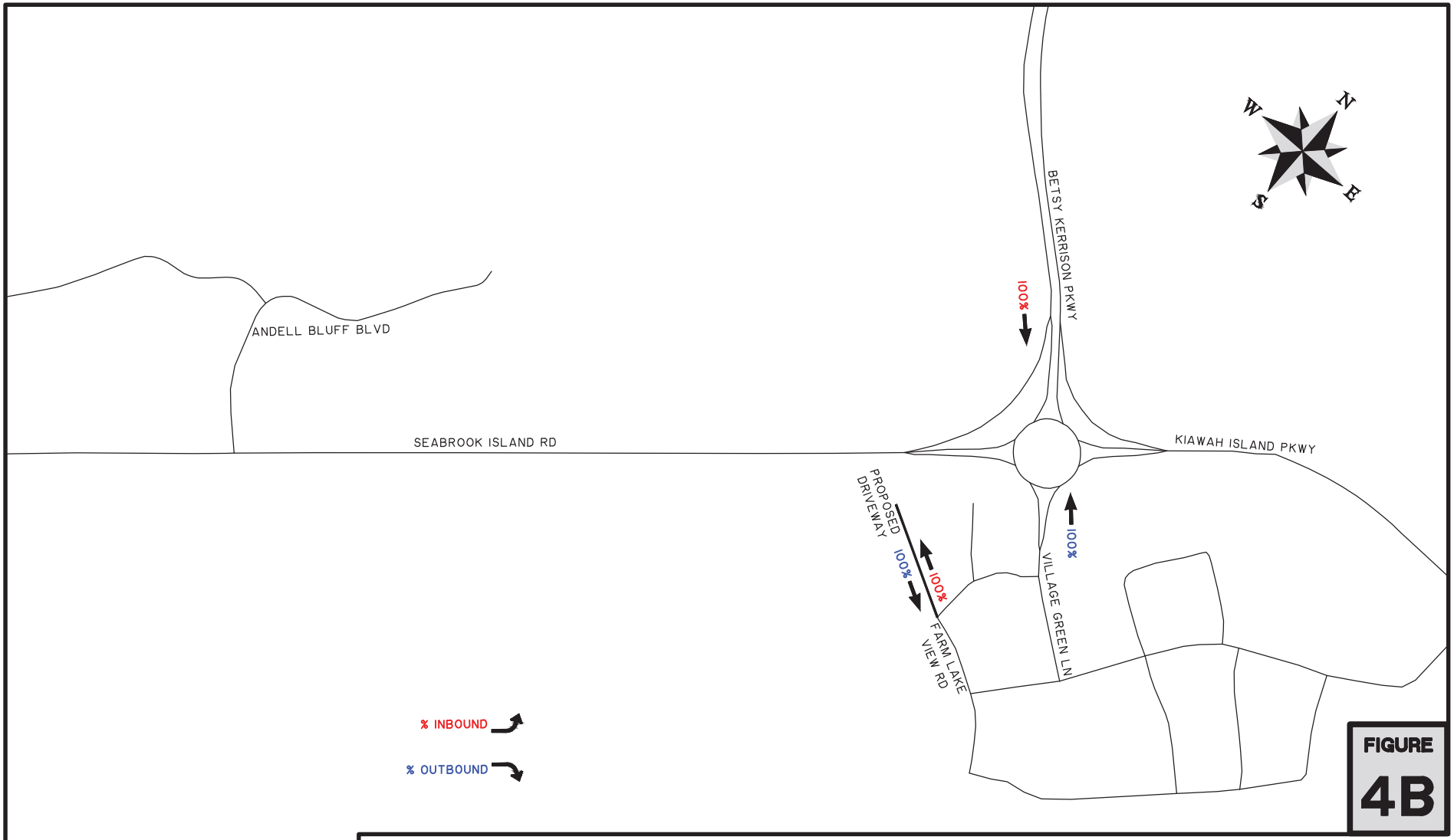

FIGURE 4B

SEABROOK ISLAND ROAD

SITE TRIP DISTRIBUTION
VILLAGE GREEN LANE ALTERNATIVE

CLIENT:

KIAWAH RESORT ASSOCIATES, LP

LOCATION: SEABROOK ISLAND, SOUTH CAROLINA

DATE: 8/17/18 DRAWN BY: DPE SHEET: FIGURE 4B

JOB NUMBER: J-27252 REVIEWED BY: DDK SCALE: 1" = 400'

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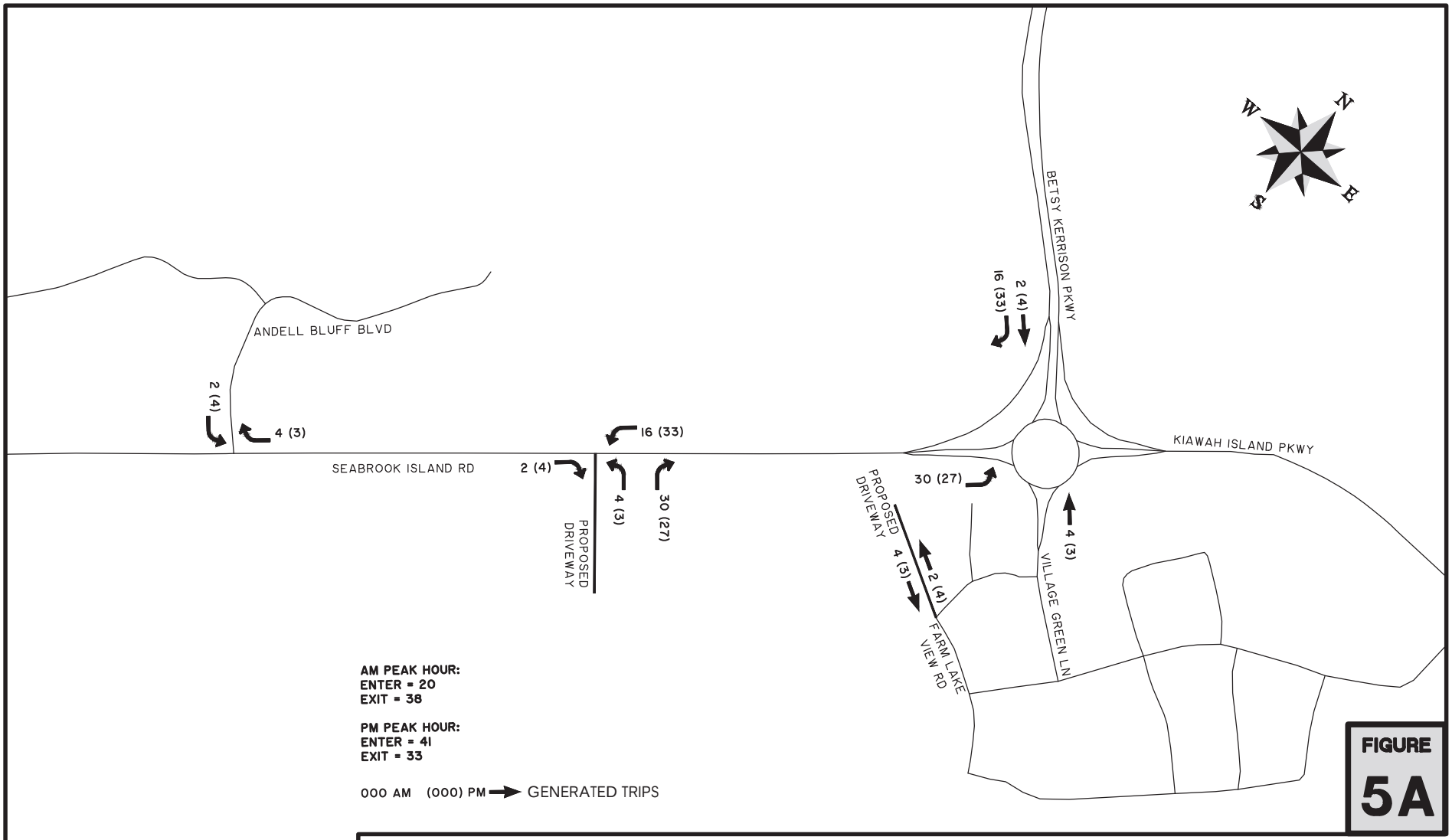

FIGURE 5A

SEABROOK ISLAND ROAD

SITE GENERATED TRIPS

CLIENT:

KIAWAH RESORT ASSOCIATES, LP

LOCATION: SEABROOK ISLAND, SOUTH CAROLINA

DATE: 8/17/18 DRAWN BY: DPE SHEET: FIGURE 5A

JOB NUMBER: J-27252 REVIEWED BY: DDK SCALE: 1" = 400'

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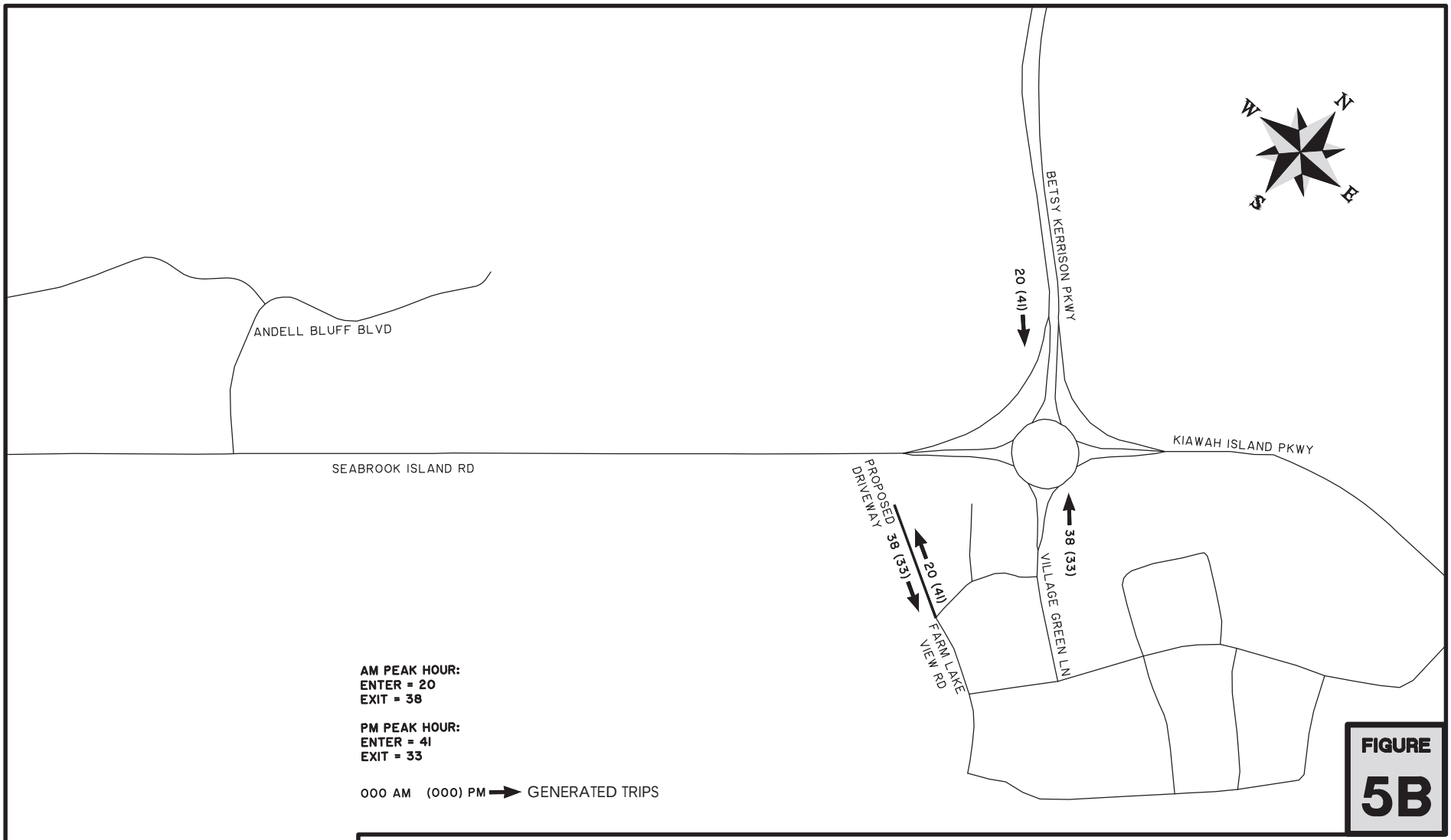

FIGURE 5B

SEABROOK ISLAND ROAD

SITE GENERATED TRIPS
VILLAGE GREEN LANE ALTERNATIVE

CLIENT:

KIAWAH RESORT ASSOCIATES, LP

LOCATION: SEABROOK ISLAND, SOUTH CAROLINA

DATE: 8/17/18 DRAWN BY: DPE SHEET: FIGURE 5B

JOB NUMBER: J-27252 REVIEWED BY: DDK SCALE: 1" = 400'

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6. FUTURE 2023 (NO-BUILD/BUILD OUT) CONDITIONS

For build out with the proposed driveway on Seabrook Island Road, the site generated volumes (Figure 5A) are added to the no-build volumes (Figure 3) to determine the morning and afternoon 2023 build out design volumes (**Figure 6A**). The future volumes are used to calculate the intersection Levels of Service with and without the proposed development. Results of the capacity analyses are shown in the Table 5, and the Synchro reports are included Appendix D and Appendix E.

Table 5. Future Levels of Service (2023)

Intersection	Control	2023 AM Peak Hour		2023 PM Peak Hour	
		No-Build (LOS/DELAY)	Build Out (LOS/DELAY)	No-Build (LOS/DELAY)	Build Out (LOS/DELAY)
Kiawah Island Pkwy, Betsy Kerrison Pkwy, Seabrook Island Rd and Village Green Ln	Round-about				
SE approach (Betsy Kerrison Pkwy)		D / 35	D / 35	A / 6	A / 6
NW approach (Village Green Ln)		C / 15	C / 16	B / 10	B / 11
NE approach (Seabrook Island Rd)		C / 24	D / 29	B / 12	B / 14
SW approach (Kiawah Island Pkwy)		A / 1	A / 1	A / 1	A / 1
Intersection Overall		**D / 26**	**D / 26**	**A / 5**	**A / 6**
Seabrook Island Rd and Andell Bluff Blvd	Stop				
SB approach (Andell Bluff Blvd)		B / 12	B / 13	B / 14	B / 15
Seabrook Island Rd and proposed driveway	Stop				
NB approach (driveway)		-	B / 10	-	B / 11

For build out with the proposed driveway on Seabrook Island Road, the intersections will operate at acceptable levels of service. Traffic generated by the development should have a minimal effect on the operation of the surrounding roadways. The proposed driveway for the development should also function with very minor delays.

As requested by the Town of Seabrook Island, an alternative analysis is evaluated to exclude the proposed driveway on Seabrook Island Road and analyze all proposed traffic to utilize Freshfields Village via Village Green Lane and Farm Lake View Road to the proposed development. For build out without the proposed driveway on Seabrook Island Road, the site generated volumes (Figure 5B) are added to the no-build volumes (Figure 3) to determine the morning and afternoon 2023 build out design volumes (**Figure 6B**). The comparison results between the build out with the proposed driveway on Seabrook Island Road and without the driveway are shown in the Table 6, and the Synchro reports are included Appendix E.

Table 6. Future Levels of Service between Build Out Alternatives

Intersection	Control	2023 AM Peak Hour Build Out (LOS/DELAY)		2023 PM Peak Hour Build Out (LOS/DELAY)	
Kiawah Island Pkwy, Betsy Kerrison Pkwy, Seabrook Island Rd and Village Green Ln	Roundabout	**WITH** Seabrook Island driveway	**WITHOUT** Seabrook Island driveway	**WITH** Seabrook Island driveway	**WITHOUT** Seabrook Island driveway
SE approach (Betsy Kerrison Pkwy)		D / 35	E / 39	A / 6	A / 7
NW approach (Village Green Ln)		C / 16	C / 18	B / 11	B / 11
NE approach (Seabrook Island Rd)		D / 29	D / 25	B / 14	B / 13
SW approach (Kiawah Island Pkwy)		A / 1	A / 1	A / 1	A / 1
Intersection Overall		**D / 26**	**D / 28**	**A / 6**	**A / 6**

For build out without the proposed driveway on Seabrook Island Road and all proposed trips utilizing Village Green Lane, the overall intersection will operate at acceptable levels of service. During the AM peak hour, the southeast approach (Betsy Kerrison Parkway) will fall into an unacceptable LOS of E. This is due to the high volume of left turning vehicles travelling from Betsy Kerrison Parkway to Kiawah Island Parkway.

The SCDOT Roadway Design Manual Figure 9.5-A – Guidelines for Right-Turn Lanes at Unsignalized Intersections on Two-Lane Highways was consulted to determine if the right-turning volumes into the proposed driveway warrant a right-turn lane on Seabrook Island Road. Both the AM and PM peak hour right-turning volumes do not warrant the need for the installation of a right-turn lane on Seabrook Island Road. The right-turn lane analysis is included in Appendix F.

Figure 9.5-G – Volume Guidelines for Left-Turn Lanes at Unsignalized Intersections on Two-Lane Highways (40 mph) was consulted to determine if the left-turning volumes into the proposed driveway warrant a left-turn lane on Seabrook Island Road. Both the AM and PM peak hour left-turning volumes fall below the warrants for a left-turn lane on Seabrook Island Road. The left-turn lane analysis is included in Appendix G.

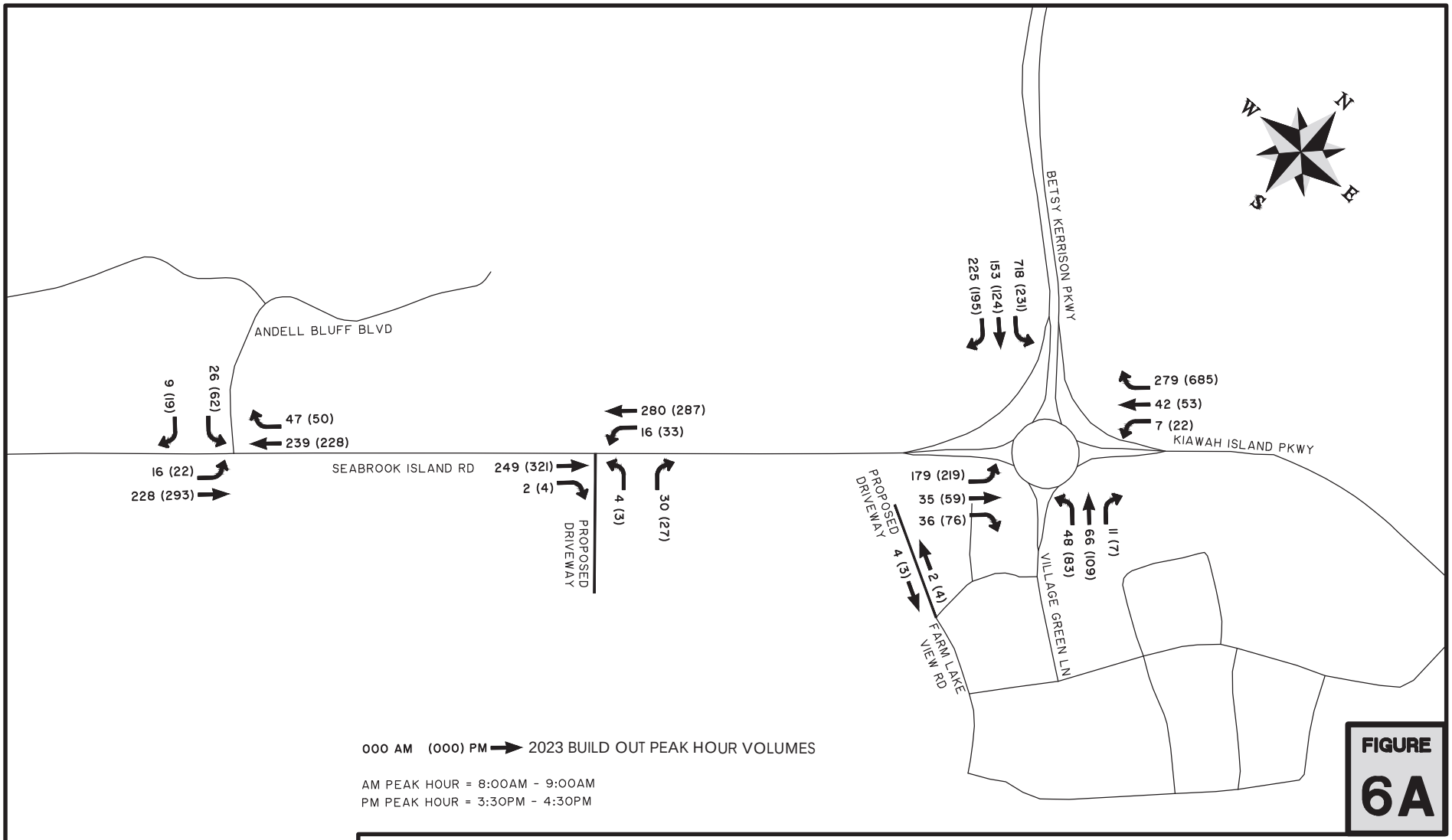

FIGURE 6A

SEABROOK ISLAND ROAD

2023 BUILD OUT PEAK HOUR VOLUMES

CLIENT:

KIAWAH RESORT ASSOCIATES, LP

LOCATION: SEABROOK ISLAND, SOUTH CAROLINA

DATE: 8/17/18 DRAWN BY: DPE SHEET: FIGURE 6A

JOB NUMBER: J-27252 REVIEWED BY: DDK SCALE: 1" = 400'

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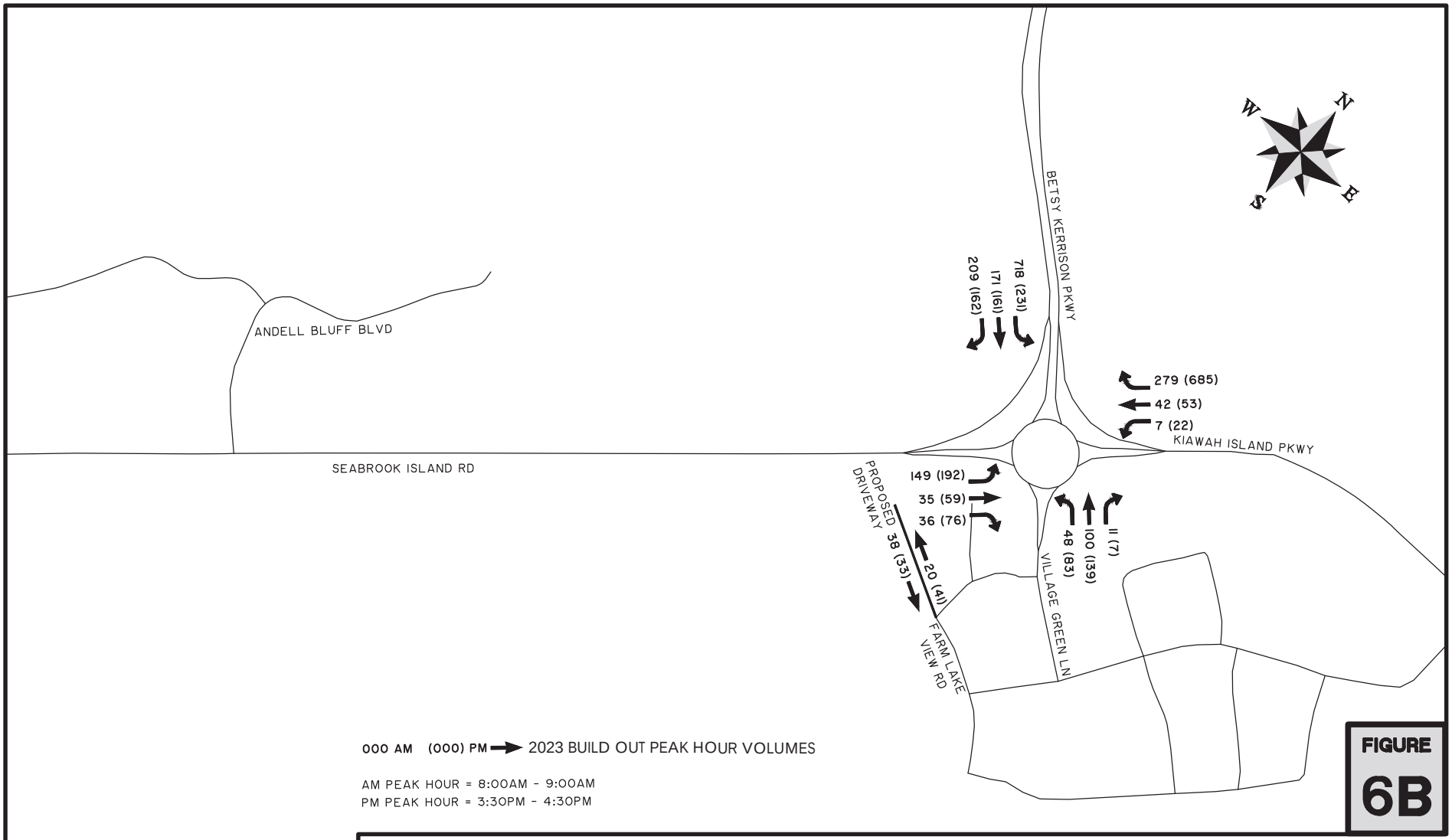
Z:\27252\27252.0000\Documents\Reports\Traffic\August 2018 Traffic Impact Analysis\Supporting Documents\AutoCAD Figures\Figure 6A - 2023 Build Out Peak Hours.dwg - Aug 17, 2018 - 11:22:08 AM



000 AM (000) PM → 2023 BUILD OUT PEAK HOUR VOLUMES

AM PEAK HOUR = 8:00AM - 9:00AM
PM PEAK HOUR = 3:30PM - 4:30PM

FIGURE 6B

SEABROOK ISLAND ROAD

2023 BUILD OUT PEAK HOUR VOLUMES
VILLAGE GREEN LANE ALTERNATIVE

CLIENT:

KIAWAH RESORT ASSOCIATES, LP

LOCATION: SEABROOK ISLAND, SOUTH CAROLINA

DATE: 8/17/18 | DRAWN BY: DPE | SHEET: FIGURE 6B

JOB NUMBER: J-27252 | REVIEWED BY: DDK | SCALE: 1" = 400'

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7. SUMMARY / CONCLUSIONS

The Seabrook Island Road – Freshfields Village Senior Living development is proposed for a site southwest of the existing roundabout at Kiawah Island Parkway, Betsy Kerrison Parkway, Seabrook Island Road and Village Green Lane, in Seabrook Island, SC. The new development will consist of 128 units of independent living housing, 40 units of assisted living, 32 units of memory care housing, and 50 dwelling units of townhomes. The development is anticipated to be completed in 2023.

Based on the analysis for the proposed driveway on Seabrook Island Road, traffic generated by the development should have a minimal effect on the operation of the surrounding roadways, and the intersections should continue to function with minimal delays. The proposed driveway for the development should also function with very minor delays.

Based on the analysis without the proposed driveway on Seabrook Island Road and all proposed trips utilizing Village Green Lane, the overall intersection will operate at acceptable levels of service. During the AM peak hour, the southeast approach (Betsy Kerrison Parkway) will fall into an unacceptable LOS of E. This is due to the high volume of left turning vehicles travelling from Betsy Kerrison Parkway to Kiawah Island Parkway.

Based on the analysis using the SCDOT Roadway Design Manual, the right-turning volumes and the left-turning volumes on Seabrook Island Road into the proposed driveway are relatively low and do not warrant the installation of a right-turn lane or a left-turn lane on Seabrook Island Road as a part of this project.

The results of the analysis indicate that there is minimal difference in level of service between the original plan that included a driveway on Seabrook Island Road, and the alternative site plan that has all access from Farm Lake View Road via Village Green Lane. The original analysis, with minimally better level of service overall at the roundabout, provides two access points to the site, which can be critical in emergency situations and is beneficial in the event of roadway reconstruction along the access at Village Green Lane. For these reasons, providing a driveway on Seabrook Island Road is recommended.

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TRAFFIC IMPACT ANALYSIS

SEABROOK ISLAND ROAD

APPENDIX A

EXISTING TRAFFIC COUNTS

J - 27252

August 2018

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735 Maryland St
Columbia, SC 29201

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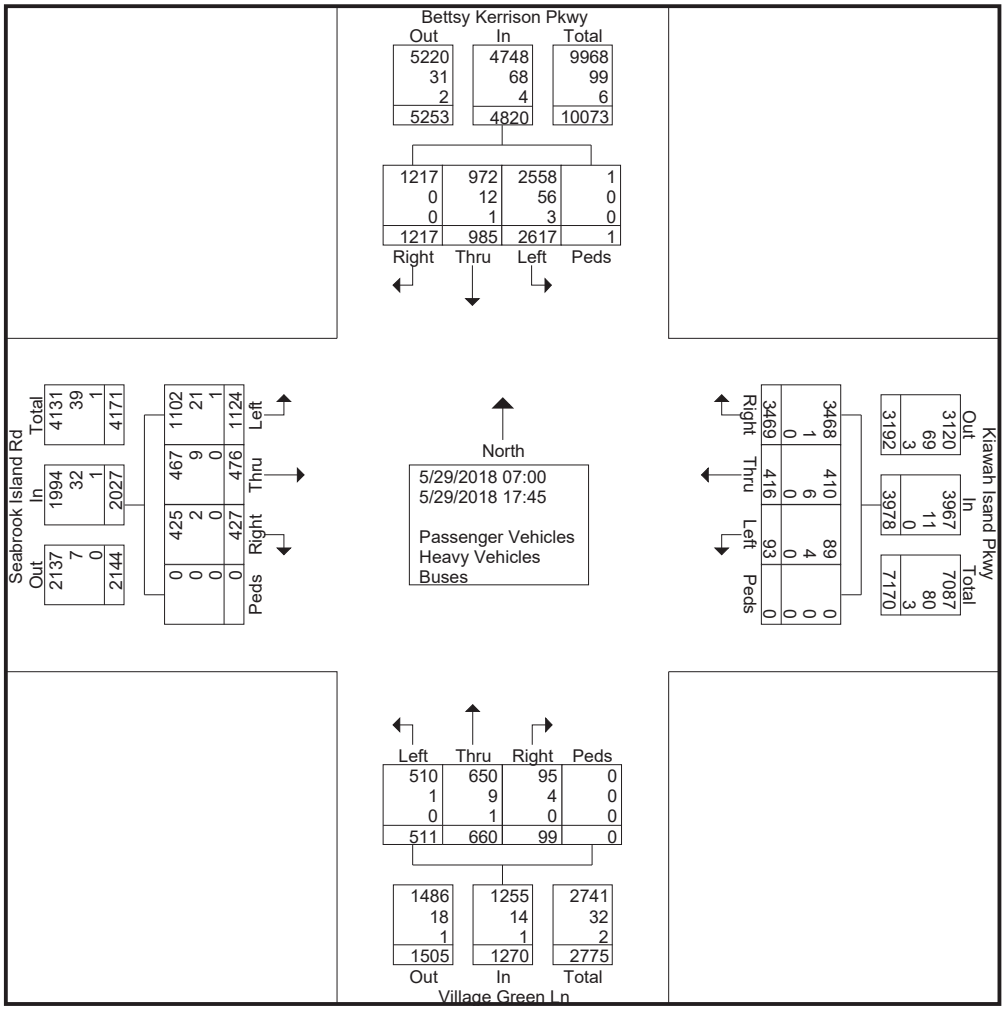
File Name : Kiawah Traffic Circle
Site Code :
Start Date : 5/29/2018
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles - Buses

	Bettsy Kerrison Pkwy Southbound				Kiawah Isand Pkwy Westbound				Village Green Ln Northbound				Seabrook Island Rd Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00	130	27	18	1	0	1	17	0	7	6	1	0	20	7	8	0	243
07:15	132	38	33	0	1	2	26	0	7	3	1	0	16	3	4	0	266
07:30	155	36	38	0	0	7	31	0	9	9	4	0	24	3	9	0	325
07:45	174	40	31	0	0	10	34	0	14	13	2	0	24	5	5	0	352
Total	591	141	120	1	1	20	108	0	37	31	8	0	84	18	26	0	1186
08:00	186	27	36	0	1	7	59	0	12	16	2	0	32	2	10	0	390
08:15	167	36	57	0	0	6	66	0	12	16	1	0	35	5	9	0	410
08:30	153	44	53	0	3	13	66	0	8	10	4	0	38	11	7	0	410
08:45	177	37	53	0	3	14	74	0	14	17	3	0	37	15	8	0	452
Total	683	144	199	0	7	40	265	0	46	59	10	0	142	33	34	0	1662
11:00	74	35	42	0	6	19	82	0	15	17	3	0	39	20	5	0	357
11:15	71	31	37	0	3	14	79	0	10	22	3	0	36	23	3	0	332
11:30	73	30	37	0	4	17	104	0	11	20	5	0	38	13	4	0	356
11:45	79	36	37	0	6	22	100	0	22	20	4	0	36	29	2	0	393
Total	297	132	153	0	19	72	365	0	58	79	15	0	149	85	14	0	1438
12:00	49	36	26	0	5	14	82	0	29	19	3	0	49	29	20	0	361
12:15	70	35	38	0	7	9	97	0	26	22	4	0	44	29	17	0	398
12:30	63	39	54	0	3	20	97	0	14	19	4	0	36	30	15	0	394
12:45	66	44	40	0	4	21	90	0	18	19	4	0	38	32	17	0	393
Total	248	154	158	0	19	64	366	0	87	79	15	0	167	120	69	0	1546
14:00	64	18	36	0	0	10	98	0	14	20	9	0	15	17	23	0	324
14:15	58	20	40	0	4	17	120	0	14	19	9	0	14	15	18	0	348
14:30	70	25	36	0	3	12	120	0	15	22	4	0	17	10	17	0	351
14:45	61	22	30	0	1	18	152	0	19	21	4	0	28	12	16	0	384
Total	253	85	142	0	8	57	490	0	62	82	26	0	74	54	74	0	1407
15:00	59	31	32	0	2	8	141	0	16	42	1	0	51	22	17	0	422
15:15	59	29	35	0	0	11	136	0	19	24	1	0	36	17	15	0	382
15:30	75	32	48	0	5	5	184	0	18	26	0	0	42	16	21	0	472
15:45	31	18	24	0	5	10	168	0	23	27	2	0	48	18	25	0	399
Total	224	110	139	0	12	34	629	0	76	119	4	0	177	73	78	0	1675
16:00	43	25	32	0	7	22	136	0	20	26	2	0	54	10	12	0	389
16:15	71	39	50	0	4	13	164	0	18	22	3	0	39	12	14	0	449
16:30	45	26	33	0	4	15	164	0	15	31	4	0	45	11	22	0	415
16:45	41	22	27	0	1	15	148	0	17	26	1	0	43	9	15	0	365
Total	200	112	142	0	16	65	612	0	70	105	10	0	181	42	63	0	1618
17:00	46	41	49	0	1	13	168	0	17	38	2	0	49	9	22	0	455
17:15	23	23	33	0	7	15	178	0	15	20	2	0	38	13	15	0	382
17:30	30	26	38	0	0	14	152	0	21	22	2	0	33	12	15	0	365
17:45	22	17	44	0	3	22	136	0	22	26	5	0	30	17	17	0	361
Total	121	107	164	0	11	64	634	0	75	106	11	0	150	51	69	0	1563
Grand Total	2617	985	1217	1	93	416	3469	0	511	660	99	0	1124	476	427	0	12095
Apprch %	54.3	20.4	25.2	0	2.3	10.5	87.2	0	40.2	52	7.8	0	55.5	23.5	21.1	0	
Total %	21.6	8.1	10.1	0	0.8	3.4	28.7	0	4.2	5.5	0.8	0	9.3	3.9	3.5	0	
Passenger Vehicles	2558	972	1217	1	89	410	3468	0	510	650	95	0	1102	467	425	0	11964
% Passenger Vehicles	97.7	98.7	100	100	95.7	98.6	100	0	99.8	98.5	96	0	98	98.1	99.5	0	98.9
Heavy Vehicles	56	12	0	0	4	6	1	0	1	9	4	0	21	9	2	0	125
% Heavy Vehicles	2.1	1.2	0	0	4.3	1.4	0	0	0.2	1.4	4	0	1.9	1.9	0.5	0	1
Buses	3	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	6
% Buses	0.1	0.1	0	0	0	0	0	0	0	0.2	0	0	0.1	0	0	0	0


Bettsy Kerrison Pkwy
Out In Total
5220 4748 9968
31 68 99
2 4 6
5253 4820 10073
1217 972 2558 1
0 12 56 0
0 1 3 0
1217 985 2617 1
Right Thru Left Peds
Seabrook Island Rd
Total 4131 39 1 4171
In 1994 32 1 2027
Out 2137 7 0 2144
1102 21 1 1124 Left
467 9 0 476 Thru
425 2 0 427 Right
0 0 0 0 Peds
North
5/29/2018 07:00
5/29/2018 17:45
Passenger Vehicles
Heavy Vehicles
Buses
Right 3469 0 1 3468
Thru 416 0 6 410
Left 93 0 4 89
Peds 0 0 0 0
Kiawah Isand Pkwy
Out 3120 69 3 3192
In 3978 11 0 3967
Total 7170 80 3 7087
Left Thru Right Peds
510 650 95 0
1 9 4 0
0 1 0 0
511 660 99 0
1486 1255 2741
18 14 32
1 1 2
1505 1270 2775
Out In Total
Village Green Ln

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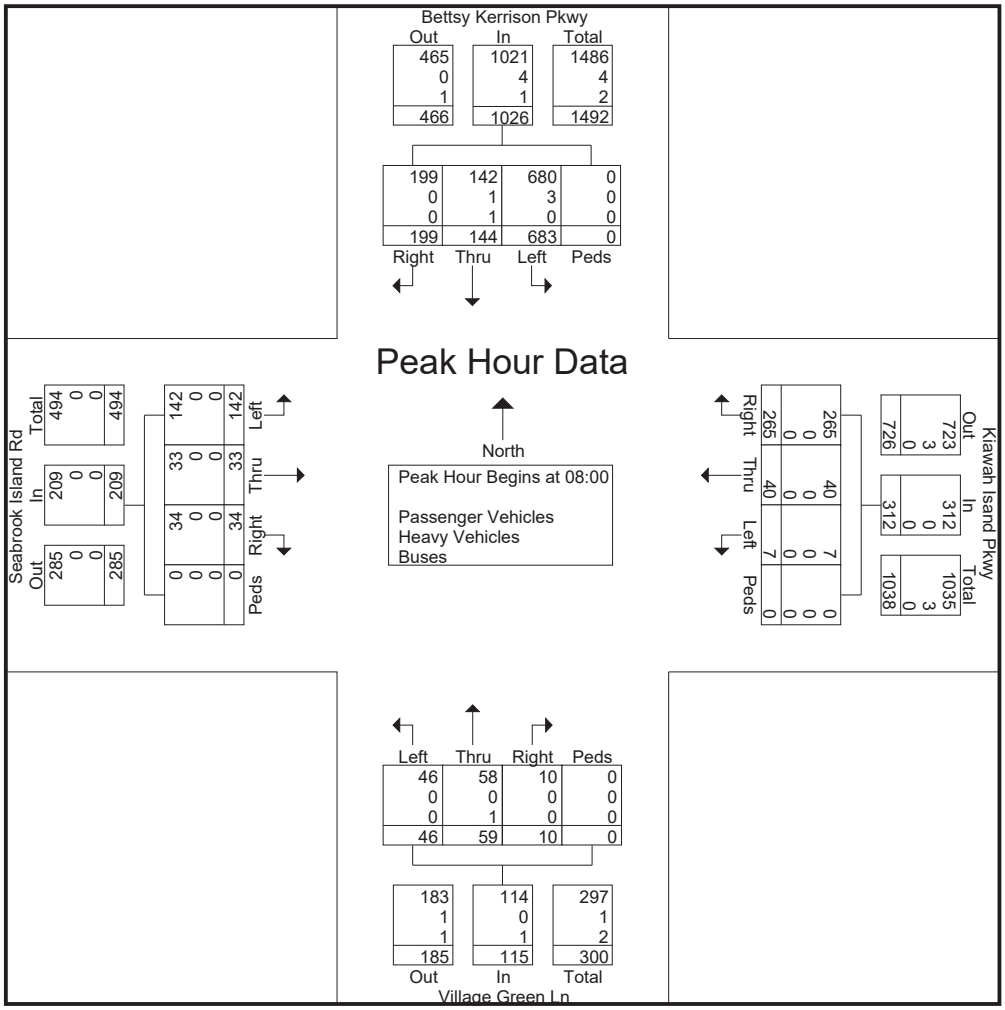
File Name : Kiawah Traffic Circle
Site Code :
Start Date : 5/29/2018
Page No : 3

	Bettsy Kerrison Pkwy Southbound					Kiawah Isand Pkwy Westbound					Village Green Ln Northbound					Seabrook Island Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00																					
08:00	**186**	27	36	0	249	1	7	59	0	67	12	16	2	0	30	32	2	**10**	0	44	390
08:15	167	36	**57**	0	260	0	6	66	0	72	12	16	1	0	29	35	5	9	0	49	410
08:30	153	**44**	53	0	250	**3**	13	66	0	82	8	10	**4**	0	22	**38**	11	7	0	56	410
08:45	177	37	53	0	**267**	3	**14**	**74**	0	**91**	**14**	**17**	3	0	**34**	37	**15**	8	0	**60**	**452**
Total Volume	683	144	199	0	1026	7	40	265	0	312	46	59	10	0	115	142	33	34	0	209	1662
% App. Total	66.6	14	19.4	0		2.2	12.8	84.9	0		40	51.3	8.7	0		67.9	15.8	16.3	0		
PHF	.918	.818	.873	.000	.961	.583	.714	.895	.000	.857	.821	.868	.625	.000	.846	.934	.550	.850	.000	.871	.919
Passenger Vehicles	680	142	199	0	1021	7	40	265	0	312	46	58	10	0	114	142	33	34	0	209	1656
% Passenger Vehicles																					
Heavy Vehicles	3	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
% Heavy Vehicles	0.4	0.7	0	0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Buses	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
% Buses	0	0.7	0	0	0.1	0	0	0	0	0	0	1.7	0	0	0.9	0	0	0	0	0	0.1



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File Name : Kiawah Traffic Circle
Site Code :
Start Date : 5/29/2018
Page No : 4

	Bettsy Kerrison Pkwy Southbound					Kiawah Isand Pkwy Westbound					Village Green Ln Northbound					Seabrook Island Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:00 to 12:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45																					
11:45	**79**	36	37	0	152	6	**22**	**100**	0	**128**	22	20	**4**	0	46	36	29	2	0	67	393
12:00	49	36	26	0	111	5	14	82	0	101	**29**	19	3	0	51	**49**	29	**20**	0	**98**	361
12:15	70	35	38	0	143	**7**	9	97	0	113	26	**22**	4	0	**52**	44	29	17	0	90	**398**
12:30	63	**39**	**54**	0	**156**	3	20	97	0	120	14	19	4	0	37	36	**30**	15	0	81	394
Total Volume	261	146	155	0	562	21	65	376	0	462	91	80	15	0	186	165	117	54	0	336	1546
% App. Total	46.4	26	27.6	0		4.5	14.1	81.4	0		48.9	43	8.1	0		49.1	34.8	16.1	0		
PHF	.826	.936	.718	.000	.901	.750	.739	.940	.000	.902	.784	.909	.938	.000	.894	.842	.975	.675	.000	.857	.971
Passenger Vehicles	252	146	155	0	553	21	64	376	0	461	91	77	14	0	182	162	116	54	0	332	1528
% Passenger Vehicles																					
Heavy Vehicles	9	0	0	0	9	0	1	0	0	1	0	3	1	0	4	3	1	0	0	4	18
% Heavy Vehicles	3.4	0	0	0	1.6	0	1.5	0	0	0.2	0	3.8	6.7	0	2.2	1.8	0.9	0	0	1.2	1.2
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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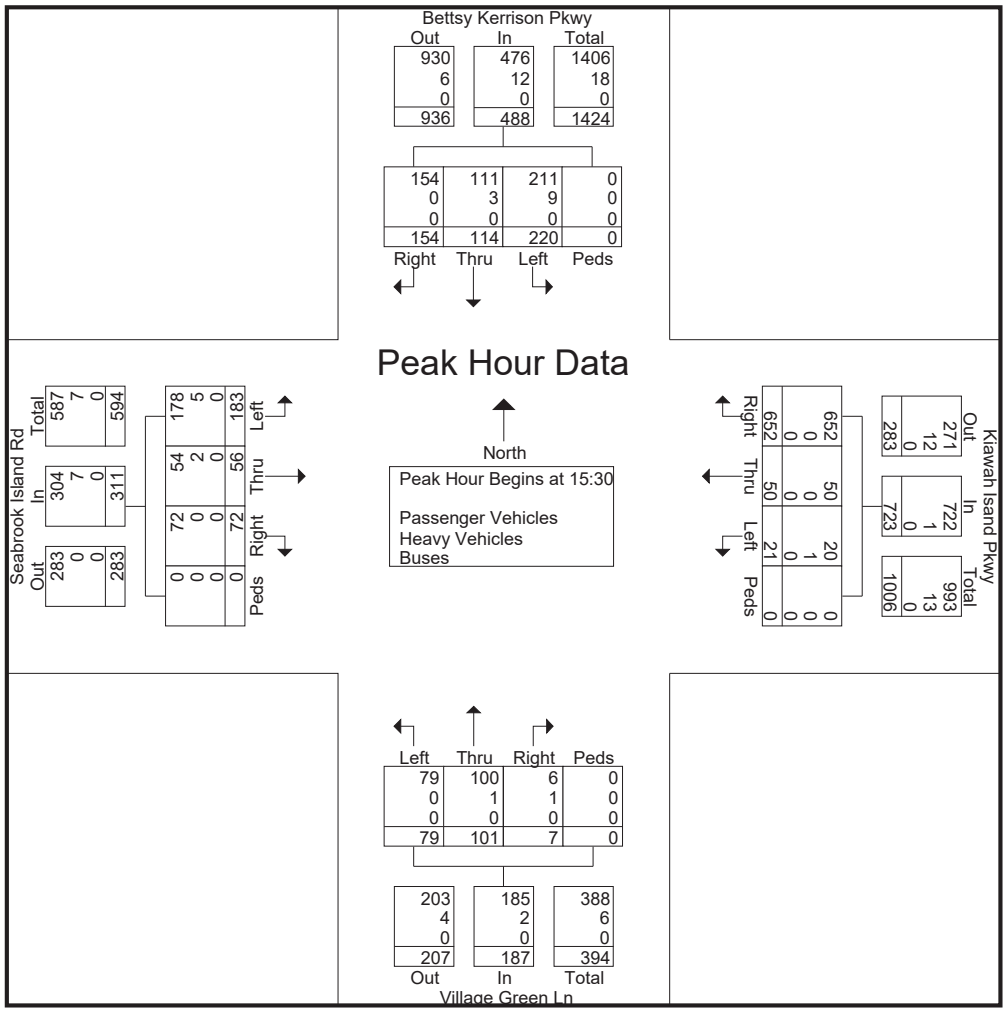
File Name : Kiawah Traffic Circle
Site Code :
Start Date : 5/29/2018
Page No : 5

	Bettsy Kerrison Pkwy Southbound					Kiawah Isand Pkwy Westbound					Village Green Ln Northbound					Seabrook Island Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 14:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 15:30																					
15:30	**75**	32	48	0	155	5	5	**184**	0	**194**	18	26	0	0	44	42	16	21	0	79	**472**
15:45	31	18	24	0	73	5	10	168	0	183	**23**	**27**	2	0	**52**	48	**18**	**25**	0	**91**	399
16:00	43	25	32	0	100	**7**	**22**	136	0	165	20	26	2	0	48	**54**	10	12	0	76	389
16:15	71	**39**	**50**	0	**160**	4	13	164	0	181	18	22	**3**	0	43	39	12	14	0	65	449
Total Volume	220	114	154	0	488	21	50	652	0	723	79	101	7	0	187	183	56	72	0	311	1709
% App. Total	45.1	23.4	31.6	0		2.9	6.9	90.2	0		42.2	54	3.7	0		58.8	18	23.2	0		
PHF	.733	.731	.770	.000	.763	.750	.568	.886	.000	.932	.859	.935	.583	.000	.899	.847	.778	.720	.000	.854	.905
Passenger Vehicles	211	111	154	0	476	20	50	652	0	722	79	100	6	0	185	178	54	72	0	304	1687
% Passenger Vehicles																					
Heavy Vehicles	9	3	0	0	12	1	0	0	0	1	0	1	1	0	2	5	2	0	0	7	22
% Heavy Vehicles	4.1	2.6	0	0	2.5	4.8	0	0	0	0.1	0	1.0	14.3	0	1.1	2.7	3.6	0	0	2.3	1.3
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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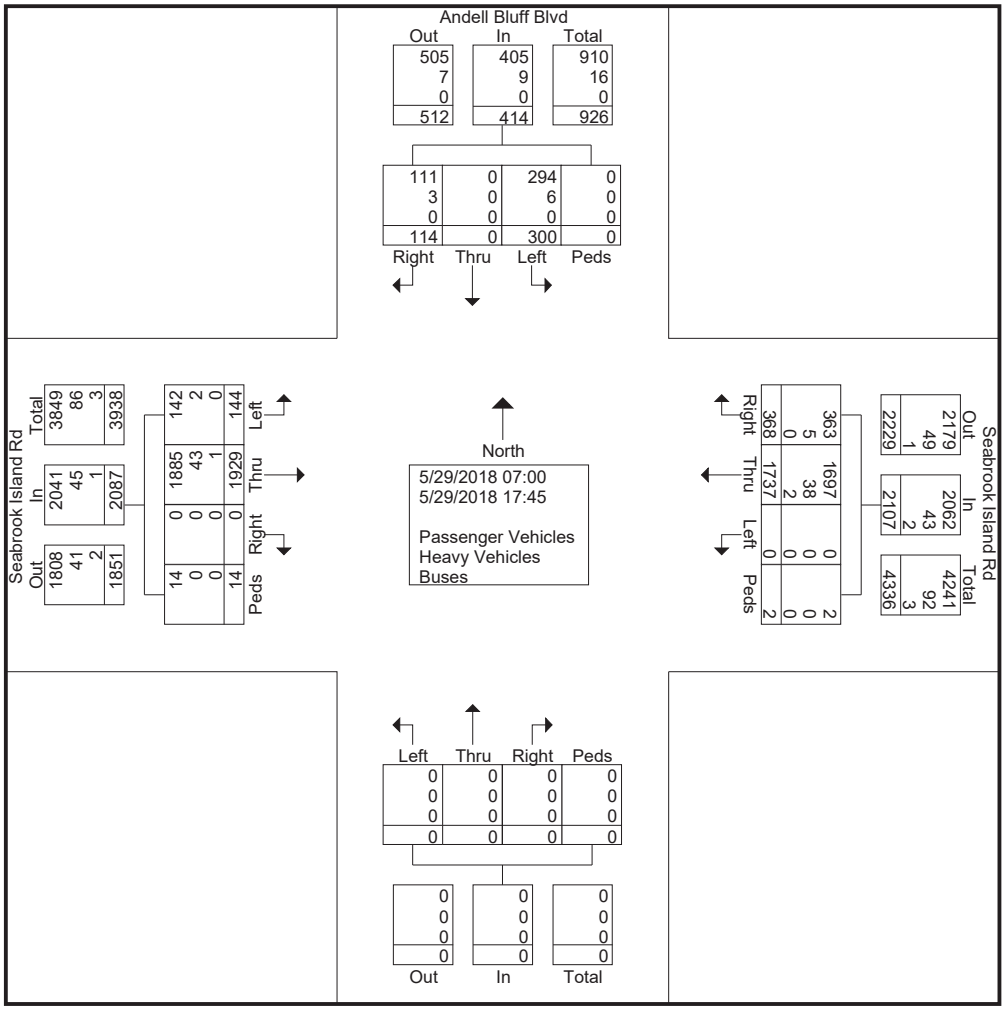
File Name : Seabrook Island Rd @ Andell Bluff Blvd
Site Code :
Start Date : 5/29/2018
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles - Buses

	Andell Bluff Blvd Southbound				Seabrook Island Rd Westbound				Northbound				Seabrook Island Rd Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00	4	0	1	0	0	23	4	0	0	0	0	0	1	36	0	1	70
07:15	3	0	0	0	0	35	2	0	0	0	0	0	1	23	0	0	64
07:30	0	0	4	0	0	38	13	0	0	0	0	0	1	41	0	1	98
07:45	4	0	6	0	0	41	10	0	0	0	0	0	3	39	0	1	104
Total	11	0	11	0	0	137	29	0	0	0	0	0	6	139	0	3	336
08:00	4	0	0	0	0	47	10	0	0	0	0	0	4	45	0	1	111
08:15	5	0	2	0	0	62	8	0	0	0	0	0	2	53	0	1	133
08:30	6	0	3	0	0	55	8	0	0	0	0	0	5	57	0	0	134
08:45	8	0	4	0	0	63	15	0	0	0	0	0	4	62	0	2	158
Total	23	0	9	0	0	227	41	0	0	0	0	0	15	217	0	4	536
11:00	9	0	3	0	0	61	14	0	0	0	0	0	4	69	0	0	160
11:15	19	0	6	0	0	40	12	0	0	0	0	0	7	69	0	1	154
11:30	11	0	3	0	0	57	16	0	0	0	0	0	4	61	0	0	152
11:45	16	0	3	0	0	63	14	0	0	0	0	0	4	78	0	0	178
Total	55	0	15	0	0	221	56	0	0	0	0	0	19	277	0	1	644
12:00	10	0	4	0	0	52	16	0	0	0	0	0	12	83	0	0	177
12:15	8	0	4	0	0	50	14	0	0	0	0	0	6	72	0	0	154
12:30	13	0	3	0	0	73	19	0	0	0	0	0	2	66	0	0	176
12:45	5	0	3	0	0	72	8	0	0	0	0	0	2	70	0	0	160
Total	36	0	14	0	0	247	57	0	0	0	0	0	22	291	0	0	667
14:00	6	0	5	0	0	57	11	0	0	0	0	0	2	55	0	0	136
14:15	14	0	3	0	0	58	15	0	0	0	0	0	2	58	0	1	151
14:30	14	0	2	0	0	51	10	1	0	0	0	0	7	81	0	0	166
14:45	18	0	9	0	0	60	12	0	0	0	0	0	5	59	0	3	166
Total	52	0	19	0	0	226	48	1	0	0	0	0	16	253	0	4	619
15:00	9	0	4	0	0	48	8	1	0	0	0	0	7	81	0	0	158
15:15	5	0	5	0	0	56	6	0	0	0	0	0	7	64	0	0	143
15:30	16	0	3	0	0	55	10	0	0	0	0	0	4	60	0	0	148
15:45	17	0	4	0	0	51	10	0	0	0	0	0	6	71	0	0	159
Total	47	0	16	0	0	210	34	1	0	0	0	0	24	276	0	0	608
16:00	12	0	3	0	0	56	14	0	0	0	0	0	3	64	0	0	152
16:15	7	0	5	0	0	75	6	0	0	0	0	0	3	55	0	0	151
16:30	10	0	3	0	0	51	10	0	0	0	0	0	0	66	0	1	141
16:45	9	0	3	0	0	47	9	0	0	0	0	0	5	54	0	0	127
Total	38	0	14	0	0	229	39	0	0	0	0	0	11	239	0	1	571
17:00	6	0	2	0	0	73	10	0	0	0	0	0	4	79	0	0	174
17:15	7	0	6	0	0	49	13	0	0	0	0	0	11	64	0	0	150
17:30	9	0	1	0	0	55	18	0	0	0	0	0	9	51	0	1	144
17:45	16	0	7	0	0	63	23	0	0	0	0	0	7	43	0	0	159
Total	38	0	16	0	0	240	64	0	0	0	0	0	31	237	0	1	627
Grand Total	300	0	114	0	0	1737	368	2	0	0	0	0	144	1929	0	14	4608
Apprch %	72.5	0	27.5	0	0	82.4	17.5	0.1	0	0	0	0	6.9	92.4	0	0.7	
Total %	6.5	0	2.5	0	0	37.7	8	0	0	0	0	0	3.1	41.9	0	0.3	
Passenger Vehicles	294	0	111	0	0	1697	363	2	0	0	0	0	142	1885	0	14	4508
% Passenger Vehicles	98	0	97.4	0	0	97.7	98.6	100	0	0	0	0	98.6	97.7	0	100	97.8
Heavy Vehicles	6	0	3	0	0	38	5	0	0	0	0	0	2	43	0	0	97
% Heavy Vehicles	2	0	2.6	0	0	2.2	1.4	0	0	0	0	0	1.4	2.2	0	0	2.1
Buses	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3
% Buses	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0.1


Andell Bluff Blvd
Out In Total
505 405 910
7 9 16
0 0 0
512 414 926
111 0 294 0
3 0 6 0
0 0 0 0
114 0 300 0
Right Thru Left Peds
Seabrook Island Rd
Total 3849 86 3 3938
In 2041 45 1 2087
Out 1808 41 2 1851
142 2 0 144 Left
1885 43 1 1929 Thru
0 0 0 0 Right
14 0 0 14 Peds
North
5/29/2018 07:00
5/29/2018 17:45
Passenger Vehicles
Heavy Vehicles
Buses
Right 368 5 0 363
Thru 1737 38 2 1697
Left 0 0 0 0
Peds 2 0 0 2
Out 2179 49 1 2229
In 2062 43 2 2107
Total 4241 92 3 4336
Seabrook Island Rd
Left Thru Right Peds
0 0 0 0
0 0 0 0
0 0 0 0
0 0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
Out In Total

SHORT COUNTS, LLC
735 Maryland St
Columbia, SC 29201
We can't say we're the Best, but you Can!

File Name : Seabrook Island Rd @ Andell Bluff Blvd
Site Code :
Start Date : 5/29/2018
Page No : 3

	Andell Bluff Blvd Southbound					Seabrook Island Rd Westbound					Northbound					Seabrook Island Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00																					
08:00	4	0	0	0	4	0	47	10	0	57	0	0	0	0	0	4	45	0	1	50	111
08:15	5	0	2	0	7	0	62	8	0	70	0	0	0	0	0	2	53	0	1	56	133
08:30	6	0	3	0	9	0	55	8	0	63	0	0	0	0	0	**5**	57	0	0	62	134
08:45	**8**	0	**4**	0	**12**	0	**63**	**15**	0	**78**	0	0	0	0	0	4	**62**	0	**2**	**68**	**158**
Total Volume	23	0	9	0	32	0	227	41	0	268	0	0	0	0	0	15	217	0	4	236	536
% App. Total	71.9	0	28.1	0		0	84.7	15.3	0		0	0	0	0		6.4	91.9	0	1.7		
PHF	.719	.000	.563	.000	.667	.000	.901	.683	.000	.859	.000	.000	.000	.000	.000	.750	.875	.000	.500	.868	.848
Passenger Vehicles	23	0	8	0	31	0	219	41	0	260	0	0	0	0	0	14	216	0	4	234	525
% Passenger Vehicles																					
Heavy Vehicles	0	0	1	0	1	0	8	0	0	8	0	0	0	0	0	1	1	0	0	2	11
% Heavy Vehicles	0	0	11.1	0	3.1	0	3.5	0	0	3.0	0	0	0	0	0	6.7	0.5	0	0	0.8	2.1
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

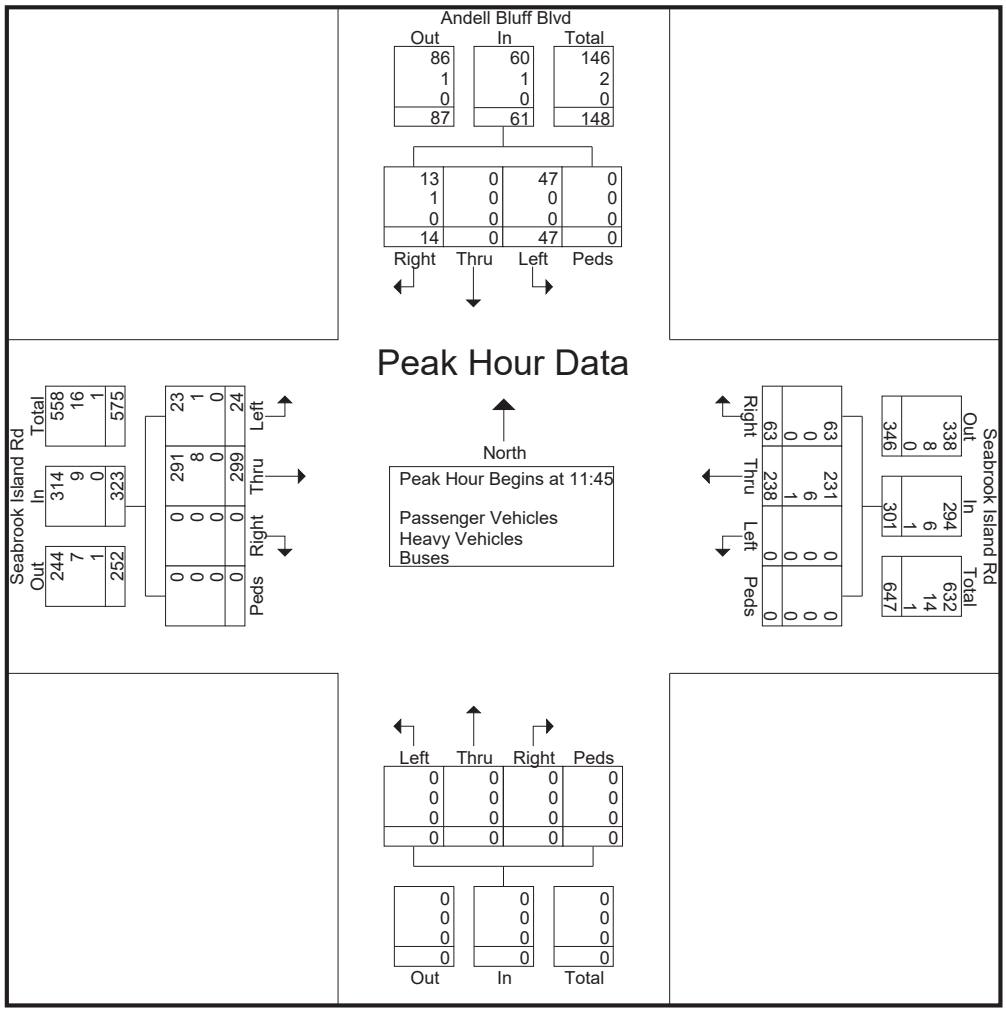
SHORT COUNTS, LLC

735 Maryland St
Columbia, SC 29201

We can't say we're the Best, but you Can!

File Name : Seabrook Island Rd @ Andell Bluff Blvd
Site Code :
Start Date : 5/29/2018
Page No : 4

	Andell Bluff Blvd Southbound					Seabrook Island Rd Westbound					Northbound					Seabrook Island Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:00 to 12:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45																					
11:45	**16**	0	3	0	**19**	0	63	14	0	77	0	0	0	0	0	4	78	0	0	82	**178**
12:00	10	0	**4**	0	14	0	52	16	0	68	0	0	0	0	0	**12**	**83**	0	0	**95**	177
12:15	8	0	4	0	12	0	50	14	0	64	0	0	0	0	0	6	72	0	0	78	154
12:30	13	0	3	0	16	0	**73**	**19**	0	**92**	0	0	0	0	0	2	66	0	0	68	176
Total Volume	47	0	14	0	61	0	238	63	0	301	0	0	0	0	0	24	299	0	0	323	685
% App. Total	77	0	23	0		0	79.1	20.9	0		0	0	0	0		7.4	92.6	0	0		
PHF	.734	.000	.875	.000	.803	.000	.815	.829	.000	.818	.000	.000	.000	.000	.000	.500	.901	.000	.000	.850	.962
Passenger Vehicles	47	0	13	0	60	0	231	63	0	294	0	0	0	0	0	23	291	0	0	314	668
% Passenger Vehicles																					
Heavy Vehicles	0	0	1	0	1	0	6	0	0	6	0	0	0	0	0	1	8	0	0	9	16
% Heavy Vehicles	0	0	7.1	0	1.6	0	2.5	0	0	2.0	0	0	0	0	0	4.2	2.7	0	0	2.8	2.3
Buses	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
% Buses	0	0	0	0	0	0	0.4	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0.1



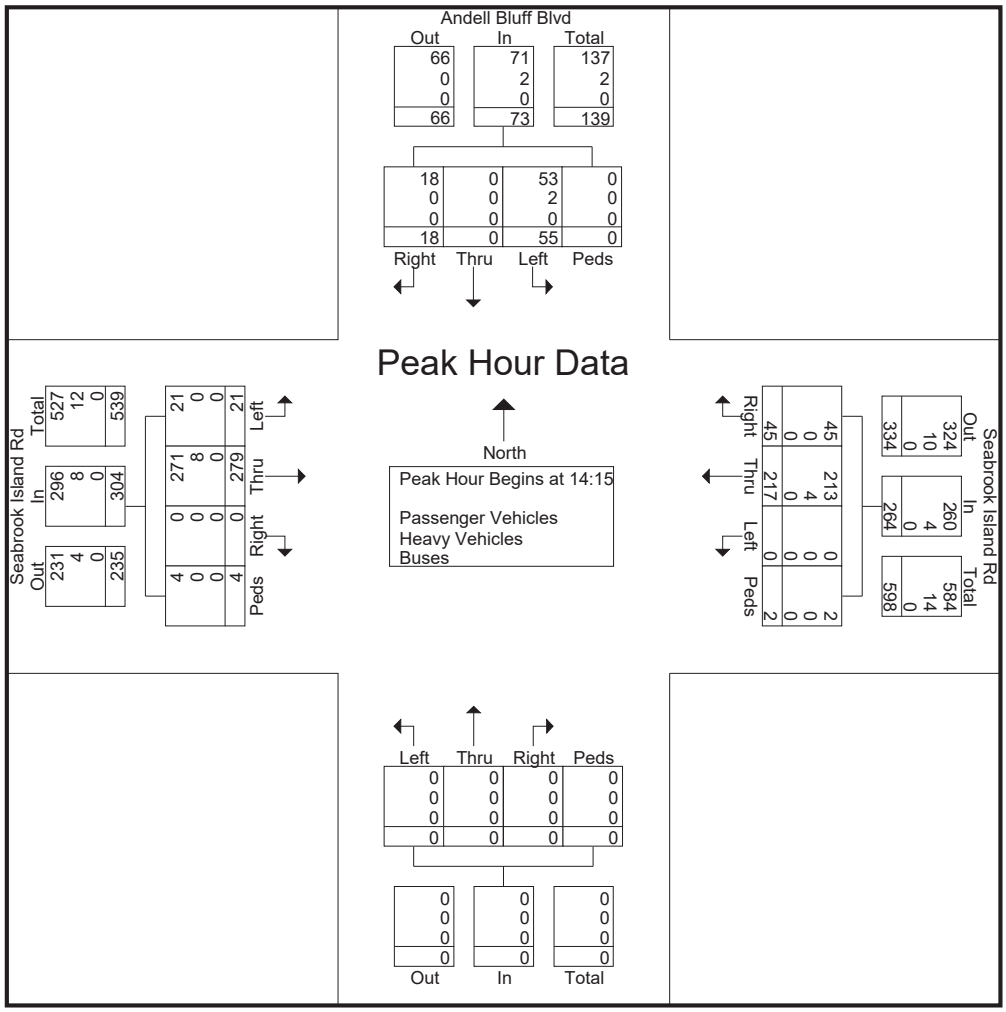
SHORT COUNTS, LLC

735 Maryland St
Columbia, SC 29201

We can't say we're the Best, but you Can!

File Name : Seabrook Island Rd @ Andell Bluff Blvd
Site Code :
Start Date : 5/29/2018
Page No : 5

	Andell Bluff Blvd Southbound					Seabrook Island Rd Westbound					Northbound					Seabrook Island Rd Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 14:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 14:15																					
14:15	14	0	3	0	17	0	58	**15**	0	**73**	0	0	0	0	0	2	58	0	1	61	151
14:30	14	0	2	0	16	0	51	10	**1**	62	0	0	0	0	0	**7**	**81**	0	0	**88**	**166**
14:45	**18**	0	**9**	0	**27**	0	**60**	12	0	72	0	0	0	0	0	5	59	0	**3**	67	166
15:00	9	0	4	0	13	0	48	8	1	57	0	0	0	0	0	7	81	0	0	88	158
Total Volume	55	0	18	0	73	0	217	45	2	264	0	0	0	0	0	21	279	0	4	304	641
% App. Total	75.3	0	24.7	0		0	82.2	17	0.8		0	0	0	0		6.9	91.8	0	1.3		
PHF	.764	.000	.500	.000	.676	.000	.904	.750	.500	.904	.000	.000	.000	.000	.000	.750	.861	.000	.333	.864	.965
Passenger Vehicles	53	0	18	0	71	0	213	45	2	260	0	0	0	0	0	21	271	0	4	296	627
% Passenger Vehicles																					
Heavy Vehicles	2	0	0	0	2	0	4	0	0	4	0	0	0	0	0	0	8	0	0	8	14
% Heavy Vehicles	3.6	0	0	0	2.7	0	1.8	0	0	1.5	0	0	0	0	0	0	2.9	0	0	2.6	2.2
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Short Counts, LLC

735 Maryland St
Columbia, SC 29201

We can't say we're the best, but you can!

Site Code: Seabrook Island Rd
Station ID: EB & WB Traffic
Just East of Andell Bluff Blvd
Kiawah Island, SC
Latitude: 0' 0.0000 Undefined

Start Time	29-May-18 Tue	WB A.M.	WB P.M.	EB A.M.	EB P.M.	Combined A.M.	Combined P.M.	30-May Wed	WB A.M.	WB P.M.	EB A.M.	EB P.M.	Combined A.M.	Combined P.M.
12:00		4	69	2	***102***	6	***171***		*	*	*	*	*	*
12:15		3	63	5	***78***	8	***141***		*	*	*	*	*	*
12:30		1	***91***	2	***81***	3	***172***		*	*	*	*	*	*
12:45		2	***77***	1	***87***	3	***164***		*	*	*	*	*	*
01:00		2	***74***	0	77	2	151		*	*	*	*	*	*
01:15		1	***74***	1	76	2	150		*	*	*	*	*	*
01:30		0	82	1	67	1	149		*	*	*	*	*	*
01:45		0	75	1	64	1	139		*	*	*	*	*	*
02:00		0	71	1	67	1	138		*	*	*	*	*	*
02:15		1	72	0	68	1	140		*	*	*	*	*	*
02:30		1	59	0	86	1	145		*	*	*	*	*	*
02:45		1	76	3	86	4	162		*	*	*	*	*	*
03:00		0	57	0	87	0	144		*	*	*	*	*	*
03:15		1	62	0	67	1	129		*	*	*	*	*	*
03:30		1	67	0	76	1	143		*	*	*	*	*	*
03:45		0	58	4	86	4	144		*	*	*	*	*	*
04:00		4	69	1	80	5	149		*	*	*	*	*	*
04:15		1	79	4	63	5	142		*	*	*	*	*	*
04:30		3	61	6	73	9	134		*	*	*	*	*	*
04:45		0	59	0	66	0	125		*	*	*	*	*	*
05:00		1	77	5	85	6	162		*	*	*	*	*	*
05:15		6	67	8	70	14	137		*	*	*	*	*	*
05:30		13	72	4	59	17	131		*	*	*	*	*	*
05:45		7	81	7	63	14	144		*	*	*	*	*	*
06:00		10	74	16	53	26	127		*	*	*	*	*	*
06:15		10	50	6	46	16	96		*	*	*	*	*	*
06:30		21	43	24	22	45	65		*	*	*	*	*	*
06:45		27	41	27	22	54	63		*	*	*	*	*	*
07:00		26	49	42	25	68	74		*	*	*	*	*	*
07:15		36	33	24	49	60	82		*	*	*	*	*	*
07:30		53	47	42	21	95	68		*	*	*	*	*	*
07:45		49	35	44	30	93	65		*	*	*	*	*	*
08:00		58	35	46	29	104	64		*	*	*	*	*	*
08:15		66	30	62	20	128	50		*	*	*	*	*	*
08:30		66	21	65	18	131	39		*	*	*	*	*	*
08:45		76	17	64	15	140	32		*	*	*	*	*	*
09:00		60	25	65	18	125	43		*	*	*	*	*	*
09:15		68	31	83	16	151	47		*	*	*	*	*	*
09:30		72	8	74	10	146	18		*	*	*	*	*	*
09:45		62	20	82	10	144	30		*	*	*	*	*	*
10:00		60	13	80	11	140	24		*	*	*	*	*	*
10:15		65	9	74	9	139	18		*	*	*	*	*	*
10:30		63	8	67	3	130	11		*	*	*	*	*	*
10:45		72	10	66	2	138	12		*	*	*	*	*	*
11:00		***76***	4	***73***	4	***149***	8		*	*	*	*	*	*
11:15		***53***	0	***90***	3	***143***	3		*	*	*	*	*	*
11:30		***68***	8	***76***	3	***144***	11		*	*	*	*	*	*
11:45		***82***	2	***90***	3	***172***	5		*	*	*	*	*	*
Total		1352	2305	1438	2256	2790	4561		0	0	0	0	0	0
Day Total		3657		3694		7351			0		0		0	
% Total		18.4%	31.4%	19.6%	30.7%				0.0%	0.0%	0.0%	0.0%		
Peak	-	11:00	00:30	11:00	12:00	11:00	12:00	-	-	-	-	-	-	-
Vol.	-	279	316	329	348	608	648	-	-	-	-	-	-	-
P.H.F.		0.851	0.868	0.914	0.853	0.884	0.942							

ADT	ADT 7,351	AADT 7,351

THOMAS & HUTTON

TRAFFIC IMPACT ANALYSIS

SEABROOK ISLAND ROAD

APPENDIX B

SYNCHRO HCM 2010 CAPACITY ANALYSES
2018 EXISTING PEAK HOUR VOLUMES

J - 27252

August 2018

thomasandhutton.com

Intersection	
Intersection Delay, s/veh	20.1
Intersection LOS	C

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1140	128	233	346
Demand Flow Rate, veh/h	1162	130	238	353
Vehicles Circulating, veh/h	105	973	945	280
Vehicles Exiting, veh/h	228	210	97	823
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	26.6	13.8	20.5	0.7
Approach LOS	D	B	C	A

Lane	Left	Bypass	Left	Left	Left	Bypass
Designated Moves	LT	R	LTR	LTR	LT	R
Assumed Moves	LT	R	LTR	LTR	LT	R
RT Channelized		Free				Free
Lane Util	1.000		1.000	1.000	1.000	
Critical Headway, s	5.193		5.193	5.193	5.193	
Entry Flow, veh/h	937	225	130	238	53	300
Cap Entry Lane, veh/h	1017	1938	427	439	854	1938
Entry HV Adj Factor	0.981	0.980	0.982	0.980	0.983	0.980
Flow Entry, veh/h	919	221	128	233	52	294
Cap Entry, veh/h	998	1900	419	430	840	1900
V/C Ratio	0.921	0.116	0.304	0.542	0.062	0.155
Control Delay, s/veh	33.0	0.0	13.8	20.5	4.9	0.0
LOS	D	A	B	C	A	A
95th %tile Queue, veh	14	0	1	3	0	1

Intersection	
Intersection Delay, s/veh	5.0
Intersection LOS	A

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	542	208	345	803
Demand Flow Rate, veh/h	553	212	352	818
Vehicles Circulating, veh/h	170	519	402	411
Vehicles Exiting, veh/h	321	235	147	320
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.7	9.5	11.4	0.6
Approach LOS	A	A	B	A

Lane	Left	Bypass	Left	Left	Left	Bypass
Designated Moves	LT	R	LTR	LTR	LT	R
Assumed Moves	LT	R	LTR	LTR	LT	R
RT Channelized		Free				Free
Lane Util	1.000		1.000	1.000	1.000	
Critical Headway, s	5.193		5.193	5.193	5.193	
Entry Flow, veh/h	379	174	212	352	80	738
Cap Entry Lane, veh/h	953	1938	672	756	749	1938
Entry HV Adj Factor	0.980	0.980	0.980	0.979	0.986	0.980
Flow Entry, veh/h	371	171	208	345	79	724
Cap Entry, veh/h	934	1900	659	740	739	1900
V/C Ratio	0.398	0.090	0.315	0.466	0.107	0.381
Control Delay, s/veh	8.4	0.0	9.5	11.4	6.0	0.0
LOS	A	A	A	B	A	A
95th %tile Queue, veh	2	0	1	2	0	2

Intersection	
Int Delay, s/veh	0.9

Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	23	9	15	217	227	41
Future Vol, veh/h	23	9	15	217	227	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	10	17	241	252	46

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	550	275	298	0	-	0
Stage 1	275	-	-	-	-	-
Stage 2	275	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	496	764	1263	-	-	-
Stage 1	771	-	-	-	-	-
Stage 2	771	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	488	764	1263	-	-	-
Mov Cap-2 Maneuver	488	-	-	-	-	-
Stage 1	759	-	-	-	-	-
Stage 2	771	-	-	-	-	-

Approach	SB	NE	SW
HCM Control Delay, s	12.1	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NEL	NET	SBLn1	SWT	SWR
Capacity (veh/h)	1263	-	543	-	-
HCM Lane V/C Ratio	0.013	-	0.065	-	-
HCM Control Delay (s)	7.9	0	12.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	55	18	21	279	217	45
Future Vol, veh/h	55	18	21	279	217	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	61	20	23	310	241	50

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	622	266	291	0	-	0
Stage 1	266	-	-	-	-	-
Stage 2	356	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	450	773	1271	-	-	-
Stage 1	779	-	-	-	-	-
Stage 2	709	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	440	773	1271	-	-	-
Mov Cap-2 Maneuver	440	-	-	-	-	-
Stage 1	762	-	-	-	-	-
Stage 2	709	-	-	-	-	-

Approach	SB	NE	SW
HCM Control Delay, s	13.8	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NEL	NET	SBLn1	SWT	SWR
Capacity (veh/h)	1271	-	492	-	-
HCM Lane V/C Ratio	0.018	-	0.165	-	-
HCM Control Delay (s)	7.9	0	13.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

THOMAS & HUTTON

TRAFFIC IMPACT ANALYSIS

SEABROOK ISLAND ROAD

APPENDIX C

TRIP GENERATION CALCULATIONS

J - 27252

August 2018

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From ITE Trip Generation Manual, 9th Edition, Volume 2

Seabrook Island Road (Freshfields Village Senior Living)

Land Use: 230 - Residential Condominium/Townhouse

50 Dwelling Units

Weekday - Vehicle Trip Ends vs Dwelling Units

Average Rate = 5.81

Directional Distribution: 50% entering, 50% exiting

Weekday	Total Trips	Entering Trips	Exiting Trips
	291	145	146

Weekday, Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9am

Average Rate = 0.44

Directional Distribution: 17% entering, 83% exiting

AM Peak Hour	Total Trips	Entering Trips	Exiting Trips
	22	4	18

Weekday, Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6pm

Average Rate = 0.52

Directional Distribution: 67% entering, 33% exiting

PM Peak Hour	Total Trips	Entering Trips	Exiting Trips
	26	17	9

From ITE Trip Generation Manual, 9th Edition, Volume 2

Seabrook Island Road (Freshfields Village Senior Living)

Land Use: 252 - Senior Adult Housing-Attached

128 Dwelling Units

Weekday - Vehicle Trip Ends vs Dwelling Units

Average Rate = 3.44

Directional Distribution: 50% entering, 50% exiting

Weekday	Total Trips	Entering Trips	Exiting Trips
	440	220	220

Weekday, Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9am

Average Rate = 0.20

Directional Distribution: 34% entering, 66% exiting

AM Peak Hour	Total Trips	Entering Trips	Exiting Trips
	26	9	17

Weekday, Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6pm

Average Rate = 0.25

Directional Distribution: 54% entering, 46% exiting

PM Peak Hour	Total Trips	Entering Trips	Exiting Trips
	32	17	15

From ITE Trip Generation Manual, 9th Edition, Volume 2

Seabrook Island Road (Freshfields Village Senior Living)

Land Use: 254 - Assisted Living

72 Beds

Weekday - Vehicle Trip Ends vs Beds

Average Rate = 2.66

Directional Distribution: 50% entering, 50% exiting

	Total Trips	Entering Trips	Exiting Trips
Weekday	192	96	96

Weekday, Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9am

Average Rate = 0.14

Directional Distribution: 65% entering, 35% exiting

	Total Trips	Entering Trips	Exiting Trips
AM Peak Hour	10	7	3

Weekday, Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6pm

Average Rate = 0.22

Directional Distribution: 44% entering, 56% exiting

	Total Trips	Entering Trips	Exiting Trips
PM Peak Hour	16	7	9

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TRAFFIC IMPACT ANALYSIS

SEABROOK ISLAND ROAD

APPENDIX D

SYNCHRO HCM 2010 CAPACITY ANALYSES
2023 NO-BUILD PEAK HOUR VOLUMES

J - 27252

August 2018

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Intersection	
Intersection Delay, s/veh	25.5
Intersection LOS	D

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1198	134	245	365
Demand Flow Rate, veh/h	1222	136	250	372
Vehicles Circulating, veh/h	110	1023	993	293
Vehicles Exiting, veh/h	239	220	102	866
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	34.5	15.2	23.9	0.8
Approach LOS	D	C	C	A

Lane	Left	Bypass	Left	Left	Left	Bypass
Designated Moves	LT	R	LTR	LTR	LT	R
Assumed Moves	LT	R	LTR	LTR	LT	R
RT Channelized		Free				Free
Lane Util	1.000		1.000	1.000	1.000	
Critical Headway, s	5.193		5.193	5.193	5.193	
Entry Flow, veh/h	985	237	136	250	56	316
Cap Entry Lane, veh/h	1012	1938	406	419	843	1938
Entry HV Adj Factor	0.980	0.980	0.983	0.981	0.983	0.980
Flow Entry, veh/h	966	232	134	245	55	310
Cap Entry, veh/h	992	1900	399	411	829	1900
V/C Ratio	0.973	0.122	0.335	0.597	0.066	0.163
Control Delay, s/veh	42.8	0.0	15.2	23.9	5.0	0.0
LOS	E	A	C	C	A	A
95th %tile Queue, veh	17	0	1	4	0	1

Intersection	
Intersection Delay, s/veh	5.3
Intersection LOS	A

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	570	218	363	844
Demand Flow Rate, veh/h	582	222	370	860
Vehicles Circulating, veh/h	178	546	422	431
Vehicles Exiting, veh/h	337	246	154	337
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.0	10.2	12.3	0.6
Approach LOS	A	B	B	A

Lane	Left	Bypass	Left	Left	Left	Bypass
Designated Moves	LT	R	LTR	LTR	LT	R
Assumed Moves	LT	R	LTR	LTR	LT	R
RT Channelized		Free				Free
Lane Util	1.000		1.000	1.000	1.000	
Critical Headway, s	5.193		5.193	5.193	5.193	
Entry Flow, veh/h	398	184	222	370	84	776
Cap Entry Lane, veh/h	946	1938	655	741	734	1938
Entry HV Adj Factor	0.981	0.980	0.980	0.980	0.986	0.980
Flow Entry, veh/h	390	180	218	363	83	761
Cap Entry, veh/h	927	1900	642	726	724	1900
V/C Ratio	0.421	0.095	0.339	0.499	0.114	0.401
Control Delay, s/veh	8.8	0.0	10.2	12.3	6.2	0.0
LOS	A	A	B	B	A	A
95th %tile Queue, veh	2	0	1	3	0	2

Intersection	
Int Delay, s/veh	1

Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	24	9	16	228	239	43
Future Vol, veh/h	24	9	16	228	239	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	10	18	253	266	48

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	579	290	314	0	-	0
Stage 1	290	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	477	749	1246	-	-	-
Stage 1	759	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	469	749	1246	-	-	-
Mov Cap-2 Maneuver	469	-	-	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	760	-	-	-	-	-

Approach	SB	NE	SW
HCM Control Delay, s	12.4	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NEL	NET	SBLn1	SWT	SWR
Capacity (veh/h)	1246	-	522	-	-
HCM Lane V/C Ratio	0.014	-	0.07	-	-
HCM Control Delay (s)	7.9	0	12.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	58	19	22	293	228	47
Future Vol, veh/h	58	19	22	293	228	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	64	21	24	326	253	52

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	653	279	305	0	-	0
Stage 1	279	-	-	-	-	-
Stage 2	374	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	432	760	1256	-	-	-
Stage 1	768	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	422	760	1256	-	-	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	750	-	-	-	-	-
Stage 2	696	-	-	-	-	-

Approach	SB	NE	SW
HCM Control Delay, s	14.3	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NEL	NET	SBLn1	SWT	SWR
Capacity (veh/h)	1256	-	474	-	-
HCM Lane V/C Ratio	0.019	-	0.18	-	-
HCM Control Delay (s)	7.9	0	14.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

THOMAS & HUTTON

TRAFFIC IMPACT ANALYSIS

SEABROOK ISLAND ROAD

APPENDIX E

SYNCHRO HCM 2010 CAPACITY ANALYSES
2023 BUILD OUT PEAK HOUR VOLUMES

J - 27252

August 2018

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Intersection	
Intersection Delay, s/veh	26.2
Intersection LOS	D

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1218	138	278	365
Demand Flow Rate, veh/h	1242	140	284	372
Vehicles Circulating, veh/h	110	1057	995	331
Vehicles Exiting, veh/h	277	222	102	866
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	34.3	16.2	28.9	0.8
Approach LOS	D	C	D	A

Lane	Left	Bypass	Left	Left	Left	Bypass
Designated Moves	LT	R	LTR	LTR	LT	R
Assumed Moves	LT	R	LTR	LTR	LT	R
RT Channelized		Free				Free
Lane Util	1.000		1.000	1.000	1.000	
Critical Headway, s	5.193		5.193	5.193	5.193	
Entry Flow, veh/h	987	255	140	284	56	316
Cap Entry Lane, veh/h	1012	1938	393	418	812	1938
Entry HV Adj Factor	0.980	0.980	0.982	0.980	0.983	0.980
Flow Entry, veh/h	968	250	138	278	55	310
Cap Entry, veh/h	992	1900	386	409	798	1900
V/C Ratio	0.975	0.132	0.357	0.680	0.069	0.163
Control Delay, s/veh	43.2	0.0	16.2	28.9	5.2	0.0
LOS	E	A	C	D	A	A
95th %tile Queue, veh	18	0	2	5	0	1

Intersection	
Intersection Delay, s/veh	5.7
Intersection LOS	A

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	612	221	393	844
Demand Flow Rate, veh/h	624	225	401	860
Vehicles Circulating, veh/h	178	577	427	465
Vehicles Exiting, veh/h	371	251	154	337
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.7	10.7	13.5	0.6
Approach LOS	A	B	B	A

Lane	Left	Bypass	Left	Left	Left	Bypass
Designated Moves	LT	R	LTR	LTR	LT	R
Assumed Moves	LT	R	LTR	LTR	LT	R
RT Channelized		Free				Free
Lane Util	1.000		1.000	1.000	1.000	
Critical Headway, s	5.193		5.193	5.193	5.193	
Entry Flow, veh/h	403	221	225	401	84	776
Cap Entry Lane, veh/h	946	1938	635	737	710	1938
Entry HV Adj Factor	0.981	0.980	0.980	0.979	0.986	0.980
Flow Entry, veh/h	395	217	221	393	83	761
Cap Entry, veh/h	927	1900	622	722	700	1900
V/C Ratio	0.426	0.114	0.355	0.544	0.118	0.401
Control Delay, s/veh	8.9	0.0	10.7	13.5	6.4	0.0
LOS	A	A	B	B	A	A
95th %tile Queue, veh	2	0	2	3	0	2

Intersection	
Int Delay, s/veh	1

Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	26	9	16	228	239	47
Future Vol, veh/h	26	9	16	228	239	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	10	18	253	266	52

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	581	292	318	0	-	0
Stage 1	292	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	476	747	1242	-	-	-
Stage 1	758	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	468	747	1242	-	-	-
Mov Cap-2 Maneuver	468	-	-	-	-	-
Stage 1	745	-	-	-	-	-
Stage 2	760	-	-	-	-	-

Approach	SB	NE	SW
HCM Control Delay, s	12.5	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NEL	NET	SBLn1	SWT	SWR
Capacity (veh/h)	1242	-	518	-	-
HCM Lane V/C Ratio	0.014	-	0.075	-	-
HCM Control Delay (s)	7.9	0	12.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	2

Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	62	19	22	293	228	50
Future Vol, veh/h	62	19	22	293	228	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	69	21	24	326	253	56

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	655	281	309	0	-	0
Stage 1	281	-	-	-	-	-
Stage 2	374	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	431	758	1252	-	-	-
Stage 1	767	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	421	758	1252	-	-	-
Mov Cap-2 Maneuver	421	-	-	-	-	-
Stage 1	749	-	-	-	-	-
Stage 2	696	-	-	-	-	-

Approach	SB	NE	SW
HCM Control Delay, s	14.5	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NEL	NET	SBLn1	SWT	SWR
Capacity (veh/h)	1252	-	470	-	-
HCM Lane V/C Ratio	0.02	-	0.191	-	-
HCM Control Delay (s)	7.9	0	14.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	4	30	249	2	16	280
Future Vol, veh/h	4	30	249	2	16	280
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	33	277	2	18	311

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	625	278	0	0	279	0
Stage 1	278	-	-	-	-	-
Stage 2	347	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	449	761	-	-	1284	-
Stage 1	769	-	-	-	-	-
Stage 2	716	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	441	761	-	-	1284	-
Mov Cap-2 Maneuver	441	-	-	-	-	-
Stage 1	756	-	-	-	-	-
Stage 2	716	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	10.4	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	701	1284	-
HCM Lane V/C Ratio	-	-	0.054	0.014	-
HCM Control Delay (s)	-	-	10.4	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	3	27	321	4	33	287
Future Vol, veh/h	3	27	321	4	33	287
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	30	357	4	37	319

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	752	359	0	0	361	0
Stage 1	359	-	-	-	-	-
Stage 2	393	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	378	685	-	-	1198	-
Stage 1	707	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	364	685	-	-	1198	-
Mov Cap-2 Maneuver	364	-	-	-	-	-
Stage 1	680	-	-	-	-	-
Stage 2	682	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	11	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWL	SWT
Capacity (veh/h)	-	-	629	1198	-
HCM Lane V/C Ratio	-	-	0.053	0.031	-
HCM Control Delay (s)	-	-	11	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Intersection Delay, s/veh	28.4
Intersection LOS	D

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1220	176	245	365
Demand Flow Rate, veh/h	1245	179	250	372
Vehicles Circulating, veh/h	110	1023	1016	336
Vehicles Exiting, veh/h	282	243	102	866
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	38.9	18.1	25.1	0.8
Approach LOS	E	C	D	A

Lane	Left	Bypass	Left	Left	Left	Bypass
Designated Moves	LT	R	LTR	LTR	LT	R
Assumed Moves	LT	R	LTR	LTR	LT	R
RT Channelized		Free				Free
Lane Util	1.000		1.000	1.000	1.000	
Critical Headway, s	5.193		5.193	5.193	5.193	
Entry Flow, veh/h	1008	237	179	250	56	316
Cap Entry Lane, veh/h	1012	1938	406	409	807	1938
Entry HV Adj Factor	0.980	0.980	0.982	0.981	0.983	0.980
Flow Entry, veh/h	988	232	176	245	55	310
Cap Entry, veh/h	992	1900	399	401	794	1900
V/C Ratio	0.996	0.122	0.441	0.611	0.069	0.163
Control Delay, s/veh	48.0	0.0	18.1	25.1	5.2	0.0
LOS	E	A	C	D	A	A
95th %tile Queue, veh	19	0	2	4	0	1

Intersection	
Intersection Delay, s/veh	6.0
Intersection LOS	A

Approach	SE	NW	NE	SW
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	616	254	363	844
Demand Flow Rate, veh/h	629	259	370	860
Vehicles Circulating, veh/h	178	546	469	468
Vehicles Exiting, veh/h	374	293	154	337
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.8	11.2	13.4	0.6
Approach LOS	A	B	B	A

Lane	Left	Bypass	Left	Left	Left	Bypass
Designated Moves	LT	R	LTR	LTR	LT	R
Assumed Moves	LT	R	LTR	LTR	LT	R
RT Channelized		Free				Free
Lane Util	1.000		1.000	1.000	1.000	
Critical Headway, s	5.193		5.193	5.193	5.193	
Entry Flow, veh/h	445	184	259	370	84	776
Cap Entry Lane, veh/h	946	1938	655	707	708	1938
Entry HV Adj Factor	0.981	0.980	0.980	0.980	0.986	0.980
Flow Entry, veh/h	436	180	254	363	83	761
Cap Entry, veh/h	927	1900	642	693	698	1900
V/C Ratio	0.471	0.095	0.396	0.523	0.119	0.401
Control Delay, s/veh	9.6	0.0	11.2	13.4	6.4	0.0
LOS	A	A	B	B	A	A
95th %tile Queue, veh	3	0	2	3	0	2

THOMAS & HUTTON

TRAFFIC IMPACT ANALYSIS

SEABROOK ISLAND ROAD

APPENDIX F

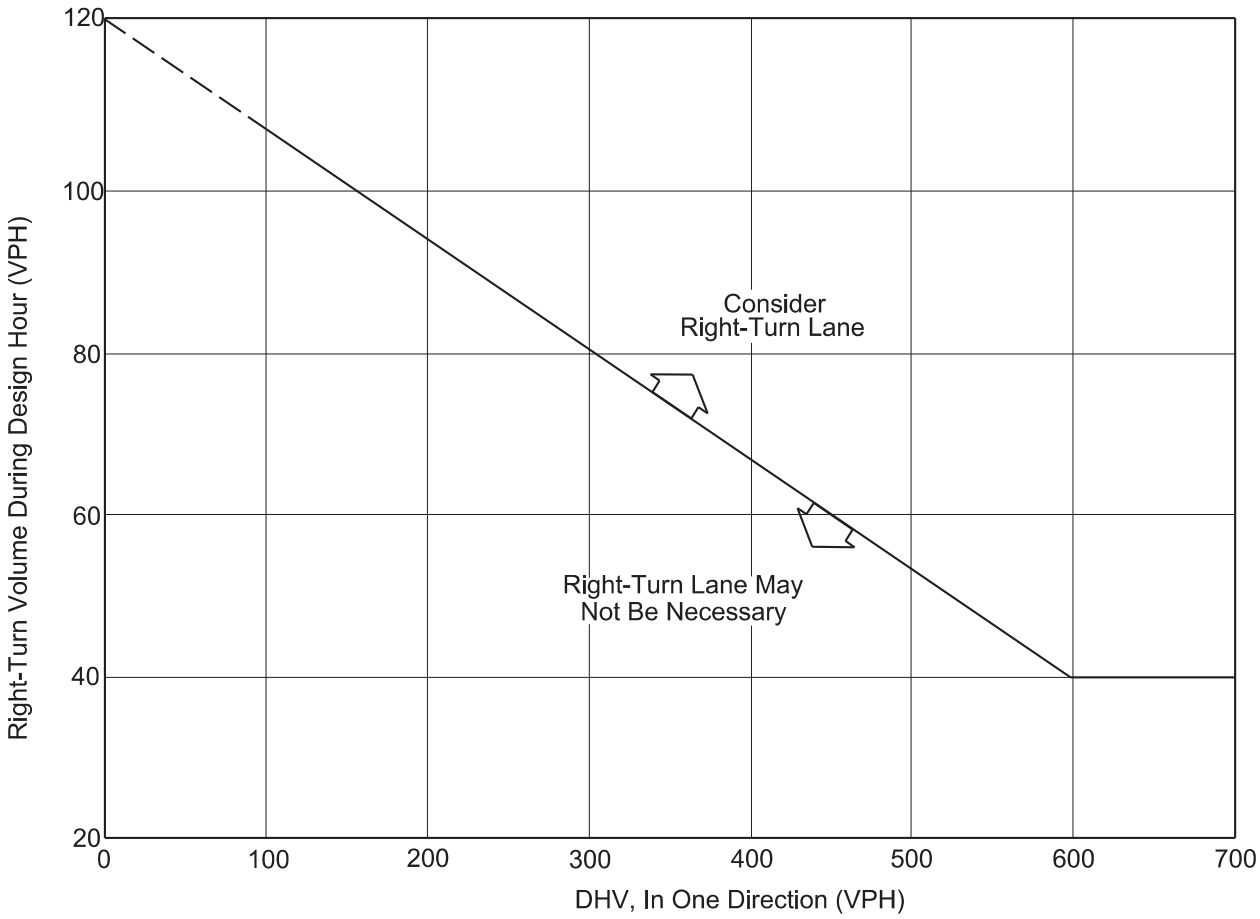
SCDOT FIGURE 9.5-A
GUIDELINES FOR RIGHT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON TWO-LANE HIGHWAYS

J - 27252

August 2018

thomasandhutton.com

For proposed driveway on Seabrook Island Road (35 mph)



Note: For highways with a design speed below 50 miles per hour with a DHV < 300 and where right turns > 40, an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

AM Peak Hour = 2 right turns with 249 vph through traffic
PM Peak Hour = 4 right turns with 321 vph through traffic

Example RIGHT TURN LANE **NOT** WARRANTED

Given:	Design Speed	=	35 miles per hour
	DHV	=	250 vehicles per hour
	Right Turns	=	100 vehicles per hour

Problem: Determine if a right-turn lane is necessary.

Solution: To read the vertical axis, use 100 – 20 = 80 vehicles per hour. The figure indicates that a right-turn lane is not necessary, unless other factors (e.g., high crash rate) indicate a lane is needed.

GUIDELINES FOR RIGHT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON TWO-LANE HIGHWAYS
Figure 9.5-A

THOMAS & HUTTON

TRAFFIC IMPACT ANALYSIS

SEABROOK ISLAND ROAD

APPENDIX G

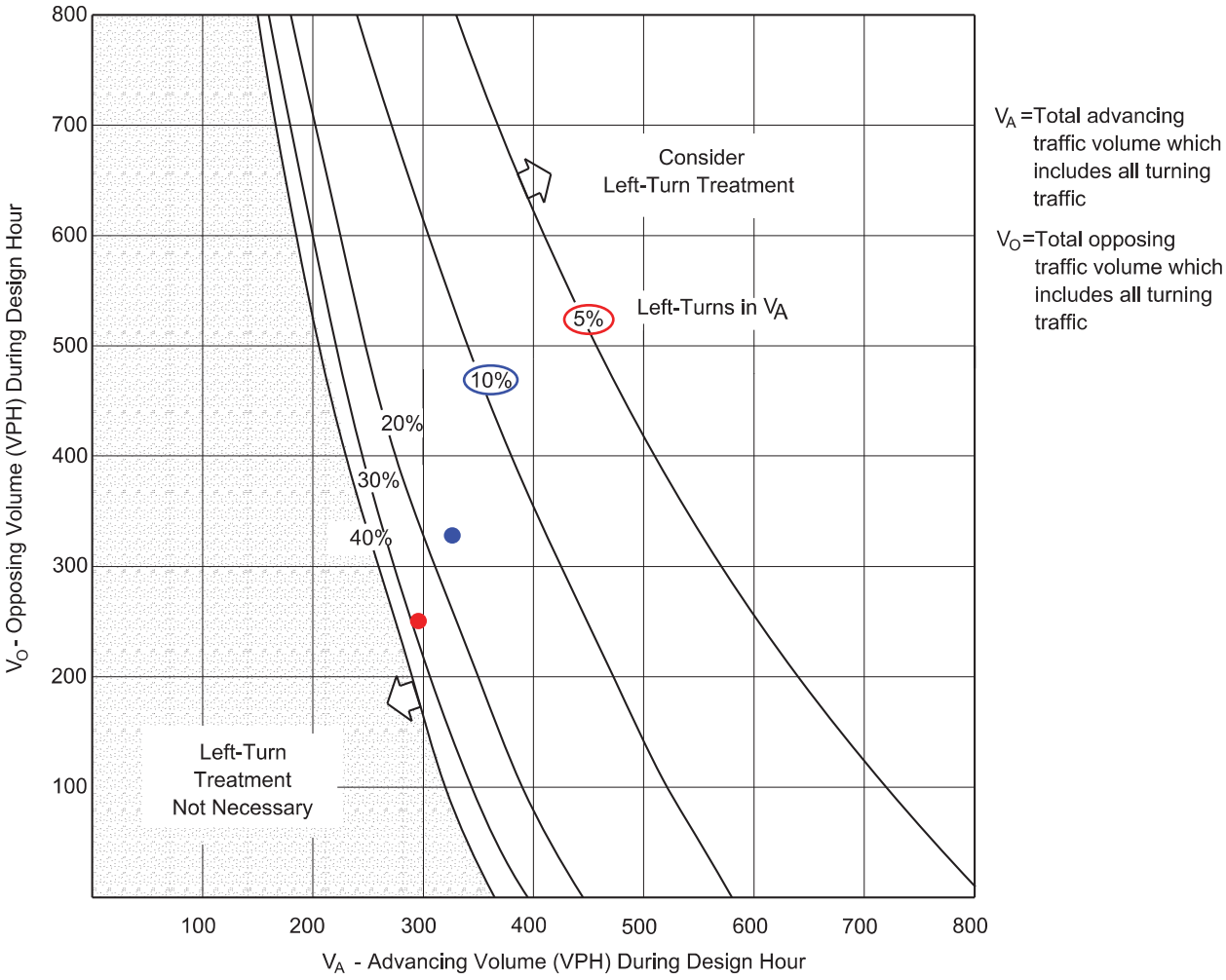
SCDOT FIGURE 9.5-G
GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON TWO-LANE HIGHWAYS (40 MPH)

J - 27252

August 2018

thomasandhutton.com

For proposed driveway on Seabrook Island Road (35 mph)



● AM Peak Hour = 16 left turns (left turns are 5% in Va)
● PM Peak Hour = 33 left turns (left turns are 10% in Va)

Instructions:

LEFT TURN LANE **NOT** WARRANTED

1. *The family of curves represents the percent of left turns in the advancing volume (V_A). The designer should locate the curve for the actual percentage of left turns. When this is not an even increment of 5, the designer should estimate where the curve lies.*

2. *Read V_A and V_O into the chart and locate the intersection of the two volumes.*

3. *Note the location of the point in #2 relative to the line in #1. If the point is to the right of the line, then a left-turn lane is warranted. If the point is to the left of the line, then a left-turn lane is not warranted based on traffic volumes.*

NOTE: There is not a figure in SCDOT Roadway Design Highway Manual for 35 mph unsignalized intersections

VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON TWO-LANE HIGHWAYS (40 mph)
Figure 9.5-G

MEMO

SEABROOK ISLAND ROAD PROPOSED INTERSECTION

09/28/2018

Summary of Findings; Review #2

To:	Joseph Cronin Robert Driscoll	Town Administrator Planning Commission Chairman
From:	Paul Ford, PE	Reveer
CC:	Rhett Reidenbach, PE	Reveer
	Planning Commission	Town (via Administrator)

PURPOSE

To document Reveer Group's (Reveer) review of the revised preliminary design drawings and traffic impact analysis for a new intersection proposed on Seabrook Island Road (SIR) to service the proposed Kiawah Senior Living Center and outparcel development (the Project/Site).

SUMMARY

Reveer's initial review as presented to Seabrook Island Planning Commission on August 15th introduced five primary issues; being the proposed geometry of the new turn lane and driveway, impacts to existing trees along SIR, stormwater management, pedestrian safety, and results of the traffic impact analysis.

The preliminary design drawings and traffic analysis were revised and resubmitted. The following revised documents are included in this review:

A. *27252-TIA-Seabrook Island August 2018 24.pdf* (Revised traffic report)
B. *Seabrook Island Road Intersection Plans 27316_0000-Site Development 8-24-18.pdf* (Revised road and driveway improvements site plan)
C. *Seabrook Island Road Tree Impact Statement.pdf* (Justification memo for reduced tree removal)
D. *Seabrook Island Road Intersection Plans 27316_0000-Site Development 8-24-18 Tree Impacts.pdf* (Tree removal exhibit in support of memo)
E. *Kiawah Logistics Narrative-Updated on 08.24.18.pdf* (Revised construction traffic control plan)

In general, the revised submittal addresses Reveer's comments and is consistent with the discussion and agreements at the meeting. **Table 1** summarizes the initial comments, the revised changes, and the status of the items.

***Table 1** – Comment Review Summary*

	Initial Comment / Issue(s)	Revised Response	Status / Additional Comment
Geometry	Driveway entrance did not support large (delivery) vehicle access	Driveway radii increased and raised median "nose" moved back	Appears acceptable
	Left turn lane on SIR requires additional storage length	Turn lane storage increased from 100' to 150'	Acceptable
	Initial transition taper on SIR (traveling towards traffic circle) needs additional length	Transition taper increased from 140' to 245'	Acceptable and compliant with SCDOT roadway design manual
Tree Impacts	Sight distance requires removal of 5 existing trees (#s 4-8 on the *Tree Impact Exhibit*) (Excerpt included for reference)	Per the *Tree Impact Statement*, removal of 3 trees (#'s 5, 6, and 7 on exhibit) is proposed	In the original assessment, the 2 additional trees identified for removal (#s 4 and 8) were right on the line and added from a conservative standpoint; the memo and revised drawings take the approach to keep as many trees as possible. It should be noted that the sight distance evaluation point resulting in the 3-tree removal is 15' back from the edge of roadway pavement (consistent with SCDOT methodology) but is now beyond the proposed stop-bar due to the geometric changes made to the driveway entrance as part of the Geometry section above (where the stop bar was moved farther back to allow the entrance of delivery vehicles). Though not the typical situation, should trees 4 and 8 remain and a vehicle leaving the Site has to pull forward (beyond the stop bar) to have adequate sight distance at the same time a large vehicle wants to enter the Site from the new left turn lane on SIR, there is potential for a conflict / accident. It is recommended that consensus of agreement be reached on the trees required for removal.
	Roadside safety requires the removal of 8 additional trees as they are within the "clear zone" as defined by SCDOT	The *Tree Impact Statement* provides justification to not remove the additional trees as it is contrary to the spirit of the Town of Seabrook's tree preservation ordinance, Kiawah's buffer requirement, Charleston County's Zoning and Land Development Regulations, and precedent set by the proximity of trees along nearby roads.	The *Tree Impact Statement* provides evidence to support not removing the additional trees and thus the original recommendation is rescinded, though the safety implication remains valid. It should be noted that with these trees now remaining, additional canopy trimming is foreseen beyond what is minimally required for sight distance to avoid contact with large vehicles and trailered boats from the Marina. The existing canopies currently reach the edge of the existing pavement whereas the proposed edge will be 12 feet farther to the east (under the current canopies) (see attached pictures)

	Initial Comment / Issue(s)	Revised Response	Status / Additional Comment
Stormwater	Elevation of the proposed drainage boxes in the shoulder of SIR appear to be approximately a foot higher than what is needed to adequately drain the area, and lowering it a foot will not allow enough room to accommodate a pipe based on the invert of the existing connection point	No changes have been made to the drawings, but it was discussed at the August 15th meeting that the drainage design was preliminary, and approval would be contingent upon a final drainage design and report.	No further comment / Pending drainage design
Pedestrians	The multi-use-path should maintain the existing 10' width and not be reduced to 8'	Revised accordingly	Acceptable
	The transition from the existing path to the "arc" across the new driveway should be less abrupt	Transition points provided with curves	Acceptable
Traffic	The Site has adequate access from Village Green Lane (via the traffic circle), but the analysis does not report the impact(s) to traffic if the proposed new driveway is denied; this would be beneficial in determining the true need of this request	Traffic report was revised to analyze all the traffic entering and exiting the Site via the existing traffic circle. Alternative Comparison: **If new driveway is approved** on SIR, this increases delay on SIR by 5 seconds at the entry to the roundabout and reduces Level of Service (LOS) from C to D; **C/24** to **D/29** [LOS/seconds of delay experienced] **If new driveway is denied** and all traffic goes through the roundabout, this increases delay on SIR by 1 second and reduces the LOS from **C/24** to **D/25**. It also increases the delay on Betsy Kerrigan Parkway's (BKP) entry into roundabout by 4 seconds and reduces the LOS from **D/35** to **E/39**. Note: the upper limit of LOS D is 35 seconds, which is where BKP is predicted to be (during the AM peak hour) even without the new development and its further degradation to LOS E with the new development is deemed unacceptable by the Highway Capacity Manual.	Summary language of the revised report states that traffic is not significantly impacted either way. However, there are additional benefits that the new driveway on SIR provides that are beyond the focus of traffic; three of which are 1) having a second point of entry could be beneficial during emergency response or similar situations, 2) providing a more formal and prominent entrance than could be perceived when entering through the roundabout and adjacent parking and retail along Farm Lake View Drive, and 3) allowing the proposed building to front on SIR that provides a better site layout, circulation, and overall relationship to the street and perspective from passing vehicles and pedestrians. If you consider the driveway solely based on traffic delay, the new driveway could be justified as a mitigation measure to keep BKP from achieving an LOS E during the AM peak-hour.

CONCLUSION

The comments introduced in Reveer's August 14th memo and presented at the Planning Commission meeting on the 15th have been addressed to an acceptable level. Discussion at the meeting and data presented in the revised traffic report supports that the new driveway, both from a traffic perspective and safety, site planning, and aesthetical factors, is better suited at its proposed location on Seabrook Island Road.

REFERENCES

Picture 1 *– Existing Shoulder / Center of Proposed Lane; Looking East*

Picture 2 *- Existing Shoulder / Center of Proposed Lane; Looking West*

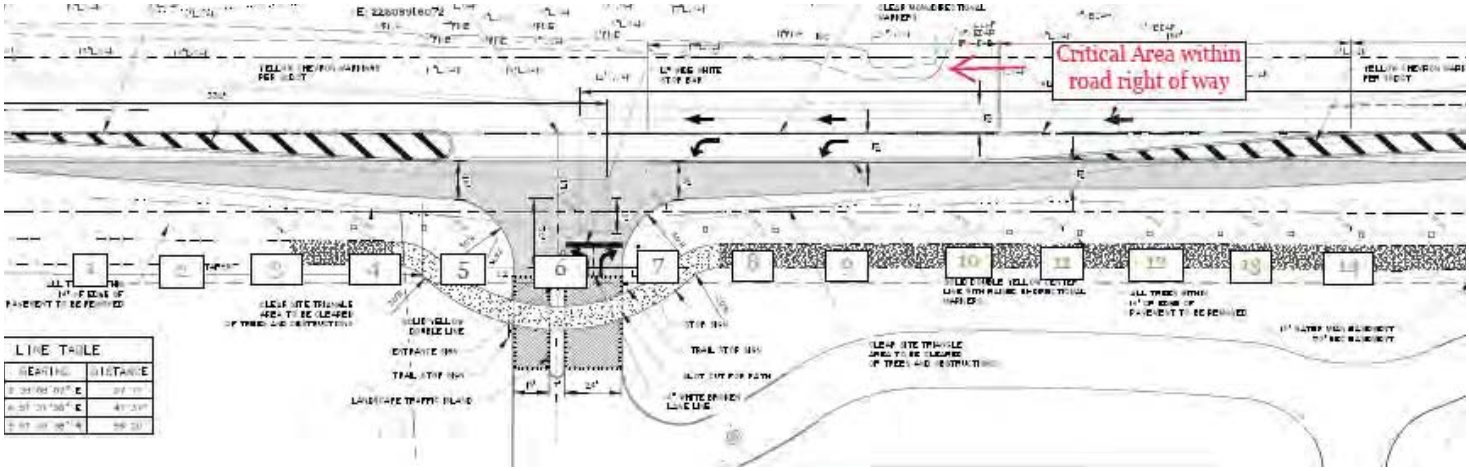


Figure 1 *– Excerpt from Tree Removal Exhibit*

Project Name: **Beds:**

(Any subheading information about client)

Department:	Position:	Fiscal Year	2021	2022	2023	2024	2025
		Avg. Occupancy	74.08	155.50	186.00	186.00	186.00
General & Administration	Executive Director		1.00	1.00	1.00	1.00	1.00
	Department Mgr & Asst.		-	-	-	-	-
	Accounting		1.00	1.00	1.00	1.00	1.00
	Human Resources		-	-	-	-	-
	Marketing		2.00	2.00	2.00	2.00	2.00
	Clerical & Secretary		2.10	2.10	2.10	2.10	2.10
			7.10	**7.10**	**7.10**	**7.10**	**7.10**
Plant	Department Mgr & Asst		1.00	1.00	1.00	1.00	1.00
	General Maintenance		2.00	2.00	2.00	2.00	2.00
	Grounds		-	-	-	-	-
	Security		2.80	2.80	2.80	2.80	2.80
	Clerical & Secretary		1.00	1.00	1.00	1.00	1.00
	Supervisors		-	-	-	-	-
	Refurbishment		1.00	1.00	1.00	1.00	1.00
			7.80	**7.80**	**7.80**	**7.80**	**7.80**
Environmental Services	Department Mgr & Asst		-	-	-	-	-
	Housekeeping		4.08	6.50	7.00	7.00	7.00
	Laundry		2.00	2.00	2.00	2.00	2.00
	Janitors		3.00	3.00	3.00	3.00	3.00
	Supervisors		-	-	-	-	-
	Other Env. Services		-	-	-	-	-
			9.08	**11.50**	**12.00**	**12.00**	**12.00**
Food & Beverage Services	F&B Director		1.00	1.00	1.00	1.00	1.00
	Food Production		3.63	6.11	7.18	7.18	7.18
	Dining Room		3.63	6.11	7.18	7.18	7.18
	Utility Workers		4.20	4.20	4.20	4.20	4.20
	Clerical & Secretary		-	-	-	-	-
	Supervisors		-	-	-	-	-
			19.49	**27.67**	**30.79**	**30.79**	**30.79**
Resident Services	Drivers		2.80	2.80	2.80	2.80	2.80
	Activities		2.80	2.80	2.80	2.80	2.80
	Other Resident Services		-	-	-	-	-
	Department Mgr & Asst		1.00	1.00	1.00	1.00	1.00
	Future		-	-	-	-	-
			9.40	**9.40**	**9.40**	**9.40**	**9.40**
Assisted Living	Department Mgr -- RN(DON)		1.00	1.00	1.00	1.00	1.00
	Activities		2.40	2.40	2.40	2.40	2.40
	Clerical & Secretary		2.60	2.60	2.60	2.60	2.60
	Non-Licensed - Care Givers		4.38	6.89	10.50	10.50	10.50
	Licensed - LPN's		3.28	4.27	7.88	7.88	7.88
	Licensed - RN's		-	-	-	-	-
	Other Assisted Living		1.40	1.40	1.40	1.40	1.40
			15.06	**18.56**	**25.78**	**25.78**	**25.78**
Memory Care	Department Mgr & Asst		-	-	-	-	-
	Non-Licensed - Care Givers		3.50	6.56	6.56	6.56	6.56
	Licensed - LPN's		2.19	2.63	2.63	2.63	2.63
	Licensed - RN's		-	-	-	-	-
	Other Memory Care		-	-	-	-	-
	Future		**7.09**	**10.59**	**10.59**	**10.59**	**10.59**
TOTAL			**75.01**	**92.61**	**103.45**	**103.45**	**103.45**

G&A Staff typically M-F, 9am - 5pm

Staffing is mainly M-F, 8am - 4pm with 1 person being 12pm - 8pm and 1 FTE weekend 8am 4pm

Staffing mainly M-F 8am to 4pm. 2 FTEs on weekends 8am-4pm

Staffing is spread out over several shifts and 7 days per week. Opening 5am to 1pm; breakfast 6am to 2pm; lunch 10am to 6pm and dinner/closing noon to 8pm.

Staffing is spread out over 3 shifts 7 days per week. 7am to 3pm; 9am to 5pm and noon to 8pm.

Staffing is spread out over 3 shifts, 7 days per week. 7am to 3:30pm; 3pm to 11:30pm and 11pm to 7:30am.

Staffing is spread out over 3 shifts, 7 days per week. 7am to 3:30pm; 3pm to 11:30pm and 11:00pm to 7:30am

Balfour Beatty

Freshfields Village – Big Rock Partners – Senior Living Project – Kiawah Island, SC

Conceptual Logistics Narrative by Milestone and Construction Traffic Plan
August 24, 2018

Balfour Beatty strives to provide the safest and most efficient site logistics plan for each project. This requires teamwork and coordination with all entities involved, i.e. authorities having jurisdiction, property owners, associations, neighboring properties, residents, and the general public. This specific project will require coordination with many of these entities. We will work as a team with all appropriate parties to ensure our commitment to safety is always met and the daily construction logistics is a minimally invasive activity while all parties are made aware of important construction deliveries.

Below is our plan on how and when we foresee construction to occur. This plan is a living and breathing document that will get updated and edited by feedback from all parties on a constant basis. All durations and start and finish times are assumptions. As we continue through early conceptual phase to the construction phase, these durations and milestones will be confirmed. Many activities and milestones will overlap as we phase the project into separate parts.

Balfour Beatty is assuming all construction traffic will enter the jobsite by turning left off Seabrook Island Road, which would require the construction of a new left-hand turn lane prior to construction starting. Depending on the lengthy permit approval process the start of the left-hand turn lane and site preparations may start at the same time.

During construction of the left-hand turn lane and the entire construction duration there will always be a dedicated flag man at the entrance and exit of the jobsite to ensure pedestrian and bike traffic is protected.

The project limits will be completely fenced and secure at all time. During construction we will provide weekly updates to all entities about scheduled deliveries, upcoming work, potential impactful activities so we can create a plan that is properly communicated to all surrounding communities.

MILESTONE #1 – Early Sitework – Surcharge (preload) Haul-in Dirt Process

February 2019 – May 2019 (3 Months)
Because of soil and seismic conditions found in the low-country coastal region and for this particular project, we are required to haul in approximately 5 - 10ft of fill (soils) over the footprint of the property and let the soil sit and compact the existing soils to an acceptable compaction level. This activity will take approximately 3 months to bring in fill dirt to the jobsite. We are anticipating approximately 25 dump trucks a day bringing dirt to the site during this time period.

MILESTONE #2 – Surcharge (preload) Compaction Process

May 2019 – July 2019 (2 Months)
After all the dirt in placed on the footprint of the project, it must stay for approximately 1-2 months to allow proper compaction required for the new structure. There will be minimal construction traffic at this time other than engineering investigations and testing of soils.

MILESTONE #3 – Remaining Sitework, Utilities, EQ Drains and Pad Prep

July 2019 – October 2019 (4 Months)
After approval from the engineer we will start remaining sitework for foundations and structure to begin. This phase will reintroduce dump trucks to the traffic flow as well as other large equipment being delivered to and from the jobsite.

MILESTONE #4 – Foundations and Retaining Walls

August 2019 – February 2020 (6 Months)

This phase of the project will introduce our first concrete trucks to the jobsite. All concrete pours will be coordinated with local entities to ensure flow of concrete trucks is not interfering with island traffic.

MILESTONE #5 – Structure Erection

December 2019 – June 2020 (6 Months)

This phase of the project will include large deliveries of steel, wall and floor structures, and concrete trucks as the building starts coming out of the ground and is topped-out.

MILESTONE #6 – Exterior Envelope

May 2020 – November 2020 (6 Months)

This phase of the project will include deliveries associated with the skin of the building (stucco, windows, siding, etc.) and the roof. Larger deliveries of steel and concrete will have stopped by this phase.

MILESTONE #7 – Interiors

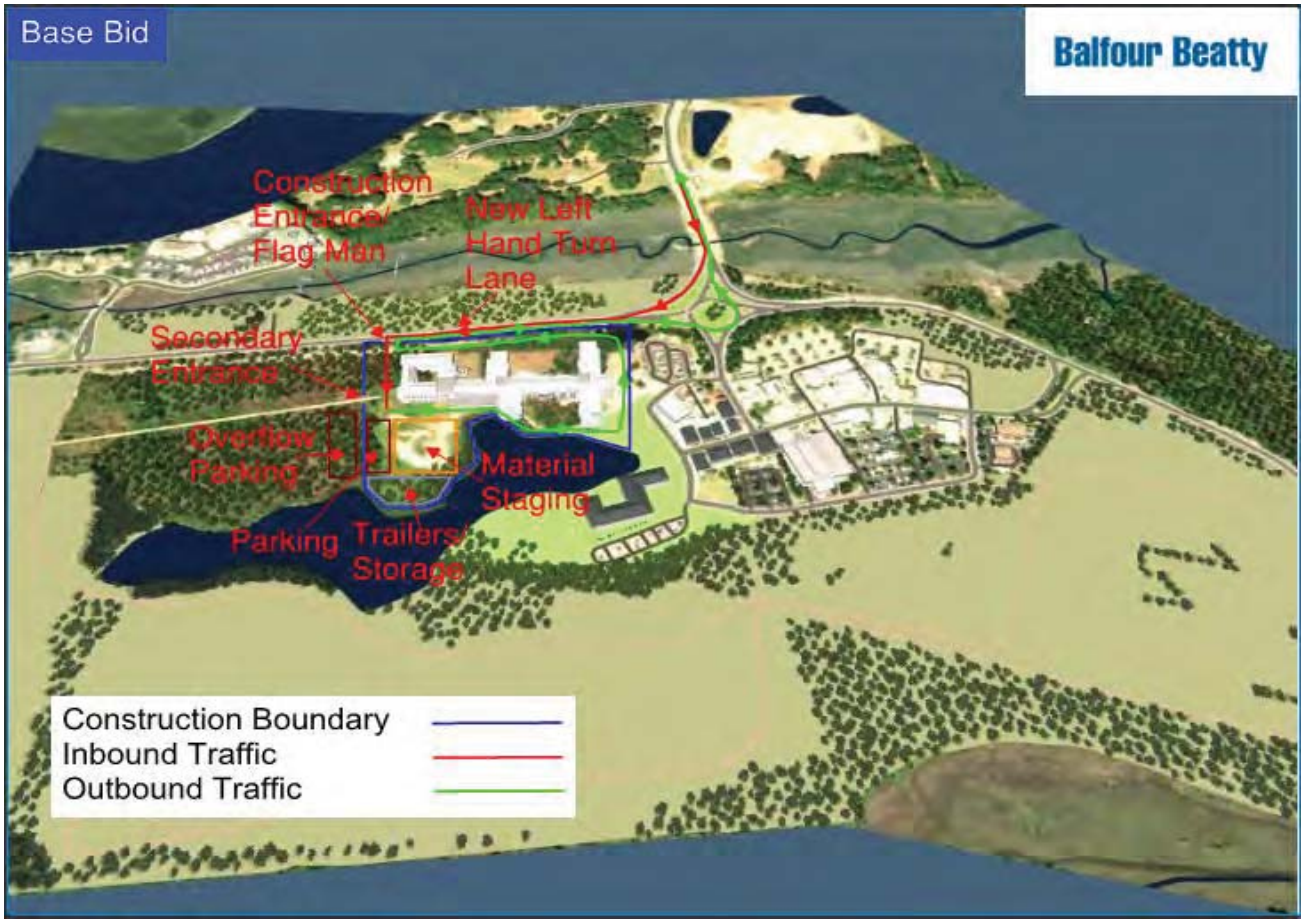
June 2020 – August 2021 (13 Months)

The interiors phase of the project will include deliveries of drywall, plumbing, mechanical, and electrical fixtures. Deliveries of all the finished materials will also occur, including millwork, cabinets, flooring, paint, appliances, etc. This phase will have the most number of workers on site.

MILESTONE #8 – Finish Sitework and Landscaping

January 2021 – August 2021 (6 Months)

The final phase will include landscaping along with site and hardscape features.



DHEC

South Carolina Department of Health and Environmental Control

NOTICE OF INTENT (NOI)
For Coverage(s) of Primary Permittees Under South Carolina NPDES General Permit For Stormwater Discharges From Construction Activities SCR100000
(Maintain As Part of On-Site SWPPP)

For Official Use Only
File Number: _____
Permit Number: SCR10_____
Submittal Package Complete: _____

Submission of this Notice of Intent constitutes notice that the Applicant identified in Section II intends to be authorized as a Primary Permittee in the state of South Carolina under NPDES General Permit SCR1000000. ***Fees required for review and NPDES coverage of each application type are as listed on page 2 of the Instructions.***

Date: 7/17/2018

Project/Site Name: Kiawah Senior Living **County:** Charleston

(Modification or Change of Information Only) **Prior Approved NPDES Permit or File Number:** _____

Do you want this project to be considered for the Expedited Review Program (ERP)? ☑ Yes or ☐ No (See instructions)

I. Notice of Intent (NOI) Application Type(s)

A. **Project (Application/Review) Type(s)** (Select **ALL** that apply):

☑ New Project (Initial Notification) ☐ Ongoing Project: ☐ Permitted or ☐ Un-Permitted
☐ Late Notification ☐ Low Impact Development (LID) or Project Design Above Regulatory Requirements
☐ New Owner/Operator or Company Name Change **(see instructions, attach Form A (Transfer of Ownership))**
☐ Major Modification: **(see instructions, attach Form B (Major Modifications))**
☐ MS4 Project Review
☑ Ocean and Coastal Resource Management (OCRM) Review
☐ Change of Information/Other (Specify): _____

B. If Applicable, identify the entity designated as **MS4 Reviewer and MS4 Operator** (i.e., Lexington County, City of Greer, etc.): **MS4 Reviewer**_____ **MS4 Operator** _____

II. Primary Permittee Information ☐ Change of Information

☐ Person or ☑ Company | If a Company, are you a ☐ Lending Institution or ☐ Government Entity?
Company EIN **(If applicable)**: EIN: 82-3707473

A. **Primary Permittee Name:** BRP Kiawah LLC
Mailing Address: 2645 North Federal Hwy., Suite 230 City: Delray Beach State: FL Zip: 33483
Phone: 561-701-4544 Fax: _____ Email Address: snealon@bigrockpartners.com

B. **Contact /ODSA Name** (If different from above OR if owner is a company): _____
Mailing Address: _____ City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____ Email Address: _____

C. **Property Owner Name** (If different from above): _____
Mailing Address: _____ City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____ Email Address: _____

III. Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP) Preparer Information ☐ Change of Information

A. **C-SWPPP Preparer Name:** Tony Woody, PE
B. **Registered Professional** ☑ Engineer ☐ Landscape Architect ☐ Tier B Land Surveyor **S. C. Registration #:** 14545
C. **Company/Firm Name:** Thomas & Hutton Engineering Co. **S. C. COA #:** 00285
Mailing Address: 682 Johnnie Dodds Blvd., Suite 100 City: Mt. Pleasant State: SC Zip: 29464
Phone: 843-849-0200 Fax: 843-849-0203 Email Address: woody.t@thomasandhutton.com

IV. Project/Site Information ☐ Change of Information

A. **Type of Construction Activity(ies)** (Select **ALL** that apply):

☑ Commercial ☐ Industrial ☑ Institutional ☐ Mass Grading ☐ Linear ☐ Utility/Infrastructure
☐ Residential: Single-family ☐ Residential: Multi-family ☐ Multi-use (Commercial & Residential)
☐ Site Preparation (No New Impervious Area) ☐ Other (Specify) _____

B. **Site Address/Location** (street address, nearest intersection, etc.) 400 Farm Lake View
City/Town (If in limits): Seabrook Island, SC Zip Code: 29455
Latitude: 32 ° 36 ' 24 " N Longitude: - 80 ° 09 ' 02 " W (Source): ☑ GPS ☐ Web Site: _____
Tax Map Number (s) (List all): 205 00 00 014

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C. Is this site located on **Indian Land**? ☐ Yes ☑ No

D. **Proposed Start Date**: 12/01/2018 **Proposed Completion Date**: 12/1/2020

E. **Disturbed Area** (nearest tenth of an acre): 8.6 ac **Total Area** (acres): 9.02 ac

F. **Modification Only:** (nearest tenth of an acre): **Disturbed Area: Current (Approved) Area:** _____
Disturbed Area Change (Increase Only): _____ **Total Disturbed Area (After Change):** _____

G. Is this project part of a **Larger Common Plan for Development or Sale (LCP)**? ☑ Yes ☐ No
LCP/ Overall Development Name: Freshfields Village Check here if this is the **First Phase.** ☐

Previous State Permit/File Number: 10-03-02-07C **Previous NPDES Coverage Number:** SCR10 V322

H. Any **Flooding Problems** exist downstream of or adjacent to this site? ☐ Yes ☑ No (If yes, provide detailed description of flooding problems and applicable floodway/flood zone information in the C-SWPPP).

I. Active **S.C. DHEC Warning Notice, Notice to Comply or Notice of Violation** for this site or LCP? ☐ Yes ☑ No

J. List Relevant **State and Federal Environmental Permits or Approvals** applied for or obtained for this site (e.g., **RCRA, USACOE, Nationwide**, etc.). **If None, list None.**
SCDHEC Water and Sewer Permit to Construct, CZC cert.

K. **Any Waiver(s)/Variances/Exceptions Requested for this Project?** (If yes, identify below and include **Waiver Request and Justifications** in the C-SWPPP for each proposed request).

1. Small Construction Activity Waiver(s) From NPDES permitting **(Section 1.4 & Appendix B)**? ☐ Yes ☑ No If yes, identify requested waiver: ☐ Rainfall Erosivity Waiver ☐ TMDL Waiver ☐ Equivalent Analysis Waiver
2. Detention Waiver **(72-302(B)**? ☐ Yes ☑ No | 3. Other (Specify): _____

V. Waterbody Information (Attach additional sheet(s) as needed) ☐ Change of Information

A. **Receiving Waterbody(s) (RWB) Information** (List the nearest and next nearest receiving waterbodies to which the sites stormwater discharges will drain. If stormwater discharges drain to multiple waterbodies, list all such waterbodies).

1. Name of Receiving Waterbodies (RWB)	2. Distance to RWB (feet)	3. Classification of RWB
a. Nearest: Brick Creek	1,600	SFH
b. Next Nearest: Kiawah River	4,500	SFH
c. Coastal Zone ONLY: Coastal Receiving Water (CRW): Brick Creek	1,600	Not Applicable
d. Other Waterbodies:		

B. **Waters of the U.S. / State Information** (Attach additional sheet(s) as needed)

Waters of the U.S./ State	1. On the site?	2. Delineated/ Identified?	3. Impacts?	4. Amount of impacts
a. Jurisdictional wetlands	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	____ Ac
b. Non-jurisdictional wetlands	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	____ Ac
c. Other Water(s): _____	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	____ Ac ____ Feet
d. Coastal Zone ONLY: Direct Critical Area	☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	____ Ac ____ Feet

5. If yes for impacts in B.3, describe each impact and activity, and list all permits (e.g., USACOE Nationwide Permit, DHEC General Permit) and certifications that have been applied for or obtained for each impact:

C. **S.C. Navigable Waters (SCNW) Information (Section 2.6.5)** The Department will address any issues related to State Navigable Waters' Program under SC Regulation 19-450 during the review of the C-SWPPP for activities that will **NOT** require a 404 permit or a 401 certification. (Attach additional sheet(s) as needed).

1. Are S. C. Navigable Waters (SCNW) on the site: ☐ Yes ☑ No
a. If **no**, do not complete this question. Proceed to Section D (Impaired Waterbodies).
b. If **yes**, provide the name of S.C. Navigable Waters (SCNW) on the site: _____

2. If **yes for C.1**, will construction activities cross over or occur in, under, or thru the SCNW? ☐ Yes ☐ No
If yes, describe SCNW activities (e.g., road crossing, sub-aqueous utility line, temporary or permanent structures, etc.) and proceed to Section C.3: _____

3. Identify permits providing coverage of SCNW activities proposed for your site. If NONE, list none. NONE

Permits/Certifications	Permit or Certification No.	Corresponding Covered SCNW Activity(ies)
a. DHEC General/ Other DHEC Permit		
b. USACOE **404 Permit or 401 Certification**		
c. **SCNW Permit** If applied for or issued, identify **Date applied for or issued:** _____		☐ **All Activities** or ☐ **Some Activities (Describe):**

d. If a SCNW Permit has NOT been applied for provide an additional plan sheet that shows plan and profile views (drawn to scale) of the SCNW and associated activities. Include a description of all proposed activities on this plan.

D. **Impaired Waterbodies Information** (Attach additional sheet(s) as needed)

1. 303(d) Listed Impaired Waterbodies

a. Name of **Nearest DHEC Water Quality Monitoring Stations (WQMS)(s)** that receives stormwater from your construction site and/or thru an MS4 and the **Name of the Corresponding Waterbody?**		b. **Is this WQMS(s) listed on the most current 303(d) List? If No, proceed to Section 2 of this table. If Yes, complete items c thru f.**	c. List the pollutant(s) identified as **"CAUSES"** of the impairment	d. Will any pollutants causing the impairment be present in your site's construction stormwater discharges?	e. If **yes for d**, list the **"USE SUPPORT"** impairment(s) affected by the pollutant(s) identified in c.
Nearest DHEC WQMS(s)	**Corresponding Waterbody**				
12A-31	Bohicket Creek	☐ Yes ☑ No		☐ Yes ☐ No	
11-22	Kiawah River	☐ Yes ☑ No		☐ Yes ☐ No	
MD-273	Kiawah River	☐ Yes ☑ No		☐ Yes ☐ No	

f. If **yes for d** above, **will use of the BMPs proposed for your project ensure the site's discharges will NOT contribute to or cause further WQS violations for the impairment(s) listed in c?** ☐ Yes ☐ No
(NOTE: If no for f, this site is NOT eligible for coverage under the CGP). See Instructions.

2. TMDL Impaired Waterbodies

a. Name of **Nearest DHEC Water Quality Monitoring Stations (WQMS)(s)** that receives stormwater from your construction site and/or thru an MS4?	b. Has a TMDL(s) been developed for this WQMS(s)? **If No, identify as such below and proceed to Section VI. If Yes, complete items c thru f of this table.**	c. If **yes for b**, what pollutants are listed as "CAUSES" or causing the impairment?	d. If **yes for b**, has the standard been **"ATTAINED" or "Fully Supported"** for the impairment(s)?	e. If **no for d (Not Attained)**, will any pollutants causing the impairment be present in your site's construction stormwater discharges?
12A-31	☐ Yes ☑ No		☐ Yes ☐ No	☐ Yes ☐ No
11-22	☐ Yes ☑ No		☐ Yes ☐ No	☐ Yes ☐ No
MD-273	☐ Yes ☑ No		☐ Yes ☐ No	☐ Yes ☐ No

f. If **yes for e** above, **are your discharges consistent with the assumptions and requirements of the TMDL(s)?** ☐ Yes ☐ No
(NOTE: If no for f, this site is NOT eligible for coverage under the CGP). See Instructions.

VI. **Signatures and Certifications** DO **NOT** SIGN IN BLACK INK! **Read the Certifications below (in entirety). Provide date, printed name, and signatures below.** If you are a **New Owner/Operator**, as Primary Permittee you must also sign and date the applicable Comprehensive SWPPP Acceptance & Compliance Agreement below.

C-SWPPP PREPARER: "One copy of the C-SWPPP, all specifications and supporting calculations, forms, and reports are herewith submitted and made a part of this application. I have placed my signature and seal on the design documents submitted signifying that I accept responsibility for the design of the system. Further, I certify to the best of my knowledge and belief that the design is consistent with the requirements of Title 48, Chapter 14 of the Code of Laws of SC, 1976 as amended, pursuant to Regulation 72-300 et seq. (if applicable), and in accordance with the terms and conditions of SCR100000." **(This should be the person identified in Section III).**

Tony Woody, PE — **Printed Name of C-SWPPP Preparer**

Signature of C-SWPPP Preparer

14545 — **S. C. Registration #**

PRIMARY PERMITTEE: "I or I (on behalf of my company and its contractors and agents), as the case may be, certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I understand that DHEC enforcement actions may be taken if the terms and conditions of the C-SWPPP are not met and I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

"I or I (on behalf of my company and its contractors and agents), as the case may be, also hereby certify that all land-disturbing construction and associated activity pertaining to this site shall be accomplished pursuant to and in keeping with the terms and conditions of the approved plans and SCR100000. I also certify that a responsible person will be assigned to the project for day-to-day control. I hereby grant authorization to the to S. C. Department of Health and Environmental Control (DHEC) and/or the local implementing agency the right of access to the site at all times for the purpose of on site inspections during the course of construction and to perform maintenance inspections following the completion of the land-disturbing activity." **(See Section 122.22 of S.C. Reg. 61-9 for signatory authority information.)** Having understood the above information, I am signing this certification as Primary Permittee to the aforementioned NPDES general permit."

Sean Nealon — **Printed Name of Primary Permittee**

Signature of Primary Permittee

Director of Development — **Title/Position**

2/9/18 — **Date Signed**

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NPDES CGP FEE SCHEDULE A

(All Counties EXCEPT Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper)
This schedule should not be used for projects reviewed by a delegated entity or MS4 operator.

If you are completing the fillable version of this form and if the **County** and **Disturbed Area** fields are correctly filled out on page 2 of this form, the fees in the right hand column will be automatically entered based on your answers to the questions below. The schedule should be attached to DHEC Form 2617. Do not send payment in window envelope. **DO NOT MAIL CASH.** DHEC will notify the Project Owner/ Operator if the submitted check or credit card payment cannot be processed. **The review clock will start when acceptable payment is received.**

1. Identify (√) the Project Review Type(s) **Enter NPDES Coverage Fee of $125 in the right-hand column if any of the following project/review types apply to this application.** Proceed to Item 2.	**(√)**	**NPDES Coverage Fee**
a. Project or LCP (Item IV.G) that will ultimately disturb one (1) acre or more Note: If your project will ultimately disturb less than one (1) acre AND is NOT a part of a Larger Common Plan, coverage under SCR100000 is not required; see http://www.scdhec.gov/administration/library/d-2628.pdf (Notification Form for Sites Disturbing Less Than 1-Acre Not Part of a Larger Common Plan, Non-Coastal County"	☐	$ ___0.00
b. New Owner/Operator (Transfer of Ownership)/Company Name Change ($125 NPDES Coverage fee is required by the Department for Transfers of Ownership and Company Name Changes)	☐	
c. Unpermitted Ongoing Project or Late Notification	☐	
d. MS4 Project Review (Item I.A and I.B) ($125 payable to Department thru MS4 Reviewer)	☐	
e. Other (Specify): _____	☐	

2. Determine the Project Review Fees (Review fees cannot exceed $2000 for a project)		
PROJECT OR LCP THAT WILL ULTIMATELY DISTRUB ONE (1) ACRE OR MORE	**(√)**	**Review Fees**
a. Enter the disturbed area (Item IV.E) for this project. Proceed to Items 2.b and 2.c.	_____ (Nearest tenth of an acre)	
b. Will this project or LCP (Item IV.G) ultimately disturb more than 1.0 acres	☐ Yes ☐ No	
c. Is this project exempt from S. C. Reg. 72-300 et seq.?	☐ Yes ☑ No	
1. If this project will **not** ultimately disturb more than 1.0 acre, and is not part of an LCP, **your project is automatically covered under this permit and the NPDES coverage fee and review fee are not required.** See the **BOW-SPWS** for "Less Than 1-Acre of Land Disturbance – Non-Coastal Counties". 2. If this project will ultimately disturb more than 1.0 acre, proceed to Item 2.d.		
d. Enter the project review fees (based on $100/disturbed area) in the right-hand column. (Multiply the disturbed area (Item 2.a) by $100/disturbed area). If the disturbed area for this project (Item 2.a.) totals 20.0 acres or more, enter $2000 in the right-hand column. Review fees cannot exceed $2000 for a project.		$ ___0.00

3. Total Required Fees Add the values in the right-hand columns of Items 1 and 2.d. Proceed to Item 4. (The Department will not review this project until all required fees are received).	$ ___0.00

4. Identify the Method of Payment:

☐ **Payment by Check:**
Attach a **signed and dated check payable to S.C. DHEC** to the **front** of this Fee Schedule.
Please note that all checks must be **less than 30 days old** and must be for the **entire required fees.**

☐ **Payment by Credit Card:** **(Check here if you wish to pay via credit card using the on-line payment system).**
The Department will contact you to provide instructions and the invoice number necessary for online payment.
Please provide an e-mail address where the invoice number may be sent: _____

For official use only: **Invoice Number** _____

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NPDES CGP FEE SCHEDULE B

(ONLY for Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper Counties)
This schedule should not be used to calculate MS4 review fees for projects reviewed by a delegated entity or MS4 operator.
Submit payment for NPDES Coverage fees only to DHEC.

If you are completing the fillable version of this form and if the **County** and **Disturbed Area** fields are correctly filled out on page 2 of this form, the fees in the right hand column will be automatically entered based on your answers to the questions below. The schedule should be attached to DHEC Form 2617. Do not send payment in window envelope. **DO NOT MAIL CASH.** DHEC will notify the Project Owner/ Operator if the check or credit card payment cannot be processed. **The review clock will start when acceptable payment is received and after the project is deemed consistent with the S.C. Coastal Zone Management Plan.**

1. Identify (√) the Project/Review Types (NOTE: You may ONLY select Item 1.a OR 1.b BELOW). Enter NPDES coverage fee of $125 in the right-hand column if any of the following project/review types apply to this application. Proceed to Item 2.	(√)	NPDES Coverage Fee(s)
a. Project or LCP that is located within ½ mile of CRW (Item V.A) that will ultimately disturb more than 0.5 acres (if select a, do not select b)	☑	$ 125 .00
b. Project or LCP that is NOT located within ½ mile of CRW (Item V.A) that will ultimately disturb one (1) acre or more (if select b, do not select a)	☐	
c. New Owner/Operator (Transfer of Ownership)/Company Name Change ($125 NPDES Coverage fee is required by the Department for Transfers of Ownership and Company Name Changes)	☐	
d. Unpermitted Ongoing Project or Late Notification	☐	
e. MS4 Project Review (Item I.A and I.B)	☐	
f. Other (Specify): _____	☐	

2. Determine the Project Review Fees (Review fees cannot exceed $2000 for a project).
NOTE: COMPLETE ITEM 2.a BELOW. COMPLETE EITHER SECTION 3 OR SECTION 4. DO NOT COMPLETE BOTH SECTIONS.

a. Enter the disturbed area (Item IV.E) for this project. Proceed to Item 3 OR Item 4. 8.6 (nearest tenth of an acre)

3. PROJECT OR LCP LOCATED WITHIN ½ MILE OF A CRW (ITEM V.A)	(√)	Review Fees
a. Will this project or LCP (Item IV.G) ultimately disturb more than 0.5 acres?	☑ Yes ☐ No	
b. Is this project exempt from S. C. Reg. 72-300 et seq.?	☐ Yes ☑ No	

1. If this project will NOT ultimately disturb more than 0.5 acres and is not part of an LCP, **your project is automatically covered under this permit and the NPDES coverage fee and review fee are not required.** See section 1.3.1.B. See the **BOW-SPWS** for "Less Than 1-Acre of Land Disturbance - Coastal Counties".
2. If this project or LCP will ultimately disturb more than 0.5 acres, **proceed to Item 3.c.**

c. Enter the project review fees (based on $100/ disturbed acre) in the right-hand column. (Multiply the disturbed area (Item 2.a.) by $100/disturbed area). If the disturbed area for this project (Item 2.a.) totals 20.0 acres or more, enter $2000 in the right-hand column. Review fees cannot exceed $2000 for a project. **Proceed to item 3.d**	$ 860 .00
d. Total Required Fees (Coastal Project located WITHIN ½ mile of a CRW (Item V.A) Add the values in the right-hand columns of Items 1 and 3.c. (The Department will not review this project until all required fees are received). **Proceed to Item 5.** ($ 325.00 previously paid with original application)	$ 985 .00

4. PROJECT OR LCP NOT LOCATED WITHIN ½ MILE OF A CRW (ITEM V.A)	(√)	Review Fees
a. Will this project or LCP (Item IV.G) ultimately disturb one (1) acre or more?	☐ Yes ☐ No	
b. Is this project exempt from S. C. Reg. 72-300 et seq.?	☐ Yes ☐ No	

1. If this project will NOT ultimately disturb one (1) acre or more, and is not part of an LCP, coverage under SCR100000 is NOT required; see the **BOW-SPWS** for "Less Than 1-Acre of Land Disturbance - Coastal Counties".
2. If this project or LCP will ultimately disturb one (1) acre or more, **proceed to Item 4.c.**

c. Enter the project review fees (based on $100/ disturbed acre) in the right-hand column. (Multiply the disturbed area (Item 2.a.) by $100/disturbed area). If the disturbed area for this project (Item 2.a.) totals 20.0 acres or more, enter $2000 in the right-hand column. Review fees cannot exceed $2000 for a project. **Proceed to item 4.d.**	$ .00
d. Total Required Fees (Coastal Project NOT located WITHIN ½ mile of a CRW (Item V.A) Add the values in the right-hand columns of Items 1 and 4.c. (The Department will not review this project until all required fees are received). **Proceed to Item 5.**	$ .00

5. Identify the Method of Payment: ☐ **Payment by Check**: (Attach a signed and dated check payable to S.C. DHEC to the front of this fee schedule. All checks must be less than 30 days old and must be for the entire amount of required fees). ☑ **Payment by Credit Card:** (Check here if you wish to pay via credit card using the on-line payment system). The Department will contact you via e-mail to provide instructions and the invoice number necessary for online payment. **Please provide an e-mail address where the invoice number may be sent:** snealon@bigrockpartners.com

For official use only: Invoice Number _____

DHEC 2617 (10/2012)

August 13, 2018

Mr. Ray Pantlik
Kiawah Development Partners
1 Kiawah Island Parkway
Kiawah Island, SC 29455

Re: Freshfields Village Senior Living Facility
BRP Kiawah, LLC
T&H J - 27151.0000.302
Stormwater Management Statement

Dear Mr. Pantlik:

Per you request, this letter is to state that the Stormwater Management Report dated August 9, 2018 for the referenced project was prepared in accordance with the State of South Carolina, and Charleston County Stormwater requirements. In our opinion, the proposed stormwater system meets the required guidelines and will have no adverse drainage impact on Seabrook Island Road, or the greater Seabrook Island.

Stormwater runoff from the subject site will be discharged into the existing stormwater detention pond, and then to its outfall, Brick Creek, which is a tidally influenced tributary of the Kiawah River.

Should you have any questions or require additional information, please do not hesitate to contact me at (843) 725-5229, or via e-mail at woody.t@thomasandhutton.com.

Sincerely,

THOMAS & HUTTON

Tony M. Woody, P.E.
Vice President/Principal

TMW/ala

Cc: Sean Nelson / BRP Kiawah, LLC
Bill Fellers / Thomas & Hutton

Stormwater Management Report

For

Freshfields Village –
Kiawah Senior Living Update

Charleston County, South Carolina

Prepared For:

BRP Kiawah, LLC

Kiawah Island, South Carolina

Prepared By:

Thomas & Hutton
682 Johnnie Dodds Blvd. / Mt. Pleasant / SC / 29464

J-27151.0000

(J-15275.404)

Date: February 19, 2003
Revision Dates: March 5, 2007
August 9, 2018

TABLE OF CONTENTS

FIGURES:

APPENDICES:

The following can be found in pockets at the end of this report:

Pre-Development Drainage Exhibit ..... 24" x 36" Exhibit

Post-Development Drainage Exhibit ..... 24" x 36" Exhibit

SUMMARY OF RESULTS
Freshfields Village – Kiawah Senior Living Update

Table 1 – Watershed Pre and Post Development Runoff Rates

Storm Frequency	Pre-Development Runoff Rates	Post-Development Runoff Rates (03/05/2007)	Post-Development Runoff Rates (08/09/2018)
2-Year	140 cfs	40 cfs	47 cfs
10-Year	238 cfs	78 cfs	88 cfs
25-Year	283 cfs	96 cfs	108 cfs
50-Year	328 cfs	113 cfs	127 cfs
100-Year	382 cfs	132 cfs	148 cfs

Table 2 – Pond Stage Summary

	NWL	*2-Year*	*10-Year*	*25-Year*	*50-Year*	*100-Year*
Pond 1 (03/05/2007)	3.2	4.19	5.02	5.42	5.82	6.31
Pond 1 (08/09/2018)	3.2	4.33	5.17	5.57	5.97	6.45

PROJECT NARRATIVE

Seabrook Island is a 3,900 acre tract of barrier island land located between the Atlantic Ocean and the Bohicket Creek/Kiawah River in northeastern Charleston County. The island became incorporated in 1988 and is located approximately 20 miles southeast of Charleston, SC. The proposed project's site is located off of Seabrook island Road to the west of the roundabout with Betsy Kerrison Parkway, in the Freshfields Village mixed-use commercial and retail complex. The first phase of Freshfields Village was completed in 2003 and additional pojects have been completed in 2007 and 2013. The site is located at the southeastern end of Seabrook Island approximately 9,700 lf west of the Atlantic Ocean.

This project will be constructed on 8.6 acres of previously cleared and filled land that was originally disturbed in the phase one construction activity in 2003. The site is adjacent to the existing stormwater lagoon that is located in the western-center of the Freshfields Village complex. This lagoon serves as the stormwater detention basin for most of the complex including this site. This site contains no wetlands, tidal marshes or other delineated critical areas. The project will also include redirecting, approximately 2 acres of Seabrook Island Road and right-of-way through Basin A into the existing Pond.

The pre-developed condition of the site was mostly wooded and drained to the surrounding wetlands, and containing soils classified as Hydrologic soil group B/D. This dual designation represents the drainage characteristics of the soil in drained and undrained conditions. For the purposes of determining curve numbers in this study, the post-developed soils are considered to be drained.

PURPOSE

- To define the limits of the drainage basin or basins that contain this project.
- To document that major drainage infrastructure such as drainage connectors, ponds, and outfalls are adequate for all existing, proposed, and future development within the drainage basin.
- To document compliance with regulatory requirements of the State of South Carolina and Charleston County summarized as follows:
  - ***South Carolina DHEC***
    - Post Development peak runoff rates shall be detained for the 2 and 10 year storms.

- Water Quality shall be maintained by retaining specified amounts of runoff in a 24 hour period.
- Sediment shall be prevented from leaving the site during construction.

- ***Charleston County***
  - Post Development peak runoff rates shall be detained for the 2 and 10 year storms.
  - Study entire drainage basin at a buildout condition, including areas upstream and downstream of the current project.
  - Drainage culverts shall be sized to accommodate runoff from the 25 year storm

PROPOSED DRAINAGE SYSTEM

The Freshfields Village – Kiawah Senior Living project post-development conditions will consist of a 300,000 sq. ft. building, a pool/deck area, access drives and associated utilities, situated within the existing Freshfields Village stormwater master plan. The new driveways turn around and parking areas will have the appropriate stormwater collection and piping that will flow to the adjacent existing lagoon which is part of the Freshfields Village stormwater system. Stormwater runoff will be collected into new drainage structures and flow through piping directly into the existing Freshfields Village lagoon system. This lagoon system serves as the stormwater detention system. It is designed to store and release the first ½ inch of runoff from the site over a 24 hour period. After being discharged into the lagoon the stormwater will flow through a discharge drainage canal to an outfall structure situated at Brick Creek. Ultimately the flow will travel through Brick Creek to the Kiawah River and later connected to the Atlantic Ocean.

The original 2003 Phase One stormwater management plan was designed for future growth that included the an 85% impervious commerical lot in this portion of 'Basin A', which this land plan meets. The runoff from the Kiawah Senior Living project was accounted for in the 2003 and reaffirmed in the 2007 and 2013 Stormwater Management Reports as part of basin 'A' and listed under the commercial space in the CN calculation found on page # 1 & 2 of 7 of the Post-Development Peak Runoff section of the report. The updated CN calculations for Basin 'A' and Basin 'A-1', can be found in Appendix A of this report.

STORMWATER QUANTITY METHODOLOGY

The existing and proposed conditions will be analyzed using the Interconnected Channel and Pond Routing (ICPR) computer program developed by Streamline Technologies. The program is used to model rainfall and stormwater runoff and to perform hydraulic routing through the storm drainage system. The ICPR program is a FEMA approved model that has the ability to analyze complex interconnected drainage systems dynamically over extended time periods.

The hydrologic input data consists of information for each drainage basin, or subwatershed, within the project. Input variables include runoff curve number, rainfall distribution pattern, hydrograph peaking factor, area of each drainage basin, and time of concentration (see below section "Hydrology" for specifics on the values of these variables that were used in this model). The ICPR program generates runoff hydrographs for each subwatershed based on the user-specified variables. Hydrographs are generated by ICPR using the SCS Unit Hydrograph Method.

The model hydraulic input data consists of a system of nodes and links. Nodes represent locations where flows enter or exit the system, pipe or channel characteristics change, or where stage/storage/time relationships are provided. Links represent traditional types of hydraulic conveyance such as pipes, channels, drop structures, weirs, etc. The sizes, inverts, lengths, and Manning n values for all pipes connecting the lagoons are input into the model. In addition to pipe information, all lagoon and detention area stage-storage information and the respective outfall structure information is input into the model. The node and link conditions are analyzed within the model for a given storm, and flow conditions are determined.

The basic equation used by ICPR to route flows through the system is:

$$\Delta s = (Q_{in} - Q_{out})\ \Delta t$$

Where:

Δs	=	Change in storage for time step
Q_{in}	=	Flow into a node at time "t"
Q_{out}	=	Flow out of a node at time "t"
Δt	=	Length of time step; user defined range from 1.0 sec to 0.1 sec.

Hydrographs for each drainage area are merged within the ICPR program, and the hydrologic results are then combined with the hydraulic information to model the hydraulic interactions of the entire drainage system. The results include lagoon and detention area discharge rates and stage/storage information during the design storm.

For the design of the storm drainage system, a warning stage elevation is set for each lagoon and detention area and structure to assure no stormwater ponding. In addition, the ultimate discharge rate from the system cannot exceed the pre-developed runoff rate. Knowing these two factors, the drainage system is designed by trial and error.

HYDROLOGY

- SCS Unit Hydrograph Method is used.

- Amount of rainfall for each storm frequency is determined based on Technical Paper No. 40, Rainfall Frequency of the U.S., USDA Soil Conservation Service. The following design storms are used in the model simulations:

  - 2-year, 24-hour Design Storm = 4.6 inches
  - 10-year, 24-hour Design Storm = 6.8 inches
  - 25-year, 24-hour Design Storm = 7.8 inches
  - 50-year, 24-hour Design Storm = 8.8 inches
  - 100-year, 24-hour Design Storm = 10.0 inches

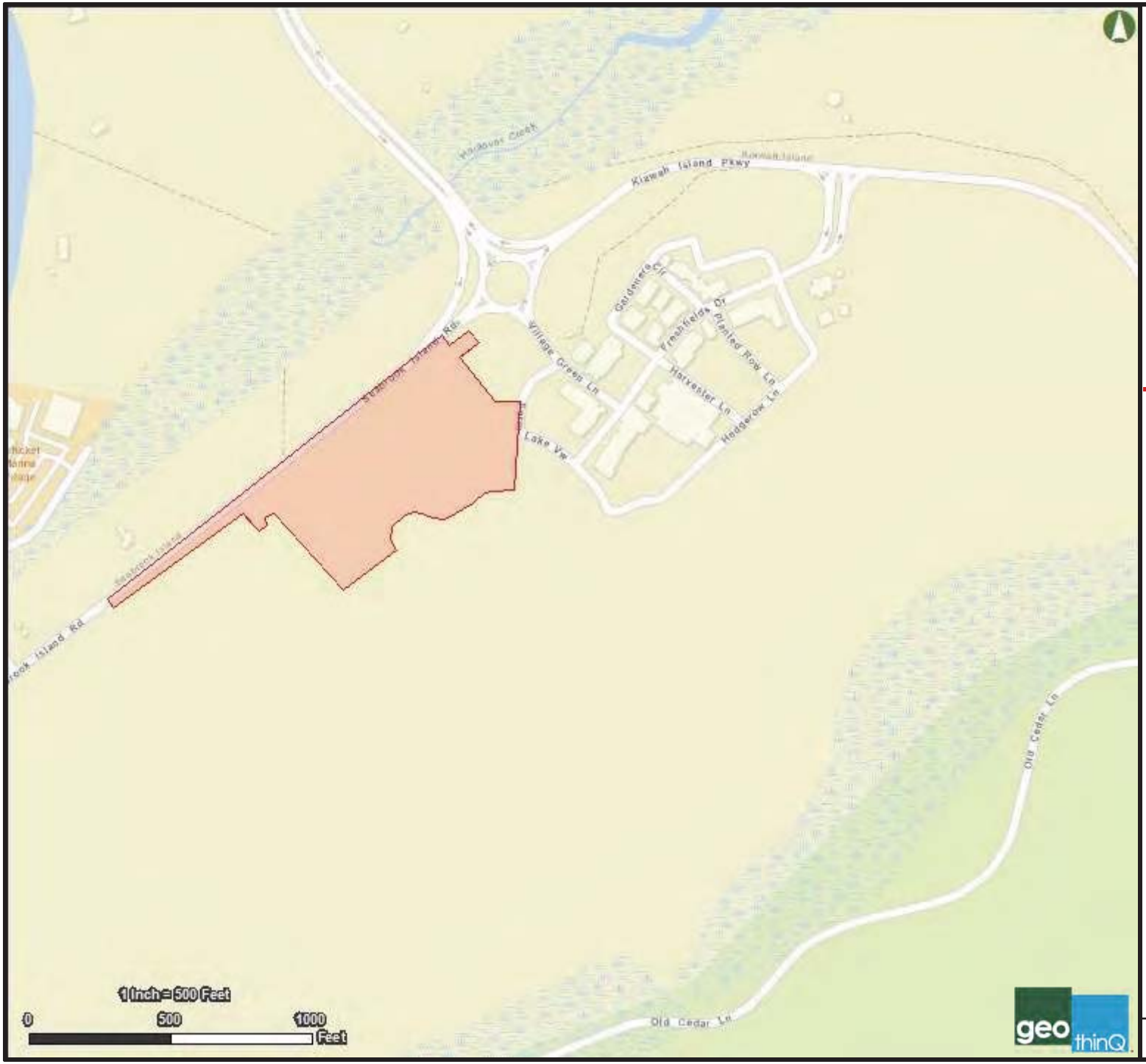
- SCS Type III Statistical Rainfall Distribution is used. This distribution pattern is determined by the Soil Conservation Service comparing regional rain-gage data.

- A 323 Hydrograph Peaking Factor is used instead of the Typical SCS 484 Peaking Factor. The 323 Factor is based on statistical analysis of actual rainfall and runoff data from the Southeastern United States, and is typical for coastal areas.

- The Curve Number assigned to each basin is based on recommended values listed in Technical Release No. 55, Urban Hydrology for Small Watersheds, USDA Natural Resources Conservation Service. For basins A, B, and C, the actual land uses and associated acreages were used to determine a composite value. However, basins D, E, and F will become a future golf course community and there are no curve number recommendations that cover that broad of a land use. Because of this, an assumption was made based on the Kiawah Island Course No. 2 development. The majority of the soils in that site were B and C soils and had an average curve number of 67 for the entire project. The soils in the future golf course community site are all B soils in the post-developed condition which will result in an overall lower curve number. Therefore, a conservative curve number of 67 was applied to the future golf course basins.

CONCLUSIONS

The post-developed runoff is detained on site and released at less than pre-developed rates. The storm drainage system design meets SCDHEC and Charleston County requirements.



THOMAS & HUTTON

SITE LOCATION MAP

KIAWAH SENIOR LIVING - FRESHFIELDS

08/13/2018

Site Boundary

FIGURE 1

This map was created using geothinQ | www.geothinQ.com | Mapping Smart Land Decisions

Soil Map—Charleston County Area, South Carolina

KIAWAH SENIOR LIVING

FIGURE 2

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Charleston County Area, South Carolina
Survey Area Data: Version 14, Oct 11, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Dec 15, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

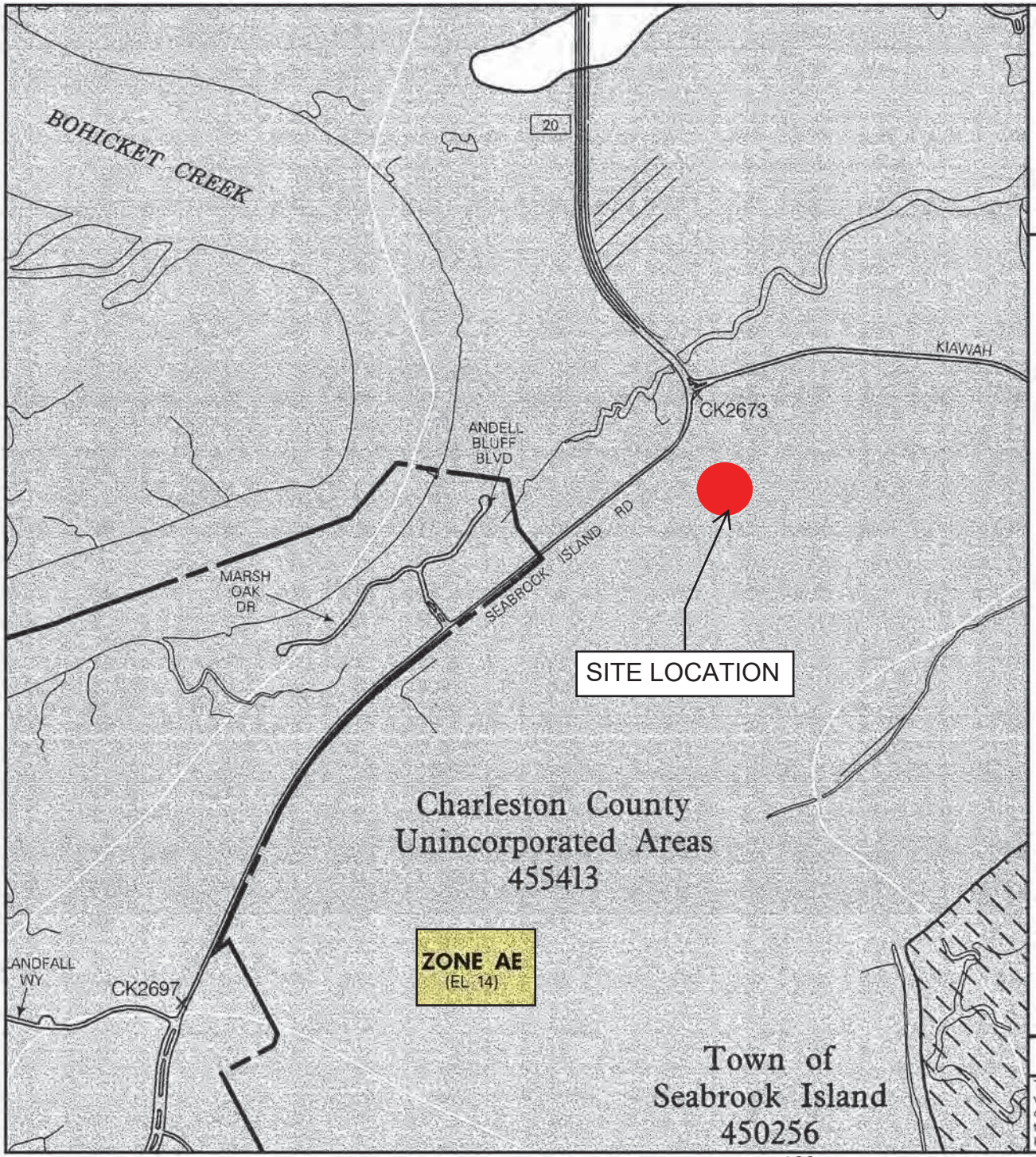
FIGURE 2

KIAWAH SENIOR LIVING

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ka	Kiawah loamy fine sand	5.9	54.6%
Sk	Seabrook loamy fine sand	4.9	45.4%
Totals for Area of Interest		**10.8**	**100.0%**

FIGURE 2



APPROXIMATE SCALE

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CHARLESTON COUNTY,
SOUTH CAROLINA
AND INCORPORATED AREAS

PANEL 785 OF 855

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHARLESTON COUNTY	455413	0785	J
KIAWAH ISLAND, TOWN OF	450257	0785	J
ROCKVILLE, TOWN OF	450249	0785	J
SEABROOK ISLAND, TOWN OF	450256	0785	J

-NOTE-

THIS MAP INCORPORATES APPROXIMATE BOUNDARIES OF COASTAL BARRIER RESOURCES SYSTEM UNITS AND/OR OTHERWISE PROTECTED AREAS ESTABLISHED UNDER THE COASTAL BARRIER IMPROVEMENT ACT OF 1990 (PL 101-591)

Notice to User: The MAP NUMBER shown below should be used when placing map orders; the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

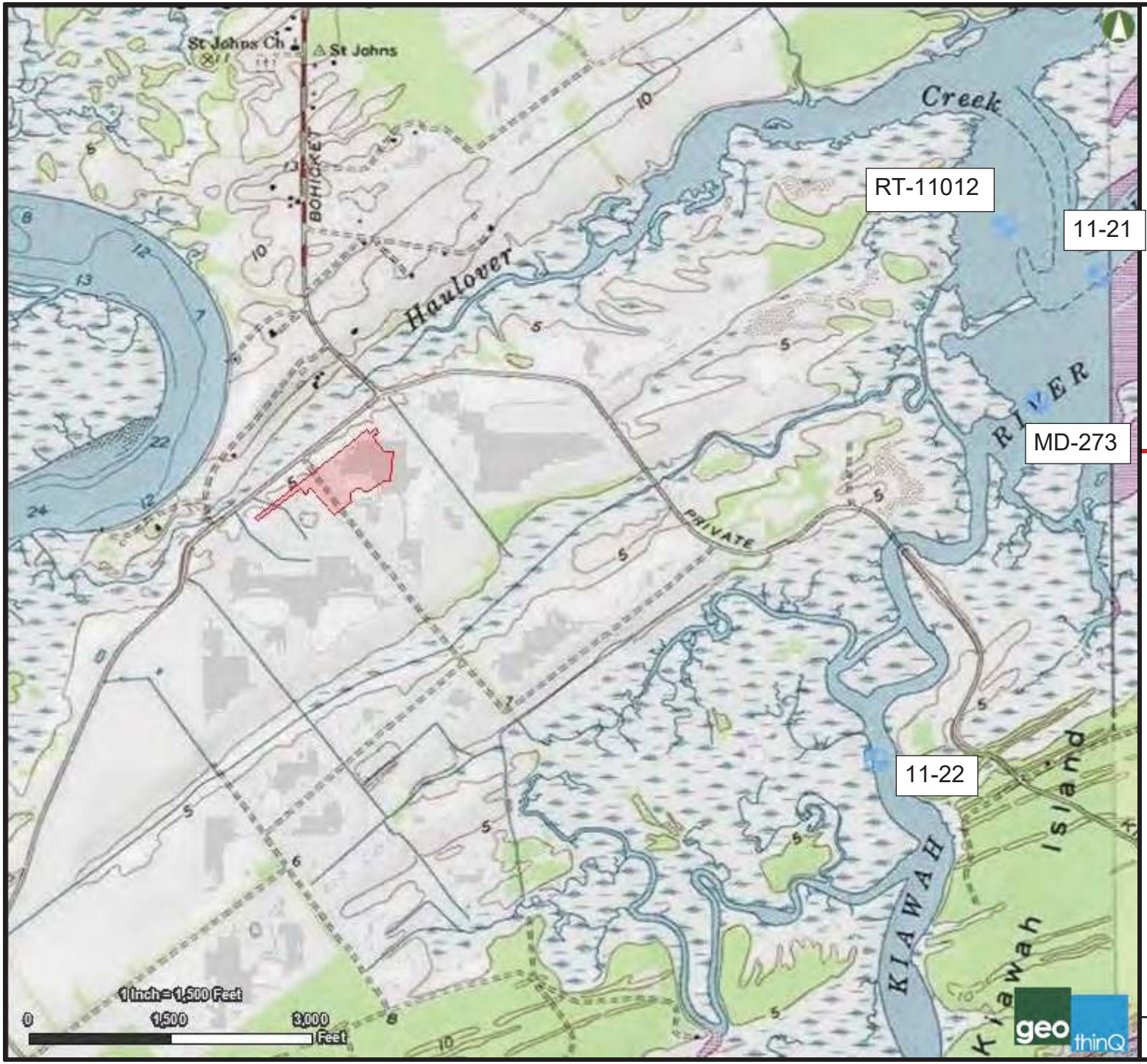
MAP NUMBER
45019C0785J

EFFECTIVE DATE:
NOVEMBER 17, 2004

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

FIGURE 3



THOMAS & HUTTON

WATER QUALITY STATIONS

KIAWAH SENIOR LIVING - FRESHFIELDS

08/13/2018

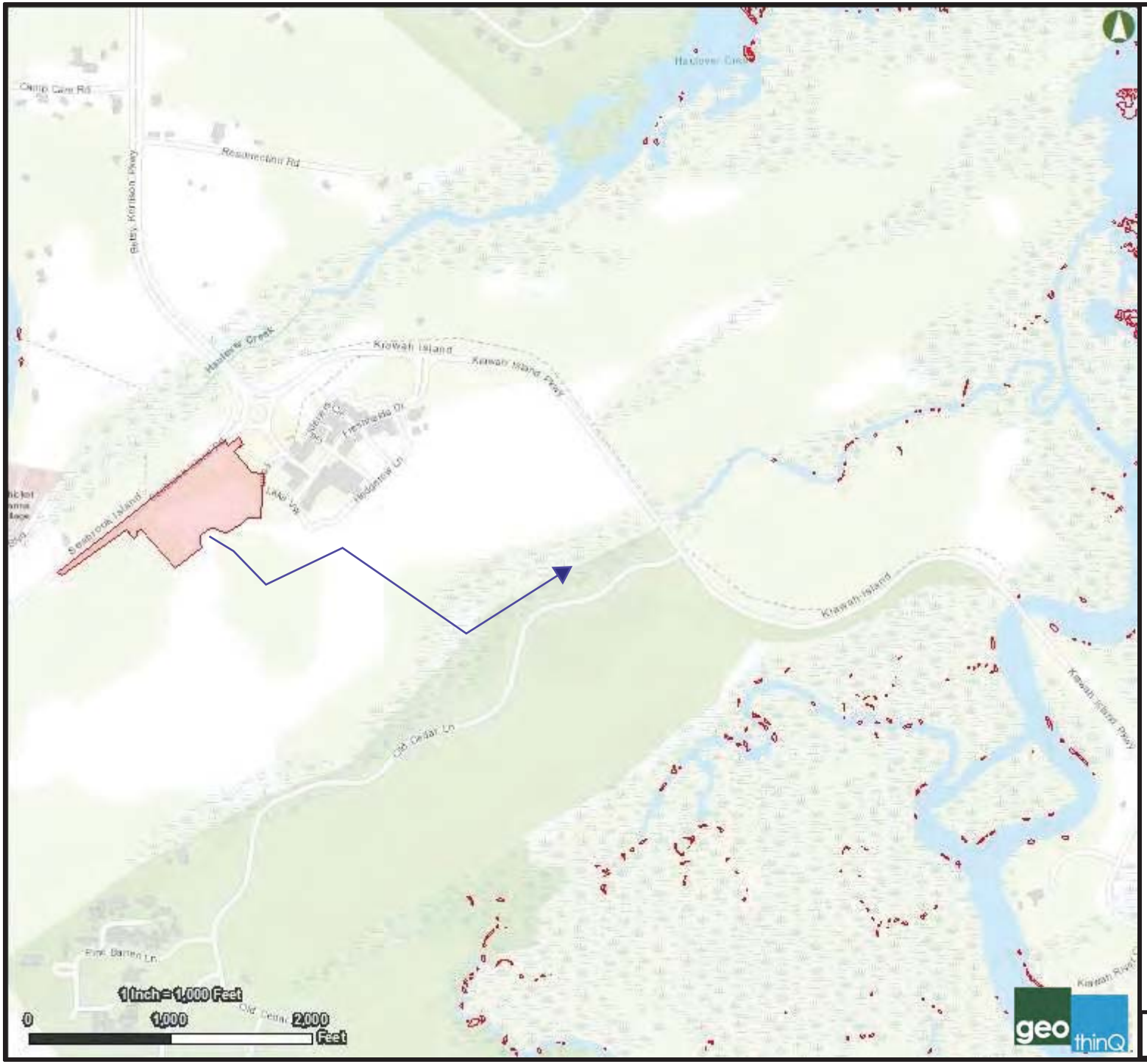
Impaired

Not on List

Site Boundary

FIGURE 4

This map was created using geothinQ | www.geothinQ.com | Mapping Smart Land Decisions



THOMAS & HUTTON

DRAINAGE FLOW PATH

KIAWAH SENIOR LIVING - FRESHFIELDS

08/13/2018

Shellfish Live 2015

Site Boundary

Drainage Flow Path

FIGURE 5

This map was created using geothinQ | www.geothinQ.com | Mapping Smart Land Decisions

Freshfields Village – Kiawah Senior Living Update

Charleston County, South Carolina

Appendix A

Time of Concentration and Curve Number Calculations

Prepared By

Thomas & Hutton
682 Johnnie Dodds Blvd. / Mt. Pleasant / SC / 29464

J-27151.0000

STORMWATER DESIGN CONSIDERATIONS FOR FRESHFIELDS VILLAGE

PREPARED FOR: Kiawah Resort Associates, LP
PREPARED BY: Thomas & Hutton Engineering Co.
DATE: February 19, 2003
REVISED: March 5, 2007

CALCULATE PREDEVELOPMENT PEAK RUNOFF - 10YR STORM EVENT

Determine Time of Concentration

Use Travel Time Concept:

Overland Flow:

t = ((0.007(nl)^0.8)/((P2^0.5)*(S^0.4)))x 60

where: t = Travel time for Overland Flow (min)
n = Manning's coefficient - from TR-55
l = Length of flow (ft)
P2 = 2-yr rainfall depth (in)
S = Hydraulic slope (ft/ft)

n =	0.15	
l =	300	ft
P2 =	4.6	in
S =	0.005	ft/ft
t =	34.3	min

Shallow Concentrated Flow

t = l/60v

where: t = Travel time for shallow concentrated flow
l = Length of flow (ft)
v = Velocity (ft/s) - From TR - 55

l =	2708	
v =	1.2	ft/s
t =	37.6	min

Therefore: tc = 71.9 min

Determine Composite Curve Number

Description	HSG	CN	A (ac)	C x A
Pasture	D	84	162.08	13614.72
			162.08	13614.72

Composite Curve Number = 84

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	237.83	**12.78**	**4.95**

CALCULATE PREDEVELOPMENT PEAK RUNOFF - 2YR STORM EVENT

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	139.69	**12.78**	**2.91**

STORMWATER DESIGN CONSIDERATIONS FOR FRESHFIELDS VILLAGE

PREPARED FOR: KRA DEVELOPMENT, LP
PREPARED BY: Thomas & Hutton Engineering Co.
DATE: February 19, 2003
REVISED: March 5, 2007
REVISED: August 9, 2018

BASIN A

CALCULATE POST-DEVELOPMENT PEAK RUNOFF - 10YR STORM EVENT

Determine Time of Concentration
Use Travel Time Concept:

Overland Flow:

t = ((0.007(nl)^0.8)/((P2^0.5)*(S^0.4)))x 60

where: t = Travel time for Overland Flow (min)
n = Manning's coefficient - from TR-55
l = Length of flow (ft)
P2 = 2-yr rainfall depth (in)
S = Hydraulic slope (ft/ft)

n =	0.15	
l =	300	ft
P2 =	4.6	in
S =	0.005	ft/ft
t =	34.3	min

Shallow Concentrated Flow:

t = l/60v

where: t=Travel time for Shallow Concentrated Flow (min)
l=Length of flow (ft)
S=Average watercourse slope (ft/ft)
v=Velocity (ft/s)- From TR-55

l=	153	ft
S=	0.005	Unpaved
v=	1.14	ft/s
t=	2.24	min

Therefore: tc = 36.5 min

Determine Composite Curve Number

Open Space (Grass-Fair)	B	69		0.00
Commercial (85% Imp)	B	92	23.95	2203.40
Wet Ponds or Saturated Wetlands		98	11.90	1166.20
			35.85	3369.6

Composite Curve Number = 94

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	93.52	**12.49**	**6.09**

CALCULATE POST-DEVELOPMENT PEAK RUNOFF - 2YR STORM EVENT

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	61.44	**12.49**	**3.913**

BASIN A-1

CALCULATE POST-DEVELOPMENT PEAK RUNOFF - 10YR STORM EVENT

Determine Time of Concentration

Use Travel Time Concept:

Overland Flow:

$t = ((0.007(nl)^{0.8})/((P2^{0.5})*(S^{0.4}))) \times 60$

where: t = Travel time for Overland Flow (min)
n = Manning's coefficient - from TR-55
l = Length of flow (ft)
P2 = 2-yr rainfall depth (in)
S = Hydraulic slope (ft/ft)

n =	0.15	
l =	100	ft
P2 =	4.6	in
S =	0.005	ft/ft
t =	14.2	min

Shallow Concentrated Flow:

t = l/60v

where: t=Travel time for Shallow Concentrated Flow (min)
l=Length of flow (ft)
S=Average watercourse slope (ft/ft)
v=Velocity (ft/s)- From TR-55

l=	214	ft
S=	0.005	Unpaved
v=	1.14	ft/s
t=	3.13	min

Pipe Flow:

t = l/60v

where: t=Travel time for Shallow Concentrated Flow (min)
l=Length of flow (ft)
S=Average watercourse slope (ft/ft)
v=Velocity (ft/s)- From TR-55

l=	273	ft
v=	2.00	ft/s
t=	2.28	min

Therefore: tc = 19.6 min

Determine Composite Curve Number

Description	HSG	CN	A (ac)	C x A
Commercial (72% Imp.)	B	88	2.87	252.56
			2.87	252.56

Composite Curve Number = 88

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	9.37	**12.33**	**5.4**

CALCULATE POST-DEVELOPMENT PEAK RUNOFF - 2YR STORM EVENT

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	5.85	**12.33**	**3.29**

BASIN B

CALCULATE POST - DEVELOPMENT PEAK RUNOFF - 10YR STORM EVENT

Determine Time of Concentration

Use Travel Time Concept:

Overland Flow:

t = (0.007(nl)^0.8)/((P2^0.5)*(S^0.4))

n =	0.15	
l =	139	ft
P2 =	4.6	in
S =	0.005	ft/ft
t =	18.5	min

Shallow Concentrated Flow:

t = l/60v

l=	17	ft
S=	0.010	Paved
v=	2.03	ft/s
t=	0.14	min

Pipe Flow:

t=1/60v

where: t=Travel time (min)
l=Length of flow (ft)
v=Velocity (ft/s)-Assume 2 ft/s

l=	1125	ft
v=	2.00	ft/s
t=	9.38	min

Therefore: tc = 28.0 min

Determine Composite Curve Number

Description	HSG	CN	A (ac)	C x A
Open Space (Grass-Fair)	B	69	4.25	293.25
Commercial	B	92	4.50	414.00
			8.75	707.25

Composite Curve Number = 81

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	21.35	**12.38**	**4.62**

CALCULATE POST - DEVELOPMENT PEAK RUNOFF - 2YR STORM EVENT

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	12.25	**12.38**	**2.63**

BASIN C

CALCULATE POST - DEVELOPMENT PEAK RUNOFF - 10YR STORM EVENT

Determine Time of Concentration

Use Travel Time Concept:

Overland Flow:

t = (0.007(nl)^0.8)/((P2^0.5)*(S^0.4))

n =	0.15	
l =	130	ft
P2 =	4.6	in
S =	0.005	ft/ft
t =	17.6	min

Pipe Flow:

t=1/60v

l=	1533	ft
v=	2.00	ft/s
t=	12.78	min

Therefore: tc = 30.3 min

Determine Composite Curve Number

Description	HSG	CN	A (ac)	C x A
Open Space (Grass-Fair)	B	69	5.40	372.60
Commercial	B	92	6.31	580.52
			11.71	953.12

Composite Curve Number = 81

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	28.55	**12.39**	**4.84**

CALCULATE POST - DEVELOPMENT PEAK RUNOFF - 2YR STORM EVENT

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	16.75	**12.39**	**2.82**

BASIN D

CALCULATE POST - DEVELOPMENT PEAK RUNOFF - 10YR STORM EVENT

Determine Time of Concentration

Use Travel Time Concept:

Overland Flow:

t = (0.007(nl)^0.8)/((P2^0.5)*(S^0.4))

n =	0.15	
l =	300	ft
P2 =	4.6	in
S =	0.01	ft/ft
t =	26.0	min

Pipe Flow:

t=1/60v

l=	752	ft
v=	2.00	ft/s
t=	6.27	min

Therefore: tc = 32.2 min

Determine Composite Curve Number

Description	HSG	CN	A (ac)	C x A
Open Space (Grass-Good)	B	61	0	0
SFR - 1/3 Acre	B	72	0	0
Lagoon		100	0	0
			58.31	0

Composite Curve Number = 67 (See attached explanation)

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	89.73	**12.45**	**3.15**

CALCULATE POST - DEVELOPMENT PEAK RUNOFF - 2YR STORM EVENT

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	41.44	**12.45**	**1.53**

BASIN E

CALCULATE POST - DEVELOPMENT PEAK RUNOFF - 10YR STORM EVENT

Determine Time of Concentration

Use Travel Time Concept:

Overland Flow:

t = (0.007(nl)^0.8)/((P2^0.5)*(S^0.4))

n =	0.15	
l =	300	ft
P2 =	4.6	in
S =	0.01	ft/ft
t =	26.0	min

Pipe Flow:

t=1/60v

l=	589	ft
v=	2.00	ft/s
t=	4.91	min

Therefore: tc = 30.9 min

Determine Composite Curve Number

Description	HSG	CN	A (ac)	C x A
Open Space (Grass-Good)	B	61	0	0
SFR - 1/3 Acre	B	72	0	0
Lagoon		100	0	0
			11.30	0

Composite Curve Number = 67 (See attached explanation)

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	17.75	**12.43**	**3.15**

CALCULATE POST - DEVELOPMENT PEAK RUNOFF - 2YR STORM EVENT

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	8.19	**12.43**	**1.53**

BASIN F

CALCULATE POST - DEVELOPMENT PEAK RUNOFF - 10YR STORM EVENT

Determine Time of Concentration

Use Travel Time Concept:

Overland Flow:

t = (0.007(nl)^0.8)/((P2^0.5)*(S^0.4))

n =	0.15	
l =	300	ft
P2 =	4.6	in
S =	0.01	ft/ft
t =	26.0	min

Pipe Flow:

t=1/60v

l=	1222	ft
v=	2.00	ft/s
t=	10.18	min

Therefore: tc = 36.2 min

Determine Composite Curve Number

Description	HSG	CN	A (ac)	C x A
Open Space (Grass-Good)	B	61	0	0
SFR - 1/3 Acre	B	72	0	0
Lagoon		100	0	0
			35.52	0

Composite Curve Number = 67 (See attached explanation)

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	50.91	**12.47**	**3.15**

CALCULATE POST - DEVELOPMENT PEAK RUNOFF - 2YR STORM EVENT

Calculate Peak Runoff Rate

Use SCS Unit Hydrograph Method (PRF=323) via ICPR Computer Program

Results:	Peak Q (cfs)	Time (hrs)	Volume (inches)
	23.32	**12.47**	**1.53**

Freshfields Village – Kiawah Senior Living Update

Charleston County, South Carolina

Appendix B

Pre-Development ICPR Model and Simulation Results

Prepared By

Thomas & Hutton
682 Johnnie Dodds Blvd. / Mt. Pleasant / SC / 29464

J-27151.0000

```
================================================================================
==== Basins ====================================================================
================================================================================

         Name: Basin 1                 Node: Bndry                 Status: Onsite
        Group: BASE                    Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh323                  Peaking Factor: 323.0
          Rainfall File: Scsiii              Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                 Time of Conc(min): 71.90
              Area(ac): 162.080                  Time Shift(hrs): 0.00
          Curve Number: 84.00               Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00



================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: 002Pre
     Filename: N:\15275\dsgn\ICPR\002Pre.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Scsiii
    Rainfall Amount(in): 4.60

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.00

--------------------------------------------------------------------------------------------------------------
         Name: 010Pre
     Filename: N:\15275\dsgn\ICPR\010Pre.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Scsiii
    Rainfall Amount(in): 6.80

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.00

--------------------------------------------------------------------------------------------------------------
         Name: 025Pre
     Filename: N:\15275\dsgn\2007-03-01\025Pre.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Scsiii
    Rainfall Amount(in): 7.80

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.00

--------------------------------------------------------------------------------------------------------------
         Name: 050Pre
     Filename: N:\15275\dsgn\ICPR\050Pre.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Scsiii
    Rainfall Amount(in): 8.80

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.00

--------------------------------------------------------------------------------------------------------------
         Name: 100Pre
     Filename: N:\15275\dsgn\2007-03-01\100Pre.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Scsiii
    Rainfall Amount(in): 10.00

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.00
```

J-15275 Freshfields Village Pre-Development 2/19/03
Revised 3/5/07
Basin Max Report

Simulation	Basin	Group	Time Max hrs	Flow Max cfs	Volume in	Volume ft3
002Pre	Basin 1	BASE	12.83	140.065	2.904	1708612
010Pre	Basin 1	BASE	12.83	238.342	4.946	2909748
025Pre	Basin 1	BASE	12.83	283.366	5.898	3470077
050Pre	Basin 1	BASE	12.83	328.389	6.859	4035731
100Pre	Basin 1	BASE	12.83	382.330	8.022	4719591

Freshfields Village – Kiawah Senior Living Update

Charleston County, South Carolina

Appendix C

Post-Development ICPR Model and Simulation Results

Prepared By

Thomas & Hutton
682 Johnnie Dodds Blvd. / Mt. Pleasant / SC / 29464

J-27151.0000

```
================================================================================
==== Basins ====================================================================
================================================================================

        Name: Basin A                 Node: Pond 1                Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File: Scsiii              Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                 Time of Conc(min): 36.50
            Area(ac): 35.850                    Time Shift(hrs): 0.00
        Curve Number: 94.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00


--------------------------------------------------------------------------------
        Name: Basin A-1               Node: Node 1                Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File:                    Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                 Time of Conc(min): 19.60
            Area(ac): 2.870                     Time Shift(hrs): 0.00
        Curve Number: 88.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00


--------------------------------------------------------------------------------
        Name: Basin B                 Node: Node 1                Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File: Scsiii              Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                 Time of Conc(min): 28.00
            Area(ac): 8.750                     Time Shift(hrs): 0.00
        Curve Number: 81.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00


--------------------------------------------------------------------------------
        Name: Basin C                 Node: Node 5                Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File: Scsiii              Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                 Time of Conc(min): 30.30
            Area(ac): 11.710                    Time Shift(hrs): 0.00
        Curve Number: 83.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00


--------------------------------------------------------------------------------
        Name: Basin D                 Node: Pond 1                Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File: Scsiii              Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                 Time of Conc(min): 32.20
            Area(ac): 58.300                    Time Shift(hrs): 0.00
        Curve Number: 67.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00


--------------------------------------------------------------------------------
        Name: Basin E                 Node: Node 5                Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File: Scsiii              Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                 Time of Conc(min): 30.90
            Area(ac): 11.300                    Time Shift(hrs): 0.00
        Curve Number: 67.00                Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00


--------------------------------------------------------------------------------
        Name: Basin F                 Node: Node 5                Status: Onsite
       Group: BASE                    Type: SCS Unit Hydrograph CN
```

Unit Hydrograph: Uh323 Peaking Factor: 323.0
Rainfall File: Scsiii Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 36.20
Area(ac): 35.520 Time Shift(hrs): 0.00
Curve Number: 67.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==========
==== Nodes ==========
==========

Name: Bndry Base Flow(cfs): 0.000 Init Stage(ft): 3.200
Group: BASE Warn Stage(ft): 3.200
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	3.200
24.00	3.200

Name: Node 1 Base Flow(cfs): 0.000 Init Stage(ft): 3.200
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

Stage(ft)	Area(ac)
0.000	0.0100
6.000	0.0800

Name: Node 4 Base Flow(cfs): 0.000 Init Stage(ft): 3.200
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

Stage(ft)	Area(ac)
0.000	0.0100
10.000	0.0100

Name: Node 5 Base Flow(cfs): 0.000 Init Stage(ft): 3.200
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

Stage(ft)	Area(ac)
0.000	0.0100
10.000	0.0100

Name: Node 6 Base Flow(cfs): 0.000 Init Stage(ft): 3.200
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

Stage(ft)	Area(ac)
0.000	0.0100
10.000	0.0100

Name: Node 7 Base Flow(cfs): 0.000 Init Stage(ft): 3.200
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

Stage(ft)	Area(ac)
0.000	0.0100
10.000	0.0100

```
-------------------------------------------------------------------------------------------
      Name: Pond 1             Base Flow(cfs): 0.000          Init Stage(ft): 3.200
     Group: BASE                                             Warn Stage(ft): 6.000
      Type: Stage/Area


      Stage(ft)        Area(ac)
--------------- ---------------
          3.000         10.1000
          4.000         10.7000
          5.000         11.3000
          6.000         11.9000

===========================================================================================
==== Pipes ================================================================================
===========================================================================================

         Name: Pipe 2              From Node: Pond 1             Length(ft): 60.00
        Group: BASE                  To Node: Node 4                  Count: 1
                                                          Friction Equation: Average Conveyance
               UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular       Circular                             Flow: Both
     Span(in): 60.00          60.00                    Entrance Loss Coef: 0.00
     Rise(in): 60.00          60.00                        Exit Loss Coef: 0.50
   Invert(ft): -2.500         -2.500                       Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Groove end projecting

Downstream FHWA Inlet Edge Description:
Circular Concrete: Groove end projecting


-------------------------------------------------------------------------------------------
         Name: Pipe 3              From Node: Node 6             Length(ft): 10.00
        Group: BASE                  To Node: Node 7                  Count: 1
                                                          Friction Equation: Average Conveyance
               UPSTREAM       DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular       Circular                             Flow: Both
     Span(in): 60.00          60.00                    Entrance Loss Coef: 0.00
     Rise(in): 60.00          60.00                        Exit Loss Coef: 0.50
   Invert(ft): -2.500         -2.500                       Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dn
 Bot Clip(in): 0.000          0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Groove end projecting

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall


-------------------------------------------------------------------------------------------
         Name: Pipe B              From Node: Node 1             Length(ft): 548.00
        Group: BASE                  To Node: Pond 1                  Count: 1
                                                          Friction Equation: Automatic
               UPSTREAM       DOWNSTREAM                Solution Algorithm: Most Restrictive
     Geometry: Circular       Circular                             Flow: Both
     Span(in): 42.00          42.00                    Entrance Loss Coef: 0.00
     Rise(in): 42.00          42.00                        Exit Loss Coef: 1.00
   Invert(ft): 0.000          0.000                        Bend Loss Coef: 0.00
  Manning's N: 0.013000       0.013000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000          0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Groove end projecting

Downstream FHWA Inlet Edge Description:
Circular Concrete: Groove end projecting
```

```
================================================================================
==== Channels ==================================================================
================================================================================

         Name: CH 3                From Node: Node 4             Length(ft): 959.00
        Group: BASE                  To Node: Node 5                  Count: 1

                UPSTREAM       DOWNSTREAM                Friction Equation: Average Conveyance
     Geometry: Trapezoidal     Trapezoidal              Solution Algorithm: Automatic
    Invert(ft): 0.000          0.000                                 Flow: Both
 TClpInitZ(ft): 9999.000       9999.000                Contraction Coef: 0.000
   Manning's N: 0.030000       0.030000                  Expansion Coef: 0.000
  Top Clip(ft): 0.000          0.000                  Entrance Loss Coef: 0.000
  Bot Clip(ft): 0.000          0.000                      Exit Loss Coef: 0.000
     Main XSec:                                       Outlet Ctrl Spec: Use dc or tw
  AuxElev1(ft):                                         Inlet Ctrl Spec: Use dn
     Aux XSec1:                                     Stabilizer Option: None
  AuxElev2(ft):
     Aux XSec2:
 Top Width(ft):
     Depth(ft):
 Bot Width(ft): 4.000          4.000
  LtSdSlp(h/v): 3.00           3.00
  RtSdSlp(h/v): 3.00           3.00


--------------------------------------------------------------------------------------------------------
         Name: CH 4                From Node: Node 5             Length(ft): 892.00
        Group: BASE                  To Node: Node 6                  Count: 1

                UPSTREAM       DOWNSTREAM                Friction Equation: Average Conveyance
     Geometry: Trapezoidal     Trapezoidal              Solution Algorithm: Automatic
    Invert(ft): 0.000          0.000                                 Flow: Both
 TClpInitZ(ft): 9999.000       9999.000                Contraction Coef: 0.000
   Manning's N: 0.030000       0.030000                  Expansion Coef: 0.000
  Top Clip(ft): 0.000          0.000                  Entrance Loss Coef: 0.000
  Bot Clip(ft): 0.000          0.000                      Exit Loss Coef: 0.000
     Main XSec:                                       Outlet Ctrl Spec: Use dc or tw
  AuxElev1(ft):                                         Inlet Ctrl Spec: Use dn
     Aux XSec1:                                     Stabilizer Option: None
  AuxElev2(ft):
     Aux XSec2:
 Top Width(ft):
     Depth(ft):
 Bot Width(ft): 4.000          4.000
  LtSdSlp(h/v): 3.00           3.00
  RtSdSlp(h/v): 3.00           3.00


================================================================================
==== Weirs =====================================================================
================================================================================

         Name: Weir 1              From Node: Node 7
        Group: BASE                  To Node: Bndry
         Flow: Both                    Count: 1
         Type: Vertical: Mavis      Geometry: Rectangular

                  Span(in): 204.00
                  Rise(in): 15.60
                Invert(ft): 3.200
       Control Elevation(ft): 3.200
                                          TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
        Weir Discharge Coef: 3.200
     Orifice Discharge Coef: 0.600


--------------------------------------------------------------------------------------------------------
         Name: Weir 2              From Node: Node 7
        Group: BASE                  To Node: Bndry
         Flow: Both                    Count: 1
         Type: Horizontal           Geometry: Rectangular

                  Span(in): 108.00
                  Rise(in): 49.00
                Invert(ft): 4.500
       Control Elevation(ft): 4.500
                                          TABLE
            Bottom Clip(in): 0.000
```

```
               Top Clip(in): 0.000
         Weir Discharge Coef: 3.200
      Orifice Discharge Coef: 0.600



================================================================================
==== Hydrology Simulations =====================================================
================================================================================

         Name: 002Post
     Filename: Z:\27151\27151.0000\Engineering\Calculations and Reports\Storm Water\ICPR\002Post.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Scsiii
    Rainfall Amount(in): 4.60

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.00

--------------------------------------------------------------------------------
         Name: 010Post
     Filename: Z:\27151\27151.0000\Engineering\Calculations and Reports\Storm Water\ICPR\010Post.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Scsiii
    Rainfall Amount(in): 6.80

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.00

--------------------------------------------------------------------------------
         Name: 025Post
     Filename: Z:\27151\27151.0000\Engineering\Calculations and Reports\Storm Water\ICPR\025Post.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Scsiii
    Rainfall Amount(in): 7.80

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.00

--------------------------------------------------------------------------------
         Name: 050Post
     Filename: Z:\27151\27151.0000\Engineering\Calculations and Reports\Storm Water\ICPR\050Post.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Scsiii
    Rainfall Amount(in): 8.80

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.00

--------------------------------------------------------------------------------
         Name: 100Post
     Filename: Z:\27151\27151.0000\Engineering\Calculations and Reports\Storm Water\ICPR\100Post.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Scsiii
    Rainfall Amount(in): 10.00

Time(hrs)       Print Inc(min)
--------------- ---------------
24.000          5.00

================================================================================
==== Routing Simulations =======================================================
================================================================================

         Name: 002Post             Hydrology Sim: 002Post
     Filename: Z:\27151\27151.0000\Engineering\Calculations and Reports\Storm Water\ICPR\002Post.I32

      Execute: Yes         Restart: No           Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                    Delta Z Factor: 0.05000
```

```
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                   End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 300.0000
        Boundary Stages:                         Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
12.000          30.000
15.000          5.000
24.000          30.000

Group           Run
--------------- -----
BASE            Yes


------------------------------------------------------------------------------------------------
         Name: 010Post             Hydrology Sim: 010Post
     Filename: Z:\27151\27151.0000\Engineering\Calculations and Reports\Storm Water\ICPR\010Post.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                    Delta Z Factor: 0.05000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                   End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 300.0000
        Boundary Stages:                         Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
12.000          30.000
15.000          5.000
24.000          30.000

Group           Run
--------------- -----
BASE            Yes


------------------------------------------------------------------------------------------------
         Name: 025Post             Hydrology Sim: 025Post
     Filename: Z:\27151\27151.0000\Engineering\Calculations and Reports\Storm Water\ICPR\025Post.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                    Delta Z Factor: 0.05000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                   End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 300.0000
        Boundary Stages:                         Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
12.000          30.000
15.000          5.000
24.000          30.000

Group           Run
--------------- -----
BASE            Yes


------------------------------------------------------------------------------------------------
         Name: 050Post             Hydrology Sim: 050Post
     Filename: Z:\27151\27151.0000\Engineering\Calculations and Reports\Storm Water\ICPR\050Post.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 0.10                    Delta Z Factor: 0.05000
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                   End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 300.0000
        Boundary Stages:                         Boundary Flows:
```

Time(hrs)	Print Inc(min)
12.000	30.000
15.000	5.000
24.000	30.000

Group	Run
BASE	Yes

Name: 100Post Hydrology Sim: 100Post
Filename: Z:\27151\27151.0000\Engineering\Calculations and Reports\Storm Water\ICPR\100Post.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 0.10 Delta Z Factor: 0.05000
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 24.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 300.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
12.000	30.000
15.000	5.000
24.000	30.000

Group	Run
BASE	Yes

J-27151.0000 (J-15275)
Freshfields Village (Kiawah Senior Living Update)
March 19, 2003
Revised August 9, 2018
Node Max Report

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Bndry	BASE	002Post	0.00	3.20	3.20	0.0000	0	13.74	47.32	0.00	0.00
Bndry	BASE	010Post	0.00	3.20	3.20	0.0000	0	13.68	88.39	0.00	0.00
Bndry	BASE	025Post	0.00	3.20	3.20	0.0000	0	13.45	108.09	0.00	0.00
Bndry	BASE	050Post	0.00	3.20	3.20	0.0000	0	13.45	127.01	0.00	0.00
Bndry	BASE	100Post	0.00	3.20	3.20	0.0000	0	13.37	148.13	0.00	0.00
Node 1	BASE	002Post	13.91	4.34	6.00	-0.0031	2688	12.33	17.73	12.36	16.96
Node 1	BASE	010Post	13.79	5.20	6.00	0.0031	3125	12.33	30.20	12.37	28.49
Node 1	BASE	025Post	13.73	5.60	6.00	0.0040	3330	12.33	35.92	12.38	33.64
Node 1	BASE	050Post	13.72	6.01	6.00	0.0049	3540	12.33	41.63	12.39	38.68
Node 1	BASE	100Post	12.52	6.52	6.00	0.0050	3797	12.33	48.48	12.40	44.57
Node 4	BASE	002Post	13.87	4.28	6.00	-0.0043	14654	14.48	33.56	14.50	33.90
Node 4	BASE	010Post	13.66	5.02	6.00	-0.0042	16772	14.48	60.63	14.50	61.40
Node 4	BASE	025Post	13.58	5.34	6.00	-0.0040	17709	14.47	73.22	14.49	74.20
Node 4	BASE	050Post	13.53	5.67	6.00	0.0037	18655	14.53	85.44	14.54	86.70
Node 4	BASE	100Post	13.48	6.07	6.00	0.0038	19803	14.59	99.02	14.59	100.60
Node 5	BASE	002Post	13.81	4.25	6.00	0.0018	27745	13.55	47.34	13.74	47.14
Node 5	BASE	010Post	13.59	4.98	6.00	0.0027	31776	12.67	94.47	13.53	87.96
Node 5	BASE	025Post	13.52	5.31	6.00	0.0031	33575	13.28	108.56	13.45	107.70
Node 5	BASE	050Post	13.48	5.64	6.00	0.0029	35405	12.66	137.99	13.39	126.37
Node 5	BASE	100Post	13.44	6.04	6.00	0.0031	37631	12.88	150.79	13.37	147.82
Node 6	BASE	002Post	13.82	4.20	6.00	0.0012	13498	13.74	47.14	13.82	47.08
Node 6	BASE	010Post	13.60	4.89	6.00	0.0026	15377	13.53	87.96	13.60	87.88
Node 6	BASE	025Post	13.53	5.21	6.00	0.0027	16227	13.45	107.70	13.52	107.58
Node 6	BASE	050Post	13.48	5.54	6.00	0.0029	17104	13.39	126.37	13.48	126.23
Node 6	BASE	100Post	13.44	5.94	6.00	0.0028	18182	13.37	147.82	13.44	147.62
Node 7	BASE	002Post	13.74	4.11	6.00	-0.0077	437	13.82	47.08	13.74	47.32
Node 7	BASE	010Post	13.68	4.58	6.00	0.0070	437	13.60	87.88	13.68	88.39
Node 7	BASE	025Post	13.45	4.73	6.00	0.0070	437	13.52	107.58	13.45	108.09
Node 7	BASE	050Post	13.45	4.88	6.00	0.0069	437	13.48	126.23	13.45	127.01
Node 7	BASE	100Post	13.37	5.03	6.00	0.0070	437	13.44	147.62	13.37	148.13
Pond 1	BASE	002Post	13.97	4.33	6.00	0.0013	474755	12.42	118.69	14.48	33.56
Pond 1	BASE	010Post	13.88	5.17	6.00	0.0030	496823	12.42	210.42	14.48	60.63
Pond 1	BASE	025Post	13.86	5.57	6.00	0.0031	507091	12.42	253.83	14.47	73.22
Pond 1	BASE	050Post	13.86	5.97	6.00	0.0031	517526	12.42	297.78	14.53	85.44
Pond 1	BASE	100Post	13.88	6.45	6.00	0.0031	530234	12.42	350.99	14.59	99.02

J-27151.0000 (J-15275)
Freshfields Village (Kiawah Senior Living Update)
March 19, 2003
Revised August 9, 2018
Basin Max Report

Simulation	Basin	Group	Time Max hrs	Flow Max cfs	Volume in	Volume ft3
002Post	Basin A	BASE	12.49	61.44	3.913	509182
010Post	Basin A	BASE	12.49	93.52	6.088	792305
025Post	Basin A	BASE	12.49	108.00	7.081	921545
050Post	Basin A	BASE	12.41	122.46	8.076	1050971
100Post	Basin A	BASE	12.41	139.77	9.271	1206456
002Post	Basin A-1	BASE	12.33	5.85	3.292	34294
010Post	Basin A-1	BASE	12.33	9.37	5.402	56274
025Post	Basin A-1	BASE	12.33	10.96	6.375	66420
050Post	Basin A-1	BASE	12.33	12.54	7.355	76622
100Post	Basin A-1	BASE	12.33	14.43	8.535	88917
002Post	Basin B	BASE	12.38	12.25	2.634	83675
010Post	Basin B	BASE	12.38	21.35	4.619	146710
025Post	Basin B	BASE	12.38	25.54	5.553	176391
050Post	Basin B	BASE	12.38	29.73	6.500	206463
100Post	Basin B	BASE	12.38	34.76	7.648	242925
002Post	Basin C	BASE	12.39	16.75	2.815	119650
010Post	Basin C	BASE	12.39	28.55	4.840	205727
025Post	Basin C	BASE	12.39	33.96	5.787	246002
050Post	Basin C	BASE	12.39	39.35	6.745	286706
100Post	Basin C	BASE	12.39	45.81	7.904	335961
002Post	Basin D	BASE	12.45	41.44	1.530	323798
010Post	Basin D	BASE	12.45	89.73	3.148	666274
025Post	Basin D	BASE	12.45	113.51	3.956	837207
050Post	Basin D	BASE	12.45	137.96	4.794	1014534
100Post	Basin D	BASE	12.45	167.91	5.830	1233829
002Post	Basin E	BASE	12.43	8.19	1.530	62753
010Post	Basin E	BASE	12.43	17.75	3.148	129129
025Post	Basin E	BASE	12.43	22.46	3.956	162257
050Post	Basin E	BASE	12.43	27.30	4.794	196626
100Post	Basin E	BASE	12.43	33.24	5.830	239128
002Post	Basin F	BASE	12.47	23.32	1.530	197282
010Post	Basin F	BASE	12.47	50.91	3.148	405943
025Post	Basin F	BASE	12.47	64.54	3.956	510088
050Post	Basin F	BASE	12.47	78.56	4.794	618128
100Post	Basin F	BASE	12.47	95.75	5.830	751738

J-27151.0000 (J-15275)
Freshfields Village (Kiawah Senior Living Update)
March 19, 2003
Revised August 9, 2018
Link Max Report

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
CH 3	BASE	002Post	14.50	33.902	-7.500	13.87	4.279	13.81	4.255
CH 3	BASE	010Post	14.50	61.404	-10.764	13.66	5.018	13.59	4.984
CH 3	BASE	025Post	14.49	74.201	10.605	13.58	5.344	13.52	5.309
CH 3	BASE	050Post	14.54	86.699	6.230	13.53	5.672	13.48	5.639
CH 3	BASE	100Post	14.59	100.596	6.369	13.48	6.070	13.44	6.040
CH 4	BASE	002Post	13.74	47.138	3.458	13.81	4.255	13.82	4.201
CH 4	BASE	010Post	13.53	87.965	3.439	13.59	4.984	13.60	4.894
CH 4	BASE	025Post	13.45	107.697	3.339	13.52	5.309	13.53	5.209
CH 4	BASE	050Post	13.39	126.367	-2.609	13.48	5.639	13.48	5.536
CH 4	BASE	100Post	13.37	147.821	-2.553	13.44	6.040	13.44	5.939
Pipe 2	BASE	002Post	14.48	33.564	8.903	13.97	4.329	13.87	4.279
Pipe 2	BASE	010Post	14.48	60.630	8.809	13.88	5.174	13.66	5.018
Pipe 2	BASE	025Post	14.47	73.220	8.631	13.86	5.567	13.58	5.344
Pipe 2	BASE	050Post	14.53	85.439	-8.756	13.86	5.966	13.53	5.672
Pipe 2	BASE	100Post	14.59	99.018	-8.950	13.88	6.452	13.48	6.070
Pipe 3	BASE	002Post	13.82	47.079	18.359	13.82	4.201	13.74	4.111
Pipe 3	BASE	010Post	13.60	87.883	11.572	13.60	4.894	13.68	4.575
Pipe 3	BASE	025Post	13.52	107.580	12.203	13.53	5.209	13.45	4.729
Pipe 3	BASE	050Post	13.48	126.226	12.533	13.48	5.536	13.45	4.876
Pipe 3	BASE	100Post	13.44	147.616	11.565	13.44	5.939	13.37	5.032
Pipe B	BASE	002Post	12.36	16.962	-2.080	13.91	4.337	13.97	4.329
Pipe B	BASE	010Post	12.37	28.491	-2.053	13.79	5.198	13.88	5.174
Pipe B	BASE	025Post	12.38	33.635	-2.019	13.73	5.602	13.86	5.567
Pipe B	BASE	050Post	12.39	38.677	2.644	13.72	6.013	13.86	5.966
Pipe B	BASE	100Post	12.40	44.569	2.703	12.52	6.520	13.88	6.452
Weir 1	BASE	002Post	13.74	47.319	-0.384	13.74	4.111	0.00	3.200
Weir 1	BASE	010Post	13.68	86.658	-0.440	13.68	4.575	0.00	3.200
Weir 1	BASE	025Post	13.45	98.938	-0.452	13.45	4.729	0.00	3.200
Weir 1	BASE	050Post	13.45	107.711	-0.440	13.45	4.876	0.00	3.200
Weir 1	BASE	100Post	13.37	115.626	0.451	13.37	5.032	0.00	3.200
Weir 2	BASE	002Post	0.00	0.000	0.000	13.74	4.111	0.00	3.200
Weir 2	BASE	010Post	13.68	1.729	-0.164	13.68	4.575	0.00	3.200
Weir 2	BASE	025Post	13.45	9.156	-0.273	13.45	4.729	0.00	3.200
Weir 2	BASE	050Post	13.45	19.294	0.370	13.45	4.876	0.00	3.200
Weir 2	BASE	100Post	13.37	32.507	0.426	13.37	5.032	0.00	3.200

Freshfields Village – Kiawah Senior Living Update

Charleston County, South Carolina

Appendix D

Water Quality Design

Prepared By

Thomas & Hutton Engineering
682 Johnnie Dodds Blvd. / Mt. Pleasant / SC / 29464

J-27151.0000

Water Quality Design Considerations

PROJECT: Freshfields Village - Kiawah Senior Living Upate
JOB NO.: J-15275.402 (27151.0000)
CLIENT: KRA Development , LLC
DATE: 3/25/2003
REVISED: 7/16/2018

I. DETERMINE DESIGN CRITERIA

Section 72-307 C. (5) of the South Carolina Stormwater Management and Sediment Reduction Regulations establishes minimum standards and specifications for the design of water quality control devices in the State of South Carolina. As provided in section 72-307 C. (5) (g), additional water quality requirements have been established for the eight coastal counties. These additional requirements are contained in the Coastal Zone Management Program Refinements For Stormwater Management Regulations. The requirements of section 72-307 C. (5) as modified by the Coastal Zone Refinements as they apply to the present project are summarized as follows:

(1) Permanent water quality ponds having a permanent pool shall be designed to store and release the first 1/2 inch of runoff from the site over a 24 hour period. The storage volume shall be designed to accommodate, at least, 1/2 inch of runoff from the entire site.
(2) For all projects, regardless of size, which are located within one-half (1/2) mile of a receiving water body in the coastal zone, criteria (1) shall be storage of the first 1/2 inch of runoff from the entire site or storage of the first one (1) inch of runoff from the built-upon portion of the property, whichever is greater.
(3) In addition, for those projects which are located within 1,000 (one thousand) feet of shellfish beds, the first one and one half (1 1/2) inches of runoff from the built-upon portion of the property must be retained on site.
(4) Permanent water quality ponds, not having a permanent pool, shall be designed to release the first inch of runoff from the site over a 24-hour period.

This project:
(a) Has a permanent water quality pond with a permanent pool.
(b) Is located within the coastal zone.
(c) Is within one-half (1/2) mile of a receiving water body.
(d) Is not located within 1,000 (one thousand) feet of shellfish beds.
(e) Has a majority of the basin area as pervious.

Therefore, the water quality control design criteria for this specific project are as follows:
*Storage of the first 1/2 inch of runoff from the entire site over a 24-hour period.

LAKE AND DITCHES

II DETERMINE STORAGE VOLUME REQUIRED

162.1 ac = Area of site
0.5 in = Volume of runoff over site to place in water quality pond
6.75 ac-ft = Volume of runoff to place in water quality pond

III DETERMINE INITIAL STAGE OF LAKE AND DITCHES

If the volume of water calculated in Section II is placed in the water quality pond, the initial stage of the pond can be calculated as follows:

Given the following stage-area-storage relationship for the pond:

Stage (ft)	Surface Area (ac)	Incremental Storage (ac-ft)	Total Storage (ac-ft)
3.2	10.00	0.00	0.00
4	10.70	8.28	8.28
5	11.30	11.00	19.28
6	11.90	11.60	30.88

Interpolation yields an initial stage of:

Stage (ft)	Total Storage (ac-ft)
3.2	0.00
3.85	6.75
4	8.28

IV. DEMONSTRATE THAT THE DESIGN CRITERIA ARE MET

1. Model the water quality pond and outfall structure in ICPR.
2. Set the initial stages at the elevations determined in Section III
3. Analyse how long it takes the pond to drain or return to normal water elevation.

See ICPR data following these calculations:
A. Results: Node Time Series by Node

The attached ICPR time-stage results show the total volume into the boundary a hour 24 is still postive / the pond is still draining
Therefore, the design criteria are met.

WATER QUALITY - Node Time Series Report

Simulation	Node	Group	Time	Stage	Warning Stage	Surface Area	Total Inflow	Total Outflow	Total Vol In	Total Vol Out
			hrs	ft	ft	ft2	cfs	cfs	af	af
WQ	Bndry	BASE	0.00	2.70	3.00	0	29.17	0.00	0	0
WQ	Bndry	BASE	0.50	2.70	3.00	0	20.11	0.00	1	0
WQ	Bndry	BASE	1.00	2.70	3.00	0	17.28	0.00	2	0
WQ	Bndry	BASE	1.50	2.70	3.00	0	14.88	0.00	2	0
WQ	Bndry	BASE	2.00	2.70	3.00	0	12.82	0.00	3	0
WQ	Bndry	BASE	2.50	2.70	3.00	0	11.10	0.00	4	0
WQ	Bndry	BASE	3.00	2.70	3.00	0	9.62	0.00	4	0
WQ	Bndry	BASE	3.50	2.70	3.00	0	8.37	0.00	4	0
WQ	Bndry	BASE	4.00	2.70	3.00	0	7.30	0.00	5	0
WQ	Bndry	BASE	4.50	2.70	3.00	0	6.33	0.00	5	0
WQ	Bndry	BASE	5.00	2.70	3.00	0	5.63	0.00	5	0
WQ	Bndry	BASE	5.50	2.70	3.00	0	4.96	0.00	5	0
WQ	Bndry	BASE	6.00	2.70	3.00	0	4.40	0.00	6	0
WQ	Bndry	BASE	6.50	2.70	3.00	0	3.87	0.00	6	0
WQ	Bndry	BASE	7.00	2.70	3.00	0	3.49	0.00	6	0
WQ	Bndry	BASE	7.50	2.70	3.00	0	3.15	0.00	6	0
WQ	Bndry	BASE	8.00	2.70	3.00	0	2.84	0.00	6	0
WQ	Bndry	BASE	8.50	2.70	3.00	0	2.57	0.00	6	0
WQ	Bndry	BASE	9.00	2.70	3.00	0	2.33	0.00	6	0
WQ	Bndry	BASE	9.50	2.70	3.00	0	2.10	0.00	6	0
WQ	Bndry	BASE	10.00	2.70	3.00	0	1.91	0.00	7	0
WQ	Bndry	BASE	10.50	2.70	3.00	0	1.77	0.00	7	0
WQ	Bndry	BASE	11.00	2.70	3.00	0	1.60	0.00	7	0
WQ	Bndry	BASE	11.50	2.70	3.00	0	1.47	0.00	7	0
WQ	Bndry	BASE	12.00	2.70	3.00	0	1.35	0.00	7	0
WQ	Bndry	BASE	12.50	2.70	3.00	0	1.25	0.00	7	0
WQ	Bndry	BASE	12.75	2.70	3.00	0	1.20	0.00	7	0
WQ	Bndry	BASE	13.00	2.70	3.00	0	1.15	0.00	7	0
WQ	Bndry	BASE	13.25	2.70	3.00	0	1.11	0.00	7	0
WQ	Bndry	BASE	13.50	2.70	3.00	0	1.07	0.00	7	0
WQ	Bndry	BASE	13.75	2.70	3.00	0	1.03	0.00	7	0
WQ	Bndry	BASE	14.00	2.70	3.00	0	0.99	0.00	7	0
WQ	Bndry	BASE	14.25	2.70	3.00	0	0.95	0.00	7	0
WQ	Bndry	BASE	14.50	2.70	3.00	0	0.94	0.00	7	0
WQ	Bndry	BASE	14.75	2.70	3.00	0	0.91	0.00	7	0
WQ	Bndry	BASE	15.00	2.70	3.00	0	0.86	0.00	7	0
WQ	Bndry	BASE	15.25	2.70	3.00	0	0.83	0.00	7	0
WQ	Bndry	BASE	15.75	2.70	3.00	0	0.77	0.00	7	0
WQ	Bndry	BASE	16.25	2.70	3.00	0	0.72	0.00	7	0
WQ	Bndry	BASE	16.75	2.70	3.00	0	0.68	0.00	7	0
WQ	Bndry	BASE	17.25	2.70	3.00	0	0.64	0.00	7	0
WQ	Bndry	BASE	17.75	2.70	3.00	0	0.60	0.00	7	0
WQ	Bndry	BASE	18.25	2.70	3.00	0	0.56	0.00	7	0
WQ	Bndry	BASE	18.75	2.70	3.00	0	0.55	0.00	7	0
WQ	Bndry	BASE	19.25	2.70	3.00	0	0.50	0.00	7	0
WQ	Bndry	BASE	19.75	2.70	3.00	0	0.47	0.00	7	0
WQ	Bndry	BASE	20.25	2.70	3.00	0	0.45	0.00	7	0
WQ	Bndry	BASE	20.75	2.70	3.00	0	0.42	0.00	7	0
WQ	Bndry	BASE	21.25	2.70	3.00	0	0.40	0.00	7	0
WQ	Bndry	BASE	21.75	2.70	3.00	0	0.38	0.00	7	0
WQ	Bndry	BASE	22.25	2.70	3.00	0	0.36	0.00	7	0
WQ	Bndry	BASE	22.75	2.70	3.00	0	0.36	0.00	7	0
WQ	Bndry	BASE	23.25	2.70	3.00	0	0.33	0.00	7	0
WQ	Bndry	BASE	23.75	2.70	3.00	0	0.31	0.00	7	0
WQ	Bndry	BASE	24.25	2.70	3.00	0	0.30	0.00	7	0
WQ	Bndry	BASE	24.75	2.70	3.00	0	0.28	0.00	7	0

Freshfields Village

Charleston County, South Carolina

Appendix E

Sediment Trapping Efficiency

Prepared By

Thomas & Hutton Engineering
682 Johnnie Dodds Blvd. / Mt. Pleasant / SC / 29464

J-27151.0000

Sediment Trapping Efficiency Calculations

Eroded particle diameter (D15) is from Appendix F of the *South Carolina Stormwater Management and Sediment Control Handbook for Land Disturbance Activities* , August 1998 (Stormwater Handbook).
Particle settling velocity (Vs) is from Appendix E, Figure 1, page 93 of the Stormwater Handbook.

Soil Type	D15
Ridgeland	0.0455
Kiawah	0.0445

Average D15 equals **0.0450** mm

FROM FIGURE 1

Vs = **3.19E-03** fps

LAKE AND DITCHES

Q(po)=	83.98	Total peak outflow (10-year storm event)
A=	10.2	Surface area of lake and ditches at control elevation
Vs=	3.19E-03	Settling Velocity (ft/sec)

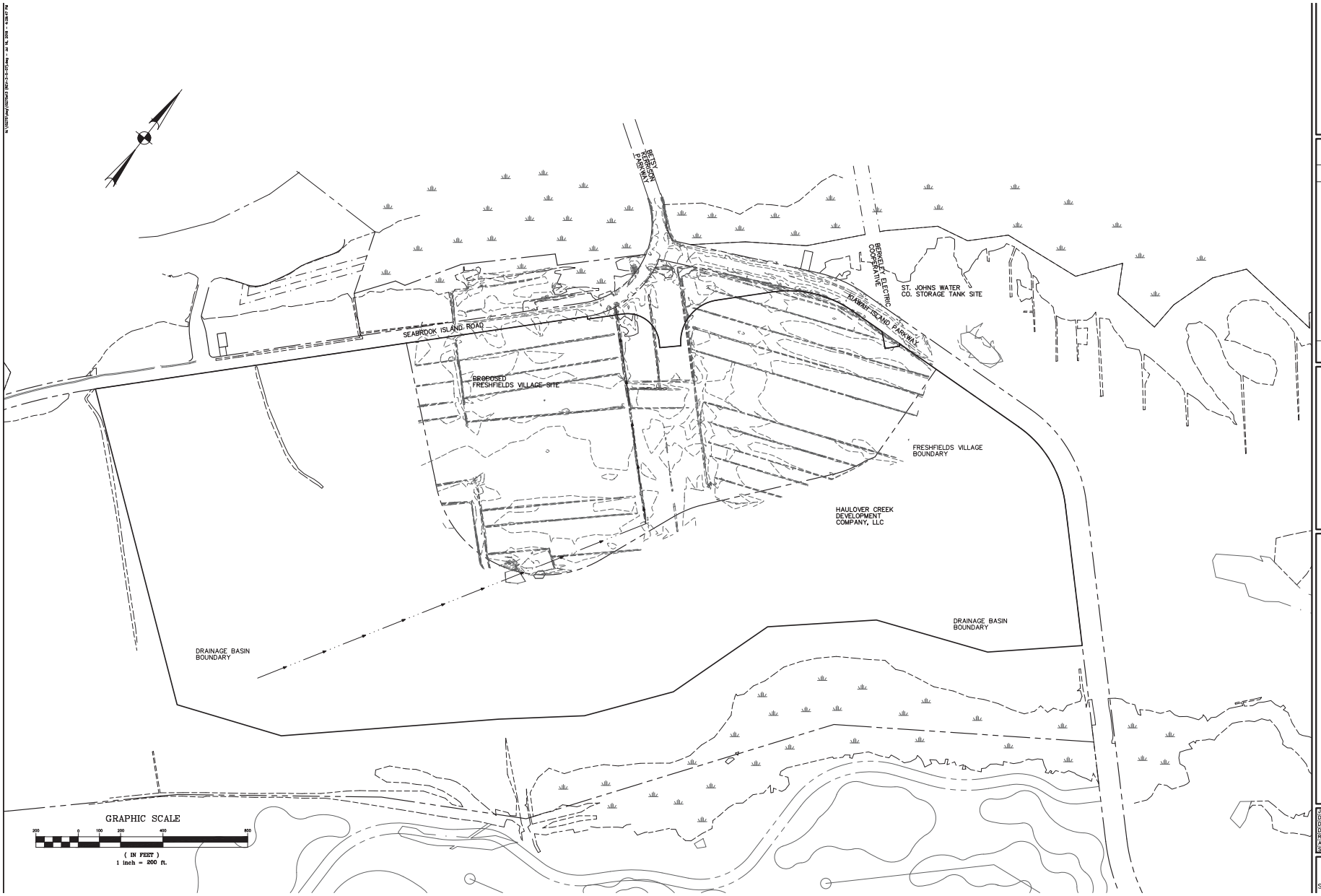
Calculate the ratio Q(po)/AV15

Q(po)/AVs= **2.58E+03**

From Appendix E, Figure 2B, page 95 of Stormwater Handbook

TRAPPING EFFICIENCY IS APPROXIMATELY EQUAL TO 82%

Design is based on Engineering Aids and Design Guidelines for Control of Sediment in South Carolina prepared by John C. Hayes, P.E. and Billy J. Barfield found in Appendix E of the Stormwater Handbook.



NO. | REVISIONS | BY | DATE

THOMAS & HUTTON ENGINEERING CO.
935 HOUSTON NORTHCUTT BOULEVARD
SUITE 100
MOUNT PLEASANT, SC 29464 (843) 849-0200
SAVANNAH, GA. • MYRTLE BEACH, SC

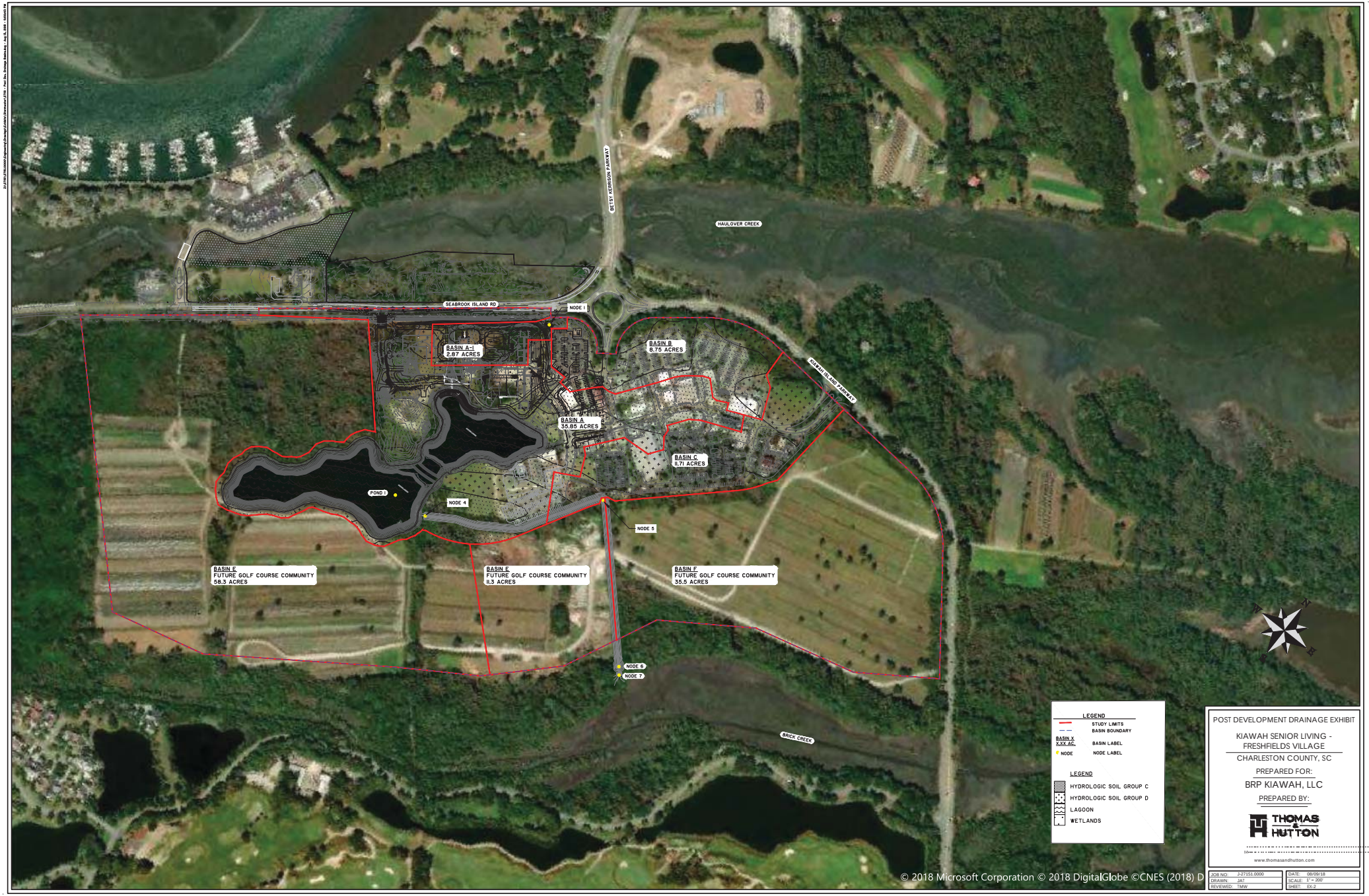
FRESHFIELDS VILLAGE

CHARLESTON COUNTY SOUTH CAROLINA

PREDEVELOPMENT DRAINAGE EXHIBIT

JOB NO: J-15275
DATE: 5/21/03
DRAWN: BRW
DESIGNED: WEF
REVIEWED: WEF
APPROVED: TMW
SCALE: 1" = 200'

SHEET 1



POST DEVELOPMENT DRAINAGE EXHIBIT

KIAWAH SENIOR LIVING - FRESHFIELDS VILLAGE

CHARLESTON COUNTY, SC

PREPARED FOR:

BRP KIAWAH, LLC

PREPARED BY:

THOMAS & HUTTON

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JOB NO:	J-27151.0000	DATE:	08/09/18
DRAWN:	JAT	SCALE:	1" = 200'
REVIEWED:	TMW	SHEET:	EX-2

BIG ROCK PARTNERS

KIAWAH SENIOR LIVING

CHARLESTON COUNTY, SOUTH CAROLINA

PREPARED FOR:

BRP KIAWAH LLC

2645 N. FEDERAL HWY, SUITE 230

DELRAY BEACH, FL 33483

(561) 701-4544

TM# 205-00-00-014

JULY 17, 2018

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PREPARED BY:

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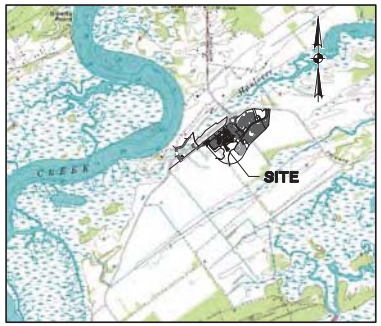

VICINITY MAP
SCALE: 1" = 2000'

KIAWAH SENIOR LIVING
J-27151.0000
7/17/18

Sheet List Table

Sheet Number	Sheet Title
C0	Cover Sheet
G0.1	General Notes and Site Map
EC0.1	SWPPP - Notes
EC0.2	SWPPP - Charts
EC1.1	SWPPP - Initial Land Disturbance Phase
EC1.2	SWPPP - Initial Land Disturbance Phase
EC1.3	SWPPP - Initial Land Disturbance Phase
EC1.4	SWPPP - Initial Land Disturbance Phase
EC2.1	SWPPP - Construction Phase
EC2.2	SWPPP - Construction Phase
EC2.3	SWPPP - Construction Phase
EC2.4	SWPPP - Construction Phase
EC3.1	SWPPP - Stabilization Phase
EC3.2	SWPPP - Stabilization Phase
EC3.3	SWPPP - Stabilization Phase
EC3.4	SWPPP - Stabilization Phase
EC4.1	SWPPP - Details
C3.1	Site Development Plan
C3.2	Site Development Plan
C3.3	Site Development
C3.4	Site Development Plan
C5.1	Details
C5.2	Details
C5.3	Water Details
C5.4	Sewer Details

REVISION HISTORY

REV. NO.	REVISION	BY	DATE

SUBMITTAL HISTORY

SUBMITTED TO	DATE

Know what's below. Call before you dig.

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EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
SILT FENCE	
CLEARING LIMITS	CL CL
LIMITS OF DISTURBANCE	LOD
SUBSURFACE DRAIN	SSD
TREE PROTECTION	
TEMPORARY SEEDING	TS
PERMANENT SEEDING	PS
SODDING	SO
RIPRAP	
OUTLET PROTECTION - RIP RAP	
SEDIMENT TRAP	
ROCK CHECK DAM	OR
STABILIZED CONSTRUCTION ENTRANCE	
STORM DRAIN INLET PROTECTION - TYPE A FILTER FABRIC	A
STORM DRAIN INLET PROTECTION - TYPE E SURFACE COURSE CURB INLET FILTER	E

DRAINAGE LEGEND

DESCRIPTION	EXISTING	PROPOSED
PIPE		
DITCH		
CURB INLET		
GRATE INLET		
JUNCTION BOX		
OUTLET STRUCTURE		

SEWER LEGEND

DESCRIPTION	EXISTING	PROPOSED
GRAVITY PIPE	SS	
SINGLE SERVICE LATERAL		
DOUBLE SERVICE LATERAL		
MANHOLE		
CLEANOUT		
FORCEMAIN	10"FM 10"FM	10"FM 10"FM
VALVE AND BOX		
FLUSH HYDRANT		
REDUCER		
BACKFLOW PREVENTOR		
CROSS		
TEE		
90° BEND - HORIZONTAL		
45° BEND - HORIZONTAL		
22-½° BEND - HORIZONTAL		
11-¼° BEND - HORIZONTAL		
BEND - VERTICAL		
PLUG \ CAP		

WATER LEGEND

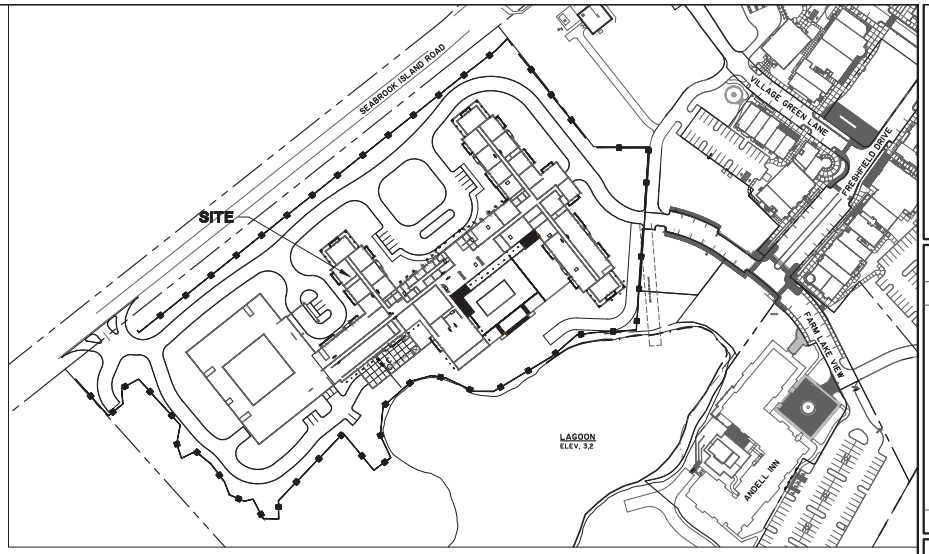
DESCRIPTION	EXISTING	PROPOSED
WATER MAIN	10"W	10"W
SINGLE SERVICE LATERAL		
DOUBLE SERVICE LATERAL		
VALVE AND BOX		
FIRE HYDRANT W/VALVE & BOX		
POST HYDRANT		
REDUCER		
BACKFLOW PREVENTOR		
CROSS		
TEE		
90° BEND - HORIZONTAL		
45° BEND - HORIZONTAL		
22-½° BEND - HORIZONTAL		
11-¼° BEND - HORIZONTAL		
BEND - VERTICAL		
CAP		

ABBREVIATIONS

HDPE	HIGH DENSITY POLYETHYTHLENE		JB	JUNCTION BOX		SDMH	STORM DRAINAGE MANHOLE
BOT	BOTTOM		LF	LINEAR FEET		SF	SQUARE FEET
CI	CURB INLET		MAX	MAXIMUM		SS	SANITARY SEWER
CPP	CORRUGATED PLASTIC PIPE		MIN	MINIMUM		TC	TOP OF CURB
DIP	DUCTILE IRON PIPE		MH	MANHOLE		TG	TOP OF GUTTER
EL	ELEVATION		OC	ON CENTER		TP	TOP OF PAVEMENT
FG	FINISH GRADE		PC	POINT OF CURVE		TW	TOP OF WALK
FH	FIRE HYDRANT		PH	POST HYDRANT		TYP	TYPICAL
FM	FORCE MAIN (SANITARY SEWER)		PT	POINT OF TANGENT		W	WATER
FP	FINISH PAD		PVC	POLYVINYL CHLORIDE		W/	WITH
FR	FRAME		RCP	REINFORCED CONCRETE PIPE		WV	WATER VALVE
GI	GRATE INLET		RJP	RESTRAINED JOINT PIPE		YI	YARD INLET
GV	GATE VALVE		R/W	RIGHT-OF-WAY			
INV	INVERT ELEVATION		SD	STORM DRAINAGE			

OTHER UTILITIES LEGEND

DESCRIPTION	EXISTING
NATURAL GAS	UGG UGG
TELEPHONE	OHT OHT
UNDERGROUND TELEPHONE	UTL UTL
ELECTRICITY	OHP OHP
UNDERGROUND ELECTRICITY	UGP UGP



PROJECT MAP

SCALE: 1" = 100'

GENERAL NOTES

1. SURVEYING AND BOUNDARY INFORMATION SUPPLIED BY SEAMEN & WHITESIDE ASSOC.
2. CONTRACTOR IS TO VERIFY ACCURACY OF ANY TEMPORARY BENCHMARKS SHOWN PRIOR TO UTILIZING THEM FOR CONSTRUCTION, ALL ELEVATIONS SHOWN ARE BASED ON NGVD29.
3. THE EXISTING UNDERGROUND UTILITIES SHOWN HEREON ARE BASED UPON AVAILABLE INFORMATION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES PRIOR TO BEGINNING DIGGING OPERATIONS, IF UTILITIES OTHER THAN THOSE SHOWN ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY AND TAKE STEPS TO PROTECT THE LINE(S) AND ENSURE CONTINUED SERVICE, DAMAGE CAUSED TO EXISTING UTILITIES BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR, ADDITIONALLY, THE CONTRACTOR SHALL CONFIRM THE CONNECTION POINTS OF NEW UTILITIES TO EXISTING UTILITIES PRIOR TO BEGINNING NEW CONSTRUCTION.
4. THE CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL AND PREVENTION STRUCTURES SHOWN ON THE PLANS,
5. THE CONTRACTOR SHALL GRASS ALL DISTURBED AREAS, IF WORK IS SUSPENDED OR DELAYED FOR 14 DAYS, THE CONTRACTOR SHALL TEMPORARILY STABILIZE THE DISTURBED AREA AT NO ADDITIONAL COST TO THE OWNER,
6. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF UNSUITABLE MATERIAL IS DISCOVERED PRIOR TO BEGINNING ANY REMOVAL OPERATION,
7. THE CONTRACTOR WILL NOTIFY THE ENGINEER IF UNSUITABLE MATERIAL IS DISCOVERD PRIOR TO BEGINNNG ANY REMOVAL OPERATION,
8. ALL PAVING, GRADING, AND DRAINAGE MATERIALS SHALL BE IN ACCORDANCE WITH THE TOWN OF KIAWAH ISLAND, SC ROAD CODE UNLESS SHOWN OTHERWISE,
9. THE STORM WATER FILTER BUFFER IS GENERALLY LOCATED 15 FOOT LAND WARD OF THE ESTABLISHED CRITICAL LINE, THIS BUFFER IS INTENDED TO PROVIDE A STRIP OF NATURAL VEGETATION THROUGH WHICH RUNOFF FROM YARDS, WHICH OFTEN CONTAINS FERTILIZERS, PESTICIDES, AND OR PET WASTE WILL BE FILTERED PRIOR TO ENTERING THE MARSH OR SALTWATER POND AND IMPACTING THE NATURAL RESOURCES IN THE AREA, NO CLEAR CUTTING, FILLING, EXCAVATION, OR CONSTRUCTION ACTIVITY (OTHER THAN NECESSARY FOR PERMITTED DRAINAGE OR WATER ACCESS STRUCTURE(S) OR OTHER PERMANENT STRUCTURES SHALL BE ALLOWED IN THE BUFFER, LIMITED CLEARING OF TREES AND GROUND COVER IS ALLOWED TO PROVIDE AND MAINTAIN VIEWS, ONLY INDIGENOUS VEGETATION SHALL BE PLANTED, VARIOUS SPECIES OF GRASS, SHRUBS, AND TREES WHICH REQUIRE FERTILIZATION SHALL NOT BE ALLOWED IN THE BUFFER, ALL CLEARING, THINNING, AND NEW PLANTING MUST BE APPROVED BY THE KIAWAH ISLAND ARCHITECTURAL REVIEW BOARD,
10. THE CONSTRUCTION PLANS AND EXECUTION OF THE CONTRACTORS CERTIFICATION CONTAINED IN THE CONTRACT DOCUMENTS SHALL CONSTITUTE THE REQUIREMENTS OF THE STORM WATER POLLUTION PREVENTION PLAN REQUIRED BY NPDES GENERAL PERMIT NO, SCR000000 FOR CONSTRUCTION ACTIVITIES,
11. THE CONTRACTOR SHALL NOTIFY FRESHFIELDS VILLAGE MANAGEMENT IN ADVANCE OF ALL WORK WITHIN THE PUBLIC RIGHT-OF-WAY, THE CONTRACTOR SHALL MAINTAIN TRAFFIC AND ESTABLISH SCDOT STANDARD TRAFFIC CONTROL DEVICES DURING CONSTRUCTION ACTIVITIES WITHIN THE RIGHT-OF-WAY.
12. THE CONTRACTOR SHALL ESTABLISH A TEMPORARY GRAVEL CONSTRUCTION EXIT AT ALL POINTS OF EGRESS FROM THE SITE,
13. THE CONTRACTOR SHALL RETAIN A COPY OF THE STORM WATER POLLUTION PLAN AT THE CONSTRUCTION SITE AT ALL TIMES, THE PLAN SHALL BE STORED AND MAINTAINED IN A WEATHER TIGHT ENCLOSURE FREELY ACCESSIBLE TO ALL PARTIES,
14. CONSTRUCTION THAT MAY AFFECT THE ROOT SYSTEM OF PROTECTED TREES WILL REQUIRE THE APPROVAL OF A CERTIFIED ARBORIST OF LANDSCAPE ARCHITECT EMPLOYED BY THE OWNER/DEVELOPER OF THE PROPERTY AND APPROVAL BY A REPRESENTATIVE OF THE CHARLESTON COUNTY PLANNING DEPARTMENT,
15. THE CONTRACTOR SHALL TAKE THE NECESSARY ACTION TO MINIMIZE THE TRACKING OF SOIL ONTO PAVED ROADWAYS, CONTRACTOR SHALL PERFORM DAILY CLEAN-UP OF ANY SOIL THAT DOES GET ONTO PAVEMENT,
16. THE CONTRACTOR SHALL NOT USE ANY WATER FROM THE EXISTING WATER SYSTEM WITHOUT REQUESTING AND PURCHASING THE WATER FROM ST, JOHNS WATER CO, CONTACT MS, AVA ROBICHAUX AT 559-0188,

GENERAL INFORMATION

COUNTY	CHARLESTON COUNTY
TOWN	KIAWAH ISLAND, SC
ZONING	PUD
TMS#	205-00-00-014
FLOOD ZONE	AE-14
FEMA MAP	45019C0785J

ENGINEER:
THOMAS & HUTTON
682 JOHNNIE DODDS BLVD.
MT. PLEASANT, SC 29464
(843) 849-0200

SURVEYOR: SEAMEN WHITESIDE SURVEYING, LLC
CHARLESTON, SC
(843) 795-9330

UTILITY: ST JOHNS WATER CO.
P.O. BOX 629
JOHNS ISLAND, SC 29455
(843) 559-0371 - TERRY BARRON

SEABROOK ISLAND UTILITY COMMISION
2001 SEABROOK ISLAND ROAD
SEABROOK ISLAND, SC 29455
(843) 768-0102 - TOMMY WEST

PREPARED FOR:
BRP KIAWAH LLC
2645 N. FEDERAL HWY, SUITE 230
DELRAY BEACH, FL 33483
(561) 701-4544

NO. | REVISIONS | BY | DATE

THOMAS & HUTTON
682 Johnnie Dodds Boulevard • Suite 100
Mt. Pleasant, SC 29464 • 843.849.0200
www.thomasandhutton.com

BRP KIAWAH LLC
CHARLESTON COUNTY, SOUTH CAROLINA
KIAWAH SENIOR LIVING
GENERAL NOTES AND SITE MAP

JOB NO:	J-2715.0000
DATE:	7/17/18
DRAWN:	BRW
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMW
SCALE:	AS SHOWN

G0.1

STORMWATER POLLUTION PREVENTION PLAN

I. SITE DESCRIPTION

A. PROJECT DESCRIPTION

A.1.	PROJECT AREA	9.02 ACRES
A.2.	AREA DISTURBED	8.57 ACRES

B. DESCRIPTION OF CONSTRUCTION ACTIVITY

WORK CONSISTS OF CLEARING, GRADING, DRAINAGE IMPROVEMENTS, GRASSING, INSTALLATION OF STORM SEWER SYSTEMS AND ROADS ASSOCIATED WITH DEVELOPMENT.

C. RUNOFF DATA

C.1.	SOIL CLASSIFICATIONS:	(HSG) B/D
C.2.	LAND USE(S):	INSTITUTIONAL

D. RECEIVING WATERS

D.1.	CLOSEST RECEIVING WATERS:	FRESHFIELDS VILLAGE LAGOON SYSTEM
D.2.	ULTIMATE RECEIVING WATERS:	BRICK CREEK

E. FLOOD

E.1.	FEMA FLOOD ZONE(S):	AE-14
E.2.	FEMA FLOOD INSURANCE MAP(S):	45019C0785J

II. CONTROL MEASURES

1. EROSION AND SEDIMENT CONTROLS

PRIOR TO START OF CONSTRUCTION, ALL EXTERIOR SILT FENCE WILL BE INSTALLED AS SHOWN ON THE PLANS.

1.1. CLEARING

1.1.1. AS CLEARING IS COMPLETED, ADDITIONAL SILT FENCE WILL BE INSTALLED WHERE NECESSARY, SUCH AS POINTS WHERE FLOWS BECOME CHANNELIZED, AND OTHER POINTS WHERE EXCESSIVE RUNOFF VELOCITIES MAY OCCUR.
1.1.2. INSTALL CONSTRUCTION ENTRANCES / EXITS BEFORE BEGINNING CLEARING
1.1.3. CONSTRUCTION DELAYS IN ANY ONE AREA GREATER THAN 14 DAYS PRIOR TO START OF ROUGH GRADING WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.
1.1.4. MAINTAIN EXISTING VEGETATION WHENEVER POSSIBLE AND MINIMIZE THE AREA OF DISTURBANCE. RETAIN AND PROTECT TREES TO ENHANCE FUTURE LANDSCAPING EFFORTS AND REDUCE RAINDROP IMPACT.
1.1.5. INSTALL ALL SEDIMENT CONTROL PRACTICES PRIOR TO ANY UP-SLOPE SOIL DISTURBING ACTIVITIES.
1.1.6. PHASE CONSTRUCTION ACTIVITIES TO MINIMIZE THE AREAS DISTURBED AT ONE TIME. THIS WILL ALSO ALLOW COMPLETED AREAS TO BE STABILIZED AND RE-VEGETATED BEFORE DISTURBING ADJACENT SITES. THE NEED FOR TEMPORARY EROSION CONTROL MEASURES MAY BE AVOIDED BY COMPLETING A PHASE AND INSTALLING PERMANENT EROSION CONTROL MEASURES WHEN THE FINAL GRADE IS ATTAINED.
1.1.7. MAINTAIN AND PROTECT ALL NATURAL WATERWAYS. RETAIN AT LEAST A 35-FOOT UNDISTURBED BUFFER OF NATURAL VEGETATION ALONG ALL WATERWAYS TO FILTER OUT SEDIMENT AND OTHER POLLUTANTS. MAINTAIN A 45-FOOT UNDISTURBED BUFFER AROUND SENSITIVE WATERS.
1.1.8. INSTALL SILT FENCE (OR BIO ROLLS/ROCK SOCK PRODUCTS) ON THE DOWN-SLOPE PERIMETER OF ALL DISTURBED AREAS PRIOR TO ANY SOIL DISTURBING ACTIVITIES (INCLUDING CLEARING AND GRUBBING). SILT FENCE CAN TREAT A MAXIMUM OF 100 SQUARE FEET PER LINEAL FOOT OF FENCE. INSTALL SILT FENCE IN SHORTER REACHES ON THE CONTOUR WITH EACH END TURNED UP-SLOPE . SWALES AND SHORELAND AREAS SHOULD ALSO BE PROTECTED WITH SILT FENCE, BIO ROLLS, OR ROCK SOCKS.
1.1.9. IN AREAS OF CONCENTRATED FLOW INSTALL STRAW BALE CHECKS, ROCK CHECK DAMS, TRIANGULAR DIKES, BIO ROLL BLANKETS, OR ROCK SOCKS TO SLOW RUNOFF AND TRAP SEDIMENT.

1.1.10. USE TEMPORARY SLOPE DRAINS OR ROCK CHUTES TO MOVE WATER DOWN STEEP SLOPES.

1.1.11. CONSTRUCT SEDIMENT BASINS FOR DRAINAGE AREAS GREATER THAN 10 ACRES

1.2. ROUGH GRADING

1.2.1. ALL EXISTING CONTROLS WILL BE MAINTAINED DURING ROUGH GRADING, DELAYS OF GREATER THAN 14 DAYS PRIOR TO START OF NEXT ACTIVITY WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.
1.2.2. ALL AREAS NOT SUBJECT TO FURTHER CONSTRUCTION (DRAINAGE, SANITARY SEWER, ROADS, WATER DISTRIBUTION SYSTEMS, OR STORM WATER FACILITIES) SHALL BE GRASSED WITH A PERMANENT COVER.
1.2.3. COVER ANY STOCK PILED TOPSOIL WITH PLASTIC (OR OTHER IMPERVIOUS COVERING) OR USE A TEMPORARY SEED MIX. USE STOCKPILED TOPSOIL AS EARTHEN BERMS TO SERVE AS TEMPORARY SEDIMENT BASINS.

1.3. DRAINAGE

1.3.1. ALL EXISTING CONTROLS WILL BE MAINTAINED DURING DRAINAGE INSTALLATION.
1.3.2. CONSTRUCTION DRAINAGE WILL BE ROUTED THROUGH LAKES, WHICH WILL ACT AS SEDIMENT BASINS OR OTHER ACCEPTABLE SEDIMENT BASINS/TRAPS.
1.3.3. STORM DRAIN INLET PROTECTION AS SHOWN ON DETAIL SHEET SHALL BE INSTALLED ON ALL CURB INLETS, STORM DRAIN MANHOLES, JUNCTION BOXES, AND GRATE INLETS.
1.3.4. DELAYS OF GREATER THAN 14 DAYS PRIOR TO START OF THE NEXT CONSTRUCTION SEQUENCE WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.
1.3.5. ALL STORM LINES NOT IN STREETS OR OTHER PAVED AREAS ARE TO BE MULCHED AND SEEDED WITHIN 5 DAYS AFTER BACKFILL.

1.4. WASTE DISTRIBUTION SYSTEM INSTALLATION

1.4.1. ALL EXISTING CONTROLS WILL BE MAINTAINED DURING INSTALLATION OF THE WATER DISTRIBUTION SYSTEM.
1.4.2. DELAYS OF GREATER THAN 14 DAYS PRIOR TO START OF NEXT ACTIVITY WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.

1.5. WASTEWATER COLLECTION SYSTEM INSTALLATION

1.5.1. ALL EXISTING CONTROLS WILL BE MAINTAINED DURING INSTALLATION OF THE WASTEWATER SYSTEM.
1.5.2. DELAYS OF GREATER THAN 14 DAYS PRIOR TO START OF NEXT ACTIVITY WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.

1.6. CONSTRUCTION OF ROADS

1.6.1. ALL EXISTING CONTROLS WILL BE MAINTAINED DURING ROAD CONSTRUCTION.
1.6.2. DELAYS OF GREATER THAN 14 DAYS PRIOR TO START OF NEXT ACTIVITY WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.

1.7. GRASSING

1.7.1. ALL EXISTING CONTROLS WILL BE MAINTAINED UNTIL GRASSING IS ESTABLISHED
1.7.2. ANY AREAS THAT ERODE OR WHERE GRASS DOES NOT ESTABLISH ITSELF SHALL BE RE-GRADED AND RE-GRASSED.

2. STORM WATER MANAGEMENT

RUNOFF FROM THIS PROJECT WILL DISCHARGE INTO A STORM WATER MANAGEMENT SYSTEM. TREATMENT WILL OCCUR IN STORM WATER DETENTION PONDS.

3. OTHER CONTROLS

3.1. WASTE DISPOSAL

3.1.1. NO SOLID MATERIALS, INCLUDING BUILDING MATERIALS, SHALL BE DISCHARGED TO ANY RECEIVING WATERS.
3.1.2. OFFSITE VEHICLE TRACKING OF SEDIMENTS AND THE GENERATION OF DUST SHALL BE MINIMIZED.
3.1.3. THIS PLAN SHALL COMPLY WITH STATE AND/OR LOCAL WASTE DISPOSAL, SANITARY SEWER OR SEPTIC SYSTEM REGULATIONS.
3.1.4. DUST CONTROL ON DISTURBED AREAS - CONTROLLING SURFACE AND AIR MOVEMENT OF DUST ON CONSTRUCTION SITE AND HAUL ROUTES. THE PURPOSE OF THE MEASURE IS TO REDUCE THE PRESENCE OF AIRBORNE SUBSTANCES, WHICH MAY BE HARMFUL OR INJURIOUS TO HUMAN HEALTH, WELFARE OR SAFETY, OR TO ANIMALS OR PLANT LIFE.

III. MAINTENANCE

1. MAINTENANCE PROGRAM

1.1. THE SITE SUPERINTENDENT, OR HIS/HER REPRESENTATIVE, SHALL MAKE VISUAL INSPECTIONS OF ALL MECHANICAL CONTROLS AND NEWLY STABILIZED AREAS (I.E. SEEDED AND MULCHED AND/OR SODDED AREAS) ON A DAILY BASIS; ESPECIALLY AFTER HEAVY RAINFALL EVENT TO INSURE THAT ALL CONTROLS ARE MAINTAINED AND PROPERLY FUNCTIONING. ANY DAMAGED CONTROLS SHALL BE REPAIRED PRIOR TO THE END OF THE WORK DAY INCLUDING RE-SEEDING AND MULCHING OR RE-SODDING IF NECESSARY.

1.2. EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE. ALL DRAINAGE SWALES, POCKETS, DEPRESSION, LOW LINES, AND OUTLET DITCHES SHALL DRAIN EFFECTIVELY AT ALL TIMES. SETTLEMENT OR WASHING THAT MAY OCCUR SHALL BE REPAIRED BY THE CONTRACTOR. SEDIMENT WILL BE REMOVED FROM BEHIND THE SEDIMENT FENCE WHEN IT REACHES 1/3 THE HEIGHT OF THE FENCE. THE SEDIMENT FENCE WILL BE REPAIRED AS NECESSARY TO MAINTAIN AN EFFECTIVE BARRIER. MAINTAIN THE CONSTRUCTION EXIT IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE SITE. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE. IMMEDIATELY REMOVE ALL OBJECTIONABLE MATERIALS SPILLED, WASHED, OR TACKED ONTO PUBLIC ROADWAYS. RESEED AND MULCH AREA WHERE SEEDING EMERGENCE IS POOR, OR WHERE EROSION OCCURS. PROTECT FROM TRAFFIC AS MUCH AS POSSIBLE. INSPECT ALL MULCHES PERIODICALLY, AND AFTER RAINSTORMS TO CHECK FOR EROSION, DISLOCATION OR FAILURE. IF WASHOUT OCCURS, REPAIR THE SLOPE GRADE, RESEED AND REINSTALL MULCH. FOLLOW THE CONSTRUCTION SEQUENCE THROUGHOUT THE PROJECT DEVELOPMENT. WHEN CHANGES IN CONSTRUCTION ACTIVITIES ARE NEEDED, AMEND THE SEQUENCE SCHEDULE IN ADVANCE TO MAINTAIN MANAGEMENT CONTROL. IF MAJOR CHANGES ARE NECESSARY, SEND A COPY OF THE MODIFIED SCHEDULE TO THE ENGINEER, SEDIMENT AND EROSION CONTROL MEASURES WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE DISTURBED AREAS ARE STABILIZED.

2. SILT FENCE

SILT FENCES WILL BE MONITORED DURING CONSTRUCTION. ANY SILT FENCE WHICH IS NOT FUNCTIONING PROPERLY WILL BE PROMPTLY REPAIRED. CLEAN OUT THE SILT FENCE WHEN IT REACHES 1/3 THE HEIGHT OF THE FENCE OR REPLACE WITH FUNCTIONAL SILT FENCE WITHIN 24 HOURS. USE OF HOSES AND WATER TO FLUSH THE SEDIMENT INTO THE STORM INLETS IS UNACCEPTABLE.

3. SEDIMENTATION BASINS

SEDIMENTATION BASINS WHICH ARE AT 50% USED CAPACITY OR APPROACHING SUCH CAPACITY SHALL BE RE-EXCAVATED TO ORIGINAL DIMENSIONS AND THE SILT PROPERLY DISPOSED OF.

4. SEDIMENT LOGS/ROLLS

SEDIMENT LOGS/ROLLS OR OTHER CONTROL MEASURES WHICH BEGIN TO DISINTEGRATE OR FUNCTION INEFFECTIVELY SHALL BE PROMPTLY REPLACED.

5. VEGETATION COVER

ANY VEGETATION COVER SERVING TO STABILIZE DISTURBED SOILS WHICH IS ITSELF DISTURBED SHALL IMMEDIATELY BE REPLACED.

6. CONSTRUCTION ENTRANCE

MAINTAIN ROCK CONSTRUCTION ENTRANCE AND CLEAN ADJACENT ROADS OF ANY MUD TRACKED ONTO THEM.

IV. INSPECTIONS

1. QUALIFIED PERSONNEL WILL INSPECT DISTURBED AREAS OF THE CONSTRUCTION SITE, AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION THAT HAVE NOT BEEN FINALLY STABILIZED, STRUCTURAL CONTROL MEASURES, AND LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE AT LEAST ONCE EVERY SEVEN CALENDAR DAYS. WHERE SITES HAVE BEEN FINALLY STABILIZED SUCH INSPECTIONS SHALL BE CONDUCTED AT LEAST ONCE EVERY MONTH DURING THE WARRANTY PERIOD.

2. DISTURBED AREAS AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION SHALL BE INSPECTED FOR EVIDENCE OF, OR THE POTENTIAL FOR, POLLUTANTS ENTERING THE DRAINAGE SYSTEM. EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED IN THE PLAN SHALL BE OBSERVED TO ENSURE THAT THEY ARE OPERATING CORRECTLY. WHERE DISCHARGE LOCATIONS OR POINTS ARE ACCESSIBLE, THEY SHALL BE INSPECTED TO ASCERTAIN WHETHER EROSION CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT IMPACTS TO RECEIVING WATERS. LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE SHALL BE INSPECTED FOR EVIDENCE OF OFFSITE SEDIMENT TRACKING.

3. A WRITTEN REPORT SUMMARIZING THE SCOPE OF THE INSPECTION, NAME(S) AND QUALIFICATIONS OF PERSONNEL MAKING THE INSPECTION, THE DATE(S) OF THE INSPECTION, WEATHER INFORMATION FOR THE PERIOD SINCE THE LAST INSPECTION (OR SINCE COMMENCEMENT OF CONSTRUCTION ACTIVITY) INCLUDING A BEST ESTIMATE OF THE BEGINNING OF EACH STORM EVENT, DURATION OF EACH STORM EVENT, APPROXIMATE AMOUNT OF RAINFALL FOR EACH STORM EVENT (IN INCHES) AND WHETHER ANY DISCHARGES OCCURRED, LOCATION(S) OF DISCHARGES OF SEDIMENT OR OTHER POLLUTANTS FROM THE SITE, LOCATION(S) OF BMP'S THAT NEED MAINTENANCE, LOCATION(S) OF BMP'S THAT FAILED TO OPERATE AS DESIGNED OR PROVED INADEQUATE FOR A PARTICULAR LOCATION, LOCATION(S) WHERE ADDITIONAL BMP'S ARE NEEDED THAT DID NOT EXIST AT THE TIME OF INSPECTION AND ANY CORRECTIVE ACTION REQUIRED INCLUDING ANY CHANGES TO SWPPP NECESSARY AND IMPLEMENTATION DATES.

4. THE REPORT SHALL BE MAINTAINED AT LEAST THREE YEARS FROM THE DATE THE SITE IS FINALLY STABILIZED. THE REPORT MUST BE SIGNED AND SHALL CONTAIN A CERTIFICATION THAT THE FACILITY IS IN COMPLIANCE WITH THE STORM WATER POLLUTION PREVENTION PLAN AND THE NPDES PERMIT REFERENCED ABOVE. THE CONTRACTOR SHALL MAINTAIN THIS REPORT. THE REPORT SHALL BE SUBMITTED TO THE ENGINEER AND OWNER.

V. LONG TERM MAINTENANCE OF DRAINAGE AND STORM WATER MANAGEMENT SYSTEM

THE ROADS AND DRAINAGE SYSTEM WILL BE OWNED AND MAINTAINED BY **THE FRESHFIELDS VILLAGE MANAGEMENT CO.** AFTER CONSTRUCTION IS COMPLETE.

VI. SC DHEC STANDARD NOTES

1. IF NECESSARY, SLOPES WHICH EXCEED EIGHT (8) VERTICAL FEET SHOULD BE STABILIZED WITH SYNTHETIC OR VEGETATIVE MATS, IN ADDITION TO GRASSING / HYDROSEEDING. IT MAY BE NECESSARY TO INSTALL TEMPORARY SLOPE DRAINS DURING CONSTRUCTION. TEMPORARY BERMS MAY BE NEEDED UNTIL THE SLOPE IS BROUGHT TO GRADE.

2. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN FOURTEEN (14) DAYS AFTER WORK HAS CEASED, EXCEPT AS STATED BELOW:

2.1. WHERE STABILIZATION BY THE 14TH DAY IS PRECLUDED BY SNOW COVER OR FROZEN GROUND CONDITIONS STABILIZATION MEASURES MUST BE INITIATED AS SOON AS PRACTICABLE.
2.2. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH-DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 14 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE.

3. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE INSPECTED ONCE EVERY CALENDAR WEEK. IF SITE INSPECTIONS IDENTIFY BMP'S THAT ARE DAMAGED OR ARE NOT OPERATING EFFECTIVELY, MAINTENANCE MUST BE PERFORMED AS SOON AS PRACTICAL OR AS REASONABLY POSSIBLE BEFORE THE NEXT STORM EVENT WHENEVER PRACTICAL.

4. PROVIDE SILT FENCE AND/OR OTHER CONTROL DEVICES, AS MAY BE REQUIRED, TO CONTROL SOIL EROSION DURING UTILITY CONSTRUCTION. ALL DISTURBED AREAS SHALL BE CLEANED, GRADED AND STABILIZED WITH GRASSING IMMEDIATELY AFTER THE UTILITY INSTALLATION. FILL, COVER, AND TEMPORARY SEEDING AT THE END OF EACH DAY ARE RECOMMENDED. IF WATER IS ENCOUNTERED WHILE TRENCHING, THE WATER SHOULD BE FILTERED TO REMOVE ANY SEDIMENTS BEFORE BEING PUMPED INTO ANY WATERS OF THE STATE.

5. ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED. ADDITIONAL CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFFSITE SEDIMENTATION. ALL TEMPORARY CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.

6. THE CONTRACTOR MUST TAKE NECESSARY ACTION TO MINIMIZE THE TRACKING OF MUD ONTO THE PAVED ROADWAY FROM CONSTRUCTION AREAS AND THE GENERATION OF DUST. THE CONTRACTOR SHALL DAILY REMOVE MUD/SOIL FROM PAVEMENT AS MAY BE REQUIRED.

7. RESIDENTIAL SUBDIVISIONS REQUIRE EROSION CONTROL FEATURES FOR INFRASTRUCTURE AS WELL AS FOR INDIVIDUAL LOT CONSTRUCTION. INDIVIDUAL PROPERTY OWNERS SHALL FOLLOW THESE PLANS DURING CONSTRUCTION OR OBTAIN APPROVAL OF AN INDIVIDUAL PLAN IN ACCORDANCE WITH S.C. REG. 72-300 AND SCR100000.

8. TEMPORARY DIVERSION BERMS AND/OR DITCHES WILL BE PROVIDED AS NEEDED DURING CONSTRUCTION TO PROTECT WORK AREAS FROM UPSLOPE RUNOFF AND/OR TO DIVERT SEDIMENT LADEN WATER TO APPROPRIATE TRAPS OR STABLE OUTLETS.

9. ALL WATERS OF THE STATE (WOS), INCLUDING WETLANDS, ARE TO BE FLAGGED OR OTHERWISE CLEARLY MARKED IN THE FIELD. A DOUBLE ROW OF SILT FENCE IS TO BE INSTALLED IN ALL AREAS WHERE A 50-FOOT BUFFER CAN NOT BE MAINTAINED BETWEEN THE DISTURBED AREA AND ALL WOS. A 10-FOOT BUFFER SHOULD BE MAINTAINED BETWEEN THE LAST ROW OF SILT FENCE AND ALL WOS

10. LITTER, CONSTRUCTION DEBRIS, OILS, FUELS, AND BUILDING PRODUCTS WITH SIGNIFICANT POTENTIAL FOR IMPACT (SUCH AS STOCKPILES OF FRESHLY TREATED LUMBER) AND CONSTRUCTION CHEMICALS THAT COULD BE EXPOSED TO STORM WATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE IN STORM WATER DISCHARGES.

11. A COPY OF THE SWPPP, INSPECTION RECORDS AND RAINFALL DATA MUST BE RETAINED AT THE CONSTRUCTION SITE OR A NEARBY LOCATION EASILY ACCESSIBLE DURING NORMAL BUSINESS HOURS, FROM THE DATE OF COMMENCEMENT OF CONSTRUCTION ACTIVITIES TO THE DATE THAT FINAL STABILIZATION IS REACHED.

12. INITIATE STABILIZATION MEASURES ON ANY EXPOSED STEEP SLOPE (3H:1V OR GREATER) WHERE LAND DISTURBING ACTIVITIES HAVE PERMANENTLY OR TEMPORARILY CEASED, AND WILL NOT RESUME FOR A PERIOD OF 7 CALENDAR DAYS.

13. MINIMIZE SOIL COMPACTION IN AREAS NOT UNDER PAVEMENTS AND /OR STRUCTURES AND, UNLESS INFEASIBLE, PRESERVE TOPSOIL.

14. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM EQUIPMENT AND VEHICLE WASHING, WHEEL WASH WATER AND OTHER WASH WATERS. WASH WATERS MUST BE TREATED IN A SEDIMENT BASIN OR ALTERNATIVE CONTROL THAT PROVIDES EQUAL OR BETTER TREATMENT PRIOR TO DISCHARGE.

15. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM DEWATERING OF TRENCHES AND EXCAVATED AREAS. THESE DISCHARGES ARE TO BE ROUTED THROUGH APPROPRIATE BMPS (SEDIMENT BASIN, FILTER BAG, ETC.).

16. THE FOLLOWING DISCHARGES ARE PROHIBITED:

16.1. WASTEWATER FROM WASHOUT OF CONCRETE, UNLESS MANAGED BY AN APPROPRIATE CONTROL;
16.2. WASTEWATER FROM WASHOUT AND CLEANOUT OF OF STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS AND OTHER CONSTRUCTION MATERIALS;
16.3. FUELS, OILS OR OTHER POLLUTANTS USED IN VEHICLE AND EQUIPMENT OPERATION AND MAINTENANCE; AND
16.4. SOAPS OR SOLVENTS USED IN VEHICLE AND EQUIPMENT WASHING.

17. AFTER CONSTRUCTION ACTIVITIES BEGIN, INSPECTIONS MUST BE CONDUCTED AT A MINIMUM OF AT LEAST ONCE EVERY CALENDAR WEEK AND MUST BE CONDUCTED UNTIL FINAL STABILIZATION IS REACHED ON ALL AREAS OF THE CONSTRUCTION SITE.

18. IF EXISTING BMPS NEED TO BE MODIFIED OR IF ADDITIONAL BMPS ARE NECESSARY TO COMPLY WITH THE REQUIREMENTS OF PERMIT SCR100000 AND/OR SC'S WATER QUALITY STANDARDS, IMPLEMENTATION MUST BE COMPLETED BEFORE THE NEXT STORM EVENT WHENEVER PRACTICABLE. IF IMPLEMENTATION BEFORE THE NEXT STORM EVENT IS IMPRACTICABLE, THE SITUATION MUST BE DOCUMENTED IN THE SWPPP AND ALTERNATIVE BMPS MUST BE IMPLEMENTED AS SOON AS REASONABLY POSSIBLE.

19. A PRE-CONSTRUCTION CONFERENCE MUST BE HELD FOR EACH CONSTRUCTION SITE WITH AN APPROVED ON-SITE SWPPP PRIOR TO THE IMPLEMENTATION OF CONSTRUCTION ACTIVITIES. FOR NON-LINEAR PROJECTS THAT DISTURB 10 ACRES OR MORE, THIS CONFERENCE MUST BE HELD ON-SITE UNLESS THE DEPARTMENT HAS APPROVED OTHERWISE.

VII. EROSION, SEDIMENTATION & POLLUTION CONTROL NOTES

1. THE IMPLEMENTATION OF THESE EROSION SEDIMENT CONTROL (ESC) PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.

2. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO INSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.

3. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT LEAVE THE SITE.

4. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.

5. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN THE 24 HOURS FOLLOWING A MAJOR STORM EVENT.

6. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING AND PRIOR TO FINAL INSPECTION. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT LADEN WATER INTO THE DOWNSTREAM SYSTEM.

7. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

8. BEFORE COMMENCING ANY LAND DISTURBING ACTIVITY, THE EXISTING STORM WATER INLET(S) THAT RECEIVING RUNOFF FROM THE PROPOSED WORK AREA SHALL BE PROTECTED. THE TEMPORARY INLET PROTECTION MUST REMAIN IN PLACE UNTIL THE CONSTRUCTION ACTIVITY IS COMPLETED, THE STREET HAS BEEN SWEPT AND ANY EXPOSED SOILS ARE STABILIZED. THE CONTRACTOR IS ALSO RESPONSIBLE FOR REMOVING ANY TEMPORARY INLET PROTECTION INSTALLED; AFTER ALL DISTURBED AREAS ARE STABILIZED. TEMPORARY PROTECTION OF THE INLETS MAY BE ACCOMPLISHED BY ONE OR MORE OF THE FOLLOWING:

8.1. USE OF GRAVEL BAGS TO FILTER THE SEDIMENT FROM ANY RUNOFF. TO MAKE A GRAVEL BAG, USE A BAG MADE OF GEOTEXTILE FABRIC (NOT BURLAP) AND FILL WITH EITHER 3/4 INCH ROCK OR 1/4 INCH PEA GRAVEL.
8.2. USE OF SEDIMENT LOGS TO FILTER THE SEDIMENT FROM ANY RUNOFF (AVAILABLE THROUGH LOCAL EROSION CONTROL SUPPLIERS).
8.3. USE OF ABOVE OR UNDER-GRATE FILTER BAGS OR DEVICES TO FILTER THE SEDIMENT FROM ANY RUNOFF (AVAILABLE THROUGH EROSION CONTROL SUPPLIERS).

9. WATER MAY NOT BE DISCHARGED IN A MANNER THAT CAUSES EROSION, SEDIMENTATION, OR FLOODING ON THE SITE, ON DOWNSTREAM PROPERTIES, IN THE RECEIVING CHANNELS, OR IN ANY STORM WATER INLET. WHEN SITE DEWATERING, WATER PUMPED FROM THE SITE, INCLUDING TRENCHES, SHALL BE TREATED BY ONE OF THE FOLLOWING:

9.1. TEMPORARY SEDIMENTATION BASINS
9.2. SEDIMENT FILTERING BAGS

10. THE CONTRACTOR SHALL VERIFY THE SIZE AND LOCATION OF ALL EXISTING UTILITIES. EXISTING UTILITIES ARE ALL UTILITIES THAT EXIST ON THE PROJECT IN AN ORIGINAL, RELOCATED OR NEWLY INSTALLED POSITION. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE COST OF REPAIRS TO DAMAGED UNDERGROUND OR OVERHEAD FACILITIES, EVEN IF THE UTILITY IS NOT SHOWN ON THE SITE DEVELOPMENT PLANS. THE CONTRACTOR SHALL CONTACT THE LOCAL UTILITIES PROTECTION CENTER TO COORDINATE THE MARKING OF EXISTING UTILITY LINES A MINIMUM OF 96 HOURS PRIOR TO COMMENCEMENT OF ANY WORK.

11. THE CONTRACTOR SHALL FLUSH ALL INLETS AND PIPE AT THE COMPLETION OF CONSTRUCTION TO REMOVE SILT AND DEBRIS. THE CLEANING AND FLUSHING OF INLETS AND PIPE (EXISTING AND PROPOSED) SHALL BE CONSIDERED PART OF THE COST FOR THE PROJECT.

12. EGRESS FROM THE SITE SHALL BE CONTROLLED SUCH THAT VEHICLES LEAVING THE SITE MUST TRAVERSE CONSTRUCTION EXITS TO REMOVE MUD FROM TIRES.

13. SCHEDULE CONSTRUCTION ACTIVITIES TO MINIMIZE THE EXPOSED AREA AND DURATION OF EXPOSURE. IN SCHEDULING, TAKE INTO ACCOUNT THE SEASON AND THE WEATHER FORECAST.

14. EROSION CONTROL MEASURES ARE THE MINIMUM REQUIRED. THE CONTRACTOR SHALL PROVIDE ADDITIONAL CONTROL MEASURES AS DICTATED BY ACTUAL FIELD CONDITIONS AT THE TIME OF CONSTRUCTION IN ORDER TO PREVENT EROSION AND CONTROL SEDIMENT. EROSION AND SEDIMENT CONTROL MEASURES WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE ENTIRE PROJECT IS TERMINATED OR SUSPENDED FOR AND INDEFINITE LENGTH OF TIME, ALL DISTURBED AREAS SHALL BE PLANTED WITH PERMANENT VEGETATION.

15. THE DATA, TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS, OR IN ANY WAY INDICATED THEREBY, WHETHER BY DRAWINGS OR NOTES, OR IN ANY OTHER MANNER, IS BASED UPON FIELD INVESTIGATIONS AND IS BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS. HOWEVER, THE SAME IS SHOWN AS INFORMATION ONLY, IS NOT GUARANTEED AND DOES NOT BIND THOMAS & HUTTON, OR THE OWNER IN ANY WAY.

16. CONTRACTOR SHALL MAINTAIN SITE ON A DAILY BASIS TO PROVIDE FOR POSITIVE DRAINAGE. CONTRACTOR, AT HIS COST, SHALL GRADE SITE AND PROVIDE NECESSARY TEMPORARY DRAINAGE SWALES TO INSURE STORM WATER DOES NOT POND ON SITE.

17. SITE DRAINAGE SHALL BE ESTABLISHED TO PREVENT ANY PONDED WATER CONDITIONS WITHIN THE CONSTRUCTION AREA AND TO FACILITATE STORM WATER DISCHARGE.

18. THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES.

19. LIME RATES AND ANALYSIS:

19.1. AGRICULTURAL LIME SHALL BE APPLIED AT THE RATE SHOWN IN THE SEEDING SECTION UNLESS SOIL TESTS INDICATE OTHERWISE. GRADED AREAS REQUIRE LIME APPLICATION. IF LIME IS APPLIED WITHIN SIX MONTHS OF PLANTING PERMANENT PERENNIAL VEGETATION, ADDITIONAL LIME IS NOT REQUIRED. AGRICULTURAL LIME APPLICATION SHALL BE WITHIN THE SPECIFICATIONS OF THE SOUTH CAROLINA DEPARTMENT OF AGRICULTURE.

20. MULCHING:

MULCHING IS REQUIRED FOR ALL PERMANENT VEGETATION APPLICATIONS. MULCH APPLIED TO SEEDED AREAS SHALL ACHIEVE 75% SOIL COVER. SELECT THE MULCHING MATERIAL FROM THE FOLLOWING AND APPLY AS INDICATED:

20.1. DRY STRAW OR DRY HAY OF GOOD QUALITY AND FREE OF WEED SEEDS CAN BE USED. DRY STRAW SHALL BE APPLIED AT THE RATE OF TWO TONS PER ACRE. DRY HAY SHALL BE APPLIED AT THE RATE OF 2 1/2 TONS PER ACRE.
20.2. WOOD CELLULOSE MULCH OR WOOD PULP FIBER SHALL BE USED WITH HYDRAULIC SEEDING. IT SHALL BE APPLIED AT A RATE OF 500 POUNDS PER ACRE. DRY STRAW OR DRY HAY SHALL BE APPLIED (AT THE RATE INDICATED ABOVE) AFTER HYDRAULIC SEEDING.
20.3. ONE THOUSAND POUNDS OF WOOD CELLULOSE OR WOOD PULP FIBER, WHICH INCLUDES A TACKIFIER, SHALL BE USED WITH HYDRAULIC SEEDING ON SLOPES 3/4:1 OR STEEPER.
20.4. SERICEA LESPEDEZA HAY CONTAINING MATURE SEED SHALL BE APPLIED AT A RATE OF 3 TONS PER ACRE.
20.5. PINE STRAW OR PINE BARK SHALL BE APPLIED AT A THICKNESS OF 3 INCHES FOR BEDDING PURPOSES. OTHER SUITABLE MATERIALS IN SUFFICIENT QUANTITY MAY BE USED WHERE ORNAMENTALS OR OTHER GROUND COVERS ARE PLANTED. THIS IS NOT APPROPRIATE FOR SEEDED AREAS.
20.6. WHEN USING TEMPORARY EROSION CONTROL BLANKETS OR BLACK SOD, MULCH IS NOT REQUIRED.
20.7. ON SLOPES GREATER THAN 10 FEET IN LENGTH AND 4:1 OR STEEPER, USE THE FOLLOWING EROSION CONTROL BLANKETS THAT HAVE BEEN PROPERLY ANCHORED TO THE SLOPE ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS:

- 2:1 SLOPES OR STEEPER: - STRAW/COCONUT BLANKET OR HIGH VELOCITY WOOD BLANKET
- 3:1 SLOPES OR STEEPER: - WOOD OR STRAW BLANKET WITH NET ON BOTH SIDES
- 4:1 SLOPES OR FLATTER: - WOOD OR STRAW MULCH BLANKET WITH NET ON ONE SIDE

VIII. HOUSEKEEPING

THESE PERFORMANCE STANDARDS APPLY TO ALL SITES.

1. PETROLEUM PRODUCTS: INCLUDING OIL, GASOLINE, LUBRICANTS AND ASPHALTIC SUBSTANCES.

1.1. HAVE EQUIPMENT TO CONTAIN AND CLEAN UP PETROLEUM SPILLS IN FUEL STORAGE AREAS OR ON MAINTENANCE AND FUELING VEHICLES
1.2. STORE IN COVERED AREAS PROTECTED WITH DIKES

2. SPILLS: PREVENTION AND RESPONSE.

2.1. STORE AND HANDLE MATERIALS TO PREVENT SPILLS
2.2. TIGHTLY SEALED CONTAINERS, NEAT AND SECURE STACKING, ETC.
2.3. REDUCE STORM WATER CONTACT IF SPILL OCCURS
2.3.1. CLEANUP PROCEDURES SHOULD BE CLEARLY POSTED.
2.3.2. CLEANUP MATERIALS SHOULD BE READILY AVAILABLE
2.3.3. STOP THE SOURCE
2.3.4. CONTAIN THE SPILL

3. NON-STORM WATER DISCHARGES

THE FOLLOWING NON-STORMWATER DISCHARGES MUST BE PROTECTED FROM CAUSING POLLUTION OR EROSION:

3.1. DISCHARGES FROM FIRE-FIGHTING ACTIVITIES
3.2. FIRE HYDRANT FLUSHINGS
3.3. WATERS USED TO WASH VEHICLES WHERE DETERGENTS ARE NOT USED
3.4. WATER USED TO CONTROL DUST
3.5. POTABLE WATER INCLUDING UNCONTAMINATED WATER LINE FLUSHINGS
3.6. ROUTINE EXTERNAL BUILDING WASH DOWN THAT DOES NOT USE DETERGENTS
3.7. PAVEMENT WASH WATERS WHERE SPILLS OR LEAKS OF TOXIC OR HAZARDOUS MATERIALS HAVE NOT OCCURRED (UNLESS ALL SPILLED MATERIAL HAS BEEN REMOVED) AND WHERE DETERGENTS ARE NOT USED
3.8. UNCONTAMINATED AIR CONDITIONING OR COMPRESSOR CONDENSATE
3.9. UNCONTAMINATED GROUND WATER OR SPRING WATER
3.10. FOUNDATION OR FOOTING DRAINS WHERE FLOWS ARE NOT CONTAMINATED WITH PROCESS MATERIALS SUCH AS SOLVENTS
3.11. UNCONTAMINATED EXCAVATION DEWATERING
3.12. LANDSCAPE IRRIGATION
3.13. DECHLORINATED SWIMMING POOL DISCHARGES.

4. CONSTRUCTION WASTES: DEMOLITION RUBBLE, PACKAGING MATERIALS, SCRAP BUILDING SUPPLIES, ETC.

4.1. SELECT A DESIGNATED WASTE COLLECTION AREA
4.2. PROVIDE LIDS FOR WASTE CONTAINERS
4.3. WHEN POSSIBLE LOCATE CONTAINERS IN COVERED AREA
4.4. MAINTAIN CONSISTENT REMOVAL SCHEDULE FOR WASTE

5. PESTICIDES: REDUCE THE AMOUNT OF PESTICIDES AVAILABLE FOR CONTACT WITH STORM WATER.

5.1. STORE IN A DRY COVERED AREA
5.2. INSTALL CURBS OR DIKES AROUND STORAGE AREA TO PROTECT AGAINST SPILLS
5.3. STRICTLY FOLLOW RECOMMENDED APPLICATION RATES

6. FERTILIZERS AND DETERGENTS: REDUCE THE AMOUNT OF FERTILIZERS AND DETERGENTS AVAILABLE FOR CONTACT WITH STORM WATER.

6.1. LIMIT APPLICATION OF FERTILIZERS TO THE MINIMUM NEEDED
6.2. APPLY MORE FREQUENTLY BUT AT LOWER APPLICATION RATES
6.3. LIMIT USE OF DETERGENTS ON-SITE
6.4. DO NOT DISCHARGE WASH WATER INTO STORM WATER SYSTEM
6.5. MAINTAIN STRUCTURAL AND VEGETATIVE BMP'S
6.6. APPLY ACCORDING TO SOIL TEST RECOMMENDATIONS PRIOR TO SEEDING.

IX. GRASSING NOTES

1. SOD:

ALL SOD SHALL BE NURSERY GROWN AS CLASSIFIED IN THE ASPS GSS. MACHINE CUT SOD AT A UNIFORM THICKENS OF 3/4" WITHIN A TOLERANCE OF 1/4", EXCLUDING TOP GROWTH AND THATCH. EACH INDIVIDUAL SOD PIECE SHALL BE STRONG ENOUGH TO SUPPORT ITS OWN WEIGHT WHEN LIFTED BY THE ENDS. BROKEN PODS, IRREGULARLY SHAPED PIECES, AND TORN OR UNEVEN ENDS WILL BE REJECTED. WOOD PEGS AND / OR WIRE STAPLES SHALL REPLACE SOD WITH AN EQUAL SOD COMPOSITION AS THAT WHICH IS EXISTING. IF NO SOD TYPE EXIST. THEN THE FOLLOWING SOD COMPOSITION SHALL BE USED.

2. SODDING SCHEDULE:

LAY SOD FROM MAY 1 TO SEPTEMBER 15 FOR SPRING PLANTING AND FROM SEPTEMBER 15 TO NOVEMBER 1 FOR FALL PLANTING.

3. SEED:

ALL SEED SHALL CONFORM TO ALL STATE LAWS AND TO ALL REQUIREMENTS AND REGULATIONS OF THE SOUTH CAROLINA DEPARTMENT OF AGRICULTURE. THE SEVERAL VARIETIES OF SEED SHALL BE INDIVIDUALLY PACKAGED OR BAGGED, AND TAGGED TO SHOW NAME OF SEED, NET WEIGHT, ORIGIN, GERMINATION, LOT NUMBER, AND OTHER INFORMATION REQUIRED BY THE DEPARTMENT OF AGRICULTURE.

3.1. PENNISETUM GLAUCIUM (BROWNTOP MILLET): TESTING 98 PERCENT PURITY AND 85 PERCENT GERMINATION.
3.2. BERMUDA COMMON: TESTING 98 PERCENT PURITY AND 85 PERCENT GERMINATION.
3.3. DOMESTIC ITALIAN RYE: TESTING 98 PERCENT PURITY AND 90 PERCENT GERMINATION.

4. MISCELLANEOUS:

4.1. PERMANENT SEEDING SHALL COVER ALL DISTURBED AREA NOT TO BE COVERED BY LANDSCAPE PLANTING BEDS, STRUCTURE, OR PAVEMENT.
4.2. SEED ALL DISTURBED AREAS WITHIN SEVEN DAYS OF FINAL GRADING AND TEMPORARY SEED/MULCH ALL AREAS THAT WILL BE LEFT INACTIVE FOR MORE THAN FOURTEEN (14) DAYS.
4.3. ALL PERMANENT GRASS PLANTINGS SHALL BE MULCHED
4.4. CENTIPEDE SOD CAN BE USED AS PERMANENT COVER ANYTIME EXCEPT JUNE THRU OCTOBER
4.5. IF GRASSING OCCURS DURING A MONTH REQUIRING TEMPORARY COVER, THE CONTRACTOR SHALL APPLY PERMANENT COVER (IN ADDITION TO THE TEMPORARY COVER) AT THE APPROPRIATE TIME AT NO NO ADDITIONAL COST. THE CONTRACTOR MUST ACHIEVE A STRAND OF PERMANENT GRASS WITH AT LEAST 95% COVER. BARE SPOTS CAN NOT BE MORE THAN 1 INCH SQUARE IN ANY 10 SF.

X. PERMANENT STABILIZATION

NEWLY SEEDED OR SODDED AREAS MUST BE PROTECTED FROM VEHICLE TRAFFIC,EXCESSIVE PEDESTRIAN TRAFFIC, AND CONCENTRATED RUNOFF UNTIL THE VEGETATION IS WELL ESTABLISHED. IF NECESSARY, AREAS MUST BE RE-WORKED AND RE-STABILIZED IF GERMINATION IS SPARSE, PLANT COVERAGE IS SPOTTY ,OR TOPSOIL EROSION IS EVIDENT. ONE OR MORE OF THE FOLLOWING MAY APPLY TO THE SITE.

4.1. SEEDED AREAS

FOR SEEDED AREAS, PERMANENT STABILIZATION MEANS A 90% COVER OF THE DISTURBED AREA WITH MATURE, HEALTHY PLANTS WITH NO EVIDENCE OF WASHING OR RILLING OF THE TOPSOIL.

4.2. SODDED AREAS

FOR SODDED AREAS, PERMANENT STABILIZATION MEANS THE COMPLETE BINDING OF THE SOD ROOTS INTO THE APPROVED MULCH MATERIAL.

4.3. PERMANENT MULCH

FOR MULCHED AREAS, PERMANENT MULCHING MEANS TOTAL COVERAGE OF THE EXPOSED AREA WITH AN APPROVED MULCH MATERIAL.

4.4. RIPRAP

FOR AREAS STABILIZED WITH RIPRAP, PERMANENT STABILIZATION MEANS THAT SLOPES STABILIZED WITH RIPRAP HAVE AN APPROPRIATE BACKING OF AN APPROVED GEOTEXTILE TO PREVENT SOIL MOVEMENT FROM BEHIND THE RIPRAP.

4.5. DITCHES, CHANNELS, AND SWALES

FOR OPEN CHANNELS, PERMANENT STABILIZATION MEANS THE CHANNEL IS STABILIZED WITH MATURE VEGETATION AT LEAST THREE INCHES IN HEIGHT, WITH WELL-GRADED RIPRAP LINING, OR WITH ANOTHER NON-EROSIVE LINING CAPABLE OF WITHSTANDING THE ANTICIPATED FLOW VELOCITIES AND FLOW DEPTHS WITHOUT RELIANCE ON CHECK DAMS TO SLOW FLOW. THERE MUST BE NO EVIDENCE OF SLUMPING OF THE LINING, UNDERCUTTING OF THE BANKS, OR DOWN CUTTING OF THE CHANNEL.

XI. FERTILIZER REQUIREMENTS

1. TEMPORARY SEEDING FERTILIZER

APPLY A MINIMUM OF 500 LBS PER ACRE OF A COMPLETE 10-10-10 FERTILIZER (11.5 POUNDS PER 1000 SQUARE FEET) OR EQUIVALENT DURING TEMPORARY SEEDING OF GRASSES UNLESS A SOIL TEST INDICATES A DIFFERENT REQUIREMENT. INCORPORATE FERTILIZER AND LIME (IF USED) INTO THE TOP 4-6 INCHES OF THE SOIL BY DISKING OR OTHER MEANS WHERE CONDITIONS ALLOW. LIME IS NOT REQUIRED FOR TEMPORARY SEEDING UNLESS A SOIL TEST SHOWS THAT THE SOIL PH IS BELOW 5.0. IT IS DESIRABLE TO APPLY LIME DURING THE TEMPORARY SEEDING OPERATION TO BENEFIT THE LONG-TERM PERMANENT SEEDING. APPLY A MINIMUM OF 1.5 TONS OF LIME / ACRE (70LBS. / 1000 SQ. FT.).

2. PERMANENT SEEDING FERTILIZER

APPLY A MINIMUM OF 1000 LBS PER ACRE OF A COMPLETE 10-10-10 FERTILIZER (23 POUNDS PER 1000 SQUARE FEET) OR EQUIVALENT DURING PERMANENT SEEDING OF GRADES UNLESS A SOIL TEST INDICATES A DIFFERENT REQUIREMENT. INCORPORATE FERTILIZER AND LIME (IF USED) INTO THE TOP 4-6 INCHES OF THE SOIL BY DISKING OR OTHER MEANS WHERE CONDITIONS ALLOW. DO NOT MIX THE LIME AND THE FERTILIZER PRIOR TO THE FIELD APPLICATION. UNLESS A SPECIFIC SOIL TEST INDICATES OTHERWISE, APPLY 1 & 1/2 TONS OF GROUND COARSE TEXTURED AGRICULTURAL LIMESTONE PER ACRE (70 LBS. / 1000 SQ.FT.).

XII. SWPP PREPARER CERTIFICATION

I HAVE PLACED MY SIGNATURE AND SEAL ON THE DESIGN DOCUMENTS SUBMITTED SIGNIFYING THAT I ACCEPT RESPONSIBILITY FOR THE DESIGN OF THE SYSTEM. FURTHER, I CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THE DESIGN IS CONSISTENT WITH THE REQUIREMENTS OF TITLE 48, CHAPTER 14 OF THE CODE OF LAWS OF SC, 1976 AS AMENDED, PURSUANT TO REGULATION 72-300 ET SEQ. (IF APPLICABLE), AND IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF SCR100000.

NO.	REVISIONS	BY	DATE

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BRP KIAWAH LLC
CHARLESTON COUNTY, SOUTH CAROLINA
KIAWAH SENIOR LIVING
SWPPP - NOTES

JOB NO:	J-27151.0000
DATE:	7/17/18
DRAWN:	BRW
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMW
SCALE:	N/A

EC0.1

STORMWATER POLLUTION PREVENTION PLAN

TEMPORARY SEEDING - COASTAL

SPECIES	LABS/AC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SANDY, DROUGHTY SITES													
BROWNTOP MILLET	40			■	■	■	■	■	■				
RYE, GRAIN	56	■	■	■						■	■	■	■
RYEGRASS	50	■	■	■	■					■	■	■	■
WELL DRAINED, CLAYEY/LOAMEY SITES													
BROWNTOP MILLET JAPANESE MILLET	40 40			■	■	■	■	■	■				
RYE, GRAIN OATS	56 75	■	■	■						■	■	■	■
RYEGRASS	50	■	■	■	■					■	■	■	■

PERMANENT SEEDING - COASTAL

SPECIES	LABS/AC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SANDY, DROUGHTY SITES													
BROWNTOP MILLET BAHIAGRASS	10 40			■	■	■	■	■	■				
BROWNTOP MILLET BAHIAGRASS SERICEA LESPEDEZA	10 30 40			■	■	■	■	■	■				
BROWNTOP MILLET ATLANTIC COASTAL PANICGRASS	10 15 PLS			■	■	■	■						
BROWNTOP MILLET SWITCHGRASS (ALAMO) LITTLE BLUESTEM SERICEA LESPEDEZA	10 8 PLS 4 20			■	■	■	■						
BROWNTOP MILLET WEEPING LOVEGRASS	10 8			■	■	■	■						
WELL DRAINED, CLAYEY/LOAMEY SITES													
BROWNTOP MILLET BAHIAGRASS	10 40			■	■	■	■	■	■				
RYE, GRAIN BAHIAGRASS CLOVER, CRIMSON (ANNUAL)	10 40 5									■	■	■	
BROWNTOP MILLET BAHIAGRASS SERICEA LESPEDEZA	10 30 40			■	■	■	■	■	■				
BROWNTOP MILLET BERMUDA, COMMON SERICEA LESPEDEZA	10 10 40			■	■	■	■	■	■				
BROWNTOP MILLET BERMUDA, COMMON KOBE LESPEDEZA (ANNUAL)	10 12 10			■	■	■	■	■	■				
BROWNTOP MILLET BAHIAGRASS BERMUDA, COMMON SERICEA LESPEDEZA	10 20 6 40			■	■	■	■	■	■				
BROWNTOP MILLET SWITCHGRASS LITTLE BLUESTEM INDIANGRASS	10 8 PLS 3			■	■	■	■	■	■				

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
SILT FENCE	
CLEARING LIMITS	CL CL
DIVERSION DIKE	DD
DIVERSION BERM	DB
TEMPORARY DIVERSION	TD
PERMANENT DIVERSION	PD
SUBSURFACE DRAIN	SSD
VEGETATED CHANNEL	
RIP RAP LINED CHANNEL	
ECB OR TRM LINED CHANNEL	
PAVED CHANNEL	PC
TREE PROTECTION	
SURFACE ROUGHENING	OR LG
TOP SOILING	
TEMPORARY SEEDING	TS
PERMANENT SEEDING	PS
MULCHING	M

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
EROSION CONTROL BLANKET OR TURF REINFORCEMENT MAT	
FLEXIBLE GROWTH MATRIX	FGM
BONDED FIBER MATRIX	BFM
SODDING	SO
SLOPED SODDING	
STAKED SOD	
STAKED SOD AROUND INLET	OR
RIPRAP	
OUTLET PROTECTION - RIP RAP	
OUTLET PROTECTION - ECB OR TRM	
DUST CONTROL	DC
POLYACRYLAMIDE (PAM)	PAM
SEDIMENT BASIN	
SEDIMENT BASIN WITH SKIMMER	
SEDIMENT TRAP	
ROCK SEDIMENT DIKE	
SEDIMENT TUBE	

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
ROCK CHECK DAM	OR
POROUS BAFFLES	
STABILIZED CONSTRUCTION ENTRANCE	
CONCRETE WASHOUT	
STORM DRAIN INLET PROTECTION - TYPE A FILTER FABRIC	A
STORM DRAIN INLET PROTECTION - TYPE A SEDIMENT TUBE	A
STORM DRAIN INLET PROTECTION - TYPE B HARDWARE FABRIC AND STONE	B
STORM DRAIN INLET PROTECTION - TYPE C BLOCK AND GRAVEL	C
STORM DRAIN INLET PROTECTION - TYPE D RIGID INLET FILTER	D
STORM DRAIN INLET PROTECTION - TYPE E SURFACE COURSE CURB INLET FILTER	E
STORM DRAIN INLET PROTECTION - TYPE F INLET TUBE	F
STORM DRAIN INLET PROTECTION - TYPE G IMPERVIOUS AREA	G
PIPE SLOPE DRAINS	
TEMPORARY STREAM CROSSING	
LEVEL SPREADER	

CONSTRUCTION SEQUENCE

CONSTRUCTION ACTIVITY	SCHEDULE CONSIDERATION
1 OBTAIN COPIES OF ALL PLAN APPROVALS AND OTHER APPLICABLE PERMITS.	CONTRACTOR TO HAVE ONSITE AT ALL TIMES DURING CONSTRUCTION.
2 FLAG THE WORK LIMITS AND BARRICADE TREES AND MARK BUFFER AREAS FOR PROTECTION.	HAVE LOCAL REGULATORY AGENCY INSPECT TREE BARRICADES.
3 HOLD PRE CONSTRUCTION CONFERENCE AT LEAST ONE WEEK PRIOR TO STARTING CONSTRUCTION.	REVIEW TREE PROTECTION (BARRICADE) WITH OWNER AND LOCAL REGULATORY AGENCY. TAKE PICTURES OF ALL PROTECTED TREES AND LOCATIONS WHERE SITE WORK TIES INTO EXISTING TO DOCUMENT PREDEVELOPMENT PROCEDURES.
4 INSTALL CONSTRUCTION ACCESS AND LAY DOWN AREAS	STABILIZE BARE AREAS IMMEDIATELY AND INSTALL CONSTRUCTION EXITS / ENTRANCES.
5 ESTABLISH RUNOFF CONTROL - DIVERSIONS.	INSTALL KEY PRACTICES BEFORE LAND GRADING. INSTALL ADDITIONAL RUNOFF-CONTROL MEASURES DURING GRADING.
6 LAND CLEARING AND GRADING-SITE PREPARATION CUTTING, FILLING AND GRADING, SURFACE ROUGHENING.	BEGIN MAJOR CLEARING AND GRADING AFTER PRINCIPAL SEDIMENT AND KEY RUNOFF-CONTROL MEASURES ARE INSTALLED. CLEAR BORROW AND DISPOSAL AREAS ONLY AS NEEDED. INSTALL ADDITIONAL CONTROL MEASURES AS GRADING PROGRESSES. MARK TREES AND BUFFER AREAS FOR PRESERVATION.
7 RUNOFF CONVEYANCE SYSTEM- STABILIZE BANKS, SLOPE DRAINS.	WHERE NECESSARY, STABILIZE BANKS AS EARLY AS POSSIBLE. INSTALL PRINCIPAL RUNOFF CONVEYANCE SYSTEM WITH RUNOFF- CONTROL MEASURES. INSTALL REMAINDER OF SYSTEM AFTER GRADING.
8 SURFACE STABILIZATION-TEMPORARY AND PERMANENT SEEDING, MULCHING, SODDING, RIP RAP.	APPLY TEMPORARY OR PERMANENT STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS WHERE WORK IS DELAYED OR COMPLETE.
9 BULKHEAD AND DECK CONSTRUCTION.	INSTALL NECESSARY EROSION AND SEDIMENTATION CONTROL PRACTICES AS WORK TAKES PLACE.
10 LANDSCAPING AND FINAL STABILIZATION - TOPSOILING, TREES AND SHRUBS, PERMANENT SEEDING, MULCHING, SODDING, RIP RAP.	LAST CONSTRUCTION PHASE--STABILIZE ALL OPEN AREAS, INCLUDING BORROW AND SPOIL AREAS. REMOVE AND STABILIZE ALL TEMPORARY CONTROL MEASURES.

LIST OF ACRONYMS FOR SEDIMENT AND EROSION CONTROL

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AMD	ACRYLAMIDE POLYMER
BFM	BONDED FIBER MATRIX
BMP(S)	BEST MANAGEMENT PRACTICE(S)
CFS	CUBIC FEET PER SECOND
CMP	CORRUGATED METAL PIPE
DHEC	DEPARTMENT OF HEATH AND ENVIRONMENTAL CONTROL
ECB	EROSION CONTROL BLANKET
EPA	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
EPSC	EROSION PREVENTION AND SEDIMENTATION CONTROL
FDA	UNITED STATES FOOD AND DRUG ADMINISTRATION
FGM	FLEXIBLE GROWTH MATRIX
HDPE	HIGH DENSITY POLYETHYLENE
MS4	MUNICIPAL SEPARATE STORM SEWER SYSTEM
MSDS	MATERIAL SAFETY DATA SHEETS
NPDES	NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PAM	POLYACRYLAMIDE OR POLYMER
RCP	REINFORCED CONCRETE PIPE
SCS	SOIL CONSERVATION SERVICE
SWPPP	STORMWATER POLLUTION PREVENTION PROGRAM
TRM	TURF REINFORCEMENT MAT
VFS	VEGETATED FILTER STRIP

SOUTH CAROLINA THOMAS & HUTTON ENGINEERING CO. No. C00285 CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 14545 TONY MILTON WOODY

NO.	REVISIONS	BY	DATE

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CHARLESTON COUNTY, SOUTH CAROLINA
KIAWAH SENIOR LIVING
SWPPP - CHARTS

JOB NO:	J-27151.0000
DATE:	7/17/18
DRAWN:	BRW
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMW
SCALE:	N/A

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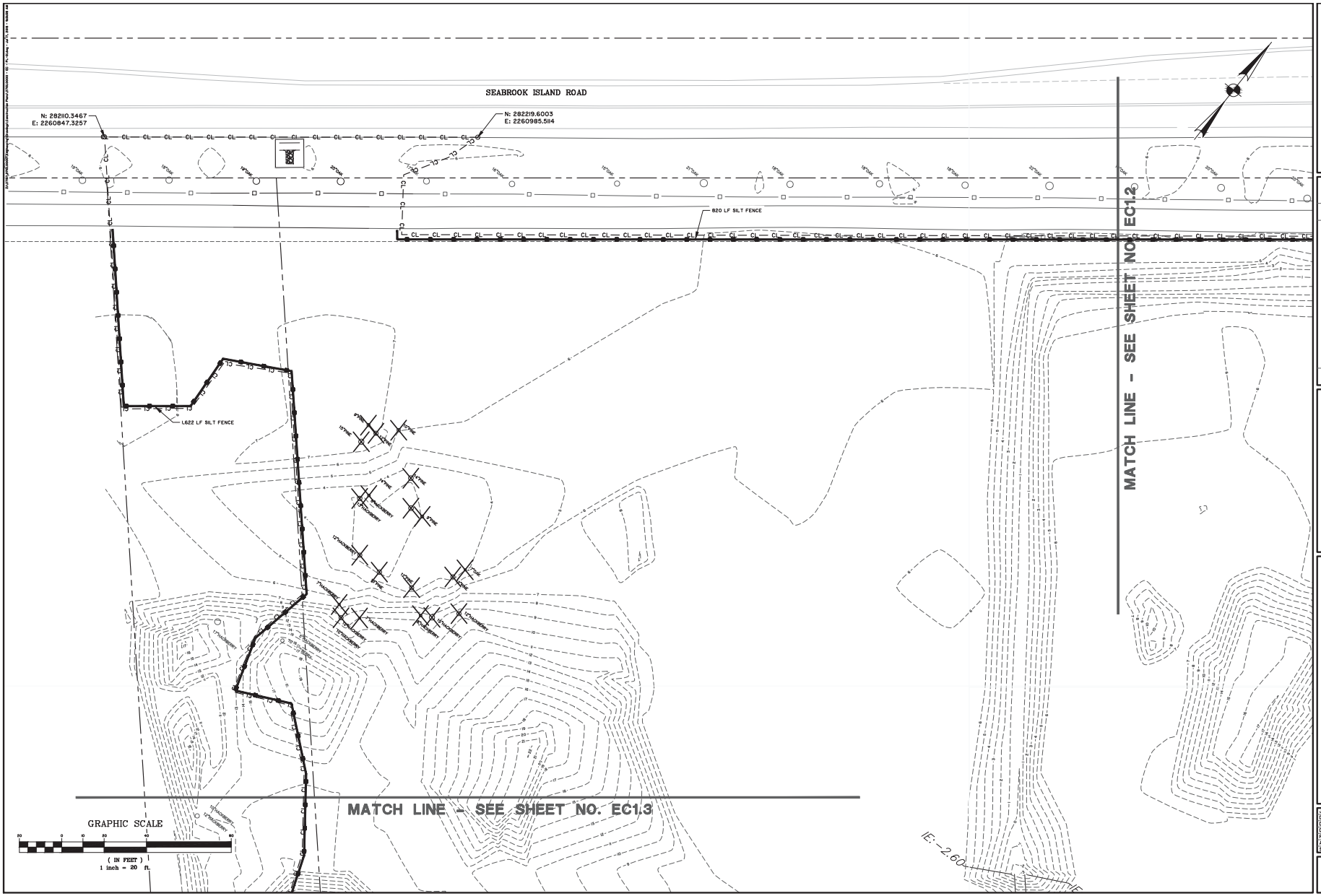

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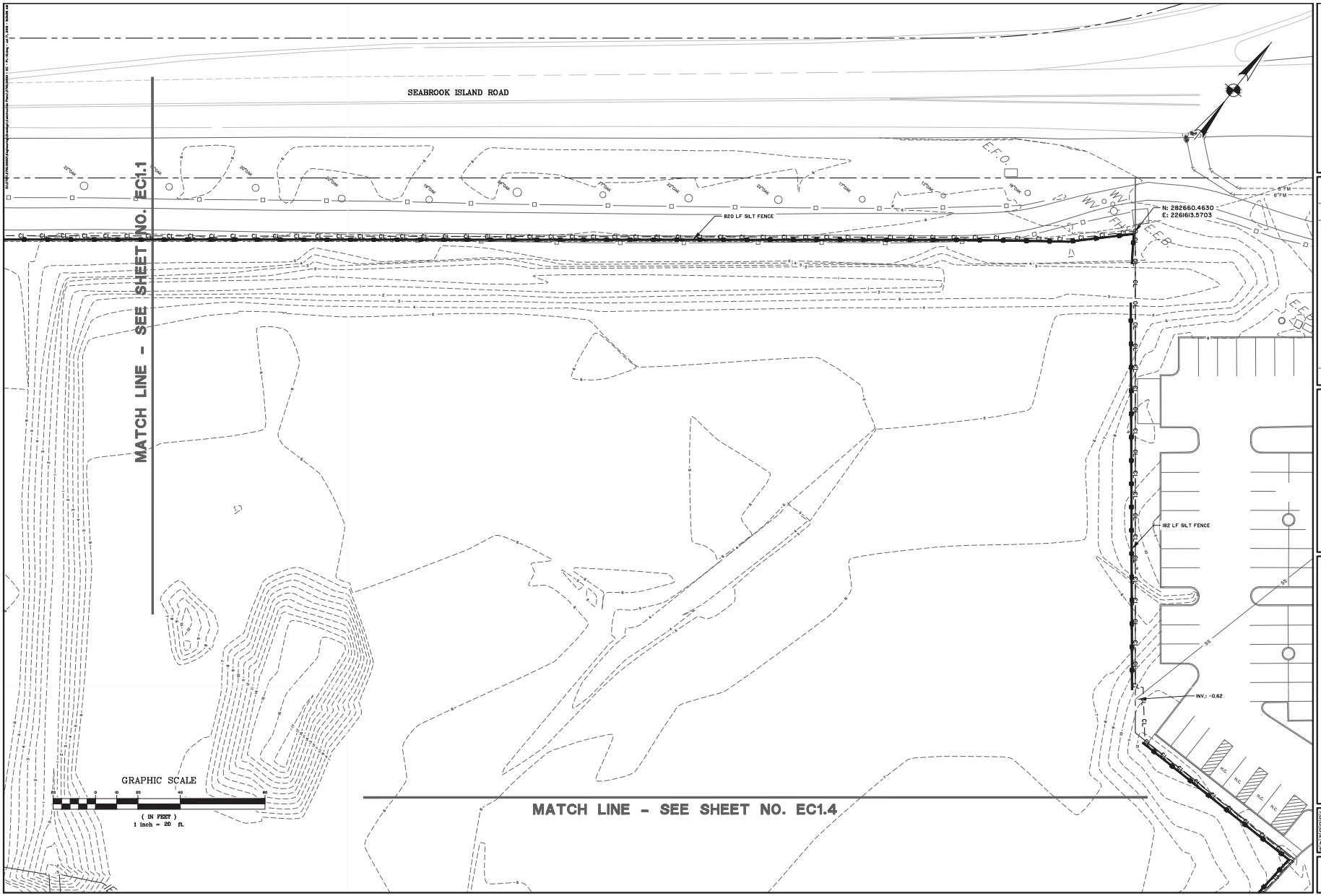

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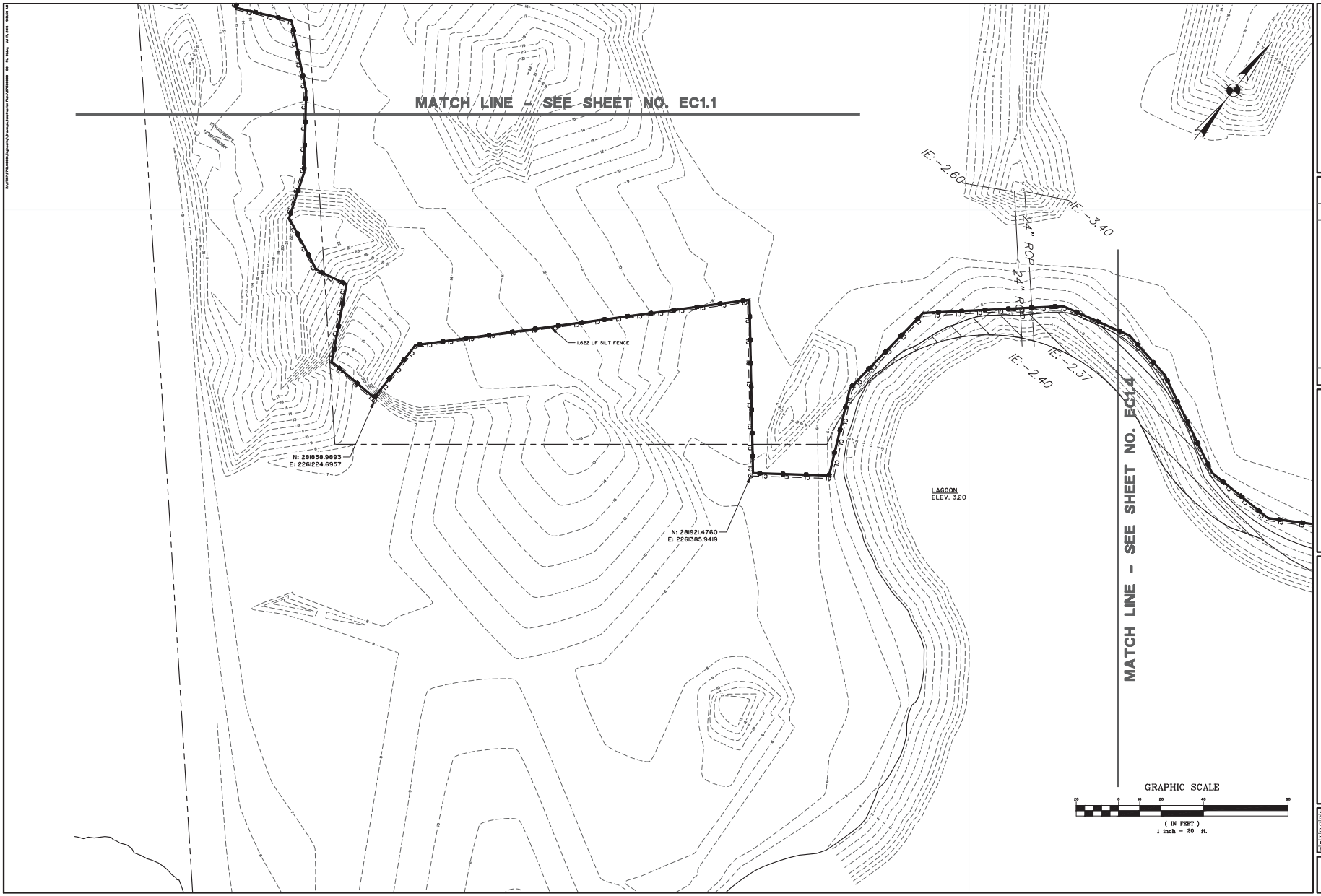

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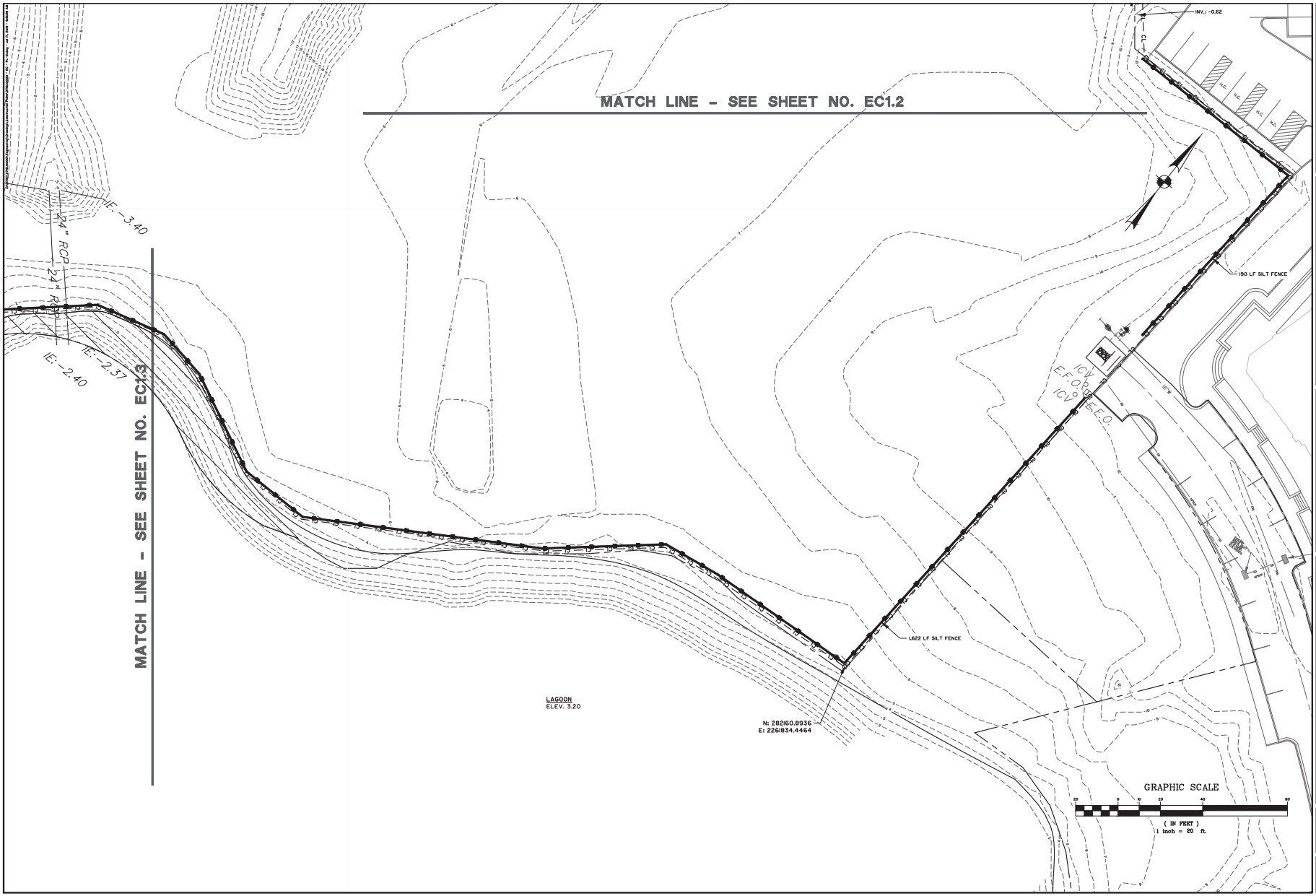

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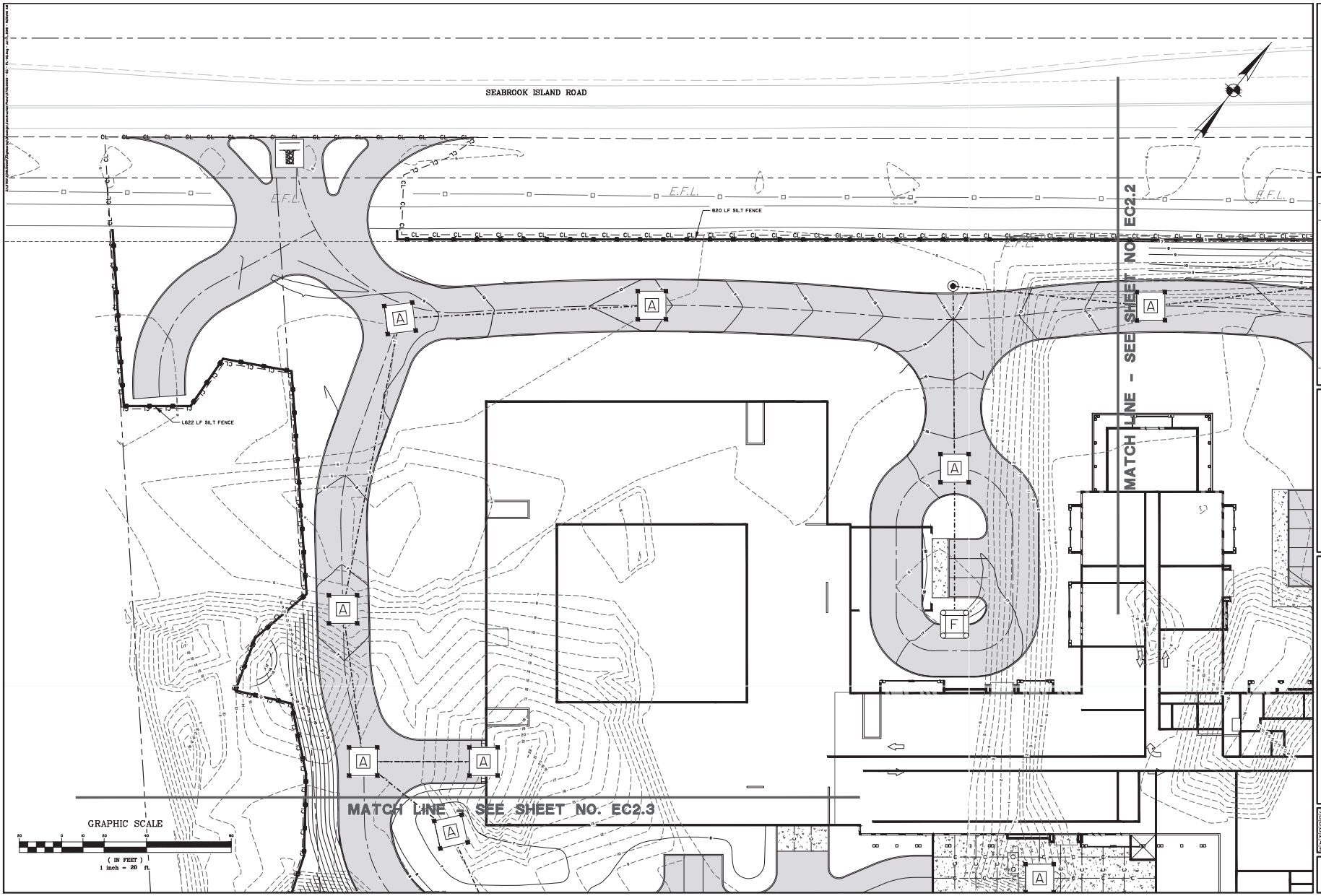

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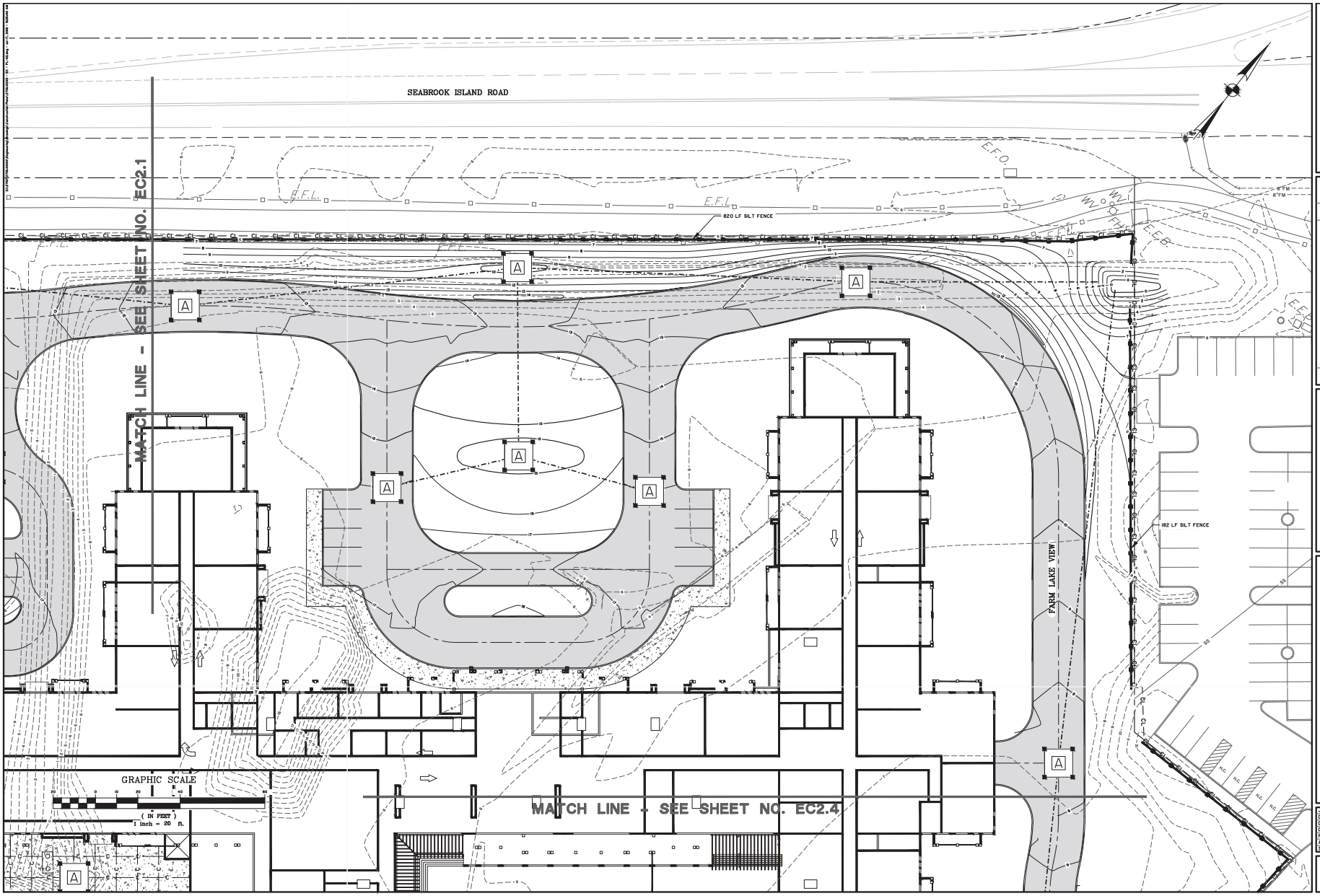

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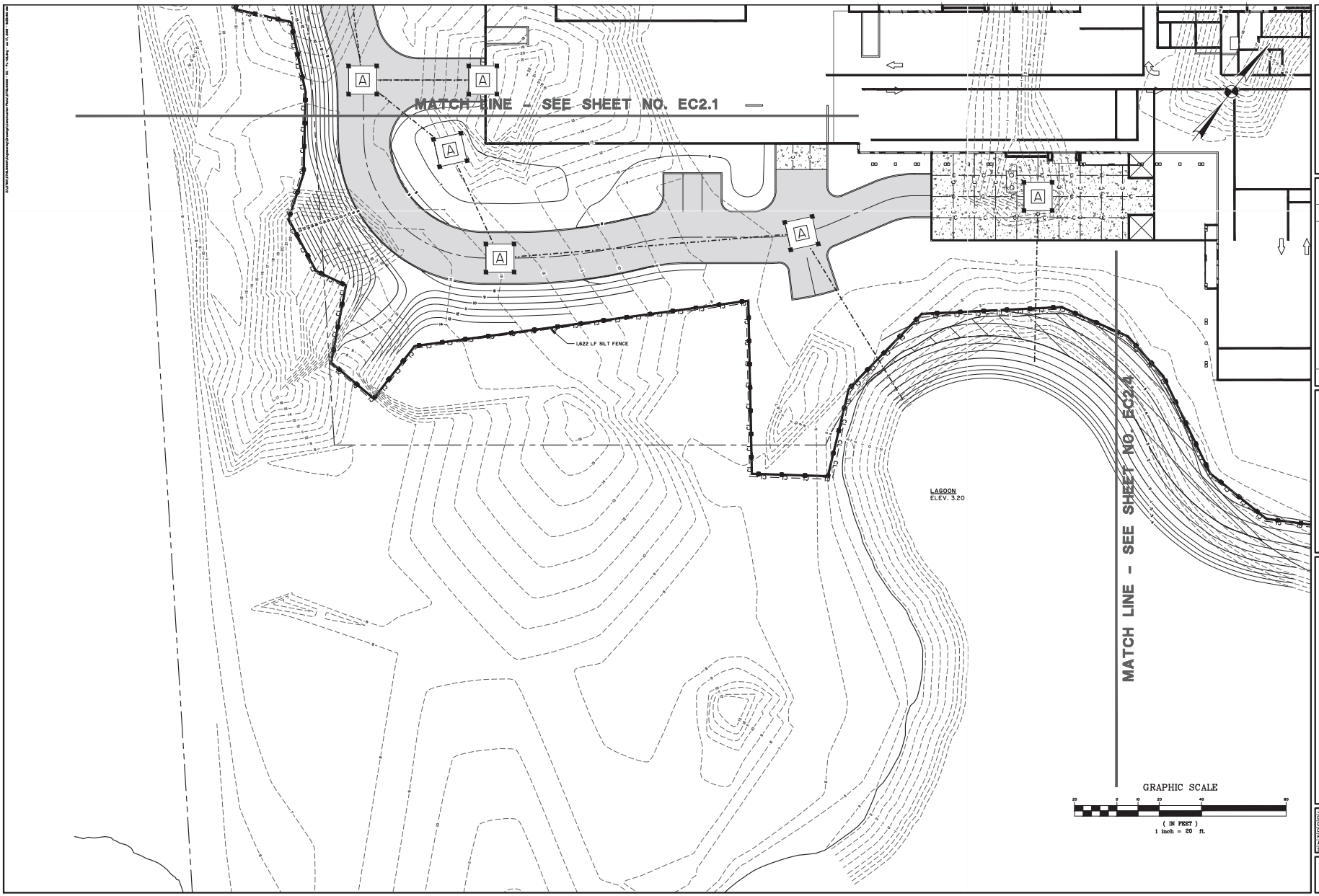

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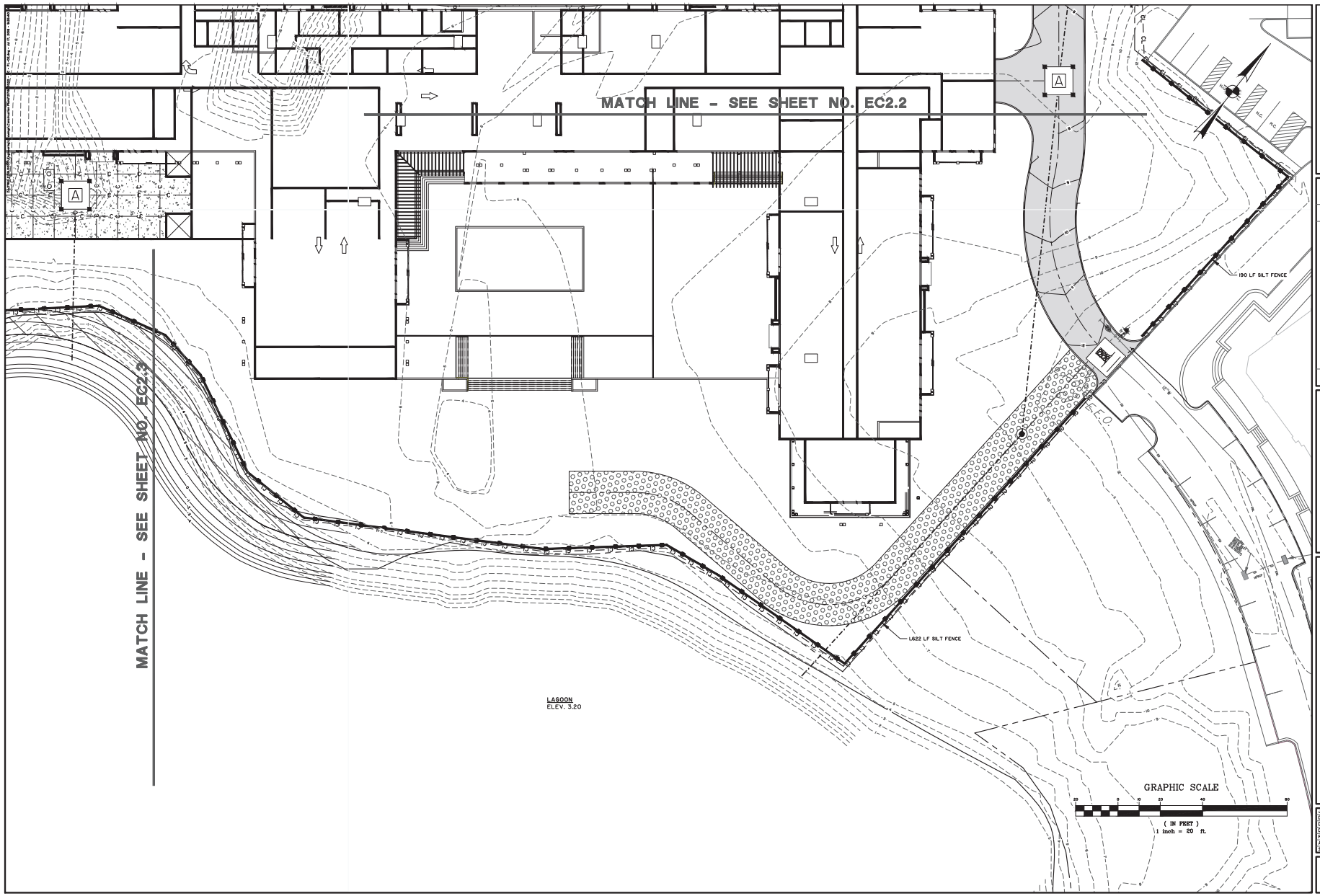

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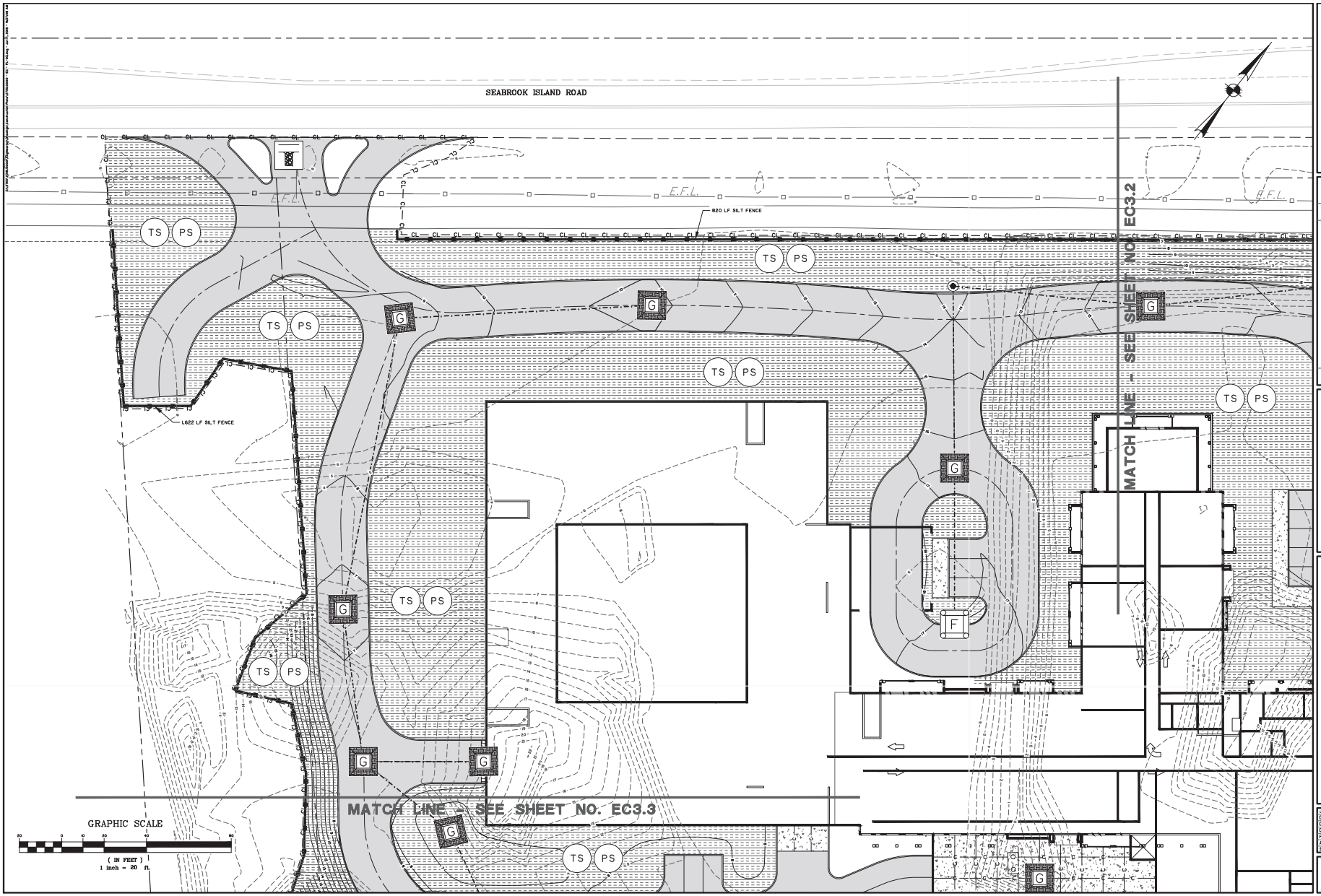

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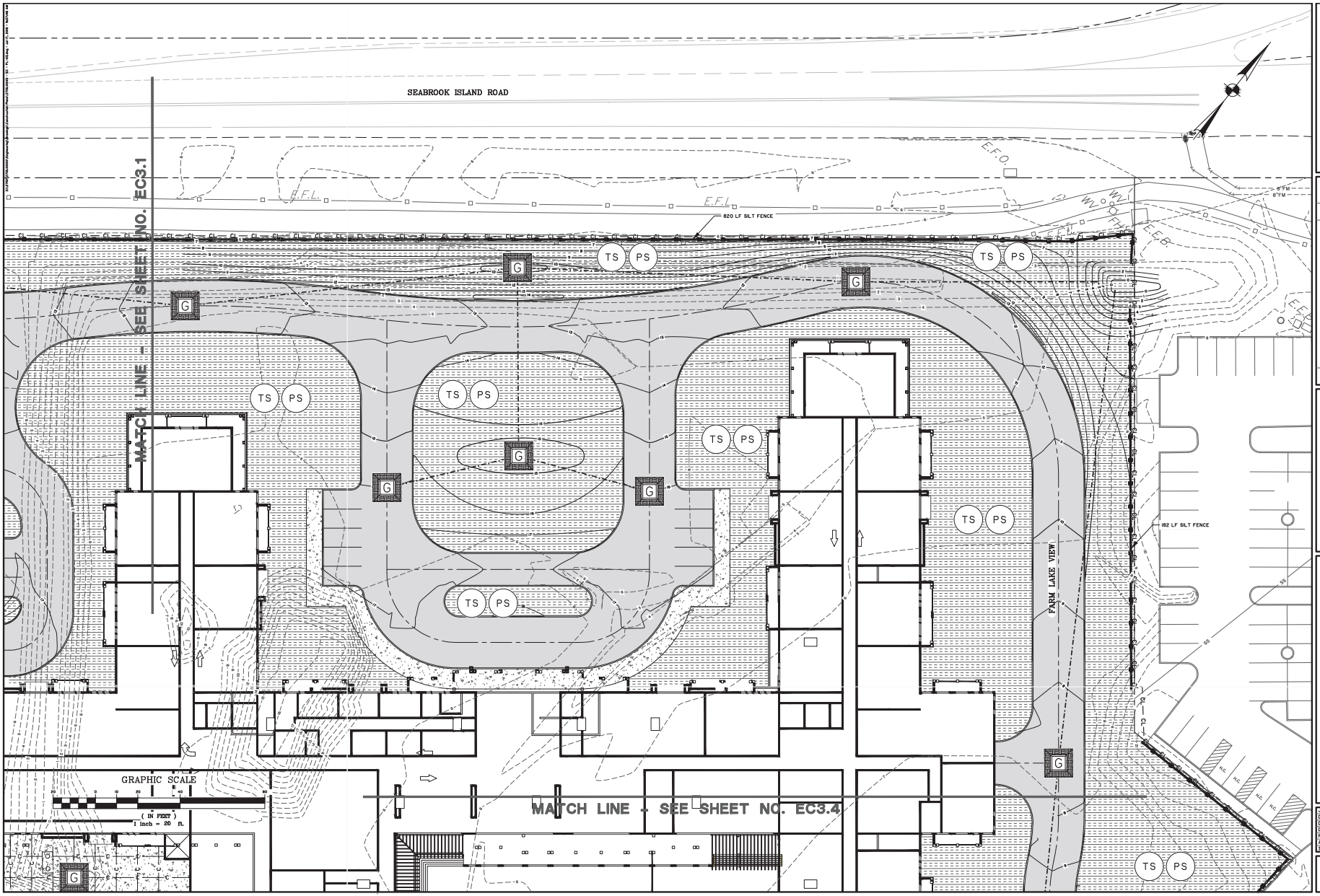

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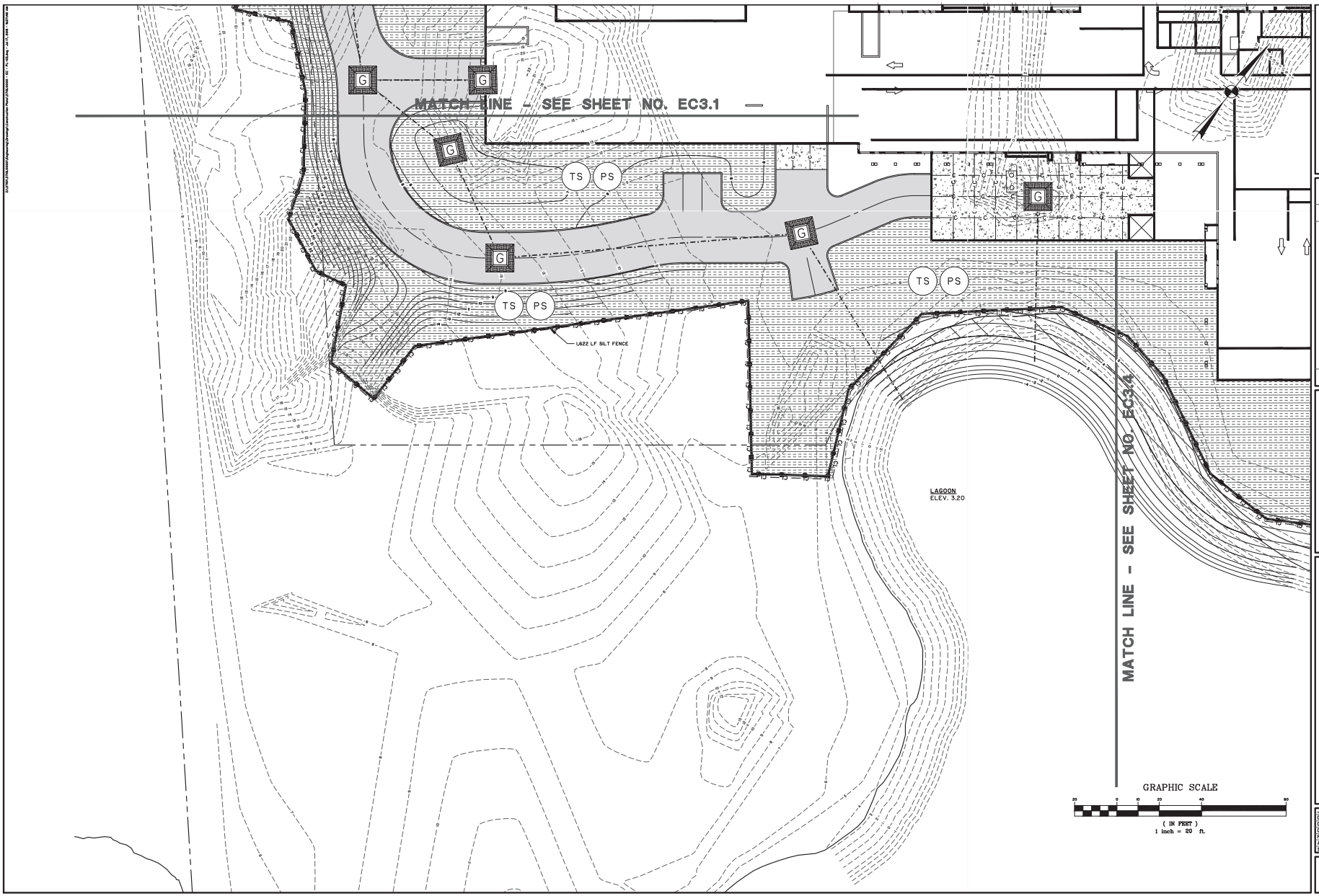

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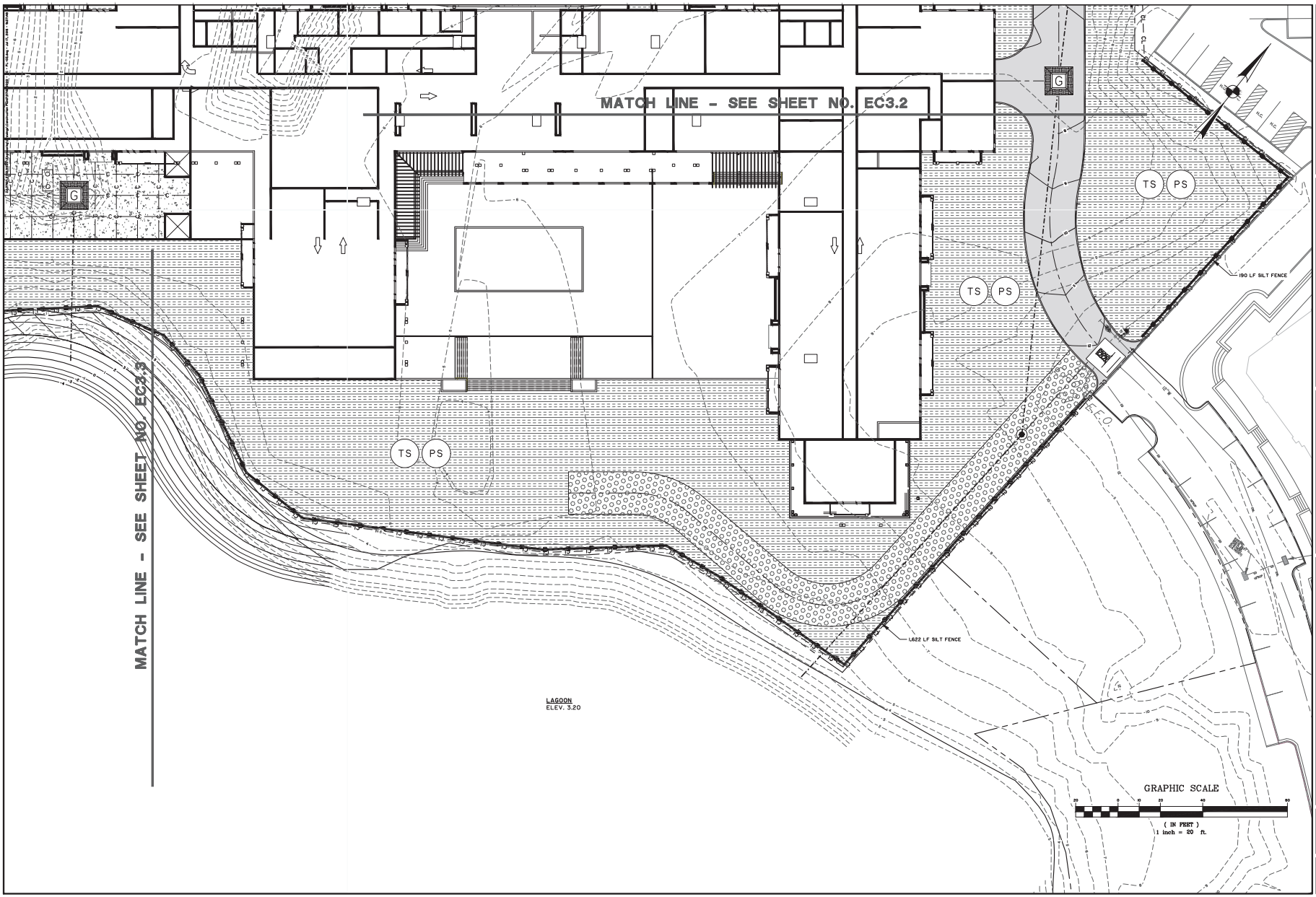

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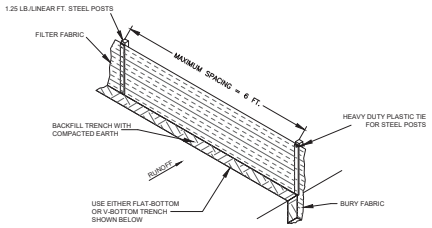
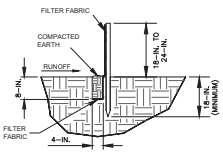
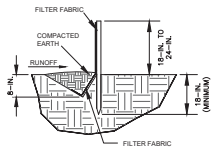


SILT FENCE INSTALLATION



FLAT-BOTTOM TRENCH DETAIL



V-SHAPED TRENCH DETAIL

WHEN AND WHERE TO USE IT:
SILT FENCE IS APPLICABLE IN AREAS:

WHERE THE MAXIMUM SHEET OR OVERLAND FLOW PATH LENGTH TO THE FENCE IS 100-FEET.
WHERE THE MAXIMUM SLOPE STEEPNESS (NORMAL [PERPENDICULAR] TO FENCE LINE) IS 2H:1V.
THAT DO NOT RECEIVE CONCENTRATED FLOWS GREATER THAN 0.5 CFS.

DO NOT PLACE SILT FENCE ACROSS CHANNELS OR USE IT AS A VELOCITY CONTROL BMP.

MATERIALS:
STEEL POSTS
USE 48-INCH LONG STEEL POSTS THAT MEET THE FOLLOWING MINIMUM PHYSICAL REQUIREMENTS:
COMPOSED OF HIGH STRENGTH STEEL WITH MINIMUM YIELD STRENGTH OF 50,000 PSI.
HAVE A STANDARD "T" SECTION WITH A NOMINAL FACE WIDTH OF 1.38-INCHES AND NOMINAL "T" LENGTH OF 1.48-INCHES.
WEIGH 1.25 POUNDS PER FOOT (± 8%).
HAVE A SOIL STABILIZATION PLATE WITH A MINIMUM CROSS SECTION AREA OF 17-SQUARE INCHES ATTACHED TO THE STEEL POSTS.
PAINTED WITH A WATER BASED BAKED ENAMEL PAINT.

USE STEEL POSTS WITH A MINIMUM LENGTH OF 4-FEET, WEIGHING 1.25 POUNDS PER LINEAR FOOT (± 8%) WITH PROJECTIONS TO AID IN FASTENING THE FABRIC. EXCEPT WHEN HEAVY CLAY SOILS ARE PRESENT ON SITE, STEEL POSTS WILL HAVE A METAL SOIL STABILIZATION PLATE WELDED NEAR THE BOTTOM SUCH THAT WHEN THE POST IS DRIVEN TO THE PROPER DEPTH, THE PLATE WILL BE BELOW THE GROUND LEVEL FOR ADDED STABILITY.
THE SOIL PLATES SHOULD HAVE THE FOLLOWING CHARACTERISTICS:
BE COMPOSED OF MINIMUM 16 GAUGE STEEL.
HAVE A MINIMUM CROSS SECTION AREA OF 17-SQUARE INCHES.

GEOTEXTILE FILTER FABRIC:
FILTER FABRIC IS:
COMPOSED OF FIBERS CONSISTING OF LONG CHAIN SYNTHETIC POLYMERS COMPOSED OF AT LEAST 85% BY WEIGHT OF POLYOLEFINS, POLYESTERS, OR POLYAMIDES.
FORMED INTO A NETWORK SUCH THAT THE FILAMENTS OR YARNS RETAIN DIMENSIONAL STABILITY RELATIVE TO EACH OTHER.
FREE OF ANY TREATMENT OR COATING WHICH MIGHT ADVERSELY ALTER ITS PHYSICAL PROPERTIES AFTER INSTALLATION.
FREE OF DEFECTS OR FLAWS THAT SIGNIFICANTLY AFFECT ITS PHYSICAL AND/OR FILTERING PROPERTIES.
CUT TO A MINIMUM WIDTH OF 36 INCHES.

USE ONLY FABRIC APPEARING ON SCDOT APPROVAL SHEET #34 MEETING THE REQUIREMENTS OF THE MOST CURRENT EDITION OF THE SCDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

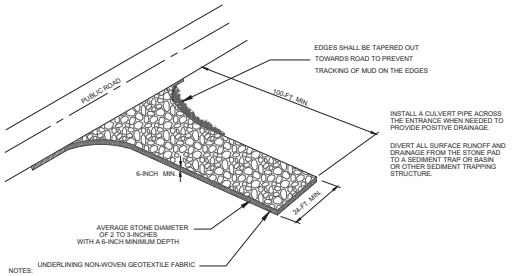
INSTALLATION:
EXCAVATE A TRENCH APPROXIMATELY 6-INCHES WIDE AND 6-INCHES DEEP WHEN PLACING FABRIC BY HAND. PLACE 12-INCHES OF GEOTEXTILE FABRIC INTO THE 6-INCH DEEP TRENCH, EXTENDING THE REMAINING 6-INCHES TOWARDS THE UPSLOPE SIDE OF THE TRENCH. BACKFILL THE TRENCH WITH SOIL OR GRAVEL AND COMPACT. BURY 12-INCHES OF FABRIC INTO THE GROUND WHEN PNEUMATICALLY INSTALLING SILT FENCE WITH A SLICING METHOD. PURCHASE FABRIC IN CONTINUOUS ROLLS AND CUT TO THE LENGTH OF THE BARRIER TO AVOID JOINTS. WHEN JOINTS ARE NECESSARY, WRAPPED THE FABRIC TOGETHER AT A SUPPORT POST WITH BOTH ENDS FASTENED TO THE POST, WITH A 6-INCH MINIMUM OVERLAP.
INSTALL POSTS TO A MINIMUM DEPTH OF 24-INCHES. INSTALL POSTS A MINIMUM OF 1- TO 2- INCHES ABOVE THE FABRIC, WITH NO MORE THAN 3-FEET OF THE POST ABOVE THE GROUND. SPACE POSTS TO MAXIMUM 6-FEET CENTERS. ATTACH FABRIC TO WOOD POSTS USING STAPLES MADE OF HEAVY-DUTY WIRE AT LEAST 1-1/2-INCH LONG, SPACED A MAXIMUM OF 8-INCHES APART. STAPLE A 2-INCH WIDE LATHE OVER THE FILTER FABRIC TO SECURELY FASTEN IT TO THE UPSLOPE SIDE OF WOODEN POSTS. ATTACH FABRIC TO THE STEEL POSTS USING HEAVY-DUTY PLASTIC TIES THAT ARE EVENLY SPACED AND PLACED IN A MANNER TO PREVENT SAGGING OR TEARING OF THE FABRIC. IN CALL CASES, TIES SHOULD BE AFFIXED IN NO LESS THAN 4 PLACES. INSTALL THE FABRIC A MINIMUM OF 24-INCHES ABOVE THE GROUND. WHEN NECESSARY, THE HEIGHT OF THE FENCE ABOVE GROUND MAY BE GREATER THAN 24-INCHES. IN TIDAL AREAS, EXTRA SILT FENCE HEIGHT MAY BE REQUIRED. THE POST HEIGHT WILL BE TWICE THE EXPOSED POST HEIGHT. POST SPACING WILL REMAIN THE SAME AND EXTRA HEIGHT FABRIC WILL BE 4-, 5-, OR 6-FEET TALL.
LOCATE SILT FENCE CHECKS EVERY 100 FEET MAXIMUM AND AT LOW POINTS. INSTALL THE FENCE PERPENDICULAR TO THE DIRECTION OF FLOW AND PLACE THE FENCE THE PROPER DISTANCE FROM THE TOE OF STEEP SLOPES TO PROVIDE SEDIMENT STORAGE AND ACCESS FOR MAINTENANCE AND CLEANOUT.

INSPECTION AND MAINTENANCE:
CHECK FOR SEDIMENT BUILDUP AND FENCE INTEGRITY. CHECK WHERE RUNOFF HAS ERODED A CHANNEL BENEATH THE FENCE, OR WHERE THE FENCE HAS SAGGED OR COLLAPSED BY FENCE OVERTOPPING. IF THE FENCE FABRIC TEARS, BEGINS TO DECOMPOSE, OR IN ANY WAY BECOMES INEFFECTIVE, REPLACE THE SECTION OF FENCE IMMEDIATELY. REMOVE SEDIMENT ACCUMULATED ALONG THE FENCE WHEN IT REACHES 1/3 THE HEIGHT OF THE FENCE, ESPECIALLY IF HEAVY RAINS ARE EXPECTED. REMOVE TRAPPED SEDIMENT FROM THE SITE OR STABILIZE IT ON SITE. REMOVE SILT FENCE WITHIN 30 DAYS AFTER FINAL STABILIZATION IS ACHIEVED OR

AFTER TEMPORARY BEST MANAGEMENT PRACTICES (BMPS) ARE NO LONGER NEEDED. PERMANENTLY STABILIZE DISTURBED AREAS RESULTING FROM FENCE REMOVAL.

SILT FENCE

NOT TO SCALE



NOTES:

WHEN AND WHERE TO USE IT:

STABILIZED CONSTRUCTION ENTRANCES SHOULD BE USED AT ALL POINTS WHERE TRAFFIC WILL BE LEAVING A CONSTRUCTION SITE AND MOVING DIRECTLY ONTO A PUBLIC ROAD.

IMPORTANT CONSIDERATIONS:

IF WASHING IS USED, PROVISIONS MUST BE MADE TO INTERCEPT THE WASH WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFFSITE. WASHDOWN FACILITIES SHALL BE REQUIRED AS DIRECTED BY SCDHEC AS NEEDED. WASHDOWN AREAS IN GENERAL MUST BE ESTABLISHED WITH CRUSHED GRAVEL AND DRAIN INTO A SEDIMENT TRAP OR SEDIMENT BASIN.

CONSTRUCTION ENTRANCES SHOULD BE USED IN CONJUNCTION WITH THE STABILIZATION OF CONSTRUCTION ROADS TO REDUCE THE AMOUNT OF MUD PICKED UP BY VEHICLES.

INSTALLATION:

REMOVE ALL VEGETATION AND ANY OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA.

DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM STONES TO A SEDIMENT TRAP OR BASIN.

INSTALL A NON-WOVEN GEOTEXTILE FABRIC PRIOR TO PLACING ANY STONE.

INSTALL A CULVERT PIPE ACROSS THE ENTRANCE WHEN NEEDED TO PROVIDE POSITIVE DRAINAGE.

THE ENTRANCE SHALL CONSIST OF 1-INCH TO 3-INCH D50 STONE PLACED AT A MINIMUM DEPTH OF 6-INCHES.

MINIMUM DIMENSIONS OF THE ENTRANCE SHALL BE 24-FEET WIDE BY 100-FEET LONG, AND MAY BE MODIFIED AS NECESSARY TO ACCOMMODATE SITE CONSTRAINTS.

THE EDGES OF THE ENTRANCE SHALL BE TAPERED OUT TOWARDS THE ROAD TO PREVENT TRACKING OF MUD AT THE EDGE OF THE ENTRANCE.

INSPECTION AND MAINTENANCE:

INSPECT CONSTRUCTION ENTRANCES EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24-HOURS AFTER EACH RAINFALL EVENT THAT PRODUCES 1/2-INCHES OR MORE OF PRECIPITATION, OR AFTER HEAVY USE. CHECK FOR MUD AND SEDIMENT BUILDUP AND PAD INTEGRITY. MAKE DAILY INSPECTIONS DURING PERIODS OF WET WEATHER. MAINTENANCE IS REQUIRED MORE FREQUENTLY IN WET WEATHER CONDITIONS. RESHAPE THE STONE PAD AS NEEDED FOR DRAINAGE AND RUNOFF CONTROL.

WASH OR REPLACE STONES AS NEEDED. THE STONE IN THE ENTRANCE SHOULD BE WASHED OR REPLACED WHENEVER THE ENTRANCE FAILS TO REDUCE MUD BEING CARRIED OFF-SITE BY VEHICLES.

FREQUENT WASHING WILL EXTEND THE USEFUL LIFE OF STONE.

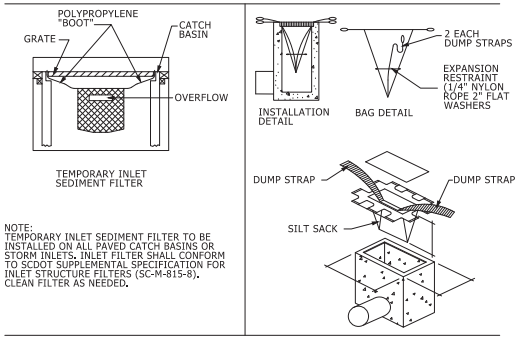
IMMEDIATELY REMOVE MUD AND SEDIMENT TRACKED OR WASHED ONTO PUBLIC ROADS BY BRUSHING OR SWEEPING. FLUSHING SHOULD ONLY BE USED WHEN THE WATER CAN BE DISCHARGED TO A SEDIMENT TRAP OR BASIN.

REPAIR ANY BROKEN PAVEMENT IMMEDIATELY.

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE

SCE

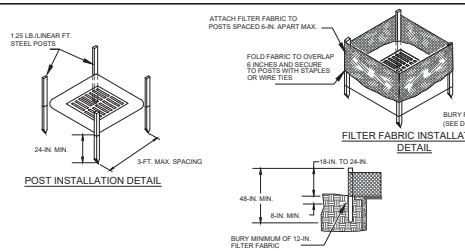


NOTE:
TEMPORARY INLET SEDIMENT FILTER TO BE INSTALLED ON ALL PAVED CATCH BASINS OR STORM INLETS. INLET FILTER SHALL CONFORM TO SCDOT SUPPLEMENTAL SPECIFICATION FOR INLET STRUCTURE FILTERS (SC-M-815-8). CLEAN FILTER AS NEEDED.

G

SILT SACK DETAIL (TYPE G)

NOT TO SCALE



POST INSTALLATION DETAIL

FILTER FABRIC INSTALLATION DETAIL

FILTER FABRIC BURIAL DETAIL

MATERIALS:
USE FILTER FABRIC THAT CONFORMS TO SCDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (LATEST EDITION).

USE STEEL POSTS THAT MEET THE FOLLOWING MINIMUM PHYSICAL REQUIREMENTS:
BE COMPOSED OF HIGH STRENGTH STEEL WITH MINIMUM YIELD STRENGTH OF 50,000 PSI.
HAVE A STANDARD "T" SECTION WITH A NOMINAL FACE WIDTH OF 1.38-INCHES AND NOMINAL "T" LENGTH OF 1.48-INCHES.
WEIGH 1.25 POUNDS PER FOOT (± 8%).
BE PAINTED WITH A WATER BASED BAKED ENAMEL PAINT.

INSTALLATION:
EXCAVATE A TRENCH 6-INCHES WIDE AND 6-INCHES DEEP AROUND THE OUTSIDE PERIMETER OF THE INLET UNLESS THE FABRIC IS PNEUMATICALLY INSTALLED.

EXTEND THE FILTER FABRIC A MINIMUM OF 12-INCHES INTO THE TRENCH. BACKFILL THE TRENCH WITH SOIL OR CRUSHED STONE AND COMPACT OVER THE FILTER FABRIC UNLESS THE FABRIC IS PNEUMATICALLY INSTALLED.

USE STEEL POSTS WITH A MINIMUM POST LENGTH OF 60-INCHES CONSISTING OF STANDARD "T" SECTIONS WITH A WEIGHT OF 1.25 POUNDS PER FOOT (±8%). INSTALL THE FILTER FABRIC TO A MINIMUM HEIGHT OF 24-INCHES ABOVE GRADE. SPACE THE STEEL POSTS AROUND THE PERIMETER OF THE INLET A MAXIMUM OF 3-FEET APART AND DRIVE THEM INTO THE GROUND A MINIMUM OF 24-INCHES. CUT THE FILTER FABRIC FROM A CONTINUOUS ROLL TO THE LENGTH OF THE PROTECTED AREA TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE NECESSARY, WRAP FILTER FABRIC TOGETHER ONLY AT A SUPPORT POST WITH BOTH ENDS SECURELY FASTENED TO THE POST, WITH A MINIMUM 6-INCH OVERLAP.

ATTACH FABRIC TO STEEL POSTS WITH HEAVY-DUTY PLASTIC TIES.

ATTACH AT LEAST FOUR (4) EVENLY SPACED TIES IN A MANNER TO PREVENT SAGGING OR TEARING OF THE FABRIC. IN ALL CASES, AFFIX TIES IN NO LESS THAN FOUR (4) PLACES.

INSPECTION AND MAINTENANCE:

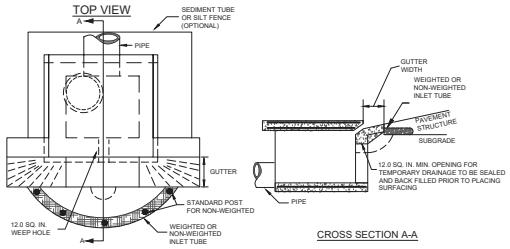
SEDIMENT SHOULD BE REMOVED WHEN IT REACHES APPROXIMATELY 1/3 THE HEIGHT OF THE FENCE. TAKE CARE NOT TO DAMAGE OR UNDERCUT FABRIC WHEN REMOVING SEDIMENT. IF A BUMP IS USED, SEDIMENT SHOULD BE REMOVED WHEN IT FILLS APPROXIMATELY 1/3 THE DEPTH OF THE HOLE. MAINTAIN THE POOL AREA, ALWAYS PROVIDING ADEQUATE SEDIMENT STORAGE VOLUME FOR THE NEXT STORM.

STORM DRAIN INLET PROTECTION STRUCTURES SHOULD BE REMOVED ONLY AFTER THE DISTURBED AREAS ARE PERMANENTLY STABILIZED. REMOVE ALL CONSTRUCTION MATERIAL AND SEDIMENT, AND DISPOSE OF THEM PROPERLY. GRADE THE DISTURBED AREA TO THE ELEVATION OF THE DROP INLET STRUCTURE CREST. USE APPROPRIATE PERMANENT STABILIZATION METHODS TO STABILIZE BARE AREAS AROUND THE INLET.

A

FILTER FABRIC INLET PROTECTION (TYPE A)

NOT TO SCALE



CROSS SECTION A-A

MATERIALS:

USE INLET TUBES THAT EXHIBIT THE FOLLOWING PROPERTIES:
PRODUCED BY A MANUFACTURER EXPERIENCED IN SEDIMENT TUBE MANUFACTURING.
COMPOSED OF COMPACTED GEOTEXTILES, CURLED EXCELSIOR WOOD, NATURAL COCONUT FIBERS OR HARDWOOD MULCH OR A MIX OF THESE MATERIALS ENCLOSED BY A FLEXIBLE NETTING MATERIAL. DO NOT USE STRAW, STRAW FIBER, STRAW BALES, PINE NEEDLES OR LEAF MULCH UNDER THIS SPECIFICATION. UTILIZE AN OUTER NETTING THAT CONSISTS OF SEAMLESS, HIGH-DENSITY POLYETHYLENE PHOTODEGRADABLE MATERIALS TREATED WITH ULTRAVIOLET STABILIZERS OR A SEAMLESS, HIGH-DENSITY POLYETHYLENE NON-DEGRADABLE MATERIALS. CURLED WOOD EXCELSIOR FIBER, OR NATURAL COCONUT FIBER ROLLED EROSION CONTROL PRODUCTS (RECP) ROLLED UP TO CREATE AN INLET TUBE DEVICES ARE NOT ALLOWED UNDER THIS SPECIFICATION.

WEIGHTED INLET TUBES:
WEIGHTED INLET TUBES ARE SEDIMENT TUBES CAPABLE OF STAYING IN PLACE WITHOUT EXTERNAL STABILIZATION MEASURES AND MAY HAVE A WEIGHTED INNER CORE OR OTHER WEIGHTED MECHANISM TO KEEP THEM IN PLACE.

MATERIALS:
APPLICABLE TYPE F WEIGHTED INLET TUBES MAY BE SELECTED FROM THE SCDOT APPROVED PRODUCTS LIST.

INSTALLATION:
INSTALL WEIGHTED INLET TUBES LYING FLAT ON THE GROUND, WITH NO GAPS BETWEEN THE UNDERLYING SURFACE AND THE INLET TUBE. NEVER STACK WEIGHTED INLET TUBES ON TOP OF ONE ANOTHER.

DO NOT COMPLETELY BLOCK INLETS WITH WEIGHTED INLET TUBES.

INSTALL WEIGHTED INLET TUBES IN SUCH A MANNER THAT ALL OVERFLOW OR OVERTOPPING WATER HAS THE ABILITY TO ENTER THE INLET UNOBSTRUCTED.

TO AVOID POSSIBLE FLOODING, TWO OR THREE CONCRETE CINDER BLOCKS MAY BE PLACED BETWEEN THE WEIGHTED INLET TUBES AND THE INLET.

NON-WEIGHTED INLET TUBES
NON-WEIGHTED INLET TUBES ARE DEFINED AS SEDIMENT TUBES THAT REQUIRE STAKING OR OTHER STABILIZATION METHODS TO KEEP THEM SAFELY IN PLACE.

MATERIALS:
APPLICABLE TYPE F NON-WEIGHTED INLET TUBES MAY BE SELECTED FROM THE SCDOT APPROVED PRODUCTS LIST.

INSPECTION AND MAINTENANCE:
INLET TUBES MAY BE TEMPORARILY MOVED DURING CONSTRUCTION AS NEEDED.
REPLACE INLET TUBES DAMAGED DURING INSTALLATION AS DIRECTED BY THE ENGINEER OR MANUFACTURER'S REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE.

F

TYPE F INLET TUBES

NOT TO SCALE

THOMAS & HUTTON ENGINEERING Co. No. COA2285
SOUTH CAROLINA PROFESSIONAL ENGINEER No. 14540 CERTIFICATE OF AUTHORIZATION
THOMAS & HUTTON
682 Johnnie Dodds Boulevard • Suite 100
Mt. Pleasant, SC 29464 • 843.849.0200
www.thomasandhutton.com

NO.	REVISIONS	BY	DATE

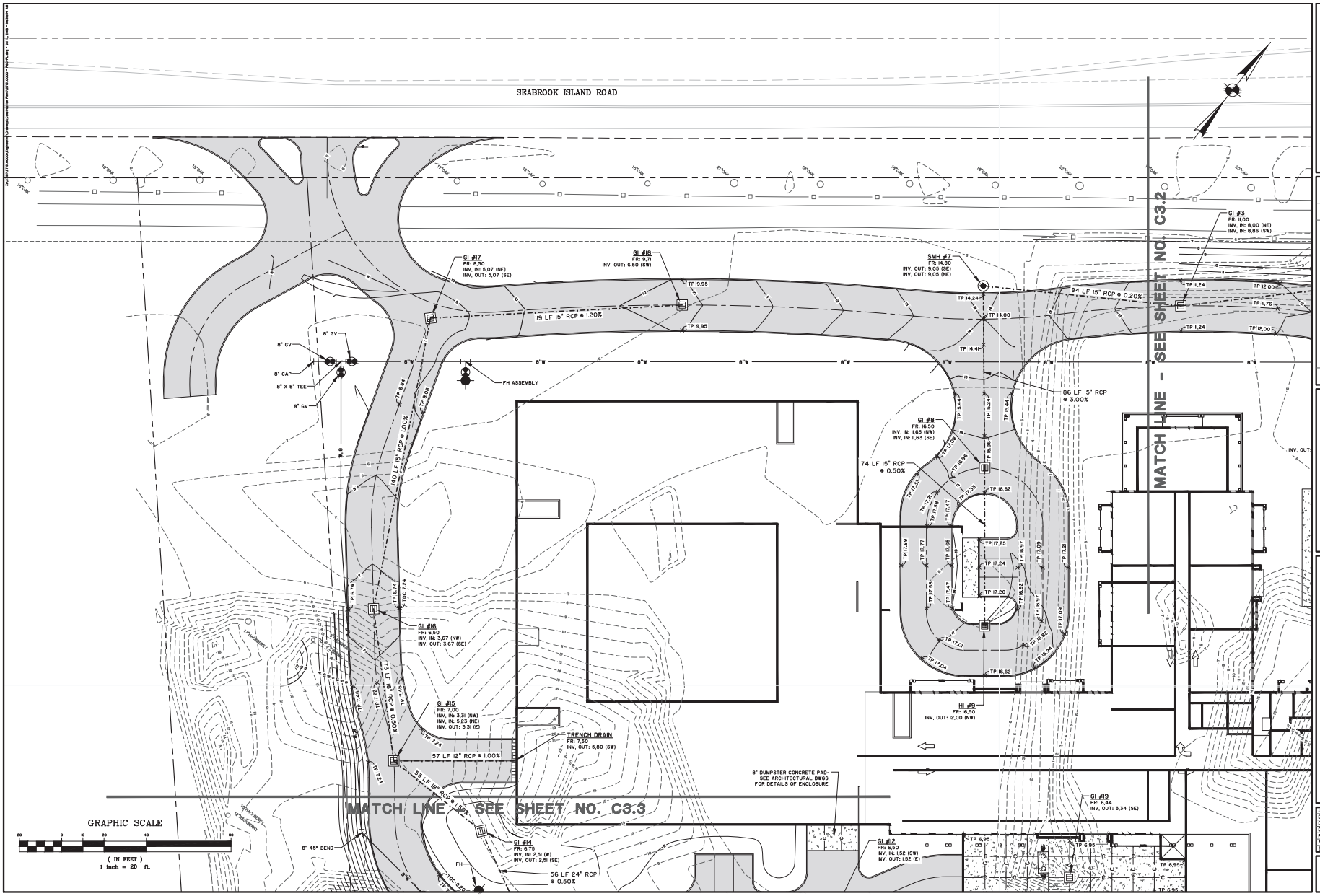
BRP KIAWAH LLC
CHARLESTON COUNTY, SOUTH CAROLINA

KIAWAH SENIOR LIVING

SWPPP - DETAILS

JOB NO:	J-2715.0000
DATE:	7/17/18
DRAWN:	BRW
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMM
SCALE:	N/A

EC4.1



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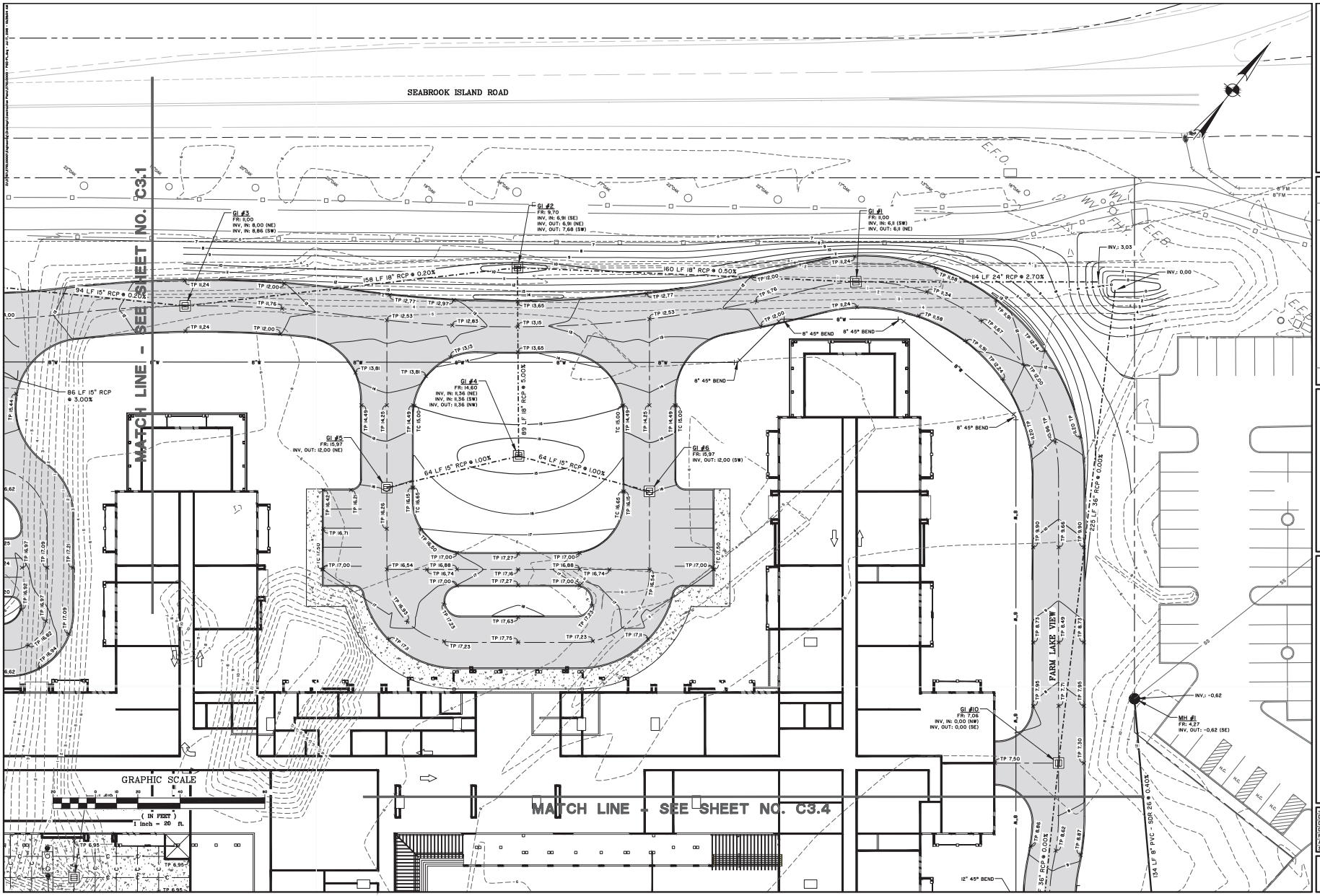
BRP KIAWAH LLC
CHARLESTON COUNTY, SOUTH CAROLINA
KIAWAH SENIOR LIVING
SITE DEVELOPMENT PLAN

JOB NO:	J-27151.0000
DATE:	7/17/19
DRAWN:	BRW
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMW
SCALE:	1" = 20'

C3.1



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BRP KIAWAH LLC
CHARLESTON COUNTY, SOUTH CAROLINA

KIAWAH SENIOR LIVING

SITE DEVELOPMENT PLAN

JOB NO:	J-2715.0000
DATE:	7/17/18
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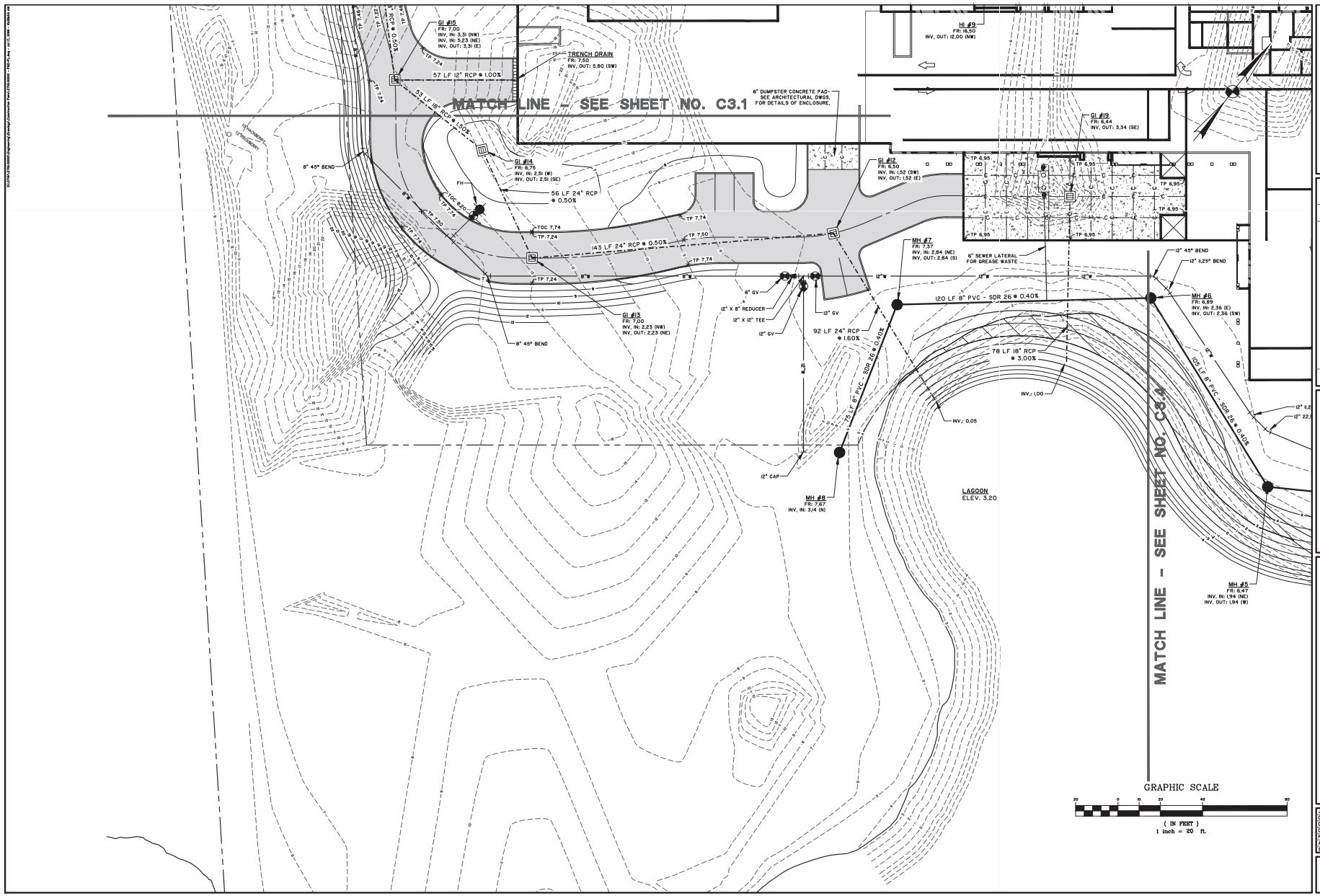
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMM
SCALE:	1" = 20'

C3.2



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SITE DEVELOPMENT

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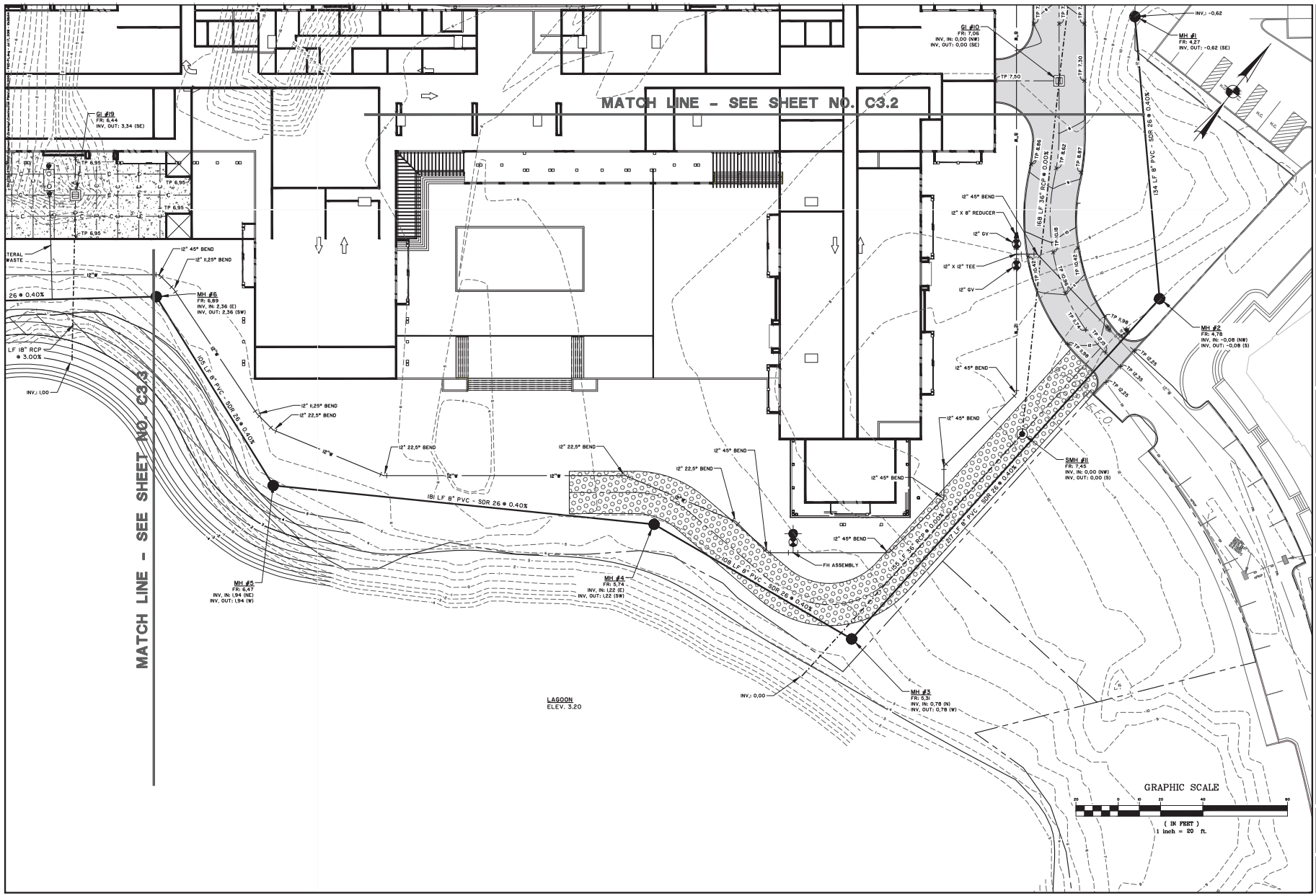
REVIEWED:	WEF
APPROVED:	TMW
SCALE:	1" = 20'

C3.3



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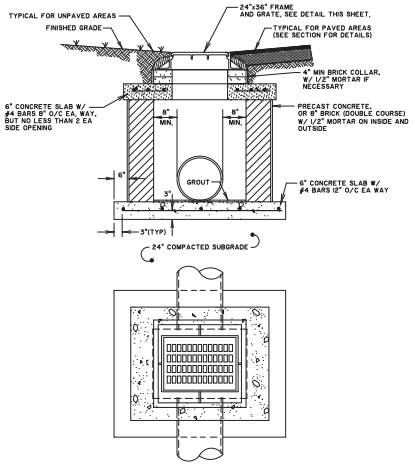
APPROVED:	TMW
SCALE:	1" = 20'

C3.4

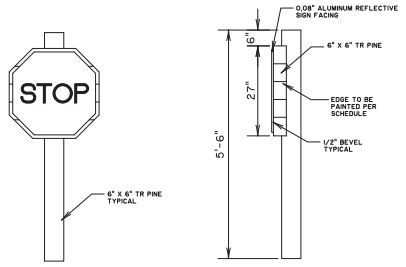


(GI) STANDARD 24"x36" GRATE INLET

NOT TO SCALE

NOTES:

1. CHAMFER ALL EXPOSED CONCRETE EDGES 3/4".
2. WHERE BRICK IS USED, ALL EXPOSED SURFACES SHALL BE COATED WITH 1/2" ±2 MORTAR INSIDE AND OUTSIDE.
3. IF PRECAST BOX IS USED, TOP, RISER, AND BASE SHALL CONFORM TO THE LATEST REVISION OF ASTM C-478.
4. ONLY TYPE S OR M MORTAR SHALL BE USED AND ALL BRICK SHALL MEET SCDOT SPECIFICATIONS.
5. UNLESS OTHERWISE SHOWN THE CENTER OF THE FRAME FOR GRATE INLET STRUCTURES ARE TO BE LOCATED 6'-0" FROM THE EDGE OF PAVEMENT I.E. CENTER OF FRAME TO ALIGN WITH THE CENTER OF ROADSIDE SWALE.



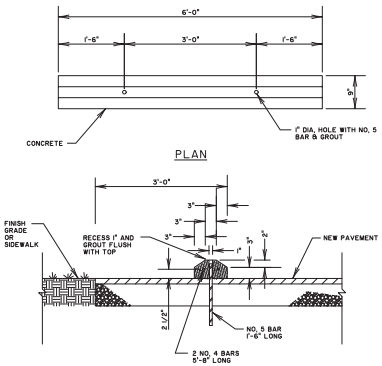
STOP SIGN

NOTES:

1. USED WHEREVER VEHICULAR TRAFFIC CONTROL IS NEEDED, GUIDELINES FOR USE SHOULD BE BASED ON SOUTH CAROLINA'S TRAFFIC LAWS AND MUTCD CURRENT ADDITIONS.
2. PRIMARY MATERIAL FOR THE SIGN POST AND FACE SHOULD BE 6" X 6" TREATED YELLOW PINE. OVERALL POST LENGTH IS 9'-0". SPECIAL HARDWARE INCLUDES 2 1/2" COUNTERSUNK OGEE WASHERS USED ON BOLTS HOLDING THE FACE PANEL TO POST. ALL OTHER HARDWARE IS STANDARD.
3. SIGN SHAPES AND SYMBOLS SHOULD BE BASED ON STANDARDS AS USED BY THE SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION AND MUTCD.
4. THE SIGN POST SHOULD BE STAINED CABOT'S CREOSOTE STAIN 0247. THE SIGN FACE FOR ALL REGULATORY SIGNS SHOULD BE 0.08 INCH ALUMINUM CONFORMING TO ASTM B 209. FINISHED SIGN SHALL BE CLEAR CUT AND THE LINES OF ALL LETTERS SHALL BE TRUE, REGULAR AND FREE OF UNEVENNESS. THE SIGN FACE SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
5. CARE SHOULD BE TAKEN TO MAKE SURE POSTS ARE PROPERLY TREATED TO PREVENT DECAY OR ATTACK FROM TERMITES.
6. THE FRONT, BACK AND EDGES OF THE SIGN BACKING SHALL BE 'PAINTED ACCORDING TO THE FOLLOWING SCHEDULE: STOP SIGN RED

TRAFFIC SIGNAGE

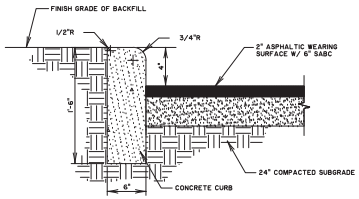
NOT TO SCALE



SECTION

WHEEL STOP DETAIL

NOT TO SCALE

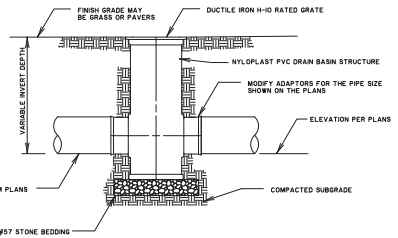


CONCRETE HEADER CURB DETAIL

NOT TO SCALE

NOTES:

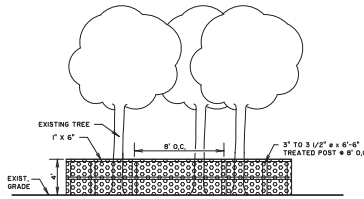
1. ALL CONCRETE SHALL BE 3,000 PSI.
2. PROVIDE CONTROL JOINTS EVERY TEN FEET (10').
3. PROVIDE EXPANSION JOINTS EVERY FIFTY FEET (50).
4. PROVIDE EXPANSION JOINT WHERE CURB ABUTS SIDEWALKS, OR OTHER STRUCTURES.
5. PROVIDE LIGHT BROOM FINISH.



(YI) YARD INLET DETAIL

NOT TO SCALE

1. THE DIAMETER OF THE INLET AND GRATE SHALL BE 10" FOR 8" PIPE, 12" FOR 12" PIPE AND 15" FOR 15" PIPE.
2. YARD INLET TO BE MANUFACTURED BY NYLOPLAST AMERICA INC. (800) 959-0328 OR EQUAL.
3. YARD INLET ARE TO BE BEDDED AND BACKFILLED UNIFORMLY IN ACCORDANCE WITH SECTION 02400, STORM DRAINAGE OF THE TECHNICAL SPECIFICATIONS.
4. YARD INLET TO BE INSTALLED PER THE MANUFACTURERS RECOMMENDATIONS.

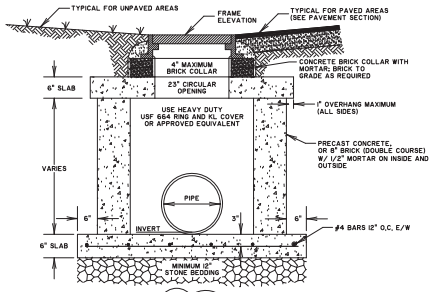


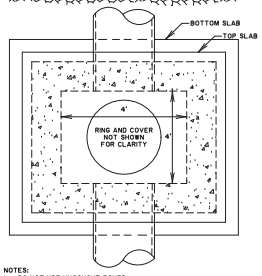
NOTES:

1. CONTRACTOR TO PROTECT AND SAVE TREE, INSTALL 4' HIGH WOODEN RAIL FENCE AROUND TREE, FENCE TO BE CONSTRUCTED OF TREATED LUMBER.
2. ATTACH RAILS TO POST WITH GALVINIZED NAILS.

TREE PROTECTION DETAIL

NOT TO SCALE



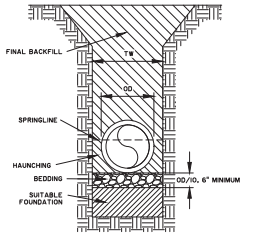


NOTES:

1. DO NOT USE KNOCKOUT BOXES.
2. TOP, RISER, AND BASE SHALL CONFORM TO THE LATEST REVISION OF ASTM C913.
3. USE GRADE 60 REINFORCING STEEL.
4. PROVIDE AT LEAST 3 INCHES OF COVER ON REINFORCING STEEL.
5. REINFORCING IN TOP SLAB, VERTICAL WALLS (RISERS), AND BOTTOM SLAB SHALL BE #4 BARS AT 12" O.C. EACH WAY.
6. CHAMFER ALL EXPOSED CONCRETE EDGES 3/4".

(SMH) STORM DRAIN MANHOLE 30" PIPE AND SMALLER

NOT TO SCALE



NOTES

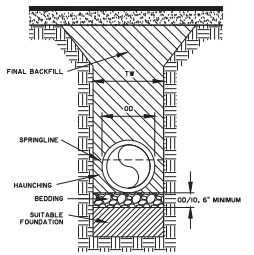
1. TW SHALL BE LESS THAN OR EQUAL TO OD + 2 FEET.
2. TRENCH SHALL BE DEWATERED BEFORE BEDDING MATERIAL IS PLACED.
3. EACH JOINT SHALL BE WRAPPED WITH FILTER FABRIC.
4. SEE ASTM D2321, TABLE I FOR MATERIAL CLASSIFICATIONS.
5. SEE ASTM D698 FOR COMPACTION METHOD.

MATERIAL REQUIREMENTS
FOUNDATION - IF NATIVE MATERIAL IS UNSUITABLE, COORDINATE WITH ENGINEER TO DETERMINE AMOUNT OF MATERIAL TO REMOVE AND SUITABLE MATERIAL WITH WHICH TO REPLACE IT.
BEDDING - CLASS IB OR CLASS II.
HAUNCHING - CLASS II OR CLASS III.
FINAL BACKFILL - CLASS II, CLASS III, OR CLASS IVA.

COMPACTION REQUIREMENTS
BEDDING - LOOSELY PLACE BEDDING UNDER MIDDLE 1/3 OF PIPE, FOR REST OF BEDDING, COMPACT CLASS IB AND CLASS II MATERIAL TO 95%
HAUNCHING - COMPACT CLASS II AND CLASS III MATERIAL TO 95% IN 6" LIFTS
FINAL BACKFILL - COMPACT CLASS II, CLASS III, OR CLASS IVA MATERIAL TO 90% IN 6" LIFTS.

RCP BEDDING UNPAVED AREAS

NOT TO SCALE



NOTES

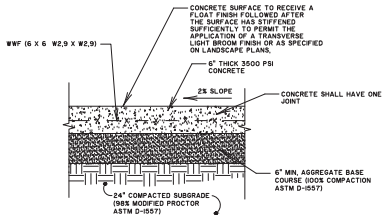
1. TW SHALL BE LESS THAN OR EQUAL TO OD + 2 FEET.
2. TRENCH SHALL BE DEWATERED BEFORE BEDDING MATERIAL IS PLACED.
3. EACH JOINT SHALL BE WRAPPED WITH FILTER FABRIC.
4. SEE ASTM D2321, TABLE I FOR MATERIAL CLASSIFICATIONS.
5. SEE ASTM D698 FOR COMPACTION METHOD.

MATERIAL REQUIREMENTS
FOUNDATION - IF NATIVE MATERIAL IS UNSUITABLE, COORDINATE WITH ENGINEER TO DETERMINE AMOUNT OF MATERIAL TO REMOVE AND SUITABLE MATERIAL WITH WHICH TO REPLACE IT.
BEDDING - CLASS IB OR CLASS II.
HAUNCHING - CLASS II OR CLASS III.
FINAL BACKFILL - CLASS II OR CLASS III.

COMPACTION REQUIREMENTS
BEDDING - LOOSELY PLACE BEDDING UNDER MIDDLE 1/3 OF PIPE, FOR REST OF BEDDING, COMPACT CLASS IB AND CLASS II MATERIAL TO 95%
HAUNCHING - COMPACT CLASS II AND CLASS III MATERIAL TO 95% IN 6" LIFTS
FINAL BACKFILL - COMPACT CLASS II OR CLASS III MATERIAL TO 95% IN 6" LIFTS

RCP BEDDING PAVED AREAS

NOT TO SCALE



CONCRETE PAVEMENT

NOT TO SCALE

1. CONTRACTOR TO CONFIRM FINISH, COLOR, TEXTURE OF CONCRETE WITH LANDSCAPE ARCHITECT PRIOR TO COMMENCEMENT.
2. CONTROL JOINTS ARE TO BE LOCATED WHERE SHOWN ON THE PLANS.

NO. | REVISIONS | BY | DATE

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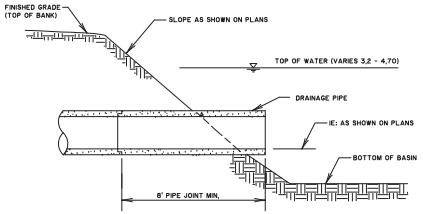
CHARLESTON COUNTY, SOUTH CAROLINA
KIAWAH SENIOR LIVING
DETAILS

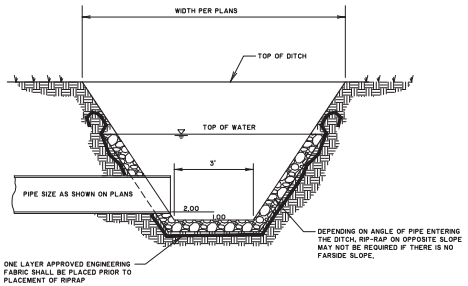
JOB NO:	J-2715.0000
DATE:	7/17/18
DRAWN:	BRW
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMW
SCALE:	N/A

C5.1



PIPE OUTLET TO BASIN

NOT TO SCALE



TYPICAL PIPE OUTLET TO DITCH

NOT TO SCALE

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CHARLESTON COUNTY, SOUTH CAROLINA

KIAWAH SENIOR LIVING

DETAILS

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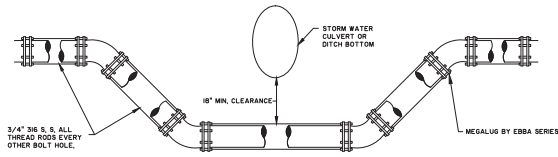
DATE:	7/17/18
DRAWN:	BRW
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMM
SCALE:	N/A

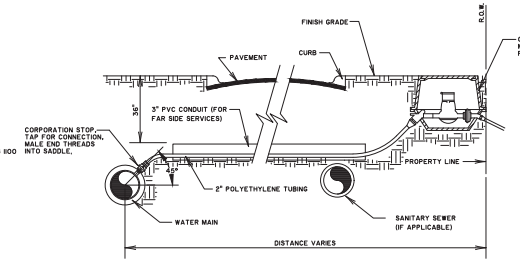
C5.2



DUCTILE IRON MEGALUG SHALL CONFORM TO ASTM A536-80 SPECIFICATIONS.

VERTICAL OFFSET DETAIL

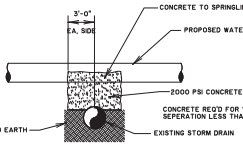
NOT TO SCALE



IRRIGATION WATER SERVICE

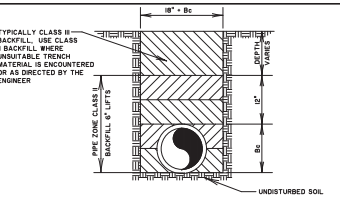
NOT TO SCALE

1. CORPORATION STOP TO BE 2 1/2" MUELLER # H 15005
2. POLYETHYLENE TUBING TO BE 2 1/2" IPS 4-04306
3. CURB VALVE AND YOKE BOX TO BE CARSON INDUSTRIES MODEL # 1419-12-S FOR 1 1/2" METER
4. WATER METER TO BE INSTALLED BY KIAWAH ISLAND UTILITY, INC.

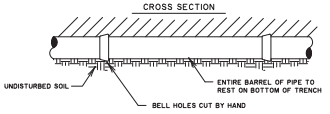


WATER LINE CROSSING ABOVE STORM DRAIN

NOT TO SCALE



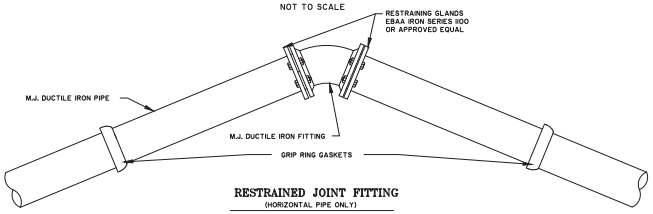
1. INSTALL APPROVED METAL DETECTION TAPE 18" FROM FINISHED GRADE.
2. FOR INFORMATION ON BACKFILL MATERIAL SEE SANITARY SEWER DETAIL SHEET
3. ALL DUCTILE IRON PIPE WATER MAIN SHALL BE ENCASED IN 8 MIL, MINIMUM POLYETHYLENE FILM IN TUBE FORM.



LONGITUDINAL SECTION

WATER MAIN BEDDING DETAIL

NOT TO SCALE



RESTRAINED JOINT FITTING

(HORIZONTAL PIPE ONLY)

NOT TO SCALE

NOTES:

1. THE FOLLOWING CONDITIONS WERE USED TO CALCULATE THE RESTRAINED LENGTHS:
   LAYING CONDITION IS TYPE 3;
   SOIL DESIGNATED AS SAND-SILT;
   DEPTH IS 3 FT.;
   DESIGN PRESSURE (TEST) IS 150 PSI;
   SAFETY FACTOR IS 1.5.
   FOR THE TEE BRANCH AND REDUCER, LENGTHS IN THE TABLE BELOW ARE BASED ON BRANCHING AND REDUCING FROM THE NEXT LARGER SIZE IN THE TABLE. DEVIATIONS FROM THESE CONDITIONS MUST BE BASED ON THE ABOVE PARAMETERS.
2. JOINT RESTRAINT SHALL BE:
   FOR PVC (4"-12") : EBAA SERIES 1500 RESTRAINT HARNESS OR APPROVED EQUIVALENT
   FOR DIP : EBAA SERIEDS 1700 RESTRAINT HARNESS OR APPROVED EQUIVALENT

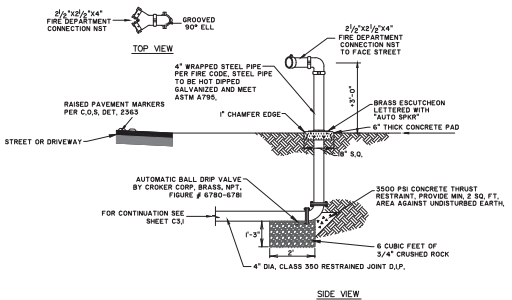
RESTRAINED JOINT TABLE

LENGTH OF RESTRAINED JOINT REQUIRED (IN L.F. EACH SIDE OF THE BEND)

SIZE	11 1/4°	22 1/2°	45°	90°	TEE BRANCH	DEAD END	REDUCER	VALVE
4"	2	5	10	24	37	60	44	60
6"	3	7	14	33	64	85	46	85
8"	4	9	18	43	90	110	46	110
10"	5	10	21	51	113	133	50	133
12"	10	20	30	60	140	160	60	160

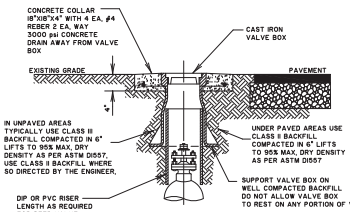
RESTRAINED JOINT FITTING

NOT TO SCALE



REMOTE FIRE DEPARTMENT CONN.

NOT TO SCALE

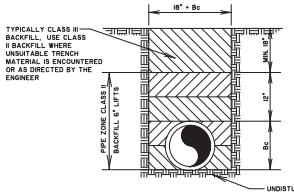


NOTES:

1. CENTER VALVE BOX OVER OPERATING NUT TO INSURE FREE VALVE OPERATION.
2. USE 6" RISER PIPE ON 4" AND 6" VALVES.
3. USE 8" RISER PIPE ON 8" VALVES AND LARGER.
4. LOCATION OF VALVE SHALL BE MARKED WITH A CLEAR BIDIRECTIONAL RAISED PAVEMENT MARKER ON THE EDGE OF PAVEMENT NEAR THE VALVE.
5. VALVE BOX NOT REQUIRED IF VALVE IS USED ON FIRE MAIN, SEE VERTICAL POST INDICATOR DETAIL.

VALVE BOX DETAIL

NOT TO SCALE

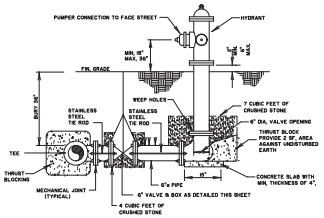


1. INSTALL APPROVED METAL DETECTION TAPE 18" FROM FINISHED GRADE.
2. FOR INFORMATION ON BACKFILL MATERIAL SEE SANITARY SEWER DETAIL SHEET
3. ALL DUCTILE IRON PIPE WATER MAIN SHALL BE ENCASED IN 8 MIL, MINIMUM POLYETHYLENE FILM IN TUBE FORM.

LONGITUDINAL SECTION

FIRE MAIN BEDDING DETAIL

NOT TO SCALE

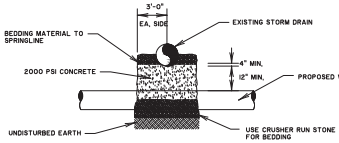


NOTES:

1. FIRE HYDRANT TO BE PLACED A MIN. OF 3' FROM EDGE OF PAVEMENT AND BACK OF CURB.
2. PUMPER CONNECTION TO FACE STREET AND HOSE CONNECTIONS SHALL BE FREE OF OBSTRUCTIONS.
3. TOP OF VALVE BOXES TO BE 1" ABOVE FINISHED GRADE IN UNPAVED AREAS AND FLUSH IN PAVED AREAS.
4. WHERE VALVE BOX IS LOCATED IN PAVERS OR CONCRETE SURFACE A COLLAR WILL NOT BE REQUIRED. TOP OF VALVE SHALL BE SET FLUSH WITH FINISH SURFACE.

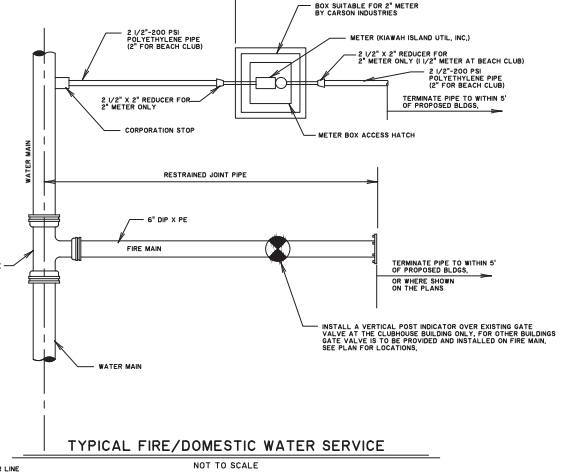
FIRE HYDRANT DETAIL

NOT TO SCALE



WATER LINE CROSSING BELOW STORM DRAIN

NOT TO SCALE



TYPICAL FIRE/DOMESTIC WATER SERVICE

NOT TO SCALE

1. METER BOX TO BE AS MANUFACTURED BY CARSON INDUSTRIES, KIAWAH ISLAND UTILITY, INC, WILL PROVIDE AND INSTALL THE METER.
2. DOMESTIC METER SIZE TO BE DETERMINED BY THE OWNER FOR EACH SPECIFIC BUILDING. CONTRACTOR TO VERIFY THIS SIZE PRIOR TO PURCHASING METER BOXES AND APPURTENANCES.
3. PRIOR TO SETTING THE METER BOX FRAMES THE CONTRACTOR SHALL VERIFY THE FINISH GRADE OF THE ADJACENT HARDSCAPE/LANDSCAPE.
4. PIPING AND METER BOX FOR BEACH CLUB TO BE 1/2" SMALLER THAN OTHER BUILDINGS.

GENERAL NOTES

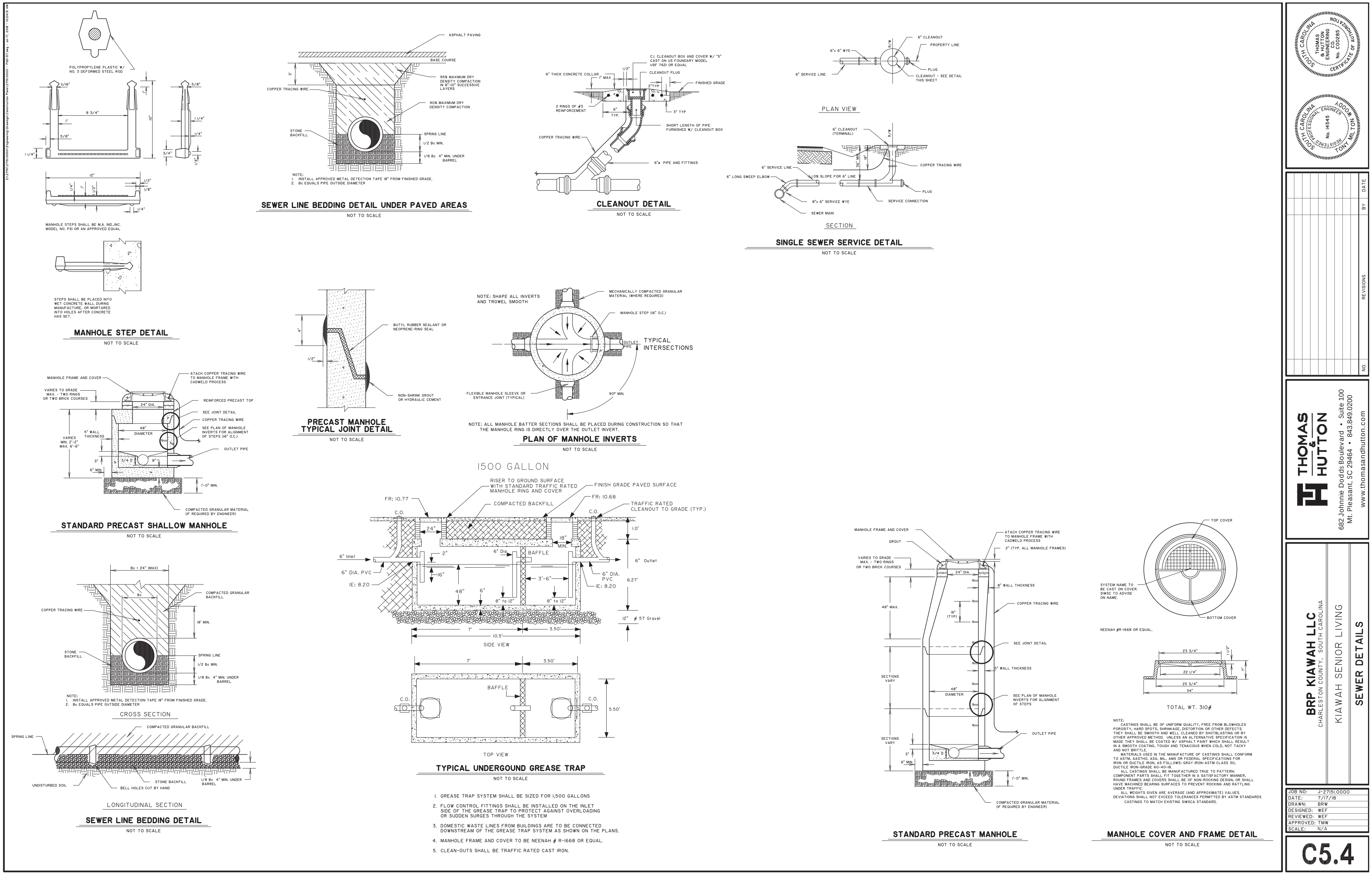
1. ALL VALVES AND HYDRANTS SHALL OPEN COUNTER CLOCKWISE.
2. THE CONTRACTOR MUST CALL KIAWAH ISLAND UTILITY, INC., 72 HOURS PRIOR TO TAPPING THE MAIN WATER LINE, PERFORMING A PRESSURE TEST, OR CONDUCTING BACTERIOLOGICAL TESTS. KIAWAH ISLAND UTILITY, INC. WILL HAVE A COMPANY REPRESENTATIVE ON SITE FOR EACH OF THESE EVENTS. KIAWAH ISLAND UTILITY, INC. MUST ALSO BE NOTIFIED AND PRESENT FOR THE INSPECTION OF ALL HYDRANTS, VALVES, AND THRUST BLOCKS PRIOR TO THEM BEING COVERED.
3. AFTER A SUCCESSFUL PRESSURE TEST, THE CONTRACTOR MUST CONDUCT BACTERIOLOGICAL TESTS ACCORDING TO SC DHEC REGULATIONS, TWO SAMPLES MUST SHOW NEGATIVE BACTERIOLOGICAL RESULTS OR THE PROCESS MUST BE REPEATED. THE CONTRACTOR IS RESPONSIBLE FOR ALL COSTS OF ALL TESTING, INCLUDING WATER USED IN FLUSHING.
4. ALL NEW FIRE HYDRANTS MUST BE TESTED FOR STATIC AND RESIDUAL FLOWS AND THE FLOWS AT 20 PSI.
5. KIAWAH ISLAND UTILITY, INC. SHALL HAVE THE RIGHT OF ENTRY TO THE CONSTRUCTION SITE TO OBSERVE AND VERIFY THAT THE CONSTRUCTION IS IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS AND TO WITNESS TESTING OF THE SYSTEM.

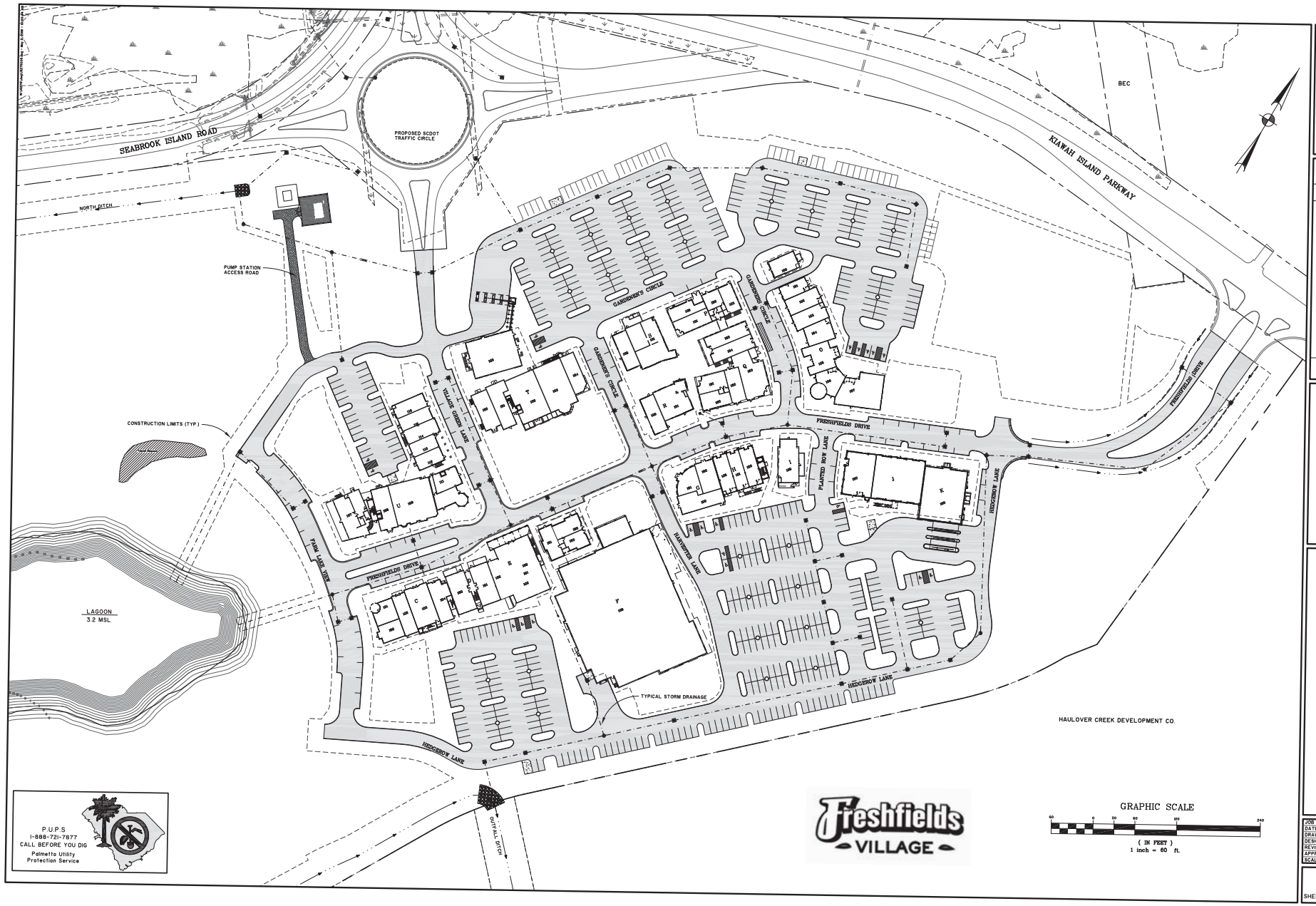
THOMAS HUTTON
682 Johnnie Dodds Boulevard • Suite 100
Mt. Pleasant, SC 29464 • 843.849.0200
www.thomasandhutton.com

BRP KIAWAH LLC
CHARLESTON COUNTY, SOUTH CAROLINA
KIAWAH SENIOR LIVING
WATER DETAILS

JOB NO:	J-2751.0000
DATE:	7/17/18
DRAWN:	BRW
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMH
SCALE:	N/A

C5.3


MANHOLE STEP DETAIL
NOT TO SCALE
SEWER LINE BEDDING DETAIL UNDER PAVED AREAS
NOT TO SCALE
CLEANOUT DETAIL
NOT TO SCALE
PLAN VIEW
SECTION
SINGLE SEWER SERVICE DETAIL
NOT TO SCALE
PRECAST MANHOLE
TYPICAL JOINT DETAIL
NOT TO SCALE
NOTE: SHAPE ALL INVERTS AND TROWEL SMOOTH
TYPICAL INTERSECTIONS
NOTE: ALL MANHOLE BATTER SECTIONS SHALL BE PLACED DURING CONSTRUCTION SO THAT THE MANHOLE RING IS DIRECTLY OVER THE OUTLET INVERT.
PLAN OF MANHOLE INVERTS
NOT TO SCALE
STANDARD PRECAST SHALLOW MANHOLE
NOT TO SCALE
1500 GALLON
SIDE VIEW
TOP VIEW
TYPICAL UNDERGOUND GREASE TRAP
NOT TO SCALE
1. GREASE TRAP SYSTEM SHALL BE SIZED FOR 1,500 GALLONS
2. FLOW CONTROL FITTINGS SHALL BE INSTALLED ON THE INLET SIDE OF THE GREASE TRAP TO PROTECT AGAINST OVERLOADING OR SUDDEN SURGES THROUGH THE SYSTEM
3. DOMESTIC WASTE LINES FROM BUILDINGS ARE TO BE CONNECTED DOWNSTREAM OF THE GREASE TRAP SYSTEM AS SHOWN ON THE PLANS.
4. MANHOLE FRAME AND COVER TO BE NEENAH # R-1668 OR EQUAL.
5. CLEAN-OUTS SHALL BE TRAFFIC RATED CAST IRON.
CROSS SECTION
LONGITUDINAL SECTION
SEWER LINE BEDDING DETAIL
NOT TO SCALE
STANDARD PRECAST MANHOLE
NOT TO SCALE
TOTAL WT. 310#
MANHOLE COVER AND FRAME DETAIL
NOT TO SCALE
THOMAS & HUTTON
682 Johnnie Dodds Boulevard • Suite 100
Mt. Pleasant, SC 29464 • 843.849.0200
www.thomasandhutton.com
BRP KIAWAH LLC
CHARLESTON COUNTY, SOUTH CAROLINA
KIAWAH SENIOR LIVING
SEWER DETAILS
JOB NO: J-27151.0000
DATE: 7/17/18
DRAWN: BRW
DESIGNED: WEF
REVIEWED: WEF
APPROVED: TMW
SCALE: N/A
C5.4



NO	REVISIONS	BY	DATE
8	ADD STUB-OUTS & DELETE YARD INLETS	WEF	8-16-04
7	ADD STORM PIPE AT BLDG F-100	WEF	6-9-04
6	INCREASED CONST. LIMITS AT KI PARKWAY ENTRANCE	WEF	4-18-04
5	REVISE SITE PLAN AND PIPING LAYOUT	WEF	4-13-04
4	REVISE PER PLAN REVIEW	WEF	3-5-04
3	ADD EXISTING GRADES & SCDOT ROW	WEF	2-3-04
2	RELOCATE DMH, ADD A & G AND SHOW SCDOT PIPING	WEF	12-24-03
1	REVISE SOUTH DITCH	WEF	12-11-03

THOMAS & HUTTON ENGINEERING CO
935 HOUSTON NORTHCUTT BOULEVARD
SUITE 100
MOUNT PLEASANT, SC 29464 (843) 849-0200
SAVANNAH, GA • MYRTLE BEACH, SC

FRESHFIELDS VILLAGE PHASE 1A

CHARLESTON COUNTY SOUTH CAROLINA

MASTER DRAINAGE PLAN

JOB NO:	J-15275
DATE:	7/1/03
DRAWN:	BRW
DESIGNED:	WEF
REVIEWED:	WEF
APPROVED:	TMW
SCALE:	1" = 60'

SHEET 5

Joe Cronin

From: G. Robert George <bobgeorgegrga@comcast.net>
Sent: Wednesday, July 25, 2018 12:12 PM
To: Joe Cronin
Cc: 'Ronald Ciancio'
Subject: RE: Freshfields Village Encroachment Permit follow up

Joe:

Following a detailed review of the hydrology report and project drawings provided for the subject project, in our opinion, there will be no adverse drainage impact from the proposed project upon Seabrook Island Road. The initial 2003 phase of the Freshfields Village Complex include the design and construction of a large detention lagoon that was intended to accommodate the required post-development storm water discharge from the proposed project. The design drawings indicate that all storm water runoff from the subject project will be discharged into the existing lagoon which, in turn, discharges into an existing drainage canal to the discharge into Brick Creek tributary to the Kiawah River.

We trust that all went well with regard to the meeting yesterday regarding the requested roadway connection.

Bob George

G. Robert George, P.L.S., P.E.

G. Robert George & Associates, Inc. (GRGA)
Consulting Engineers, Land Planners and Land Surveyors

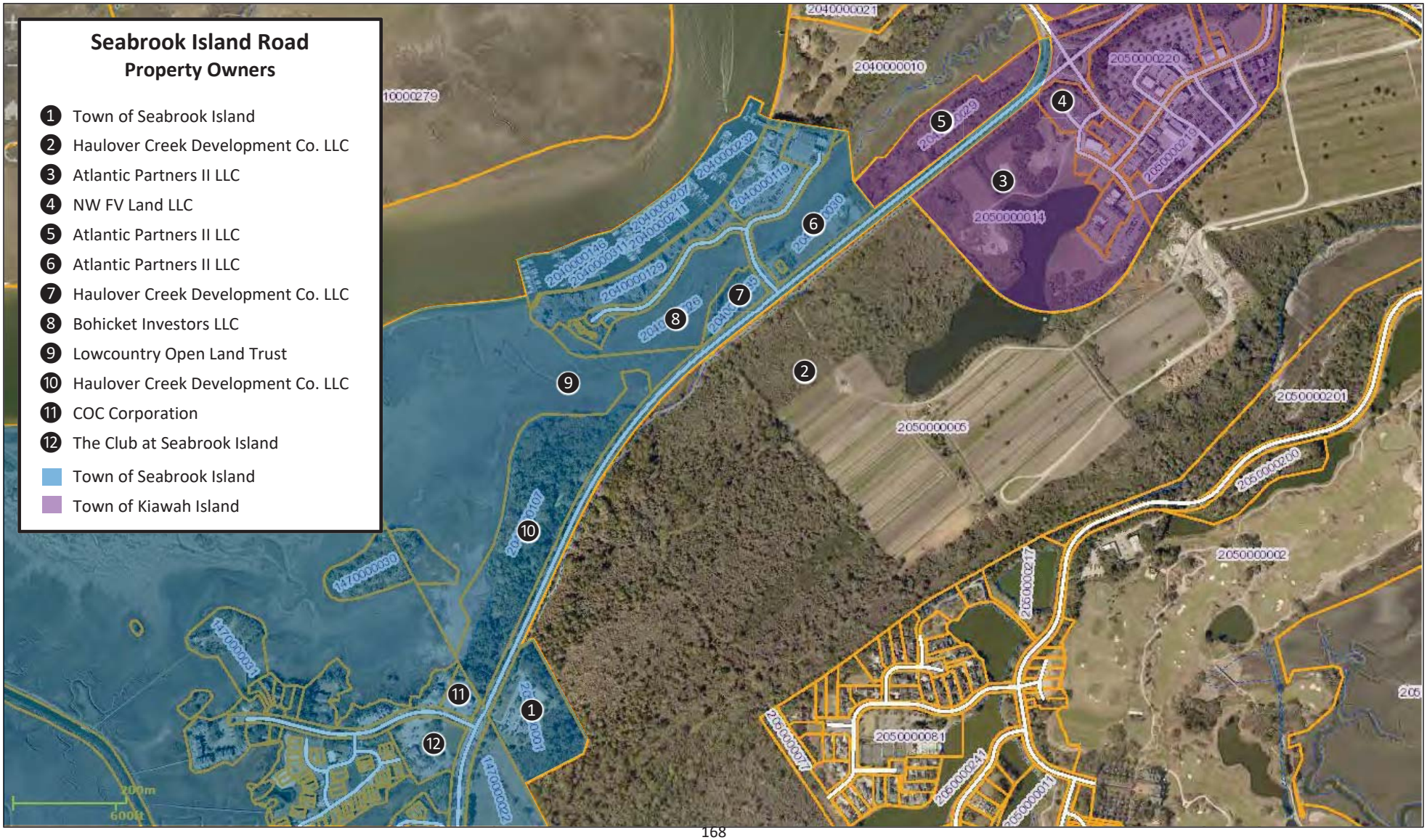
2411 Savannah Highway
Charleston, South Carolina 29414
Post Office Box 32158 29417
PH: (843) 556-4261
FAX: (843) 571-0276
bobgeorgegrga@comcast.net

From: Joe Cronin [mailto:jcronin@townofseabrookisland.org]
Sent: Tuesday, July 24, 2018 11:08 AM
To: G. Robert George
Cc: Ronald Ciancio
Subject: FW: Freshfields Village Encroachment Permit follow up

Bob,

I have attached the stormwater drawings and materials for the Senior project in Kiawah.

Joseph M. Cronin
Town Administrator
Town of Seabrook Island
2001 Seabrook Island Road
Seabrook Island, SC 29455
Office: (843) 768-5321
Cell: (843) 637-9832


Seabrook Island Road
Property Owners
1 Town of Seabrook Island
2 Haulover Creek Development Co. LLC
3 Atlantic Partners II LLC
4 NW FV Land LLC
5 Atlantic Partners II LLC
6 Atlantic Partners II LLC
7 Haulover Creek Development Co. LLC
8 Bohicket Investors LLC
9 Lowcountry Open Land Trust
10 Haulover Creek Development Co. LLC
11 COC Corporation
12 The Club at Seabrook Island
Town of Seabrook Island
Town of Kiawah Island
200m
600ft