



May 23, 2025

Subject: Technical Memo for Variance Request: 1018 Osceola Avenue Grading and Drainage Improvements

From: Kevin B. Herren, PE and Ryne C. Phillips, PE, PhD
Seamon, Whiteside & Associates, Inc.

To: Charles Drayton
Director of Planning & Zoning
Town of Sullivan's Island
2056 Middle Street, P.O. Box 427
Sullivan's Island, SC 29482

Attachments: 1018 Osceola Avenue Grading and Drainage Plans
Town of Sullivan's Island Osceola Avenue Project Exhibit

1. Executive Summary

- 1018 Osceola Avenue, without interventions, is at severe risk of repetitive tidal flooding. Current recommendations proposed as part of the recently completed (and approved by Town Council) Stormwater Master Plan were limited to flood mitigation projects that could be implemented within the public right-of-way which may exclude marsh-adjacent properties (such as 1018 Osceola Avenue) from receiving flood mitigation benefits. Therefore, to accommodate these properties, this plan recommended that the Town of Sullivan's Island encourage and allow property owners to fill or protect their property against an appropriate tidal mitigation target.
- Stormwater impacts to adjacent property owners and public rights-of-way will be reduced if the proposed grading and drainage plan is implemented.
 - Existing Conditions: 23% of Property Flows towards Osceola Avenue, 20% of Property Flows towards 1010 Osceola Avenue, 23% of Property Flows towards 1026 Osceola Avenue, 34% of Property Flows towards the marsh
 - Proposed Conditions: 21% of Property Flows towards Osceola Avenue, 3% of Property Flows towards 1010 Osceola Avenue, 3% of Property Flows towards 1026 Osceola Avenue, 73% of Property Flows towards the marsh
- Town Osceola Avenue Project: The proposed grading and drainage improvements of this property should reduce the stormwater operations and maintenance by the Town after the roadway project is complete. The runoff will be routed more efficiently and retained within the property / toward the marsh, making it easier for the Town to manage the stormwater along the road. If the road project is completed without these improvements to the property, additional stormwater management would likely be required by the Town in front of this property.
- Based on the results of our analysis, and the information presented herein, the owner of 1018 Osceola Avenue is requesting a variance of Town Code Section 21-13, 21-139 (2) and 21-139 (3) to allow implementation of the proposed grading and drainage project.

2. Introduction

Seamon, Whiteside & Associates, Inc. has completed a grading and drainage plan to portray the necessary improvements for protecting the property at 1018 Osceola Avenue from tidal-driven flooding within the Town of Sullivan's Island, SC. Figure 1 below depicts the project area for this analysis. This technical memorandum serves to document our analysis and reasoning for requesting variance from current Town code and policy.



Figure 1 – Project location within the Town of Sullivan's Island, SC.

3. Existing Conditions & Property Risks

The property at 1018 Osceola Avenue is a vulnerable property on Osceola Avenue for tidal-driven flooding. This property has recently been renovated with a new home which sits directly adjacent to the open marsh with no form of flood protection. With recent flooding of Osceola Avenue, rainfall becoming increasingly more intense, and tide elevations in the area expected to continue rising, the risks of flooding associated with this property continue to increase moving forward without any improvements being made. These risks include:

- **Tidal Flooding** - As noted in the “Island-Wide Stormwater Master Plan and Infrastructure Improvement Strategy” by Seamon, Whiteside, & Associates, Inc. Dated February 2025 and approved by Town Council in March 2025 (hereby referred to as the Stormwater Master Plan), the current typical tide elevation on Sullivan’s Island is 3.31 feet NAVD88 with extreme tidal elevations exceeding 4.55 feet NAVD88 (Section 4.4.2 of the Stormwater Master Plan). Future sea level rise was also analyzed as a part of the Stormwater Master Plan. The results of this future sea level rise analysis indicated that future (50-year planning horizon) typical tides would exceed 5.39 feet NAVD88, with extreme tides exceeding 6.63 feet NAVD88 (Section 4.4.2.1 of the Stormwater Master Plan). The property elevation currently ranges from approximately 6.5 feet NAVD88 at the building pad and slopes down to 3-4 feet NAVD88 in the back of the property (along the marsh) and down to 4 feet NAVD88 along Osceola Avenue and both neighboring property boundaries. Based on the analysis and results of the Stormwater Master Plan, severe and repetitive tidal flooding will be a systemic problem for this property, that without intervention, may lead to irrevocable damage for this property.
- **Roadway Improvements** – The Stormwater Master Plan outlines high-priority projects for mitigating flooding on Sullivan’s Island such as proposed improvements for Osceola Avenue (Section 5.3.1 of the Stormwater Masterplan). Specifically, the Stormwater Master Plan calls for raising Osceola Avenue by 1.5 – 2 feet up to an elevation of 6 feet NAVD88 with suggestions of a future final target elevation of 7 feet NAVD88 (see attached for project exhibit). This is being proposed due to the constant flooding and submergence of the roadway in recent storm events and to combat the projected sea level rise in the future. Figure 2 below shows Osceola Avenue flooded near Station 9 ½ after a storm event, roughly 600 feet from the property, while Figures 3 through 5 show the roadway flooded directly in front of the property. Raising this street will protect the roadway from future floods but will still leave low-lying and marsh-adjacent properties, such as 1018 Osceola Avenue, at risk of tidal floods.



Figure 2 – Flooded Osceola Avenue (near Sta. 9 ½)
December 2023



Figure 3 – Flooded Osceola Avenue (in front of 1018 Osceola Avenue)
November 2024



Figure 4 – Flooded Osceola Avenue (in
front of 1018 Osceola Avenue)
November 2024

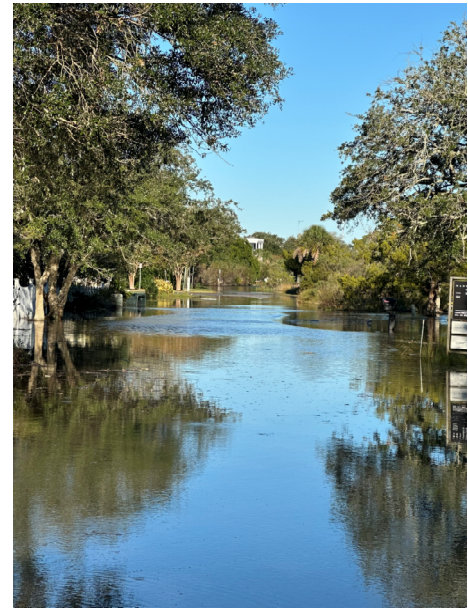


Figure 5 – Flooded Osceola Avenue (in
front of 1018 Osceola Avenue)
November 2024

4. Proposed Conditions and Code Variance Reasoning

The attached grading and drainage plan proposes the following improvements to 1018 Osceola Avenue:

- **Landscape Wall** – the Client requested a landscape wall to accompany their landscape architecture. The landscape wall extends across the entire back side of the property, 3.5 feet inland from the critical wetland limits, and extends west into the 1010 Osceola Avenue property and approximately 50 feet along the eastern boundary with 1026 Osceola Avenue, adjacent to the existing seawall. The landscape wall is proposed at elevation 7 feet NAVD88, reaching a maximum height of 1 foot within the project's property. The wall reaches a height of roughly 2.5 feet above the existing grade within the back corner of the property to the east, 1026 Osceola Avenue.
- **Critical Wetland Area Landscaping** – by installing the landscape wall 3.5 feet off of the critical wetland limits of the marshland in the back of the property, this allows for a buffer area to be gently graded and landscaped with appropriate native vegetation. This will create a dense stand to stabilize the shoreline and protect the marsh against erosion, wave action, and storm surges prior to reaching the landscape wall, as well as provide a habitat and food source for wildlife. The 3.5-foot strip of land will be graded at a 3H:1V slope, keeping the fill within the Town Code's 1-foot limit, and planted with primarily *Spartina alterniflora* (smooth cordgrass), which is a dominant grass species along tidal marshes, crucial for stabilization and erosion protection. The extensive root system of the vegetation helps retain the soil, while the plant stems attenuate wave energy. The toe of the slope, at the critical wetland limits, will be installed with coir logs, which are natural, biodegradable erosion control measures designed to withstand the impacts of water and waves and protect the living shoreline buffer area.
- **Raising the Property Elevation** – this includes raising the elevation up to 7 feet NAVD88 along the majority of the landscape wall boundary, raising the front yard to 6 feet NAVD88 stretching from the around eastern side of the property and into the adjacent property to the west. The property will also be graded in the backyard to an elevation of



5.75 feet NAVD in the landscaping in front of the wood fence to capture runoff and direct it towards the dry wells. Grading also includes raising the roadside drainage swale from 3 feet to 4 feet NAVD88. A drainage swale is proposed in the southwest corner of the property to ensure drainage toward the roadway. There is also a swale proposed within the pervious pathway along the eastern property boundary to retain runoff within the property and prevent flow to 1026 Osceola Avenue.

- Drainage Infrastructure – this includes installing yard inlets for gutter tie-ins and surface drainage surrounding the new home layout. The yard inlets will capture the majority of the runoff within the property and drain towards two (2) dry wells in the backyard, preventing excessive runoff to neighboring properties. The dry well will have a gravity discharge for normal runoff events and a sump pump with a discharge pipe that will operate when the water level reaches too high in the dry well. Both pipes will be discharged in the marsh.

These improvements are necessary to protect this property from tidal flooding, as well as the neighboring properties from additional surface runoff. This will require variance from Town Code Section 21-13, which states “Any importation of materials of any type or re-contouring of a lot’s existing contours that increased a lot’s existing ground elevation more than one (1) foot above existing grade and results or may result in elevating an existing or proposed structure is strictly prohibited”. Due to the landscape wall, which is being represented as a fence, this project will also require variance from the Town Code Section 21-139 (2), which states “All fences shall be constructed of wood or metal or manufactured materials that appear to be wood, or wood/wire materials; chain-link fences are prohibited. New fence products may be allowed, subject to approval by the Design Review Board. (12-18-12)” and Section 21-139 (3) “All fences shall be at least twenty-five percent (25%) open across the entire plane of the fence.”

The improvements and variance are required for the following reasons:

- Provide flood mitigation for repetitive tidal flooding of this property which is severely impacted by today’s extreme tides that are only anticipated to become worse and more frequent in the future. The current extreme tidal elevation (as analyzed within the Stormwater Master Plan) is already above the majority of the property, with future typical and extreme tidal elevations indicative that future tides may frequently exceed the building pad elevation, flooding the entire site, and causing severe and potentially irrevocable damage to this property. The proposed landscape wall extension and grading at elevation 7 feet NAVD88 will mitigate against projected extreme tidal events and will protect the Owner’s property and house. This design aligns with the general Lowcountry target elevations for long-term coastal resiliency. This elevation is also referenced in Section 5.3.1 of the Stormwater Master Plan as a recommended target elevation of tidal perimeter protection improvements.
- The pathway swale elevation is required to be 6.5 feet NAVD88 along the eastern property boundary in order to protect 1026 Osceola Avenue from surface runoff. With the building pad around 6.5 feet NAVD88, any ground at or below this would allow for runoff and sediment to sheet flow from the property over the path to the neighboring property during extreme tide or storm events.
- The new building on the property has increased the impervious area on the site. The proposed drainage infrastructure will account for this additional impervious area and prevent surface runoff throughout the property and potentially to neighboring properties. The check valves installed on all discharge pipes will prevent any tidal water from backflowing into the property.
- The grading and necessary fill will create a safe and efficient drainage layout for the site, neighboring properties, and Osceola Avenue. Surface water will be directed away from the house toward the marsh to infiltrate in the backyard and or get captured by the two dry wells and discharged to the marsh, keeping runoff from entering adjacent properties. There are two drainage swales proposed in the southwest and southeast corners of the property to promote drainage into the roadside drainage swale.
- The northeast corner of the property is currently at risk of erosion due to storm tides. The landscape wall and grading in



this area is necessary in order to mitigate against land loss / erosion and flooding. The landscape wall wraps around the property corner approximately 50 feet along the property line bordering 1026 Osceola Avenue. This is done to tie into the existing seawall installed along this area within the 1026 property, which extends along the back of their property at an elevation that appears to be at or above the proposed top of the landscape wall of 7 feet NAVD88. By extending the landscape wall and tying into the existing seawall location, the function of the existing seawall will remain for the neighboring property and this corner will be better protected from future erosion.

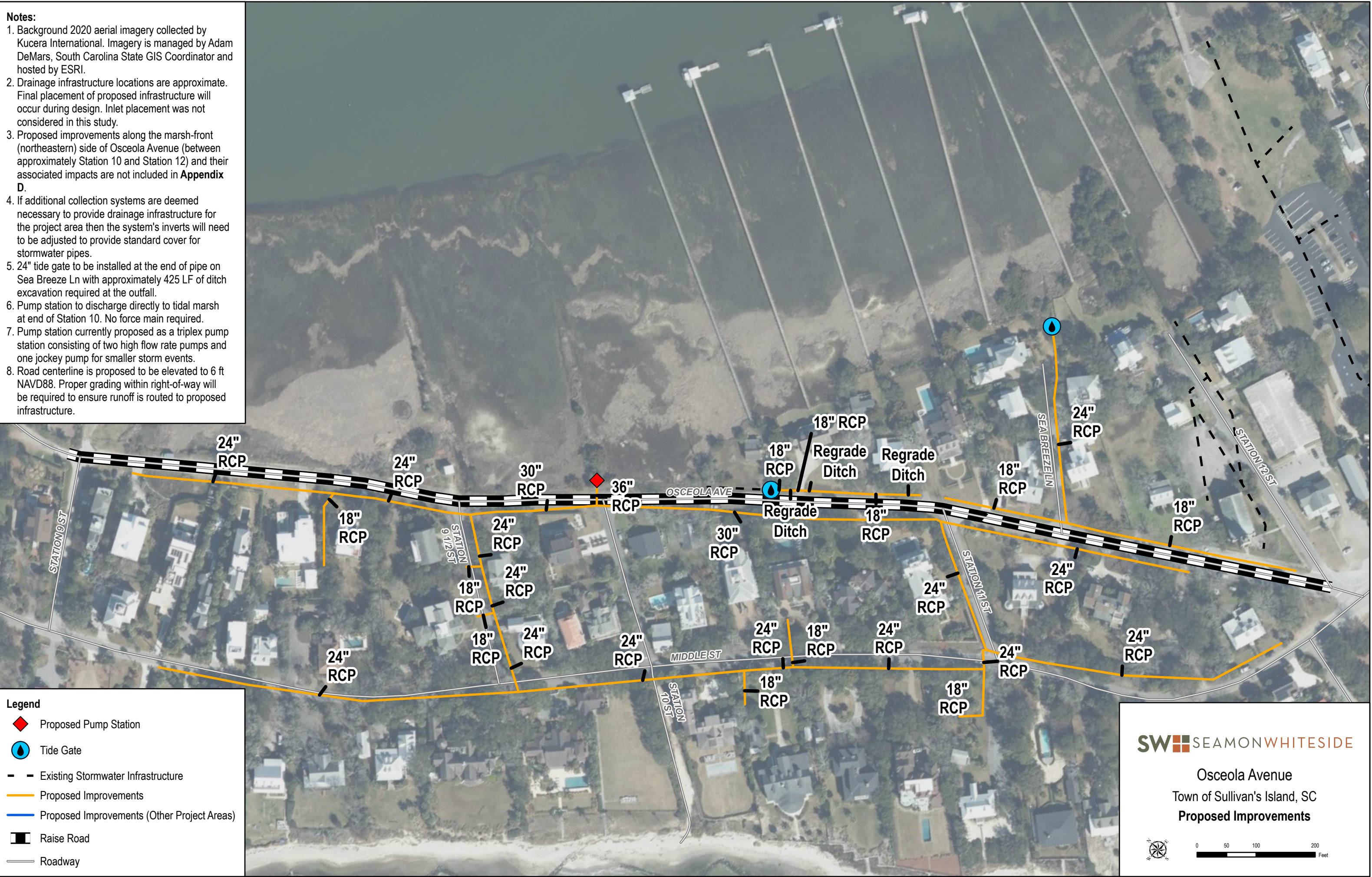
- With the Town proposing raising Osceola Avenue, the additional fill will allow for the property's grading to blend with the new road elevation. This will prevent flooding of the driveway and allow the roadside drainage to operate more efficiently.

5. Alignment with Proposed Osceola Town Project

The Stormwater Master Plan identified the proposed improvements along Osceola Avenue (including raising the roadway) as the highest priority project that the Town of Sullivan's Island need to implement to improve their long-term coastal resiliency. This entire corridor has already experienced severe systemic flooding that will continue to increase and pose risks to the properties adjacent to the roadway.

The improvements proposed in the attached grading and drainage plan will not only preserve the property at 1018 Osceola Avenue but will also safeguard the Town's investment if / when the roadway elevation is raised. With tidal elevations rising and storm events expected to increase in severity, the property would continue to flood if the roadway project was implemented without any of the proposed changes recommended herein. Implementing the landscape wall at elevation 7 feet NAVD88 in addition to the proposed grading and drainage improvements will protect the property and aligns with the objectives / recommendations of the Town's Stormwater Master Plan. Most importantly, the proposed site improvements do not and will not jeopardize the Town's proposed project.


- Notes:**
1. Background 2020 aerial imagery collected by Kucera International. Imagery is managed by Adam DeMars, South Carolina State GIS Coordinator and hosted by ESRI.
 2. Drainage infrastructure locations are approximate. Final placement of proposed infrastructure will occur during design. Inlet placement was not considered in this study.
 3. Proposed improvements along the marsh-front (northeastern) side of Osceola Avenue (between approximately Station 10 and Station 12) and their associated impacts are not included in **Appendix D**.
 4. If additional collection systems are deemed necessary to provide drainage infrastructure for the project area then the system's inverts will need to be adjusted to provide standard cover for stormwater pipes.
 5. 24" tide gate to be installed at the end of pipe on Sea Breeze Ln with approximately 425 LF of ditch excavation required at the outfall.
 6. Pump station to discharge directly to tidal marsh at end of Station 10. No force main required.
 7. Pump station currently proposed as a triplex pump station consisting of two high flow rate pumps and one jockey pump for smaller storm events.
 8. Road centerline is proposed to be elevated to 6 ft NAVD88. Proper grading within right-of-way will be required to ensure runoff is routed to proposed infrastructure.



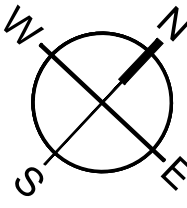
501 WINDO PARK BOULEVARD, SUITE 200, MOUNT PLEASANT, SC 29464 | JUDSONVILLE BUILDING 600, 701 EASLEY BRIDGE RD, SUITE 600, GREENVILLE, SC 29611 | 201 PETERSON DR, CHARLOTTE, NC 28207 | 1711 N. CEDAR STREET, SUMMERVILLE, SC 29583 | 1501 N. DANIEL MORGAN AVENUE, SUITE 300, SPARTANBURG, SC 29306
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- NOTES:**
- SPOT ELEVATION KEY: "EX" = EXISTING, "FUT" = FUTURE, "BW" = BOTTOM OF WALL, "TW" = TOP OF WALL.
 - FOR PROJECT SURVEY INFORMATION INCLUDING VERTICAL DATUM AND BENCHMARK LOCATION, SEE SHEET C2.0.
 - PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING EXISTING CONDITIONS, INCLUDING BUT NOT LIMITED TO TOPOGRAPHIC, TREE, STORM DRAINAGE FACILITIES, AND ALL UTILITIES. EXISTING UTILITIES SHOWN ARE APPROXIMATE AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ENGINEER. THEREFORE, THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE EXACT VERTICAL AND HORIZONTAL LOCATIONS OF ALL EXISTING UTILITIES. ANY DISCREPANCIES OR CONFLICTS IDENTIFIED DURING VERIFICATION OF EXISTING CONDITIONS AND UTILITIES SHALL BE REPORTED TO THE OWNER AND ENGINEER. ANY COSTS ASSOCIATED WITH CORRECTIVE WORK OR DAMAGES THAT ARE A RESULT OF THE CONTRACTOR NOT VERIFYING EXISTING CONDITIONS AND THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UTILITIES WILL BE THE CONTRACTOR'S RESPONSIBILITY.
 - CONTRACTOR TO SELF-VERIFY THAT SITE GRADES, DRAINAGE PIPES, AND DRAINAGE STRUCTURES ARE CONSTRUCTED PER THE PLANS.
 - YARD INLET LOCATIONS ARE SUBJECT TO CHANGE PRIOR TO CONSTRUCTION BASED ON FIELD CONDITIONS.
 - ALL DRAINAGE PIPE TO BE INSTALLED WITH CHECK VALVES AT THE DISCHARGE LOCATION (TIDEFLEX DUCKBILL CHECK VALVE, OR EQUAL).
 - PIPE PENETRATIONS THROUGH THE LANDSCAPE WALL SHALL BE WATERTIGHT SEALED WITH FLEXIBLE BOOTS, OR EQUAL.



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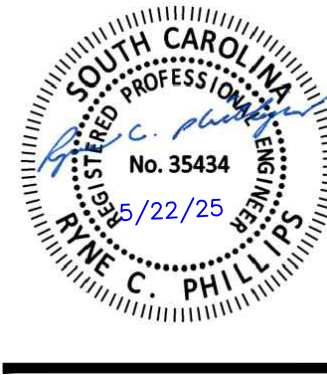
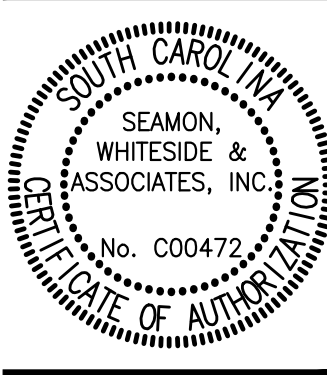


SCALE: 1" = 10'



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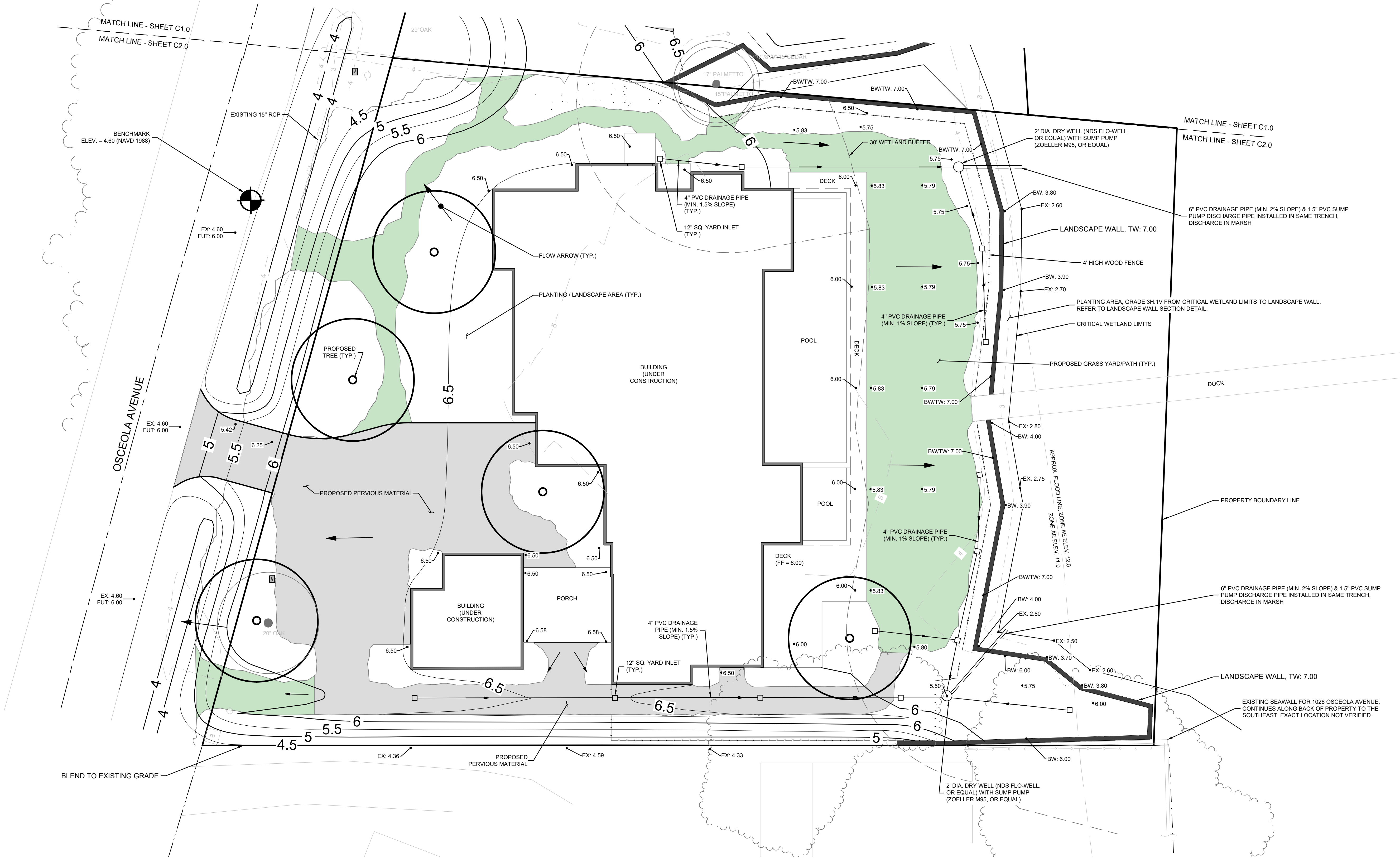
OSCEOLA AVENUE GRADING AND DRAINAGE PLAN
HARPER BUILDING GROUP
1018 & 1010 OSCEOLA AVENUE
SULLIVANS ISLAND, SC

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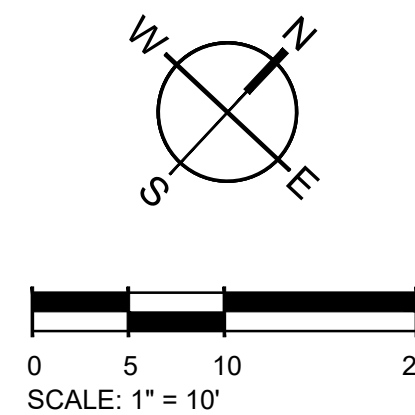
REVISION HISTORY	

1010
OSCEOLA AVE
GRADING AND
DRAINAGE
PLAN

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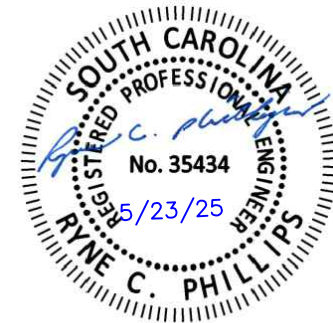
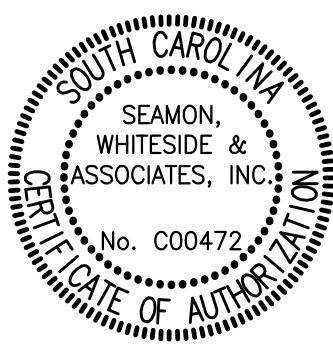


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 - GUTTER DESIGN ON THE BUILDING IS TO BE DESIGNED BY OTHERS. GUTTERS ARE TO TIE-IN TO THE YARD INLET DRAINAGE SYSTEM. YARD INLET LOCATIONS ARE SUBJECT TO CHANGE PRIOR TO CONSTRUCTION BASED ON FIELD CONDITIONS.
 - FINAL DESIGN OF DRY WELL AND SUMP PUMP LOCATION, EQUIPMENT, AND PIPE CONNECTIONS SUBJECT TO CHANGE PRIOR TO CONSTRUCTION BASED ON FIELD CONDITIONS.
 - ALL DRAINAGE PIPE AND SUMP PUMP DISCHARGE PIPE TO BE INSTALLED WITH CHECK VALVES AT THE DISCHARGE LOCATION (TIDEFLEX DUCKBILL CHECK VALVE, OR EQUAL).
 - PIPE PENETRATIONS THROUGH THE LANDSCAPE WALL SHALL BE WATERTIGHT SEALED WITH FLEXIBLE BOOTS, OR EQUAL.



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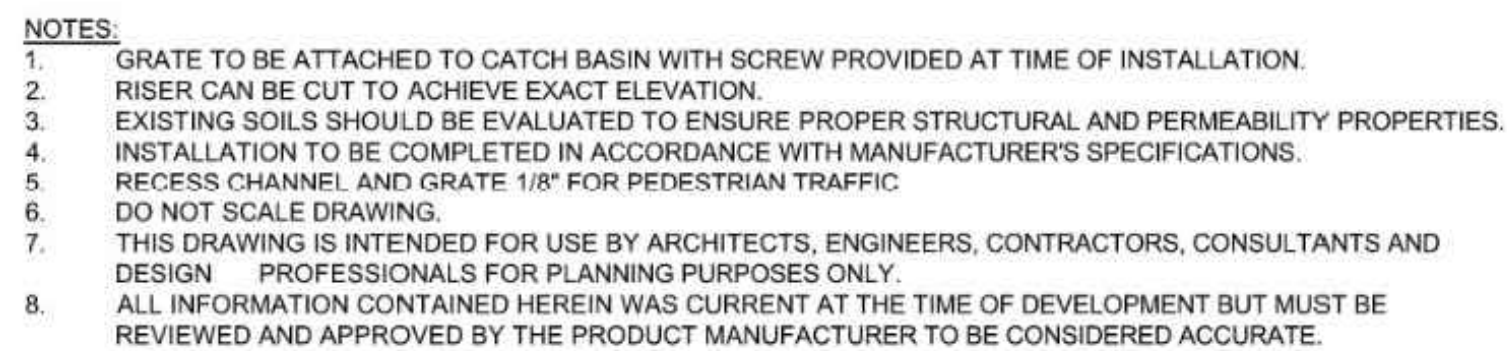


OSCEOLA AVENUE GRADING AND DRAINAGE PLAN
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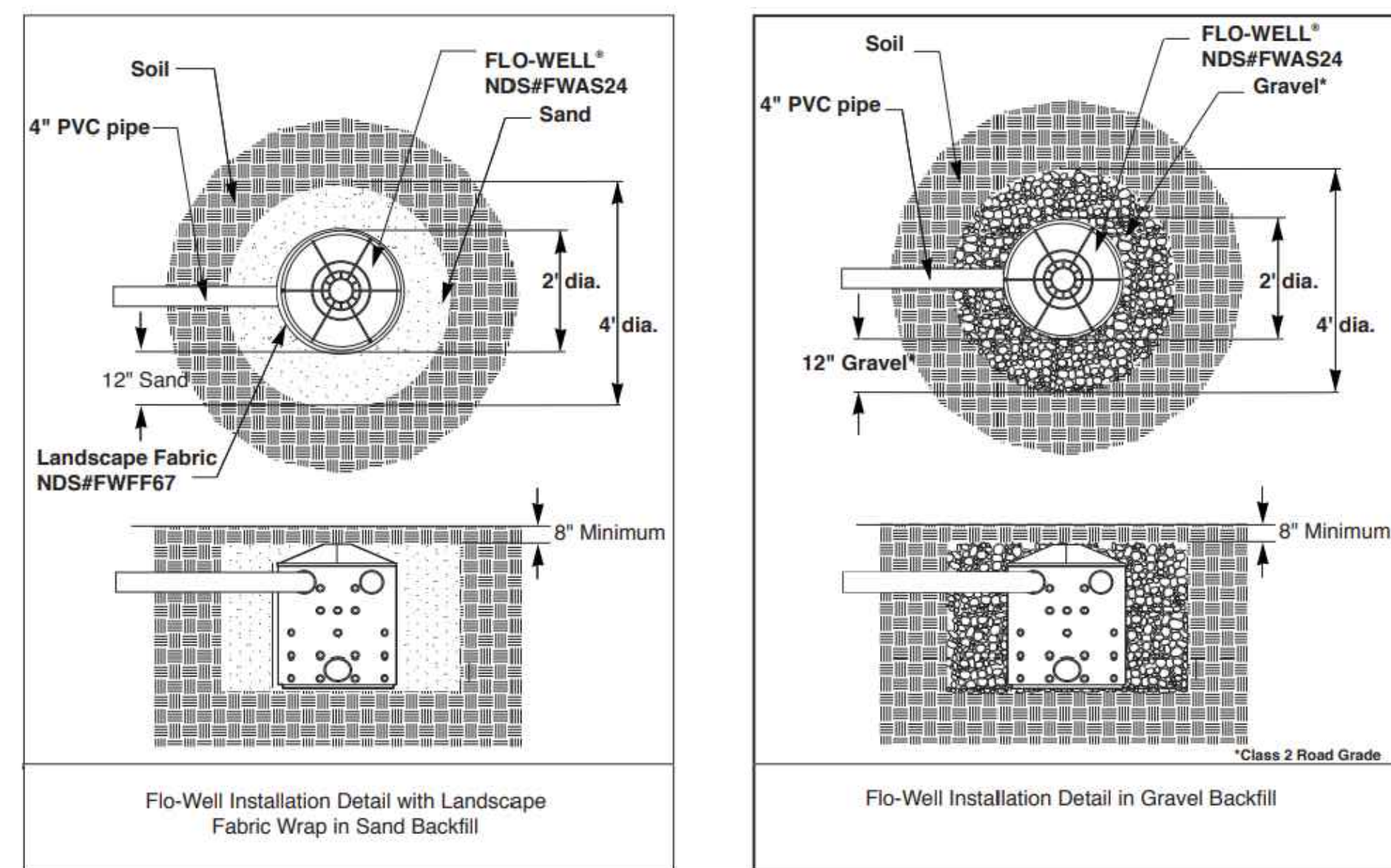
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REVISION HISTORY	

1018
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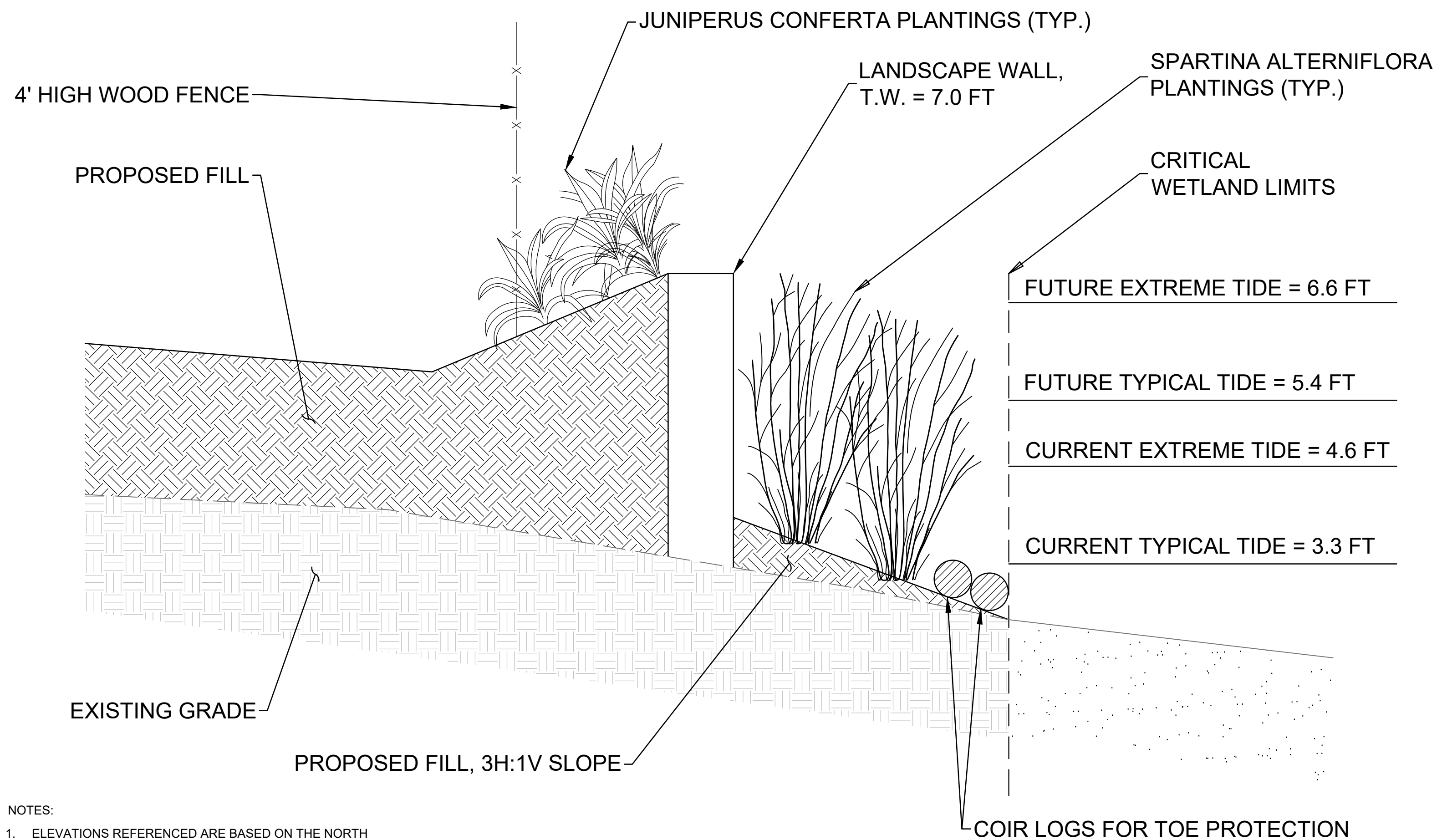


SCALE: NOT TO SCALE



- NOTES:
1. SUMP PUMP IN DRY WELL TO BE SIZED WITH A MINIMUM PUMP CAPACITY OF 50 GPM AT 3 FEET OF HEAD.

SCALE: NOT TO SCALE



- NOTES:
1. ELEVATIONS REFERENCED ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SCALE: NOT TO SCALE

SCALE: NOT TO SCALE