



PLANNING AND ZONING BOARD/ LOCAL PLANNING AGENCY

REGULAR MEETING AGENDA

TUESDAY, NOVEMBER 12, 2019 AT 5:30 PM

CITY HALL - COMMISSION CHAMBERS

1126 EAST STATE ROAD 434, WINTER SPRINGS, FLORIDA

CALL TO ORDER

Roll Call

Invocation

Pledge Of Allegiance

Approval Of The Agenda

AWARDS AND PRESENTATIONS

100. Not Used

INFORMATIONAL AGENDA

200. Not Used

PUBLIC INPUT

Anyone who wishes to speak during Public Input on any Agenda Item or subject matter will need to fill out a "Public Input" form. Individuals will limit their comments to three (3) minutes, and representatives of groups or homeowners' associations shall limit their comments to five (5) minutes, unless otherwise determined by the City Commission.

CONSENT AGENDA

300. The Office Of The City Clerk Requests That The Planning And Zoning Board/Local Planning Agency Review And Approve The Wednesday, October 2, 2019 Planning And Zoning Board/Local Planning Agency Regular Meeting Minutes.

Attachments: [Minutes](#)

PUBLIC HEARINGS AGENDA

400. Winter Springs Townhomes

Attachments: [1. Exhibit 1 – Vicinity Map](#)
[2. Exhibit 2 – Aesthetic Review](#)
[3. Exhibit 3 – Waiver Application](#)
[4. Exhibit 4 – Final Engineering Plans / Site Plan Approval](#)
[5. Exhibit 5 – Reports](#)
[6. Exhibit 6 – Developer’s Agreement](#)

REGULAR AGENDA

500. Not Used

REPORTS

PUBLIC INPUT

Anyone who wishes to speak during Public Input on any Agenda Item or subject matter will need to fill out a “Public Input” form. Individuals will limit their comments to three (3) minutes, and representatives of groups or homeowners’ associations shall limit their comments to five (5) minutes, unless otherwise determined by the City Commission.

ADJOURNMENT

PUBLIC NOTICE

This is a Public Meeting, and the public is invited to attend and this Agenda is subject to change. Please be advised that one (1) or more Members of any of the City's Advisory Boards and Committees may be in attendance at this Meeting, and may participate in discussions.

Persons with disabilities needing assistance to participate in any of these proceedings should contact the City of Winter Springs at (407) 327-1800 "at least 48 hours prior to meeting, a written request by a physically handicapped person to attend the meeting, directed to the chairperson or director of such board, commission, agency, or authority" - per Section 286.26 *Florida Statutes*.

“If a person decides to appeal any decision made by the board, agency, or commission with respect to any matter considered at such meeting or hearing, he or she will need a record of the proceedings, and that, for such purpose, he or she may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based” - per Section 286.0105 *Florida Statutes*.

CITY OF WINTER SPRINGS, FLORIDA
MINUTES
PLANNING AND ZONING BOARD/LOCAL PLANNING AGENCY
REGULAR MEETING
OCTOBER 2, 2019

CALL TO ORDER

The Regular Meeting of Wednesday, October 2, 2019 of the Planning and Zoning Board/Local Planning Agency was called to Order at 5:30 p.m. by Chairperson Kok Wan Mah in the Commission Chambers (City Hall, 1126 East State Road 434, Winter Springs, Florida 32708).

Roll Call:

Chairperson Kok Wan Mah present
Vice-Chairperson Kevin McCann, present
Board Member James Evans, absent
Board Member Michael Ferrante, present
Board Member Bart Phillips, present
Assistant to the City Clerk, Christian Gowan, present
Assistant to the City Clerk, Tristin Motter, present

A moment of silence was followed by the Pledge of Allegiance.

No changes were made to the Agenda.

AWARDS AND PRESENTATIONS

100. Not Used

INFORMATIONAL AGENDA

200. Not Used

PUBLIC INPUT

Chairperson Mah opened “Public Input”.

No one addressed the Planning and Zoning Board/Local Planning Agency.

Chairperson Mah closed “Public Input”.

CONSENT AGENDA

300. The Office Of The City Clerk Requests That The Planning And Zoning Board/Local Planning Agency Review And Approve The Wednesday, May 23, 2019 Planning And Zoning Board/Local Planning Agency Special Meeting Minutes.

IN TERMS OF THE MAY 23, 2019 PLANNING AND ZONING BOARD/LOCAL PLANNING AGENCY SPECIAL MEETING MINUTES. “I MOVE THAT WE ACCEPT.” MOTION BY VICE-CHAIRPERSON McCANN. SECONDED BY BOARD MEMBER FERRANTE. DISCUSSION.

VOTE:

**BOARD MEMBER PHILLIPS: AYE
CHAIRPERSON MAH: AYE
VICE-CHAIRPERSON McCANN: AYE
BOARD MEMBER FERRANTE: AYE
MOTION CARRIED.**

301. The Office Of The City Clerk Requests That The Planning And Zoning Board/Local Planning Agency Review And Approve The Wednesday, June 5, 2019 Planning And Zoning Board/Local Planning Agency Regular Meeting Minutes

REGARDING THE JUNE 5, 2019 PLANNING AND ZONING BOARD/LOCAL PLANNING AGENCY REGULAR MEETING MINUTES, “MOTION TO APPROVE.” MOTION BY BOARD MEMBER PHILLIPS. SECONDED BY VICE-CHAIRPERSON McCANN. DISCUSSION.

VOTE:

CHAIRPERSON MAH: AYE

VICE-CHAIRPERSON McCANN: AYE

BOARD MEMBER FERRANTE: AYE

BOARD MEMBER PHILLIPS: AYE

MOTION CARRIED.

PUBLIC HEARINGS AGENDA

400. The Community Development Department Requests That The Planning And Zoning Board/Local Planning Agency Hold A Public Hearing To Consider A Waiver For Northern Oaks, A 35-Lot Single-Family Residential Subdivision.

Mr. Christopher Schmidt, Director, Community Development Department introduced himself and Ms. Marla Molina, Senior City Planner, Community Development Department.

Presenting the Agenda Item for review, Mr. Schmidt mentioned that an updated Staff Report had been provided to the Board Members and noted, "We had done an initial review through engineering and then we did a second review which came in this morning from CPH, who we outsource to, then the stormwater calculations were adjusted accordingly. That's why we amended our request and the Applicant is agreeable to our recommendation."

Ms. Molina spoke on the history of the project, and the rationale for the proposed lot coverage changes.

Vice-Chairperson Kevin McCann inquired, "Does it change the number of units on the property?" Ms. Molina responded, "No. The number of units will remain the same, a total maximum of thirty-five (35) units."

Board Member Michael Ferrante asked if the setbacks would change to which Ms. Molina replied, "The setbacks will not change, it's the lot coverage."

Brief discussion followed on setbacks and lot coverage.

Chairperson Mah said, "When the two (2) original Waivers were requested back in March, this should have been part of that package..." Mr. Schmidt noted, "...Correct..."

Continuing, Chairperson Mah added, “Because, in order to build their homes with the setbacks that were requested, they would have needed to increase the lot coverage.” Mr. Schmidt stated, “Correct.”

Discussion followed on Limited Administrative Waivers for a small number of homes.

Mr. Dan Edwards, Vice President of Land – Central Florida Division, Dream Finders Homes, 8529 Southpark Circle, #130, Orlando, Florida: spoke briefly about the development and stated, “We’re good with the fifty percent (50%).”

Board Member Bart Phillips said, “It seems like that property has a lot of problems with water, and there was like a river going through it - has that all been taken care of so we don’t have homes falling apart?”

Ms. Molina pointed out, “We’ve had our Engineer take a look at the - floodplain and the stormwater. So, that’s what they reviewed today and - also the Final Engineering Plans. So, none of those issues came up with the Engineer today.”

Board Member Phillips then asked, “So right now, the City’s Planning feels that it is comfortable having homes built in some of those locations?” Ms. Molina responded, “Yes.”

Board Member Phillips then noted seeing some possible drainage problems when passing the site recently.

In response to these concerns Mr. Schmidt stated, “The Final Engineering and Site Plan was approved previously. We had them look at the stormwater calc[ulation]s to make sure it could take the capacity of up to fifty percent (50%), which the Engineers assured us that it could. They submitted that to us. So - the site is in development right now; so there are going to be some issues because not all the infrastructure is locked in stone; but yes, we’ve been confirmed by the City Engineer that they’re good to go with regards to stormwater.”

In reference to Board Member Phillips’ comments, Mr. Edwards mentioned that just recently, a Duke Energy Corporation subcontractor had hit a water main and that the City had responded and resolved the issue.

Chairperson Mah opened “Public Input”.

There were no Speakers at this time.

Chairperson Mah closed “Public Input”.

“I MAKE THE MOTION THAT WE APPROVE.” MOTION BY VICE-CHAIRPERSON McCANN. SECONDED BY BOARD MEMBER FERRANTE. DISCUSSION.

VOTE:

**BOARD MEMBER FERRANTE: AYE
BOARD MEMBER PHILLIPS: NAY
VICE-CHAIRPERSON McCANN: AYE
CHAIRPERSON MAH: AYE
MOTION CARRIED.**

REGULAR AGENDA

500. Not Used

600. REPORTS

Chairperson Mah reminded Committee Members and the public about the “2030 and Beyond” Survey and encouraged individuals to participate and share their input.

PUBLIC INPUT

Chairperson Mah opened “Public Input”.

No one spoke.

Chairperson Mah closed “Public Input”.

ADJOURNMENT

The Regular Meeting was adjourned at 5:48 p.m. by Chairperson Mah.

RESPECTFULLY SUBMITTED:

CHRISTIAN GOWAN
ASSISTANT TO THE CITY CLERK

NOTE: These Minutes were Approved at the _____, 2019 Planning And Zoning Board/Local Planning Agency Regular Meeting.



PUBLIC HEARINGS AGENDA ITEM 400

PLANNING AND ZONING BOARD/LOCAL PLANNING AGENCY
TUESDAY, NOVEMBER 12, 2019 | REGULAR MEETING

TITLE

Winter Springs Townhomes

SUMMARY

The Community Development Department requests that the Planning and Zoning Board /Local Planning Agency hold a Public Hearing to consider the Aesthetic Review, Final Engineering Plans, multiple Waivers, and the Development Agreement for Winter Springs Townhomes located in the Town Center. The applicant DFH Land, LLC (Dream Finders Homes) is proposing a 114-unit townhome subdivision in the Town Center. The 8.35 acre parcel is located at the northeast corner of Michael Blake Boulevard and Tree Swallow Drive (Exhibit 1). The site is bordered on the north and east by the Cross-Seminole Trail, on the west by Michael Blake Boulevard, and on the south by Tree Swallow Drive. The property is located in the T5 transect of the Town Center, which includes single-family attached units (townhomes) as a permitted use.

General Information		
Applicant	DFC Seminole Crossing, LLC (Dream Finders Homes)	
Property Owner(s)	DFC Seminole Crossing, LLC	
Location	Northeast corner of Michael Blake Boulevard and Tree Swallow Drive	
Tract Size	8.35 Acres	
Parcel ID Number	26-20-30-5AR-0A00-007K	
Zoning Designation	Town Center (T-C) T5 Transect Urban Center Zone	
FLUM Designation	Town Center District	
Adjacent Land Use	North: Cross-Seminole Trail East: Cross-Seminole Trail	South: Tree Swallow Drive West: Michael Blake Boulevard
Approved /Pending Development Permits (Conditional Use, Waivers, Or Variance)	Pending Waivers	

Development Agreement	Pending Development Agreement
Code Enforcement	Not applicable
City Liens	Not applicable

Aesthetic Review:

Pursuant to Section 9-603, which sets forth guidelines and minimum standards for Aesthetic Review packages, staff has utilized the below criteria in Section 9-603 to determine the following. The attached Aesthetic Review package (Exhibit 2) includes all of the submittal requirements for aesthetic review as set forth in Section 9-600 through 9-607 and include the following: (a) a site plan; (b) elevations illustration all sides of structures facing public streets or spaces; (c) illustrations of all walls, fences, and other accessory structures and the indication of height and their associated materials; (d) elevation of proposed exterior permanent signs or other constructed elements other than habitable space, if any; (e) illustrations of materials, texture, and colors to be used on all buildings, accessory structures, exterior signs; and (f) other architectural and engineering data as may be required. The procedures for review and approval are set forth in Section 9-603.

Aesthetic Review	
1.	<p>The plans and specifications of the proposed project indicate that the setting, landscaping, proportions, materials, colors, texture, scale, unity, balance, rhythm, contrast, and simplicity are coordinated in a harmonious manner relevant to the particular proposal, surrounding area and cultural character of the community.</p> <p>The project is located east of the intersection on the northeast corner of Michael Blake Boulevard and Tree Swallow Drive. The entrance area will be decorated with landscaping, and a landscaped median in front of the entrance. The design of the proposed townhomes includes 10 two-story townhomes, 10 three-story townhomes, and a single story cabana with a swimming pool, with a neutral complementary color scheme. The variation in angles, arches, and expression lines provide for variety amongst the townhomes, but together are complementary of each other and the surrounding area. The architecture is complementary to the diverse styles of architecture that have been provided in the Town Center. For example, the three-story townhome building at the roundabout of Michael Blake Boulevard and Tree Swallow is designed as a feature building that will contain enhanced architectural and aesthetic elements.</p>

2.	<p>The plans for the proposed project are in harmony with any future development which has been formally approved by the city within the surrounding area.</p>
3.	<p>The plans for the proposed project are not excessively similar or dissimilar to any other building, structure or sign which is either fully constructed, permitted but not fully constructed, or included on the same permit application, and facing upon the same or intersecting street within five hundred (500) feet of the proposed site, with respect to one or more of the following features of exterior design and appearance:</p> <ul style="list-style-type: none"> a. Front or side elevations; b. Size and arrangement of elevation facing the street, including reverse arrangement; or c. Other significant features of design such as, but not limited to: materials, roof line, hardscape improvements, and height or design elements. <p>The proposed units are designed to contribute to the quality architectural styles that are typical of the surrounding area. This project represents a positive addition to the City of Winter Springs Town Center. Significant design features include architectural design elements such as columns, a variety of angles and shapes of rooflines, and varying colors and facades of stucco throughout the multiple variations of units.</p>
4.	<p>The plans for the proposed project are in harmony with, or significantly enhance, the established character of other buildings, structures or signs in the surrounding area with respect to architectural specifications and design features deemed significant based upon commonly accepted architectural principles of the local community.</p> <p>The proposed project enhances the character and overall aesthetics of the surrounding area. The City of Winter Springs is comprised of diverse architectural styles and, therefore, the proposed project represents a positive addition to this area of the City.</p>
5.	<p>The proposed project has incorporated significant architectural enhancements such as concrete masonry units with stucco, wrought iron, columns and piers, porches, arches, planting areas, display windows, and other distinctive design detailing and promoting the character of the community.</p> <p>The proposed units are designed to contribute to the quality architectural styles that are typical of the surrounding area. This project represents a positive addition to the City of Winter Springs Town Center. Significant design features include architectural design elements columns, a variety of</p>

	angles and shapes of rooflines, and varying colors and facades of stucco throughout the multiple variations of units.
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Waiver Requirement:

Section 20-34. – Waivers.

- (a) Any real property owner may file a waiver application requesting a waiver for their real property from any term and condition of this chapter (except from the list of permitted, conditional and prohibited uses set forth in any zoning district category).

- (b) The Planning and Zoning Board shall be required to review all waiver applications and make a written recommendation to the City Commission. Such recommendation shall include the reasons for the Board’s recommendation and show the board has considered the applicable waiver criteria set forth in this section.

- (c) Upon receipt of the Planning and Zoning Board’s recommendation, the City Commission shall make a final decision on the application. If the City Commission determines that the Planning and Zoning Board has not made a recommendation on an application within a reasonable period of time, the City Commission may, at its discretion, consider an application without the Planning and Zoning Board's recommendation.

- (d) All waiver recommendations and final decisions shall comply with the following criteria:

Waiver criteria set forth in Subsection 20-34(d) are as follows:	
1.	The applicant clearly demonstrates that the applicable term or condition clearly creates an illogical, impossible, impractical, or patently unreasonable result related to the proposed property and development.
2.	The proposed development plan is in substantial compliance with this chapter and in compliance with the comprehensive plan.
3.	The proposed development plan will significantly enhance the real property.
4.	The proposed development plan serves the public health, safety, and welfare.
5.	The waiver will not diminish property values in or alter the essential character of the surrounding neighborhood.

6.	The waiver granted is the minimum waiver that will eliminate or reduce the illogical, impossible, impractical, or patently unreasonable result caused by the applicable term or condition under this chapter.
7.	The proposed development plan is compatible and harmonious with the surrounding neighborhood.
8.	Whether the applicant has agreed to execute a binding development agreement required by city to incorporate the terms and conditions of approval deemed necessary by the city commission including, but not limited to, any mitigative techniques and plans required by City Code.

Waivers Description/Justification

1.	<p>On Building 4 at the corner of Michael Blake Boulevard and Tree Swallow Road, requesting a portion of the building to have a setback of 12.6', which is outside of the 0' – 8' setback in the T5 transect code. A majority of the building meets the setback requirement, but due to the shape of the right-of-way around the roundabout and physical limitations within the building footprint, the west portion of the building will be outside of the 8' setback.</p> <p><u>Justification:</u></p> <p>1) This waiver request is due to the peculiar shape of the right-of-way and proposed structure. Granting this waiver will allow for a prominent corner building to be constructed on the main view corridor of the roundabout area and add to the urban nature of the town center. Imposing the 8' maximum setback would create an illogical or unreasonable result because the feature corner building could not otherwise be achieved.</p> <p>2) This waiver request is necessary to allow for the construction of the building on that corner without compromising the rear access of the residents. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan. A 4.6' increase to the setback is the minimum necessary to achieve the feature corner building that is desired to create an aesthetically pleasing view corridor.</p> <p><u>City Code:</u></p> <p>Per Sec. 20-325. - Transect standards. T5 (Urban Center Zone) (2) Dimensional requirements. Lot Design Guidelines Principle building setbacks (from property line) Front/principle plane 0 ft.—8 ft. max (from front property line).</p>
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2.	<p>For the amenity building at the pool, requesting a 1-story elevation, which is less than the minimum requirement of 2 stories for accessory structures. The amenity building will have a small footprint of about 1,100 square feet and adding a second story will impede upon the view corridor of the park area between Streets B & C.</p> <p><u>Justification</u></p> <p>1) This waiver request is due size, location, and intended use of proposed structure. Granting this request will allow for a proportional design elevation for the pool amenity building.</p> <p>2) This waiver request is necessary to allow the amenity building to be constructed adjacent to the pool and be a suitable proportion to the footprint. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan.</p> <p><u>City Code:</u></p> <p>Sec. 20-325. Transect standards. T5 (Urban Center Zone) (2) Dimensional requirements. Lot Design Guidelines. Building height 2 stories min., 5 stories max.</p>
3.	<p>For proposed Streets A and B, requesting to have the 6' sidewalk located adjacent to the parallel parking spaces, which is the opposite configuration from the Town Center Street thoroughfare requirements in the Transect Zone Design Standards. The purpose of this request is to allow the 6' landscape portion of the right-of-way to be adjacent to the townhomes side wall and provide a graded buffer between the wall and the sidewalk. Furthermore, having the sidewalk adjacent to the parallel parking stall also allows for an easier transition for car passengers to exit/enter the parked vehicles without crossing a landscape area.</p> <p><u>Justification</u></p> <p>1) This waiver request is due to the layout of the buildings relative to the proposed rights-of-way and will still fit within the nature of the town center in that the landscape and sidewalk elements are still be proposed, just in a different configuration, to allow people parking in an on-street space to step out of their vehicles onto a safe, stable, concrete sidewalk instead of into a grassy green space.</p>

	<p>2) This Waiver Request is necessary to allow for the construction of the buildings at a 0-foot setback on the right-of-way, while still meeting the other requirements of the regulations, such as minimum finish floor grades. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan.</p> <p><u>City Code:</u> 20-325(c)(4) Thoroughfare Standards.</p>
4.	<p>For proposed Streets B and C, requesting to have the 6' sidewalk located adjacent to the parallel parking spaces and the landscape area on the opposite side of the drive lane, as opposed to the typical one-way variation of the Town Center Street thoroughfare requirements in the Transect Zone Design Standards. The purpose of this request to allow for more landscape area adjacent to the central greenspace/park area. Furthermore, having the sidewalk adjacent to the parallel parking stall also allows for an easier transition for car passengers to exit/enter the parked vehicles without crossing a landscape area.</p> <p><u>Justification</u></p> <p>1) This waiver request is due to the layout of the buildings relative to the proposed rights-of-way and will still fit within the nature of the town center in that the landscape and sidewalk elements are still be proposed, just in a different configuration, to allow people parking in an on-street space to step out of their vehicles onto a safe, stable, concrete sidewalk instead of into a grassy green space.</p> <p>2) This waiver request is necessary to allow for the construction of a park / amenity area central to the proposed development. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan.</p> <p><u>City Code:</u> 20-325(c)(4) Thoroughfare Standards.</p>
5.	<p>For Buildings 12, 14, 16, 17, 18, 19 and 20; requesting to have a maximum building set back of 11' - 22' adjacent to the Seminole County Trail right-of-way, which is outside of the 0' – 8' setback in the T5 transect code. For the buildings facing the Seminole County Trail, the area between the building</p>

	<p>Trail right-of-way must include a set of stairs, 6' sidewalk, and retaining wall and the additional setback space is to allow for this for these features to fit within that space. The typical setback would be 11' and only expands up to 22' along Buildings 12, 14, and 16 as the right-of-way line angles out east, away from the internal alignment of the buildings.</p> <p><u>Justification</u></p> <p>1) This waiver request is due to the peculiar shape of the right-of-way and proposed layout of the site. Granting this request will allow for townhomes that face the scenic Seminole County Trail.</p> <p>2) This waiver request is necessary to allow for the construction of the building in these locations, while have the front of the building face the trail and provide standard internal sidewalk access. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan.</p> <p><u>City Code:</u></p> <p>Sec. 20-325. Transect standards. T5 (Urban Center Zone) (2) Dimensional requirements. Lot Design Guidelines Principle building setbacks (from property line) Front/principle plane 0 ft.—8 ft. max (from front property line)</p>
6.	<p>A waiver from the City's Code of Ordinances prohibiting common yards in the Town Center T5 Transect. Buildings 2 and 3 by their orientation have their primary facades facing an open space tract and not a public right-of-way thus creating a common yard condition.</p> <p><u>Justification</u></p> <p>1) This waiver request is due to the orientation of Buildings 2 and 3 not facing a public right-of-way. The area directly in front of these buildings is intended to be community open space and provide a continuous landscape corridor from the amenity building to Michael Blake Blvd.</p> <p>2) This Waiver Request is necessary to facilitate the continuous landscape corridor from the amenity building to Michael Blake Blvd. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan.</p> <p><u>City Code:</u></p> <p>Sec. 20-325. - Transect standards. T5 (Urban Center Zone) (2) Dimensional requirements. Lot Design Guidelines. Private frontages - Common yard – Prohibited.</p>

In evaluation of the above six (6) proposed waiver requests, the applicant has satisfied the eight (8) specific criteria required for waivers in the City Code of Ordinances.

Applicable Law, Public Policy, and Events:

Home Rule Powers

Winter Springs Code of Ordinances

Town Center District Code

City of Winter Springs Comprehensive Plan

Background Data:

The 8-acre site is part of a larger parcel of approximately 46-acres that was previously owned in its entirety by Winter Springs Holdings, Inc. (IBEW). Winter Springs Holdings sold portions of the property to other entities, including Catalyst Development Partners, currently building an apartment project on the west side of Michael Blake Boulevard. The 8-acre property is subject to a Developer's Agreement which includes the following applicable provisions:

- After the Catalyst Apartment Project (currently under construction), no additional apartment units are permitted anywhere on the 46-acre property;
- Parcels fronting S.R. 434 and Tuskawilla Road must be developed with a commercial use; and
- The property is served by a master stormwater treatment facility that is currently under construction as part of the Catalyst Apartment Project.

Proposed Layout / Unit Type:

The Final Engineering Plan proposes townhomes consisting of 10 two-story and 10 three-story buildings, for a total of 20-buildings ranging in size from 3 to 10 units per building, and a cabana including a swimming pool. The Final Engineering Plan for the subdivision features a grid of public streets and private alleys, consistent with the Town Center Code. Townhome units along the perimeter of the development will front Tree Swallow Drive, Michael Blake Boulevard, and the Cross-Seminole Trail. The internal buildings will all face public streets. All units have two-car garages accessed from alleys at the back of the buildings.

Site Amenities:

The central area of the subdivision includes a pool, cabana, and green space/park area. A main feature of the subdivision will be the immediate access to the Cross-Seminole Trail, with the ability for residents to use the trail for access to nearby shopping, schools, parks, and other community destinations.

Water and Sewer:

Water and sewer facilities are available to the site in Michael Blake Boulevard. A lift station is being built at the northwest corner of the property that will serve both the Catalyst Apartment project and the proposed Dream Finders townhome subdivision. The City has water and sewer plant capacity to serve the 114-unit townhome development.

Stormwater:

Winter Springs Townhomes will be served by a master stormwater pond currently being constructed as part of the Catalyst Apartments project. No additional onsite stormwater treatment is required. Onsite stormwater collection and piping facilities will route stormwater to the pond located on the east side of the Trail Bridge.

Transportation:

Winter Springs Townhomes will be accessed from both Michael Blake Boulevard and Tree Swallow Drive. The existing and future Town Center street network provides multiple options for residents to reach their desired

destinations. At the SR 434/Michael Blake Boulevard intersection, a traffic signal will be constructed by the City when it meets the applicable traffic warrants.

Parking:

The proposed Winter Springs Townhomes project consists of 114 townhome units, which requires 228 spaces. All townhome units will have two-car garages and per City Code, each 2-car garage is counted as 1 space, giving 114 garage spaces. Developments within the Town Center do not have a specific parking ratio requirement. However, this development had been designed to meet the City’s parking code outside of the Town Center which is 2.0 spaces per dwelling unit, LDC Section 9-277(2). The remainder of the development provides 115 surface parking along streets and pockets of parking area, distributed throughout the development, resulting in a total of 229 parking spaces, or a 2.01 space per dwelling unit ratio.

Reports:

The Final Engineering submittal is required to include the following reports or updates of previously prepared reports for the same property.

Reports	
2018	Fire Flow
August 27, 2018	Civil Site Specs
October 1, 2018	School Capacity Availability Letter of Determination (SCALD)
November 14, 2018	Ecological Study (listed species)
November 21, 2018	Geotechnical Engineering
December 2018	Traffic Study
January 21, 2019	Stormwater Report
March 7, 2019	Parking Analysis
March 8, 2019	Roadway Underdrain Evaluation
July 29, 2019	Water and Sewer Analysis

The Applicant has agreed to specific conditions of approval for the Plan and Waivers as negotiated in the Developer's Agreement.

Pursuant to Section 20-29 of the City Code, all applications for waivers and development projects requiring a community workshop pursuant to Section 20-29.1 shall be required to be memorialized in a binding development agreement executed by the City and the property owner. Community workshops are required for all new residential subdivisions of ten (10) or more lots under Section 20-29.1. The 114 townhome lots shall be individually owned, requiring a subdivision, though the final plat will be reviewed separately from the Final Engineering Plans. A community workshop was held on July 30, 2019. The draft Development Agreement is enclosed as Exhibit 6 hereto.

The Development Agreement has been drafted to address several important issues regarding the proposed Final Engineering Plans and the eventual platting of this Project. The primary issue that has been tentatively resolved in the draft Development Agreement is related to the conveyance of two small neighborhood squares. A full and detailed history of the requirement to convey two small neighborhood squares may be found in the City Commission Agenda Item titled "Small Neighborhood Squares #4 and #5" from the September 23, 2019 City Commission meeting. An abbreviated history is included herein.

A lengthy series of development agreements has encumbered the DFC Property, beginning in June 2000. These development agreements included the requirement that, at the time of development, two small neighborhood squares, referred to as Small Neighborhood Square #4 and #5, would be conveyed to the City.

The first relevant development agreement was entered into on June 26, 2000 with Schrimsher Land Fund (the "Original Schrimsher Agreement"). The Original Schrimsher Agreement was intended to establish the vision for the future appearance and qualities of the Town Center Community and implement the traditional urban design conventions, such as a palette of squares, parks, and street types as mentioned above. Through this

Agreement, Schrimsher consented to the adoption of the Town Center District Code and its applicability to the Schrimsher Property. The Original Schrimsher Agreement established the open spaces that Schrimsher would convey to the City and to the State of Florida. Schrimsher agreed to convey to the City title to Magnolia Park, Lake Trail Park, and Wetland Park, in addition to several "Small Neighborhood Squares," known as #2, 3, 4, and 5. The Agreement established the size of each Small Neighborhood Square as follows:

#5 - .44 acres

#4 - .42 acres

#3 - .44 acres

#2 - .45 acres

Small Neighborhood Squares #4 and #5 are depicted in Exhibit A of the Original Schrimsher Agreement and, it is the City's belief that they are located on what is now the DFC Property, though DFC has disputed this claim. In consideration for these conveyances, the City agreed that it would perform certain obligations, including stubbing-out utilities to the boundaries of the Schrimsher property at the City's expense.

The Original Schrimsher Agreement was eventually terminated due to the financial crisis and economic recession of 2007 and 2008. However, the City maintained in subsequent development agreements with different developers of the property that the requirement to convey two neighborhood squares would remain binding. Specifically, in the November 10, 2010, Winter Springs Holdings, Inc. entered into a "Future Development Commitment Agreement," recorded in the Seminole County Official Records at Book 7486, Page 146. The Future Development Commitment Agreement restated the existing commitment of the owner to convey Small Neighborhood Square #4 and #5, at the time the City determined the squares would be needed in conjunction with the future development of the Property. The location of the Neighborhood Squares was depicted in an Exhibit to the Agreement, which utilized the same Exhibit that had been attached to the Original Schrimsher Agreement from 2000.

In anticipation of considering the Final Engineering Plans, Aesthetic Review, and Waivers, the City Commission was asked to review the obligation to

convey the small neighborhood squares at its September 23, 2019 City Commission meeting. The City Commission requested that the City staff attempt to negotiate with DFC to find an acceptable alternative to the conveyance of the two small neighborhood squares, which has been memorialized via the draft Development Agreement.

The primary obligations of the Development Agreement are as follows:

- Developer will, at its expense, design, permit and construct the townhome subdivision in a manner consistent with the Final Engineering Plans, Aesthetic Plans, and Waivers contained in the application file.
- Developer consents to the following specific conditions of approval for the Final Engineering Plans, Aesthetic Plans, and Waivers:
 - Planting Elm and Crepe myrtle trees along the northern boundary of the Project and within the Cross-Seminole Trail right-of-way, provided that should Seminole County object to the plantings, Developer shall be excused from this condition. Trees shall be alternating and maximum of 15' apart on center and at least 2.5" caliper. The trees shall be maintained by the Developer for the first two years after planting;
 - Installing irrigation for the trees above, which shall be maintained as part of the future Project's community irrigation system, provided that should Seminole County object to the installation, Developer shall be excused from this condition;
 - Installing a minimum of five (5) dog stations at locations spread throughout the Project, which shall consist of doggie-bag stations to be stocked with baggies and maintained by the Homeowner's Association in perpetuity;
 - Conveying the following land to the City:
 - The northwest corner of the townhome Property, consisting of approximately 0.3 acres and surrounding, but not including, the lift station property (the "Northwest Corner Property Conveyance")
 - The northern portion of the Detention Pond Property located east of the DFC townhome property, consisting of approximately 4.0 acres (the "Detention Pond Property Conveyance")

- o Making a cash contribution of \$125,000 to the City
- o Cooperating with the City to relocate the current stormwater open conveyance system currently located on the Northwest Corner Property by installing a replacement stormwater pipe at a location deemed acceptable to the City.

The Development Agreement also grants the Developer permission to build five (5) model homes in two townhome buildings, which may not be used for purposes of residential occupation prior to final plat approval.

Should the Developer fail to receive building permits and substantially commence vertical construction of buildings within two years of the effective date of the Agreement, the City Commission has the option to terminate the Agreement.

Final Development Plan Approval:

The City Commission may approve Final Engineering Plans separately and prior to approval of the final plat as provided in Section 9-74 of the City Code.

Fiscal Impact:

Approval of the Final Engineering Plan and Aesthetic Review allows the subject property to be developed into a 114-unit Townhome Community. Development of the subject property is anticipated to provide and increase to the City’s taxable value. The potential tax revenue of the proposed subdivision at buildout is estimate to be \$60,000/year.

Procedural History:	
August 31, 2018	Application Submittal Date
January 3, 2018	Planning & Zoning Board/Local Planning Agency Approval Recommendation (Preliminary Engineering Plans)
January 8, 2018	City Commission Approval (Preliminary Engineering Plans)
July 30, 2019	Community Workshop Meeting

September 23, 2019	City Commission Dream Finders Townhomes Contract Obligation Meeting
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Communication Efforts:

The Meeting Agenda and this Agenda Item have been forwarded to the Planning and Zoning Board / Local Planning Agency members and are available on the City’s Website, LaserFiche, and the City’s Server. The Agenda has been forwarded to the Mayor and City Commission; City Manager; and City Attorney/Staff. Additionally, the Meeting Agenda has been sent to media/press representatives, all Homeowner’s Associations on file with the City, all owners of real property adjacent to and within approximately five hundred feet of the subject property, all individuals who have requested Agenda information, Department Directors; and also posted outside City Hall; posted inside City Hall with additional copies available for the general public.

RECOMMENDATION

Staff recommends that the Planning & Zoning Board/Local Planning Agency forward a recommendation of approval to the City Commission for the Aesthetic Review, Preliminary/Final Engineering Plans, multiple Waivers from the Town Center Code, and the Development Agreement for Winter Springs Townhomes, contingent upon the below conditions of approval.

CONDITIONS OF APPROVAL

Approval of the Final Engineering Plan, Aesthetic Plans, and Waivers shall be contingent upon the execution of the Development Agreement and completion of all obligations contained therein.

The following are conditions of approval specifically relating to the Final Engineering Plans:

1. Site Utility Notes #2 shall state that the contractor shall contact Sunshine 811 (by calling 800-432-4770 or 811) at least two (2) full business days before beginning any excavation or demolition to allow all utilities to mark their facilities and respond to the Positive Response System. The note shall also

reference that the contractors are required to comply with FS 556 the Underground Facility Damage Prevention and Safety Act. The plan sheet logo from the Sunshine 811 web site shall be placed on the drawings (Sheet C01.0).

2. Site Utility Notes #4 shall reference that potable water lines 3” and smaller shall be AWWA C901 and rated for 200 psi (Sheet C01.0).

3. Site Utility Notes #13 shall reference that the potable water mains shall be restrained in accordance with the Pipe Joint Restraint Detail in these plans (Sheet C01.0).

4. Site Utility Notes #18 shall reference that root shields shall also be required where the distance between the utility pipelines and the trees is at that 5 foot minimum (Sheet C01.0).

5. Site Utility Notes #20 shall reference the latest edition of the NFPA 24 code, not the 2007 edition (Sheet C01.0).

6. Site Grading Notes #2 may be deleted as the revised information is contained in Site Utility Notes #2. Should it be repeated then follow comment #1 above (Sheet C01.0).

7. In the Jurisdiction/Utilities box the Water Management reference shall be “SJRWMD” (Sheet C01.0).

8. Site Plan Notes #9 references a street lighting plan, include the street lighting in the final plan set (Sheet C01.0).

9. The plan shall state that the Contractor of Record is responsible for applying and obtaining a Notice of Intent from FDEP and for complying with the SJRWMD, FDEP, and EPA NPDES regulations for construction site control of sediment and erosion control and for the runoff from the project site (Sheet C05.0).

10. The plan shall state that the Contractor of Record is responsible for the preparation of a detailed SWPPP and for the submission to and approval from the City of Winter Springs (Sheet C05.0).

11. The plan shall provide one street/alley plan and profile plan for all streets and alleys (Sheet C07).

12. Storm structure STS11 is a conflict manhole, the manhole will need to be an FDEP approved this design. FDEP used to require that sanitary sewers passing through storm structures were required to be encased, and the joint of Ductal Iron Pipe should be lined with Protecto 401 or similar coating (not bitumastic) (Sheet C07.1).

13. All the storm structures that have 48 inch and 60 inch pipes connecting to them shall be at least 6 feet in diameter (Sheet C07.1)

14. A fire hydrant shall be provided on Tree Shallow Lane at Street A (Sheet C08.0).

15. The water main on Street A shall be extended to connect the water main on Alley B (Sheet C08.0).

16. Remove Utility Note referencing "OUC mains" (Sheet C08.0).

17. Shall provide garbage truck access route (Sheet C09.0).

18. Shall provide two one-inch lifts of SP 9.5. (Detail #5 - Sheet C12.0).

19. Southern Magnolia tree shall be relocated from the location Double Dector Check Assembly/Fire Department Connection for buildings 19 and 20 (Sheet L01.1).

20. General Notes #15 shall state that the contractor shall contact Sunshine 811 (by calling 800-432-4770 or 811) at least two (2) full business days before beginning any excavation or demolition to allow all utilities to mark their facilities and respond to the Positive Response System. The note shall also reference that the contractors are required to comply with FS 556 the Underground Facility Damage Prevention and Safety Act and include the Sunshine 811 logo on the drawings (Sheet LI02.0).

21. Shall provide the analysis to include the proposed 8-inch water main on Tree Swallow and its connection to the water main on Street D. Including this pipeline in the Hydraulic Analysis may help comment #2 below.

22. The fire flow analysis for the 2450 gpm flow from FH 3 and FH 4 shows a flow velocity of almost 15 fps for the 8 inch pipe connecting to the existing 12 inch WM on Michael Blake Blvd and entering the development. This is excessive. The City allows size on size taps, so a 12 inch tap and 12 inch pipe from Michael Blake Blvd to the internal water main loop will lesson this excessive velocity.

23. Additionally, pipe P17 shall run to and connect to the 8 inch pipeline on Alley B.

24. This report references the existence of organic soils (Section 7.2.2) and recommends their removal. Shall provide organic soils on the grading plans.

25. In Section 9.1, UES references cut/fill in the range of 2 feet or less. Shall inform UES that the fill will be more along the depths of up to 5 feet along the perimeter of the development towards the Cross Seminole Trail.

26. In Section 9.7, UES references the potential for post-construction vertical settlement of 1 inch or less. Shall provide proof to the City Engineer that removal of the organic soils and the proposed fill (compacted) shall alleviate this potential settlement.

27. In Section 10.2.5, UES references the effects of ground water on the pavement section and recommends minimum separations from the SHGT to the bottom of the base course - depending upon the material used for the base course. An additional Underdrain Analysis was performed and underdrains are shown on Tree Swallow, Street A, and Street D as included in the plan set. Shall provide Plan and Profiles for the other streets and alleys, although they are referenced in the Underdrain Report.

Attachments:

1. Exhibit 1 – Vicinity Map
2. Exhibit 2 – Aesthetic Review

3. Exhibit 3 – Waiver Application
4. Exhibit 4 – Final Engineering Plans / Site Plan Approval
5. Exhibit 5 – Reports
6. Exhibit 6 – Developer’s Agreement

RECOMMENDATION

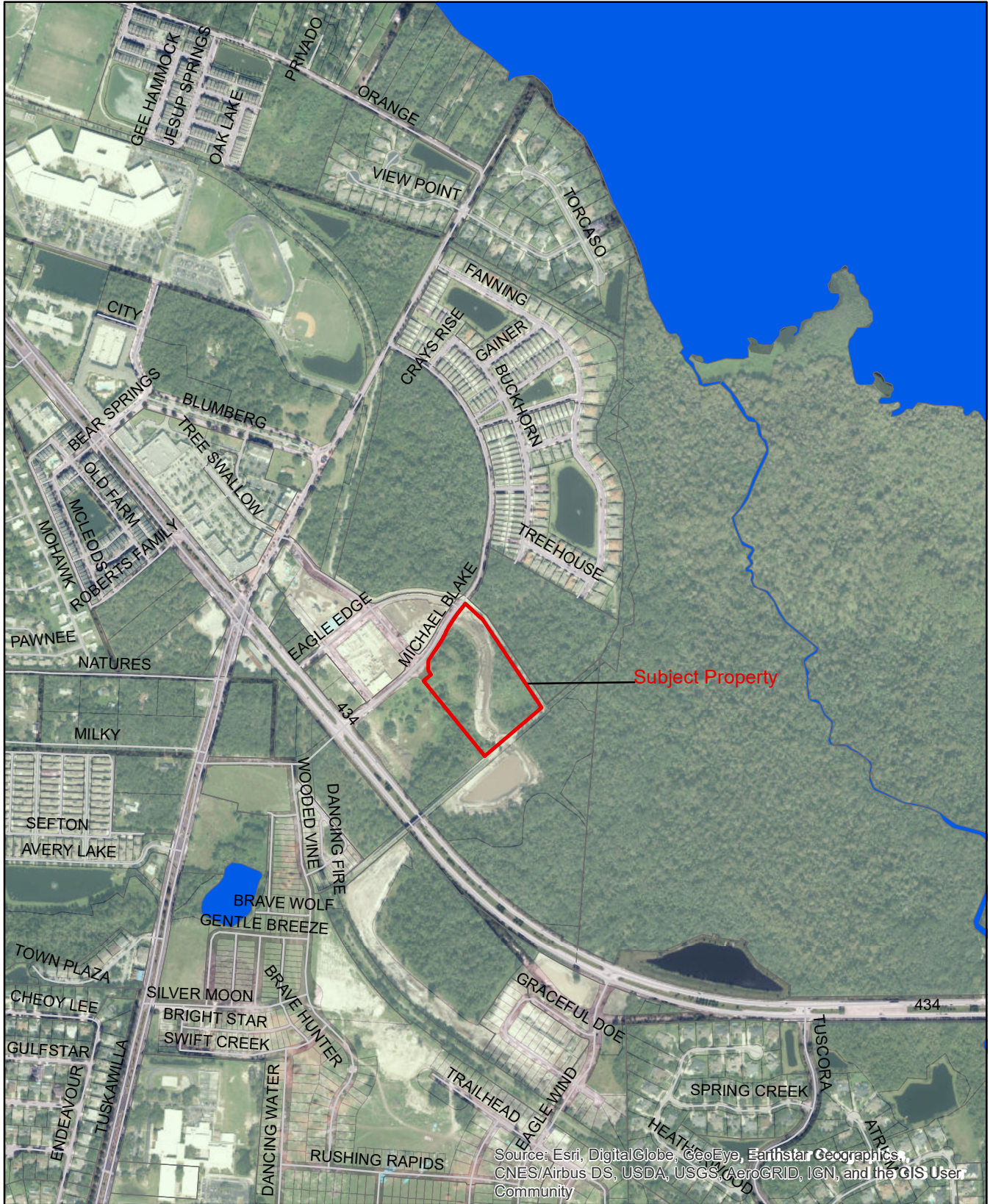
Staff recommends that the Planning & Zoning Board/Local Planning Agency forward a recommendation of approval to the City Commission for the Aesthetic Review, Preliminary/Final Engineering Plans, multiple Waivers from the Town Center Code, and the Development Agreement for Winter Springs Townhomes, contingent upon the below conditions of approval.

Exhibit 1

Aerial Map of Winter Springs Townhomes

AERIAL MAP

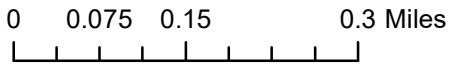
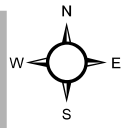
Winter Springs Townhomes



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Streets
- WaterBodies
- Parcels



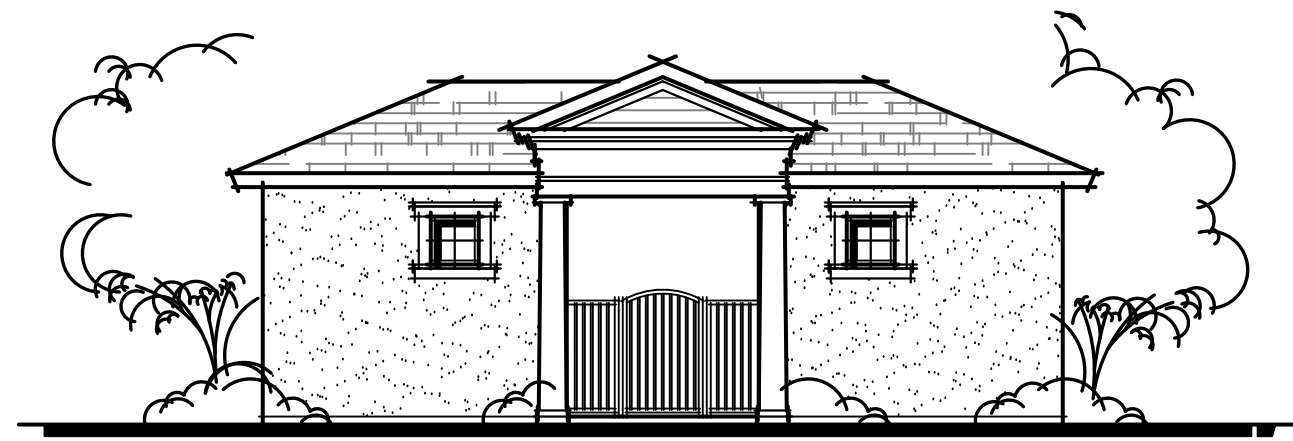
1 inch = 883 feet

Exhibit 2

Aesthetic Review



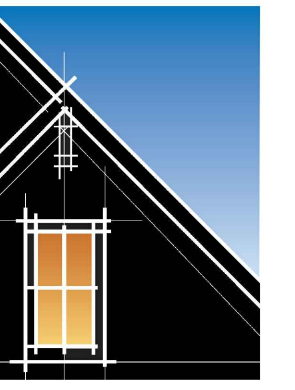
DREAM FINDERS
THE MARK OF A QUALITY HOME



W I N T E R S P R I N G T O W N H O M E S & A M E N I T Y

W I N T E R S P R I N G S , F L O R I D A

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HOUSING
DESIGN
MATTERS

HOUSING DESIGN MATTERS
11512 LAKE MEAD AVENUE
SUITE 102
JACKSONVILLE, FL 32256
TELEPHONE 904.572.1505

DERYL L. PATTERSON

FL LIC. No. AR11419

DREAM FINDERS
WINTER SPRING
TOWNHOMES AND AMENITY BUILDINGS

SUBMITTAL SET
NOT VALID UNLESS WET
SIGNATURE AND RAISED SEAL

07.15.19 REVISED
07.31.19 REVISED

PROJECT :	18010
DRAWN BY:	ZS
DATE:	06.18.19

A000



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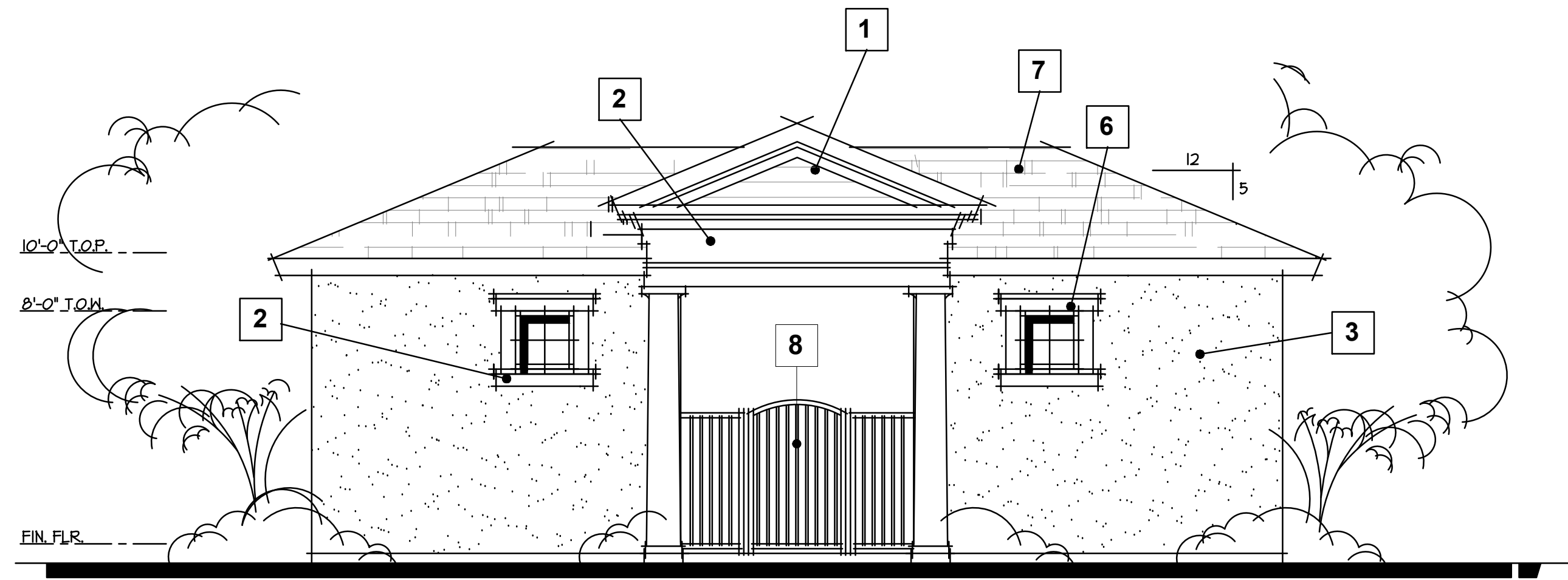
DREAM FINDER'S
WINTER SPRING
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07.31.19 REVISED

PROJECT : 18010
DRAWN BY: ZS
DATE: 06.18.19
Amenity Building

AA1.1

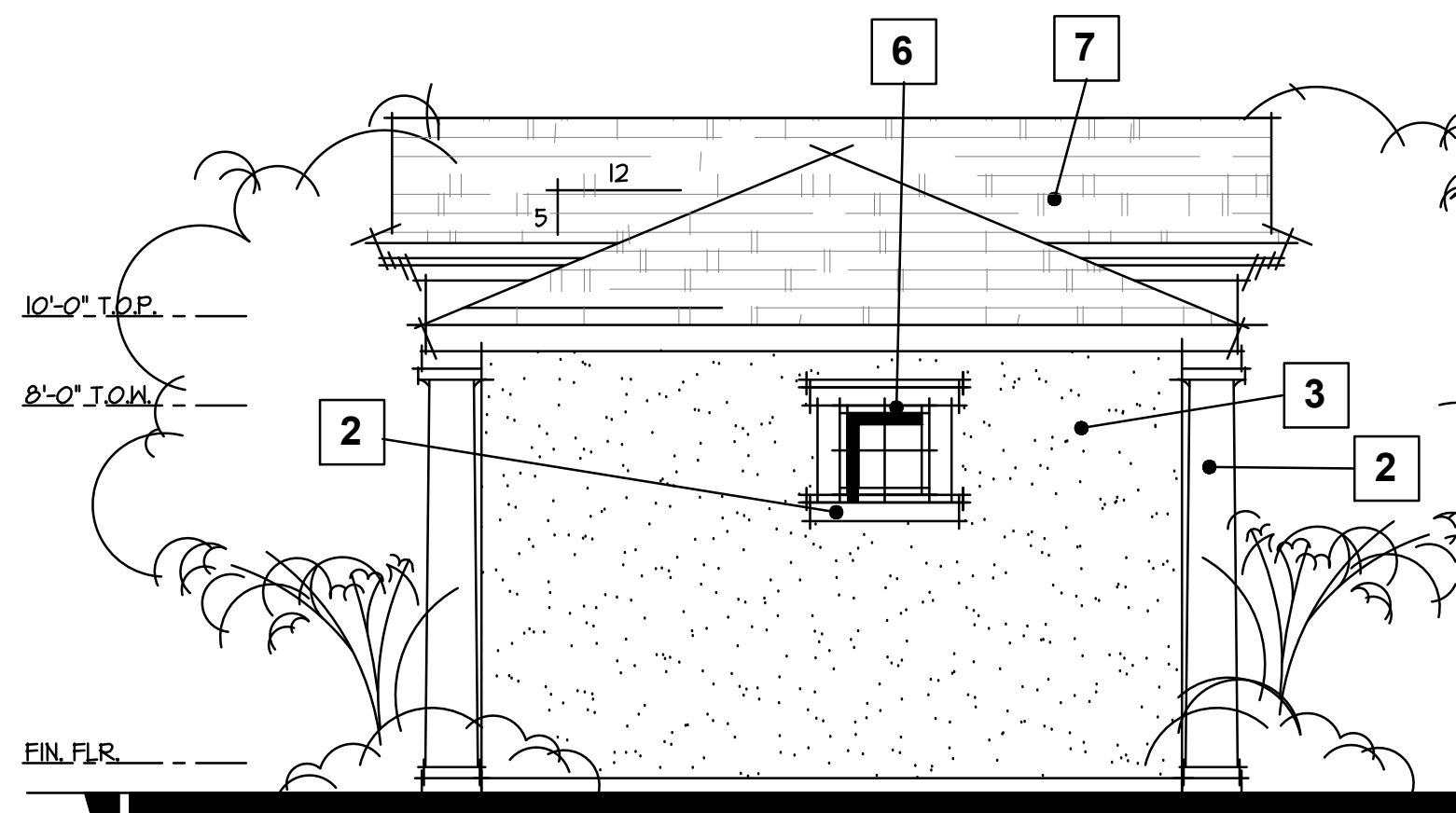


AMENITY BUILDING - FRONT ELEVATION

SCALE: 1/4" = 1'-0"

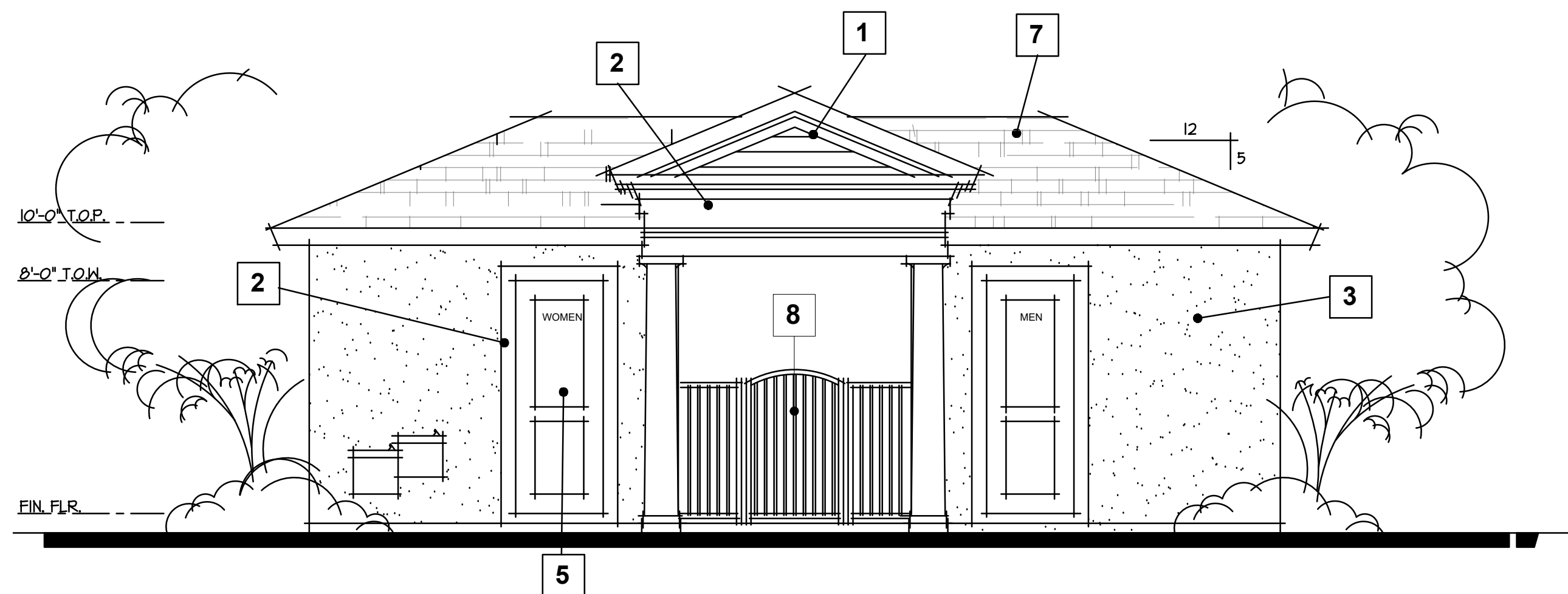
ELEVATION COLOR LEGEND

- 1. SIDING - SW 7043 WORLDLY GRAY
- 2. TRIM - SW 7009 PEARLY WHITE
- 3. STUCCO - SW 2819 DOWNING SLATE
- 4. SIDING - SW 6234 UNCERTAIN GRAY
- 5. DOOR/ACCENT - SW 7020 BLACK FOX
- 6. WINDOWS - BRONZE
- 7. SHINGLES - WEATHERED WOOD
- 8. 2 3/4" DIA. WROUGHT IRON RAILING. BRONZE FINISH



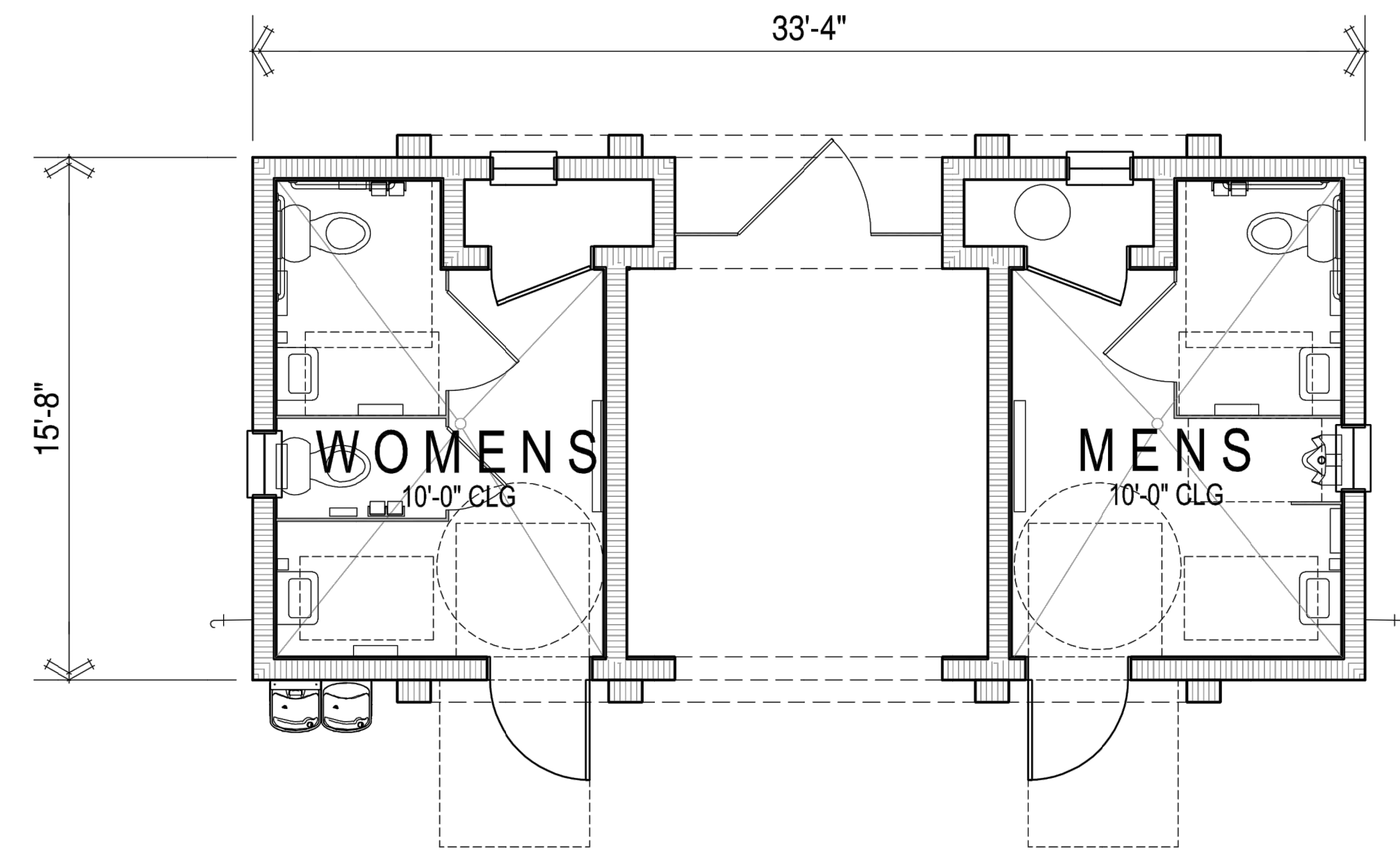
AMENITY BUILDING - LEFT & RIGHT SIDE ELEVATION

SCALE: 1/4" = 1'-0"



AMENITY BUILDING - REAR ELEVATION

SCALE: 1/4" = 1'-0"



AMENITY BUILDING - FLOOR PLAN

SCALE: 1/4" = 1'-0"



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DREAM FINDER'S
WINTER SPRING
TOWNHOMES AND AMENITY BUILDINGS

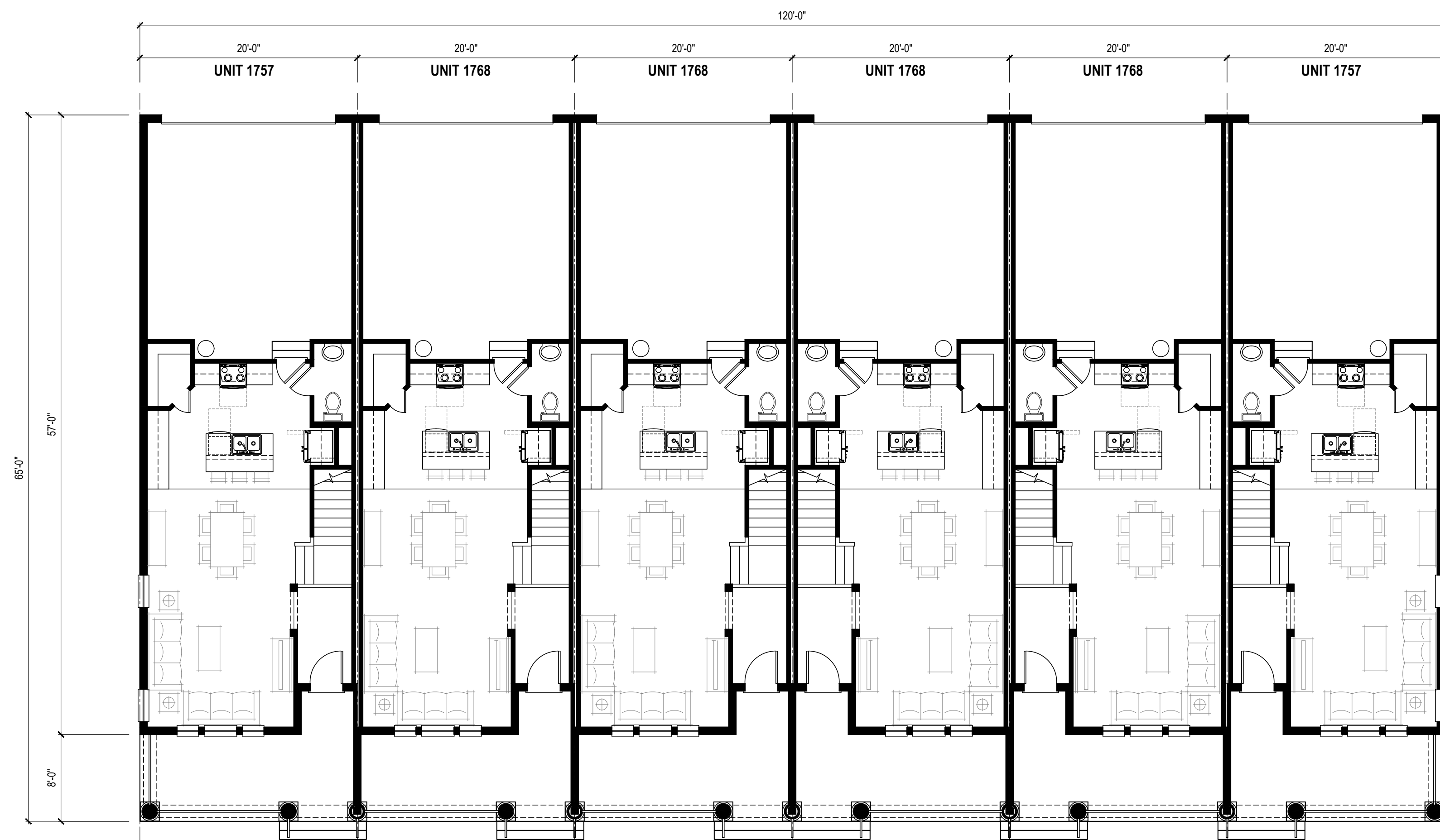
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Building Type 1
1st Level Bldg Flr Pln

AA2.1



BUILDING TYPE 1 - 1st LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"



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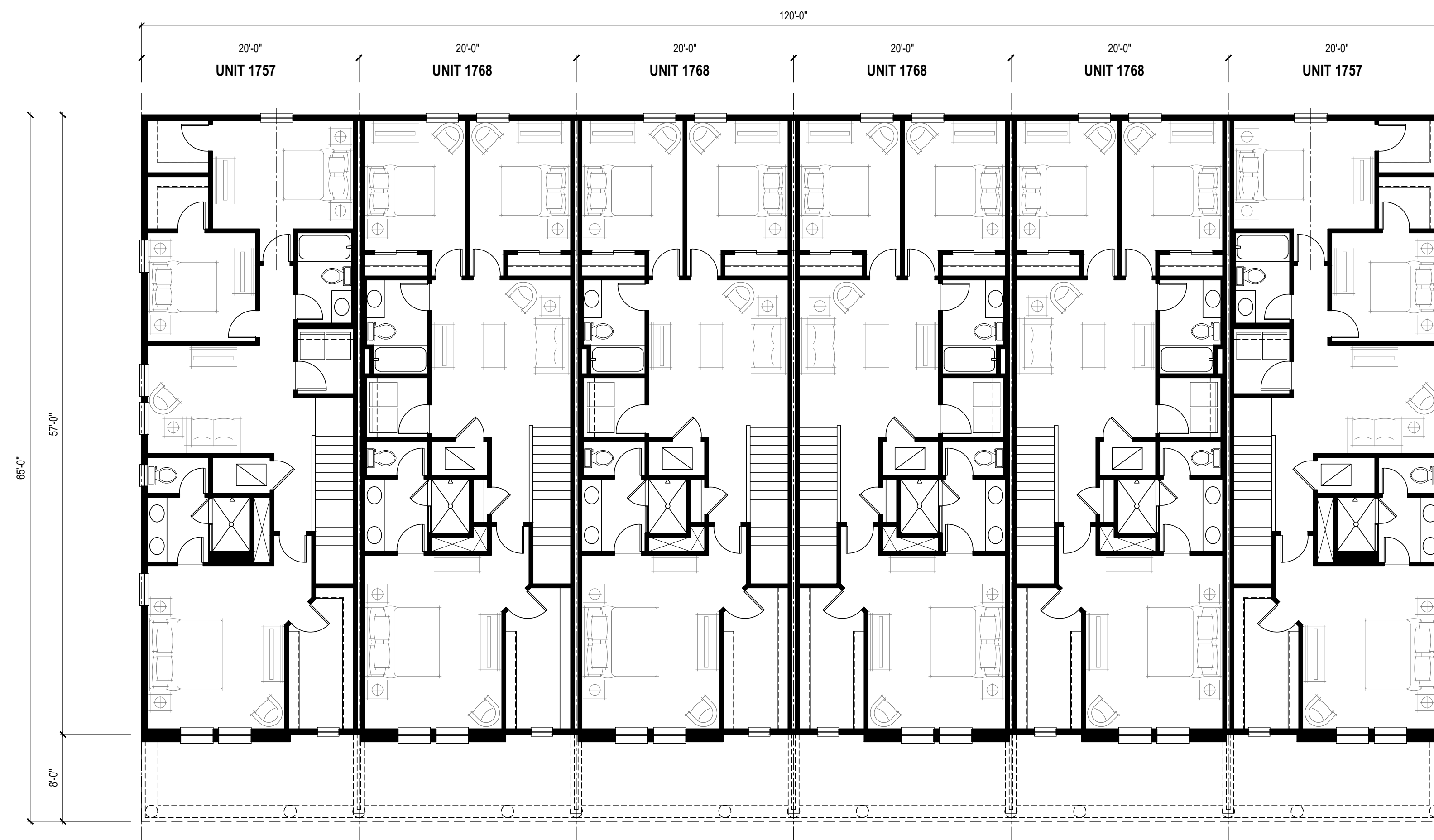
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Building Type 1
2nd Level Bldg Fir Pln

AA2.2



BUILDING TYPE 1 - 2nd LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"

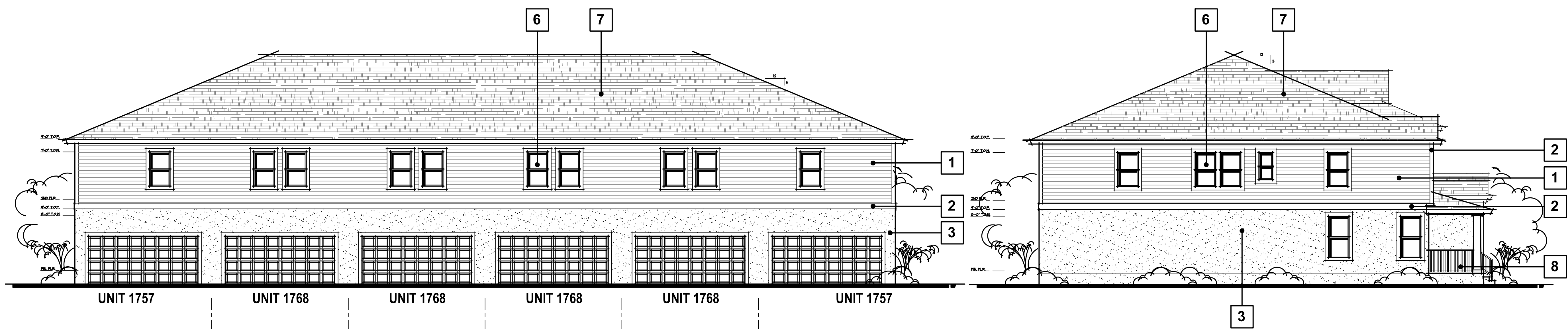
ELEVATION COLOR LEGEND

1. SIDING - SW7043 WORLDLY GRAY
2. TRIM - SW7009 PEARLY WHITE
3. STUCCO - SW2819 DOWNING SLATE
4. SIDING - SW6234 UNCERTAIN GRAY
5. DOOR/ACCENT - SW7020 BLACK FOX
6. WINDOWS - BRONZE
7. SHINGLES - WEATHERED WOOD
8. 2 3/4" DIA. WROUGHT IRON RAILING. BRONZE FINISH



BUILDING TYPE 1 - FRONT ELEVATION

SCALE: 1/8" = 1'-0"



BUILDING TYPE 1 - REAR ELEVATION

SCALE: 1/8" = 1'-0"

BUILDING TYPE 1 - SIDE ELEVATIONS

SCALE: 1/8" = 1'-0"



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Building Type 1
Elevations

AA2.3



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DREAM FINDER'S
WINTERS PRING
TOWNHOMES AND AMENITY BUILDINGS

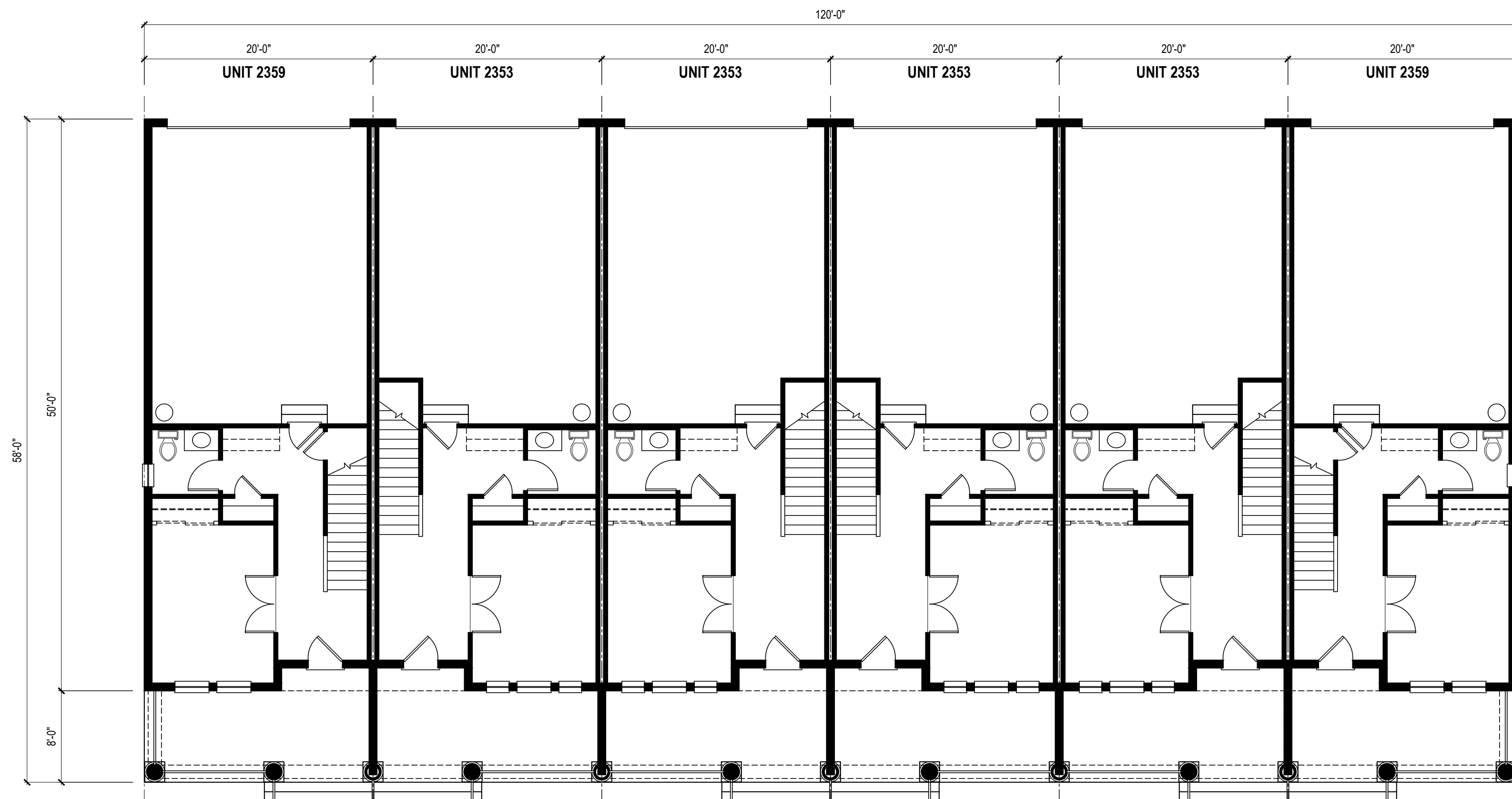
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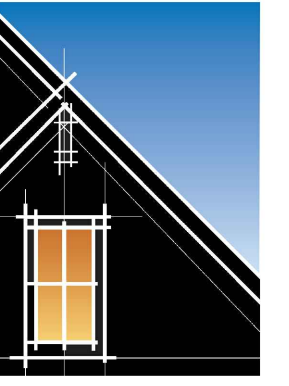
Building Type 2
1st Level Bldg Flr Pln

AA3.1



BUILDING TYPE 2 - 1st LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"



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DREAM FINDER'S
WINTER SPRING
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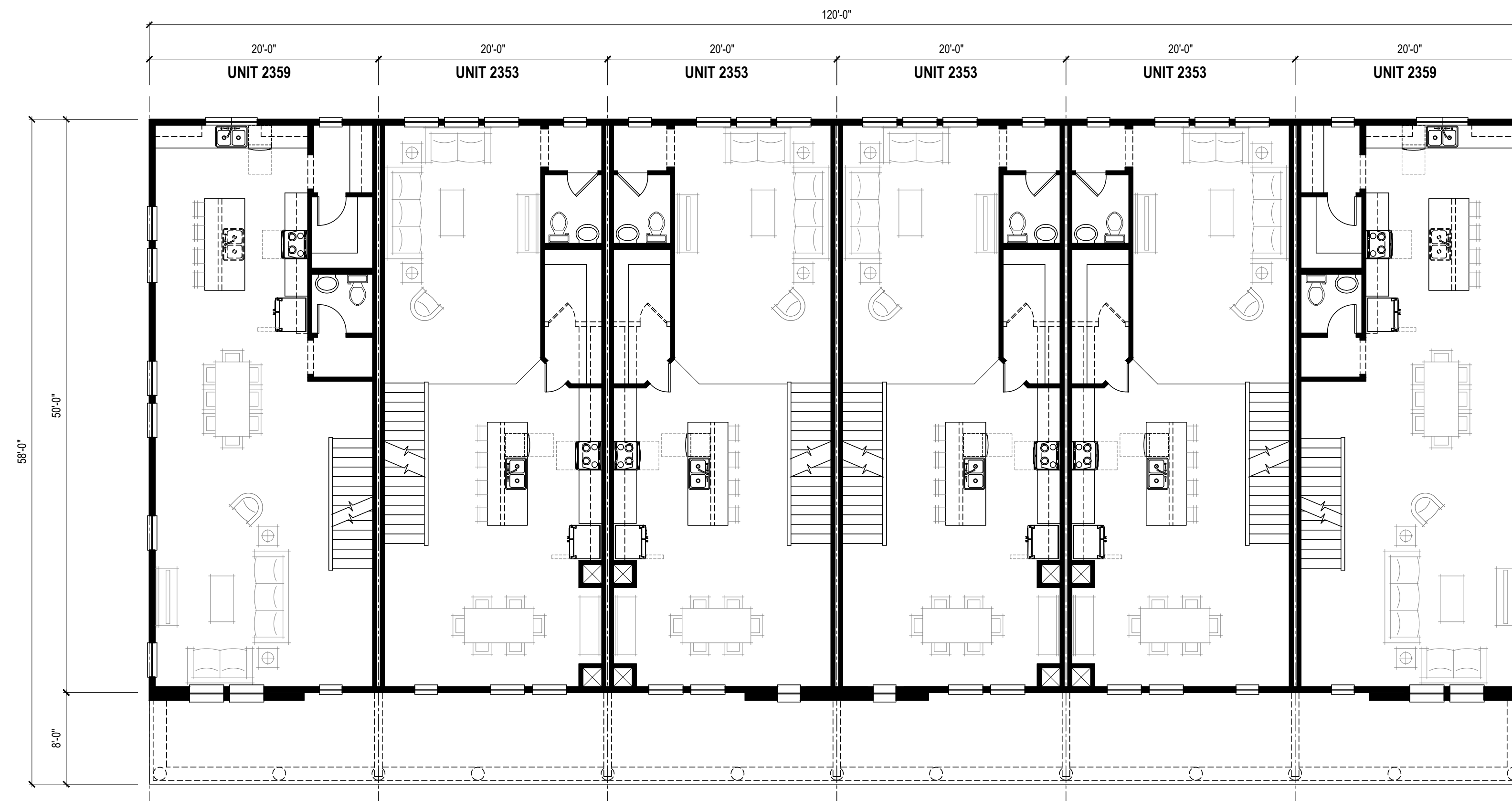
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07.31.19 REVISED

PROJECT : 18010
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DATE: 06.18.19

Building Type 2
2nd Level Bldg Fir Pln

AA3.2



BUILDING TYPE 2 - 2nd LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"



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DREAM FINDER'S
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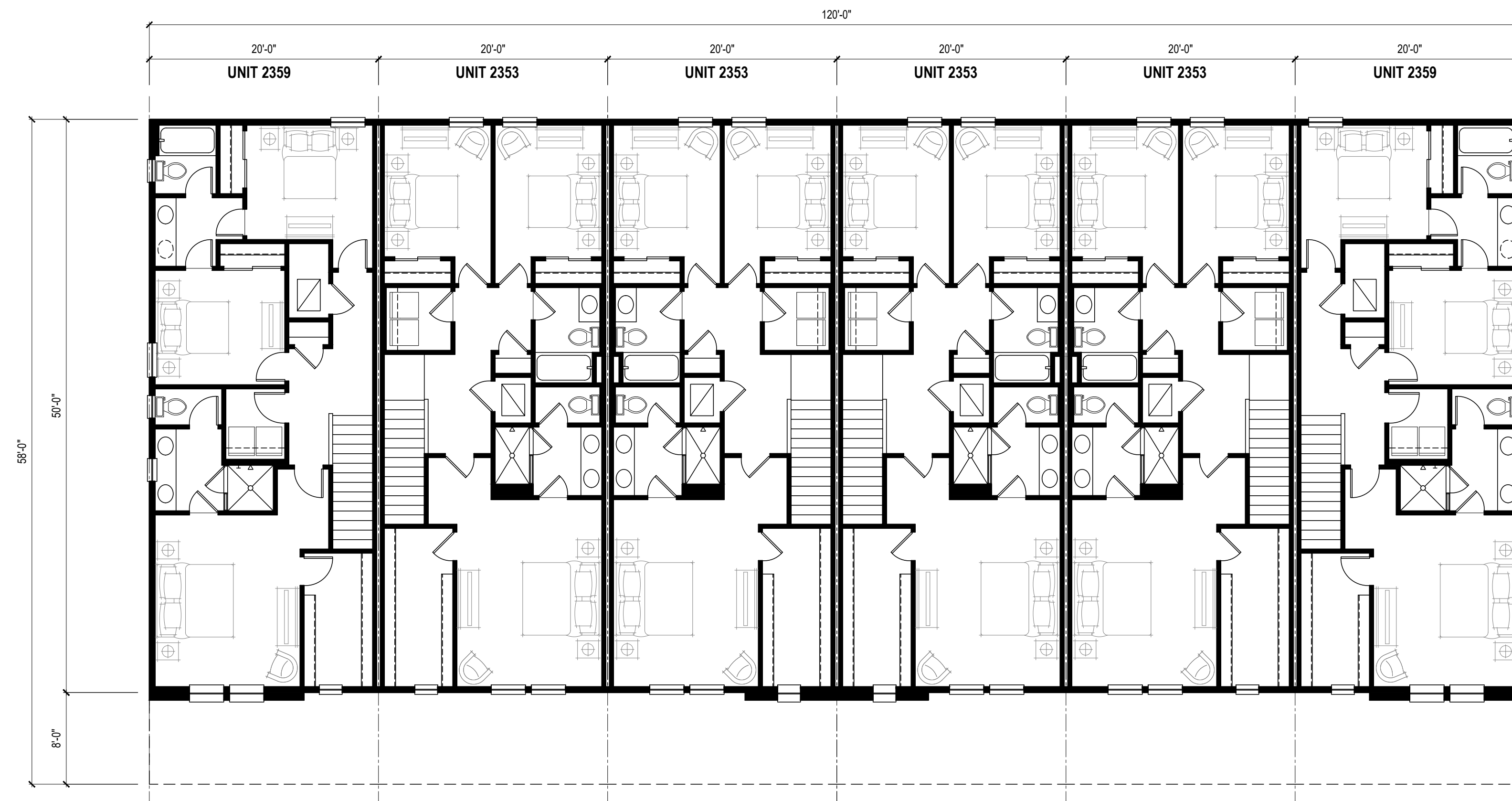
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PROJECT : 18010
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Building Type 2
3rd Level Bldg Fir Pln

AA3.3



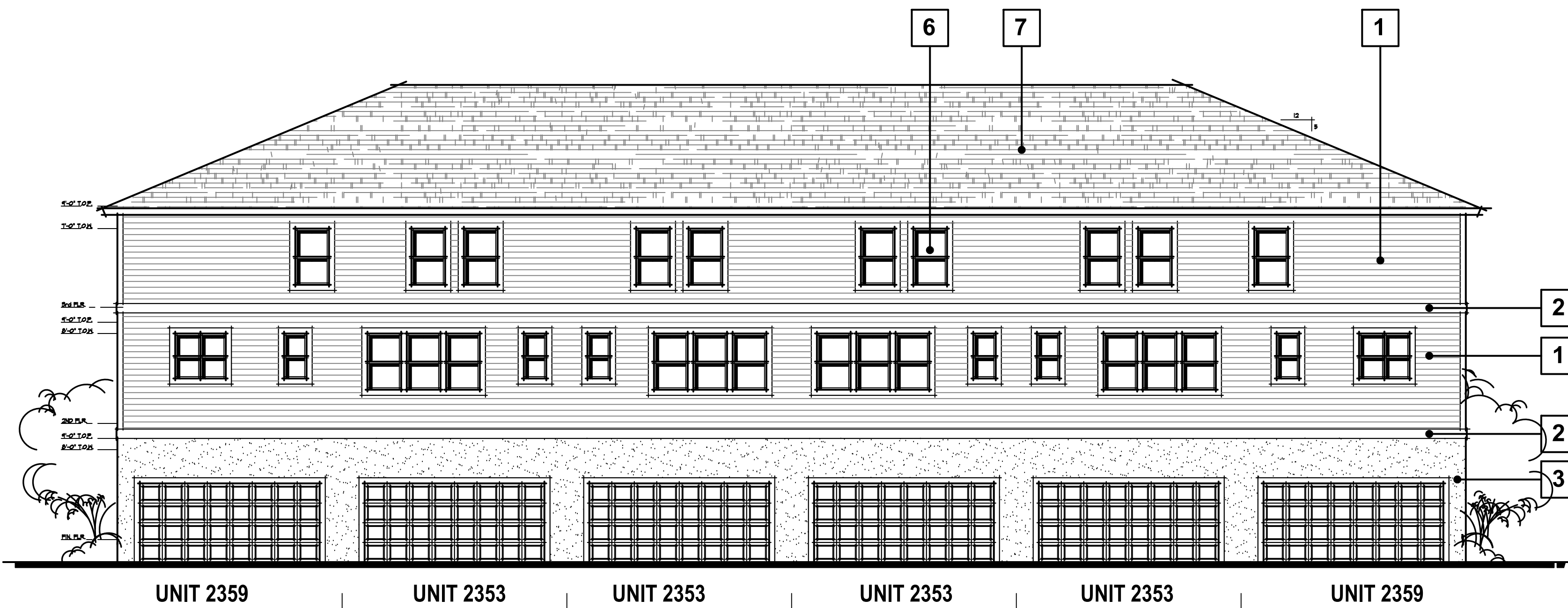
BUILDING TYPE 2 - 3rd LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"



- ELEVATION COLOR LEGEND**
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 - 2. TRIM - SW7009 PEARLY WHITE
 - 3. STUCCO - SW2819 DOWNING SLATE
 - 4. SIDING - SW6234 UNCERTAIN GRAY
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 - 7. SHINGLES - WEATHERED WOOD
 - 8. 2 3/4" DIA. WROUGHT IRON RAILING. BRONZE FINISH

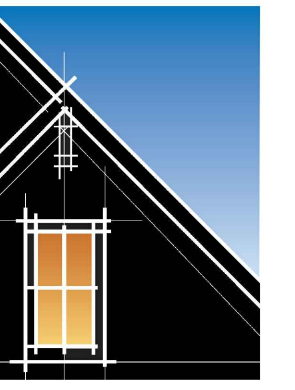
BUILDING TYPE 2 - FRONT ELEVATION
SCALE: 1/8" = 1'-0"



BUILDING TYPE 2 - REAR ELEVATION
SCALE: 1/8" = 1'-0"



BUILDING TYPE 2 - SIDE ELEVATIONS
SCALE: 1/8" = 1'-0"



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DESIGN
MATTERS**

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DREAM FINDER'S
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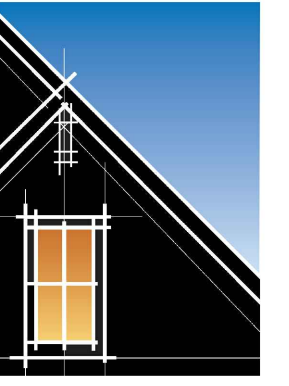
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07.15.19 REVISED
07.31.19 REVISED

PROJECT : 18010
DRAWN BY: ZS
DATE: 06.18.19

Building Type 2
Elevations

AA3.4



HOUSING
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MATTERS

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DREAM FINDERS
WINTER SPRING
TOWNHOMES AND AMENITY BUILDINGS

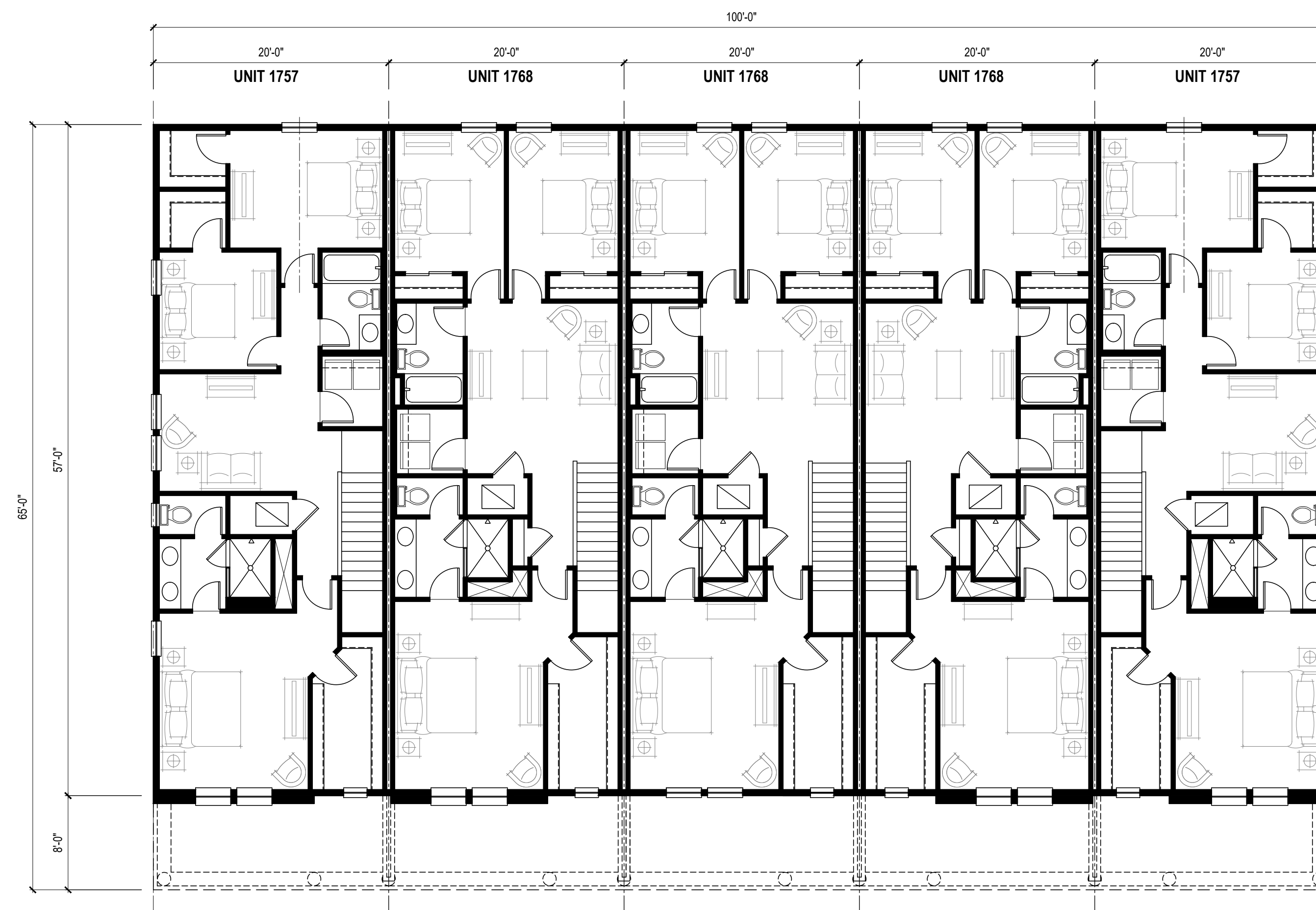
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SIGNATURE AND RAISED SEAL

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PROJECT : 18010
DRAWN BY: ZS
DATE: 06.18.19

Building Type 3
2nd Level Bldg Fir Pln

AA4.2

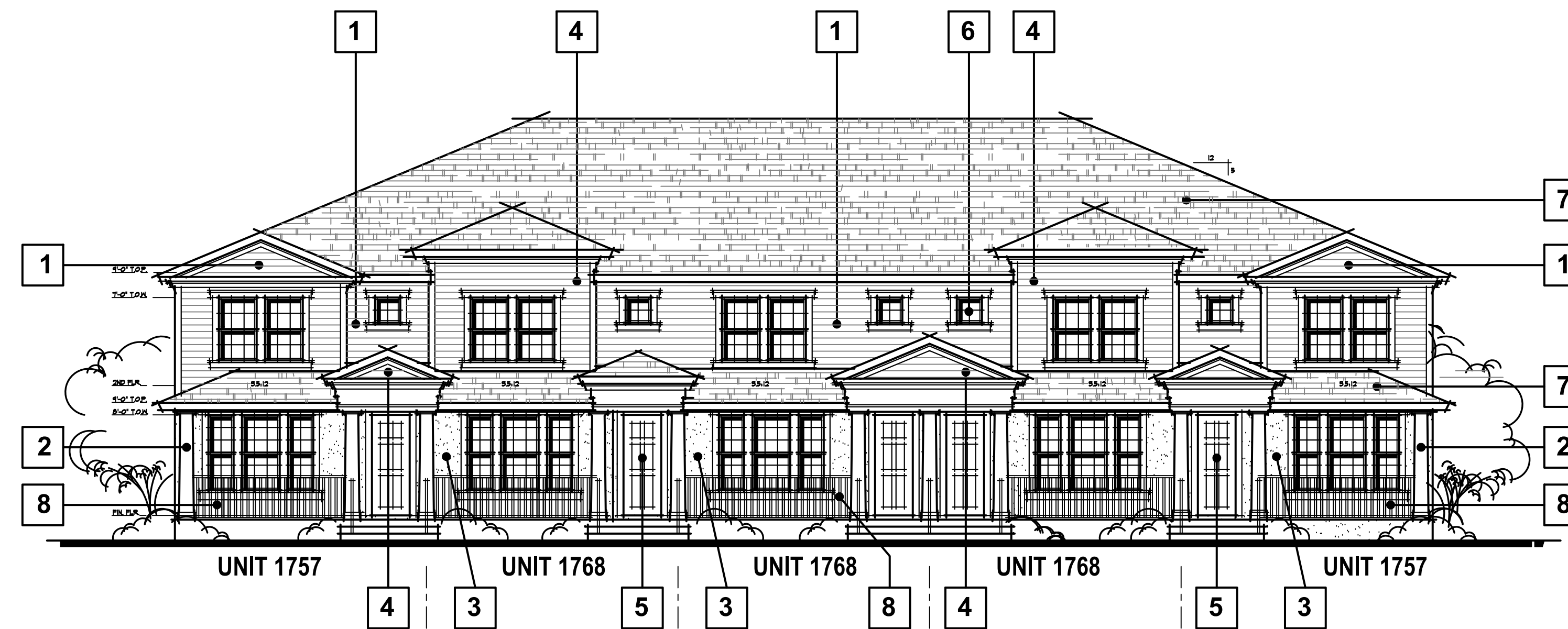


BUILDING TYPE 3 - 2nd LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"

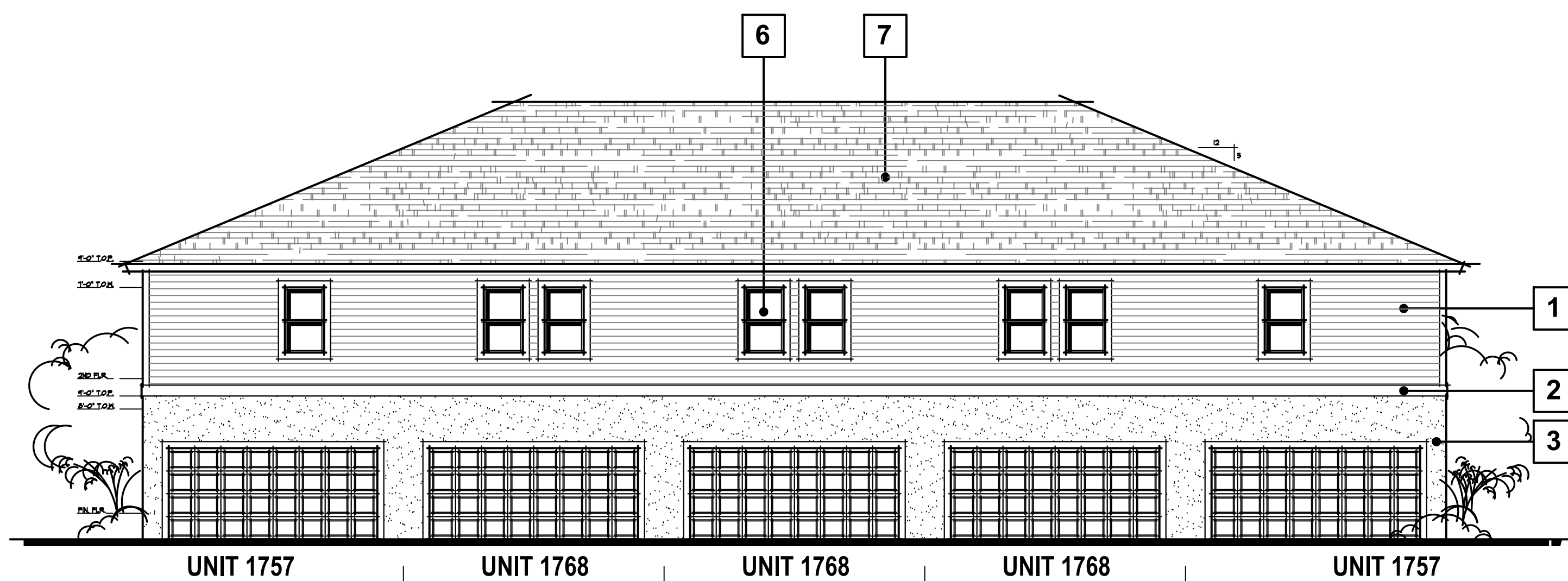
ELEVATION COLOR LEGEND

1. SIDING - SW7043 WORLDLY GRAY
2. TRIM - SW7009 PEARLY WHITE
3. STUCCO - SW2819 DOWNING SLATE
4. SIDING - SW6234 UNCERTAIN GRAY
5. DOOR/ACCENT - SW7020 BLACK FOX
6. WINDOWS - BRONZE
7. SHINGLES - WEATHERED WOOD
8. 2 3/4" DIA. WROUGHT IRON RAILING. BRONZE FINISH



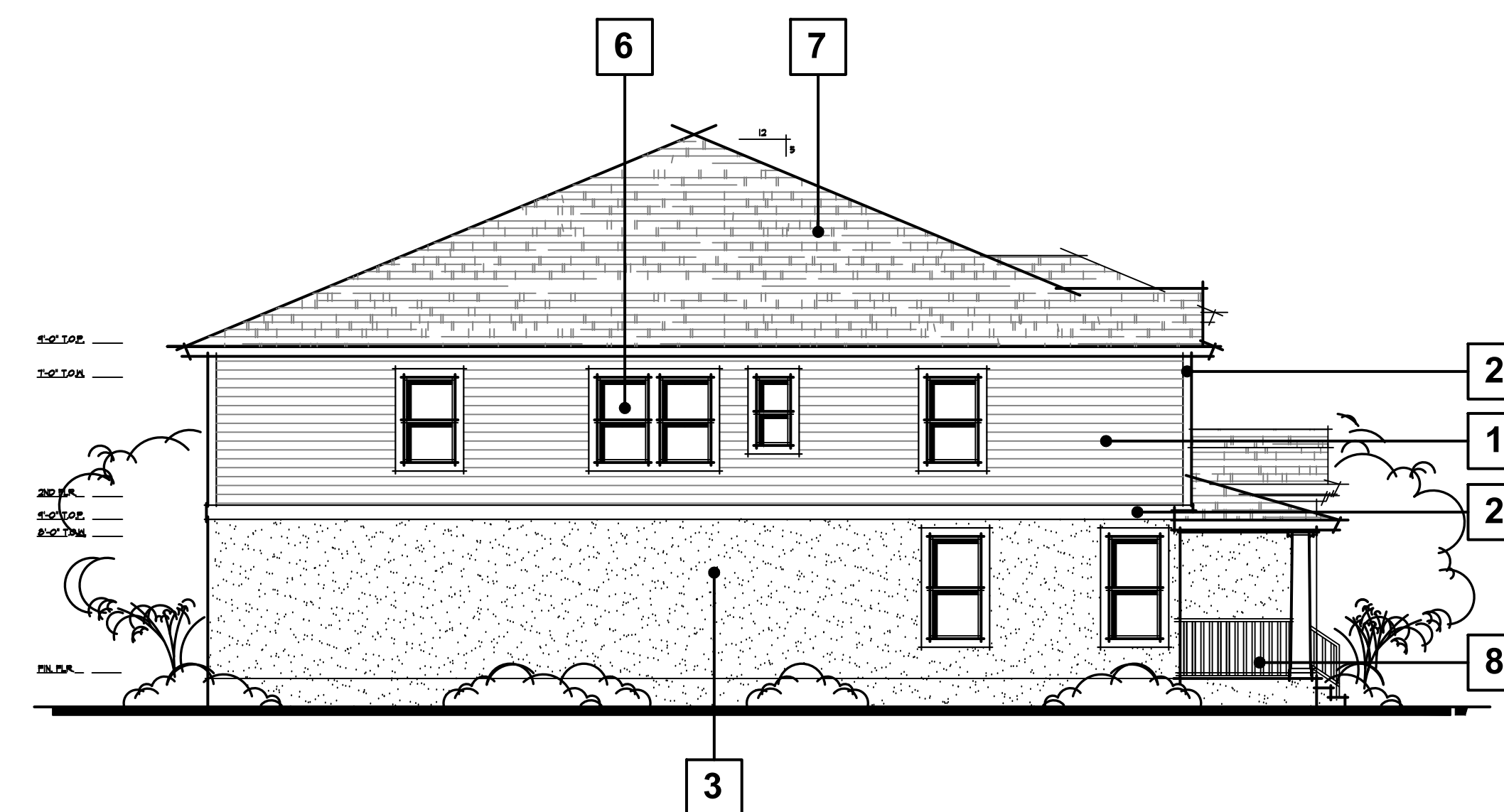
BUILDING TYPE 3 - FRONT ELEVATION

SCALE: 1/8" = 1'-0"



BUILDING TYPE 3 - REAR ELEVATION

SCALE: 1/8" = 1'-0"



BUILDING TYPE 3 - SIDE ELEVATIONS

SCALE: 1/8" = 1'-0"



**HOUSING
DESIGN
MATTERS**

HOUSING DESIGN MATTERS
11512 LAKE MEAD AVENUE
SUITE 102
JACKSONVILLE, FL 32256
TELEPHONE 904.572.1505

DERYL L. PATTERSON

FL LIC. No. AR11419

DREAM FINDER'S
 WINTER SPRING
 TOWNHOMES AND AMENITY BUILDINGS

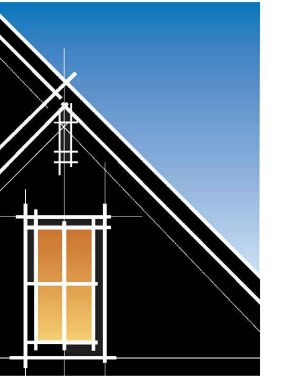
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Building Type 3
Elevations

AA4.3



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DREAM FINDER'S
WINTERS PRING
TOWNHOMES AND AMENITY BUILDINGS

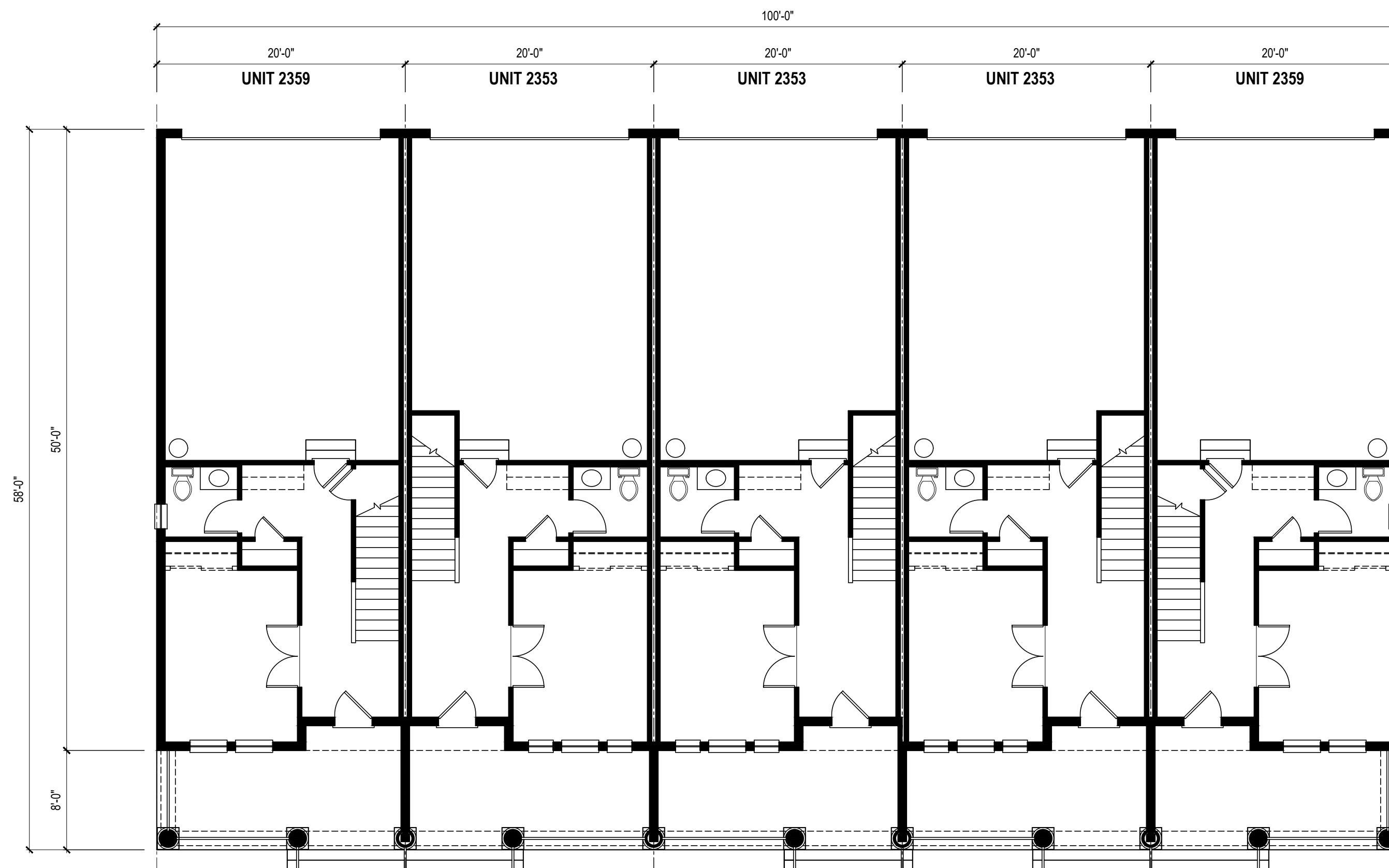
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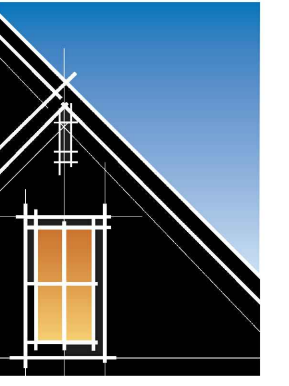
Building Type 4
1st Level Bldg Flr Pln

AA5.1



BUILDING TYPE 4 - 1st LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"



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DREAM FINDER'S
WINTERS PRING
TOWNHOMES AND AMENITY BUILDINGS

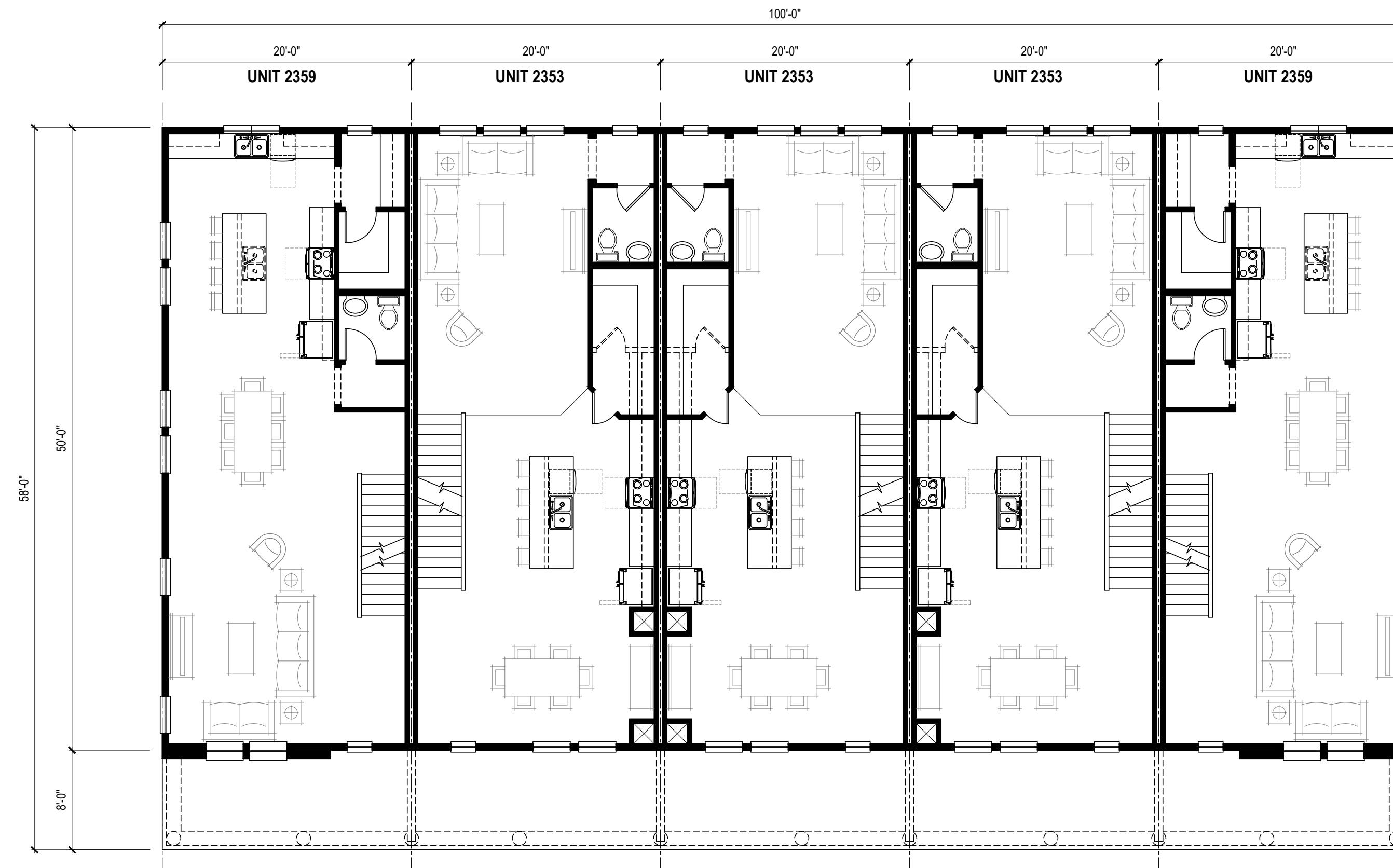
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PROJECT : 18010
DRAWN BY: ZS
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Building Type 4
2nd Level Bldg Fir Pln

AA5.2



BUILDING TYPE 4 - 2nd LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"



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FL LIC. No. AR11419

DREAM FINDER'S
WINTERS PRING
TOWNHOMES AND AMENITY BUILDINGS

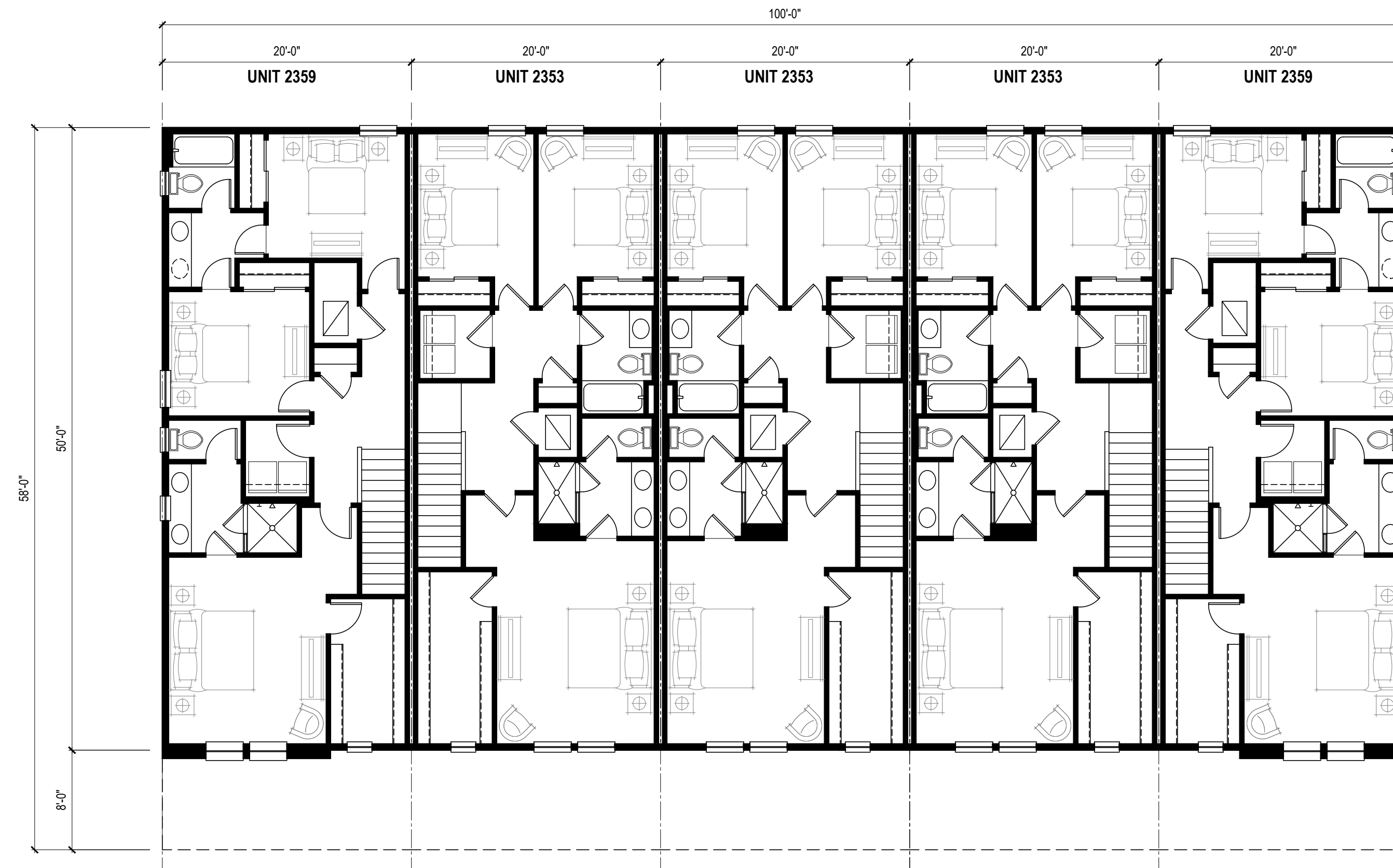
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SIGNATURE AND RAISED SEAL

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PROJECT : 18010
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Building Type 4
3rd Level Bldg Fir Pln

AA5.3



BUILDING TYPE 4 - 3rd LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"



BUILDING TYPE 4 - FRONT ELEVATION
SCALE: 1/8" = 1'-0"

- ELEVATION COLOR LEGEND**
- 1. SIDING - SW7043 WORLDLY GRAY
 - 2. TRIM - SW7009 PEARLY WHITE
 - 3. STUCCO - SW2819 DOWNING SLATE
 - 4. SIDING - SW6234 UNCERTAIN GRAY
 - 5. DOOR/ACCENT - SW7020 BLACK FOX
 - 6. WINDOWS - BRONZE
 - 7. SHINGLES - WEATHERED WOOD
 - 8. 2 3/4" DIA. WROUGHT IRON RAILING. BRONZE FINISH



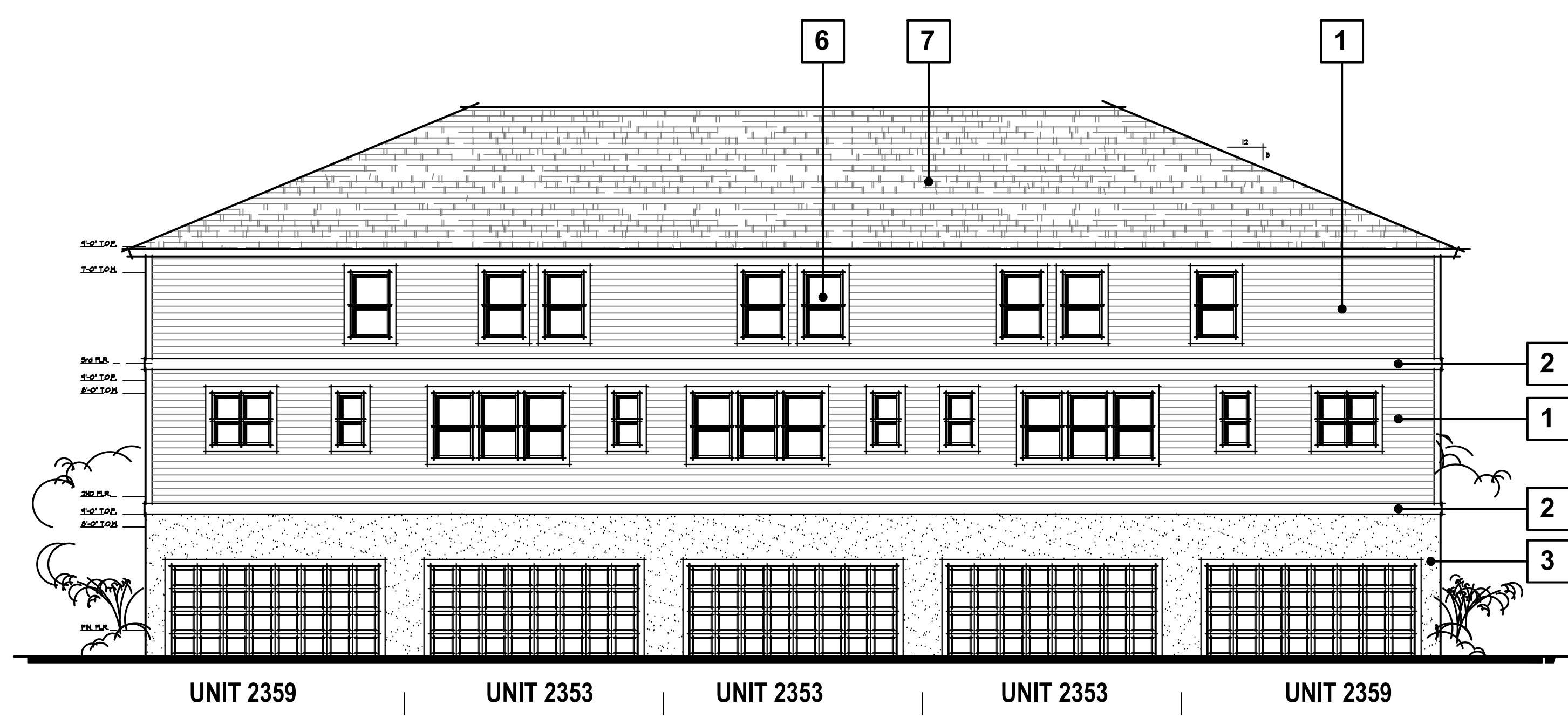
**HOUSING
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MATTERS**

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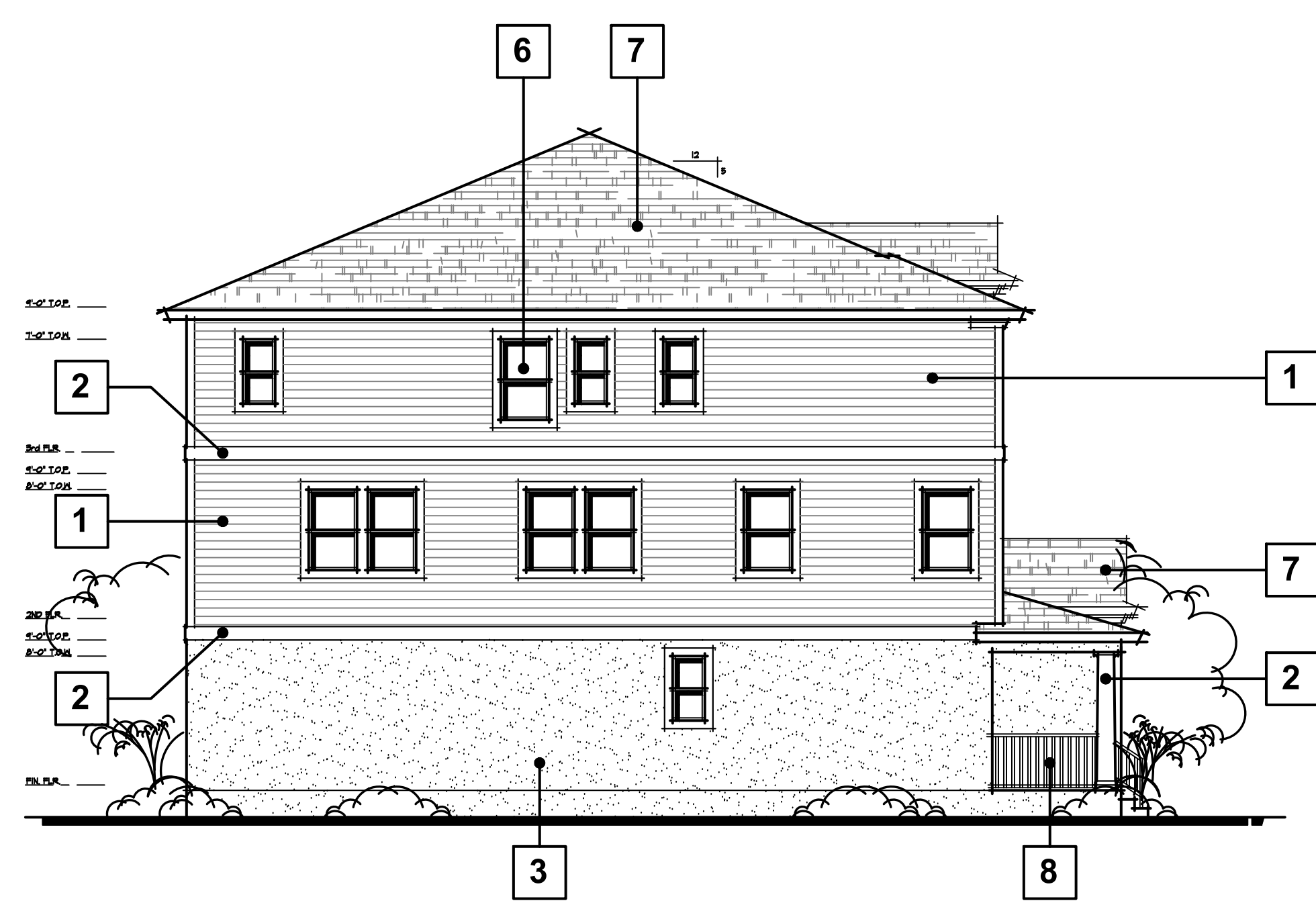
DERYL L. PATTERSON

FL LIC. No. AR11419

DREAM FINDER'S
 WINTER SPRING
 TOWNHOMES AND AMENITY BUILDINGS



BUILDING TYPE 4 - REAR ELEVATION
SCALE: 1/8" = 1'-0"



BUILDING TYPE 4 - SIDE ELEVATIONS
SCALE: 1/8" = 1'-0"

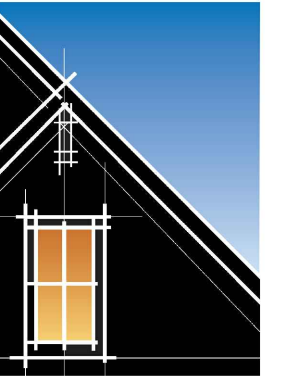
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SIGNATURE AND RAISED SEAL

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Building Type 4
Elevations

AA5.4



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DREAM FINDER'S
WINTERS PRINCIPAL
TOWNHOMES AND AMENITY BUILDINGS

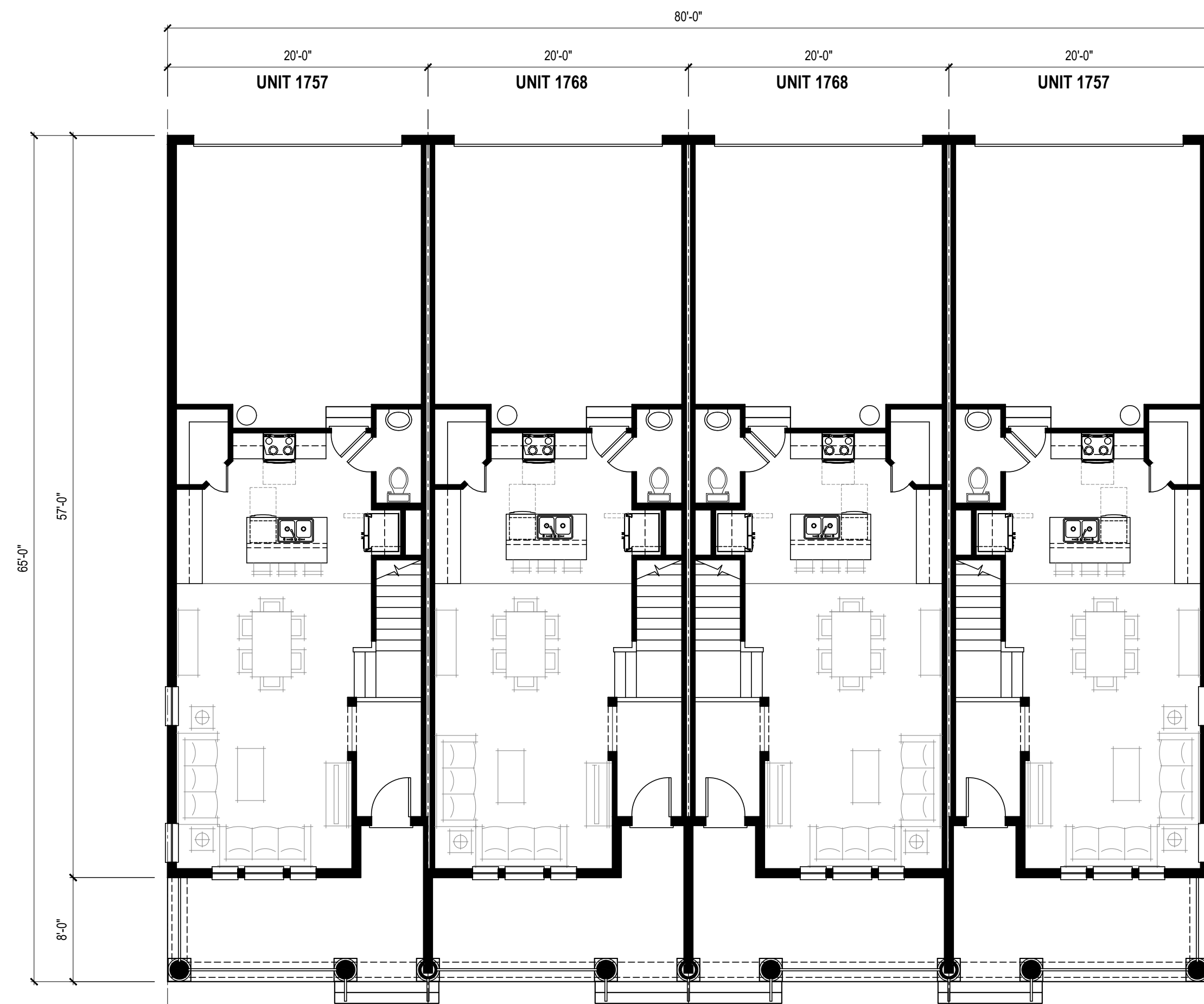
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PROJECT : 18010
DRAWN BY: ZS
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Building Type 5
1st Level Bldg Flr Pln

AA6.1



BUILDING TYPE 5 - 1st LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"



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DREAM FINDER'S
WINTER SPRING
TOWNHOMES AND AMENITY BUILDINGS

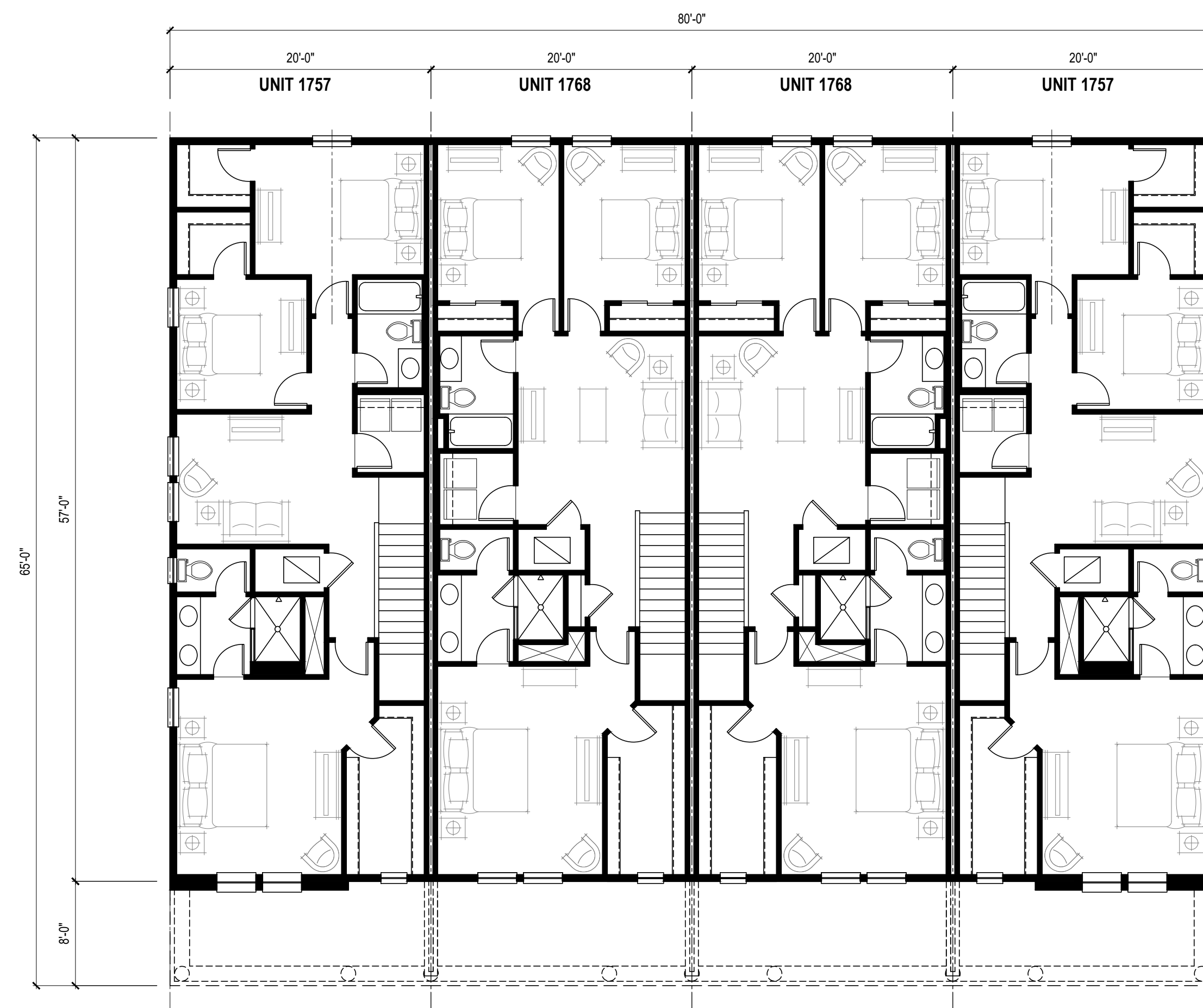
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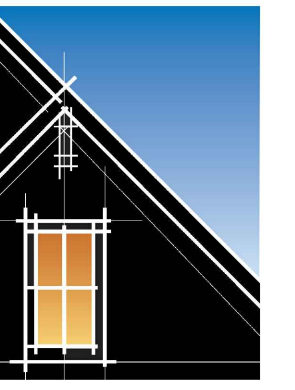
Building Type 5
2nd Level Bldg Fir Pln

AA6.2



BUILDING TYPE 5 - 2nd LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"



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DREAM FINDER'S
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Building Type 5
Elevations

AA6.3

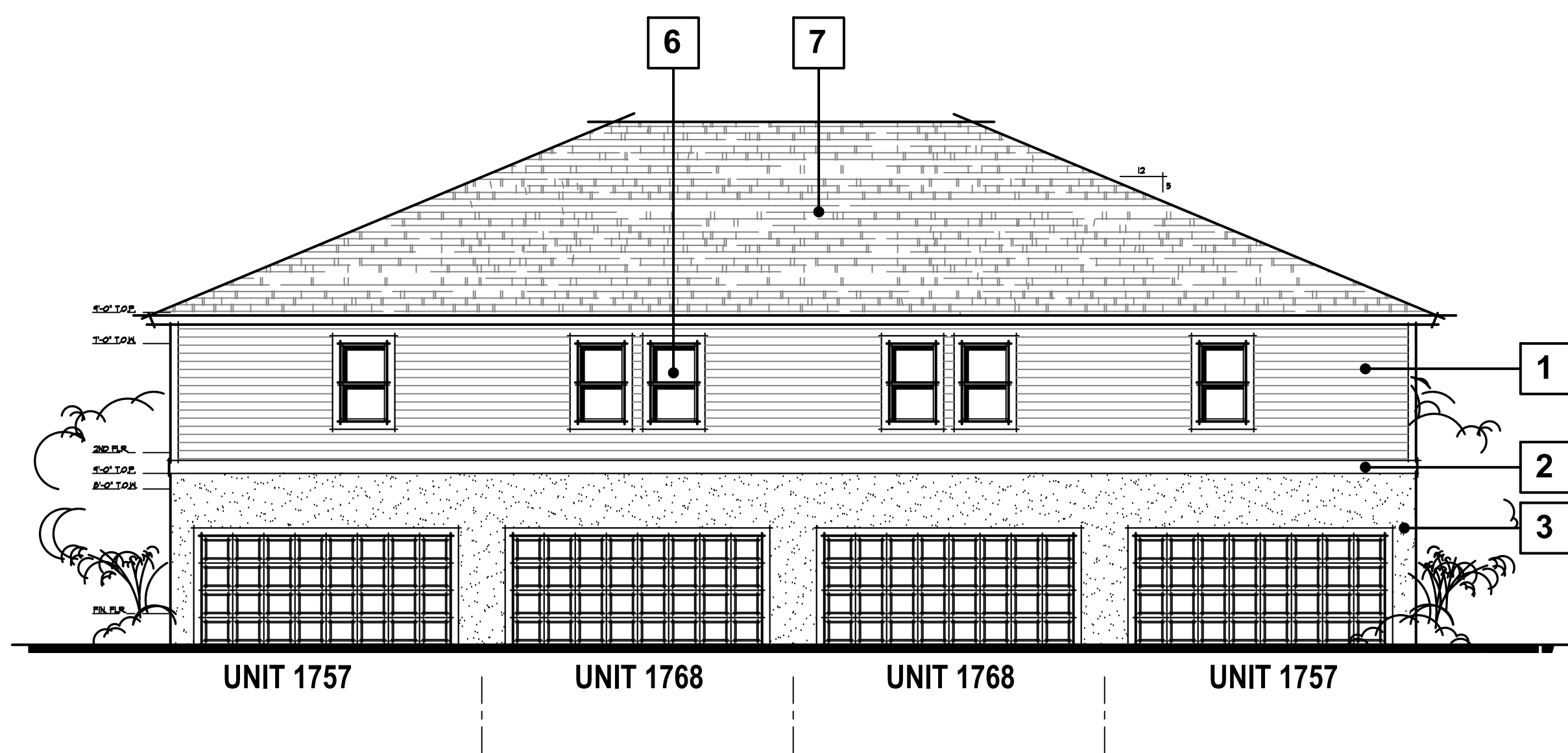
ELEVATION COLOR LEGEND

1. SIDING - SW7043 WORLDLY GRAY
2. TRIM - SW7009 PEARLY WHITE
3. STUCCO - SW2819 DOWNING SLATE
4. SIDING - SW6234 UNCERTAIN GRAY
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6. WINDOWS - BRONZE
7. SHINGLES - WEATHERED WOOD
8. 2 3/4" DIA. WROUGHT IRON RAILING. BRONZE FINISH



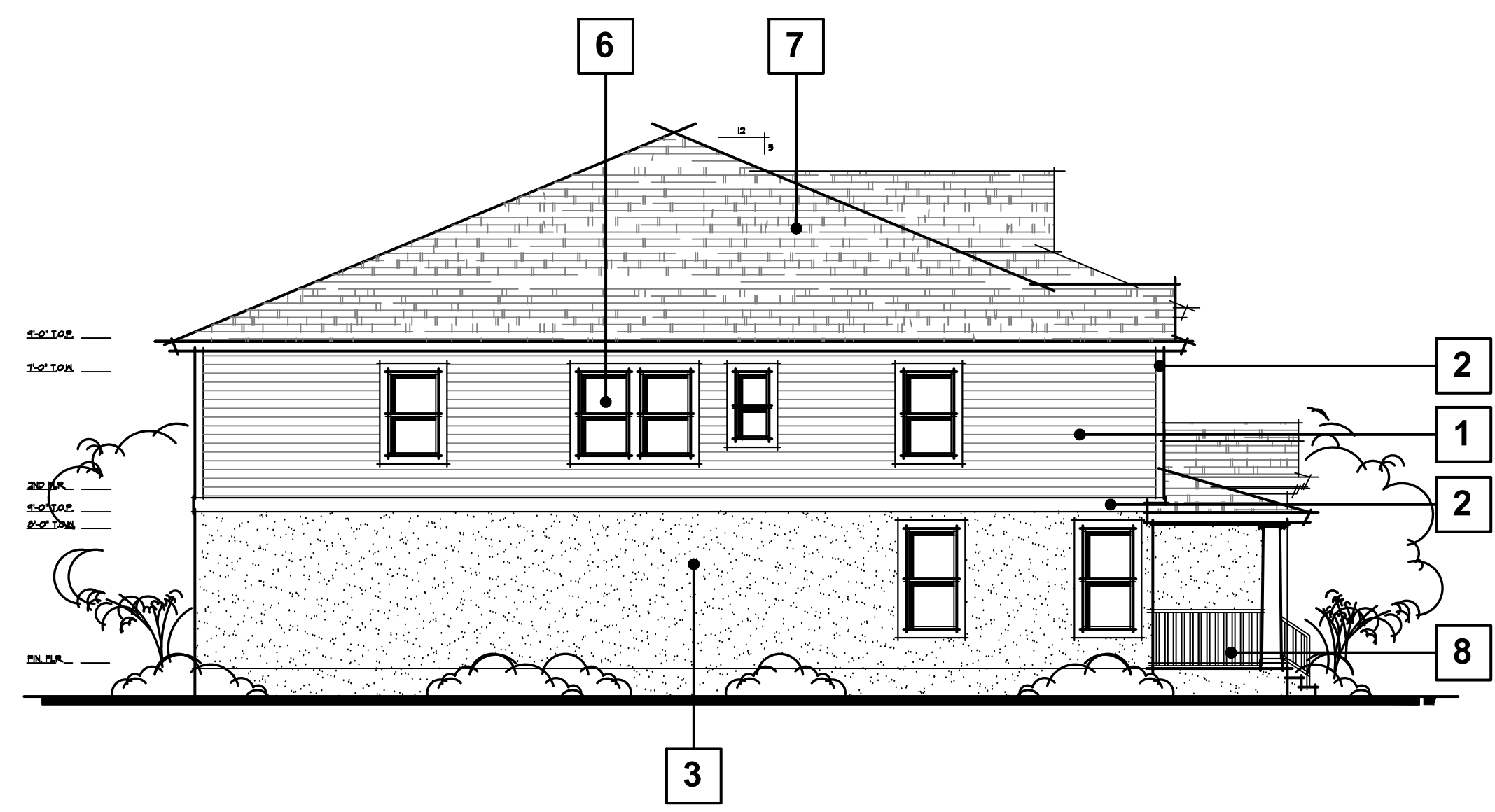
BUILDING TYPE 5 - FRONT ELEVATION

SCALE: 1/8" = 1'-0"



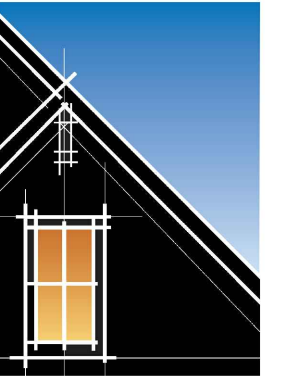
BUILDING TYPE 5 - REAR ELEVATION

SCALE: 1/8" = 1'-0"



BUILDING TYPE 5 - SIDE ELEVATIONS

SCALE: 1/8" = 1'-0"



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DREAM FINDER'S
WINTERS PRINCIPALS
TOWNHOMES AND AMENITY BUILDINGS

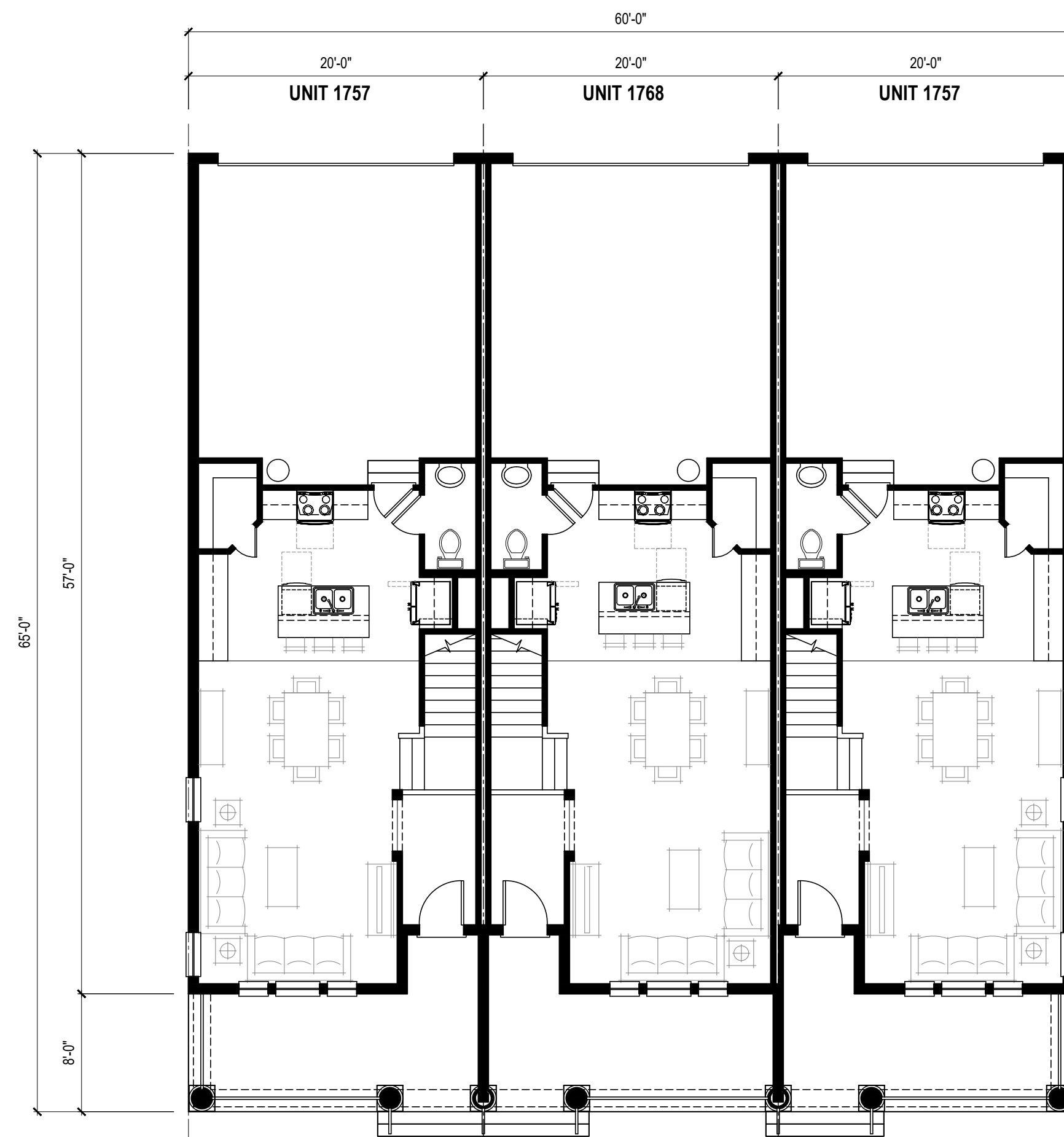
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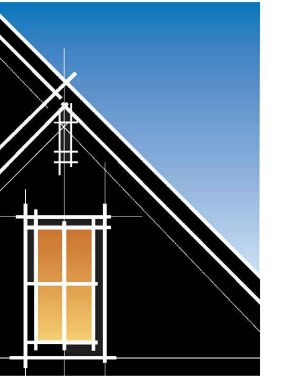
Building Type 6
1st Level Bldg Flr Pln

AA7.1



BUILDING TYPE 6 - 1st LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"



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DREAM FINDER'S
WINTER SPRING
TOWNHOMES AND AMENITY BUILDINGS

SUBMITTAL SET
NOT VALID UNLESS WET
SIGNATURE AND RAISED SEAL

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PROJECT :	18010
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Building Type 6
2nd Level Bldg Fir Pln

AA7.2

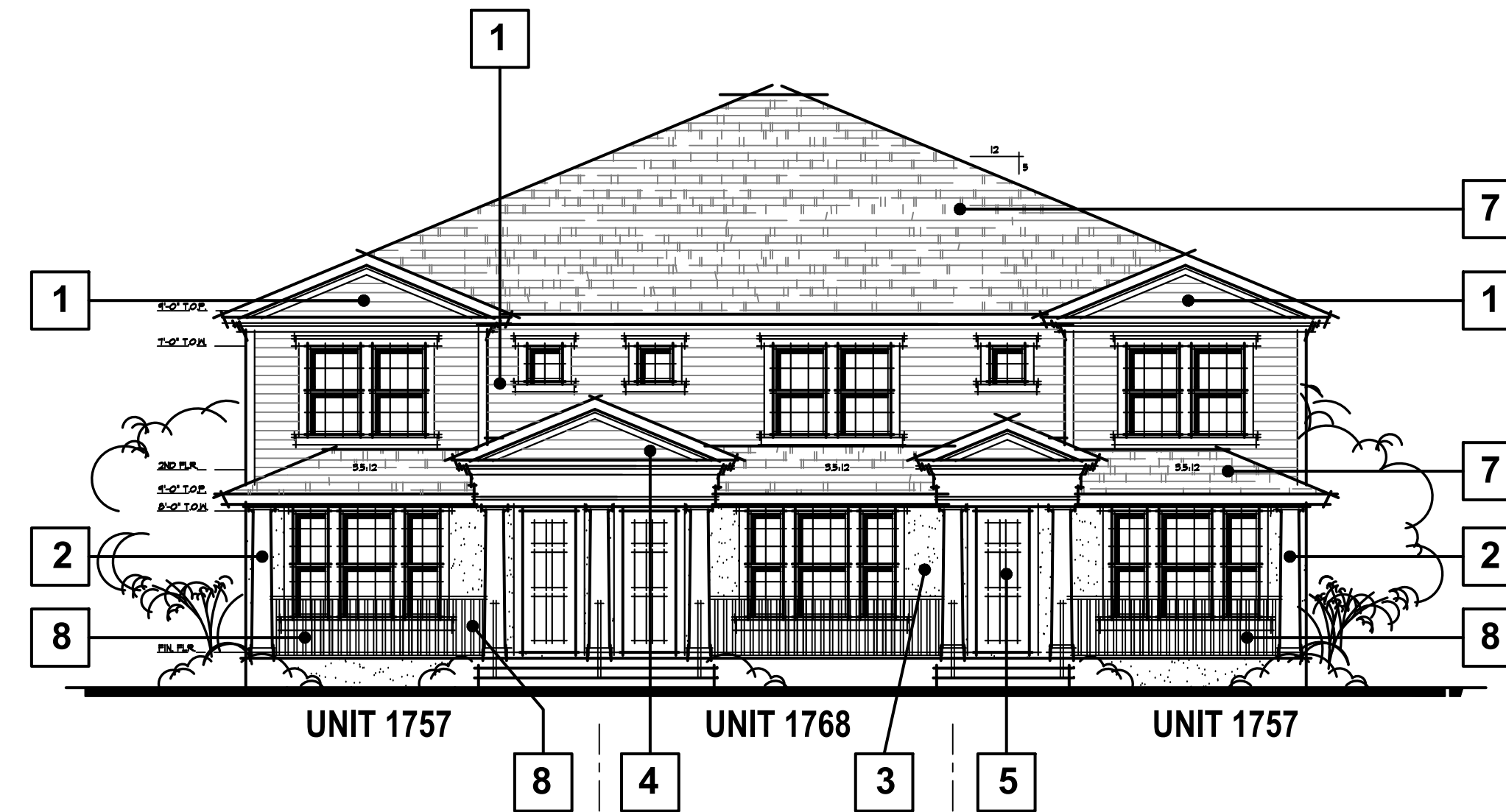


BUILDING TYPE 6 - 2nd LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"

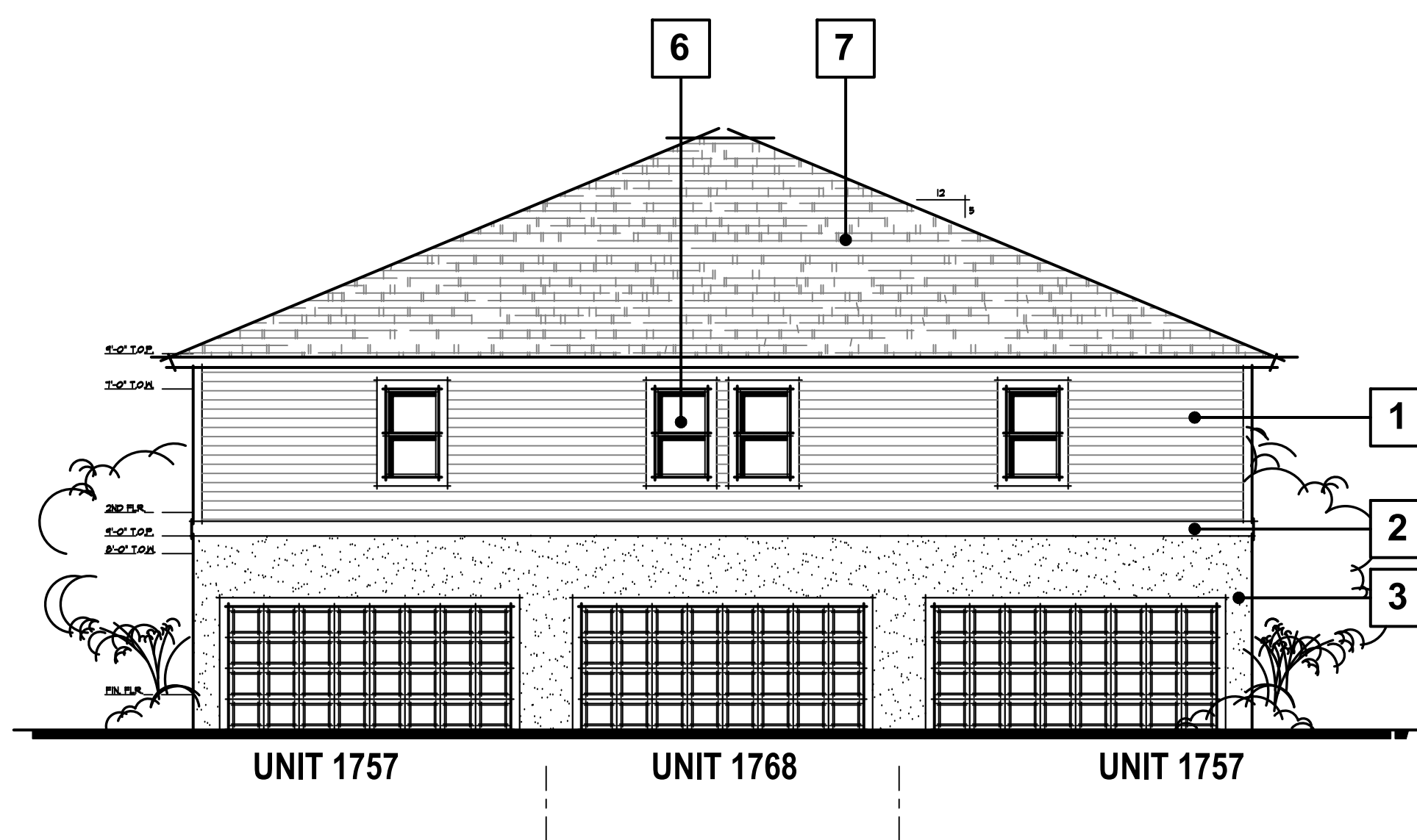
ELEVATION COLOR LEGEND

1. SIDING - SW7043 WORLDLY GRAY
2. TRIM - SW7009 PEARLY WHITE
3. STUCCO - SW2819 DOWNING SLATE
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7. SHINGLES - WEATHERED WOOD
8. 2 3/4" DIA. WROUGHT IRON RAILING. BRONZE FINISH



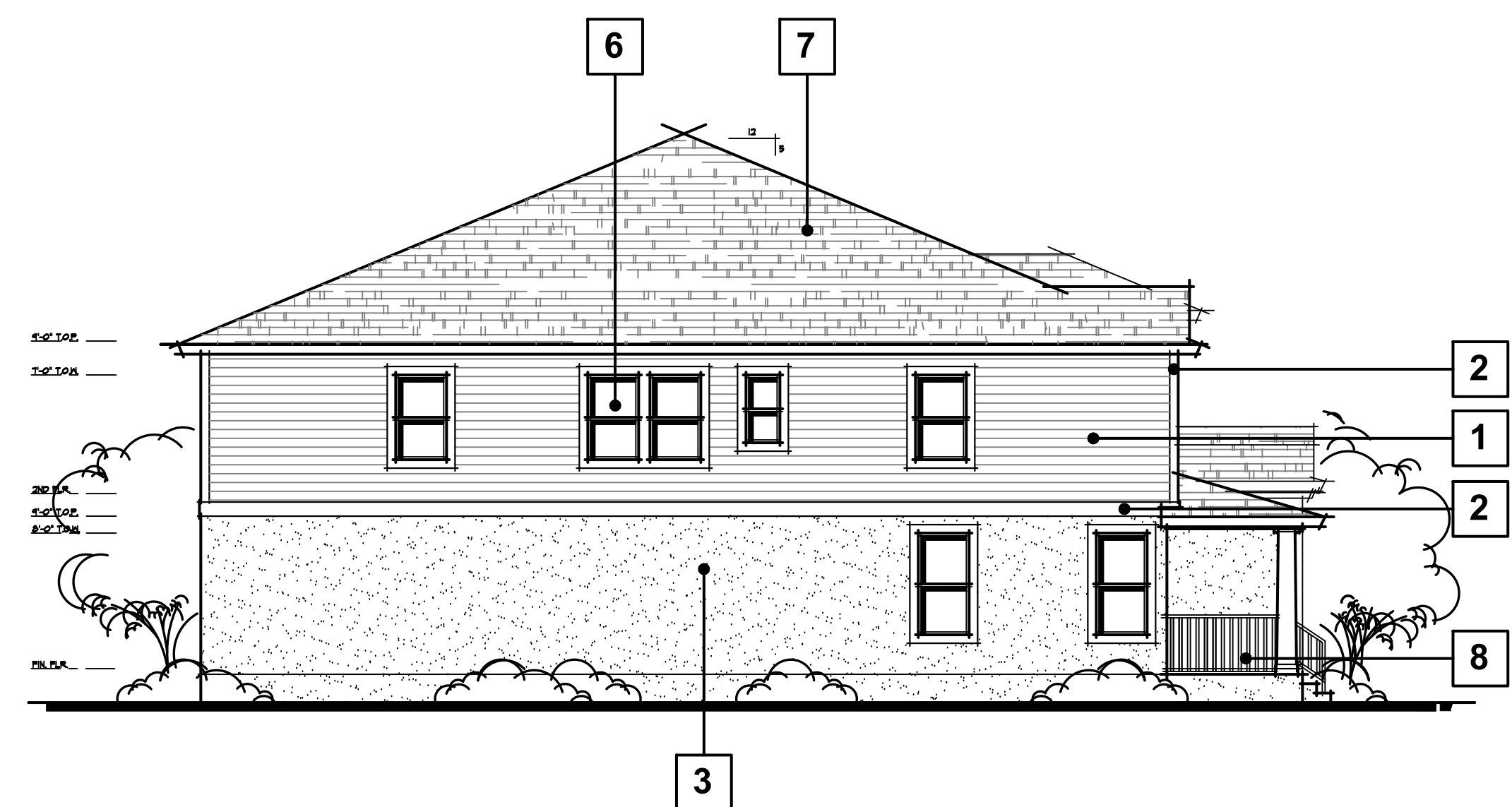
BUILDING TYPE 6 - FRONT ELEVATION

SCALE: 1/8" = 1'-0"



BUILDING TYPE 6 - REAR ELEVATION

SCALE: 1/8" = 1'-0"



BUILDING TYPE 6 - SIDE ELEVATIONS

SCALE: 1/8" = 1'-0"



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DERYL L. PATTERSON

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DREAM FINDER'S
 WINTER SPRING
 TOWNHOMES AND AMENITY BUILDINGS

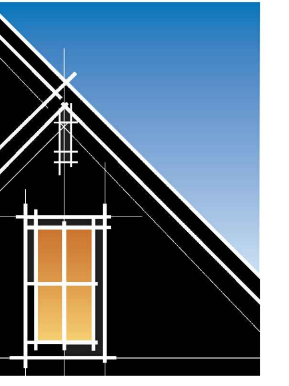
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Building Type 6
Elevations

AA7.3



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DREAM FINDER'S
W I N T E R S P R I N G
TOWNHOMES AND AMENITY BUILDINGS

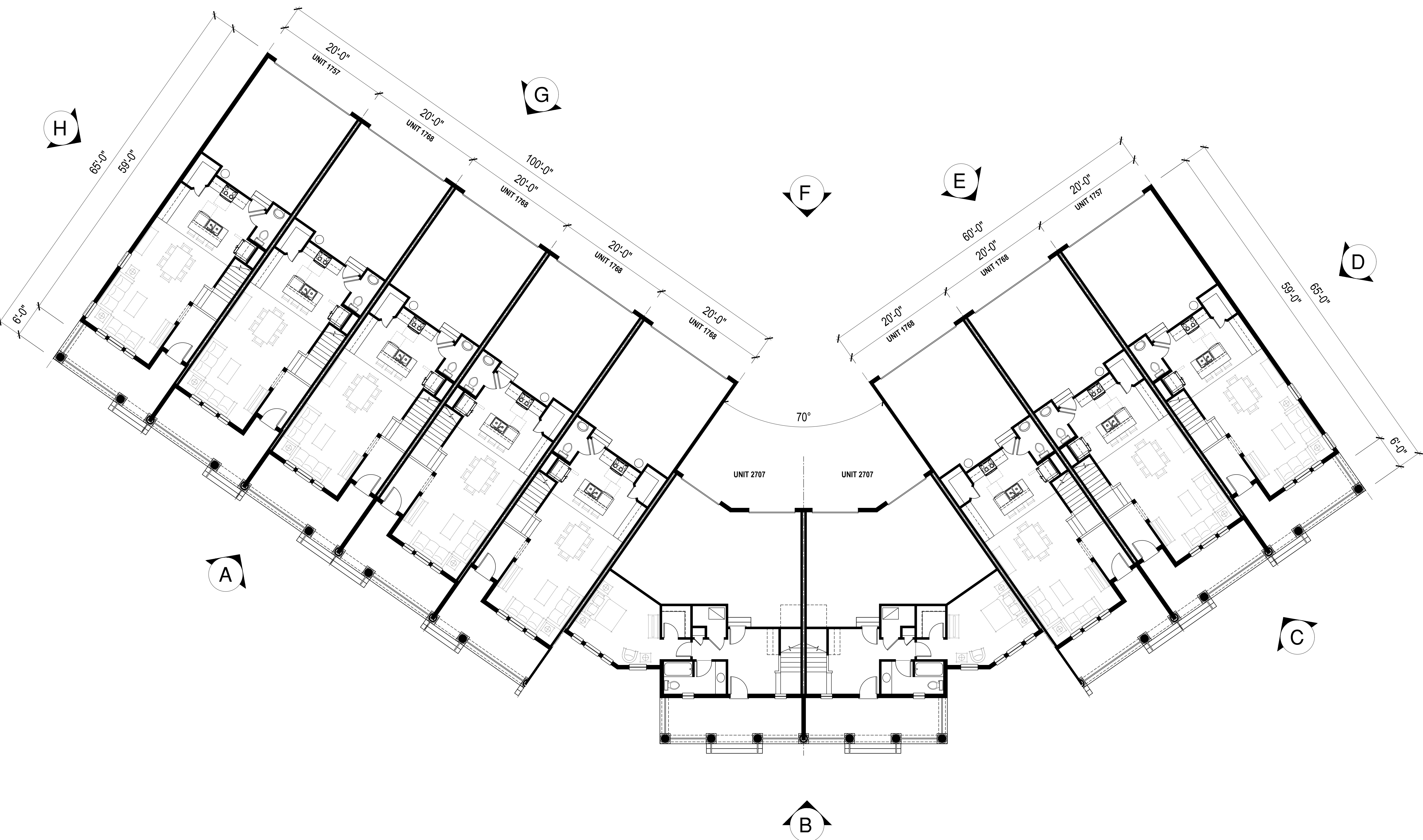
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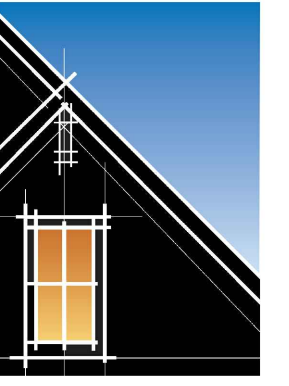
Building Type 7
1st Level Bldg Flr Pln

AA8.1



BUILDING TYPE 7 - 1st LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"



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WINTER SPRING
TOWNHOMES AND AMENITY BUILDINGS

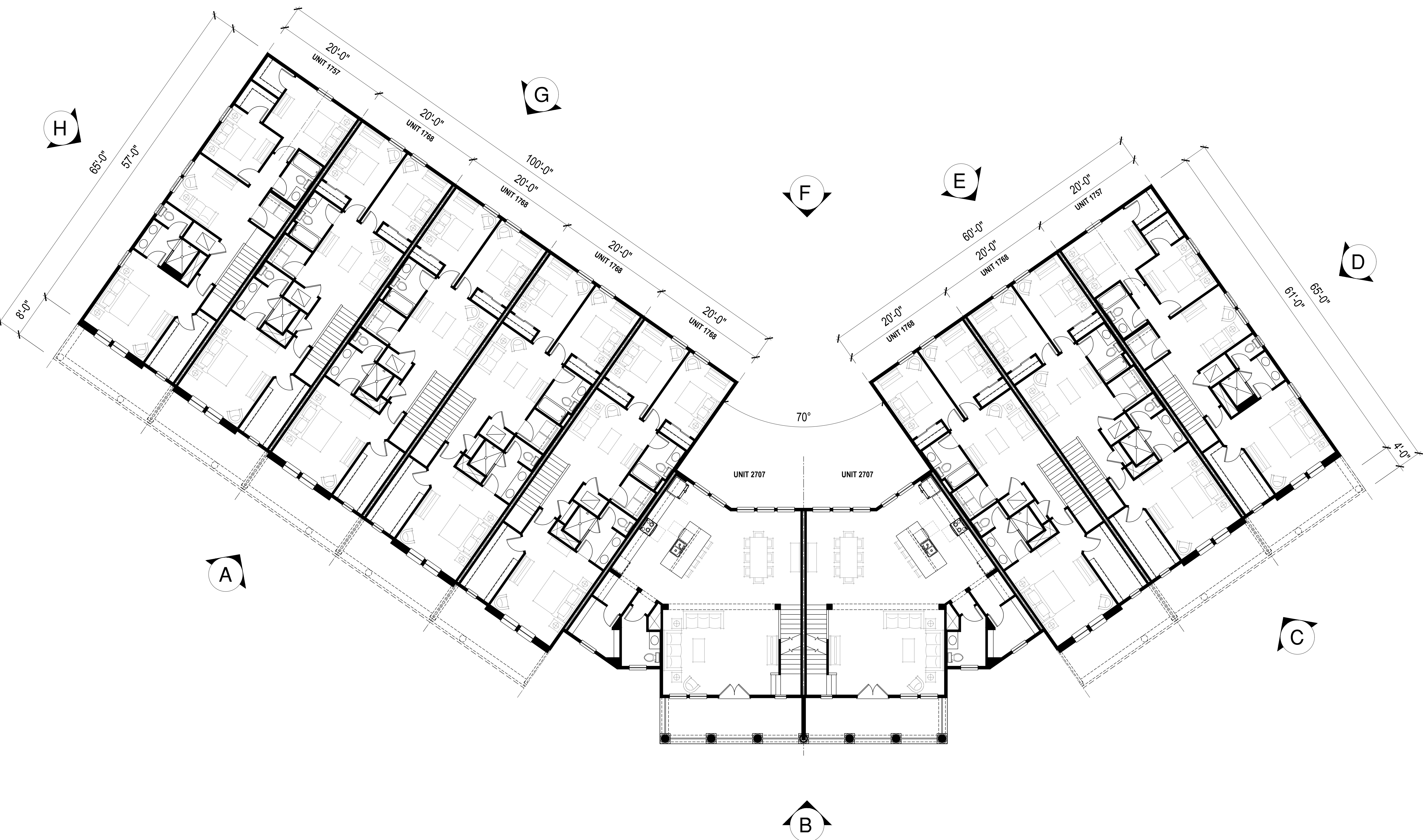
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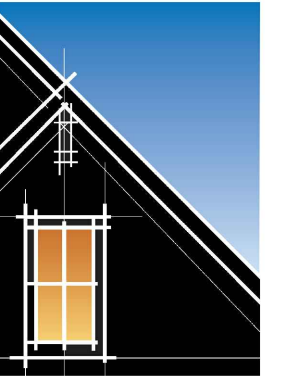
Building Type 7
2nd Level Bldg Flr Pln

AA8.2



BUILDING TYPE 7 - 2nd LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"



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DREAM FINDER'S
WINTERS PRINCIPALS
TOWNHOMES AND AMENITY BUILDINGS

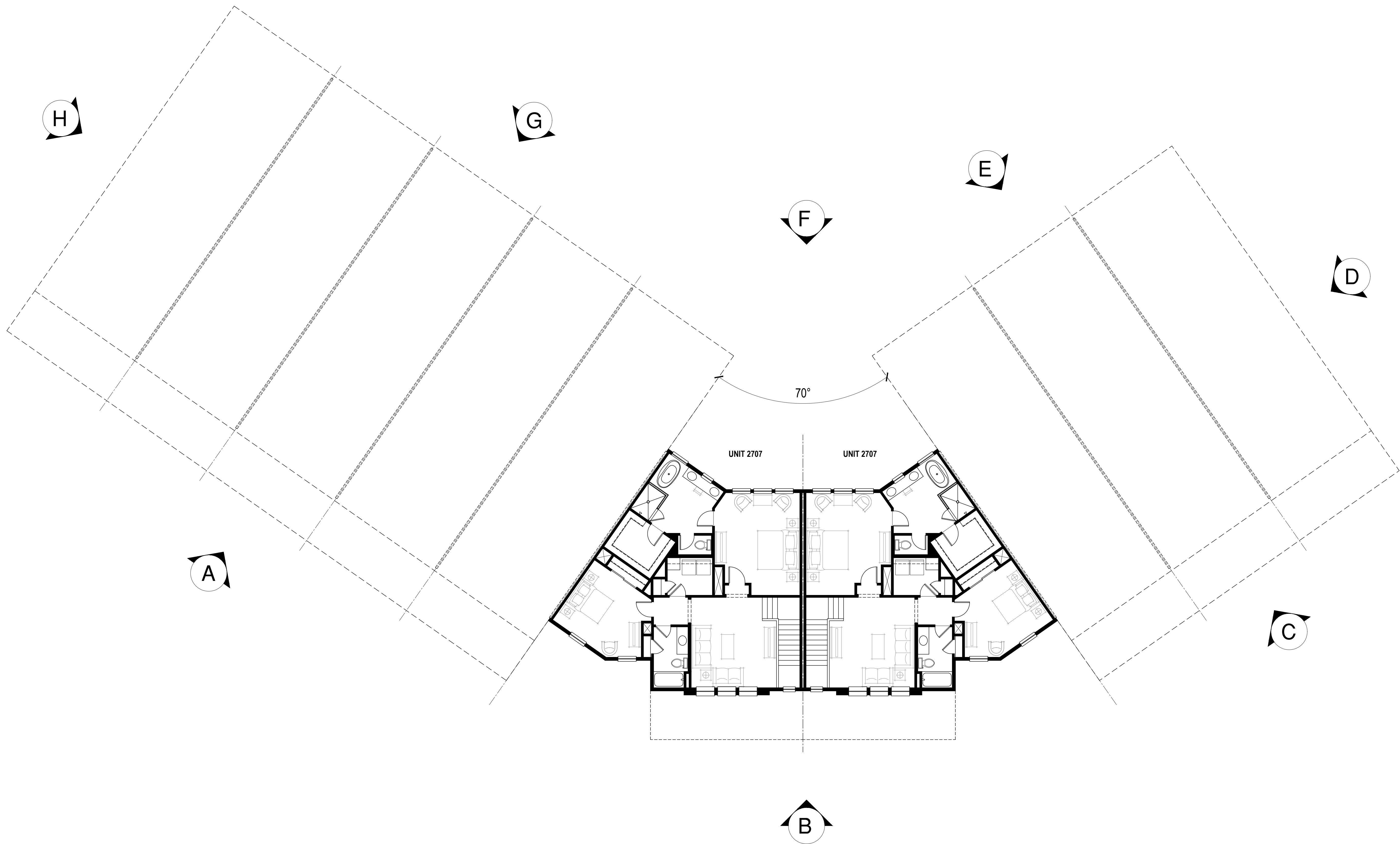
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Building Type 7
3rd Level Bldg Flr Plan

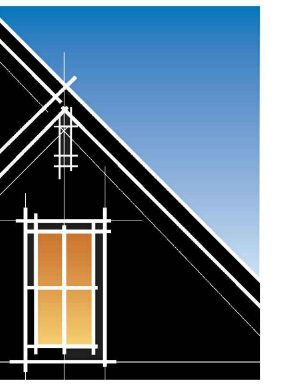
AA8.3



BUILDING TYPE 7 - 3rd LEVEL BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"

- ELEVATION COLOR LEGEND**
1. SIDING - SW7043 WORLDLY GRAY
 2. TRIM - SW7009 PEARLY WHITE
 3. STUCCO - SW2819 DOWNING SLATE
 4. SIDING - SW6234 UNCERTAIN GRAY
 5. DOOR/ACCENT - SW7020 BLACK FOX
 6. WINDOWS - BRONZE
 7. SHINGLES - WEATHERED WOOD
 8. 2 3/4" DIA. WROUGHT IRON RAILING, BRONZE FINISH



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DREAM FINDER'S
 WINTER SPRING
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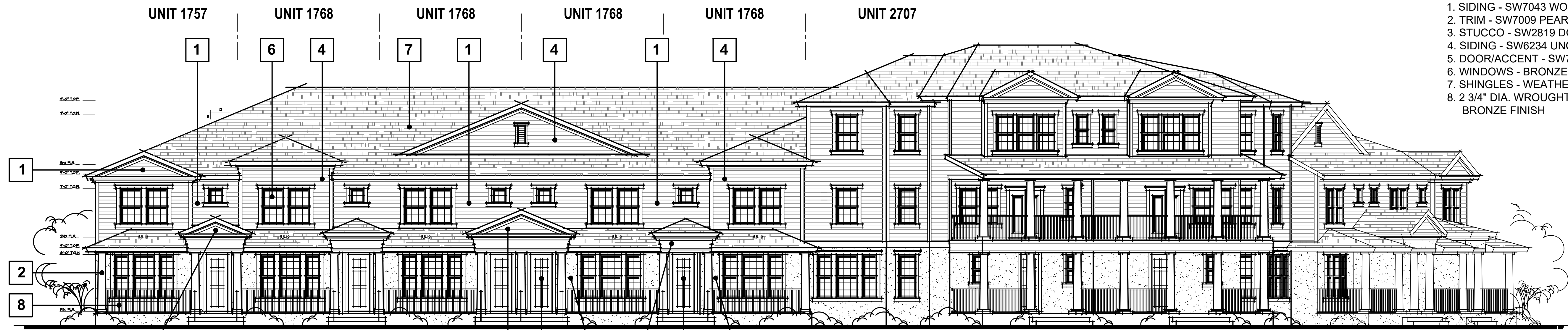
SUBMITTAL SET
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PROJECT : 18010
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DATE: 06.18.19

Building Type 7
Elevations

AA8.4



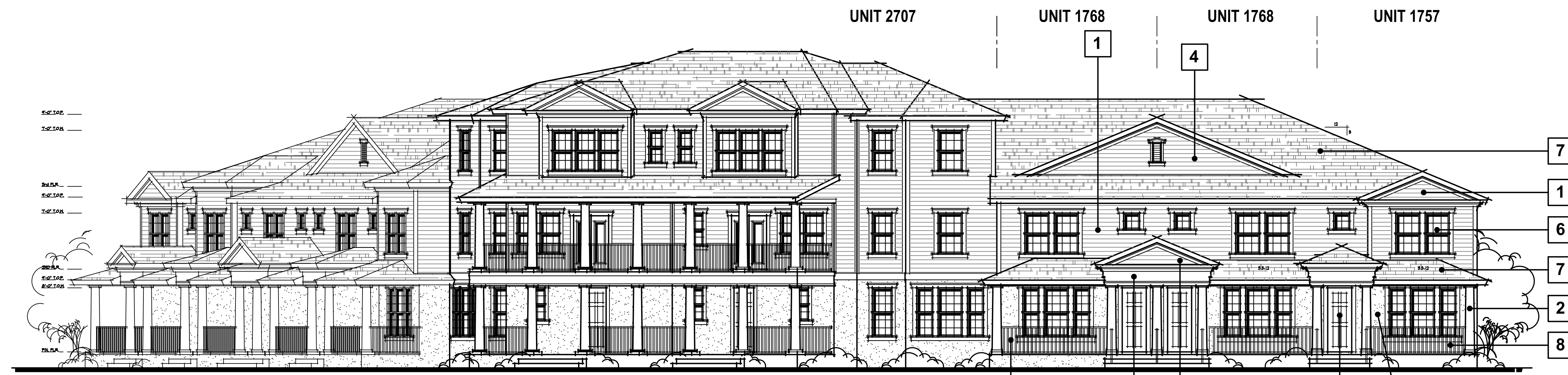
BUILDING TYPE 7 - ELEVATION 'A'

SCALE: 1/8" = 1'-0"



BUILDING TYPE 7 - ELEVATION 'B'

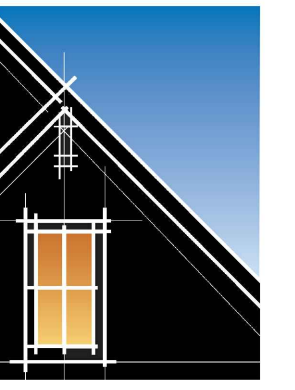
SCALE: 1/8" = 1'-0"



BUILDING TYPE 7 - ELEVATION 'C'

SCALE: 1/8" = 1'-0"

- ELEVATION COLOR LEGEND**
1. SIDING - SW7043 WORLDLY GRAY
 2. TRIM - SW7009 PEARLY WHITE
 3. STUCCO - SW2819 DOWNING SLATE
 4. SIDING - SW6234 UNCERTAIN GRAY
 5. DOOR/ACCENT - SW7020 BLACK FOX
 6. WINDOWS - BRONZE
 7. SHINGLES - WEATHERED WOOD
 8. 2 3/4" DIA. WROUGHT IRON RAILING. BRONZE FINISH



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DREAM FINDER'S
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DATE: 06.18.19

Building Type 7
Elevations

AA8.5



BUILDING TYPE 7 - ELEVATION 'D'

SCALE: 1/8" = 1'-0"

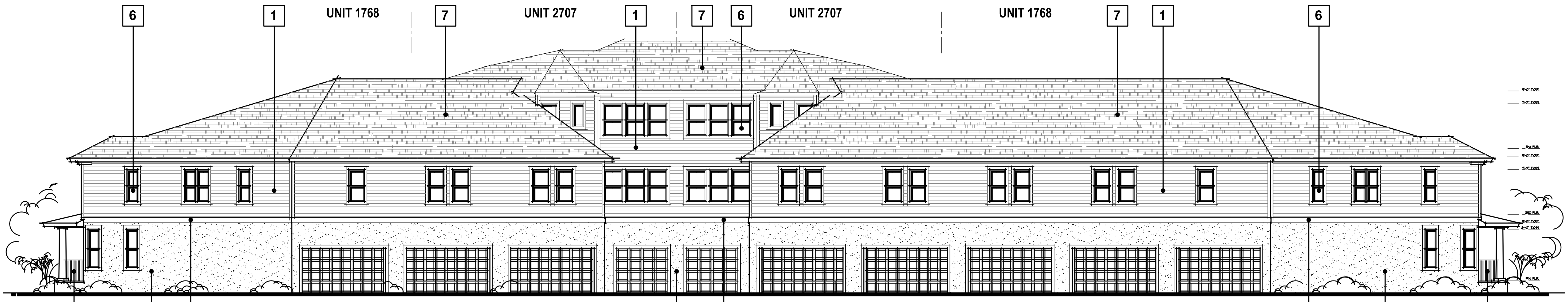
UNIT 1757 UNIT 1768 UNIT 1768 UNIT 2707



BUILDING TYPE 7 - ELEVATION 'E'

SCALE: 1/8" = 1'-0"

UNIT 1768 UNIT 2707 UNIT 2707 UNIT 1768



BUILDING TYPE 7 - ELEVATION 'F'

SCALE: 1/8" = 1'-0"



BUILDING TYPE 7 - ELEVATION 'G'

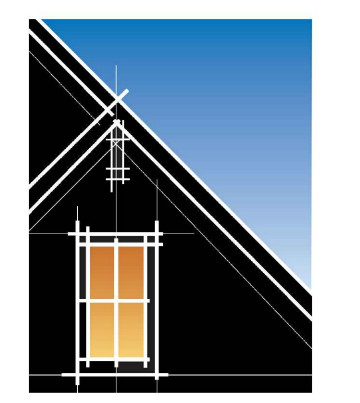
SCALE: 1/8" = 1'-0"

- ELEVATION COLOR LEGEND**
1. SIDING - SW7043 WORLDLY GRAY
 2. TRIM - SW7009 PEARLY WHITE
 3. STUCCO - SW2819 DOWNING SLATE
 4. SIDING - SW6234 UNCERTAIN GRAY
 5. DOOR/ACCENT - SW7020 BLACK FOX
 6. WINDOWS - BRONZE
 7. SHINGLES - WEATHERED WOOD
 8. 2 3/4" DIA. WROUGHT IRON RAILING. BRONZE FINISH



BUILDING TYPE 7 - ELEVATION 'H'

SCALE: 1/8" = 1'-0"



**HOUSING
DESIGN
MATTERS**

HOUSING DESIGN MATTERS
11512 LAKE MEAD AVENUE
SUITE 102
JACKSONVILLE, FL 32256
TELEPHONE 904.572.1505

DERYL L. PATTERSON

FL LIC. No. AR11419

DREAM FINDER'S
 WINTER SPRING
 TOWNHOMES AND AMENITY BUILDINGS

SUBMITTAL SET
NOT VALID UNLESS WET
SIGNATURE AND RAISED SEAL

07.15.19 REVISED
07.31.19 REVISED

PROJECT :	18010
DRAWN BY:	ZS
DATE:	06.18.19

Building Type 7
Elevations

AA8.6



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TOWNHOMES AND AMENITY BUILDINGS

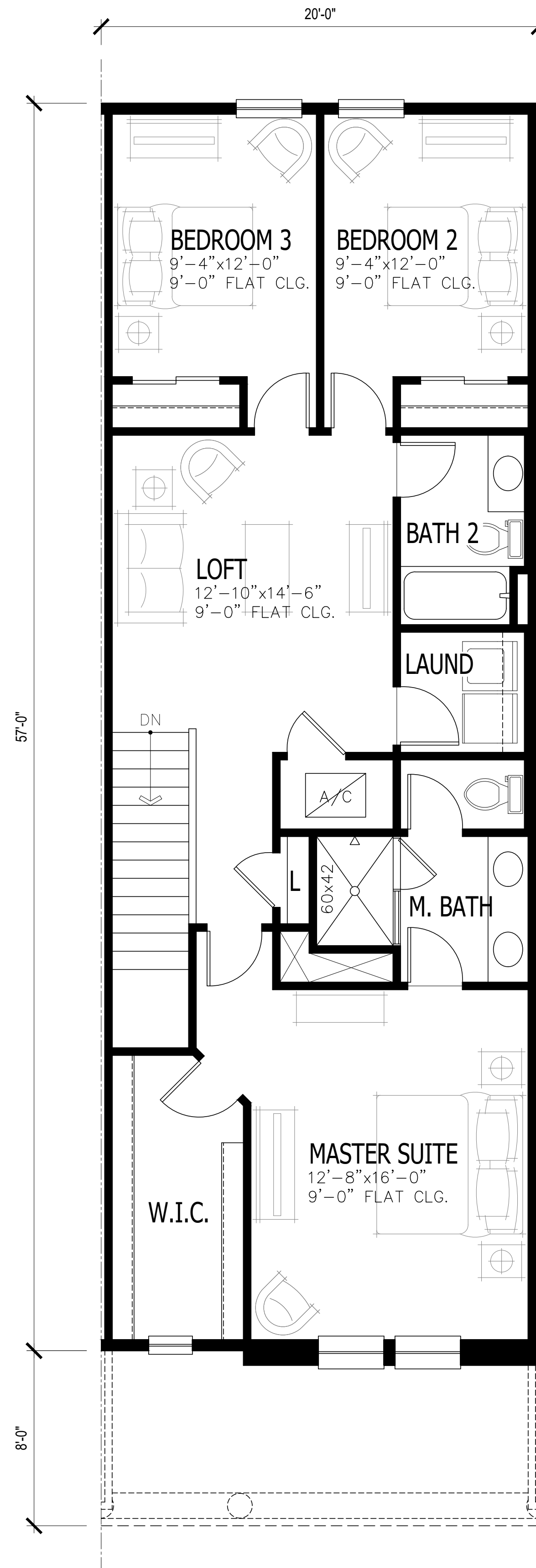
SUBMITTAL SET
NOT VALID UNLESS WET
SIGNATURE AND RAISED SEAL

07.15.19 REVISED
07.31.19 REVISED

PROJECT : 18010
DRAWN BY: ZS
DATE: 06.18.19

Interior Unit Plan 1768

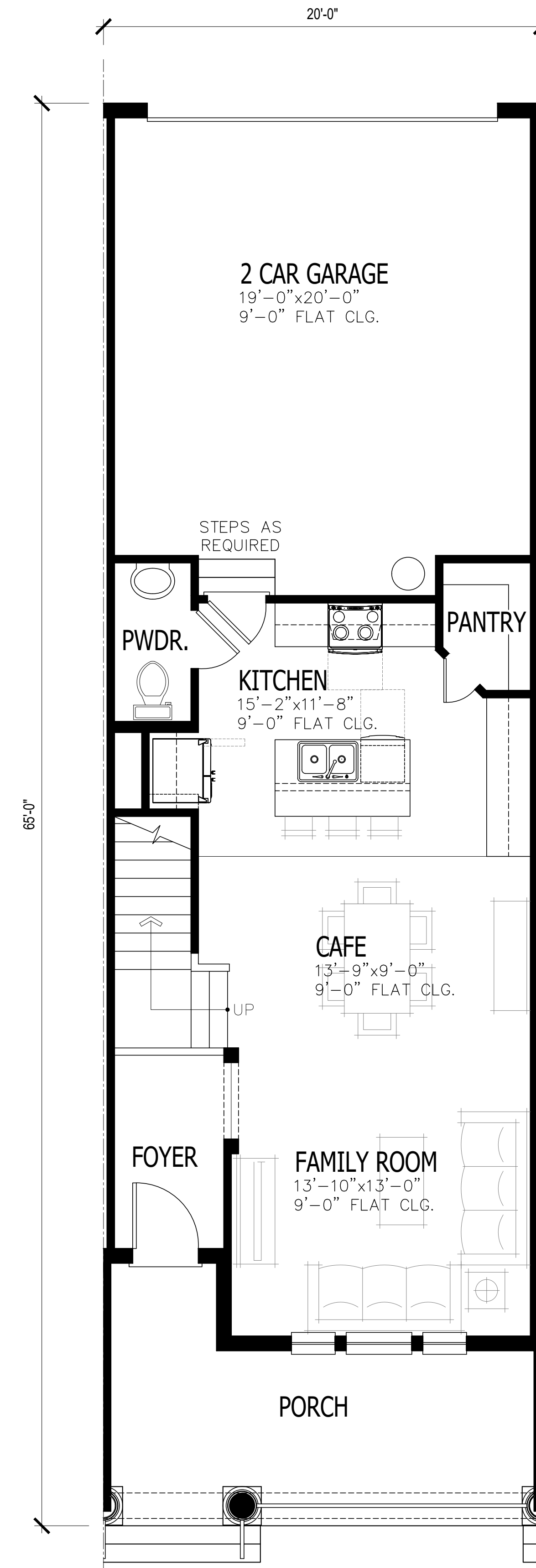
AU1.1



2nd LEVEL FLOOR PLAN

SCALE: 1/4" = 1'-0"

1768 SQUARE FOOTAGES	
1st FLOOR	686
2nd FLOOR	1082
SUBTOTAL	1768
2 CAR GARAGE	433
PORCH	181
TOTAL	2382



1st LEVEL FLOOR PLAN

SCALE: 1/4" = 1'-0"



**HOUSING
DESIGN
MATTERS**

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JACKSONVILLE, FL 32256
TELEPHONE 904.572.1505

DERYL L. PATTERSON

FL LIC. No. AR11419

DREAM FINDER'S
WINTER SPRING
TOWNHOMES AND AMENITY BUILDINGS

SUBMITTAL SET
NOT VALID UNLESS WET
SIGNATURE AND RAISED SEAL

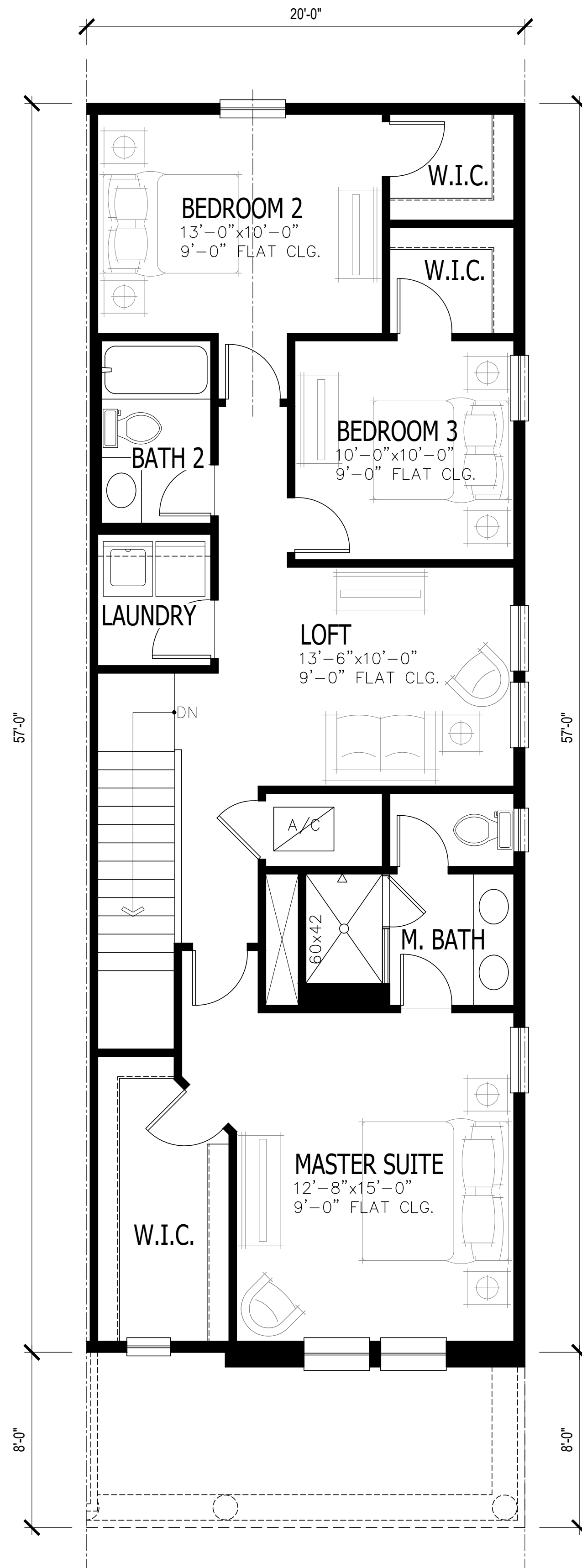
07.15.19 REVISED
07.31.19 REVISED

PROJECT : 18010
DRAWN BY: ZS
DATE: 06.18.19

End Unit Plan 1757

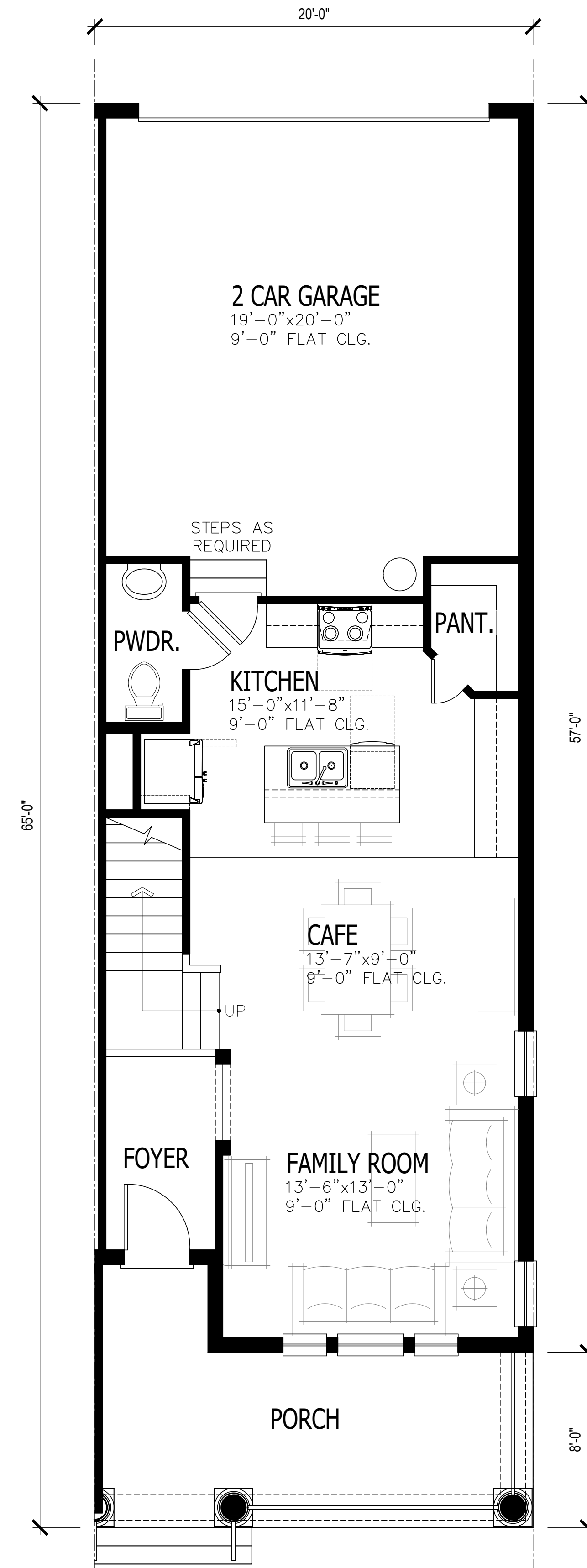
AU2.1

1757 SQUARE FOOTAGES	
1st FLOOR	686
2nd FLOOR	1071
SUBTOTAL	1757
2 CAR GARAGE	433
PORCH	161
TOTAL	2371



2nd LEVEL FLOOR PLAN

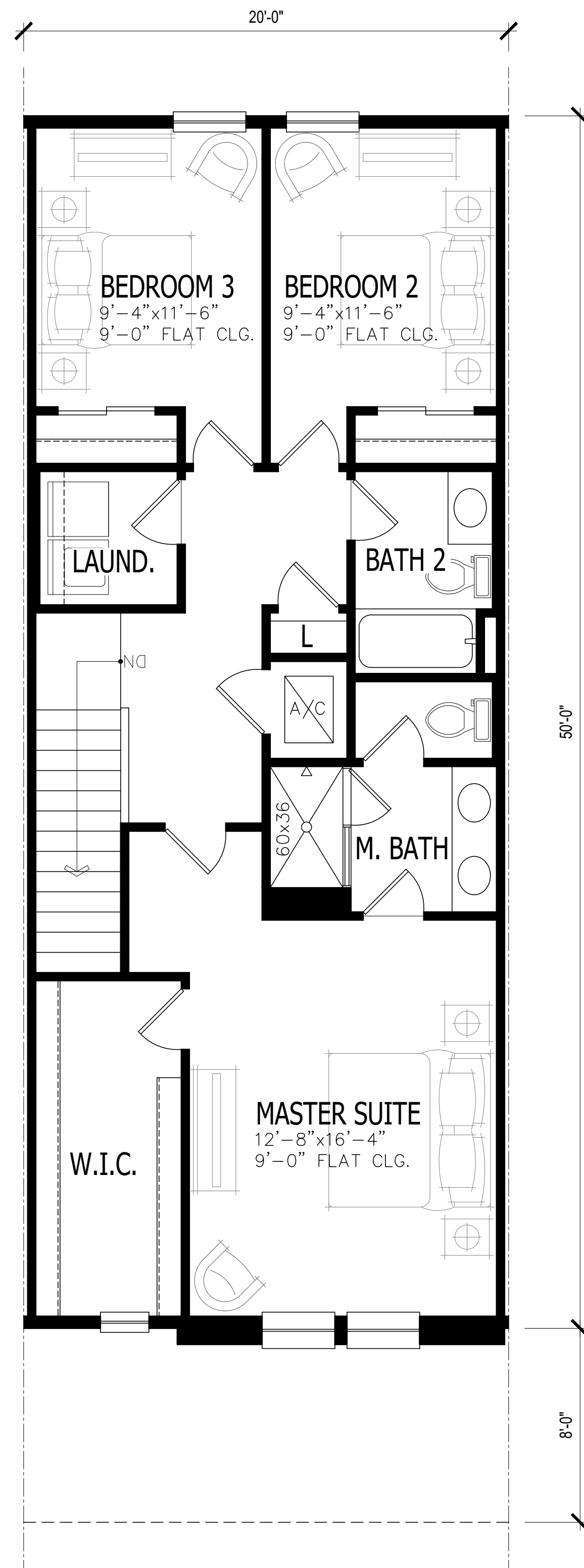
SCALE: 1/4" = 1'-0"



1st LEVEL FLOOR PLAN

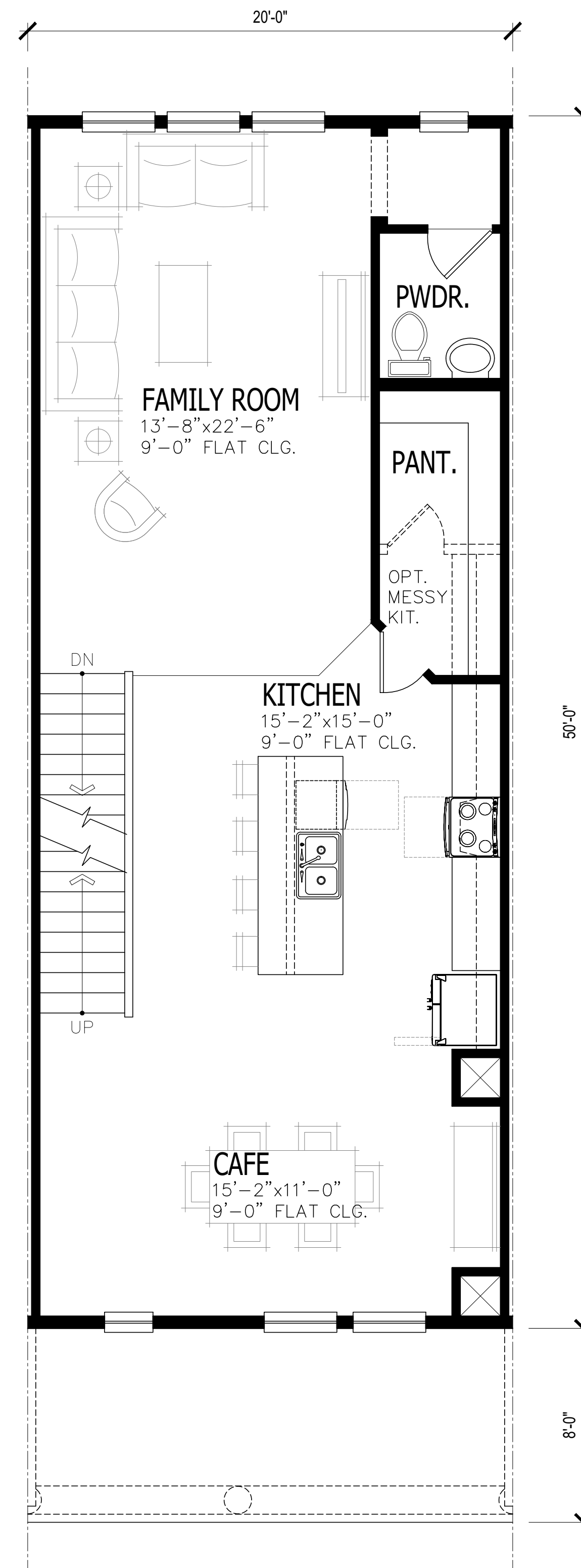
SCALE: 1/4" = 1'-0"

2353 SQUARE FOOTAGES	
1st FLOOR	468
2nd FLOOR	944
3rd FLOOR	941
SUBTOTAL	2353
2 CAR GARAGE	516
PORCH	176
TOTAL	3045



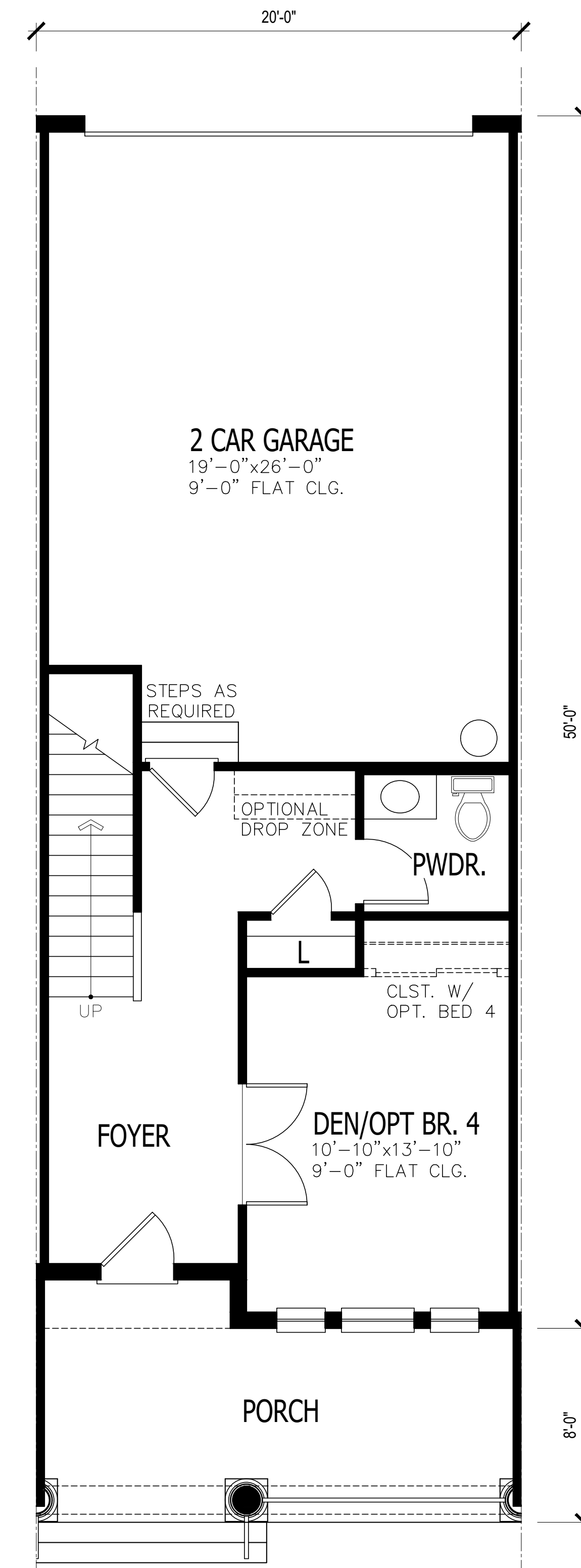
3rd LEVEL FLOOR PLAN

SCALE: 1/4" = 1'-0"



2nd LEVEL FLOOR PLAN

SCALE: 1/4" = 1'-0"



1st LEVEL FLOOR PLAN

SCALE: 1/4" = 1'-0"



HOUSING
DESIGN
MATTERS

HOUSING DESIGN MATTERS
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TELEPHONE 904.572.1505

DERYL L. PATTERSON

FL LIC. No. AR11419

DREAM FINDER'S
WINTER SPRING
TOWNHOMES AND AMENITY BUILDINGS

SUBMITTAL SET
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SIGNATURE AND RAISED SEAL

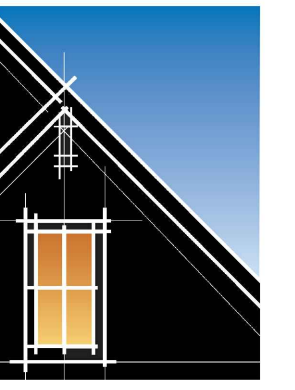
07.15.19 REVISED
07.31.19 REVISED

PROJECT : 18010
DRAWN BY: ZS
DATE: 06.18.19

Interior Unit Plan 2353

AU3.1

2359 SQUARE FOOTAGES	
1st FLOOR	451
2nd FLOOR	955
3rd FLOOR	953
SUBTOTAL	2359
2 CAR GARAGE	533
PORCH	176
TOTAL	3068



**HOUSING
DESIGN
MATTERS**

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SUITE 102
JACKSONVILLE, FL 32256
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DERYL L. PATTERSON

FL LIC. No. AR11419

DREAM FINDER'S
WINTER SPRING
TOWNHOMES AND AMENITY BUILDINGS

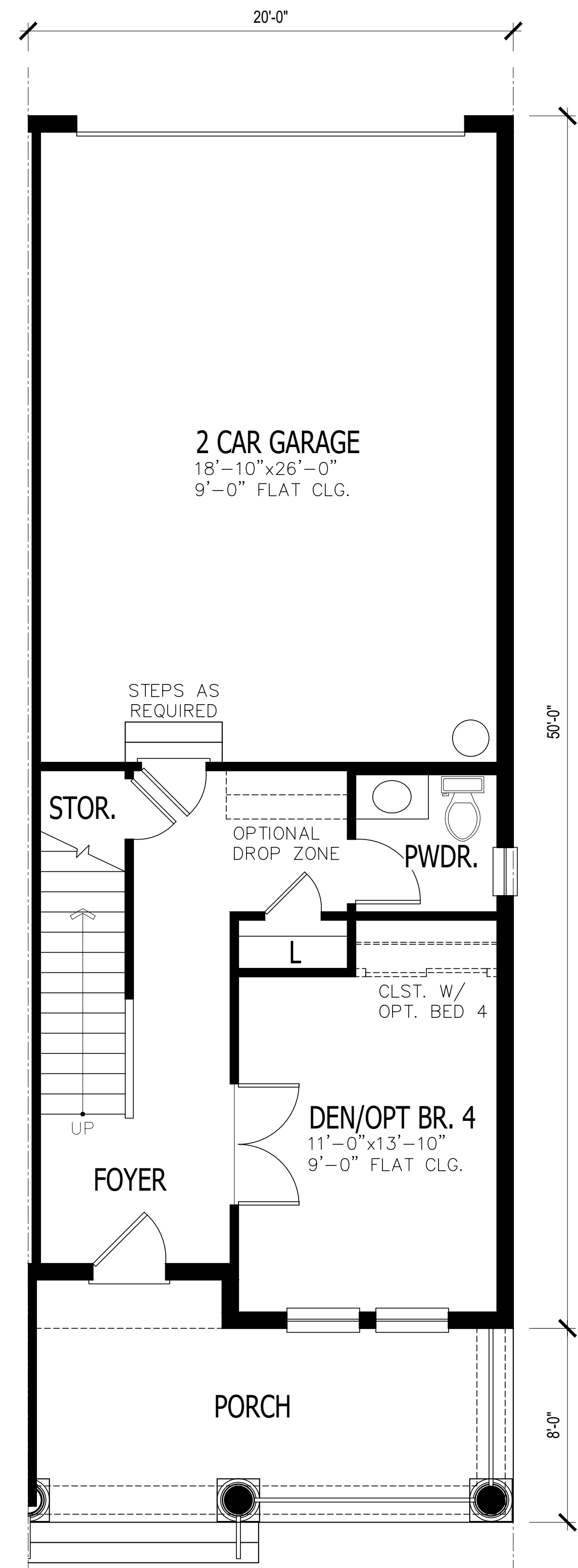
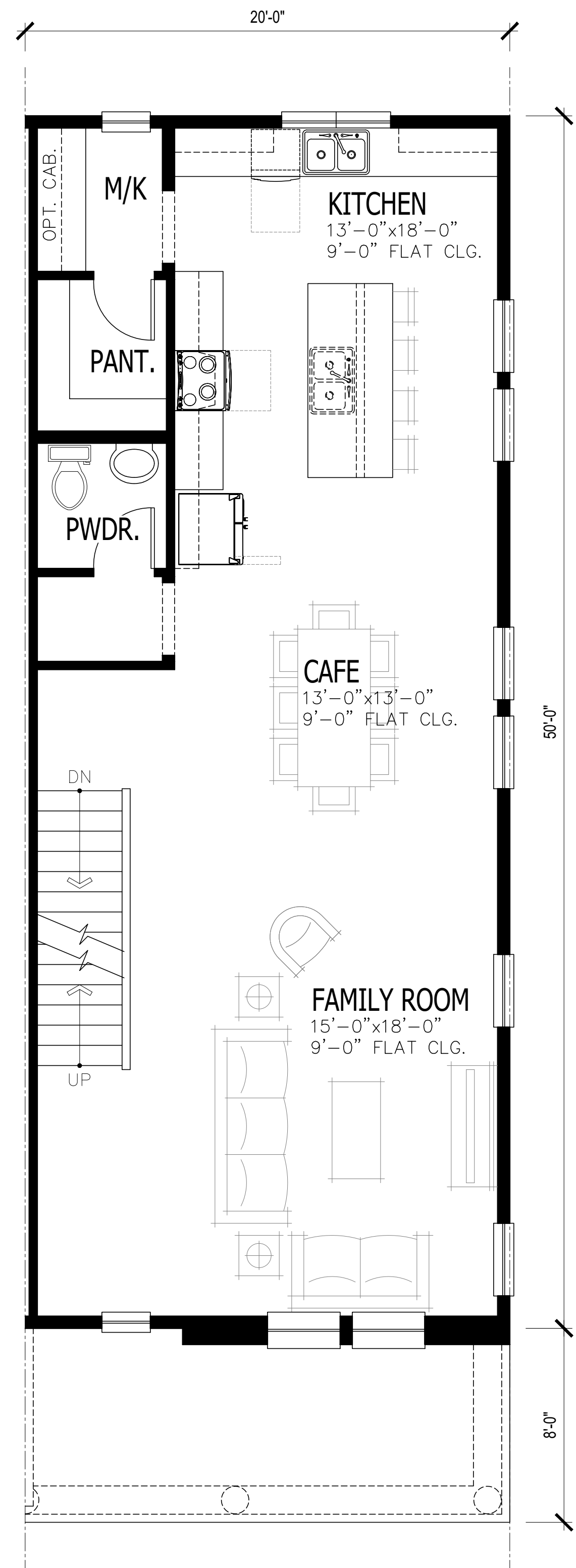
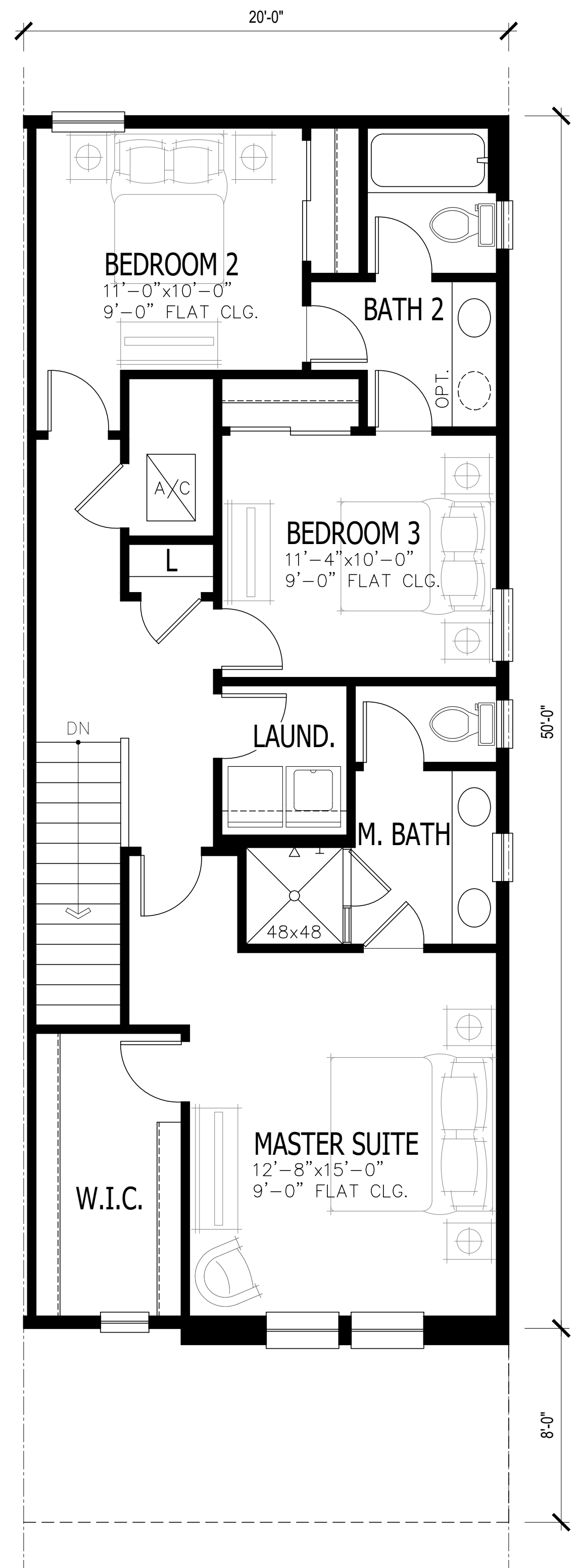
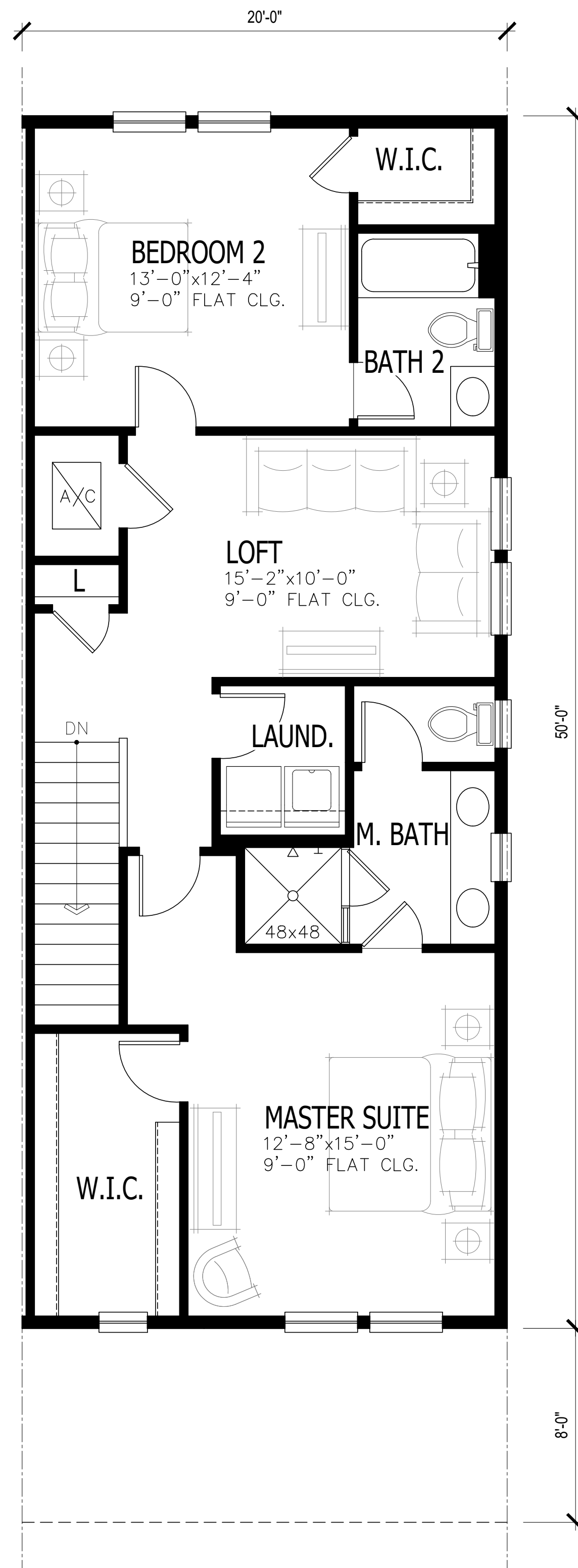
SUBMITTAL SET
NOT VALID UNLESS WET
SIGNATURE AND RAISED SEAL

07.15.19 REVISED
07.31.19 REVISED

PROJECT : 18010
DRAWN BY: ZS
DATE: 06.18.19

End Unit Plan 2359

AU.4.1





**HOUSING
DESIGN
MATTERS**

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DREAM FINDER'S
WINTER SPRING
TOWNHOMES AND AMENITY BUILDINGS

SUBMITTAL SET
NOT VALID UNLESS WET
SIGNATURE AND RAISED SEAL

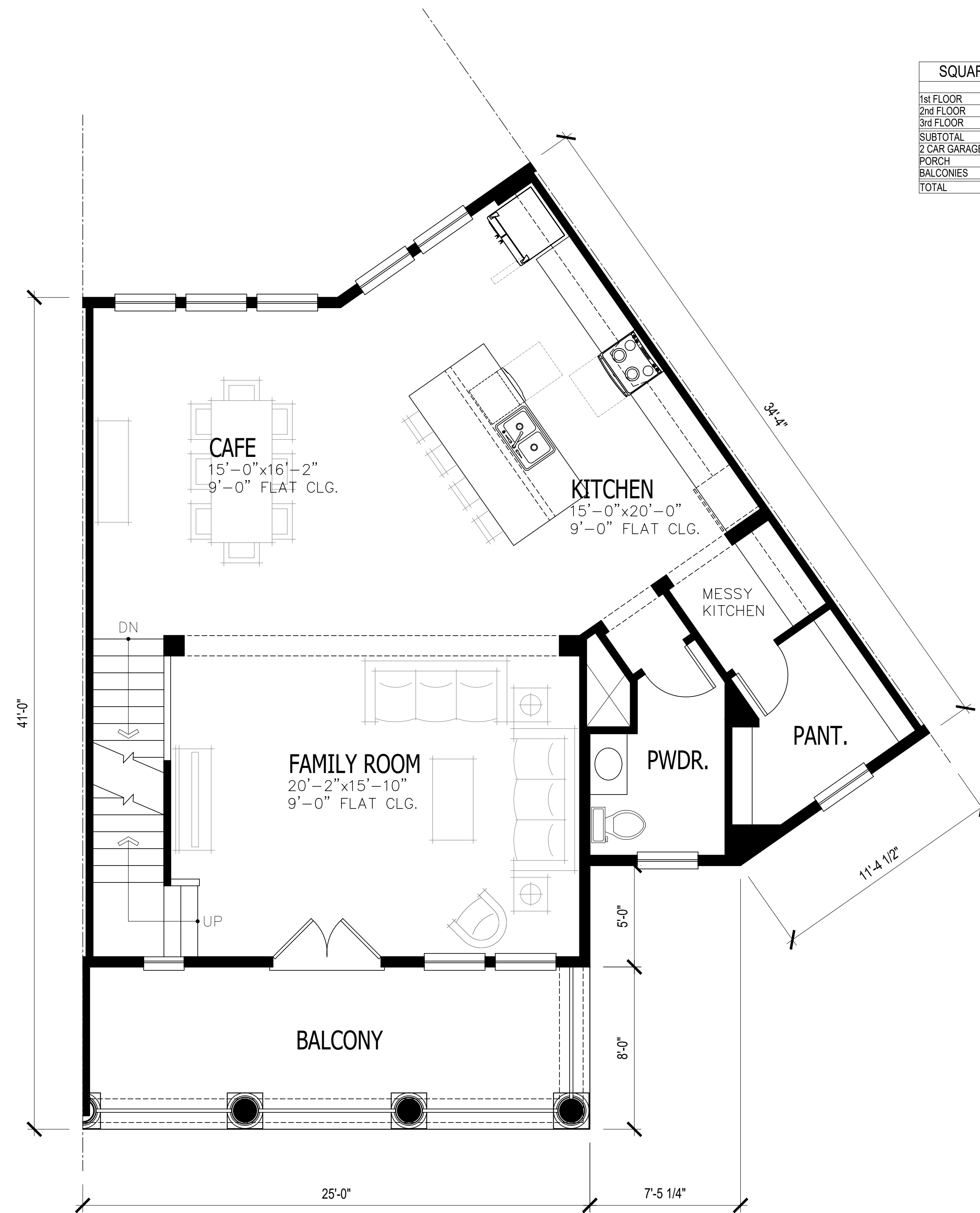
07.15.19 REVISED
07.31.19 REVISED

PROJECT : 18010
DRAWN BY: ZS
DATE: 06.18.19

Corner Unit Plan 2707

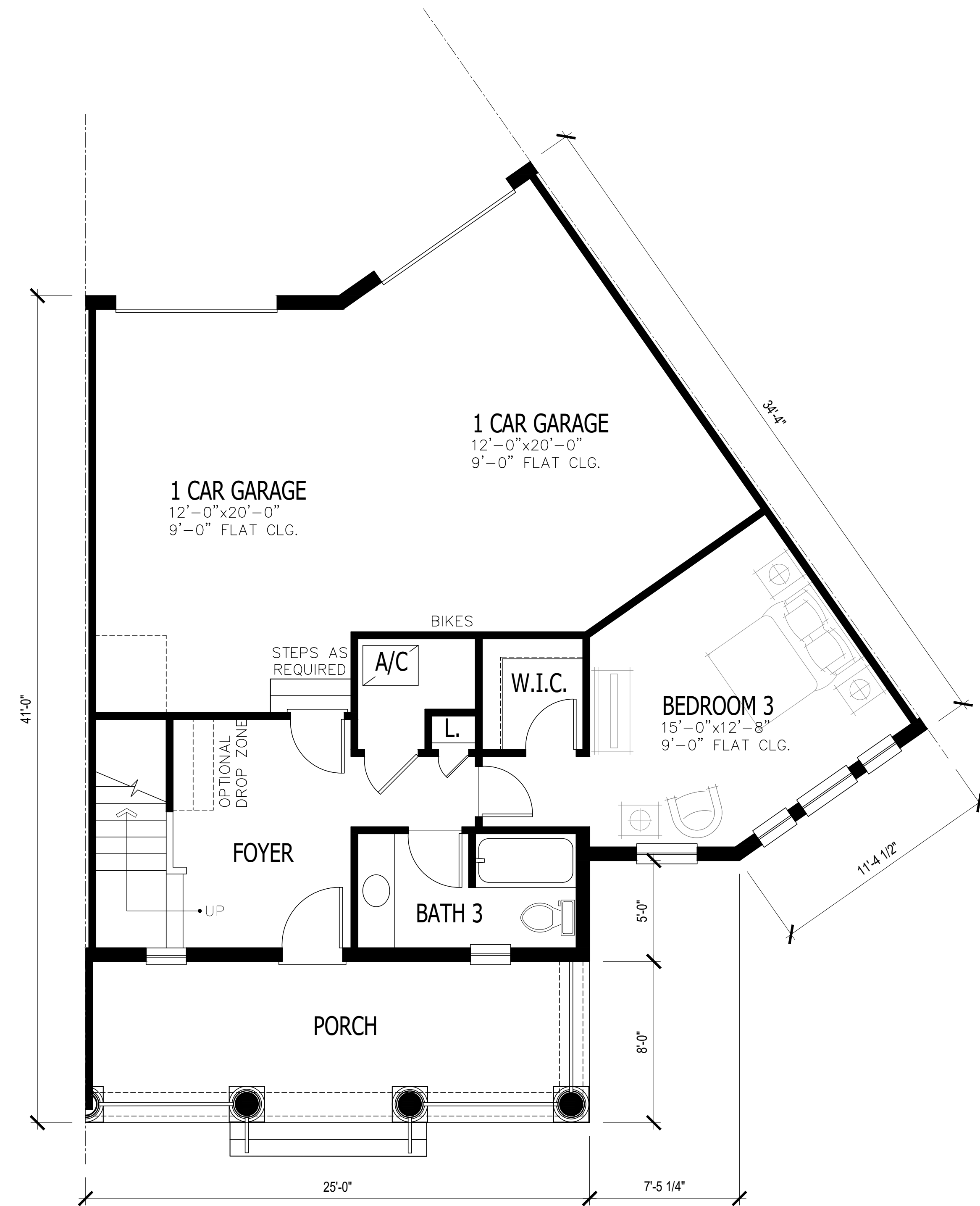
AU5.1

SQUARE FOOTAGES	
1st FLOOR	550
2nd FLOOR	1078
3rd FLOOR	1079
SUBTOTAL	2707
2 CAR GARAGE	599
PORCH	200
BALCONIES	200
TOTAL	3706



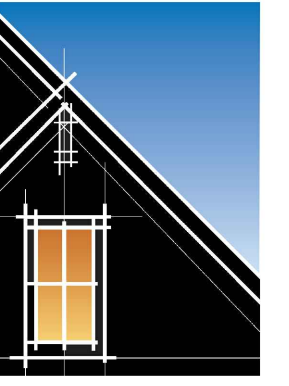
2nd LEVEL FLOOR PLAN

SCALE: 1/4" = 1'-0"



1st LEVEL FLOOR PLAN

SCALE: 1/4" = 1'-0"



HOUSING
DESIGN
MATTERS

HOUSING DESIGN MATTERS
11512 LAKE MEAD AVENUE
SUITE 102
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DERYL L. PATTERSON

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DREAM FINDER'S
WINTER SPRING
TOWNHOMES AND AMENITY BUILDINGS

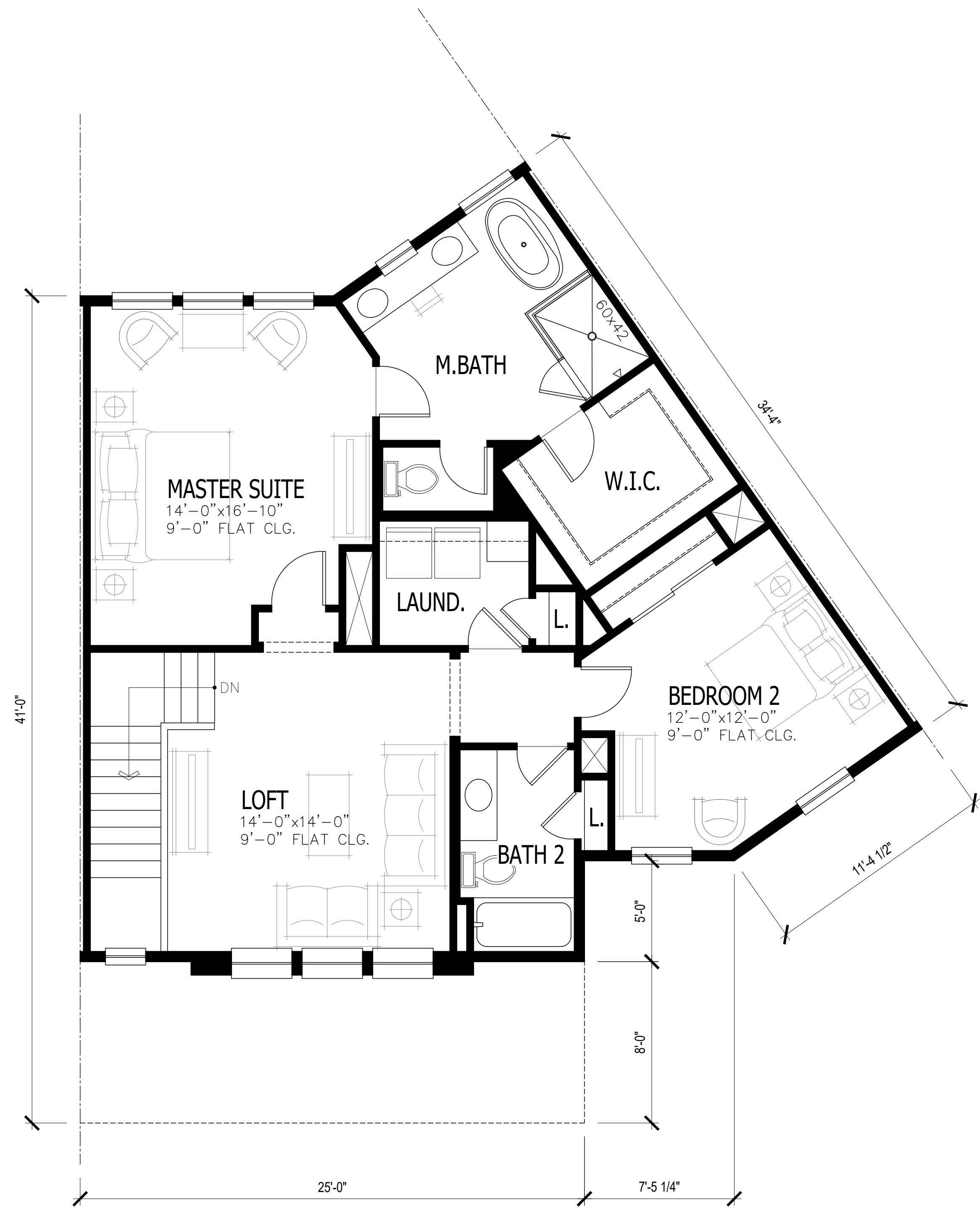
SUBMITTAL SET
NOT VALID UNLESS WET
SIGNATURE AND RAISED SEAL

07.15.19 REVISED
07.31.19 REVISED

PROJECT : 18010
DRAWN BY: ZS
DATE: 06.18.19

Corner Unit Plan 2707

AU5.2



3rd LEVEL FLOOR PLAN

SCALE: 1/4" = 1'-0"



3-Unit 2-Story Colonial- Side Elevation



3-Unit 2-Story Colonial- Front Elevation



3-Unit 2-Story Colonial- Rear Elevation



4-Unit 2-Story Colonial- Side Elevation



4-Unit 2-Story Colonial- Front Elevation



4-Unit 2-Story Colonial- Rear Elevation



5-Unit 2-Story Colonial- Side Elevation



5-Unit 2-Story Colonial- Front Elevation



5-Unit 2-Story Colonial- Rear Elevation



6-Unit 2-Story Colonial- Side Elevation

6-Unit 2-Story Colonial- Front Elevation



6-Unit 2-Story Colonial- Rear Elevation



5-Unit 3-Story Colonial- Side Elevation



5-Unit 3-Story Colonial- Front Elevation



5-Unit 3-Story Colonial- Rear Elevation



6-Unit 3-Story Colonial- Side Elevation



6-Unit 3-Story Colonial- Front Elevation



6-Unit 3-Story Colonial- Rear Elevation



6-Unit 2 Story TH Assembly

Color Elevation

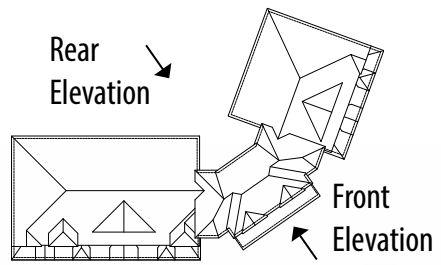
WINTER SPRING TH
18011-4
AA26002897
06-18-19
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6-Unit 3 Story TH Assembly

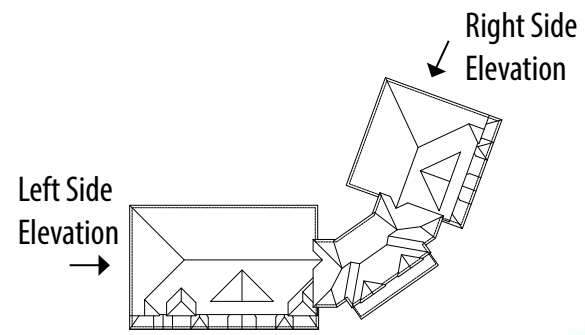
Color Elevation



10-Unit 2 & 3-Story Colonial- Front Elevation



10-Unit 2 & 3-Story Colonial- Rear Elevation



10-Unit 2 & 3-Story Colonial- Left Side Elevation



10-Unit 2 & 3-Story Colonial-Right Side Elevation



Pool Cabana

Front Elevation



Pool Cabana - Front Elevation



Pool Cabana - Rear Elevation



Pool Cabana -Left Side Elevation



Pool Cabana - Right Side Elevation



ONE WAY











Shingle Roof:
Weathered Wood



Windows:
Bronze

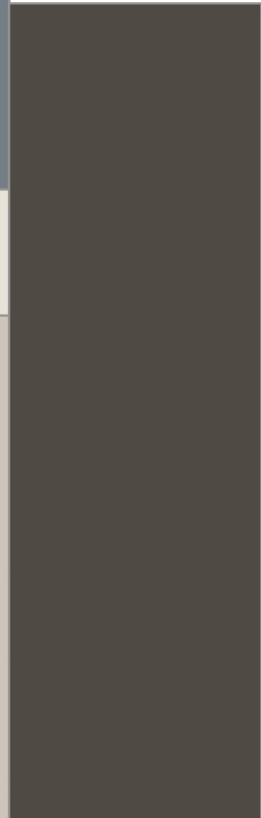
Board & Batten:
SW 6234
Uncertain Gray



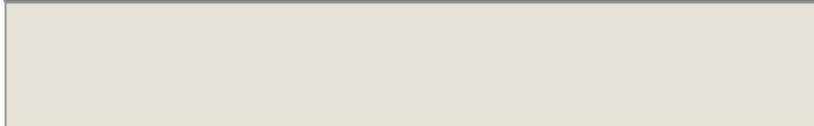
Stucco:
SW 2819
Downing Slate



Door/Accent Color:
SW 7020
Black Fox



Trim:
SW 7009
Pearly White



Siding:
SW 7043
Worldly Gray

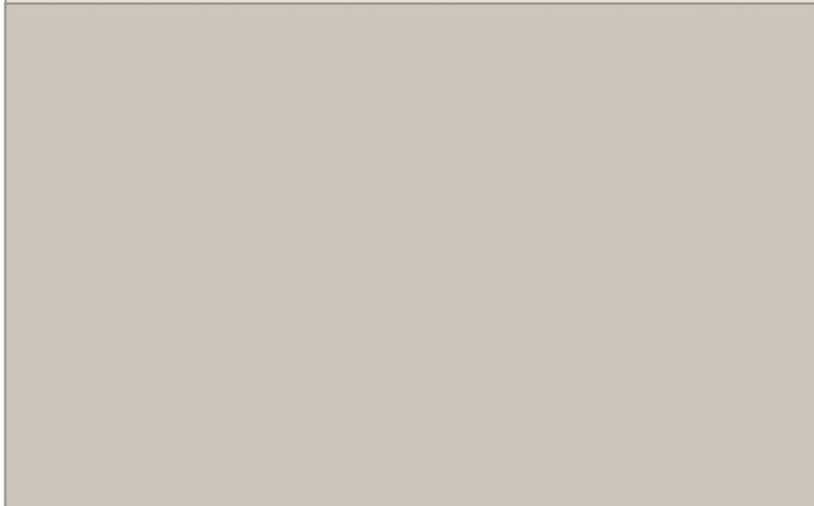


Exhibit 3

Waiver Applications



**CITY OF WINTER SPRINGS
COMMUNITY DEVELOPMENT DEPARTMENT**

1126 East State Road 434
Winter Springs, Florida 32708
customerservice@winterspringsfl.org

Application – Waiver

The Community Development Director reserves the right to determine whether this application is complete and accurate. An incomplete application will not be processed and will be returned to the applicant. The application shall be reviewed per [Chapter 20 – Zoning Sec. 20-34](#). The processing time may take up to ten (10) business days.

Applicants are responsible for posting notice (provided by the city) on the site at least seven (7) days prior to the Planning & Zoning Board (PZB) meeting at which the matter will be considered. Said notice shall not be posted within the City right-of-way.

All applicants shall be afforded minimal due process as required by law, including the right to receive notice, be heard, present evidence, cross-examine witnesses, and be represented by a duly authorized representative. Applicants are further advised that a Waiver is quasi-judicial in nature.

Therefore, APPLICANT ACKNOWLEDGES and AGREES, by signing below, that he or she:

- May be sworn-in as a witness in order to provide testimony to the City Commission;
- Shall be subject to cross-examination by party intervenors (if requested); and
- Shall be required to qualify expert witnesses, as appropriate.

Applicants are encouraged to familiarize themselves with [Chapter 2 – Administration Sec. 2-30](#) of the Winter Springs City Code relating to Quasi-Judicial Rules and Procedures of the City Commission. All Waiver recommendations shall be based from the required information/documentation provided, the Winter Springs Code of Ordinances, and the Winter Springs Comprehensive Plan (to the extent applicable).

The City Commission (CC) shall render all final decisions regarding Waivers and may impose reasonable conditions on any approved Waiver to the extent deemed necessary and relevant to ensure compliance with applicable criteria and other applicable provisions of the Winter Springs Code of Ordinances and the Winter Springs Comprehensive Plan. All formal decisions shall be based on competent substantial evidence and the applicable criteria as set forth in Chapter 20, Zoning. Applicants are advised that if, they decide to appeal any decisions made at the meetings or hearings with respect to any matter considered at the meetings or hearings, they will need a record of the proceedings and, for such purposes, they will need to insure that a verbatim record of the proceedings is made, at their cost, which includes the testimony and evidence upon which the appeal is to be based, per [Florida Statute 286.0105](#).

A Waiver which may be granted by the City Commission shall expire two (2) years after the effective date of such approval by the City Commission, unless a building permit based upon and incorporating the Waiver, is issued by the City within said time period. Upon written request of the property owner, the City Commission may extend the expiration date, without public hearing, an additional six (6) months, provided the property owner demonstrates good cause for the extension. In addition, if the aforementioned building permit is timely issued, and the building permit subsequently expires and the subject development project is abandoned or discontinued for a period of six months, the Waiver shall be deemed expired and null and void, per [Chapter 20 – Sec.20-36](#).



**CITY OF WINTER SPRINGS
COMMUNITY DEVELOPMENT DEPARTMENT**

1126 East State Road 434
Winter Springs, Florida 32708
customerservice@winterspringsfl.org

Application – Waiver

REQUIRED INFORMATION:

Applicant(s): _____ Date: _____

Mailing address: _____

Email: _____

Phone Number: _____

Property Owner(s): _____

Mailing Address: _____

Email: _____

Phone Number: _____

Project Name: _____

Property Address: _____

Parcel ID(s): _____

Parcel Size: _____

Existing Use: _____

Future Land Use: _____

Zoning District: _____

Waiver that is being requested? _____

Demonstrate that the applicable term or condition clearly creates an illogical, impossible, impractical, or patently unreasonable result related to the proposed property and development?

Demonstrate that the proposed development plan is in substantial compliance with [Chapter 20](#) of the City’s Code of Ordinances and in compliance with the Comprehensive Plan?



**CITY OF WINTER SPRINGS
COMMUNITY DEVELOPMENT DEPARTMENT**

1126 East State Road 434
Winter Springs, Florida 32708
customerservice@winterspringsfl.org

Application – Waiver

Will the proposed development plan significantly enhance the real property?

Will the proposed development plan serve the public health, safety, and welfare of the City of Winter Springs?

Will the waiver diminish property values in or alter the essential character of the surrounding neighborhood?

Is the waiver request the minimum waiver that will eliminate or reduce the illogical, impossible, impractical, or patently unreasonable result caused by the applicable term or condition under [Chapter 20 – Zoning](#)?

Is the proposed development plan compatible and harmonious with the surrounding neighborhood?

Has the applicant agreed to a binding development agreement required by city to incorporate the terms and conditions of approval deemed necessary by the City Commission including, but not limited to, any mitigative techniques and plans required by city code? Yes _____ No _____



**CITY OF WINTER SPRINGS
COMMUNITY DEVELOPMENT DEPARTMENT**

1126 East State Road 434
Winter Springs, Florida 32708
customerservice@winterspringsfl.org

Application – Waiver

List all witnesses that the applicant intends to present to the City Commission to provide testimony:

Describe with specificity any evidence which the applicant intends to present to the City Commission, including oral factual testimony, maps, photographs, records or reports and/or expert testimony:

Attach all documentary evidence which the applicant intends to present to the city commission to the back of this application.

The Applicant has a continuing duty to update the list of witnesses, description of evidence, and documentary evidence throughout the application process. Additional witnesses or evidence will not be admitted at the city commission hearing if not submitted at least seven (7) days prior to such hearing_

REQUIRED DOCUMENTATION (PDF):

- ___ A complete Application and Fee (\$500.00*)
- ___ A general description of the relief sought under this division
- ___ A brief explanation, with applicable supporting competent substantial evidence and documents, as to why the application satisfies the relevant criteria set forth in this division
- ___ A Legal Description accompanied by a certified survey or the portion of the map maintained by the Seminole County Property Appraiser reflecting the boundaries of the subject property (To scale).
- ___ An Excel mailing list with the names and addresses of each property owner within 500 ft. of each property line, along with the HOA Associations within 1/2 mile of each property line.
- ___ For all new commercial development and new residential subdivisions of ten (10) or more lots or existing commercial buildings being altered by 50 percent or greater of the original floor plan or seating capacity and requiring a modified site plan, or development agreements process under section 20-28.1 of the City Code, or as otherwise deemed applicable by the city to relevantly and competently examine an application for compliance with the city code and the affect and impact the proposed use will have on neighborhood and surrounding properties, applicants shall be required to submit with the following additional information referenced in [Chapter 20 – Zoning Sec.20.29 Applications \(7\) – \(11\)](#).

* Fees are as shown above plus actual costs incurred for advertising or notification, and for reimbursement for technical and/or professional services which may be required in connection with the review, inspection or approval of any development (based on accounting submitted by the city’s consultant) , payable prior to approval of the pertinent stage of development.



**CITY OF WINTER SPRINGS
COMMUNITY DEVELOPMENT DEPARTMENT**

1126 East State Road 434
Winter Springs, Florida 32708
customerservice@winterspringsfl.org

Application – Waiver

CITY LIMITED RIGHT OF ENTRY: By submitting this Application you hereby grant temporary right of entry for City Officials to enter upon the subject property for purposes of evaluating this Application.

APPLICANT'S AUTHORIZATION: I desire to make Application for a Waiver for the aforementioned project and have read and agree to the terms contained herein. In addition, if the Applicant is a corporate entity, the undersigned hereby represents and warrants that he/she is authorized to act on behalf of, and bind, the corporate entity.

Applicant Name (Print): Dan Edwards

Applicant Signature: [Signature] Date: 8/12/19

Business Name: Dream Finders Homes

Address: 8529 Southpark Circle, Suite 130, Orlando, FL 32819 Parcel ID: 26-20-30-5AR-0A00-007K

Property Owner's Name (Print): DFC SEMINOLE CROSSING, LLC

Property Owner Signature: [Signature], VICE PRESIDENT Date 8/14/19

STATE OF Florida COUNTY OF Orange

The foregoing instrument was acknowledged before me this 12th day of August, 2019, by Dan Edwards who is personally known to me or who has produced FL DL as identification and who did/did not take an oath.

Date: 8/12/2019 (seal):

Notary Public Signature: [Signature]
My Commission expires: 2/3/2022



Note: The Property Owner shall sign and have their signature notarized below if the Applicant is not the owner of the subject property.

Property Owner's Name (Print): PFC SEMINOLE CROSSING, LLC

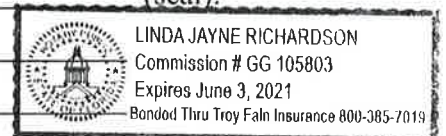
Property Owner Signature: [Signature], VICE PRESIDENT Date 8/14/19

STATE OF FLORIDA COUNTY OF Duval

The foregoing instrument was acknowledged before me this 14th day of August, 2019, by Robert River who is personally known to me or who has produced as identification and who did/did not take an oath.

Date: August 14 (seal):

Notary Public Signature: [Signature]
My Commission expires: June 3, 2021



Waivers Requested:

1. On Building 4 at the corner of Michael Blake Boulevard and Tree Swallow Road, requesting a portion of the building to have a setback of 12.6', which is outside of the 0' – 8' setback in the T5 transect code. A majority of the building meets the setback requirement, but due to the shape of the right-of-way around the roundabout and physical limitations within the building footprint, the west portion of the building will be outside of the 8' setback.
2. For the amenity building at the pool, requesting a 1-story elevation, which is less than the minimum requirement of 2 stories for accessory structures. The amenity building will have a small footprint of about 1,100 square feet and adding a second story will impede upon the view corridor of the park area between Streets B & C.
3. For proposed Streets A and B, requesting to have the 6' sidewalk located adjacent to the parallel parking spaces, which is the opposite configuration from the Town Center Street thoroughfare requirements in the Transect Zone Design Standards. The purpose of this request is to allow the 6' landscape portion of the right-of-way to be adjacent to the townhomes side wall and provide a graded buffer between the wall and the sidewalk. Furthermore, having the sidewalk adjacent to the parallel parking stall also allows for an easier transition for car passengers to exit/enter the parked vehicles without crossing a landscape area.
4. For proposed Streets B and C, requesting to have the 6' sidewalk located adjacent to the parallel parking spaces and the landscape area on the opposite side of the drive lane, as opposed to the typical one-way variation of the Town Center Street thoroughfare requirements in the Transect Zone Design Standards. The purpose of this request to allow for more landscape area adjacent to the central greenspace/park area. Furthermore, having the sidewalk adjacent to the parallel parking stall also allows for an easier transition for car passengers to exit/enter the parked vehicles without crossing a landscape area.
5. For Buildings 12, 14, 16, 17, 18, 19 and 20; requesting to have a maximum building set back of 11' - 22' adjacent to the Seminole County Trail right-of-way, which is outside of the 0' – 8' setback in the T5 transect code. For the buildings facing the Seminole County Trail, the area between the building Trail right-of-way must include a set of stairs, 6' sidewalk, and retaining wall and the additional setback space is to allow for this for these features to fit within that space. The typical setback would be 11' and only expands up to 22' along Buildings 12, 14, and 16 as the right-of-way line angles out east, away from the internal alignment of the buildings.
6. Requesting the removal of one (1), specimen tree within the project site. The existing tree is a 24" oak tree, which is defined as a specimen tree in the City code.
7. A waiver from the City's Code of Ordinances prohibiting common yards in the Town Center T5 Transect. Buildings 2 and 3 by their orientation have their primary facades facing an open space tract and not a public right-of-way thus creating a common yard condition.

Waiver Request 1:

1. Demonstrate that the applicable term or condition clearly creates an illogical, impossible, impractical, or patently unreasonable result related to the proposed property and development?

This Waiver Request is due to the peculiar shape of the right-of-way and proposed structure. Granting this waiver will allow for a prominent corner building to be constructed on the main view corridor of the roundabout area and add to the urban nature of the town center.

2. Demonstrate that the proposed development plan is in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan?

This Waiver Request is necessary to allow for the construction of the building on that corner without compromising the rear access of the residents. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan.

Waiver Request 2:

1. Demonstrate that the applicable term or condition clearly creates an illogical, impossible, impractical, or patently unreasonable result related to the proposed property and development?

This Waiver Request is due size, location, and intended use of proposed structure. Granting this request will allow for a proportional design elevation for the pool amenity building.

2. Demonstrate that the proposed development plan is in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan?

This Waiver Request is necessary to allow the amenity building to be constructed adjacent to the pool and be a suitable proportion to the footprint. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan.

Waiver Request 3:

1. Demonstrate that the applicable term or condition clearly creates an illogical, impossible, impractical, or patently unreasonable result related to the proposed property and development?

This Waiver Request is due to the layout of the buildings relative to the proposed rights-of-way and will still fit within the nature of the town center in that the landscape and sidewalk elements are still be proposed, just in a different configuration.

2. Demonstrate that the proposed development plan is in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan?

This Waiver Request is necessary to allow for the construction of the buildings at a 0-foot setback on the right-of-way, while still meeting the other requirements of the regulations, such as minimum finish floor grades. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan.

Waiver Request 4:

1. Demonstrate that the applicable term or condition clearly creates an illogical, impossible, impractical, or patently unreasonable result related to the proposed property and development?

This Waiver Request is due to the layout of the buildings relative to the proposed rights-of-way and will still fit within the nature of the town center in that the landscape and sidewalk elements are still be proposed, just in a different configuration.

2. Demonstrate that the proposed development plan is in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan?

This Waiver Request is necessary to allow for the construction of a park / amenity area central to the proposed development. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan.

Waiver Request 5:

1. Demonstrate that the applicable term or condition clearly creates an illogical, impossible, impractical, or patently unreasonable result related to the proposed property and development?

This Waiver Request is due to the peculiar shape of the right-of-way and proposed layout of the site. Granting this request will allow for townhomes that face the scenic Seminole County Trail.

2. Demonstrate that the proposed development plan is in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan?

This Waiver Request is necessary to allow for the construction of the building in these locations, while have the front of the building face the trail and provide standard internal sidewalk access. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan.

Waiver Request 6:

1. Demonstrate that the applicable term or condition clearly creates an illogical, impossible, impractical, or patently unreasonable result related to the proposed property and development?

This Waiver Request is due the current grade of the site. The site will drain into a master pond system, which requires the grade of the property to be raised by 3-4 feet in the area of the

existing tree. Furthermore, the existing tree is located where a proposed retaining wall is needed at the interface between the raised project site and existing Seminole County Trail.

2. Demonstrate that the proposed development plan is in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan?

This Waiver Request is necessary to allow for the raising of the site grades and construction of a retaining wall. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan.

Waiver Request 7:

1. Demonstrate that the applicable term or condition clearly creates an illogical, impossible, impractical, or patently unreasonable result related to the proposed property and development?

This Waiver Request is due to the orientation of Buildings 2 and 3 not facing a public right-of-way. The area directly in front of these buildings is intended to be community open space and provide a continuous landscape corridor from the amenity building to Michael Blake Blvd.

2. Demonstrate that the proposed development plan is in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan?

This Waiver Request is necessary to facilitate the continuous landscape corridor from the amenity building to Michael Blake Blvd. The proposed development plan is otherwise in substantial compliance with Chapter 20 of the City's Code of Ordinances and in compliance with the Comprehensive Plan.

Exhibit 4

Final Engineering Plan

WINTER SPRINGS TOWNHOMES

AT
MICHAEL BLAKE BLVD.
WINTER SPRINGS, FLORIDA

OWNER / APPLICANT
DFC SEMINOLE CROSSING, LLC
14701 PHILIPS HWY, STE 300
JACKSONVILLE, FL 32256
DAN EDWARDS

ENGINEER
NV5, INC.
201 S. BUMBY AVENUE
ORLANDO, FLORIDA 32803
FRANKLIN A. PORTER, P.E.
407-896-3317

PLANS

Sheet Number	Sheet Title
C01.0	COVER SHEET
C02.0	DEMO PLAN
C02.1	TREE PLAN
C03.0	SWPPP PHASE 1
C04.0	SWPPP PHASE 2
C05.0	SWPPP DETAILS AND NOTES
C06.0	SITE LAYOUT PLAN
C06.1	SIGHT TRIANGLES
C07.0	GRADING AND STORM DRAINAGE
C07.1	STRUCTURES DATA
C07.2	PLAN & PROFILE TREE SWALLOW
C07.3	PLAN & PROFILE STREET A
C07.4	PLAN & PROFILE STREET D
C08.0	WATER AND SEWER LAYOUT
C09.0	FIRE TRUCK ACCESS PLAN
C10.0	WATER DETAILS
C11.0	WASTEWATER DETAILS
C12.0	GENERAL DETAILS 1
C13.0	GENERAL DETAILS 2
S01.0	BOUNDARY SURVEY
L01.0	LANDSCAPE PLAN
L10.1	IRRIGATION PLAN
L10.2	IRRIGATION DETAILS



VICINITY MAP



AERIAL PHOTO

LEGAL DESCRIPTION

A PORTION OF LOTS 7 AND 8, BLOCK "A", D.R. MITCHELL'S SURVEY OF THE LEVY GRANT ON LAKE JESSUP, SAID LANDS LYING IN SECTION 6, TOWNSHIP 21 SOUTH, RANGE 31 EAST, ACCORDING TO THE PLAT THEREOF AS RECORDED IN PLAT BOOK 1, PAGE 5, OF THE PUBLIC RECORDS OF SEMINOLE COUNTY, FLORIDA; BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE INTERSECTION OF STATE ROAD 434 AND TUSKAWILLA ROAD (PER FLORIDA DEPARTMENT OF TRANSPORTATION RIGHT-OF-WAY MAP, SECTION 77070-2516, SHEET 10 OF 13, P.1. STATION 600+32.11); THENCE RUN S38°23'34"E, A DISTANCE OF 1320.11 FEET ALONG THE BASELINE OF SURVEY AS SHOWN ON SAID RIGHT-OF-WAY MAP; THENCE DEPARTING SAID BASELINE, RUN N51°36'26"E, A DISTANCE OF 94.94 FEET TO A POINT ON THE NORTHEASTERLY RIGHT-OF-WAY LINE OF THE AFORESAID STATE ROAD 434, AS SHOWN ON SAID RIGHT-OF-WAY MAP, FOR THE POINT OF BEGINNING, THENCE RUN ALONG SAID NORTHEASTERLY RIGHT-OF-WAY LINE OF STATE ROAD 434 AND EASTERLY RIGHT OF WAY LINE OF MICHAEL BLAKE BOULEVARD (AS RECORDED IN OFFICIAL RECORD BOOK 7486, PAGE 138) THE FOLLOWING COURSES AND DISTANCES: RUN N24°10'06"W A DISTANCE OF 48.66 FEET; THENCE RUN N38°43'16"W A DISTANCE OF 246.60 FEET TO THE POINT OF CURVATURE OF A CURVE CONCAVE EASTERLY HAVING A RADIUS OF 25.00 FEET; AND A CHORD BEARING OF N06°16'44"E, THENCE RUN NORTHERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 90°00'00" A DISTANCE OF 39.27 FEET TO THE POINT OF TANGENCY; THENCE RUN N51°16'44"E A DISTANCE OF 389.87 FEET; THENCE RUN N53°37'06"E A DISTANCE OF 71.07 FEET TO THE POINT OF CURVATURE OF A CURVE CONCAVE SOUTHERLY HAVING A RADIUS OF 15.00 FEET AND A CHORD BEARING OF N74°09'35"E; THENCE RUN EASTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 41°04'59" A DISTANCE OF 10.76 FEET TO THE POINT OF TANGENCY; THENCE RUN S85°17'55"E A DISTANCE OF 22.68 FEET TO THE POINT OF CURVATURE OF A CURVE CONCAVE SOUTHERLY HAVING A RADIUS OF 15.00 FEET AND A CHORD BEARING OF S64°11'16"; THENCE RUN EASTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 42°13'19" A DISTANCE OF 11.05 FEET TO THE POINT OF TANGENCY; THENCE RUN S43°04'36" A DISTANCE OF 31.18 FEET; THENCE RUN N51°24'49"E A DISTANCE OF 63.63 FEET; THENCE RUN N34°23'22"W A DISTANCE OF 27.14 FEET TO THE POINT OF CURVATURE OF A CURVE CONCAVE EASTERLY HAVING A RADIUS OF 15.00 FEET AND A CHORD BEARING OF N16°43'25"W; THENCE RUN NORTHERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 35°19'54" A DISTANCE OF 9.25 FEET TO THE POINT OF TANGENCY; THENCE RUN N00°56'32"E A DISTANCE OF 51.24 FEET TO THE POINT OF CURVATURE OF A CURVE CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 15.00 FEET AND A CHORD BEARING OF N17°39'17"E; THENCE RUN NORTHEASTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 33°25'31" A DISTANCE OF 8.75 FEET TO THE POINT OF TANGENCY; THENCE RUN N34°22'03"E A DISTANCE OF 70.51 FEET TO A NON-TANGENT CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 1030.00 FEET AND A CHORD BEARING OF N32°18'59"E; THENCE RUN NORTHEASTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 07°15'46" A DISTANCE OF 130.56 FEET TO THE POINT OF REVERSE CURVATURE OF A CURVE CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 944.00 FEET AND A CHORD BEARING OF N35°29'59"E; THENCE RUN NORTHEASTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 13°37'45" A DISTANCE OF 224.55 FEET TO THE SOUTHERLY LINE OF ACQUISITION PARCEL B (THE RAILS TO TRAILS CORRIDOR) AS DESCRIBED IN OFFICIAL RECORDS BOOK 4092, PAGE 0164, PUBLIC RECORDS OF SEMINOLE COUNTY, FLORIDA; THENCE DEPARTING SAID EASTERLY RIGHT OF WAY LINE OF MICHAEL BLAKE BOULEVARD, RUN S46°13'52"E ALONG SAID SOUTHERLY LINE A DISTANCE OF 145.09 FEET; THENCE RUN S32°50'43"E A DISTANCE OF 662.97 FEET TO THE INTERSECTION OF SAID SOUTHERLY LINE AND THE NORTHWESTERLY LINE OF SAID ACQUISITION PARCEL B; THENCE RUN S50°31'58"W ALONG SAID NORTHWESTERLY LINE, A DISTANCE OF 468.43 FEET; THENCE N38°32'29"W A DISTANCE OF 606.03 FEET TO THE POINT OF BEGINNING.

SITE UTILITY NOTES:

- ALL FILL MATERIAL IS TO BE IN PLACE, AND COMPACTED BEFORE INSTALLATION OF PROPOSED UTILITIES.
- CONTRACTOR SHALL NOTIFY THE PROPER UTILITIES AUTHORITIES 48 HOURS PRIOR TO ANY UTILITIES CONSTRUCTION.
- SANITARY SEWER GRAVITY PIPE SHALL BE AS FOLLOWS:
 - 8" PVC SDR35 PER ASTM D 3034, FOR PIPES LESS THAN 10' DEEP
 - 8" PVC SDR26 PER ASTM D 3034, FOR PIPES MORE THAN 10' DEEP
 - 6" PVC SDR 35 PER ASTM D 3034
- WATER LINES SHALL BE AS FOLLOWS, UNLESS OTHERWISE DEPICTED ON PLANS:
 - 3" AND SMALLER, P.V.C. ASTM D 221, WITH SDR 21 RATING, CONTINUALLY MARKED WITH MFR'S NAME PIPE SIZE, CELL CLASSIFICATION, SDR RATING, AND ASTM D1748 MAT. CLASS
 - 4" TO 16" P.V.C. AWWA C900, RATED DR 18 (CLASS 150), CONTINUALLY MARKED AS REQ'D
 - 4" TO 16", DIP. AWWA C151, PRESSURE CLASS 350 (4-12"), PRESSURE CLASS 250 (14-16")
- MINIMUM TRENCH WIDTH SHALL BE 2 FEET.
- CONTRACTOR SHALL MAINTAIN A MINIMUM OF 3'-0" COVER ON ALL WATERLINES AND SANITARY SEWER.
- LINES UNDERGROUND SHALL BE INSTALLED, INSPECTED AND APPROVED BY CITY OF WINTER SPRINGS PUBLIC WORKS UTILITIES BEFORE BACKFILLING. CONTRACTOR TO PROVIDE A MINIMUM 48 HOURS NOTICE.
- TOPS OF EXISTING MANHOLES SHALL BE RAISED AS NECESSARY TO BE FLUSH WITH PROPOSED PAVEMENT ELEVATIONS, AND TO BE SIX INCHES ABOVE UNPAVED GROUND ELEVATIONS WITH WATER TIGHT LIDS.
- EXISTING UTILITIES HAVE BEEN FIELD VERIFIED. HOWEVER, EXISTING UTILITIES SHALL BE RE-VERIFIED IN FIELD PRIOR TO INSTALLATION OF NEW LINES. THE EXISTING SANITARY SEWER SIZE, LOCATION, AND ELEVATION SHALL BE VERIFIED PRIOR TO CONSTRUCTION AND DEPICTED ON THESE PLANS.
- REFER TO INTERIOR PLUMBING DRAWINGS FOR TIE-IN OF ALL UTILITIES.
- ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICE COMPANIES SHALL BE PERFORMED PRIOR TO ANNOUNCED BUILDING POSSESSION AND THE FINAL CONNECTION OF SERVICES.
- CONTRACTOR SHALL COORDINATE WITH ALL UTILITY COMPANIES FOR INSTALLATION REQUIREMENTS AND SPECIFICATIONS.
- ALL WATER JOINTS ARE TO BE MECHANICAL RESTRAINED JOINTS.
- IN THE EVENT OF A VERTICAL CONFLICT BETWEEN WATER LINES, SANITARY LINES, STORM LINES AND GAS LINES (EXISTING AND PROPOSED), THE SANITARY LINE SHALL BE DUCTILE IRON PIPE WITH MECHANICAL JOINTS AT LEAST 10 FEET ON BOTH SIDES OF CROSSING, THE WATER LINE SHALL HAVE MECHANICAL RESTRAINED JOINTS AS REQUIRED TO PROVIDE A MINIMUM OF 18" CLEARANCE. MEETING REQUIREMENTS OF ANSI A21.10 OR ANSI 21.11 (AWWA C-151) (CLASS 50).
- ALL SANITARY LATERALS (LESS THAN 6" DIAMETER) SHALL BE SLOPED AT A MINIMUM OF 1.00%.
- CONTRACTOR SHALL TURN OFF THE CORPORATION STOPS AT THE METERS FOR ALL WATER SERVICES THAT ARE TO BE REMOVED.
- WHEN ANY ROOTS OF EXISTING TREES ARE ENCOUNTERED DURING LAND CLEARING AND/OR GRADING OF THE SITE THE ROOTS MUST BE CUT OFF EVENLY WITH CLEAN SHARP PRUNING TOOLS. CONTRACTOR SHALL MINIMIZE DAMAGE TO TREE ROOT SYSTEM.
- A MINIMUM OF 5 FT SEPARATION SHALL BE PROVIDED BETWEEN THE UNDERGROUND UTILITIES AND ANY PROPOSED LARGE CANOPY TREES.
- UNDERGROUND FIRE MAINS AND FIRE HYDRANTS WILL BE PUBLIC AND MUST BE INSTALLED BY A LICENSED FIRE CONTRACTOR CLASS I, II, III, IV. COMBINATION FIRE MAINS (SHARED DOMESTIC AND FIRE PROTECTION SERVICE) AND FIRE HYDRANTS UP TO THE DEDICATED FIRE PROTECTION SYSTEM "POINT OF SERVICE" CAN BE INSTALLED BY A LICENSED UNDERGROUND UTILITY/EXCAVATION CONTRACTOR, GENERAL CONTRACTOR, OR PLUMBING CONTRACTOR.
- UNDERGROUND FIRE MAINS WILL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH NFPA 24-2007 EDITION. STANDARDS FOR THE INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES.
- IN PAVED AREAS, ALL CLEANOUT COVERS AND VALVE BOXES SHALL BE TRAFFIC RATED AND FLUSH WITH TOP OF PAVEMENT.
- ALL SANITARY MANHOLES SHALL HAVE INCLUDE TROWEL-FINISHED CONCRETE BENCHING.

SITE GRADING NOTES:

- CONTRACTOR IS RESPONSIBLE FOR DEMOLITION OF EXISTING STRUCTURES INCLUDING REMOVAL OF ANY EXISTING UTILITIES SERVING THE STRUCTURE.
- THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
- ALL CUT OR FILL SLOPES SHALL BE 4:1 OR FLATTER UNLESS OTHERWISE NOTED.
- PRECAST STRUCTURES MAY BE USED AT CONTRACTORS OPTION.
- EXISTING AND NEWLY INSTALLED PIPES TO BE CLEANED OUT TO REMOVE ALL SILT AND DEBRIS.
- STORM PIPE SHALL BE PER MASTER SITE SPECIFICATIONS (ADS HP STORM OR APPROVED EQUIVALENT)
- IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY TO RETURN IT TO EXISTING CONDITIONS OR BETTER.
- ALL STORM PIPE ENTERING STRUCTURES SHALL BE GROUDED TO ASSURE CONNECTION AT STRUCTURE IS WATERTIGHT
- ALL STORM SEWER MANHOLES IN PAVED AREAS SHALL BE FLUSH WITH PAVEMENT, AND SHALL HAVE TRAFFIC BEARING RING LID COVERS. MANHOLES IN UNPAVED AREAS SHALL BE 6" ABOVE FINISH GRADE. LIDS SHALL BE LABELED "STORM SEWER".
- THE CONTRACTOR SHALL ADHERE TO ALL TERMS & CONDITIONS AS OUTLINED IN THE GENERAL N.P.D.E.S. PERMIT FOR STORM WATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES.
- CONTRACTOR SHALL ADJUST AND/OR CUT EXISTING PAVEMENT AS NECESSARY TO ASSURE A SMOOTH FIT AND CONTINUOUS GRADE.
- CONTRACTOR SHALL ASSURE POSITIVE DRAINAGE AWAY FROM BUILDINGS FOR ALL NATURAL AND PAVED GROUND SURFACES.
- ALL UNSURFACED AREAS DISTURBED BY GRADING OPERATION SHALL RECEIVE 4 INCHES OF TOPSOIL. CONTRACTOR SHALL APPLY STABILIZATION FABRIC TO ALL SLOPES 3:1V OR STEEPER. CONTRACTOR SHALL STABILIZE DISTURBED AREAS IN ACCORDANCE WITH GOVERNING SPECIFICATIONS UNTIL A HEALTHY STAND OF VEGETATION IS OBTAINED.
- CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE GOVERNING CODES AND BE CONSTRUCTED TO SAME.
- ALL STORM STRUCTURES SHALL HAVE A SMOOTH UNIFORM POURED MORTAR INVERT FROM INVERT IN TO INVERT OUT.
- TOPOGRAPHIC INFORMATION IS TAKEN FROM A TOPOGRAPHIC SURVEY BY LAND SURVEYOR/CONSULTANT. IF THE CONTRACTOR DOES NOT ACCEPT EXISTING TOPOGRAPHY AS SHOWN ON THE PLANS, WITHOUT EXCEPTION, THEN THE CONTRACTOR SHALL SUPPLY, AT THEIR EXPENSE, A TOPOGRAPHIC SURVEY BY A REGISTERED LAND SURVEYOR TO THE OWNER FOR REVIEW.
- ALL EXISTING MANHOLE RIMS TO BE FLUSH WITH FINISHED GRADE. CONTRACTOR TO INSTALL MANHOLE RISERS OR ADJUST EXISTING FRAMES AS NECESSARY.
- EXISTING GRATE ELEVATIONS TO REMAIN, WHERE PAVEMENT OVERLAY IS TO BE PLACED. FEATHER OVERLAY TO MATCH EXISTING GRATE ELEVATION TO FORM A SMOOTH TRANSITION.
- SPOT ELEVATIONS ADJACENT TO CURBS REPRESENT EDGE OF PAVEMENT ELEVATIONS, TOP OF CURB SHOULD BE CONSIDERED 6" HIGHER.
- CONTRACTOR TO MATCH EXISTING GRADE AT LIMITS OF DISTURBANCE, AS DEPICTED ON SWPPP SITE MAPS
- STRIP THE SURFICIAL ORGANIC SANDS AND IMPORT A MINIMUM OF 2 FEET OF PRE-APPROVED ENGINEERED FILL WITHIN THE LIMITS OF PROPOSED BUILDING FOUNDATIONS AND PAVEMENT.
- AFTER STRIPPING IS COMPLETE, THE EXPOSED SUBGRADE SHALL BE OBSERVED, TESTED AND PROOF-ROLLED WITH A MINIMUM OF 10 PASSES WITH A HEAVY VIBRATORY ROLLER IN PERPENDICULAR DIRECTIONS.
- FILL SHALL BE COMPACTED IN LIFTS NO THICKER THAN 9 TO 12 INCHES IN LOOSE THICKNESS, WITH EACH LIFT COMPACTED TO AT LEAST 95 PERCENT OF THE SOILS MODIFIED PROCTOR DRY DENSITY, (ASTM D-1557), AT A DEPTH OF 1 FOOT BELOW THE COMPACTED SURFACE, AS DETERMINED BY IN-PLACE DENSITY TESTS.
- FILL SHALL BE COMPACTED TO 95 PERCENT OF THE MATERIAL'S MAXIMUM MODIFIED PROCTOR DRY DENSITY
- IMPORTED FILL OR BACKFILL SHOULD CONSIST OF FINE SAND WITH LESS THAN 15 PERCENT PASSING THE NO. 200 SIEVE, FREE OF RUBBLE, ORGANICS, CLAY, DEBRIS, AND OTHER UNSUITABLE MATERIAL.
- MOISTURE CONTENT OF THE FILL SHALL BE WITH IN +/- 2 PERCENT OF OPTIMUM MOISTURE CONTENT AS ESTABLISHED IN ASTM D-1557.
- ONE FIELD DENSITY TEST SHALL BE CONDUCTED PER 2,500 SQUARE FEET (OR FRACTION THEREOF) PER LIFT, IN THE BUILDING AREA. 1 TEST PER 5,000 SQUARE FEET IN PAVEMENT AREAS.
- ALTHOUGH THE EXPOSED SUBGRADE IS ANTICIPATED TO BE RELATIVELY STABLE UPON INITIAL EXPOSURE, UNSUITABLE SUBGRADE CONDITIONS COULD DEVELOP DURING GENERAL CONSTRUCTION OPERATIONS IF THE SOILS ARE WETTED AND/OR SUBJECTED TO REPETITIVE CONSTRUCTION TRAFFIC.
- LANDSCAPED AREAS BETWEEN RESIDENTIAL BUILDINGS AND SIDEWALKS ALONG PUBLIC ROADS SHALL BE SLOPED SUCH THAT THE EXPOSED FOOTER OF THE BUILDING IS A MINIMUM OF 1 FOOT AND MAXIMUM OF 2.5 FEET.
- PER TOWN CENTER CODE ALL RESIDENTIAL FINISHED FLOORS MUST BE 2 FEET ABOVE THE ADJACENT SIDEWALK GRADE.

SEMINOLE COUNTY FIRE NOTES:

- ALL WORK AND MATERIALS SHALL COMPLY WITH ALL CITY OF WINTER SPRINGS REGULATIONS AND CODES AND O.S.H.A. STANDARDS.
- CONTRACTORS MUST BE FOOT PREQUALIFIED IN THE WORK CLASSES OF GRADING, DRAINAGE, AND FLEXIBLE PAVING TO BE ELIGIBLE TO WORK WITHIN THE PUBLIC ROW OF THIS PROJECT. THE PAVING SUBCONTRACTOR, IF APPLICABLE, MUST ALSO BE FOOT PREQUALIFIED IN FLEXIBLE PAVING. ALL PAVEMENT SLOPES, SIDEWALKS SHALL BE PER THE APPROVED FINAL ENGINEERING AND PROJECT SITE WORK SPECIFICATIONS PER THE ARCHITECTURAL PLANS SHALL BE CHECK AGAINST THE FINAL ENGINEERING PLANS.
- ALL DISTURBED AREAS ARE TO RECEIVE FOUR INCHES OF TOPSOIL, SEED, MULCH AND WATER UNTIL A HEALTHY STAND OF GRASS IS ESTABLISHED. SEE 02900 SPECIFICATION.
- ALL ISLANDS WITH CURB & GUTTER SHALL BE LANDSCAPED, UNLESS OTHERWISE NOTED. THOSE ISLANDS ARE TO HAVE CONC. CURB.
- ALL DIMENSIONS AND RADII ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
- EXISTING STRUCTURES WITHIN CONSTRUCTION LIMITS ARE TO BE MODIFIED AS NECESSARY. ALL COST SHALL BE INCLUDED IN BASE BID.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELOCATIONS, (UNLESS OTHERWISE NOTED ON PLANS) INCLUDING BUT NOT LIMITED TO, ALL UTILITIES, STORM DRAINAGE, SIGNS, TRAFFIC SIGNALS & POLES, ETC. AS REQUIRED. ALL WORK SHALL BE IN ACCORDANCE WITH GOVERNING AUTHORITIES REQUIREMENTS AND PROJECT SITE WORK SPECIFICATIONS AND SHALL BE APPROVED BY SUCH. ALL COST SHALL BE INCLUDED IN BASE BID.
- THE SITE WORK FOR THE PROJECT SHALL MEET OR EXCEED THE 'SITE SPECIFIC SPECIFICATIONS'.
- LIGHTING ELECTRICAL PLANS TO BE PROVIDED BY DUKE ENERGY. ALL SITE LIGHTING IS TO BE INSTALLED PRIOR TO SITE ACCEPTANCE. CITY APPROVAL OF THE DUKE STREET LIGHTING PLAN IS REQUIRED PRIOR TO FINALIZATION AND WILL BE PART OF THE ENGINEERING SUBMITTAL. POLES AND FIXTURES ARE REQUIRED TO BE DECORATIVE.
- ALL SIGNAGE AND STRIPING TO BE INSTALLED IN ACCORDANCE WITH MUTCD (LATEST EDITION) STANDARDS AND SPECIFICATIONS. ALL SIGNAGE IS TO BE DECORATIVE. ALL STRIPING TO BE THERMOPLASTIC.
- ALL CONSTRUCTION DUMPSTERS TO BE WASTE PRO, NO EXCEPTIONS. DUMPSTERS ARE TO BE LOCATED A MIN. OF 100' FROM ANY SITE BOUNDARY.
- NO ON-SITE BURNING IS ALLOWED AT ANY TIME.
- ALL ORGANIC OR OTHER UNSUITABLE MATERIALS MUST BE HAULED OFF THE SITE AND PROPERLY DISPOSED.
- PAYMENT OF THE 1% SITE INSPECTION FEE IS DUE PRIOR TO BREAKING GROUND. FEE IS 1% OF THE TOTAL SITEWORK CONSTRUCTION COST, NOT INCLUDING ITEMS COVERED BY A BUILDING PERMIT.
- PROVIDE A VIDEO INSPECTION OF ALL SANITARY SEWER MAINS, SANITARY SEWER LATERALS, AND ALL STORMWATER PIPES. PROVIDE THE CITY WITH A DVD COPY OF ALL VIDEO INSPECTIONS.
- ALL WORK PERFORMED WITHIN THE FDOT RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH 2017 DESIGN STANDARDS, 2017 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AND 2010 UTILITY ACCOMMODATION MANUAL.
- A 6" CHAIN LINK FENCE WITH EITHER GREEN OR BLACK OPAQUE PRIVACY SCREEN IS REQUIRED TO BE INSTALLED AROUND THE PROJECT PERIMETER PRIOR TO SITE WORK.
- A REFUNDABLE STORMWATER POLLUTION PREVENTION PLAN CASH DEPOSIT OR LETTER OF CREDIT FOR THE LESSER OF 1% OF THE SITE CONSTRUCTION COST OR \$5,000 IS REQUIRED AT THE PRE-CONSTRUCTION MEETING.

GEOTECHNICAL DATA:

CONTRACTOR IS RESPONSIBLE FOR OBTAINING A COPY OF THE GEOTECHNICAL REPORT BY UNIVERSAL ENGINEERING SCIENCES, USE REPORT NO. 1626718, DATED NOVEMBER 21, 2018
PLEASE REFER TO CHAPTERS:
9.8 FLOOR SLABS
11.0 SITE PREPARATION
12.0 DEWATERING AND EXCAVATION CONSIDERATIONS
NOTE: THE GEOTECHNICAL REPORT INCLUDES OBSERVATIONS OF ORGANIC SOILS FROM EXISTING GRADE TO 2.5' BELOW GRADE. ORGANIC CONTENT GREATER THAN 5% IS UNSUITABLE FOR STRUCTURE PLACEMENT AND GREATER THAN 10% IS UNSUITABLE FOR PAVEMENT PLACEMENT. REQUIRED REMOVAL OF UNSUITABLE ORGANICS SOILS AND REPLACEMENT WITH COMPACTED BACKFILL.

SITE INFORMATION:

TOTAL AREA:	8.35± AC
(EXCLUDES MICHAEL BLAKE BLVD AND INCLUDES TREE SWALLOW ROAD EAST EXTENSION)	
ZONING:	TOWN CENTER (T5 - URBAN CENTER)
SETBACKS:	
FRONT MINIMUM:	0 FT
FRONT MAXIMUM:	8 FT
REAR:	3 FT
SIDE MINIMUM:	0 FT
SIDE MAXIMUM:	24 FT
BUILDING HEIGHT:	2 STORIES MINIMUM, 5 STORIES MAX
UNIT MIX:	
TEN (10) - 2-STORY BUILDINGS, MAX. 6 UNITS	
TEN (10) - 3-STORY BUILDINGS, MAX. 6 UNITS	
TOTAL 114 UNITS	

PARKING RECAP:

LOT 1:	STREET PARKING: 115 GARAGE PARKING: (2 CAR GARAGES) 228 X 0.5 = 114 SPACES
TOTAL:	229
PARKING RATIO:	229 SPACES / 114 UNITS: 2.01

BUILDING DATA				
BUILDING	UNITS	STORIES	FIRE SPRINKLER	
1	6	2	NO	
2	5	2	NO	
3	3	2	NO	
4	10	3	YES	
5	5	3	YES	
6	5	2	NO	
7	5	2	NO	
8	6	2	NO	
9	6	2	NO	
10	6	3	YES	
11	6	2	NO	
12	6	3	YES	
13	5	2	NO	
14	6	3	YES	
15	4	2	NO	
16	6	3	YES	
17	6	3	YES	
18	6	3	YES	
19	6	3	YES	
20	6	3	YES	
	114			

SITWORK SPECIFICATIONS:

CIVIL ENGINEERING SITWORK SPECIFICATIONS ARE INTEGRAL TO THIS PLAN SET AND INCLUDED IN THE FINAL PERMIT SET OF DOCUMENTATION FROM THE CITY OF WINTER SPRINGS. THE CONTRACTOR SHALL OBTAIN A COPY THROUGH THE CITY OF WINTER SPRINGS ONLINE PERMITTING PORTAL OR BY CONTACTING NV5.

VERTICAL DATUM:

ALL ELEVATIONS ARE BASED ON NGVD 1929 VERTICAL DATUM

JURISDICTION / UTILITIES

SITWORK CONSTRUCTION
CITY OF WINTER SPRINGS, FLORIDA
1126 EAST STATE ROAD 434
WINTER SPRINGS, FLORIDA 32708
407-327-1800
WATER MANAGEMENT:
S.J.W.M.D.
601 S. LAKE DESTINY RD, SUITE 200
MAITLAND, FLORIDA 32751
407-695-4800
WATER:
CITY OF WINTER SPRINGS, FLORIDA
1126 EAST STATE ROAD 434
WINTER SPRINGS, FLORIDA 32708
407-327-2669
WASTEWATER:
CITY OF WINTER SPRINGS, FLORIDA
1126 EAST STATE ROAD 434
WINTER SPRINGS, FLORIDA 32708
407-327-2669
ELECTRIC:
DUKE ENERGY
2801 WEST STATE ROAD 426
OVIEDO, FLORIDA 32765
800-700-8744
TELEPHONE:
AT&T
ORLANDO, FLORIDA 32801
407-351-8190
CABLE:
BRIGHTHOUSE
3767 ALL AMERICAN BLVD.
ORLANDO, FLORIDA 32810
407-291-2500

CONSULTANTS

CIVIL ENGINEER:
NV5, INC.
201 SOUTH BUMBY AVENUE
ORLANDO, FLORIDA 32803
FRANK A. PORTER, P.E.
407-896-3317
SURVEYOR:
LOCHRANE ENGINEERING, INC.
201 SOUTH BUMBY AVENUE
ORLANDO, FLORIDA 32803
CHRIS LABERG, P.E.
407-896-3317
ARCHITECT:
THE PRESTON PARTNERSHIP, LLC
115 PERIMETER CENTER PLACE, SUITE 950
ATLANTA, GEORGIA 30346
DAVID YUNG, AIA, LEED AP BD+C
770-396-7248
LANDSCAPE:
THE PRESTON PARTNERSHIP, LLC
115 PERIMETER CENTER PLACE, SUITE 950
ATLANTA, GEORGIA 30346
DAVID YUNG, AIA, LEED AP BD+C
770-396-7248
GEOTECH:
UNIVERSAL ENGINEERING SCIENCES
3532 MAGGIE BLVD.
ORLANDO, FLORIDA 32811
407-423-0504

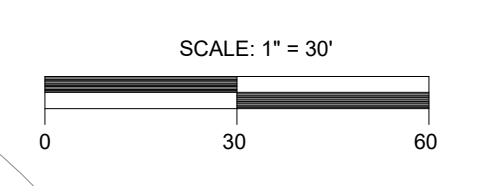
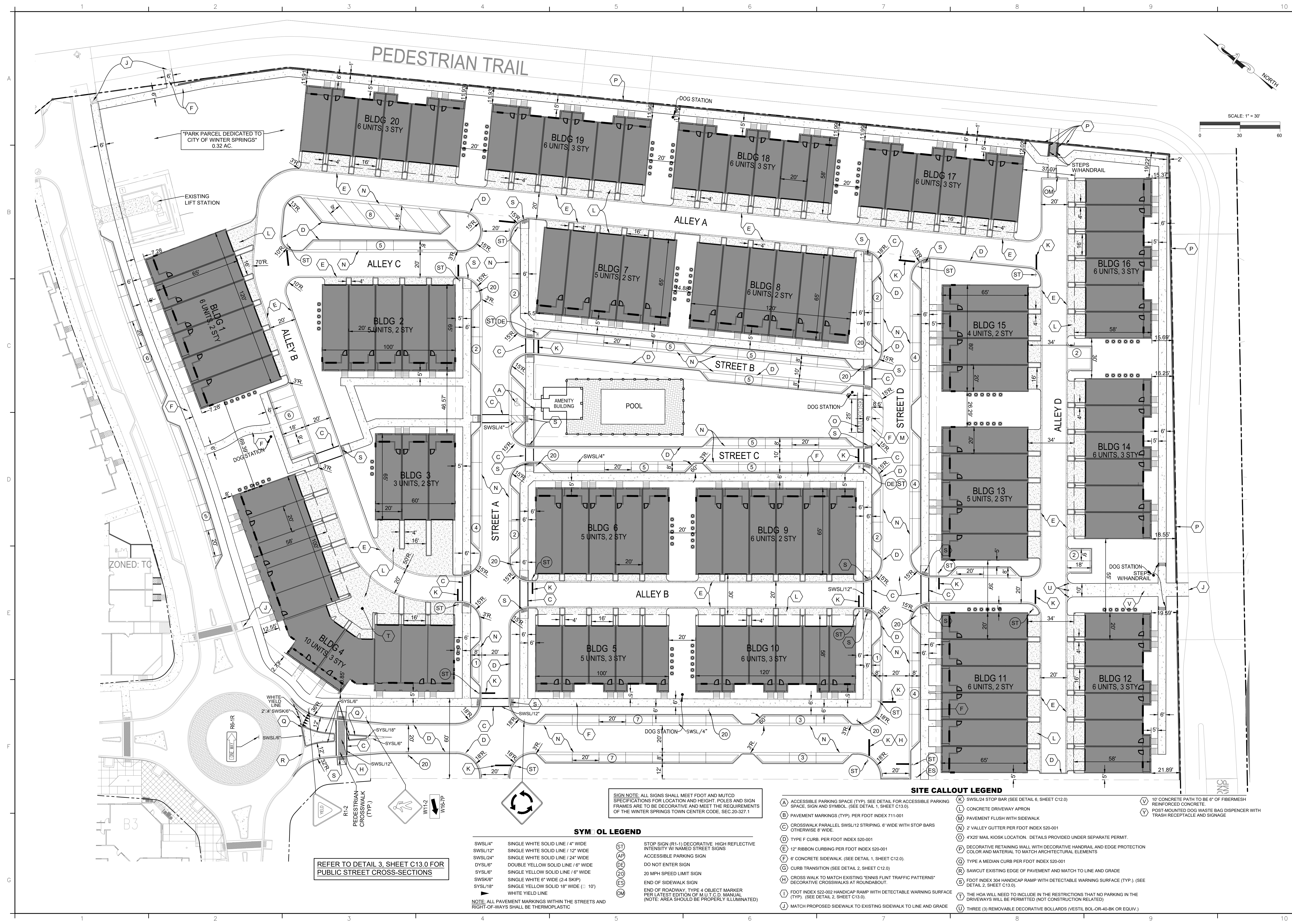
RECORD DRAWING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
	NO.	DATE	REVISIONS																			
	WINTER SPRINGS TOWNHOMES																					
	MICHAEL BLAKE BLVD. WINTER SPRINGS, FLORIDA																					

COVER SHEET

201 S. BUMBY AVE. ORLANDO, FL 32803 NV5 INC. WWW.NV5.COM

CERTIFICATE OF AUTHORIZATION # 20695

ENGINEER: FRANK A. PORTER, P.E. FL. LIC. #06932
DATE: Oct. 31, 2019
ENGINEER: GCR



JOB #: 17063.20 ENGINEER: FRANK A. PORTER, P.E. FL. LIC. #08002	PROJECT MGR.: FAP DESIGNER: RID DATE: Nov. 06, 2019 ENGINEER: GCR
RECORD DRAWING THIS RECORD DRAWING IS BASED ON THE RESULTS OF A LIMITED NUMBER OF CONSTRUCTION PERMITS FOR THE PROJECT AND DOES NOT REPRESENT THE FINAL DESIGN OR CONSTRUCTION. THE ENGINEER'S LIABILITY IS LIMITED TO THE DESIGN AND CONSTRUCTION OF THE PROJECT AS SHOWN ON THIS RECORD DRAWING. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THE INFORMATION PROVIDED TO THE CLIENT OF ANY THIRD PARTY.	NO. DATE REVISIONS
WINTER SPRINGS TOWNHOMES AT MICHAEL BLAKE BLVD. WINTER SPRINGS, FLORIDA FOR DREAM FINDERS HOMES LLC	ENGINEER: FRANK A. PORTER, P.E. FL. LIC. #08002
SITE LAYOUT PLAN	SHEET C06.0

SIGN NOTE: ALL SIGNS SHALL MEET FDOT AND MUTCD SPECIFICATIONS FOR LOCATION AND HEIGHT. POLES AND SIGN FRAMES ARE TO BE DECORATIVE AND MEET THE REQUIREMENTS OF THE WINTER SPRINGS TOWN CENTER CODE, SEC.20-327.1

SYM. OL LEGEND

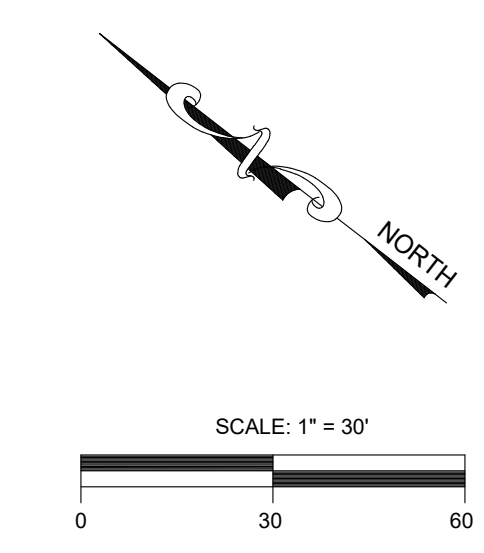
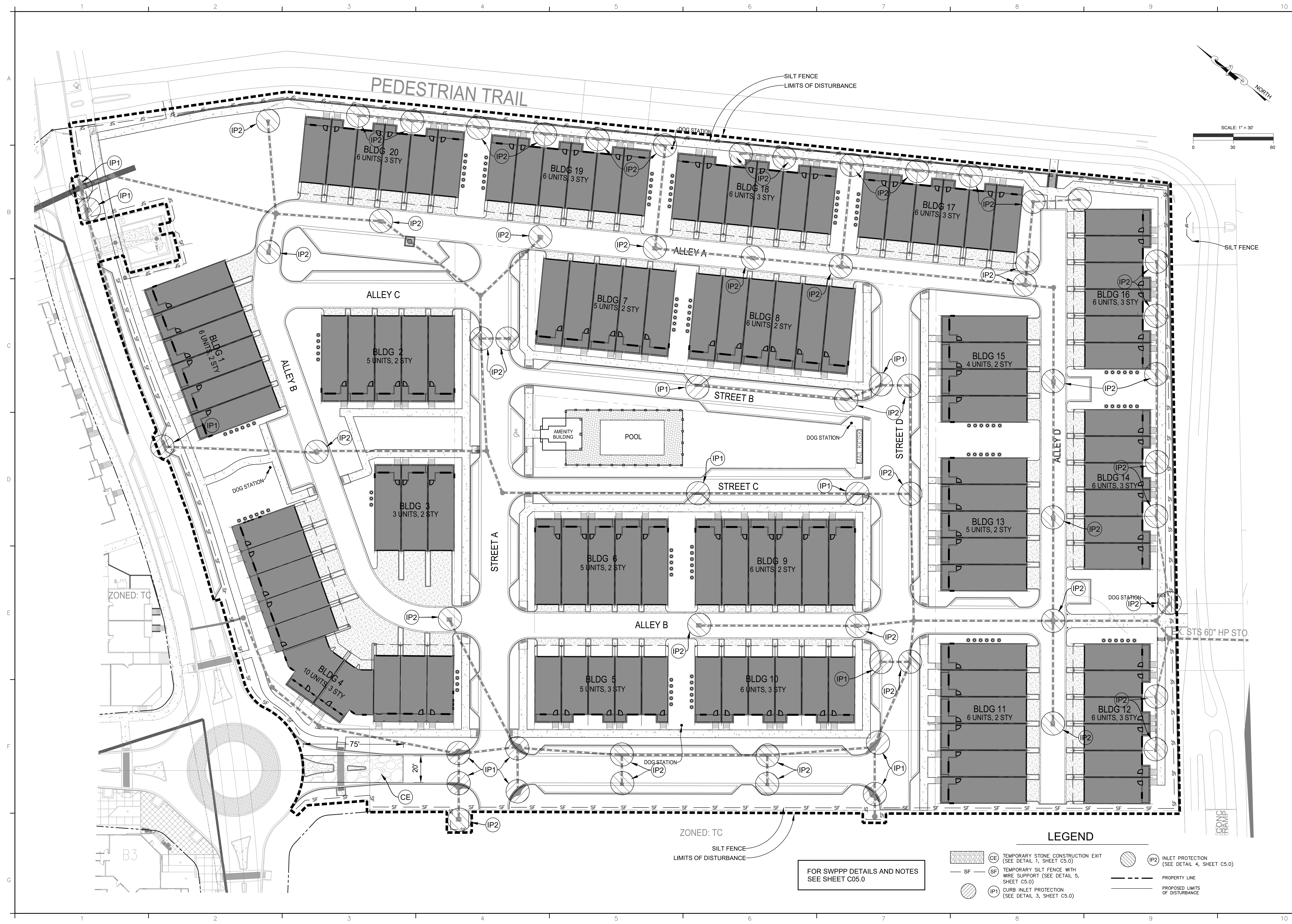
SWSL4"	SINGLE WHITE SOLID LINE / 4" WIDE	(ST)	STOP SIGN (R1-1) DECORATIVE, HIGH REFLECTIVE INTENSITY W/ NAMED STREET SIGNS
SWSL12"	SINGLE WHITE SOLID LINE / 12" WIDE	(AP)	ACCESSIBLE PARKING SIGN
SWSL24"	SINGLE WHITE SOLID LINE / 24" WIDE	(DE)	DO NOT ENTER SIGN
DYSL6"	DOUBLE YELLOW SOLID LINE / 6" WIDE	(20)	20 MPH SPEED LIMIT SIGN
SYSL6"	SINGLE YELLOW SOLID LINE / 6" WIDE	(ES)	END OF SIDEWALK SIGN
SWSK6"	SINGLE WHITE 6" WIDE (2-4 SKIP)	(OM)	END OF ROADWAY, TYPE 4 OBJECT MARKER PER LATEST EDITION OF M.U.T.C.D. MANUAL (NOTE: AREA SHOULD BE PROPERLY ILLUMINATED)
SYSL18"	SINGLE YELLOW SOLID 18" WIDE (10')		
	WHITE YIELD LINE		

NOTE: ALL PAVEMENT MARKINGS WITHIN THE STREETS AND RIGHT-OF-WAYS SHALL BE THERMOPLASTIC

SITE CALLOUT LEGEND

(A)	ACCESSIBLE PARKING SPACE (TYP.) SEE DETAIL FOR ACCESSIBLE PARKING SPACE, SIGN AND SYMBOL. (SEE DETAIL 1, SHEET C13.0)	(K)	SWSL/24 STOP BAR (SEE DETAIL 6, SHEET C12.0)
(B)	PAVEMENT MARKINGS (TYP.) PER FDOT INDEX 711-001	(L)	CONCRETE DRIVEWAY APRON
(C)	CROSSWALK PARALLEL SWSL/12 STRIPING, 6" WIDE WITH STOP BARS OTHERWISE 6" WIDE.	(M)	PAVEMENT FLUSH WITH SIDEWALK
(D)	TYPE F CURB. PER FDOT INDEX 520-001	(N)	2" VALLEY GUTTER PER FDOT INDEX 520-001
(E)	12" RIBBON CURBING PER FDOT INDEX 520-001	(O)	4"x25" MAIL KIOSK LOCATION. DETAILS PROVIDED UNDER SEPARATE PERMIT.
(F)	6" CONCRETE SIDEWALK. (SEE DETAIL 1, SHEET C12.0).	(P)	DECORATIVE RETAINING WALL WITH DECORATIVE HANDRAIL AND EDGE PROTECTION COLOR AND MATERIAL TO MATCH ARCHITECTURAL ELEMENTS
(G)	CURB TRANSITION (SEE DETAIL 2, SHEET C12.0)	(Q)	TYPE A MEDIAN CURB PER FDOT INDEX 520-001
(H)	CROSS WALK TO MATCH EXISTING "ENNIS FLINT TRAFFIC PATTERNS" DECORATIVE CROSSWALKS AT ROUNDABOUT.	(R)	SAWCUT EXISTING EDGE OF PAVEMENT AND MATCH TO LINE AND GRADE
(I)	FDOT INDEX 522-002 HANDICAP RAMP WITH DETECTABLE WARNING SURFACE (TYP.) (SEE DETAIL 2, SHEET C13.0).	(S)	FDOT INDEX 304 HANDICAP RAMP WITH DETECTABLE WARNING SURFACE (TYP.) (SEE DETAIL 2, SHEET C13.0).
(J)	MATCH PROPOSED SIDEWALK TO EXISTING SIDEWALK TO LINE AND GRADE	(T)	THE HOA WILL NEED TO INCLUDE IN THE RESTRICTIONS THAT NO PARKING IN THE DRIVEWAYS WILL BE PERMITTED (NOT CONSTRUCTION RELATED)
		(U)	THREE (3) REMOVABLE DECORATIVE BOLLARDS (VESTIBL BOL-OR-40-BK OR EQUIV.)
		(V)	10" CONCRETE PATH TO BE 6" OF FIBERMESH REINFORCED CONCRETE.
		(W)	POST-MOUNTED DOG WASTE BAG DISPENSER WITH TRASH RECEPTACLE AND SIGNAGE

REFER TO DETAIL 3, SHEET C13.0 FOR PUBLIC STREET CROSS-SECTIONS



FOR SWPPP DETAILS AND NOTES
SEE SHEET C05.0

LEGEND

	TEMPORARY SILT FENCE WITH WIRE SUPPORT (SEE DETAIL 5, SHEET C5.0)		INLET PROTECTION (SEE DETAIL 4, SHEET C5.0)
	CURB INLET PROTECTION (SEE DETAIL 3, SHEET C5.0)		PROPERTY LINE
	TEMPORARY STONE CONSTRUCTION EXIT (SEE DETAIL 1, SHEET C5.0)		PROPOSED LIMITS OF DISTURBANCE

LOCHRANE
Consulting Engineers - Surveyors
An IWS Company

241 SOUTH BUNNY AVENUE, ORLANDO, FL 32803
PH: (407) 244-5111 FAX: (407) 244-5107
WWW.LOCHRANE.COM
CERTIFICATE OF AUTHORIZATION # 00000000

PHASE 2 SWPPP PLAN

WINTER SPRINGS TOWNHOMES
AT
MICHAEL BLAKE BLVD.
WINTER SPRINGS, FLORIDA
FOR
DREAM FINDERS HOMES LLC

RECORD DRAWING
THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED SURVEYING AND FIELD VERIFICATION OF THE LIMITED NUMBER OF CONSTRUCTION PERMITS REQUIRED FOR THE PROJECT. THE ENGINEER HAS CONDUCTED VISUAL INSPECTIONS AND VISUAL VERIFICATION OF THE EXISTING CONDITIONS AND UTILITIES. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THE RECORD DRAWING. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THE RECORD DRAWING.

ENGINEER: FRANK A. PORTER, P.E.
FL LIC. #06902

DESIGNER: RID

ENGINEER: GCR

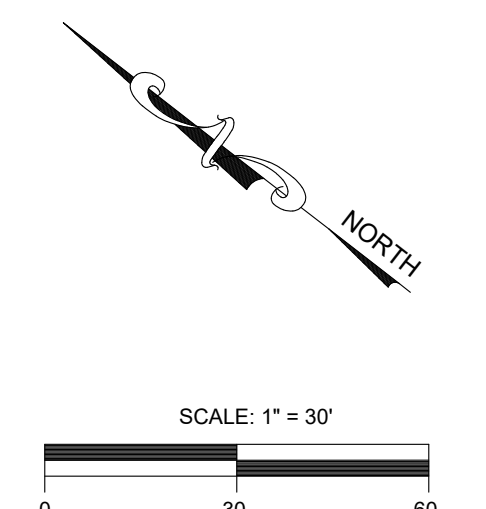
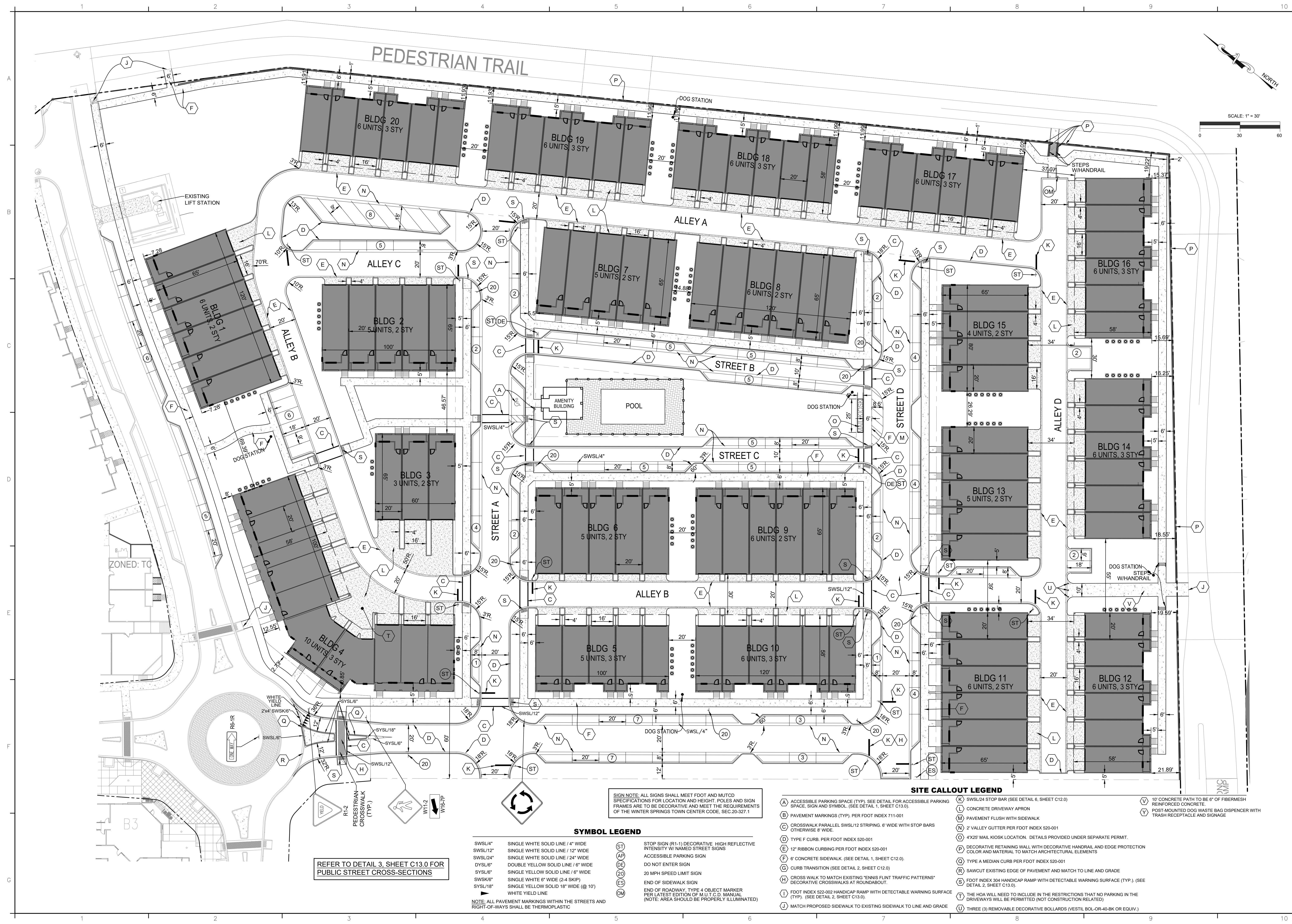
DATE: OCT. 28, 2019

NO.	DATE	REVISIONS

JOB #: 17063.20
PLI. MGR: FAP
DESIGNER: RID
ENGINEER: GCR

SHEET
C04.0

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JOB #: 17063.20
 ENGINEER: FRANK A. PORTER, P.E.
 FL LIC. #06092
 DATE: OCT. 28, 2019
 ENGINEER: GCR

NO.	DATE	REVISIONS

RECORD DRAWING
 WINTER SPRINGS TOWNHOMES
 AT
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 FOR
 DREAM FINDERS HOMES LLC

SITE LAYOUT
 PLAN

201 S. BUMBY AVE.
 ORLANDO, FL
 32835
 WWW.NV5.COM
 CERTIFICATE OF AUTHORIZATION # 20065

SHEET
 C06.0

SIGN NOTE: ALL SIGNS SHALL MEET FDOT AND MUTCD SPECIFICATIONS FOR LOCATION AND HEIGHT. POLES AND SIGN FRAMES ARE TO BE DECORATIVE AND MEET THE REQUIREMENTS OF THE WINTER SPRINGS TOWN CENTER CODE, SEC.20-327.1

SYMBOL LEGEND

SWSL4"	SINGLE WHITE SOLID LINE / 4" WIDE	(ST)	STOP SIGN (R1-1) DECORATIVE, HIGH REFLECTIVE INTENSITY W/ NAMED STREET SIGNS
SWSL12"	SINGLE WHITE SOLID LINE / 12" WIDE	(AP)	ACCESSIBLE PARKING SIGN
SWSL24"	SINGLE WHITE SOLID LINE / 24" WIDE	(DE)	DO NOT ENTER SIGN
DYSL6"	DOUBLE YELLOW SOLID LINE / 6" WIDE	(20)	20 MPH SPEED LIMIT SIGN
SYSL6"	SINGLE YELLOW SOLID LINE / 6" WIDE	(ES)	END OF SIDEWALK SIGN
SWSK6"	SINGLE WHITE 6" WIDE (2-4 SKIP)	(OM)	END OF ROADWAY, TYPE 4 OBJECT MARKER PER LATEST EDITION OF M.U.T.C.D. MANUAL (NOTE: AREA SHOULD BE PROPERLY ILLUMINATED)
SYSL18"	SINGLE YELLOW SOLID 18" WIDE (@ 10')		
WHITE YIELD LINE			

REFER TO DETAIL 3, SHEET C13.0 FOR PUBLIC STREET CROSS-SECTIONS

SITE CALLOUT LEGEND

(A)	ACCESSIBLE PARKING SPACE (TYP). SEE DETAIL FOR ACCESSIBLE PARKING SPACE, SIGN AND SYMBOL. (SEE DETAIL 1, SHEET C13.0).	(K)	SWSL/24 STOP BAR (SEE DETAIL 6, SHEET C12.0)
(B)	PAVEMENT MARKINGS (TYP). PER FDOT INDEX 711-001	(L)	CONCRETE DRIVEWAY APRON
(C)	CROSSWALK PARALLEL SWSL/12 STRIPING, 6" WIDE WITH STOP BARS OTHERWISE 6" WIDE.	(M)	PAVEMENT FLUSH WITH SIDEWALK
(D)	TYPE F CURB. PER FDOT INDEX 520-001	(N)	2" VALLEY GUTTER PER FDOT INDEX 520-001
(E)	12" RIBBON CURBING PER FDOT INDEX 520-001	(O)	4"x25" MAIL KIOSK LOCATION. DETAILS PROVIDED UNDER SEPARATE PERMIT.
(F)	6" CONCRETE SIDEWALK. (SEE DETAIL 1, SHEET C12.0).	(P)	DECORATIVE RETAINING WALL WITH DECORATIVE HANDRAIL AND EDGE PROTECTION COLOR AND MATERIAL TO MATCH ARCHITECTURAL ELEMENTS
(G)	CURB TRANSITION (SEE DETAIL 2, SHEET C12.0)	(R)	TYPE A MEDIAN CURB PER FDOT INDEX 520-001
(H)	CROSS WALK TO MATCH EXISTING "ENNIS FLINT TRAFFIC PATTERNS" DECORATIVE CROSSWALKS AT ROUNDABOUT.	(S)	SAWCUT EXISTING EDGE OF PAVEMENT AND MATCH TO LINE AND GRADE
(I)	FDOT INDEX 522-002 HANDICAP RAMP WITH DETECTABLE WARNING SURFACE (TYP.). (SEE DETAIL 2, SHEET C13.0).	(T)	FDOT INDEX 304 HANDICAP RAMP WITH DETECTABLE WARNING SURFACE (TYP.). (SEE DETAIL 2, SHEET C13.0).
(J)	MATCH PROPOSED SIDEWALK TO EXISTING SIDEWALK TO LINE AND GRADE	(U)	THE HOA WILL NEED TO INCLUDE IN THE RESTRICTIONS THAT NO PARKING IN THE DRIVEWAYS WILL BE PERMITTED (NOT CONSTRUCTION RELATED)
		(V)	10' CONCRETE PATH TO BE 6" OF FIBERMESH REINFORCED CONCRETE.
		(W)	POST-MOUNTED DOG WASTE BAG DISPENSER WITH TRASH RECEPTACLE AND SIGNAGE

NOTE: ALL PAVEMENT MARKINGS WITHIN THE STREETS AND RIGHT-OF-WAYS SHALL BE THERMOPLASTIC

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JOB #: 17063.20 ENGINEER: FRANK A. PORTER, P.E. FL. LIC. #06902	PJL. MGR.: FAP DESIGNER: RID ENGINEER: GCR
DATE: Oct. 28, 2019	REVISIONS:
RECORD DRAWING <small>THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED SURVEYING AND FIELD VERIFICATION OF THE EXISTING CONDITIONS. THE ENGINEER HAS CONDUCTED VISUAL GENERAL VERIFICATION OF THE EXISTING CONDITIONS AND HAS NOT CONDUCTED A FULL SURVEY. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THE INFORMATION PROVIDED HEREON. THE USER SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF THE INFORMATION PROVIDED HEREON.</small>	NO. DATE
WINTER SPRINGS TOWNHOMES AT MICHAEL BLAKE BLVD. WINTER SPRINGS, FLORIDA	FOR DREAM FINDERS HOMES LLC
SIGHT TRIANGLES	SHEET C06.1
201 S. BUMBY AVE. ORLANDO, FL 32835-3037 WWW.NV5.COM	CERTIFICATE OF AUTHORIZATION # 20065 NV5

SIGN NOTE: ALL SIGNS SHALL MEET FDOT AND MUTCD SPECIFICATIONS FOR LOCATION AND HEIGHT. POLES AND SIGN FRAMES ARE TO BE DECORATIVE AND MEET THE REQUIREMENTS OF THE WINTER SPRINGS TOWN CENTER CODE, SEC.20-327.1

SYMBOL LEGEND

SWSL4" SWSL12" SWSL24" DYSL6" SYSL6" SWSK6" SYSL18" SYSL6" SWSL12" WHITE YIELD LINE	SINGLE WHITE SOLID LINE / 4" WIDE SINGLE WHITE SOLID LINE / 12" WIDE SINGLE WHITE SOLID LINE / 24" WIDE DOUBLE YELLOW SOLID LINE / 6" WIDE SINGLE YELLOW SOLID LINE / 6" WIDE SINGLE WHITE 6" WIDE (2-4 SKIP) SINGLE YELLOW SOLID 18" WIDE (@ 10') WHITE YIELD LINE	(ST) STOP SIGN (R1-1) DECORATIVE, HIGH REFLECTIVE INTENSITY W/ NAMED STREET SIGNS (AP) ACCESSIBLE PARKING SIGN (DE) DO NOT ENTER SIGN (20) 20 MPH SPEED LIMIT SIGN (ES) END OF SIDEWALK SIGN (EM) END OF ROADWAY, TYPE 4 OBJECT MARKER PER LATEST EDITION OF M.U.T.C.D. MANUAL (NOTE: AREA SHOULD BE PROPERLY ILLUMINATED)
--	--	---

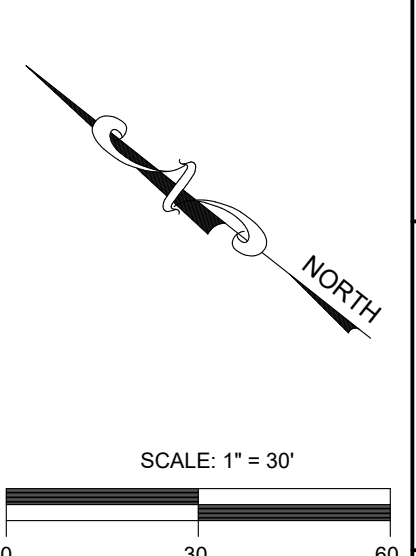
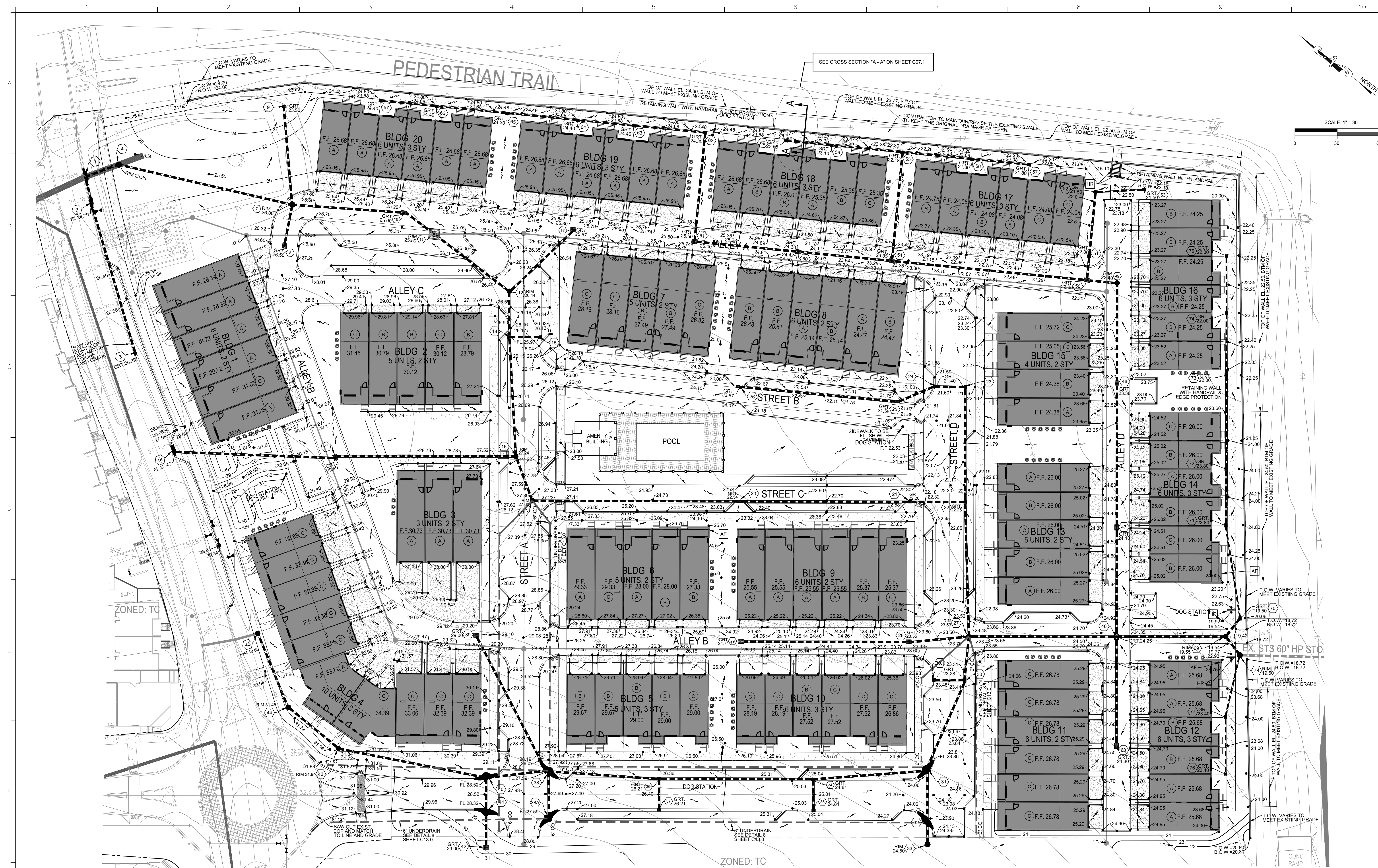
REFER TO DETAIL 3, SHEET C13.0 FOR PUBLIC STREET CROSS-SECTIONS

NOTE: ALL PAVEMENT MARKINGS WITHIN THE STREETS AND RIGHT-OF-WAYS SHALL BE THERMOPLASTIC

SITE CALLOUT LEGEND

(A) ACCESSIBLE PARKING SPACE (TYP.) SEE DETAIL FOR ACCESSIBLE PARKING SPACE, SIGN AND SYMBOL. (SEE DETAIL 1, SHEET C13.0). (B) PAVEMENT MARKINGS (TYP.) PER FDOT INDEX 711-001 (C) CROSSWALK PARALLEL SWSL12 STRIPING, 6' WIDE WITH STOP BARS OTHERWISE 6' WIDE. (D) TYPE F CURB. PER FDOT INDEX 520-001 (E) 12" RIBBON CURBING PER FOOT INDEX 520-001 (F) 6" CONCRETE SIDEWALK. (SEE DETAIL 1, SHEET C12.0). (G) CURB TRANSITION (SEE DETAIL 2, SHEET C12.0) (H) CROSS WALK TO MATCH EXISTING "ENNIS FLINT TRAFFIC PATTERNS" DECORATIVE CROSSWALKS AT ROUNDABOUT. (I) FDOT INDEX 522-002 HANDICAP RAMP WITH DETECTABLE WARNING SURFACE (TYP.). (SEE DETAIL 2, SHEET C13.0). (J) MATCH PROPOSED SIDEWALK TO EXISTING SIDEWALK TO LINE AND GRADE	(K) SWSL24 STOP BAR (SEE DETAIL 6, SHEET C12.0) (L) CONCRETE DRIVEWAY APRON (M) PAVEMENT FLUSH WITH SIDEWALK (N) 2' VALLEY GUTTER PER FOOT INDEX 520-001 (O) 4"x25" MAIL KIOSK LOCATION. DETAILS PROVIDED UNDER SEPARATE PERMIT. (P) DECORATIVE RETAINING WALL WITH DECORATIVE HANDRAIL AND EDGE PROTECTION COLOR AND MATERIAL TO MATCH ARCHITECTURAL ELEMENTS (Q) TYPE A MEDIAN CURB PER FOOT INDEX 520-001 (R) SAWCUT EXISTING EDGE OF PAVEMENT AND MATCH TO LINE AND GRADE (S) FDOT INDEX 304 HANDICAP RAMP WITH DETECTABLE WARNING SURFACE (TYP.). (SEE DETAIL 2, SHEET C13.0). (T) THE HOA WILL NEED TO INCLUDE IN THE RESTRICTIONS THAT NO PARKING IN THE DRIVEWAYS WILL BE PERMITTED (NOT CONSTRUCTION RELATED) (U) THREE (3) REMOVABLE DECORATIVE BOLLARDS (VESTIBOL-BOL-OR-40-BK OR EQUIV.)
--	--

(V) 10' CONCRETE PATH TO BE 6" OF FIBERMESH REINFORCED CONCRETE.



GEOTECHNICAL DATA:

CONTRACTOR IS RESPONSIBLE FOR OBTAINING A COPY OF THE GEOTECHNICAL REPORT BY UNIVERSAL ENGINEERING SCIENCES, UES REPORT NO. 1626718, DATED NOVEMBER 21, 2018

PLEASE REFER TO CHAPTERS:

- 9.8 FLOOR SLABS
- 11.0 SITE PREPARATION
- 12.0 DEWATERING AND EXCAVATION CONSIDERATIONS

NOTE: THE GEOTECHNICAL REPORT INCLUDES OBSERVATIONS OF ORGANIC SOILS FROM EXISTING GRADE TO 2' BELOW GRADE. ORGANIC CONTENT GREATER THAN 5% IS UNSUITABLE FOR STRUCTURE PLACEMENT AND GREATER THAN 10% IS UNSUITABLE FOR PAVEMENT PLACEMENT. REQUIRED REMOVAL OF UNSUITABLE ORGANIC SOILS AND REPLACEMENT WITH COMPACTED BACKFILL.

VERTICAL DATUM:

ALL ELEVATIONS ARE BASED ON NGVD 1929 VERTICAL DATUM

NOTES:

1. ALL SITE WORK SHOWN SHALL BE CONSTRUCTED BY GENERAL CONTRACTOR.
2. SOIL DENSITY TESTING, SUBSURFACE INVESTIGATIONS AND ALL OTHER GEOTECHNICAL ACTIVITY ONSITE SHALL BE SUPERVISED AND CERTIFIED BY A PROFESSIONAL GEOTECHNICAL ENGINEER.
3. FOR DETAILED STORM STRUCTURES SEE SHEET C13.0

SYMBOLS FOR PROPOSED IMPROVEMENTS

- STORM STRUCTURE (SEE SCHEDULE FOR STRUCTURE TYPE)
- DRAINAGE DITCH
- PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION
- PROPOSED STORM SEWER PIPING
- EXISTING STORM SEWER PIPING
- MATCH EXISTING GRADE
- SLOPE ARROW
- HR HANDRAIL AT STEPS
- 29 DRAINAGE STRUCTURE INDICATOR
- AF ALTERNATE FOUNDATION DESIGN, DEPTH 12" BELOW GRADE SHOWN (ALL OTHER FOUNDATIONS 18" BELOW FINISHED GRADE)
- PROPOSED CONTOUR
- EXISTING CONTOUR
- (1) - 4" STEP W/ 20' GARAGE SLOPED @ 2%
- (2) - 7" STEP W/ 20' GARAGE SLOPED @ 2%

FOR STORM SEWER SCHEDULE
SEE SHEET C07.1

JOB #: 17063.20
 ENGINEER: FRANK A. PORTER, P.E.
 FL LIC #06992
 DATE: OCT. 28, 2019

REVISIONS:

NO.	DATE	REVISIONS

RECORD DRAWING

WINTER SPRINGS TOWNHOMES
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 DREAM FINDERS HOMES LLC

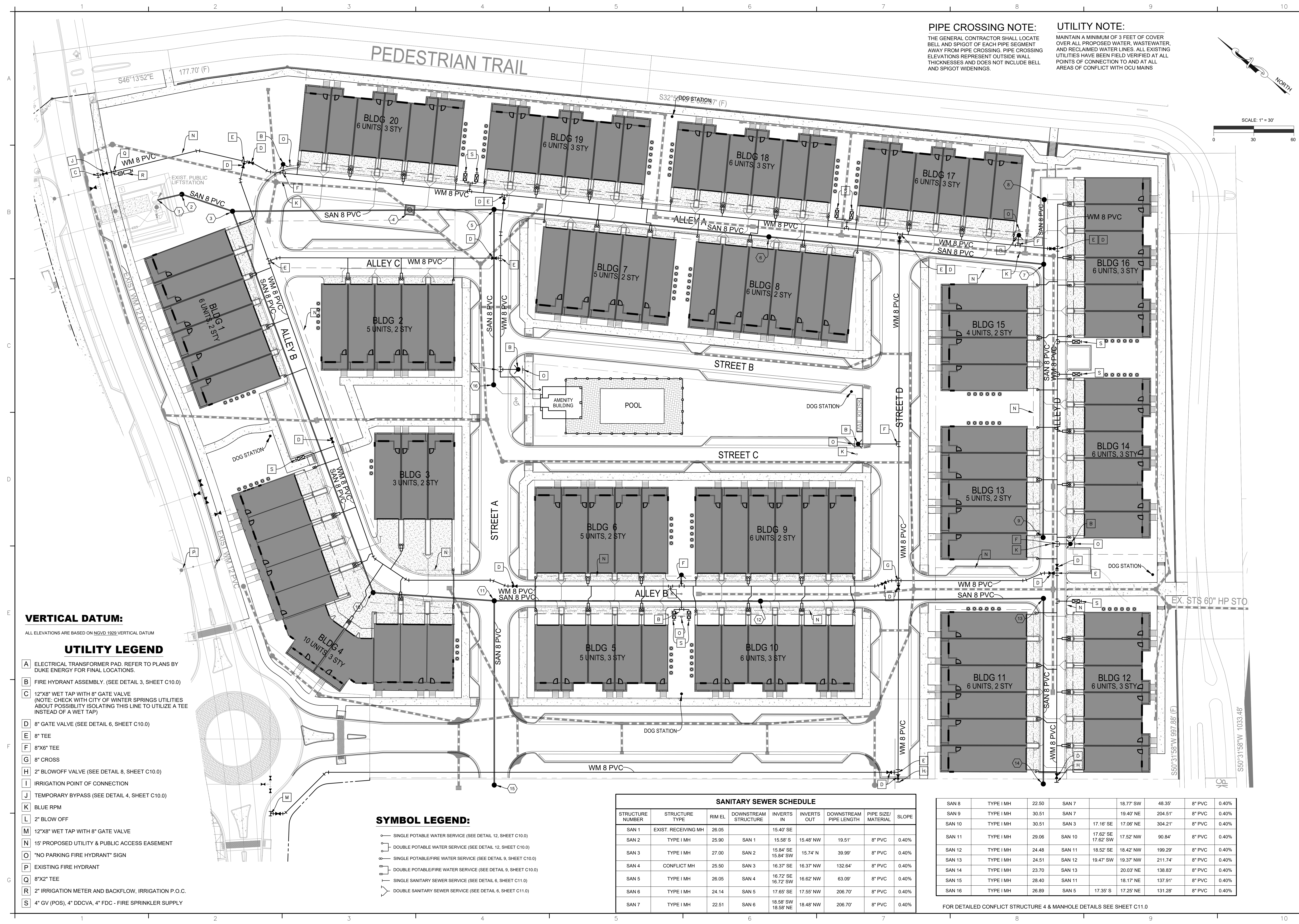
GRADING AND STORM DRAINAGE

201 S. BUMBY AVE.
 ORLANDO, FL 32805
 WWW.NV5.COM
 CERTIFICATE OF AUTHORIZATION # 20065

ENGINEER: FRANK A. PORTER, P.E.
 FL LIC #06992
 DATE: OCT. 28, 2019

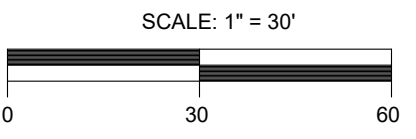
CONTRACTOR: N.V.5 CONSTRUCTION, INC.
 17063.20 C07.0 GRADING PLAN.dwg - Oct 28, 2019 - 4:24pm

SHEET C07.0



PIPE CROSSING NOTE:
 THE GENERAL CONTRACTOR SHALL LOCATE BELL AND SPIGOT OF EACH PIPE SEGMENT AWAY FROM PIPE CROSSING. PIPE CROSSING ELEVATIONS REPRESENT OUTSIDE WALL THICKNESSES AND DOES NOT INCLUDE BELL AND SPIGOT WIDENINGS.

UTILITY NOTE:
 MAINTAIN A MINIMUM OF 3 FEET OF COVER OVER ALL PROPOSED WATER, WASTEWATER, AND RECLAIMED WATER LINES. ALL EXISTING UTILITIES HAVE BEEN FIELD VERIFIED AT ALL POINTS OF CONNECTION TO AND AT ALL AREAS OF CONFLICT WITH OCU MAINS



JOB #: 17063.20
 ENGINEER: FRANK A. PORTER, P.E.
 FL LIC # 98992
 DATE: OCT. 28, 2019
 PROJECT MGR: FAP
 DESIGNER: RID
 ENGINEER: GCR

NO.	DATE	REVISIONS

RECORD DRAWING
 THIS RECORD DRAWING IS BASED ON THE RESULTS OF A LIMITED NUMBER OF CONVEYANCE PERFORMED REVISIONS PLANS AND UNLESS OTHERWISE NOTED, ALL EXISTING UTILITIES AND DIMENSIONS REPRESENTED ON THESE PLANS ARE AS SHOWN AND THE ENGINEER HAS CONDUCTED VISUAL INSPECTION TO THE BEST OF HIS KNOWLEDGE.
 ENGINEER: FRANK A. PORTER, P.E.
 FL LIC # 98992

WINTER SPRINGS TOWNHOMES
 AT
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 FOR
 DREAM FINDERS HOMES LLC

WATER AND SEWER LAYOUT

201 S. BUMBAY AVE.
 ORLANDO, FL
 32807-1863-0037
 WWW.NV5.COM
 CERTIFICATE OF AUTHORIZATION # 20065

NV5

SHEET
C08.0

- VERTICAL DATUM:**
 ALL ELEVATIONS ARE BASED ON NGVD 1929 VERTICAL DATUM
- UTILITY LEGEND**
- A ELECTRICAL TRANSFORMER PAD. REFER TO PLANS BY DUKE ENERGY FOR FINAL LOCATIONS.
 - B FIRE HYDRANT ASSEMBLY. (SEE DETAIL 3, SHEET C10.0)
 - C 12"X8" WET TAP WITH 8" GATE VALVE (NOTE: CHECK WITH CITY OF WINTER SPRINGS UTILITIES ABOUT POSSIBILITY ISOLATING THIS LINE TO UTILIZE A TEE INSTEAD OF A WET TAP)
 - D 8" GATE VALVE (SEE DETAIL 6, SHEET C10.0)
 - E 8" TEE
 - F 8"X6" TEE
 - G 8" CROSS
 - H 2" BLOWOFF VALVE (SEE DETAIL 8, SHEET C10.0)
 - I IRRIGATION POINT OF CONNECTION
 - J TEMPORARY BYPASS (SEE DETAIL 4, SHEET C10.0)
 - K BLUE RPM
 - L 2" BLOW OFF
 - M 12"X8" WET TAP WITH 8" GATE VALVE
 - N 15' PROPOSED UTILITY & PUBLIC ACCESS EASEMENT
 - O "NO PARKING FIRE HYDRANT" SIGN
 - P EXISTING FIRE HYDRANT
 - Q 8"X2" TEE
 - R 2" IRRIGATION METER AND BACKFLOW, IRRIGATION P.O.C.
 - S 4" GV (POS), 4" DDCVA, 4" FDC - FIRE SPRINKLER SUPPLY

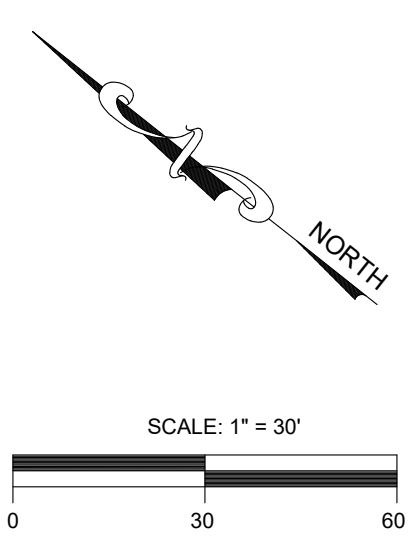
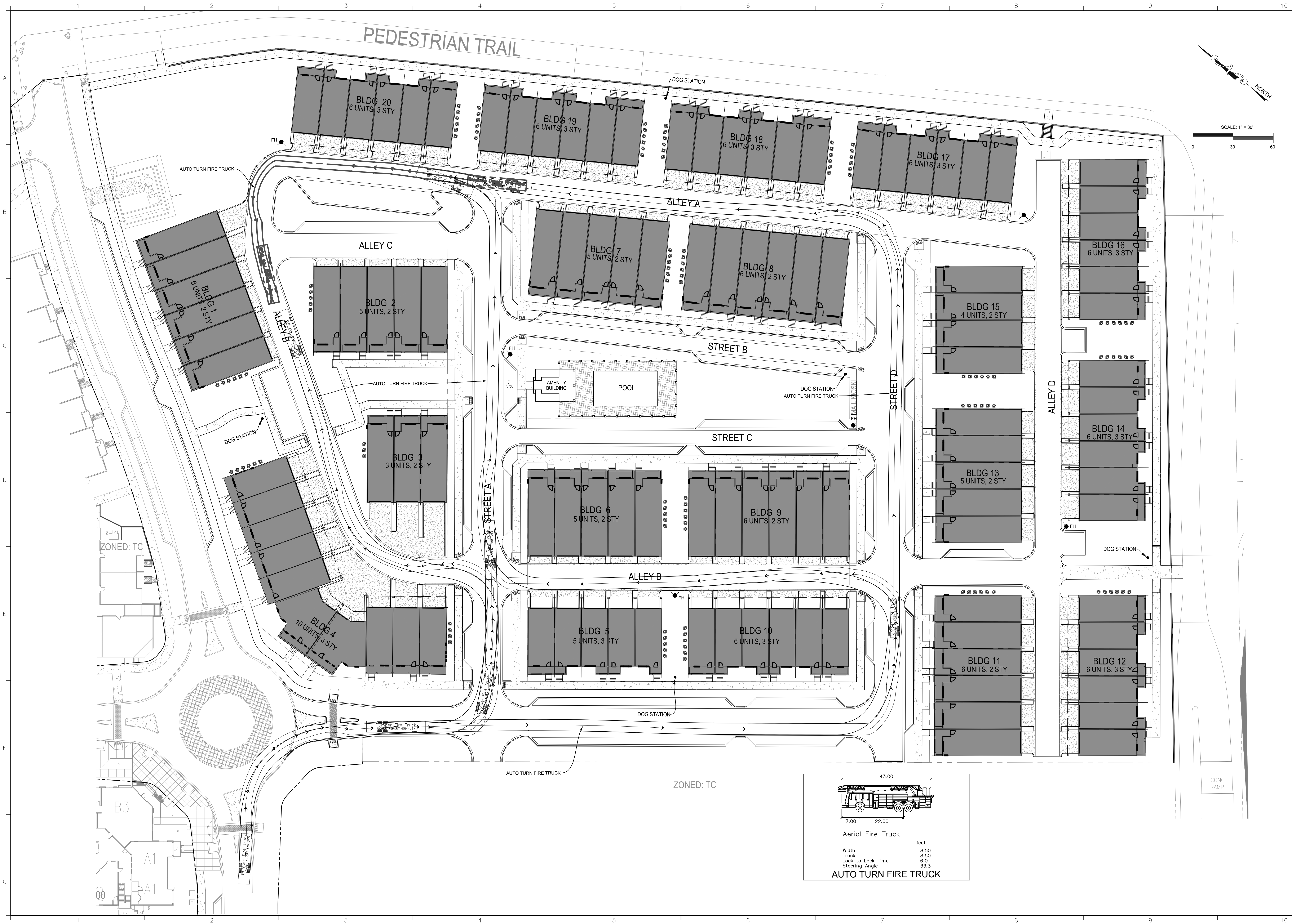
- SYMBOL LEGEND:**
- SINGLE POTABLE WATER SERVICE (SEE DETAIL 12, SHEET C10.0)
 - DOUBLE POTABLE WATER SERVICE (SEE DETAIL 12, SHEET C10.0)
 - SINGLE POTABLE/FIRE WATER SERVICE (SEE DETAIL 9, SHEET C10.0)
 - DOUBLE POTABLE/FIRE WATER SERVICE (SEE DETAIL 9, SHEET C10.0)
 - SINGLE SANITARY SEWER SERVICE (SEE DETAIL 6, SHEET C11.0)
 - DOUBLE SANITARY SEWER SERVICE (SEE DETAIL 6, SHEET C11.0)

SANITARY SEWER SCHEDULE									
STRUCTURE NUMBER	STRUCTURE TYPE	RIM EL	DOWNSTREAM STRUCTURE	INVERTS IN	INVERTS OUT	DOWNSTREAM PIPE LENGTH	PIPE SIZE/MATERIAL	SLOPE	
SAN 1	EXIST. RECEIVING MH	26.05	SAN 1	15.40' SE	15.58' S	15.48' NW	19.51'	8" PVC	0.40%
SAN 2	TYPE I MH	25.90	SAN 1	15.58' S	15.84' SE	15.74' N	39.99'	8" PVC	0.40%
SAN 3	TYPE I MH	27.00	SAN 2	15.84' SE	16.37' SE	16.37' NW	132.64'	8" PVC	0.40%
SAN 4	CONFLICT MH	25.50	SAN 3	16.37' SE	16.72' SE	16.62' NW	63.09'	8" PVC	0.40%
SAN 5	TYPE I MH	26.05	SAN 4	16.72' SE	17.65' SE	17.55' NW	206.70'	8" PVC	0.40%
SAN 6	TYPE I MH	24.14	SAN 5	17.65' SE	18.58' SW	18.48' NW	206.70'	8" PVC	0.40%
SAN 7	TYPE I MH	22.51	SAN 6	18.58' SW	18.77' SW	18.77' SW	48.35'	8" PVC	0.40%
SAN 8	TYPE I MH	22.50	SAN 7	18.77' SW	19.40' NE	204.51'	8" PVC	0.40%	
SAN 9	TYPE I MH	30.51	SAN 3	17.16' SE	17.06' NE	304.21'	8" PVC	0.40%	
SAN 10	TYPE I MH	30.51	SAN 10	17.62' SE	17.62' SW	17.52' NW	90.84'	8" PVC	0.40%
SAN 11	TYPE I MH	29.06	SAN 10	17.62' SE	18.42' NW	199.29'	8" PVC	0.40%	
SAN 12	TYPE I MH	24.48	SAN 11	18.52' SE	19.37' NW	211.74'	8" PVC	0.40%	
SAN 13	TYPE I MH	24.51	SAN 12	19.47' SW	20.03' NE	138.83'	8" PVC	0.40%	
SAN 14	TYPE I MH	23.70	SAN 13	20.03' NE	18.17' NE	137.91'	8" PVC	0.40%	
SAN 15	TYPE I MH	28.40	SAN 11	18.17' NE	17.25' NE	131.28'	8" PVC	0.40%	
SAN 16	TYPE I MH	26.89	SAN 5	17.35' S	17.25' NE	131.28'	8" PVC	0.40%	

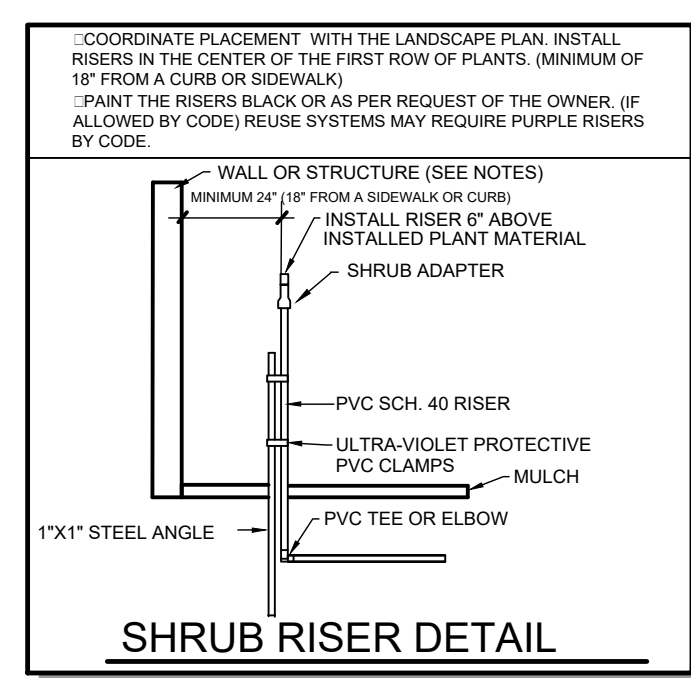
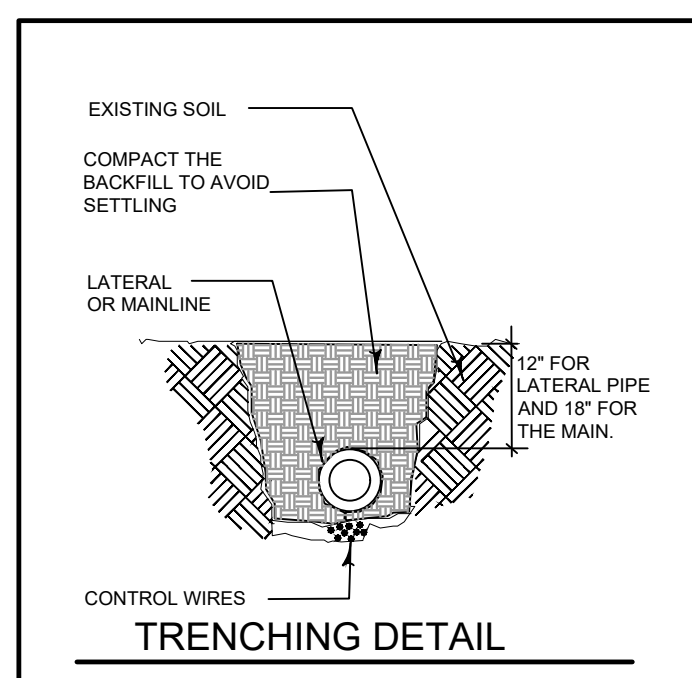
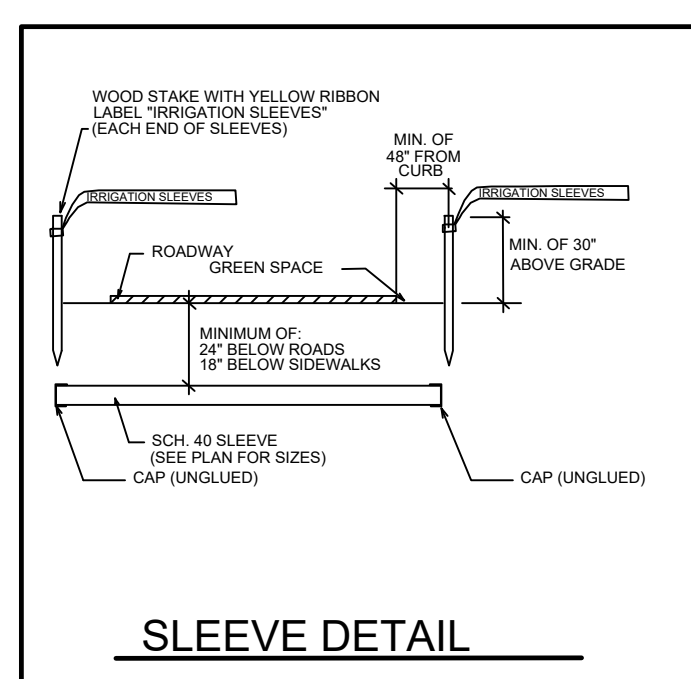
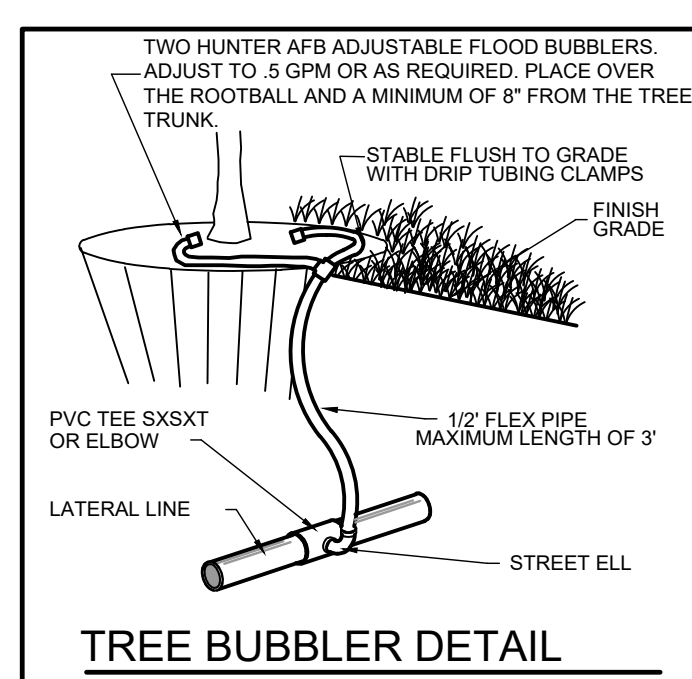
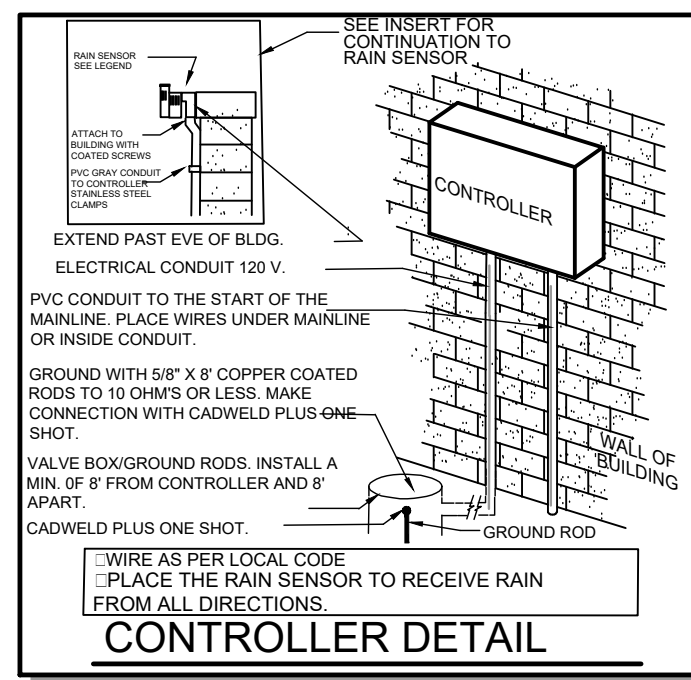
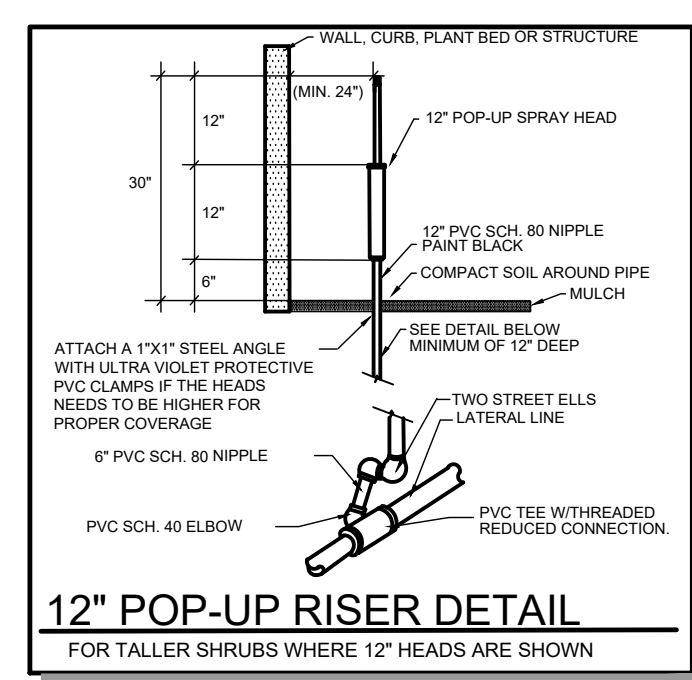
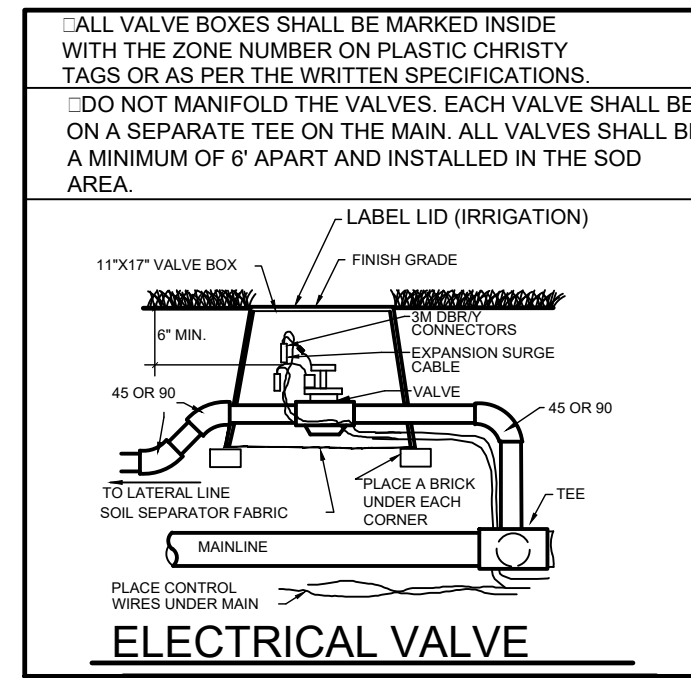
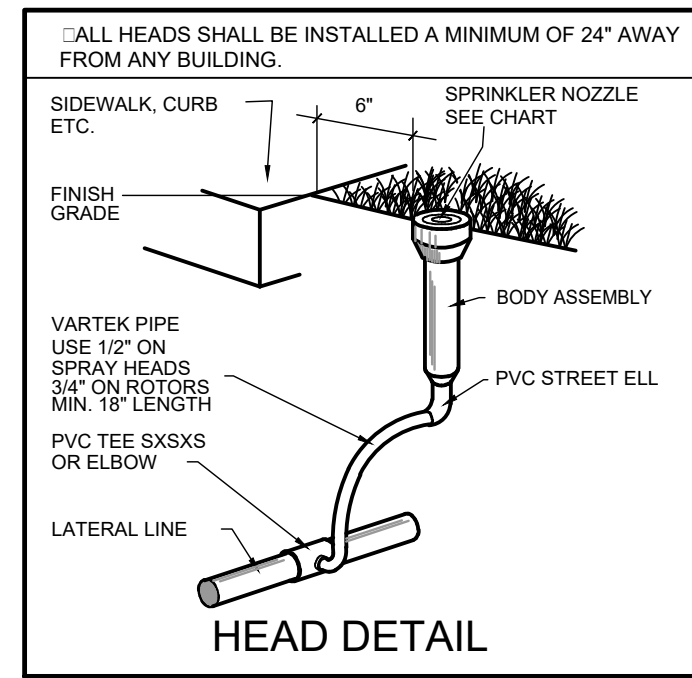
TYPE	INVERT	ELEVATION	PIPE SIZE	SLOPE
SAN 8	TYPE I MH	22.50	8" PVC	0.40%
SAN 9	TYPE I MH	30.51	8" PVC	0.40%
SAN 10	TYPE I MH	30.51	8" PVC	0.40%
SAN 11	TYPE I MH	29.06	8" PVC	0.40%
SAN 12	TYPE I MH	24.48	8" PVC	0.40%
SAN 13	TYPE I MH	24.51	8" PVC	0.40%
SAN 14	TYPE I MH	23.70	8" PVC	0.40%
SAN 15	TYPE I MH	28.40	8" PVC	0.40%
SAN 16	TYPE I MH	26.89	8" PVC	0.40%

FOR DETAILED CONFLICT STRUCTURE 4 & MANHOLE DETAILS SEE SHEET C11.0

C:\17063.20\CONSTR\17063.20_C08.0 UTILITY PLAN.dwg - Oct. 28, 2019 - 4:25pm



<p>ENGINEER FRANK A. PORTER, P.E. FL LIC #06902</p>	<p>JOB #: 17063.20 PLJ MGR: FAP DESIGNER: RID ENGINEER: GCR</p>
<p>RECORD DRAWING THIS RECORD DRAWING IS BASED ON THE CREDENTIALS OF THE LIMITED LIABILITY COMPANY OF CONTRACTORS FOR PREPARED RECORD PLANS AND ANY OTHER UTILITY RECORDING OF EXISTING UTILITIES AND IS NOT A GUARANTEE OF THE ACCURACY OF THE INFORMATION PROVIDED. THE ENGINEER DOES NOT WARRANT THE RECORDING OF THE INFORMATION PROVIDED TO THE BEST OF HIS KNOWLEDGE.</p>	<p>DATE: Oct. 28, 2019</p>
<p>WINTER SPRINGS TOWNHOMES AT MICHAEL BLAKE BLVD. WINTER SPRINGS, FLORIDA FOR DREAM FINDERS HOMES LLC</p>	<p>NO. DATE</p> <p>REVISIONS</p>
<p>FIRE TRUCK ACCESS PLAN</p>	<p>201 S. BUMBY AVE. ORLANDO, FL 32837 WWW.NV5.COM CERTIFICATE OF AUTHORIZATION # 20065</p>
<p>SHEET C09.0</p>	<p>0:\17063.20\CONSTR\17063.20_C09.0_FIRE_TRUCK_ACCESS_PLAN.dwg - Oct. 28, 2019 - 4:25pm</p>

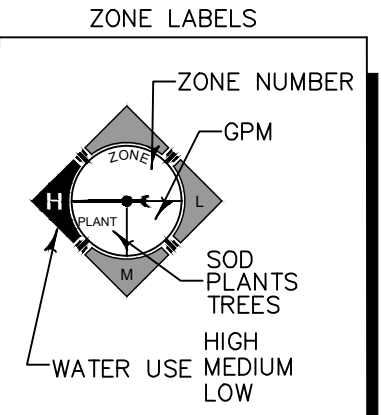


ENER NOTE

- REFER TO THE LANDSCAPE PLANS WHEN TRENCHING TO AVOID TREES AND SHRUBS. HAND DIG AROUND ANY EXISTING TREES. DO NOT CUT ANY ROOTS OVER 2" IN DIAMETER.
- ALL MAINLINE PIPING SHALL BE BURIED TO A MINIMUM DEPTH OF 18" OF COVER. ALL LATERAL PIPING SHALL BE BURIED TO A MINIMUM DEPTH OF 12" OF COVER.
- ALL POP-UP ROTORS AND SPRAYS SHALL BE INSTALLED USING AN 18" PVC FLEX PIPE CONNECTION. DO NOT USE POLYETHYLENE PIPE. USE WELDON 737 WITH A PURPLE PRIMER OR RED HOT CHRISTY'S BLUE GLUE ON ALL CONNECTIONS.
- ADJUST ALL NOZZLES TO REDUCE WATER WASTE ON HARD SURFACES, WINDOWS AND BLDG. WALLS. THROTTLE ALL VALVES ON SHRUB LINES AS REQUIRED TO PREVENT FOGGING. USE ADJUSTABLE NOZZLES WHERE REQUIRED TO AVOID ANY WATER ON BUILDING WINDOWS.
- ALL RISERS SHALL BE PAINTED BLACK OR A COLOR CHOSEN BY THE OWNER'S REPRESENTATIVE AND SHALL BE STAKED WITH A STEEL ANGLE AND SECURED WITH STAINLESS STEEL CLAMPS. LEAVE THE BOTTOM 12" OF THE PIPE PURPLE ON RECLAIMED SYSTEMS.
- ALL CONTROL WIRE CONNECTIONS SHALL BE MADE IN VALVE BOXES USING 3M DBR-Y WIRE CONNECTORS AND SEALANT WITH WIRE NUTS.
- THE CONTRACTOR SHALL PREPARE AN AS-BUILT DRAWING SHOWING ALL IRRIGATION INSTALLATION. THE CONTRACTOR SHALL NEATLY MARK IN RED INK ON A WHITE BOND PAPER COPY OF THE IRRIGATION PLAN ANY INSTALLATION THAT DEVIATES FROM THE PLAN. THE AS-BUILT DRAWING SHALL ALSO LOCATE ALL MAINLINE AND VALVES BY SHOWING EXACT MEASUREMENTS FROM HARD SURFACES. MEASUREMENTS SHALL BE MARKED ON THE PLAN EVEN WHEN THE EQUIPMENT IS INSTALLED IN THE EXACT LOCATION AS THE PLAN. PROVIDE THE OWNER A PDF OF THE AS-BUILT PLAN.
- ALL VALVES, GATE VALVES AND QUICK COUPLERS SHALL BE INSTALLED IN VALVE BOXES. THE VALVE BOXES SHALL BE PURPLE WHEN USING RECLAIMED WATER.
- ANY PIPING SHOWN OUTSIDE THE PROPERTY LINE OR RUNNING OUTSIDE A LANDSCAPE AREA IS SHOWN THERE FOR CLARITY ONLY. ALL LINES SHALL BE INSTALLED ON THE PROPERTY AND INSIDE THE LANDSCAPE AREAS OR INSIDE A SCH. 40 SLEEVE.
- ALL HEADS SHALL BE INSTALLED A MINIMUM OF 24" FROM ANY WALL AND A MINIMUM OF 6" FROM ANY SIDEWALK, PATIO OR ROAD. (MINIMUM OF 2'-0" WHERE THERE ARE NO BUMPER STOPS) THE EXACT HEIGHT OF ANY 12" POP-UP THAT IS SHOWN IN A SHRUB BED SHALL BE DETERMINED BY THE OWNER'S REPRESENTATIVE IN THE FIELD. INSTALL THE 12" POP-UP HIGHER WHERE BLOCKED BY TALL SHRUBS.
- THE CONTRACTOR SHALL EXERCISE CARE SO AS NOT TO DAMAGE ANY EXISTING UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMMEDIATE REPAIRS AND COST OF ANY DAMAGE CAUSED BY THEIR WORK.
- ALL WORK SHALL BE GUARANTEED FOR ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE AGAINST ALL DEFECTS IN EQUIPMENT AND WORKMANSHIP OR AS OUTLINED IN THE WRITTEN SPECIFICATIONS.
- ELECTRICAL SERVICE TO LOCATION OF THE CONTROLLER, WELL OR PUMP SHALL BE PROVIDED TO A JUNCTION BOX OR DISCONNECT AT THE EQUIPMENT LOCATION BY THE ELECTRICAL CONTRACTOR OR BY OWNER WHEN IT IS NOT PART OF THE BID PACKAGE. CONFIRM THE LOCATION OF THE CONTROLLER WITH THE OWNER OR GENERAL CONTRACTOR BEFORE ANY INSTALLATION.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SCALE THE PLAN AND CHECK NOZZLE TYPES TO DETERMINE THE CORRECT SPACING OF THE HEADS. THE CONTRACTOR SHALL NOT SPACE THE HEADS FURTHER APART OR USE LESS HEADS THAN SHOWN ON THE PLAN. ANY CHANGES TO THE HEAD SPACING OR LAYOUT, WITHOUT THE CONSENT OF THE LANDSCAPE ARCHITECT OR OWNER, SHALL HOLD THE IRRIGATION CONTRACTOR RESPONSIBLE FOR WARRANTY OF THE PLANTS AND OR SOD IN THESE AREAS.
- 48 HOURS BEFORE DIGGING, CALL 1-800-432-4770 (SUNSHINE STATE ONE CALL CENTER)
- INSTALL THREE EXTRA CONTROL WIRES TO EACH TERMINATION OF THE MAIN. ALL CONTROL WIRES SHALL BE INSTALLED INSIDE OF SCH. 40 GRAY PVC CONDUIT WHERE THEY CANNOT BE UNDER THE MAIN.

NOZZLE CHART

LETTER	SPEC.	COLOR	G.P.M.	40 PSI	DISTANCE	RADIUS	ZONE LABELS
A	MP2000	RED	1.47	19'	FULL	360'	
B	MP CORNER	TURQUOISE	.45	14'	CORNER	105'	
C	MP CORNER	TURQUOISE	.19	14'	CORNER	45'	
D	MP2000	BLACK	.74	19'	HALF	180'	
F	MP2000	BLACK	.40	19'	QUARTER	90'	
G	MP END STRIP	IVORY COPPER	.22	5' X 15'	END STRIP		
H	RAIN. XPCN	BLACK	.23	4.5'	HALF PATTERN		
M	MP SIDE S	BROWN	.44	5' X 30'	SIDE STRIP		
S	MP815-90	GRAY	.49-.93	8'-16'	90-180"		
V	MP3000	BLUE	.86	30'	QUARTER	90'	
W	MP3000	BLUE	1.82	30'	HALF	180'	
X	MP3000	YELLOW	2.73	30'	THREE QTR.	270'	
Y	MP3000	GRAY	3.64	30'	FULL	360'	
Z	MP2000	GREEN	1.10	19'	THREE QTR.	270'	



THE NOZZLES LISTED SHOW THE TYPE OF MP ROTATOR NOZZLE THAT SHOULD BE USED. THE CONTRACTOR SHOULD INSTALL CORRECT NOZZLE IN EACH HEAD AS SHOWN BY THE LETTER BESIDE THE HEAD ON THE PLAN. DO NOT USE MP1000 SERIES NOZZLES. THE GPM, DISTANCE AND ANGLE ON THE NOZZLE CHART ARE APPROXIMATE. THE CONTRACTOR SHALL ADJUST ALL NOZZLES TO PROVIDE THE 100% COVERAGE, BUT LIMIT OVERTHROW ON TO BUILDINGS, WALLS, PAVEMENT, ETC. THE HEADS SHALL BE SPACED AS PER THE PLAN. SCALE THE PLAN FOR DISTANCE. DO NOT ASSUME THAT ALL HEADS ARE SPACED AS PER CONVENTIONAL SPRAY HEADS. THE PRECIPITATION RATE FOR THESE NOZZLES IS LESS THAN A CONVENTIONAL SPRAY NOZZLE. FOLLOW THE ZONE CHART FOR AN APPROXIMATE RUN TIME FOR EACH ZONE, BUT SET THE RUN TIME ON THE CONTROLLER BASED ON THE SPECIFIC SITE CONDITIONS. DO NOT SUBSTITUTE WITH STANDARD NOZZLES.

RE END

Symbol	Description
●	HUNTER PRS40 SPRAY SERIES 6" POP-UP
■	HUNTER PRS40 SPRAY SERIES 12" POP-UP
▲	HUNTER PRS40 SHRUB ADAPTER ON RISER
⊙	TWO HUNTER AFB ADJUSTABLE FLOOD BUBBLERS PER TREE.
⊕	HUNTER PGP ULTRA ROTOR HEAD - 6 GPM
⊖	HUNTER PGP ULTRA ROTOR HEAD - 3 GPM
---	CLASS 200 PURPLE PVC MAINLINE-2 1/2"
---	CLASS 200 PVC PURPLE LATERAL LINE- SIZE AS SHOWN UNTIL A SMALLER SIZE IS SHOWN. MINIMUM SIZE OF 3/4" (EXCEPT RISERS AND FLEX PIPE) NOT ALL PIPE SIZES ARE SHOWN ON THE PLANS. SIZE PIPE TO KEEP VELOCITY UNDER 5' PER SECOND.
---	SCH. 40 SLEEVE (MINIMUM OF 24" DEPTH AND 2 SIZES LARGER THAN THE PIPE SIZE OR AS LABELED ON THE PLAN) NOT ALL SLEEVES ARE MARKED OR LABELED. SLEEVE UNDER ALL PAVEMENT, WALKS, ETC.
⊕	HUNTER ICV ELECTRIC VALVE. SIZE AS SHOWN BELOW. INSTALL VALVE IN A 11"X17" PURPLE VALVE BOX AND COVER 0-25 GPM=1" 26-50 GPM=1 1/2" 51 AND HIGHER GPM=2"
⊙	CONTROLLER- HUNTER ICC2. WHERE SHOWN ON THE PLAN. INSTALL WITH A HUNTER WIRELESS MINI-CLIK RAIN SENSOR. GROUND WITH A MINIMUM 8' COPPER CLAD ROD. SLEEVE TO AS REQUIRED.
⊕	POINT OF CONNECTION TO A 2" POTABLE WATER METER. REFER TO THE UTILITY PLAN FOR THE EXACT LOCATION AND DETAILS.

RECLAIMED WATER REPAIRMENT

- ALL PIPE SHALL BE THE PURPLE RECLAIMED WATER TYPE.
- ALL SPRINKLER HEADS SHALL HAVE PURPLE INDICATORS.
- ALL MANUAL AND ELECTRIC VALVES SHALL HAVE TAGS TO INDICATE RECLAIMED WATER.
- ALL VALVE BOXES SHALL BE PURPLE WITH PURPLE LIDS TO INDICATE THE PRESENCE OF RECLAIMED WATER.
- ALL EQUIPMENT SHALL BE INSTALLED AS PER ALL LOCAL, COUNTY, STATE, AND FEDERAL CODES. PROVIDE AND INSTALL ALL REQUIRED RECLAIMED WATER SIGNS. COORDINATE PLACEMENT AND TYPE WITH THE RECLAIMED WATER PROVIDER.
- ALL CROSSINGS OF IRRIGATION PIPING AND POTABLE WATER LINES SHALL HAVE THE VERTICAL CLEARANCE VISUALLY VERIFIED AND THIS VERIFICATION MUST BE SHOWN ON THE AS-BUILT DRAWINGS BY DOCUMENTING THE VERTICAL MEASUREMENT SEPARATING THE PIPES.
- THE VERTICAL SEPARATION BETWEEN THE POTABLE AND RECLAIMED WATER LINES SHALL BE A MINIMUM OF 18". THIS SEPARATION SHALL BE VERIFIED AND DOCUMENTED IN A SET OF AS-BUILT DRAWINGS AS PER SPECIFICATIONS. THE HORIZONTAL SEPARATION SHALL BE 5' CENTER TO CENTER AND 3' OUTSIDE TO OUTSIDE IF VERTICAL MINIMUM OF 18" IS NOT MET. REFER TO THE SPECIFIC CODE IF THESE SEPARATIONS CAN NOT BE MET.

ENGINEER: FRANK A. PORTER, P.E. FL. LIC. #89092
 DESIGNER: LWS
 ENGINEER: JBL
 DATE: Oct. 30, 2019

RECORD DRAWING
 THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED REVIEW OF CONTRACT FOR RECLAIMED WATER PLANS. A REVIEW OF THE RECLAIMED WATER PLANS AND THE RECLAIMED WATER SYSTEM SHALL BE CONDUCTED BY THE ENGINEER BEFORE THE RECLAIMED WATER SYSTEM IS INSTALLED. THE ENGINEER'S REVIEW IS LIMITED TO THE RECLAIMED WATER SYSTEM AND DOES NOT EXTEND TO THE REST OF THE PROJECT.

WINTER SPRINGS TOWNHOMES
 AT
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 FOR
 DREAM FINDERS HOMES LLC

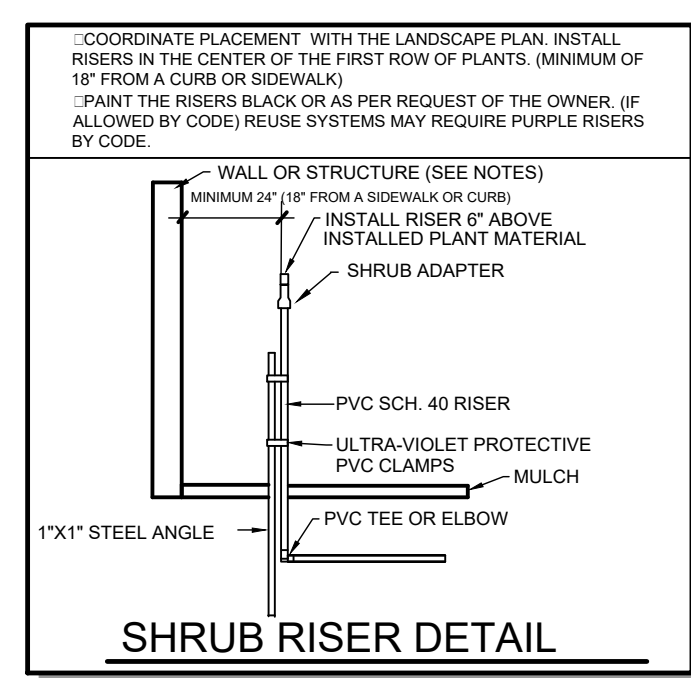
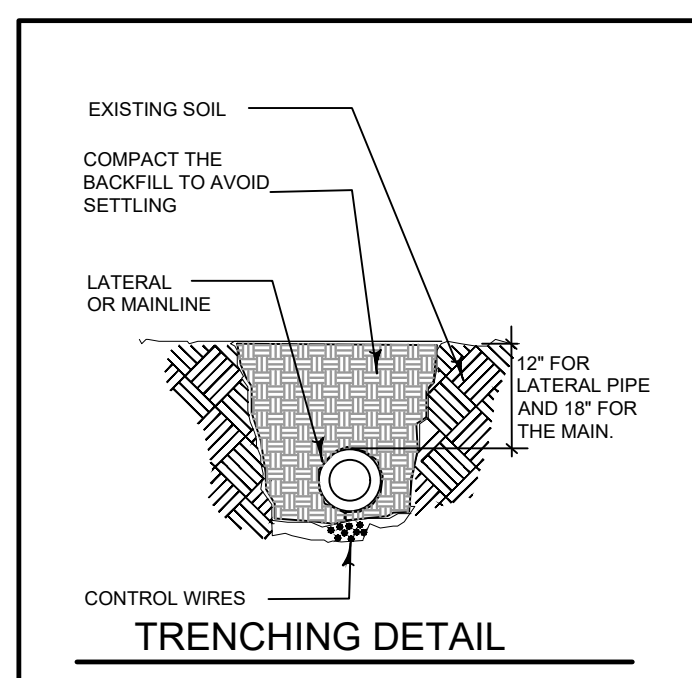
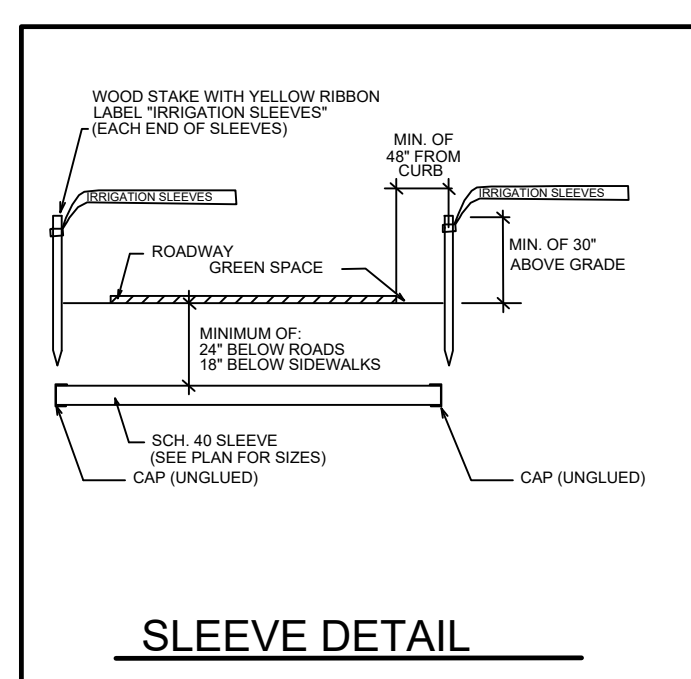
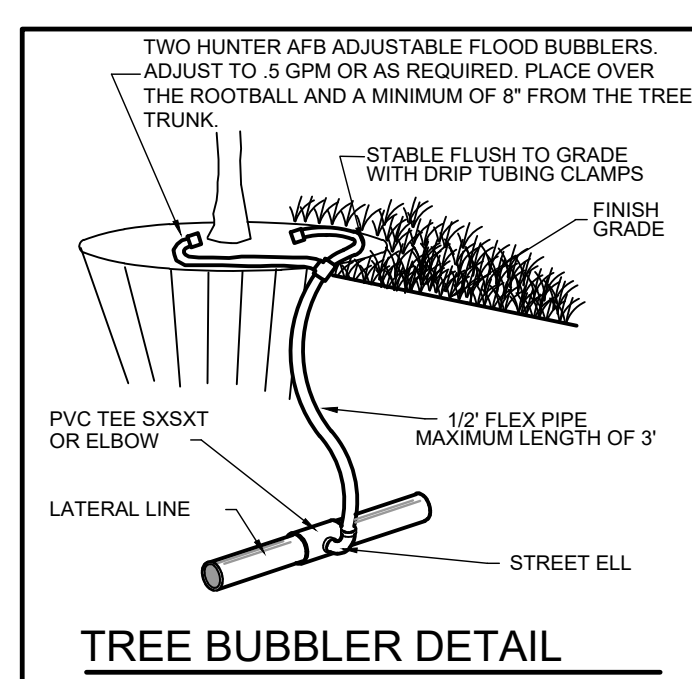
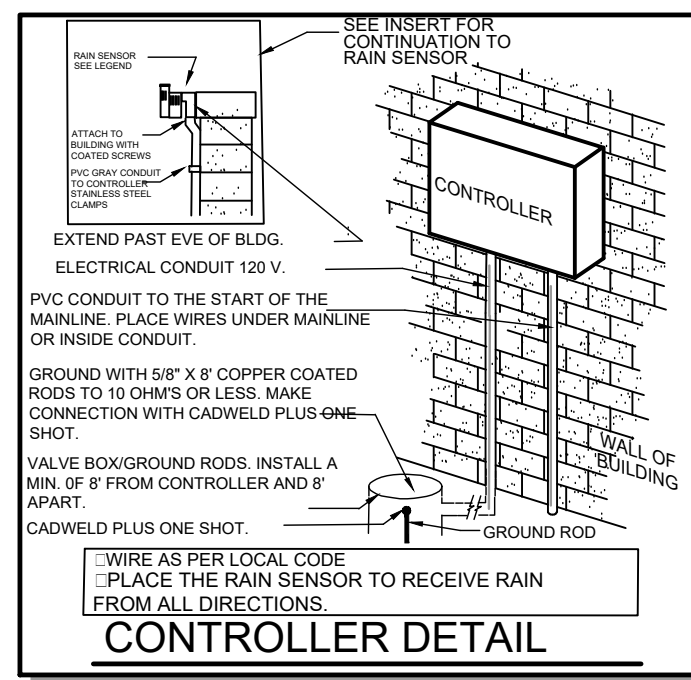
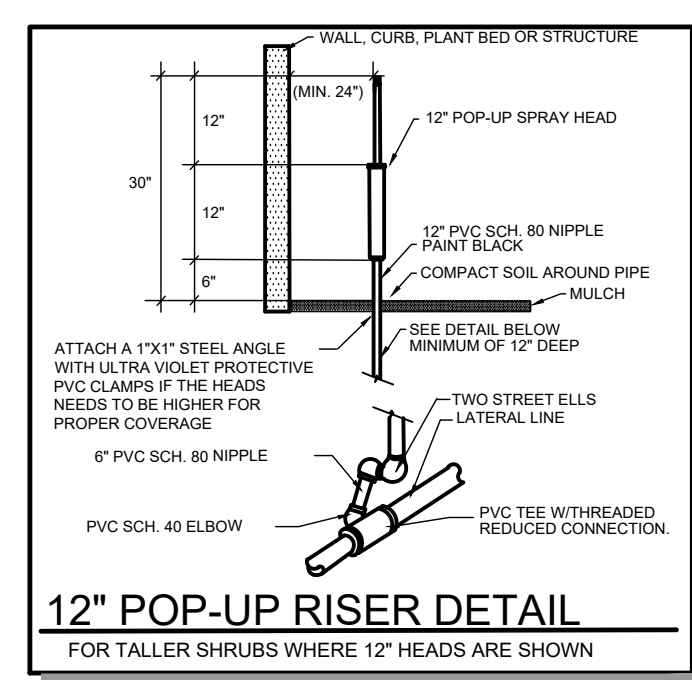
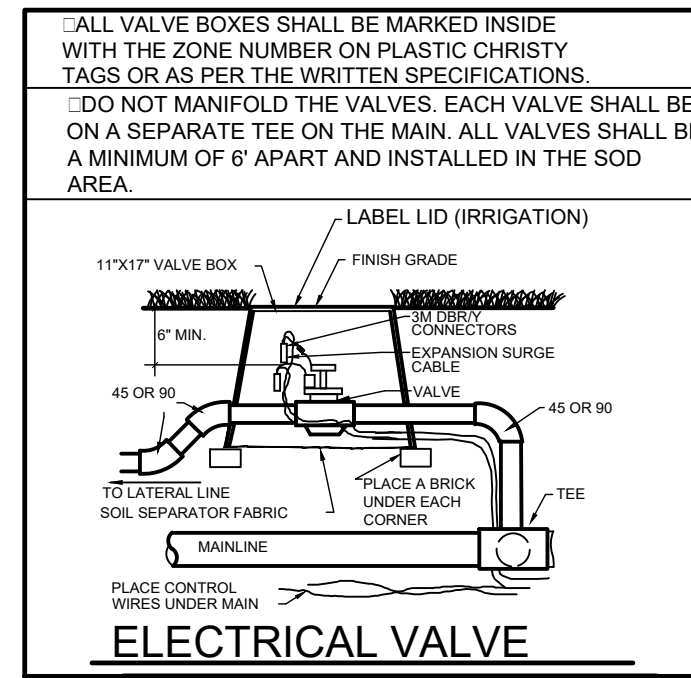
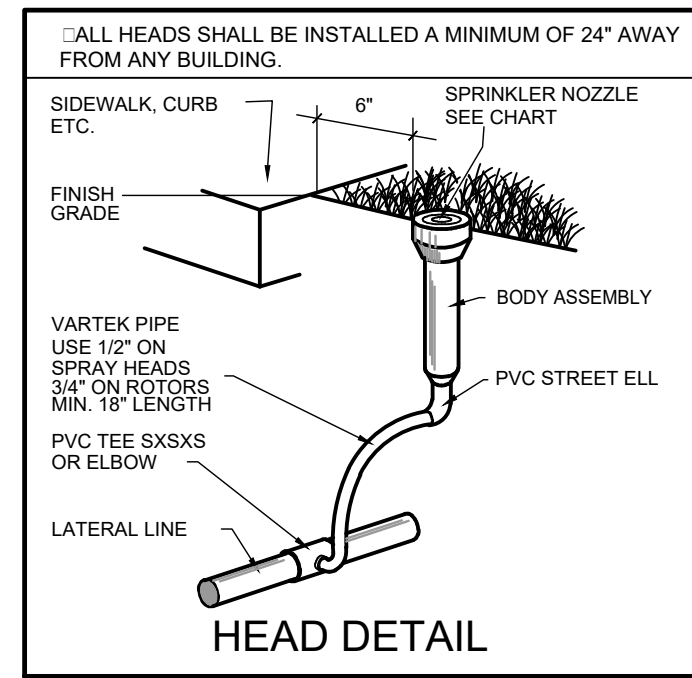
IRRIGATION DETAILS

LOCHRANE
 Consulting Engineers - Surveyors
 An NWS Company
 385 SOUTH HAWY AVENUE (ORLANDO, FL 32835)
 PH: 407-884-3377 FAX: 407-884-8787
 www.lochrane.com

J. SCOTT LIBERTY, LANDSCAPE ARCHITECT LLC
 FLORIDA REGISTRATION NO. LA20021416
 5621 REVELWOOD LOOP WINTER PARK, FL 32792
 PHONE: 407-119-2124 FAX: 407-611-6304

IRIGATION DESIGN
 LANDSCAPE ARCHITECTURE
 1000 W. STATE ST. SUITE 100
 WINTER PARK, FL 32792

SHEET
 L102.0

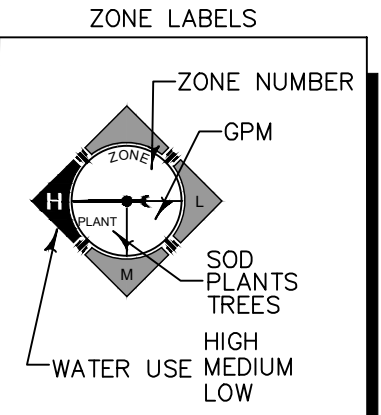


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NOZZLE CHART

LETTER	SPEC.	COLOR	G.P.M.	40 PSI	DISTANCE	RADIUS	ZONE LABELS
A	MP2000	RED	1.47	19'	FULL	360'	
B	MP CORNER	TURQUOISE	.45	14'	CORNER	105'	
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F	MP2000	BLACK	.40	19'	QUARTER	90'	
G	MP END STRIP	IVORY COPPER	.22	5' X 15'	END STRIP		
H	RAIN. XPCN	BLACK	.23	4.5'	HALF PATTERN		
M	MP SIDE S	BROWN	.44	5' X 30'	SIDE STRIP		
S	MP815-90	GRAY	.49-.93	8'-16'	90-180°		
V	MP3000	BLUE	.86	30'	QUARTER	90°	
W	MP3000	BLUE	1.82	30'	HALF	180°	
X	MP3000	YELLOW	2.73	30'	THREE QTR.	270°	
Y	MP3000	GRAY	3.64	30'	FULL	360°	
Z	MP2000	GREEN	1.10	19'	THREE QTR.	270°	



THE NOZZLES LISTED SHOW THE TYPE OF MP ROTATOR NOZZLE THAT SHOULD BE USED. THE CONTRACTOR SHOULD INSTALL CORRECT NOZZLE IN EACH HEAD AS SHOWN BY THE LETTER BESIDE THE HEAD ON THE PLAN. DO NOT USE MP1000 SERIES NOZZLES. THE GPM, DISTANCE AND ANGLE ON THE NOZZLE CHART ARE APPROXIMATE. THE CONTRACTOR SHALL ADJUST ALL NOZZLES TO PROVIDE THE 100% COVERAGE, BUT LIMIT OVERTHROW ON TO BUILDINGS, WALLS, PAVEMENT, ETC. THE HEADS SHALL BE SPACED AS PER THE PLAN. SCALE THE PLAN FOR DISTANCE. DO NOT ASSUME THAT ALL HEADS ARE SPACED AS PER CONVENTIONAL SPRAY HEADS. THE PRECIPITATION RATE FOR THESE NOZZLES IS LESS THAN A CONVENTIONAL SPRAY NOZZLE. FOLLOW THE ZONE CHART FOR AN APPROXIMATE RUN TIME FOR EACH ZONE, BUT SET THE RUN TIME ON THE CONTROLLER BASED ON THE SPECIFIC SITE CONDITIONS. DO NOT SUBSTITUTE WITH STANDARD NOZZLES.

RE END

Symbol	Description
●	HUNTER PRS40 SPRAY SERIES 6" POP-UP
■	HUNTER PRS40 SPRAY SERIES 12" POP-UP
▲	HUNTER PRS40 SHRUB ADAPTER ON RISER
⊙	TWO HUNTER AFB ADJUSTABLE FLOOD BUBBLERS PER TREE.
---	CLASS 200 PURPLE PVC MAINLINE-2 1/2"
---	CLASS 200 PVC PURPLE LATERAL LINE- SIZE AS SHOWN UNTIL A SMALLER SIZE IS SHOWN. MINIMUM SIZE OF 3/4" (EXCEPT RISERS AND FLEX PIPE)
---	SCH. 40 SLEEVE (MINIMUM OF 24" DEPTH AND 2 SIZES LARGER THAN THE PIPE SIZE OR AS LABELED ON THE PLAN) ALL PIPES UNDER PAVEMENT SHALL BE SLEEVED. ALL SLEEVES ARE NOT MARKED AND LABELED.
⊙	HUNTER ICV ELECTRIC VALVE. SIZE AS SHOWN BELOW. INSTALL VALVE IN A 11"x17" PURPLE VALVE BOX AND COVER 0-25 GPM=1" 26-50 GPM=1 1/2" 51 AND HIGHER GPM=2"
⊙	CONTROLLER- HUNTER ICC2. WHERE SHOWN ON THE PLAN. INSTALL WITH A HUNTER WIRELESS MINI-CLIK RAIN SENSOR. GROUND WITH A MINIMUM 8' COPPER CLAD ROD. SLEEVE TO AS REQUIRED.
⊙	POINT OF CONNECTION TO A 2" POTABLE WATER METER AND BACKFLOW PREVENTER. REFER TO THE UTILITY PLAN FOR THE EXACT LOCATION AND DETAILS.

RECLAIMED WATER REPAIRMENT

- ALL PIPE SHALL BE THE PURPLE RECLAIMED WATER TYPE.
- ALL SPRINKLER HEADS SHALL HAVE PURPLE INDICATORS.
- ALL MANUAL AND ELECTRIC VALVES SHALL HAVE TAGS TO INDICATE RECLAIMED WATER.
- ALL VALVE BOXES SHALL BE PURPLE WITH PURPLE LIDS TO INDICATE THE PRESENCE OF RECLAIMED WATER.
- ALL EQUIPMENT SHALL BE INSTALLED AS PER ALL LOCAL, COUNTY, STATE, AND FEDERAL CODES. PROVIDE AND INSTALL ALL REQUIRED RECLAIMED WATER SIGNS. COORDINATE PLACEMENT AND TYPE WITH THE RECLAIMED WATER PROVIDER.
- ALL CROSSINGS OF IRRIGATION PIPING AND POTABLE WATER LINES SHALL HAVE THE VERTICAL CLEARANCE VERTICALLY VERIFIED AND THIS VERIFICATION MUST BE SHOWN ON THE AS-BUILT DRAWINGS BY DOCUMENTING THE VERTICAL MEASUREMENT SEPARATING THE PIPES.
- THE VERTICAL SEPARATION BETWEEN THE POTABLE AND RECLAIMED WATER LINES SHALL BE A MINIMUM OF 18". THIS SEPARATION SHALL BE VERIFIED AND DOCUMENTED IN A SET OF AS-BUILT DRAWINGS AS PER SPECIFICATIONS. THE HORIZONTAL SEPARATION SHALL BE 5' CENTER TO CENTER AND 3' OUTSIDE TO OUTSIDE IF VERTICAL MINIMUM OF 18" IS NOT MET. REFER TO THE SPECIFIC CODE IF THESE SEPARATIONS CAN NOT BE MET.

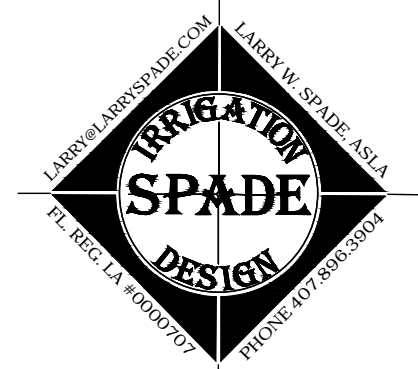
JOB #: 17063.20
ENGINEER: FRANK A. PORTER, P.E., FL LIC. #89092
PRJ. MGR: FAP
DESIGNER: LWS
ENGINEER: JBL
DATE: Mar. 11, 2019

NO.	DATE	REVISIONS
3	3-8-19	PRR REVISED SITE PLAN
2	1-16-19	PRR REVISED SITE PLAN

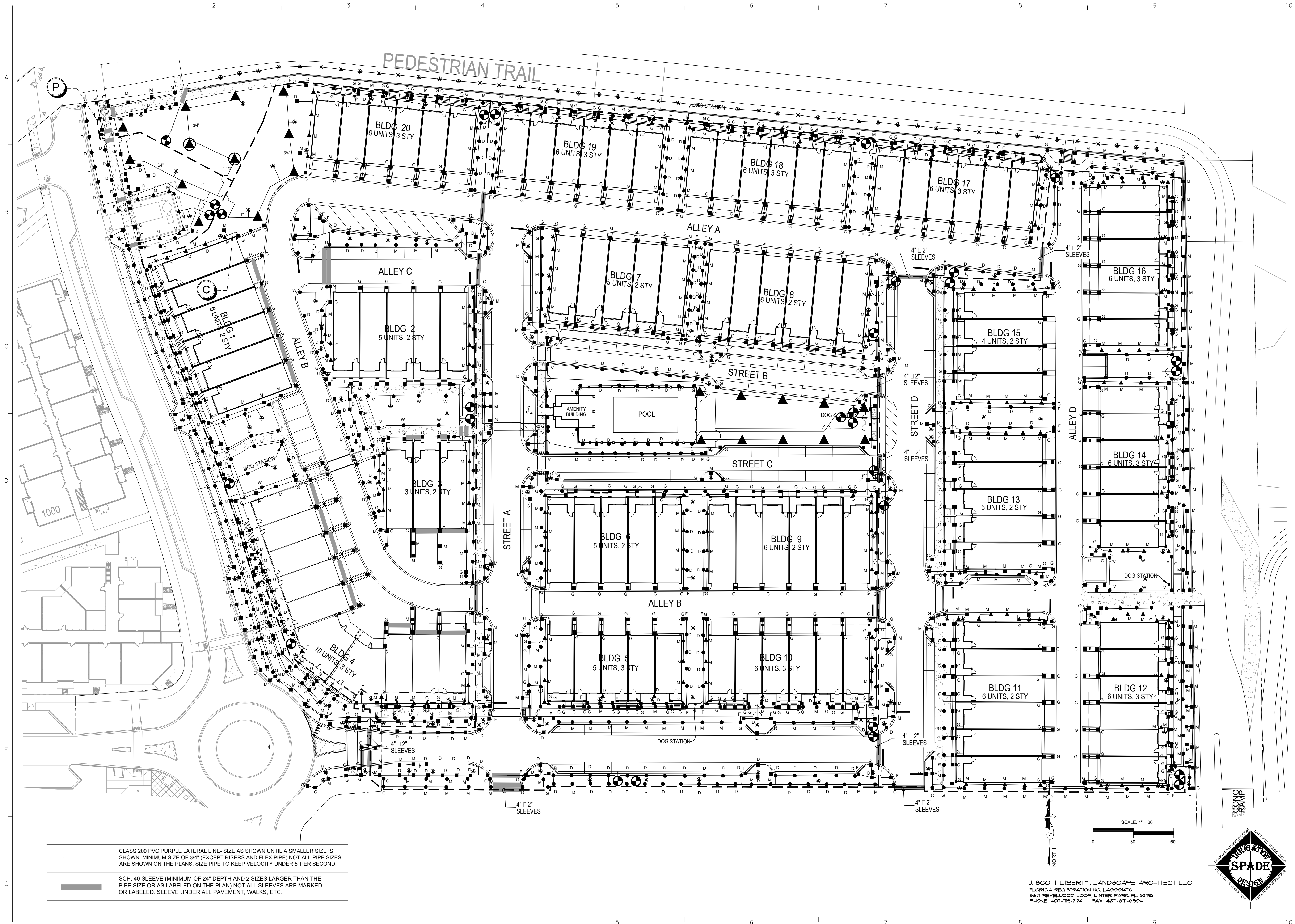
RECORD DRAWING
THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED REVIEW OF CONTRACT DOCUMENTS AND RECLAIMED WATER PLAN AND UTILITIES. THE CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES AND PROVIDE THE RECORD DRAWING WITHIN THE SPECIFIED TIME FRAME. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE RECORD DRAWING. REFER TO THE REST OF DRAWING KNOWLEDGE.
ENGINEER: FRANK A. PORTER, P.E., FL LIC. #89092

WINTER SPRINGS TOWNHOMES
AT
MICHAEL BLAKE BLVD.
WINTER SPRINGS, FLORIDA
FOR
DREAM FINDERS HOMES LLC

IRRIIGATION DETAILS
385 SOUTH BABY AVENUE (ORLANDO, FL 32835)
PH: 407-866-2377 | FAX: 407-866-2377
www.lochrane.com
CERTIFICATE OF PROFESSIONAL ENGINEERING
LOCHRANE
Consulting Engineers - Surveyors
An NWS Company
SHEET
L102.0

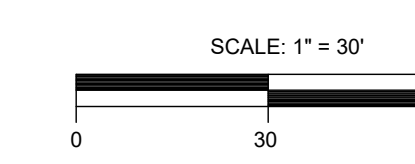


J. SCOTT LIBERTY, LANDSCAPE ARCHITECT LLC
FLORIDA REGISTRATION NO. LA20021416
5621 REVELWOOD LOOP WINTER PARK, FL 32792
PHONE: 407-119-2124 FAX: 407-611-6304

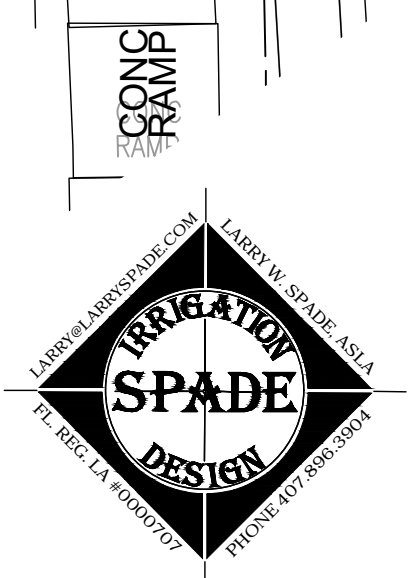


CLASS 200 PVC PURPLE LATERAL LINE - SIZE AS SHOWN UNTIL A SMALLER SIZE IS SHOWN. MINIMUM SIZE OF 3/4" (EXCEPT RISERS AND FLEX PIPE) NOT ALL PIPE SIZES ARE SHOWN ON THE PLANS. SIZE PIPE TO KEEP VELOCITY UNDER 5' PER SECOND.

SCH. 40 SLEEVE (MINIMUM OF 24" DEPTH AND 2 SIZES LARGER THAN THE PIPE SIZE OR AS LABELED ON THE PLAN) NOT ALL SLEEVES ARE MARKED OR LABELED. SLEEVE UNDER ALL PAVEMENT, WALKS, ETC.



J. SCOTT LIBERTY, LANDSCAPE ARCHITECT LLC
 FLORIDA REGISTRATION NO. LA20021416
 5621 REVELWOOD LOOP WINTER PARK, FL 32782
 PHONE: 407-119-2124 FAX: 407-611-6304



LOCHRANE
 Consulting Engineers - Surveyors
 An AWS Company

385 SOUTH RUBY AVENUE ORLANDO, FL 32803
 PH: 407-966-3377 FAX: 407-966-3377
 www.lochrane.com
 CERTIFICATE OF PROFESSIONAL ENGINEERS

IRRIGATION PLAN

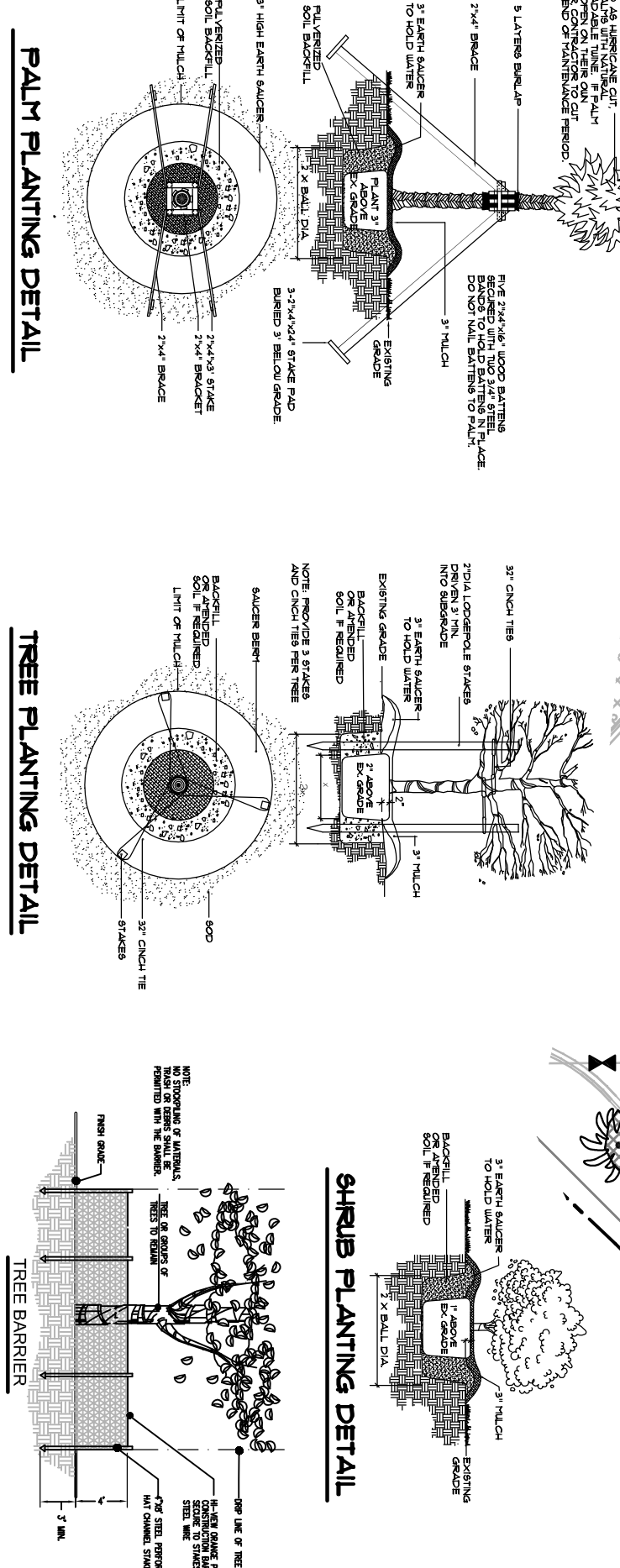
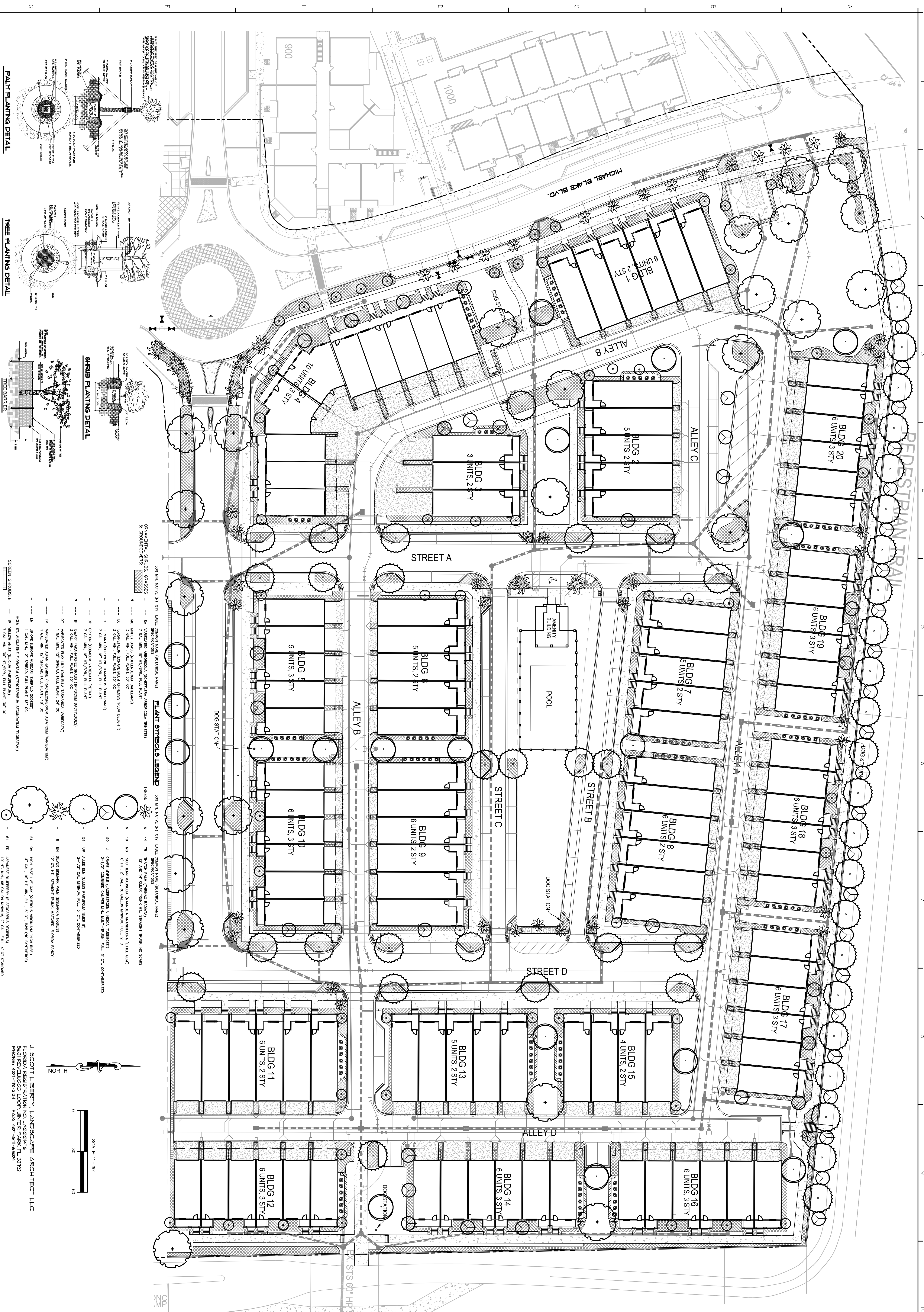
WINTER SPRINGS TOWNHOMES
 AT
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 FOR
 DREAM FINDERS HOMES LLC

RECORD DRAWING
 THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED REVIEW OF CONTRACT DOCUMENTS AND FIELD SURVEY DATA. AND WITH THE UNDERSTANDING THAT THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXISTING UTILITIES AND CONDITIONS. THE ENGINEER'S REVIEW IS LIMITED TO THE INFORMATION PROVIDED TO HIM BY THE CONTRACTOR AND IS NOT A GUARANTEE OF THE ACCURACY OF THE INFORMATION. THE ENGINEER'S REVIEW IS LIMITED TO THE BEST OF HIS KNOWLEDGE.

NO.	DATE	REVISIONS
1	10-23-19	ENTRANCE REMOVED FOR PARK
2	1-16-19	FOR REVISED SITE PLAN

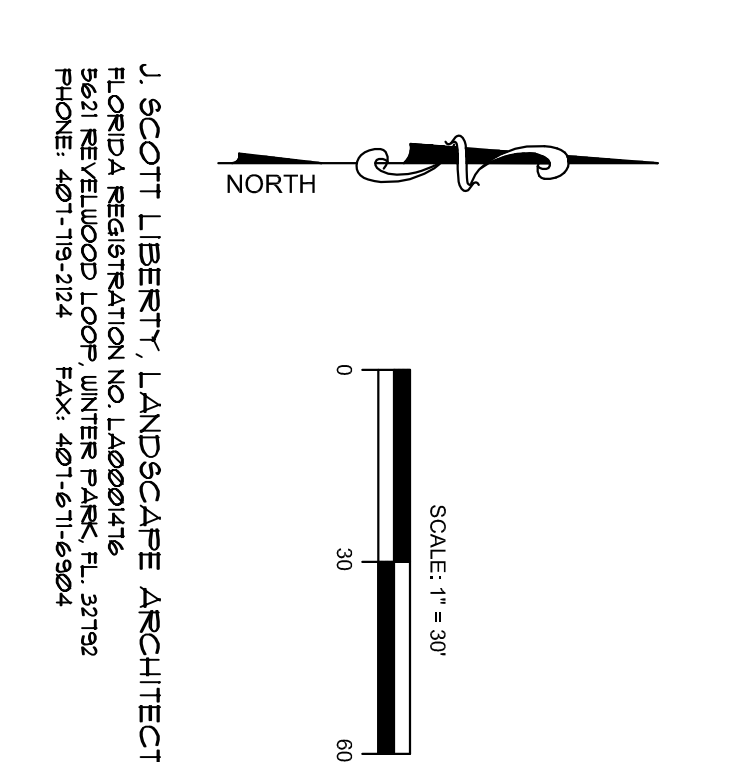
ENGINEER: FRANK A. PORTER, P.E. FL. LIC. #89092
 DATE: OCT. 30, 2019
 ENGINEER: JBL

PROJECT: WINTER SPRINGS TOWNHOMES
 DRAWING: IRRIGATION PLAN
 SCALE: 1" = 30'



PLANT SYMBOL & LEGEND

SYMBOL	500' MIN. NAME (N) CITY LABEL COMMON NAME (BOTANICAL NAME)
(Symbol)	SPERMATOPHYTES (Gymnosperms)
(Symbol)	ANGIOSPERMS (Dicotyledons)
(Symbol)	ANGIOSPERMS (Monocotyledons)
(Symbol)	SHRUBS
(Symbol)	TREES
(Symbol)	SCREEN SHRUBS



J. SCOTT LIBERTY LANDSCAPE ARCHITECT LLC
 5621 NE WOOD LOOP, WINTER PARK, FL 32789
 PHONE: 407-793-2124 FAX: 407-671-6304

WINTER SPRINGS TOWNHOMES
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 FOR
 DREAM FINDERS HOMES LLC

RECORD DRAWING
 THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED PERIODIC FIELD OBSERVATIONS DURING CONSTRUCTION. A REVIEW OF CONTRACTOR FURNISHED RECORD PLANS INDICATING CHANGES INCORPORATED DURING CONSTRUCTION AND WITNESSED UTILITY TESTING OF DRINKING WATER AND WASTEWATER SYSTEMS, ALTHOUGH THE ACCURACY CANNOT BE GUARANTEED. THE ENGINEER RELIES ON THE RECORD DRAWING IS CORRECT TO THE BEST OF HIS/HER KNOWLEDGE.
 ENGINEER:
 FL LIC. #

NO.	DATE	REVISIONS
5	10-23-19	NORTH TRAIL BUFFER TREES ADDED, ENTRANCE REMOVED FOR PARK
4	7-18-19	SPECC CHANGES TO MATCH THE BLAKE, LANDSCAPE ADDED AT TRAIL
3	3-8-19	PER REVISED SITE PLAN
2	1-21-19	PER REVISED SITE PLAN
1	12-13-18	PER REVISED SITE PLAN

ENGINEER
 FRANK A. PORTER, P.E.
 FL LIC. #659052
 DATE: Oct. 23, 2019

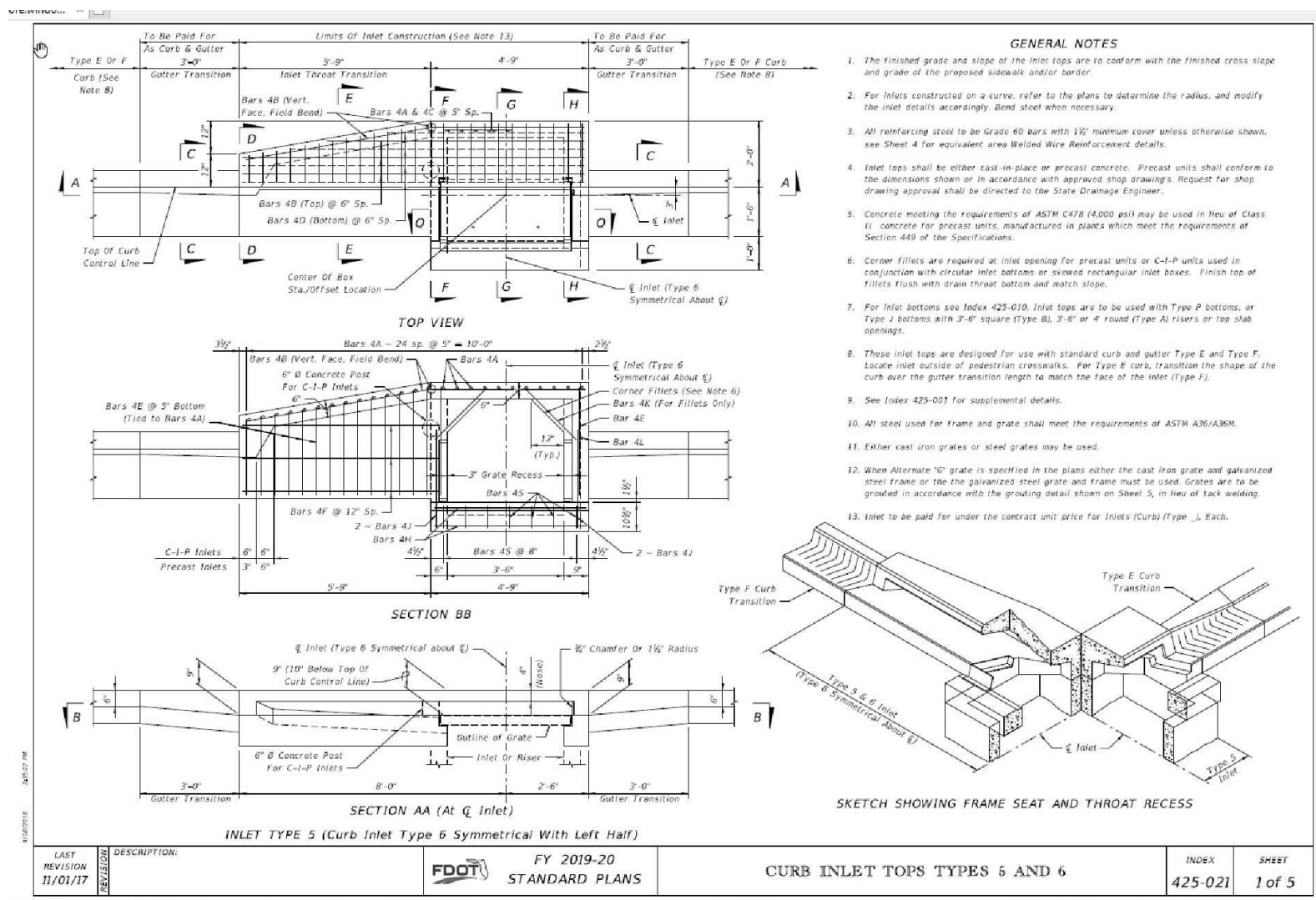
JOB #: 17063.20
 PRJ. MGR: FAP
 DESIGNER: RID
 ENGINEER: GCR

LOCHRANE
 Consulting Engineers - Surveyors
 An NVIS Company

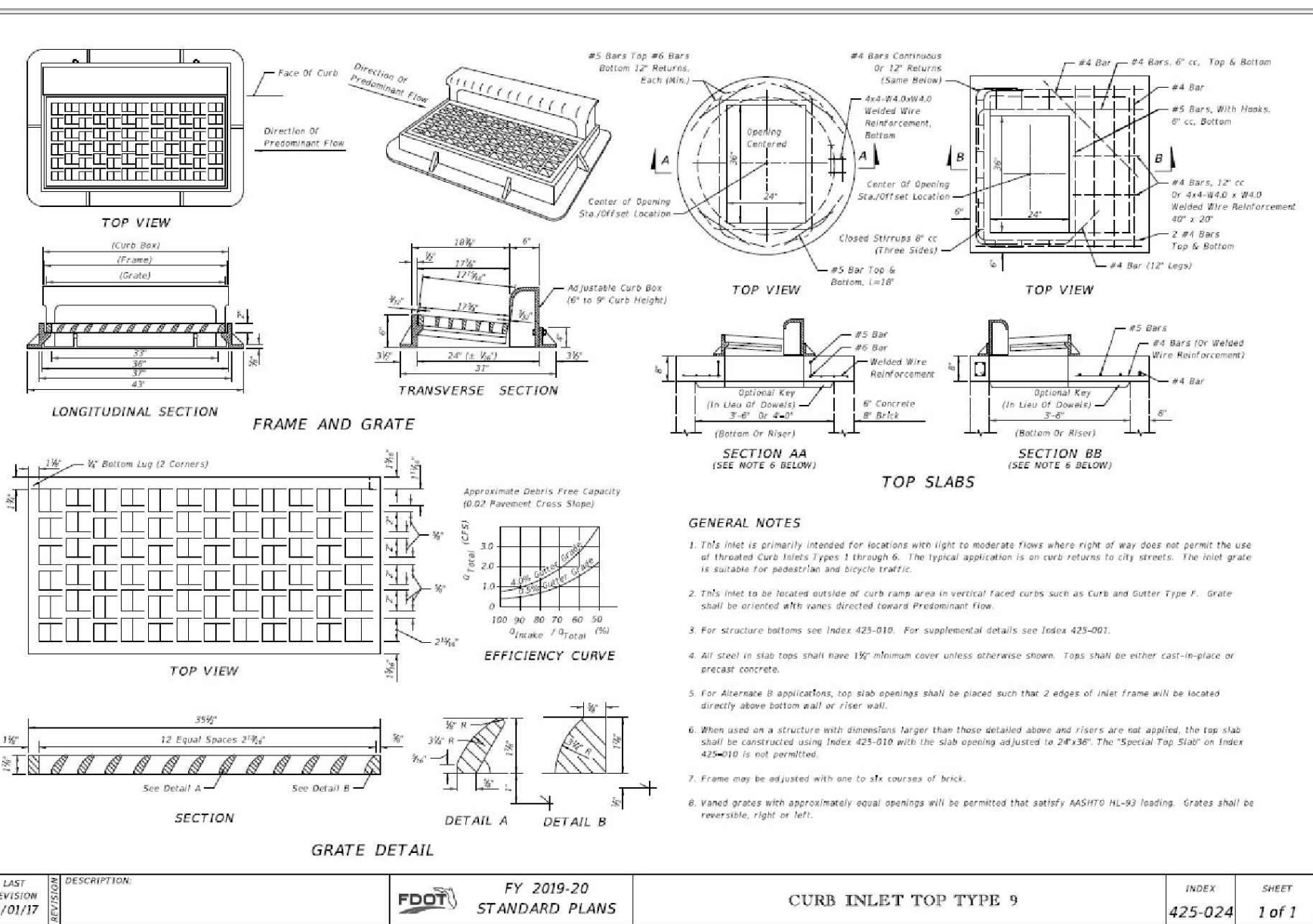
1601 SOUTH SUMNER AVENUE | ORLANDO, FL 32825
 PH: (407) 896-3317 | FAX: (407) 896-9167
 WWW.LOCHRANE.COM

CERTIFICATE OF AUTHORIZATION # 00002859

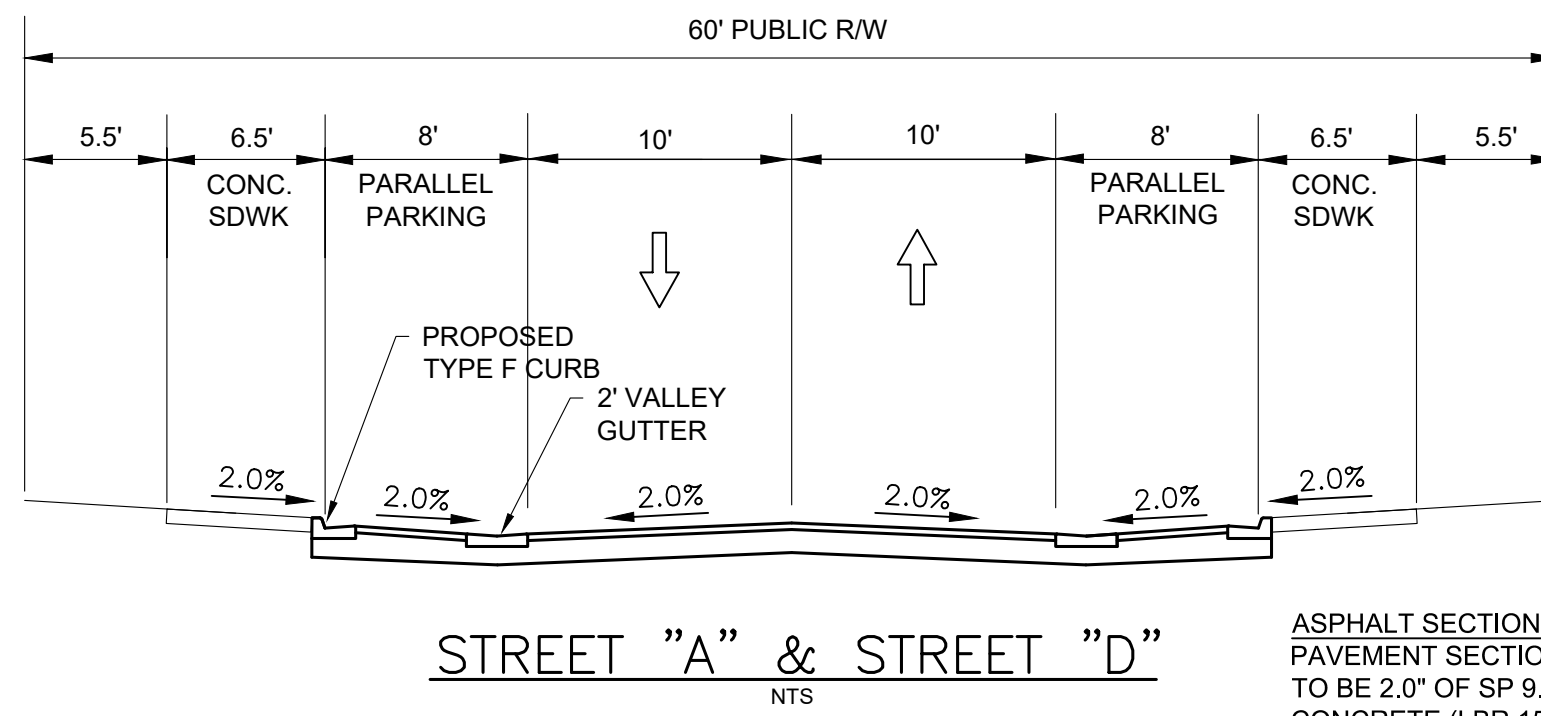
SHEET
 L01.1



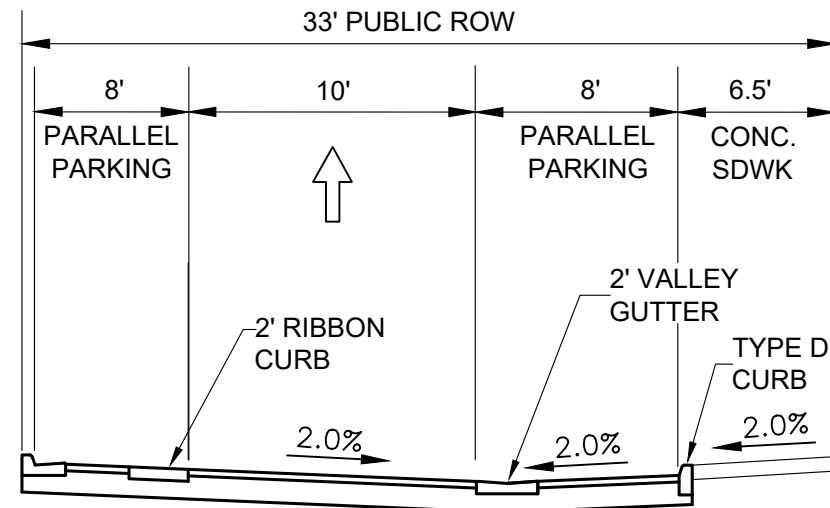
TYPE 5 & 6 CURB INLET



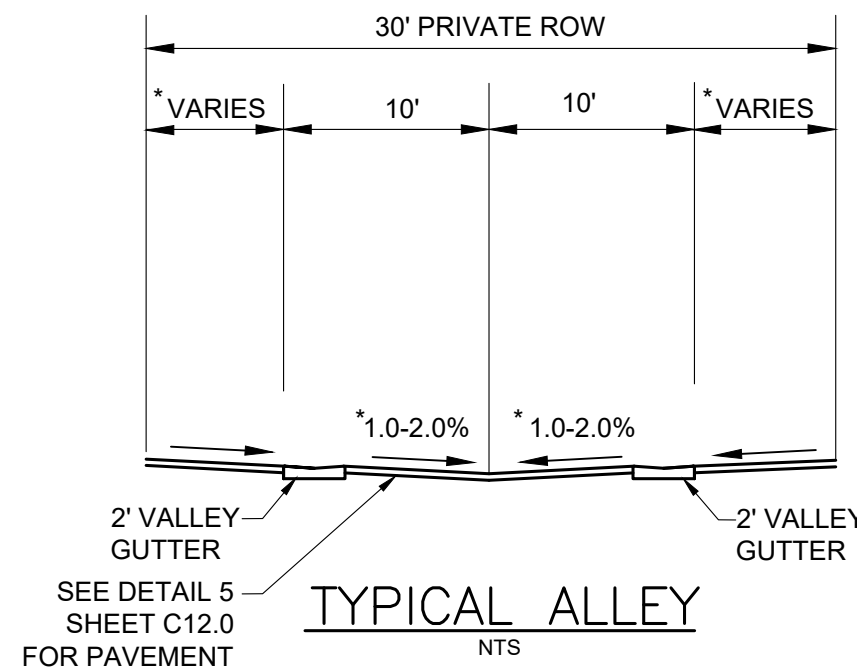
TYPE 9 INLET



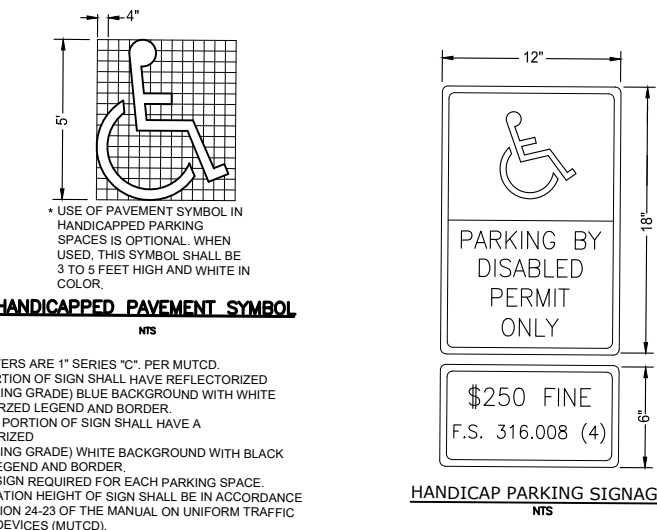
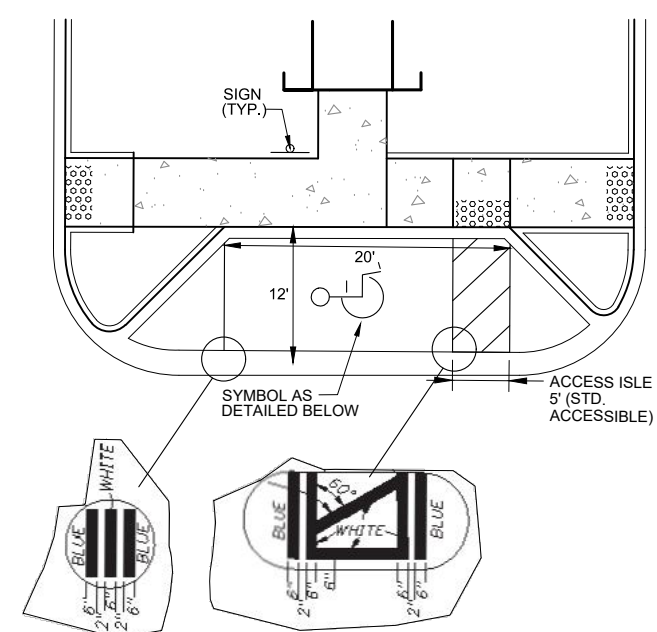
ASPHALT SECTION: PAVEMENT SECTION WITHIN CITY ROW IS TO BE 2.0" OF SP 9.5 WITH 8" OF CRUSHED CONCRETE (LBR 150). CONTRACTOR TO PROVIDE LBR TESTING RESULTS TO CITY FOR VERIFICATION. CONTRACTOR TO LAY ASPHALT IN TWO 1.0' LIFTS.



ASPHALT SECTION: PAVEMENT SECTION WITHIN CITY ROW IS TO BE 2.0" OF SP 9.5 WITH 8" OF CRUSHED CONCRETE (LBR 150). CONTRACTOR TO PROVIDE LBR TESTING RESULTS TO CITY FOR VERIFICATION. CONTRACTOR TO LAY ASPHALT IN TWO 1.0' LIFTS.



* NOTE: SLOPES VARY SEE GRADING PLAN C07.0 FOR EXACT GRADES, SLOPES AND WIDTHS



TYPE C INL AND GRATE

6

7

1. ROADWAY UNDERDRAINS SHOULD BE CONSTRUCTED WITH A MINIMUM 6-INCH DIAMETER UNDERDRAIN PIPE, WRAPPED WITH FILTER FABRIC (ADS "DRAIN GUARD," OR EQUIVALENT) OR SMOOTH WALL HDPE PIPE WITHOUT FILTER SOCK.

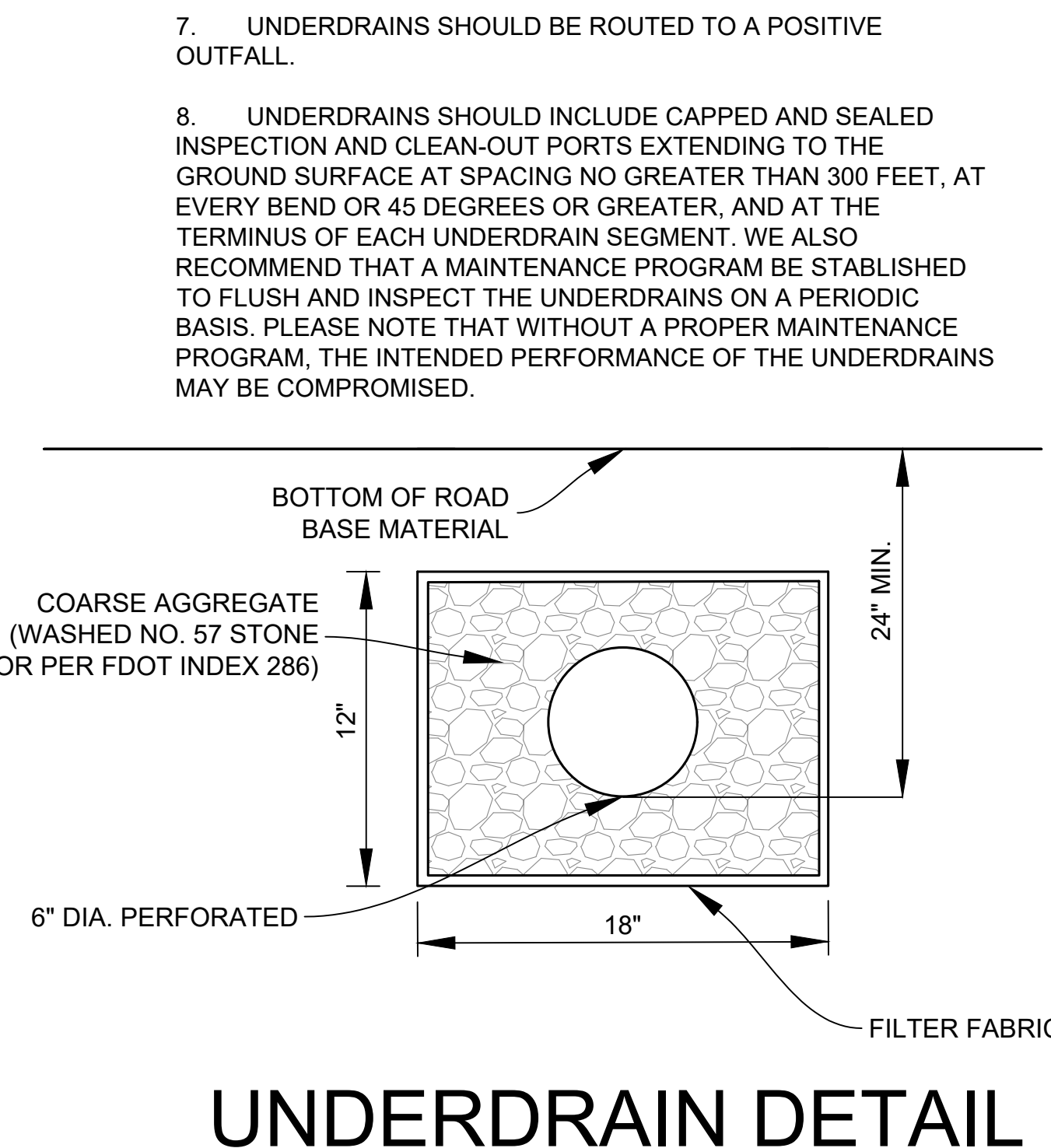
2. UNDERDRAINS SHOULD BE CONSTRUCTED ALONG BOTH SIDES OF THE ROADWAYS FOR THE PORTIONS REQUIRING UNDERDRAINS TO PROVIDE SEPARATION BETWEEN THE BOTTOM OF THE BASE COURSE AND THE SEASONAL HIGH GROUNDWATER LEVEL.

3. THE BOTTOM OF THE UNDERDRAIN PIPING SHOULD BE PLACED A MINIMUM OF 24-INCHES BELOW THE BOTTOM OF BASE COURSE.

4. THE UNDERDRAINS SHOULD BE CONSTRUCTED IN A TRENCH A MINIMUM OF 18-INCHES WIDE, WITH THE UNDERDRAIN CENTERED IN THE TRENCH. FURTHER, THE UNDERDRAIN TRENCH SHOULD EXTEND 6-INCHES BELOW THE INVERT OF THE UNDERDRAIN PIPING.

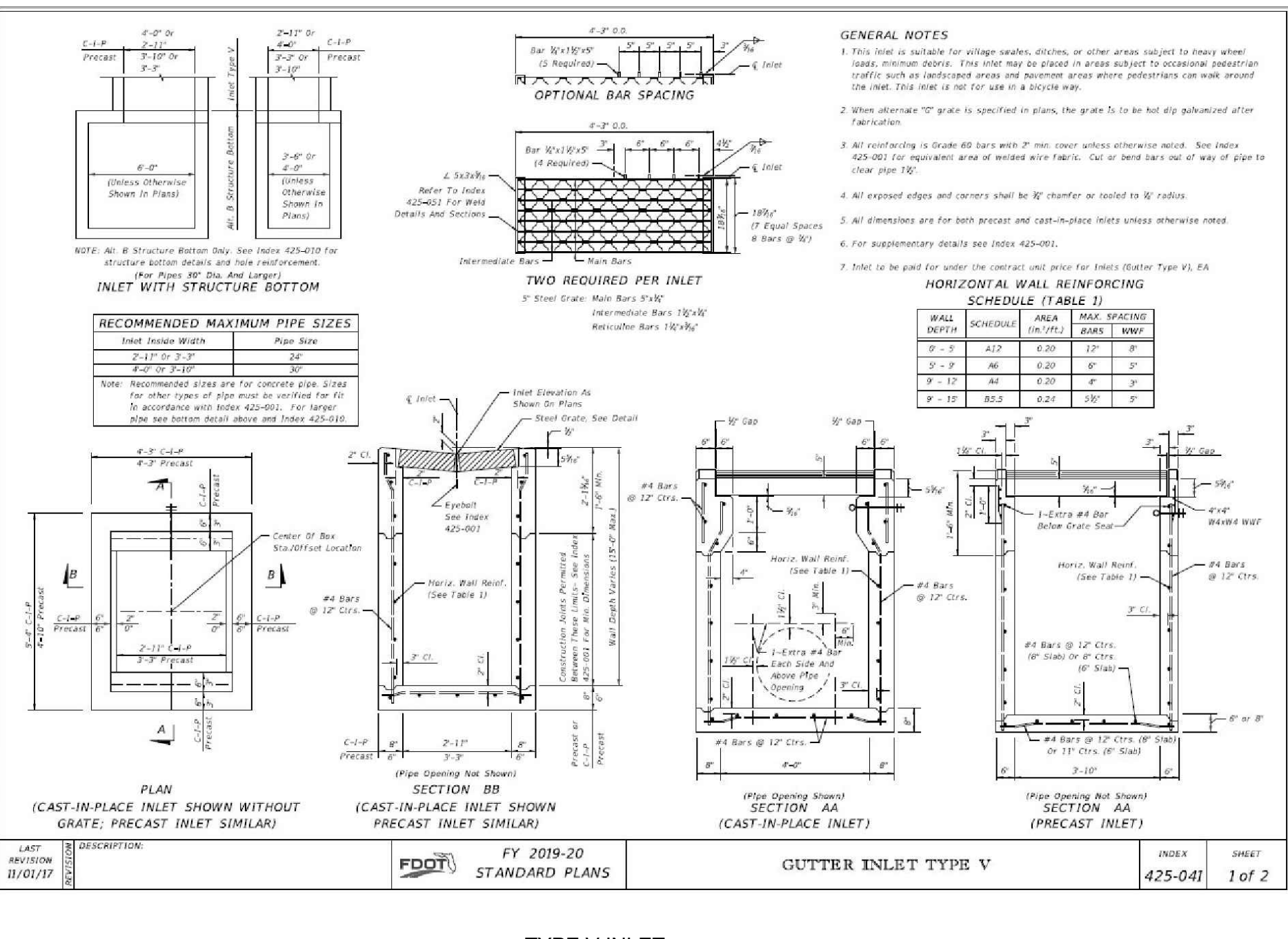
5. BACKFILL PLACED IN THE UNDERDRAIN TRENCH SHOULD CONSIST OF "CLEAN" FILTER SAND MEETING FDOT SPECIFICATIONS FOR FILTER SAND (FDOT SPECIFICATION 902-4). FILTER SAND BACKFILL SHOULD EXTEND TO 12 INCHES ABOVE THE TOP OF THE UNDERDRAIN PIPE. BACKFILL ABOVE THE FDOT FILTER SAND MAY CONSIST OF CLEAN NATIVE MATERIAL, PROVIDED THESE MATERIALS CONTAIN LESS THAN 10 PERCENT SOIL FINES.

6. PRIOR TO THE PLACEMENT OF UNDERDRAIN PIPING OR FILTER SAND BACKFILL, THE PERIMETER OF THE UNDERDRAIN TRENCH SHOULD BE LINED WITH FILTER FABRIC (MIRAFI 140N, OR EQUIVALENT) TO MINIMIZE THE POTENTIAL FOR INTRUSION OF SOIL FINES FROM THE SURROUNDING SUBGRADE. THE FILTER FABRIC SHOULD COMPLETELY LINE THE PERIMETER OF THE UNDERDRAIN TRENCH AND OVERLAP A MINIMUM OF 12 INCHES AT THE TOP OF THE FILTER SAND BACKFILL.



8

4



TYPE V INLET

3

JOB #: 17063.20
 ENGINEER: FRANK A. PORTER, P.E.
 FL LIC #86902
 DATE: Oct. 31, 2019
 ENGINEER: GCR

RECORD DRAWING
 THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED SURVEYING AND FIELD DATA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF ALL DIMENSIONS AND CONDITIONS SHOWN ON THIS DRAWING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY MATERIALS AND LABOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY MATERIALS AND LABOR.

WINTER SPRINGS TOWNHOMES
 AT
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 FOR
 DREAM FINDERS HOMES LLC

GENERAL DETAILS 2
 201 S. BUMBAY AVE.
 ORLANDO, FL
 32801
 WWW.NVS.COM
 CERTIFICATE OF AUTHORIZATION # 20065

FL LIC #
 SHEET
 C13.0

We recommend using the existing surficial sands or approved structural fill densified to at least 98 percent of Modified Proctor test maximum dry density (ASTM D 1557) without additional stabilization under concrete pavement, with the following stipulations:

1. Prior to placement of concrete, the subgrade soils should be prepared as recommended in Section 11.0 of this report.
2. The surface of the subgrade soils must be smooth, and any disturbances or wheel rutting corrected prior to placement of concrete.
3. The subgrade soils must be moistened prior to placement of concrete.
4. Concrete pavement thickness should be uniform throughout, with exception to the thickened edges (curb or footing).
5. The bottom of the pavement should be separated from the seasonal high groundwater level by at least 12 inches.

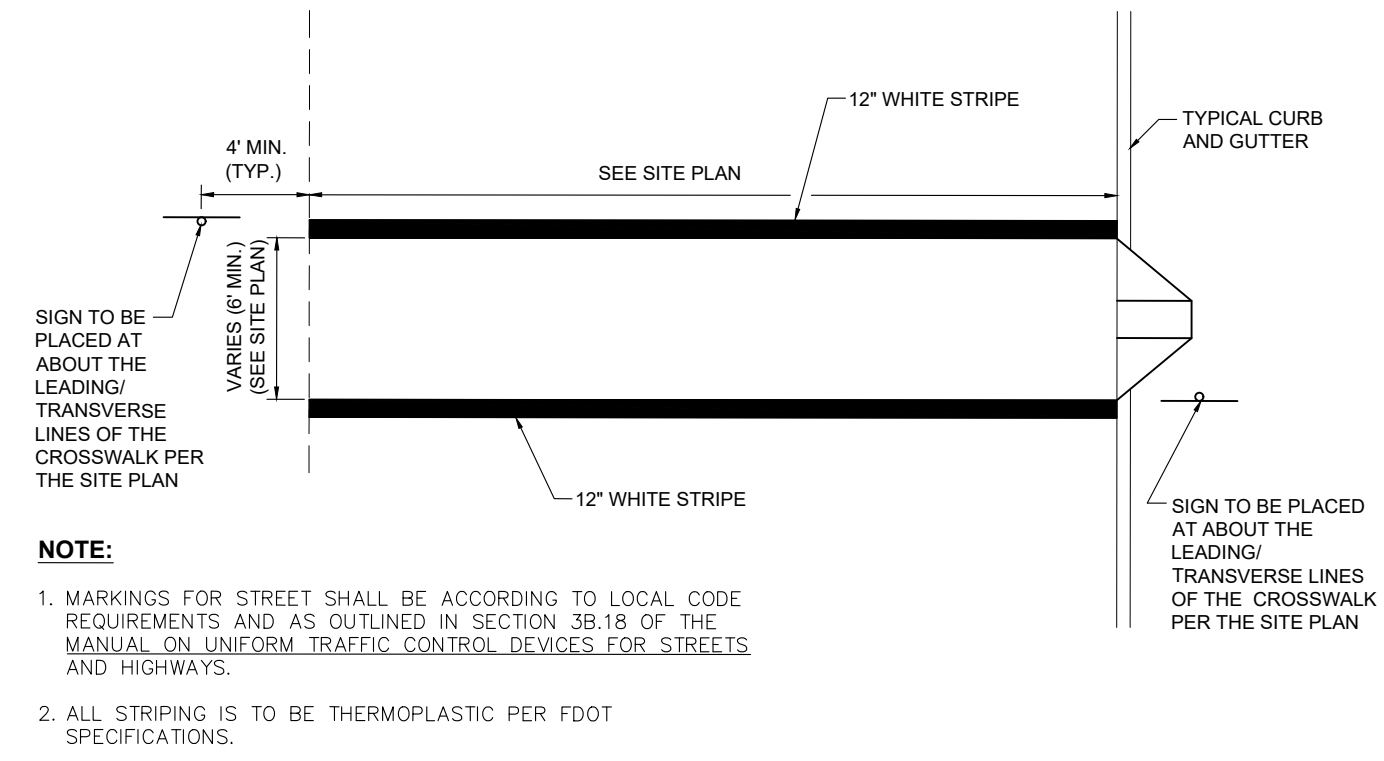
Based on review of the Seminole County construction standards and the FDOT Rigid Pavement Design Manual, our recommended minimum concrete pavement design is shown in Table V.

Service Level	Minimum Pavement Thickness	Maximum Control Joint Spacing	Recommended Saw Cut Depth
Light Duty	6 inches	12 feet x 12 feet	2 inches
Heavy Duty	7 inches	14 feet x 14 feet	2½ inches

We recommend using concrete with a minimum 28-day compressive strength of at least 4,000 pounds per square inch. Layout of the Saw cut control joints should form square panels, and the depth of saw cut joints should be ½ of the concrete slab thickness.

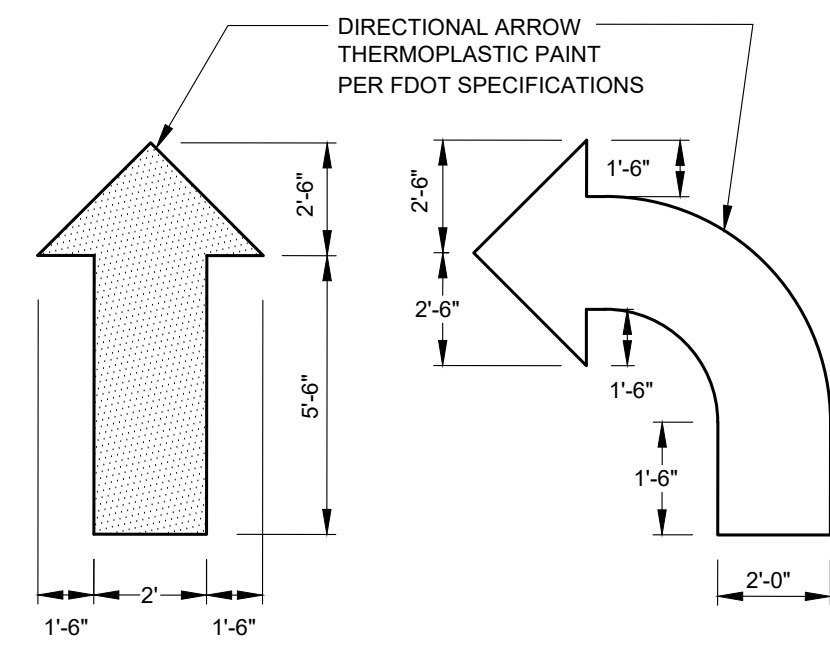
CONCRETE PAVING
NTS

10



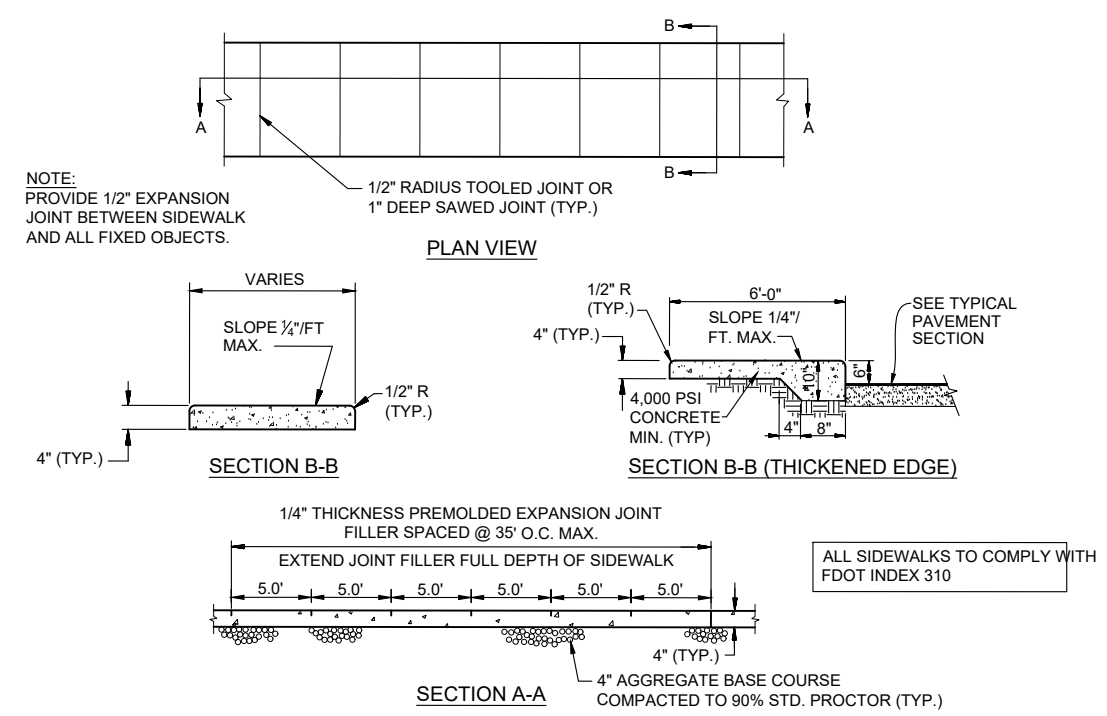
PRIVATE CROSSWALK STRIPING DETAIL
NTS

7



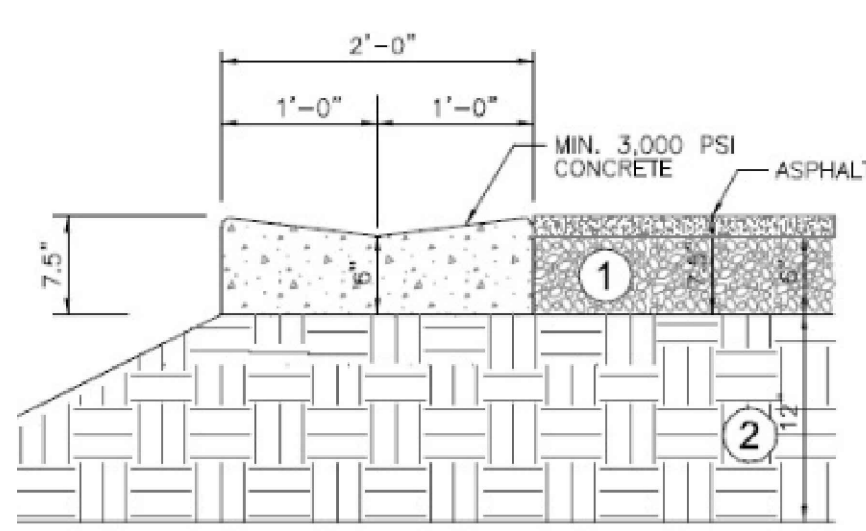
DIRECTIONAL ARROW DETAILS
NTS

4



TYPICAL CONCRETE SIDEWALK DETAIL
NTS

1

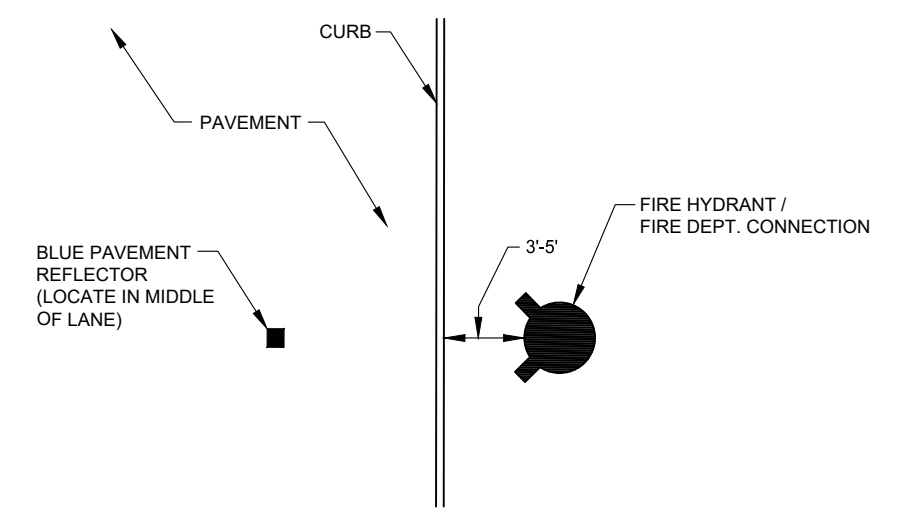


- GENERAL NOTES:**
1. CRUSHED CONCRETE BASE SHALL BE COMPACTED TO NOT LESS THAN 98% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-180 WITH MINIMUM LBR 120
 2. SUB GRADE SHALL BE COMPACTED TO NOT LESS THAN 98% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-180 WITH MINIMUM STABILIZATION (FBV=50) AND A MAXIMUM OF 6" LIFTS.

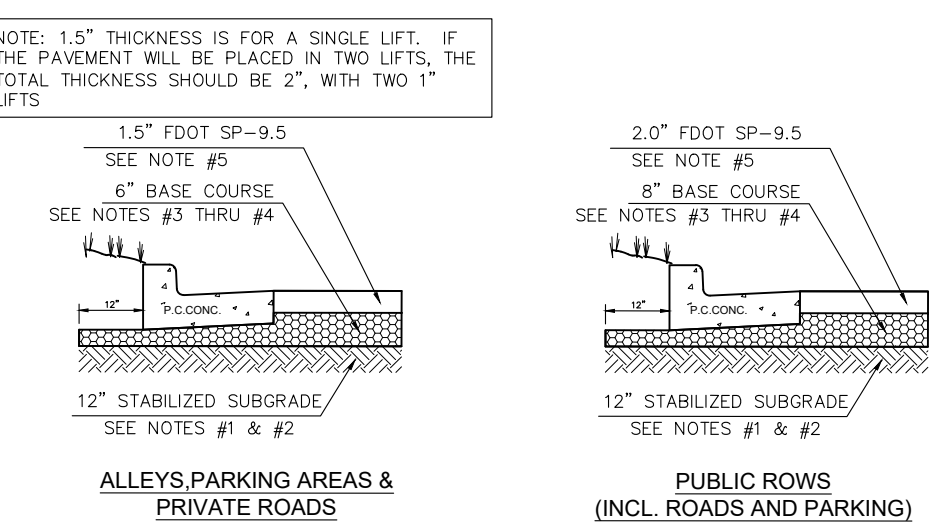
- ADDITIONAL CURBING NOTES:**
1. DENSITY TESTS SHALL BE REQUIRED AT A MINIMUM OF ONE PER 5,000 SQUARE FEET, AND PERFORMED BY AN APPROVED INDEPENDENT LABORATORY AT THE CONTRACTOR'S EXPENSE.
 2. ALL CURBS SHALL BE POURED MONOLITHICALLY. ALL CURBS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THIS DETAIL SHEET.
 3. CONTROL JOINTS SHALL BE TOOLED OR CUT EVERY TEN (10) FEET.
 4. ALL AREAS BEHIND CURBS SHALL BE BACKFILLED WITHIN 72 HOURS OF PLACEMENT.

2' VALLEY
NTS

8



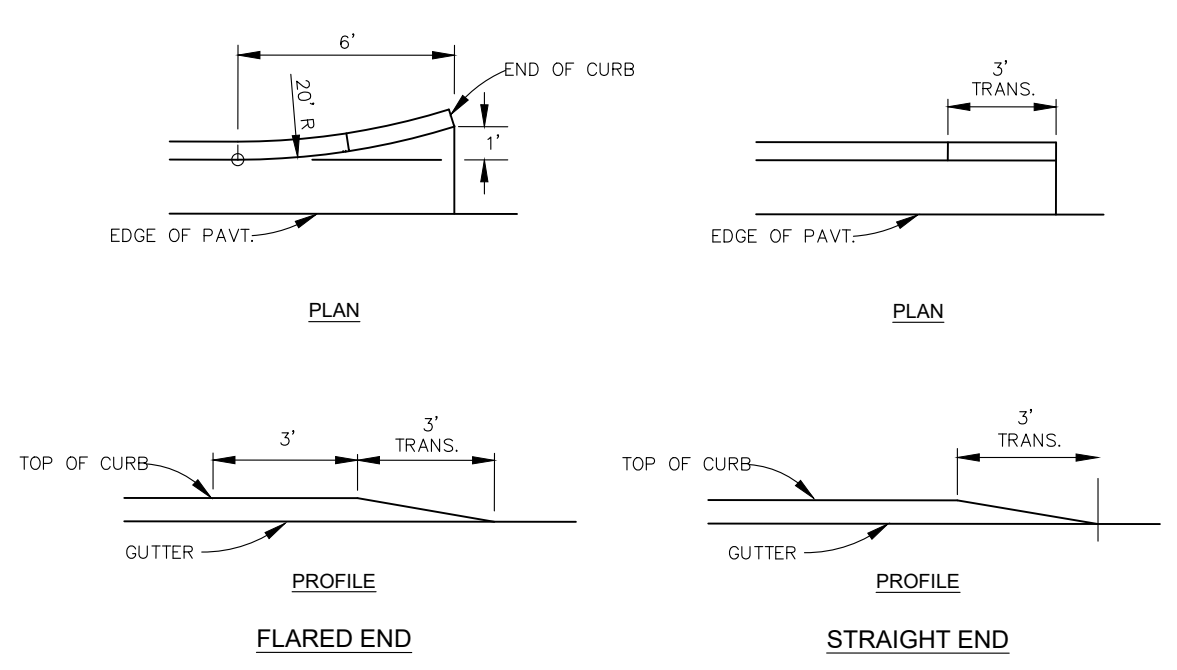
PAVEMENT MARKING AT FIRE HYDRANT / FDC DETAIL
NTS



1. THE SUBGRADE SHOULD MEET A MINIMUM LBR OF 40 (STABILIZED SUBGRADE). THE EXISTING SANDY SOIL AND RECOMMENDED IMPORTED FILL WILL LIKELY POSSESS A LBR OF 20 TO 30. THEREFORE, IN ORDER TO INCREASE THE BEARING VALUE, SHELL, LIMEROCK, CRUSHED CONCRETE, LOW PLASTICITY CLAYEY SANDS OR ANOTHER ACCEPTABLE PRODUCT WOULD NEED TO BE BLENDED WITH THESE SANDS. THE STABILIZED SUBGRADE SHOULD BE A MINIMUM DEPTH OF 12 INCHES AND COMPACTED TO A MINIMUM DENSITY OF 98% OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY.
2. COMPACTION TESTING OF THE SUBGRADE SHOULD BE PERFORMED TO FULL DEPTH AT A FREQUENCY OF AT LEAST ONE (1) TEST PER 5,000 SQUARE FEET, OR EVERY 250 LINEAL FEET OF ROADWAY, WHICHEVER IS GREATER. COMPACTION TESTING OF THE STABILIZED SUBGRADE SHOULD BE PERFORMED AT FULL DEPTH AT A FREQUENCY OF AT LEAST ONE (1) TEST PER 10,000 SQUARE FEET, OR A MINIMUM OF 3 TESTS, WHICHEVER IS GREATER.
3. ALL BASE MATERIALS SHOULD BE COMPACTED TO A MINIMUM DENSITY OF 98% (MPOD), CRUSHED CONCRETE, LIMEROCK, AND SHELL BASES SHOULD BE A MINIMUM LBR OF 150 AND COMPLY WITH THE LATEST EDITION OF THE FDOT ROAD AND BRIDGE CONSTRUCTION SPECIFICATIONS.
4. TRAFFIC SHOULD NOT BE ALLOWED ON THE SUBGRADE AS THE BASE IS PLACED TO AVOID RUTTING. BEFORE PAVING, THE BASE SHOULD BE CHECKED FOR SOUNDNESS.
5. THE ASPHALTIC CONCRETE SHOULD MEET STANDARD FDOT MATERIAL REQUIREMENTS AND PLACEMENT PROCEDURES AS OUTLINED IN THE LATEST EDITION OF THE FDOT ROAD AND BRIDGE CONSTRUCTION SPECIFICATIONS EXCEPT THAT THE ASPHALTIC CONCRETE SHOULD BE COMPACTED TO A MINIMUM OF 98% OF THE MARSHALL MAXIMUM LABORATORY UNIT HEIGHT OF SAMPLES SECURED DAILY DURING PLACEMENT.

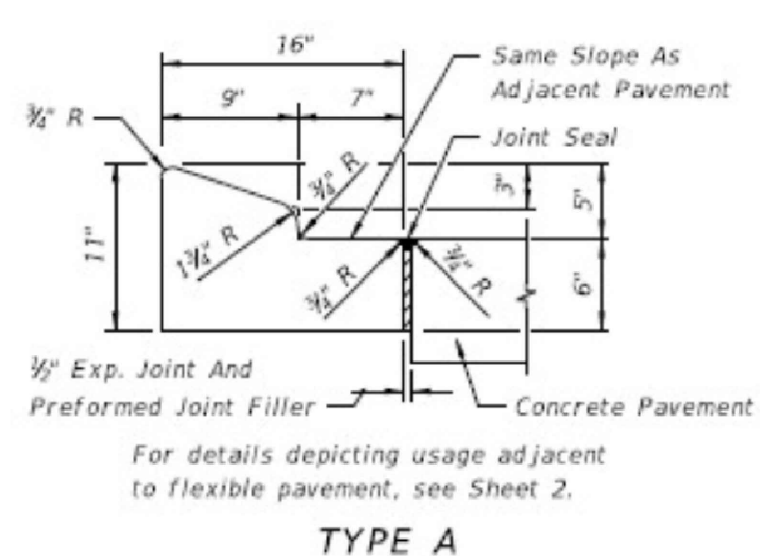
ASPHALT PAVING
NTS

5



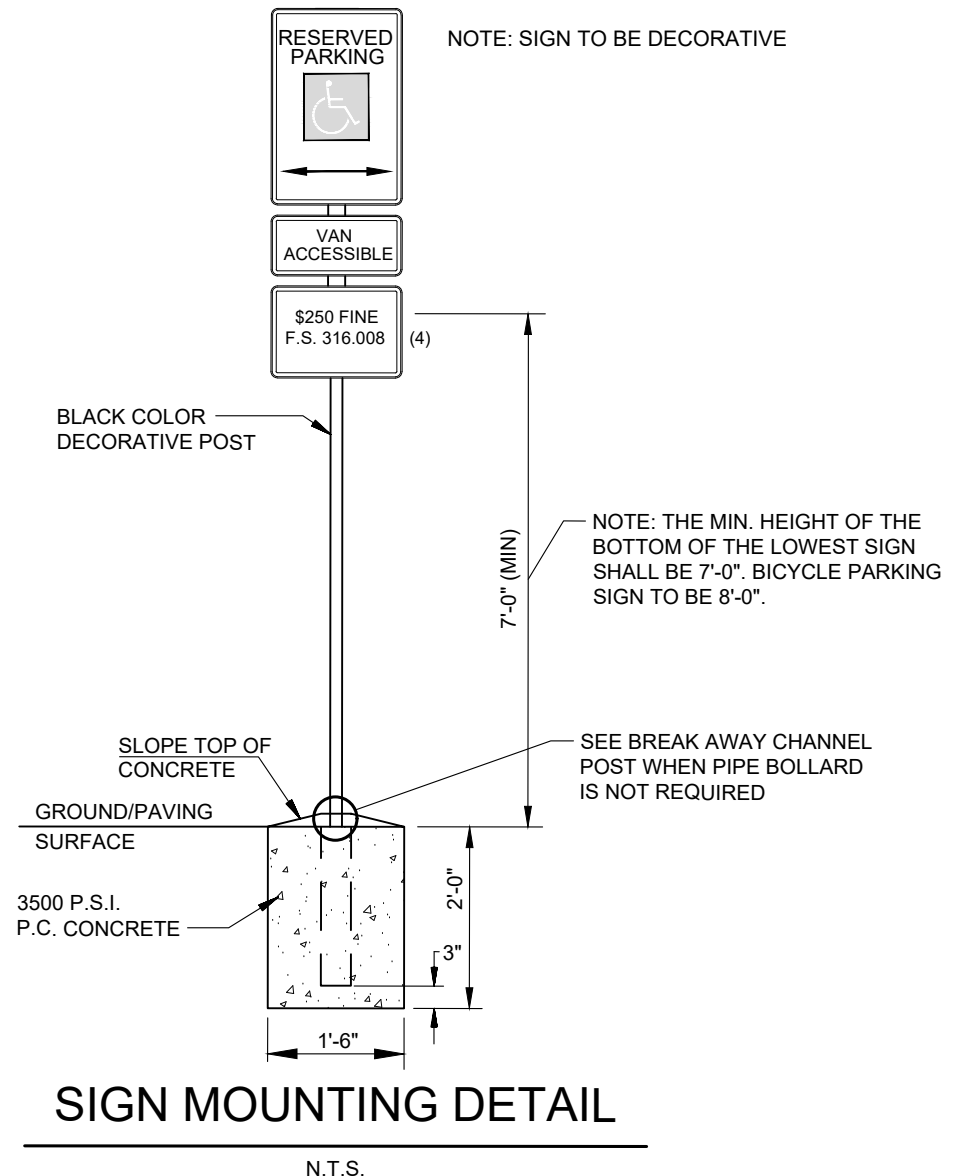
CURB AND GUTTER ENDINGS DETAIL
NTS

2



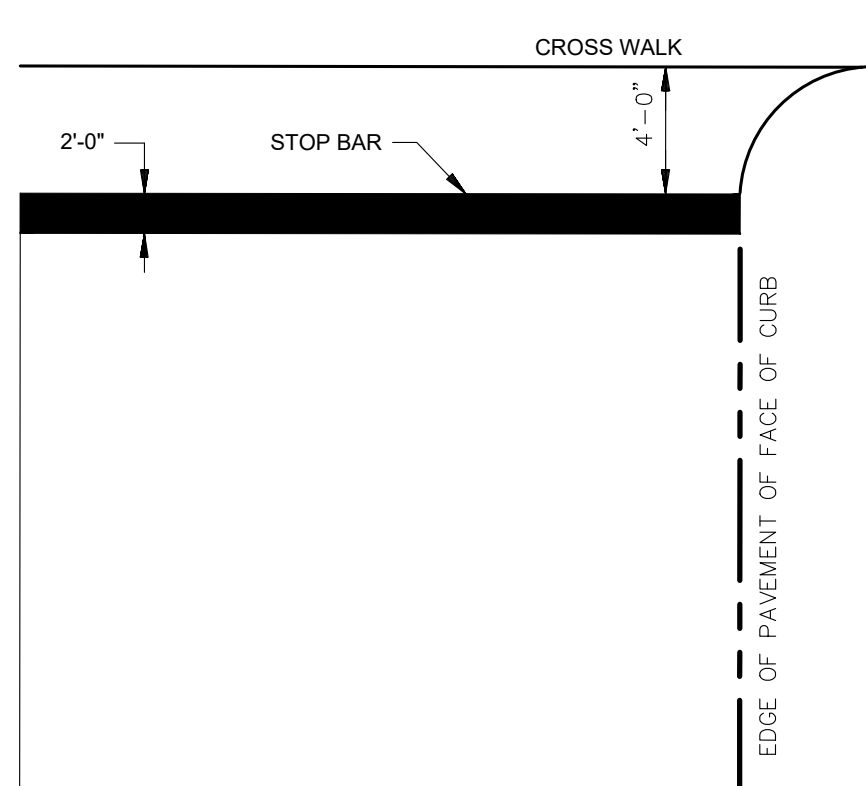
FDOT TYPE A MEDIAN CURB PER FDOT INDEX 520-001
NTS

11



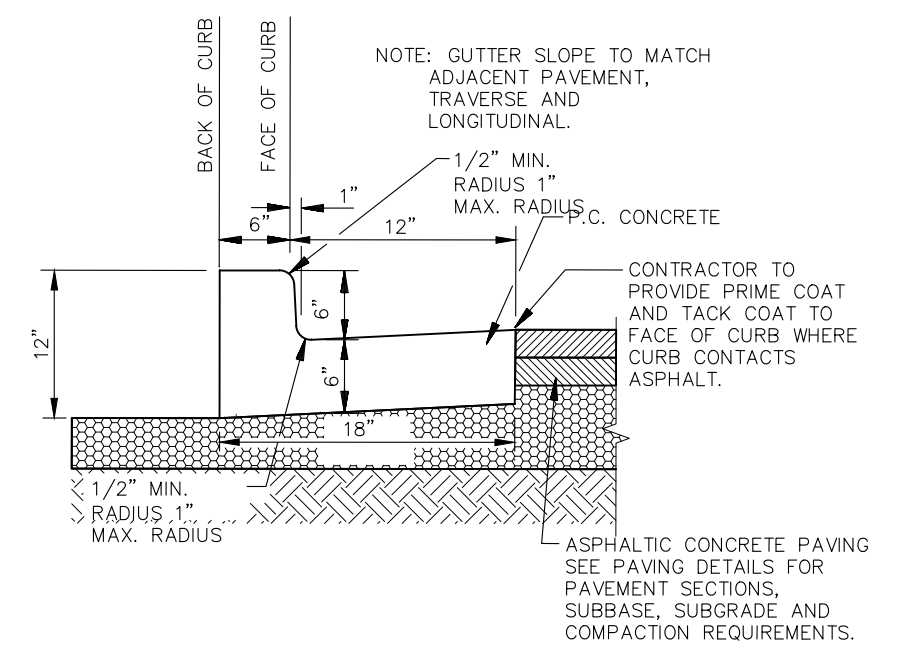
SIGN MOUNTING DETAIL
NTS

9



STOP BAR DETAIL
NTS

6



18" CURB AND GUTTER DETAIL
NTS

3

JOB #: 17063.20
 ENGINEER: FRANK A. PORTER, P.E., FL LIC. #06902
 PLJ. MGR.: FAP
 DESIGNER: RID
 ENGINEER: GCR
 DATE: Oct. 31, 2019

RECORD DRAWING
 THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED NUMBER OF CONVECTIVE PAVEMENT FIELD TESTS. THE RESULTS OF THESE TESTS WILL BE USED TO DETERMINE THE DESIGN OF THE PAVEMENT. THE ENGINEER DOES NOT WARRANT THE ACCURACY OF THE RECORD DRAWING. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR THE RESULTS OF THESE TESTS.

WINTER SPRINGS TOWNHOMES
 AT
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 FOR
 DREAM FINDERS HOMES LLC

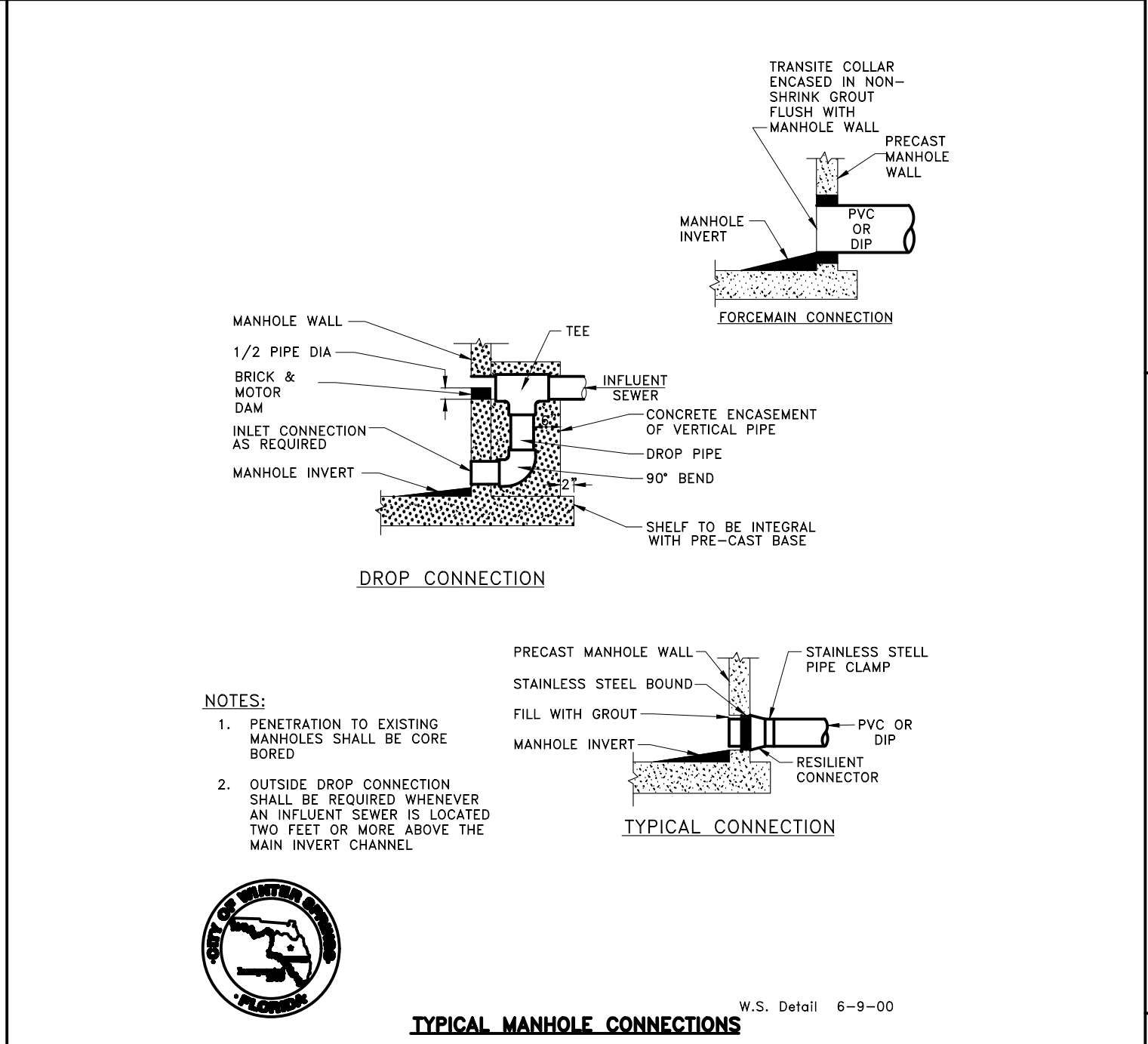
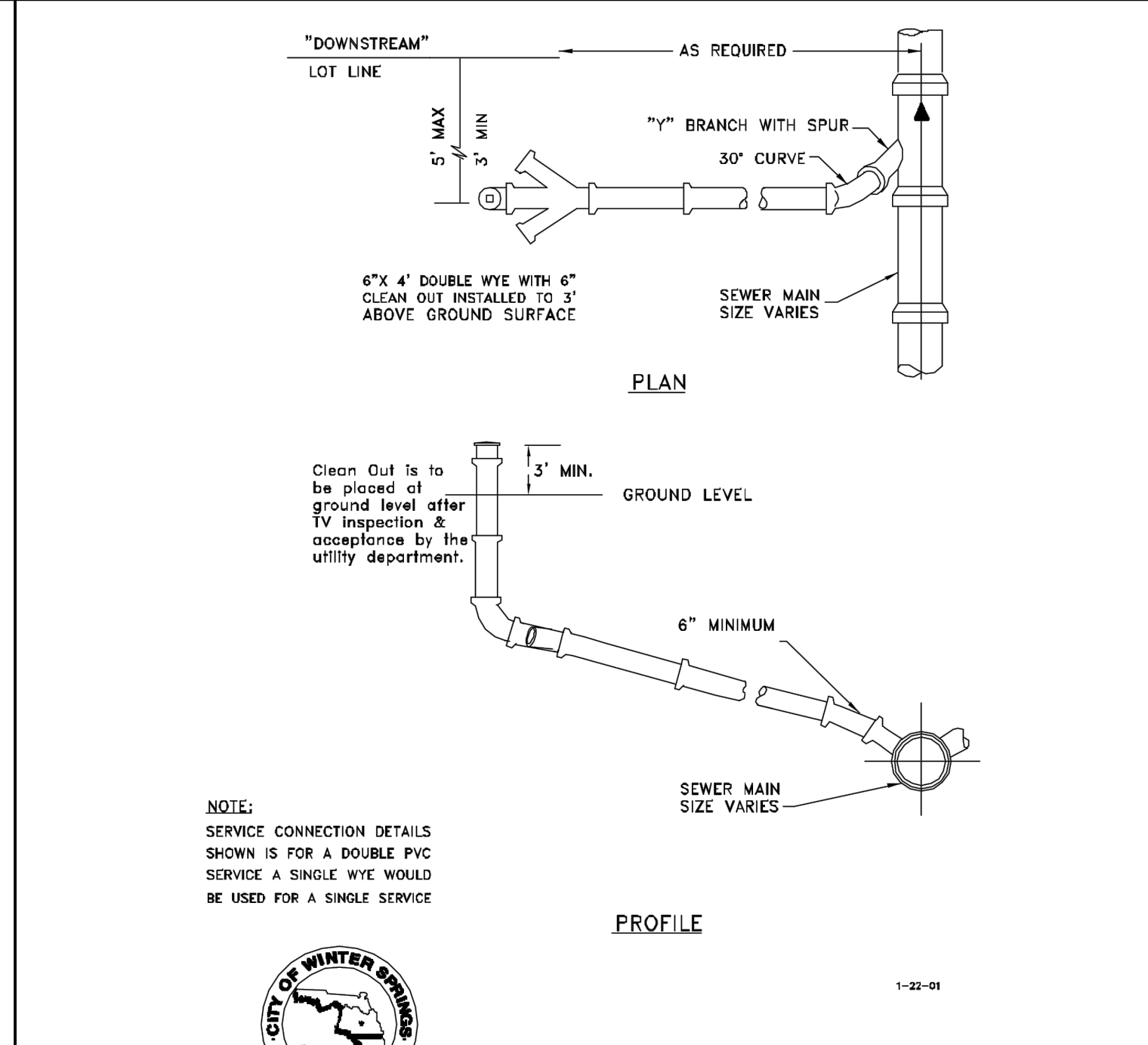
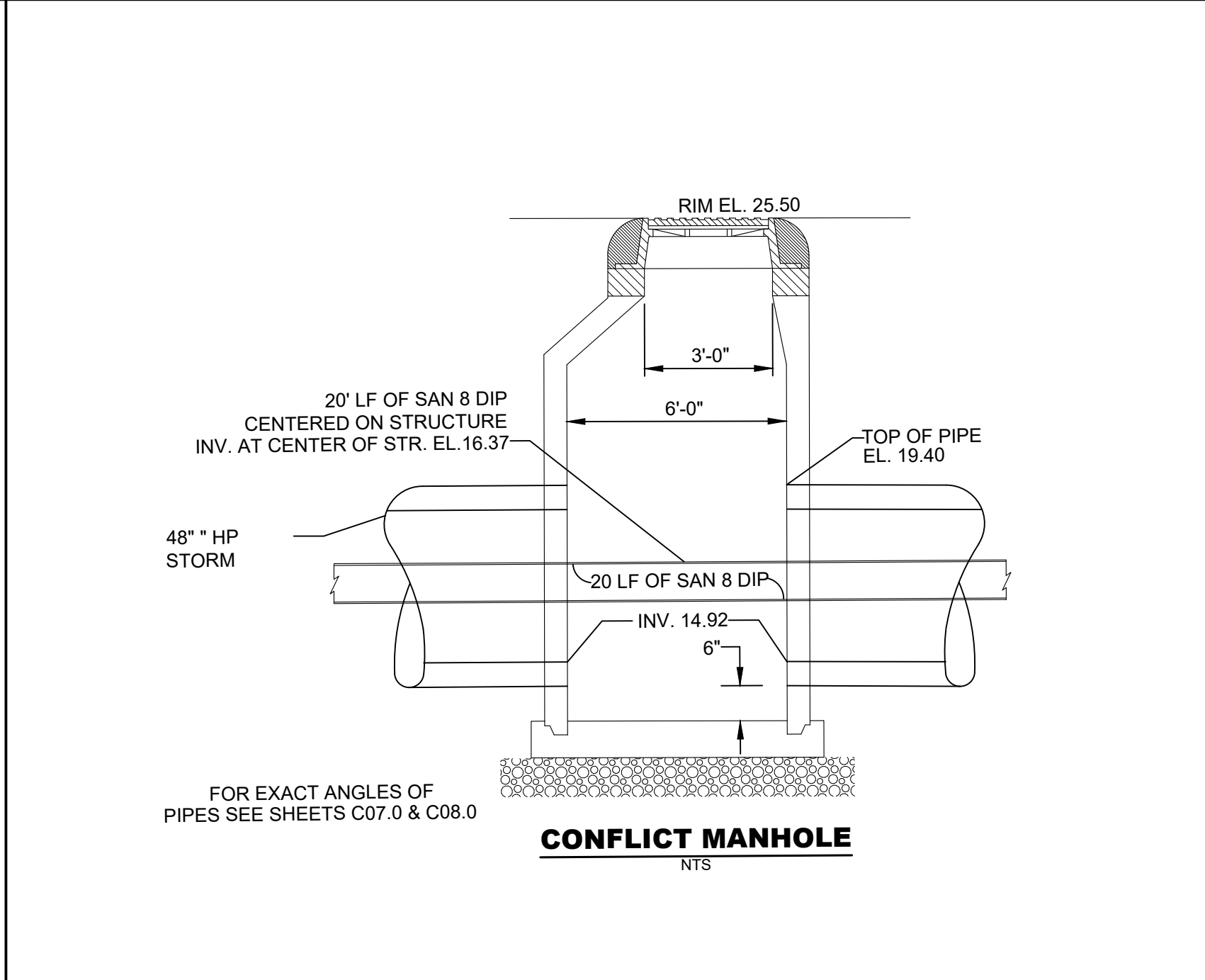
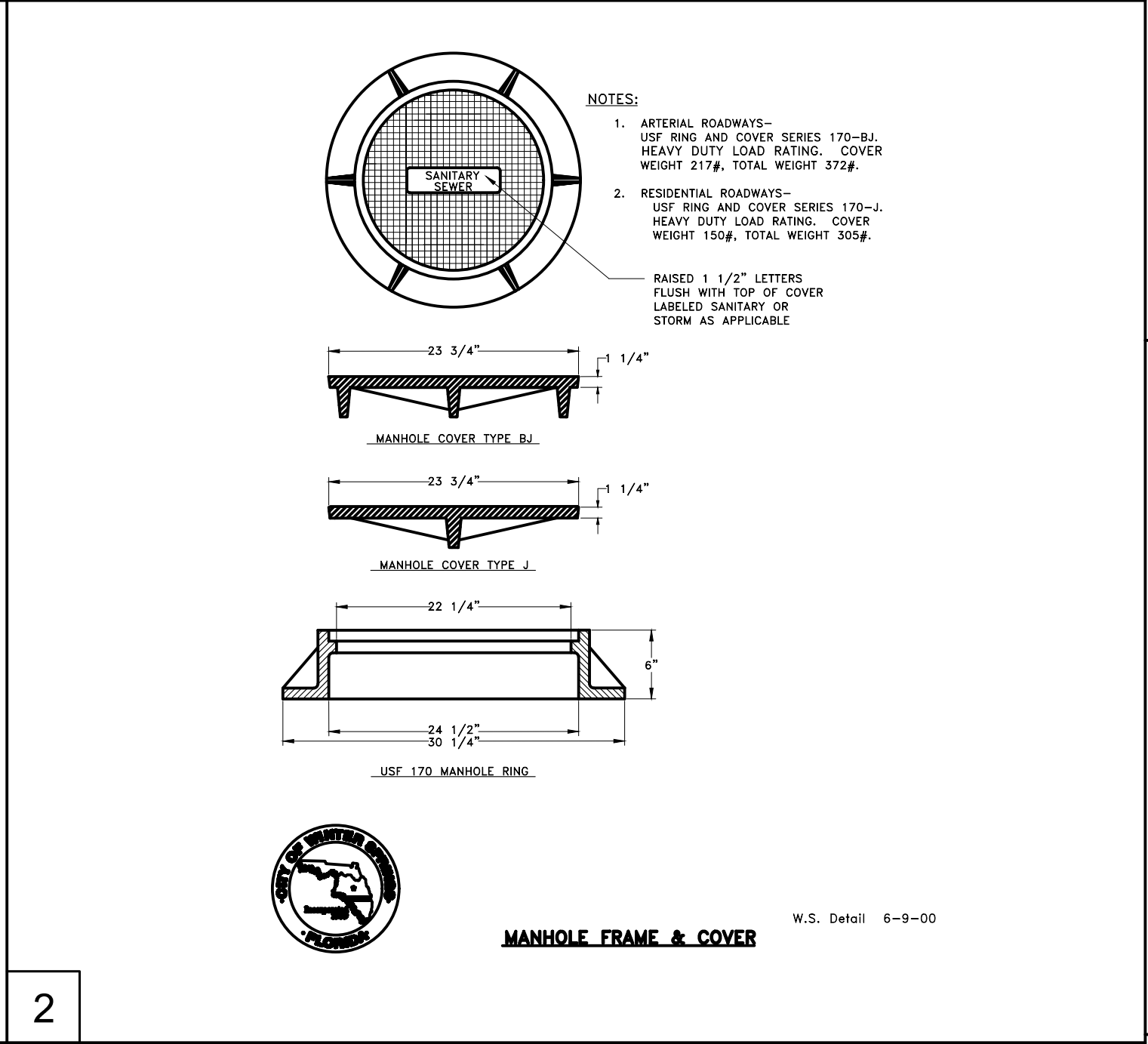
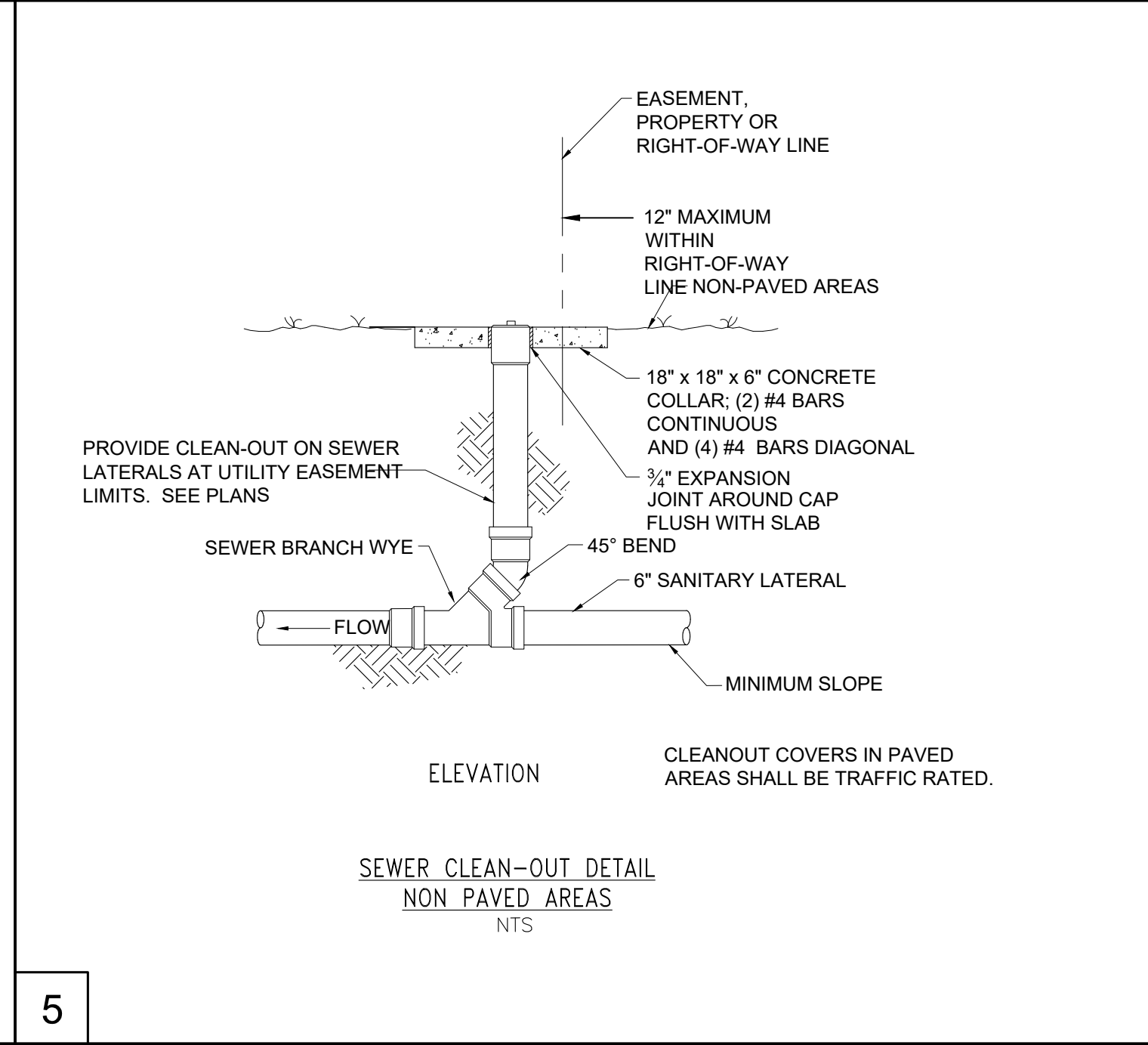
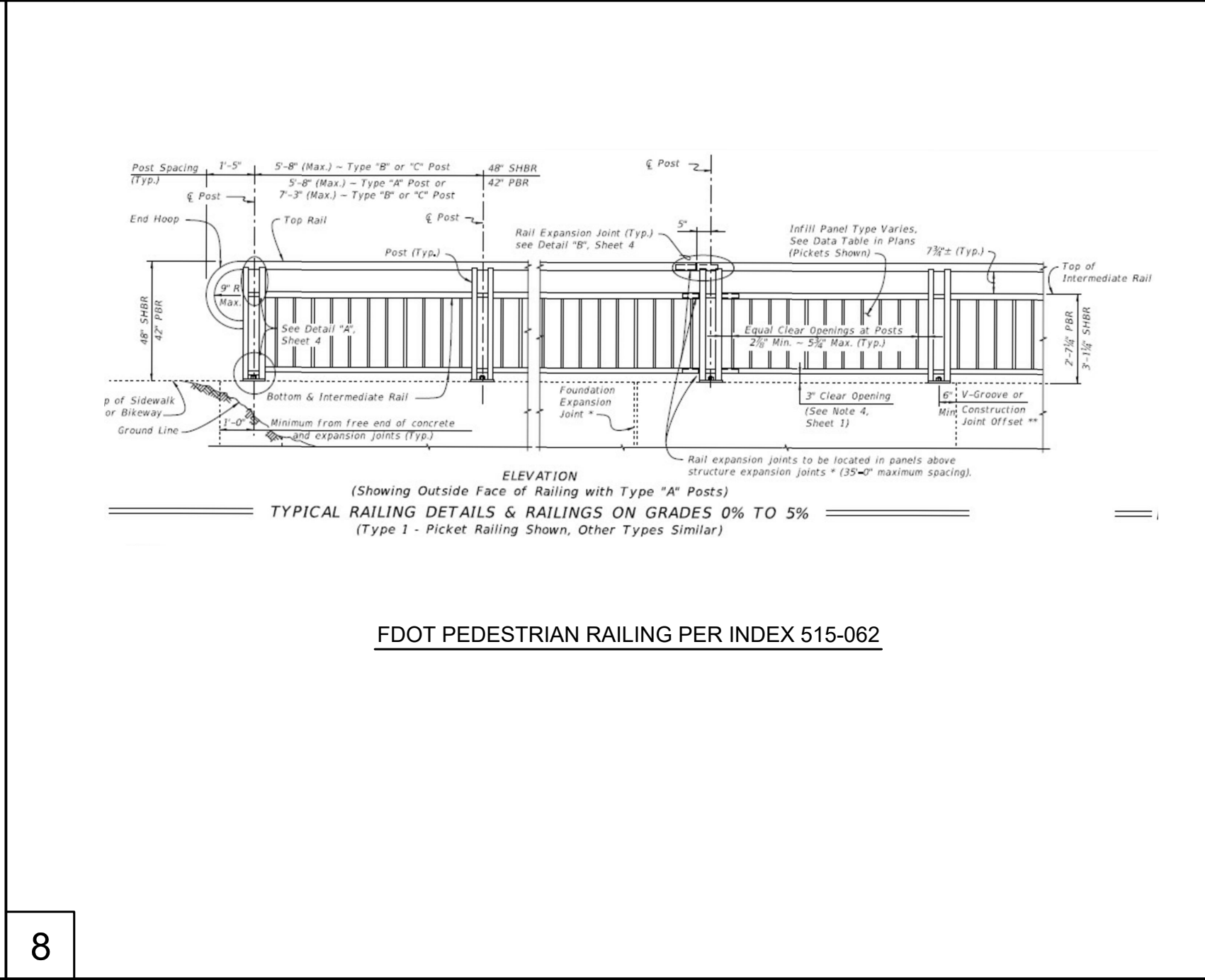
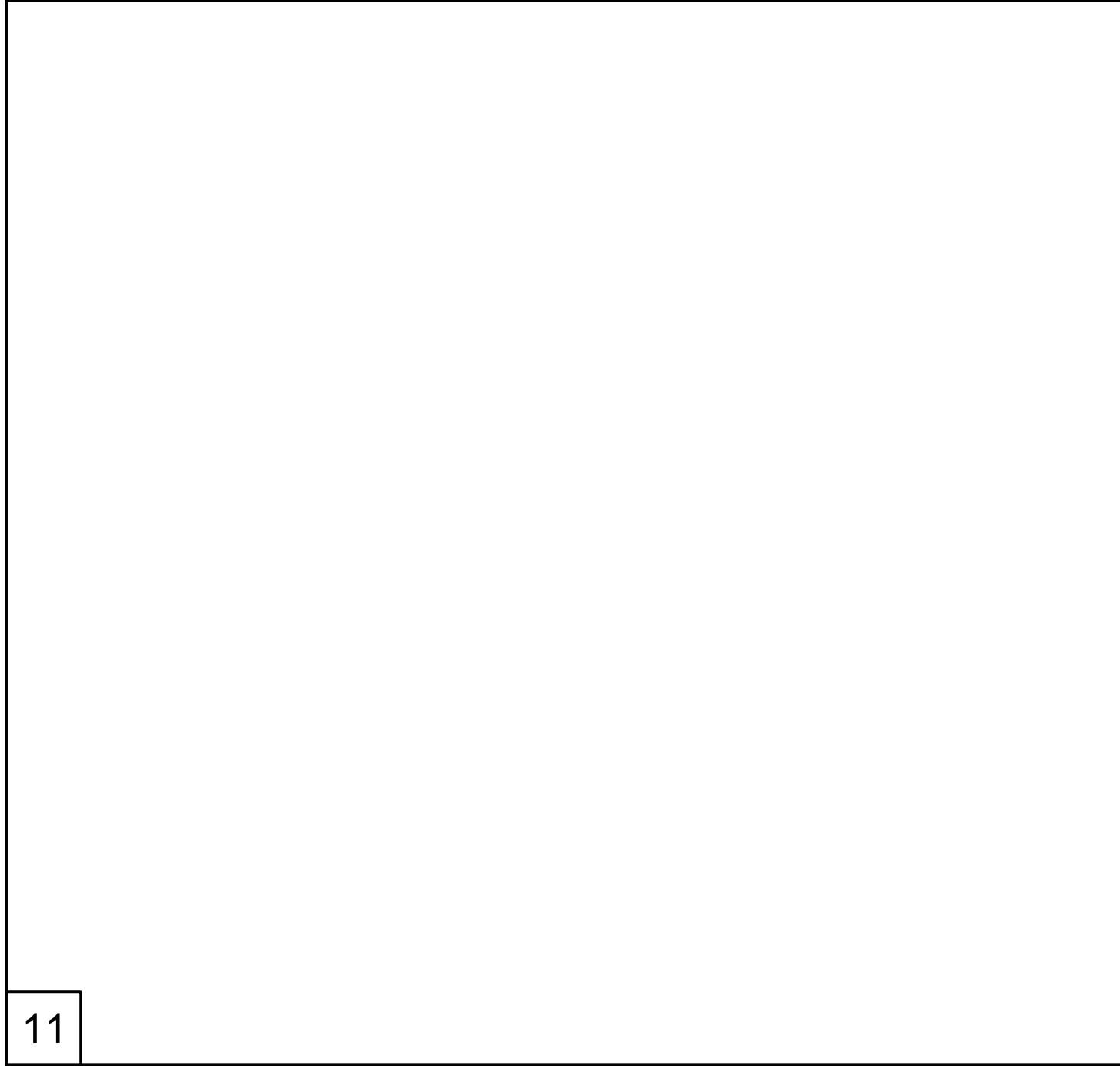
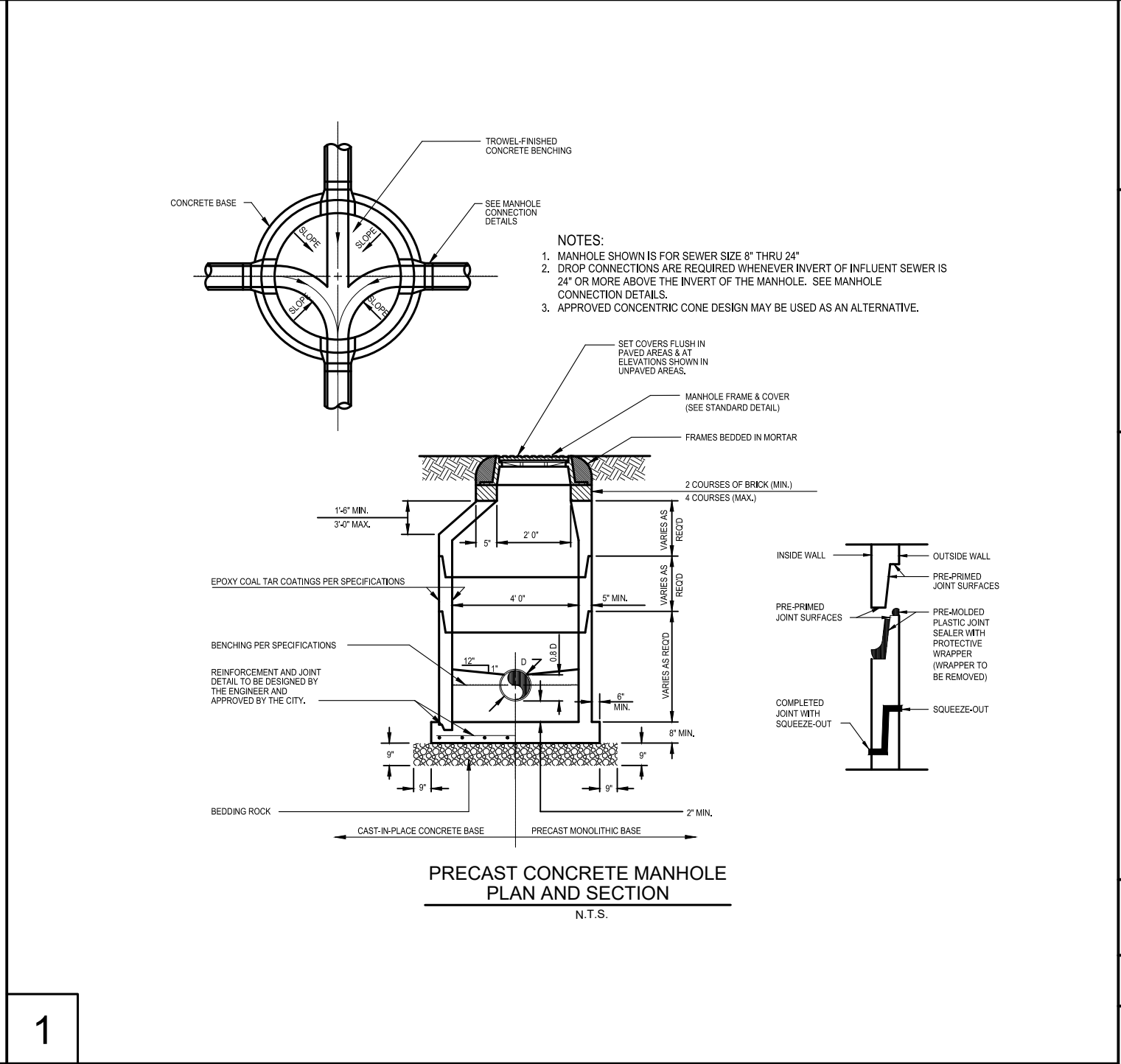
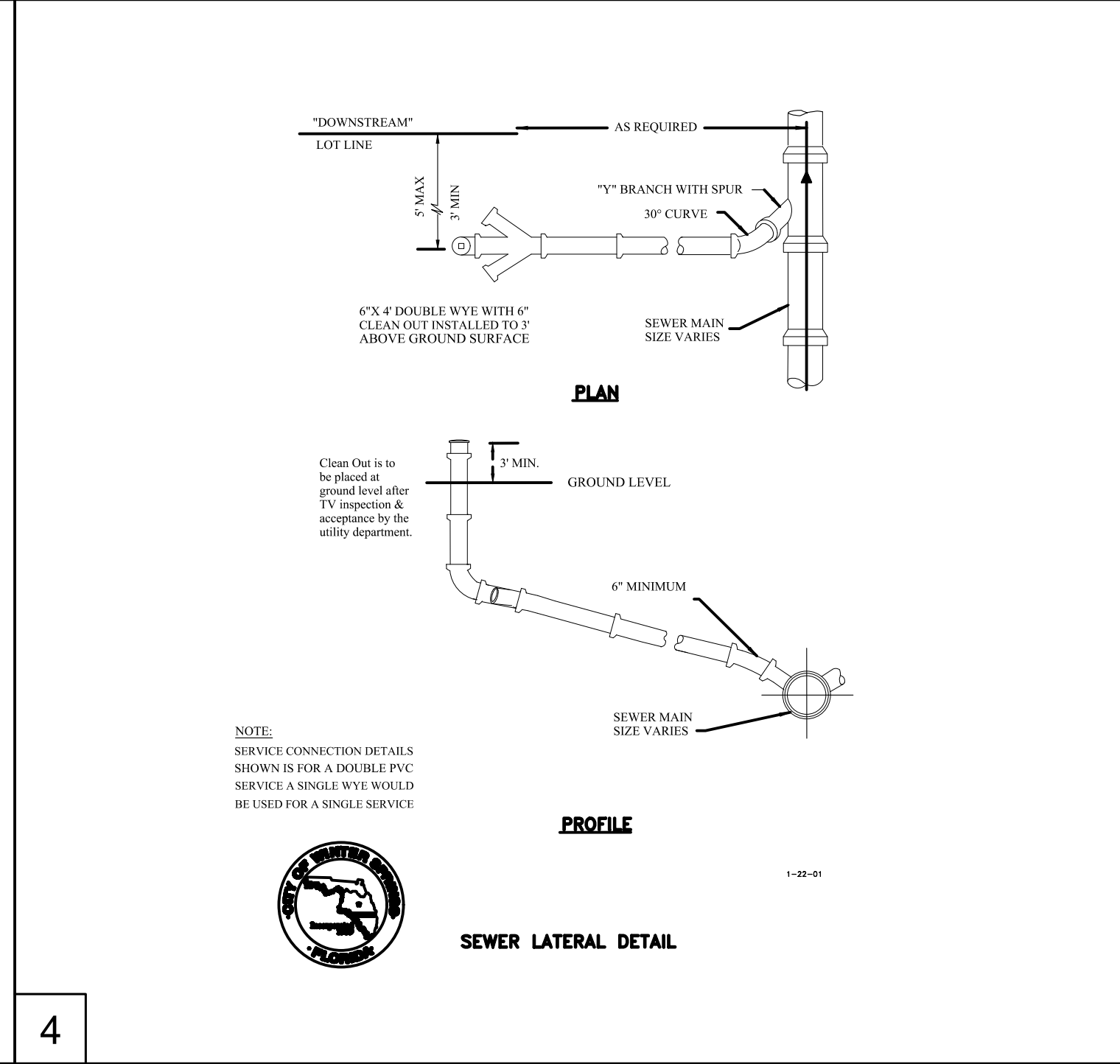
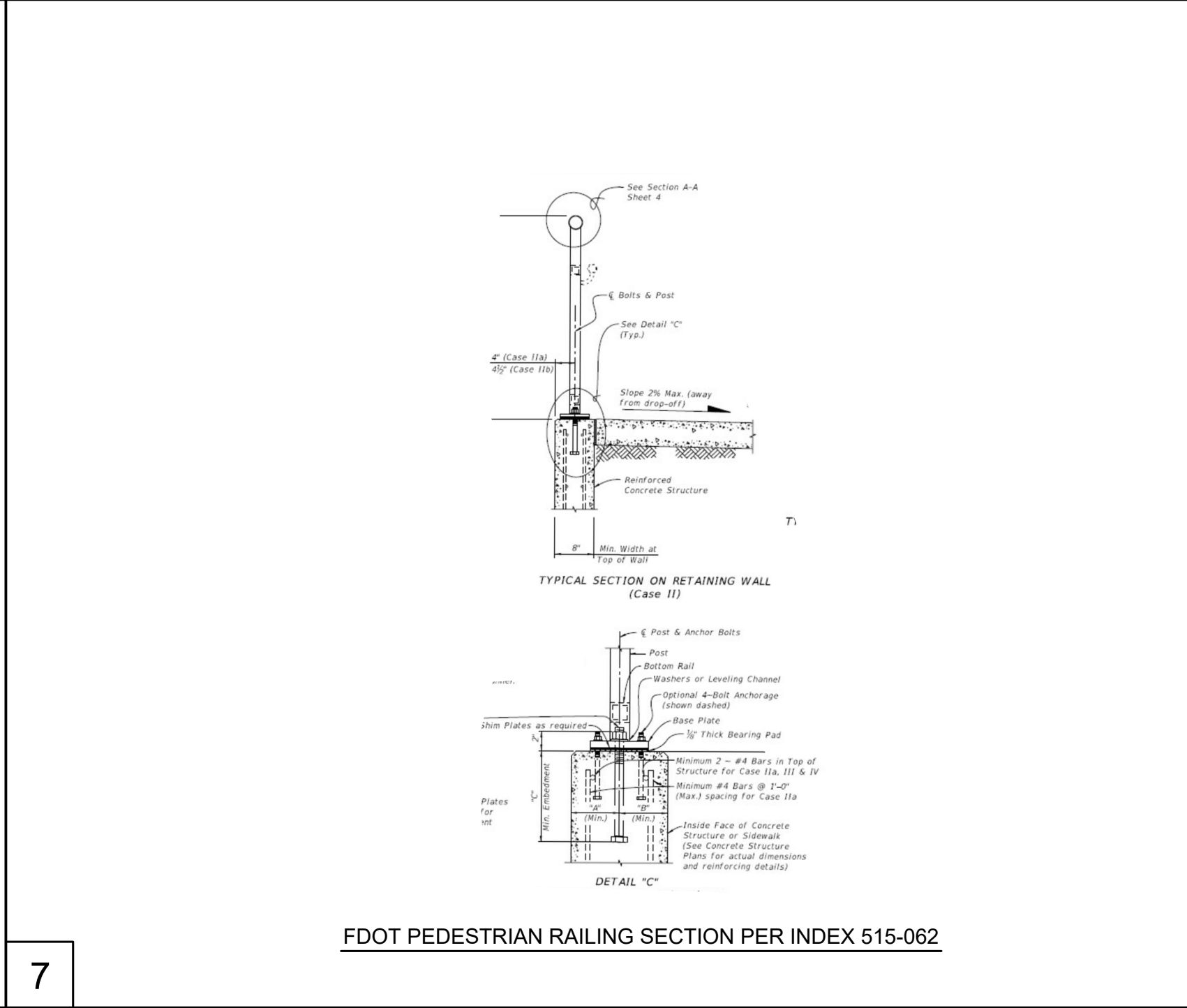
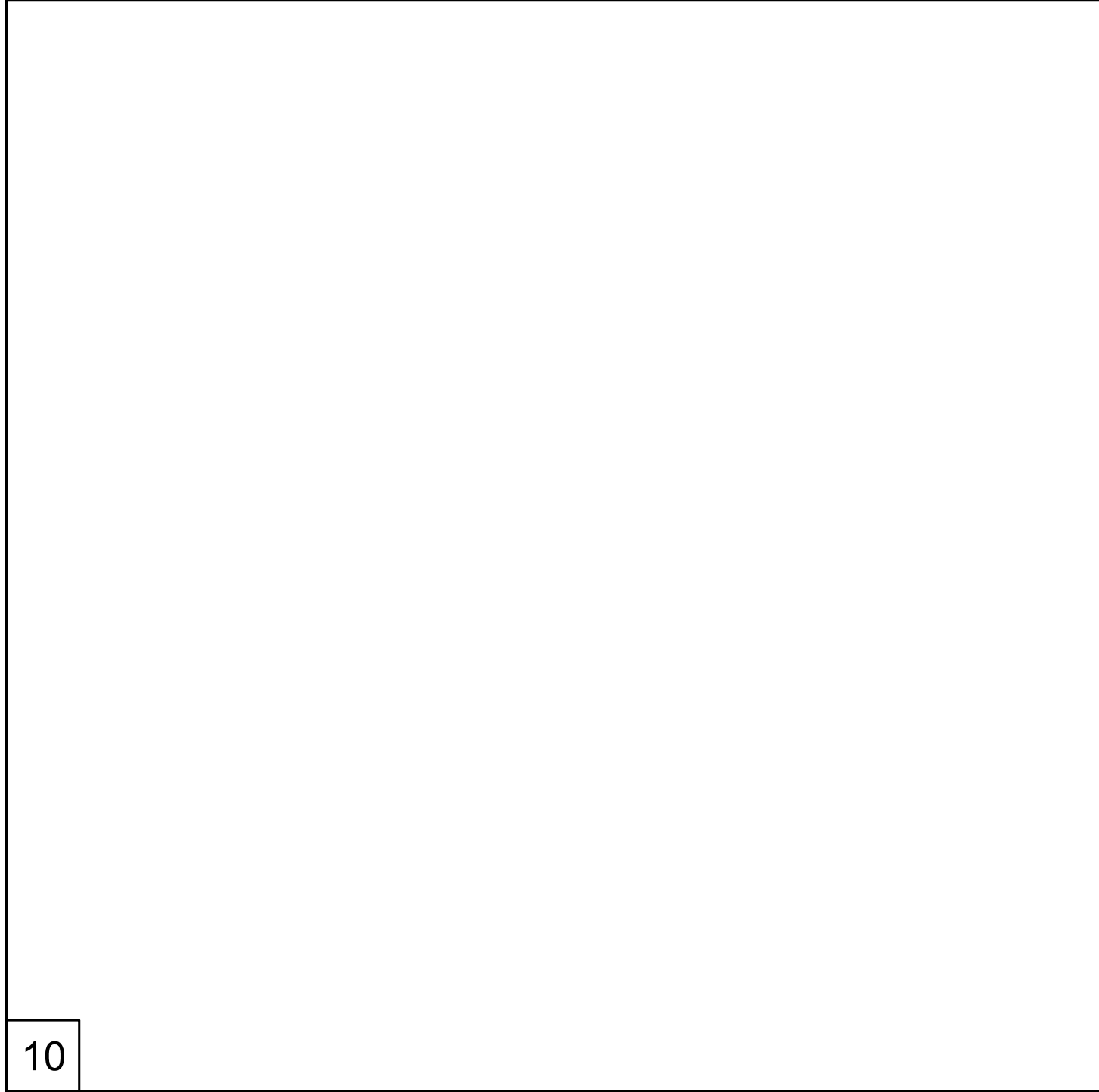
GENERAL DETAILS 1

201 S. BUMBAY AVE.
 ORLANDO, FL
 32807-9865-0371
 WWW.NVS.COM
 CERTIFICATE OF AUTHORIZATION # 20065

NVS

SHEET
 C12.0

NO. DATE REVISIONS



12

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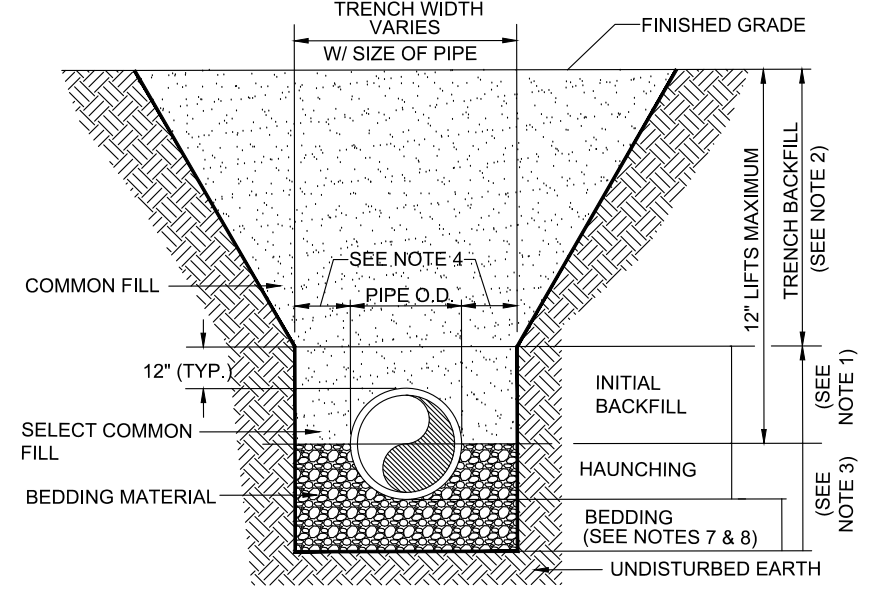
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JOB #: 17063.20 ENGINEER: FRANK A. PORTER, P.E. FL. LIC. #06092 DATE: Oct. 31, 2019	REVISIONS NO. DATE DESCRIPTION
RECORD DRAWING THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED SURVEYING AND FIELD DATA. THE ENGINEER HAS LIMITED KNOWLEDGE OF THE EXISTING CONDITIONS AND HAS NOT CONDUCTED A FULL SURVEY OF THE PROJECT. THE ENGINEER'S RESPONSIBILITY IS LIMITED TO THE DESIGN OF THE SANITARY SYSTEM AND TO THE PREPARATION OF THE RECORD DRAWING. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THE RECORD DRAWING OR THE RESULTS OF THE LIMITED SURVEYING AND FIELD DATA. THE USER OF THIS RECORD DRAWING SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF THE RECORD DRAWING AND THE RESULTS OF THE LIMITED SURVEYING AND FIELD DATA. THE ENGINEER'S LIABILITY IS LIMITED TO THE DESIGN OF THE SANITARY SYSTEM AND TO THE PREPARATION OF THE RECORD DRAWING. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THE RECORD DRAWING OR THE RESULTS OF THE LIMITED SURVEYING AND FIELD DATA. THE USER OF THIS RECORD DRAWING SHALL BE RESPONSIBLE FOR VERIFYING THE ACCURACY OF THE RECORD DRAWING AND THE RESULTS OF THE LIMITED SURVEYING AND FIELD DATA.	WINTER SPRINGS TOWNHOMES AT MICHAEL BLAKE BLVD. WINTER SPRINGS, FLORIDA FOR DREAM FINDERS HOMES LLC
WASTEWATER DETAILS	SHEET C11.0

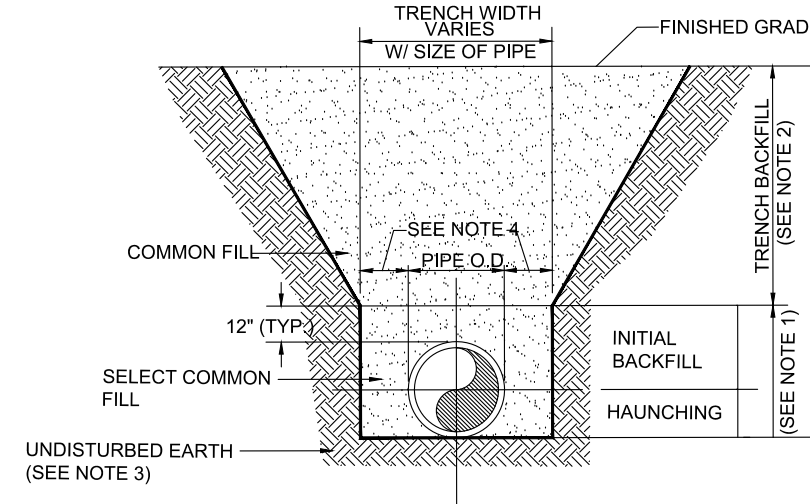
PVC PIPE APPLICATIONS
MINIMUM LINEAR FEET OF PVC PIPE TO BE RESTRAINED

FITTINGS	PVC PIPE DIAMETERS							
	4"	6"	8"	10"	12"	16"	18"	20"
TEE	30	45	70	75	95	120	140	165
END CAPS AND VALVES ON THE END OF THE MAIN	50	110	115	121	141	180	220	240
90° BENDS	40	40	45	50	60	75	75	95
45° BENDS	20	20	20	30	30	40	40	50
22 1/2° BENDS	10	10	10	10	10	20	20	20
11 1/4° BENDS	10	10	10	10	10	10	10	10



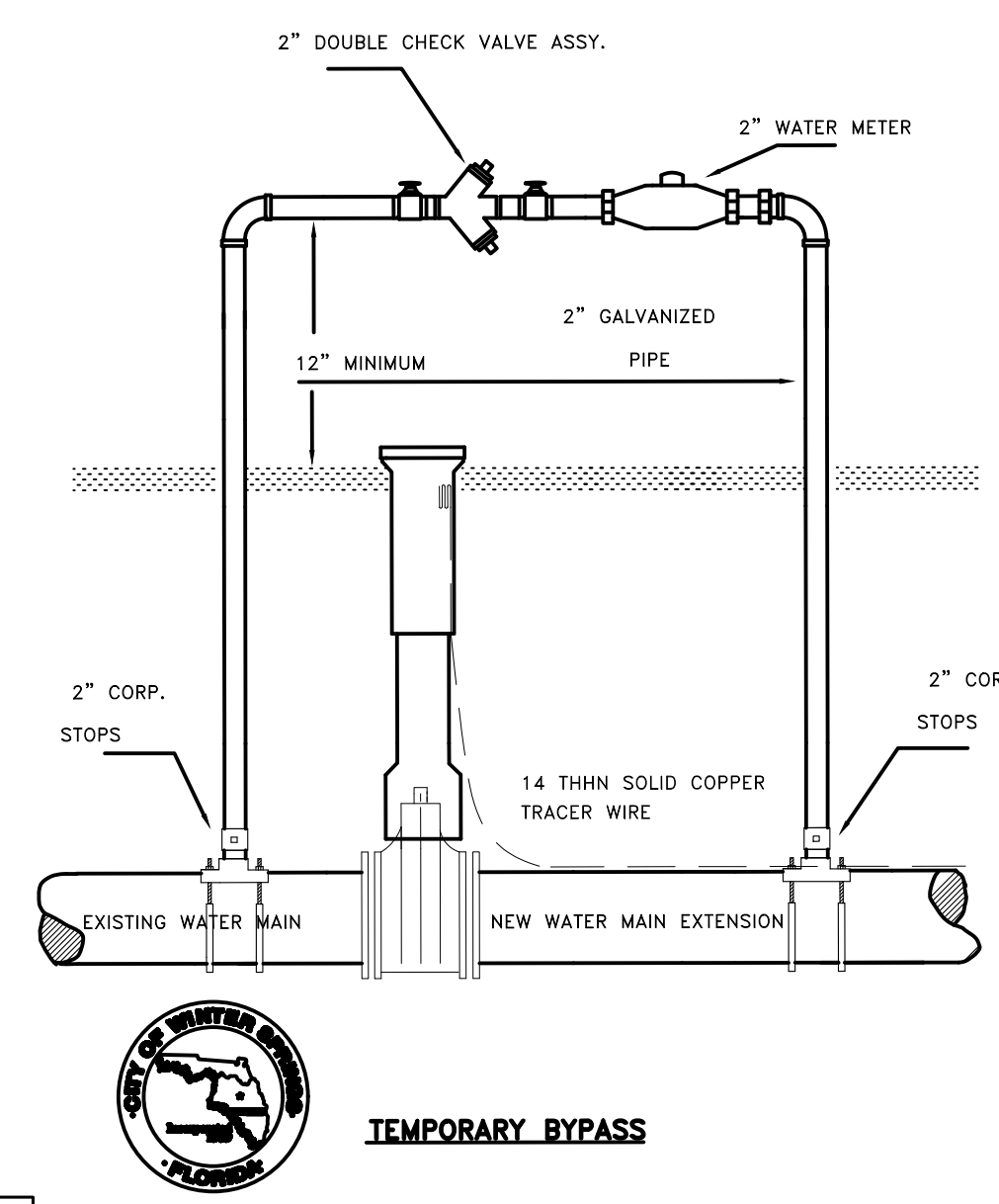
- NOTES:
 1. TRENCH BACKFILL: COMMON FILL COMPACTED TO 95% OF THE MAXIMUM DENSITY, PER AASHTO T-190. DENSITY TEST SHALL BE PROVIDED TO THE CITY BY AN APPROVED LAB.
 2. PIPE BEDDING UTILIZING SELECT COMMON FILL OR BEDDING ROCK IN ACCORDANCE WITH TYPE "A" BEDDING AND TRENCHING DETAIL MAY BE REQUIRED AS DIRECTED BY UTILITIES.
 3. 15" MAXIMUM/12" MINIMUM FOR PIPE DIAMETERS LESS THAN 24".
 4. 24" MAXIMUM/12" MINIMUM FOR PIPE DIAMETERS 24" AND LARGER.
 5. WATER SHALL NOT BE PERMITTED IN THE TRENCH DURING CONSTRUCTION.
 6. ALL PIPE TO BE INSTALLED WITH BELL FACING UPSTREAM TO THE DIRECTION OF THE FLOW.
 7. BEDDING DEPTH SHALL BE 4" MINIMUM FOR PIPE DIAMETERS UP TO 12" AND 6" MINIMUM FOR PIPE DIAMETER 16" AND LARGER.
 8. DEPTH FOR REMOVAL OF UNSUITABLE MATERIAL SHALL GOVERN DEPTH OF BEDDING ROCK BELOW THE PIPE. UTILITIES SHALL DETERMINE (IN THE FIELD) THE REQUIRED REMOVAL OF UNSUITABLE MATERIAL TO REACH SUITABLE FOUNDATION.
 9. FINAL RESTORATION IN IMPROVED AREAS SHALL BE IN COMPLIANCE WITH ALL APPLICABLE REGULATIONS OF THE GOVERNING AGENCIES.

BEDDING & TRENCHING - TYPE A
NTS

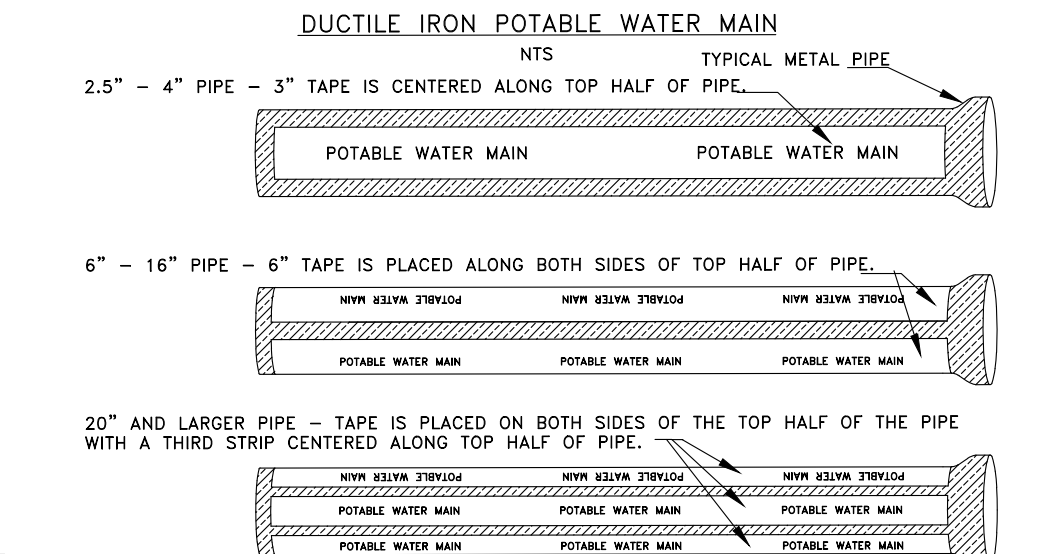


- NOTES:
 1. TRENCH BACKFILL: COMMON FILL COMPACTED TO 95% OF THE MAXIMUM DENSITY, PER AASHTO T-190. DENSITY TEST SHALL BE PROVIDED TO THE CITY BY AN APPROVED LAB.
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 3. 15" MAXIMUM/12" MINIMUM FOR PIPE DIAMETERS LESS THAN 24".
 4. 24" MAXIMUM/12" MINIMUM FOR PIPE DIAMETERS 24" AND LARGER.
 5. WATER SHALL NOT BE PERMITTED IN THE TRENCH DURING CONSTRUCTION.
 6. ALL PIPES ARE TO BE INSTALLED WITH THE BELL FACING UPSTREAM TO THE DIRECTION OF THE FLOW.
 7. FINAL RESTORATION IN IMPROVED AREAS SHALL BE IN COMPLIANCE WITH ALL APPLICABLE REGULATIONS OF THE GOVERNING AGENCIES.

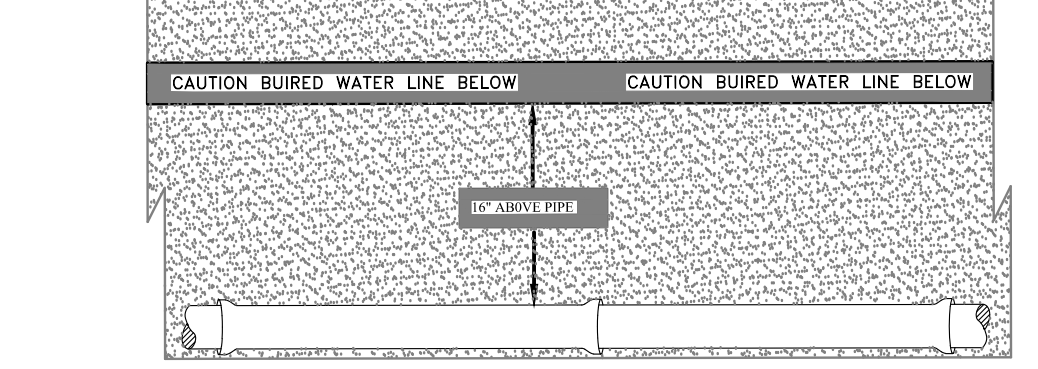
BEDDING & TRENCHING - TYPE B
NTS



TEMPORARY BYPASS



NOTE:
 LOCATE WIRE IS REQUIRED ON ALL POTABLE, REUSE AND SEWER FORCE MAINS. WIRE IS TO BE 14 GAUGE SOLID COPPER UP, 600V WITH INSULATED JACKET. WIRE IS TO BE LAID ON TOP OF PIPE AND TAPED EVERY 5' AT A MINIMUM. VALVE BOXES ARE TO BE USED AS JUNCTION POINTS WITH ACCESS TO THE WIRES. VALVE BOXES SHALL BE LOCATED NO MORE THAN 500' APART.



NOTE:
 Standard Non-Detectable Warning Tape
 Water Line Tape is 3" Wide and Blue With Black Lettering
 Sewer Line Tape is 3" Wide and Green With Black Lettering
 Force Main Tape is 3" Wide and Brown With Black Lettering

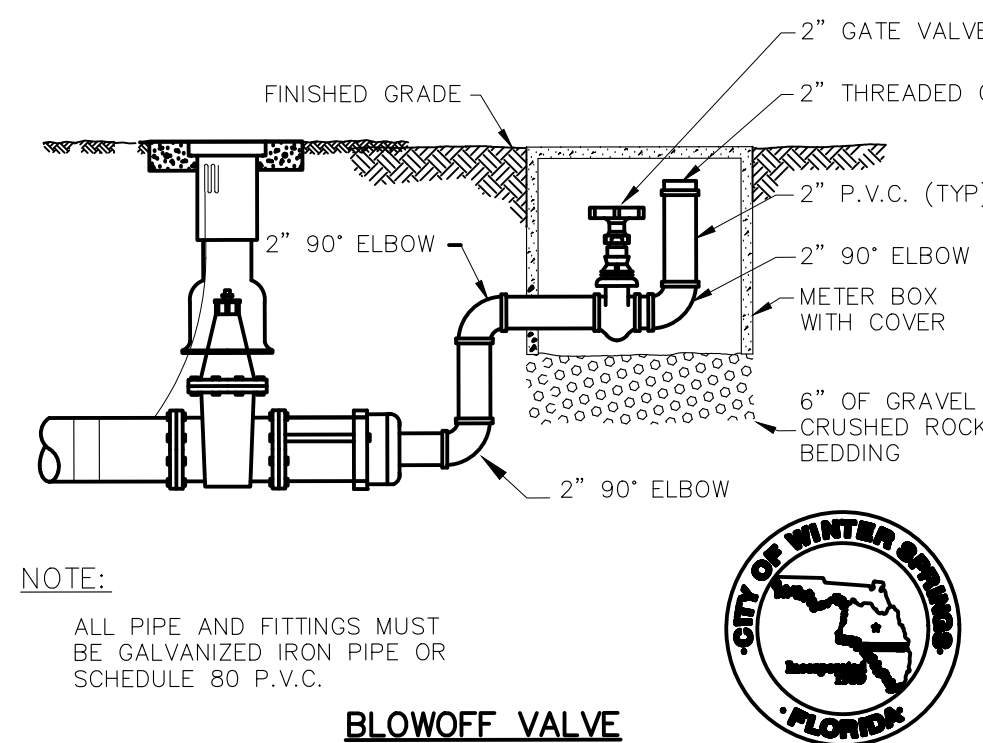
PIPE IDENTIFICATION AND WARNING TAPE

DUCTILE IRON PIPE APPLICATIONS
MINIMUM LINEAR FEET OF PVC PIPE TO BE RESTRAINED

FITTINGS	DUCTILE IRON DIAMETERS										
	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	
TEE	36	45	54	61	72	108	90	126	117	135	198
END CAPS AND VALVES ON THE END OF THE MAIN	45	90	81	126	99	153	117	171	144	216	243
90° BENDS	36	36	36	45	45	54	54	63	72	81	90
45° BENDS	18	18	18	27	27	27	27	27	36	36	45
22 1/2° BENDS	9	9	9	9	9	18	18	18	18	18	18
11 1/4° BENDS	9	9	9	9	9	9	9	9	9	9	9

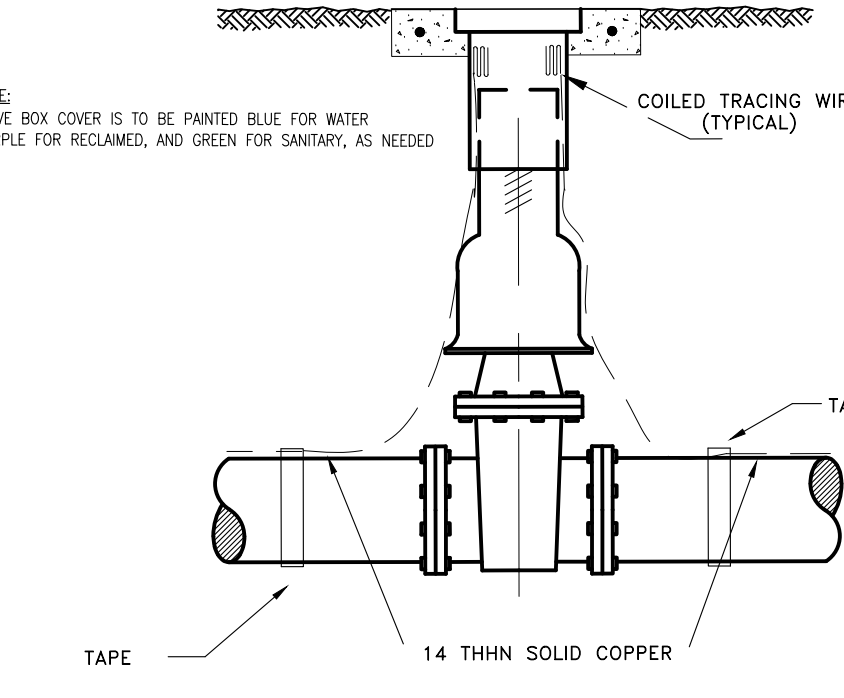
NOTE:
 * THE LINEAR FOOTAGE OF PIPE IS MEASURED FROM THE BEND OR FITTING OUT TO THE AMOUNT SHOWN ON THE CHART. ANY BELL OR JOINT THAT FALLS WITHIN THAT LINEAR FOOTAGE SHALL HAVE A BELL OR JOINT RESTRAINT INSTALLED

PIPE JOINT RESTRAINT DETAIL
NTS



NOTE:
 ALL PIPE AND FITTINGS MUST BE GALVANIZED IRON PIPE OR SCHEDULE 80 P.V.C.

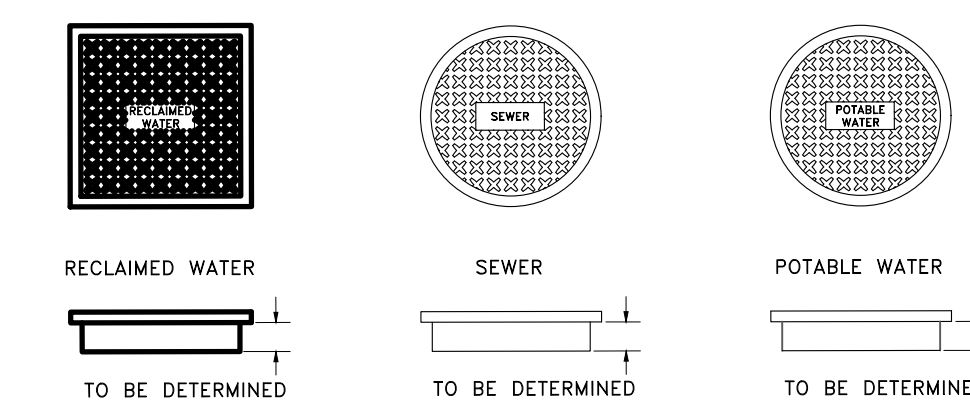
BLOWOFF VALVE



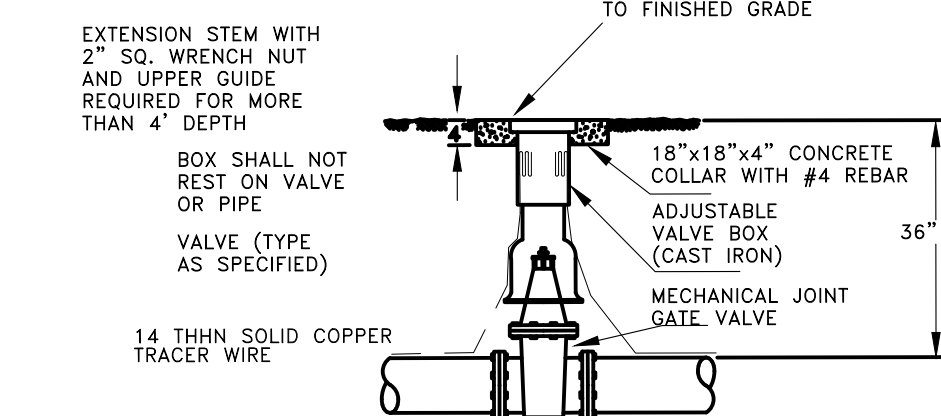
NOTE:
 VALVE BOX COVER IS TO BE PAINTED BLUE FOR WATER, PURPLE FOR RECLAIMED, AND GREEN FOR SANITARY, AS NEEDED.

- TRACING WIRE GENERAL NOTES:
 1. PIPE LINE TRACING WIRE IS TO BE INSTALLED ON ALL POTABLE WATER RECLAIMED WATER AND SEWER FORCE MAINS.
 2. SYSTEMS-TRACING WIRE SHALL ALLOW TRACABILITY OF ALL PIPE BRANCHES INCLUDING THOSE FOR HYDRANTS. TRACING WIRE SHALL BE INSTALLED OVER THE ENTIRE LENGTH OF THE MAIN AND SECURED TO THE MAIN EVERY 5 FEET WITH ADHESIVE TAPE. WIRE SHALL EXTEND A MINIMUM OF 12" ABOVE GRADE AT EACH INTERVAL AND SHALL BE COILED AND PLACED IN A VALVE BOX FOR EASY ACCESSIBILITY.
 3. ON DEAD END MAINS THE TRACING WIRE SHALL BE PLACED IN A PROPERLY IDENTIFIED PVC VALVE BOX AT THE END OF THE RUN.

TRACING WIRE CONNECTION

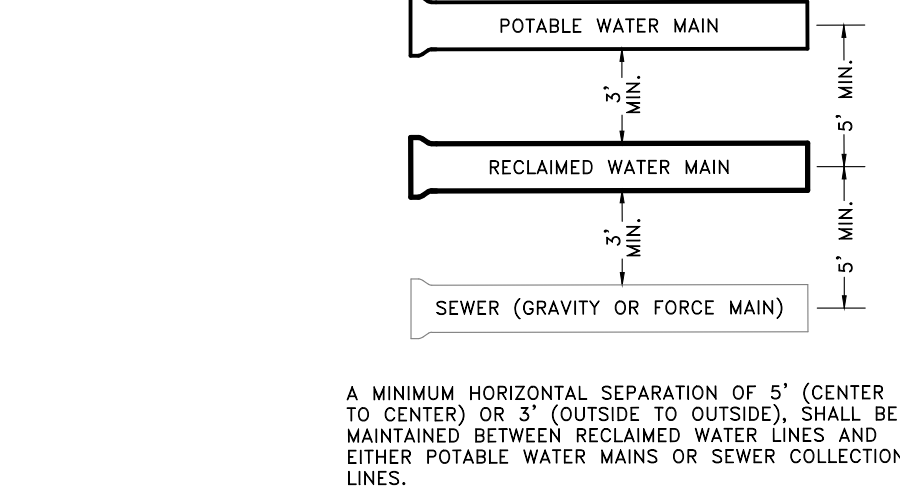


TYPICAL VALVE BOX COVER DETAILS

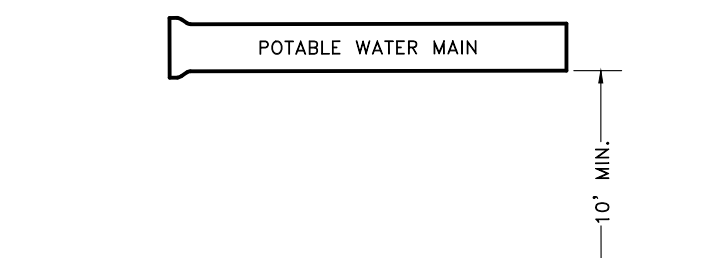


TYPICAL VALVE AND VALVE BOX DETAIL

VALVE, VALVE BOX AND COVER

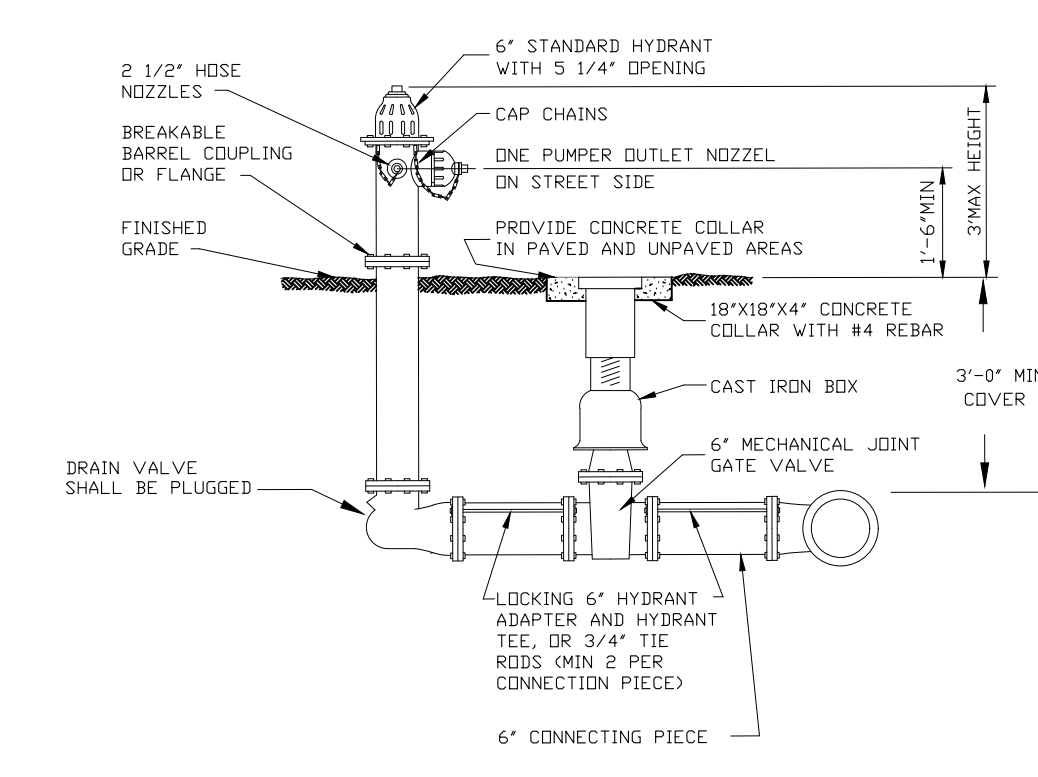


A MINIMUM HORIZONTAL SEPARATION OF 5' (CENTER TO CENTER) OR 3' (OUTSIDE TO OUTSIDE), SHALL BE MAINTAINED BETWEEN RECLAIMED WATER LINES AND EITHER POTABLE WATER MAINS OR SEWER COLLECTION LINES.



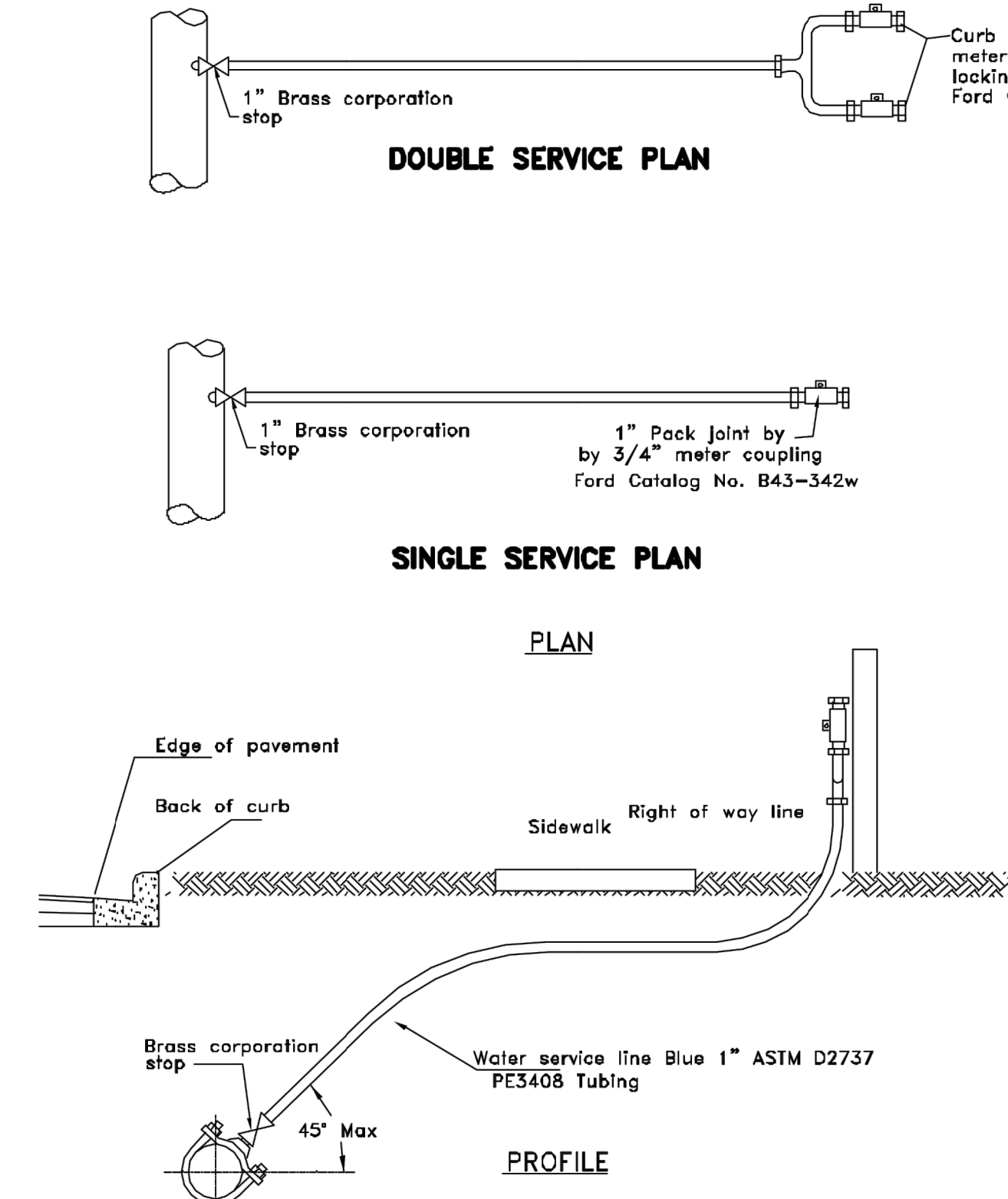
A MINIMUM HORIZONTAL SEPARATION OF 10' (OUTSIDE TO OUTSIDE), SHALL BE MAINTAINED BETWEEN SEWER COLLECTION LINES AND POTABLE WATER MAINS.

MINIMUM HORIZONTAL SEPARATION REQUIREMENTS FOR POTABLE, RECLAIMED, AND SEWER LINES



- NOTES:
 1. THE HYDRANTS ACCEPTABLE TO THE CITY OF WINTER SPRINGS SHALL BE EITHER THE CLOW # 45 MEDALION AMERICAN BARLING 8048, OR THE MUELLER A-162.
 2. ENTIRE ASSEMBLY SHALL BE PAINTED SHERWIN WILLIAMS SAFETY YELLOW.
 3. GRIP RING OR MEGA LUG RESTRAINTS MAY BE USED IN PLACE OF ALL THREAD RODS

FIRE HYDRANT ASSEMBLY



DOUBLE SERVICE PLAN

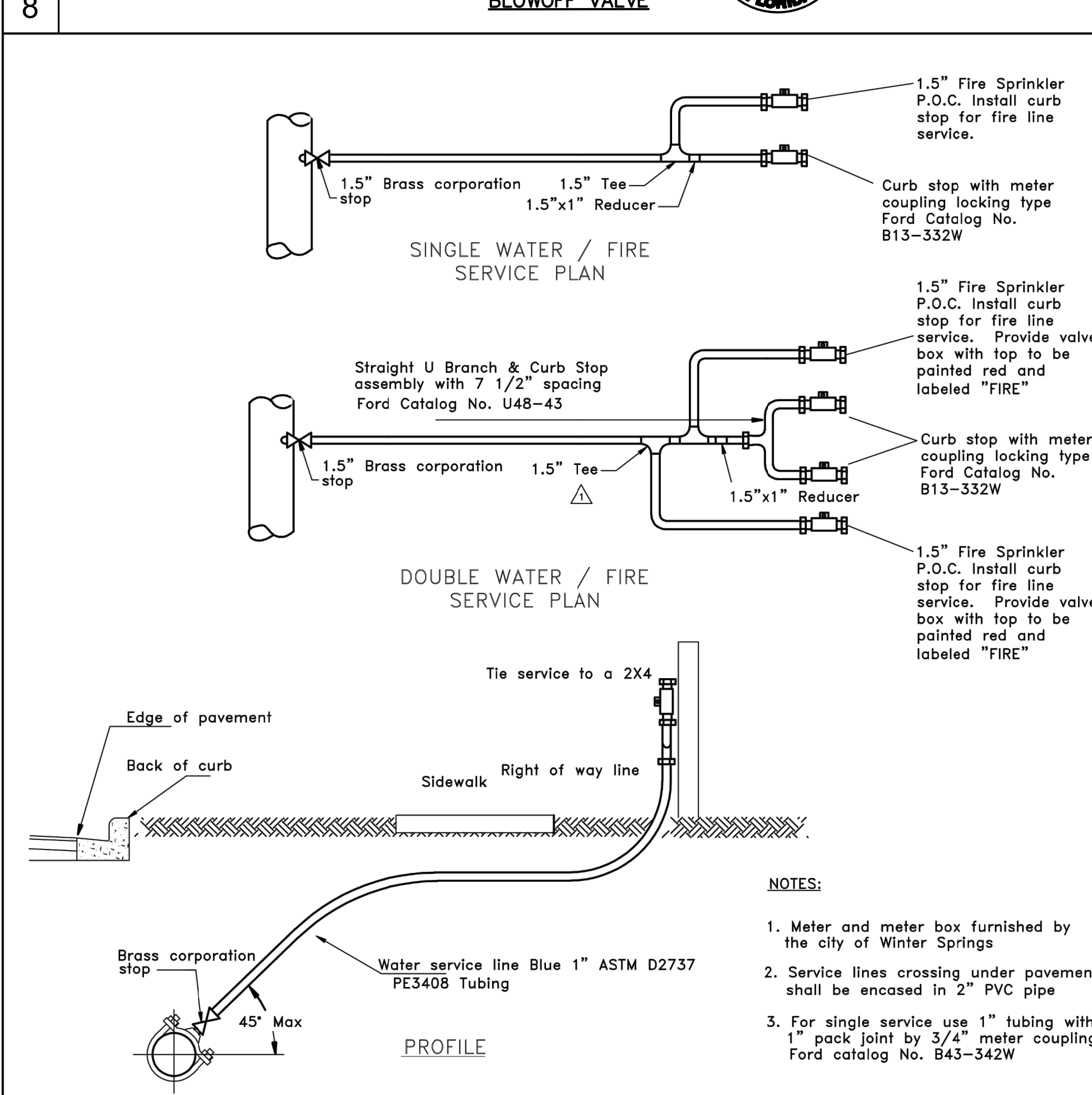
SINGLE SERVICE PLAN

PLAN

PROFILE

- NOTES:
 1. Meter and meter box furnished by the city of Winter Springs
 2. Service lines crossing under pavement shall be encased in 2" PVC pipe
 3. For single service use 1" tubing with a 1" pack joint by 3/4" meter coupling Ford catalog No. B43-342W

Potable Water Service Line



SINGLE WATER / FIRE SERVICE PLAN

DOUBLE WATER / FIRE SERVICE PLAN

PROFILE

- NOTES:
 1. Meter and meter box furnished by the city of Winter Springs
 2. Service lines crossing under pavement shall be encased in 2" PVC pipe
 3. For single service use 1" tubing with a 1" pack joint by 3/4" meter coupling Ford catalog No. B43-342W

POTABLE WATER/FIRE SERVICE CONNECTION

11

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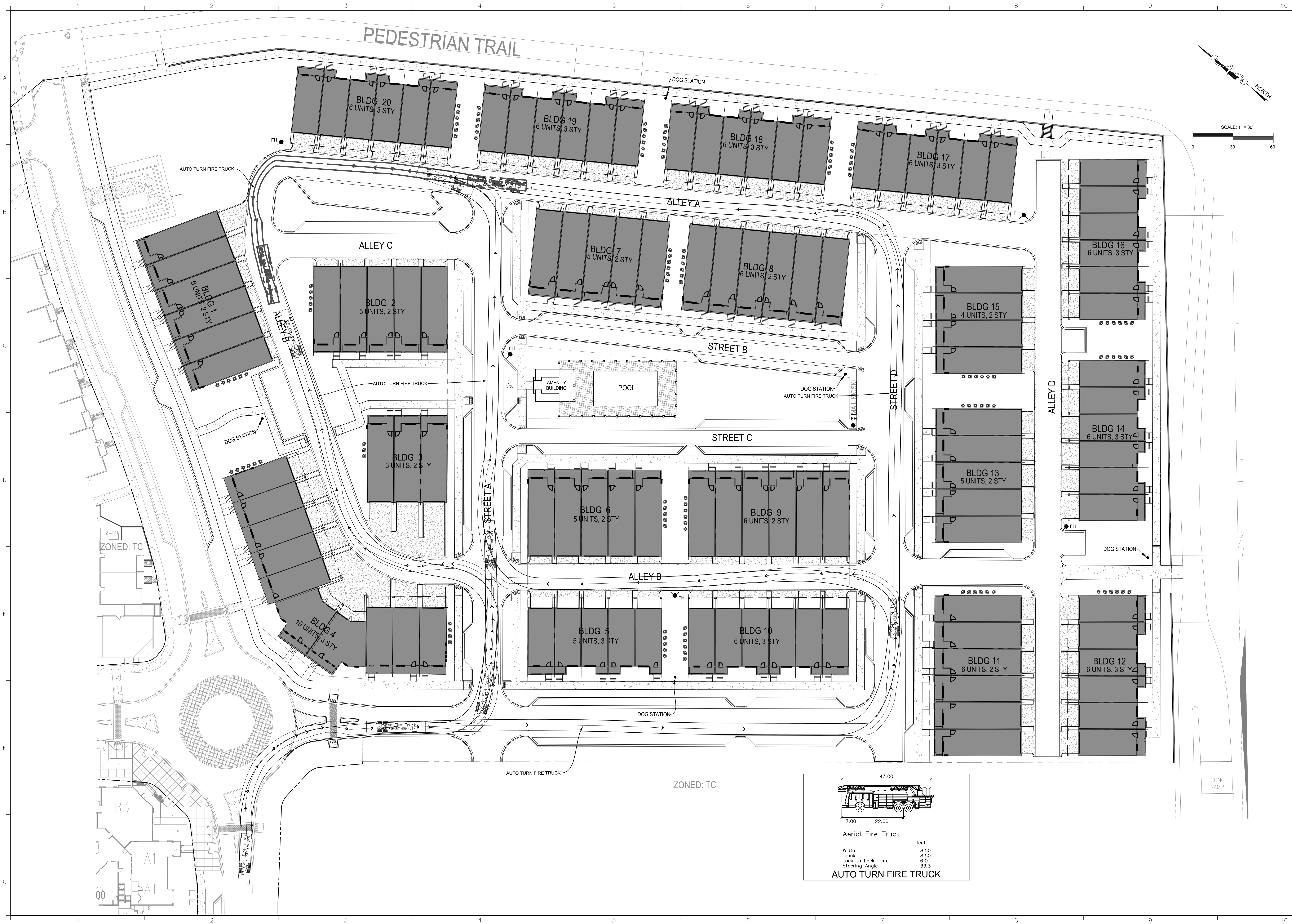
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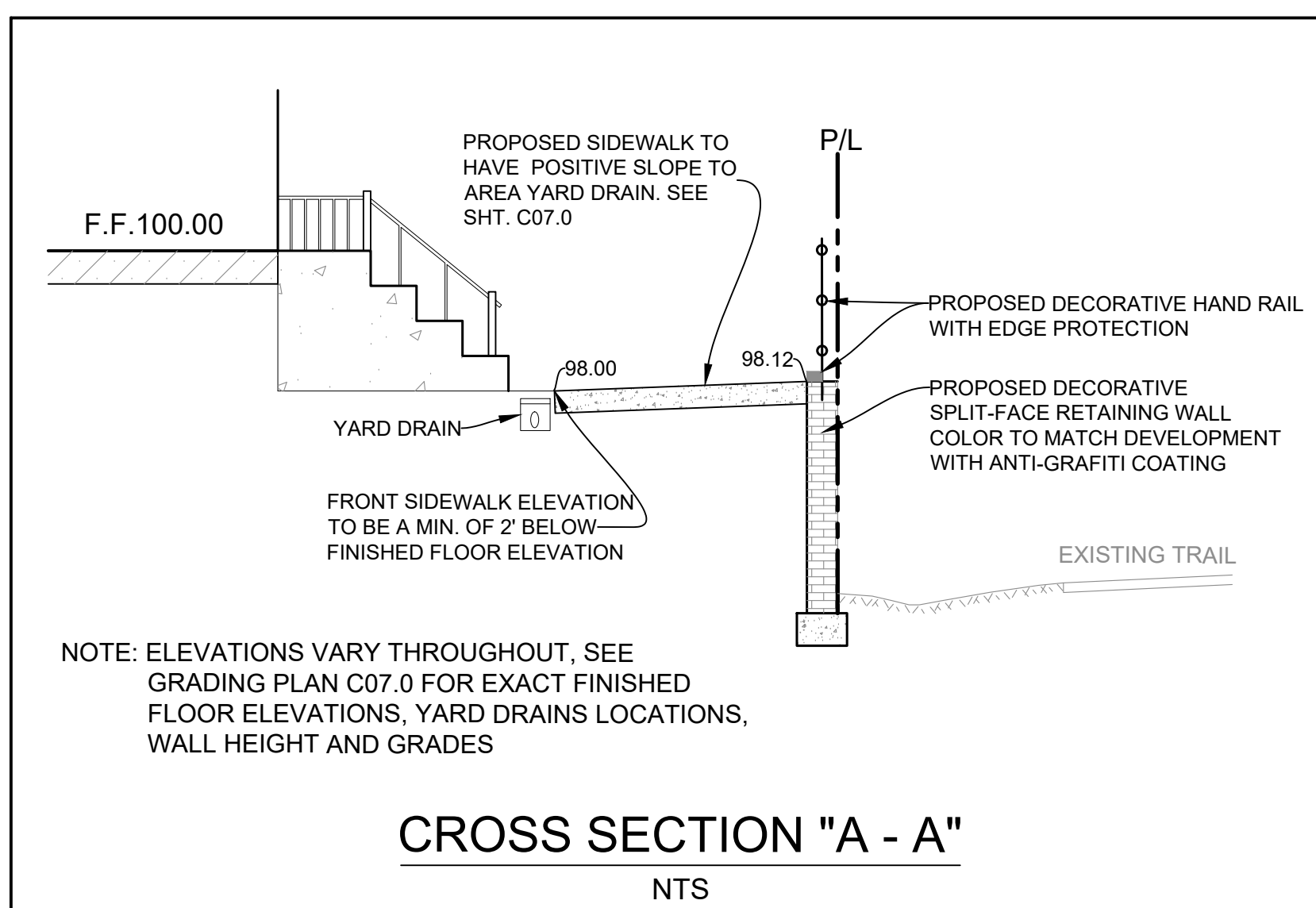
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<p>ENGINEER FRANK A. PORTER, P.E. FL LIC #89892</p>	<p>DESIGNER RID</p>	<p>DATE Oct. 31, 2019</p>
<p>PROJECT WINTER SPRINGS TOWNHOMES AT MICHAEL BLAKE BLVD. WINTER SPRINGS, FLORIDA</p>	<p>CLIENT DREAM FINDERS HOMES LLC</p>	<p>NO. DATE</p>
<p>RECORD DRAWING THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED SURVEYING AND FIELD VERIFICATION OF THE EXISTING CONDITIONS. THE ENGINEER HAS CONDUCTED VISUAL GENERAL VERIFICATION OF THE EXISTING CONDITIONS AND HAS NOT CONDUCTED ANY OTHER SURVEYING OR TESTING. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THE INFORMATION PROVIDED HEREIN. THE ENGINEER'S LIABILITY IS LIMITED TO THE PROFESSIONAL SERVICES PROVIDED BY THE ENGINEER.</p>	<p>REVISIONS</p>	<p>FLIC #</p>
<p>PROJECT LOCATION 201 S. BUMBAY AVE. ORLANDO, FL 32807 WWW.NV5.COM</p>	<p>CERTIFICATE OF AUTHORIZATION # 20065</p>	<p>DATE Oct. 31, 2019</p>
<p>PROJECT TITLE FIRE TRUCK ACCESS PLAN</p>	<p>PROJECT NO. C09.0</p>	<p>SCALE 1" = 30'</p>
<p>PROJECT NO. C09.0</p>	<p>PROJECT TITLE FIRE TRUCK ACCESS PLAN</p>	<p>PROJECT NO. C09.0</p>



NOTE: ELEVATIONS VARY THROUGHOUT, SEE GRADING PLAN C07.0 FOR EXACT FINISHED FLOOR ELEVATIONS, YARD DRAINS LOCATIONS, WALL HEIGHT AND GRADES

STRUCTURE DETAILS:

NAME TYPE VG INL TYPE IMH TYPE 5 INL TYPE 9 INL TYPE C INL YARD DRAIN	REFERENCE 2017-2018 FDOT DESIGN STANDARD 221 2017-2018 FDOT DESIGN STANDARD 201 2017-2018 FDOT DESIGN STANDARD 211 2017-2018 FDOT DESIGN STANDARD 211 2017-2018 FDOT DESIGN STANDARD 214 2017-2018 FDOT DESIGN STANDARD 232 NYLOPLAST 12" DOME INLET
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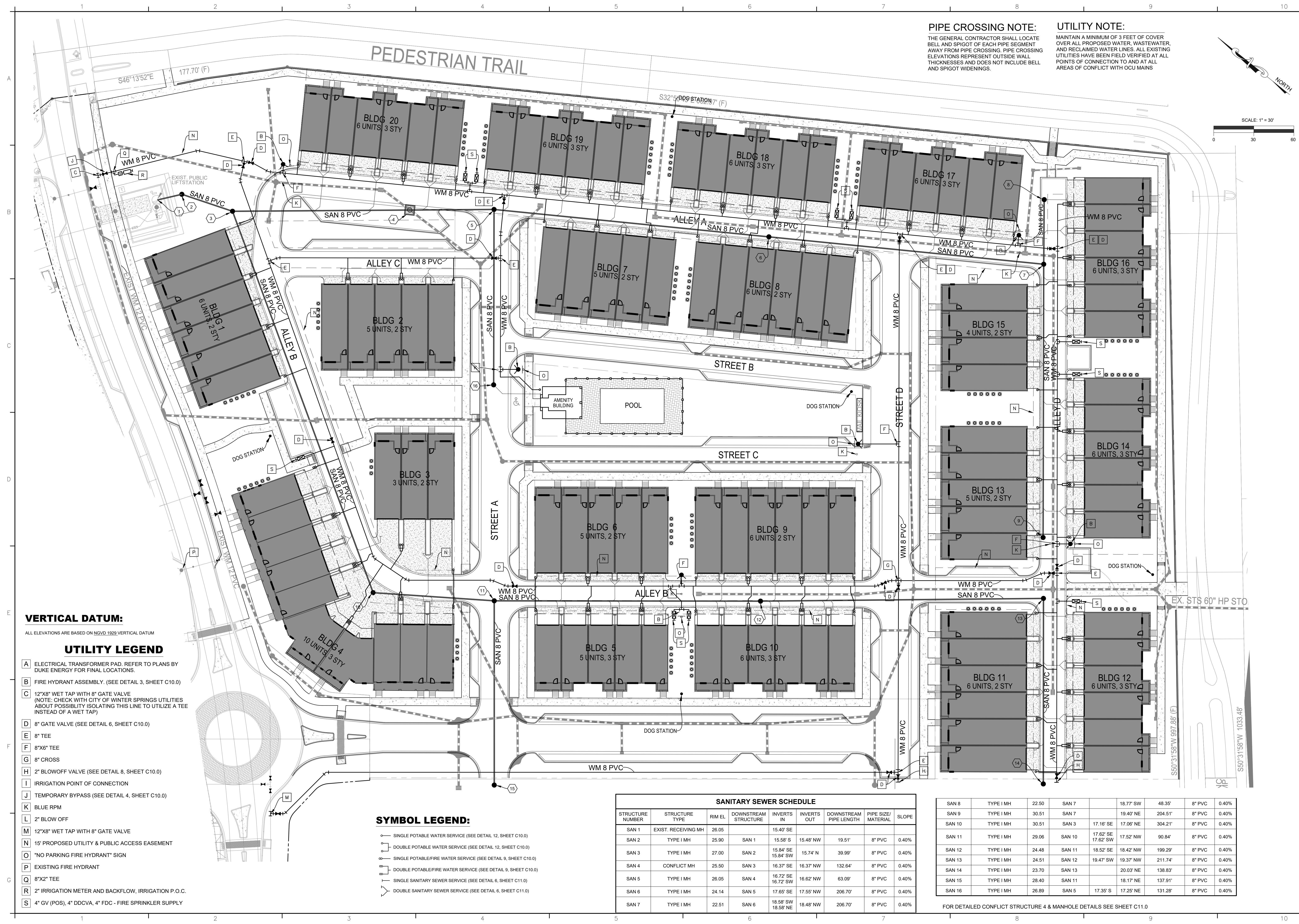
VERTICAL DATUM:

ALL ELEVATIONS ARE BASED ON NGVD 1929 VERTICAL DATUM

STORM SEWER SCHEDULE								
STR NO.	STR TYPE	GRATE/RIM/EOP ELEV	DOWNSTREAM STR NO.	INVERTS IN	INVERTS OUT	DS PIPE LENGTH	PIPE SIZE/MATERIAL	SLOPE
STS 1	TYPE VG INL	24.68	STS 4	19.82' SW	15.51' SE	25'	48" HP STORM PP	0.22%
STS 2	TYPE 5 INL	24.76	STS 1	19.87' SW	19.87' NE	18'	18" HP STORM PP	0.30%
STS 3	TYPE VG INL	26.29	STS 2		20.20' NE	111'	15" HP STORM PP	0.30%
STS 4	TYPE IMH	25.25	STS 7	15.45' NW	15.45' SE	120'	48" HP STORM PP	0.23%
STS 7	TYPE 6	26.00	STS 10	15.16' NW 21.41' SW 18.58' NE	15.16' SE	79'	48" HP STORM PP	0.23%
STS 8	TYPE C INL	26.50	STS 7		21.50' NE	29'	18" HP STORM PP	0.32%
STS 9	YARD DRAIN	23.50	STS 7		19.25' SW	70'	12" PVC	0.97%
STS 10	TYPE C INL	25.00	STS 11	14.98' NW	14.98' S	26'	48" HP STORM PP	0.22%
STS 11	CONFLICT MH	25.50	STS 12	14.92' N	14.92' S	66'	48" HP STORM PP	0.22%
STS 12	TYPE IMH	26.12	STS 14	14.77' N 21.23' E	14.77' SW	32'	60" HP STORM PP	0.22%
STS 13	TYPE C INL	25.67	STS 12		21.42' W	63'	15" HP STORM PP	0.30%
STS 14	TYPE VG INL	25.97	STS 16	14.70' NE 21.84' SE	14.70' SW	84'	60" HP STORM PP	0.22%
STS 15	TYPE VG INL	25.97	STS 14		21.70' NW	22'	15" HP STORM PP	0.27%
STS 16	TYPE IMH	27.10	STS 19	14.51' NE 21.92' NW	14.51' SW	34'	60" HP STORM PP	0.22%
STS 17	TYPE C INL	29.49	STS 16	22.37' NW	22.37' SE	127'	18" HP STORM PP	0.30%
STS 18	TYPE 5 INL	27.47	STS 17		22.71' SE	114'	18" HP STORM PP	0.30%
STS 19	TYPE IMH	27.55	STS 20	14.44' NE	14.44' SE	146'	60" HP STORM PP	0.22%
STS 20	TYPE 9 INL	22.54	STS 21	14.12' NW	14.12' SE	120'	60" HP STORM PP	0.22%
STS 21	TYPE 9 INL	22.20	STS 22	13.85' NW	13.85' SE	39'	60" HP STORM PP	0.20%
STS 22	TYPE VG	22.25	STS 27	13.77' NW 16.60' NE	13.77' SW	95'	60" HP STORM PP	0.22%
STS 23	TYPE VG INL	21.40	STS 22	16.84' NW	16.84' SW	81'	18" HP STORM PP	0.30%
STS 24	TYPE 9 INL	21.40	STS 23	16.91' NW	16.90' SE	22'	18" HP STORM PP	0.27%
STS 25	TYPE VG INL	21.55	STS 24	17.00' NW	17.00' SE	26'	18" HP STORM PP	0.31%
STS 26	TYPE 9 INL	23.87	STS 25		18.12' SE	113'	18" HP STORM PP	0.99%
STS 27	TYPE IMH	23.53	STS 46	13.56' NE 13.56' SW 18.87' NW	13.56' SE	104'	60" HP STORM PP	0.22%
STS 28	TYPE C INL	23.55	STS 27	19.00' NW	19.00' SE	43'	18" HP STORM PP	0.30%
STS 29	TYPE C INL	24.19	STS 28		19.35' SE	118'	18" HP STORM PP	0.30%
STS 30	TYPE VG INL	23.28	STS 27	16.03' W 16.03' NW	13.65' NE	31'	48" HP STORM PP	0.30%
STS 30.1	TYPE 9 INL	23.28	STS 30		16.25' SE	22'	15" HP STORM PP	1.00%
STS 31	TYPE 6 INL	23.86	STS 30	16.23' SW 16.29' NW	16.23' E	68'	48" HP STORM PP	0.30%
STS 32	TYPE 6 INL	23.90	STS 31	16.17' SW	16.35' NE	37'	36" HP STORM PP	0.32%
STS 33	TYPE IMH	24.50	STS 32		16.22' NE	16'	36" HP STORM PP	0.32%
STS 34	TYPE VG INL	24.61	STS 31	17.62' NW 20.24' SW	17.62' SE	80'	36" HP STORM PP	1.66%
STS 35	TYPE VG INL	24.81	STS 34		20.31' NE	22'	15" HP STORM PP	0.30%
STS 36	TYPE VG INL	26.21	STS 34	19.43' NW 21.63' SW	19.43' SE	109'	36" HP STORM PP	1.66%
STS 37	TYPE VG INL	26.21	STS 36		21.70' NE	22'	15" HP STORM PP	0.30%
STS 38	TYPE 6 INL	27.59	STS 36	20.72' NW 23.00' NE 22.90' SW	20.72' SE	78'	36" HP STORM PP	1.66%
STS 38A	TYPE 6 INL	27.59	STS 38		23.00' NE	35'	18" HP STORM PP	0.28%
STS 39	TYPE C INL	29.00	STS 38		24.50' SW	108'	18" HP STORM PP	1.39%
STS 40	TYPE 6 INL	28.32	STS 38	22.30' NW 20.85' SW	20.85' SE	45'	36" HP STORM PP	0.30%
STS 41	TYPE 6 INL	28.32	STS 40	20.93' SW	20.93' NE	26'	36" HP STORM PP	0.30%
STS 42	TYPE C INL	29.00	STS 41		21.00' NE	25'	36" HP STORM PP	0.30%
STS 43	TYPE IMH	31.94	STS 40	22.62' N	22.62' SE	106'	18" HP STORM PP	0.30%
STS 44	TYPE IMH	31.48	STS 43	22.76' NE	22.76' S	46'	18" HP STORM PP	0.30%
STS 45	TYPE IMH	30.60	STS 44		22.93' SW	56'	18" HP STORM PP	0.30%
STS 46	TYPE C INL	24.25	STS 69	13.33' NW 15.11' NE 19.77' SW	13.33' SE	77'	60" HP STORM PP	0.22%
STS 47	TYPE C INL	24.10	STS 46	15.34' NE	15.34' SW	77'	30" HP STORM PP	0.30%
STS 48	TYPE C INL	23.38	STS 47	15.65' NE	15.65' SW	102'	24" HP STORM PP	0.30%
STS 49	TYPE IMH	22.40	STS 48	15.86' NW	15.86' SW	71'	24" HP STORM PP	0.30%
STS 50	TYPE C INL	22.00	STS 49	15.92' NW 16.78' NE	15.92' SE	21'	18" HP STORM PP	0.30%
STS 51	YARD DRAIN	22.00	STS 50	16.95' NE	16.95' SW	17'	12" PVC	1.00%
STS 52	YARD DRAIN	21.50	STS 51	17.41' SE	17.41' SW	46'	10" PVC	1.00%
STS 53	YARD DRAIN	21.50	STS 52		17.75' NW	34'	10" PVC	1.00%
STS 54	TYPE C INL	23.35	STS 50	16.33' NE 17.41' NW	16.33' SE	138'	18" HP STORM PP	0.30%
STS 55	YARD DRAIN	22.18	STS 54	17.10' SE 17.10' NW	17.10' SW	77'	12" PVC	1.00%
STS 56	YARD DRAIN	21.80	STS 55	17.60' SE	17.60' NW	50'	10" PVC	1.00%
STS 57	YARD DRAIN	21.80	STS 56		18.00' NW	40'	10" PVC	1.00%
STS 58	YARD DRAIN	23.10	STS 55	18.68' NW	18.68' SE	50'	10" PVC	3.16%
STS 59	YARD DRAIN	23.55	STS 58		19.75' SE	33'	10" PVC	3.27%
STS 60	TYPE C INL	24.30	STS 54	17.61' NW	17.61' SE	66'	18" HP STORM PP	0.30%
STS 61	TYPE C INL	25.50	STS 60	17.83' NE	17.83' SE	74'	18" HP STORM PP	0.30%
STS 62	YARD DRAIN	24.30	STS 61	18.60' NW	18.60' SW	77'	12" PVC	1.00%
STS 63	YARD DRAIN	24.40	STS 62	19.10' NW	19.10' SE	50'	10" PVC	1.00%
STS 64	YARD DRAIN	24.40	STS 63	19.50' NW	19.50' SE	40'	10" PVC	1.00%
STS 65	YARD DRAIN	24.30	STS 64	20.00' NW	20.00' SE	50'	10" PVC	1.00%
STS 66	YARD DRAIN	24.40	STS 65	20.50' NW	20.50' SE	50'	10" PVC	1.00%
STS 67	YARD DRAIN	24.40	STS 66		20.90' SE	40'	10" PVC	1.00%
STS 68	TYPE C INL	24.30	STS 46		20.00' NE	77'	15" HP STORM PP	0.30%
STS 69	TYPE IMH	19.55	STS 78	13.16' NW 15.28' E	13.16' S	17'	60" HP STORM PP	0.18%
STS 70	YARD DRAIN	19.50	STS 69	15.44' NE	15.44' W	16'	12" PVC	1.00%
STS 71	YARD DRAIN	23.80	STS 70	16.10' NE	16.10' SW	66'	12" PVC	1.00%
STS 72	YARD DRAIN	23.80	STS 71	16.50' NE	16.50' SW	40'	12" PVC	1.00%
STS 73	YARD DRAIN	22.00	STS 72	17.16' NE	17.16' SW	66'	10" PVC	1.00%
STS 74	YARD DRAIN	22.00	STS 73	17.60' NE	17.60' SW	44'	10" PVC	1.00%
STS 75	YARD DRAIN	22.00	STS 74		18.00' SW	40'	10" PVC	1.00%
STS 76	YARD DRAIN	23.40	STS 77		19.00' NE	40'	10" PVC	3.00%
STS 77	YARD DRAIN	23.40	STS 78	17.80' SW	16.35' NE	45'	10" PVC	3.00%
STS 78	TYPE IMH	20.63		13.13' N 15.00' SW	13.12' SE	65'	60" HP STORM PP	3.45%

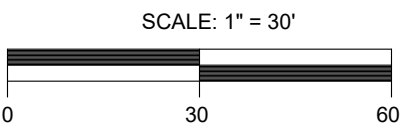
NOTE: STRUCTURES 2A, 5 AND 6 ARE NO LONGER IN USE

RECORD DRAWING <small>THIS RECORD DRAWING IS BASED ON THE RESULTS OF A LIMITED SURVEY OF CONSTRUCTION PERFORMED IN ACCORDANCE WITH THE FLORIDA ENGINEERING AND SURVEYING BOARD'S REGULATIONS AND THE FLORIDA ENGINEERING AND SURVEYING BOARD'S REGULATIONS. THE ENGINEER BEARS THE RESPONSIBILITY FOR THE ACCURACY OF THE INFORMATION PROVIDED HEREON AND THE USER OF THIS DRAWING SHOULD CONSULT THE RECORD DRAWING FOR THE LATEST REVISIONS.</small>	REVISIONS <table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	DATE	DESCRIPTION						
NO.	DATE	DESCRIPTION								
WINTER SPRINGS TOWNHOMES <small>AT</small> MICHAEL BLAKE BLVD. WINTER SPRINGS, FLORIDA <small>FOR</small> DREAM FINDERS HOMES LLC	STRUCTURES DATA									
NVS <small>201 S. BUMBAY AVE. ORLANDO, FL (407) 986-5371 WWW.NVS.COM</small>	<small>CERTIFICATE OF AUTHORIZATION # 20065</small>									
<small>JOB #:</small> 17063.20 <small>ENGINEER:</small> FRANK A. PORTER, P.E. <small>FL LIC. #</small> 96902 <small>PLI. MGR.:</small> <small>DESIGNER:</small> <small>DATE:</small> Oct. 28, 2019 <small>ENGINEER:</small> GCR	C07.1 <small>SHEET</small>									



PIPE CROSSING NOTE:
 THE GENERAL CONTRACTOR SHALL LOCATE BELL AND SPIGOT OF EACH PIPE SEGMENT AWAY FROM PIPE CROSSING. PIPE CROSSING ELEVATIONS REPRESENT OUTSIDE WALL THICKNESSES AND DOES NOT INCLUDE BELL AND SPIGOT WIDENINGS.

UTILITY NOTE:
 MAINTAIN A MINIMUM OF 3 FEET OF COVER OVER ALL PROPOSED WATER, WASTEWATER, AND RECLAIMED WATER LINES. ALL EXISTING UTILITIES HAVE BEEN FIELD VERIFIED AT ALL POINTS OF CONNECTION TO AND AT ALL AREAS OF CONFLICT WITH OCU MAINS



VERTICAL DATUM:
 ALL ELEVATIONS ARE BASED ON NGVD 1929 VERTICAL DATUM

- UTILITY LEGEND**
- A ELECTRICAL TRANSFORMER PAD. REFER TO PLANS BY DUKE ENERGY FOR FINAL LOCATIONS.
 - B FIRE HYDRANT ASSEMBLY. (SEE DETAIL 3, SHEET C10.0)
 - C 12"X8" WET TAP WITH 8" GATE VALVE (NOTE: CHECK WITH CITY OF WINTER SPRINGS UTILITIES ABOUT POSSIBILITY ISOLATING THIS LINE TO UTILIZE A TEE INSTEAD OF A WET TAP)
 - D 8" GATE VALVE (SEE DETAIL 6, SHEET C10.0)
 - E 8" TEE
 - F 8"X6" TEE
 - G 8" CROSS
 - H 2" BLOWOFF VALVE (SEE DETAIL 8, SHEET C10.0)
 - I IRRIGATION POINT OF CONNECTION
 - J TEMPORARY BYPASS (SEE DETAIL 4, SHEET C10.0)
 - K BLUE RPM
 - L 2" BLOW OFF
 - M 12"X8" WET TAP WITH 8" GATE VALVE
 - N 15' PROPOSED UTILITY & PUBLIC ACCESS EASEMENT
 - O "NO PARKING FIRE HYDRANT" SIGN
 - P EXISTING FIRE HYDRANT
 - Q 8"X2" TEE
 - R 2" IRRIGATION METER AND BACKFLOW, IRRIGATION P.O.C.
 - S 4" GV (POS), 4" DDCVA, 4" FDC - FIRE SPRINKLER SUPPLY

- SYMBOL LEGEND:**
- SINGLE POTABLE WATER SERVICE (SEE DETAIL 12, SHEET C10.0)
 - DOUBLE POTABLE WATER SERVICE (SEE DETAIL 12, SHEET C10.0)
 - SINGLE POTABLE/FIRE WATER SERVICE (SEE DETAIL 9, SHEET C10.0)
 - DOUBLE POTABLE/FIRE WATER SERVICE (SEE DETAIL 9, SHEET C10.0)
 - SINGLE SANITARY SEWER SERVICE (SEE DETAIL 6, SHEET C11.0)
 - DOUBLE SANITARY SEWER SERVICE (SEE DETAIL 6, SHEET C11.0)

SANITARY SEWER SCHEDULE								
STRUCTURE NUMBER	STRUCTURE TYPE	RIM EL	DOWNSTREAM STRUCTURE	INVERTS IN	INVERTS OUT	DOWNSTREAM PIPE LENGTH	PIPE SIZE/MATERIAL	SLOPE
SAN 1	EXIST. RECEIVING MH	26.05	SAN 1	15.40' SE	15.48' NW	19.51'	8" PVC	0.40%
SAN 2	TYPE I MH	25.90	SAN 1	15.58' S	15.48' NW	19.51'	8" PVC	0.40%
SAN 3	TYPE I MH	27.00	SAN 2	15.84' SE 15.84' SW	15.74' N	39.99'	8" PVC	0.40%
SAN 4	CONFLICT MH	25.50	SAN 3	16.37' SE	132.64'	8" PVC	0.40%	
SAN 5	TYPE I MH	26.05	SAN 4	16.72' SE 16.72' SW	16.62' NW	63.09'	8" PVC	0.40%
SAN 6	TYPE I MH	24.14	SAN 5	17.65' SE	17.55' NW	206.70'	8" PVC	0.40%
SAN 7	TYPE I MH	22.51	SAN 6	18.58' SW 18.58' NE	18.48' NW	206.70'	8" PVC	0.40%

SAN 8	TYPE I MH	22.50	SAN 7	18.77' SW	48.35'	8" PVC	0.40%	
SAN 9	TYPE I MH	30.51	SAN 7	19.40' NE	204.51'	8" PVC	0.40%	
SAN 10	TYPE I MH	30.51	SAN 3	17.16' SE 17.06' NE	304.21'	8" PVC	0.40%	
SAN 11	TYPE I MH	29.06	SAN 10	17.62' SE 17.62' SW	17.52' NW	90.84'	8" PVC	0.40%
SAN 12	TYPE I MH	24.48	SAN 11	18.52' SE	18.42' NW	199.29'	8" PVC	0.40%
SAN 13	TYPE I MH	24.51	SAN 12	19.47' SW	19.37' NW	211.74'	8" PVC	0.40%
SAN 14	TYPE I MH	23.70	SAN 13	20.03' NE	138.83'	8" PVC	0.40%	
SAN 15	TYPE I MH	28.40	SAN 11	18.17' NE	137.91'	8" PVC	0.40%	
SAN 16	TYPE I MH	26.89	SAN 5	17.35' S 17.25' NE	131.28'	8" PVC	0.40%	

FOR DETAILED CONFLICT STRUCTURE 4 & MANHOLE DETAILS SEE SHEET C11.0

JOB #: 17063.20
 ENGINEER: FRANK A. PORTER, P.E.
 FL LIC #06902
 PROJECT MGR: FAP
 DESIGNER: RID
 DATE: OCT. 31, 2019
 ENGINEER: GCR

RECORD DRAWING
 THIS RECORD DRAWING IS BASED ON THE RESULTS OF A LIMITED NUMBER OF CONVEYANCE PERMITS FOR EXISTING PLANS AND UTILITIES. THE FIELD VERIFICATION OF EXISTING UTILITIES HAS BEEN COMPLETED. THE ENGINEER DOES NOT WARRANT THE ACCURACY OF THE INFORMATION PROVIDED HEREON.

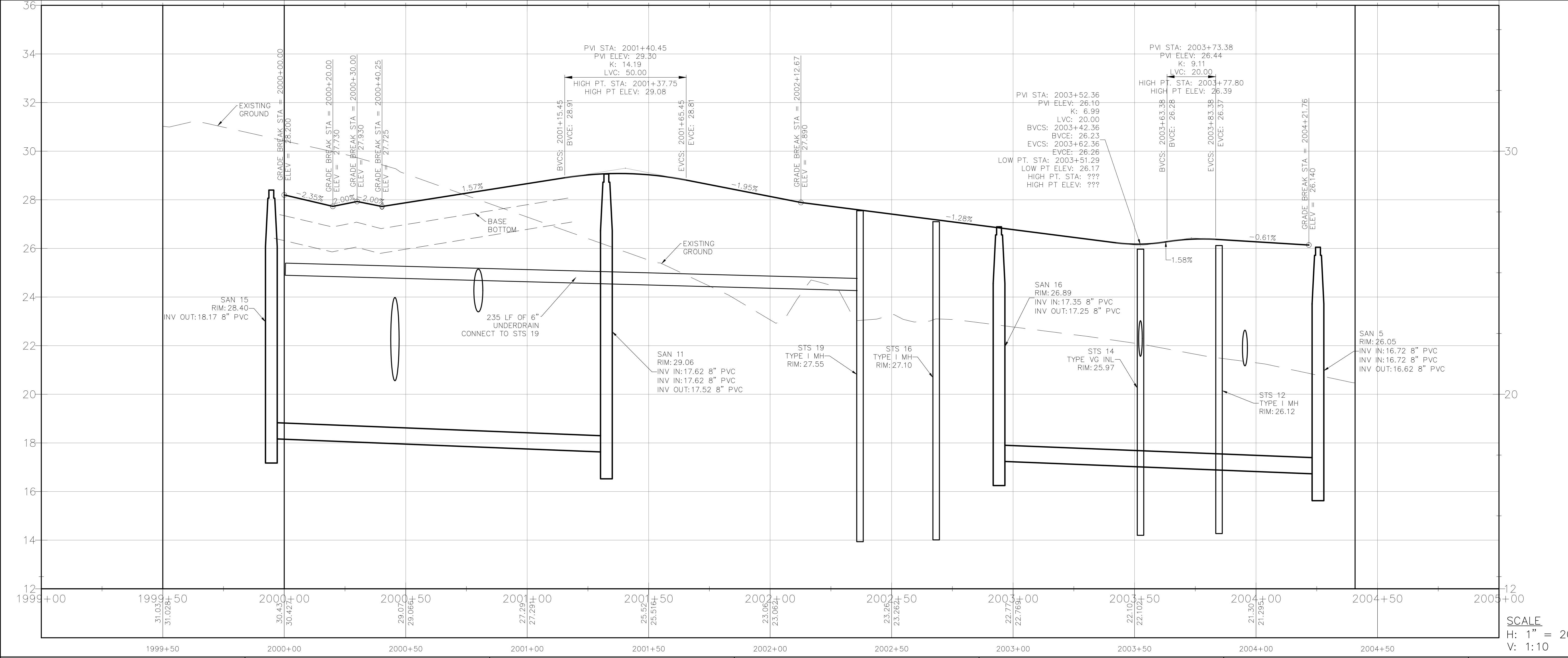
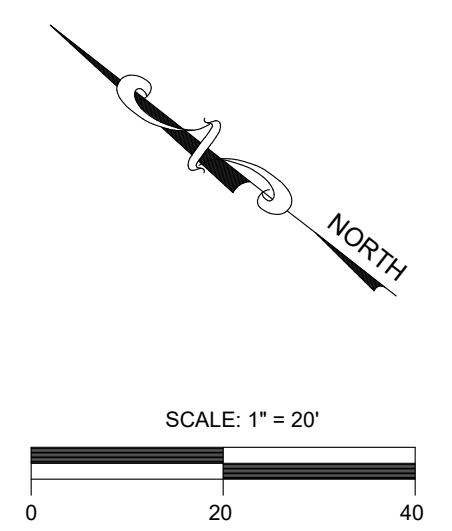
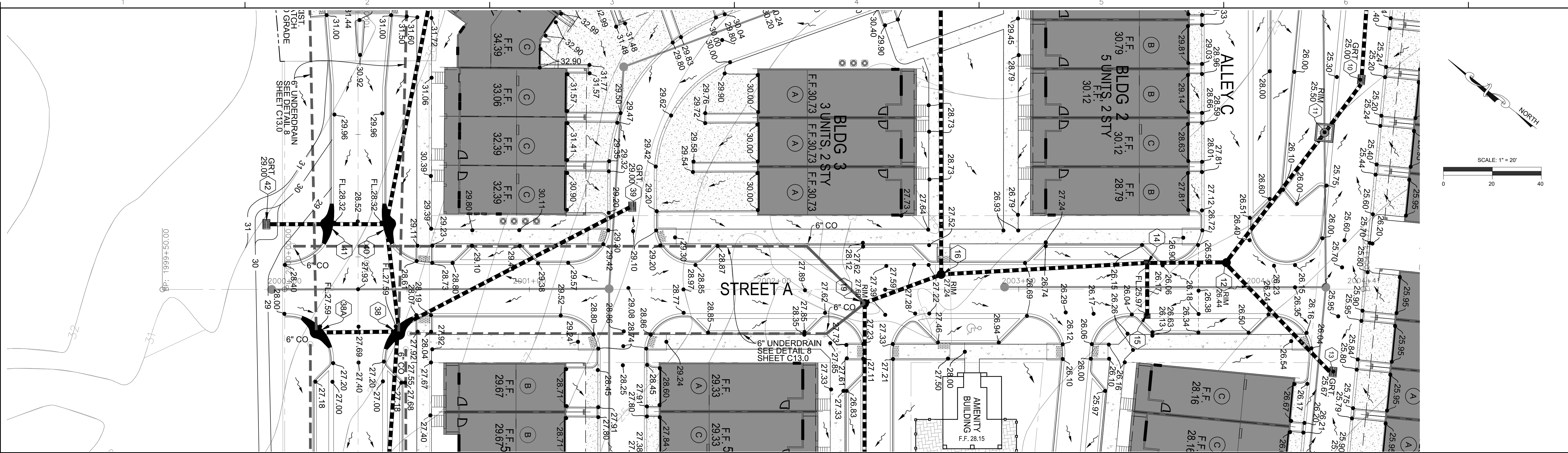
WINTER SPRINGS TOWNHOMES
 AT
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 FOR
 DREAM FINDERS HOMES LLC

WATER AND SEWER LAYOUT

201 S. BUMBLY AVE.
 ORLANDO, FL
 32807-9863-0037
 WWW.NVS.COM
 CERTIFICATE OF AUTHORIZATION # 20065

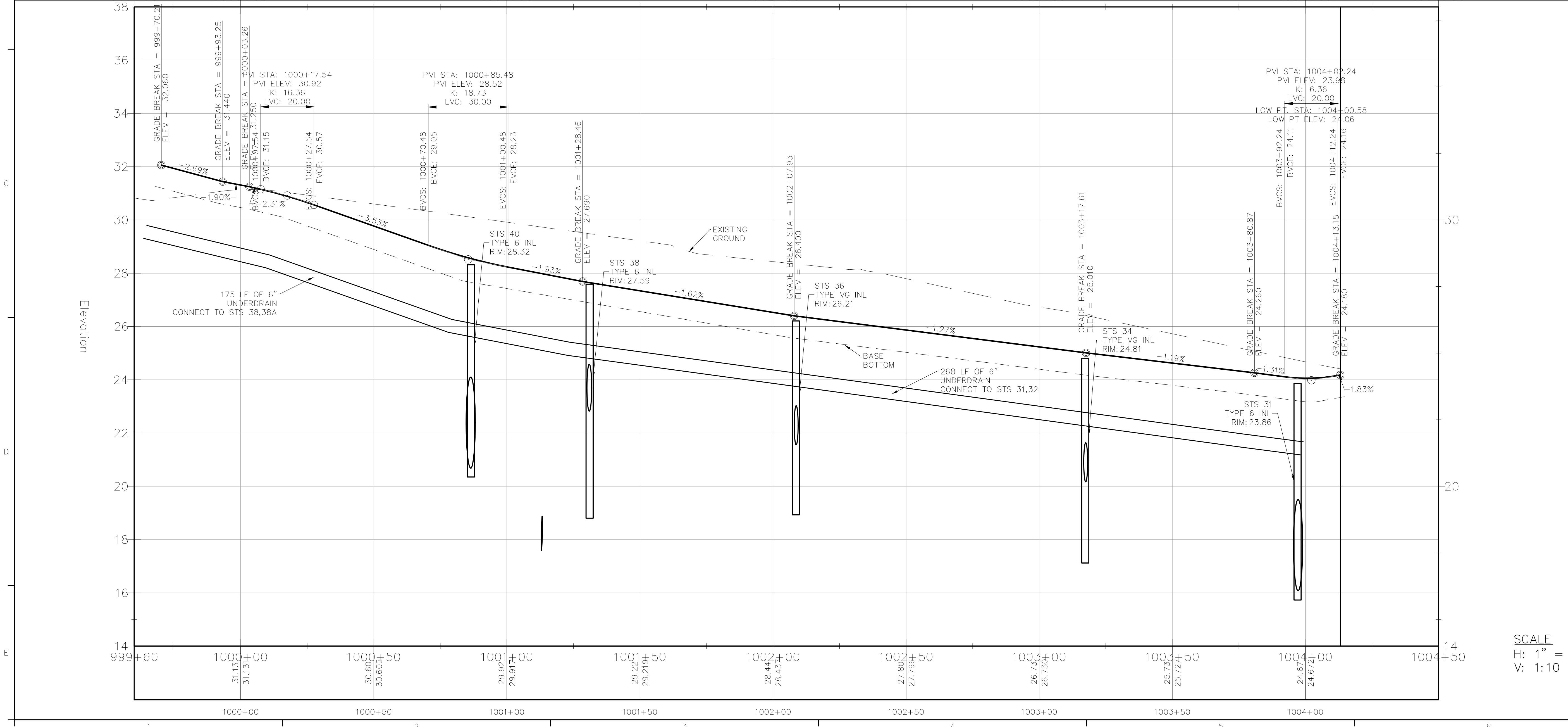
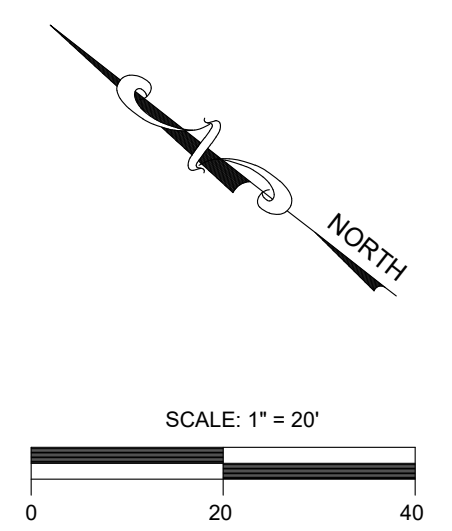
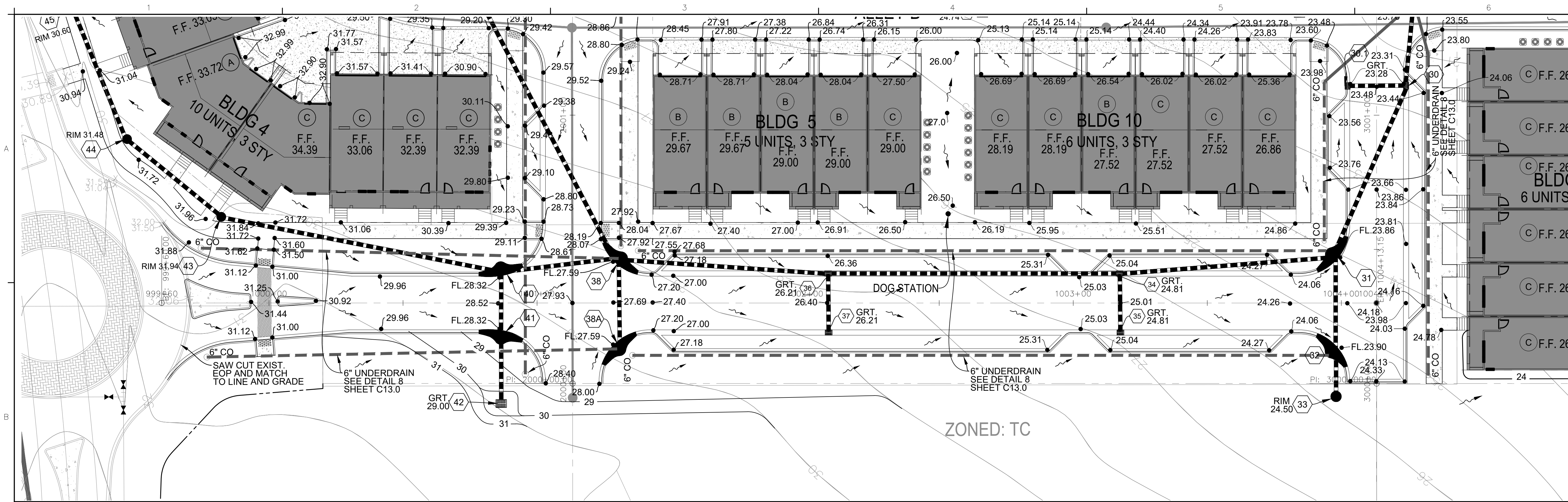
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 SHEET
C08.0

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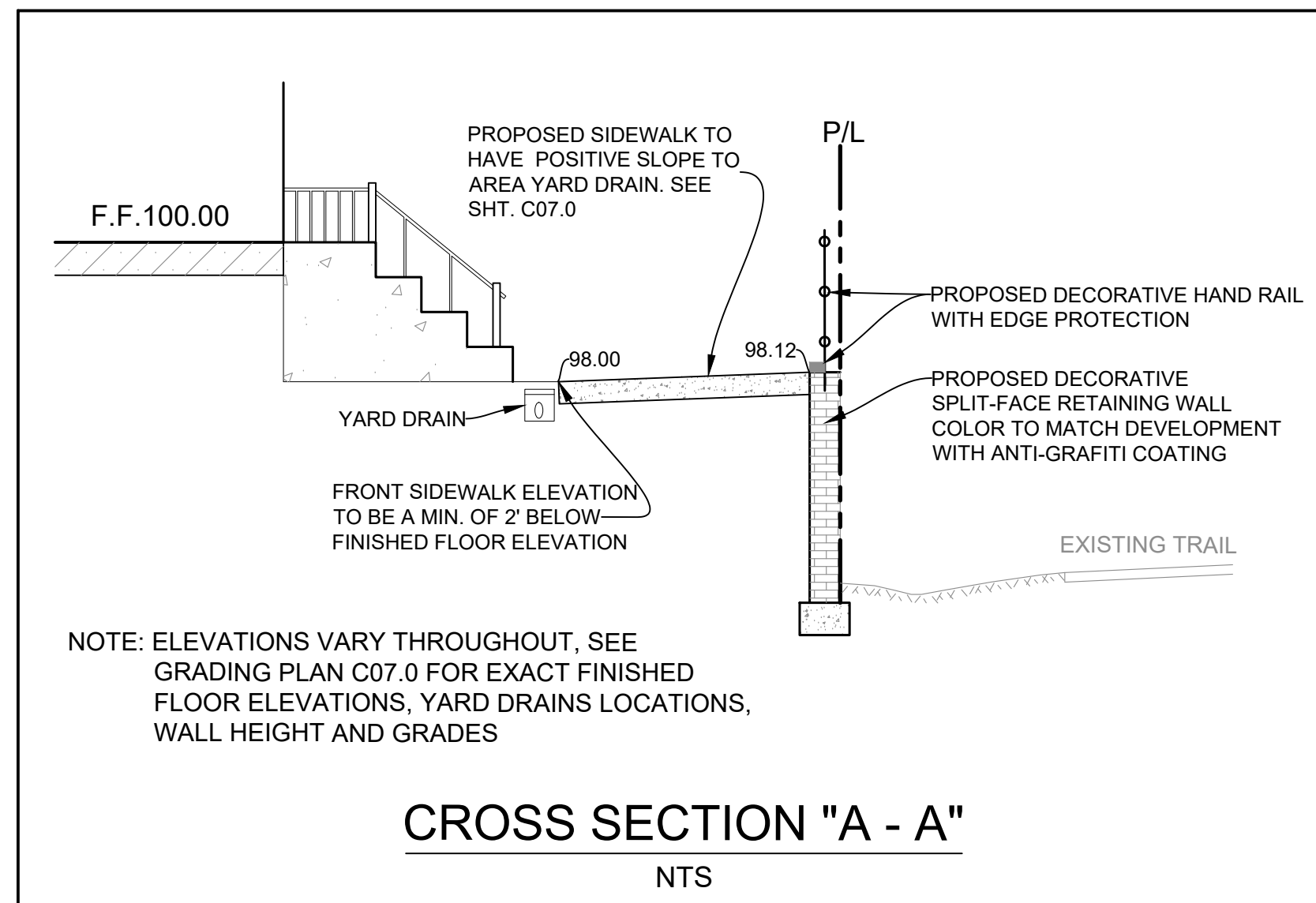
RECORD DRAWING <small>THIS RECORD DRAWING IS BASED ON THE ORIGINAL RECORD DRAWING AND THE ORIGINAL RECORD DRAWING IS THE ONLY AUTHORITY FOR THE DESIGN AND CONSTRUCTION OF THE PROJECT. THE ENGINEER HAS REVIEWED THIS RECORD DRAWING AND HAS FOUND IT TO BE ACCURATE AND COMPLETE. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THE INFORMATION PROVIDED IN THIS RECORD DRAWING.</small>		ENGINEER: FRANK A. PORTER, P.E. FL LIC #80892	DATE: Oct. 31, 2019
PROJECT: WINTER SPRINGS TOWNHOMES CLIENT: MICHAEL BLAKE BLVD. WINTER SPRINGS, FLORIDA FOR: DREAM FINDERS HOMES LLC	REVISIONS NO. DATE 1 2 3	ENGINEER: FRANK A. PORTER, P.E. FL LIC #80892	DESIGNER: FRANK A. PORTER, P.E. FL LIC #80892
PLAN & PROFILE STREET A	SHEET C07.3	201 S. BUMBY AVE. ORLANDO, FL 32807 WWW.NVS.COM CERTIFICATE OF AUTHORIZATION # 20065	JOB # 17063.20 PJI MGR: FAP DESIGNER: FRANK A. PORTER, P.E. FL LIC #80892 DATE: Oct. 31, 2019 ENGINEER: GCR

SCALE
H: 1" = 20'
V: 1:10



SCALE
H: 1" = 20'
V: 1:10

JOB #:	17063.20	
PLN. MGR.:	FAP	
DESIGNER:	RD	
ENGINEER:	GCR	
DATE:	OCT. 31, 2019	
ENGINEER:	FRANK A. PORTER, P.E.	
FL. LIC. #:	98992	
NO.	DATE	REVISIONS
<p>RECORD DRAWING</p> <p>THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED SURVEYING AND FIELD VERIFICATION OF THE EXISTING CONDITIONS. THE ENGINEER HAS CONDUCTED VISUAL INSPECTIONS AND VERIFIED THE EXISTING CONDITIONS TO THE BEST OF HIS KNOWLEDGE AND BELIEFS. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THE INFORMATION PROVIDED HEREON. THE ENGINEER'S LIABILITY IS LIMITED TO THE PROFESSIONAL SERVICES PROVIDED HEREON.</p>		
<p>WINTER SPRINGS TOWNHOMES AT MICHAEL BLAKE BLVD. WINTER SPRINGS, FLORIDA FOR DREAM FINDERS HOMES LLC</p>		
<p>PLAN & PROFILE TREE SWALLOW</p>		
<p>201 S. BUMBAY AVE. ORLANDO, FL 32807 WWW.NV5.COM</p>		
<p>CERTIFICATE OF AUTHORIZATION # 20065</p>		
<p>SCALE H: 1" = 20' V: 1:10</p>		
<p>SHEET C07.2</p>		



STRUCTURE DETAILS:

NAME	REFERENCE
TYPE VG INL	2017-2018 FDOT DESIGN STANDARD 221
TYPE I MH	2017-2018 FDOT DESIGN STANDARD 201
TYPE 5 INL	2017-2018 FDOT DESIGN STANDARD 211
TYPE 9 INL	2017-2018 FDOT DESIGN STANDARD 211
TYPE C INL	2017-2018 FDOT DESIGN STANDARD 214
TYPE C INL	2017-2018 FDOT DESIGN STANDARD 232
YARD DRAIN	NYLOPLAST 12" DOME INLET

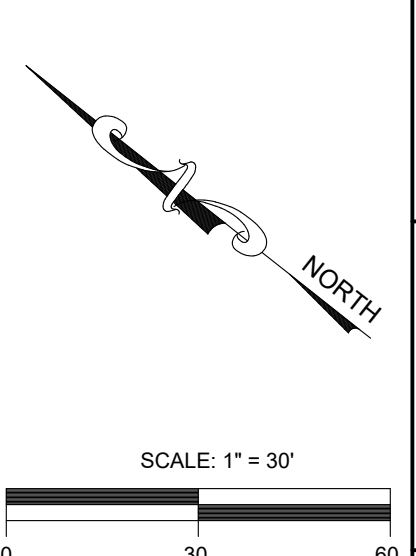
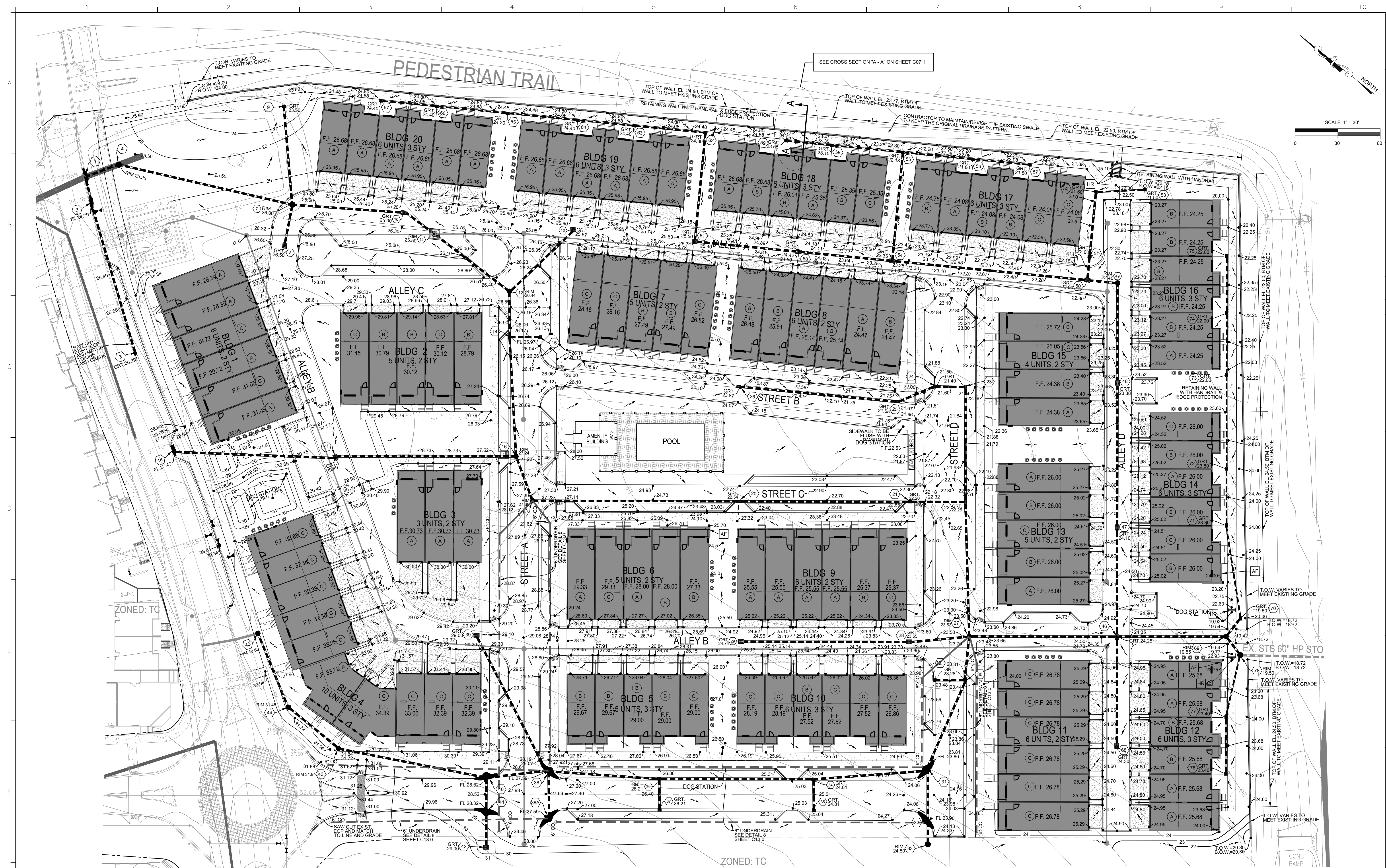
VERTICAL DATUM:

ALL ELEVATIONS ARE BASED ON NGVD 1929 VERTICAL DATUM

STORM SEWER SCHEDULE									
STR NO.	STR TYPE	GRATE/ RIM/EOP ELEV	DOWNSTREAM STR NO.	INVERTS IN	INVERTS OUT	DS PIPE LENGTH	PIPE SIZE/ MATERIAL	SLOPE	
STS 1	TYPE VG INL	24.68	STS 4	19.82' SW	15.51' SE	25'	48" HP STORM PP	0.22%	
STS 2	TYPE 5 INL	24.76	STS 1	19.87' SW	19.87' NE	18'	18" HP STORM PP	0.30%	
STS 3	TYPE VG INL	26.29	STS 2		20.20' NE	111'	15" HP STORM PP	0.30%	
STS 4	TYPE I MH	25.25	STS 7	15.45' NW	15.45' SE	120'	48" HP STORM PP	0.23%	
STS 7	TYPE 6	26.00	STS 10	15.16' NW 21.41' SW 18.58' NE	15.16' SE	79'	48" HP STORM PP	0.23%	
STS 8	TYPE C INL	26.50	STS 7		21.50' NE	29'	18" HP STORM PP	0.32%	
STS 9	YARD DRAIN	23.50	STS 7		19.25' SW	70'	12" PVC	0.97%	
STS 10	TYPE C INL	25.00	STS 11	14.98' NW	14.98' S	26'	48" HP STORM PP	0.22%	
STS 11	CONFLICT MH	25.50	STS 12	14.92' N	14.92' S	66'	48" HP STORM PP	0.22%	
STS 12	TYPE I MH	26.12	STS 14	14.77' N 21.23' E	14.77' SW	32'	60" HP STORM PP	0.22%	
STS 13	TYPE C INL	25.67	STS 12		21.42' W	63'	15" HP STORM PP	0.30%	
STS 14	TYPE VG INL	25.97	STS 16	14.70' NE 21.84' SE	14.70' SW	84'	60" HP STORM PP	0.22%	
STS 15	TYPE VG INL	25.97	STS 14		21.70' NW	22'	15" HP STORM PP	0.27%	
STS 16	TYPE I MH	27.10	STS 19	14.51' NE 21.92' NW	14.51' SW	34'	60" HP STORM PP	0.22%	
STS 17	TYPE C INL	29.49	STS 16	22.37' NW	22.37' SE	127'	18" HP STORM PP	0.30%	
STS 18	TYPE 5 INL	27.47	STS 17		22.71' SE	114'	18" HP STORM PP	0.30%	
STS 19	TYPE I MH	27.55	STS 20	14.44' NE	14.44' SE	146'	60" HP STORM PP	0.22%	
STS 20	TYPE 9 INL	22.54	STS 21	14.12' NW	14.12' SE	120'	60" HP STORM PP	0.22%	
STS 21	TYPE 9 INL	22.20	STS 22	13.85' NW	13.85' SE	39'	60" HP STORM PP	0.20%	
STS 22	TYPE VG	22.25	STS 27	13.77' NW 16.60' NE	13.77' SW	95'	60" HP STORM PP	0.22%	
STS 23	TYPE VG INL	21.40	STS 22	16.84' NW	16.84' SW	81'	18" HP STORM PP	0.30%	
STS 24	TYPE 9 INL	21.40	STS 23	16.91' NW	16.90' SE	22'	18" HP STORM PP	0.27%	
STS 25	TYPE VG INL	21.55	STS 24	17.00' NW	17.00' SE	26'	18" HP STORM PP	0.31%	
STS 26	TYPE 9 INL	23.87	STS 25		18.12' SE	113'	18" HP STORM PP	0.99%	
STS 27	TYPE I MH	23.53	STS 46	13.56' NE 13.56' SW 18.87' NW	13.56' SE	104'	60" HP STORM PP	0.22%	
STS 28	TYPE C INL	23.55	STS 27	19.00' NW	19.00' SE	43'	18" HP STORM PP	0.30%	
STS 29	TYPE C INL	24.19	STS 28		19.35' SE	118'	18" HP STORM PP	0.30%	
STS 30	TYPE VG INL	23.28	STS 27	16.03' W 16.03' NW	13.65' NE	31'	48" HP STORM PP	0.30%	
STS 30.1	TYPE 9 INL	23.28	STS 30		16.25' SE	22'	15" HP STORM PP	1.00%	
STS 31	TYPE 6 INL	23.86	STS 30	16.23' SW 16.29' NW	16.23' E	68'	48" HP STORM PP	0.30%	
STS 32	TYPE 6 INL	23.90	STS 31	16.17' SW	16.35' NE	37'	36" HP STORM PP	0.32%	
STS 33	TYPE I MH	24.50	STS 32		16.22' NE	16'	36" HP STORM PP	0.32%	
STS 34	TYPE VG INL	24.61	STS 31	17.62' NW 20.24' SW	17.62' SE	80'	36" HP STORM PP	1.66%	
STS 35	TYPE VG INL	24.81	STS 34		20.31' NE	22'	15" HP STORM PP	0.30%	
STS 36	TYPE VG INL	26.21	STS 34	19.43' NW 21.63' SW	19.43' SE	109'	36" HP STORM PP	1.66%	
STS 37	TYPE VG INL	26.21	STS 36		21.70' NE	22'	15" HP STORM PP	0.30%	
STS 38	TYPE 6 INL	27.59	STS 36	20.72' NW 23.00' NE 22.90' SW	20.72' SE	78'	36" HP STORM PP	1.66%	
STS 38A	TYPE 6 INL	27.59	STS 38		23.00' NE	35'	18" HP STORM PP	0.28%	
STS 39	TYPE C INL	29.00	STS 38		24.50' SW	108'	18" HP STORM PP	1.39%	
STS 40	TYPE 6 INL	28.32	STS 38	22.30' NW 20.85' SW	20.85' SE	45'	36" HP STORM PP	0.30%	
STS 41	TYPE 6 INL	28.32	STS 40	20.93' SW	20.93' NE	26'	36" HP STORM PP	0.30%	
STS 42	TYPE C INL	29.00	STS 41		21.00' NE	25'	36" HP STORM PP	0.30%	
STS 43	TYPE I MH	31.94	STS 40	22.62' N	22.62' SE	106'	18" HP STORM PP	0.30%	
STS 44	TYPE I MH	31.48	STS 43	22.76' NE	22.76' S	46'	18" HP STORM PP	0.30%	
STS 45	TYPE I MH	30.60	STS 44		22.93' SW	56'	18" HP STORM PP	0.30%	
STS 46	TYPE C INL	24.25	STS 69	13.33' NW 15.11' NE 19.77' SW	13.33' SE	77'	60" HP STORM PP	0.22%	
STS 47	TYPE C INL	24.10	STS 46	15.34' NE	15.34' SW	77'	30" HP STORM PP	0.30%	
STS 48	TYPE C INL	23.38	STS 47	15.65' NE	15.65' SW	102'	24" HP STORM PP	0.30%	
STS 49	TYPE I MH	22.40	STS 48	15.86' NW	15.86' SW	71'	24" HP STORM PP	0.30%	
STS 50	TYPE C INL	22.00	STS 49	15.92' NW 16.78' NE	15.92' SE	21'	18" HP STORM PP	0.30%	
STS 51	YARD DRAIN	22.00	STS 50	16.95' NE	16.95' SW	17'	12" PVC	1.00%	
STS 52	YARD DRAIN	21.50	STS 51	17.41' SE	17.41' SW	46'	10" PVC	1.00%	
STS 53	YARD DRAIN	21.50	STS 52		17.75' NW	34'	10" PVC	1.00%	
STS 54	TYPE C INL	23.35	STS 50	16.33' NE 17.41' NW	16.33' SE	138'	18" HP STORM PP	0.30%	
STS 55	YARD DRAIN	22.18	STS 54	17.10' SE 17.10' NW	17.10' SW	77'	12" PVC	1.00%	
STS 56	YARD DRAIN	21.80	STS 55	17.60' SE	17.60' NW	50'	10" PVC	1.00%	
STS 57	YARD DRAIN	21.80	STS 56		18.00' NW	40'	10" PVC	1.00%	
STS 58	YARD DRAIN	23.10	STS 55	18.68' NW	18.68' SE	50'	10" PVC	3.16%	
STS 59	YARD DRAIN	23.55	STS 58		19.75' SE	33'	10" PVC	3.27%	
STS 60	TYPE C INL	24.30	STS 54	17.61' NW	17.61' SE	66'	18" HP STORM PP	0.30%	
STS 61	TYPE C INL	25.50	STS 60	17.83' NE	17.83' SE	74'	18" HP STORM PP	0.30%	
STS 62	YARD DRAIN	24.30	STS 61	18.60' NW	18.60' SW	77'	12" PVC	1.00%	
STS 63	YARD DRAIN	24.40	STS 62	19.10' NW	19.10' SE	50'	10" PVC	1.00%	
STS 64	YARD DRAIN	24.40	STS 63	19.50' NW	19.50' SE	40'	10" PVC	1.00%	
STS 65	YARD DRAIN	24.30	STS 64	20.00' NW	20.00' SE	50'	10" PVC	1.00%	
STS 66	YARD DRAIN	24.40	STS 65	20.50' NW	20.50' SE	50'	10" PVC	1.00%	
STS 67	YARD DRAIN	24.40	STS 66		20.90' SE	40'	10" PVC	1.00%	
STS 68	TYPE C INL	24.30	STS 46		20.00' NE	77'	15" HP STORM PP	0.30%	
STS 69	TYPE I MH	19.55	STS 78	13.16' NW 15.28' E	13.16' S	17'	60" HP STORM PP	0.18%	
STS 70	YARD DRAIN	19.50	STS 69	15.44' NE	15.44' W	16'	12" PVC	1.00%	
STS 71	YARD DRAIN	23.80	STS 70	16.10' NE	16.10' SW	66'	12" PVC	1.00%	
STS 72	YARD DRAIN	23.80	STS 71	16.50' NE	16.50' SW	40'	12" PVC	1.00%	
STS 73	YARD DRAIN	22.00	STS 72	17.16' NE	17.16' SW	66'	10" PVC	1.00%	
STS 74	YARD DRAIN	22.00	STS 73	17.60' NE	17.60' SW	44'	10" PVC	1.00%	
STS 75	YARD DRAIN	22.00	STS 74		18.00' SW	40'	10" PVC	1.00%	
STS 76	YARD DRAIN	23.40	STS 77		19.00' NE	40'	10" PVC	3.00%	
STS 77	YARD DRAIN	23.40	STS 78	17.80' SW	16.35' NE	45'	10" PVC	3.00%	
STS 78	TYPE I MH	20.63		13.13' N 15.00' SW	13.12' SE	65'	60" HP STORM PP	3.45%	

NOTE: STRUCTURES 2A, 5 AND 6 ARE NO LONGER IN USE

JOB #:	17063.20
ENGINEER:	FRANK A. PORTER, P.E. FL LIC #89092
PLI. MGR.:	
DESIGNER:	
DATE:	Oct. 31, 2019
ENGINEER:	GCR
REVISIONS:	
NO.	DATE
<p>THIS RECORD DRAWING IS BASED ON THE RESULTS OF A LIMITED SURVEY OF CONSTRUCTION PERMITS, RECORD PLANS, AND UTILITIES. THE ENGINEER HAS CONDUCTED VISUAL AND LIMITED UTILITY TESTING OF EXISTING UTILITIES AND HAS OBSERVED THE UTILITIES AS SHOWN ON THE RECORDS. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THE RECORDS OR THE RESULTS OF HIS VISUAL TESTING.</p>	
<p>RECORD DRAWING</p>	
<p>WINTER SPRINGS TOWNHOMES AT MICHAEL BLAKE BLVD. WINTER SPRINGS, FLORIDA FOR DREAM FINDERS HOMES LLC</p>	
<p>STRUCTURES DATA</p>	
<p>201 S. BUMBAY AVE. ORLANDO, FL 32807-8865 WWW.NVS.COM CERTIFICATE OF AUTHORIZATION # 20065</p>	
<p>SHEET</p>	
<p>C07.1</p>	



GEOTECHNICAL DATA:

CONTRACTOR IS RESPONSIBLE FOR OBTAINING A COPY OF THE GEOTECHNICAL REPORT BY UNIVERSAL ENGINEERING SCIENCES, UES REPORT NO. 1626718, DATED NOVEMBER 21, 2018

PLEASE REFER TO CHAPTERS:

- 9.8 FLOOR SLABS
- 11.0 SITE PREPARATION
- 12.0 DEWATERING AND EXCAVATION CONSIDERATIONS

NOTE: THE GEOTECHNICAL REPORT INCLUDES OBSERVATIONS OF ORGANIC SOILS FROM EXISTING GRADE TO 2' BELOW GRADE. ORGANIC CONTENT GREATER THAN 5% IS UNSUITABLE FOR STRUCTURE PLACEMENT AND GREATER THAN 10% IS UNSUITABLE FOR PAVEMENT PLACEMENT. REQUIRED REMOVAL OF UNSUITABLE ORGANIC SOILS AND REPLACEMENT WITH COMPACTED BACKFILL.

VERTICAL DATUM:

ALL ELEVATIONS ARE BASED ON NGVD 1929 VERTICAL DATUM

NOTES:

1. ALL SITE WORK SHOWN SHALL BE CONSTRUCTED BY GENERAL CONTRACTOR.
2. SOIL DENSITY TESTING, SUBSURFACE INVESTIGATIONS AND ALL OTHER GEOTECHNICAL ACTIVITY ONSITE SHALL BE SUPERVISED AND CERTIFIED BY A PROFESSIONAL GEOTECHNICAL ENGINEER.
3. FOR DETAILED STORM STRUCTURES SEE SHEET C13.0

SYMBOLS FOR PROPOSED IMPROVEMENTS

- STORM STRUCTURE (SEE SCHEDULE FOR STRUCTURE TYPE)
- DRAINAGE DITCH
- PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION
- PROPOSED STORM SEWER PIPING
- EXISTING STORM SEWER PIPING
- MATCH EXISTING GRADE
- SLOPE ARROW
- HR HANDRAIL AT STEPS
- 29 DRAINAGE STRUCTURE INDICATOR
- AF ALTERNATE FOUNDATION DESIGN, DEPTH 12" BELOW GRADE SHOWN (ALL OTHER FOUNDATIONS 18" BELOW FINISHED GRADE)
- PROPOSED CONTOUR
- EXISTING CONTOUR
- (1) - 4" STEP W/ 20' GARAGE SLOPED @ 2%
- (2) - 7" STEP W/ 20' GARAGE SLOPED @ 2%

FOR STORM SEWER SCHEDULE
SEE SHEET C07.1

JOB #: 17063.20
 ENGINEER: FRANK A. PORTER, P.E.
 FL LIC #06992
 DATE: OCT. 31, 2019
 ENGINEER: GCR

REVISIONS

NO.	DATE	REVISIONS

RECORD DRAWING

THIS RECORD DRAWING IS BASED ON THE RECORDS OF THE LIMITED LIABILITY COMPANY OF CONTRACTORS PREPARED FOR THE PROJECT AND THE CONTRACTOR'S RESPONSIBILITY IS TO VERIFY THE ACCURACY AND COMPLETENESS OF THE RECORDS. THE ENGINEER'S RESPONSIBILITY IS TO VERIFY THE ACCURACY AND COMPLETENESS OF THE RECORDS. THE ENGINEER'S RESPONSIBILITY IS TO VERIFY THE ACCURACY AND COMPLETENESS OF THE RECORDS.

WINTER SPRINGS TOWNHOMES
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 DREAM FINDERS HOMES LLC

GRADING AND STORM DRAINAGE

201 S. BUMBY AVE.
 ORLANDO, FL 32805
 WWW.NV5.COM
 CERTIFICATE OF AUTHORIZATION # 20065

NV5

SHEET C07.0



JOB #: 17063.20 ENGINEER: FRANK A. PORTER, P.E. FL. LIC. #06092	PJL. MGR.: FAP DESIGNER: RID ENGINEER: GCR
DATE: Oct. 31, 2019	REVISIONS:
NO. DATE	REVISIONS
RECORD DRAWING <small>THIS RECORD DRAWING IS BASED ON THE RESULTS OF A LIMITED SURVEY OF CONSTRUCTION PROVIDED RECORD PLANS AND ANY UNDETERMINED UTILITY LOCATIONS OF POWER, WATER AND GAS. THE ENGINEER HAS CONDUCTED VISUAL INSPECTIONS AND HAS GUARANTEED THE ACCURACY OF THE RECORD DRAWING TO THE BEST OF HIS KNOWLEDGE.</small>	
WINTER SPRINGS TOWNHOMES AT MICHAEL BLAKE BLVD. WINTER SPRINGS, FLORIDA FOR DREAM FINDERS HOMES LLC	
SIGHT TRIANGLES	
201 S. BUMBY AVE. ORLANDO, FL 32835-3037 WWW.NV5.COM CERTIFICATE OF AUTHORIZATION # 20065	
SHEET C06.1	

REFER TO DETAIL 3, SHEET C13.0 FOR PUBLIC STREET CROSS-SECTIONS

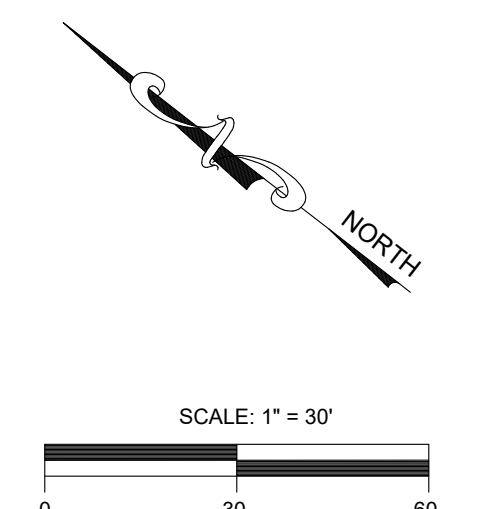
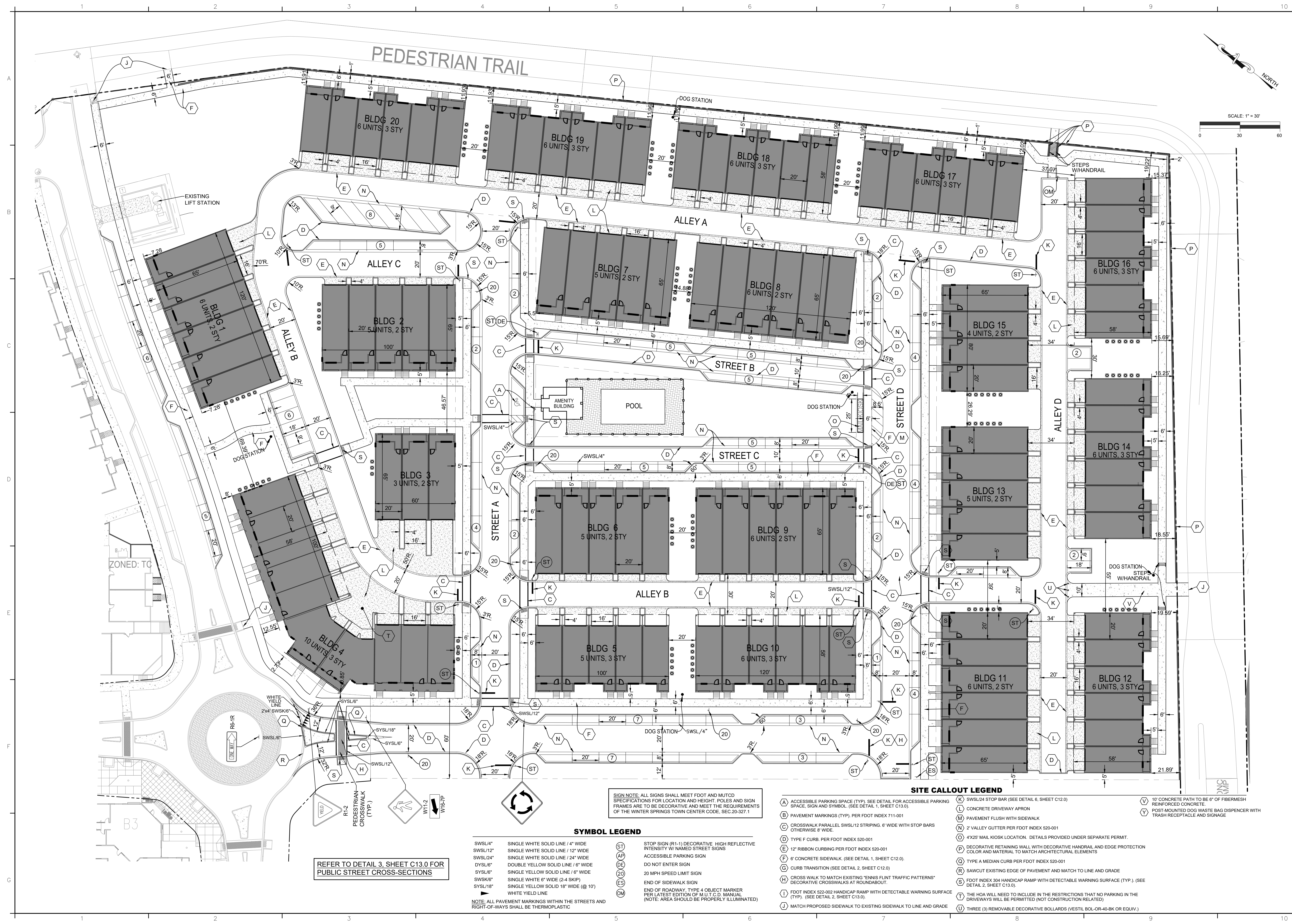
SYMBOL LEGEND

SWSL4"	SINGLE WHITE SOLID LINE / 4" WIDE	(S1)	STOP SIGN (R1-1) DECORATIVE, HIGH REFLECTIVE INTENSITY W/ NAMED STREET SIGNS
SWSL12"	SINGLE WHITE SOLID LINE / 12" WIDE	(AP)	ACCESSIBLE PARKING SIGN
SWSL24"	SINGLE WHITE SOLID LINE / 24" WIDE	(DE)	DO NOT ENTER SIGN
DYSL6"	DOUBLE YELLOW SOLID LINE / 6" WIDE	(20)	20 MPH SPEED LIMIT SIGN
SYSL6"	SINGLE YELLOW SOLID LINE / 6" WIDE	(E5)	END OF SIDEWALK SIGN
SWSK6"	SINGLE WHITE 6" WIDE (2-4 SKIP)	(OM)	END OF ROADWAY, TYPE 4 OBJECT MARKER PER LATEST EDITION OF M.U.T.C.D. MANUAL (NOTE: AREA SHOULD BE PROPERLY ILLUMINATED)
SYSL18"	SINGLE YELLOW SOLID 18" WIDE (@ 10')		
WHITE YIELD LINE			

SITE CALLOUT LEGEND

(A)	ACCESSIBLE PARKING SPACE (TYP). SEE DETAIL FOR ACCESSIBLE PARKING SPACE, SIGN AND SYMBOL. (SEE DETAIL 1, SHEET C13.0).	(X)	SWSL/24 STOP BAR (SEE DETAIL 6, SHEET C12.0)
(B)	PAVEMENT MARKINGS (TYP). PER FDOT INDEX 711-001	(L)	CONCRETE DRIVEWAY APRON
(C)	CROSSWALK PARALLEL SWSL/12 STRIPING, 6" WIDE WITH STOP BARS OTHERWISE 6" WIDE.	(M)	PAVEMENT FLUSH WITH SIDEWALK
(D)	TYPE F CURB. PER FDOT INDEX 520-001	(N)	2" VALLEY GUTTER PER FDOT INDEX 520-001
(E)	12" RIBBON CURBING PER FOOT INDEX 520-001	(O)	4"x25" MAIL KIOSK LOCATION. DETAILS PROVIDED UNDER SEPARATE PERMIT.
(F)	6" CONCRETE SIDEWALK. (SEE DETAIL 1, SHEET C12.0).	(P)	DECORATIVE RETAINING WALL WITH DECORATIVE HANDRAIL AND EDGE PROTECTION COLOR AND MATERIAL TO MATCH ARCHITECTURAL ELEMENTS
(G)	CURB TRANSITION (SEE DETAIL 2, SHEET C12.0)	(Q)	TYPE A MEDIAN CURB PER FOOT INDEX 520-001
(H)	CROSS WALK TO MATCH EXISTING "ENNIS FLINT TRAFFIC PATTERNS" DECORATIVE CROSSWALKS AT ROUNDABOUT.	(R)	SAWCUT EXISTING EDGE OF PAVEMENT AND MATCH TO LINE AND GRADE
(I)	FDOT INDEX 522-002 HANDICAP RAMP WITH DETECTABLE WARNING SURFACE (TYP.). (SEE DETAIL 2, SHEET C13.0).	(S)	FDOT INDEX 304 HANDICAP RAMP WITH DETECTABLE WARNING SURFACE (TYP.). (SEE DETAIL 2, SHEET C13.0).
(J)	MATCH PROPOSED SIDEWALK TO EXISTING SIDEWALK TO LINE AND GRADE	(T)	THE HOA WILL NEED TO INCLUDE IN THE RESTRICTIONS THAT NO PARKING IN THE DRIVEWAYS WILL BE PERMITTED (NOT CONSTRUCTION RELATED)
		(U)	THREE (3) REMOVABLE DECORATIVE BOLLARDS (VESTIBOL-BOL-OR-40-BK OR EQUIV.)

NOTE: ALL PAVEMENT MARKINGS WITHIN THE STREETS AND RIGHT-OF-WAYS SHALL BE THERMOPLASTIC



JOB #: 17063.20
ENGINEER: FRANK A. PORTER, P.E.
FL LIC. #06092
DATE: Oct. 31, 2019
ENGINEER: GCR

NO.	DATE	REVISIONS

RECORD DRAWING
THIS RECORD DRAWING IS BASED ON THE RESULTS OF A LIMITED SURVEY OF CONSTRUCTION PERMITS, RECORD PLANS, AND UTILITIES. THE ENGINEER HAS CONDUCTED VISUAL INSPECTIONS AND VERIFIED THE EXISTING UTILITIES AND RECORD PLANS. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THE RECORDS OR THE RESULTS OF HIS VISUAL INSPECTIONS.
ENGINEER: FRANK A. PORTER, P.E.
FL LIC. #06092

WINTER SPRINGS TOWNHOMES
AT
MICHAEL BLAKE BLVD.
WINTER SPRINGS, FLORIDA
FOR
DREAM FINDERS HOMES LLC

SITE LAYOUT
PLAN

201 S. BUMBY AVE.
ORLANDO, FL
32835-3537
WWW.NV5.COM
CERTIFICATE OF AUTHORIZATION # 20065
Oct. 31, 2019 - 8:48am

SHEET
C06.0

REFER TO DETAIL 3, SHEET C13.0 FOR PUBLIC STREET CROSS-SECTIONS

SIGN NOTE: ALL SIGNS SHALL MEET FDOT AND MUTCD SPECIFICATIONS FOR LOCATION AND HEIGHT. POLES AND SIGN FRAMES ARE TO BE DECORATIVE AND MEET THE REQUIREMENTS OF THE WINTER SPRINGS TOWN CENTER CODE, SEC.20-327.1

SYMBOL LEGEND

SWSL4"	SINGLE WHITE SOLID LINE / 4" WIDE	(ST)	STOP SIGN (R1-1) DECORATIVE, HIGH REFLECTIVE INTENSITY W/ NAMED STREET SIGNS
SWSL12"	SINGLE WHITE SOLID LINE / 12" WIDE	(AP)	ACCESSIBLE PARKING SIGN
SWSL24"	SINGLE WHITE SOLID LINE / 24" WIDE	(DE)	DO NOT ENTER SIGN
DYSL6"	DOUBLE YELLOW SOLID LINE / 6" WIDE	(20)	20 MPH SPEED LIMIT SIGN
SYSL6"	SINGLE YELLOW SOLID LINE / 6" WIDE	(ES)	END OF SIDEWALK SIGN
SWSK6"	SINGLE WHITE 6" WIDE (2-4 SKIP)	(OM)	END OF ROADWAY, TYPE 4 OBJECT MARKER PER LATEST EDITION OF M.U.T.C.D. MANUAL (NOTE: AREA SHOULD BE PROPERLY ILLUMINATED)
SYSL18"	SINGLE YELLOW SOLID 18" WIDE (@ 10')		
	WHITE YIELD LINE		

SITE CALLOUT LEGEND

(A)	ACCESSIBLE PARKING SPACE (TYP). SEE DETAIL FOR ACCESSIBLE PARKING SPACE, SIGN AND SYMBOL. (SEE DETAIL 1, SHEET C13.0).	(K)	SWSL/24 STOP BAR (SEE DETAIL 6, SHEET C12.0)
(B)	PAVEMENT MARKINGS (TYP). PER FDOT INDEX 711-001	(L)	CONCRETE DRIVEWAY APRON
(C)	CROSSWALK PARALLEL SWSL/12 STRIPING, 6" WIDE WITH STOP BARS OTHERWISE 6" WIDE.	(M)	PAVEMENT FLUSH WITH SIDEWALK
(D)	TYPE F CURB. PER FDOT INDEX 520-001	(N)	2" VALLEY GUTTER PER FDOT INDEX 520-001
(E)	12" RIBBON CURBING PER FDOT INDEX 520-001	(O)	4"x25" MAIL KIOSK LOCATION. DETAILS PROVIDED UNDER SEPARATE PERMIT.
(F)	6" CONCRETE SIDEWALK. (SEE DETAIL 1, SHEET C12.0).	(P)	DECORATIVE RETAINING WALL WITH DECORATIVE HANDRAIL AND EDGE PROTECTION COLOR AND MATERIAL TO MATCH ARCHITECTURAL ELEMENTS
(G)	CURB TRANSITION (SEE DETAIL 2, SHEET C12.0)	(R)	TYPE A MEDIAN CURB PER FDOT INDEX 520-001
(H)	CROSS WALK TO MATCH EXISTING "ENNIS FLINT TRAFFIC PATTERNS" DECORATIVE CROSSWALKS AT ROUNDABOUT.	(S)	SAWCUT EXISTING EDGE OF PAVEMENT AND MATCH TO LINE AND GRADE
(I)	FDOT INDEX 522-002 HANDICAP RAMP WITH DETECTABLE WARNING SURFACE (TYP.). (SEE DETAIL 2, SHEET C13.0).	(T)	FDOT INDEX 304 HANDICAP RAMP WITH DETECTABLE WARNING SURFACE (TYP.). (SEE DETAIL 2, SHEET C13.0).
(J)	MATCH PROPOSED SIDEWALK TO EXISTING SIDEWALK TO LINE AND GRADE	(U)	THE HOA WILL NEED TO INCLUDE IN THE RESTRICTIONS THAT NO PARKING IN THE DRIVEWAYS WILL BE PERMITTED (NOT CONSTRUCTION RELATED)
		(V)	10' CONCRETE PATH TO BE 6" OF FIBERMESH REINFORCED CONCRETE.
		(W)	POST-MOUNTED DOG WASTE BAG DISPENSER WITH TRASH RECEPTACLE AND BAG

NOTE: ALL PAVEMENT MARKINGS WITHIN THE STREETS AND RIGHT-OF-WAYS SHALL BE THERMOPLASTIC

BEST MANAGEMENT PRACTICES SEQUENCE

1. SITE DESCRIPTION

A. CONSTRUCTION OF 20 MULTIFAMILY TOWNHOME BUILDINGS, PUBLIC ROADS, AND SURFACE PARKING AREAS.

B. SEQUENCE OF SOIL DISTURBANCE:

- (1) INSTALL PERIMETER SEDIMENT AND EROSION CONTROLS.
- (2) PREPARE SITE.
- (3) CLEAR AND GRUB PROPOSED AREA.
- (4) INSTALL PROPOSED UNDERGROUND STORMWATER AND UTILITIES.
- (5) INSTALL CONCRETE CURB, CONCRETE SIDEWALK, AND PAVEMENT.
- (6) STABILIZE SITE.

C. TOTAL SITE AREA: 8.44 ACRES
DISTURBED SITE AREA: 8.44 ACRES

D. SOILS: VERY LOOSE TO MEDIUM DENSE FINE SAND WITH VARIOUS AMOUNTS OF SILT.

E. DRAINAGE AREA FOR EXISTING DISCHARGE POINT: 16.2± ACRES
DRAINAGE AREA FOR PROPOSED DISCHARGE POINT: 16.2± ACRES

F. LATITUDE AND LONGITUDE OF EXISTING DISCHARGE POINT:
DISCHARGE POINT LAT: 28° 41' 43.8" N
DISCHARGE POINT LONG: 81° 15' 32.1" W
DISCHARGES TO EXISTING WETLANDS
LATITUDE AND LONGITUDE OF PROPOSED DISCHARGE POINT:
DISCHARGE POINT LAT: 28° 41' 43.8" N
DISCHARGE POINT LONG: 81° 15' 32.1" W
DISCHARGES TO EXISTING WETLANDS

2. CONTROLS

A. EROSION AND SEDIMENT CONTROLS:

(1) STABILIZATION PRACTICES:

1. TEMPORARY SEEDING SHALL BE RYE GRASS APPLIED AT MANUFACTURER'S RECOMMENDATIONS TO ANY DISTURBED AREAS THAT ARE INACTIVE FOR SEVEN DAYS.
2. MULCHING PRACTICES AND SOD SHALL BE APPLIED TO PARKING LOT ISLANDS.

(2) STRUCTURAL PRACTICES:

1. PRIOR TO CLEARING, A SILT FENCE SHALL BE INSTALLED AROUND THE PERIMETER OF THE SITE, AS SHOWN HEREIN. DURING THE CLEARING, GRUBBING, AND SITE GRADING STAGES, AREAS TO BE LEFT DISTURBED MORE THAN 7 DAYS SHALL BE STABILIZED WITH RYE GRASS APPLIED PER THE MANUFACTURER'S SPECIFICATIONS. AFTER SEEDING, EACH AREA SHALL BE MULCHED WITH 4,000 POUNDS OF STRAW PER ACRE.
2. AFTER ALL INITIAL SITE GRADING WORK, ALL PROPOSED INLETS/OUTFALLS, ONCE INSTALLED, SHALL BE PROTECTED FROM EROSION AND SEDIMENT RUNOFF BY THE USE OF THE INLET PROTECTION DESIGNATED ON THE SITE MAP. DISTURBED PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE PERMANENTLY CEASED SHALL BE STABILIZED WITH SEED OR SOD AS INDICATED ON THE SITE MAP NO LATER THAN 14 DAYS AFTER THE LAST CONSTRUCTION ACTIVITY. SEEDING SHALL BE THE SAME AS IN TEMPORARY SEEDING.
3. ALL INSTALLATION SHALL BE COMMENCED AS DEPICTED ON THE SITE MAPS AND EROSION CONTROL DETAIL SHEET. IF SEDIMENT AND EROSION CONTROL MEASURES DEVIATE FROM THE PLANS THE CITY OF WINTER SPRINGS SHALL BE NOTIFIED.

B. PERMANENT STORMWATER MANAGEMENT CONTROLS:

1. CATCH BASINS AND STORM SEWER SYSTEM ON-SITE TO PROVIDE POSITIVE DRAINAGE OF THE ENTIRE SITE TO THE DISCHARGE POINT.

C. CONTROLS FOR OTHER POLLUTANTS:

1. WASTE DISPOSAL: ALL WASTE WILL BE DISPOSED OF IN AN APPROPRIATE LEGAL MANOR, AND COMPLY WITH CITY OF WINTER SPRINGS ORDINANCES FOR WASTE DISPOSAL AND COMMERCIAL SITE DEVELOPMENT.
2. VEHICLE TRACKING: OFF SITE VEHICLE TRACKING OF SEDIMENTS AND DUST GENERATION WILL BE MINIMIZED VIA BEST POSSIBLE PRACTICES, DAILY SWEEPING AND THE USE OF WATER TO KEEP DUST DOWN.
3. FERTILIZERS, HERBICIDES, AND PESTICIDES: FERTILIZERS AND PESTICIDES WILL BE USED AT A MINIMUM AND IN ACCORDANCE WITH THE MANUFACTURERS' SUGGESTED APPLICATION RATES. THE FERTILIZERS AND PESTICIDES SHALL BE STORED IN A COVERED SHED.
4. TOXIC SUBSTANCES: ALL PAINTS AND OTHER CHEMICALS WILL BE STORED IN A LOCKED COVERED SHED.
5. OTHER: PORT-O-LETS WILL BE PLACED AWAY FROM THE STORM SEWER SYSTEMS AND STORM INLETS. NO VEHICLE MAINTENANCE SHALL BE CONDUCTED ON-SITE. A WASHDOWN AREA SHALL BE DESIGNATED AT ALL TIMES AND WILL NOT BE LOCATED IN ANY AREA THAT WILL ALLOW FOR THE DISCHARGE OF POLLUTED RUNOFF. A SMALL VEGETATED BERM SHALL BE PLACED AROUND THE WASHDOWN AREA.

3. MAINTENANCE:

1. SILT FENCE SHALL BE INSPECTED AT LEAST WEEKLY. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY. SEDIMENT DEPOSITS SHALL BE REMOVED WHEN THEY REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER.
2. INLETS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAIN EVENT AND ANY REPAIRS SHALL BE PERFORMED IMMEDIATELY.
3. BARE AREAS OF THE SITE THAT WERE PREVIOUSLY SEEDED SHALL BE RE-SEEDED PER MANUFACTURERS' INSTRUCTIONS.
4. MULCH AND SOD THAT HAS BEEN WASHED OUT SHALL BE REPLACED IMMEDIATELY.

ALL MEASURES ON THIS SITE MAP, AND IN THE STORM WATER POLLUTION PREVENTION PLAN, SHALL BE MAINTAINED IN FULLY FUNCTIONAL CONDITION UNTIL NO LONGER REQUIRED FOR A COMPLETED PHASE OF WORK OR FINAL STABILIZATION OF THE SITE. CONTROLS ARE TO BE REPLACED OR REPAIRED IF IN A SUBSTANDARD CONDITION. ALL MAINTENANCE MODIFICATIONS ARE TO BE NOTED, ON PLANS, AS THEY OCCUR.

4. INSPECTIONS:

A QUALIFIED INSPECTOR SHALL INSPECT ALL POINTS OF DISCHARGE INTO SURFACE WATERS OF THE STATE AND MS4 (CITY OF WINTER SPRINGS & FDOT), DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED; AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION; STRUCTURAL CONTROLS; AND, LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE, AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM THAT IS 0.50 INCHES OR GREATER. A REPORT SUMMARIZING THE SCOPE OF THE INSPECTION SHALL BE MADE AND RETAINED IN THE CONSTRUCTION TRAILER AS PART OF THE STORMWATER POLLUTION PREVENTION

5. NON-STORMWATER DISCHARGES:

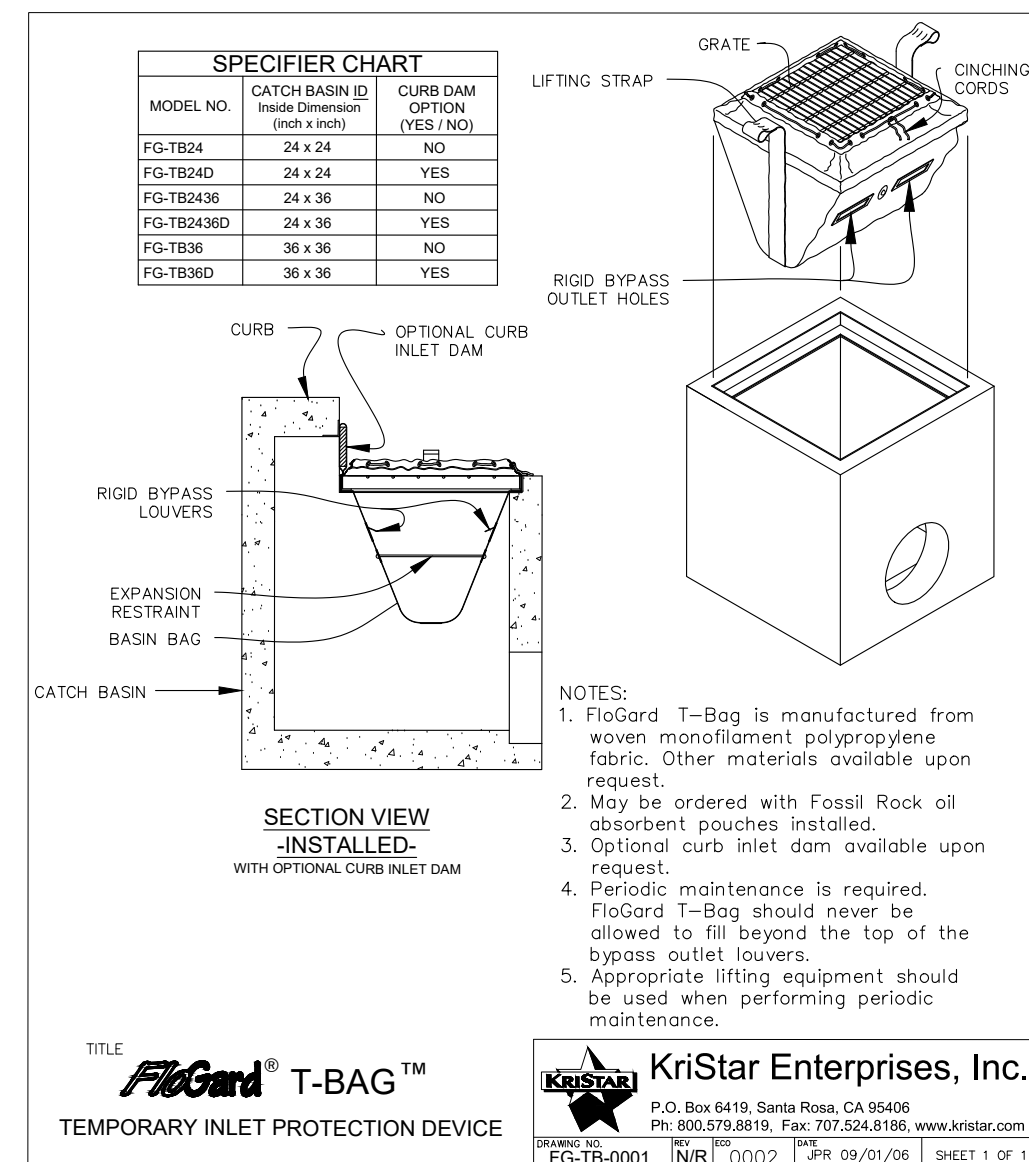
IT IS ANTICIPATED THAT THE FOLLOWING NON-STORMWATER DISCHARGES MAY OCCUR FROM THE SITE DURING THE CONSTRUCTION PERIOD:

1. WATER FROM LINE FLUSHINGS
2. PAVEMENT WASH WATER (WHERE NO SPILLS OR LEAKS OF TOXIC OR HAZARDOUS MATERIALS HAVE OCCURRED)
3. SITE WATERING, TO ALLEVIATE FUGATIVE DUST
4. ROUTINE EXTERNAL BUILDING WASHDOWN WHICH DOES NOT USE DETERGENTS
5. IRRIGATION DRAINAGE

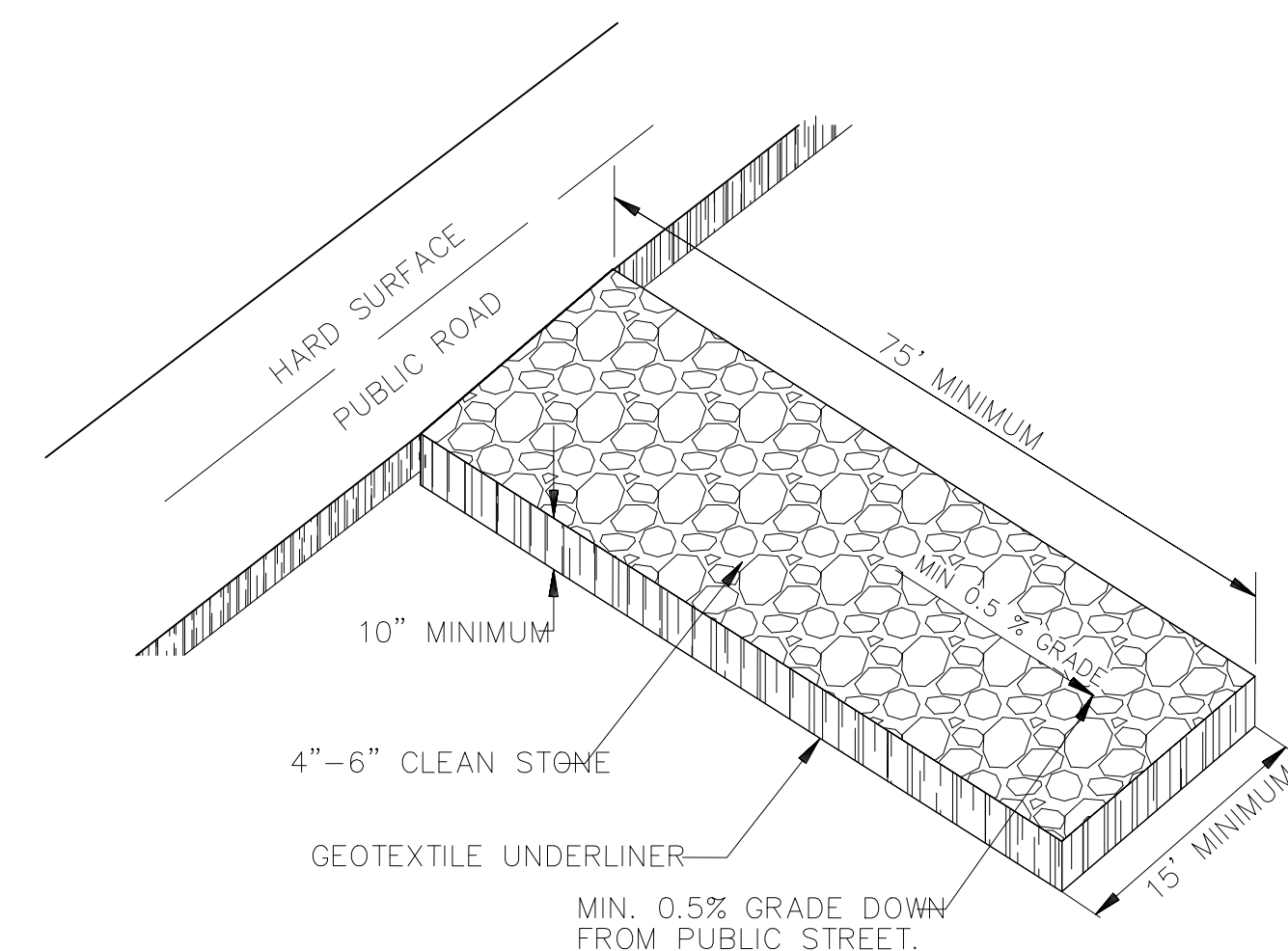
IF SAID DISCHARGES DO OCCUR, THEY WILL BE DIRECTED TO THE TEMPORARY EROSION CONTROL MEASURES PRIOR TO DISCHARGE

6. CONTRACTOR/SUBCONTRACTOR CERTIFICATION:

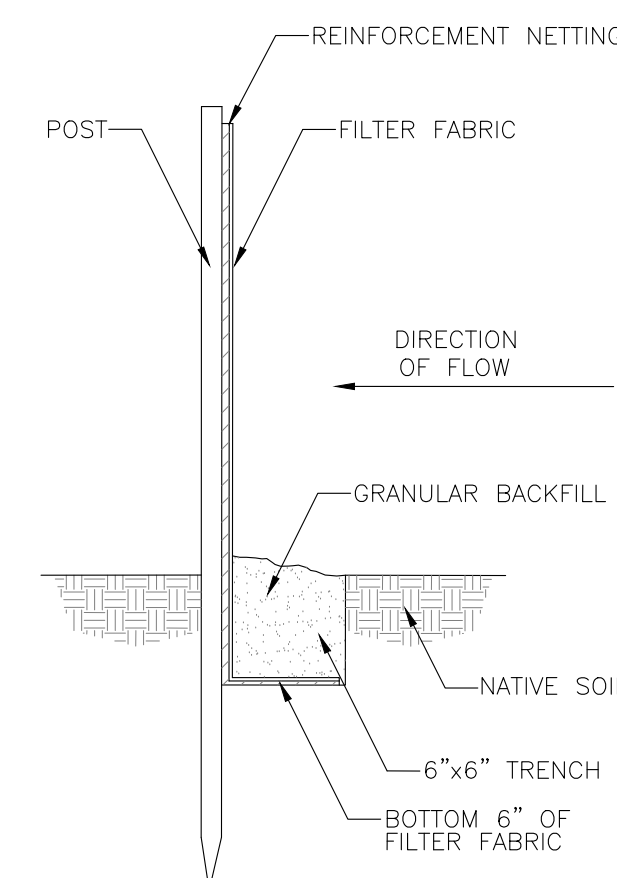
ALL CONTRACTOR(S) AND SUBCONTRACTOR(S) IDENTIFIED ABOVE MUST SIGN THE FOLLOWING CERTIFICATION: "I CERTIFY UNDER PENALTY OF LAW THAT I UNDERSTAND, AND SHALL COMPLY WITH, THE TERMS AND CONDITIONS OF THE STATE OF FLORIDA GENERIC PERMIT FOR STORMWATER DISCHARGE FROM LARGE AND SMALL CONSTRUCTION ACTIVITIES AND THIS STORMWATER POLLUTION PREVENTION PLAN PREPARED THEREUNDER."



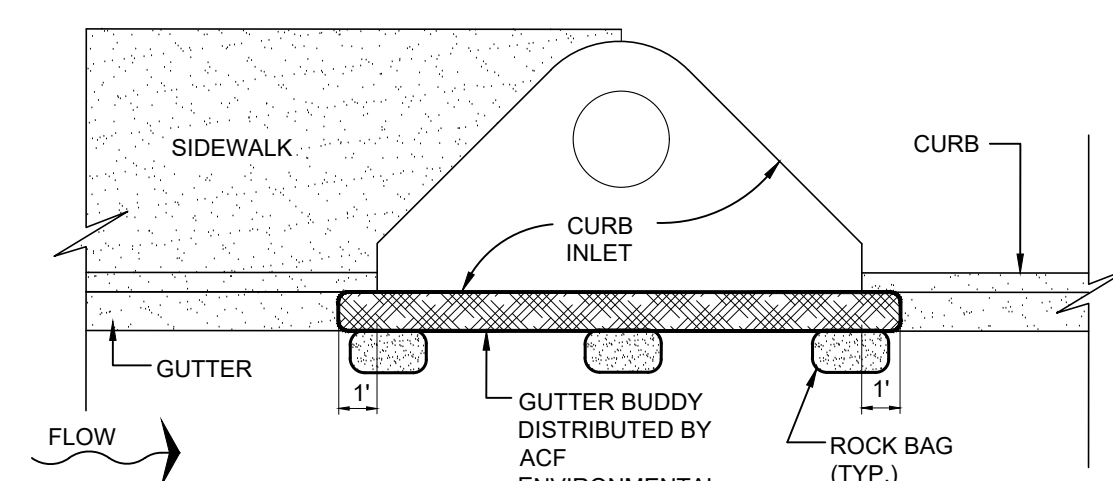
INLET SEDIMENT FILTER
N.T.S.



CONSTRUCTION ENTRANCE
N.T.S.



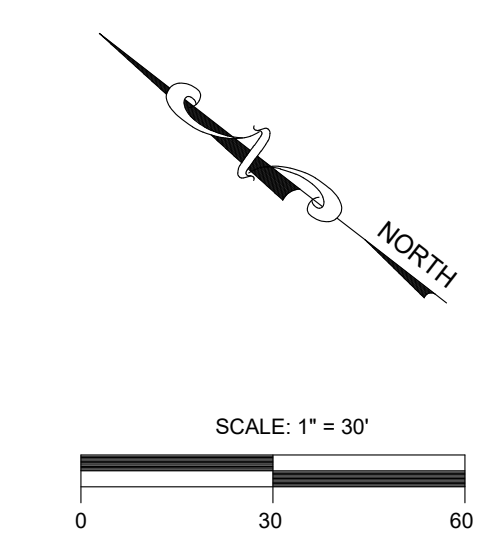
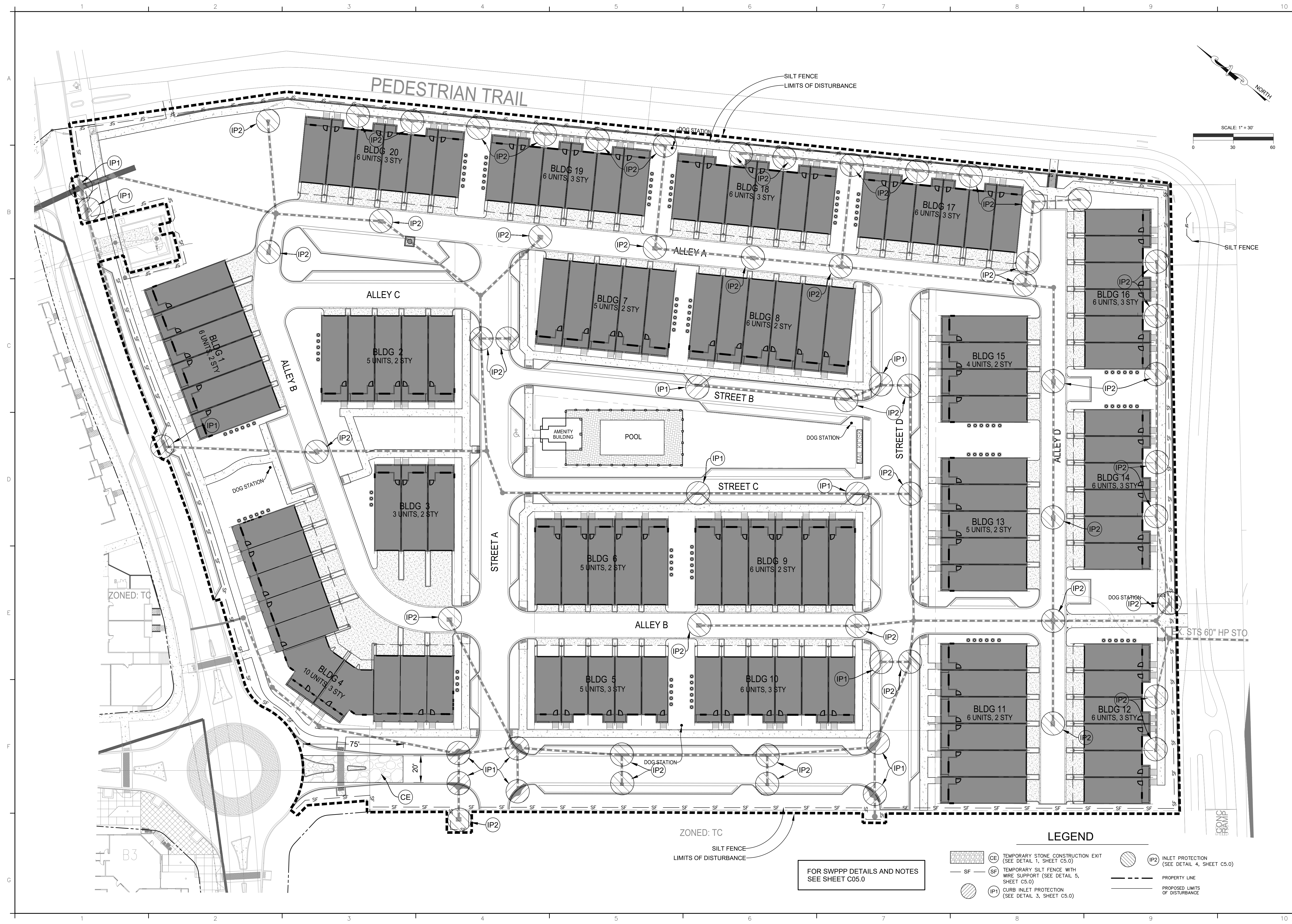
SILT BARRIER DETAIL
N.T.S.



GUTTER BUDDY CURB INLET PROTECTION
N.T.S.

JOB #:	17063.20
ENGINEER:	FRANK A. PORTER, P.E. FL LIC #89092
PLI. MGR.:	FAP
DESIGNER:	RID
DATE:	OCT. 31, 2019
ENGINEER:	GCR
REVISIONS:	
NO. DATE	
RECORD DRAWING	THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED SURVEYING AND FIELD DATA. IT IS NOT TO BE USED FOR ANY OTHER PURPOSES WITHOUT THE WRITTEN CONSENT OF THE ENGINEER. THE ENGINEER'S LIABILITY IS LIMITED TO THE DESIGN AND CONSTRUCTION OF THE PROJECT AND DOES NOT EXTEND TO ANY OTHER ASPECTS OF THE PROJECT. THE ENGINEER'S LIABILITY IS LIMITED TO THE DESIGN AND CONSTRUCTION OF THE PROJECT AND DOES NOT EXTEND TO ANY OTHER ASPECTS OF THE PROJECT.
WINTER SPRINGS TOWNHOMES	
AT	
MICHAEL BLAKE BLVD.	
WINTER SPRINGS, FLORIDA	
FOR	
DREAM FINDERS HOMES LLC	
SWPPP DETAILS AND NOTES	
201 S. BUMBY AVE.	
ORLANDO, FL	
407.786.5337	
WWW.NV5.COM	
CERTIFICATE OF AUTHORIZATION # 20065	
NV5	
SHEET	
C05.0	

0:\17063.20\CONSTR\17063.20 C05.0 SWPPP DETAIL AND NOTES SHEET.dwg - Oct 31, 2019 - 8:47am



FOR SWPPP DETAILS AND NOTES
SEE SHEET C05.0

LEGEND

	TEMPORARY SILT FENCE WITH WIRE SUPPORT (SEE DETAIL 5, SHEET C5.0)		INLET PROTECTION (SEE DETAIL 4, SHEET C5.0)
	CURB INLET PROTECTION (SEE DETAIL 3, SHEET C5.0)		PROPERTY LINE
	TEMPORARY STONE CONSTRUCTION EXIT (SEE DETAIL 1, SHEET C5.0)		PROPOSED LIMITS OF DISTURBANCE

LOCHRANE
Consulting Engineers - Surveyors
An IWS Company
241 SOUTH BUNNY AVENUE, ORLANDO, FL 32803
PH: (407) 244-5111 FAX: (407) 244-5107
WWW.LOCHRANE.COM
CERTIFICATE OF AUTHORIZATION # 00000000

PHASE 2 SWPPP PLAN

WINTER SPRINGS TOWNHOMES
AT
MICHAEL BLAKE BLVD.
WINTER SPRINGS, FLORIDA
FOR
DREAM FINDERS HOMES LLC

RECORD DRAWING
THIS RECORD DRAWING IS BASED ON THE RESULTS OF LIMITED SURVEYING AND FIELD VERIFICATION OF THE LIMITED NUMBER OF CONSTRUCTION PERMITS REQUIRED FOR THIS PROJECT. THE ENGINEER HAS CONDUCTED VISUAL INSPECTIONS AND VISUAL VERIFICATION OF THE EXISTING CONDITIONS AND THE PROPOSED CONSTRUCTION. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THE RECORD DRAWING. THE ENGINEER'S LIABILITY IS LIMITED TO THE PROFESSIONAL SERVICES PROVIDED BY THE ENGINEER.

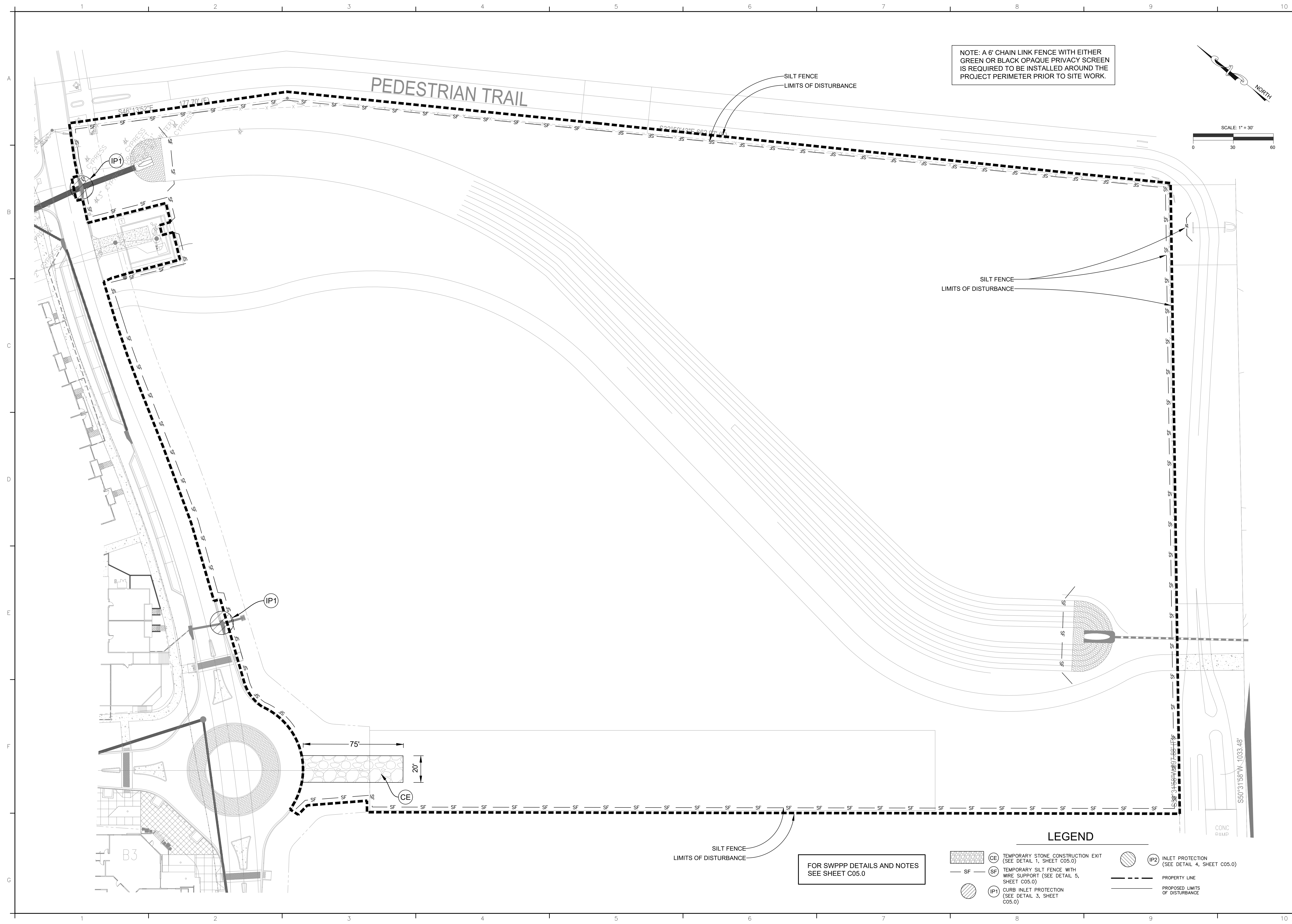
NO.	DATE	REVISIONS

ENGINEER: FRANK A. PORTER, P.E.
FL LIC. #06902
DESIGNER: RID
DATE: OCT. 31, 2019
ENGINEER: GCR

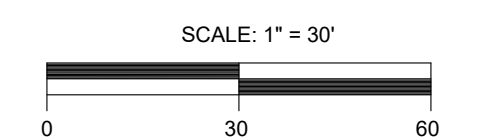
JOB #: 17063.20
PLJ. MGR.: FAP
ENGINEER: GCR

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SHEET
C04.0



NOTE: A 6" CHAIN LINK FENCE WITH EITHER GREEN OR BLACK OPAQUE PRIVACY SCREEN IS REQUIRED TO BE INSTALLED AROUND THE PROJECT PERIMETER PRIOR TO SITE WORK.



FOR SWPPP DETAILS AND NOTES SEE SHEET C05.0

LEGEND

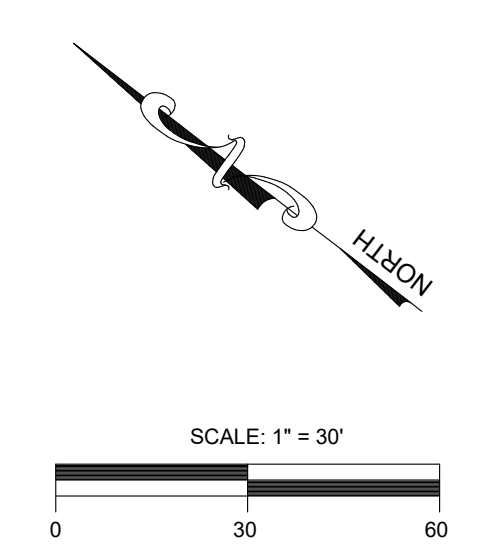
SF	TEMPORARY SILT FENCE WITH WIRE SUPPORT (SEE DETAIL 5, SHEET C05.0)	IP2	INLET PROTECTION (SEE DETAIL 4, SHEET C05.0)
IP1	CURB INLET PROTECTION (SEE DETAIL 3, SHEET C05.0)	CE	TEMPORARY STONE CONSTRUCTION EXIT (SEE DETAIL 1, SHEET C05.0)
	PROPERTY LINE		PROPOSED LIMITS OF DISTURBANCE
	TEMPORARY SILT FENCE WITH WIRE SUPPORT (SEE DETAIL 5, SHEET C05.0)		

<p>RECORD DRAWING</p> <p><small>THIS RECORD DRAWING IS BASED ON THE RESULTS OF A LIMITED NUMBER OF CONVECTIVE RAINFALL EVENTS. THE ENGINEER DOES NOT WARRANT THE ACCURACY OF THE INFORMATION PROVIDED HEREIN AND WILL NOT BE RESPONSIBLE FOR ANY DAMAGE TO PROPERTY OR PERSONS ARISING FROM THE USE OF THIS INFORMATION. THE ENGINEER DOES NOT WARRANT THE ACCURACY OF THE INFORMATION PROVIDED HEREIN AND WILL NOT BE RESPONSIBLE FOR ANY DAMAGE TO PROPERTY OR PERSONS ARISING FROM THE USE OF THIS INFORMATION.</small></p> <p>ENGINEER: FRANK A. PORTER, P.E. FL LIC # 98952</p>	<p>DATE: Oct. 31, 2019</p>	<p>NO. DATE</p> <p>REVISIONS</p>	<p>WINTER SPRINGS TOWNHOMES AT MICHAEL BLAKE BLVD. WINTER SPRINGS, FLORIDA</p> <p>FOR DREAM FINDERS HOMES LLC</p>
<p>SWPPP PHASE 1</p>			
<p>201 S. BUMBY AVE. ORLANDO, FL 32807-8863-3037 WWW.NV5.COM</p> <p>CERTIFICATE OF AUTHORIZATION # 20065</p>			
<p>NV5</p>			
<p>SHEET</p>			
<p>C03.0</p>			

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EXISTING TREES TO BE REMOVED			
SIZE	TREES REMOVED	CREDIT/TREE	TOTAL CREDITS
4"-8"	232	1	232
9"-11"	64	2	128
12"-15"	61	3	183
16"-24"	23	4	92
25"+	0	5	0
TOTAL TREES	380	TOTAL CREDITS	635

PROPOSED TREES			
SPECIES	PROPOSED TREES	CREDIT/TREE	TOTAL CREDITS
ELM	30	1	30
LIVE OAK	26	2	52
CABBAGE PALM	27	2	54
SYLVESTER PALM	7	2	14
CRAPE MYRTLE	27	2	54
MAGNOLIA	19	1	19
HOLLY	40	2	80
TOTAL TREES	176	TOTAL CREDITS	303



TREE CHART

1- 17" PALM	126- 5" GUM	253- 8" PALM
2- 12" PALM	127- 7" GUM	254- 14" PALM
3- 10" PALM	128- 5" GUM	255- 12" PALM
4- 14" PALM	129- 5" GUM	256- 13" PALM
5- 12" PALM	130- 5" GUM	257- 8" PALM
6- 16" PALM	131- 3-6" OAK	258- 7" GUM
7- 14" PALM	132- 6" OAK	259- 5" GUM
8- 7" GUM	133- 5" BAY	260- 21" OAK
9- 5" GUM	134- 6" PINE	261- 18" OAK
10- 4" GUM	135- 6" PINE	262- 15" OAK
11- 7" BAY	136- 19" PINE	263- 14" PALM
12- 11" PALM	137- 2-5" GUM	264- 9" PALM
13- 11" PALM	138- 5" BAY	265- 12" PALM
14- 6" GUM	139- 2-5" PALM	266- 10" PALM
15- 2-5" BAY	140- 5" GUM	267- 5" GUM
16- 4" GUM	141- 4" GUM	268- 13" PALM
17- 6" BAY	142- 4" GUM	269- 8" GUM
18- 4" BAY	143- 15" GUM	270- 6" GUM
19- 2-13" OAK	144- 14" BAY	271- 6" GUM
20- 6" GUM	145- 6" BAY	272- 7" GUM
21- 12" GUM	146- 5" OAK	273- 9" PALM
22- 11" GUM	147- 5" BAY	274- 10" OAK
23- 17" OAK	148- 8" GUM	275- 16" PALM
24- 5" BAY	149- 5" GUM	276- 12" PALM
25- 20" OAK	150- 5" OAK	277- 10" PALM
26- 12" OAK	151- 6" BAY	278- 12" PALM
27- 20" OAK	152- 6" GUM	279- 10" GUM
28- 8" GUM	153- 6" GUM	280- 16" OAK
29- 5" GUM	154- 7" GUM	281- 10" OAK
30- 4" GUM	155- 4" GUM	282- 9" PALM
31- 7" MAPLE	156- 4" OAK	283- 8" OAK
32- 6" GUM	157- 10" GUM	284- 12" PALM
33- 4" MAPLE	158- 6" GUM	285- 10" PALM
34- 5" GUM	159- 6" BAY	286- 6" GUM
35- 4" GUM	160- 7" MAPLE	287- 5" GUM
36- 8" BAY	161- 10" MAPLE	288- 5" GUM
37- 6" BAY	162- 7" GUM	289- 5" GUM
38- 8" BAY	163- 8" OAK	290- 10" GUM
39- 9" GUM	164- 5" MAPLE	291- 11" PALM
40- 6" GUM	165- 10" PALM	292- 11" PALM
41- 5" GUM	166- 5" GUM	293- 13" PALM
42- 4" GUM	167- 9" GUM	294- 12" PALM
43- 4" BAY	168- 7" BAY	295- 11" PALM
44- 8" GUM	169- 8" GUM	296- 12" PALM
45- 6" BAY	170- 9" GUM	297- 13" PALM
46- 6" BAY	171- 6" BAY	298- 13" PALM
47- 5" BAY	172- 7" BAY	299- 11" PALM
48- 5" GUM	173- 7" GUM	300- 11" PALM
49- 5" BAY	174- 5" GUM	301- 12" PALM
50- 5" BAY	175- 5" GUM	302- 11" PALM
51- 6" GUM	176- 11" GUM	303- 12" PALM
52- 4" PINE	177- 5" GUM	304- 9" PALM
53- 5" BAY	178- 7" GUM	305- 13" GUM
54- 5" BAY	179- 5" BAY	306- 12" GUM
55- 5" BAY	180- 5" GUM	307- 21" OAK
56- 9" BAY	181- 5" GUM	308- 7" GUM
57- 4" BAY	182- 5" GUM	309- 6" GUM
58- 20" BAY	183- 6" GUM	310- 7" GUM
59- 12" MAPLE	184- 6" GUM	311- 14" GUM
60- 5" PINE	185- 10" GUM	312- 11" GUM
61- 8" PINE	186- 6" GUM	313- 16" GUM
62- 12" GUM	187- 5" GUM	314- 9" OAK
63- 5" GUM	188- 2-5" GUM	315- 9" OAK
64- 2-4" BAY	189- 9" PINE	316- 8" OAK
65- 7" OAK	190- 6" GUM	317- 15" GUM
66- 5" BAY	191- 6" GUM	318- 8" MAGNOLIA
67- 6" OAK	192- 14" OAK	319- 7" GUM
68- 8" OAK	193- 13" OAK	320- 6" GUM
69- 5" BAY	194- 12" GUM	321- 8" GUM
70- 5" BAY	195- 9" GUM	322- 5" GUM
71- 5" GUM	196- 9" GUM	323- 8" GUM
72- 5" CHINA BERRY	197- 8" GUM	324- 6" OAK
73- 8" GUM	198- 14" GUM	325- 6" BAY
74- 5" GUM	199- 12" GUM	326- 2-5" OAK
75- 6" GUM	200- 8" GUM	327- 2-5" OAK
76- 5" BAY	201- 5" GUM	328- 12" GUM
77- 5" BAY	202- 11" GUM	329- 6" BAY
78- 4" OAK	203- 8" GUM	330- 7" GUM
79- 5" GUM	204- 12" PALM	331- 12" GUM
80- 5" BAY	205- 24" OAK	332- 11" GUM
81- 5" BAY	206- 16" GUM	333- 6" BAY
82- 19" GUM	207- 6" GUM	334- 5" GUM
83- 6" BAY	208- 11" PALM	335- 7" CAMPHOR
84- 6" BAY	209- 11" GUM	336- 5" BAY
85- 6" BAY	210- 11" PALM	337- 8" BAY
86- 6" GUM	211- 14" GUM	338- 6" OAK
87- 5" BAY	212- 7" GUM	339- 5" OAK
88- 8" PINE	213- 6" GUM	340- 8" OAK
89- 6" BAY	214- 4" BAY	341- 6" OAK
90- 5" GUM	215- 6" GUM	342- 13" GUM
91- 6" GUM	216- 6" BAY	343- 12" PALM
92- 5" BAY	217- 6" BAY	344- 13" GUM
93- 8" BAY	218- 4" BAY	345- 6" GUM
94- 5" GUM	219- 5" BAY	346- 2-16" MAPLE
95- 5" BAY	220- 4" BAY	347- 8" OAK
96- 8" PINE	221- 4" GUM	348- 2-14" GUM
97- 5" GUM	222- 2-5" GUM	349- 6" GUM
98- 5" BAY	223- 6" BAY	350- 17" OAK
99- 9" BAY	224- 5" GUM	351- 6" OAK
100- 7" GUM	225- 6" GUM	352- 11" GUM
101- 5" GUM	226- 6" GUM	353- 5" BAY
102- 8" GUM	227- 4" GUM	354- 5" OAK
103- 19" BAY	228- 10" GUM	355- 14" GUM
104- 11" GUM	229- 10" GUM	356- 5" OAK
105- 12" PALM	230- 11" GUM	357- 6" OAK
106- 11" PALM	231- 7" BAY	358- 15" GUM
107- 13" PALM	232- 9" GUM	359- 5" OAK
108- 12" GUM	233- 5" PINE	360- 3-5" OAK
109- 11" PALM	234- 4" GUM	361- 9" BAY
110- 10" PALM	235- 6" GUM	362- 7" CAMPHOR
111- 13" PALM	236- 2-10" OAK	363- 6" CAMPHOR
112- 12" PALM	237- 20" PINE	364- 17" GUM
113- 6" GUM	238- 8" PALM	365- 7" OAK
114- 7" GUM	239- 20" PALM	366- 5" OAK
115- 13" GUM	240- 10" PALM	367- 6" BAY
116- 5" GUM	241- 10" PALM	368- 5" BAY
117- 2-7" OAK	242- 12" PALM	369- 6" OAK
118- 7" GUM	243- 8" PALM	370- 8" GUM
119- 5" GUM	244- 13" PALM	371- 8" PALM
120- 5" OAK	245- 12" PALM	372- 6" BAY
121- 5" GUM	246- 12" PALM	373- 10" GUM
122- 8" PINE	247- 12" PALM	374- 12" GUM
123- 5" GUM	248- 11" PALM	375- 12" GUM
124- 6" PINE	249- 10" PALM	376- 11" GUM
125- 8" PINE	250- 9" PINE	377- 6" GUM
	251- 11" PALM	378- 8" GUM
		379- 8" GUM
		380- 7" GUM
		381- 12" GUM
		382- 11" OAK
		383- 11" GUM
		384- 9" GUM
		385- 9" GUM

NOTE: ALL TREES TO BE REMOVED DUE TO PROPOSED GRADE CHANGE ON THE SITE

JOB #:	17063.20
ENGINEER:	FRANK A. PORTER, P.E.
FL LIC #:	460602
PLI MGR:	FAP
DESIGNER:	RID
DATE:	OCT. 31, 2019
ENGINEER:	GCR

NO.	DATE	REVISIONS

RECORD DRAWING

THIS RECORD DRAWING IS BASED ON THE CREDITS OF LIMITED LIABILITY COMPANY FOR PLANNED REDEVELOPMENT PROJECTS AND THE LIMITED LIABILITY COMPANY FOR PLANNED REDEVELOPMENT PROJECTS. THE ENGINEER HAS CONDUCTED VISUAL INSPECTIONS AND SURVEYS TO VERIFY THE EXISTING CONDITIONS AND TO DETERMINE THE LOCATION AND SIZE OF THE TREES TO BE REMOVED. THE ENGINEER HAS CONDUCTED VISUAL INSPECTIONS AND SURVEYS TO VERIFY THE EXISTING CONDITIONS AND TO DETERMINE THE LOCATION AND SIZE OF THE TREES TO BE REMOVED. THE ENGINEER HAS CONDUCTED VISUAL INSPECTIONS AND SURVEYS TO VERIFY THE EXISTING CONDITIONS AND TO DETERMINE THE LOCATION AND SIZE OF THE TREES TO BE REMOVED.

ENGINEER: FRANK A. PORTER, P.E.
FL LIC # 460602

WINTER SPRINGS TOWNHOMES
AT
MICHAEL BLAKE BLVD.
WINTER SPRINGS, FLORIDA
FOR
DREAM FINDERS HOMES LLC

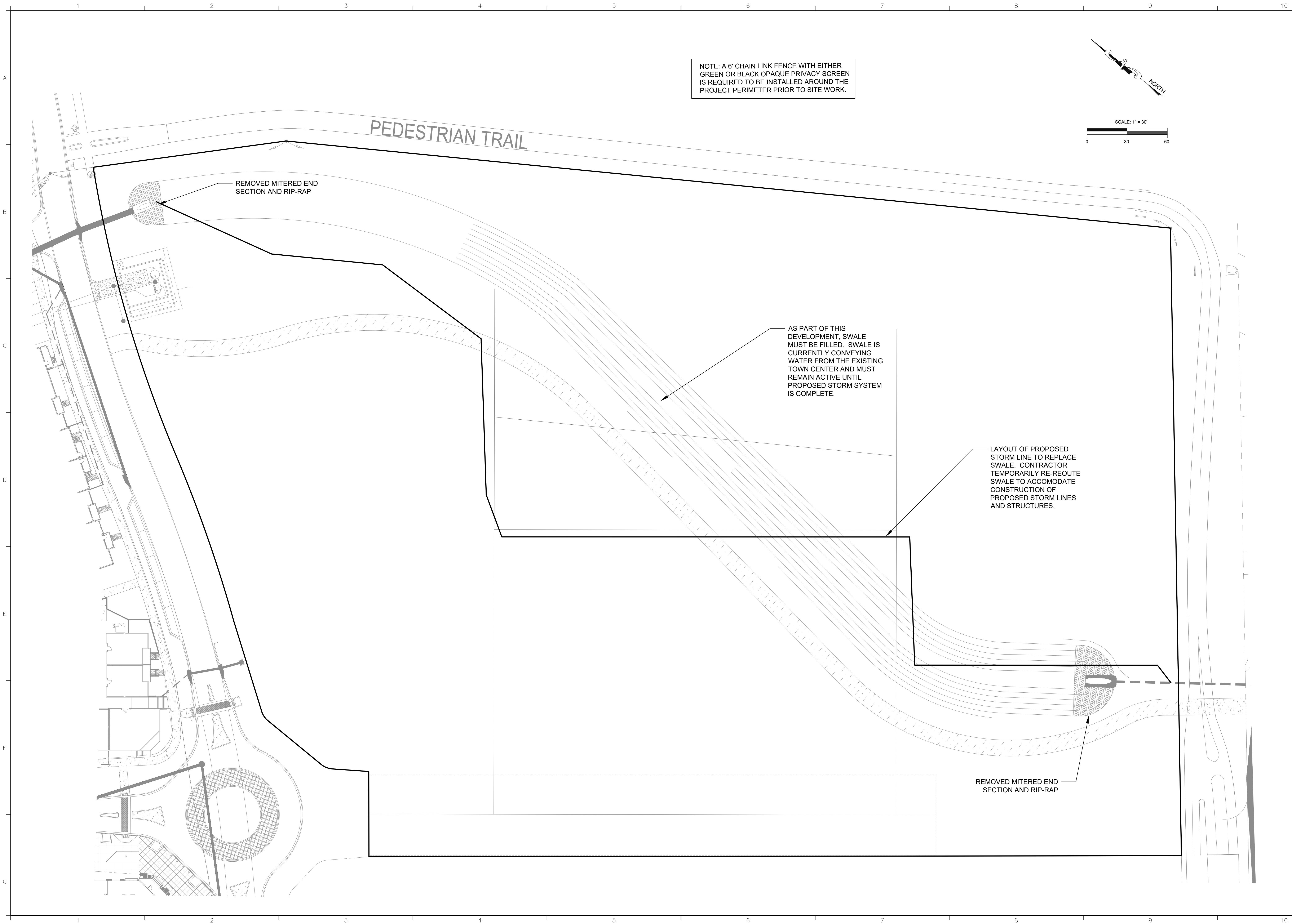
TREE PLAN

201 S. BUMBY AVE.
ORLANDO, FL
32807
WWW.NVS.COM

CERTIFICATE OF AUTHORIZATION # 20065

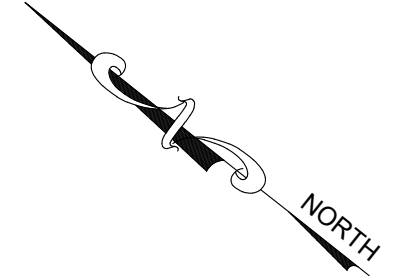
DATE: OCT. 31, 2019 - 8:46 AM

SHEET C02.1



NOTE: A 6' CHAIN LINK FENCE WITH EITHER GREEN OR BLACK OPAQUE PRIVACY SCREEN IS REQUIRED TO BE INSTALLED AROUND THE PROJECT PERIMETER PRIOR TO SITE WORK.

SCALE: 1" = 30'



JOB #: 17063.20
 ENGINEER: FRANK A. PORTER, P.E.
 FL LIC. #89892
 DATE: Oct. 31, 2019

NO.	DATE	REVISIONS

RECORD DRAWING
 THIS RECORD DRAWING IS BASED ON THE RESULTS OF A LIMITED SURVEY OF CONVEYING FACILITIES FOR THE PROJECT. THE LOCATION OF CONVEYING FACILITIES SHOWN ON THIS DRAWING IS NOT GUARANTEED. THE ENGINEER DOES NOT WARRANT THE ACCURACY OF THE INFORMATION SHOWN ON THIS DRAWING. THE ENGINEER'S LIABILITY IS LIMITED TO THE EXTENT OF HIS PROFESSIONAL KNOWLEDGE.
 ENGINEER: FRANK A. PORTER, P.E.
 FL LIC. #89892

WINTER SPRINGS TOWNHOMES
 AT
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 FOR
 DREAM FINDERS HOMES LLC

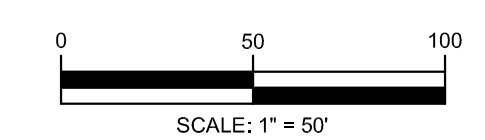
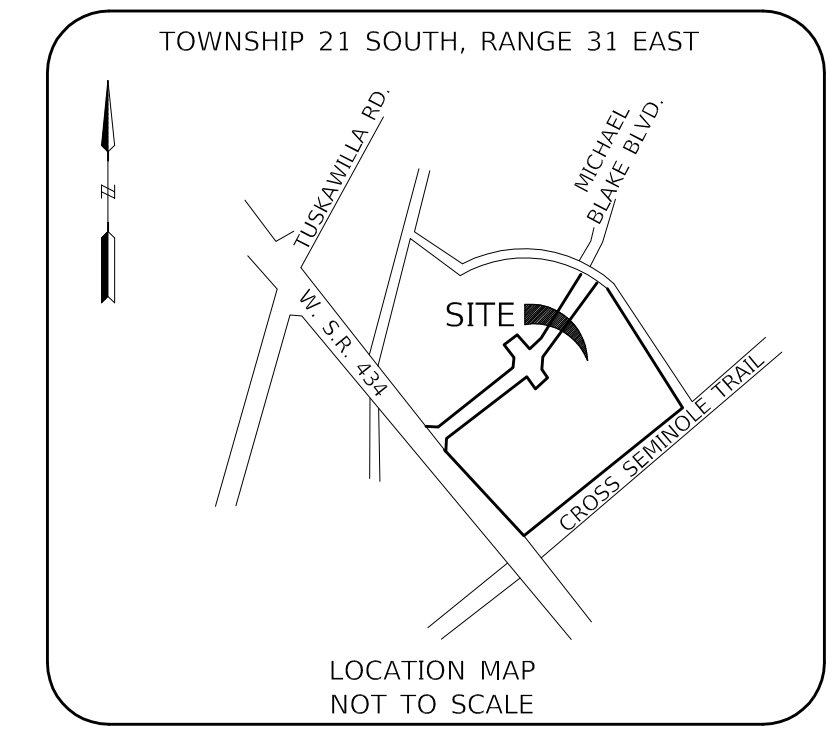
DEMO PLAN

201 S. BUMBY AVE.
 ORLANDO, FL
 32837
 WWW.NV5.COM
 CERTIFICATE OF AUTHORIZATION # 20065

SHEET
 C02.0

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PART OF BLOCK 4, LOTS 7 AND 8
D R MITCHELLS SURVEY OF THE LEVY GRANT
ON LAKE JESSUP
PLAT BOOK 1, PAGE 5



LEGEND:

- | | | | |
|--------|----------------------------|---|---------------------------|
| ALUM | = ALUMINUM | ○ | = OAK TREE (AS NOTED) |
| B/BNK | = BOTTOM OF BANK | ✱ | = PALM TREE (AS NOTED) |
| B/SLP | = BOTTOM OF SLOPE | ✱ | = CYPRESS TREE (AS NOTED) |
| BWF | = BARBED WIRE FENCE | ✱ | = SIGN |
| CB | = CATCH BASIN | ⊕ | = WATER METER |
| C&G | = CURB AND GUTTER | ⊕ | = WATER VALVE |
| CINL | = CURB INLET | ⊕ | = VALVE COVER (SANITARY) |
| CLF | = CHAIN LINK FENCE | | |
| CM | = CONCRETE MONUMENT | | |
| CONC | = CONCRETE | | |
| ELEV | = ELEVATION | | |
| E/P | = EDGE OF PAVEMENT | | |
| INV | = INVERT ELEVATION | | |
| LB | = LICENSED BUSINESS | | |
| LL | = LANE LINE | | |
| N&D | = NAIL & DISK | | |
| ℙ | = PROPERTY LINE | | |
| PT | = POINT | | |
| PVC | = POLYVINYL CHLORIDE | | |
| PVT | = PAVEMENT | | |
| RCP | = REINFORCED CONCRETE PIPE | | |
| R/W | = RIGHT OF WAY | | |
| S.R. | = STATE ROAD NUMBER | | |
| STS | = STORM SEWER | | |
| SWK | = SIDEWALK | | |
| T/BNK | = TOP OF BANK | | |
| T.B.M. | = TEMPORARY BENCH MARK | | |
| TRAV | = TRAVERSE | | |
| W/ | = WITH | | |

SURVEYOR'S NOTES:

1. THE SURVEY SHOWN HEREON REPRESENTS A TOPOGRAPHIC SURVEY AS DEFINED IN CHAPTER 51-17, FLORIDA ADMINISTRATIVE CODES.
2. THIS SURVEY WAS PERFORMED FOR THE SOLE AND EXCLUSIVE BENEFIT OF THE ENTITIES LISTED HEREON AND SHALL NOT BE RELIED UPON BY ANY OTHER ENTITY OR INDIVIDUAL WHOMSOEVER.
3. THIS SURVEY MAKES NO CLAIMS REGARDING OWNERSHIP OR RIGHTS OF POSSESSION.
4. NON-VISIBLE AND SUBSURFACE IMPROVEMENTS ARE NOT LOCATED UNLESS NOTED OTHERWISE.
5. ELEVATIONS SHOWN HEREON WERE BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29) AND THE FOLLOWING SEMINOLE COUNTY BENCHMARKS:
SEMINOLE COUNTY BENCHMARK NO. 4733501, ELEVATION = 39.102'
SEMINOLE COUNTY BENCHMARK NO. 4733701, ELEVATION = 45.515'
6. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES AS SHOWN HEREON ARE FOR INFORMATIONAL PURPOSES ONLY.
7. SYMBOLS SHOWN ON THIS SURVEY MAY NOT BE SHOWN TO SCALE.
8. THIS SURVEY MAY HAVE BEEN REDUCED IN SIZE UPON REPRODUCTION. THIS MUST BE CONSIDERED WHEN OBTAINING SCALED INFORMATION.

SURVEYOR'S CERTIFICATION:

TO: POLLACK SHORES REAL ESTATE GROUP

I, THE UNDERSIGNED, DO HEREBY CERTIFY THAT THE SURVEY REPRESENTED HEREON MEETS OR EXCEEDS THE REQUIREMENTS SET FORTH IN CHAPTER 51-17, FLORIDA ADMINISTRATIVE CODE, PURSUANT TO CHAPTER 472.027 FLORIDA STATUTES.

CHRISTOPHER A. LABERGE, P.S.M., FLORIDA REGISTRATION NO. 6014

REPRESENTING: LOCHRANE ENGINEERING, INC. 201 S. BUMBY AVENUE, ORLANDO, FL 32803 LICENSED SURVEY BUSINESS (LB) NO. 2856

- NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER -



PART OF BLOCK 4, LOTS 7 AND 8
D R MITCHELLS SURVEY OF THE LEVY GRANT
ON LAKE JESSUP
PLAT BOOK 1, PAGE 5

PROJECT NO. 13034.10
REFERENCE 03067
DATE SURVEYED 02/03/2014
DATE DRAWN 03/14/2014
DRAWN BY: RTS CHECKED BY: CAL
SCALE: 1"=50' F/B

WINTER SPRINGS TOWN CENTER
PHASE II APARTMENTS
FOR
POLLACK SHORES
REAL ESTATE GROUP

TOPOGRAPHIC SURVEY

LOCHRANE Consulting Engineers Surveyors
Veteran Owned Small Business
30 Years
100% Employee Owned
100% Florida Owned

303 SOUTH BURNLEY AVENUE, ORLANDO, FL 32803
PH: (407) 944-3317 | FAX: (407) 944-3317 | WWW.LOCHRANE.COM
CERTIFICATE OF AUTHORIZATION # 0002826

SHEET 1 OF 1

S:\proj\2013\13034.10\WSP\CP2\A\DWG\13034-SRV.dwg - Mar 14, 2014 - 4:45pm

LEGAL DESCRIPTION

A PORTION OF LOTS 7 AND 8, BLOCK "A", D.R. MITCHELL'S SURVEY OF THE LEVY GRANT ON LAKE JESSUP, SAID LANDS LYING IN SECTION 6, TOWNSHIP 21 SOUTH, RANGE 31 EAST, ACCORDING TO THE PLAT THEREOF AS RECORDED IN PLAT BOOK 1, PAGE 5, OF THE PUBLIC RECORDS OF SEMINOLE COUNTY, FLORIDA; BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE INTERSECTION OF STATE ROAD 434 AND TUSKAWILLA ROAD (PER FLORIDA DEPARTMENT OF TRANSPORTATION RIGHT-OF-WAY MAP, SECTION 77070-2516, SHEET 10 OF 13, P.1. STATION 600+32.11); THENCE RUN S38°23'34"E, A DISTANCE OF 1320.11 FEET ALONG THE BASELINE OF SURVEY AS SHOWN ON SAID RIGHT-OF-WAY MAP; THENCE DEPARTING SAID BASELINE, RUN N51°36'26"E, A DISTANCE OF 94.94 FEET TO A POINT ON THE NORTHEASTLY RIGHT-OF-WAY LINE OF THE AFORESAID STATE ROAD 434, AS SHOWN ON SAID RIGHT-OF-WAY MAP, FOR THE POINT OF BEGINNING; THENCE RUN ALONG SAID NORTHEASTLY RIGHT-OF-WAY LINE OF STATE ROAD 434 AND EASTERLY RIGHT OF WAY LINE OF MICHAEL BLAKE BOULEVARD (AS RECORDED IN OFFICIAL RECORD BOOK 7486, PAGE 138) THE FOLLOWING COURSES AND DISTANCES: RUN N24°10'06"W A DISTANCE OF 48.66 FEET; THENCE RUN N38°43'16"W A DISTANCE OF 246.60 FEET TO THE POINT OF CURVATURE OF A CURVE CONCAVE EASTERLY HAVING A RADIUS OF 25.00 FEET; AND A CHORD BEARING OF N06°16'44"E, THENCE RUN NORTHERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 90°00'00" A DISTANCE OF 39.27 FEET TO THE POINT OF TANGENCY; THENCE RUN N51°16'44"E A DISTANCE OF 389.87 FEET; THENCE RUN N53°37'06"E A DISTANCE OF 71.07 FEET TO THE POINT OF CURVATURE OF A CURVE CONCAVE SOUTHERLY HAVING A RADIUS OF 15.00 FEET AND A CHORD BEARING OF N74°09'35"E; THENCE RUN EASTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 41°04'59" A DISTANCE OF 10.76 FEET TO THE POINT OF TANGENCY; THENCE RUN S85°17'55"E A DISTANCE OF 22.68 FEET TO THE POINT OF CURVATURE OF A CURVE CONCAVE SOUTHERLY HAVING A RADIUS OF 15.00 FEET AND A CHORD BEARING OF S64°11'16"E; THENCE RUN EASTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 42°13'19" A DISTANCE OF 11.05 FEET TO THE POINT OF TANGENCY; THENCE RUN N43°04'36"E A DISTANCE OF 31.18 FEET; THENCE RUN N51°24'49"E A DISTANCE OF 63.63 FEET; THENCE RUN N34°23'22"W A DISTANCE OF 27.14 FEET TO THE POINT OF CURVATURE OF A CURVE CONCAVE EASTERLY HAVING A RADIUS OF 15.00 FEET AND A CHORD BEARING OF N16°43'25"W; THENCE RUN NORTHERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 35°19'54" A DISTANCE OF 9.25 FEET TO THE POINT OF TANGENCY; THENCE RUN N00°56'32"E A DISTANCE OF 51.24 FEET TO THE POINT OF CURVATURE OF A CURVE CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 15.00 FEET AND A CHORD BEARING OF N17°39'17"E; THENCE RUN NORTHEASTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 33°25'31" A DISTANCE OF 8.75 FEET TO THE POINT OF TANGENCY; THENCE RUN N34°22'03"E A DISTANCE OF 70.51 FEET TO A NON-TANGENT CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 1030.00 FEET AND A CHORD BEARING OF N32°18'59"E; THENCE RUN NORTHEASTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 07°15'46" A DISTANCE OF 130.56 FEET TO THE POINT OF REVERSE CURVATURE OF A CURVE CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 944.00 FEET AND A CHORD BEARING OF N35°29'59"E; THENCE RUN NORTHEASTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 13°37'45" A DISTANCE OF 224.55 FEET TO THE SOUTHERLY LINE OF ACQUISITION PARCEL B (THE RAILS TO TRAILS CORRIDOR) AS DESCRIBED IN OFFICIAL RECORDS BOOK 4092, PAGE 0164, PUBLIC RECORDS OF SEMINOLE COUNTY, FLORIDA; THENCE DEPARTING SAID EASTERLY RIGHT OF WAY LINE OF MICHAEL BLAKE BOULEVARD, RUN S46°13'52"E ALONG SAID SOUTHERLY LINE A DISTANCE OF 145.09 FEET; THENCE RUN S32°50'43"E A DISTANCE OF 662.97 FEET TO THE INTERSECTION OF SAID SOUTHERLY LINE AND THE NORTHWESTERLY LINE OF SAID ACQUISITION PARCEL B; THENCE RUN S50°31'58"W ALONG SAID NORTHWESTERLY LINE, A DISTANCE OF 468.43 FEET; THENCE RUN N38°32'29"W A DISTANCE OF 606.03 FEET TO THE POINT OF BEGINNING.

PLAT OF SURVEY

AREA SUMMARY

CONTAINS 364,300 SQUARE FEET OR 8.363 ACRES MORE OR LESS.

CURVE DATA
 $\Delta = 33^{\circ}25'31''$
 $R = 15.00'$
 $L = 8.75'$
 $CHORD$
 $N17^{\circ}39'17''E$
 $8.63' D\&M$

CURVE DATA
 $\Delta = 07^{\circ}15'46''$
 $R = 1030.00'$
 $L = 130.56'$
 $CHORD$
 $N32^{\circ}18'59''E$
 $130.47' D\&M$

CURVE DATA
 $\Delta = 35^{\circ}19'54''$
 $R = 15.00'$
 $L = 9.25'$
 $CHORD$
 $N16^{\circ}43'25''W$
 $9.10' D\&M$

CURVE DATA
 $\Delta = 41^{\circ}04'59''$
 $R = 15.00'$
 $L = 10.76'$
 $CHORD$
 $N00^{\circ}56'32''E$
 $51.24' D\&M$

CURVE DATA
 $\Delta = 42^{\circ}13'19''$
 $R = 15.00'$
 $L = 11.05'$
 $CHORD$
 $S64^{\circ}11'16''E$
 $10.81' D\&M$

CURVE DATA
 $\Delta = 42^{\circ}13'19''$
 $R = 15.00'$
 $L = 11.05'$
 $CHORD$
 $S64^{\circ}11'16''E$
 $10.81' D\&M$

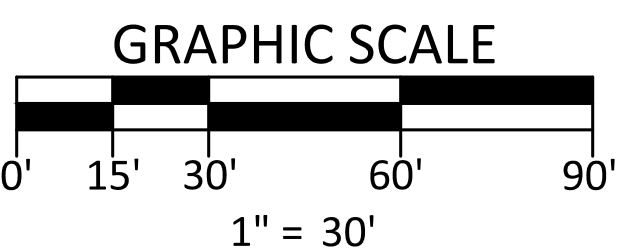
CURVE DATA
 $\Delta = 42^{\circ}13'19''$
 $R = 15.00'$
 $L = 11.05'$
 $CHORD$
 $S64^{\circ}11'16''E$
 $10.81' D\&M$

NOTES

- BEARING STRUCTURE IS ASSUMED AND BASED ON THE MONUMENTED NORTHEASTERLY RIGHT-OF-WAY LINE OF STATE ROAD 434 (SECTION 77070-2516) BEING N38°43'16"W (PER RIGHT-OF-WAY MAP.)
- THIS SURVEY REFLECTS ONLY MATTERS OF RECORD AS PROVIDED BY THE CLIENT OR CLIENTS REPRESENTATIVE.
- THIS SURVEY WAS MADE ON THE GROUND. THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.
- THIS BUILDING/LOT LIES IN ZONES "M", BASED ON FLOOD INSURANCE RATE MAP NO. 12117C0160F, COMMUNITY NO. 120295, CITY OF WINTER SPRINGS, SEMINOLE COUNTY, FLORIDA, DATED SEPTEMBER 28, 2007.
- ACCORDING TO FLORIDA STATUTES, CHAPTER 472.205, A LAND SURVEYOR SHALL NOT AFFIX HIS SEAL OR NAME TO ANY PLAN OR DRAWING WHICH DEPICTS WORK WHICH HE IS NOT LICENSED TO PERFORM OR WHICH IS BEYOND HIS PROFESSION OR SPECIALTY THEREIN. THEREFORE, WE ARE UNABLE TO CERTIFY AS TO MUNICIPAL ZONING COMPLIANCE, INTERPRETATION OF ZONING CODES OR THE DETERMINATION OF VIOLATIONS THEREOF.
- THIS SURVEY WAS MADE WITH BENEFIT OF TITLE FIRST AMERICAN TITLE INSURANCE COMPANY'S COMMITMENT NO. 2037-3811937(C1), EFFECTIVE AUGUST 22, 2017. (SUBJECT PROPERTY IS A PORTION OF THE LAND DESCRIBED IN THE TITLE COMMITMENT).
- THIS SURVEY IS VALID ONLY FOR THE PARTIES TO WHOM IT IS CERTIFIED.
- THIS SURVEY EXCEEDS THE ACCURACY REQUIREMENTS SET FORTH IN FLORIDA STATUTES.
- SUBJECT PROPERTY CONTAINS NO PARKING SPACES, UNDER CONSTRUCTION.
- ZONING INFORMATION WAS NOT PROVIDED AT THE TIME OF SURVEY.
- SITE UNDER CONSTRUCTION AT TIME OF SURVEY.
- NO DELINEATED WETLANDS WERE OBSERVED.

SCHEDULE B-2 - EXCEPTIONS

- RESTRICTION AS TO THE NEARBY PROPERTY ONLY, AND NO OTHER RESTRICTION, AS DEFINED IN AND SET FORTH IN PARAGRAPH 18.02(C) OF THE THIRD AMENDMENT TO MEMORANDUM OF LEASE RECORDED IN BOOK 6265, PAGE 934, AS EVIDENCED BY THAT CERTAIN LEASE DATED OCTOBER 19, 2001, BY AND BETWEEN CAPITAL GREEN, L.L.C., A GEORGIA LIMITED LIABILITY COMPANY ("LANDLORD") AND PUBLIC SUPER MARKETS, INC., A FLORIDA CORPORATION ("TENANT") AS EVIDENCED BY THAT CERTAIN MEMORANDUM OF LEASE RECORDED SEPTEMBER 27, 2002 IN BOOK 4539, PAGE 651; AS AMENDED BY FIRST ADDENDUM TO MEMORANDUM OF LEASE RECORDED FEBRUARY 16, 2003 IN BOOK 4713, PAGE 1200; FURTHER AMENDED BY SECOND AMENDMENT TO MEMORANDUM OF LEASE RECORDED JUNE 9, 2005 IN BOOK 5759, PAGE 833; AS FURTHER AMENDED BY THIRD AMENDMENT TO MEMORANDUM OF LEASE MAY 30, 2006 IN BOOK 6265, PAGE 934; AS FURTHER AMENDED BY FOURTH AMENDMENT TO MEMORANDUM OF LEASE RECORDED MAY 30, 2006 IN BOOK 6265, PAGE 944; AS FURTHER AMENDED BY FIFTH AMENDMENT TO MEMORANDUM OF LEASE RECORDED FEBRUARY 11, 2013 IN BOOK 7962, PAGE 1505. (CONTAINS NO EASEMENTS TO DEPICT.)
- FUTURE DEVELOPMENT COMMITMENT AGREEMENT BY AND BETWEEN WINTER SPRINGS HOLDINGS INC., A DELAWARE CORPORATION AND THE CITY OF WINTER SPRINGS FLORIDA RECORDED NOVEMBER 29, 2010 IN BOOK 7486, PAGE 146. (CONTAINS NO EASEMENTS TO DEPICT.)
- TEMPORARY PUBLIC DRAINAGE EASEMENT BY AND BETWEEN WINTER SPRINGS HOLDINGS INC., A DELAWARE CORPORATION AND THE CITY OF WINTER SPRINGS FLORIDA RECORDED JANUARY 18, 2012 IN BOOK 7699, PAGE 200. (AFFECTS SUBJECT PROPERTY, SHOWN HEREON.)
- DEVELOPMENT AGREEMENT (MULTI-FAMILY/MIXED USE APARTMENT PROJECT-S.R. 434), BY AND BETWEEN THE CITY OF WINTER SPRINGS FLORIDA AND WINTER SPRINGS HOLDINGS INC., A DELAWARE CORPORATION, DATED APRIL 9, 2015 IN BOOK 8446, PAGE 1131; AS MODIFIED BY THAT CERTAIN FIRST MODIFICATION OF DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF WINTER SPRINGS, A FLORIDA MUNICIPAL CORPORATION AND WINTER SPRINGS HOLDINGS, INC., A DELAWARE CORPORATION, DATED JANUARY 9, 2017, RECORDED MARCH 3, 2017 IN BOOK 8817, PAGE 98; AS AMENDED BY THAT CERTAIN FIRST AMENDMENT TO DECLARATION OF CONDITIONS, COVENANTS, EASEMENTS AND RESTRICTIONS BY AND BETWEEN WINTER SPRINGS HOLDINGS, INC., A DELAWARE CORPORATION, TUSKAWILLA RETAIL PARTNERS, L.L.C., A FLORIDA LIMITED LIABILITY COMPANY AND WINTER SPRINGS APARTMENTS, LP, A DELAWARE LIMITED LIABILITY PARTNERSHIP, DATED AS OF JULY 31, 2017, RECORDED AUGUST 3, 2017 IN OFFICIAL RECORDS BOOK 8964, PAGE 1579. (BLANKET TYPE EASEMENT, NOT PLOTTABLE. ALSO DETENTION POND AREA, SANITARY SEWER AND LIFT STATION EASEMENT SHOWN HEREON.)



THIS SURVEY MEETS THE "STANDARDS OF PRACTICE" AS REQUIRED BY CHAPTER 5J-17 FLORIDA BOARD OF LAND SURVEYORS, PURSUANT TO SECTION 472.027 OF THE FLORIDA STATUTES.

JAMES D. BRAY, PSM 6507

"NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF THIS FLORIDA LICENSED SURVEYOR AND MAPPER."

BB - BOTTOM OF BANK	CM - CENTERLINE	EM - ELECTRIC METER	Y - GUY WIRE ANCHOR
BFP - BACK FLOW PREVENTER	CMP - CONCRETE MONUMENT	EL - ELEVATION	HP - HANDICAP PARKING
BW - BARBED WIRE FENCE	CP - CORRUGATED METAL PIPE	EP - EASEMENT	H - HIGH DENSITY POLYETHYLENE
BOL - BOLLARD	COV - COVERED	EP - EASEMENT	IE - INVERT ELEVATION
BE - BURIED ELECTRIC LINE	CP - CONCRETE PAD	EP - EASEMENT	IR - IRON PIPE
CB - CABLE TV RISER	CP - CONCRETE PAD	EP - EASEMENT	IR - IRON PIPE
CALL - CALCULATED	CP - CONCRETE PAD	EP - EASEMENT	IR - IRON PIPE
CA - CALCULATED & MEASURED	CP - CONCRETE PAD	EP - EASEMENT	IR - IRON PIPE
C - CENTRAL ANGLE	CP - CONCRETE PAD	EP - EASEMENT	IR - IRON PIPE
CC - COVERED CONCRETE	CP - CONCRETE PAD	EP - EASEMENT	IR - IRON PIPE
CC - CERTIFIED CORNER RECORD	CP - CONCRETE PAD	EP - EASEMENT	IR - IRON PIPE
CC - CONCRETE FLUME	CP - CONCRETE PAD	EP - EASEMENT	IR - IRON PIPE
CC - CHAIN LINK FENCE	CP - CONCRETE PAD	EP - EASEMENT	IR - IRON PIPE

POC - POINT OF COMMENCEMENT	NS - NORTH AMERICAN	RF - SQUARE FEET	TR - TELEPHONE RISER
PS - PARKING SPACES	NOVD - NATIONAL GEODETIC	SD - STORM DRAIN LINE	TSW - TRAFFIC SIGNAL WIRE
PLS - PROFESSIONAL LAND SURVEYOR	NTS - NOT TO SCALE	SN - SIGN	TP - TYPICAL
PT - POINT OF TANGENCY	OR - OFFICIAL RECORDS BOOK	SW - STOCK WIRE FENCE	UE - UTILITY EASEMENT
PVC - PLASTIC PIPE	OW - OVERHEAD WIRE	SV - SEWER VALVE	UL - UTILITY LINE
PR - CURVE RADII	P - PLAT BOOK	SW - STOCK WIRE FENCE	UL - UTILITY LINE
RF - FIBER OPTIC CABLE LINE	PC - POINT OF COMMENCEMENT	SW - STOCK WIRE FENCE	UL - UTILITY LINE
RF - FIBER OPTIC CABLE LINE	PC - POINT OF COMMENCEMENT	SW - STOCK WIRE FENCE	UL - UTILITY LINE
RF - FIBER OPTIC CABLE LINE	PC - POINT OF COMMENCEMENT	SW - STOCK WIRE FENCE	UL - UTILITY LINE
RF - FIBER OPTIC CABLE LINE	PC - POINT OF COMMENCEMENT	SW - STOCK WIRE FENCE	UL - UTILITY LINE
RF - FIBER OPTIC CABLE LINE	PC - POINT OF COMMENCEMENT	SW - STOCK WIRE FENCE	UL - UTILITY LINE
RF - FIBER OPTIC CABLE LINE	PC - POINT OF COMMENCEMENT	SW - STOCK WIRE FENCE	UL - UTILITY LINE

BOUNDARY SURVEY DATE:		4/10/18	
per 5J-17.051(3)(b)3 Florida Administrative Code			
DATE:	JOB #	REVISION	BY:
04/10/18	47460	UPDATE BOUNDARY & ADD TREE LOCATION	GLT
10/17/17	47812	ADDED LIFT STATION EASEMENT FROM ITEM 13	SHH

BOUNDARY AND TREE SURVEY	
SCALE: 1" = 30'	JOB #47812
FIELD DATE: 10/12/17	DRAWN BY: SHH
PREPARED FOR:	SHEET 1 OF 1
LOCHRANE	
LOCATION: NE CORNER MICHAEL BLAKE BLVD & E. STATE ROAD 434, WINTER SPRINGS, FLORIDA	SUBDIVISION NAME: D.R. MITCHELL'S

Exhibit 5

Reports

Winter Springs Town Center - Townhomes

Fire Flow Study

Introduction:

The proposed development is the construction 20 townhome buildings with a mixture of 2 and 3 story elevations. The 3 story buildings will include internal fire sprinklers and the 2 story buildings will not and rely upon the nearby fire hydrants for a fire water supply. The water supply will connect to an existing 12" public watermain along Michael Blake Boulevard. The following analysis to examine the proposed fire flow capacity at both the worst-case fire hydrant location and the base of riser pressure for the worst-case fire sprinkler.

Requirements:

Fire Hydrants

2 story building, largest Building GFA = 15,600 SF

FFPC Table 18.4.5.2.1 (Type V(111)) = 2,250 gpm @ 2 hours

Minimum hydrant pressure = 20 psi

Fire Sprinkler

3 story units, max. GFA = 3,036 SF / unit

$3,036 \text{ SF} \times 0.1 \text{ gpm/SF} = 304 \text{ gpm} + 250 \text{ gpm hose demand} = 553 \text{ gpm @ } 35 \text{ psi}$

Fireflow Test

A fireflow test was conducted by Wayne Automatic on 11/27/2018.

The test resulted in the following:

Static Pressure = 74 psi

Residual Pressure = 64 psi @ 1,350 gpm

Analysis:

The project demands and supply were modelled in WaterCAD and applied two scenarios:

Scenario 1: Fire sprinkler demand of 553 gpm applied at the unit furthest from the water supply.

Scenario 2: Two hydrants with a total demand of 2,250 gpm (1,200 gpm and 1,050 gpm) on two hydrants furthest from the water source.

In both scenarios, the water supply was adjusted to the appropriate pressure per the fire flow graph. Also, a residential domestic demand was placed on all the units:

$$1 \text{ units} = 350 \text{ gpd} = 0.24 \text{ gpm}$$

$$0.24 \text{ gpm} * 2.5 \text{ (peak hout factor)} = 0.6 \text{ gpm / unit}$$

Results:

For the hydrant flow, the worst case scenario is to flow both hydrant FH3 and FH4 with a total demand of 2,250 gpm.

$$\text{Fire Hydrant, FH3} = 1,200 \text{ gpm @ } 29.7 \text{ psi}$$

$$\text{Fire Hydrant, FH4} = 1,050 \text{ gpm @ } 28.5 \text{ psi}$$

For the sprinkler flow, the worst case scenario is to flow the sprinkler located in Building 12 with a total demand of 553 gpm.

$$\text{Building 12, BLDG 12,} = 556.6 \text{ gpm @ } 70.4 \text{ psi}$$

Summary:

As indicated in the above results, the proposed watermain system capable of supplying adequate water flow for both fire and domestic demands.

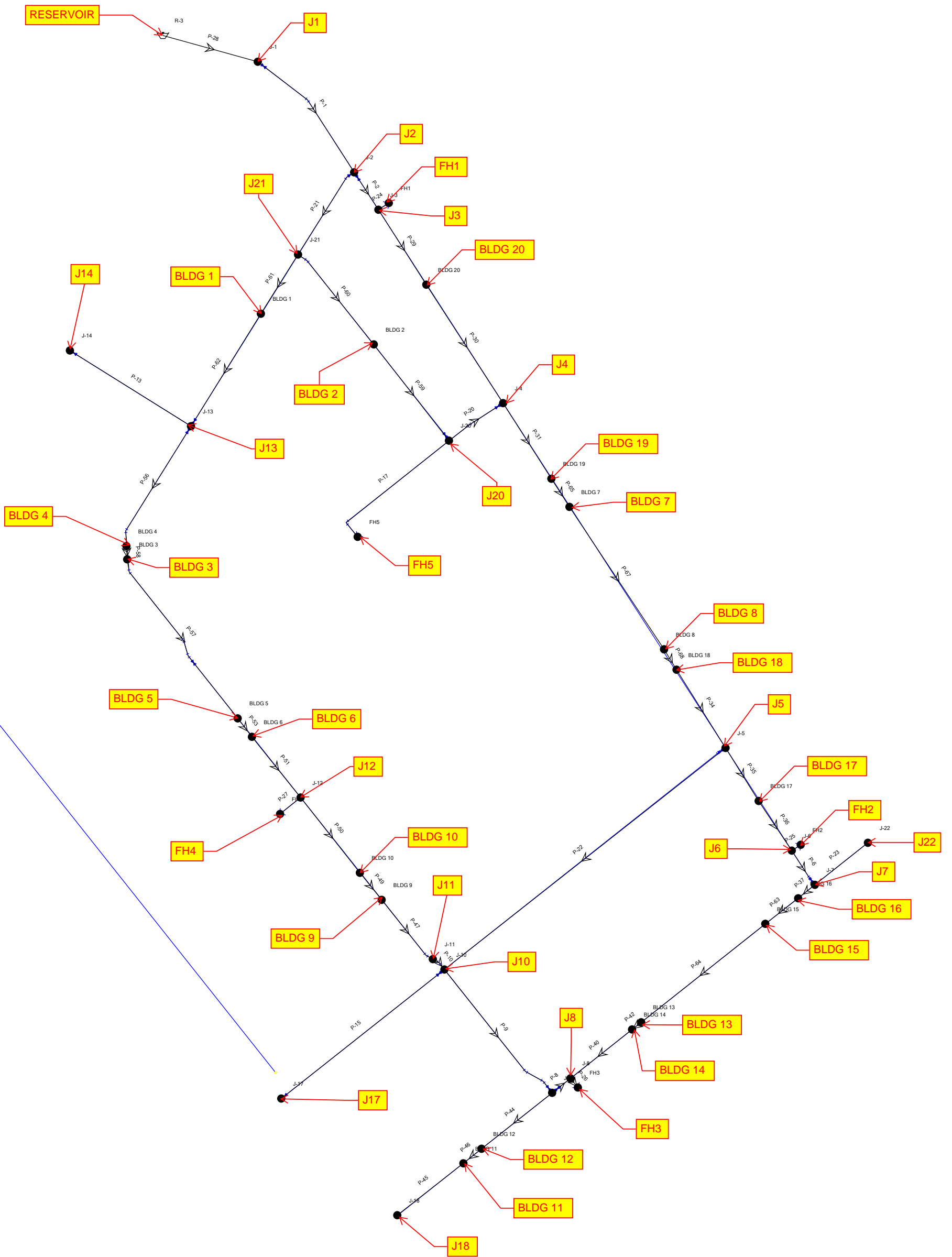
Respectfully Submitted,



Franklin A. Porter, PE
Managing Technical Director / Civil Engineering | VP
NV5, Inc.
Florida P.E. Lic. No. 69092



Scenario: Base



FlexTable: Junction Table (WATER MODEL HYDRANTS.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
28	J-1	21.94	<None>	0.00	124.85	44.5
29	J-2	22.48	<None>	0.00	111.32	38.4
31	J-3	22.53	<None>	0.00	108.02	37.0
33	J-4	22.99	<None>	0.00	106.45	36.1
35	J-5	21.00	<None>	0.00	98.24	33.4
37	J-6	19.59	<None>	0.00	97.72	33.8
39	J-7	19.56	<None>	0.00	95.74	33.0
41	J-8	19.25	<None>	0.00	94.48	32.5
43	J-9	19.21	<None>	0.00	94.81	32.7
45	J-10	20.93	<None>	0.00	95.89	32.4
47	J-11	21.00	<None>	0.00	95.89	32.4
49	J-12	22.78	<None>	0.00	95.88	31.6
51	J-13	25.63	<None>	0.00	104.85	34.3
53	J-14	25.78	<None>	0.00	104.85	34.2
58	J-17	22.48	<None>	0.00	95.89	31.8
60	J-18	19.41	<None>	0.00	94.81	32.6
62	FH5	30.29	<None>	0.00	106.80	33.1
63	J-20	23.45	<None>	0.00	106.80	36.1
65	J-21	23.41	<None>	0.00	108.05	36.6
71	J-22	19.59	<None>	0.00	95.74	32.9
113	FH1	28.45	<None>	0.00	108.02	34.4
115	FH2	25.94	<None>	0.00	97.72	31.1
117	FH3	25.08	<None>	1,200.00	93.80	29.7
119	FH4	28.85	<None>	1,050.00	94.70	28.5
125	BLDG 20	22.82	<None>	3.60	107.36	36.6
128	BLDG 19	22.87	<None>	3.60	104.67	35.4
131	BLDG 18	21.16	<None>	3.60	100.02	34.1
134	BLDG 17	20.55	<None>	3.60	97.98	33.5
137	BLDG 16	19.54	<None>	3.60	95.61	32.9
140	BLDG 14	19.28	<None>	3.60	94.77	32.7
143	BLDG 13	19.29	<None>	3.00	94.87	32.7
146	BLDG 12	18.78	<None>	3.60	94.81	32.9
149	BLDG 11	18.71	<None>	3.60	94.81	32.9
152	BLDG 9	21.29	<None>	3.60	95.88	32.3
155	BLDG 10	21.44	<None>	3.60	95.88	32.2
158	BLDG 6	23.14	<None>	3.00	97.52	32.2
161	BLDG 5	23.52	<None>	3.00	98.60	32.5
164	BLDG 4	26.24	<None>	6.00	102.50	33.0
167	BLDG 3	26.20	<None>	1.80	101.52	32.6
170	BLDG 2	23.76	<None>	3.00	107.43	36.2
173	BLDG 1	24.03	<None>	3.60	106.78	35.8
176	BLDG 15	19.42	<None>	2.40	95.42	32.9
179	BLDG 7	22.13	<None>	3.00	103.79	35.3
182	BLDG 8	21.16	<None>	3.60	100.75	34.4

FH3 & FH4
BOTH GREATER
THAN 20 PSI

FlexTable: Pipe Table (WATER MODEL HYDRANTS.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
30	P-1	108	J-1	J-2	8.0	PVC	150.0	2,318.40	14.80
32	P-2	32	J-2	J-3	8.0	PVC	150.0	685.37	4.37
40	P-6	30	J-6	J-7	8.0	PVC	150.0	531.86	3.39
44	P-8	17	J-8	J-9	8.0	PVC	150.0	-680.74	4.35
46	P-9	120	J-9	J-10	8.0	PVC	150.0	-687.94	4.39
48	P-10	12	J-10	J-11	8.0	PVC	150.0	34.77	0.22
54	P-13	104	J-13	J-14	8.0	PVC	150.0	0.00	0.00
59	P-15	151	J-17	J-10	8.0	PVC	150.0	0.00	0.00
64	P-17	108	FH5	J-20	6.0	PVC	150.0	0.00	0.00
68	P-20	48	J-20	J-4	8.0	PVC	150.0	590.20	3.77
69	P-21	73	J-21	J-2	8.0	PVC	150.0	-1,633.03	10.42
70	P-22	259	J-5	J-10	8.0	PVC	150.0	722.71	4.61
72	P-23	49	J-22	J-7	8.0	PVC	150.0	0.00	0.00
114	P-24	9	FH1	J-3	6.0	PVC	150.0	0.00	0.00
116	P-25	8	FH2	J-6	6.0	PVC	150.0	0.00	0.00
118	P-26	9	FH3	J-8	6.0	PVC	150.0	-1,200.00	13.62
120	P-27	19	FH4	J-12	6.0	PVC	150.0	-1,050.00	11.91
124	P-28	71	R-3	J-1	8.0	PVC	150.0	2,318.40	14.80
126	P-29	64	J-3	BLDG 20	8.0	PVC	150.0	685.37	4.37
127	P-30	102	BLDG 20	J-4	8.0	PVC	150.0	681.77	4.35
129	P-31	65	J-4	BLDG 19	8.0	PVC	150.0	1,271.98	8.12
133	P-34	67	BLDG 18	J-5	8.0	PVC	150.0	1,258.18	8.03
135	P-35	45	J-5	BLDG 17	8.0	PVC	150.0	535.46	3.42
136	P-36	43	BLDG 17	J-6	8.0	PVC	150.0	531.86	3.39
138	P-37	16	J-7	BLDG 16	8.0	PVC	150.0	531.86	3.39
142	P-40	57	BLDG 14	J-8	8.0	PVC	150.0	519.26	3.31
145	P-42	8	BLDG 13	BLDG 14	8.0	PVC	150.0	522.86	3.34
148	P-44	65	BLDG 12	J-9	8.0	PVC	150.0	-7.20	0.05
150	P-45	61	J-18	BLDG 11	8.0	PVC	150.0	0.00	0.00
151	P-46	17	BLDG 11	BLDG 12	8.0	PVC	150.0	-3.60	0.02
153	P-47	57	J-11	BLDG 9	8.0	PVC	150.0	34.77	0.22
156	P-49	25	BLDG 9	BLDG 10	8.0	PVC	150.0	31.17	0.20
157	P-50	69	BLDG 10	J-12	8.0	PVC	150.0	27.57	0.18
159	P-51	56	J-12	BLDG 6	8.0	PVC	150.0	-1,022.43	6.53
162	P-53	17	BLDG 6	BLDG 5	8.0	PVC	150.0	-1,025.43	6.55
166	P-56	100	BLDG 4	J-13	8.0	PVC	150.0	-1,036.23	6.61
168	P-57	142	BLDG 5	BLDG 3	8.0	PVC	150.0	-1,028.43	6.56

FlexTable: Pipe Table (WATER MODEL HYDRANTS.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
169	P-58	10	BLDG 3	BLDG 4	8.0	PVC	150.0	-1,030.23	6.58
171	P-59	88	J-20	BLDG 2	8.0	PVC	150.0	-590.20	3.77
172	P-60	86	BLDG 2	J-21	8.0	PVC	150.0	-593.20	3.79
174	P-61	51	J-21	BLDG 1	8.0	PVC	150.0	1,039.83	6.64
175	P-62	96	BLDG 1	J-13	8.0	PVC	150.0	1,036.23	6.61
177	P-63	30	BLDG 16	BLDG 15	8.0	PVC	150.0	528.26	3.37
178	P-64	115	BLDG 15	BLDG 13	8.0	PVC	150.0	525.86	3.36
180	P-65	24	BLDG 19	BLDG 7	8.0	PVC	150.0	1,268.38	8.10
183	P-67	124	BLDG 7	BLDG 8	8.0	PVC	150.0	1,265.38	8.08
184	P-68	17	BLDG 8	BLDG 18	8.0	PVC	150.0	1,261.78	8.05

FlexTable: Reservoir Table (WATER MODEL HYDRANTS.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
123	R-3	129.60	<None>	2,318.40	129.60

ELEVATION IS BASED ON
47 PSI FROM FLOW
GRAPH + 21' PHYSICAL
ELEVATION

FlexTable: Junction Table (WATER MODEL SPRINKLERS.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
28	J-1	21.94	<None>	0.00	184.59	70.4
29	J-2	22.48	<None>	0.00	183.50	69.7
31	J-3	22.53	<None>	0.00	183.24	69.5
33	J-4	22.99	<None>	0.00	183.09	69.3
35	J-5	21.00	<None>	0.00	182.37	69.8
37	J-6	19.59	<None>	0.00	182.30	70.4
39	J-7	19.56	<None>	0.00	182.06	70.3
41	J-8	19.25	<None>	0.00	181.90	70.4
43	J-9	19.21	<None>	0.00	181.87	70.4
45	J-10	20.93	<None>	0.00	182.24	69.8
47	J-11	21.00	<None>	0.00	182.26	69.8
49	J-12	22.78	<None>	0.00	182.42	69.1
51	J-13	25.63	<None>	0.00	183.01	68.1
53	J-14	25.78	<None>	0.00	183.01	68.0
58	J-17	22.48	<None>	0.00	182.24	69.1
60	J-18	19.41	<None>	0.00	181.49	70.1
62	FH5	30.29	<None>	0.00	183.13	66.1
63	J-20	23.45	<None>	0.00	183.13	69.1
65	J-21	23.41	<None>	0.00	183.24	69.2
71	J-22	19.59	<None>	0.00	182.06	70.3
113	FH1	28.45	<None>	0.00	183.24	67.0
115	FH2	25.94	<None>	0.00	182.30	67.6
117	FH3	25.08	<None>	0.00	181.90	67.8
119	FH4	28.85	<None>	0.00	182.42	66.4
125	BLDG 20	22.82	<None>	3.60	183.18	69.4
128	BLDG 19	22.87	<None>	3.60	182.93	69.3
131	BLDG 18	21.16	<None>	3.60	182.52	69.8
134	BLDG 17	20.55	<None>	3.60	182.33	70.0
137	BLDG 16	19.54	<None>	3.60	182.04	70.3
140	BLDG 14	19.28	<None>	3.60	181.93	70.4
143	BLDG 13	19.29	<None>	3.00	181.94	70.4
146	BLDG 12	18.78	<None>	556.60	181.49	70.4
149	BLDG 11	18.71	<None>	3.60	181.49	70.4
152	BLDG 9	21.29	<None>	3.60	182.32	69.7
155	BLDG 10	21.44	<None>	3.60	182.35	69.6
158	BLDG 6	23.14	<None>	3.00	182.52	69.0
161	BLDG 5	23.52	<None>	3.00	182.59	68.8
164	BLDG 4	26.24	<None>	6.00	182.85	67.8
167	BLDG 3	26.20	<None>	1.80	182.79	67.7
170	BLDG 2	23.76	<None>	3.00	183.18	69.0
173	BLDG 1	24.03	<None>	3.60	183.15	68.8
176	BLDG 15	19.42	<None>	2.40	182.02	70.3
179	BLDG 7	22.13	<None>	3.00	182.86	69.5
182	BLDG 8	21.16	<None>	3.60	182.58	69.8

FlexTable: Pipe Table (WATER MODEL SPRINKLERS.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
30	P-1	108	J-1	J-2	8.0	PVC	150.0	621.40	3.97
32	P-2	32	J-2	J-3	8.0	PVC	150.0	193.41	1.23
40	P-6	30	J-6	J-7	8.0	PVC	150.0	184.05	1.17
44	P-8	17	J-8	J-9	8.0	PVC	150.0	171.45	1.09
46	P-9	120	J-9	J-10	8.0	PVC	150.0	-388.75	2.48
48	P-10	12	J-10	J-11	8.0	PVC	150.0	-235.27	1.50
54	P-13	104	J-13	J-14	8.0	PVC	150.0	0.00	0.00
59	P-15	151	J-17	J-10	8.0	PVC	150.0	0.00	0.00
64	P-17	108	FH5	J-20	6.0	PVC	150.0	0.00	0.00
68	P-20	48	J-20	J-4	8.0	PVC	150.0	165.12	1.05
69	P-21	73	J-21	J-2	8.0	PVC	150.0	-427.99	2.73
70	P-22	259	J-5	J-10	8.0	PVC	150.0	153.48	0.98
72	P-23	49	J-22	J-7	8.0	PVC	150.0	0.00	0.00
114	P-24	9	FH1	J-3	6.0	PVC	150.0	0.00	0.00
116	P-25	8	FH2	J-6	6.0	PVC	150.0	0.00	0.00
118	P-26	9	FH3	J-8	6.0	PVC	150.0	0.00	0.00
120	P-27	19	FH4	J-12	6.0	PVC	150.0	0.00	0.00
124	P-28	71	R-3	J-1	8.0	PVC	150.0	621.40	3.97
126	P-29	64	J-3	BLDG 20	8.0	PVC	150.0	193.41	1.23
127	P-30	102	BLDG 20	J-4	8.0	PVC	150.0	189.81	1.21
129	P-31	65	J-4	BLDG 19	8.0	PVC	150.0	354.93	2.27
133	P-34	67	BLDG 18	J-5	8.0	PVC	150.0	341.13	2.18
135	P-35	45	J-5	BLDG 17	8.0	PVC	150.0	187.65	1.20
136	P-36	43	BLDG 17	J-6	8.0	PVC	150.0	184.05	1.17
138	P-37	16	J-7	BLDG 16	8.0	PVC	150.0	184.05	1.17
142	P-40	57	BLDG 14	J-8	8.0	PVC	150.0	171.45	1.09
145	P-42	8	BLDG 13	BLDG 14	8.0	PVC	150.0	175.05	1.12
148	P-44	65	BLDG 12	J-9	8.0	PVC	150.0	-560.20	3.58
150	P-45	61	J-18	BLDG 11	8.0	PVC	150.0	0.00	0.00
151	P-46	17	BLDG 11	BLDG 12	8.0	PVC	150.0	-3.60	0.02
153	P-47	57	J-11	BLDG 9	8.0	PVC	150.0	-235.27	1.50
156	P-49	25	BLDG 9	BLDG 10	8.0	PVC	150.0	-238.87	1.52
157	P-50	69	BLDG 10	J-12	8.0	PVC	150.0	-242.47	1.55
159	P-51	56	J-12	BLDG 6	8.0	PVC	150.0	-242.47	1.55
162	P-53	17	BLDG 6	BLDG 5	8.0	PVC	150.0	-245.47	1.57
166	P-56	100	BLDG 4	J-13	8.0	PVC	150.0	-256.27	1.64
168	P-57	142	BLDG 5	BLDG 3	8.0	PVC	150.0	-248.47	1.59

FlexTable: Pipe Table (WATER MODEL SPRINKLERS.wtg)

Current Time: 0.000 hours

ID	Label	Length (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
169	P-58	10	BLDG 3	BLDG 4	8.0	PVC	150.0	-250.27	1.60
171	P-59	88	J-20	BLDG 2	8.0	PVC	150.0	-165.12	1.05
172	P-60	86	BLDG 2	J-21	8.0	PVC	150.0	-168.12	1.07
174	P-61	51	J-21	BLDG 1	8.0	PVC	150.0	259.87	1.66
175	P-62	96	BLDG 1	J-13	8.0	PVC	150.0	256.27	1.64
177	P-63	30	BLDG 16	BLDG 15	8.0	PVC	150.0	180.45	1.15
178	P-64	115	BLDG 15	BLDG 13	8.0	PVC	150.0	178.05	1.14
180	P-65	24	BLDG 19	BLDG 7	8.0	PVC	150.0	351.33	2.24
183	P-67	124	BLDG 7	BLDG 8	8.0	PVC	150.0	348.33	2.22
184	P-68	17	BLDG 8	BLDG 18	8.0	PVC	150.0	344.73	2.20

FlexTable: Reservoir Table (WATER MODEL SPRINKLERS.wtg)

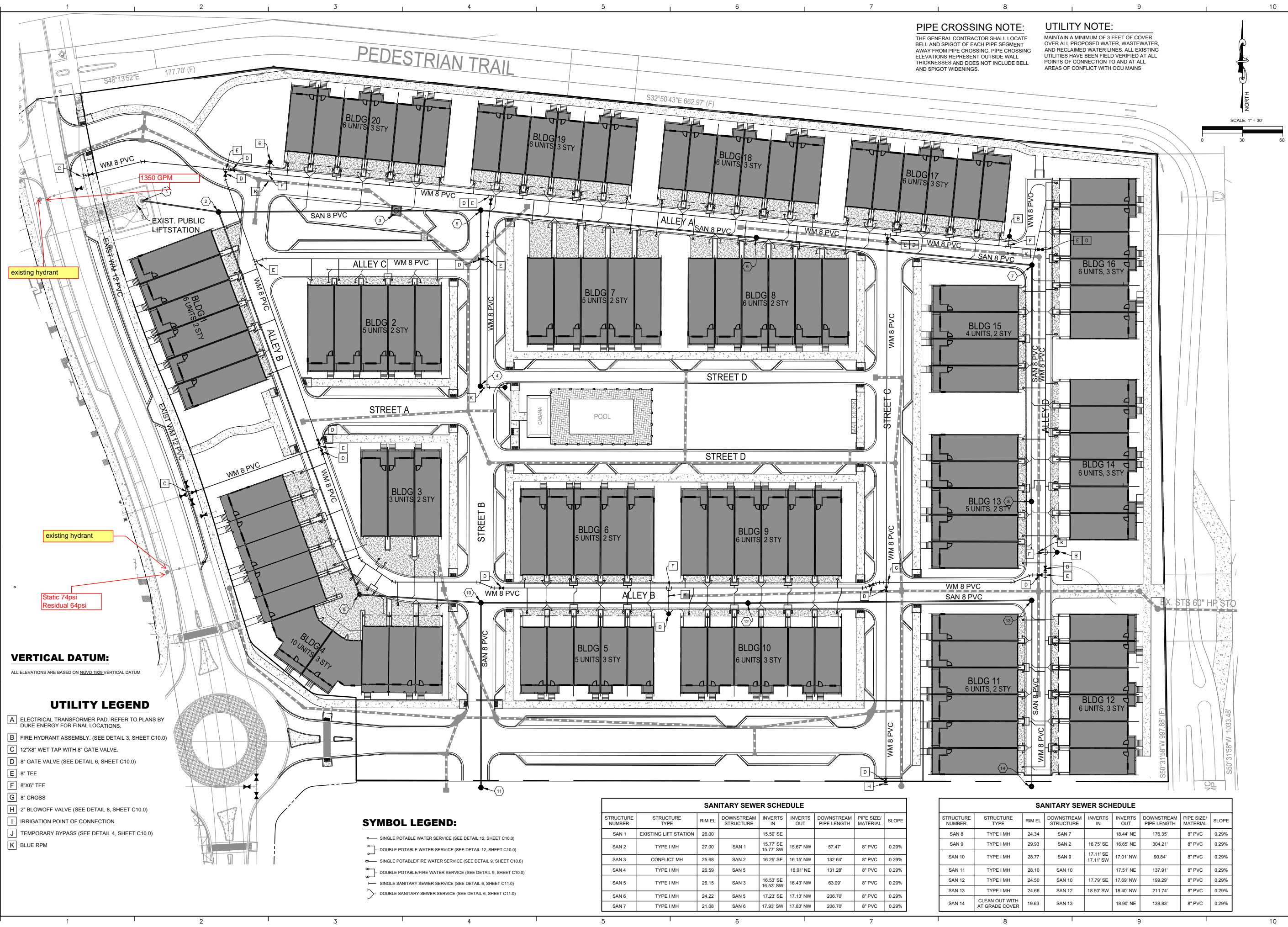
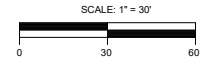
Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Flow (Out net) (gpm)	Hydraulic Grade (ft)
123	R-3	185.00	<None>	621.40	185.00

ELEVATION IS BASED ON
71 PSI FROM FLOW
GRAPH + 21' PHYSICAL
ELEVATION

PIPE CROSSING NOTE:
 THE GENERAL CONTRACTOR SHALL LOCATE BELL AND SPIGOT OF EACH PIPE SEGMENT AWAY FROM PIPE CROSSING. PIPE CROSSING ELEVATIONS REPRESENT OUTSIDE WALL THICKNESSES AND DOES NOT INCLUDE BELL AND SPIGOT WIDENINGS.

UTILITY NOTE:
 MAINTAIN A MINIMUM OF 3 FEET OF COVER OVER ALL PROPOSED WATER, WASTEWATER, AND RECLAIMED WATER LINES. ALL EXISTING UTILITIES HAVE BEEN FIELD VERIFIED AT ALL POINTS OF CONNECTION TO AND AT ALL AREAS OF CONFLICT WITH OCU MAINS



VERTICAL DATUM:
 ALL ELEVATIONS ARE BASED ON NGVD 1929 VERTICAL DATUM

- UTILITY LEGEND**
- A ELECTRICAL TRANSFORMER PAD. REFER TO PLANS BY DUKE ENERGY FOR FINAL LOCATIONS.
 - B FIRE HYDRANT ASSEMBLY. (SEE DETAIL 3, SHEET C10.0)
 - C 12"X8" WET TAP WITH 6" GATE VALVE.
 - D 8" GATE VALVE (SEE DETAIL 6, SHEET C10.0)
 - E 8" TEE
 - F 8"X6" TEE
 - G 8" CROSS
 - H 2" BLOWOFF VALVE (SEE DETAIL 8, SHEET C10.0)
 - I IRRIGATION POINT OF CONNECTION
 - J TEMPORARY BYPASS (SEE DETAIL 4, SHEET C10.0)
 - K BLUE RPM

- SYMBOL LEGEND:**
- SINGLE POTABLE WATER SERVICE (SEE DETAIL 12, SHEET C10.0)
 - DOUBLE POTABLE WATER SERVICE (SEE DETAIL 12, SHEET C10.0)
 - SINGLE POTABLE/FIRE WATER SERVICE (SEE DETAIL 9, SHEET C10.0)
 - DOUBLE POTABLE/FIRE WATER SERVICE (SEE DETAIL 9, SHEET C10.0)
 - SINGLE SANITARY SEWER SERVICE (SEE DETAIL 6, SHEET C11.0)
 - DOUBLE SANITARY SEWER SERVICE (SEE DETAIL 6, SHEET C11.0)

SANITARY SEWER SCHEDULE

STRUCTURE NUMBER	STRUCTURE TYPE	RIM EL.	DOWNSTREAM STRUCTURE	INVERTS IN	INVERTS OUT	DOWNSTREAM PIPE LENGTH	PIPE SIZE/MATERIAL	SLOPE
SAN 1	EXISTING LIFT STATION	26.00		15.50' SE				
SAN 2	TYPE I MH	27.00	SAN 1	15.77' SE 15.77' SW	15.67' NW 57.47'	8' PVC	0.29%	
SAN 3	CONFLICT MH	25.68	SAN 2	16.25' SE	16.15' NW 132.64'	8" PVC	0.29%	
SAN 4	TYPE I MH	26.59	SAN 5	16.91' NE	131.28'	8" PVC	0.29%	
SAN 5	TYPE I MH	26.15	SAN 3	16.53' SE 16.53' SW	16.43' NW 63.09'	8" PVC	0.29%	
SAN 6	TYPE I MH	24.22	SAN 5	17.23' SE	17.13' NW 206.70'	8" PVC	0.29%	
SAN 7	TYPE I MH	21.08	SAN 6	17.93' SW	17.83' NW 206.70'	8" PVC	0.29%	

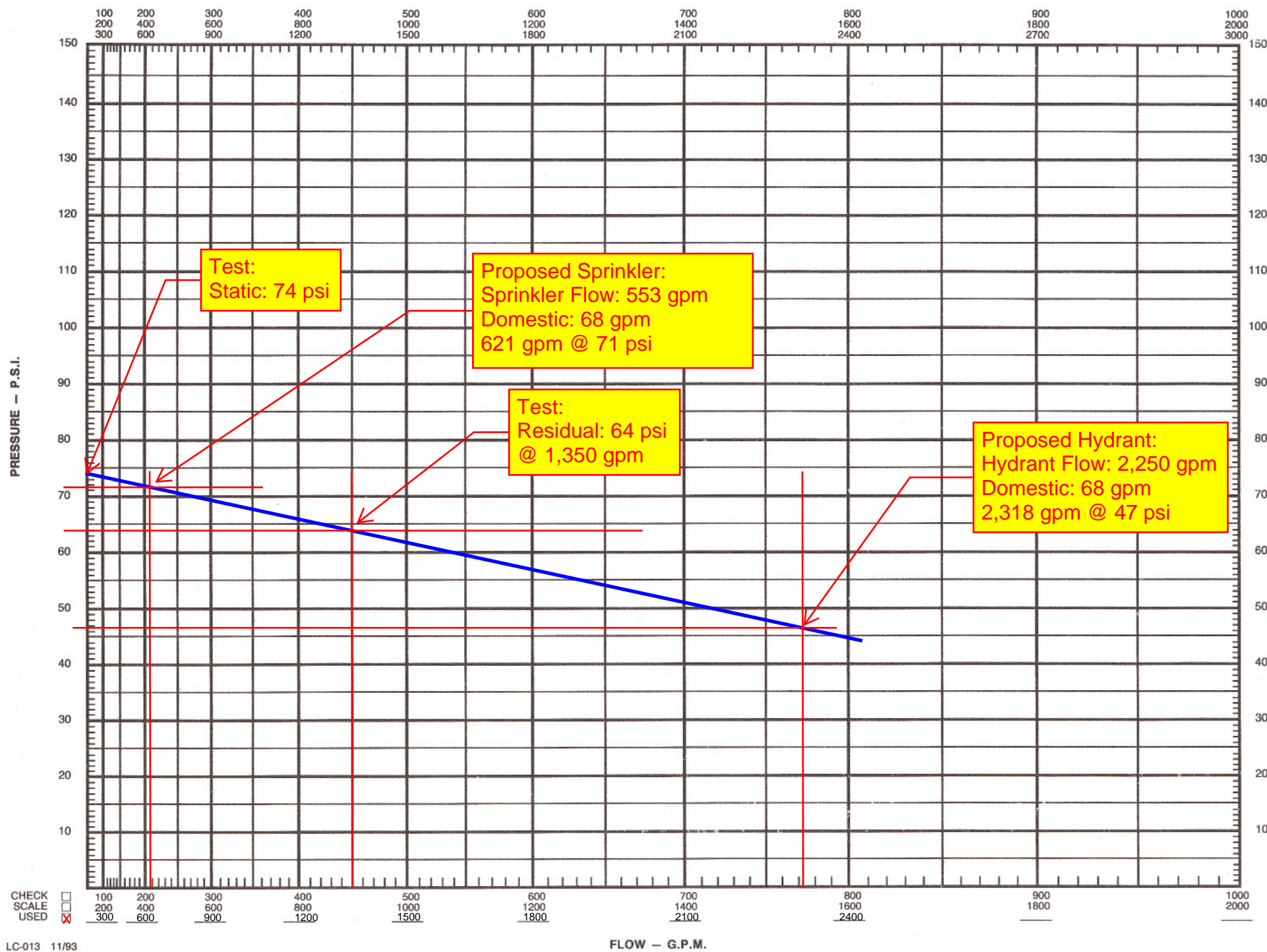
SANITARY SEWER SCHEDULE

STRUCTURE NUMBER	STRUCTURE TYPE	RIM EL.	DOWNSTREAM STRUCTURE	INVERTS IN	INVERTS OUT	DOWNSTREAM PIPE LENGTH	PIPE SIZE/MATERIAL	SLOPE
SAN 8	TYPE I MH	24.34	SAN 7	18.44' NE	176.35'	8" PVC	0.29%	
SAN 9	TYPE I MH	29.93	SAN 2	16.75' SE 16.65' NE	304.21'	8" PVC	0.29%	
SAN 10	TYPE I MH	28.77	SAN 9	17.11' SE 17.11' SW	17.01' NW 90.84'	8" PVC	0.29%	
SAN 11	TYPE I MH	28.10	SAN 10	17.51' NE	137.91'	8" PVC	0.29%	
SAN 12	TYPE I MH	24.50	SAN 10	17.79' SE	17.69' NW 199.29'	8" PVC	0.29%	
SAN 13	TYPE I MH	24.66	SAN 12	18.50' SW	18.40' NW 211.74'	8" PVC	0.29%	
SAN 14	CLEAN OUT WITH AT GRADE COVER	19.63	SAN 13	18.90' NE	138.83'	8" PVC	0.29%	

JOB #: 17063.20
 ENGINEER: FRANK A. PORTER, P.E.
 FL LIC. #06002
 PROJECT: WINTER SPRINGS TOWNHOMES
 DATE: Aug. 27, 2018
 DESIGNER: FRANK A. PORTER, P.E.
 ENGINEER: GCR
 REVISIONS: [Table with columns for NO., DATE, and REVISIONS]
 RECORD DRAWING: THIS RECORD DRAWING IS BASED ON THE PRELIMINARY PLANS AND FIELD VERIFICATION OF EXISTING UTILITIES. THE GENERAL CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL EXISTING UTILITIES. THE ENGINEER SHALL BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION PROVIDED. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION PROVIDED BY OTHER SOURCES.
 WINTER SPRINGS TOWNHOMES
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 DREAM FINDERS HOMES LLC
 WATER AND SEWER LAYOUT
 201 S. BUMBY AVE.
 ORLANDO, FL 32837
 WWW.NVS.COM
 CERTIFICATE OF AUTHORIZATION # 20065
 NV5
 SHEET: C08.0
 C:\17063.20\CONSTR\17063.20.C08.0 UTILITY PLAN.dwg - Aug 27, 2018 - 11:52pm

WATER SUPPLY GRAPH NO. N 1.85

DATE 11/27/18	BY	LOC. #
PROPERTY OF WSTC TOWNHOMES		



**WINTER SPRINGS TOWN CENTER TOWNHOMES SITEWORK SPECIFICATIONS
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Division	Section Title
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DIVISION 2 - SITE CONSTRUCTION

02220	Site Demolition
02230	Site Clearing
02300	Earthwork
02318	Rock Excavation
02340	Soil Stabilization
02375	Stone Protection (Rip-rap)
02510	Water Distribution
02532	Sewage Lift Station
02535	Sanitary Sewage Systems
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02555	Natural And Propane Gas Distribution
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CIVIL ENGINEERING CONSULTANT OF RECORD

Frank Porter, P.E.
Lochrane Engineering, Inc.
201 S. Bumby Avenue
Orlando, FL 32803

Frank Porter, P.E.
69092

Date

UniSpec – Civil (Master Site Specifications)

SECTION 02220 - SITE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition of structures, paving, and utilities.
 - 2. Filling voids created as a result of removals or demolition.
- B. Related Requirements:
 - 1. Section 02230 - Site Clearing: Clearing of trees and other plant vegetation
 - 2. Section 02300 - Earthwork: Placement of fill material

1.2 REGULATORY REQUIREMENTS

- A. Conform to applicable State and local codes for demolition of structures, safety of adjacent structures, dust control, runoff control, and pollution prevention.
- B. Obtain required permits and licenses from appropriate authorities. Pay associated fees including disposal charges.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Do not close or obstruct public or private roadways, sidewalks, or fire hydrants without appropriate permits or written authorization.
- E. If hazardous, contaminated materials or other environmental related conditions are discovered, stop work immediately and notify the Engineer of Record for action to be taken. Do not resume work until specifically authorized by the Engineer of Record.
- F. Test soils around buried tanks for contamination. Coordinate notification for mobilization to site and required observation of tank removal with Engineer of Record.

1.3 SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of capped utilities and subsurface obstructions that will remain after demolition. Submit record as part of closeout submittals.

1.4 PROJECT CONDITIONS

- A. Structures to be demolished will be discontinued in use and vacated prior to start of work.
- B. Owner assumes no responsibility for condition of structures to be demolished.
- C. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as reasonably practical. Variations within structures may occur by Owner's removal and salvage operations prior to start of demolition work.

- D. Unless otherwise indicated in Contract Documents or specified by the Owner, items of salvageable value to Contractor shall be removed from site and structures. Storage or sale of removed items on site will not be permitted and shall not interfere with other work specified.
- E. Explosives shall not be brought to site or used without written consent of authorities having jurisdiction. Such written consent will not relieve Contractor of total responsibility for injury to persons or for damage to property due to blasting operations. Performance of required blasting shall comply with governing regulations.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

- A. Fill material shall be aggregate fill materials as specified in Section 02300.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Provide, erect, and maintain erosion control devices, temporary barriers, and security devices at locations indicated on Construction Drawings.
- B. Protect existing landscaping materials, appurtenances, and structures, which are not to be demolished. Repair damage to existing items to remain caused by demolition operations.
- C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring as necessary.
- D. Mark location of utilities. Protect and maintain in safe and operable condition utilities that are to remain. Prevent interruption of existing utility service to occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing authorities and Owner.
- E. Notify adjacent property owners of work that may affect their property, potential noise, utility outages, or other disruptions. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon, or limit access to their property. Coordinate notice with Owner.

3.2 GENERAL DEMOLITION REQUIREMENTS

- A. Conduct demolition to minimize interference with adjacent structures or pavements to remain.
- B. Cease operations immediately if adjacent structures appear to be in danger. Notify authority having jurisdiction. Do not resume operations until directed by authority.
- C. Conduct operations with minimum of interference to public or private access. Maintain ingress and egress at all times.
- D. Sprinkle work with water to minimize dust. Provide hoses and water connections for this purpose.
- E. Comply with governing regulations pertaining to environmental protection.
- F. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to start of work.

3.3 DEMOLITION

- A. Demolish site improvements designated to be removed as shown on the drawings. Site improvements shall include but not be limited to structures, retaining walls, foundations, pavements, curbs and gutters, drainage structures, utilities, signage or landscaping.
- B. Disconnect and cap or remove utilities to be abandoned as shown on the drawings.
- C. Fill or remove underground tanks, piping, and appurtenances as shown.
- D. Demolish buildings completely and remove from site using methods as required to complete work within limitations of governing regulations. Small structures may be removed intact when acceptable to Owner and authorities having jurisdiction.
- E. Locate demolition equipment and remove materials to prevent excessive loading to supporting walls, floors, or framing.
- F. Demolish concrete and masonry in small sections. Break up concrete slabs-on-grade that are 2-feet or more below proposed subgrade to permit moisture drainage. Remove slabs-on-grade and below grade construction within 2-feet of proposed subgrade.

3.4 FILLING BASEMENTS AND VOIDS

- A. Completely fill below grade areas and voids resulting from demolition or removal of structures, underground fuel storage tanks, wells, cisterns, etc., using aggregate fill materials consisting of stone, gravel, or sand free from debris, trash, frozen materials, roots, and other organic matter.
- B. Areas to be filled shall be free of standing water, frost, frozen or unsuitable material, trash, and debris prior to fill placement.
- C. Place fill materials in accordance with Section 02300 unless subsequent excavation for new work is required.
- D. Grade surface to match adjacent grades and to provide flow of surface drainage after fill placement and compaction.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from site debris, rubbish, and other materials resulting from demolition operations. Leave areas of work in clean condition.
- B. No burning of any material, debris, or trash on-site or off-site will be allowed except when allowed by appropriate governing authority and Owner. If allowed as stated above, burning shall be performed in manner prescribed by governing authority. Attend burning materials until fires have burned out and have been completely extinguished.
- C. Transport materials removed from demolished structures with appropriate vehicles and dispose off-site to areas that are approved for disposal by governing authorities and appropriate property owners.

END OF SECTION

SECTION 02230 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Cleaning site of debris, grass, trees, and other plant life in preparation for site or building earthwork.
 - 2. Protection of existing structures, trees, or vegetation indicated on the Construction Drawings to remain.
- B. Related Requirements:
 - 1. Section 02220 – Site Demolition: Demolition and removal of structures, paving, utilities and other improvements.
 - 2. Section 02300 – Earthwork: Stripping and removal of topsoil.
 - 3. Section 02370 - Erosion And Sedimentation Control (Including SWPPP)

1.2 ENVIRONMENTAL REQUIREMENTS

- A. Construct temporary erosion and sediment control systems as shown on Construction Drawings and as directed by the "Storm Water Pollution Prevention Plan" (SWPPP) to protect adjacent properties and water resources from erosion and sedimentation.
- B. In event that sitework on this project will disturb one or more acres, starting work shall be strictly governed by the sequence of construction as specified in Section 02370 and SWPPP site maps. Contractor shall not begin construction without "National Pollution Discharge Elimination System" (NPDES) permit governing discharge of storm water from site for entire construction period. NPDES permit requires SWPPP to be in place during construction.
- C. Clearing and grubbing shall commence in the proper sequence as stated in Section 02370 and on the SWPPP site map and subsequent to the halt in construction for performance of the inspection and certification of BMPs as stated.
- D. Contractor shall conduct storm water management practices in accordance with the project SWPPP and applicable NPDES permit and shall enforce action taken or imposed by Federal or State agencies, including cost of fines, construction delays, and remedial actions resulting from Contractor's failure to comply with provisions of NPDES permit.

1.3 PROJECT CONDITIONS

- A. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as reasonably practical.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 PREPARATION

- A. Identify existing plant life that is to remain and verify clearing limits are clearly tagged, identified, and marked in such manner as to ensure their protection throughout construction operations.

3.2 PROTECTION

- A. Locate, identify, and protect existing utilities that are to remain.
- B. Protect trees, plant growth, and features designated to remain as part of final landscaping.
- C. Conduct operations with minimum interference to public or private accesses and facilities. Maintain ingress and egress at all times and clean or sweep roadways daily as required by SWPPP or governing authority. Dust control shall be provided with sprinkling systems or equipment provided by Contractor.
- D. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by a licensed land surveyor and replaced, as necessary, in kind.
- E. Provide traffic control as required, in accordance with the US Department of Transportation's "Manual on Uniform Traffic Control Devices" and applicable state highway department requirements.

3.3 EQUIPMENT

- A. Material shall be transported to and from the project site using well-maintained and operating vehicles. Transporting vehicles operating on site shall stay on designated haul roads and shall not endanger improvements by rutting, overloading, or pumping.

3.4 CLEARING

- A. Clear areas required for access to site and execution of work.
- B. Unless otherwise indicated on Construction Drawings, remove trees, shrubs, grass, other vegetation, improvements, or obstructions interfering with installation of new construction. Removal includes digging out stumps and roots. Depressions caused by clearing and grubbing operations shall be filled to subgrade elevation to avoid ponding of water. Satisfactory fill material shall be placed in accordance with Section 02300.
- C. Remove grass, trees, plant life, stumps, and other construction debris from site to dump site that is suitable for handling such material according to state laws and regulations.
- D. Cut heavy growths of grass from areas before stripping and topsoil removal and remove cuttings with remainder of cleared vegetative material.

END OF SECTION

SECTION 02300 (31 2000) - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavation, filling, and backfilling for structures, pavement, and outparcels.
2. Trenching and backfilling for utilities.
3. Dewatering.
4. Boring under crossings.

B. Related Requirements:

1. Section 02318 - Rock Excavation.
2. Section 02340 - Soil Stabilization.
3. Section 02370 - Erosion Control and Sedimentation. Temporary and permanent erosion control.
4. Section 02375 - Stone Protection. Rip-rap stone for slope protection.

1.2 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.

B. ASTM International (ASTM)

1. ASTM D422 - Particle Size Analysis of Soil.
2. ASTM D698 - Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN.m/m³)).
3. ASTM D1557 - Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 Kn.m/m³)).
4. ASTM D2487 - Classification of Soils for Engineering Purposes (Unified Soil Classification System).
5. ASTM D2488 - Description and Identification of Soils (Visual-Manual Procedures).
6. ASTM D4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
7. ASTM D6938 – In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

C. American Association of State Highway and Transportation Officials (AASHTO)

1. AASHTO T 88 - Particle Size Analysis of Soils.

D. Florida Department of Transportation (FDOT):

1. Standard Specifications for Construction and Materials.

E. National Fire Protection Association (NFPA)

1. NFPA 70 - National Electrical Code.

F. American Water Works Association (AWWA)

1. AWWA C200 - Standard for Steel Water Pipe - 6 In. (150 mm) and Larger.
2. AWWA C206 - Field Welding Of Steel Water Pipe.

1.3 DEFINITIONS

- A. Satisfactory Materials: ASTM D2487 soil classification groups GW, GP, GM, SW, SP, SM, ML, CL, [CH,] [MH,] [SC,][GC,] or a combination of these group symbols.
1. Fill material shall further conform to the plasticity index and liquid limits (PI and LL) specified in Paragraph FILLING hereinafter.
 2. Satisfactory materials shall be free of rock or gravel larger than allowed for fill or backfill material as specified hereinafter or as shown on the drawings.
 3. Satisfactory materials shall contain no debris, waste, frozen materials, vegetation, and other deleterious matter.
 4. Unless specifically stated otherwise in the Drawings, the following table stipulates maximum allowable values for plasticity index (PI) and liquid limit (LL) of satisfactory materials to be used as fill in specified areas:

<u>Location</u>	<u>PI</u>	<u>LL</u>
Building area (below upper four feet)	20	50
Building area (upper four feet)	12	40
Areas outside the building pad including outparcels (Below upper two feet)	20	50
(Upper two feet, except for depth to receive topsoil)	15	40

(References to depth are to proposed subgrade elevations)

- B. Unsatisfactory Materials: Materials which do not comply with the requirements for satisfactory materials are unsatisfactory.
1. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory materials which contains root and other organic matter or frozen material. The Engineer of Record shall be notified of any contaminated materials.
 2. Unsatisfactory materials also include satisfactory materials not maintained within 2 percent of optimum moisture content at time of compaction.
- C. Rock: Rock shall be as defined in Section 02318.

1.4 SUBMITTALS

- A. Submit 30-pound sample of each type of off-site fill material that is to be used at the site in airtight containers to the independent testing laboratory or submit gradation and certification of aggregate material that is to be used at the site to the independent testing laboratory for review upon request by Owner.
- B. Submit name of each material supplier and specific type and source of each material upon request by Owner. Change in source throughout project requires approval of Owner.
- C. Submit Dewatering Plans upon request by Owner.
- D. Shop drawings or details pertaining to excavating and filling are not required unless otherwise shown on the Drawings or if contrary procedures to Construction Documents are proposed.
- E. Shop drawings or details pertaining to site utilities are not required unless required by regulatory authorities or unless uses of materials, methods, equipment, or procedures that are contrary to The Drawings or Specifications are proposed. Do not perform work until Owner has accepted required shop drawings.
- F. Contact utility companies and determine if additional easements will be required to complete project. Provide written confirmation of the status of all easements to Owner at time of Preconstruction Conference or no later than 90 days prior to certificate of occupancy.

PART 2 - PRODUCTS

2.1 SOIL AND ROCK MATERIALS

- A. Fill and Backfill. Satisfactory materials excavated from the site.
- B. Imported Fill Material: Satisfactory material provided from offsite borrow areas when sufficient satisfactory materials are not available from required excavations.
- C. Trench Backfill: ASTM D2321 unless otherwise specified or shown on the drawings.
- D. Bedding: Aggregate Type as indicated on the plans or naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No.200 sieve.
- E. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2- inch sieve and 0 to 5 percent passing a No.8 sieve.
- F. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No.4 sieve.
- G. Topsoil: Topsoil shall consist of stripping material excavated from the site. Topsoil shall consist of organic surficial soil found in depth of not more than 6-inches. Topsoil shall be as further defined in Section 02900 – Planting.

2.2 APPURTENANT MATERIALS

- A. Stabilization fabrics and geogrids: As specified in Section 02340.
- B. Filter and drainage fabrics: As specified in Section 02340.
- C. Steel Casing Pipe: Comply with AWWA C200 minimum grade B, size, and wall thickness as indicated on The Drawings.
- D. Trench Utility Locator Tape: Heavy duty 6" wide underground warning tape. Tape shall be made from polyethylene material, 3.5 mils thick, with a minimum tensile strength of 1,750 psi. Place the tape at one-half the minimum depth of cover for the utility line or a maximum of 3 feet, whichever is the less, but never above the top of subgrade. Color of tape shall be determined by as follows:
 - 1. Natural Gas or Propane – Yellow.
 - 2. Electric – Red.
 - 3. Telephone – Orange.
 - 4. Water – Blue.
 - 5. Sanitary Sewer – Green.

2.3 EQUIPMENT

- A. Transport off-site materials to project using well-maintained and operating vehicles. Once on site, transporting vehicles shall stay on designated haul roads and shall at no time endanger improvements by rutting, overloading, or pumping.

2.4 SOURCE QUALITY CONTROL

- A. Perform Limerock Bearing Ratio (LBR) tests in outparcels and areas to receive pavement for each type of material that is imported from off-site. LBR value shall be equal to or above pavement design subgrade LBR value indicated on Construction Drawings.
- B. Following tests shall be performed on each type of on-site or imported soil material used as compacted fill:
 - 1. Moisture and Density Relationship: ASTM D698 or ASTM D1557.
 - 2. Mechanical Analysis: AASHTO T88 or ASTM D422.
 - 3. Plasticity Index: ASTM D4318.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, datum, elevations, and grades necessary for construction as shown on the drawings.
- B. Notify utility companies to remove or relocate public utilities that are in conflict with proposed improvements.
- C. Protect plant life, lawns, fences, existing structures, sidewalks, paving, and curbs, unless otherwise noted on the drawings from excavating equipment and vehicular traffic.
- D. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by licensed land surveyor and replaced, as necessary, by same.
- E. Remove from site, material encountered in grading operations that is unsatisfactory material or undesirable for backfilling, subgrade, or foundation purposes. Dispose of in manner satisfactory to Owner and local governing agencies. Backfill areas with layers of satisfactory material and compact as specified herein.
- F. Prior to placing fill in low areas, such as previously existing creeks, ponds, or lakes, perform following procedures:
 - 1. Drain water out by gravity with ditch having flow line lower than lowest elevation in low area. If drainage cannot be performed by gravity ditch, use adequate pump to obtain the same results.
 - 2. After drainage of low area is complete, remove muck, mud, debris, and other unsatisfactory material by using acceptable equipment and methods that will keep natural soils underlying low area dry and undisturbed.
 - 3. All muck, mud, and other materials removed from low areas shall be dried on-site by spreading in thin layers for observation. Material shall be inspected and, if found to be satisfactory for use as fill material, shall be incorporated into lowest elevation of site filling operation, but not under building subgrade or within 5'-0" of perimeter of building subgrade, paving or outparcel subgrade. If, after observation, material is found to be unsatisfactory, it shall be removed from site.
- G. Locate and identify utilities that have previously been installed and protect from damage.
- H. Locate and identify existing utilities that are to remain and protect from damage.
- I. Maintain in operating condition existing utilities, previously installed utilities, and drainage systems encountered in utility installation. Repair surface or subsurface improvements shown on the Drawings.
- J. Verify location, size, elevation, and other pertinent data required making connections to existing utilities and drainage systems as indicated on the Drawings.
- K. Over excavate and properly prepare areas of subgrade that are not capable of supporting proposed systems. Stabilize these areas by using acceptable geotextile fabrics or aggregate material placed and compacted as specified in Section 02340.

3.2 DEWATERING

A. General:

1. Dewatering activities shall conform to applicable provisions in 02370.
2. Provide dewatering systems as required for excavations.
3. Design and provide dewatering system using accepted and professional methods consistent with current industry practice to eliminate water entering the excavation under hydrostatic head from the bottom or sides. Design system to prevent differential hydrostatic head, which would result in floating out soil particles in a manner, termed as a "quick" or "boiling" condition. System shall not be dependent solely upon sumps or pumping water from within the excavation where differential head would result in a quick condition, which would continue to worsen the integrity of the excavation's stability.
4. Provide dewatering system of sufficient size and capacity to prevent ground and surface water flow into the excavation and to allow Work to be installed in a dry condition.
5. Control, by acceptable means, all water regardless of source. Contractor shall be responsible for disposal of the water.
6. Control groundwater in a manner that preserves strength of foundation soils, does not cause instability or raveling of excavation slopes, and does not result in damage to existing structures. Where necessary, lower water level in advance of excavation utilizing wells, wellpoints, jet educators, or similar positive methods. The water level as measured by piezometers shall be maintained a minimum of 3 feet below prevailing excavation level.
7. Commence dewatering prior to any appearance of water in excavation and continue until Work is complete to the extent that no damage results from hydrostatic pressure, flotation, or other causes.
8. Open pumping with sumps and ditches will be allowed provided it does not result in boils, loss of fines, softening of the ground, or instability of slopes.
9. Install wells or wellpoints, if required, with suitable screens and filters so that continuous pumping of fines does not occur. Arrange discharge to facilitate collection of samples by the Owner. During normal pumping and upon development of wells, levels of fine sand or silt in the discharge water shall not exceed 5 ppm. Install sand tester on discharge of each pump during testing to verify that levels are not exceeded.
10. Control grading around excavations to prevent surface water from flowing into excavation areas.
11. No additional payment will be made for any supplemental measures to control seepage, groundwater, or artesian head.

B. Design:

1. Designate and obtain the services of a qualified dewatering specialist to provide dewatering plan as may be necessary to complete the Work.
2. Contractor shall be responsible for the accuracy of the drawings, design data, and operational records required.
3. Contractor shall be responsible for the design, installation, operation, maintenance, and any failure of any component of the system.

C. Damages:

1. Contractor shall be responsible for and shall repair any damage to work in place, other contractor's equipment, utilities, residences, highways, roads, railroads, private and municipal well systems, adjacent structures, natural resources, habitat, existing wells, and the excavation. Contractor responsibility shall also include, damage to the bottom due to heave and including but not limited to, removal and pumping out of the excavated area that may result from Contractor's negligence, inadequate or improper design and operation of the dewatering system, and any mechanical or electrical failure of the dewatering system.
2. Remove subgrade materials rendered unsatisfactory by excessive wetting and replace with approved backfill material at no additional cost to the Owner.

D. Maintaining Excavation in Dewatering Condition:

1. Dewatering shall be a continuous operation. Interruptions due to power outages or any other reason will not be permitted.

2. Continuously maintain excavation in a dry condition with positive dewatering methods during preparation of subgrade, installation of pipe, and construction of structures until the critical period of construction or backfill is completed to prevent damage of subgrade support, piping, structure, side slopes, or adjacent facilities from flotation or other hydrostatic pressure imbalance.
3. Provide standby equipment on site, installed, wired, and available for immediate operation if required to maintain dewatering on a continuous basis in the event any part of the system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, perform such work as may be required to restore damaged structures and foundation soils at no additional cost to Owner.
4. System maintenance shall include but not be limited to 24-hour supervision by personnel skilled in the operation, maintenance, and replacement of system components and any other work required to maintain excavation in dewatered condition.

- E. System Removal: Upon completion of the work, remove dewatering equipment from the site, including related temporary electrical service.
- F. Wells shall be removed or cut off a minimum of 3 feet below final ground surface, capped, and abandoned in accordance with regulations by agencies having jurisdiction.

3.3 TOPSOIL EXCAVATION

- A. Cut heavy growths of grass from areas before stripping and remove cuttings with remainder of cleared vegetative material.
- B. Strip topsoil to a depth of not less than 6 inches from areas that are to be filled, excavated, landscaped, or re-graded to such depth that it prevents intermingling with underlying subsoil or questionable material.
- C. Stockpile topsoil in storage piles in areas shown on The Drawings or where directed by Owner. Construct storage piles to freely drain surface water. Cover storage piles as required to prevent windblown dust. Dispose of unsuitable topsoil as specified for waste material, unless otherwise specified by Owner. Remove excess topsoil from site unless specifically noted otherwise on the Drawings.

3.4 GENERAL EXCAVATION

- A. Classification of Excavation: The Contractor shall assure himself by site investigation or other necessary means that he is familiar with the type, quantity, quality, and character of excavation work to be performed. Excavation shall be considered unclassified excavation, except as indicated in the Contract Documents.
- B. When performing grading operations during periods of wet weather, provide adequate dewatering, drainage and ground water management to control moisture of soils.
- C. Shore, brace, and drain excavations as necessary to maintain excavation as safe, secure, and free of water at all times.
- D. Excavate building areas to line and grade as shown on the Drawings being careful not to over excavate beyond elevations needed for building subgrades.
- E. Place satisfactory excavated material into project fill areas.
- F. Unsatisfactory excavated material shall be disposed of in manner and location that is acceptable to Owner and local governing agencies.
- G. Perform excavation using capable, well-maintained equipment and methods acceptable to Owner and local governing agencies.

3.5 ROCK EXCAVATION

- A. Rock excavation (if required) is specified in Section 02318.

3.6 TRENCHING EXCAVATION FOR UTILITIES

- A. Contact local utility companies before excavation begins. Dig trench at proper width and depth for laying pipe, conduit, or cable. Cut trench banks vertical, if possible, and remove stones from bottom of trench as necessary to avoid point-bearing. Over-excavate wet or unstable soil, if encountered, from trench bottom as necessary to provide suitable base for continuous and uniform bedding. Replace over-excavation with satisfactory material and dispose of unsatisfactory material.
- B. Trench excavation sidewalls shall be sloped, shored, sheeted, braced, or otherwise supported by means of sufficient strength to protect workmen in accordance with applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration (OSHA), and by local ordinances. Lateral travel distance to exit ladder or steps shall not be greater than 25 feet in trenches 4 feet or deeper.
- C. Perform trench excavation as indicated on the Drawings for specified depths. During excavation, stockpile materials suitable for backfilling in orderly manner far enough from bank of trench to avoid overloading, slides, or cave-ins.
- D. Remove excavated materials not required or not satisfactory as backfill or embankments and waste off-site or at on-site locations approved by the Owner and in accordance with governing regulations. Dispose of structures discovered during excavation as specified in Section 02220.
- E. Prevent surface water from flowing into trenches or other excavations by temporary grading or other methods, as required. Remove accumulated water in trenches and other excavations as specified.
- F. Open cut excavation with trenching machine or backhoe. Where machines other than ladder or wheel-type trenching machines are used, do not use clods for backfill.
- G. Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on bedding material at every point along entire length except where necessary to excavate for bell holes, proper sealing of pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer, or wider than needed to make joint connection properly.
- H. Trench width below top of pipe shall not be less than 12 inches nor more than 18 inches wider than outside surface of pipe or conduit that is to be installed to designated elevations and grades. Other trench width for pipe, conduit, or cable shall be least practical width that will allow for proper compaction of trench backfill.
- I. Trench depth requirements measured from finished grade or paved surface shall meet the following requirements or applicable codes and ordinances, whichever is more stringent:
 - 1. Water Mains: 30 inches to top of pipe barrel or 6 inches below frost line, established by local building official, whichever is deeper.
 - 2. Sanitary Sewer: Elevations and grades as indicated on the drawings and as specified in Section 02535.
 - 3. Storm Sewer: Elevations and grades as indicated on the Drawings.
 - 4. Electrical Conduits: 24 inches minimum to top of conduit or as required by NEC 300-5, NEC 710-36 codes, or local utility company requirements, whichever is deeper.
 - 5. TV Conduits: 18 inches minimum to top of conduit or as required by local utility company, whichever is deeper.
 - 6. Telephone Conduits: 18 inches minimum to top of conduit, or as required by local utility company, whichever is deeper.

7. Gas Mains and Service: 30 inches minimum to top of pipe, or as required by local utility company, whichever is deeper.

3.7 SUBGRADE PREPARATION

- A. Scarification and Compaction: Areas exposed by excavation or stripping and on which subgrade preparations are to be performed shall be scarified to minimum depth of 8 inches and compacted as specified hereinafter.
- B. Proofrolling: Subgrades shall be proofrolled to detect areas of insufficient compaction and soft pocket, or areas of excess yielding. Proofrolling shall be accomplished by making minimum of two complete passes with fully-loaded tandem-axle dump truck with a minimum weight of 20 tons, or approved equal, in each of two perpendicular directions. Limit vehicle speed to three mph. Areas of failure such as soft spots, unsatisfactory soils, and areas of excessive pumping or rutting shall be excavated and re-compacted as specified herein. Continual failure areas shall be stabilized in accordance with Section 02340 at no additional cost to Owner. Subgrade exposed longer than 48 hours or on which precipitation has occurred shall be re-proofrolled. Document proofrolling procedure, specific locations, deficiencies, and corrective measures for review by Owner or Engineer of Record upon request.

3.8 FILLING

- A. Fill areas to contours and elevations shown on the Drawings with materials deemed satisfactory.
- B. Place fills in continuous lifts specified herein.
- C. Fill within proposed building subgrade, paving subgrade, and outparcel subgrades shall not contain rock or stone greater than 6 inches in any dimension.
- D. Unless otherwise specified for rock fill, rock or stone less than 6-inches in largest dimension may be used in fill below structures, paving, outparcels, and graded areas, up to 24 inches below surface of proposed subgrade or finish grade of graded areas when mixed with satisfactory material. Rock or stone less than 2 inches in largest dimension may be used in fill within the upper 24 inches of proposed subgrade or finish grade of graded areas when mixed with satisfactory material.
- E. Fill materials used in preparation of subgrade shall be placed in lifts or layers not to exceed 8 inches loose measure and compacted as specified hereinafter.
- F. Material imported from off-site shall have LBR value equal to or above pavement design subgrade LBR value indicated on The Drawings.
- G. Building area subgrade pad shall be that portion of site directly beneath and 5 feet beyond building and appurtenances, including limits of future building expansion areas as shown on the Drawings.

3.9 ROCK FILL

- A. Rock fill shall include on-site excavated material classified as rock excavation as specified in Section 02318. Rock fill may be utilized in fill up to 48 inches below top of subgrade or finish grade of graded areas outside the proposed building, paving, and outparcel areas. Rock fill shall consist of rock having a maximum dimension not greater than 12 inches in any dimension. Rock fill shall be placed in successive horizontal layers of loose material having a thickness of approximately the maximum size of the larger rock in the lift, but not greater than 12 inches. Each layer of material shall be spread uniformly, completely saturated, and compacted. Shot rock shall not be dumped into place, but shall be distributed in horizontal lifts by blading and dozing in such a manner as to ensure proper placement into final position in the embankment. Voids shall be filled with finer material including shot rock fines and limited soil fines during the spreading operation. Successive layers shall not be placed until all voids of the current lift are filled and the lift is compacted. Each successive layer of material shall

adequately bond to the material on which it is placed. Compaction shall be accomplished with vibratory compactors, heavy rubber-tired rollers, or steel-wheeled rollers. Compaction shall be by uniform passes of compaction equipment in sufficient number of passes, but not less than two passes, such that no further consolidation is evident.

3.10 PIPE BEDDING

- A. Excavate trenches for pipe or conduit to 4 inches below bottom of pipe and to the width as specified herein. Place 4 inches of bedding material, compact in bottom of trench, and shape to conform to lower portion of pipe barrel.
- B. Place geotextile fabric as specified on the Drawings and in accordance with Section 02340.

3.11 TRENCH BACKFILLING

- A. Materials used for trench backfill shall comply with requirements as specified herein.
- B. Backfill and compact in accordance with fill and compaction requirements in ASTM D2321 unless otherwise shown on the drawings.
- C. Do not backfill trenches until required tests are performed and utility systems comply with and are accepted by applicable governing authorities.
- D. Backfill trenches to contours and elevations shown on the Drawings.
- E. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

3.12 BORINGS AND CASINGS UNDER ROADS, HIGHWAYS, AND RAILROAD CROSSINGS

- A. When indicated by the Drawings, street, road, highway, or railroad crossings for utility mains installed by jacking and boring method shall be in accordance with area specifications and governing authorities.
- B. Excavation of approach pits and trenches within right-of-way of street, road, highway, or railroad shall be of sufficient distance from paving or railroad tracks to permit traffic to pass without interference. Tamp backfill for approach pits and trenches within right-of-way in layers not greater than 6-inches thick for entire length and depth of trench or pit. Compact backfill to 98 percent of maximum density in accordance with ASTM D698, (or 95 percent of maximum density, in accordance with ASTM D1557) obtained at optimum moisture as determined by AASHTO T180. Mechanical tampers may be used after cover of 6 inches has been obtained over top of barrel of pipe.
- C. Accomplish boring operation using commercial type boring rig. Bore hole to proper alignment and grade. Bore hole shall be within 2 inches of same diameter as largest outside joint diameter of pipe installed. Install pipe in hole immediately after bore has been made and in no instance shall hole be left unattended while open.
- D. In event subsurface operations result in failure or damage to pavement or railroad tracks within 1 year of construction, make necessary repairs to pavement or railroad tracks. If paving cracks on either side of pipe line or is otherwise disturbed or broken due to construction operations, repair or replace disturbed or broken area.
- E. Clean, prime, and line interior and exterior of casing pipe with two coats of asphalt coating in accordance with and governing authorities.
- F. Butt weld steel casing. Welds shall be full penetration single butt-welds in accordance with AWWA C206.

- G. Install casing and utility pipe with end seals, vent pipe, and other special equipment in accordance with area specifications and governing authorities.

3.13 COMPACTION

- A. Compact as follows:

<u>Location</u>	Percent of Maximum Laboratory Density	
	<u>ASTM D698</u>	<u>ASTM D1557</u>
Subgrade & Fill below Structures, Pavement and Outparcels	98	95
Subgrade & Fill in All other Areas	95	92

- B. Maintain moisture content of not less than 1 percent below and not more than 3 percent above optimum moisture content of fill materials to attain required compaction density.
- C. Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.
- D. Corrective Measures for Non-Complying Compaction: Remove and recompact deficient areas until proper compaction is obtained. Continual failure areas shall be stabilized in accordance with Section 02340 at no additional cost to Owner.

3.14 MAINTENANCE OF SUBGRADE

- A. Verify finished subgrades to ensure proper elevation and conditions for construction above subgrade.
- B. Protect subgrade from excessive wheel loading during construction, including concrete trucks, dump trucks, and other construction equipment.
- C. Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in manner that will comply with compaction requirements by use of material with LBR equal to or better than that specified on the drawings. Surface of subgrade after compaction shall be firm, uniform, smooth, stable, and true to grade and cross-section.
- D. Construct temporary ditches and perform such grading as necessary to maintain positive drainage away from subgrade at all times.

3.15 BORROW AND SPOIL SITES

- A. Comply with NPDES and local erosion control permitting requirements for any and all on-site and off-site, disturbed spoil and borrow areas. Upon completion of spoil or borrow operations, clean up spoil or borrow areas in a neat and reasonable manner to the satisfaction of Owner or off-site property owner, if applicable.

3.16 FINISH GRADING

- A. Check grading of building subgrades by string line from grade stakes (blue tops) set at not more than 50-foot centers. Allowable tolerance shall be plus or minus 0.10 feet from plan grade. Provide engineering and field staking as necessary for verification of lines, grades, and elevations.
- B. Grade areas where finish grade elevations or contours are indicated on the Drawings, other than paved areas, outparcels, and buildings, including excavated areas, filled and transition areas, and landscaped areas. Graded areas shall be uniform and smooth, free from rock, debris, or irregular surface changes. Ground surfaces shall vary uniformly between indicated elevations. Grade finished ditches to allow for proper drainage without

ponding and in manner that will minimize erosion potential. For topsoil, sodding, and seeding requirements refer to Section 02900.

- C. Correct settled and eroded areas within 1 year after date of completion at no additional expense to Owner. Bring grades to proper elevation.

3.17 FIELD QUALITY CONTROL

- A. Field quality control shall be the responsibility of the Contractor. Except for specified mandatory testing, field quality control testing and inspection shall be at the discretion of the Contractor as necessary to assure compliance with Contract requirements.

3.18 GENERAL CONTRACTOR TESTING AND INSPECTION (T&I)

- A. The General Contractor will perform testing and inspection (T & I) but only as a means of quality control performance.
- B. Testing and inspection shall be either continuous or periodic in accordance with Section 01458 and as follows:
 - 1. Continuous: Perform in areas supporting a structure including, but not limited to, building pad area, retaining walls, etc. When continuous testing and inspection is in progress, conduct testing and inspection in areas outside building pad or structure at the frequencies stated herein. This shall include, but not limited to, proofrolling documentation to assure correctness and completeness of proofrolling and any associated corrective actions taken by the Contractor.
 - 2. Periodic: In addition to continuous inspections specified above, perform periodic testing as follows when continuous testing is not being performed as described above:
 - a. Two days during the first week when earthwork starts in a paved area.
 - b. Two days each week thereafter until earthwork is complete.
- C. Test Frequency:
 - 1. Number of tests to be taken shall be the test frequencies stated based on quantities or occurrences which have accumulated up to, in between, or during each periodic visit.
 - 2. Not less than one specified test shall be conducted each periodic visit when material has been placed since last visit.
 - 3. In addition, at least one specified test shall be conducted on work being placed during each periodic visit.
- D. Field testing, frequency, and methods may vary as determined by and between the Owner and the Engineer of Record.
- E. Work shall be performed by a Special Inspector – Technical I unless specified otherwise. Report of testing and inspection results shall be made upon the completion of testing.
- F. Classification of Materials: Perform test for classification of materials used and encountered during construction in accordance with ASTM D2488 and ASTM D2487.
- G. Laboratory Testing Of Materials: Perform laboratory testing of materials (Proctor, Sieve Analysis, Atterberg Limits, Consolidation Test, etc.) as specified.
- H. Proofrolling: Document and explain proofrolling inspection procedures and results in the laboratory inspection report.
- I. Field Density Tests
 - 1. Building Subgrade Areas, Including 5'-0" Outside of Exterior Building Lines: In cut areas, not less than one compaction test for every 2,500 sq. ft and at locations along all continuous wall footings with intervals not exceeding 100 feet and at each column spread footing. In fill areas, same rate of testing for each 8-inch

lift, measured loose and at locations along continuous wall footings with intervals not exceeding 100 feet and at each column spread footing.

- a. Density tests on top of building subgrade shall be performed within 48 hours prior to placement of overlying materials. If inclement weather occurs after testing, retest prior to placement of overlying materials.
 2. Paving Areas and other Areas of Construction Exclusive of Building Subgrade:
 - a. In cut areas, not less than one compaction test for every 10,000 sq. ft. In fill areas, same rate of testing for each 8-inch lift, measured loose.
 - b. Outparcels: In cut areas, not less than one compaction test for every 2,500 sq. ft. In fill areas, same rate of testing for each 8-inch lift, measured loose.
 - c. Utility Trench Backfill: Intervals not exceeding 200-feet of trench for first and every other 8-inch lift of compacted trench backfill.
 3. Test Method: In-place nuclear density, ASTM D6938.
- J. Observation and Inspection:
1. Observe all subgrades/excavation bases below footings and slabs and verify design bearing capacity is achieved as required. Work shall be performed by a Special Inspector – Technical II.
 2. Observe and document presence of groundwater within excavations.

3.19 RETESTING AND RE-INSPECTION

- A. General Contractor will conduct retesting and re-inspection as necessary until corrections are fully completed by the Contractor.

END OF SECTION

SECTION 02340 (31 3200) - SOIL STABILIZATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavation, treatment, and backfilling of subgrade for lime, cement, fly ash, or bridge lift stabilization.
 - 2. Geotextile fabric and geogrid for stabilization of subgrade.
- B. Related Requirements:
 - 1. Section 02300 - Earthwork

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.
- B. ASTM International (ASTM):
 - 1. ASTM C150 - Portland Cement.
 - 2. ASTM C618 - Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete.
 - 3. ASTM C977 - Quicklime and Hydrated Lime for Soil Stabilization.
 - 4. ASTM D1633 - Compressive Strength of Molded Soil-Cement Cylinders.
- C. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. AASHTO M216 - Lime for Soil Stabilization.
- D. National Lime Association (NLA):
 - 1. NLA Bulletin 326 - Lime Stabilization Construction Manual.
- E. State Department of Transportation (DOT):
 - 1. Standard Specifications for Construction and Materials.

1.3 ENVIRONMENTAL REQUIREMENTS

- A. Do not install mixed materials in wind in excess of 10 mph or when temperature is below 40 degrees Fahrenheit.

1.4 SUBMITTALS

- A. Submit 30-pound sample of each material to be used at the site in airtight containers to the Construction Testing Laboratory (CTL) or submit gradation and certification of material that is to be used to the CTL for review.
- B. Submit name of each materials supplier and specific type and source of each material. Obtain approval of Owner prior to change in source.
- C. Submit mix designs, materials mix ratio, and laboratory test data to the Civil Engineering Consultant of Record 4 weeks prior to beginning stabilization activities. Certify materials and mix ratios will achieve the specified requirements as indicated in the Construction Documents or as specified by state and local agencies for soil stabilization if not stated in the Construction Documents.

- D. Submit approved mix designs, materials mix ratio, and laboratory test data to the CTL prior to commencing stabilization activities.

PART 2 PRODUCTS

1.5 MANUFACTURERS

- A. Provide products from one of the following manufacturers as specified in the Materials paragraph below:
 1. TenCate Geosynthetics North America (Mirafi), Pendergrass, GA., (706) 693-2226, www.tencate.com
 2. Hanes Geo Components (WEBTEC), Winston Salem, NC. (336) 747-1600, www.hanesgeo.com
 3. Tensar International Corp., Atlanta, GA. (888) 828-5126, www.tensarcorp.com
 4. Thrace-LINQ Inc., Summerville, SC (843) 873-5800, www.thracelinq.com
 5. DuPont (Tyvar). Summerville, SC (843) 832-6860, www.typargeo.com
 6. Synteen Technical Fabrics, Lancaster, SC (800) 796-8336, www.synteen.com

1.6 MATERIALS

- A. Soil Treatment Materials:
 1. Hydrated Lime: ASTM C977 or AASHTO M216.
 2. Portland Cement: ASTM C150, Type I.
 3. Fly Ash: ASTM C618.
- B. Aggregate:
 1. Coarse Aggregate: Crushed carbonate, crushed gravel, crushed air-cooled slag, granulated slag, a mixture of crushed and granulated slag, or other types of suitable material meeting the following gradation requirements:

Sieve Size	Percent Passing
2 inches	100
1 inch	70-100
3/4 inch	50-90
No. 4	30-60
No. 30	7-30
No. 200	0-5

- 2. Fine Aggregate: Sand – Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter meeting the following gradation requirements:

Sieve Size	Percent Passing
No. 4	90-100
No. 50	7-40
No. 200	0-5

- C. Subsoil: Existing to be reused.
- D. Bridge Lift Material: Surge stone, granular fill, or shot rock fill.

1.7 ACCESSORIES

- A. Curing Seal: Asphalt Emulsion Primer.
- B. Geotextile Fabric for Stabilization: Provide one of the following:
 1. Mirafi HP 370 or HP 570, by TenCate.
 2. SF40 or SF65, by DuPont.

3. GTF-200 or 300, by Thrace-LINQ.
 4. TerraTex HD, by Hanes.
- C. Geogrid for Stabilization: Provide one of the following:
1. Biaxial Geogrid Type 1 (formerly BX 1100), by Tensar.
 2. Biaxial Geogrid Type 2 (formerly BX 1200), by Tensar.
 3. Mirafi BXG 11, by TenCate.
 4. Mirafi BXG 12, by TenCate.
 5. SF 11, by Synteen.
 6. SF 12, by Synteen

PART 3 EXECUTION

1.8 PREPARATION

- A. Obtain approval of mix design before proceeding with placement.
- B. Start stabilization only when weather and soil conditions are favorable for successful application of proposed material.
- C. Proofroll subgrade to identify areas in need of stabilization.

1.9 EQUIPMENT

- A. Perform operations using suitable, well maintained equipment capable of excavating subsoil, mixing and placing materials, wetting, consolidating, and compacting of material.

1.10 EXCAVATION

- A. Excavate subsoil to depth sufficient to accommodate soil stabilization.
- B. Remove lumped subsoil, boulders, and rock that interfere with achieving uniform subsoil conditions.
- C. Do not excavate within normal 45 degree bearing splay of any foundation.
- D. Notify Engineer of Record of unexpected subsurface conditions. Discontinue affected work in area until notified to resume work.
- E. Correct areas over-excavated in accordance with Section 02300.
- F. Remove excess excavated material from site.

1.11 GEOTEXTILE FABRIC AND/OR GEOGRID

- A. Place geotextile fabric and/or geogrid over subsoil surface, lap edges and ends in accordance with manufacturer's recommendations in those areas that are shown on Construction Drawings or in those areas that need additional stabilization prior to placement of base course. Bridge lift sections may require the use of geotextile fabric and/or geogrid for stabilization prior to placement of fill.
- B. Place geotextile fabric and/or geogrid in accordance with manufacturer's recommendations.

1.12 SOIL TREATMENT AND BACKFILLING

- A. Lime Stabilized Subgrade: Where indicated on Construction Drawings or as required after continual failure, treat prepared subgrade with hydrated lime in accordance with state highway department specifications.
- B. Cement Stabilized Subgrade: Where indicated on Construction Drawings or as required after continual failure, treat prepared subgrade with Portland cement in accordance with state highway department specifications.
- C. Fly Ash Stabilized Subgrade: Where indicated on Construction Drawings or as required after continual failure, treat prepared subgrade with fly ash in accordance with state highway department specifications.
- D. Bridge Lifts: Where indicated on Construction Drawings or as required after continual failure, treat prepared subgrade by application of a bridge lift. Bridging over existing soils shall be acceptable only when approved in writing by the Owner. Place geotextile fabric or geogrid over existing soils to be bridged. The geotextile fabric or geogrid selected shall be appropriate for the bridge lift material being placed. Place bridge lift over geotextile fabric or geogrid. Surge stone and shot rock will be approved by the Owner's representative on a submittal basis. The Owner and the Owner's representative shall have sole discretion as to the acceptability of all submittals.
- E. Backfill and compaction of treated subsoil shall be in accordance with Sections 02300.
- F. Maintain optimum moisture of mixed materials to attain required stabilization and compaction.
- G. Finish subgrade surface in accordance with Section 02300.
- H. Remove surplus mix materials from site.

1.13 CURING

- A. Immediately following compaction of mix, seal top surface with curing seal.
- B. Do not permit traffic for 72 hours after sealing top surface.

1.14 FIELD QUALITY CONTROL

- A. Field quality control shall be the responsibility of the Contractor. Except for specified mandatory testing, field quality control testing and inspection shall be at the discretion of the Contractor as necessary to assure compliance with Contract requirements. Owner T&I specified below shall not be considered a substitute for the Contractor's responsibility to perform similar routine, necessary, and customary testing and inspection of the methods and frequency suitable for the type of work involved.

1.15 OWNER TESTING AND INSPECTION (T&I)

- A. The Owner may perform testing and inspection (T & I) but only as a means of verification to the Owner of Contractor quality control performance.

END OF SECTION

SECTION 02510 (33 1000) - WATER DISTRIBUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Site water piping and fittings including domestic potable waterline and fire protection system supply waterline, valves, and fire hydrants.

B. Related Requirements:

1. Section 02300 – Earthwork: Trenching, backfill, and compaction for utilities.

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.

B. American Society of Mechanical Engineers (ASME):

1. ASME B 16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

C. ASTM International (ASTM):

1. ASTM B88 - Seamless Copper Water Tube.
2. ASTM D1784 - Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
3. ASTM D2241 - Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR-Series).
4. ASTM D2564 - Poly (Vinyl Chloride) (PVC) Solvent Cement.
5. ASTM D2672 - Poly (Vinyl Chloride) (PVC) Integrally Molded Bell Ends For Solvent - Cemented Pipe Joints.
6. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.
7. ASTM F477 - Elastomeric Gaskets And Lubricant.
8. ASTM F656 - Poly (Vinyl Chloride) (PVC) Cement Primer.

D. American Water Works Association (AWWA):

1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
2. AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and other Liquids.
3. AWWA C116 - Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Watersupply Service.
4. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
5. AWWA C153 - Ductile-Iron Compact Fittings for Water Service.
6. AWWA C504 - Rubber-Seated Butterfly Valves.
7. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
8. AWWA C550 - Protective Interior Coatings for Valves And Hydrants.
9. AWWA C600 - Installation of Ductile-Iron Water Mains and Appurtenances.
10. AWWA C605 - Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
11. AWWA C651 - Disinfecting Water Mains.
12. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 Inches Through 12 Inches, for Water Distribution.

1.3 SUBMITTALS

- A. Furnish 1 copy of results of meter test and hydrostatic pressure test to Owner, Owners Civil Engineering Consultant (CEC), and utility company upon completion of water distribution backfilling operations.

B. Project Record Documents:

1. Disinfection report: Record the following:
 - a. Type and form of disinfectant used.
 - b. Date and time disinfectant injection start and time of completion.
 - c. Test locations.
 - d. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
 - e. Date and time of flushing start and completion.
 - f. Disinfectant residual after flushing in ppm for each outlet tested.
2. Bacteriological report: Record the following:
 - a. Date issued, project name, testing laboratory name, address, and telephone number.
 - b. Time and date of water sample collection.
 - c. Name of person collecting samples.
 - d. Test locations.
 - e. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
 - f. Coliform bacteria test results for each outlet tested.
 - g. Certification that water conforms, or fails to conform, to bacterial standards.
 - h. Bacteriologist's signature and authority.
3. Accurately record actual locations of piping mains, valves, connections, and top of pipe elevations.
4. Identify and describe unexpected variations to subsoil conditions and location of uncharted utilities.

PART 2 - PRODUCTS

2.1 PIPE

- A. Pipe sizes 3-inches and smaller for installation below grade and outside building shall comply with one or combination of following:
 1. Seamless Copper Tubing: Type "K" soft copper, ASTM B88.
 - a. Fittings: Wrought copper (95-5 Tin Antimony solder joint), ASME B 16.22.
 2. Polyvinyl Chloride (PVC) Water Pipe: Pipe, ASTM D 2241, with SDR 21 rating, continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM D1784 material classification.
 - a. Pipe joints: Integrally molded bell ends, ASTM D2672.
 - b. Cement primer: ASTM F656.
 - c. Solvent cement: ASTM D2564.
- B. Pipe sizes 4 to 16 inches for installation below grade and outside building shall comply with one or combination of following:
 1. Ductile Iron Water Pipe: AWWA C151, Pressure class 350 (4-12") Pressure Class 250 (14-16").
 - a. Fittings: Either mechanical joint or push-on joint, AWWA C153, and shall be coated with a 6-8 mil nominal thickness fusion bonded epoxy conforming to the requirements of AWWA C550 and C116, or cement mortar lined in accordance with AWWA C104.
 - b. Elastomeric gaskets and lubricant: ASTM F477.
 2. Polyvinyl Chloride (PVC) Water Pipe: Pipe, AWWA C900, rated DR 18 (Class 150), continually marked as required.
 - a. Elastomeric gaskets and lubricant: ASTM F477 for smaller pipes.
 - b. Pipe joints: Integrally molded bell ends, ASTM D3139.

2.2 VALVES

- A. Gate Valves, 2-Inches and Larger:
 1. Manufacturer and Model: Mueller Resilient Wedge Gate Valves or approved equal.

2. AWWA C509, iron body, non-rising stem with square nut, single wedge, resilient seat, flanged or mechanical joint ends, control rod, post indicator where indicated on Construction Drawings, extension box and valve key.

B. Ball Valves, 2-Inches and Smaller:

1. Manufacturer and Model: Mueller Oriseal or approved equal.
2. Brass body, teflon coated brass ball, rubber seats and stem seals, Tee stem pre-drilled for control rod, AWWA compression inlet end, compression outlet with electrical ground connector, with control rod, extension box and valve key.

C. Butterfly Valves, From 2-Inch to 24-Inch: AWWA C504, Iron body, bronze disc, resilient replaceable seat, water or lug ends, infinite position lever handle.

D. Check Valves, Post Indicator Valves, And Backflow Preventers: Refer to Section 13900 - Fire Suppression.

E. Mark manufacturer's name and pressure rating on valve body.

2.3 FIRE HYDRANTS

A. Fire Hydrants: Type as required by utility company/Local Fire Department and as shown on Construction Drawings.

B. Hydrant Extensions: Fabricate in multiples of 6-inches with rod and coupling to increase barrel length.

C. Hose and Steamer Connections: Match sizes with utility company, with two hose nozzles, one pumper nozzle.

D. Finish: Apply primer and 2 coats of enamel or special coating to color as required by utility company.

2.4 ACCESSORIES

- A. Thrust Blocking: Place 2500 psi concrete to provide sufficient bearing area to transmit unbalanced thrust from bends, tees, caps, or plugs to undisturbed soil without loading undisturbed soil in excess of 2,500 pounds per square foot when water main pressure is 100 psi.

MINIMUM THRUST BLOCKING BEARING AREAS

Pipe Diameter	Tees Sq. Ft	90° Bend Sq. Ft	45° Bend Sq. Ft	22½° Bend Sq. Ft.	11¼° Bend Sq. Ft.	5 5/8 Bend/Sq. Ft.	Cap/Plug Sq. Ft.	Sq. Ft.
3"	1.0	1.0	1.0	1.0	1.0	1.0	1.5	
4"	1.0	1.0	1.0	1.0	1.0	1.0	2.0	
6"	1.5	2.0	1.0	1.0	1.0	1.0	3.0	
8"	2.5	3.5	1.8	1.0	1.0	1.0	4.0	
10"	4.0	5.5	2.8	1.5	1.0	1.0	6.0	
12"	6.0	8.0	4.0	2.0	1.5	1.0	8.5	
14"	8.0	11.0	5.5	3.0	2.0	1.5	12.0	
16"	10.0	14.2	7.0	4.0	3.0	2.5	15.0	
18"	21.0	21.0	12.0	6.0	4.0	3.5	24.0	

- B. Locked mechanical joint fittings shall be installed where vertical changes in direction are required and, if approved by Owner and governing authority, can be installed in lieu of above thrust blocking requirements.

- C. Polyethylene Encasement: Single layer of two ply cross-laminated high density polyethylene encasement per AWWA C105, Section 4.1.2, Type III, Class C (Black), Grade 33, tensile strength 5,000 psi minimum, elongation 100 percent, thickness nominal 0.004 inch (4 mil).
- D. Trace Wire: Magnetic detectable conductor, (#12 Copper) brightly colored plastic covering imprinted with "Water Service" in large letters.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that building service connection and municipal utility water main size, location, and depth are as indicated on Construction Drawings.

3.2 PREPARATION

- A. Ream pipe and tube ends and remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare pipe for connections to equipment with flanges or unions.
- D. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by licensed land surveyor and replaced, as necessary, by same.

3.3 TRENCHING AND BEDDING

- A. Excavate pipe trench and place bedding material in accordance with Section 02300.

3.4 INSTALLATION – GENERAL

- A. Perform installation in accordance with utility company or municipality requirements which shall take precedence over requirements stated herein when difference exists.

3.5 INSTALLATION - PIPE AND FITTINGS

- A. Maintain separation of water main from sanitary and storm sewer piping in accordance with state or local codes.
- B. Install ductile iron pipe and fittings in accordance with AWWA C600.
- C. Install PVC pipe and fittings in accordance with AWWA C605.
- D. Ductile iron pipe and fittings shall be installed with polyethylene encasement around the pipe for the entire length of the project except where water main is within steel casing or is concrete encased. Install polyethylene encasement in accordance with AWWA C105, Method A.
- E. Install pipe to allow for expansion and contraction without stressing pipe or joints or as specified by pipe manufacturer.
- F. Install access fittings in accordance with local codes to permit disinfection of water system performed under this Section.

- G. Connections with Existing Pipelines: Where connections are made between new work and existing piping, make connection using suitable fittings for conditions encountered. Make each connection with existing pipe at time and under conditions with least interference with operation of existing pipeline and in compliance with local utility company.
- H. Form and place concrete for thrust blocks or other specified methods of retainage at each change of direction or end of pipe main.
- I. Place pipe to depth in accordance with Section 02300.
- J. Backfill trench in accordance with Section 02300.
- K. Install trace wire continuous over top of non-metal pipe. Bury a minimum of 6 inches below finish grade, and above pipeline.

3.6 INSTALLATION - VALVES AND HYDRANTS

- A. Install gate valves as indicated on Construction Drawings. Support valve on concrete pads with valve stem vertical and plumb. Install valve boxes in manner that will not transmit loads, stress, or shock to valve body. Center valve box over operating nut of valve vertical and plumb. Securely fit valve box together leaving cover flush with finished surface.
- B. Install fire hydrant assemblies as indicated on Construction Drawings in vertical and plumb position with steamer/pumper nozzle pointed perpendicular to traffic where hydrant is adjacent to street, roadway, or parking lot drive or toward protected building unless otherwise directed by local authorities. Support hydrant assembly on concrete pad and firmly brace on side opposite inlet pipe against undisturbed soil and concrete blocking. Place minimum of 6-cubic feet of crushed stone or gravel around hydrant base and barrel after thrust blocking has cured at least 24 hours. Maintain vertical position of hydrant backfilling and compacting.

3.7 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Perform disinfection of potable lines in accordance with AWWA C651.
- B. Disinfect distribution system with chlorine before acceptance for domestic operation. Chlorine dosage shall be not less than 50 parts per million. Flush lines before introduction of chlorinating materials and after contact period of not less than 24 hours. Flush with clean water after contact period until residual chlorine content is not greater than 1.0 part per million. Flush water discharged from water supply lines or hydrants shall not be allowed to discharge directly onto exposed soil or turf which could result in erosion of soil. If potential for erosion exists at discharge point, measures shall be taken to prevent erosion. Open and close valves in lines being disinfected several times during contact period. After disinfection, take water sample and bacteriological test in accordance with AWWA C651. Do not place distribution system in service until approval is obtained from local governing authorities.
- C. Provide a means of neutralizing the super-chlorinated water before releasing into the environment. This may be accomplished by either a method of dechlorination, direct release into a detention area approved by Wal-Mart, or any method acceptable to federal, state, and local codes. Direct release to open ground shall not be allowed, unless contained within an onsite detention facility with 6" permanent storage. In this case, the Contractor shall time the release to assure that no rainstorms are imminent. The intent of this condition is to allow the majority of the chlorine to evaporate into the atmosphere before a rainstorm has the opportunity to wash the residual downstream. Contractor shall not release super-chlorinated water directly into the sanitary sewer system, private or public, nor any storm drain system not directly discharging into the detention facility.

3.8 SERVICE CONNECTIONS

02510-5

- A. Provide water service connection in compliance with utility company requirements including reduced pressure backflow preventer (if required) and water meter with by-pass valves and sand strainer.

3.9 FIELD QUALITY CONTROL

- A. Test water distribution system pipe installed below grade and outside building in accordance with the following procedures:
 - 1. Perform testing of pipe materials, joints, and other materials incorporated into construction of water mains and force mains to determine leakage and water tightness. In the event state or local code requires more stringent test, more stringent test shall take precedence.
 - 2. Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water. Test at not less than one-and-one-half times working pressure for two hours. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage shall be 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.
- B. Prepare reports of testing activities.

END SECTION

SECTION 02532 (33 3213) - SEWAGE LIFT STATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Exterior submersible pre-packaged sewage lift station and wet well.
- B. Related Requirements:
 - 1. Section 02300 – Earthwork: Excavation, backfill, and compaction.
 - 2. Section 02535 - Sanitary Sewer Systems. Force mains.

1.2 SYSTEM DESCRIPTION

- A. Pre-packaged duplex lift station unit with a fiberglass wet well and all components including pumps, guide rail system, controls and other accessories and components providing a complete working lift station.

1.3 QUALITY ASSURANCE

- A. Commercial Testing of Pumps:
 - 1. Visually inspect pumps to confirm conformance with drawings and specifications as to horsepower, voltage, phase and hertz.
 - 2. Megger the motor seal and housing chambers for infinity to test for moisture content or insulation defects.
 - 3. Allow pumps to run dry to check for proper rotation.
 - 4. Measure amp readings in each leg with discharge piping attached and the pump submerged in water to check for an imbalanced stator winding.

1.4 SUBMITTALS

- A. Shop Drawings: Provide dimensional shop drawings of equipment items.
- B. Certification: Provide certification of satisfactory start-up performance.
- C. Project Record Documents:
 - 1. Record Drawings:
 - a. Accurately record submit actual sewer inlet invert elevations at the wet well, wet well bottom elevation, pump on/off level switch elevations, and high level alarm elevation.
 - b. Identify and describe all approved modifications.
 - 2. O&M Manual: Furnish one copy of Lift Station Operation and Maintenance Manual to Owner's Director of Maintenance and Warranty. Include, in addition to installation and general operating procedure, the operation, maintenance, and servicing procedures of the major individual components provided with the lift station. Include parts lists of components and a troubleshooting guide.

1.5 WARRANTY

- A. Provide printed manufacturer's warranty certificate for warranty of the total package lift station for a period of two years from the date of start-up.

PART 2 - PRODUCTS

2.1 LIFT STATION

- A. Manufacturer: As shown on Construction Drawings or as approved by Engineer of Record.
- B. Provide lift station and components as shown and specified on the drawings.
- C. Substitutions: Not permitted.

2.2 NAMEPLATES

- A. Pumps: Show manufacturer's name, pump model number, and electrical information stamped on the motor nameplate.
- B. Valves: Show manufacturer's name and pressure rating marked on valve body.

2.3 PAINTING

- A. Protect metal surfaces coming into contact with the pump, other than stainless steel or brass, with a factory applied fused polymer coating on the exterior of the pump.
- B. Repair painted surfaces damaged during handling or construction with primer and paint compatible with the base material and original painted finish.

2.4 GUIDE RAIL SYSTEM

- A. Install pumps on lift-out rail systems as shown to allow for easy removal without requiring entry into the wet well.
- B. The pump shall be automatically connected to the discharge connection elbow when lowered into place, and shall be easily removed for inspection or service. A simple linear downward motion of the pump shall accomplish sealing of the pumping unit to the discharge connection elbow without the need of O-rings.

2.5 CONTROLS

- A. Assemble and test the motor control panel in accordance with UL Standard 508 for industrial controls.
- B. Provide alarm system producing a signal that is compatible with remote building alarm system. Install conduit and signal wire from the pump station control panel to the NOVAR Panel area of the store in accordance with the construction documents.
- C. Provide color coded internal wiring, each wire being a different color or stripe (except for ground).
- D. Provide electrical components and assembly in accordance with applicable sections in Division 16.
- E. Float switches or level controls shall be adjustable for level setting from the surface.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that building sewer service pipe size, location, and elevation are as indicated on Construction Drawings.

3.2 INSTALLATION

- A. Install in accordance with the lift station manufacturer's recommendations.
 - B. Comply with Section 02300 for excavation, backfill, and material testing for wet well installation unless otherwise shown on the Lift Station drawings and instructions.
- 3.3 Place top of wet well slab not less than 1 foot above the surrounding area. Taper surrounding grading up to meet the base of the top slab to provide positive drainage away from the station.
- A. Obtain approval of the Engineering Consultant prior to modifications resulting from field variations.
- 3.4 START-UP
- A. After lift station has been installed and wired, complete the following startup procedures and provide certification of satisfactory performance to the Owner's Engineering Consultant:
 1. Megger stator and power cables.
 2. Check seal lubrication.
 3. Check for proper rotation.
 4. Check power supply voltage.
 5. Measure motor operating load and no load current.
 6. Check level control operation and sequence.

END OF SECTION

SECTION 02535 (33 3000) - SANITARY SEWAGE SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sanitary sewer drainage piping, fittings, accessories, cleanouts, and bedding.
2. Connection of site sanitary sewer system to municipal sanitary sewer systems.

B. Related Requirements:

1. Section 02300 – Earthwork: Trenching, backfill, and compaction for utilities
2. Section 02536 - Sewer Manholes, Frames, and Covers
3. Section 03310 – Cast-in-place Structural Concrete

1.2 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.

B. ASTM International (ASTM):

1. ASTM A74 - Cast Iron Soil Pipe and Fittings
2. ASTM A746 - Ductile Iron Gravity Sewer Pipe
3. ASTM C425 - Compression Joints for Vitrified Clay Pipe and Fittings
4. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings
5. ASTM C700 - Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated
6. ASTM D2241 - Poly (vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
7. ASTM D2657 - Heat-Joining Polyolefin pipe and Fittings
8. ASTM D3034 - Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
9. ASTM D3035 - Polyethylene (PE) Plastic Pipe Using Flexible Elastomeric Seals
10. ASTM D3139 - Joints for Plastic Pressure Pipe Using Flexible Elastomeric Seals
11. ASTM D3261 - Butt Heat Fusion Polyethylene (PE) Plastic Fittings For Polyethylene Plastic Pipe And Tubing
12. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe
13. ASTM F1417 - Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air.

C. American Water Works Association (AWWA):

1. AWWA C111 - Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
2. AWWA C600 - Ductile-Iron Water Mains And Their Appurtenances
3. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In, For Water Distribution
4. AWWA C901 - Polyethylene (PE) Pressure Pipe, Tubing And Fittings 1/2 Inch Through 3 Inches, For Water Distribution
5. AWWA C906 - Polyethylene (PE) Pressure Pipe And Fittings, 4 Inch Through 63 Inch, For Water Distribution

1.3 SUBMITTALS

A. Project Record Documents:

1. Accurately record actual locations of pipe runs, connections, cleanouts, and invert elevations.
2. Identify and describe unexpected variations to subsoil conditions and location of uncharted utilities.

1.4 PROJECT CONDITIONS

- A. Coordinate work with termination of sanitary sewer connection outside building and connection to municipal sewer utility service.

PART 2 - PRODUCTS

2.1 SEWER PIPE, FITTINGS, AND JOINTS

- A. Polyvinyl Chloride Pipe (PVC): ASTM D 3034, rated SDR 35 unless otherwise specified by the utility company. Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM D 3034 classification.
 - 1. Pipe joints: Integrally molded bell ends, ASTM D 3034, Table 2, with factory supplied elastomeric gaskets and lubricant.
- B. Vitrified Clay Pipe (VCP): ASTM C700: Use only if required by local jurisdiction.
 - 1. Fittings: ASTM C700
 - 2. Joints: ASTM C425
 - 3. Gaskets: ASTM C425. Gaskets shall be manufactured from high grade, properly vulcanized elastomeric compound consisting of either basic natural or synthetic rubber. Gasket manufacturing tolerances shall comply with Rubber Manufacturer's Association tolerances for gaskets.
 - 4. Lubricant: Suitable for lubricating joint components; no deteriorating effects on gasket or pipe material, will not support growth of fungi or bacteria, and shall be of type recommended by gasket manufacturer.
- C. Force Main:
 - 1. High-Density Polyethylene Pipe (HDPE): AWWA C901 and C906, ASTM D3035, SDR 11 for 150 psi pressure rating.
 - a. Fittings: Molded, AWWA C901 or C906.
 - b. Joints: Butt fusion, ASTM D2657, flanged gasket joints at interface
 - 2. Polyvinyl Chloride Pipe (PVC): For less than 4 inches in diameter, ASTM D2241 for push-on or solvent weld joints, and for pipe 4 inches in diameter and larger, AWWA C900, Class 150 with push-on joints.
 - a. Joints/Fittings: Push-on, ASTM D3139 with ASTM F477 gaskets.
 - b. Solvent Cement: ASTM D2564.
 - 3. Ductile Iron Pipe (DIP): ASTM A746, Class 50, inside nominal diameter as shown on the drawings, bell and spigot end.
 - a. Ductile Iron Pipe Joint Device: AWWA C111, rubber gasket joint devices.

2.2 PIPE ACCESSORIES

- A. Pipe Joints: Mechanical clamp ring type, stainless steel expanding and contracting sleeve, neoprene-ribbed gasket for positive seal.
- B. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps, etc.

2.3 CLEANOUTS AND MANHOLES

- A. Manholes shall conform to Section 02536.
- B. Lid and Frame: Provide in accordance with Section 02536. Provide traffic grade and rated covers and frames where cleanouts and manholes are within pavement, with the letters "SSCO" or "SANITARY SEWER" respectively cast into the cover.

- C. Shaft Construction: Cast iron shaft of internal diameter as specified on Construction Drawings with 2500 psi concrete collar for cleanouts.

2.4 APPURTENANCES

- A. Trace Wire: Magnetic detectable conductor (#12 copper), brightly colored plastic covering, imprinted with "Sanitary Sewer Service" in large letters.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that trench cut and excavation is ready to receive work and excavations, dimensions, and elevations are as indicated on Construction Drawings.

3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with bedding material.
- B. Remove large stones or other hard matter that could damage pipe or impede consistent backfilling or compaction.

3.3 BEDDING

- A. Excavate trench and place bedding material in accordance with Section 02300.

3.4 INSTALLATION - PIPE

- A. Install type and class of pipe as shown on the drawings. Pipes shall be laid and maintained to the required line and grade with necessary fittings, bends, manhole risers, cleanouts and other appurtenances placed at the required locations. The pipe shall be installed with uniform bearing under the full length of the barrel of the pipe. The pipe shall be inspected for defects and cracks before being lowered into the trench. Defective, damaged or unsound pipe, or pipe that has had its grade disturbed after laying shall be taken up and replaced. Commence installation at lowest point with the bell end upgrade.
- B. No pipe shall be laid in water or when trench conditions are unsuitable for work.
- C. Pipe connecting to manholes or other structures shall terminate flush inside of the structure wall.
- D. Joints for PVC and CISP shall be thoroughly lubricated with an approved lubricant before pipe sections are slipped together. Open ends shall be fully protected with a stopper to prevent earth or other material from entering the pipe during construction. Carefully free interior of the pipe from dirt, cement and other deleterious material as the work progresses.
- E. Maintain separation of potable water main from sewer piping at crossings a minimum of 10 feet horizontal and 18 inches vertical.
- F. Install HDPE piping and fittings to AWWA C901 and C906. Butt fusion welded per ASTM D3261.
- G. Route pipe in straight line parallel to roads, buildings and adjacent utilities and as shown on the drawings.
- H. Establish elevations of buried piping with sufficient cover as recommended by pipe manufacturer to ensure not less than 3 feet of cover, except as noted on drawings.

- I. Form and place concrete for thrust blocks at each elbow of pipe force main. See construction drawing for details of construction.
- J. Backfill trench in accordance with Section 02300.
- K. Install trace wire continuous over top of non-metal pipe. Bury 6 inches minimum below finish grade, above pipe-line.

3.5 INSTALLATION – CLEANOUTS AND MANHOLES

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. For cleanouts, form and place cast-in-place concrete base pad with provision for sanitary sewer pipe to be installed to proper elevations.
- C. For manholes, construct inverts according to the following guidelines:
 - 1. Invert channel shall be smooth and accurately shaped to a semicircular bottom to match with the inside of the adjacent sewer section.
 - 2. Invert channels and structure bottoms shall be shaped with mortar and lean concrete.
 - 3. Changes in size and grade of invert shall be made gradually and evenly.
 - 4. Changes in the direction of the sewer entering branch or branches shall have a true curve of as large a radius as the manhole will permit.
- D. For manholes, provide manhole rings, frame, and cover as shown on the construction drawings.

3.6 FIELD QUALITY CONTROL

- A. Field quality control shall be conducted by the Contractor in accordance with Section 01452.
- B. Pipes and joints shall not be completely backfilled until after inspection, testing, and approval by the Owner and local jurisdiction.
- C. Prior to testing for leakage, the pipe trench shall be backfilled to at least the spring line of the pipe. If required to prevent pipe movement during testing, additional backfill shall be added leaving the pipe joints uncovered to permit inspection.
- D. Exfiltration Test
 - 1. Each section of sewer line between successive manholes shall be tested by closing the lower end of the sewer to be tested and the inlet sewer of the upper manhole, using stoppers.
 - 2. Fill the manhole and pipe with water to a point which produces a maximum of 3 feet of head above the invert of the sewer at the center of the upper manhole; or if groundwater is present, 3 feet of head above the average adjacent groundwater level.
 - 3. The allowable leakage shall be 200 gal/inch of pipe diameter/mile/day
- E. Infiltration Test
 - 1. If excessive ground water is encountered in the construction of a section of the sewer, the exfiltration test shall not be used.
 - 2. The upper and lower ends of the sewer to be tested shall be closed sufficiently to prevent the entrance of water.
 - 3. Pumping of ground water shall be discontinued for at least 3 days; then infiltration shall be tested.
 - 4. Infiltration into each section of sewer between adjoining manholes shall not exceed that allowed for the exfiltration test, except that head conditions shall be a maximum of 6 feet.

- F. The Exfiltration Test may be limited to the manholes only when the authority having jurisdiction does not require the test and the Engineer of Record waives the test. The Infiltration Test will always be required when excessive ground water is encountered in addition to the air test.
- G. Air Test: Gravity systems shall be air tested between manholes at 3.5 psi for 5 minutes per ASTM F1417 for plastic pipes.
- H. Deflection Test:
 - 1. Deflection tests shall be conducted on all plastic pipe using a mandrel with a diameter equal to 95 percent of the inside diameter of the pipe. The test shall be performed without mechanical pulling devices.
 - 2. Allowable Deflection: Maximum allowable pipe deflection shall not exceed 5 percent of nominal inside diameter.
 - 3. Mandrel: Mandrel, go/no-go, device shall be cylindrical in shape and constructed with either 9 or 16 evenly spaced arms or prongs. Mandrels with fewer arms will be rejected as not sufficiently accurate. Contact length of mandrel's arms shall equal or exceed nominal inside diameter of sewer to be inspected. Critical mandrel dimensions shall carry tolerance of 0.01-inch maximum. Contractor shall provide mandrel and necessary equipment for mandrel test.
 - 4. Procedure: Mandrel shall be hand-pulled through flexible pipe sewer lines no earlier than 30 days after trench has been completely backfilled. Sections of sewer not passing mandrel shall be uncovered and rebedded, rerounded, or replaced to satisfaction of Owner or governing agency. Repaired section shall be retested.
- I. Hydrostatic Test: Force main piping shall be hydrostatically tested at 150 psi in accordance with AWWA C 600.
- J. Provide measuring devices, meters, water, materials, and labor for making the required tests.
- K. Tests shall be conducted in the presence of the Engineer of Record or his designee. Test data shall be submitted to the Engineer for review and approval.

END OF SECTION

SECTION 02536 (33 3913) - SEWER MANHOLES, FRAMES, AND COVERS

PART 1 - GENERAL

1.1 SUMMARY

1.2 Section Includes:

1. Monolithic concrete, modular precast concrete, masonry, and precast polyethylene manhole assemblies.

1.3 Related Requirements:

1. Section 02300 - Earthwork. Excavation, backfill, and compaction
2. Section 02535- Sanitary Sewer Systems
3. Section 02630 - Storm Drainage

1.4 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.
- B. ASTM International (ASTM):
 1. ASTM A48 - Gray Iron Castings.
 2. ASTM C55 - Concrete Building Brick.
 3. ASTM C94 - Ready Mixed Concrete.
 4. ASTM C478 - Precast Reinforced Concrete Manhole Sections.
 5. ASTM C990 - Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
 6. ASTM D1248 - Polyethylene Plastics Molding and Extrusion Materials.
 7. ASTM D2412 - Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
- C. International Masonry Industry All-Weather Council (IMIAC):
 1. Recommended Practices and Guide Specification for Cold Weather Masonry Construction.
- D. State Department of Transportation (DOT), Construction and Material Specifications.

1.5 SUBMITTALS

- A. Shop Drawings: Indicate reference to Construction Drawings of manhole locations, elevations, piping with sizes, locations, and elevations of penetrations.

PART 2 - PRODUCTS

2.1 MANHOLES

- A. Cast-In-Place Concrete: Nonreinforced cast in place concrete barrel.
 1. Concrete: 3500 psi concrete conforming to ASTM C94.
 2. Forms: Steel sheet accurately shaped and fabricated of sufficient strength to form dense watertight walls to true dimensions.
- B. Precast Concrete: Reinforced precast concrete barrel.
 1. Manhole Sections: ASTM C478.

2. Joints and Joint Sealant: Joint between manhole barrel sections shall conform to ASTM C990 using pre-formed flexible joint sealant.
 3. Pipe Connection Sealant: Joint material between manhole barrel and adjoining pipe shall be as shown on the drawings.
 4. Construct manholes of precast concrete sections as required by Construction Drawings to size, shape, and depth indicated.
- C. Concrete Brick: ASTM C55, Grade N Type I-moisture controlled, normal weight, of same grade, type and weight as block units, nominal modular size of 3 5/8-inches x 7 5/8-inches x 2 1/4-inches.
- D. Precast Polyethylene:
1. Manufacturer: Advanced Drainage Systems (ADS) or approved equal.
 2. Precast polyethylene in accordance with ASTM D1248. Nominal cylinder internal diameter shall be 48-inches and shall be designed to accept concrete filled polyethylene manhole lids and standard cast iron frames with lid or grate.
 3. Manholes shall have compressive strength that meets ASTM D2412 standards.
- E. Mortar and Grout: Mortar for finishing and sealing shall be Class "C". Honeycombing less than 2-inches deep shall be repaired using Class "D" mortar.
- F. Brick Transition Reinforcement: Formed steel 8-gauge wire with galvanized finish.
- G. Configuration:
1. Barrel Construction: Concentric with eccentric cone top section.
 2. Shape: Cylindrical.
 3. Clear Inside Dimensions: 48-inches diameter minimum or as indicated on Construction Drawings.
 4. Design Depth: As indicated on Construction Drawings.
 5. Clear Lid Opening: 22-inches minimum.
 6. Pipe Entry: Provide openings as indicated on Construction Drawings.
 7. Main and Lateral Pipes: Neatly cut off main and lateral pipes flush with inside of manhole or inlet where they enter structure walls. Point up irregularities and rough edges with nonshrinking grout.
- H. Inverts: Shape inverts for smooth flow across structure floor as indicated on Construction Drawings. Use concrete and mortar to obtain proper grade and contour. Finish surface with fine textured wood float.

2.2 COMPONENTS

- A. Lid and Frame:
1. Manufacturer: One of the following or approved equal:
 - a. Bass & Hays Foundry.
 - b. Deeter Foundry, Inc.
 - c. East Jordan Iron Works.
 - d. Neenah Foundry.
 - e. U.S. Foundry & Manufacturing
 2. ASTM A48, Class 30B minimum, heavy duty cast iron construction, machined flat bearing surface.
 3. Removable lid, closed or open as indicated on Construction Drawings, with sealing gasket.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify items specified by other Sections are properly sized and located.

- B. Verify that built-in items are in proper location and ready for roughing into work.
- C. Verify that the excavation for manholes is correct.

3.2 PREPARATION

- A. Coordinate placement of inlet and outlet pipe or duct sleeves as indicated on Construction Drawings.

3.3 PRECAST MANHOLE CONSTRUCTION

- A. Place base pad to proper elevation and location and trowel top surface level for placement of manhole barrel.
- B. Place manhole barrel plumb and level to correct elevations and anchor to base pad.
 1. After completion of slab foundation, lower first joint of manhole barrel into position, grooved end first, and set level and plumb on concrete base. Align and adjust to proper grade prior to placing and forming invert. Pour invert immediately after setting of first section of manhole barrel.
 2. Prior to setting subsequent manhole barrel sections, apply primer to tongue and groove ends and allow to set in accordance with manufacturer's recommendations. Place joint sealant on tongue end. Lower next section into position, and remove excess material from interior of structure. Add additional material on exterior of joint, if necessary, for completely watertight joint.
- C. Set cover frames and lids level without tipping, to correct elevations. Utilize pre-cast rings or brick and mortar to achieve final rim elevation. Maximum limit, 4 courses.

3.4 CAST-IN-PLACE MANHOLE CONSTRUCTION

- A. Cast-in-place concrete shall conform to the applicable requirements of concrete in Division 3. Utilize steel forms.
- B. Place base pad to proper elevation and location and pour monolithically with invert. Base shall support pipe to first joint.
- C. Deposit concrete in evenly distributed layers of about 18 inches, with each layer vibrated to bond to preceding layer.
- D. Place gasket between all joints and paint exterior of manhole within 5 inches of the joint with mastic waterproofing.
- E. Place precast concrete cone.
- F. Set section cover frames and lids level without tipping, to correct elevations. Utilize pre-cast rings or brick and mortar to achieve final rim elevation. Maximum limit, 4 courses.

3.5 MASONRY MANHOLE CONSTRUCTION

- A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- B. Lay masonry units in running bond. Course 3 brick units and 3 mortar joints to equal 8 inches.
- C. Form flush mortar joints
- D. Lay masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- E. Install joint reinforcement 16 inches on center

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- F. Place joint reinforcement in first and second horizontal joints above base pad and below lid frame opening
- G. As work progresses, build in fabricated metal items
- H. Cut and fit masonry for pipes as specified herein
- I. Set cover frames and covers level to correct elevations without tipping.

END OF SECTION

SECTION 02630 (33 4000) - STORM DRAINAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Storm sewer drainage piping, fittings, and accessories.
 2. Storm drainage structures.

1.2 Related Requirements:

1. Section 02300 – Earthwork: Excavation, trenching, backfill, and compaction.
2. Section 02370 – Erosion and Sedimentation Control (Including SWPPP).
3. Section 02536 - Sewer Manholes, Frames, and Covers.
4. Division 3- Concrete: See Architectural / Building Specifications.

1.3 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.
- B. American Association of State Highway and Transportation Officials (AASHTO):
1. AASHTO M 170 – Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
 2. AASHTO M 190 - Bituminous Coated Corrugated Metal Culvert Pipe and Arches.
 3. AASHTO M 198 - Joints for Circular Sewer and Culvert Pipe Using Flexible Watertight Gaskets.
 4. AASHTO M 252 - Corrugated Polyethylene Drainage Tubing, 3 to 10 Inch Diameter.
 5. AASHTO M 294 - Corrugated Polyethylene Drainage Tubing, 12 to 60 Inch Diameter.
- C. ASTM International (ASTM):
1. ASTM A 74 - Cast Iron Soil Pipe and Fittings.
 2. ASTM A 185 - Steel welded Wire Fabric, Plain, for Concrete Reinforcement.
 3. ASTM A 615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 4. ASTM A 746 - Ductile Iron Gravity Sewer Pipe.
 5. ASTM A 760 - Corrugated Steel Pipe, Metallic-Coated For Sewers And Drains.
 6. ASTM A 796 - Structural Design Of Corrugated Steel Pipe, Pipe-Arches, And Arches For Storm And Sanitary Sewers And Other Buried Applications.
 7. ASTM A 798 - Factory-Made Corrugated Steel Pipe For Sewers And Other Applications.
 8. ASTM A 929 - Steel Sheet, Metallic-Coated By The Hot-Dip Process For Corrugated Steel Pipe.
 9. ASTM C 76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
 10. ASTM C 150 - Portland Cement.
 11. ASTM C 206 - Finished Hydrated Lime.
 12. ASTM C 443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
 13. ASTM C 564 - Rubber Gasket for Cast Iron Soil Pipe and Fittings.
 14. ASTM C 924 - Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.
 15. ASTM C 969 - Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
 16. ASTM C 990 - Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
 17. ASTM D 3034 - Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.
 18. ASTM D 3212 - Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
 19. ASTM F 477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

20. ASTM F 949 - Poly (Vinyl Chloride)(PVC) Corrugated Sewer Pipe with Smooth Interior and Fittings.
21. ASTM F 1417 - Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air.
22. ASTM F 2306 - 12 to 60 Annular Corrugated Profile Engineer of Record Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications.

D. American Concrete Institute (ACI):

1. ACI 301 - Structural Concrete for Buildings.

E. UNI-Bell PVC Pipe Association:

1. UNI-B-6 – Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe.

1.4 SUBMITTALS

A. Project Record Documents:

1. Accurately record actual locations of pipe runs, connections, catch basins, cleanouts, and invert elevations.
2. Identify and describe unexpected variations to subsoil conditions and location of uncharted utilities.

1.5 PROJECT CONDITIONS

- A. Coordinate work with termination of storm sewer connection outside building including connection to municipal storm sewer system.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

- A. Pipe and joint materials specified below for storm drainage shall be strictly limited to the extent shown or allowed on the drawings or as specified in Part 3 hereinafter.
- B. Reinforced Concrete Pipe (RCP): ASTM C 76, Class III unless noted otherwise on Drawings.
1. Joint Material: Provide joints to the extent allowable in Part 3 Joints.
 - a. Rubber O-ring Gasket: AASHTO M 198, Type B or ASTM C 443.
 - b. Bitumen or Butyl-Rubber Sealant: ASTM C990.
 2. Flared End Sections: ASTM C 76 or, for sections with toe Engineer of Record, AASHTO M 170.
- C. Ductile Iron Pipe (DIP): ASTM A 746.
1. Fittings: Cast iron, ASTM A 74.
 2. Joint Material: Rubber Gasket, ASTM C 564 for compression joints.
- D. High Density Polyethylene Pipe (HDPE): AASHTO M 252 Type S, M 294 Type S, or ASTM F 2306 smooth interior/annular exterior. Use only where specifically indicated on Drawings.
1. Joint Material:
 - a. Rubber Gasket.
 - 1) ADS N-12 WT by Advanced Drainage Systems, Inc.
 - 2) ADS N-12 ST by Advanced Drainage Systems, Inc.
 - 3) BLUE SEAL by Hancor, Inc.
 - 4) Sure-Lok by Hancor, Inc.
 - b. Corrugated Coupling Bands.
 - 1) Hi-Q by Hancor, Inc.
 - 2) ADS N-12 by Advanced Drainage Systems, Inc.
 - c. PE Wrap.

- E. Polyvinyl Chloride (PVC) Pipe: ASTM D 3034, rated SDR 35, or ASTM F 949 for Profile Pipe, continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM D3034 classification. Only permitted when specifically indicated on Drawings.
 - 1. Pipe joints conforming to ASTM D 3212.
 - 2. Joint Material: Restrained Gasket, ASTM F 477.

- F. Corrugated Steel (Metal) Pipe (CSP or CMP): ASTM A 760, pipe gauge shall be as shown on the drawings. Galvanized, aluminized (Type 1R), or bituminous coated as specified on Drawings. Use only where specifically indicated on Drawings. Corrugated steel pipe may be round pipe, arch pipe, or slotted drainpipe as indicated on Drawings. Slotted drainpipe shall have 1.75-inches wide drain waterway openings and 6 inches minimum height drain guide.
 - 1. CSP, bands and appurtenances shall be uniformly coated inside and outside with a 0.05 inch minimum thickness bituminous coating in accordance with AASHTO M 190.
 - 2. CSP shall be supplied with paved inverts or fully lined to provide a smooth interior, smooth flow lining only as indicated on the drawings.
 - 3. Joint Material:
 - a. Semi-corrugated "Hugger" type bands and "O" ring gaskets.
 - b. Semi-corrugated "Hugger" type bands.

- G. Spiral Rib Metal Pipe: ASTM A760 Type 1R or Type IIR. Coatings shall meet requirements of ASTM A 929 and shall be galvanized, aluminized, or bituminous coated as specified on Drawings. Use only where specifically indicated on Drawings.
 - 1. Pipe gauge shall be as shown on the construction drawings. Standard corrugated steel pipe (CMP or CSP) shall not be substituted for Spiral Rib Metal Pipe.
 - 2. Acceptable manufacturers: Provide the following or approved equal:
 - a. Ultra Flo or Ultra Flo II by Contech, Inc.
 - b. Max Flow by Southeast Culvert, Inc.
 - c. Max Flow by St. Regis Culvert, Inc.
 - d. Max Flow by Thompson Culvert, Inc.
 - 3. Joint Material: Provide joints to the extent allowable in Part 3 Joints.
 - a. Semi-corrugated "Hugger" type bands and "O" ring gaskets.
 - 4. Semi-corrugated "Hugger" type bands.

- H. Subdrains: Perforated, PVC or flexible corrugated plastic pipe as specified herein of the size indicated on the drawings.

2.2 DRAINAGE STRUCTURES

- A. Manholes: Conform to Section 02536.

- B. Grates and Frames: Provide in accordance with details shown on Drawings or equivalent by one of the acceptable manufacturers.
 - 1. Acceptable Manufacturers:
 - a. Bass & Hays Foundry.
 - b. Deeter Foundry, Inc.
 - c. East Jordan Iron Works.
 - d. Neenah Foundry.
 - e. U.S. Foundry & Manufacturing.
 - 2. Standard Grates and Frames: Heavy duty grates, with maximum slot width of 1-1/8".
 - 3. Siphonic Break Manhole Grate and Frame: Heavy duty grate with maximum slot width of 1/2" and minimum net open area of 1.5 square feet. Provide one of the following
 - a. Model R-2750 Grate and Frame by Neenah.
 - b. Model 2212 Grate and Frame by Deeter.

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- c. Model 1480M1 Grate and 1480Z Frame by East Jordan.
- C. Cast-In-Place concrete for drainage structures including manholes, inlets, catch basins, collars, support blocks, headEngineer of Records and paved ditches shall conform to ACI 301.
 - 1. Compressive Strength: 3500 psi at 28 days.
 - 2. Reinforcement: ASTM A 615, grade 60 deformed reinforcing bars, and ASTM A 185 for wire fabric.
- D. Cement Mortar used for paving inverts, filling lift holes, joints, patching and anchoring castings shall consist of one part Portland cement, type I, ASTM C 150, 1/4 part hydrated lime, ASTM C 206 and 2-1/2 parts clean, well-graded sand and water free of suspended matter, alkali, and containing no industrial or domestic waste.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that trench cut and excavation is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over-excavation with bedding material.
- B. Remove large stones or other hard matter that could damage piping or impede consistent backfilling or compaction.
- C. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by licensed land surveyor and replaced, as necessary, by same.

3.3 INSTALLATION – PIPE

- A. Install type of pipe shown on the drawings. Where type of pipe material is not shown or restricted on the drawings, provide only RCP or DIP. Installation provisions herein shall apply to the extent as applicable to the pipe and joints allowed.
- B. Inspect pipe for defects and cracks before being lowered into the trench, piece by piece. Remove and replace defective, damaged or unsound pipe or pipe that has had its grade disturbed after laying. Protect open ends with a stopper to prevent earth or other material from entering the pipe during construction. Remove dirt, excess water, and other foreign materials from the interior of the pipe during the pipe laying progress.
- C. Excavate pipe trench and place bedding material in accordance with Section 02300.
- D. Install pipe in accordance with manufacturer’s written recommendations.
- E. Corrugated or Spiral Rib Metal Pipe: Install as indicated on the drawings, as recommended by the manufacturer, and in accordance with ASTM A 798 and A 796 as they apply.
- F. HDPE Pipe: Install pipe in accordance with pipe manufacturer's installation Guidelines for Culvert Storm Drainage Applications and as indicated on the drawings.
- G. Commence installation at the lowest point for each segment of the route. Lay RCP with the groove or bell end upstream. Place riveted CSP with the inside circumferential laps pointing downstream. Repair damaged bituminous coating on CSP by applying bituminous material conforming to AASHTO M190.

- H. Lay pipe to the required line and slope gradients with the necessary fittings, bends, manhole, risers and other appurtenances placed at the required location as noted on Drawings.
- I. Do not displace or damage pipe when compacting.
- J. Do not place pipe in water or when trench conditions are unsuitable for such work.
- K. Joints:
Construct joints as described herein and in accordance with manufacturer’s installation instructions. Provide pipe joint type for soiltight, silttight, or watertight only silttight or watertight only watertight joint performance in accordance with the following table. The table applies only to the extent as applicable to the pipe and joint type and the joint performance as shown or specified.

Pipe and Joint Type	Joint Performance		
	Watertight	Silttight	Soiltight
RCP			
Rubber O-Ring Gasket	x	x	x
Bitumen or Butyl Rubber Sealant			x
DIP			
Rubber Gasket	x	x	x
HDPE			
Rubber Gasket			
Hancor BLUE SEAL	x	x	x
ADS N-12 WT	x	x	x
Hancor Sure-Lok		x	x
ADS N-12 ST		x	x
Corrugated Coupling Bands			
Hancor Hi-Q			x
ADS N-12			x
PE Wrap			x
PVC			
Restrained Gasket	x	x	x
CMP or Spiral Rib Aluminum Pipe			
Hugger Band w/ O Ring Rubber Gasket		x	x
Hugger Band			x

3.4 INSTALLATION – MANHOLES, CATCH BASINS, INLETS, AND JUNCTION BOXES

- A. Construct drainage structures in accordance with details shown on Drawings and in accordance with Section 02536 as applicable.
- B. Precast Sections:
 1. Install precast section with bases in accordance with Section 02300 and 02536 or as shown on drawings.
 2. Align pipe openings to that of the pipe entering and leaving the manhole, etc. Properly Pipe with connections to manholes, etc. as shown on the drawings.
- C. Construct Cast-In-Place sections as shown on the drawings and in accordance with Section 03300.
 1. Form bottom of excavation clean and smooth to correct elevation.

2. Form and place cast-in-place concrete base pad, with provision for storm sewer pipe to be placed at proper elevation.
 3. Form and place cast-in-place concrete Engineer of Records, sleeved at proper elevation to receive storm sewer pipe in accordance with details shown on Drawings.
- D. Invert channels shall be smooth and accurately shaped to a semicircular bottom conforming to the inside of the adjacent sewer section. Shape invert channels and structure bottoms with cement mortar. Changes in size and grade of invert shall be made gradually and evenly. Changes in direction of the sewer entering branch or branches shall have a true curve of as large a radius as the manhole will permit.
- E. Frames and Covers:
1. Set frames and covers to the proper elevation. Firmly embed frames in mortar approximately 1 inch thick and align to fit the top section of the structure.
 2. Limit bricks set in mortar and used to adjust the frame to finished grade to no more than four courses.
 3. Adjustment rings used to make adjustments in grade shall be made with the initial ring embedded in mortar and the exterior of the rings parged with mortar not less than 1/2 inch thick. No adjustment made in this manner shall exceed 8 inches.
- F. Construct concrete cradles as shown on the drawings and as needed when crossing over and under sewer pipe or utility lines. Concrete shall be 3000 psi mix with a minimum thickness of 6 inches.

3.5 SUBDRAINS

- A. Install subdrains in accordance with the details and at the locations shown on the drawings.

3.6 INSPECTION AND TESTING

- A. General:
1. Clean, inspect, and test Storm sewer systems and culverts, upon completion or at such time as directed. The system or culvert shall have a true grade and line. Actual elevations shall be within 0.08 feet of the elevations given on the drawings.
 2. After completion of the Work, or any part thereof, the job shall be tested to determine that it has been installed in accordance with the drawings and specifications. In general, the Work shall prove to be in good condition, installed in accordance with the drawings and specifications and ready for use.
- B. Cleaning and Testing:
1. Visibly inspect and remove all debris and obstructions from storm pipe.
 2. Test for infiltration and exfiltration by hydrostatic testing per ASTM C 969. Manholes and pipe shall conform to ASTM C 969 leakage criteria.
 3. Test watertight joints in accordance with the requirements of jurisdictional authorities, UNI-B-6 and the following:
 - a. Option: Test plastic piping according to ASTM F 1417.
 - b. Option: Test concrete piping according to ASTM C 924.
- C. Alignment Test: After backfill has been placed and compacted to a depth not less than one foot above top of pipe, a visual inspection shall be made by flashing a light between manholes. Correct displacement or misalignment of invert.

END OF SECTION

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SECTION 02715 (32 1100) - BASE COURSE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Aggregate base for asphaltic concrete including sand/shell base and hot-mix sand asphalt base.
- B. Related Requirements:
 - 1. Section 01458 - Testing Laboratory Services. Testing by Owner's Construction Testing Laboratory.
 - 2. Section 02300 – Earthwork: Excavation, Backfill, and Compaction for Pavement subgrade.

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.
- B. ASTM International (ASTM):
 - 1. ASTM D698 – Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbs/ft³ (600 kN-m/m³)).
 - 2. ASTM D1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbs/ft³ (2,700 kN-m/m³)).
 - 3. ASTM D6938 – In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- C. Asphalt Institute.
- D. State Highway Department Standard Specifications.

1.3 SUBMITTALS

- A. Submit materials certificate to the Owner's Civil Engineering Consultant and the Owner's Construction Testing Laboratory, signed by materials producer and Contractor, certifying that materials comply with, or exceed, requirements specified herein or on the Construction Drawings.
- B. Submit certification of base course materials and placement as specified in Parts 2 and 3 hereinafter.

1.4 WEATHER LIMITATIONS

- A. Do not place aggregate when base surface temperature is less than 40 degrees F, nor when air temperature is below 45 degrees F. Do not place aggregate when surface is wet or frozen. Do not place aggregate when weather conditions are unfavorable otherwise.

PART 2 - PRODUCTS

2.1 BASE COURSE MATERIAL

- A. Aggregate Base Course: Aggregate base course shall consist of a well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction. Base course may consist of a granular base (crushed slag, stone, or gravel, etc), sand/shell base material, or a hot-mix sand asphalt base.

- B. Base course shall be as shown on the drawings, or when not shown, shall be as specified herein.
- C. Aggregate base material requirements from State or other local highway agency specifications may be used for aggregate base course for roads, streets, or similar use pavements if the following conditions are met:
 - 1. Percentage of material by weight passing the No. 200 sieve will not exceed 10.
 - 2. Portion of the material passing the No. 40 sieve must have a liquid limit not greater than 25 and a plasticity index not greater than 5.
- D. Aggregate shall consist of clean, sound, durable particles of crushed stone, crushed slag, crushed gravel, angular sand, or other approved material. Aggregate shall be free of lumps of clay, organic matter, and other objectionable materials or coatings. The portion retained on the No. 4 sieve shall be known as coarse aggregate; that portion passing the No. 4 sieve shall be known as fine aggregate.
 - 1. Coarse aggregates shall be angular particles of uniform density.
 - 2. Fine aggregates shall be angular particles of uniform density. Fine aggregate shall consist of screenings, angular sand, crushed recycled concrete fines, or other finely divided mineral matter processed or naturally combined with the coarse aggregate.
- E. Gradation: The specified gradation requirements shall apply to the completed base course. The aggregates shall have a maximum size of 2 inches and shall be continuously well graded within the following limits:

GRADATION OF AGGREGATES
Percentage by Weight Passing Square-Mesh Sieve

Sieve Designation	No. 1	No. 2	No. 3
2 inch	100	----	----
1-1/2 inch	70-100	100	----
1 inch	45-80	60-100	100
1/2 inch	30-60	30-65	40-70
No. 4	20-50	20-50	20-50
No. 10	15-40	15-40	15-40
No. 40	5-25	5-25	5-25
No. 200	0-10	0-10	0-10

NOTE: Particles having diameters less than 0.0008 inch shall not be in excess of 3 percent by weight of the total sample tested.

- F. Hot-mix Sand Asphalt Bases: Asphalt Institute Type VI, VII, or VIII Mixes for Hot-mix Sand Asphalt Bases. Hot-Mix base shall be used only under asphaltic concrete surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Contractor shall verify to the Owner in writing that the subgrade has been inspected, tested, and gradients and elevations are correct, dry, and properly prepared in accordance with Section 02300.

3.2 CONSTRUCTION

- A. Perform base course construction in accordance with the applicable State standard specifications or as shown or specified.
- B. Perform base course construction in a manner that will drain the surface properly and prevent runoff from adjacent areas from draining onto base course construction.

- C. Compact base material to not less than 98 percent of optimum density as determined by ASTM D698 or 95 percent of optimum density, as determined by ASTM D1557 unless otherwise indicated on the Drawings.
- D. Construct to thickness indicated on Construction Drawings. The minimum base thickness as shown on drawings shall be achieved throughout all pavement areas.
 - 1. Granular Base: Apply in lifts or layers not exceeding 8-inches, measured loose.
 - 2. Sand/Shell Base: Apply in lifts or layers not exceeding 4-inches, measured loose.
 - 3. Hot-mix Sand Asphalt Bases: Apply in lifts or layers not exceeding 3-inches, measured loose.

3.3 FIELD QUALITY CONTROL

- A. Field quality control shall be the responsibility of the Contractor. Except for specified mandatory testing, field quality control testing and inspection shall be at the discretion of the Contractor as necessary to assure compliance with Contract requirements. Owner T&I shall not be considered a substitute for the Contractor's responsibility to perform similar routine, necessary, and customary testing and inspection of the methods and frequency suitable for the type of work involved.
- B. Mandatory Testing and Inspection:
 - 1. Measure base course tolerances no more than 25 ft. on center with a rod and level or stringline.
 - 2. Certify in writing to the Owner that base course placement is in accordance with Contract Document requirements prior to subsequent work thereon.
- C. Testing and inspection shall be during unannounced visits on a periodic basis as follows:
 - 1. One day when placement begins.
 - 2. One day when placement is approximately 25% complete.
 - 3. One day when placement is approximately 50% complete.
- D. Field testing, observation, and inspection shall be conducted only during the periodic site visits.
 - 1. Test frequencies stated shall be based on quantities or occurrences which have accumulated up to, in between, and during each periodic visit.
 - 2. Not less than one specified test shall be conducted each periodic visit when material has been placed since last visit.
 - 3. In addition, at least one specified test shall be conducted on work being placed during each periodic visit.
- E. Field tests for in-place materials will be performed in accordance with the following:
 - 1. Density: Nuclear Method, ASTM D6938. One test in each lift for each 20,000 sq. ft. of in-place base material area.
 - 2. Base Material Thickness: One test for each 20,000 sq. ft. of in-place base material area. All areas tested for thickness shall meet or exceed the base thickness shown on the drawings.
 - 3. Verify Contractor's measurements of base course elevation
- F. Prepare and distribute test reports to Engineer of Record.

3.4 RETESTING AND RE-INSPECTION

- A. CTL will conduct retesting and re-inspection as necessary until corrections are fully completed by the Contractor.

END OF SECTION

SECTION 02740 (32 1216) - ASPHALT CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Asphalt concrete binder and surface course.
- B. Related Requirements:
 - 1. Section 02300 - Earthwork.
 - 2. Section 02715 - Base Course.
 - 3. Section 02765 - Pavement Markings.
 - 4. Section 02770 - Curbs and Sidewalks.

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.
- B. The Asphalt Institute (AI):
 - 1. MS-2 - Mix Design Methods For Asphalt Concrete And Other Hot-Mix Types.
- C. State Highway Department Standard Specifications
 - 1. Standard Specifications for Construction and Materials – Local in the state where project is located.
- D. ASTM International (ASTM):
 - 1. ASTM D1188 - Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples.
 - 2. ASTM D2041 - Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
 - 3. ASTM D2950 - Density of Bituminous Concrete in Place by the Nuclear Methods.
 - 4. ASTM D2726 - Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixture.
 - 5. ASTM D5444 - Mechanical Size Analysis of Extracted Aggregate.
- E. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. AASHTO M017 - Mineral Filler for Bituminous Paving Mixtures.
 - 2. AASHTO M140 - Emulsified Asphalt.
 - 3. AASHTO M208 - Cationic Emulsified Asphalt.
 - 4. AASHTO M320 - Performance-Graded Asphalt Binder
 - 5. AASHTO M323 - Superpave Volumetric Mix Design
 - 6. AASHTO T164 - Quantitative Extraction of Asphalt Binder from Hot-Mix Asphalt (HMA)
 - 7. AASHTO T166 - Bulk Specific Gravity of Compacted Hot-Mix Asphalt Mixtures Using Saturated Surface-Dry Specimens
 - 8. AASHTO T209 – Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt (HMA)
 - 9. AASHTO T245 - Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.
 - 10. AASHTO T275 - Bulk Specific Gravity of Compacted Hot-Mix Asphalt Mixtures Using Paraffin-Coated Specimens
 - 11. AASHTO T308 - Asphalt Content of Hot-Mix Asphalt (HMA) by the Ignition Method.
 - 12. AASHTOT312 - Preparing and Determining the Density of Hot-Mix Asphalt (HMA) Specimens by Means of the Superpave Gyrotory Compactor.

13. AASHTO T331 - Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method

F. National Asphalt Pavement Association (NAPA):

1. IS 123 – Recycling Hot-Mix Asphalt Pavements
2. IS 128 - HMA Pavement Mix Type Selection Guide

1.3 QUALITY ASSURANCE

A. Pre-installation Meeting: Convene a pre-installation meeting at the site at least two weeks prior to commencing work of this Section. Require attendance of parties directly affecting work of this Section, including, but not limited to, the Owner's representative, CTL's representative and inspector, Contractor, paving sub-contractor and job foreman.

1. Contact Engineer of Record three weeks prior to pre-installation conference to confirm schedule.
2. Record discussions of meeting and decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. Review foreseeable methods and procedures related to paving work, including the following:
 - a. Review preparation and installation procedures and coordinating and scheduling required with related work.
 - b. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
 - c. Tour, inspect and discuss condition of subgrade, drainage structures, and other preparatory work.
 - d. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
 - e. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - f. Review paving requirements (drawings, specifications and other contract documents).
 - g. Review required submittals, both completed and yet to be completed.
 - h. Review required inspections, testing procedures.
 - i. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
 - j. Review safety precautions relating to placement of paving.

1.4 SUBMITTALS

A. Submit mix designs to the Civil Engineering Consultant of Record at least 30 days prior to beginning asphalt paving operations. Mix designs over one year old will not be accepted by Owner. Mix design submittal shall follow the format as recommended by Asphalt Institutes Manual MS-2 and include the following:

1. Type and Name of mix.
2. Gradation Analysis.
3. Optimum asphalt content.
4. Grade of asphalt binder.
5. Volumetric properties.
6. References to local State Highway Department Specification for each material when applicable.

B. Submit approved mix designs and laboratory test results to CTL signed by the materials producer and Contractor certifying materials and mix ratios conform to the requirements specified herein.

C. Submit certification of asphalt placement as specified in Field Quality Control.

1.5 PROJECT CONDITIONS

A. Weather Limitations:

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1. Apply tack coat when ambient or base surface temperature is above 40 F, and when temperature has been above 35 F for 12 hours immediately prior to application. Do not apply when base is wet, contains excess moisture, during rain, or when frozen.
 2. Construct asphalt concrete paving when ambient temperature is above 40 F.
- B. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aggregate: Use locally available materials and gradations that meet local State Highway Department Specifications and exhibit satisfactory records of previous installations. All aggregate requirements, including those for quality, shall meet those in AASHTO M323 for the specified traffic level.
- B. Asphalt Binder: Asphalt binder shall be a performance-graded (PG) binder, meeting the requirements of M 320, which is appropriate for the climate and traffic-loading conditions at the site of the paving project and in compliance with the local State Highway Department Specifications for that location, or as specified by the contract documents.
1. Design reliability shall be 85% for the high- and low-temperature performance.
 2. The minimum required PG binder shall be that which satisfies the required design reliability using the pavement temperature data determined.
 3. The high-temperature grade shall be increased by one grade equivalent to accommodate low traffic speeds.
- C. Tack Coat: Emulsified asphalt; AASHTO M140 or AASHTO M208, SS-1h, CSS-1, or CSS-1h, may be diluted with up to 1 part water to 1 part asphalt.
- D. Mineral Filler: Rock or slag dust, hydraulic cement, or other inert material complying with AASHTO M17, if recommended by local State Highway Department Specifications.
- E. Reclaimed Asphalt Pavement (RAP): RAP may be used in amounts not to exceed 20% by wt. The mix design shall contain the percentage of RAP that is to be used in the production. Production procedures using RAP material shall conform to NAPA IS 123. Additional RAP provisions shall be as follows:
1. Material-handling machinery shall not drive on the RAP stockpiles.
 2. RAP maximum top size aggregate introduced into the mix shall be 1-1/2 inches.
 3. Dust (fines) in the RAP, when added to the virgin aggregate, shall not exceed the requirements of the virgin mix design.
 4. Moisture content shall be monitored to assure that the material can be thoroughly dried as it is processed.
 5. Stockpiles shall be left uncovered or stored under the roof of an open-sided building.
 6. Material handling front-end loader operators shall be experienced in handling RAP materials.
 7. RAP shall be loaded in the cold feed bins in small consistent quantities without causing the material to compact in the bin.
 8. RAP shall not be held in the bin for extended periods of time, especially on hot, humid days.
 9. During production, RAP material shall not be allowed to contact open flame.

2.2 AGGREGATE SIZE REQUIREMENTS - SUPERPAVE MIX

- A. Nominal Maximum Size: The combined aggregate shall have a nominal maximum aggregate size of 4.75 to 19.0 mm for surface courses and no larger than 25 mm for subsurface courses in accordance with Table 3 of AASHTO

M323. Selection of the appropriate nominal maximum aggregate size mixture shall be in accordance with NAPA IS 128.

- B. Gradation Classification The combined aggregate gradation shall be classified as coarse-graded when it passes below the Primary Control Sieve (PCS) control point as defined in Table 4 of AASHTO M323. All other gradations shall be classified as fine-graded.

2.3 ASPHALT-AGGREGATE MIXTURE

- A. Superpave Mix:

1. The initial, design, and maximum number of gyrations shall conform to the following:

Superpave Gyrotory Compaction Effort

Design ESALs (Million)	Compaction Parameters		
	$N_{initial}$	N_{design}	N_{max}
< 0.3	6	50	75
0.3 < 3	7	75	115

2. The design, when compacted in accordance with T 312, shall meet the relative density, VMA, VFA, and dust-to-binder ratio requirements specified in the following table. Air voids at N (design) shall be 4.0 per cent.

Superpave HMA Design Requirements

Design ESALs ^a (Million)	Required Relative Density, Percent of Theoretical Maximum Specific Gravity			Voids in the Mineral Aggregate (VMA) Percent Minimum				VFA Range, Percent	Dust- to- Binder Ratio Range ^b
	<i>N_{initial}</i>	<i>N_{design}</i>	<i>N_{max}</i>	Nominal Maximum Aggregate Size, mm					
				25.0	12.5	9.5	4.75		
<0.3	≤91.5	96.0	≤98.0	12.0	14.0	15.0	16.0	70-80 ^c	0.6-1.2
0.3 to <3	≤90.5	96.0	≤98.0	12.0	14.0	15.0	16.0	65-78	0.6-1.2

^a Design ESALs are the anticipated project traffic level expected on the design project over a 20-year period. Regardless of the actual design life of the project, determine the design ESALs for 20 years.

^b For the 4.75-mm nominal maximum size mixtures, the dust-to-binder ratio shall be 0.9 to 2.0.

^c For the 25.0-mm nominal maximum size mixtures, the specified lower limit of the VFA range shall be 67 percent for design traffic levels < 0.3 million ESALs.

3. Aggregate gradation and asphalt content tolerances for acceptance of plant produced mix shall be as follows:

Property	Maximum tolerance for any one sample	Average of samples for given mix for four or more samples
3/4" (19mm)	±7.0	±4.0
1/2" (12.5 mm)	±7.0	±4.0
#4 (4.75mm)	±6.0	±3.5
#8 (2.36mm)	±6.0	±3.5
#50 (0.3mm)	±4.0	±2.3
#200 (0.075mm)	±2.0	±1.2
Asphalt Content	±0.4	±0.3
Air Voids	±2.0	±1.2
VMA	> Min.	> Min.

B. Marshall Mix:

1. The design shall meet the requirements specified in the following table.

Marshall HMA Design Requirements

Design ESALs ^a (Million)	Compaction Effort ^b (Blows)	Design Air Voids, Percent	Voids in Mineral Aggregate (VMA), Percent Minimum				VFA Range, Percent	Minimum Stability, pounds	Flow, inches
			1 in	3/4 in.	1/2 in.	3/8 in.			
< 0.3	50	3-5	12.0	13.0	14.0	15.0	70-82	1000	0.08 – 0.16
0.3 < 3	75	3-5	12.0	13.0	14.0	15.0	20-82	1500	0.08 – 0.16

^a Design ESALs are the anticipated project traffic level expected on the design project over a 20-year period. Regardless of the actual design life of the project, determine the design ESALs for 20 years.

^b Flat-foot, static base hammer.

2. Aggregate gradation and asphalt content tolerances for acceptance of plant produced mix shall be as follows:

Property	Maximum tolerance for any one sample	Average of samples for given mix for four or more samples
3/4" (19mm)	±7.0	±4.0
1/2" (12.5 mm)	±7.0	±4.0
#4 (4.75mm)	±6.0	±3.5
#8 (2.36mm)	±6.0	±3.5
#50 (0.3mm)	±4.0	±2.3
#200 (0.075mm)	±2.0	±1.2
Asphalt Content	±0.4	±0.3
Air Voids	±2.0	±1.2
VMA	> Min.	> Min.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that the prepared base material has been inspected, tested, and gradients and elevations are correct, dry, and properly prepared in accordance with Section 02715.

3.2 PREPARATION

- A. Proof roll prepared base material surface to check for unstable areas in accordance with Section 02300 including documentation and re-proof rolling as required. Paving work shall begin only after unsuitable areas have been corrected and are ready to receive paving.
- B. Establish and maintain required lines and elevations.
- C. Cover the surfaces of curbs, gutters, manholes and other structures on which the asphalt concrete mixture will be placed, with a thin, uniform coat of liquid asphalt. Where the asphalt concrete mixture will be placed against the vertical face of an existing pavement, clean the vertical face to remove foreign substances and apply a coating of liquid asphalt at a rate of approximately 0.25 gallons per square yard.
- D. Density Control Strips.
 - 1. Prior to beginning placement of asphalt, construct asphalt concrete density control strips.
 - 2. Source and type of material, material requirements, and laydown and compaction equipment used for compaction shall be the same as that to be used in the project.
 - 3. The subgrade or pavement layer upon which the control strip is constructed shall tested prior to construction of the control strip.
 - 4. The control strip shall be a minimum of 250 linear feet long and one paver width wide.
 - 5. Rolling the control strip shall continue until no appreciable increase in density is obtained by additional coverages.
 - 6. Upon completion of rolling, the Contractor shall use a nuclear testing device to establish the mean density of the control strip. The mean density will be based on 10 tests taken at randomly selected sites within the control strip area. The nuclear gauge will be calibrated with the average of 3 cores taken from the same area. The average of the cores shall meet the specified density requirements. The calibration factor between the average nuclear density and average core density shall be applied to the Contractor's nuclear gauge for Contractor's density monitoring.
- E. Equipment:
 - 1. Equipment necessary for the paving of asphalt concrete shall be on the project prior to beginning paving operations.

2. Maintain equipment in satisfactory operating condition and correct breakdowns in manner that will not delay or be detrimental to the schedule of paving operations.

3.3 APPLICATION

A. Tack Coat:

1. Apply to contact surfaces of previously constructed asphalt concrete base courses or Portland cement concrete and surfaces abutting or projecting into asphalt concrete or into asphalt concrete pavement.
2. Apply tack coat to asphalt concrete base course or sand asphalt base course. Apply emulsified asphalt tack coat between each lift or layer of full depth asphalt concrete and sand asphalt bases and on surface of bases where asphalt concrete paving will be constructed.
3. Apply at rate which produces a residual of asphalt cement between 0.04 and 0.06 gal per sq. yd of surface.
4. Allow drying until at proper condition to receive paving.

3.4 ASPHALT CONCRETE PLACEMENT

- A. Place asphalt concrete mixture on completed, compacted underlying surface, spread, and strike off. Spread mixture at the minimum ambient temperature that will allow the required density to be achieved.
- B. Whenever possible, spread pavement by finishing machine; however, inaccessible or irregular areas may be placed by hand methods. Spread hot mixture uniformly to required depth with hot shovels and rakes. After spreading, carefully smooth hot mixture to remove segregated course aggregate and rake marks. Rakes and lutes used for hand spreading shall be type designed for use on asphalt mixtures. Do not dump loads faster that they can be properly spread. Workers shall not stand on loose mixture while spreading.
- C. Placement and routing of hauling and placing equipment shall be conducted in a manner to avoid tire tracking of bituminous material onto existing paved surfaces.
- D. Paving Machine Placement: Apply successive lifts of asphalt concrete in transverse directions except when placing within small areas, parallel lifts may be placed when considered more practical. Joints of successive parallel lifts shall be offset a minimum of 2 feet. Place surface course parallel to flow of traffic. Place asphalt paving in typical strips not less than 10'-0" wide. Asphalt concrete pavement, including base and surface course, shall be placed in two or more lifts as indicated on drawings. Pavement thicknesses shall be thickness shown on the drawings for each course but not less than 1-1/2 inch nor more than 3 inches for each lift.

3.5 ROLLING AND COMPACTION

- A. After being spread, mixture shall be compacted by rolling as soon as it will bear the weight of rollers without undue displacement. Number, weight, types of rollers, and sequences of rolling operations shall be such that the required density and surface are consistently attained while the mixture is in workable condition.
- B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
- C. Breakdown Rolling: Perform breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling with hot material.
- D. Intermediate Rolling: Follow breakdown rolling as soon as possible while mixture is hot. Continue second rolling until mixture has been thoroughly compacted as follows:
 1. Minimum Average Density: 93 percent of theoretical maximum density according to AASHTO T209 or ASTM D2041, with no individual test less than 91 percent nor greater than 97 percent.

- E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.
- F. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot asphalt concrete. Compact by rolling to maximum surface density and smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked. Any masked or marred finish surfaces shall be repaired or smoothed.
- H. Compaction at Unsupported Edges of Pavements: Start the first roller pass 12-15 inches from the unsupported edge. Allow the uncompacted asphalt to act as a dike to hold the mat in place. The final pass over the uncompacted dike should not slough off if the roller is supported on the compacted mat.

3.6 JOINTS

- A. General: Place each asphalt paving layer as continuous as possible to keep the number of joints to a minimum. Create joints between old and new pavement, between successive days work, and where the mixture has become cold (less than 140 degrees F). Make these joints in such a manner as to create a continuous bond between the old and new pavement construction courses.
- B. Construction joints shall have same texture, density, and smoothness as other sections of asphalt concrete course.
- C. Transverse Joints: If placing of material is discontinued or if material in place becomes cold, make a joint running perpendicular to the direction traveled by the paver. Before placement continues, trim the edge of the previously placed pavement to a straight line perpendicular to the paver and cut back to expose an even vertical surface for the full thickness of the course. When placement continues, position the paver on the transverse joint so that sufficient hot mixture will be spread in order to create a joint after rolling that conforms to the required smoothness. If the temperature of the previously placed pavement material drops below 140 degrees F before paving is resumed, give the exposed vertical face a thin coat of liquid asphalt just before paving is continued.
- D. Longitudinal Joints: Coat longitudinal joints that are not completed before the previously laid mixture has cooled to a temperature below 140 degrees F, with liquid asphalt just before paving is continued.

3.7 FIELD QUALITY CONTROL

- A. Field quality control shall be the responsibility of the Contractor. Except for specified mandatory testing, field quality control testing and inspection shall be at the discretion of the Contractor as necessary to assure compliance with Contract requirements. Owner T&I shall not be considered a substitute for the Contractor's responsibility to perform similar routine, necessary, and customary testing and inspection of the methods and frequency suitable for the type of work involved.
- B. Mandatory Testing:
 - 1. Pavement Thickness: Measure pavement thickness behind the paver at the beginning of and during pavement placing operations to assure proper thickness.
 - 2. Field Density Test For In-Place Materials: In-place density tests by nuclear method in accordance with ASTM D2950. Nuclear density shall be correlated with ASTM D1188 or D2726 or AASHTO T166, T275, T331 as applicable.
 - a. Density tests on subgrades and aggregate base courses to be overlaid by pavements shall be performed within 48 hours prior to placement of the pavement lift. If inclement weather occurs after testing, retest prior to placement of next lift. Testing frequencies shall be as specified in Sections 02300 and 02715 respectively.

- C. Coring holes remaining from cores taken by the CTL shall be immediately filled by the Contractor with full depth, hot-mix asphalt concrete or non-shrink grout tinted to match the surrounding pavement.
- D. Obtain test samples for volumetric testing from the truck at the asphalt plant. Mixture samples shall be taken at least 2 times for every 8 hour day. Deliver samples to the CTL for testing by the CTL:
- E. Areas of deficient paving, including compaction, smoothness, thickness, and asphalt mixture, shall be delineated, removed, and replaced in compliance with specifications requirements. Alternative remedial or corrective measures for repair of deficient paving may be allowed provided a plan of corrective action is submitted in the form of a Request For Information (RFI) and the plan is approved by the CEC.
- F. Provide certification in writing that asphalt placement is in accordance with specification requirements.
- G. Provide documentation to the CTL of proof rolling and of subgrade and aggregate base compaction testing prior to pavement placement each day in the areas to be paved including the density control strip
- H. The testing and inspection shall be on a periodic basis as follows:
 - 1. One day on the day when the density control strip is placed.
 - 2. One day when pavement placement is approximately 25% complete.
 - 3. One day when pavement placement is approximately 50% complete.
- I. Field testing, observation, and inspection shall be conducted only during the periodic site visits except as required for subgrade testing for density control strip specified in PREPARATION paragraph above.
 - 1. Number of tests to be taken at each site visit shall be the test frequencies stated based on quantities or occurrences which have accumulated up to, in between, or during each periodic visit.
 - 2. Not less than one specified test shall be conducted each periodic visit when material has been placed since last visit.
 - 3. In addition, at least one specified test shall be conducted on work being placed during each periodic visit.
- J. Core Sampling and Testing: Asphalt surface and base courses shall be randomly cored at minimum rate of 3 cores per day's placement per mix type, but not less than 3 cores in light duty areas and 3 cores in heavy-duty areas shall be obtained. In addition to cores taken during periodic site visits, sampling shall be performed at the rate of one sample per 1000 sq. yds., or fraction thereof, of pavement placed during the absence of the CTL. Asphalt concrete pavement samples shall be tested for conformance with density and thickness requirements. Cores shall be cut from minimal loading areas representative of project.
- K. Surface Smoothness Test: In areas of obvious depressions or bumps, suspect areas of each lift shall be checked with a 10'-0" straightedge both parallel with, and at right angles to, centerline of the paved area. The variation of the surface between two contact points shall not exceed 1/4-inch.
- L. Pavement Thickness: The CTL will measure thickness of each core sample taken. At each core location, the thickness of the course shall meet or exceed the thickness shown. If the thickness of a lower course of asphalt is less than the thickness shown, it shall be identified as a deviation and recorded. The Contractor shall either remove and replace the deficient pavement or increase the thickness of the upper course so that the total thickness of the pavement meets or exceeds the design thickness, provided that the specified compaction of the lower lift is achieved.
- M. Field Density Test For In-Place Materials:
 - 1. Density tests shall be conducted on each core sample taken in accordance with ASTM D1188 or D2726 (AASHTO T166, T275, T331) as applicable.
- N. Volumetric Properties: Perform testing as follows on samples provided by the Contractor:

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1. Superpave Mix: Compact into specimens in accordance with AASHTO T312. Test each specimen for determination of relative density, VMA, VFA, and dust-to-binder ratio.
2. Marshall Mix: Compact into specimens using compactive blows equal to mix design per side with the Marshall hammer as described in AASHTO T245. Temperature shall be equal to temperature at paving machine with reheating. Test each specimen for determination of laboratory air voids, Marshall stability, and flow.

O. Asphalt Content and Aggregate Gradation: Asphalt content extraction and gradation of extracted aggregate testing shall be performed in accordance with AASHTO T 308 or AASHTO T164 and ASTM D5444 respectively and local State Highway Department Specifications requirements. At least one asphalt content and one gradation test shall be taken for each 2000 tons or each day pavement is placed.

3.8 RETESTING AND RE-INSPECTION

A. CTL will conduct retesting and re-inspection as necessary until corrections are fully completed by the Contractor.

END OF SECTION

SECTION 02751 (32 1313) - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparation and placement of Portland cement concrete parking areas.
2. Preparation and placement of Portland cement concrete roads and entrances.
3. Aggregate base below slab.

B. Related Requirements:

1. Section 01330 - Submittal Procedures:
2. Section 01458 - Testing Laboratory Services. Procedures for inspection, testing, and documentation by Owner furnished testing laboratory.
3. Section 02300 - Earthwork: Excavation, backfill, compaction for subgrades.
4. Section 02765 - Pavement Markings.

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.

B. American Concrete Institute (ACI):

1. ACI 117 - Tolerances for Concrete Construction and Materials and Commentary.
2. ACI 301 - Structural Concrete.
3. ACI 305.1- Hot Weather Concreting.
4. ACI 306.1- Cold Weather Concreting.
5. ACI 308.1 - Curing Concrete.
6. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary.

C. American Society for Testing and Materials (ASTM):

1. ASTM A 36 - Structural Steel.
2. ASTM A185 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
3. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.
4. ASTM C31 - Making and Curing Concrete Test Specimens in the Field.
5. ASTM C33 - Concrete Aggregates.
6. ASTM C 39 - Comprehensive Strength of Cylindrical Concrete Specimens.
7. ASTM C42 - Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
8. ASTM C94 - Ready-Mixed Concrete.
9. ASTM C138 - Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
10. ASTM C143 - Slump of Hydraulic Cement Concrete.
11. ASTM C150 - Portland Cement.
12. ASTM C172 - Sampling Freshly Mixed Concrete.
13. ASTM C231 - Air-Content of Freshly Mixed Concrete by the Pressure Method.
14. ASTM C260 - Air-Entraining Admixtures for Concrete.
15. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
16. ASTM C403 - Time of Setting of Concrete Mixtures by Penetration Resistance

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17. ASTM C618 - Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete.
18. ASTM C920 - Elastomeric Joint Sealants.
19. ASTM C989 - Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
20. ASTM C1064 - Temperature of Freshly Mixed Portland Concrete Cement.
21. ASTM C1218 - Water-Soluble Chloride in Mortar and Concrete.
22. ASTM C1602 - Mixing Water used in the Production of Hydraulic Cement Concrete.
23. ASTM D98 - Calcium Chloride
24. ASTM D 698 - Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb. (2.49 Kg) Hammer and 12-in (305 mm) Drop.
25. ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous).
26. ASTM D1241 - Materials for Soil-Aggregate Subbase, Base and Surface Courses
27. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
28. ASTM D1752: Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
29. ASTM D2628 - Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.
30. ASTM D3575: Standard Test Methods for Flexible Cellular Materials Made From Olefin Polymers.

D. Federal Specifications (FS):

1. FS HH-F-341 - Fillers, Expansion Joint: Bituminous (Asphalt & Tar)

E. International Code Council, Inc.:

1. International Building Code (IBC).

F. State Highway Department Standard Specifications.

G. National Ready-Mixed Concrete Association:

1. NRMCA Inspection Standards

1.3 SUBMITTALS

- A. Obtain ENGINEER OF RECORD approval for Mix Design and Pavement Joint and Placement Plan prior to commencement of work.
- B. Submit submittal items required within this section in a single submittal.
- C. Sieve Analysis for Aggregate Base: Submit current sieve analysis report, sampled and tested within the last 60 days of submittal date, for aggregate base and choker material.
- D. Concrete Batch Plant Certifications: Submit name and address of the concrete supplier's batch plant and plant certification(s) by National Ready-Mix Concrete Association and/or State Department of Transportation.
- E. Mix Design:
 1. Submit three copies of each proposed mix.
 2. Submit separate mix design for concrete to be placed by pumping in addition to the mix design for concrete to be placed directly from the truck chute.
 3. Submit mix design to the Civil Engineering Consultant of Record and the Construction Testing Laboratory,
 4. Include applicable information and the following:
 - a. Proportions of cementitious materials, fine and coarse aggregate, and water.

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- b. Water-cementitious material ratio, 28-day compressive design strength, slump, and air content.
 - c. Type of cement, fly ash, slag and aggregate.
 - d. Aggregate gradation.
 - e. Type and dosage of admixtures.
 - f. Special requirements for pumping.
 - g. Range of ambient temperature and humidity for which design is valid.
 - h. Special characteristics of mix which require precautions in mixing, placing, or finishing techniques to achieve finished product specified.
5. Materials and methods for curing concrete.
- F. Attachments to Concrete Mix Design: Submit the following as attachments to be included with the Concrete Mix Design:
- 1. Cementitious materials mill test reports for the following:
 - a. Portland cement
 - b. Fly ash
 - c. Slag
 - 2. Designation, type, quality, and source (natural or manufactured) of coarse and fine aggregate materials.
 - 3. Sieve Analysis Reports: Provide separate sieve analysis of percentages passing for coarse and fine aggregate. Show values for each sieve size shown on the mix design form. Do not leave any line blank. Sieve analysis sampling and testing for each aggregate source shall be conducted within 60 days of concrete submittal date.
 - 4. Aggregate Supplier Statement:
 - a. Stating if aggregate is possibly alkali-reactive based on tests or past service.
 - b. Stating if aggregate can possibly cause pop-outs, "D" cracking, or other disruptions due to moisture gain, freezing, or other mechanisms, based on tests or past service.
 - 5. Product data for the following concrete materials admixtures:
 - a. Water reducing
 - b. Set retarding
 - c. Set accelerating
 - d. Data indicating chloride ion content information for each admixture
 - 6. Concrete compressive strength data as required by ACI 318.
 - 7. Concrete supplier approval of mix design.
 - 8. Chloride-Ion Content: Measured water-soluble chloride-ion content (percent by weight of cementitious materials) in accordance with ASTM C1218.
 - 9. Time of Initial Setting: Initial setting time in accordance with ASTM C403.
- G. Product Data: Submit certified laboratory test data or manufacturer's certificates and data for the items listed below certifying that materials are in conformance requirements specified herein. Submit to the Civil Engineering Consultant of Record and the Construction Testing Laboratory for review and approval and within 7 calendar days after receipt of Notice-to-Proceed.
- 1. Portland cement concrete mix design(s)
 - 2. Type and source of Portland cement, fly ash, and slag
 - 3. Aggregate gradations
 - 4. Joint back-up material
 - 5. Soft preformed joint filler
 - 6. Pavement joint sealant
 - 7. Dowel bars
 - 8. Tie bars
 - 9. Reinforcing steel bars

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10. Welded wire fabric
11. Air entraining admixtures
12. Water-reducing, set-retarding, and set-accelerating admixtures (if used)

H. Pavement Joint and Placement Plan: For projects with all-concrete parking lots, provide a placement plan identifying the items listed below.

1. Concrete truck access location.
2. Extent of placements including width, length, slab placement area and volume.
3. Locations of construction joints.
4. Location of sawn contraction joints if different from those shown on the civil drawings.

I. Pre-Slab Installation Meeting:

1. Provide record of notification of pre-slab meeting including company name, persons contacted, and date and method of contact.
2. Provide meeting minutes to all participants and Engineer of Record including sign-in sheet.

J. Delivery Tickets:

1. Copies of delivery tickets for each load of concrete delivered to site.
2. Indicate information required by ASTM C 94 on each ticket including additional information required for slabs.
3. Information on ticket shall include quantities of material batched including the amount of free water in the aggregate and the quantity of water that can be added at the site without exceeding the maximum water cementitious ratio of the approved mix design. Aggregate moisture corrections shall be based on ASTM definitions of aggregate moisture content and absorption.
4. Mix identification number on ticket shall match number on submitted and approved mix design.
5. Submit copies to Testing Laboratory with each concrete delivery.

K. Installation Certification: Submit certification in writing that final placement is in accordance with specification requirements.

L. Statement of Approval of Concrete Supplier: Submit statement with information specified in Quality Assurance paragraph below.

1.4 QUALITY ASSURANCE

A. Concrete Truck Inspection:

1. Conform to ASTM C94, NRMCA, and Department of Transportation standards in state where project is located.
2. Perform inspections immediately before starting concreting operations.
3. Record acceptable truck numbers.
4. Record the identification numbers of those trucks found to be acceptable on the basis of inspections.
5. Do not bring on site for concreting operations, any truck whose identification numbers are not recorded as acceptable. Notify Testing Lab if non-conforming trucks are used to deliver concrete for slabs and pavements.

B. Tolerances:

1. Conform to most stringent requirements of ACI 117 and ACI 301 except as specified herein.
2. Conform to ACI 117 thickness tolerances for slabs-on-ground.

C. Concrete Supplier Approval:

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1. The concrete supplier shall be fully approved and acceptable by the concrete subcontractor as the producer of concrete for which the subcontractor is to place and finish. Prepare Statement of Approval of Concrete Supplier stating project name, name of concrete supplier, along with the statement of approval and the signatures of the Contractor and concrete pavement subcontractor.
- D. Pre-installation Meeting: Convene a pre-installation meeting at the site at least two weeks prior to commencing work of this Section. Require attendance of parties directly affecting work of this Section, including, but not limited to, the Owner's representative, CTL's representative and inspector, Contractor, concrete sub-contractor and job foreman, concrete supplier, and base fine grading contractor.
1. Contact Engineer of Record Thirty days prior to pre-installation conference to confirm schedule.
 2. Record discussions of meeting and decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. Review foreseeable methods and procedures related to paving work, including the following:
 3. CTL's testing and inspection procedures.
 4. Concrete finishes and finishing.
 5. Cold- and hot-weather concreting procedures.
 6. Curing procedures.
 7. Concrete design mixture and examine procedures for ensuring quality of concrete materials.
 8. Proposed sources of concrete materials, including capabilities and location of plant that will manufacture concrete.
 9. Tour, inspect and discuss condition of subgrade, drainage structures, and other preparatory work.
 10. Requirements for protecting concrete work, including restriction of traffic during installation period and for remainder of construction period.
 11. Review and finalize construction schedule and verify availability of materials.
 12. Concrete paving requirements (drawings, specifications and other contract documents).
 13. Required submittals, both completed and yet to be completed.
 14. Weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
 15. Safety precautions relating to placement of concrete.
 16. Changes to the contract documents from recommendations or discussions at the Pre-Construction meeting shall be approved in writing by the Engineer of Record prior to implementation.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Concreting in Hot, Dry, or Windy Weather:
1. Employ precautions to avoid cracking when the concrete rate of evaporation exceeds 0.1 pounds per square foot per hour or when any combination of concrete materials and weather conditions are favorable for the formation of plastic shrinkage cracks.
 2. Maintain an accurate reading thermometer at the job site to check temperature of concrete.
 3. Reject concrete if more than one slump adjustment, as defined in ASTM C 94, is required.
 4. Do not place concrete when forms, subgrade, aggregate base, or reinforcing bars are more than 120 F or the temperature differential between the forms, aggregate base, or reinforcing bars and concrete will create conditions favorable for settlement cracks or thermal cracking.
- B. Concreting in Cold Weather:
1. Conform to ACI 306.1 when temperature and other environmental conditions are as noted therein.
 2. Subgrade shall be thawed to depth of 12 inches immediately before placing concrete.
 3. Measure and record concrete temperature during protection period in each placement at regular time intervals, but not less than 3 times per 24 hour period.

4. Do not place slabs on subgrade or base that is more than 20°F cooler than concrete. Warm subgrade or base to decrease temperature differential to 20 F or less

1.6 PROJECT CONDITIONS

- A. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects. Use flexible spring steel forms or laminated boards to form radius bends as required. Coat forms with non-staining type of coating that will not discolor or deface surface of concrete.

B. Aggregate Base and Choker Materials:

1. Aggregate Base Material:
 - a. Gradation: Conform to gradation shown on the Civil Drawings.
 - b. Equivalent Gradation: Equivalent gradations may be used upon approval of the Civil Engineer of Record. Submit proposed equivalent gradation to the Architect for approval within 30 days after the award of contract. Equivalent gradation shall be one of the following.
 - 1) Any state DOT approved road base material meeting the following gradation:

<u>Std. Sieve Size</u>	<u>% Passing</u>
No. 1-1/2	100
No. 4	15-55
No. 200	5-12

- 2) Material conforming to the General Requirements and of the Gradation "A", "C", or "D" requirements (with the modified allowance of 5% to 12% passing the No. 200 sieve) as defined by ASTM D1241

2. Aggregate Choker Material: Clean granular fill with less than 3% clay and/or friable particles. Use one of the following gradations:
 - a. ASTM 448 No. 10 with 6% to 12% passing No. 200 sieve.
 - b. Material meeting the following gradation:

<u>Std. Sieve Size</u>	<u>% Passing</u>
No. 4	85-100
No. 8	75-95
No. 16	55-75
No. 50	22-45
No. 100	10-30
No. 200	6-12

C. Reinforcement:

1. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A185. Furnish in flat sheets.
2. Reinforcing Bars: Deformed steel bars, ASTM A615, Grade 60.

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3. Joint Dowel Bars: ASTM A615, grade 40 minimum, smooth round plain steel bars, or ASTM A36, smooth round or square plain steel bars, cut bars true to length with ends square and free of burrs. Epoxy coat per State Highway Department Standard Specifications.
- D. Cementitious Materials:
1. Portland Cement: ASTM C150, Type I, Use only one brand throughout project.
 2. Fly Ash: ASTM C 618, Class C or F. Use only one type and source throughout project.
 3. Slag: ASTM C989, Grade 100 or 120. Use only one type and source throughout project.
- E. Pavement Joint Materials:
1. Joint Back-up Material: Polyethylene foam, 100% closed cell
 2. Soft Preformed Joint Filler: Flexible closed-cell non-extruding synthetic foam expansion joint strips.
 - a. Ceramar Flexibe Foam Expansion Joint, by W.R. Meadows.
 - b. Deck-O-Foam Expansion Joint Filler, by W.R. Meadows
 - c. Expansion Joint Filler, by BASF Building Systems (Degussa) (Formerly Sonneborn Sonolastic).
 3. Sealant:
 - a. Dow 888, by Dow Corning.
 - b. 301 NS by Pecora.
 - c. Spectrum 800 or 900 by Tremco.
- F. Concrete Aggregate:
1. Conform to ASTM C33.
 2. Aggregate shall contain no coal or lignite in concrete that will not be covered by soil.
 3. Fine Aggregate:
 - a. Conform to fine aggregate grading requirements as defined in section 6.1 of ASTM C 33 unless approved by the Civil Engineer.
 - b. If manufactured sand is used, blend with minimum 25% natural sand unless otherwise approved by Civil Engineer.
 4. Coarse Aggregate:
 - a. Nominal maximum coarse aggregate size shall be 1 inch for slabs \leq 5-1/2 inch thick.
 - b. The nominal maximum size of an aggregate is the smallest sieve size through which the major portion of the aggregate must pass, with a minimal amount retained on the maximum sieve size. Maximum 4% shall be retained on the nominal maximum size sieve.
 5. Adjust proportions of combined coarse, intermediate, and fine aggregates to provide the following particle size distribution characteristics, unless otherwise approved:
 - a. Coarseness Factor of 60 to 75%.
 - 1) The Coarseness Factor (CF) is the percent of combined aggregate retained on the #8 sieve that is also retained on the 3/8" sieve.
 - 2) The Coarseness Factor is calculated as follows:
 - 3) $CF = \text{Aggregate retained on } 3/8" \text{ sieve} / \text{Aggregate retained on } \#8 \text{ sieve.}$
 - b. Adjusted Workability Factor
 - 1) The Workability Factor (WF) is the percent of combined aggregate that passes the #8 sieve.
 - 2) The Adjusted Workability Factor (Adj-WF) is calculated as follows:
 - 3) $\text{Adj-WF} = WF + [(\text{Cementitious Material} - 564 \text{ lbs.}) / 37.6]$
 - 4) The range of accepted Adj-WF for a given CF is as follows:
 - 5) $\text{Adj-WF} = [(11.25 - .15 \text{ CF}) + 33] \pm 2.5$
 - 6) Combined percent retained on any given sieve size shall not exceed 24%.
 6. Gradation requirement of ASTM C33 may be waived in order to meet ranges specified.

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- G. Water: ASTM C 1602.
- H. Air Entrainment: ASTM C260.
 - 1. Air-Mix or AEA-92, by Euclid.
 - 2. MB-VR MB-AE 90, or Micro-Air, BASF.
 - 3. Daravair or Darex Series, by W.R. Grace.
 - 4. Equivalent approved products.
- I. Evaporation Retardant: Water-based polymer, sprayable.
 - 1. Euco-Bar, by Euclid
 - 2. Confilm, by BASF Admixtures (Master Builders)
 - 3. Aquafilm, by Dayton Superior.
- J. Liquid Membrane Curing and Sealing Compound: ASTM C 1315, Type I, Class A or B, 25% minimum solids content, clear non-yellowing with no styrene-butadiene.
 - 1. Water Based, VOC less than 350 g/l:
 - a. Super Aqua Cure, by Euclid Chemical Corp.
 - b. Kure 1315 by BASF.
 - 2. Solvent Based (For use below 40F)
 - a. Super Rez-Seal, by Euclid Chemical Corp.
 - b. Kure-N-Seal 30 by BASF.
- K. Dissipating Curing Compound (For use below 40F): ASTM C 309 Type 1, Class A or B.
 - 1. Solvent base, VOC less than 350 g/l: Cetri Vex EnvioCure 100 by Vexcon.

2.2 CONCRETE MIX

- A. Design mix shall produce normal weight concrete consisting of Portland cement, supplementary cementitious materials, aggregates, admixtures, and water to produce specified requirements.
- B. Geographical Weather Exposure Classification: Reference IBC Figure 1904.2.2. Uncertainty of classification due to a project location near a border of a classification shall be referred to Engineer of Record for clarification.
- C. Compressive Strength at 28 days, unless otherwise indicated on the Drawings:
 - 1. Negligible exposure classification: 3,500 psi with a maximum water-cementitious ratio of 0.53.
 - 2. Moderate exposure classification: 4,000 psi with a maximum water-cementitious ratio of 0.48.
 - 3. Severe exposure classification: 4,500 psi with a maximum water-cementitious ratio of 0.45.
- D. Slump Range: 2"-4" for hand placed concrete, 1-1/4" to 3" for machine placed (slipform) concrete.
- E. Air Entrainment as shown below:

Nominal Maximum Size Aggregate (Inch)	Average Air Content (%)		
	Negligible	Moderate	Severe
3/8	4.5	6.0	7.5
1/2	4.0	5.5	7.0
3/4	3.5	5.0	6.0

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1	3.0	4.5	6.0
1-1/2	2.5	4.5	5.5

F. Supplementary Cementitious Materials (SCM):

1. Concrete mix shall contain SCM at the amounts specified unless other amounts are approved by the Civil Engineer. Either fly ash or ground granulated blast furnace slag (GGBFS) may be used for the SCM but shall not be used together to form a ternary mix. Use of fly ash or GGBFS in the concrete mix is mandatory.
2. Fly Ash: Substitute fly ash for Portland cement at 15% of the total cementitious content.
 - a. If used to mitigate potential aggregate reactivity, only Type F fly ash may be used and shall have the following maximum properties: 1.5% available alkali and 8.0% CaO. When a maximum of 25% replacement is used, up to 10.0% CaO is permitted.
3. Ground Granulated Blast Furnace Slag (GGBFS): Substitute GGBFS for Portland cement at 20% of the total cementitious content.
 - a. If required to mitigate potential sulfate exposure or aggregate reactivity, up to 50% substitution of Portland cement is allowed.
4. Maintain air-entrainment at specified levels.

G. Calcium Chloride:

1. Calcium chloride (Type L) may be used in solution form as part of the mixing water to accelerate concrete setting and early-strength development.
2. Amount of calcium chloride added shall not be more than necessary to produce the desired results and shall not exceed 2% by weight of cement.
3. The dosage range for the calcium chloride for the entire project shall not vary by more than 1%. Range is defined as the difference between the maximum and minimum dosages of calcium chloride for the entire project.
4. Calcium chloride shall not be used in the following applications unless approved by the Civil Engineer:
 - a. concrete containing embedded dissimilar metals or aluminum
 - b. slabs supported on permanent galvanized steel forms
 - c. concrete exposed to deicing chemicals
 - d. prestressed or post-tension concrete
 - e. concrete containing aggregates with potentially deleterious reactivity and concrete exposed to soil
 - f. concrete exposed to soil or water containing sulfates.
5. Use calcium chloride in accordance with manufacturer's recommendation.
6. Chloride-ion Concentration: Maximum water-soluble chloride-ion concentrations in hardened concrete at ages from 28 to 42 days contributed from the ingredients including water, aggregates, cementitious materials, and admixtures shall not exceed the following limits unless approved by the Civil Engineer:

Type of Member	Maximum water-soluble chloride ion (Cl-) content in concrete (percent by weight of cement)
Prestressed concrete	0.06
Reinforced concrete exposed to chloride in service	0.15
Reinforced concrete that will be dry or protected from moisture in service	1.00
Other reinforced concrete construction	0.30
7. When using calcium chloride or other admixtures containing chlorides, measure water-soluble chloride-ion content (percent by weight of cement) per ASTM C 1218. Sample shall be from concrete representing the submitted mix design and maximum chloride dosage anticipated for the project.

2.3 MIXING

- A. Mix concrete and deliver in accordance with ASTM C 94.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Proofroll prepared base material surface to check for unstable areas in accordance with Section 02300 including documentation and re-proof rolling as required. Paving work shall begin only after unsuitable areas have been corrected and are ready to receive paving.
- B. Remove loose material from compacted base material surface to produce firm, smooth surface immediately before placing concrete.

3.2 AGGREGATE BASE PLACEMENT

- A. Unless otherwise specified on the Drawings, place aggregate base as specified herein.
- B. Aggregate Base:
 - 1. Install aggregate base where shown on Drawings.
 - 2. Compact to final thickness shown in layers not exceeding 6 inches with minimum of 2 passes per layer with vibratory compactor.
 - 3. Compact fill to 98% of aggregate's Standard Proctor as determined by Method D of ASTM D698.
 - 4. Leave base up to 2 inches low until just prior to concrete placement.
- C. Aggregate Base Fine Grading:
 - 1. Compact to final thickness shown with 2 passes minimum vibratory compactor to produce smooth, flat, dense surface.
 - 2. Do not allow excess moisture in or on base at time of placing concrete.
 - 3. Level off aggregate base top surface with a maximum 3/4" thick aggregate choker material to achieve the following:
 - a. To reduce surface friction and to meet specified fine grade tolerances specified below.
 - b. To level areas exposed to rain, traffic, or excavations for buried utilities.
 - c. At areas where aggregate base material does not have sufficient fine particles to produce a surface that is free of exposed aggregate or surface voids greater than 3/8" in size at time of slab installation.
 - 4. Construction Testing Laboratory shall verify adequate fines at surface immediately prior to concrete slab placement.
 - 5. Provide dry, smooth, flat, dense surface
 - 6. Proof-roll 48 hrs. maximum prior to concrete placement. Depression under a fully loaded ready mix truck shall not exceed 1/2 inch.
- D. Pavement Aggregate Base Fine Grade Tolerance: +0 inch, -3/4 inch with transition no greater than 3/4 inch vertically to 8 inches horizontally.

3.3 INSTALLATION

- A. Form Construction
 - 1. Set forms to required grades and lines, rigidly braced and secured.

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2. Install sufficient quantity of forms to allow continuance of work and so that forms remain in place minimum of 24 hours after concrete placement.
 3. Check completed formwork for grade and alignment to following tolerances:
 - a. Top of forms not more than 1/8-inch in 10'-0".
 - b. Vertical face on longitudinal axis, not more than 1/4-inch in 10'-0".
 4. Clean forms after each use and coat with form release agent as often as required to ensure separation from concrete without damage.
- B. Reinforcement: Fasten reinforcing bars or welded wire fabric (if required) accurately and securely in place with suitable supports and ties. Remove from reinforcement all dirt, oil, loose mill scale, rust, and other substances that will prevent proper bonding of the concrete to the reinforcement.
- C. Concrete Placement
1. Mix and place concrete when the air temperature in the shade and away from artificial heat is a minimum of 35 degrees F and rising. Hot and cold weather concreting shall be in accordance with ACI 305.1 (hot weather) and 306.1 (cold weather).
 2. Do not place concrete until base material and forms have been checked for alignment and grade. Concrete shall not be placed around manholes or other structures until they are at required finish elevation and alignment.
 3. Place concrete using methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.
 4. Deposit and spread concrete in continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place construction joint.
- D. Contraction and Construction Joints: Construct contraction and construction joints straight with face perpendicular to concrete surface. Construct transverse joints perpendicular to centerline, unless otherwise detailed.
1. Contraction Joints: Provide joints at spacing of 12'-0" on centers, maximum each way. Construct control joints for depth equal to at least 1/4 of the concrete thickness, as follows:
 - a. Form tooled joints in fresh concrete by grooving top with recommended tool and finishing edge with jointer.
 - b. Sawed Contraction Joints:
 - 1) Use saws, blades, skid plates, and accessories by Soff-Cut International, Inc. or approved equal.
 - 2) Start cutting sawed joints as soon as concrete has hardened sufficiently to prevent raveling or dislodging of aggregates. This will typically be from 1 hour in hot weather to 4 hours in cold weather after completing finishing of slab in that joint location.
 - 3) Provide at least two "Soff-Cut" saws on site with blades capable of achieving the required depth of saw cut.
 - 4) Extend sawed joint to the slab boundaries and abutments, including columns, drains, and other penetrations in the path of a defined joint. Implement methods and timing of the saw cut beyond the limits of the Soff-Cut saw reach to provide a consistent depth of cut with minimal raveling of joint edges.
 2. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for period of more than 1/2 hour. Construct joints in accordance with details shown.
- E. Isolation and Fixed Object Joints: Construct joint at locations and in accordance with details shown.

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- F. Pavement Joint Materials: Place joint fillers, back-up material, and sealants at locations shown and in accordance with manufacturer's instructions.
 - 1. Soft Preformed Joint Fillers: Extend preformed joint fillers full-width and depth of joint, and not less than 1/2-inch or more than 1-inch below finished surface. Furnish preformed joint fillers in 1-piece lengths for full width being placed, wherever possible. Where more than 1 length is required, lace or clip preformed joint filler sections together in a single plane.

3.4 CONCRETE FINISHING

- A. After initial striking off and consolidating of concrete paving, smooth surface using either magnesium straight edge, wood, or magnesium channel float.
- B. Round edges of slabs and formed joints to 1/2-inch radius with edging tool. Eliminate tool marks on concrete surface.
- C. After completion of straightedge / floating and when excess moisture or surface sheen has disappeared, uniformly finish surface to provide a coarse, nonslip finish by scoring surface with stiff-bristled broom perpendicular to flow of traffic so as to produce regular corrugations not over 1/16 of an inch deep. Initial nonslip finishing shall be approved by the Engineer of Record.
- D. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point up minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Owner.

3.5 CURING AND PROTECTION

- A. Protect and cure finished concrete paving using curing compound. Cure for a period not less than 7 days.
- B. Use solvent based curing compound when compound is applied below 40 F.

3.6 CLEANING AND ADJUSTING

- A. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just prior to final inspection.
- B. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials.

3.7 FIELD QUALITY CONTROL

- A. Field quality control shall be the responsibility of the Contractor. Except for specified mandatory testing, field quality control testing and inspection shall be at the discretion of the Contractor as necessary to assure compliance with Contract requirements. Owner T&I shall not be considered a substitute for the Contractor's responsibility to perform similar routine, necessary, and customary testing and inspection of the methods and frequency suitable for the type of work involved.
- B. Responsibilities and Duties Relative Testing Lab and Inspection:
 - 1. Notify CTL in advance of concrete placements to allow sufficient time to prepare for a site visit.
 - 2. Assist CTL in securing field specimens.

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3. Provide and maintain for sole use of CTL, facilities for safe storage and proper curing of concrete test cylinders at project site as required by ASTM C31 and acceptable to Testing Laboratory.
- C. Correction of Deficient Work:
1. When directed by the Owner, remove and replace or repair concrete and related Work which does not conform to specified requirements including strength, tolerances, and finishes.
 2. Bear cost of corrections or delays to other work affected by, or resulting from, corrections to concrete Work.
 3. If results of compressive strength tests reveal deficiencies in concrete, meet requirements of ACI 318 and ACI 301.
- D. The testing and inspection shall be as follows:
1. One day when pavement placement begins.
 2. One day when pavement placement is approximately 25% complete.
 3. One day when pavement placement is approximately 50% complete.
- E. Field testing, observation, and inspection shall be conducted only during the periodic site visits.
1. Number of tests to be taken at each site visit shall be the test frequencies stated based on quantities or occurrences only as it occurs during each periodic visit.
 2. In addition, at least one specified test shall be conducted on work being placed during each periodic visit.
- F. Field testing, frequency, and methods may vary as determined by and between the Owner and the Testing Laboratory.
- G. Review the Contractor's proposed materials and mix design for conformance with specifications.
- H. Perform testing in accordance with ACI 301 and testing standards listed herein.
- I. Strength Tests:
1. Secure composite samples in accordance with ASTM C172. Sample at regularly spaced intervals from middle portion of the batch. Sampling time shall not exceed 15 minutes.
 2. Mold and cure specimens in accordance with ASTM C31.
 - a. A minimum of four concrete test cylinders shall be taken for every 100 cubic yards or less of each class of concrete placed each day and not less than once for each 5000 square feet of paved area.
 - b. During the initial 24 hours (plus or minus 8 hours) after molding, the temperature immediately adjacent to the specimens shall be maintained in the range of 60 to 80 degrees F. Control loss of moisture from the specimens by shielding from the direct rays of the sun and from radiant heating devices.
 - c. Specimens transported prior to 48 hours after molding shall not be demolded, but shall continue initial curing at 60 to 80 degrees F until time for transporting.
 - d. Specimens transported after 48 hours age shall be demolded in 24 hours (plus or minus 8 hours). Curing shall then be continued but in saturated limewater at 73.4 degrees (plus or minus 3 degrees F) until the time of transporting.
 - e. Wet cure cylinders under controlled temperature until testing.
 3. Test cylinders in accordance with ASTM C39.
 - a. Size of specimen test cylinder shall be 6" x 12" or 4" x 8".
 - b. Date test cylinders and number consecutively. Give each cylinder of each set an identifying letter (i.e. A, B, C, D). Prepare a sketch of the site plan for each test set identifying location of placed concrete.

- c. Test one cylinder (A) at 7 days for information..
 - d. Test two cylinders (B and C) at 28 days and the average of the breaks shall constitute the compressive strength of the concrete sample.
 - e. Retain fourth cylinder (D) for further testing if needed, but do not retain cylinder more than 90 days.
4. Evaluation and Acceptance:
- a. Strength level of concrete will be considered satisfactory if the average of all sets of three consecutive strength tests equal or exceed specified strength and no individual strength test (average of two cylinders) results are below specified compressive strength by more than 500 psi.
 - b. Complete concrete work will not be accepted unless requirements of ACI 301, have been met, including dimensional tolerances, appearance, and strength of structure.
 - c. Where average strength of cylinders, as shown by tests is not satisfactory, Owner reserves the right to require Contractor to provide improved curing conditions of temperature and moisture to secure required strength. If average strength of laboratory control cylinders should fall so low as to cause portions of structure to be in question by Owner, follow core procedure set forth in ASTM C42. If results of core test indicate, in opinion of Owner, that strength of structure is inadequate, provide without additional cost to Owner, replacement, load testing, or strengthening as may be ordered by Owner. If core tests are so ordered and results of such tests disclose that strength of structure is as required, cost of test will be paid by Owner.
- J. Slump Test: Conduct slump test for each cylinder set taken in accordance with ASTM C143. Make additional slump tests for every other load from a stationary mixer or truck to test consistency. Sampling shall be in accordance with ASTM C172.
- K. Air Content: Conduct air content test for each cylinder set for concrete in accordance with ASTM C 231, ASTM C 173, or ASTM C 138. Indicate test method on report. Make test at same time as slump test.
- 1. Perform air content test for first and second truck for each class of concrete placed each day. If either test fails, perform air test on every truck until two consecutive air tests comply with the requirements of the project specifications.
- L. Unit Weight: ASTM C 138.
- M. Temperature Test: Conduct temperature test for each cylinder set taken in accordance with ASTM C1064. Test hourly when air temperature is 40 F and below or 80 F and above. Determine temperature of concrete sample and ambient air for each strength test.
- N. In addition to required information noted previously in this Section, record the following information on concrete compression reports:
- 1. Test cylinder number and letter.
 - 2. Specific foundations or structures covered by this test.
 - 3. Proportions of concrete mix or mix identification.
 - 4. Maximum size coarse aggregate.
 - 5. Specified compressive strength.
 - 6. Tested compressive strength.
 - 7. Slump, air-content.
 - 8. Concrete plastic unit weight.
 - 9. Concrete Temperature.
 - 10. Elapsed time from batching at plant to discharge from delivery truck at project.
 - 11. Date and time concrete was placed.

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12. Ambient temperature, wind speed, and relative humidity during concrete placement.
 13. Name of technician securing samples.
 14. Curing conditions for concrete strength test specimens (field and laboratory).
 15. Date strength specimens transported to laboratory.
 16. Age of strength specimens when tested.
 17. Type of fracture during test.
- O. At the start of each day's mixing, report any significant deviations from approved mix design including temperature, moisture and condition of aggregate.
- P. Review each delivery ticket of concrete. Report type of concrete delivered, amount of water added and time at which cement and aggregate were loaded into truck, and time at which concrete was discharged from truck
- Q. In Place Pavement Testing:
1. Randomly core pavement during periodic site visits. Sampling shall be performed at the rate of one sample per 1000 sq. yds., or fraction thereof, of pavement placed during the absence of the CTL. Sample and test cores in accordance with ASTM C42. Core will be tested for thickness and quality of aggregate distribution. Core holes shall be patched by the Contractor immediately with Portland cement concrete and shall be finished to provide level surface as specified herein.
 2. Establish and maintain required lines and elevations.
 3. Check surface areas at intervals necessary to eliminate ponding areas.
- R. Additional Tests: Additional in-place tests shall be conducted as directed by the Engineer of Record when specified concrete strengths and other characteristics have not been attained in the structures.

END OF SECTION

UniSpec – Civil (Master Site Specifications)

SECTION 02765 (32 1723) - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Painting and marking of pavements, curbs, guard posts, and light pole bases.

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.

B. American Association of State Highway and Transportation (AASHTO):

1. AASHTO M247 - Glass Beads Used in Traffic Paints
2. AASHTO M248 - Ready-Mixed White and Yellow Traffic Paints

C. ASTM International (ASTM):

1. ASTM D4414 - Standard Practice for Measurement of Wet Film Thickness by Notched Gauges.

D. Federal Specifications (FS):

1. FS A-A-2886 - Paint, Traffic, Solvent Based (supersedes FS TT-P-85 and FS TT-P-115, Type I)
2. FS TT-B-1325 - Beads (Glass Spheres) Retro-Reflective
3. FS TT-P-1952 - Paint, Traffic And Airfield Marking, Waterborne

1.3 PROJECT CONDITIONS

- A. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize flagmen, barricades, warning signs, and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Paint shall be waterborne or solvent borne, colors as shown or specified herein. Pavement marking paints shall comply with applicable state and local laws enacted to ensure compliance with Federal Clean Air Standards. Paint materials shall conform to the restrictions of the local Air Pollution Control District.

- B. Waterborne Paint: Paints shall conform to FS TT-P-1952.

- C. Solvent Borne Paint: Paint shall conform to FS A-A-2886 or AASHTO M248. Paint shall be non-bleeding, quick-drying, and alkyd petroleum base paint suitable for traffic-bearing surface and be mixed in accordance with manufacturer's instructions before application for colors White, Yellow, Blue, and Red.

- D. Glass Beads: AASHTO M 247, Type 1 or FS TT-B-1325, Type 1, Gradation A.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the work area and correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Sweep and clean surface to eliminate loose material and dust.
- B. Where existing pavement markings are indicated on Construction Drawings to be removed or would interfere with adhesion of new paint, a motorized abrasive device shall be used to remove the markings. Equipment employed shall not damage existing paving or create surfaces hazardous to vehicle or pedestrian traffic. Within public rights-of-way, appropriate governing authority shall approve method of marking removal.
- C. New pavement surfaces shall be allowed to cure for not less than 30 days before application of marking materials.

3.3 CLEANING EXISTING PAVEMENT MARKINGS

- A. Remove existing pavement markings which are in good condition but interfere or conflict with the newly applied marking patterns. Deteriorated or obscured markings that are not misleading or confusing or do not interfere with the adhesion of the new marking material do not require removal. Conduct grinding, scraping, sandblasting or other operations in such a manner that the finished pavement surface is not damaged or left in a pattern that is misleading or confusing. Use dust collection system when pavement preparation includes grinding, scraping or sandblasting of existing pavement markings.

3.4 APPLICATION

- A. Apply two coats of same color of paint as specified below, at manufacturer's recommended rate, without addition of thinner, with maximum of 100 square feet per gallon or as required to provide a minimum wet film thickness of 15 mils and dry film thickness of 7 ½ mils per coat. Paint shall be applied for a total dry film thickness of 15 mils. Apply with mechanical equipment to produce uniform straight edges. At sidewalk curbs and crosswalks, use straightedge to ensure uniform, clean, and straight stripe.
- B. Install pavement markings according to manufacturer's recommended procedures for the specified material.
- C. Following items shall be painted with colors noted below:
 - 1. Pedestrian Crosswalks: White
 - 2. Exterior Sidewalk Curbs, Light Pole Bases, and Guard posts: Yellow
 - 3. Fire Lanes: Red or per local code
 - 4. Lane Striping where separating traffic moving in opposite directions: Yellow
 - 5. Lane Striping where separating traffic moving in the same direction: White
 - 6. ADA Symbols: Blue or per local code
 - 7. ADA parking space markings as shown on the drawings.
 - 8. Parking Stall Striping: Yellow, unless otherwise noted on Construction Drawings
 - 9. Associate Parking Area: White, unless otherwise noted on Construction Drawings
- D. Apply glass beads at pedestrian crosswalk striping and at lane striping and arrows at driveways connecting to public streets. Broadcast glass beads uniformly into wet markings at a rate of 6 lb/gal.

3.5 FIELD QUALITY CONTROL

- A. Field quality control shall be the responsibility of the Contractor. Field quality control testing and inspection shall be at the discretion of the Contractor as necessary to assure compliance with Contract requirements.

3.6 CLEANING

- A. Waste materials shall be removed at the end of each workday. Upon completion of the work, all containers and debris shall be removed from the site. Paint spots upon adjacent surfaces shall be carefully removed by approved procedures that will not damage the surfaces and the entire job left clean and acceptable.

END OF SECTION

SECTION 02770 (32 1600) - CURBS AND SIDEWALKS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Portland cement concrete curbs, gutters, and sidewalks except sidewalks adjacent to building.

B. Related Requirements:

1. Section 02300 - Earthwork: Preparation of subgrades.

1.2 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.

B. American Concrete Institute (ACI):

1. ACI 305R - Hot Weather Concreting
2. ACI 306R - Cold Weather Concreting
3. ACI 306.1 - Cold Weather Concreting.
4. ACI 308 - Curing Concrete

C. ASTM International (ASTM):

1. ASTM A185 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
2. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.
3. ASTM C31 - Making and Curing Concrete Test Specimens in the Field.
4. ASTM C39 - Comprehensive Strength of Cylindrical Concrete Specimens.
5. ASTM C42 - Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
6. ASTM C94 - Ready-Mixed Concrete.
7. ASTM C138 - Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
8. ASTM C143 - Slump of Hydraulic Cement Concrete.
9. ASTM C231 - Air-Content of Freshly Mixed Concrete by the Pressure Method.
10. ASTM C172 - Sampling Freshly Mixed Concrete.
11. ASTM C173 - Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
12. ASTM C260 - Air-Entraining Admixtures for Concrete.
13. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
14. ASTM C618 - Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete.
15. ASTM C989 - Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
16. ASTM C1064 - Temperature of Freshly Mixed Portland Concrete Cement.
17. ASTM C1218 - Water-Soluble Chloride in Mortar and Concrete.
18. ASTM D98 - Calcium Chloride.
19. ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous).
20. ASTM D1190 - Concrete Joint Sealer, Hot Poured, Elastic Type.
21. ASTM D1751 - Performed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
22. ASTM D2628 - Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.

D. Federal Specifications (FS):

1. FS HH-F-341 - Fillers, Expansion Joint: Bituminous (Asphalt & Tar)

E. State Highway Department Standard Specifications

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1.3 SUBMITTALS

A. Mix Design:

1. Submit three copies of each proposed mix.
2. Submit separate mix design for concrete to be placed by pumping in addition to the mix design for concrete to be placed directly from the truck chute.
3. Submit mix design to the Civil Engineering Consultant of Record and the Construction Testing Laboratory.
4. Include applicable information and the following:
 - a. Proportions of cementitious materials, fine and coarse aggregate, and water.
 - b. Water-cementitious material ratio, 28-day compressive design strength, slump, and air content.
 - c. Type of cement, fly ash, slag and aggregate.
 - d. Aggregate gradation.
 - e. Type and dosage of admixtures.
 - f. Special requirements for pumping.
 - g. Range of ambient temperature and humidity for which design is valid.
 - h. Special characteristics of mix which require precautions in mixing, placing, or finishing techniques to achieve finished product specified.
 - i. Materials and methods for curing concrete.

B. Submit certified laboratory test data or manufacturer's certificates and data for the items listed below certifying that materials are in conformance requirements specified herein. Submit to the Engineering Consultant of Record and the Construction Testing Laboratory for review and approval and within 7 calendar days after receipt of Notice-to-Proceed.

1. Concrete mix design(s)
2. Type and source of Portland cement, fly ash, and slag
3. Aggregate gradations
4. Preformed expansion joint filler
5. Field molded/poured sealant
6. Dowel bars
7. Expansion sleeves
8. Tie bars
9. Reinforcing steel bars
10. Welded wire fabric
11. Air entraining admixtures
12. Water-reducing, set-retarding and set-accelerating admixtures (if used)

C. Test Reports: Submit field quality control test reports.

1.4 PROJECT CONDITIONS

- #### A. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

- #### A. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects. Use flexible spring steel forms or laminated boards to form radius bends as required. Forms shall be of depth equal to depth of curbing or sidewalk, and so designed as to permit secure fastening together at tops. Coat forms with non-staining type of coating that will not discolor or deface surface of concrete.
- #### B. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A185. Furnish in flat sheets.

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- C. Reinforcing Steel: Deformed steel bars, ASTM A615, Grade 60.
- D. Portland Cement: Shall conform to ASTM C150, Type I.
- E. Fly Ash: ASTM C618, Class C or F. Use only one type and source throughout project.
- F. Slag: ASTM C989, Grade 100 or 120. Use only one type and source throughout project.
- G. Exterior Pavement Joint Materials
 - 1. Joint Back-up Material: Polyethylene foam, 100% closed cell.
 - 2. Sealant:
 - a. Dow 888, by Dow Corning.
 - b. 301 NS by Pecora.
 - c. Spectrum 800 or 900 by Tremco.
- H. Aggregate: ASTM C33.
- I. Water: Clean and potable
- J. Dowel Bars: ASTM A615, grade 60, and plain steel bars.
- K. Air Entrainment: ASTM C260. .
 - 1. Air-Mix or AEA-92, by Euclid Chemical Corp.
 - 2. MB-VR MB-AE 90, or Micro-Air, by BASF.
 - 3. Daravair or Darex Series, by W.R. Grace.
 - 4. Equivalent approved products.
- L. Liquid Membrane Curing and Sealing Compound: ASTM C1315, Type I, Class A or B, 25% minimum solids content, clear non-yellowing with no styrene-butadiene.
 - 1. Water Based, VOC less than 350 g/l:
 - a. Super Aqua Cure, by Euclid Chemical Corp.
 - b. Kure 1315 by BASF.
 - 2. Solvent Based
 - a. Super Rez-Seal, by Euclid Chemical Corp.
 - b. Kure-N-Seal 30 by BASF.
- M. Dissipating Curing Compound: ASTM C309 Type 1, Class A or B.
 - 1. Solvent base, VOC less than 350 g/l: Cetri Vex EnvioCure 100 by Vexcon.

2.2 CONCRETE MIXING

- A. Mix concrete and deliver in accordance with ASTM C94. Design mix shall produce normal weight concrete consisting of Portland cement, supplementary cementitious materials, aggregates, admixtures and water to produce the following:
 - 1. Compressive Strength: 3,500 psi minimum at 28 days unless otherwise indicated on the Drawings.
 - 2. Slump Range: 2"-4" for hand placed concrete, 1-1/4" to 3" for machine placed (slipform) concrete.
 - 3. Air Entrainment: 5 to 8 percent.
- B. Supplementary Cementitious Materials (SCM):
 - 1. Concrete mix shall contain SCM at the amounts specified unless other amounts are approved by the Civil Engineer. Either fly ash or ground granulated blast furnace slag (GGBFS) may be used for the SCM but shall not be used together to form a ternary mix. Use of fly ash or GGBFS in the concrete mix is mandatory.
 - 2. Fly Ash: Substitute fly ash for Portland cement at 15% of the total cementitious content.

- a. If used to mitigate potential aggregate reactivity, only Type F fly ash may be used and shall have the following maximum properties: 1.5% available alkali and 8.0% CaO. When a maximum of 25% replacement is used, up to 10.0% CaO is permitted.
 - 3. Ground Granulated Blast Furnace Slag (GGBFS): Substitute GGBFS for Portland cement at 20% of the total cementitious content.
 - a. If required to mitigate potential sulfate exposure or aggregate reactivity, up to 50% substitution of Portland cement is allowed.
 - 4. Maintain air-entrainment at specified levels.
- C. Calcium chloride:
- 1. Calcium chloride (Type L) may be used in solution form as part of the mixing water to accelerate concrete setting and early-strength development.
 - a. Amount of calcium chloride added shall not be more than necessary to produce the desired results and shall not exceed 2% by weight of cement.
 - b. The dosage range for the calcium chloride for the entire project shall not vary by more than 1%. Range is defined as the difference between the maximum and minimum dosages of calcium chloride for the entire project.
 - c. Calcium chloride shall not be used in the following applications unless approved by the Civil Engineer:
 - 1) concrete containing embedded dissimilar metals or aluminum
 - 2) slabs supported on permanent galvanized steel forms
 - 3) concrete exposed to deicing chemicals
 - 4) prestressed or post-tension concrete
 - 5) concrete containing aggregates with potentially deleterious reactivity and concrete exposed to soil
 - 6) concrete exposed to soil or water containing sulfates.
 - 2. Use calcium chloride in accordance with manufacturer's recommendation.
 - 3. Chloride-ion Concentration:
 - a. Maximum water-soluble chloride-ion concentrations in hardened concrete at ages from 28 to 42 days contributed from the ingredients including water, aggregates, cementitious material, and admixtures shall not exceed the following limits unless approved by the Civil Engineer:

Type of Member	Maximum water-soluble chloride ion (Cl-) content in concrete (percent by weight of cement)
Prestressed concrete	0.06
Reinforced concrete exposed to chloride in service	0.15
Reinforced concrete that will be dry or protected from moisture in service	1.00
Other reinforced concrete construction	0.30

- 4. When using calcium chloride or other admixtures containing chlorides, measure water-soluble chloride-ion content (percent by weight of cementitious materials) per ASTM C1218. Sample shall be from concrete representing the submitted mix design and maximum chloride dosage anticipated for the project.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Begin paving work only after unsuitable areas have been corrected and are ready to receive paving.
- B. Remove loose material from compacted base material surface to produce firm, smooth surface immediately before placing concrete.

3.2 INSTALLATION

- A. Form Construction

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1. Set forms to required grades and lines, rigidly braced and secured.
2. Install sufficient quantity of forms to allow continuance of work and so that forms remain in place minimum of 24 hours after concrete placement.
3. Check completed formwork for grade and alignment to following tolerances:
 - a. Top of forms not more than 1/8-inch in 10'-0".
 - b. Vertical face on longitudinal axis, not more than 1/4-inch in 10'-0".
4. Clean forms after each use and coat with form release agent as often as required to ensure separation from concrete without damage.

B. Reinforcement: Fasten reinforcing bars or welded wire fabric (if required) accurately and securely in place with suitable supports and ties. Remove from reinforcement all dirt, oil, loose mill scale, rust, and other substances that will prevent proper bonding of the concrete to the reinforcement.

C. Concrete Placement

1. Concrete shall be mixed and placed when the air temperature in the shade and away from artificial heat is a minimum of 35 degrees F and rising. Hot and cold weather concreting shall be in accordance with ACI 305R (hot weather) and 306.1 and 306R (cold weather). Do not place concrete until base material and forms have been checked for line and grade. Moisten base material if required to provide uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until set at required finish elevation and alignment.
2. Place concrete using methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.
3. Deposit and spread concrete in continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place construction joint. Automatic machine may be used for curb and gutter placement. Machine placement shall be at required cross section, line, grade, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified herein.

D. Joint Construction

1. Contraction Joints: Construct concrete curb or combination concrete curb and gutter, where specified on Construction Drawings, in uniform sections of length specified on Construction Drawings. Form joints between sections either by steel templates, 1/8-inch in thickness, of length equal to width of curb and gutter, and with depth which will penetrate at least 2-inches below surface of curb and gutter; or with 3/4-inch thick performed expansion joint filler cut to exact cross section of curb and gutter; or by sawing to depth of at least 2-inches while concrete is between 4 and 24 hours old. If steel templates are used, they shall be left in place until concrete has set enough to hold its shape, but shall be removed while forms are still in place.
2. Longitudinal Construction Joints: Tie concrete curb or combination concrete curb and gutter, where specified on Construction Drawings, to concrete pavement with 1/2-inch round deformed reinforcement bars of length and spacing shown on Construction Drawings.
3. Transverse Expansion Joints: Concrete curb, combination concrete curb and gutter, or concrete sidewalk shall have filler cut to exact cross section of curb, gutter, or sidewalk. Joints shall be similar to type of expansion joint used in adjacent pavement.

E. Joint Fillers: Extend joint fillers full-width and depth of joint, and not less than 1/2-inch or more than 1-inch below finished surface where joint sealer is indicated. Furnish joint fillers in 1-piece lengths for full width being placed, wherever possible. Where more than 1 length is required, lace or clip joint filler sections together.

F. Joint Sealants: Install in accordance with manufacturer's recommendations.

3.3 CONCRETE FINISHING

A. After striking off and consolidating concrete, smooth surface by screeding and floating. Adjust floating to compact surface and produce uniform texture. After floating, test surface for trueness with 10'-0" straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide continuous smooth finish.

- B. Work edges of sidewalks, gutters, back top edge of curb, and formed joints with edging tool, rounding edge to 1/2-inch radius. Eliminate tool marks on concrete surface. After completion of floating and trowelling, when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
 - 1. Curbs, gutters, and sidewalks: Broom finish by drawing fine-hair broom across surface perpendicular to flow of traffic. Repeat operation as necessary to produce fine line texture.
- C. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point up minor honeycombed areas. Remove and replace areas or sections with major defects as directed Owner.
- D. Check surface areas at intervals necessary to eliminate ponding areas. Remove and replace unacceptable work as directed by Owner.

3.4 CURING AND PROTECTION

- A. Protect and cure finished concrete paving using with curing compound or with acceptable moist-curing methods in accordance with "water-curing" section of ACI 308. Cure for a period not less than 7 days.
- B. Use solvent based curing compound when compound is applied below 40 F.

3.5 BACKFILL

- A. After concrete has set sufficiently, spaces on either side of concrete curb, combination concrete curb and gutter, or concrete sidewalk shall be refilled to required elevation with suitable material compacted in accordance with Section 02300.

3.6 CLEANING AND PROTECTION

- A. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just prior to final inspection.
- B. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials.

3.7 FIELD QUALITY CONTROL

- A. Field quality control shall be the responsibility of the Contractor. Field quality control testing and inspection shall be at the discretion of the Contractor as necessary to assure compliance with Contract requirements.

END OF SECTION

SECTION 02787 (32 1236) - SEAL COAT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Seal coats using a polymer-modified asphalt emulsion blended with fine aggregate.

B. Related Requirements:

1. Section 02740 – Asphaltic Concrete Paving.
2. Section 02765 – Pavement Marking

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.

B. ASTM International (ASTM)

1. ASTM C 136 – Method of Sieve Analysis of Fine and Coarse Aggregate
2. ASTM D 217 – Method for Cone Penetration of Lubricating Grease
3. ASTM D 244 – Test Methods for Emulsified Asphalts
4. ASTM D 562 – Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer
5. ASTM D 977 – Emulsified Asphalt
6. ASTM D 2397 – Cationic Emulsified Asphalt
7. ASTM D 2042 – Method for solubility of Asphalt Materials in Trichloroethylene
8. ASTM D 3910 – Practice for Design, Testing, and Construction of Slurry Seal
9. ASTM D 6690 – Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Convene a pre-installation meeting at the site at least two weeks prior to commencing work of this Section. Require attendance of parties directly affecting work of this Section, including, but not limited to, the Owner's representative, CTL's representative and inspector, Contractor, and job foreman.

1. Contact Engineer of Record three weeks prior to pre-installation conference to confirm schedule.
2. Record discussions of meeting and decisions and agreements reached, and furnish copy of record to each party attending. Review foreseeable methods and procedures related to paving work, including the following:
 - a. Review preparation and installation procedures and coordinating and scheduling required with related work.
 - b. Review proposed sources of materials.
 - c. Tour, inspect, and discuss condition of existing pavement and other preparatory work such as patching, crack sealing, and oil spot priming/repair.
 - d. Review requirements for protecting paving work, including restriction of traffic during installation and curing period.
 - e. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - f. Review paving requirements (drawings, specifications, and other contract documents).
 - g. Review required submittals, both completed and yet to be completed.

- h. Review required inspections, testing procedures.
- i. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
- j. Review health and safety precautions relating to handling and placement of seal coat.

1.4 QUALITY ASSURANCE

- A. Contractor Qualifications: The seal coat applicator shall have not less than 3 years documented experience in the application of emulsion seal coats.

1.5 SUBMITTALS

- A. Product Data: Submit the manufacturer's product information for oil spot primer.
- B. Certificates:
 - 1. Submit manufacturer's certification that each consignment of emulsion shipped to the project meets the requirements of the applicable specification for the emulsion specified, except that the water content shall not exceed 50 percent. The certification shall also indicate the solids content of the emulsion and the date the tests were conducted.
 - 2. Submit certification of placement in accordance with specification requirements as specified in Part 3 Field Quality Control.
- C. Qualification Statements: Submit contractor qualifications certification.
- D. Mix Design:
 - 1. Submit mix design and emulsion properties to the Civil Engineering Consultant of Record at least 30 days prior to beginning sealing operations. Mix designs over one year old will not be accepted.
 - 2. Submit approved mix designs and laboratory test results to CTL signed by the materials producer and Contractor certifying materials and mix ratios conform to the requirements specified herein.
- E. Calibration Results: Submit report of spreading equipment calibration tests.

1.6 SITE CONDITIONS

- A. Weather Limitations: Apply seal coat only under the following weather conditions:
 - 1. The atmospheric temperature is between 50 and 90 F and is expected to remain above 50 F for 24 hours.
 - 2. Pavement temperature is above 55 F.
 - 3. Surface is dry and no moisture is expected within 24 hours.
 - 4. Weather and wind conditions are such that overspray is preventable and will allow proper curing and opening to traffic within a reasonable time.
- B. Maintain access for vehicular and pedestrian traffic as required by the Engineer of Record. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aggregate: Aggregate shall be 100 percent passing the No. 16 (1.18 mm) sieve when tested in accordance with ASTM C 136. Aggregate shall consist of hard, washed, dry natural or manufactured particles free of dust, trash, clay, organic materials or other contaminants.

- B. Asphalt Emulsion: Comply with ASTM D977 or ASTM D2397 for SS-1h or CSS-1h. The penetration of the residue from the distillation test shall be 20 to 60. Clay stabilized emulsion, with a ph not greater than 7.0, and solids content not less than 45 percent may be used. The polymer material shall be milled or blended into the asphalt or emulsifier solution prior to the emulsification process. The minimum amount and type of polymer modifier shall be determined by the laboratory performing the mix design.
- C. Coal Tar: Coal tar emulsion or coal tar/asphalt emulsion shall not be used as a substitute for asphalt emulsion.
- D. Water: Water shall be potable and free of harmful soluble salts or reactive chemicals and any other contaminants and at least 50 F.
- E. Additives: Additives shall be included and approved as part of the mix design and be compatible with the other components of the mix.
- F. Crack Sealant: Crack sealant shall conform to ASTM D6690, Type II or higher and compatible with the specified seal coat emulsion.
- G. Oil Spot Primer: Oil spot primer shall be a quick drying latex emulsion with suitable admixtures manufactured specifically for the purpose of isolating the asphalt sealcoat from any residual oils, petroleum grease, and gasoline stained pavement. The oil spot primer shall be certified for compatibility with the specified emulsion by the manufacturer of the emulsion.
- H. Pavement Primer/Tack Coat: Pavement primer/tack coat shall consist of one part SS1h emulsion diluted with four parts water applied at an undiluted emulsion rate of 0.05 to 0.10 gal/SY (diluted emulsion rate of 0.25 to 0.50 gal/SY).

2.2 COMPOSITION

- A. Composition. Seal coat shall consist of a mixture of the specified emulsion, water, aggregate, and additives and be proportioned to meet the requirements shown in the following Table 1.

TABLE 1 – Undiluted Seal Coat Design Properties

Method	Minimum	Maximum
Weight (per gallon), ASTM D 244, lbs	9.0	
Cone Penetration, ASTM D 217, mm	340	700
% Non-Volatile ¹	50	
% Non-Volatile Residue Soluble in Trichloroethylene, ASTM D 2042	10	35
Wet Track Abrasion Loss, ASTM D 3910, g		35
Viscosity, ASTM D 562, KU	75	
Dried Film Color	Black	

¹Weigh 10 g of homogeneous product into a previously tared, small ointment can. Place in an oven at 325°F for 90 minutes. Cool, reweigh and calculate non-volatile residue as a percent of the original mass.

2.3 EQUIPMENT

- A. Distributors. Distributors or spray units used for the spray application of the seal coat shall be self propelled and capable of uniformly applying 0.10 to 0.30 gallons per square yard of material over the required width of application. Distributors shall be equipped with tachometers, pressure gauges, and volume measuring devices. The mix tank shall have a mechanically powered, full sweep, mixer with sufficient power to move and homogeneously mix the entire contents of the tank.
- B. Spray Nozzles. Nozzles shall be free from clogs and debris and set at the same angle.
- C. Mixing Equipment. The mixing machine shall have a continuous flow mixing unit capable of accurately delivering a predetermined proportion of aggregate, water, and emulsion, and of discharging the thoroughly mixed product on a continuous basis. The mixing unit shall be capable of thoroughly blending all ingredients together and discharging the material without segregation.
- D. Spreading Equipment. Spreading equipment shall be a mechanical type squeegee/brush distributor attached to the mixing machine, equipped with flexible material in contact with the surface to prevent loss of slurry from the spreader box. It shall be maintained to prevent loss of slurry on varying grades and adjusted to assure uniform spread. There shall be a lateral control device and a flexible strike off capable of being adjusted to lay the slurry at the specified rate of application. The spreader box shall have an adjustable width. The box shall be kept clean. Emulsion and aggregate build up on the box shall not be permitted.
- E. Clean equipment with a petroleum solvent if previously used with a different material.
- F. Hand Squeegee or Brush Application. Hand spreading application shall be used only in places not accessible to the mechanized equipment or to accommodate neat trim work at curbs, etc. Material that is applied by hand shall meet the same standards as that applied by machine.
- G. Calibration. Spreading equipment shall be provided with a method of calibration by the manufacturer. Equipment shall be calibrated to assure that it will produce and apply a mix that conforms to the job mix formula. Calibrations shall be made with the approved job materials prior to application of the seal coat.

2.4 PREPARATION

- A. A period of at least 60 days at +70 F daytime temperatures shall elapse between the placement of a hot mixed asphalt concrete surface course and the application of the seal coat except as permitted for remediation patching below.
- B. Remediate distressed areas of existing pavement by saw-cutting and removing existing pavement, regrading and compacting the underlying base course and replacing with full depth asphalt at locations and as shown on the drawings.
 - 1. Repairs not specifically shown on the plans but considered necessary by the CEC, the Geotechnical Engineer, or the CTL shall be identified and submitted as an RFI to the Engineer of Record (CM) prior to commencement of repairs.
 - 2. Repairs submitted by RFI and approved shall be performed as directed by the CEC. Cost for such work directed and performed will be paid for in accordance with the "Changes in the Work" Clause of the General Conditions.
 - 3. Repairs shall be completed 30 days prior to the application of the seal coat.
- C. Longitudinal and traverse cracks in excess of 0.25 inch, but less than 1 inch shall be sealed with a crack sealant. Cracks that contain weed or other live vegetable matter shall be treated with a locally approved, non-oil based sterilant prior to applying the crack filler.

- D. Existing crack sealants in the parking lot shall be evaluated for compatibility with the specified emulsion. Report to the Engineer of Record if appearance or performance of the seal coat will be compromised by the existing crack sealant materials.
- E. Remove oil drippings or grease buildup determined by the CEC to be detrimental to the subsequent seal coat performance by scraping excessive buildup and by steam cleaning. Prevent oil contaminated water from entering storm sewer inlets. After cleaning, treat cleaned areas with the oil spot primer.
- F. Immediately prior to applying the primer and seal coat, the surface shall be cleared of all loose material, dirt, dust, grease, oil, vegetation and other objectionable material. If water is used, cracks shall be allowed to dry thoroughly before applying the seal coat.
- G. Protect existing manholes, inlets, vaults, valve boxes, meter boxes, etc. as necessary to maintain free accessibility upon completion of seal coat application. Surfaces adjacent to seal coat application areas such as sidewalks, curb and/or gutter, storefronts, etc. shall be protected by use of felt paper anchored with clean aggregate, or by shielding components with plywood during application.
- H. Apply a primer/tack coat at a rate of 0.05 to 0.10 gal/sq.yd. Remove loose gravel by sweeping prior to application of primer.
- I. Coordinate limits of seal coat application operations with Owner's Engineer of Record and Store Manager to avoid interruption to store operations. Protect adjacent areas of the parking lot outside of current seal coat application limits to avoid tracking onto adjacent areas. Partition off limits of current seal coat operations until surface is traffic ready.
- J. Coordinate with Store Manager to deactivate lawn sprinkler systems least 48 hours prior to placing the seal coat and remain off for at least 24 hours after the seal coat application.

2.5 APPLICATION

- A. The Minimum/Maximum application rate shall be between 0.10 and 0.17 gal/SY per application.
- B. Dampen pavement with a fog spray of water if ambient temperatures exceed 80°F. No standing water shall remain on the surface.
- C. Apply the first coat uniformly in a manner such that the combined application of the first and second coats equal the total rate specified above.
- D. Suspend application when the distribution tank has less than 100 gallons left and refill to prevent irregular patterns or misses.
- E. Each coat shall be allowed to dry and cure initially a minimum of 2-4 hours before applying any subsequent coats. The initial drying shall allow evaporation of water of the applied mixture, resulting in the coating being able to sustain light foot traffic. The initial curing shall enable the mixture to withstand vehicle traffic without damage to the seal coat.
- F. Apply the second coat in the same manner as outlined for the first coat.
- G. Apply additional coats if and where necessary as determined by the CEC.
 1. Submit an RFI identifying extent of additional coats for approval prior to application.
 2. Apply additional coats in accordance with RFI approval. Cost for such additional work directed and performed will be paid for in accordance with the "Changes in the Work" Clause of the General Conditions.

- H. The finished surface shall present a uniform texture with no streaks.
- I. The final coat shall be allowed to dry a minimum of eight hours in dry daylight conditions before opening to traffic, and initially cure enough to support vehicular traffic without damage to the seal coat.
- J. Where marginal weather conditions exist during the eight hour drying time, additional drying time shall be allowed. The length of time shall be as specified by the supplier. The surface shall be checked after the additional drying time for trafficability before opening the section to vehicle traffic.

2.6 FIELD QUALITY CONTROL

- A. Certify in writing that the seal coat placement is in accordance with specification requirements.

END OF SECTION

SECTION 02812 (32 8400) – SITE IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Underground, automatically controlled lawn and shrub bed irrigation system including electrical connections, water main connections, and accessories.

B. Related Requirements

1. Section 02300 - Earthwork. Trenching, backfill, and compaction for utilities.
2. Section 02510 - Water Distribution Systems.
3. Section 02900 - Planting. Extended Maintenance Service for Site Irrigation System.
4. Section 02370 - Erosion Control

1.2 REFERENCES

A. ASTM International (ASTM)

1. ASTM D2239 - Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Inside Diameter.
2. ASTM D2241 - Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR-Series).
3. ASTM D2564 - Solvent Cement for poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
4. ASTM D2609 - Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe.
5. ASTM D2855 - Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

B. National Fire Protection Agency (NFPA)

1. NFPA 70 - National Electrical Code (NEC).

C. American Society of Safety Engineers

1. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers.
2. ASSE 1015 - Performance Requirements for Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies.

1.3 SUBMITTALS

- A. Submittal process: Submit in accordance Section 01330 - Submittal Procedures. Submit required submittals within 30 days after contract award. Submittals shall be available at all times to the Construction Manager.

B. Quality Assurance Submittals:

1. Irrigation Contractor Qualifications: Provide minimum of 3 references and list of similar projects with owner's names, addresses, and telephone numbers.

C. Test Reports

D. Closeout Submittals:

1. As-Built Drawings: Furnish two sets, noting exact locations of elements and changes to Construction Drawings.
2. Operation Manual: Furnish two copies, bound in 1 inch diameter three ring binders, indexed and tabbed for easy reference, and labeled on spine and cover. Manual shall include following:
 - a. Approved submittals as specified herein.

- b. Installation instructions including mounting details for control valves.
- c. Operating Instructions:
 - 1) Winterization procedures.
 - 2) Recommended operation sequence, frequency, and length of operation cycle, as per relationship to estimated absorption rate, evaporation rate, and anticipated flow.
- d. Maintenance Instructions:
 - 1) Manufacturers' product data, installation, and maintenance instructions.
 - 2) Copies of completed warranty information. Contractor to complete and mail necessary warranty registration information to manufacturer keeping copies for Owner.
- 3. Controller Chart: Prepare color coded chart reduced in size, mounted on the inside of the controller cabinet, containing same plan information as as-built drawings, and laminated in plastic on both sides, with following specific information:
 - a. Note routing of main line, control wires, and controller location.
 - b. Identify valves as to size, station number shown on controller, and type of irrigation head (e.g. micro spray head, rotary head) for each valve.
 - c. Delineate each station's limits of coverage by color-coding, with each station having different color showing its zone with zone number designation.
 - d. Size, type, and location of water source.
- 4. Meetings and Inspections Log.
- 5. Certification of Conformance: Provide certificate of satisfactory performance of irrigation system installation signed by the Contractor and Landscape Architect or irrigation designer for attachment to CEC Conformance Letter included at the end of Section 01456.

1.4 QUALITY ASSURANCE

- A. Contractor Qualifications: Minimum of 3 consecutive years' experience in area of project and having installed other jobs of similar size and scope including drip irrigation and ET Series Controllers.
- B. Pre-Work Meeting and Conference Call: Convene a pre-work meeting and conference call at the Project site prior to commencing subgrade preparation for site paving to review conditions of operations, procedures and coordination with related work. Require attendance of parties directly affecting work of this Section including but not limited to Contractor, irrigation contractor, site work contractor, Landscape Architect, or irrigation designer.
 - 1. Discuss conditions of Project site.
 - 2. Review approach and schedule for, but not limited to, the following items:
 - a. Water source.
 - b. Mainline routing and installation.
 - c. Zone installation and site preparation.
 - d. Material availability.
 - e. Sleeve installation, installation of curb and paving markings for sleeve locations and coordination with site work contractor.
 - f. Status of irrigation schedule
 - g. Potential conflicts between irrigation and other site utilities
 - h. Required Inspections.
- C. Meeting and Inspection Log: Maintain log of required meetings and inspections. Record the date; time; weather conditions; and a brief summary of the discussions, decisions, and agreements reached. Landscape Architect or Irrigation Designer will review and sign log at the conclusion of the meeting. Furnish copy of log to each party attending.

1.5 PROJECT CONDITIONS

- A. Visit site and become familiar with nature and location of work, existing conditions, and conditions that will exist during installation.

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1.6 WARRANTY

- A. Guarantee Site Irrigation System for a period of 12-19 months following the Substantial Completion Date in accordance with the Extended Maintenance/Warranty Chart included Section 02900 and as follows:
1. Defects in material, equipment, and workmanship.
 2. Repair of damage to premises resulting from leaks or other defects in material, equipment, and workmanship to satisfaction of Owner.

1.7 EXTENDED MAINTENANCE SERVICE

- A. Extended Maintenance for Site Irrigation System is specified in Section 02900.

PART 2 - PRODUCTS

2.1 OWNER FURNISHED PRODUCTS

- A. Under provisions of Section 01640, Owner will furnish irrigation products for installation by Contractor as follows:
1. Automatic Smart Controllers.
 2. Rainfall / Freeze Sensor.
 3. Flow Sensors.
 4. Master Valves.

2.2 MANUFACTURERS

- A. Acceptable manufacturers shall include:
1. Hunter Industries, Inc., (800) 733-2823
 2. Rain Bird Corporation Commercial Turf Division, (800) 724-6247.
 3. The Toro Company - Irrigation Division, (888) 384-9939.
 4. HydroPoint Data Systems, Inc. (707) 769-9696 ext 412,
 5. Netafim USA, (888) 638-2346.
 6. Ametek - Armor, (800) 348-7558.
 7. Data Industrial, (800) 338-0312.
 8. Creative Sensor Technology, (508) 763-8100.
 9. Superior Controls Company, Inc, (661)-257-3533.

2.3 PIPE

- A. Polyvinyl Chloride (PVC): Pipe over 1 inch diameter shall conform to ASTM D224, SDR 21, and Class 200.
- B. Polyvinyl Chloride (PVC): Pipe 1 inch diameter and under shall conform to ASTM D2241, SDR 13.5, and Class 315.
- C. Flexible Polyethylene (PE): Pipe shall conform to ASTM D2239, SDR 11.5, PE23, rated at 100 PSI, National Sanitation Foundation (NSF) approved. Subject to approval of Owner, PE shall be used for laterals in areas where ground is subject to freezing for extended periods of time each year.
- D. Joints:
1. Pipe sizes 2 1/2 inch or smaller shall have bell and socket joints.
 2. Pipe sizes larger than 2 1/2 inch shall have snap connections with rubber gasket joints. Thrust blocking shall be required in accordance with Section 02510.
- E. Pipe used for reclaimed water shall be appropriate color and marked as designated for such use.

- F. Fittings:
 1. Polyvinyl Chloride (PVC) Fittings: Fittings shall conform to ASTM D2241, Schedule 40, and Molded.
 2. Flexible Polyethylene (PE) Lateral Line Fittings: Fittings shall conform to ASTM D2609, Type 1 PVC insert fittings designed for used with this type of pipe. Pipe and fittings shall be joined with stainless steel pinch clamps or worm gear clamps, including stainless steel screw.
- G. Risers above finished grade shall be black in color or receive 2 coats of black exterior semi-gloss enamel paint if a color other than black.

2.4 ACCESSORIES

- A. Sleeves: Sleeves for pipes passing beneath paving shall conform to ASTM D2241, Schedule 40. Minimum diameter of 2 inch or 2 sizes larger than pipe scheduled to pass through them.
- B. PVC Solvent Cement: Cement shall conform to ASTM D2564.
- C. Swing Joint Connections: Connections between heads and laterals shall be thick wall, flexible, polyethylene pipe, with fittings that have male barbs on one end and either male or female screw ends opposite. Glue fittings and female barb adapters are not allowed.

2.5 RECLAIMED WATER PRODUCTS AND MATERIALS

- A. Irrigation products used with reclaimed water shall be the appropriate color and marked as designated for such use.

2.6 CUTOFF OR ISOLATION VALVES

- A. 3 inches or Smaller: Provide full port brass ball valves with 600 WOG rating as manufactured by Red-White Valve Corporation, Carson, CA.
- B. Larger than 3 inches: Provide cast iron and bronze mechanical joint valves, fusion bonded epoxy coated exterior and interior, Resilient Wedge Valve as manufactured by Clow Valve Co., Oskaloosa, IA.
- C. Provide a valve key and cast iron cylindrical valve box with top with each valve.

2.7 QUICK COUPLER VALVES

- A. Provide one of following if shown on the plans:
 1. Rain Bird model 44NP Valve with model 44K Key.
 2. Hunter model HQ-44LRC with model HK-44 Key.
 3. Toro model 100-SLVLC 470 Series Valve and 100-SLK Coupler Key.
- B. Provide each valve with key having 3/4 inch male top pipe threads for hose connection.

2.8 ELECTRIC CONTROL VALVES

- A. Provide one of the following:
 1. Hunter ICV Series electric remote control valves and ICZ Drip Zone Control Kit.
 2. Rain Bird PEB Series electric remote control valves and XCZ Drip Control Zone Kit.
 3. Netafim Control Valve Kit.
 4. Toro P220 Series plastic valves and DZK Drip Zone Valve Kit.
- B. Provide 3M DBY watertight connectors.

2.9 SPRINKLER HEADS

- A. Full or Part Circle Pop-Up Fixed Spray Sprinkler:
 - 1. Acceptable Products:
 - a. Hunter PRS40 with MP Rotators and check valve (CV) feature.
 - b. Rain Bird 1800 Series Sprinklers with Rotary Nozzles including PRS and SAM features.
 - c. Toro 570Z PRX Series with MPR Precision Series Spray Nozzles.
- B. Full or Part Circle Pop-up Gear Driven Rotor Sprinkler:
 - 1. Acceptable Products:
 - a. Rain Bird Rotor, 5000 Series plus MPR rotor nozzle with Seal-A-Matic (SAM) check valve.
 - b. Toro Super T5P-COM, with check valve or Toro TR-XTP Series with factory installed check valve, trajectory adjustment, and X Flow Device.
 - c. Hunter PGP and PGJ series pop-up rotors, with check valve.
- C. Pressure Compensating Micro-Spray Nozzles:
 - 1. Acceptable Products:
 - a. Rain Bird Micro Spray.
 - b. Hunter Micro Spray.
 - c. Toro Stream Spray and Stream Bubbler Nozzles with PC.

2.10 LOW VOLUME AND DRIPLINE IRRIGATION

- A. Hunter Professional Landscape Dripline with 0.4, 0.6, or 1.0 GPH built-in emitters.
- B. Netafim Techline with 0.4, 0.6, or 0.9 GPH dripper.
- C. Toro Drip-In PC drip tubing with 0.5 or 1.0 GPH emitter. Use only in groundcover and shrub beds with mulch.
- D. Rain Bird XFD (subsurface installation) or XFS (surface installation) drip tubing and components with 0.6 or 0.9 GPH emitter.

2.11 VALVE BOX

- A. Valve boxes shall be manufactured by Ametek, Plymouth Products Division, Sheboygan WI., RainBird Corporation or equal by acceptable manufacturer. No irrigation valve box shall be placed in pavement areas unless otherwise shown on the Drawings.
 - 1. When used with single valve, provide Economy Turf Box or Rain Bird model VB-RND with green colored snap fit cover labeled "Valve Box".
 - 2. When used with 2 or more valves, provide Jumbo Box or Rain Bird model VB-STD with 20 inch x 14 inch cover opening with cover labeled "Control Valve".

2.12 MANUAL DRAIN VALVES

- A. Manual drain valves shall be provided by acceptable manufacturers specified above.

2.13 CONTROL WIRE

- A. Number 14-size minimum copper wire, U. L. approved for underground direct burial.
 - 1. Colored wire shall have same color-coding as shown on controller.
 - 2. Provide single wire from controller to each valve.
 - 3. Provide common neutral from controller to each valve.

4. Provide a minimum of two extra sets of wire, 2 control and 1 neutral, to each end of the main for future use.
 - a. Loop Systems: Provide two spare control wires in each direction to halfway point of loop.

2.14 BACKFLOW PREVENTOR

- A. Comply with requirements and codes of local governing authority regarding backflow prevention.
- B. Provide the necessary materials, insulation/draining capabilities, and insulated fiberglass enclosure, dark green in color.
- C. Backflow preventers shall be type suitable for use in high hazard cross connection to potable water system as manufactured by one of the following manufacturer's: Watts Regulator Company, Febco, or Wilkins.
 1. Reduced pressure backflow preventers shall be ASSE # 1013 and labeled accordingly.
 2. Double check valve assembly backflow preventers shall be ASSE # 1015 and labeled accordingly.
 3. In absence of local codes or requirements, provide double check assembly backflow preventer installed in strict accordance with manufacturer's written instructions.

2.15 METER

- A. Meter and meter box shall conform to requirements of local utility company.

2.16 RAINFALL / FREEZE SENSOR (OWNER FURNISHED / CONTRACTOR INSTALLED)

- A. Rainfall Sensor:
 1. Irritrol Wireless Rain Sensor, Model RS 1000.
- B. Rainfall / Freeze Sensor:
 1. Irritrol Wireless Rain/Freeze Sensor, Model RFS 1000.

2.17 FLOW SENSOR (OWNER FURNISHED / CONTRACTOR INSTALLED)

- A. Data Industrial – Series 735PV or 228PV.
- B. Creative Sensor Technology – Series FSI.

2.18 MASTER VALVE (OWNER FURNISHED / CONTRACTOR INSTALLED)

- A. Superior Controls Company, Inc. – Angle or Globe 3100 Series.

2.19 AUTOMATIC CONTROLLER (OWNER FURNISHED / CONTRACTOR INSTALLED)

- A. Controller shall have an integral weatherproof, lockable stainless steel pedestal cabinet with internal transformer.
 1. HydroPoint Weather-TRAK ET Pro2 Central Series Model: WtPro2C-XX-SPL where XX is the number of stations. Include the following:
 - a. One year WT.net subscription service
 - b. Five year hardware warranty.
 - c. On site controller training.
 - d. Site Profile Worksheet.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Pressure/Flow Test: Perform calculations according to the Irrigation Association's 3-Step Method. Provide written calculations to the Owner's CEC including the following site information:
 - 1. Static or residual pressure at the POC.
 - 2. Calculation of pressure for "worst case" sprinkler head.
 - 3. Calculation of GPM per zone.
- B. Prior to installation, receive approval from General Contractor to proceed with construction.
- C. Contractor shall field verify all aboveground and underground utilities prior to start of work.

3.2 EXCAVATION

- A. Trenching and Backfilling:
 - 1. Trenching and backfilling shall conform to Section 02300 and 02370.
 - 2. Excavate trench to proper depth as shown or specified.
 - 3. Minimum trench width shall be 3 1/2 inches.
 - 4. Over excavate trenches deeper than required in soils containing rock or other hard material that might damage pipe and backfill to proper depth with selected fine earth or sand.
 - 5. Backfill and hand tamp over excavation prior to installing piping.
 - 6. Keep trenches free of obstructions and debris that would damage pipe.
 - 7. Irrigation piping shall not be installed in same trench as heating duct, electric ducts, storm and sanitary sewer lines, water and gas mains.
- B. Do not cut sidewalks, paved areas, or curb and gutter when trenching for piping unless otherwise noted on the Drawings.
 - 1. Provide sleeves as specified in Part 2 above under paving prior to installation of paving.
 - 2. Auger, bore, or tunnel under existing paving without disturbing pavement. Damaged pavement shall be removed and replaced in accordance with Section 02740 or 02751.

3.3 WATER METER

- A. Provide water meter box for irrigation system if required or shown on the Drawings.

3.4 PIPING INSTALLATION

- A. Minimum cover from top of piping to finished grade shall be provided as follows:
 - 1. Lawn and planting areas:
 - a. Mains and Control Valves: 18 inches.
 - b. Laterals: 12 inches.
 - 2. Drives or parking areas: 24 inches.
- B. Clearances: Maintain 3 inch minimum horizontal clearance between parallel lines in same trench or vertical clearance between lines crossing at angles.
- C. Special Requirements - PVC and PE pipe:
 - 1. Snake pipe in trench at least 1 foot per 100 feet of pipe to allow for thermal expansion.
 - 2. Pipe laterals shall be laid to drain to low point drains located at lowest elevations of each zone.
- D. Rest full length of pipe section on bed of trench, excavating recesses to accommodate joints. Do not lay pipe on unstable material or blocking, or when in opinion of Owner conditions are unsuitable.

- E. Threaded Plastic Pipe Jointing:
 1. Do not use solvent cement on threaded joints.
 2. Wrap joints with Teflon tape or use virgin Teflon lubricant.
 - F. Bell and Socket Plastic Pipe Jointing: Cement joints in accordance with ASTM D2855.
- 3.5 QUICK COUPLER AND AUTOMATIC LOW POINT DRAIN VALVES
- A. Provide quick coupler valves as shown on the drawings to accommodate winterization.
 - B. Provide automatic low point drain valves on all zones. Provide two valves at lowest point of each zone with each drain installed above a 12 inch by 12 inch by 12 inch deep area of coarse washed gravel.
- 3.6 SLEEVING
- A. Provide sleeves for both piping and control wiring where either passes under paved surfaces.
 1. Depths of sleeves shall be same as that required for piping at each location or condition.
 2. Extend sleeves 12 inches beyond paving at each end.
 3. Install permanent benchmark at top of curbs for reference to sleeve locations.
- 3.7 VALVES
- A. Do not locate beneath paved surfaces.
 - B. Install plumb to within 1/16 inch.
 - C. Locate within valve box with 6 inch deep layer of coarse gravel beneath bottom of valve.
 - D. Top of quick coupler valves shall be 6 inches to top of valve box. Top of gravel layer shall be 3 inches below top of valve.
 - E. Master Valve (if required on the Drawings):
 1. Locate immediately behind backflow preventer.
 2. Valve shall be energized by master valve circuit on automatic controller.
- 3.8 SPRINKLERS
- A. Install plumb to within 1/16 inch with top collar, not nozzle, flush with finish grade.
 - B. Provide swing joint with each sprinkler except where entire head is raised above grade and/or where rigid riser piping is required.
 - C. Heads adjacent to paving and curb: Locate between 6 and 12 inches from edge of paving or back of curb to prevent car overhang to conflict with a fully extended sprinkler.
- 3.9 ELECTRICAL CONNECTIONS AND CONTROL WIRE
- A. Conform to the National Electrical Code (NEC) and local electrical codes.
 - B. Provide electrical connection to system as designated on the Drawings and as specified herein.
 - C. Wire Placement:
 1. Do not run control and power supply wiring in same conduit.

2. Provide continuous runs of wire between controller and valves. Splices shall be made with one of following:
 - a. Watertight below ground electrical junction boxes.
 - b. Water-tight connectors, such as utilized for valves, and located within valve box for ease of locating.
 - c. The location of electrical splices shall be shown on the As-Built drawings.
 3. Bury control wire beside pipe in same trench. Bundle and tape together at not more than 10 ft intervals.
- D. Expansion Loops: Construct by wrapping wire around 1/2 inch diameter pipe to create coil. A 3 foot section of wire shall be used to create 12 inch coil with 6 foot section being used to create 24 inch coil.
1. Provide 12 inch coils at each wire splice, not including valves, and at each change of wire direction.
 2. Provide 24 inch coils at each control valve and where each valve enters conduit for automatic controller.

3.10 BACKFILLING

- A. Sand or fine-grained soils shall be used for initial backfill to sufficient depth to prevent damage to pipe from rocks or other debris during compaction of subsequent backfill.
- B. Fill trench to within 3 inches of finish grade with excavated soil and compact in accordance with Section 02300.
- C. Fill top 3 inches with existing topsoil in planting or turf areas and wheel roll until compaction of backfill is same as surrounding soil.
- D. Grade backfilled trench uniform with surrounding grades.

3.11 BACKFLOW PREVENTOR

- A. Comply with local codes for installation of backflow preventer. In absence of local codes, install in accordance with manufacturer's written instructions.

3.12 RAINFALL / FREEZE SENSOR

- A. Location and installation shall be as shown on the Drawings and per manufacturer's written recommendations.

3.13 FLOW SENSOR

- A. Location and installation shall be as shown on the Drawings and per manufacturer's written recommendations.

3.14 MASTER VALVE

- A. Location and installation shall be as shown on the Drawings and per manufacturer's written recommendations.
 1. Master valve normal operating position shall be open and shall be electronically actuated.

3.15 AUTOMATIC CONTROLLER

- A. Location and installation shall be as shown on the Drawings and approved by Owner prior to installation.
- B. Install rigid conduits for both power supply and control wiring.
 1. Control wire conduit shall extend to 18 inches below grade.
 2. Pull spare wires for future valves and extend to area outside paved surfaces.
- C. Install electrical grounding for controller in accordance with manufacturer's written instructions.

3.16 FIELD QUALITY CONTROL

- A. Irrigation Inspections: Conduct the following inspections during the course of the work in the presence of the Landscape Architect or irrigation designer to verify conformance to specification requirements. Notify CEC for observation of inspection by the Landscape Architect or irrigation designer. Correct noted deficiencies during each inspection prior to proceeding with subsequent work. After each inspection complete Irrigation Inspection Checklist included at the end of this Section signed by all signifiers listed thereon.
1. Mainline Inspection: Inspect the installed main line, electronic control valves, wiring prior to backfilling main line.
 2. Substantial Completion Inspection: Inspect all completed irrigation work. Landscape Architect or irrigation designer will develop a punch list of deficient or incomplete items and deliver to Contractor within 3 calendar days of inspection date.
 3. Final Inspection: Within 30 days of project substantial completion date and subsequent to correction of punch list deficiencies, convene a final inspection of all irrigation work.
 4. Warranty Inspections: Convene a warranty inspection 30 calendar days prior to expiration of warranty period specified in Part 3 of Section 02900.
- B. Inspection and Adjustments: Following installation and prior to Substantial Completion Inspection, make final adjustments to site irrigation including but not limited to the following:
1. Flush system completely, with nozzles and screens removed and drip lines ends open to extract debris.
 2. Verify sprinkler operation and alignment for direction of throw. Correct as necessary.
 3. Check pop-up rotor/rotator nozzling for proper arc of spray with no overthrow onto pavement. Adjust nozzles as necessary for proper throw and matched precipitation rate.
 4. Ensure uniform distribution exists.
 5. Ensure proper irrigation head operational after landscaping and/or sod installation.
- C. Main Line Inspection and Hydrostatic Tests:
1. Owner's Landscape Architect or Irrigation Designer will observe testing.
 2. Center load piping with small amount of backfill to prevent arching or slipping under pressure.
 3. Install risers and caps on mainline and sub-main lines. Apply continuous and static water pressure of 75 psi for a minimum of 3 hours when welded plastic joints have cured at least 3 hours.
 4. Allowable Leakage:
 - a. Utilize the following formula to calculate the allowable leakage for O-ring gasket pipe.
$$L = \frac{SD(P)^{0.5}}{133,200}$$
In which: L=Allowable leakage in gallons per hour
S=Length of pipe tested in feet
D=Pipe diameter in inches
P=Average test pressure in PSI gauge
 - b. No allowable leakage shall be acceptable with solvent based mainline system.
 5. Repair leaks and retest.
- D. Automatic Controller
1. Controller Activation: Activate controller manufacturer's subscription service in accordance with the manufacturer's instructions.
 2. Documentation: Complete the Site Profile Worksheet included with controller. Submit to Owner's Landscape Consultant (SC&A) by email to Jennifer.wilson@sca-nr.com. Call to confirm receipt of email by calling (615) 469-0943.
 3. Testing: Upon completion of irrigation system installation, perform a flow test with the controller in "Flow" mode in accordance with the Owner's Manual.
 4. Notification: Upon final inspection and again after warranty inspection, contact SC&A, Owner's Landscape Consultant, by calling (615) 469-0943 to verify controller operation.

E. Prepare inspection log in accordance with Paragraph Quality Assurance in Part 1.

3.17 CLOSEOUT ACTIVITIES.

A. Demonstration: Following final adjustment, operate entire irrigation installation to demonstrate complete and successful operation of equipment.

B. Training: Arrange and attend an onsite training of the controller system to be presented by the controller manufacturer's representative. Contact controller manufacturer to coordinate training time and date.

END OF SECTION

SECTION 02822 (32 3114) - CHAIN LINK FENCES AND GATES (SITE RELATED)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Chain link fences and gates associated with sitework.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM A 392 - Zinc-Coated Steel Chain-Link Fence Fabric
 - 2. ASTM C 94 - Ready-Mixed Concrete
- B. Chain Link Fence Manufacturers Institute (CLFMI) latest edition Product Manual

1.3 SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines and easements.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum 3 years documented experience.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Posts: Type I or II or roll formed "C" Section steel conforming to CLFMI and as specified hereinafter.
- B. Fabric: No. 9 gage (0.148 nominal) galvanized steel wire in 2 inch mesh; ASTM A 392, top and bottom selvages twisted and barbed, height as shown. Furnish 1-piece fabric widths.
- C. End, Corner, and Pull Posts: Minimum sizes and weights as follows:
 - 1. Up to 13 Foot Fabric Height: Type I or II in accordance with CLFMI Product Manual.
 - 2. 13 foot and over Fabric Height (If required):
 - a. Type I Posts: Round; 4.0 inch outside diameter pipe, 9.10 lbs/lin ft.
 - b. Type II Posts: 4.0 inch outside diameter pipe, 6.56 lbs/lin ft.
- D. Line (Intermediate) Posts: Minimum sizes and weights as follows:
 - 1. Up to 8 Foot Fabric Height: Type I, II, or "C" Section in accordance with CLFMI Product Manual.
 - 2. Over 8 Foot Fabric Height:
 - a. Type I Posts:
 - 1) Round: 2.875 inch outside diameter pipe, 5.79 lbs/lin ft.
 - 2) Square: 2.5" x 2.5" outside dimension, 5.10 lbs/lin ft.
 - b. Type II Posts: 2.875 inch outside diameter pipe, 4.64 lbs/lin ft.

- E. Gate Posts: Type I or II in accordance with CLFMI Product Manual.
- F. Top, Bottom, and Intermediate Rails: Type I or II in accordance with CLFMI Product Manual.
 - 1. Manufacturer's longest lengths.
 - 2. Couplings: Expansion type, approximately 6 inches long.
 - 3. Attaching Devices: Means of attaching top rail securely to each gate, corner, pull, and end post.
- G. Sleeves: Galvanized steel pipe not less than 6-inches long with inside diameter not less than ½ inch greater than outside diameter of pipe. Provide steel plate closure welded to bottom of sleeve of width and length not less than 1 inch greater than outside diameter of sleeve.
- H. Tension Wire: 7 gauge galvanized steel conforming to CLFMI, Marcellled, located at bottom of fabric.
- I. Wire Ties: Class 1 galvanized steel, no less than 9 gage.
- J. Post Brace Assembly: Manufacturer's standard adjustable brace at end of gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375-inch diameter rod and adjustable tightener.
- K. Post Tops: Galvanized steel, weather tight closure cap for each tubular post. Furnish caps with openings to permit passage of top rail.
- L. Stretcher Bars: Galvanized steel, 1 piece lengths equal to full height of fabric, with minimum cross-section of 3/16-inch x 3/4-inch. Provide one stretch bar for each gate and end post, and two for each corner and pull post.
- M. Stretch Bar Bands: Manufacturer's standard
- N. Gate Cross-bracing: 3/8-inch diameter galvanized steel adjustable length truss rods.
- O. Ready Mix Concrete: ASTM C94, mix design as follows:
 - 1. Design mix to produce normal weight concrete consisting of Portland cement, aggregate, water-reducing admixture, air-entraining admixture, and water to produce following:
 - a. Compressive Strength: 3,500 psi, minimum at 28 days, unless otherwise indicated on Construction Drawings.
 - b. Slump Range: 1 to 3 inches at time of placement
 - c. Air Entrainment: 5 to 8 percent
- P. Swinging Gate Hardware:
 - 1. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit full 180-degree gate opening. Provide a pair of 1 1/2-inch hinges for each leaf over 6'-0" nominal height.
 - 2. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.
- Q. Double Gates Hardware: Provide gate stops for double gates, consisting of mushroom type of flush plate with anchors set in concrete, to engage center drop rod or plunger bar. Include locking device and padlock eye as integral part of latch, using 1 padlock for locking both gate leaves.
- R. Sliding Gate Hardware: Provide manufacturer's standard heavy-duty track, ball-bearing hanger sheaves, overhead framing and supports, guides, stays, bracing, and accessories as required.

2.2 GATE FABRICATION

- A. Fabricate swing gate perimeter frames of 1.90-inch OD pipe, galvanized steel. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frame members maximum of 8'-0" apart.
- B. Assemble gate frames by welding or special fittings and rivets, for rigid connections. Install same fabric as for fence with stretcher bars at vertical edges. Install diagonal cross-bracing on gates as required ensuring rigid frame without sag or twist. Bars may be used at top and bottom edges. Attach stretchers to gate frame at 15 inches o.c. maximum.
- C. Attach hardware to provide security against removal or breakage.

2.3 FINISH

- A. Fabric, Framing, and Other Iron Parts: Hot dip zinc coated in accordance with CLFMI Product Manual.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install chain link fence in accordance with CLFMI Product Manual unless otherwise specified herein.
- B. Comply with recommended procedures and instructions of fencing manufacturer. Provide secure, aligned installation with line posts spaced at 10'-0" o.c. maximum.
- C. Methods for Setting Posts:
 - 1. Grade-Set Posts:
 - a. Drill or hand excavate to a depth approximately 3 inches lower than post bottom. Set post bottom not less than 36 inches below finish grade.
 - b. Excavate each post hole to 12 inch diameter, or not less than four times diameter of post.
 - c. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations. Extend concrete footing 2-inches above grade and trowel crown to shed water.
 - d. Post shall be set plumb within 1/4" in 10 feet.
 - 2. Sleeve Set Posts: Anchor posts by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with nonshrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.
- D. Top Rails: Run rail continuously, bending to form radius for curved runs. Provide expansion couplings as recommended by manufacturer.
- E. Center Rails: Provide center rails where indicated. Install in 1 piece between posts and flush with post on fabric side, using special offset fittings where necessary.
- F. Brace Assemblies: Install braces so posts are plumb when diagonal rod are under proper tension.
- G. Tension Wire: Install tension wires through post cap loops before stretching fabric and tie to each post cap with not less than 6 gauge galvanized wire. Fasten fabric to tension wire using 11 gauge galvanized steel hog rings spaced 24-inches o.c.
- H. Fabric: Leave approximately 2 inches between finish grade and bottom selvage. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

- I. Stretcher Bars: Secure at end, corner, pull, and gate posts by threading through or clamping to fabric at 4 inches o.c. and secure to posts with metal bands spaced at 15 inches o.c.
- J. Tie Wires:
 - 1. Use U-shaped wire, conforming to diameter of pipe to which attached, clasp pipe and fabric firmly when ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing.
 - 2. Tie fabric to line posts with wire ties spaced 12 inches o.c. Tie fabric to rails and braces with wire ties spaced 24 inches o.c. Tie fabric to tension wires with hog rings spaced 24-inches o.c.
 - 3. Manufacturer's standard procedure will be accepted if of equal strength and durability.
- K. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.
- L. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubrication.

3.2 ADDITIONAL INSTALLATION PROVISIONS

- A. Use U-shape tie wires, conforming to the diameters of pipe, that clasp the pipe and fabric firmly with ends twisted at least 2 full turns.
- B. Bend ends of exposed wires to minimize hazards to persons or clothing.
- C. Install nuts for fasteners on tension bands and hardware bolts on the side of the fence opposite the fabric. The ends of bolts, once secure and checked for smooth operation, shall be peened to prevent removal of nuts.
- D. Repair coatings damaged in the field with methods and techniques as recommended by the manufacturer.

END OF SECTION

SECTION 02890 (34 4113) - TRAFFIC SIGNS AND SIGNALS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Traffic control signs.

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.
- B. ASTM International (ASTM):
 - 1. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - 2. ASTM C94 - Ready Mix Concrete
 - 3. ASTM D4956 - Retroreflective Sheeting for Traffic Control.
- C. US Department of Transportation, Federal Highway Administration:
 - 1. Manual on Uniform Traffic Control Devices (MUTCD).

PART 2 - PRODUCTS

2.1 SIGNS

- A. Conform to US Department of Transportation [MUTCD](#). Sign classification, type, size, and color shall be as shown on the drawings
- B. Retroreflectivity: Microprismatic type sheeting conforming to ASTM D 4956, Type VIII, IX, or XI.

2.2 POSTS

- A. Square Post: Square tubular steel sign post, galvanized, 12 ga, perforated full-length with 7/16 inch holes on four sides. Post size shall be as shown on the Drawings.
- B. Steel Pipe: ASTM A 53, Type E (electric-resistance welded) or Type S (seamless), Grade B, Schedule 40, size as shown on the Drawings.

2.3 CONCRETE

- A. Mix concrete and deliver in accordance with ASTM C 94.
- B. Design mix to produce normal weight concrete consisting of Portland cement, aggregate, water-reducing admixture, air-entraining admixture, and water to produce following:
 - 1. Compressive Strength: 3,500 psi, minimum at 28 days, unless otherwise indicated on the Drawings.
 - 2. Slump Range: 1 to 3-inches at time of placement
 - 3. Air Entrainment: 5 to 8 percent

PART 3 - EXECUTION

3.1 PREPARATION

- A. Field verify underground utilities prior to sign installation. Primary utilities of concern of shallow depths are lawn sprinkler systems, electric, telephone, fiber optic, cable and gas.

3.2 INSTALLATION

- A. Install signs as shown on the Drawings and in accordance with MUTCD and manufacturer's instructions.
- B. Install signs of the type and at locations shown on the Drawings.
- C. Install posts of the type as shown on the drawing.
- D. Where shown as painted, field paint steel pipe posts in accordance with Section 09900.

END OF SECTION

UniSpec II – Civil (Master Site Specifications)

SECTION 02900 (32 9300) – PLANTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Planting of drought tolerant trees, shrubs, sod, seed, groundcover, and associated materials.
- B. Related Requirements:
 - 1. Section 02300 - Earthwork.
 - 2. Section 02370 - Erosion and Sedimentation Control.
 - 3. Section 02812 - Site Irrigation System.

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.
- B. American National Standards Institute (ANSI):
 - 1. ANSI Z60.1 - American Standard for Nursery Stock.
- C. ASTM International (ASTM):
 - 1. ASTM D5268 - Topsoil used for Landscaping Purposes.
 - 2. ASTM C602 - Agricultural Liming Materials.
- D. Erosion Control Technology Council (ECTC):
 - 1. Standard Specification for Rolled Erosion Control Products.

1.3 SUBMITTALS

- A. Submittal Process: Submit in accordance with Section 01330 - Submittal Procedures.
- B. Submittals shall be available at all times to the Construction Manager.
- C. Grower / Nursery Information: Submit name, address, phone number and contact person for each Grower / Nursery 30 days prior to plant material selection meeting.
- D. Materials Test Reports: Submit topsoil borrow area test reports to Owner's Civil Engineering Consultant (CEC) minimum 6 weeks prior to delivery to site.
 - 1. Provide location of topsoil borrow area.
 - 2. Provide name of independent soil testing laboratory.
 - 3. Provide date of sampling and testing.
- E. Product Data:
 - 1. Submit certification tags from trees, shrubs, sod, and seed verifying type and purity to Owner's CEC.
 - 2. Submit photographs of each species of tree specified. Photographs shall be taken at grower's nursery prior to digging. Photographs shall contain tree with measuring rod in vertical position, showing overall height and spread with visual measurements, container size, root flair and rood condition inside the container, and trunk caliper. Submit 30 days prior to plant material selection meeting.
- F. Sample: Submit minimum one cubic foot representative sample of wood or mineral mulch to Owner's CEC.

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- G. Quality Assurance Submittals:
 1. Submit to Owner and Owner's CEC a copy of the invoice for each shipment of plant materials to the Project site. Invoice shall include name and size of each type of plant material.
 2. Tree Transplanting Contractor Qualifications:
 - a. Provide statement of required qualifications of tree transplanting contractor.
 - b. Provide Owner project names, addresses, project owner's names and phone numbers for completed projects of similar scope.
 - c. Provide progress photographs of the tree transplanting process and final photographs taken at least 2 years after establishment.
 - d. Provide evidence of the health of at least 10 trees transplanted 3 or more years ago on at least 3 different projects. Trees shall be of similar size, species, and conditions of the trees indicated on the Plans.

- H. Closeout Submittals:
 1. Submit Meetings and Inspections Log prior to Final Completion of the Project.
 2. Certification of Conformance: Provide certificate of satisfactory performance of planting operations signed by the Contractor and Landscape Architect for attachment to CEC Conformance Letter included at the end of Section 01456.

1.4 QUALITY ASSURANCE

- A. Pre-Work Meeting: Convene a pre-work meeting minimum 30 days prior to commencing work on this Section. Review conditions of operations, procedures and coordination with related work. The pre-work meeting shall be set up as a conference call with the Landscape Architect.
 1. Review planting schedule and maintenance.
 2. Review required inspections, schedule of topsoil testing, and environmental procedures.

- B. A Construction Testing Laboratory (CTL) selected and paid for by the Owner, will be retained to perform testing and analysis on in-place topsoil.
 1. The CTL shall prepare test reports that indicate test location and test results. Civil Engineering Consultant (CEC), and Contractor shall be provided with copies of reports as follows:
 - a. Topsoil Analysis – within 10 calendar days of sampling date.
 - b. Topsoil Depth Inspection – within 3 working days of test completion.
 2. In event that test performed fails to meet Specifications, the (CTL) shall notify Owner and Contractor immediately and record the deviations on the Observation Log.
 3. Contractor shall provide free access to site for testing activities.

- C. Tree Transplanting Contractor Qualifications: Tree transplanting contractor shall meet the following qualifications:
 1. Certified Arborist on staff.
 2. Local representation and offices in the state or an adjoining state where the work is to be performed.
 3. Minimum five years of experience transplanting and establishing trees of the same size, species, and quantity as shown on the plans.

- D. Plant Material Selection:
 1. Trees: Trees will be approved by the Landscape Architect at the tree grower nursery prior to purchase and delivery to the site. Approved tree plants will be tagged by the Contractor at the tree grower nursery. Trees delivered to the site shall be similar in size and quality to the approved tagged sample.
 2. Shrubs: Deliver representative samples of each shrub variety and size to the Project site for verification of specification compliance. Mark shrubs with size, genus, species, cultivar, and variety.
 3. Schedule and arrange meeting of landscape contractor and landscape architect for observation of plant material at the tree grower nursery. Tagging and observation will be based on compliance with requirements for genus, species, variety, cultivar, size, and quality.

4. Owner and landscape architect may observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects.
 5. Remove rejected trees or shrubs immediately from Project site.
- E. Plant Measurements: Measure according to ANSI Z60.1. Spread, height, or container sizes shown on the drawings are minimum acceptable sizes. Do not prune to obtain required sizes. If range of sizes is given, no plant shall be less than minimum size, and at least 50 percent of plants shall be as large as upper half of range specified.
1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread. Do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- F. Soil-Testing Laboratory Qualifications:
1. Multiresidue Herbicide/Pesticide Screen: A NELAC (National Environmental Laboratory Accreditation Conference) certified independent soil testing laboratory with the experience and capability to conduct the testing indicated based on local conditions.
 2. Topsoil Analysis: Independent soil testing laboratory employing a landscape or soil agronomist familiar with the final use of the material and construction practices for large earthwork sites.
- G. Quality Assurance Inspections: Conduct the following inspections during the course of the work in the presence of the Landscape Architect to verify conformance to specification requirements. Notify CEC for observation of inspection by the Landscape Architect. Correct noted deficiencies during each inspection prior to proceeding with subsequent work.
1. Island Inspection: Inspect parking islands for excavation depth and soil conditions prior to installation of planting or irrigation. Obtain sample of planting soil mix.
 2. Substantial Completion Inspection: Convene a substantial completion inspection to observe completed work. Landscape Architect will record the deficient or incomplete items on the deviation log within 3 calendar days of inspection date.
 3. Final Inspection: Within 30 days of substantial completion date, convene a final inspection to observe that all work is completed as specified and shown on the drawings.
 4. Warranty Inspections: Convene a warranty inspection 60 calendar days prior to expiration of warranty period specified in Part 3 herein.
- H. Meeting and Inspection Log: Maintain log of required meetings and inspections. Record the date; time; weather conditions; and a brief summary of the discussions, decisions, agreements (or disagreements) reached. Provide log to CEC for signature and review by Landscape Architect at the conclusion of each meeting. Furnish copy of log to each party attending.

1.5 MEETING AND EVENT NOTIFICATIONS

- A. Provide the following notifications to the Owner's Civil Engineering Consultant (CEC) within the time period listed below. CEC will notify Owner, landscape architect, and other necessary sub consultants:
1. Pre-Work Meeting: Minimum 14 calendar days prior to meeting date.
 2. Plant Material Selection Meeting at Grower: Minimum 14 calendar days prior to meeting date.
 3. Planting Operations: 14 calendar days prior to commencing planting operations.
 4. Island Inspection: 7 calendar days prior to inspection date.
 5. Tree Transplanting: Minimum 7 calendar days in advance for transplanting of trees 8 inches in caliper or greater.
 6. Substantial Completion Inspection: 7 calendar days prior to substantial completion date.
 7. Final Inspection: 7 calendar days prior to Grand Opening.
 8. Warranty Inspection: 14 calendar days prior to inspection date.

- B. Provide notifications by email or other written means to show proof of delivery.

1.6 PROJECT CONDITIONS

- A. Perform work only during weather conditions favorable to landscape construction and to health and welfare of plants. Owner shall determine suitability of such weather conditions.

1.7 WARRANTY

- A. Guarantee plant material for a period of 12-19 months following the Substantial Completion Date in accordance with the Extended Maintenance/Warranty Chart included in Part 3 hereinafter.
 - 1. A limit of one replacement of each plant shall be required, except for losses or replacements due to failure to comply with requirements.
 - 2. Remove from site any plant that is dead or unsatisfactory to Owner, Jurisdiction having Authority, or Landscape Architect. Replace plants during normal planting season.

1.8 EXTENDED MAINTENANCE SERVICE

- A. Provide extended landscape maintenance beyond Substantial Completion as specified in Part 3 Paragraph "Extended Maintenance" for a period as stated in the Extended Maintenance/Warranty Chart included therein. Pursuant to Paragraph 20.5 of the General Conditions, and the associated Performance Bond (Exhibit A) therein, the extended maintenance specified in this section shall be considered within the maintenance obligation of the bond.

PART 2 - PRODUCT

2.1 WOODY PLANT MATERIALS

- A. Furnish nursery-grown trees and shrubs complying with ANSI Z60.1 and the following requirements:
 - 1. Provide plants with healthy root systems developed by transplanting or root pruning.
 - 2. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as disfiguring knots, sun scald, injuries, abrasions, and disfigurement.
 - 3. Provide selected specimen quality plants being exceptionally heavy, symmetrical, tight knit, so trained or favored in their development and appearance as to be superior in form, number of branches, compactness and symmetry.
 - 4. Do not prune plants before delivery.
 - 5. Trees with fresh cuts of limbs over 1 1/4-inch, which have not completely calloused, shall be rejected.
 - 6. Provide plants typical of their species or variety and exhibiting a normal habit of growth and be legibly tagged with proper name. Provide plants grown under climatic conditions similar to those of site or have been acclimated to such condition for at least 2 years.
 - 7. Root system of each plant shall be well-provided with fibrous roots. Parts shall be sound, healthy, vigorous, well-branched, and densely foliated when in leaf.
 - 8. Plants designated ball and burlap shall be moved with root systems as solid units with balls of earth firmly wrapped with burlap and comply with the following:
 - a. Diameter and depth of balls of earth shall be sufficient to encompass fibrous root feeding systems necessary for healthy development of plant.
 - b. No plant shall be accepted when ball of earth surrounding its roots has been cracked or broken preparatory to or during process of planting. Balls shall remain intact during all operations.
 - c. Heel-in plants that cannot be planted immediately by setting in ground and covering balls with soil or mulch and then watering.
 - d. Hemp burlap and twine is preferable to treated. If treated burlap is used, twine shall be cut from around trunk and burlap shall be removed.
 - 9. Provide single trunk trees growing from single unutilated crown of roots. No part of trunk shall be conspicuously crooked as compared with normal trees of same variety.

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- 10. Provide shrubs with thickness corresponding to trade classification "No.1". Single-stemmed or thin plants shall not be accepted. Side branches shall be generous, well-twiggged, and plant as whole well-branched to ground. Plants shall be in moist condition, free from dead wood, bruises, or other root or branch injuries.

2.2 LAWN SEED

- A. Provide fresh, clean, new crop lawn seed mixture. Furnish to Owner dealers guaranteed statement of composition of mixture and percentage of purity and germination of each variety.
- B. Seed Mixture: Provide seed of grass species and varieties, proportions by weight and minimum percentages of purity, germination, and maximum percentage of weed seed. Seed mixtures vary by region and season and shall comply with State DOT and Local Soil Conservation Service Standards for lawn turf.

2.3 SOD

- A. Provide sod species suitable as lawn turf for the region. Sod shall be strongly rooted, weed, disease, pest free and uniform in thickness.

2.4 GROUNDCOVER

- A. Provide groundcover established and well rooted in pots or similar containers and comply with ANSI Z60.1. Slopes steeper than a 3:1 shall receive one or more of the specific regional groundcovers listed below or as shown on the drawings.

1. SOUTHEAST

Coronilla varia	Crown Vetch
Euonymus fortunei	Wintercreeper
Vinca minor	Periwinkle

2.5 TOPSOIL

- A. ASTM D5268, natural, friable, fertile, fine loamy soil possessing characteristics of representative topsoil in the vicinity that produces heavy growth. Topsoil shall have a pH range of 5.5 to 7.4 percent, free from subsoil, objectionable weeds, litter, sods, stiff clay, stones larger than 1-inch in diameter, stumps, roots, trash, herbicides, toxic substances, or any other material which may be harmful to plant growth or hinder planting operations. Top soil shall contain a minimum of three percent organic material.
- B. Topsoil shall be tested in accordance with part 3 below.
- C. Salvaged or Existing Topsoil: Reuse suitable topsoil stockpiled on-site or existing topsoil undisturbed by grading or excavation operations. Clean topsoil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
- D. Verify amount of suitable topsoil stockpiled if any, and supply additional imported topsoil as needed.
- E. Imported Topsoil: Supplement salvaged topsoil with imported topsoil from off-site sources when existing quantities are insufficient.
 - 1. Obtain topsoil displaced from naturally well-drained sites where topsoil occurs at least 6 inches deep; do not obtain from agricultural land, bogs, or marshes.
 - 2. Verify borrow and disposal sites are permitted as required by state and local regulations. Obtain written confirmation that permits are current and active.
 - 3. Obtain permits required by state and local regulations for transporting topsoil. Permits shall be current and active.

- F. Amend existing and imported topsoil as indicated in part 3 below.

2.6 ORGANIC SOIL AMENDMENTS

- A. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.
- B. Back to Nature Cotton Burr Compost or approved equivalent.
- C. Compost: Decomposed organic material including leaf litter, manure, sawdust, plant trimmings and/or hay, mixed with soil.
- D. Pecan Hulls: Composted pecan hulls for local source.
- E. Biosolids: Use Grade 1 containing lower pathogen levels.
- F. Worm Castings: Earthworms.

2.7 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C602, Class O agricultural limestone containing a minimum of 80 percent calcium carbonate equivalent with a minimum of 95 percent passing No. 8 sieve and minimum of 55 percent passing No. 60 sieve.
- B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing No. 6 sieve and a maximum of 10 percent passing No. 40 sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Agricultural Gypsum: Finely ground, containing a minimum of 90 percent calcium sulfate.
- E. Sand: Clean, washed, natural or manufactured, free of toxic materials.

2.8 PLANTING ACCESSORIES

- A. Non Selective Herbicide: Roundup-Pro, Finale or equivalent.
- B. Selective Post Emergent Herbicide: EPA registered and approved, of type recommended by manufacturer for application.
- C. Selective Pre-Emergent Herbicide: EPA registered and approved, of type recommended by manufacturer for application.

2.9 PLANTING SOIL MIX

- A. Planting medium containing 75 percent specified topsoil mixed with 15 percent organic soil amendments and 10 percent sharp washed sand.

2.10 FERTILIZER

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.

1. Composition: Nitrogen, phosphorous, and potassium in amount required to remedy deficiencies identified in the results of the existing topsoil and in-place topsoil test performed by the geotechnical engineering company and the CTL.
- B. Slow-Release Fertilizer: Use one of the following:
1. Osmocote Standard Granular fertilizer by Scotts Company composed of 13 percent nitrogen, 13 percent phosphorous, and 13 percent potassium, by weight.
 2. Multi-Cote All Purpose by Schultz composed of 17 percent nitrogen, 17 percent phosphorous, and 17 percent potassium, by weight.
- C. Deliver fertilizer, mixed as specified, in original unopened standard size bags showing weight, analysis and name of manufacturer. Containers shall bear manufacturer's guaranteed statement of analysis, or manufacturer's certificate of compliance covering analysis shall be furnished to Owner. Store fertilizer in such manner that it shall be kept dry.

2.11 MULCH

- A. Straw Mulch: Straw mulch shall used for seeding purposes only and shall be air-dry, clean, mildew and seed free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Wood Mulch: Wood mulch shall be shredded hardwood or softwood mulch obtained from a local source harvested in a sustainable manner and salt free and free from deleterious materials and suitable as a top dressing of trees and shrubs. Mulch shall have the characteristics of retaining moisture, forming a mat not susceptible to spreading by wind or rain, and providing a suitable growth medium for plants and shall be free of soil, rocks, weeds, sawdust, dirt, garbage, or other debris.
1. Hardwood Mulch: Shredded hardwood mulch shall consist of long fibrous interlocking strands.
 2. Softwood Mulch: Softwood mulch shall be medium sized softwood material 1/2 to 3 inches with fines of 1/2 inches and below produced from douglas fir, hemlock, or red cedar.
 3. Color: Natural.
- C. Mineral Mulch: Mineral mulch shall consist of decomposed granite, crushed rock, or gravel. Mulch shall be hard, durable stone, washed free of loam, sand, clay, and other foreign substances.
1. Where wood mulch is shown or specified, mineral mulch shall be used where regionally appropriate or where wood mulch is not readily available.
 2. Size Range: 3/4 inch maximum 1/4 inch minimum.
 3. Color: Readily available natural gravel color range.
- D. Pine Bark or Pine Needle Mulch shall not be used.

2.12 TREE STAKING

- A. Tomahawk Tree Stabilizer and Fertilization System manufactured by Border Concepts, Inc. (800)845-3343.
1. Part # 82100 – 42 inch Tomahawk
 2. Part # 82101 – 32 inch Tomahawk

2.13 WATER

- A. Potable water, hose, and other watering equipment.

2.14 WEED MAT

- A. 4.1 oz., woven polypropylene, needle-punched fabric, weed barrier.

2.15 STEEL EDGING

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- A. 1/8-inch x 4-inch interlocking steel edging, staked with metal stakes sufficiently to hold in place.

2.16 EROSION CONTROL BLANKET

- A. Rolled Erosion Control Products shall have current QDOR™ (Quality Data Oversight and Review) status issued by the Erosion Control Technology Council and shall meet state or agency specific requirements. Evidence of QDOR™ approval shall accompany the product shipped to the job site for ready identification by the contractor or an agency inspector.

PART 3 - EXECUTION

3.1 PREPARATION

- A. If project completion date prohibits in-season planting, prepare for out-of-season seeding or sodding so that lawns shall be completed and ready for acceptance at time of project completion.
- B. Unsuitable Subsoils: Locations containing unsuitable subsoil shall be treated by one or more of the following:
 - 1. Where unsuitability is deemed by Owner to be due to excessive compaction caused by heavy equipment and where natural subsoil is other than AASHTO classification of A6 or A7, loosen such areas with spikes, discing, or other means to loosen soil to condition acceptable to Owner. Loosen soil to minimum depth of 12 inches with additional loosening as required to obtain adequate drainage. Contractor may introduce peat moss, sand, or organic matter into the subsoil to obtain adequate drainage. Such remedial measures shall be considered as incidental, without additional cost to Owner.
 - 2. Where unsuitability is deemed by Owner to be due to presence of boards, mortar, concrete, or other construction materials in sub-grade and where natural subsoil is other than AASHTO classification of A6 or A7, remove debris and objectionable material. Such remedial measures shall be considered as incidental, without additional cost to Owner.
 - 3. Where unsuitability is deemed by Owner to be because natural subsoil falls into AASHTO classification of A6 or A7 and contains moisture in excess of 30 percent, then installation of sub-drainage system or other means described elsewhere in Specifications shall be used. Where such conditions have not been known or revealed prior to planting time and they have not been recognized in preparation of The Drawings and Specifications, then Owner shall issue pricing order to install proper remedial measures.
- C. Unsuitable Topsoil: Locations containing unsuitable topsoil shall be treated by one or more of the following:
 - 1. Where unsuitability is deemed by Owner to be because of presence of objectionable weeds; litter; sods; stiff clay; toxic substances; herbicides or other material which may be harmful to plant growth, then topsoil shall be removed from the site and disposed of in a legal manner.
 - 2. Where unsuitability is deemed by Owner to be because of presence of the stumps, roots; stones larger than 1 inch in diameter; less than 3 percent organic material; low or high pH range, remove objectionable material and amend topsoil to meet the requirements specified in part 2 above. Such remedial measures shall be considered as incidental, without additional cost to Owner.
- D. Perform planting operations at steady rate of work unless weather conditions make it impossible to work. No plant material shall be planted in frozen ground.
- E. Tree and Shrub Preparation
 - 1. Dig bare-rooted shrubs with adequate fibrous roots. Cover roots with uniformly thick coating of mud by being puddled immediately after they are dug, or packed in moist straw or moss.
 - 2. Dig ball and burlap plants with firm natural balls of earth of diameter and depth to include fibrous roots.
 - 3. Protect roots or balls of plants at all times from sun and drying winds.
 - 4. Ball and burlap plants which cannot be planted immediately upon delivery shall be set on ground and protected with soil, wet moss, or other acceptable material. Heel-in bare rooted plants that cannot be planted immediately upon delivery. All shall be kept moist.

5. Open and separate bundles of plants before roots are covered. Prevent air pockets among roots. During planting operations, cover bare roots with canvas, hay, or other suitable material. Plants shall not be bound with wire or rope which will result in damage to bark or branches.
- F. Sod and Seed Bed Preparation
1. Newly Graded Subgrades:
 - a. Do not place topsoil until subgrade has been approved in accordance with Section 02300.
 - b. Before placing topsoil, rake subsoil surface clear of stones, debris, and roots. Disk, drag, harrow, or hand rake subgrade to depth of 4 inches and remove stones larger than 1-1/2 inches to provide bond for topsoil.
 - c. Spread topsoil to a depth of 4 inches but not less than required to meet finish grades after light rolling and natural settlement. Adjust depth of topsoil in areas adjacent to paved surfaces or curbs to allow for the placement of sod or seed.
 2. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface as follows:
 - a. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
 - b. Disk, drag, or harrow surface soil to a depth of at least 6 inches.
 - c. Remove stones larger than 1-1/2 inch in any dimension and sticks, roots, trash, and other extraneous matter.
 - d. Legally dispose of waste material, including grass, vegetation, and turf.
 - e. Adjust depth of topsoil in areas adjacent to paved surfaces or curbs to allow for the placement of sod or seed.
 3. Incorporate soil amendments and commercial fertilizer into the top 4 inches of topsoil to achieve the specified topsoil requirements. Till soil to a homogenous mixture of fine texture.
 4. Grade areas to finish grades, filling as needed or removing surplus topsoil. Float areas to smooth, uniform grade as indicated on the Drawings. Lawn areas shall slope to drain.
 5. Where no grades are shown, areas shall have a smooth and continual grade between existing or fixed controls, such as walks, curbs, catch basin, steps, or buildings. Roll, scarify, rake, and level as necessary to obtain true, even lawn surfaces. Finish grades shall meet approval of Owner.
 6. Sod and seed beds shall be firmed by rolling before seeding begins.
- G. Groundcover Bed Preparation:
1. Grade areas to finish grades, filling as needed or removing surplus topsoil. Float areas to smooth, uniform grade as indicated on the Drawings.
 2. Set out and space groundcover 12 inches apart maximum.
 3. Dig holes large enough to allow spreading of roots, and backfill with planting soil.
 4. Remove groundcover from pots.
 5. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
 6. Water thoroughly after planting taking care not to cover plant crowns with wet soil.
 7. Protect plants from hot sun and wind; remove protection when plants show evidence of recovery from transplanting shock.
- H. Island Preparation:
1. Excavate compacted soil to a depth of 24 inches.
 2. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 3. Scarify sides of excavation pit smeared or smoothed during excavation.
 4. Subsoil or topsoil removed from islands shall not be used in planting soil mix.
 5. Notify Owner's CEC if subsoil conditions evidence unexpected water seepage or retention within excavation area.
 6. Backfill islands in 9 inch lifts with planting soil mix specified herein. Tamp each lift lightly to prevent settling.

7. Grade areas to finish grades, filling as needed to allow positive drainage. Float areas to a smooth, uniform grade as indicated on the Drawings.
- I. Raised Planter Preparation:
 1. Excavate compacted soil and construction debris within raised planter to minimum 12 inches below finish grade of adjacent sidewalk.
 2. Notify Owner's CEC if subsoil conditions evidence unexpected water seepage or retention with the excavation area.
 3. Scarify bottom of excavation and provide positive drainage to drainage pipe.
 4. Install drainage pipe as shown in the drawings.
 5. Backfill raised planter in 9 inch lifts with specified planting soil mix to within 1 inch of bottom edge of wall cap. Tamp each lift lightly to prevent settling. If settling occurs prior to planting add additional planting soil mix.
 6. Grade areas to finish grades, filling as needed to allow positive drainage. Float areas to a smooth, uniform grade as indicated on the Drawings.

3.2 PROTECTION

- A. Topsoil which must be transported across finished sidewalks shall be delivered in such manner that no damage will be done to sidewalks.
- B. Before commencing work, trees and shrubs that are to be saved shall be protected from damage by placement of fencing flagged for visibility or some other suitable protective procedure approved by Owner.
- C. Trucks or other equipment shall not be driven or parked within drip line of any tree unless tree overspreads paved area.
- D. Use precautionary measures when performing work around trees, sidewalks, pavements, utilities, and other features either existing or previously installed.
- E. Adjust depth of earthwork and topsoil when working immediately adjacent to aforementioned features in order to prevent disturbing tree roots, undermining sidewalks and pavements, and damage in general to other features either existing or previously installed.
- F. Cover plants transported to project in open vehicles with tarpaulins or other suitable covers securely fastened to body of vehicle to prevent injury to plants. Closed vehicles shall be adequately ventilated to prevent overheating of plants. Evidence of inadequate protection following digging, carelessness while in transit, or improper handling or storage shall be cause for rejection. Plants shall be kept moist, fresh, and protected. Such protection shall encompass entire period during which plants are in transit, being handled, or are in temporary storage.
- G. Plants shall not be delivered to the site more than seven days prior to planting. Plants not planted within 48 hours of delivery, shall be healed in (covered with sawdust, soil or mulch), and the containers or balls protected from wind and temperature and kept moist until planting.
- H. Where excavation, fill, or grading is required within drip line of trees that are to remain, work shall be performed as follows:
 1. Trenching: When trenching occurs around trees to remain, tree roots shall not be cut but trench shall be tunneled under or around roots by careful hand digging without injury to roots.
 2. Raising Grades:
 - a. Where fill not exceeding 16 inches is required, clean, washed gravel graded from 1 inch to 2 inches in size shall be placed directly around tree trunk. Extend gravel out from trunk on all sides minimum of 18 inches and finish approximately 2 inches above finished grade at tree. Install gravel before any earth fill is placed. New earth fill shall not be left in contact with trunks of trees requiring fill.

- b. Where fill exceeding 16 inches is required, construct dry-laid tree well around trunk of tree. Tree well shall extend out from trunk on all sides minimum of 3 feet and to 3 inches above finish grade. Place coarse-graded rock directly around tree well extending out to drip line of tree. Place clean, washed gravel graded from 1 inch to 2 inches in size directly over coarse rock to depth of 3 inches. Place approved backfill material directly over washed gravel to desired finish grade.
- 3. Lowering Grades: Existing trees in areas where new finish grade is to be lowered shall have regrading work done by hand to elevation indicated on The Drawings. Roots as required shall be cut cleanly 3 inches below finished grade and scars covered with tree paint.
- 4. Trees marked for preservation that are more than 6 inches above proposed grades shall stand on broad rounded mounds and graded smoothly into lower level. Trees located more than 16 inches above proposed grades shall have dry-laid stone wall or other retaining structure as detailed on The Drawings constructed minimum of 5 feet from trunk. Exposed or broken roots shall be cut clean and covered with topsoil.

3.3 PLANTING BED ESTABLISHMENT

- A. Prior to preparing planting beds, the area shall conform to the lines and grades shown on the plans and the condition of the subsoil shall be approved by the Owner.
- B. Contractor shall verify the location of any underground utilities on site.
- C. Planting beds where existing subsoil is determined by Owner to be unsuitable for plant growth in accordance paragraph Unsuitable Subsoil herein shall be excavated to a depth of 24 inches or as needed to provide adequate drainage. Replace excavated soil with planting soil mix.
- D. Planting beds where existing subsoil is acceptable by Owner shall be prepared as follows:
 - 1. Seven days prior to commencing establishment of the planting areas, apply non selective herbicide. Remove dead vegetation.
 - 2. Loosen subsoil to a depth of 12 inches. Remove stones larger than 1 inch in any dimension, sticks, roots, rubbish, and other extraneous matter and legally dispose of them off site.
 - 3. Spread 3 inches of soil conditioner over the surface of the planting area and incorporate into the top 12 inches of the soil. Prior to spreading soil conditioner, add or remove topsoil as needed to accommodate addition of soil conditioner and to achieve finish grade.
 - 4. Till planting soil mix to a homogenous mixture of fine texture.
 - 5. Float areas to smooth, uniform grade providing positive drainage out of planting beds and away from structures or as indicated on the Drawings.
- E. Apply slow release fertilizer at a rate of 1-1/2 pounds per 100 square feet for beds areas or as recommended by manufacturer and incorporate into the top 8 inches.

3.4 TREE AND SHRUB PLANTING

- A. Plants too large for 2 persons to lift in and out of holes shall be placed with sling. Do not rock trees in holes to raise.
- B. If rock or other underground obstruction is encountered, Owner may require plant pits to be relocated, pits enlarged, or plants deleted from project.
- C. Make adjustments in locations as directed. In event that pits or areas for planting are prepared and backfilled with planting soil mix or topsoil to grade prior to commencement of lawn operations, they shall be so marked that when planting proceeds, they can be readily located. In case underground obstructions such as ledges or utilities are encountered, change location under direction of Owner without charge.

- D. Holes for trees shall be at least 2 feet greater in diameter than spread of root system and at least 6 inches deeper than root ball or as shown on the Drawings. Holes for shrubs shall be at least 2 feet greater in diameter than the spread of root system and at least 2 feet deep or as shown on the Drawings. Holes for vines shall be at least 12 inches greater in diameter than the spread of rootball at least 12 inches deep.
- E. Backfill tree holes and shrub beds with planting soil mix. Apply slow release fertilizer at a rate of 1/4 pounds per caliper inch for trees. Incorporate fertilizer into the planting soil mix.
- F. Plants shall be planted at same depth as they had previously grown or as shown on the drawings. Backfill planting soil mix in layers of not more than 8 inches and each layer watered sufficiently to settle before next layer is placed. Tamp planting soil mix under edges of balled plants. Use enough planting soil mix to bring surfaces to finish grade when settled.
 - 1. Provide saucer around each plant as shown on The Drawings.
 - 2. Soak plants with water twice within first 24 hours after time of planting. Apply water with low pressure so as to soak in thoroughly without dislodging topsoil.
- G. Tree Staking: Install Tomahawk Tree Stabilizer and Fertilization System as shown on the drawings. Use one size larger than required by manufacturer.

3.5 MISCELLANEOUS INSTALLATIONS

- A. Weed Mat: Place weed mat under planting areas that will not be seeded and in any other locations as shown on the Drawings. Cover weed mat with 4 inches of mulch and secure in place with soil staples.
- B. Mulch: Place 4 inches of mulch as a top dressing in planting beds. Mulch single trees or shrubs to outside edge of saucer.
- C. Peg sodded slopes greater than 3:1 to hold in place.
- D. Areas to be covered with erosion control blankets shall be properly prepared, fertilized, and seeded before blanket is applied. When blanket is unrolled, netting shall be on top and fibers in contact with soil. In ditches, apply blanket in direction of flow of water. On slopes, apply blankets vertically on slope. Overlap ends and sides 6 inches and staple per manufacturer's written instructions.

3.6 AREAS TO BE TURFED

- A. Unless otherwise shown on the plans, disturbed areas including out-lots shall be permanently sodded and seeded.
- B. Place 16-24 inch wide strip of solid slab sod adjacent to paved surfaces including sidewalks, curbs, walls, drainage structures, and vehicular pavement as shown on the drawings.
- C. Continually seed remaining disturbed areas until fully turfed with no bare spots.

3.7 SOIL STABILIZATION

- A. Provide one or more of the following techniques to prevent soil eroding from denuded areas and leaving the site. Refer to stabilization requirements in Section 02370.
 - 1. Temporary Seeding or Stabilization.
 - 2. Permanent Seeding, Sodding, or Mulching.

3.8 SEEDING

- A. Do not perform seeding in windy conditions.

- B. Seeding shall be dispersed in 2 directions at right angles to each other.
- C. Permanently seed and mulch cut and fill slopes as construction proceeds to extent considered desirable and practical. In the event it is not practical to seed areas, slopes shall be stabilized with straw mulch and tackifier, bonded fiber matrix, netting, blankets or other means to reduce the erosive potential of the area.
- D. Seed lawn areas by sowing evenly with approved mechanical seeder at rate of minimum of 3 pounds per 1,000 square feet. Culti-packer or approved similar equipment may be used to cover seed and to form seedbed in one operation. In areas inaccessible to culti-packer, lightly rake seeded ground with flexible rakes and roll with water ballast roller. After rolling mulch with straw mulch at the rate of 2 tons per acre.
- E. Surface layer of soil for seeded areas shall be kept moist during germination period. Water seeded areas twice first week to minimum depth of 6 inches with fine spray and once per week thereafter as necessary to supplement natural rain to equivalent of 6 inches depth.

3.9 SODDING

- A. Cut and lay sod on same day. Only healthy vigorous growing sod shall be laid.
- B. Lay sod across slope and tightly together to result in solid coverage free of gaps.
- C. Roll or firmly but lightly tamp new sod with suitable wooden or metal tamper sufficiently to set or press sod into underlying soil.
- D. All finished sodding shall be smooth and free of lumps and depressions.
- E. After sodding has been completed, clean up and thoroughly water newly-sodded areas.

3.10 MAINTENANCE DURING CONSTRUCTION

- A. Begin maintenance operations immediately after each plant is planted and continue as required until acceptance. Water, mulch, weed, prune, spray, fertilize, cultivate, and otherwise maintain and protect plants. Re-set settled plants to proper grade and position, restore planting saucers, and remove dead, diseased, or unhealthy plant material. Tighten and repair stakes and wires. Correct defective work as soon as possible after it becomes apparent and weather and season permit.
- B. Upon completion of the planting operations, clean up landscaped areas to be free of stones, containers, trash, and other waste and debris to leave area in a neat and well groomed appearance.
- C. Supplement rainfall as required to provide an equivalent of 1 inch of water per week until the plants have rooted and are established.
- D. Maintain all plant material in a healthy, vigorous growing condition.
- E. Make weekly inspections to determine moisture content of soil and adjust watering schedule established by irrigation system installer to fit conditions.
- F. After grass growth has started, reseed or sod areas that fail to show uniform stand of grass in accordance with The Drawings and as specified herein. Continue Reseeding and sodding such areas repeatedly until areas are covered with satisfactory growth of grass. Perform removal and replacement or topsoil conditioning if required to facilitate establishment of grass.

- G. Water in such manner and as frequently as is deemed necessary by Owner to assure continued growth of healthy grass. Water areas of site in such a manner as to prevent erosion due to excessive quantities applied over small areas and to avoid damage to finished surface due to watering equipment.
- H. Provide water for execution and maintenance at no expense to Owner. Furnish portable tanks, pumps, hose, pipe, connections, nozzles, and any other equipment required to transport water from available outlets and apply it to seeded areas in approved manner.
- I. Mowing:
 - 1. Initiate mowing of turf grass areas when grass has attained height of 3 inches and roots are firmly established. Maintain turf grass height at 2 1/2 to 3 inches at subsequent cuttings depending on time of year. Remove no more than 1/3 of grass leaf at any cutting and cutting shall not occur more than 10 days apart.
 - 2. Mow native grass areas no more than 3 times per year to a height of no less than 4 inches.
- J. Remove heavy cuttings to prevent destruction of underlying turf. If weeds or other undesirable vegetation threaten to smother planted species, such vegetation shall be mowed or, in case of rank growths, shall be uprooted, raked and removed from area by methods approved by Owner.
- K. Remove weeds and other undesirable vegetation by applying herbicides as recommended by the manufacturer or by uprooting. Rake and remove uprooted vegetation from area by methods approved by Owner.
- L. Protect seeded area from pedestrian or vehicular trespassing while grass is germinating. Provide fences, signs, barriers, or other necessary temporary protective devices. Repair damage resulting from trespass, erosion, washout, settlement, or other causes.
- M. Remove fences, signs, barriers, or other temporary protective devices after final acceptance.
- N. Remove and replace diseased, distressed, dead, or rejected plants prior to Substantial Completion Date.
- O. Replacements shall be plants of same variety and size specified on The Drawings. Furnish and plant as specified herein. Replacements resulting from removal, loss, or damage due to occupancy of project in any part, vandalism, physical damage by animals, vehicles, etc., and losses due to curtailment of water by local authorities will be approved and paid for by Owner.
- P. Grassed areas damaged during process of work shall be restored or repaired to condition satisfactory to the Owner. Fill, grade, re-fertilize, replant, or mulch as required to restore to contract requirements.

3.11 FILED QUALITY CONTROL

- A. Field quality control shall be the responsibility of the Contractor in accordance with Section 01452. Except for specified mandatory testing, field quality control testing and inspection shall be at the discretion of the Contractor as necessary to assure compliance with Contract requirements. Owner T&I specified below shall not be considered a substitute for the Contractor's responsibility to perform similar routine, necessary, and customary testing and inspection of the methods and frequency suitable for the type of work involved.
- B. Retain an independent soil testing laboratory to sample and test imported topsoil. The testing lab for the Multi-residue Herbicide/Pesticide Screen shall be NELAC certified.
 - 1. Topsoil Analysis: Collect 5 random samples from the topsoil borrow area or areas. Combine samples and test as a composite for percentages of organic matter; presence of herbicides; percentage of sand, silt, and clay content; deleterious material; pH; and mineral and plant-nutrient content of topsoil.
 - 2. Multiresidue Herbicide/Pesticide Screen: Perform a multiresidue herbicide/pesticide screen that includes the following herbicides and pesticides: Acetochlor, Alachlor, Atrazine, Butylate, Carbofuran, Clomazone, Cyanazine, Diazinon, Ethyl Chlorpyrifos, Ethyl Parathion, EPTC, Ethalfluralin, Fluchloralin, Fonofos,

Isofenphos, Malathion, Methyl Parathion, Metolachlor, Metribuzin, Pebulate, Propachlor, Prometon, Propazine, Pendimethalin, Simazine, Trifluralin, and Vernolate.

3. Submit topsoil borrow area test reports to Owner’s Civil Engineering Consultant (CEC) minimum 6 weeks prior to delivery to site.

3.12 OWNER TESTING AND INSPECTION (T&I)

- A. The Owner will perform testing and inspection (T & I) but only as a means of verification to the Owner of Contractor quality control performance.
- B. Owner T&I specified herein below will be performed by the Owner’s Construction Testing Laboratory (CTL) in accordance with Section 01458
- C. The CTL will perform topsoil testing for verification of depth of topsoil placement as follows:
 - a. Open Lawn Areas: Test at 50 feet on center, minimum 1 inspection per area
 - b. Parking Islands: One test per 200 square feet of sod and seed bed preparation area, minimum one per island.
2. Submit test reports in accordance with Section 01458.

3.13 EXTENDED MAINTENANCE

- A. Provide landscape maintenance for the site including stormwater conveyance systems as specified below.
- B. Comply with Federal, State, Local or other governmental requirements relating to the general upkeep and maintenance of Stormwater Conveyance Systems, Natural Areas, Natural and Created Wetlands. Failure to follow these standards will fall to the liability of the Contractor
- C. Commence Extended Maintenance immediately after Substantial Completion Date and continue as indicated on the following chart:

D.

EXTENDED MAINTENANCE / WARRANTY CHART		
Substantial Completion Date	Extended Maintenance / Warranty Expiration	Duration
December	July	19 months
January	July	18 months
February	July	17 months
March	July	16 months
April	July	15 months
May	July	14 months
June	July	13 months
July	July	12 months
August	August	12 months
September	September	12 months
October	October	12 months
November	November	12 months

- E. General Landscaping: Landscape maintenance shall include necessary watering, cultivation, weeding, pruning, wound dressing, disease and insect pest control, protective spraying, straightening plants which lean or sag, adjustments of plants which settle or are planted too low, mowing, replacement of mulch that has been displaced, repairing and reshaping of saucers, and reseeding or replanting of those areas affected. Remove rubbish, waste, tools, and equipment used at end of each workday.

- F. Watering
 - 1. Utilize the Owner's irrigation system for watering. Failure of system does not relieve Contractor's responsibility of maintaining desired level of moisture necessary to maintain vigorous, healthy growth.
 - 2. Apply water in quantities sufficient to penetrate soil to minimum depth of 8-inches in shrub beds and 6-inches in turf areas at rate that will prevent saturation of soil.
 - 3. Supplemental on-site water will be furnished by Owner. Contractor shall furnish hose and other watering equipment as required for supplemental watering.

- G. Weeding: Maintain all shrub and groundcover areas free from weeds and undesirable grasses.

- H. Disease and insect pest control: Inspect plant material at least once each month to locate any disease or insect pest infestations. Upon discovery of infestation, nature or species of infestation shall be identified. Spray or treat as required to keep trees and shrubs free of insects and disease.

- I. Supplement rainfall and irrigation system as required to provide adequate water for vigorous and healthy growth of trees.

- J. Pruning and Repair: Prune as required to remove dead or injured branches, to compensate for loss of roots as result of transplanting operations, and to maintain safety in traveled areas. Pruning shall not change the natural habit or attractive, balanced shape of plant. Cuts shall be made at the outside edge of the branch collar.

- K. Turf Maintenance: Maintain an establish lawn by watering, fertilizing, weeding, mowing, trimming, edging, re-planting and operations required to maintain full turf coverage. Roll, re-grade, re-mulch, and replant bare or eroded areas greater 1 square foot to produce a uniformly smooth lawn. Provide materials and installation techniques the same as those used in the original installation.
 - 1. Mowing:
 - a. Mow turf grass areas at regular intervals to keep turf height from exceeding 3-inches. Maintain turf grass height at 2-1/2 to 3-1/2 inches at subsequent cuttings depending on time of year. Remove no more than 1/3 of grass leaf at any cutting. Mow turf grass at intervals of not more than 10 days during growing season. Mow in such manner as to prevent clippings from blowing onto paved areas and sidewalks. Cleanup after mowing shall include sweeping or blowing to clear mowing debris.
 - b. Mow native grass areas no more than 3 times per year to a height of no less than 4 inches.
 - 2. Edging: Mechanically edge turf areas adjacent to sidewalks, curbs and other paved surfaces with a blade type edger. Perform edging with each mowing interval.
 - 3. Trimming: Trim grass around valve boxes, poles and other structures with string type trimmers. Do not trim grass around tree trunks with mechanical trimmer. Remove grass adjacent to tree trunk by methods that will not cause damage to trees.
 - 4. Turf Fertilization: Apply balanced commercial grade fertilizer minimum 4 times annually. Adjust type, frequency, and quantity of fertilizer to provide lush and healthy turf at all times. Spilled or excess fertilizer shall be swept and properly disposed. Flushing into storm sewer is prohibited.
 - 5. Turf Weed Control: Develop and maintain a broadleaf weed and foreign grass control program consisting of both post and pre-emergent chemical control. Maintain turf in a weed-free condition.

- L. Clean up: During course of maintenance, excess and waste materials shall be continuously and promptly removed at end of each workday.

- M. Maintenance report and schedule of activities: Utilizing the online Evoco Quickbase Landscape tracking application to provide monthly schedules and reports to Owner detailing previous and subsequent planned maintenance activities. Use the report form located at the end of this section. Include dated digital photographs in PDF format with each monthly report showing current and full clear views of entire landscaped and turf areas. Upload maintenance report and photos to the Quickbase Landscape tracking application each month.

- N. General Irrigation:

1. Contractor shall maintain the irrigation system in good operating condition and coordinate the operation of the system with the store manager through monthly inspections of system components and make repairs or replacement of parts as necessary. This includes checking and verifying operation in each zone including but limited to the following: head alignment, rain sensors, controller, cleaning and replacing filters, observe drip emitters and tubing for problems, calibrate on-site weather station, and leak detection.
 2. Optimize water usage and water conservation by adjusting programming to allow for weather changes and growth seasons. Irrigation shall be conducted between 2:00 a.m. and 6:00 a.m. unless requested by Owner.
 3. In the event of irrigation system failure, provide manual watering to keep the plant material in a vigorous, healthy condition until system is restored.
 4. Comply with water rationing ordinances mandated by the jurisdictional authorities.
- O. Winterization:
1. When cold weather approaches and chance for freezing conditions exist, the irrigation system shall be drained after each use.
 2. Winterization procedure shall include the following:
 - a. Shut water off at main gate valve
 - b. Open manual drain valves
 - c. Blow out each section twice with compressed air
 - d. Set controller to cycle through each section minimum time available, once each day through winter months.
 - e. If backflow preventer is installed with unions, remove and store out of weather.
- P. Spring Start-up: Spring start-up procedure shall include the following:
1. Reinstall backflow prevention device.
 2. Close manual drain valves.
 3. Slowly turn water on.
 4. Check for leaks and proper alignment of heads.
 5. Check drip line and emitters for damage.
 6. Repair and adjust system as required for proper operation.
- Q. Contractor's Responsibility: Landscaped areas shall be maintained by Contractor:
1. Maintain areas adjacent to stormwater conveyances and collection areas as follows:
 - a. Mow only to the top of bank, top of side slope, or the perimeter fence.
 2. Perform limited maintenance including trash and debris removal only from stormwater conveyance systems including swales, ditches, channels, dry detention and wet detention (retention) basins except for within open water areas.
 3. Contractor shall not operate motorized equipment or perform maintenance activities including mowing, trimming, herbicide, pesticide or fertilizer applications within areas identified as stormwater conveyance or collection areas.
 4. Evaluate and report overall condition of wetland areas and plant material on the monthly maintenance report provided below. Compliance testing, sampling and reporting including, but not limited to water samples and photos will be provided by others.
 5. Determine applicable environmental laws and regulations regarding the use of chemicals adjacent to these areas and complying with all such applicable laws and regulations. Contractor shall not apply any chemicals directly or indirectly into stormwater conveyance or collection areas.
 6. Comply with all Federal, state, local or other governmental requirements relating to the general upkeep of these areas. Failure to follow these standards will fall to the liability of the Contractor.
- R. No-Fault Repair and Correction: No fault repair and correction work shall consist of work to correct faults or repair damage existing through no fault of the Contractor, but which is necessary for the continued proper maintenance and operation of the landscape system including correction of sprinkler system, on-site utilities, equipment, landscape plants or materials damage, or other corrections necessary for the duration of the Extended Maintenance/Warranty Period specified above. No fault repair and correction shall not include work as other-

wise defined within the scope of Extended Maintenance. The Contractor shall perform such necessary work and shall bear costs up to an amount of \$300 per month. This amount, multiplied by number of months of anticipated warranty period, shall be included in the bid price.

END OF SECTION



School Capacity Availability Letter of Determination

Seminole County Public Schools



Educational Support Center
400 East Lake Mary Blvd. Sanford, FL 32773-7127

Project Information	
Project Name	Winter Springs Townhomes
School District Tracking #	2018-17
Jurisdiction	City of Winter Springs
Parcel ID (s)	26-20-30-5AR-0A00-007K
Project Location:	Town Center-east side of Michael Blake Blvd
Number of Residential Units:	114
Residential Unit Type:	Single Family Attached
Property Owner/Developer:	DFH Land, LLC
Applicant Name:	Batey Mcgraw

Development Review Table							
	CSA	Enroll-ment	Capacity (Incl. Programed 3 Yr. additions)	Prior Reserved Capacity	Total Available Capacity	Capacity Reserved for Project	Remaining Available Capacity
Elem	E-3	2749	3141	168	224	12	212
Middle	M-3	3449	3977	188	340	6	334
High	H-3	4427	4806	148	231	8	223

This School Capacity Availability Letter of Determination reserves capacity for the above referenced parcel(s) and confirms that said parcel(s) and the resulting subdivision meets the School Concurrency requirements of Section 163.3180, Florida Statutes, and the adopted 2007 Interlocal Agreement for Public School Facility Planning and School Concurrency, as amended.

The duration for which capacity is reserved shall be subject to the respective municipality's Land Development Code, but shall not exceed two years from the date of jurisdiction's development approval or the issuance of a building permit, whichever occurs first.


 Michael Rigby, AICP, Facilities Planner

 Richard LeBlanc, Director of Facilities

10/1/2018 Date
10/1/2018 Date

Terms and Definitions:

Capacity: the total capacity within a CSA which is in place or under construction within the first three years of the School Board's current Capital Improvement Plan will be calculated, and is counted as available capacity for the residential development under review. Adjacent CSA's are considered if no capacity is available in the effected CSA.

Capacity Reserved for Project: is determined by applying the current SCPS student generation rate (as adopted in the current impact fee study) to the number and type of units proposed in the development request. **Capacity is reserved in the CSA providing said capacity. Student assignment may not be to the school in closest proximity to the proposed residential development.**

Concurrency Service Area (CSA): A geographic unit promulgated by the School Board and adopted by local governments within which the level of service is measured when an application for residential development is reviewed for school concurrency purposes. **The CSA listed represents the area that the capacity is reserved and may be adjacent to the projects actual CSA.**

Enrollment: The total enrollment count as recorded on October 13, 2017 for all schools, by type within each respective CSA.

Level of Service Standard (LOS): A standard or condition established to measure utilization within a concurrency service area. Current Level of Service is determined by the sum of the FTE student count at the same type of schools within a concurrency service area, divided by the sum of the permanent FISH capacity of the same type of schools within a concurrency service area. Projected or future Level of Service is determined by the sum of the projected COFTE enrollments at the same type of schools within a concurrency service area, divided by the sum of the planned permanent FISH capacity of the same type of schools within a concurrency service area. The levels of service shall be as follows:

Elementary and Middle School CSA	2008-2012 100%	Beginning 2013 100%
High School CSA	110%	100%

Prior Reserved Capacity: is school capacity that is assigned to all residential development which has received final approval after January 1, 2008. This total will be subtracted from the available capacity in each respective CSA to determine impacts to LOS.

Remaining Available Capacity: is the number of remaining student stations available for concurrency purposes after the reserved capacity is deducted.

Total Available Capacity: is the net of the capacity less enrollment and reserved capacity in the effected CSA. This amount must be equal to or greater than the capacity reserved for the development to be issued a SCALD.



November 14, 2018

Dan Edwards
Dream Finders Homes
360 Corporate Way
Orange Park, Florida 32073

**Proj: Winter Springs Townhomes South Site –
Winter Springs, Seminole County, Florida
Parcel ID: #26-20-30-5AR-0A00-007K
Section 6, Township 21 South, Range 31 East
(BTC File #900-06)**
Re: Environmental Assessment Report

Dear Mr. Edwards:

In November of 2018, Bio-Tech Consulting, Inc. (BTC) conducted an environmental assessment of the approximately 8.34-acre Winter Springs Townhomes South Site. This site is located in the City of Winter Springs, just east of the intersection of East State Road 434 and Tuskawilla Road; within Section 6, Township 21 South, Range 31 East, Seminole County, Florida (Figures 1, 2, and 3). This environmental assessment included the following elements:

- review of soil types mapped within the property boundaries;
- evaluation of land use types/vegetative communities present;
- field review for occurrence of protected flora and fauna; and,
- permitting summary.

SOILS

According to the Soil Survey of Seminole County, Florida, prepared by the U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS), three (3) soil types exist within the site boundary (Figure 4). These soil types include the following:

Orlando: Main Office
3025 East South Street
Orlando, FL 32803

Vero Beach Office
4445 N A1A
Suite 221
Vero Beach, FL 32963

Jacksonville Office
1157 Beach Boulevard
Jacksonville Beach, FL 32250

Tampa Office
6011 Benjamin Road
Suite 101 B
Tampa, FL 33634

Key West Office
1107 Key Plaza
Suite 259
Key West, FL 33040

Aquatic & Land
Management Operations
3825 Rouse Road
Orlando, FL 32817

407.894.5969
877.894.5969
407.894.5970 fax

- **Basinger and Smyrna fine sands, depressional (#11)**
- **Brighton, Samsula, and Sanibel mucks (#17)**
- **St. Johns and EauGallie fine sands (#29)**

The following presents a brief description of the soil types mapped for the site:

Basinger and Smyrna fine sands, depressional (#11) are nearly level, very poorly drained soils found in depressions. Typically the surface layer of Basinger soil consists of black mucky fine sand about 5 inches thick. Typically the surface layer of Smyrna soil consists of black fine sand about 2 inches thick. During most years undrained areas of this soil unit are ponded for 6 to 9 months. The permeability of Basinger soil is rapid. The permeability of Smyrna soil is rapid in the surface and subsurface, moderate or moderately rapid in the subsoil, and rapid in the substratum.

Brighton, Samsula, and Sanibel mucks (#17) are nearly level and very poorly drained. These soils are in depressions and freshwater marshes and swamps. Undrained areas are ponded. The slopes are dominantly less than 1 percent. Undrained areas of the soils in this map unit are ponded for 6 to 9 months or more, except during extended dry periods. The permeability of Brighton, Samsula, and Sanibel soils is rapid. The available water capacity is very high in the organic materials of these soils and is moderate to low in the sandy underlying material. The natural fertility and content of organic matter in these soils are very high.

St. Johns and EauGallie fine sands (#29) are nearly level, poorly drained soils found on low broad plains on the flatwoods. Typically, St. Johns soil has a surface layer of black fine sand about 12 inches thick. EauGallie soil has a surface layer of black fine sand about 3 inches thick. During most years, the soils in this map unit have a seasonal high water table within 12 inches of the surface for 1 to 4 months. The permeability of St. Johns soil is rapid in the surface and subsurface layers and in the substratum, and is moderate or moderately slow in the subsoil. The permeability of EauGallie soil is rapid in the surface and subsurface layers. It is moderate or moderately slow in the sandy part of the subsoil, and slow or very slow in the loamy part of the subsoil.

The Florida Association of Environmental Soil Scientists (FAESS) considers the main components in the Basinger and Smyrna fine sands, depressional (#11) and Brighton, Samsula, and Sanibel mucks (#17) soil types associated with the site to be hydric. The FAESS also considers inclusions present in all of the soil types associated with the site to be hydric. This information can be found in the [Hydric Soils of Florida Handbook](#), Fourth Edition, March 2007.

LAND USE TYPES/VEGETATIVE COMMUNITIES

The Winter Springs Townhomes South Site currently supports four (4) land use types/vegetative communities. These land use types/vegetative communities were identified utilizing the Florida Land Use, Cover and Forms Classification System, Level III (FLUCFCS, FDOT, January 2004) (Figure 5). The on-site upland land use types/vegetative communities are classified as Mixed Hardwoods (438) and Disturbed Lands (740). The on-site wetland/surface water land use types/vegetative communities are classified as Streams and Waterways (510) and Wetland Hardwood Forests (610). The following provides a brief description of these on-site land use types/vegetative communities.

Uplands:

438 Mixed Hardwoods

The northern and southern portions of the site contain forested uplands that are most consistent with the Mixed Hardwoods (438) FLUCFCS classification. Vegetative species identified within this community type included live oak (*Quercus virginiana*), laurel oak (*Quercus laurifolia*), American sweetgum (*Liquidambar styraciflua*), camphor tree (*Cinnamomum camphora*), wax myrtle (*Myrica cerifera*), cabbage palm (*Sabal palmetto*), saw palmetto (*Serenoa repens*), saltbush (*Baccharis halimifolia*), blackberry (*Rubus* spp.), American beautyberry (*Callicarpa americana*), winged sumac (*Rhus copallinum*), hairy indigo (*Indigofera hirsuta*), broomsedge (*Andropogon virginicus*), Virginia chain fern (*Woodwardia virginica*), greenbriar (*Smilax* spp.), caesarweed (*Urena lobata*), and muscadine grapevine (*Vitis rotundifolia*).

740 Disturbed Lands

The site contains multiple areas that were cleared and had some initial site work done and these areas are most consistent with the Disturbed Lands (740) FLUCFCS classification. Vegetative species identified within this community type included saltbush (*Baccharis halimifolia*), broomsedge (*Andropogon virginicus*), Peruvian primrosewillow (*Ludwigia peruviana*), blackberry (*Rubus* spp.), cogongrass (*Imperata cylindrica*), beggar-ticks (*Bidens alba*), caesarweed (*Urena lobata*), and dogfennel (*Eupatorium leptophyllum*).

Wetland/Surface Water:

510 Streams and Waterways

The site contains a man-made stormwater drainage ditch that extends off-site beyond the northern and southern site boundaries. This man-made stormwater drainage ditch is most

consistent with the Streams and Waterways (510) FLUCFCS classification. Vegetative species identified within this community type included Peruvian primrosewillow (*Ludwigia peruviana*), torpedograss (*Panicum repens*), marsh pennywort (*Hydrocotyle umbellata*), soft rush (*Juncus effusus*), cattail (*Typha* spp.), spikerush (*Eleocharis* spp.), beakrush (*Rhynchospora* spp.), beggar-ticks (*Bidens alba*), dogfennel (*Eupatorium leptophyllum*), bahiagrass (*Paspalum notatum*), and water hyssop (*Bacopa caroliniana*).

610 Wetland Hardwood Forests

Three (3) areas located within the site contain forested wetland areas that are most consistent with the Wetland Hardwood Forests (610) FLUCFCS classification. Vegetative species identified within this community type included laurel oak (*Quercus laurifolia*), American sweetgum (*Liquidambar styraciflua*), sweetbay magnolia (*Magnolia virginiana*), water oak (*Quercus nigra*), cabbage palm (*Sabal palmetto*), Chinese tallowtree (*Triadica sebifera*), camphor tree (*Cinnamomum camphora*), wax myrtle (*Myrica cerifera*), tuberous sword fern (*Nephrolepis cordifolia*), swamp fern (*Blechnum serrulatum*), Virginia chain fern (*Woodwardia virginica*), netted chain fern (*Woodwardia areolata*), and Peruvian primrosewillow (*Ludwigia peruviana*).

All on-site wetland impacts that are proposed to occur as a result of this project were authorized and mitigated for under SJRWMD ERP No. 95027-2 via the purchase of a conservation easement over 120 acres of land within the Bergmann Mitigation Tract.

WILDLIFE AND PROTECTED SPECIES

Using methodologies outlined in the Florida's Fragile Wildlife (Wood, 2001); Measuring and Monitoring Biological Diversity Standard Methods for Mammals (Wilson, et al., 1996); and Florida Fish and Wildlife Conservation Commission's (FFWCC's) Gopher Tortoise Permitting Guidelines (April 2008 - revised May 2017); an assessment for "listed" floral and faunal species was conducted at the site on November 8 and 12, 2018. This assessment included both direct observations and indirect evidence, such as tracks, burrows, tree markings, and vocalizations that indicated the presence of species observed. The assessment focused on species that are "listed" by the FFWCC's Official Lists - Florida's Endangered Species, Threatened Species and Species of Special Concern (May 2017) that have the potential to occur in Seminole County (Table 1).

No plant species listed by either The Florida Department of Agriculture (FDA) or U.S. Fish and Wildlife Service (USFWS) was identified on the site during the assessments conducted. The following is a list of wildlife species identified during the evaluation of the site:

Reptiles and Amphibians:

brown anole (*Norops sagrei*)
eastern racer (*Coluber constrictor*)
green anole (*Anolis carolinensis*)
southern toad (*Anaxyrus terrestris*)

Birds:

Black Vulture (*Coragyps atratus*)
Blue Jay (*Cyanocitta cristata*)
Great Egret (*Ardea alba*)
Northern Cardinal (*Cardinalis cardinalis*)
Northern Mockingbird (*Mimus polyglottos*)
Red-shouldered Hawk (*Buteo lineatus*)

Mammals:

nine-banded armadillo (*Dasyopus novemcinctus*)
northern raccoon (*Procyon lotor*)
Virginia opossum (*Didelphis virginiana*)

None of the above species are listed in the FFWCC's Official Lists - Florida's Endangered Species, Threatened Species and Species of Special Concern (May 2017). The following provides a brief description of particular wildlife species as they relate to development of the site:

Bald Eagle (*Haliaeetus leucocephalus*)

State protected by F.A.C. 68A-16.002 and federally protected by both the Migratory Bird Treaty Act (1918) and the Bald and Golden Eagle Protection Act (1940)

In August of 2007, the US Fish and Wildlife Service (USFWS) removed the Bald Eagle from the list of federally endangered and threatened species. Additionally, the Bald Eagle was removed from FFWCC's imperiled species list in April of 2008. Although the Bald Eagle is no longer protected under the Endangered Species Act, it is still protected under the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and FFWCC's Bald Eagle rule (Florida Administrative Code 68A-16.002 Bald Eagle (*Haliaeetus Leuchocephalus*)).

In May of 2007, the USFWS issued the National Bald Eagle Management Guidelines. In April of 2008, the FFWCC adopted a new Bald Eagle Management Plan that was written to closely follow the federal guidelines. Under FFWCC's new management plans, buffer zones are recommended based on the nature and magnitude of the project or activity. The recommended protective buffer zone is 660 feet or less from the nest tree, depending on what activities or structures are already near the nest. A FFWCC Eagle permit is not needed for any activity occurring outside of the 660-foot buffer zone. No activities are permitted within 330 feet of a nest during the nesting season, October 1 through May 15 or when eagles are present at the nest.

In addition to the on-site evaluation for “listed” species, BTC conducted a review for any FFWCC recorded Bald Eagle nests on or in the vicinity of the site. This review revealed two (2) Bald Eagle nests (IDs #SE-003 and #SE-087), through the 2016-2017 nesting season, located within one mile (1.0) of the site (see attached Bald Eagle nest data). According to FFWCC, these nests are located approximately 1,530 feet (east) and 2,585 feet (north) from the site’s boundary, respectively. Since the site is located outside of the 660-foot buffer zone for both of these nests, no further action should be required pertaining to Bald Eagle nests.

Wood Stork (*Mycteria Americana*)

Federally Listed as “Endangered” by USFWS

This site is shown to be located within a Wood Stork Nesting Colony Core Foraging Area. The Wood Stork (*Mycteria Americana*) is listed as “Endangered” by both the FFWCC and the USFWS. Wood storks are large, long-legged wading birds, about 45 inches tall, with a wingspan of 60 to 65 inches. Their plumage is white except for black primaries and secondaries and a short black tail. The head and neck are largely unfeathered and dark gray in color. The bill is black, thick at the base, and slightly decurved. Wood Storks are birds of freshwater and estuarine wetlands, primarily nesting in cypress or mangrove swamps. They feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools as well as roadside ditches. Particularly attractive feeding sites are depressions in marshes or swamps where fish become concentrated during periods of falling water levels.

Based on our review of available databases, there is no record of a Wood Stork rookery on the site or within close proximity. The USFWS and the U.S. Army Corps of Engineers require that any impacts to on-site ditches and/or wetlands, which would eliminate a portion of the Wood Stork foraging habitat, be either mitigated through the purchase of mitigation credits or recreated elsewhere on-site so that there would be no net loss of Wood Stork foraging habitat. However, based on the permitted status of the site, it is not anticipated that any further action will be required pertaining to Wood Storks.

USFWS CONSULTATION AREAS

The U.S. Fish and Wildlife Service have established “consultation areas” for certain listed species. Generally, these consultation areas only become an issue if USFWS consultation is required, which is usually associated with permitting through the U.S. Army Corps of Engineers. The reader should be aware that species presence and need for additional review are often determined to be unnecessary early in the permit review process due to lack of appropriate habitat or other conditions. However, the USFWS makes the final determination.

Consultation areas are typically very regional in size, often spanning multiple counties where the species in question is known to exist. Consultation areas by themselves do not indicate the presence of a listed species. They only indicate an area where there is a potential for a listed species to occur and that additional review might be necessary to confirm or rule-out the presence of the species. The additional review typically includes the application of species-specific criteria to rule-out or confirm the presence of the species in question. Such criteria might consist of a simple review for critical habitat types. In other cases, the review might include the need for species-specific surveys using established methodologies that have been approved by the USFWS. The following paragraphs include a list of the USFWS Consultation Areas associated with the site. Also included, is a brief description of the respective species habitat and potential for additional review.

Everglade Snail Kite (*Rostrhamus sociabilis*)

Federally Listed as “Endangered” by USFWS

The site falls within the USFWS Consultation Area for the Everglade Snail Kite. Currently the Everglade Snail Kite is listed as “Endangered” by the USFWS. Everglade Snail Kites are similar in size to Red-shouldered Hawks. All Everglade Snail Kites have deep red eyes and a white rump patch. Males are slate gray, and females and juveniles vary in amounts of white, light brown, and dark brown, but the females always have white on their chin. Everglade Snail Kites vocalize mainly during courtship and nesting. They may occur in nearly all of the wetlands of central and southern Florida. They regularly occur in lake shallows along the shores and islands of many major lakes, including Lakes Okeechobee, Kissimmee, Tohopekaliga (Toho) and East Toho. They also regularly occur in the expansive marshes of southern Florida such as Water Conservation Areas 1, 2, and 3, Everglades National Park, the upper St. John’s River marshes and Grassy Waters Preserve.

Although a portion of the site contains wetlands, no Everglade Snail Kites were observed within the site during the wildlife survey conducted by BTC. As no suitable habitat exists within the limits of the site, it is not anticipated that a formal survey would be required by the USFWS or another agency to determine if any Everglade Snail Kites utilize any portions of the site.

Florida Scrub-Jay (*Aphelocoma coerulescens*)

Federally Listed as “Threatened” by USFWS

Currently the Florida Scrub-Jay is listed as threatened by the USFWS. Florida Scrub Jays are largely restricted to scattered, often small and isolated patches of sand pine scrub, xeric oak, scrubby flatwoods, and scrubby coastal stands in peninsular Florida (Woolfenden 1978a, Fitzpatrick et al. 1991).

They avoid wetlands and forests, including canopied sand pine stands. Optimal Scrub-Jay habitat is dominated by shrubby scrub, live oaks, myrtle oaks, or scrub oaks from 1 to 3 m (3 to 10 ft.) tall, covering 50% to 90 % of the area; bare ground or sparse vegetation less than 15 cm (6 in) tall covering 10% to 50% of the area; and scattered trees with no more than 20% canopy cover (Fitzpatrick et al. 1991).

No Florida Scrub-Jays were observed on the site during the wildlife surveys conducted by BTC. As little suitable habitat exists within the limits of the site, it is not anticipated that a formal survey would be required by the USFWS or another agency to determine if any Florida Scrub-Jays utilize any portions of the site.

West Indian Manatee (*Trichechus manatus*)
Federally Listed as “Endangered” by USFWS

The site falls within the USFWS Consultation Area for the West Indian manatee. Currently the West Indian manatee is listed as “Endangered” by the USFWS. Manatees are protected under the Marine Mammal Protection Act, which prohibits the take (i.e., harass, hunt, capture, or kill) of all marine mammals. Manatees are found in marine, estuarine and freshwater environments. The West Indian manatee (*Trichechus manatus*), includes two distinct subspecies, the Florida manatee (*Trichechus manatus latirostris*) and the Antillean manatee (*Trichechus manatus manatus*). While morphologically distinctive, both subspecies have many common features. Manatees have large, seal-shaped bodies with paired flippers and a round, paddle-shaped tail. They are typically grey in color (color can range from black to light brown) and occasionally spotted with barnacles or colored by patches of green or red algae. The muzzle is heavily whiskered and coarse, single hairs are sparsely distributed throughout the body. Adult manatees, on average, are about nine feet long (3 meters) and weigh about 1,000 pounds (200 kilograms). At birth, calves are between three and four feet long (1 meter) and weigh between 40 and 60 pounds (30 kilograms).

Although the site falls within the USFWS West Indian manatee consultation area, no West Indian manatees were observed and no suitable habitat for this species exists within the site boundaries. No further action should be required pertaining to West Indian manatees.

PERMITTING

St. Johns River Water Management District (SJRWMD)

An Environmental Resource Permit (ERP) (Permit No. 95027-2) was issued by the SJRWMD on December 13, 2005 (expired on December 13, 2010) to authorize construction and operation of a

stormwater management system for the Winter Springs Town Center, Phase II project. Subsequent SJRWMD ERPs issued for this project authorized transfers of ownership (95027-3, 95027-6) and Permit No. 95027-8 authorized a two-year extension of the permit duration. ERP No. 95027-9 was issued to Winter Springs Apartments, LP on February 20, 2017 (expires on February 20 2022) to authorize construction and operation of a stormwater management system for a 12.83-acre portion of the Winter Springs Town Center, Phase II project. As noted above, all on-site wetland impacts that are proposed to occur with this project were previously authorized and mitigated for under SJRWMD ERP No. 95027-2 via the purchase of a conservation easement over 120 acres of land within the Bergmann Mitigation Tract.

The environmental limitations described in this document are based on observations and technical information available on the date of the on-site evaluation. This report is for general planning purposes only. The limits of any on-site wetlands/surface waters can only be determined and verified through field delineation and/or on-site review by the pertinent regulatory agencies. The wildlife surveys conducted within the subject property boundaries do not preclude the potential for any listed species, as noted on Table 1 (attached), currently or in the future. Should you have any questions or require any additional information, please do not hesitate to contact our office at (407) 894-5969. Thank you.

Regards,

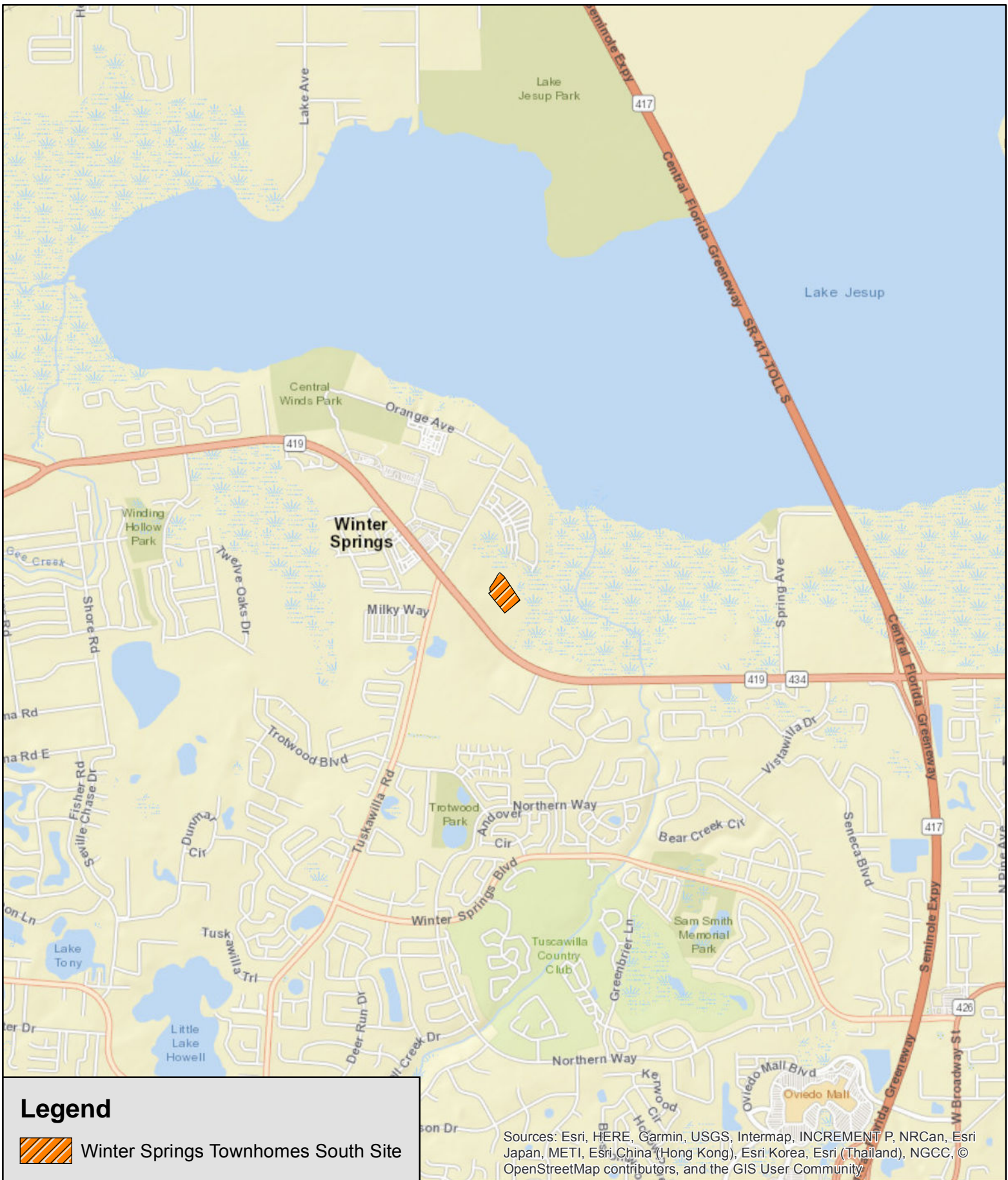


Nathan Johnson
Field Biologist

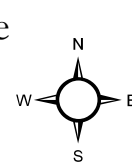


Joseph Galletti
Vice President

attachments



Winter Springs Townhomes South Site
 Seminole County, Florida
 Figure 1
 Location Map




0.5
 Miles

Project #: 900-06
 Produced By: JDH
 Date: 11/5/2018

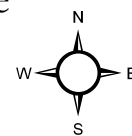


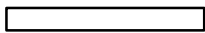
Legend

 Winter Springs Townhomes South Site (± 8.34 Ac.)

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Winter Springs Townhomes South Site
 Seminole County, Florida
 Figure 2
 2017 Aerial Map



150
 Feet
 Project #: 900-06
 Produced By: JDH
 Date: 11/5/2018

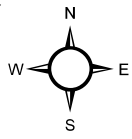


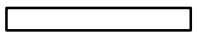
Legend

 Winter Springs Townhomes South Site

Bio-Tech Consulting Inc.
 Environmental and Permitting Services
 3025 E. South Street Orlando, FL 32803
 Ph: 407-894-5969 Fax: 407-894-5970
 www.bio-techconsulting.com

Winter Springs Townhomes South Site
 Seminole County, Florida
 Figure 3
 USGS Topographic Map






1,000
 Feet
 Project #: 900-06
 Produced By: JDH
 Date: 11/5/2018



Legend

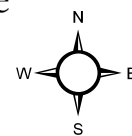
 Winter Springs Townhomes South Site

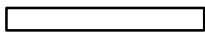
Seminole County Soils

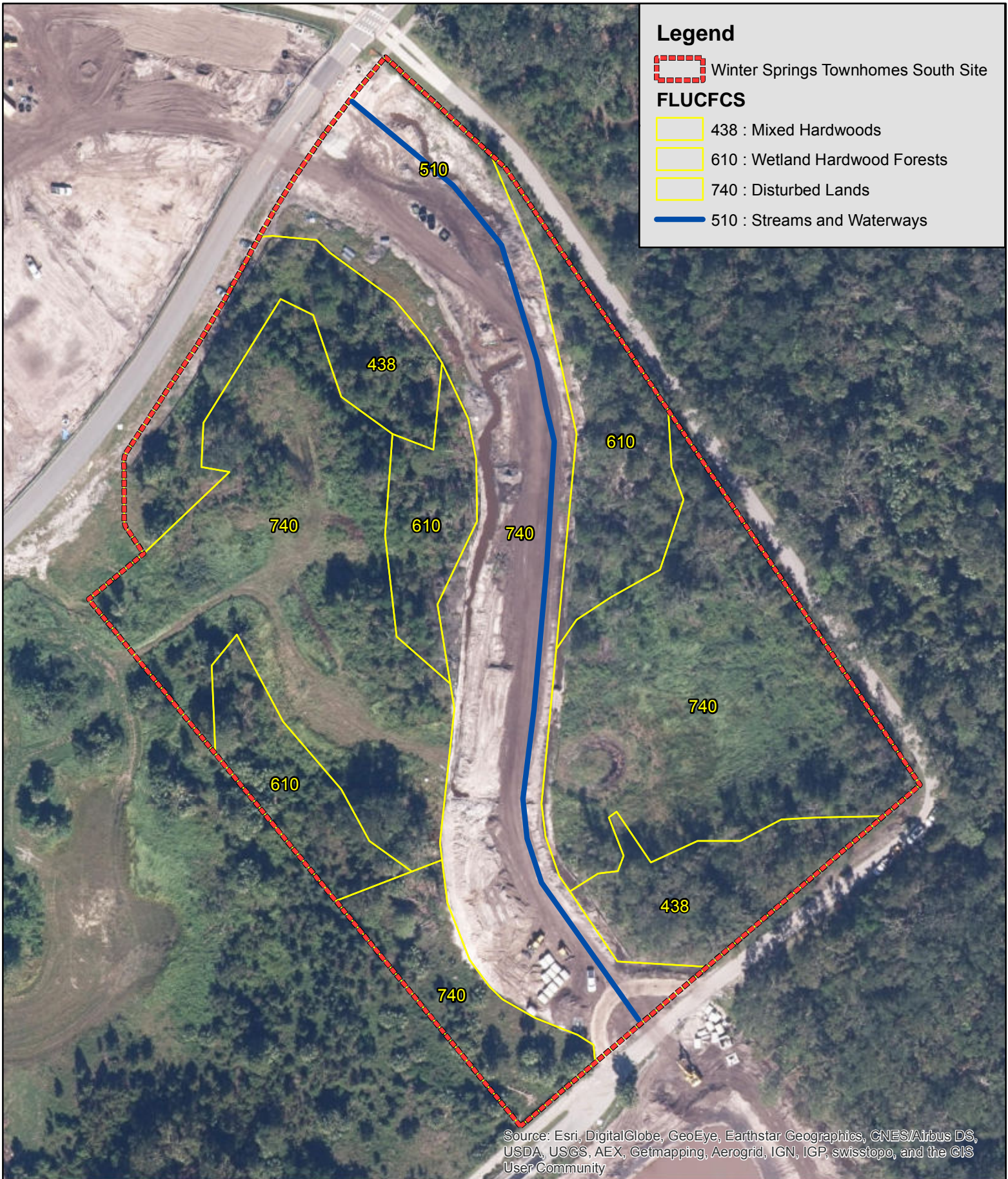
-  11: Basinger and Smyrna fine sands, depressional
-  17: Brighton, Samsula, and Sanibel mucks
-  29: St. Johns and EauGallie fine sands

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

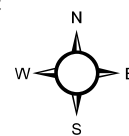
Winter Springs Townhomes South Site
 Seminole County, Florida
 Figure 4
 SSURGO Soils Map



150
 Feet
 Project #: 900-06
 Produced By: JDH
 Date: 11/5/2018



Winter Springs Townhomes South Site
 Seminole County, Florida
 Figure 5
 FLUCFCS Map



100
 Feet

Project #: 900-06
 Produced By: NTJ
 Date: 11/12/2018

Table 1:		Potentially Occuring Listed Wildlife and Plant Species in Seminole County, Florida	
Scientific Name	Common Name	Federal Status	State Status
<u>FISH</u>			
<i>Pteronotropis welaka</i>	bluenose shiner	N	ST
<u>REPTILES</u>			
<i>Alligator mississippiensis</i>	American alligator	SAT	FT(S/A)
<i>Drymarchon corais couperi</i>	Eastern indigo snake	LT	FT
<i>Gopherus polyphemus</i>	gopher tortoise	C	ST
<i>Lampropeltis extenuata</i>	short-tailed snake	N	ST
<i>Pituophis melanoleucus mugitus</i>	Florida pine snake	N	SSC
<u>BIRDS</u>			
<i>Aphelocoma coerulescens</i>	Florida scrub-jay	LT	FT
<i>Egretta caerulea</i>	little blue heron	N	ST
<i>Egretta tricolor</i>	tricolored heron	N	ST
<i>Falco sparverius paulus</i>	southeastern American kestrel	N	ST
<i>Grus canadensis pratensis</i>	Florida sandhill crane	N	ST
<i>Haliaeetus leucocephalus</i>	bald eagle	N	**
<i>Mycteria americana</i>	wood stork	LT	FT
<i>Pandion haliaetus</i>	osprey	N	SCC*
<u>MAMMALS</u>			
<i>Puma concolor coryi</i>	Florida Panther	LE	FE
<i>Sciurus niger shermani</i>	Sherman's fox squirrel	N	SSC
<i>Trichechus manatus</i>	West Indian manatee	LE	FE
<u>PLANTS</u>			
<i>Carex chapmanii</i>	Chapman's Sedge	N	T
<i>Centrosema arenicola</i>	Sand Butterfly Pea	N	E
<i>Cucurbita okeechobeensis</i>	Okeechobee Gourd	LE	E
<i>Dennstaedtia bipinnata</i>	hay scented fern	N	E
<i>Illicium parviflorum</i>	star anise	N	E
<i>Lechea cernua</i>	nodding pinweed	N	T
<i>Nolina atopocarpa</i>	Florida Beargrass	N	T
<i>Ophioglossum palmatum</i>	Hand Fern	N	E
<i>Pecuma plumula</i>	Plume Polypody	N	E
<i>Pteroglossaspis ecristata</i>	Giant Orchid	N	T
<i>Pycnanthemum floridanum</i>	Florida Mountain-mint	N	T
<i>Salix floridana</i>	Florida willow	N	E

FEDERAL LEGAL STATUS

LE-Endangered: species in danger of extinction throughout all or a significant portion of its range.

LT-Threatened: species likely to become Endangered within the foreseeable future throughout all or a significant portion of its range.

SAT-Endangered due to similarity of appearance to a species which is federally listed such that enforcement personnel have difficulty in attempting to differentiate between the listed and unlisted species.

C-Candidate species for which federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened.

XN-Non-essential experimental population.

N-Not currently listed, nor currently being considered for listing as Endangered or Threatened.

STATE LEGAL STATUS - ANIMALS

FE- Listed as Endangered Species at the Federal level by the U. S. Fish and Wildlife Service

FT- Listed as Threatened Species at the Federal level by the U. S. Fish and Wildlife Service

FXN- Federal listed as an experimental population in Florida

FT(S/A)- Federal Threatened due to similarity of appearance

ST- State population listed as Threatened by the FFWCC. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future.

SSC-Listed as Species of Special Concern by the FFWCC. Defined as a population which warrants special protection, recognition, or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance, or substantial human exploitation which, in the foreseeable future, may result in its becoming a threatened species. (SSC* for *Pandion haliaetus* (Osprey) indicates that this status applies in Monroe county only.)

N-Not currently listed, nor currently being considered for listing.

*** State protected by F.A.C. 68A-16.002 and federally protected by both the Migratory Bird Treaty Act (1918) and the Bald and Golden Eagle Protection Act (1940)*

STATE LEGAL STATUS - PLANTS

E-Endangered: species of plants native to Florida that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue; includes all species determined to be endangered or threatened pursuant to the U.S. Endangered Species Act.

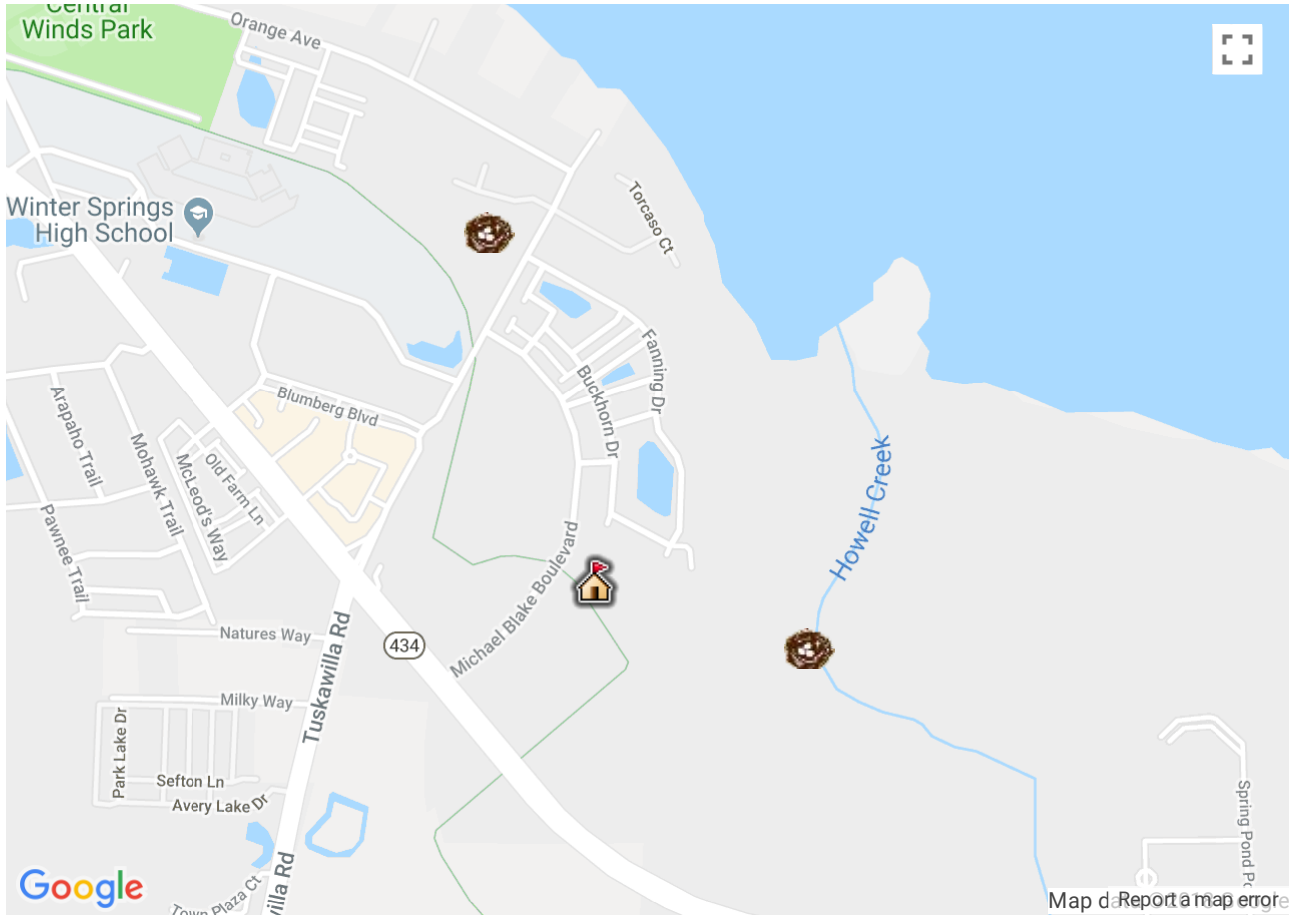
T-Threatened: species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in number as to cause them to be Endangered.

N-Not currently listed, nor currently being considered for listing.

This report was generated using the bald eagle nest locator at <https://public.myfwc.com/FWRI/EagleNests/nestlocator.aspx> on 11/12/2018 3:26:44 PM.

Search Entered: Within 1 miles of latitude 28.695978 and longitude -81.257258; All Search Results
2 record(s) were found; 2 record(s) are shown

Bald Eagle Nest Map:



Bald Eagle Nest Data Search Results:

Results per page:

All ▼

Nest ID	County	Latitude	Longitude	Township	Range	Section	Gaz Page	Last Known Active	Last Surve- yed	Act 13	Act 14	Act 15	Act 16	Act 17	Dist. (Mi)
SE003	Seminole	28 41.70	81 15.16	21S	31E	37	80	2014	2014	*	*	Y	*	*	0.29
SE087	Seminole	28 42.17	81 15.57	20S	31E	38	80	2014	2014	*	*	Y	*	*	0.49

"Y" denotes an active nest
"N" denotes an inactive nest
"- " denotes an unobserved nest

"U" denotes a nest that was visited but status was undetermined
"*" denotes a nest that was not surveyed



**UNIVERSAL ENGINEERING
SCIENCES**

DESIGN LEVEL GEOTECHNICAL EXPLORATION

WSTC TOWNHOMES
WINTER SPRINGS, SEMINOLE COUNTY, FLORIDA

UES PROJECT No. 0130.1800122.0001
UES REPORT No. 1626718

PREPARED FOR:

NV5, Inc.
201 South Bumby Avenue
Orlando, FL 32803

PREPARED BY:

Universal Engineering Sciences
3532 Maggie Boulevard
Orlando, Florida 32811
(407) 423-0504

November 21, 2018



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- Rockledge
- Sarasota
- St. Petersburg
- Tampa
- Tifton, GA
- West Palm Beach

November 21, 2018

NV5, Inc.
201 South Bumby Avenue
Orlando, FL 32803

Attention: Mr. Jason Mahoney, P.E.
Managing Director / Civil Engineering VP
Jason.Mahoney@nv5.com

Reference: **Design Level Geotechnical Exploration**
WSTC Townhomes
Winter Springs, Seminole County, Florida
UES Project No. 0130.1800122.0001
UES Report No. 1626718

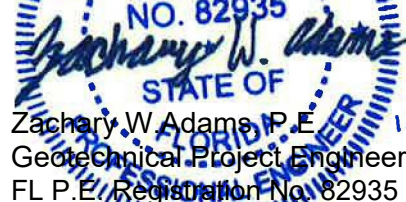
Dear Mr. Mahoney:

Universal Engineering Sciences, Inc. (UES) has completed a geotechnical exploration at the above referenced site in Seminole County, Florida. The scope of our exploration was planned in conjunction with and authorized by you. This exploration was performed in accordance with UES Proposal No. 1618095, dated October 22, 2018 and with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made.

The following report presents the results of our field exploration with a geotechnical engineering interpretation of those results with respect to the project characteristics as provided to us. We have included soil and groundwater conditions at the boring locations and geotechnical recommendations for foundation design, pavement design and site preparation. The site was found to be suitable for the proposed Townhome development following the site preparation procedures presented in this report.

We appreciate the opportunity to have worked with you on this project and look forward to a continued association. Please do not hesitate to contact us if you should have any questions, or if we may further assist you as your plans proceed.

Respectfully Submitted,
UNIVERSAL ENGINEERING SCIENCES, INC.
Certificate of Authorization No. 549


Zachary W. Adams, P.E.
Geotechnical Project Engineer
FL P.E. Registration No. 82935



Ricardo C. Kiriakidis, Ph.D., P.E.
Geotechnical Department Manager

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1.0 PROJECT DESCRIPTION

We understand that the proposed development will consist of developing an approximate 8-acre site for a new townhome development located at the north east corner (NEC) of SR 434 and Michael Blake Boulevard in Winter Springs, Florida in Winter Springs, Florida. We were provided with a site plan showing the proposed layouts of the townhome structures. The site plan identified twenty (20) 2- to 3-story structures totaling 114 units and associated paved roadway areas. UES previously completed a preliminary exploration of the subject site (UES Report No. 1556876, dated April 16, 2018). The results of our preliminary exploration have been used in conjunction with the current exploration to provide final design recommendations. We have assumed the site is part of a master stormwater system.

Structural loading information was not provided by the client at the time of this report. We have assumed the townhome structures will have column loads on the order of 50 kips or less (if applicable) with wall loads on the order of 5 kips/ft. We anticipate that minimal (i.e. less than 2 feet of) structural fill will be necessary to achieve finished grades in the proposed building and pavement areas of the site.

The recommendations presented within this report are based upon the above information and assumptions. If any of this information or assumptions is incorrect, please contact UES immediately so that we may review, and possibly amend the recommendations contained herein.

No site or project facilities/improvements, other than those described herein, should be designed using the soil information presented in this report. Moreover, UES will not be responsible for the performance of any site improvement so designed and constructed.

2.0 PURPOSE

The purposes of this exploration were:

- to explore and evaluate the subsurface conditions at the site with special attention to potential problems that may impact the proposed development,
- to provide our estimates of the seasonal high groundwater level at the boring locations and
- to provide geotechnical engineering recommendations for foundation design, pavement design and site preparation.

This report presents an evaluation of site conditions on the basis of geotechnical procedures for site characterization. The recovered samples were not examined, either visually or analytically, for chemical composition or environmental hazards. We would be glad to provide you with a proposal for these services at your request.

Our exploration was not designed to specifically address the potential for surface expression of deep geological conditions, such as sinkhole development related to karst activity. This evaluation requires a more extensive range of field services than those performed in this study. We would be pleased to conduct an exploration to evaluate the probable effect of the regional geology upon the proposed construction, if you so desire.



3.0 SITE DESCRIPTION

The subject site is located within Section 38, Township 21 South, Range 31 East in Seminole County, Florida. More specifically, the site is located at the NEC of SR 434 and Michael Blake Boulevard in Winter Springs, Florida. At the time of our exploration, the site consisted of a moderately vegetated, vacant property.

3.1 SOIL SURVEY

There are four (4) native soil types mapped within the general area of the site according to the USDA NRCS Soil Survey of Seminole County. A brief summary of the mapped surficial (native) soil type(s) is presented in Table I.

**TABLE I
SUMMARY OF PUBLISHED SOIL DATA**

Soil Symbol	Soil Type	Hydrologic Group	Drainage Characteristics	Depth of Published Seasonal High GWT (feet)
11	Basinger and Smyrna fine sands, depressional	A/D	Very poorly drained	0
17	Brighton, Samsula and Sanibel mucks	A/D	Very poorly drained	0
27	Pomellow fine sand, 0 to 5 percent slopes	A	Moderately well drained	2 to 3½
29	St. Johns and EauGallie fine sands	B/D	Poorly drained	½ to 1½

We note that the majority of the site is mapped as St. Johns and EauGallie fine sands. Brighton, Samsula and Sanibel mucks are mapped along the northeastern corner of the property which based on aerial photographs appear to have been previously cleared and excavated.

Please note that the SCS soil survey data is based on pre-developmental conditions. The native subsurface conditions depicted on the soil survey may have been altered due to development within the project vicinity and are not necessarily representative of the current subsurface conditions encountered during our exploration.

3.2 TOPOGRAPHY

According to information obtained from the United States Geologic Survey (USGS) "Casselberry, Florida" quadrangle map, the native ground surface elevation across the site area ranges approximately +20 to +30 feet National Geodetic Vertical Datum (NGVD). The site is located 1/4-mile south of Lake Jessup. Based on review of the USGS map and the Seminole County Watershed Atlas, the normal high water elevation of Lake Jessup appears to be approximately +5 feet NGVD. A copy of a portion of the USGS Map is included in Appendix A.



3.3 POTENTIOMETRIC MAP

Based upon review of the St. Johns River Water Management District Potentiometric map (May 2009) of the Upper Floridian Aquifer for the project area, the potentiometric level at the site is estimated to be at elevation +25 to +30 feet, NGVD. The native ground surface elevation across the site area is approximately +20 to +30 feet NGVD. **This indicates artesian groundwater levels near the existing ground surface across the site up to 10 feet above the existing ground surface.** Therefore, excavations should not extend past 10 feet (or below the confining unit – whichever occurs first) without the approval of the geotechnical Engineer.

4.0 SCOPE OF SERVICES

The services conducted by UES during our current geotechnical exploration were as follows:

- Drilled fifteen (15) Standard Penetration Test (SPT) borings within the proposed building areas to depths of 15 feet below existing grades.
- Secured samples of representative soils encountered in the soil borings for review, laboratory analysis and classification by a Geotechnical Engineer.
- Measured the existing site groundwater levels and provide an estimate of the seasonal high groundwater level at the boring locations.
- Conducted laboratory testing on selected soil samples obtained in the field to determine their engineering properties.
- Assessed the existing soil conditions with respect to the proposed construction.
- Prepared a report which documents the results of our exploration and analysis with geotechnical engineering recommendations.

5.0 FIELD EXPLORATION

The fifteen (15) SPT borings, designated B-01 through B-15, as shown on the attached Boring Location Plan in Appendix B, were performed in general accordance with the procedures of ASTM D 1586 “Standard Method for Penetration Test and Split-Barrel Sampling of Soils”. SPT sampling was performed continuously within the top 10 feet to detect variations in the near surface soil profile and on approximate 5 feet centers thereafter.

The SPT soil borings were performed with an ATV-mounted drilling rig. UES located the test borings by using the provided site plan, measuring from existing on-site landmarks shown on an aerial photograph, and by using handheld GPS devices. No survey control was provided. Hence, the indicated test boring locations should be considered accurate to the degree of the methodologies used. The approximate boring locations are shown in Appendix B.

Ground surface elevations at the boring locations would be beneficial to help us to identify any anomalies in our measured and estimated seasonal high groundwater levels, as well as improve the usefulness the groundwater information during the civil engineering design of the site.



6.0 LABORATORY TESTING

The soil samples recovered from the test borings were returned to our laboratory and visually classified in general accordance with ASTM D 2487 “Standard Classification of Soils for Engineering Purposes” (Unified Soil Classification System). We selected representative soil samples from the borings for laboratory testing to aid in classifying the soils and to help to evaluate the general engineering characteristics of the site soils. The results of these tests are shown on the boring logs in Appendix B. A summary of the tests performed is shown in Table II.

**TABLE II
 LABORATORY METHODOLOGIES**

Test Performed	Number Performed	Reference
Grain Size Analysis (#200 wash only)	10	ASTM D 1140 “Amount of Material in Soils Finer than the No. 200 (75 - μ m) sieve”
Moisture Content	10	ASTM D 2216 “Laboratory Determination of Water (Moisture) Content of Soil by Mass”
Organic Content	1	ASTM D 2974 (Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils)

7.0 SUBSURFACE CONDITIONS

7.1 GENERALIZED SOIL PROFILE

The results of our field exploration and laboratory analysis, together with pertinent information obtained from the SPT borings, such as soil profiles, penetration resistance and groundwater levels are shown on the boring logs included in Appendix B. The Key to Boring Logs, Soil Classification Chart is also included in Appendix B. The soil profiles were prepared from field logs after the recovered soil samples were examined by a Geotechnical Engineer. The stratification lines shown on the boring logs represent the approximate boundaries between soil types, and may not depict exact subsurface soil conditions. The actual soil boundaries may be more transitional than depicted. A generalized profile of the soils encountered at our boring locations is presented in Table III. For detailed soil profiles, please refer to the attached boring logs.

**TABLE III
 GENERALIZED SOIL PROFILE**

Stratum No.	Typical Depth		Soil Description	Typical Range of SPT “N” Values
	(feet, bls)			
	From	To		
1	0	15*	Very loose to medium dense fine SAND with varying amounts of silt [SP, SP-SM, SM]. <u>Local surficial organic sands were encountered within Boring B-10 and our previous borings B-06 and B-07</u>	3 to 26

*Denotes maximum termination depth of the borings.



7.2 NOTABLE FINDINGS

7.2.1 Shallow Groundwater Table and Potential for Artesian conditions

Shallow seasonal high groundwater levels across the site will control site grading. Portions of the site may need to be raised to provide adequate separation above the ground water table. **Depending upon final site grades, pavement underdrains may be necessary for portions of this site if the required separation is not met by grading.**

In addition, according to the SJRWMD Potentiometric map there is a potential for Artesian conditions up to 10 feet above the existing ground surface if the confining unit is breached. We recommend that any excavation on site be monitored by UES to assist in the eventuality that deeper (greater than 10 feet bls.) excavations are needed.

7.2.2 Shallow Organic Soils

Organic soils were observed in three of the soil borings (B-06 & B-07 of the preliminary exploration and B-10 of current exploration), with relative low organic contents ranging from 6 to 10%. The slightly organic soils extended from existing grade to depths of approximately 2½ feet bls. **Deeper deposits of organic soils may be found between the widely spaced borings.**

The general state of geotechnical practice is that soils with organic contents greater than about 5 percent are considered unsuitable to remain in-place to support structures and soils with organic contents greater than about 10 percent are considered unsuitable to remain in-place to support pavements.

If encountered within the development areas, we recommend that the unsuitable organic soils be completely removed from the construction limits and replaced by compacted select backfill. **Failure to properly remove and replace highly organic materials as recommended may lead to excessive settlement and potential cracking of structures and pavements within their useful life. We note that the slightly organic soils encountered were shallow in nature, and can likely be removed during the site preparation procedures.**

8.0 GROUNDWATER CONDITIONS

8.1 EXISTING GROUNDWATER LEVEL

We measured the water levels in the boreholes on November 14 & 15, 2018 during our drilling operations. Groundwater was encountered at depths ranging from approximately 2 to 4½ feet below existing site grades at the time of our exploration. Fluctuations in groundwater levels should be anticipated throughout the year, primarily due to topographical relief, seasonal variations in rainfall, surface runoff, and other factors that may vary from the time the borings were conducted.

8.2 SEASONAL HIGH GROUNDWATER LEVEL

Based on historical data, the rainy season in Central Florida is between June and October of the year. In order to estimate the seasonal high water level at the boring locations, many factors are examined, including the following:

- Measured groundwater level
- Drainage characteristics of existing soil types



- Current & historical rainfall data
- Natural relief points (such as lakes, rivers, wetlands, etc.)
- Man-made drainage systems (ditches, canals, retention basins, etc.)
- On-site types of vegetation
- Review of available data (soil surveys, USGS maps, etc.)
- Redoximorphic features (mottling, stripping, etc.)

Based on the results of our field exploration and the factors listed above, we anticipate that the seasonal high groundwater level at our boring locations will likely form at depths ranging from at or near the existing ground surface to depths of approximately 3 feet below existing grades. The estimated seasonal high groundwater table at each boring location is shown on the attached boring logs in Appendix B.

It should be noted that the estimated seasonal high water levels do not provide any assurance that groundwater levels will not exceed these estimated levels during any given year in the future. Should the impediments to surface water drainage be present, or should rainfall intensity and duration, or total rainfall quantities, exceed the normally anticipated rainfall quantities, groundwater levels might exceed our seasonal high estimates. Further, it should be understood that changes in the surface hydrology and subsurface drainage from on-site and/or off-site improvements could have significant effects on the normal and seasonal high groundwater levels.

9.0 FOUNDATION DESIGN RECOMMENDATIONS

The following recommendations are made based upon a review of the attached soil test data, our understanding of the proposed construction, and experience with similar projects and subsurface conditions. The applicability of geotechnical recommendations is very dependent upon project characteristics such as improvement locations, and grade alterations. UES must review the final site and grading plans to validate all recommendations rendered herein.

Additionally, if subsurface conditions are encountered during construction, which were not encountered in the borings, report those conditions immediately to us for observation and recommendations.

9.1 STRUCTURAL AND GRADING INFORMATION

We understand that this project will consist of the construction of a new townhome development located at the northeast corner of State Route 434 and Michael Blake Boulevard in Winter Springs, Florida. We were provided with a site plan showing the proposed layouts of the townhome structures. The site plan identified twenty (20) 2- to 3-story structures totaling 114 units and associated paved roadway areas.

Preliminary structural loading information was not provided by the client at this time. We have assumed that the maximum column loads will not exceed 50 kips and that maximum wall loads will not exceed 5 kips per lineal foot.

Grading information was not provided at this time. We have assumed that cuts/fills on the order of 2 feet or less will be necessary to achieve finished grades in the proposed building and pavement areas of the site.



Prior to finalizing any design, the structural/grading information outlined above should be confirmed by the project structural/civil engineer. This is crucial to our evaluation and estimates of settlements. If any of this information is incorrect or if you anticipate any changes, please inform Universal Engineering Sciences, Inc. immediately so that we may review and modify our recommendations as appropriate.

9.2 ANALYSIS

Based on the results of the soil borings, the near surface soils within the proposed building areas appear to be very loose to medium dense sands with varying amounts of silt to a depth of 15 feet below grade. It is our opinion that the proposed structures can be supported on properly designed and constructed shallow foundation systems. Provided that the site preparation recommendations outlined in this report are followed, and any loose surficial soils are properly densified, the parameters outlined below may be used for foundation design.

9.3 BEARING PRESSURE

Provided our suggested site preparation procedures are followed, we recommend designing shallow footing foundations for a **maximum allowable net soil bearing pressure of 2,500 pounds per square foot (psf)**. The allowable net bearing pressure is that pressure that may be transmitted to the soil in excess of the minimum surrounding overburden pressure. The allowable bearing pressure should include dead load plus sustained live load. Per the Florida Building Code (FLBC), the foundations should be designed for the most unfavorable effects due to the combinations of loads specified in the FLBC.

9.4 FOUNDATION SIZE

The minimum width recommended for an isolated column footing is 24 inches. For continuous wall or slab on grade foundations, the minimum footing width should comply with the current FLBC, but under no circumstances should be less than 12 inches. Even though the maximum allowable soil bearing pressure may not be achieved, these width recommendations should control the size of the foundations.

9.5 BEARING DEPTH

The base of all footings should be at least 12 inches below finished grade elevation in accordance with the FLBC. We recommend stormwater and surface water be diverted away from the building exterior, both during and after construction, to reduce the possibility of erosion beneath the exterior footings.

9.6 BEARING MATERIAL

The bearing level soils should exhibit a density of at least 95 percent of the maximum dry density as determined by ASTM D 1557 (Modified Proctor) to a depth of at least **2 feet below foundation** level as described in this report. In addition to compaction, the bearing soils must exhibit stability and be free of "pumping" conditions.

9.7 SETTLEMENT ESTIMATES

Post-construction settlement of the structure will be influenced by several interrelated factors, such as (1) subsurface stratification and strength/compressibility characteristics of the bearing



soils to a depth of approximately twice the width of the footing; (2) footing size, bearing level, applied loads, and resulting bearing pressures beneath the foundation; (3) site preparation and earthwork construction techniques used by the contractor, and (4) external factors, including but not limited to vibration from offsite sources and groundwater fluctuations beyond those normally anticipated for the naturally-occurring site and soil conditions which are present.

Our settlement estimates for the structure are based upon adherence to our recommended site preparation procedures presented in this report. Any deviation from these recommendations could result in an increase in the estimated post-construction settlement of the structures. Furthermore, should building loads change from those assumed by us, greater settlements may be expected.

Due to the sandy nature of the surficial soils, following the compaction operations we expect the majority of settlement to be elastic in nature and occur relatively quickly, on application of the loads, during and immediately following construction. Using the recommended maximum allowable bearing pressure, the assumed maximum structural loads, and the field and laboratory test data which we have correlated into the strength and compressibility characteristics of the subsurface soils, **we estimate the total post-construction vertical settlement of the proposed structure to be on the order of 1 inch or less.**

Differential settlement results from differences in applied bearing pressures and the variations in the compressibility characteristics of the subsurface soils. Assuming our site preparation recommendations are followed, **we anticipate post-construction differential settlement of less than ½ inch.**

9.8 FLOOR SLABS

Conventional floor slabs may be supported upon the compacted fill and should be structurally isolated from other foundation elements or adequately reinforced to prevent distress due to differential movements. For the slab design, we recommend using a subgrade modulus (k) of 100 pounds per cubic inch, which can be achieved by compacting the subgrade soils as recommended in this report. We recommend using a sheet vapor barrier (in accordance with Florida Building Code requirements) beneath the building slab-on-grade to help control moisture migration through the slab.

10.0 PAVEMENT RECOMMENDATIONS

10.1 GENERAL

We assume that a combination of flexible asphaltic and rigid concrete pavement sections will be used for the pavement areas on this project. Our recommendations for both pavement types are listed in the following sections. We assume that the roadway will be designed and constructed in accordance with the Seminole County Transportation Standards. Our recommendations for design of the roadway are listed in the following sections.

10.2 ASPHALTIC PAVEMENTS

12.2.1 Layer Components

We recommend using a three-layer pavement section for the proposed roadway consisting of stabilized subgrade, base course, and surface course. The Seminole County Roadway Design



Standards has divided the pavement requirements for urban roadways into two categories (Commercial/Industrial and Local). Table IV summarizes the minimum pavement component thicknesses for roadway design.

**TABLE IV
 MINIMUM ASPHALTIC PAVEMENT COMPONENT THICKNESSES**

Function	Layer Component (inches)		
	Surface Course	Base Course	Stabilized Subgrade
Local	1½	6	12
Commercial/Industrial	2	8	12

10.2.2 Stabilized Subgrade

We recommend that the stabilized subgrade materials immediately beneath the base course exhibit a minimum Limerock Bearing Ratio (LBR) of 40, as specified by Florida Department of Transportation (FDOT). The stabilized subgrade should be compacted to at least 98 percent of the Modified Proctor maximum dry density (ASTM D 1557) value.

Stabilized subgrade can be imported materials or a blend of on-site and imported materials. If a blend is proposed, we recommend that the contractor perform a mix design to find the optimum mix proportions. ***Please note, Seminole County does not allow the use of plastic clay to stabilize the subgrade. Crushed limerock or recycled concrete aggregate base material could be used to stabilize the subgrade soils to meet the recommended LBR value stated previously.***

Compaction testing of the stabilized subgrade should be performed to full depth at a frequency of at least one (1) test per 10,000 square feet, or a minimum of 4 tests, whichever is greater

10.2.3 Base Course

Based on review of the Seminole County roadway design standards, the base course may be either limerock or soil-cement. As an alternative, we have provided recommendations for recycled crushed concrete base if deemed acceptable by local municipality standards.

For a limerock base, the base course should be compacted to a minimum density of 98 percent of the Modified Proctor maximum dry density and exhibit a minimum LBR of 100. The limerock material should comply with the latest edition of the Florida Department of Transportation (FDOT) Road and Bridge Construction specifications.

For a soil-cement base, the base shall be designed to have minimum in-situ strength of 350 pounds per square inch (psi). Seven-day laboratory design compressive strength shall be a minimum of 500 psi for mixed in-place and 450 psi for plant mixed.

Place soil-cement in a loose condition for its full depth and compact in-place to a minimum density of 98 percent of the maximum dry density (AASHTO T-180). The moisture density requirements shall be determined by the methods prescribed in AASHTO T-135.



Place and finish the soil-cement according to Portland Cement Association requirements. Final review of the soil-cement base course should include manual "chaining" and/or "soundings" seven days after placement. Shrinkage cracks will form in the soil-cement mixture and you should expect reflection cracking on the surface course.

Recycled concrete aggregate (RCA) may provide a cost-effective alternative material in lieu of a limerock base course. Local availability, along with municipality standards, typically governs the use of crushed concrete use as an alternative base course material. The advantages of using recycled concrete aggregate as a pavement base course include its high strength (stronger than limerock), resistance to groundwater related distress, and lack of reflection cracking caused by thermal expansion and contraction.

If a RCA base is used, the base course material should be sourced from an FDOT approved supplier. The base should be compacted to a minimum density of 98 percent of the Modified Proctor maximum dry density and exhibit a minimum LBR of 150. The base material should comply with the gradation criteria listed in the latest edition of the FDOT Road and Bridge Construction Specifications. In an effort to ensure consistency of the crushed concrete material, additional LBR and sieve gradation tests should be performed at a minimum frequency of one test per 10,000 square feet, and for each visual change in material.

Compaction testing of the base course should be performed to full depth at a frequency of at least one test per 10,000 square feet, or every 500 lineal feet of roadway, whichever is greater.

10.2.4 Surface Course

For the pavements, we recommend that the surfacing consist of FDOT SuperPave (SP) asphaltic concrete. The surface course should consist of FDOT SP-9.5 fine mix for light-duty areas and FDOT SP-12.5 topped with SP-9.5 fine mix for heavy duty areas. The asphalt concrete should be placed within the allowable lift thicknesses for fine Type SP mixes per the latest edition of FDOT, Standard Specifications for Road and Bridge Construction.

The asphaltic concrete should be compacted to an average field density of 93 percent of the laboratory maximum density determined from specific gravity (G_{mm}) methods, with an individual test tolerance of **+2 percent and -1.2% of the design G_{mm}** . Specific requirements for the SuperPave asphaltic concrete structural course are outlined in the latest edition of FDOT, Standard Specifications for Road and Bridge Construction.

Note: If the Designer (or Contract Documents) limits compaction to the static mode only or lifts are placed one-inch thick, then the average field density should be 92 percent, with an individual test tolerance of + 3 percent, and -1.2% of the design G_{mm} .

After placement and field compaction, the wearing surface should be cored to evaluate material thickness and density. Cores should be obtained at frequencies of at least one (1) core per 10,000 square feet of placed pavement, or a minimum of two (2) cores per day's production.

10.2.5 Effects of Groundwater

One of the most critical influences on the pavement performance in Central Florida is the relationship between the pavement base course and the seasonal high groundwater level. Sufficient separation will need to be maintained between the bottom of base course and the



anticipated seasonal high groundwater level. We recommend that the seasonal high groundwater and the bottom of the base course be separated by at least 12 inches for soil cement and crushed concrete base course, and at least 18 inches for a limerock base course.

Based on the anticipated seasonal high groundwater conditions, it appears that some portions of the site may need to be raised to achieve the required separation. The separation should be confirmed by reviewing the final site grading and paving plan. If the separation is not provided by grading, the installation of underdrains will be required.

10.3 CONCRETE “RIGID” PAVEMENTS

Concrete pavement is a rigid pavement that transfers much lighter wheel loads to the subgrade soils than a flexible asphalt pavement; therefore, requiring less subgrade preparation. Concrete pavement is recommended under the dumpster area, and 10 feet in front of the trash enclosures, at a minimum.

We recommend using the existing surficial sands or approved structural fill densified to at least 98 percent of Modified Proctor test maximum dry density (ASTM D 1557) without additional stabilization under concrete pavement, with the following stipulations:

1. Prior to placement of concrete, the subgrade soils should be prepared as recommended in Section 11.0 of this report.
2. The surface of the subgrade soils must be smooth, and any disturbances or wheel rutting corrected prior to placement of concrete.
3. The subgrade soils must be moistened prior to placement of concrete.
4. Concrete pavement thickness should be uniform throughout, with exception to the thickened edges (curb or footing).
5. The bottom of the pavement should be separated from the seasonal high groundwater level by at least 12 inches.

Based on review of the Seminole County construction standards and the FDOT Rigid Pavement Design Manual, our recommended minimum concrete pavement design is shown in Table V.

**TABLE V
MINIMUM CONCRETE PAVEMENT THICKNESSES**

Service Level	Minimum Pavement Thickness	Maximum Control Joint Spacing	Recommended Saw Cut Depth
Light Duty	6 inches	12 feet x 12 feet	2 inches
Heavy Duty	7 inches	14 feet x 14 feet	2½ inches

We recommend using concrete with a minimum 28-day compressive strength of at least 4,000 pounds per square inch. Layout of the Saw cut control joints should form square panels, and the depth of saw cut joints should be ⅓ of the concrete slab thickness.



We recommend allowing UES to review and comment on the final concrete pavement design, including section and joint details (type of joints, joint spacing, etc.), prior to the start of construction.

For further details on concrete pavement construction, please reference the "Guide to Jointing of Non-Reinforced Concrete Pavements" published by the Florida Concrete and Products Association, Inc., and "Building Quality Concrete Parking Areas", published by the Portland Cement Association.

Specimens to verify the compressive strength of the pavement concrete should be obtained for at least every 50 cubic yards, or at least once for each day's placement, whichever is greater.

11.0 SITE PREPARATION

We recommend normal, good practice site preparation procedures for the new construction areas. These procedures include: **removing organic topsoils (up to 2½ feet)**, stripping/clearing of the site to remove existing vegetation, roots, debris, etc. Following stripping, the exposed subgrade soils should be proof-rolled, and all subgrade and subsequent fill/backfill soils should be properly densified. A more detailed description of this work is presented in this section.

1. Prior to construction, existing underground utility lines and other below grade structures within the construction area should be located. Provisions should be made to relocate interfering utilities to appropriate locations. It should be noted that if underground improvements are not properly removed or plugged, they may serve as conduits for subsurface erosion which may lead to excessive settlement of overlying structures.
2. Perform any necessary remedial dewatering prior to any earthwork operations. Dewatering should be performed to a depth of at least 2 feet below the bottom of any excavations or compacted surface.
3. Strip the proposed construction limits of vegetation, topsoil, roots, **organics**, debris and other deleterious materials within and 5 feet beyond the perimeter of the new construction areas. Expect clearing and grubbing to depths of **6 to 24 inches particularly in areas near boring B-10 and our previous borings B-06 and B-07 (other areas may also require additional grubbing depending on field observations during earthwork)**. We strongly recommend that the stripped/excavated surfaces be observed and probed by representatives of UES.
4. Proof-roll the exposed subsurface soils under the observation of UES, to locate any soft areas of unsuitable soils, and to increase the density of the shallow loose fine sand soils. If deemed necessary by UES, in areas that continue to "yield", remove any deleterious materials and replace with a clean, compacted sand backfill.
5. After approval of the stripped surface, within the building areas, compact the upper 2 feet of the exposed subgrade soils (including the 5 feet margin) to at least 95 percent of the Modified Proctor test maximum dry density (ASTM D 1557).



6. Place fill as necessary. All fill should consist of clean sand with less than 10 percent soil fines and be free of organics, debris and other deleterious materials. Fill soils containing between 5 and 10 percent fines may require strict moisture control. Place fill in maximum 12-inch loose, uniform lifts and compact each lift at least 95 percent of the Modified Proctor maximum dry density.
7. Within the pavement areas, the upper 12 inches of subgrade beneath the base course or concrete slabs (sub-base) should be stabilized and compacted to at least 98 percent of the Modified Proctor maximum dry density.
8. Test the subgrade and each lift of fill for compaction at a frequency of not less than one test per 2,500 square feet in the building areas and one test per 10,000 square feet in the pavement areas, with a minimum of 4 tests in each area.
9. Prior to the placement of reinforcing steel and concrete, verify compaction within the footing trenches to a depth of 2 feet. We recommend testing every column footing and at least one test every 100 feet of wall footing, with a minimum of 4 tests per building. Re-compaction of the foundation excavation bearing level soils, if loosened by the excavation process, can typically be achieved by making several passes with a walk-behind vibratory sled or jumping jack.

Stability of the compacted soils is essential and independent of compaction and density control. If the near surface soils or the structural fill experience “pumping” conditions, terminate all earthwork activities in that area. Pumping conditions occur when there is too much water present in the soil-water matrix. Earthwork activities are actually attempting to compact the water and not the soil. The disturbed soils should be dried in place by scarification and aeration prior to any additional earthwork activities.

Vibrations produced during vibratory compaction operations at the site may be significantly noticeable within 100 feet and may cause distress to adjacent structures if not properly regulated. Provisions should be made to monitor these vibrations so that any necessary modifications in the compaction operations can be made in the field before potential damages occur. Universal Engineering Sciences can provide vibration monitoring services to help document and evaluate the effects of the surface compaction operation on existing structures. It is recommended that large vibratory rollers remain a minimum of 50 feet from existing structures. Within this zone, the use of a static roller or small hand guided plate compactors is recommended.

12.0 DEWATERING AND EXCAVATION CONSIDERATIONS

Based on the groundwater level conditions encountered, dewatering will likely be required for the successful construction of this project. Where excavations will extend only a few feet below the groundwater table, a sump pump may be sufficient to control the groundwater table. Deeper excavations may require well points and/or sock drains to control the groundwater table. Regardless of the method(s) used, we recommend drawing down the water level at least 2 feet below the bottom of the excavation. The actual method(s) of dewatering should be determined by the contractor. The design and discharge of the dewatering system must be performed in accordance with applicable regulatory criteria (i.e.



water management district, etc.) and compliance with such criteria is the sole responsibility of the contractor.

Excavations should be sloped as necessary to prevent slope failure and to allow backfilling. As a minimum, temporary excavations below 4-foot depth should be sloped in accordance with OSHA regulations. Where lateral confinement will not permit slopes to be laid back, the excavation should be shored in accordance with OSHA requirements. During excavation, excavated material should not be stockpiled at the top of the slope within a horizontal distance equal to the excavation depth. Provisions for maintaining workman safety within excavations is the sole responsibility of the contractor.

13.0 CONSTRUCTION RELATED SERVICES

We recommend the owner retain UES to provide inspection services during the site preparation procedures for confirmation of the adequacy of the earthwork operations. Field tests and observations include verification of foundation and pavement subgrades by monitoring earthwork operations and performing quality assurance tests of the placement of compacted structural fill courses.

The geotechnical engineering design does not end with the advertisement of the construction documents. The design is an on-going process throughout construction. Because of our familiarity with the site conditions and the intent of the engineering design, we are most qualified to address site problems or construction changes, which may arise during construction, in a timely and cost-effective manner.

14.0 LIMITATIONS

This report has been prepared for the exclusive use of **NV5, Inc.** and other designated members of their design/construction team associated with the proposed construction for the specific project discussed in this report. No other site or project facilities should be designed using the soil information contained in this report. As such, UES will not be responsible for the performance of any other site improvement designed using the data in this report.

This report should not be relied upon for final design recommendations or professional opinions by unauthorized third parties without the expressed written consent of Universal Engineering Sciences. Unauthorized third parties that rely upon the information contained herein without the expressed written consent of Universal Engineering Sciences, Inc. assume all risk and liability for such reliance.

The recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated on the Boring Location Plan and from other information as referenced. This report does not reflect any variations which may occur between the boring locations. The nature and extent of such variations may not become evident until the course of construction. If variations become evident, it will then be necessary for a re-evaluation of the recommendations of this report after performing on-site observations during the construction period and noting the characteristics of the variations.

Borings for a typical geotechnical report are widely spaced and generally not sufficient for reliably detecting the presence of isolated, anomalous surface or subsurface conditions, or reliably estimating unsuitable or suitable material quantities. Accordingly, UES does not



recommend relying on our boring information for estimation of material quantities unless our contracted services **specifically** include sufficient exploration for such purpose(s) and within the report we so state that the level of exploration provided should be sufficient to detect anomalous conditions or estimate such quantities. Therefore, UES will not be responsible for any extrapolation or use of our data by others beyond the purpose(s) for which it is applicable or intended.

All users of this report are cautioned that there was no requirement for UES to attempt to locate any man-made buried objects or identify any other potentially hazardous conditions that may exist at the site during the course of this exploration. Therefore, no attempt was made by UES to locate or identify such concerns. UES cannot be responsible for any buried man-made objects or environmental hazards which may be subsequently encountered during construction that are not discussed within the text of this report. We can provide this service if requested.

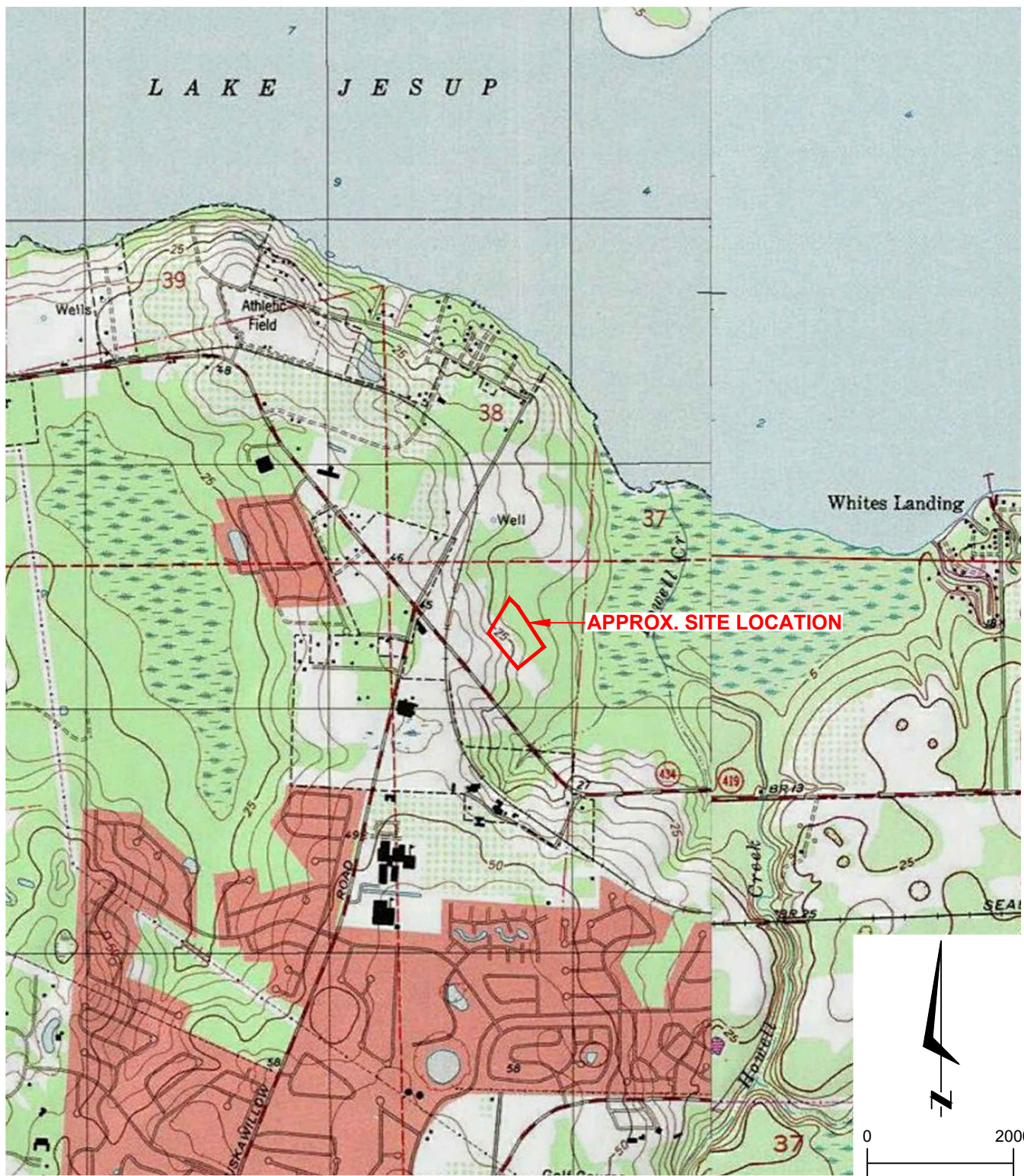
During the early stages of most construction projects, geotechnical issues not addressed in this report may arise. Because of the natural limitations inherent in working with the subsurface, it is not possible for a geotechnical engineer to predict and address all possible problems. An Association Geotechnical Business Council (GBC) publication, "Important Information About This Geotechnical Engineering Report" appears in Appendix D, and will help explain the nature of geotechnical issues.

Further, we present documents in Appendix D: Constraints and Restrictions, to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.



APPENDIX A





SOURCE: USGS QUADRANGLE MAP OF "CASSELBERRY, FLORIDA".

SCALE (FT.)



UNIVERSAL
ENGINEERING SCIENCES

GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA
U.S.G.S. SITE LOCATION MAP

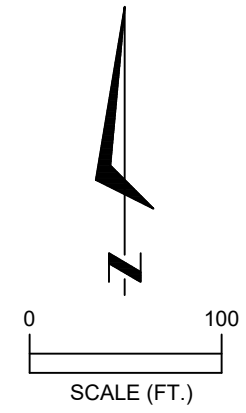
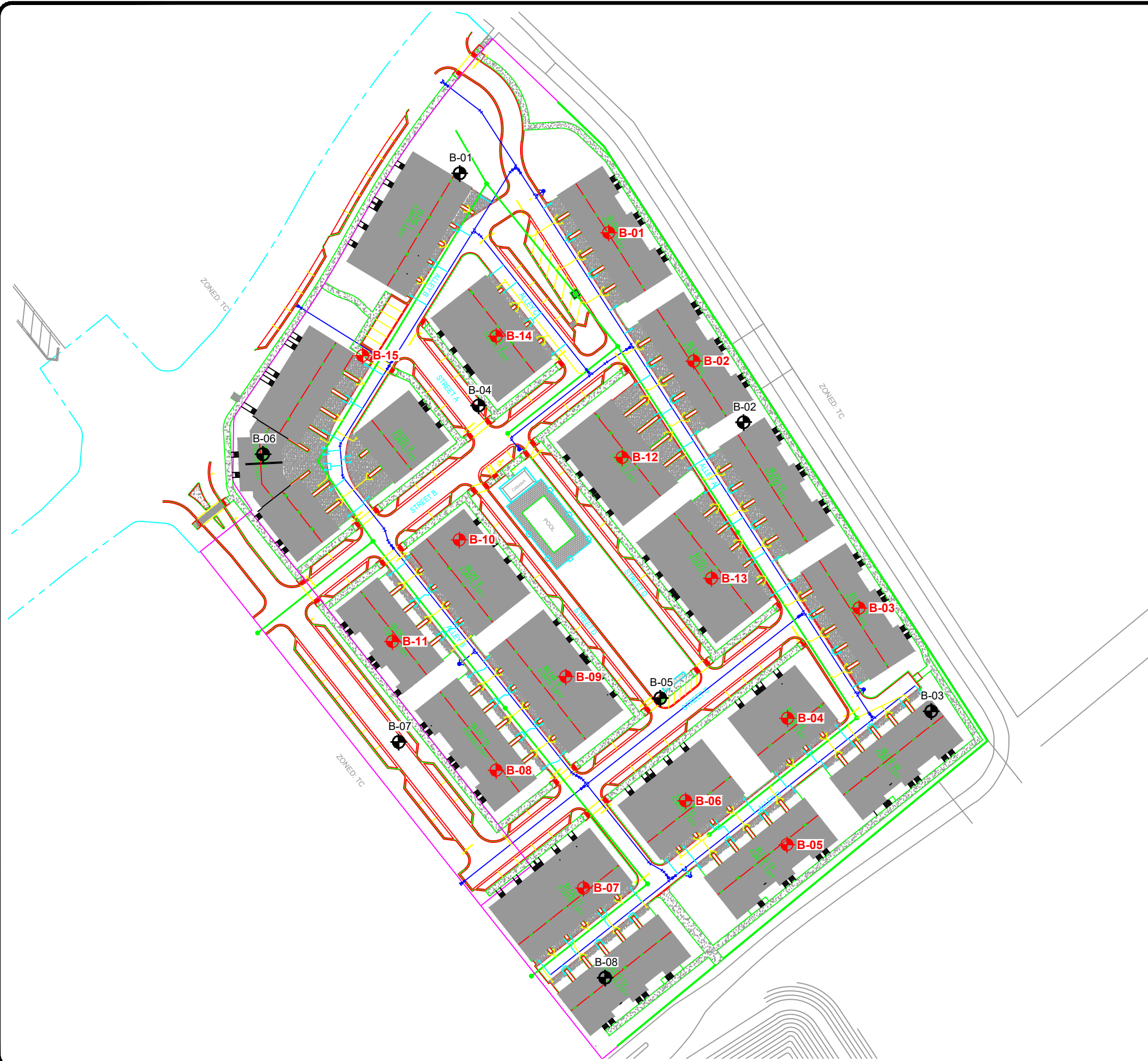
DRAWN BY: R.K.S.	DATE: 11 - 16 - 18	CHECKED BY: Z.W.A.	DATE: 11 - 20 - 18
SCALE: AS SHOWN	PROJECT NO: 0130.1800122.0001	REPORT NO: 1626718	PAGE NO: A-1

18-0676-01

APPENDIX B



18-0676-01



LEGEND

- APPROX. STANDARD PENETRATION TEST BORING LOCATION PERFORMED 11/14 & 11/15 /18
- PREVIOUS STANDARD PENETRATION TEST BORING LOCATION PERFORMED 4/4/18

THIS DRAWING CREATED USING PLAN PROVIDED BY CLIENT.

GEOTECHNICAL EXPLORATION
 WSTC TOWNHOMES
 SEMINOLE COUNTY, FLORIDA
 SOIL BORING LOCATION PLAN



PAGE NO: B-1

FOR: NV5, INC.	
DRAWN BY: R.K.S.	DATE: 11 - 16 - 18
CHECKED BY: Z.W.A.	DATE: 11 - 20 - 18
REPORT NO: 1626718	SCALE: AS SHOWN
PROJECT NO: 0130.1800122.0001	



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.1

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-01**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/15/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 4.5

DATE FINISHED: 11/15/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/15/18

DRILLED BY: ORL-JB/DM/DK

EST. SHGWT (ft): 3.0

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Medium dense very dark brown fine SAND with silt & roots [SP-SM]						
		3-5-6	11	▽		-- loose, brown, no roots						
		5-6-3	9	▼		Medium dense gray fine SAND [SP]						
5		8-13-11	24									
		6-5-6	11			Loose grey fine SAND with silt [SP-SM]	8	24				
		3-4-4	8			Loose grey fine SAND [SP]						
10		3-3-3	6			-- gray						
15		3-2-3	5			BORING TERMINATED AT 15.0 FT.						
20												

W-10188.GPJ



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.2

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-02**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/15/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.5

DATE FINISHED: 11/15/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/15/18

DRILLED BY: ORL-JB/DM/DK

EST. SHGWT (ft): 2.0

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Loose gray brown fine SAND with silt [SP-SM]						
		2-2-3	5	▽								
		3-4-4	8	▼		-- brown						
						-- medium dense						
5		8-11-10	21			Loose gray fine SAND [SP]						
		8-6-4	10									
		4-3-3	6									
10		3-4-3	7									
						-- gray brown						
15		2-4-3	7			BORING TERMINATED AT 15.0 FT.						
20												

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UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.3

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-03**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/15/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 4.0

DATE FINISHED: 11/15/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/15/18

DRILLED BY: ORL-JB/DM/DK

EST. SHGWT (ft): 2.5

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Loose gray brown fin fine SAND [SP]						
		2-3-3	6	▽								
		8-6-4	10	▼		Very loose red brown fine SAND with silt [SP-SM]						
5		3-2-2	4			Medium dense brown fine SAND [SP]	8	23				
		4-7-9	16			-- with gray						
		7-7-5	12									
10		5-4-3	7			-- loose						
15		2-3-3	6			BORING TERMINATED AT 15.0 FT.						
20												

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UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.4

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-04**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/14/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.5

DATE FINISHED: 11/14/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/14/18

DRILLED BY: ORL-JB/DM/DK

EST. SHGWT (ft): 2.0

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	S A M P L E	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	S Y M B O L	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Loose dark brown fine SAND with silt & roots [SP-SM]						
		2-2-4	6	▽		Medium dense light tan to brown fine SAND [SP]						
		4-6-5	11	▽		Loose brown fine SAND with silt [SP-SM]						
5		3-3-4	7			Medium dense brown fine SAND [SP]	6	25				
		8-13-11	24			-- gray						
		8-6-6	12									
10		3-4-4	8			-- loose						
15		2-3-4	7			BORING TERMINATED AT 15.0 FT.						
20												

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UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.5

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-05**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/15/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.5

DATE FINISHED: 11/15/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/15/18

DRILLED BY: ORL-JB/DM/DK

EST. SHGWT (ft): 2.0

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Loose gray brown fine SAND with roots [SP]						
		2-3-3	6	▽		Loose light grey brown fine SAND with silt [SP-SM]	7	16				
		3-5-4	9	▽		Very loose brown fine SAND [SP]						
5		3-2-2	4			Medium dense brown fine SAND with silt [SP-SM]						
		4-8-6	14			Loose gray fine SAND [SP]						
		6-5-5	10									
10		4-3-4	7									
15		2-2-3	5			BORING TERMINATED AT 15.0 FT.						
20												

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UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.6

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-06**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/14/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.5

DATE FINISHED: 11/14/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/14/18

DRILLED BY: ORL-JB/DM/CM

EST. SHGWT (ft): 2.0

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Medium dense dark red brown fine SAND with silt [SP-SM]						
		4-6-7	13	▽		Medium dense orange red brown fine SAND [SP]						
		8-8-9	17	▼		-- dark brown						
5		9-7-4	11			Very loose dark brown fine SAND with silt [SP-SM]						
		3-2-1	3									
		1-2-2	4									
10		3-4-6	10			-- loose						
						Loose dark brown fine SAND [SP]						
15		4-5-4	9			BORING TERMINATED AT 15.0 FT.						
20												

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UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.7

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-07**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/14/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 4.5

DATE FINISHED: 11/14/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/14/18

DRILLED BY: ORL-JB/DM/CM

EST. SHGWT (ft): 3.0

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Medium dense dark red brown fine SAND with silt [SP-SM]						
		8-9-10	19			-- orange, red-brown	6	16				
		10-10-15	25			Medium dense brown fine SAND [SP]						
5		8-7-6	13			Very loose dark brown fine SAND with silt [SP-SM]						
		2-2-2	4			-- loose						
		1-2-5	7			-- medium dense						
10		5-5-7	12			Loose brown fine SAND [SP]						
15		4-4-6	10			BORING TERMINATED AT 15.0 FT.						
20												

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UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.8

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-08**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/14/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 4.0

DATE FINISHED: 11/14/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED,, PERCHED SHGWT

DATE OF READING: 11/14/18

DRILLED BY: ORL-JB/DM/CM

EST. SHGWT (ft): 0.0

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	S A M P L E	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	S Y M B O L	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0				▽		Loose red brown silty fine SAND [SM]						
4-4-5		9				Medium dense red brown fine SAND with silt [SP-SM]						
5-5-6		11		▼		-- brown						
5-7-8		15				Loose brown fine SAND [SP]						
5-5-4		9				-- very loose, dark brown						
3-2-2		4				Loose dark brown fine SAND with silt [SP-SM]						
1-2-3		5				-- gray brown						
3-3-3		6				BORING TERMINATED AT 15.0 FT.						
20												

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UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.9

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-09**

SECTION: TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.
LOCATION: SEE BORING LOCATION PLAN

G.S. ELEVATION (ft): N.S. DATE STARTED: 11/14/18

WATER TABLE (ft): 3.0 DATE FINISHED: 11/14/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/14/18 DRILLED BY: ORL-JB/DM/CM

EST. SHGWT (ft): 1.5 TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLER	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Medium dense red brown fine SAND with silt & roots [SP-SM]						
		8-11-9	20	▽		-- brown						
		8-7-6	13	▽								
5		2-2-4	6			-- loose, no roots						
		4-4-5	9				8	23				
		4-5-7	12			Medium dense gray fine SAND [SP]						
		5-5-5	10			-- loose						
10												
						-- light gray						
15		4-3-3	6			BORING TERMINATED AT 15.0 FT.						
20												

W-10188.GPJ



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.10

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-10**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/14/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 2.0

DATE FINISHED: 11/14/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/14/18

DRILLED BY: ORL-JB/DM/CM

EST. SHGWT (ft): 0.5

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0				▽		Medium dense very dark red brown fine SAND with organics [SP-OL]						
		5-7-6	13	▽		Loose dark brown fine SAND with silt [SP-SM]	8	22				6
		6-5-5	10			-- very loose, brown, with roots						
5		3-2-1	3			Very loose brown fine SAND [SP]						
		1-2-2	4									
		3-4-4	8			-- loose						
10		4-5-5	10			-- gray						
15		5-6-3	9			BORING TERMINATED AT 15.0 FT.						
20												

W-10188.GPJ



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.11

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-11**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/14/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 2.0

DATE FINISHED: 11/14/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/14/18

DRILLED BY: ORL-JB/DM/CM

EST. SHGWT (ft): 0.5

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0				▽		Loose dark red brown fine SAND with silt & roots [SP-SM]						
		2-4-6	10	▽		-- medium dense	6	30				
		7-7-8	15									
5		8-8-8	16			-- loose, brown						
		5-5-4	9									
		2-2-2	4			-- very loose						
10		2-3-5	8			-- loose						
						-- gray brown						
15		3-3-3	6			BORING TERMINATED AT 15.0 FT.						
20												

W-10188.GPJ



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.12

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-12**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/15/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 4.0

DATE FINISHED: 11/15/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/15/18

DRILLED BY: ORL-JB/DM/DK

EST. SHGWT (ft): 2.5

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	S A M P L E	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	S Y M B O L	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Loose gray brown fine SAND [SP]						
		2-3-3	6	▽		loose brown fine SAND with silt [SP-SM]						
		4-5-5	10	▼		Medium dense brown fine SAND [SP]						
5		11-12-14	26			-- gray						
		5-6-7	13									
		4-5-4	9			-- loose						
						Loose brown fine SAND with silt [SP-SM]	8	25				
10		3-3-3	6									
						Loose brown fine SAND [SP]						
15		3-3-3	6			BORING TERMINATED AT 15.0 FT.						
20												

W-10188.GPJ



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.13

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-13**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/15/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.5

DATE FINISHED: 11/15/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/15/18

DRILLED BY: ORL-JB/DM/DK

EST. SHGWT (ft): 2.0

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Loose gray fine SAND [SP]						
		3-4-6	10	▽								
		10-9-7	16	▽		Medium dense brown to red brown to brown fine SAND with silt [SP-SM]						
						-- loose						
5		4-5-5	10			Medium dense light brown fine SAND [SP]						
		7-10-10	20									
		4-4-5	9			-- loose, light tan brown						
10		3-4-4	8			-- light gray tan						
15		3-3-3	6			BORING TERMINATED AT 15.0 FT.						
20												

W-10188.GPJ



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.14

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-14**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/15/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.0

DATE FINISHED: 11/15/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/15/18

DRILLED BY: ORL-JB/DM/DK

EST. SHGWT (ft): 1.5

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Loose brown fine SAND with silt & roots [SP-SM]						
		2-3-4	7	▽								
		3-4-5	9	▽		-- no roots						
5		4-5-5	10			Medium dense gray brown fine SAND [SP]						
		5-6-5	11									
		5-4-4	8			-- loose, gray						
10		4-3-4	7									
15		4-3-3	6			BORING TERMINATED AT 15.0 FT.						
20												

W-10188.GPJ



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0001

REPORT NO.: 1626718

PAGE: B-2.15

PROJECT: GEOTECHNICAL EXPLORATION
WSTC TOWNHOMES
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-15**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: NV5, INC.

G.S. ELEVATION (ft): N.S.

DATE STARTED: 11/15/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.0

DATE FINISHED: 11/15/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 11/15/18

DRILLED BY: ORL-JB/DM/DK

EST. SHGWT (ft): 1.5

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Loose brown fine SAND with silt & roots [SP-SM]						
		3-4-4	8	▽								
		3-5-4	9	▼								
						-- medium dense, no roots						
5		5-6-6	12			Medium dense gray brown fine SAND [SP]						
		5-6-5	11									
		4-4-4	8			-- loose, gray						
10		3-4-4	8									
						Loose grey fine SAND with silt [SP-SM]						
15		3-3-4	7				7	24				
						BORING TERMINATED AT 15.0 FT.						
20												

W-10188.GPJ



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0000

REPORT NO.: 1556876

PAGE: B-2.1

PROJECT: GEOTECHNICAL EXPLORATION
WINTER SPRINGS TOWN CENTER
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-01**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: LOCHRANE ENGINEERING

G.S. ELEVATION (ft): N.S.

DATE STARTED: 4/4/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.0

DATE FINISHED: 4/4/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 4/4/2018

DRILLED BY: ORL - JB/CM

EST. SHGWT (ft): 0.5

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0				▽		Loose dark brown fine SAND with silt [SP-SM]						
4-3-5		8		▼		Loose brown fine SAND [SP]	4	31				
4-3-5		8				-- medium dense, shade lighter						
5-8-10		18				-- light grey brown						
6-8-9		17										
7-9-9		18				-- loose						
10-5-4-5		9										
15-2-2-2		4				-- very loose						
4-4-4		8				Loose grey brown fine SAND with silt [SP-SM]						
20						BORING TERMINATED AT 20.0 FEET						

W-09875.GPJ



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0000

REPORT NO.: 1556876

PAGE: B-2.2

PROJECT: GEOTECHNICAL EXPLORATION
WINTER SPRINGS TOWN CENTER
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-02**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: LOCHRANE ENGINEERING

G.S. ELEVATION (ft): N.S.

DATE STARTED: 4/4/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.0

DATE FINISHED: 4/4/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 4/4/2018

DRILLED BY: ORL - JB/CM

EST. SHGWT (ft): 0.5

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	S A M P L E	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	S Y M B O L	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0				▽		Loose brown fine SAND [SP]						
		2-4-6	10			Medium dense dark brown fine SAND with silt [SP-SM]						
		5-5-7	12			Medium dense brown fine SAND, trace roots [SP]						
5		8-9-12	21			-- light brown						
		6-8-8	16									
		6-6-5	11			-- loose						
10		4-3-4	7									
						-- grey						
15		2-3-3	6									
20		5-5-6	11			BORING TERMINATED AT 20.0 FEET						

W-09875.GPJ



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0000

REPORT NO.: 1556876

PAGE: B-2.3

PROJECT: GEOTECHNICAL EXPLORATION
WINTER SPRINGS TOWN CENTER
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-03**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: LOCHRANE ENGINEERING

G.S. ELEVATION (ft): N.S.

DATE STARTED: 4/4/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 2.5

DATE FINISHED: 4/4/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 4/4/2018

DRILLED BY: ORL - JB/CM

EST. SHGWT (ft): 0.0

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0				▽		Medium dense light brown fine SAND [SP]						
		5-5-8	13	▼								
		5-9-9	18			-- shade darker						
5		11-11-9	20			-- loose						
		5-6-4	10			-- very loose						
		3-2-2	4			-- loose, shade darker						
10		2-3-2	5									
						Loose grey brown silty fine SAND [SM]						
15		2-3-4	7			BORING TERMINATED AT 15.0 FEET						
20												

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UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0000

REPORT NO.: 1556876

PAGE: B-2.4

PROJECT: GEOTECHNICAL EXPLORATION
WINTER SPRINGS TOWN CENTER
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-04**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: LOCHRANE ENGINEERING

G.S. ELEVATION (ft): N.S.

DATE STARTED: 4/4/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.0

DATE FINISHED: 4/4/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 4/4/2018

DRILLED BY: ORL - JB/CM

EST. SHGWT (ft): 0.5

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0				▽		Loose grey brown fine SAND [SP]						
		2-3-7	10	▽		Loose dark brown fine SAND with silt [SP-SM], trace organics & wood	6	29				3
		5-3-3	6			-- grey brown -- no organics						
5		3-3-5	8			-- medium dense						
		7-7-7	14			Loose light grey brown fine SAND [SP]						
		4-3-3	6			-- very loose						
10		3-2-2	4									
		2-2-3	5			Loose grey brown silty fine SAND [SM]						
15												
		5-5-6	11			-- medium dense						
20						BORING TERMINATED AT 20.0 FEET						

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UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0000

REPORT NO.: 1556876

PAGE: B-2.5

PROJECT: GEOTECHNICAL EXPLORATION
WINTER SPRINGS TOWN CENTER
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-05**

SHEET: **1 of 1**

SECTION: TOWNSHIP:

RANGE:

CLIENT: LOCHRANE ENGINEERING

G.S. ELEVATION (ft): N.S.

DATE STARTED: 4/4/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.5

DATE FINISHED: 4/4/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 4/4/2018

DRILLED BY: ORL - JB/CM

EST. SHGWT (ft): 1.0

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	S A M P L E	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	S Y M B O L	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0				▽		Medium dense grey brown fine SAND, trace roots [SP]						
		5-6-6	12			-- loose						
		4-5-5	10	▼		-- dark brown						
5		5-7-10	17			-- medium dense	5	24				
		6-7-9	16			Medium dense dark brown fine SAND with silt [SP-SM]						
		5-7-5	12			Medium dense light brown fine SAND [SP]						
		2-3-2	5			-- loose						
10												
		3-5-6	11			Medium dense light brown fine SAND with silt [SP-SM]						
15						BORING TERMINATED AT 15.0 FEET						
20												



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0000

REPORT NO.: 1556876

PAGE: B-2.6

PROJECT: GEOTECHNICAL EXPLORATION
WINTER SPRINGS TOWN CENTER
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-06**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: LOCHRANE ENGINEERING

G.S. ELEVATION (ft): N.S.

DATE STARTED: 4/4/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 2.5

DATE FINISHED: 4/4/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 4/4/2018

DRILLED BY: ORL - JB/CM

EST. SHGWT (ft): 0.0

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	S A M P L E	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	S Y M B O L	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0				▽		Loose dark brown organic fine SAND with wood [SP-OL]						
		1-2-3	5	▼		Loose dark brown silty fine SAND [SM]	5	42				6
		2-3-6	9									
5		4-6-4	10									
		2-2-3	5			-- medium dense						
		4-5-7	12			-- loose						
10		7-5-5	10									
						-- brown						
15		3-3-4	7			BORING TERMINATED AT 15.0 FEET						
20												

W-09875.GPJ



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0000

REPORT NO.: 1556876

PAGE: B-2.7

PROJECT: GEOTECHNICAL EXPLORATION
WINTER SPRINGS TOWN CENTER
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-07**

SECTION: TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: LOCHRANE ENGINEERING

G.S. ELEVATION (ft): N.S.

DATE STARTED: 4/4/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 2.0

DATE FINISHED: 4/4/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

DATE OF READING: 4/4/2018

DRILLED BY: ORL - JB/CM

EST. SHGWT (ft): 0.0

TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	S A M P L E	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	S Y M B O L	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0				▽								
		3-6-5	11	▼		Medium dense dark red brown organic fine SAND [SP-OL]	6	41				10
		2-4-9	13		Medium dense dark brown fine SAND with silt [SP-SM]							
					Medium dense dark brown fine SAND [SP]							
5		6-7-8	15			-- loose						
		3-3-3	6			-- very loose, shade darker						
		1-2-1	3									
10		1-1-2	3									
15		4-6-7	13			-- medium dense, grey						
						BORING TERMINATED AT 15.0 FEET						
20												

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UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0130.1800122.0000

REPORT NO.: 1556876

PAGE: B-2.8

PROJECT: GEOTECHNICAL EXPLORATION
WINTER SPRINGS TOWN CENTER
SEMINOLE COUNTY, FLORIDA

BORING I.D.: **B-08**

SECTION:

TOWNSHIP:

SHEET: **1 of 1**

RANGE:

CLIENT: LOCHRANE ENGINEERING

G.S. ELEVATION (ft): N.S.

DATE STARTED: 4/4/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.5

DATE FINISHED: 4/4/18

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED, N.R. = NOT RECORDED

DATE OF READING: 4/4/2018

DRILLED BY: ORL - JB/CM

EST. SHGWT (ft): 1.0






TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT/DAY)	ORG. CONT. (%)
									LL	PI		
0						Very loose red brown fine SAND, trace roots [SP]						
		1-2-2	4	▽		-- brown						
		2-4-5	9	▼		-- dark red brown -- medium dense, shade lighter						
5		6-6-7	13			-- loose	3	26				
		3-3-4	7			Loose dark red brown fine SAND with silt [SP-SM]						
		3-4-5	9									
10		5-5-4	9									
						Medium dense brown fine SAND [SP]						
15		4-5-7	12			BORING TERMINATED AT 15.0 FEET						
20												

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SYMBOLS AND ABBREVIATIONS

<u>SYMBOL</u>	<u>DESCRIPTION</u>
N-Value	No. of Blows of a 140-lb. Weight Falling 30 Inches Required to Drive a Standard Spoon 1 Foot
WOR	Weight of Drill Rods
WOH	Weight of Drill Rods and Hammer
	Sample from Auger Cuttings
	Standard Penetration Test Sample
	Thin-wall Shelby Tube Sample (Undisturbed Sampler Used)
RQD	Rock Quality Designation
	Stabilized Groundwater Level
	Seasonal High Groundwater Level (also referred to as the W.S.W.T.)
NE	Not Encountered
GNE	Groundwater Not Encountered
BT	Boring Terminated
-200 (%)	Fines Content or % Passing No. 200 Sieve
MC (%)	Moisture Content
LL	Liquid Limit (Atterberg Limits Test)
PI	Plasticity Index (Atterberg Limits Test)
NP	Non-Plastic (Atterberg Limits Test)
K	Coefficient of Permeability
Org. Cont.	Organic Content
G.S. Elevation	Ground Surface Elevation

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS More than 50% retained on the No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW Well-graded gravels and gravel-sand mixtures, little or no fines
			GP Poorly graded gravels and gravel-sand mixtures, little or no fines
	SANDS More than 50% of coarse fraction passes No. 4 sieve	GRAVELS WITH FINES	GM Silty gravels and gravel-sand-silt mixtures
			GC Clayey gravels and gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS 5% or less passing No. 200 sieve	SW** Well-graded sands and gravelly sands, little or no fines
			SP** Poorly graded sands and gravelly sands, little or no fines
SANDS with 12% or more passing No. 200 sieve		SM** Silty sands, sand-silt mixtures	
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less		ML Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			OL Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50%		MH Inorganic silts, micaceous or diamicaceous fine sands or silts, elastic silts
			CH Inorganic clays or clays of high plasticity, fat clays
			OH Organic clays of medium to high plasticity
			PT Peat, muck and other highly organic soils

*Based on the material passing the 3-inch (75 mm) sieve

** Use dual symbol (such as SP-SM and SP-SC) for soils with more than 5% but less than 12% passing the No. 200 sieve

RELATIVE DENSITY

(Sands and Gravels)

- Very loose – Less than 4 Blow/Foot
- Loose – 4 to 10 Blows/Foot
- Medium Dense – 11 to 30 Blows/Foot
- Dense – 31 to 50 Blows/Foot
- Very Dense – More than 50 Blows/Foot

CONSISTENCY

(Silts and Clays)

- Very Soft – Less than 2 Blows/Foot
- Soft – 2 to 4 Blows/Foot
- Firm – 5 to 8 Blows/Foot
- Stiff – 9 to 15 Blows/Foot
- Very Stiff – 16 to 30 Blows/Foot
- Hard – More than 30 Blows/Foot

RELATIVE HARDNESS

(Limestone)

- Soft – 100 Blows for more than 2 Inches
- Hard – 100 Blows for less than 2 Inches

MODIFIERS

These modifiers Provide Our Estimate of the Amount of Minor Constituents (Silt or Clay Size Particles) in the Soil Sample

- Trace – 5% or less
- With Silt or With Clay – 6% to 11%
- Silty or Clayey – 12% to 30%
- Very Silty or Very Clayey – 31% to 50%

These Modifiers Provide Our Estimate of the Amount of Organic Components in the Soil Sample

- Trace – Less than 3%
- Few – 3% to 4%
- Some – 5% to 8%
- Many – Greater than 8%

These Modifiers Provide Our Estimate of the Amount of Other Components (Shell, Gravel, Etc.) in the Soil Sample

- Trace – 5% or less
- Few – 6% to 12%
- Some – 13% to 30%
- Many – 31% to 50%

APPENDIX C



Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply this report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an

assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help

others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBC-Member geotechnical engineer for more information.



8811 Colesville Road/Suite G106, Silver Spring, MD 20910

Telephone: 301/565-2733 Facsimile: 301/589-2017

e-mail: info@geoprofessional.org www.geoprofessional.org

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CONSTRAINTS & RESTRICTIONS

The intent of this document is to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

WARRANTY

Universal Engineering Sciences has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering practices, and makes no other warranty either expressed or implied as to the professional advice provided in the report.

UNANTICIPATED SOIL CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings.

The nature and extent of variations between borings may not become known until excavation begins. If variations appear, we may have to re-evaluate our recommendations after performing on-site observations and noting the characteristics of any variations.

CHANGED CONDITIONS

We recommend that the specifications for the project require that the contractor immediately notify Universal Engineering Sciences, as well as the owner, when subsurface conditions are encountered that are different from those present in this report.

No claim by the contractor for any conditions differing from those anticipated in the plans, specifications, and those found in this report, should be allowed unless the contractor notifies the owner and Universal Engineering Sciences of such changed conditions. Further, we recommend that all foundation work and site improvements be observed by a representative of Universal Engineering Sciences to monitor field conditions and changes, to verify design assumptions and to evaluate and recommend any appropriate modifications to this report.

MISINTERPRETATION OF SOIL ENGINEERING REPORT

Universal Engineering Sciences is responsible for the conclusions and opinions contained within this report based upon the data relating only to the specific project and location discussed herein. If the conclusions or recommendations based upon the data presented are made by others, those conclusions or recommendations are not the responsibility of Universal Engineering Sciences.

CHANGED STRUCTURE OR LOCATION

This report was prepared in order to aid in the evaluation of this project and to assist the architect or engineer in the design of this project. If any changes in the design or location of the structure as outlined in this report are planned, or if any structures are included or added that are not discussed in the report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved by Universal Engineering Sciences.

USE OF REPORT BY BIDDERS

Bidders who are examining the report prior to submission of a bid are cautioned that this report was prepared as an aid to the designers of the project and it may affect actual construction operations.

Bidders are urged to make their own soil borings, test pits, test caissons or other investigations to determine those conditions that may affect construction operations. Universal Engineering Sciences cannot be responsible for any interpretations made from this report or the attached boring logs with regard to their adequacy in reflecting subsurface conditions which will affect construction operations.

STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs which accompany this report. However, the actual change in the ground may be more gradual. Where changes occur between soil samples, the location of the change must necessarily be estimated using all available information and may not be shown at the exact depth.

OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water level, boulders, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, obstructions, etc.; however, lack of mention does not preclude their presence.

WATER LEVELS

Water level readings have been made in the drill holes during drilling and they indicate normally occurring conditions. Water levels may not have been stabilized at the last reading. This data has been reviewed and interpretations made in this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tides, and other factors not evident at the time measurements were made and reported. Since the probability of such variations is anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

LOCATION OF BURIED OBJECTS

All users of this report are cautioned that there was no requirement for Universal Engineering Sciences to attempt to locate any man-made buried objects during the course of this exploration and that no attempt was made by Universal Engineering Sciences to locate any such buried objects. Universal Engineering Sciences cannot be responsible for any buried man-made objects which are subsequently encountered during construction that are not discussed within the text of this report.

TIME

This report reflects the soil conditions at the time of exploration. If the report is not used in a reasonable amount of time, significant changes to the site may occur and additional reviews may be required.



TRAFFIC IMPACT ANALYSIS

**LOT 5 TOWNHOMES @
WINTER SPRINGS TOWN CENTER
WINTER SPRINGS, FLORIDA**



Prepared for:
NV5, INC.
201 South Bumby Ave
Orlando, Florida 32803

Prepared by:
Traffic Planning and Design, Inc.
535 Versailles Drive
Maitland, Florida 32751
407-628-9955

December 2018

TPD № 5060

PROFESSIONAL ENGINEERING CERTIFICATION

I hereby certify that I am a Professional Engineer properly registered in the State of Florida practicing with Traffic Planning & Design, Inc., a corporation authorized to operate as an engineering business, EB-3702, by the State of Florida Department of Professional Regulation, Board of Professional Engineers, and that I have prepared or approved the evaluations, findings, opinions, conclusions, or technical advice attached hereto for:

PROJECT: Lot 5 Townhomes @ Winter Springs Town Center
LOCATION: Winter Springs, Florida
CLIENT: NV5, INC.

I hereby acknowledge that the procedures and references used to develop the results contained in these computations are standard to the professional practice of Transportation Engineering as applied through professional judgment and experience.

NAME: Turgut Dervish, P.E.
P.E. No.: 20400
DATE: December 6th, 2018

SIGNATURE:



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INTRODUCTION

This traffic analysis was performed to assess the impact of a proposed Townhouse development in the City of Winter Springs, Florida. Located in the northwest quadrant of the intersection of Michael Blake Boulevard and Tree Swallow Road, the proposed development will consist of 114 units to be completed within one-year. **Figure 1** depicts the location of the project site and the roadways. Access to the site will be provided via access driveways from Michael Blake Boulevard and Tree Swallow Road. **Figure 2** depicts the proposed site plan. The analysis considers the project's impacts on the following roadways and intersections in the property vicinity:

Roadways

SR 434

- Central Winds Drive to Tuskawilla Road
- Tuskawilla Road to Michael Blake Boulevard
- Michael Blake Boulevard to Tuscora Drive

Tuskawilla Road

- Trotwood Boulevard to SR 434
- SR 434 to Blumberg Boulevard

Michael Blake Boulevard

- SR 434 to Tuskawilla Road

Intersections

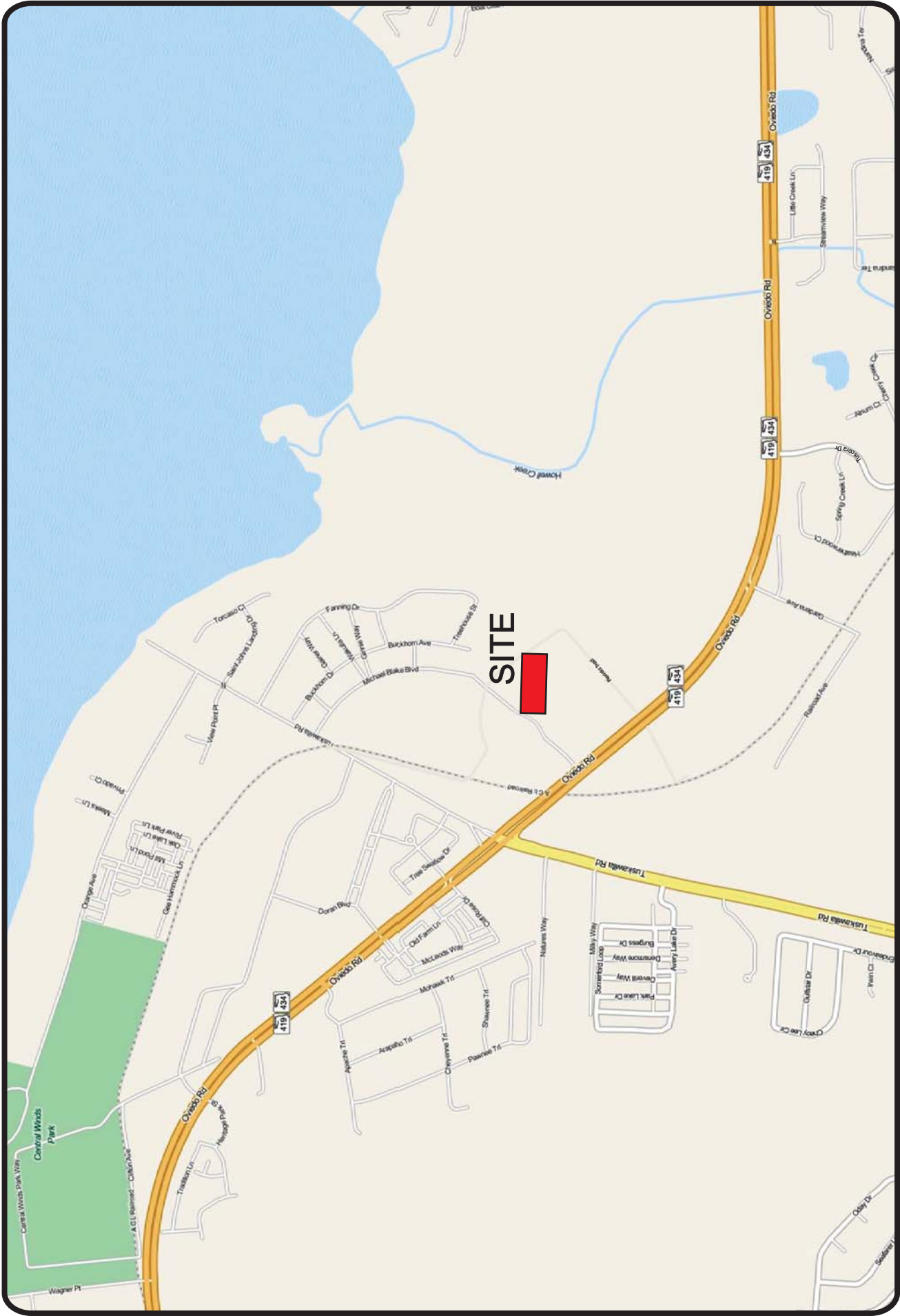
SR 434 & Bear Springs Drive

SR 434 & Tuskawilla Road

SR 434 & Michael Blake Boulevard

Data used in this analysis consists of site plan/development information provided by the Project Engineers, daily traffic volume data obtained from the Florida DOT and Seminole County and A.M./P.M. peak hour traffic counts obtained by Traffic Planning and Design, Inc.



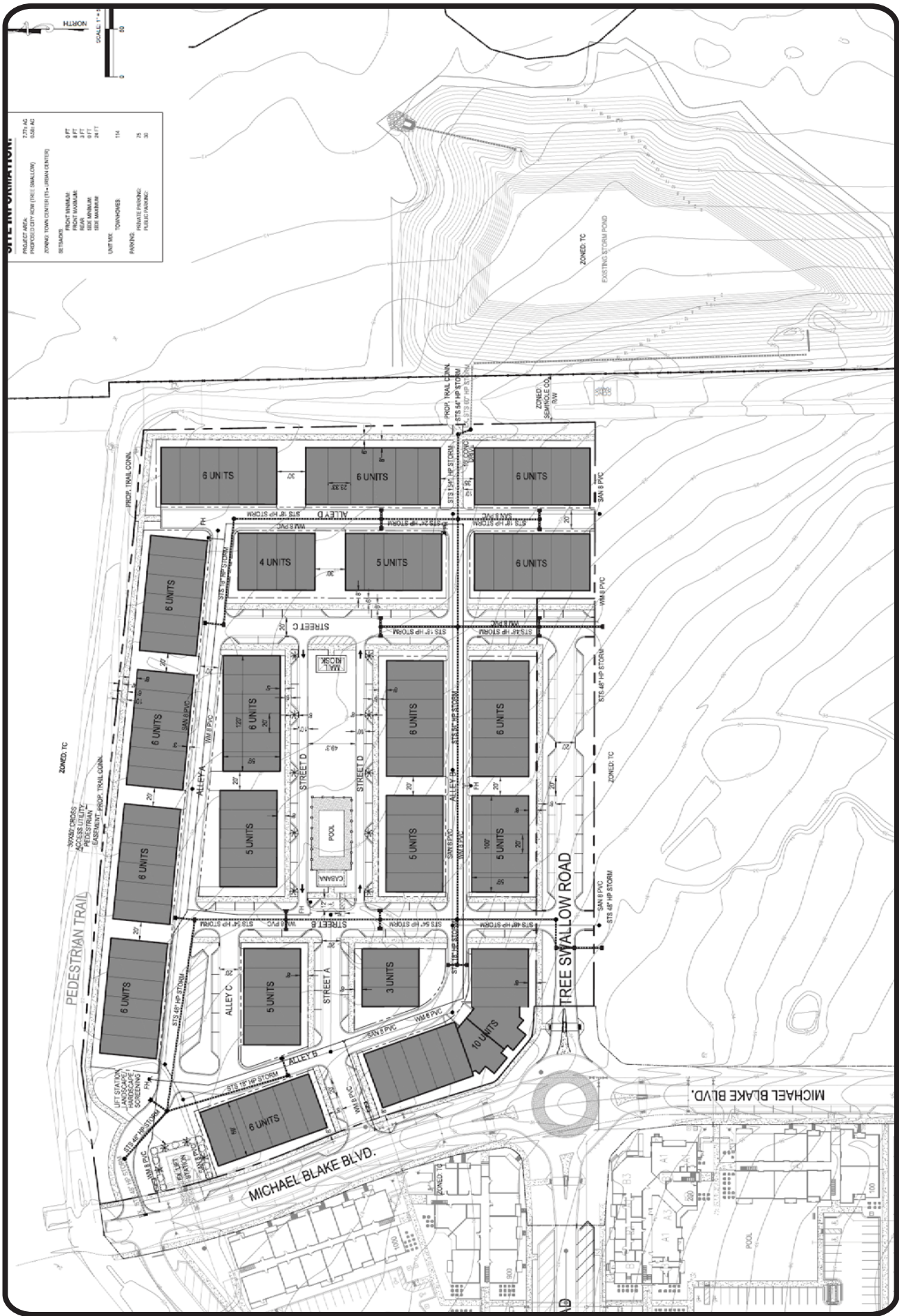


Site Location

Lot 5 Townhomes @ Winter Springs Town Center
 Project No 5060

Figure 1





GENERAL INFORMATION

PROJECT AREA: 1.77 AC
 PROJECTED SET BACK (SEE SMALLBOX) 0.50 AC
 ZONING: TOWN CENTER (TH - JORDAN CENTER)

SETBACKS:
 FRONT MINIMUM 8 FT
 SIDE MINIMUM 8 FT
 REAR MINIMUM 8 FT

UNIT MIX:
 TOWNHOMES 114
 PARKING 70
 PUBLIC PARKING 20

Proposed Site Plan

Lot 5 Townhomes @ Winter Springs Town Center
 Project No 5060
Figure 2



EXISTING ROADWAY ANALYSIS

Capacity analyses were performed for the study roadway segments and intersections for the existing traffic in order to establish their current operating conditions. The roadway segments were analyzed for daily conditions and the intersections for A.M. and P.M. peak hour conditions.

Roadway Segment Analysis

The study roadway segments were analyzed by comparing their existing traffic volumes with their respective capacities at the adopted LOS standard. The daily traffic volumes and capacities were obtained from the Seminole County 2017 Roadway Segment Counts and Roadway Concurrency information sheets. The Seminole County data sheets are included in **Appendix A**. The A.M./P.M. peak hour volumes along the roadway segments were determined from counts made at the study intersections. Summaries of the daily and A.M./P.M. peak hour roadway capacity analyses are presented in **Tables 1 and 2**.

**Table 1
Existing Daily Roadway Capacity Analysis**

Roadway Segment	No. of Lanes	LOS Standard	Daily Capacity ⁽¹⁾	Existing Daily Volume ⁽²⁾	LOS
SR 434					
Central Winds Dr to Tuskawilla Rd	4LD	E	48,000	37,172	C
Tuskawilla Rd to Michael Blake Blvd	4LD	E	48,000	37,172	C
Michael Blake Blvd to Tuscora Dr	4LD	E	48,000	27,172	C
Tuskawilla Road					
Trotwood Blvd to SR 434	4LD	E	42,560	18,992	C
SR 434 to Blumberg Blvd	2LU	D	17,800	5,600 ⁽³⁾	C
Michael Blake Boulevard					
SR 434 to Tuskawilla Rd	2LU	D	17,800	830 ⁽³⁾	C

⁽¹⁾ Based on Concurrency Roadway

⁽²⁾ Obtained from Florida Traffic Information DVD

⁽³⁾ Estimated from the intersection counts with the use of K=0.09



**Table 2
Existing A.M./P.M. Peak Hour Roadway Capacity Analysis**

Roadway Segment	No. of Lanes	Adopted		A.M. Peak Hour			P.M. Peak Hour		
		LOS Standard	Daily Capacity ⁽¹⁾	Volume ⁽²⁾	Peak Dir	LOS	Volume	Peak Dir	LOS
SR 434									
Central Winds Dr to Tuskawilla Rd	4LD	E	2,000	1,474	WB	C	1,604	EB	C
Tuskawilla Rd to Michael Blake Blvd	4LD	E	2,000	1,148	WB	C	1,262	EB	C
Michael Blake Blvd to Tuscora Dr	4LD	E	2,000	1,180	WB	C	1,224	EB	C
Tuskawilla Rd									
Trotwood Blvd to SR 434	4LD	E	2,100	724	NB	C	749	SB	C
SR 434 to Blumberg Blvd	2L	D	830	150	NB	C	248	SB	C
Michael Blake Blvd									
SR 434 to Tuskawilla Rd	2L	D	830	72	SB	C	80	NB	C

⁽¹⁾ Based on Seminole County Service Volume

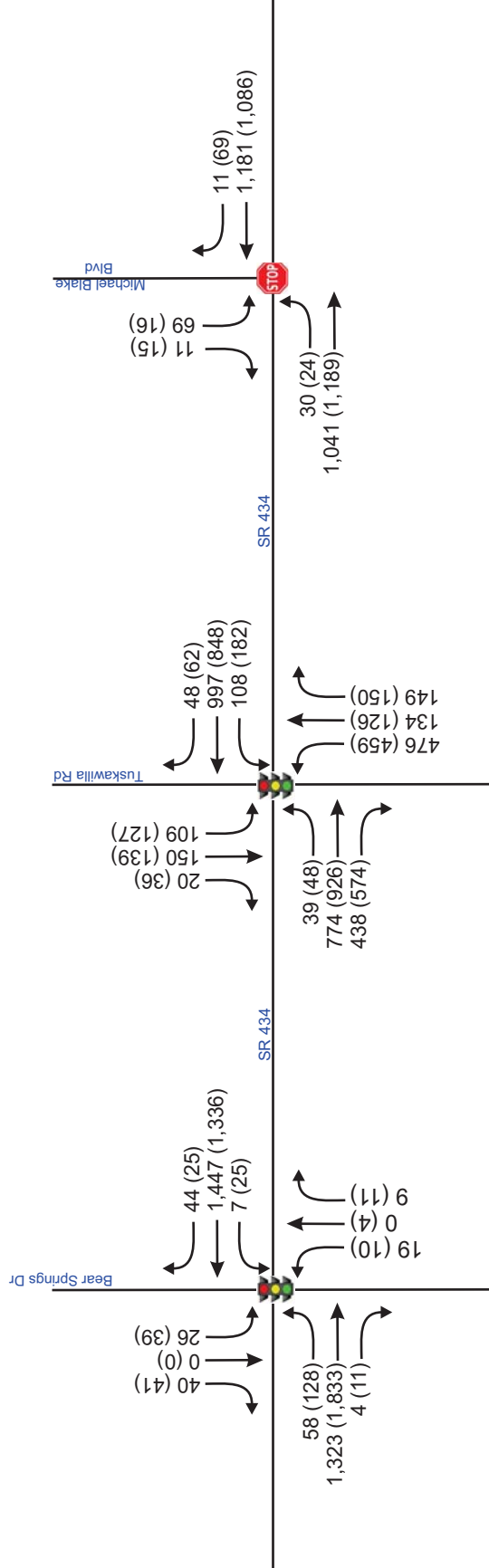
⁽²⁾ Estimated from the intersection counts

The existing conditions analysis reveals that the study segments currently operate satisfactorily within their adopted LOS standards.

Intersection Analysis

A capacity analysis was conducted for each study intersections using HCS7 software in accordance with the procedures of the 2010 *Highway Capacity Manual (HCM)*. The capacity analysis was performed using the existing intersection geometries, A.M./P.M. peak hour traffic volumes and signal timings. The A.M./P.M. peak hour volumes were determined from turning movement counts obtained by TPD and are included in **Appendix B** along with signal timing sheets provided by Seminole County. The existing intersection volumes are displayed in **Figure 3**. The intersection capacity analysis results are summarized in **Table 3** and the HCS7 analysis worksheets are included in **Appendix C**.





Legend:
 00 (00)
 └── PM Peak Hour
 └── AM Peak Hour



**Existing A.M./P.M.
Peak Hour Traffic Volumes**

Lot 5 Townhomes @ Winter Springs Town Center
 Project № 5060

Figure 3



**Table 3
Existing Intersection Capacity Analysis**

Intersection	Control	Period	EB		WB		NB		SB		Overall	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
SR 434 & Bear Spring Dr	Signal	A.M.	11.9	B	15.7	B	67.1	E	67.4	E	15.6	B
		P.M.	18.2	B	14.6	B	67.2	E	67.5	E	18.3	B
SR 434 & Tuskawilla Rd	Signal	A.M.	36.2	D	37.1	D	58	E	82.2	F	45	D
		P.M.	48	D	32.3	C	57.7	E	83.5	F	48.2	D
SR 434 & Michael Blake Blvd	STOP	A.M.	12.1	B	10.8	B	-	-	38.1	E	--	--
		P.M.	11.6	B	11.5	B	-	-	19.4	C	--	--

The results of the intersection capacity analysis indicate that the study intersections operate at satisfactory overall Level of Service.



PROPOSED DEVELOPMENT AND TRIP GENERATION

The proposed development will consist of 114 Townhouse units. To determine the impact of this development, an analysis of its trip generation characteristics was conducted. This included the determination of the trips to be generated as well as their distribution and assignment to the area roadways.

Trip Generation

The trip generation of the proposed development was calculated with the use of trip generation rates obtained from the 10th Edition of the ITE Trip Generation Manual. **Table 4** provides a summary of the trip generation calculation.

Table 4
Trip Generation Summary

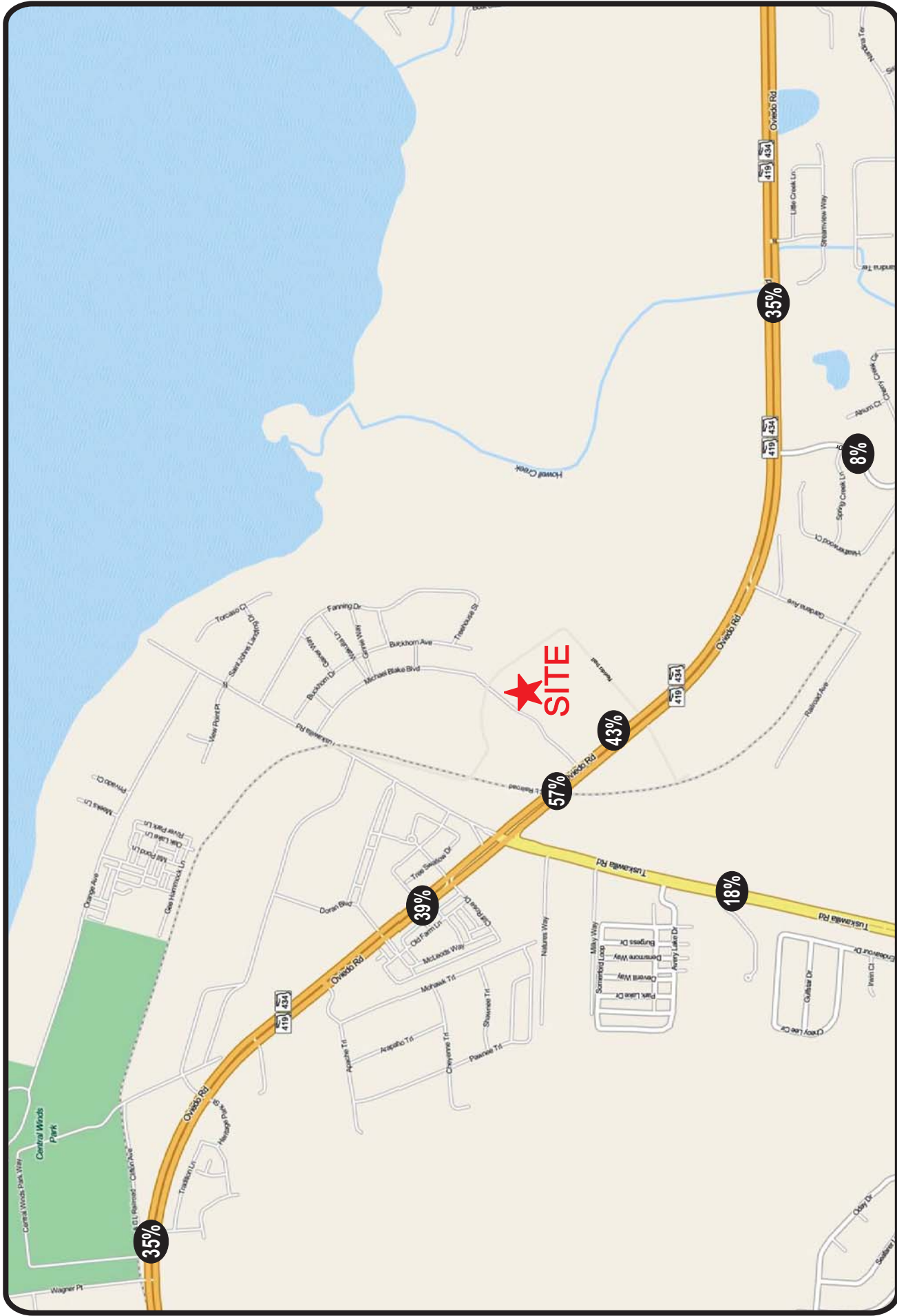
ITE Code	Land Use	Size (DU)	Daily		A.M. Peak Hour			P.M. Peak Hour				
			Rate	Trips	Rate	Enter	Exit	Total	Rate	Enter	Exit	Total
220	MF Housing	114	7.20	821	0.47	12	42	54	0.58	42	24	66
Totals				821		12	42	54		42	24	66

The proposed development is projected to generate 821 daily trips, of which 54 will occur in the A.M. peak hour and 66 will occur in the P.M. peak hour.

Trip Distribution/Trip Assignment

The proposed distribution pattern was estimated using the 2040 OUATS model with 2020 interpolation. The model generated distribution is shown in **Figure 4** and a model distribution plot is included in **Appendix D**. With this distribution pattern, the project trips were assigned to the area roadways as shown in **Figure 5**.



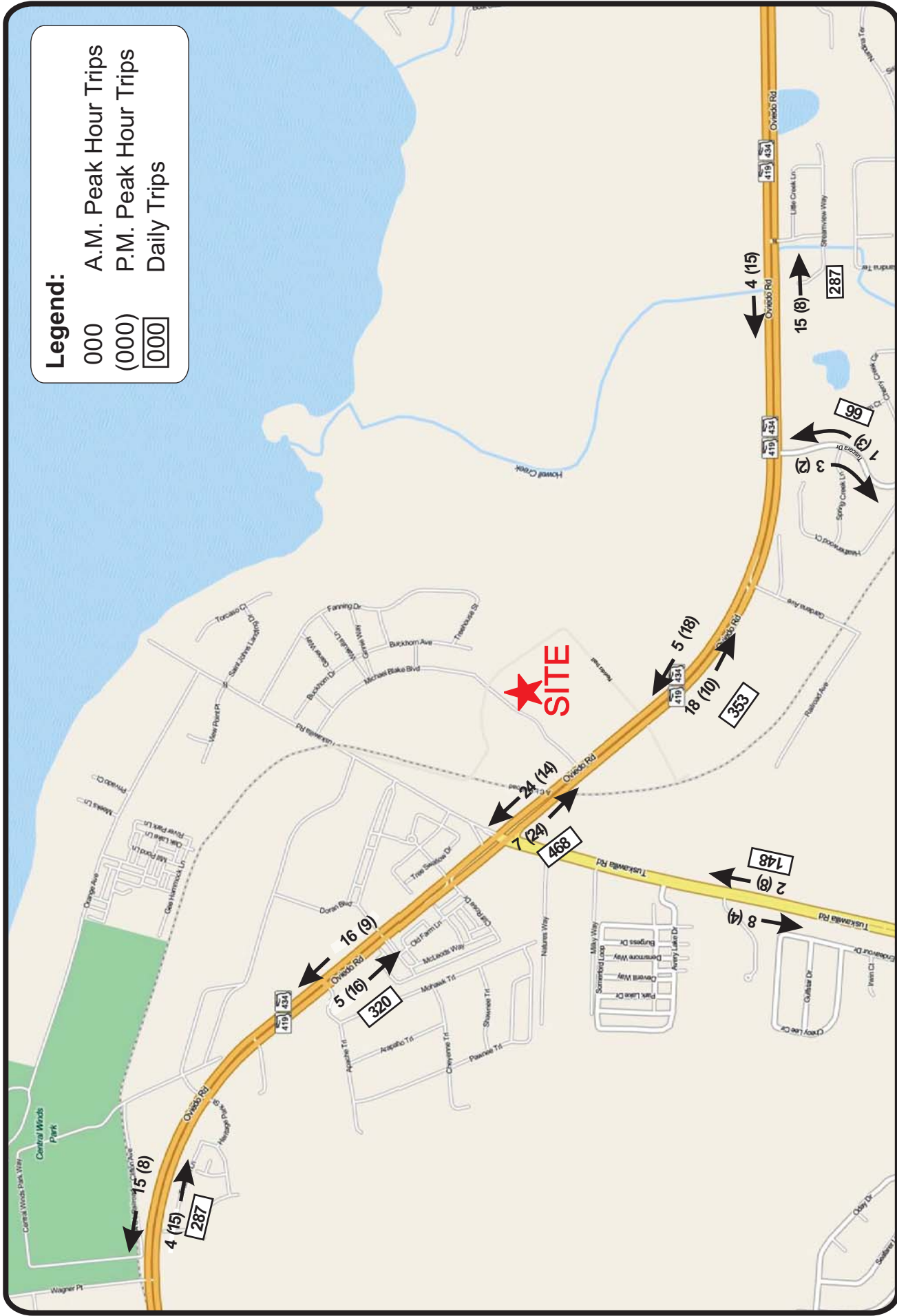


Trip Distribution

Lot 5 Townhomes @ Winter Springs Town Center
 Project № 5060

Figure 4





Trip Assignment

Lot 5 Townhomes @ Winter Springs Town Center
 Project № 5060

Figure 5



PROJECTED TRAFFIC CONDITIONS

Projected traffic conditions for the project buildout were analyzed using daily traffic volumes for the roadway segments and A.M./P.M. peak hour traffic volumes for the intersections. The projected traffic volumes used in the analysis consisted of background traffic volumes and project trips. Background traffic volumes were estimated with the use of a growth factor of 1.02 for a one-year growth plus traffic from approved developments identified by the city. Approved development traffic volumes are included in **Appendix E**. A review of the historical traffic volumes on SR 434 in the project vicinity revealed a 1.71 annual growth during the last eight years. Therefore, a minimum annual growth of 2% was used in the background traffic estimation. The trends analysis sheet is included in **Appendix F**.

Roadway Segment Analysis

A roadway segment analysis was performed for the study roadway segments by comparing the projected traffic volumes of the segments with their respective capacities at the adopted LOS standards. The daily, A.M. and P.M. peak hour analyses are summarized in **Tables 5, 6 and 7**.

**Table 5
Projected Daily Roadway Capacity Analysis**

Roadway Segment	No. of Lns	Adopted		Projected Daily Volume							Proj. LOS	
		LOS Stnd	Daily Capacity	Future Vol*	Committed Trips				Pro. Trips	Total		
					Catalyst Apartments	Integra	Tuskawilla Crossings	Towncenter Commercial				
SR 434												
Central Winds Dr to Tuskawilla Rd	4LD	E	48,000	37,915	890	1,809	1,567	911	320	43,412	E	
Tuskawilla Rd to Michael Blake Blvd	4LD	E	48,000	37,915	1,020	3,214	1,828	1,332	468	45,777	E	
Michael Blake Blvd to Tuscora Dr	4LD	E	48,000	27,715	390	3,214	1,828	864	353	34,364	D	
Tuskawilla Rd												
Trotwood Blvd to SR 434	4LD	E	42,560	19,372	427	605	1,306	421	148	22,279	C	
SR 434 to Blumberg Blvd	2LU	D	17,800	5,712	148	495	522	0	0	6,877	A	
Michael Blake Blvd												
SR 434 to Tuskawilla Rd	2LU	D	17,800	847	1,224	220	266	140	0	2,697	A	

* Existing Volume X 1.02

The results of the analysis show that the study roadway segments will continue to operate at adequate LOS in the projected conditions.



**Table 6
Projected A.M. Peak Hour Roadway Capacity Analysis**

Roadway Segment	No. of Lns	Adopted		Projected A.M. PHPD Volume							Proj. LOS
		LOS Stnd	Daily Capacity	Future Vol*	Committed Trips				Proj. Trip	Total	
					Catalyst Apartments	Integra	Tuskawilla Crossings	Towncenter Commercial Outparcels			
SR 434											
Central Winds Dr to Tuskawilla Rd	4LD	E	2,000	1,503	55	43	65	44	16	1,726	D
Tuskawilla Rd to Michael Blake Blvd	4LD	E	2,000	1,171	63	68	49	64	24	1,439	C
Michael Blake Blvd to Tuscora Dr	4LD	E	2,000	1,204	24	68	49	47	5	1,397	C
Tuskawilla Rd											
Trotwood Blvd to SR 434	4LD	E	2,100	738	26	25	50	23	2	864	B
SR 434 to Blumberg Blvd	2L	D	830	153	9	2	17	0	0	181	A
Michael Blake Blvd											
SR 434 to Tuskawilla Rd	2L	D	830	73	75	1	4	8	0	161	A

*Existing Volume X 1.02

**Table 7
Projected P.M. Peak Hour Roadway Capacity Analysis**

Roadway Segment	No. of Lns	Adopted		Projected P.M. PHPD Volume							Proj. LOS
		LOS Stnd	Daily Capacity	Future Vol*	Committed Trips				Proj. Trip	Total	
					Catalyst Apartments	Integra	Tuskawilla Crossings	Towncenter Commercial Outparcels			
SR 434											
Central Winds Dr to Tuskawilla Rd	4LD	E	2,000	1,636	54	60	78	37	16	1,881	E
Tuskawilla Rd to Michael Blake Blvd	4LD	E	2,000	1,287	62	92	60	54	24	1,579	D
Michael Blake Blvd to Tuscora Dr	4LD	E	2,000	1,248	24	93	72	31	10	1,478	C
Tuskawilla Rd											
Trotwood Blvd to SR 434	4LD	E	2,100	764	26	36	52	15	4	897	B
SR 434 to Blumberg Blvd	2L	D	830	253	9	3	13	0	0	278	A
Michael Blake Blvd											
SR 434 to Tuskawilla Rd	2L	D	830	82	74	1	3	5	0	165	A

* Existing Volume X 1.02



Intersection Analysis

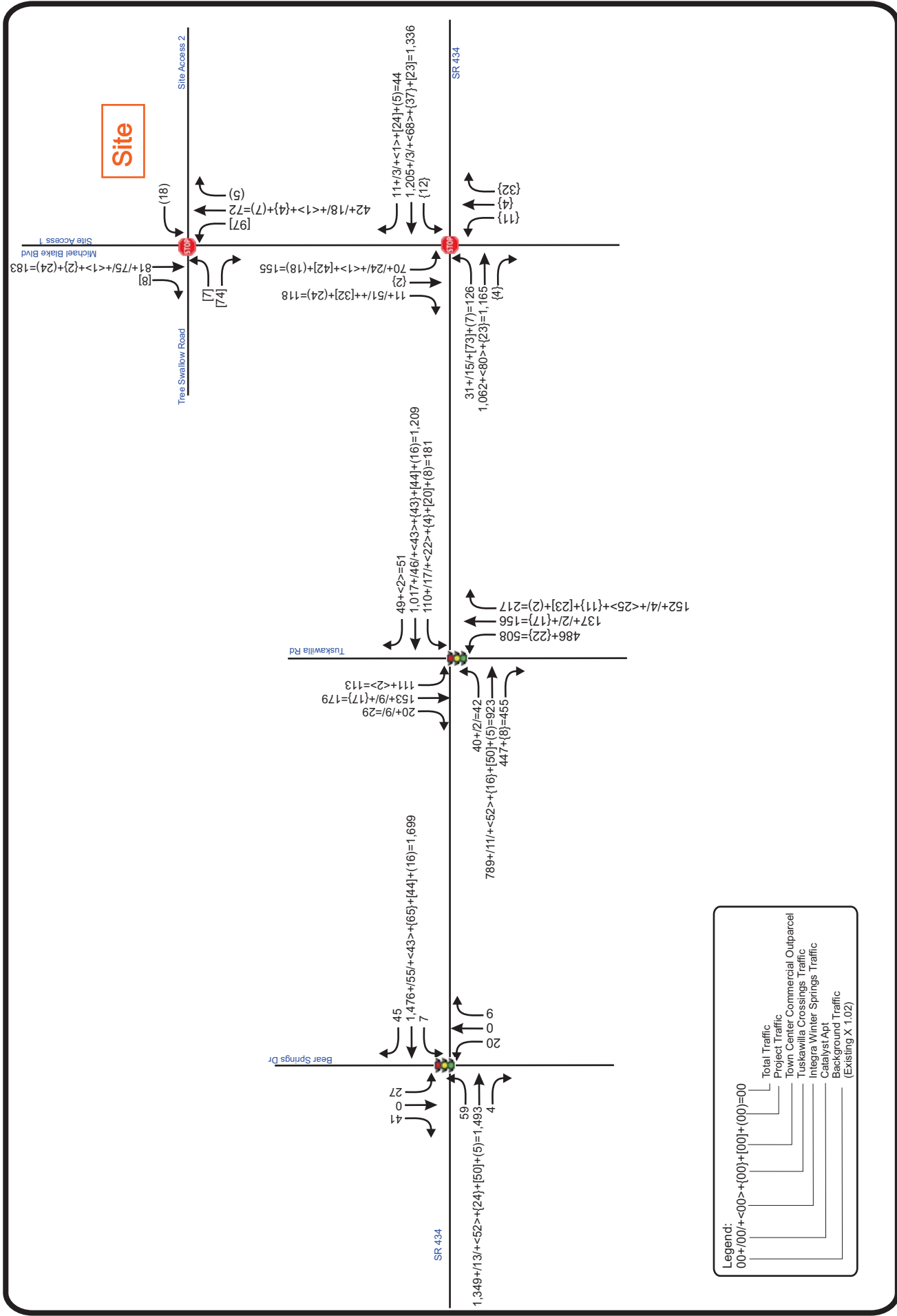
To assess the projected operating conditions at the study intersections, intersection capacity analyses were conducted using projected traffic volumes. The intersections were analyzed using the *HCS7 Software* in accordance with the procedures of the 2010 Highway Capacity Manual. Projected peak hour volumes were similarly calculated by applying a growth factor to existing volumes plus approved development trips and project trips. **Figures 6 and 7** show the projected peak hour intersection turning volumes for the study intersections. The projected Levels of Service are summarized in **Table 8**.

**Table 8
Projected Intersection Capacity Analysis**

Intersection	Control	Period	EB		WB		NB		SB		Overall	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
SR 434 & Bear Springs Dr	Signal	A.M.	13.4	B	19.2	B	67.1	E	67.5	E	17.9	B
		P.M.	24.9	C	17.0	B	67.2	E	67.6	E	22.9	C
SR 434 & Tuskawilla Rd	Signal	A.M.	57.6	E	66.8	E	65.4	E	87.1	F	64.9	E
		P.M.	86.9	F	63.1	E	82.0	F	82.0	F	78.2	E
SR 434 & Michael Blake Blvd	STOP	A.M.	16.3	C	11.6	B	-	-	183	F	--	--
		P.M.	18.0	C	12.2	B	-	-	68.9	F	--	--
Michael Blake Blvd & Site Access	Roundabout	A.M.	4.0	A	3.4	A	3.8	A	4.5	A	4.1	A
		P.M.	3.9	A	3.9	A	5.1	A	3.8	A	4.6	A

The analysis shows that the study intersections will operate at acceptable overall Levels of Service in the projected conditions except for southbound left turns at Michael Blake Boulevard and SR 434. This is due to delays caused by the stop sign which will continue to prevail until a signal becomes warranted and installed. Detailed printouts of each intersection capacity analysis are included in **Appendix G**.





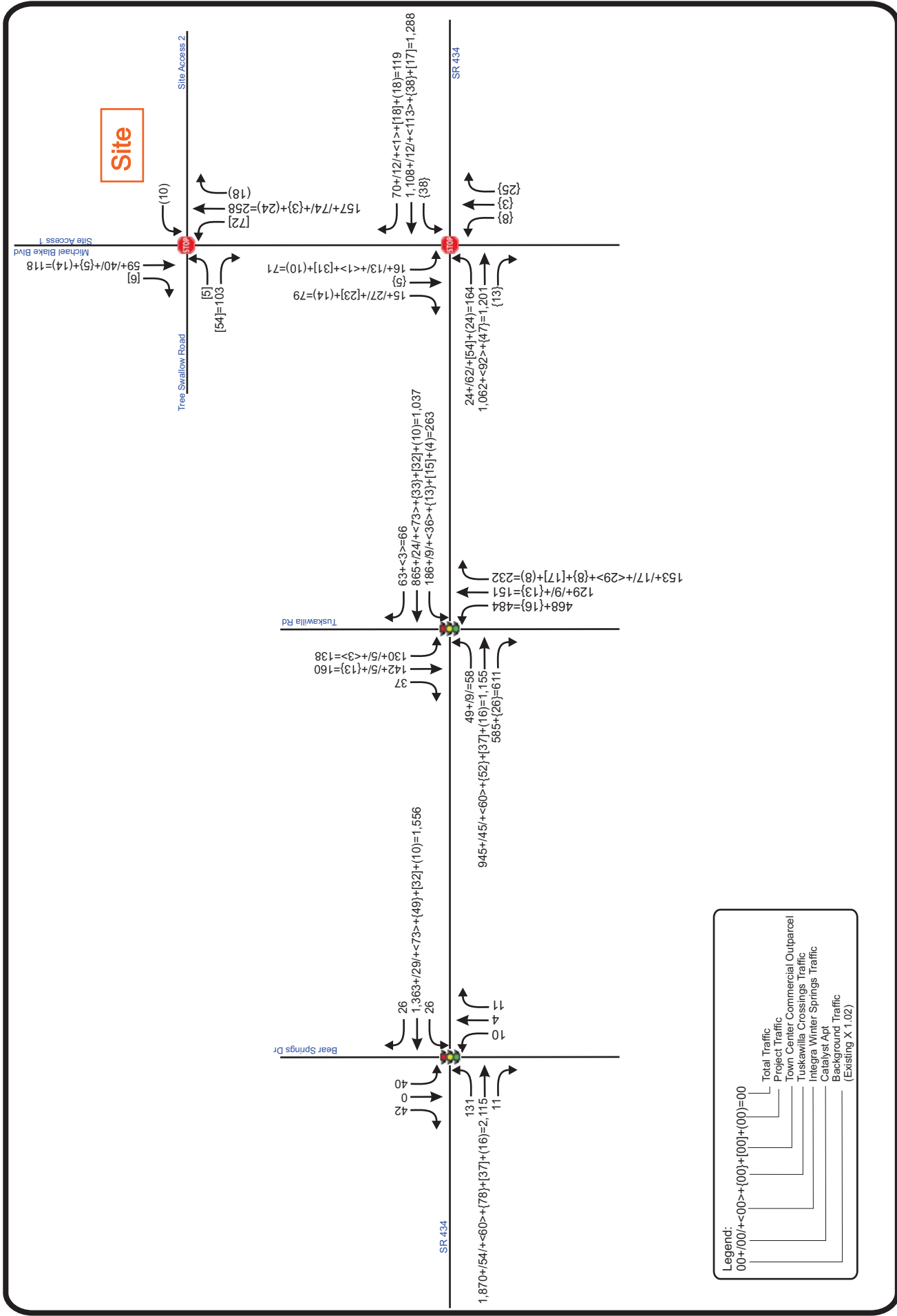
Lot 5 Townhomes @ Winter Springs Town Center
 Project № 5060



Figure 6



Projected A.M. Peak Hour Traffic Volumes



Lot 5 Townhomes @ Winter Springs Town Center
Project № 5060



Figure 7



Projected P.M. Peak Hour
Traffic Volumes

Turn Lane Analysis

Turn lane analyses were conducted at the intersection of SR 434 and Michael Blake Boulevard as follows:

a) Westbound right turn lane on SR 434

A right turn lane of 274 feet has recently been constructed at this location. The adequacy of this turn lane length was checked as follows:

Left Turn Lane Length (TL) = Deceleration Distance (DD) + Queue Length (QL)

DD = 240 feet for 50 mph (As per FDOT Index 301)

There is no queue length required since right turning vehicles do not stop. Therefore, the existing right turn at this location has an adequate length.

b) Eastbound left turn lane on SR 434

This is an existing left turn lane with a total length of 390 feet. The adequacy of this left turn lane was checked as follows:

Left Turn Lane Length (TL) = Deceleration Distance (DD) + Queue Length (QL)

DD = 240 feet for 50 mph (As per FDOT Index 301)

QL = $1.8 * 25 = 45$ feet (From HCS Analysis)

TL = $240 + 45 = 285$ feet

The existing left turn lane length is 390 feet and is adequate for the projected left turns at this location.



c) Southbound turn lanes on Michael Blake Boulevard

This is an existing right-turn with a total length of 115 feet. The adequacy of this right-turn was checked as follows:

Right Turn Lane Length (TL) = Deceleration Distance (DD) + Queue Length (QL)

DD = 145 feet (As per FDOT Index 301, design speed of 30 mph)

QL = $1.5 * 25 = 37.5$ feet (from HCS7 Analysis)

TL = $145 + 37.5 = 182.5$ feet

The distance between Sea Hawk Cove and SR 434 is adequate to provide a length of approximately 180 feet and this has been provided.

The left turn lane on Michael Blake Boulevard is an extension of the southbound through lane where it intersects with SR 434. Therefore, no additional length will be required to accommodate the projected southbound left turn volumes.



STUDY CONCLUSIONS

This traffic analysis was performed to assess the impact of the proposed townhome development located in the northeast quadrant of Michael Blake Boulevard and Tree Swallow Road in Winter Springs, Florida. The proposed development will consist of 114 units to be completed in one year. Access to the site will be provided via access driveways at Michael Blake Boulevard and Tree Swallow Road. The results of the study as documented herein are summarized below:

- The proposed development will generate a total daily traffic volume of 821 vehicle trips, of which 54 will occur in the A.M. peak hour and 66 will occur in the P.M. peak hour.
- The study roadway segments currently operate at adequate Levels of Service and will continue to operate at satisfactory Levels of Service when project trips are added.
- The study roadway intersections currently operate at satisfactory overall Levels of Service and will continue to operate at adequate Levels of Service in the projected conditions with the completion of the proposed development except for the southbound left turns from Michael Blake Boulevard to SR 434. This is due to delays caused by the stop control at this location.
- At the SR 434 and Michael Blake Boulevard intersection, a southbound right turn lane of approximately 180 feet is required and the distance between SR 434 and Sea Hawk Cove is adequate for this purpose. The lengths of the existing eastbound left turn lane and Westbound right turn lane on SR 434 are adequate for the projected traffic volumes.



APPENDICES

APPENDIX A

Seminole County Traffic Count/ LOS Sheet

<i>Sta ID</i>	<i>Rdway Name</i>	<i>Segment Limits</i>	<i>2016 AADT</i>	<i>2017 AADT</i>
284	SR 426	Dean Rd to Chapman Rd	26,621	29,297
285	SR 426	Chapman Rd to Red Bug Lake Rd	29,103	30,160
286	SR 426	Red Bug Lake Rd to Winter Springs Blvd	23,344	24,909
287	SR 426	Winter Springs Blvd to Lake Jesup Ave	16,588	17,339
288	SR 426	Lake Jesup Ave to SR 434	14,849	15,266
289	SR 434	Orange County Line to Chapman Rd	47,852	49,689
290	SR 434	Chapman Rd to Alafaya Woods Blvd	38,633	39,556
291	SR 434	Alafaya Woods to Mitchell Hammock Rd	34,203	34,955
292	SR 434	Mitchell Hammock Rd to SR 426-CR 419	13,037	12,507
293	SR 434	SR 426-CR 419 to DeLeon St	19,183	18,955
294	SR 434	DeLeon St to E-W Expressway	24,056	24,092
295	SR 434	E-W Expressway to Springs Ave	25,977	26,109
296	SR 434	Springs Ave to Tuskawilla Rd	25,682	27,212
297	SR 434	Tuskawilla Rd to SR 419	37,075	37,172
298	SR 434	SR 419 to Belle Ave	24,444	25,749
299	SR 434	Belle Ave to US 17-92	33,431	35,336
300	SR 434	US 17-92 to CR 427	27,789	28,136
301	SR 434	CR 427 to Rangeline Rd	41,825	42,868
302	SR 434	Rangeline Rd to Palm Springs Dr	43,886	46,856
303	SR 434	Palm Springs Dr to Raymond Ave	41,493	45,491
304	SR 434	Raymond Ave to I-4	50,987	50,900
305	SR 434	I-4 to Douglas Ave	57,583	59,290
306	SR 434	Douglas Ave to Wekiva Springs Rd	56,481	55,312
307	SR 434	Wekiva Springs Rd to Sand Lake Rd	38,706	39,910
308	SR 434	Sand Lake Rd to SR 436	38,954	39,479
309A	SR 434	SR 436 to W. Town Pkwy	45,780	46,134
309B	SR 434	W. Town Pkwy to Trailwood Dr	51,975	50,391
309C	SR 434	Trailwood Dr to SR 414	46,521	47,090
310	SR 436	Orange County Line to Howell Branch Rd	51,425	56,914
311	SR 436	Howell Branch Road to Lake Howell Rd	59,672	57,731
311A	SR 436	Lake Howell Rd to Red Bug Lake Rd	59,680	67,103
312	SR 436	Red Bug Lake Rd to US 17-92	69,041	76,335
313	SR 436	US 17-92 to CR 427 (Longwood Ave)	47,223	49,654
314	SR 436	CR 427 (Longwood) to CR 427 (Maitland)	54,560	60,081
315	SR 436	CR 427 (Maitland) to Palm Springs Dr	58,756	59,856
316	SR 436	Palm Springs Dr to Northlake Blvd	60,391	76,693
317	SR 436	Northlake Blvd to I-4 East Ramp	69,807	75,221
318	SR 436	I-4 East Ramp to Wymore-Douglas	55,325	56,354
319	SR 436	Wymore-Douglas to Lynchfield Ave	58,859	57,826
320	SR 436	Lynchfield Ave to Montgomery Rd	58,030	66,028
320A	SR 436	Montgomery Rd to SR 434	58,535	64,771
321	SR 436	SR 434 to Bear Lake Rd	53,893	54,861
322	SR 436	Bear Lake Rd to Hunt Club Blvd	56,678	57,749
323	SR 436	Hunt Club Blvd to Orange County Line	50,013	49,504
324	Tangerine Ave	Howell Branch Rd to Orange County Line	3,940	4,202
325	Triplet Lake	US 17-92 to N. Triplet Lake Dr	2,571	2,159

Sta ID	Rdway Name	Segment Limits	2016 AADT	2017 AADT
326	Tuskawilla Rd	SR 434 to Trotwood Blvd	19,383	18,992
327	Tuskawilla Rd	Trotwood Blvd to Winter Springs Blvd	19,751	19,732
328	Tuskawilla Rd	Winter Springs Blvd to Dyson Dr	22,925	23,656
329	Tuskawilla Rd	Dyson Dr to E Lake Dr	27,006	30,336
330	Tuskawilla Rd	E Lake Dr to Eagle Blvd	34,965	35,885
331	Tuskawilla Rd	Eagle Blvd to Red Bug Lake Rd	35,737	36,271
332	Tuskawilla Rd	Red Bug Lake Rd to Dike Rd	32,744	34,275
333	Tuskawilla Rd	Dike Rd to SR 426	28,691	30,847
334	Upsala Rd	SR 46 to Coastline Rd	8,830	8,482
335	Upsala Rd	Coastline Rd to Central Park Dr	6,945	7,539
336	Upsala Rd	East 90 Turn to CR 46A	11,659	11,785
337	US 17-92	Orange County Line to Lake of the Woods	53,750	57,894
338	US 17-92	Lake of the Wood to SR 436	52,476	55,022
339	US 17-92	SR 436 to Triplet Lake Dr	53,042	58,256
340	US 17-92	Triplet Lake Dr to Seminola-Dogtrack	49,705	49,493
341	US 17-92	Seminola-Dogtrack to SR 434	50,226	51,229
341A	US 17-92	SR 434 to Shepard Rd	36,433	39,268
342	US 17-92	Shepard Rd to General Hutchison Pkwy	35,003	36,498
342A	US 17-92	General Hutchison to CR 427/SR 419	42,843	44,231
343	US 17-92	CR 427-SR 419 to CR 427	38,912	
344	US 17-92	CR 427 to Lake Mary Blvd	32,002	
345	US 17-92	Lake Mary Blvd to Airport Blvd	41,057	40,941
346	US 17-92	Airport Blvd to CR 46A	22,822	24,044
347	US 17-92	CR 46A to SR 46	25,673	27,513
348	US 17-92	SR 46 to Seminole Blvd	13,964	13,973
349	US 17-92	Seminole Blvd to Oak Dr	15,948	17,002
350	US 17-92	Oak Dr to CR 15 (Upsala Rd)	17,101	18,335
351	US 17-92	CR 15 (Upsala Rd) to Volusia County Line	26,367	32,317
352	US 441	Orange County Line to Orange County Line	31,698	30,670
353	Wekiva Springs Ln	SR 434 to Wekiva Springs Rd	3,712	3,505
354	Wekiva Springs Rd	Orange County Line to Hunt Club Blvd	16,240	16,364
355	Wekiva Springs Rd	Hunt Club Blvd to Fox Valley Dr	21,079	21,558
356	Wekiva Springs Rd	Fox Valley Dr to E Lake Brantley Dr	25,721	26,520
357	Wekiva Springs Rd	E Lake Brantley Dr to SR 434	28,956	28,298
358	West Lake Brantley (E)	Sand Lake Rd to SR 436	5,409	5,221
359	West Lake Brantley (W)	Sand Lake Rd to Jennifer Hope Blvd	4,378	4,172
360	West Lake Brantley (W)	Jennifer Hope Blvd to Westwood Dr	2,733	2,525
361	W Wekiva Trl	Hunt Club Blvd to Canterclub Trail	4,371	4,138
362	W Wekiva Trl	Canterclub Trail to Hunt Club Blvd	2,272	2,228
363	Winter Park Dr	SR 436 to Wilshire Blvd	12,084	11,947
364	Winter Park Dr	Wilshire Blvd to Queen's Mirror Cir	11,770	11,628
365	Winter Park Dr	Queen's Mirror Cir to Crystal Bowl Cir	12,540	12,598
366	Winter Park Dr	Crystal Bowl Cir to Seminola Blvd	12,781	12,374
367	Wymore Rd	SR 436 to Westmonte Dr	14,276	13,926
368	Wymore Rd	Westmonte Dr to Spring Lake Hills Dr	16,734	16,913
369	Wymore Rd	Spring Lake Hills Dr to Lake Destiny Rd	13,615	13,188

<i>RKEY</i>	<i>Roadway Name</i>	<i>From</i>	<i>To</i>	
S3435	S.R. 434	Raymond Ave	I-4 East Ramp	
			Current Traffic Count	<u>55,700</u>
			Roadway Link Capacity	<u>48,000</u>
			Committed Trips	<u>173,802</u>
			Net Available Capacity	<u>-181,502</u>
S3440	S.R. 434	Palm Springs Dr	Raymond Ave	
			Current Traffic Count	<u>44,150</u>
			Roadway Link Capacity	<u>60,000</u>
			Committed Trips	<u>122,305</u>
			Net Available Capacity	<u>-106,455</u>
S3445	S.R. 434	C.R. 427	Palm Springs Dr	
			Current Traffic Count	<u>47,393</u>
			Roadway Link Capacity	<u>48,000</u>
			Committed Trips	<u>0</u>
			Net Available Capacity	<u>607</u>
S3450	S.R. 434	U.S. 17-92	C.R. 427	
			Current Traffic Count	<u>26,553</u>
			Roadway Link Capacity	<u>48,000</u>
			Committed Trips	<u>0</u>
			Net Available Capacity	<u>21,447</u>
S3455	S.R. 434	Moss Rd	U.S. 17-92	
			Current Traffic Count	<u>35,204</u>
			Roadway Link Capacity	<u>48,000</u>
			Committed Trips	<u>0</u>
			Net Available Capacity	<u>12,796</u>
S3460	S.R. 434	S.R. 419	Moss Rd	
			Current Traffic Count	<u>26,430</u>
			Roadway Link Capacity	<u>48,000</u>
			Committed Trips	<u>0</u>
			Net Available Capacity	<u>21,570</u>
S3465	S.R. 434	Tuskawilla Rd	S.R. 419	
			Current Traffic Count	<u>39,652</u>
			Roadway Link Capacity	<u>48,000</u>
			Committed Trips	<u>0</u>
			Net Available Capacity	<u>8,348</u>
S3470	S.R. 434	S.R. 417	Tuskawilla Rd	
			Current Traffic Count	<u>29,044</u>
			Roadway Link Capacity	<u>48,000</u>
			Committed Trips	<u>293</u>
			Net Available Capacity	<u>18,663</u>
S3475	S.R. 434	DeLeon Ave	S.R. 417	
			Current Traffic Count	<u>25,694</u>
			Roadway Link Capacity	<u>18,270</u>
			Committed Trips	<u>293</u>
			Net Available Capacity	<u>-7,717</u>

<i>RKEY</i>	<i>Roadway Name</i>	<i>From</i>	<i>To</i>	
TSK90	Tuskawilla Rd	S.R. 434	Winter Springs Blvd	
				Current Traffic Count <u>20,710</u>
				Roadway Link Capacity <u>42,560</u>
				Committed Trips <u>0</u>
				Net Available Capacity <u>21,850</u>
U1700	U.S. 17-92	Lake of the Woods Blvd	Orange County Line	
				Current Traffic Count <u>54,837</u>
				Roadway Link Capacity <u>60,000</u>
				Committed Trips <u>392</u>
				Net Available Capacity <u>4,771</u>
U1705	U.S. 17-92	S.R. 436	Lake of the Woods Blvd	
				Current Traffic Count <u>55,410</u>
				Roadway Link Capacity <u>60,000</u>
				Committed Trips <u>629</u>
				Net Available Capacity <u>3,961</u>
U1710	U.S. 17-92	Triplett Lake Dr	S.R. 436	
				Current Traffic Count <u>60,889</u>
				Roadway Link Capacity <u>60,000</u>
				Committed Trips <u>44</u>
				Net Available Capacity <u>-933</u>
U1715	U.S. 17-92	Dog Track Rd/Seminola Blvd	Triplett Lake Dr	
				Current Traffic Count <u>53,377</u>
				Roadway Link Capacity <u>60,000</u>
				Committed Trips <u>15</u>
				Net Available Capacity <u>6,608</u>
U1720	U.S. 17-92	S.R. 434	Seminola-Dogtrack Rd	
				Current Traffic Count <u>56,579</u>
				Roadway Link Capacity <u>60,000</u>
				Committed Trips <u>50</u>
				Net Available Capacity <u>3,371</u>
U1725	U.S. 17-92	Shepard Rd	S.R. 434	
				Current Traffic Count <u>37,802</u>
				Roadway Link Capacity <u>60,000</u>
				Committed Trips <u>120</u>
				Net Available Capacity <u>22,078</u>
U1728	U.S. 17-92	S.R. 419/C.R. 427	Shepard Rd	
				Current Traffic Count <u>45,481</u>
				Roadway Link Capacity <u>48,000</u>
				Committed Trips <u>105</u>
				Net Available Capacity <u>2,414</u>
U1730	U.S. 17-92	C.R. 427	S.R. 419/C.R. 427	
				Current Traffic Count <u>34,143</u>
				Roadway Link Capacity <u>48,000</u>
				Committed Trips <u>105</u>
				Net Available Capacity <u>13,752</u>

APPENDIX B

Intersection Counts and Signal Timing Data

15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: October 31, 2018 (Wednesday)

CITY: Winter Springs

LATITUDE: 0

LOCATION: Bears Springs Dr & SR 434

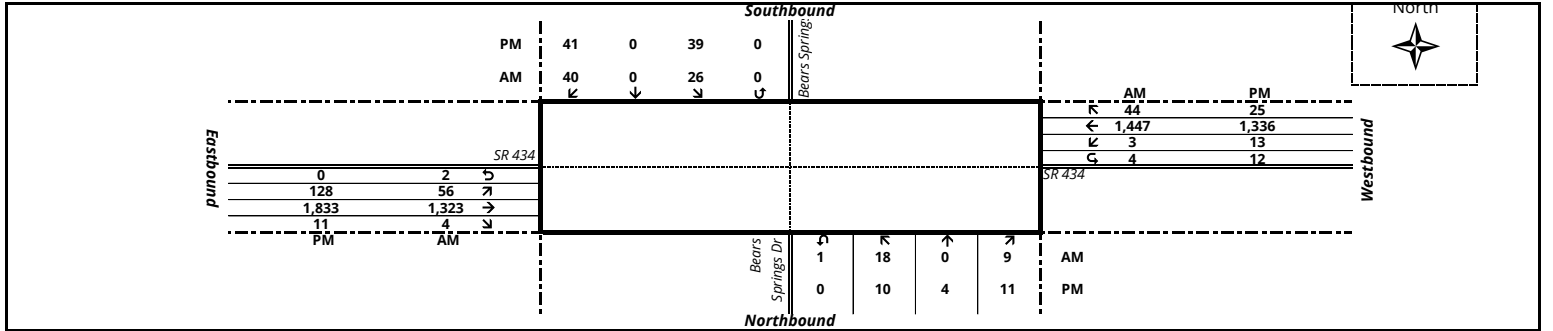
COUNTY: Seminole County

LONGITUDE: 0

TIME BEGIN	Bears Springs Dr					Bears Springs Dr					N/S TOTAL	SR 434					SR 434					E/W TOTAL	GRAND TOTAL
	NORTHBOUND					SOUTHBOUND						EASTBOUND					WESTBOUND						
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		
07:00 AM	6	0	4	0	10	20	0	6	0	26	36	29	282	1	0	312	0	289	14	0	303	615	651
07:15 AM	2	0	8	0	10	23	1	9	0	33	43	7	308	1	0	316	0	391	15	0	406	722	765
07:30 AM	6	0	12	0	18	9	0	8	0	17	35	3	291	2	2	298	1	393	6	0	400	698	733
07:45 AM	10	0	3	1	14	2	0	9	0	11	25	18	318	0	0	336	1	350	6	1	358	694	719
TOTAL	24	0	27	1	52	54	1	32	0	87	139	57	1,199	4	2	1,262	2	1,423	41	1	1,467	2,729	2,868
08:00 AM	3	0	0	0	3	8	0	12	0	20	23	7	321	0	1	329	0	382	4	1	387	716	739
08:15 AM	2	0	3	0	5	8	0	8	0	16	21	19	307	2	1	329	1	377	18	0	396	725	746
08:30 AM	3	0	3	0	6	8	0	11	0	19	25	12	377	2	0	391	1	338	16	2	357	748	773
08:45 AM	4	1	4	0	9	10	0	5	0	15	24	7	277	0	2	286	2	257	4	2	265	551	575
TOTAL	12	1	10	0	23	34	0	36	0	70	93	45	1,282	4	4	1,335	4	1,354	42	5	1,405	2,740	2,833
04:00 PM	0	1	1	0	2	9	1	1	0	11	13	10	313	3	0	326	1	325	11	6	343	669	682
04:15 PM	1	0	0	0	1	6	0	7	0	13	14	16	361	3	0	380	2	321	8	6	337	717	731
04:30 PM	5	0	5	0	10	5	0	9	0	14	24	21	394	2	0	417	7	324	9	8	348	765	789
04:45 PM	5	1	8	0	14	2	0	10	0	12	26	18	407	4	0	429	4	302	7	5	318	747	773
TOTAL	11	2	14	0	27	22	1	27	0	50	77	65	1,475	12	0	1,552	14	1,272	35	25	1,346	2,898	2,975
05:00 PM	4	2	5	0	11	12	0	8	0	20	31	36	451	3	0	490	4	329	7	1	341	831	862
05:15 PM	3	1	1	0	5	8	0	6	0	14	19	30	466	5	0	501	3	327	6	4	340	841	860
05:30 PM	1	0	2	0	3	9	0	18	0	27	30	33	465	1	0	499	3	349	7	4	363	862	892
05:45 PM	2	1	3	0	6	10	0	9	0	19	25	29	451	2	0	482	3	331	5	3	342	824	849
TOTAL	10	4	11	0	25	39	0	41	0	80	105	128	1,833	11	0	1,972	13	1,336	25	12	1,386	3,358	3,463

AM Peak																					Peak Hour Factor: 0.963		
07:45 AM to 08:45 AM	18	0	9	1	28	26	0	40	0	66	94	56	1,323	4	2	1,385	3	1,447	44	4	1,498	2,883	2,977

PM Peak																					Peak Hour Factor: 0.971		
05:00 PM to 06:00 PM	10	4	11	0	25	39	0	41	0	80	105	128	1,833	11	0	1,972	13	1,336	25	12	1,386	3,358	3,463



15 MINUTE TURNING MOVEMENT COUNTS

(Trucks Only)

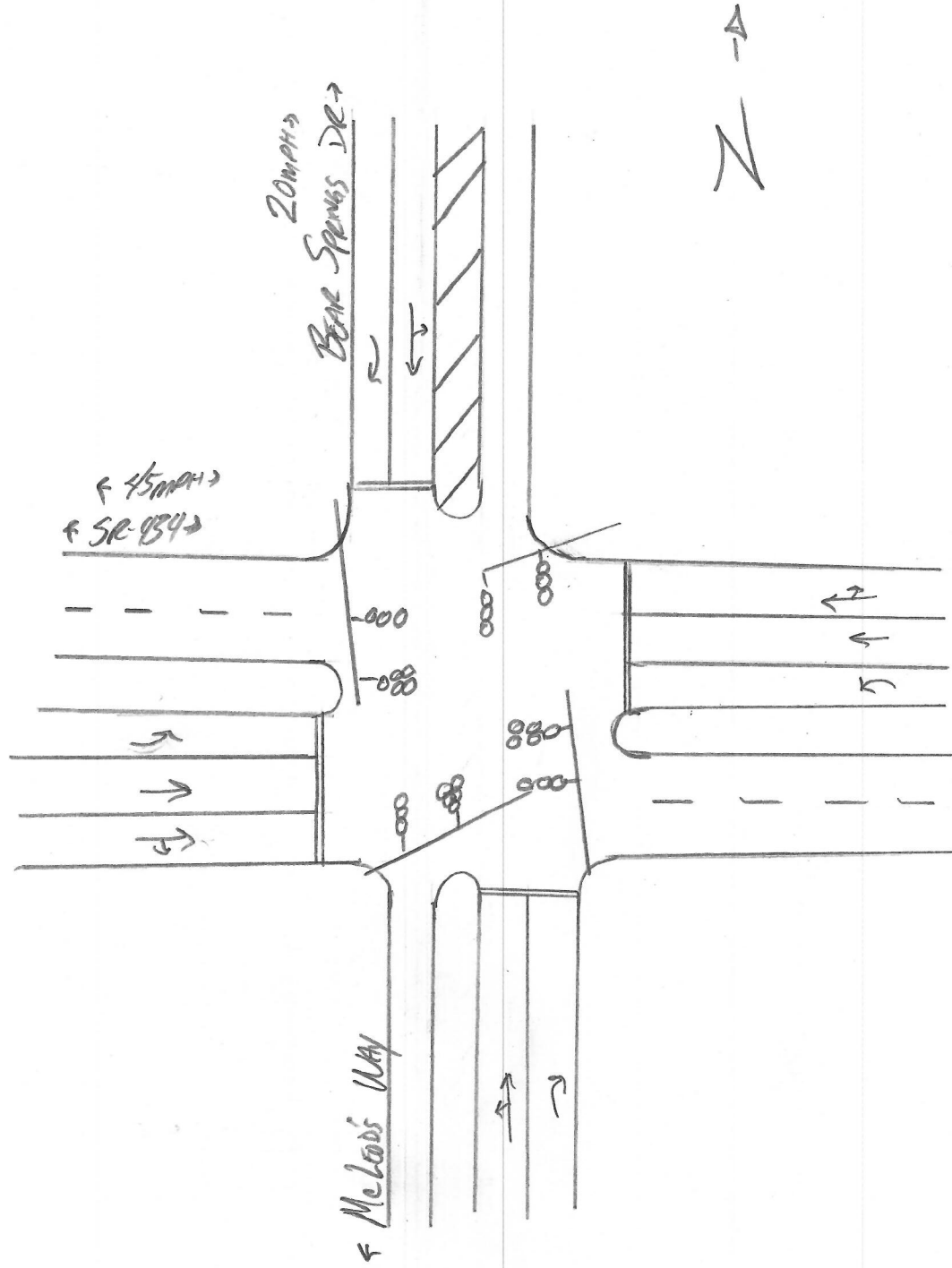
DATE: October 31, 2018 (Wednesday)

CITY: Winter Springs LATITUDE: 0

LOCATION: Bears Springs Dr & SR 434

COUNTY: Seminole County LONGITUDE: 0

TIME BEGIN	Bears Springs Dr					Bears Springs Dr					N/S TOTAL	SR 434					SR 434					E/W TOTAL	GRAND TOTAL
	NORTHBOUND					SOUTHBOUND						EASTBOUND					WESTBOUND						
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	13	0	8	0	0	8	21	21
07:15 AM	0	0	0	0	0	1	0	0	0	1	1	0	5	0	0	5	0	7	0	0	7	12	13
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	11	0	5	0	0	5	16	16
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	0	8	1	0	9	17	17
TOTAL	0	0	0	0	0	1	0	0	0	1	1	0	37	0	0	37	0	28	1	0	29	66	67
08:00 AM	0	0	0	0	0	0	0	1	0	1	1	1	7	0	0	8	0	5	0	0	5	13	14
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	12	0	7	0	0	7	19	19
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7	0	9	0	0	9	16	16
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	11	0	6	0	0	6	17	17
TOTAL	0	0	0	0	0	0	0	1	0	1	1	1	37	0	0	38	0	27	0	0	27	65	66
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	6	0	0	6	9	9
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	9	0	0	9	11	11
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	8	0	0	8	11	11
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	3	1	0	4	6	6
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	0	26	1	0	27	37	37
05:00 PM	0	0	0	0	0	0	0	1	0	1	1	0	4	0	0	4	0	2	0	0	2	6	7
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	0	0	3	4	4
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	3	0	0	3	5	5
TOTAL	0	0	0	0	0	0	0	1	0	1	1	0	7	0	0	7	0	10	0	0	10	17	18
AM Peak																							
07:45 AM to 08:45 AM	0	0	0	0	0	0	0	1	0	1	1	1	34	0	0	35	0	29	1	0	30	65	66
PM Peak																							
05:00 PM to 06:00 PM	0	0	0	0	0	0	0	1	0	1	1	0	7	0	0	7	0	10	0	0	10	17	18



15 MINUTE TURNING MOVEMENT COUNTS
(Cars and Trucks)

DATE: October 31, 2018 (Wednesday)
LOCATION: Tuskawilla Rd & SR 434

CITY: Winter Springs LATITUDE: 0
COUNTY: Seminole County LONGITUDE: 0

Tuskawilla Rd

Tuskawilla Rd

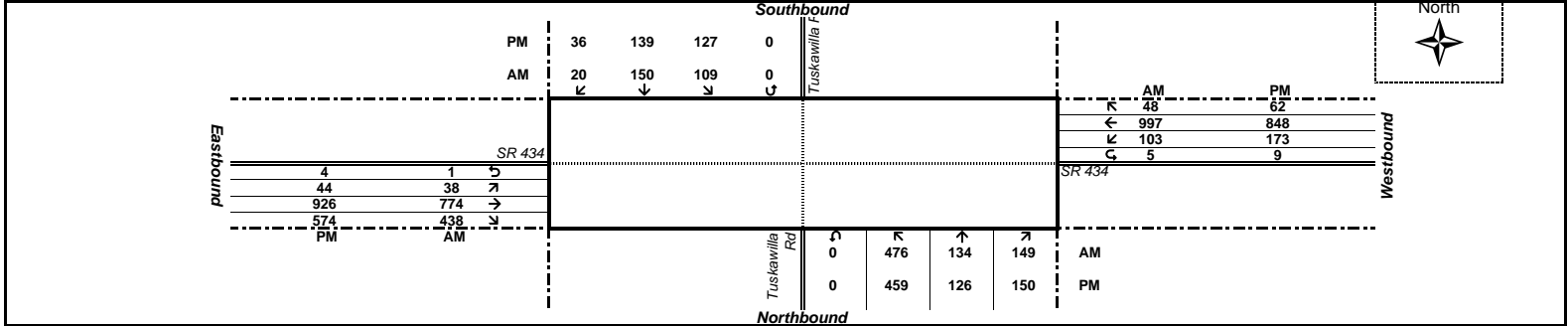
SR 434

SR 434

TIME BEGIN	NORTHBOUND					SOUTHBOUND					N/S TOTAL	EASTBOUND					WESTBOUND					E/W TOTAL	GRAND TOTAL
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		
07:00 AM	122	80	21	0	223	24	54	4	0	82	305	17	171	102	0	290	20	196	28	1	245	535	840
07:15 AM	112	25	35	0	172	28	59	8	0	95	267	4	206	141	0	351	35	291	6	1	333	684	951
07:30 AM	133	13	50	0	196	23	21	4	0	48	244	10	192	101	1	304	34	281	2	2	319	623	867
07:45 AM	109	16	43	0	168	34	16	4	0	54	222	7	205	94	0	306	14	229	12	1	256	562	784
TOTAL	476	134	149	0	759	109	150	20	0	279	1,038	38	774	438	1	1,251	103	997	48	5	1,153	2,404	3,442
08:00 AM	127	17	36	0	180	15	19	8	0	42	222	16	182	120	0	318	36	229	6	3	274	592	814
08:15 AM	127	17	34	0	178	16	17	13	0	46	224	11	191	117	0	319	44	273	14	1	332	651	875
08:30 AM	116	19	45	0	180	21	23	4	0	48	228	9	205	149	1	364	33	198	10	0	241	605	833
08:45 AM	97	25	62	0	184	25	25	3	0	53	237	7	174	150	1	332	44	177	17	1	239	571	808
TOTAL	467	78	177	0	722	77	84	28	0	189	911	43	752	536	2	1,333	157	877	47	5	1,086	2,419	3,330
04:00 PM	133	23	38	0	194	31	31	11	0	73	267	7	198	124	0	329	33	202	15	3	253	582	849
04:15 PM	129	31	30	0	190	16	26	8	0	50	240	11	232	125	0	368	26	193	13	1	233	601	841
04:30 PM	144	26	39	0	209	31	41	6	0	78	287	6	268	134	0	408	30	195	18	2	245	653	940
04:45 PM	100	30	43	0	173	35	35	18	0	88	261	16	222	162	0	400	44	191	17	1	253	653	914
TOTAL	506	110	150	0	766	113	133	43	0	289	1,055	40	920	545	0	1,505	133	781	63	7	984	2,489	3,544
05:00 PM	115	29	37	0	181	33	32	10	0	75	256	16	247	116	3	382	50	222	16	3	291	673	929
05:15 PM	118	27	24	0	169	22	30	1	0	53	222	7	237	141	1	386	38	214	13	2	267	653	875
05:30 PM	126	40	46	0	212	37	42	7	0	86	298	5	220	155	0	380	41	221	16	3	281	661	959
05:45 PM	119	32	43	0	194	28	37	6	0	71	265	4	225	150	0	379	35	193	14	2	244	623	888
TOTAL	478	128	150	0	756	120	141	24	0	285	1,041	32	929	562	4	1,527	164	850	59	10	1,083	2,610	3,651

AM Peak																				Peak Hour Factor: 0.905			
07:00 AM to 08:00 AM	476	134	149	0	759	109	150	20	0	279	1,038	38	774	438	1	1,251	103	997	48	5	1,153	2,404	3,442

PM Peak																				Peak Hour Factor: 0.959			
04:45 PM to 05:45 PM	459	126	150	0	735	127	139	36	0	302	1,037	44	926	574	4	1,548	173	848	62	9	1,092	2,640	3,677



15 MINUTE TURNING MOVEMENT COUNTS

(Trucks Only)

DATE: October 31, 2018 (Wednesday)

CITY: Winter Springs

LATITUDE: 0

LOCATION: Tuskawilla Rd & SR 434

COUNTY: Seminole County

LONGITUDE: 0

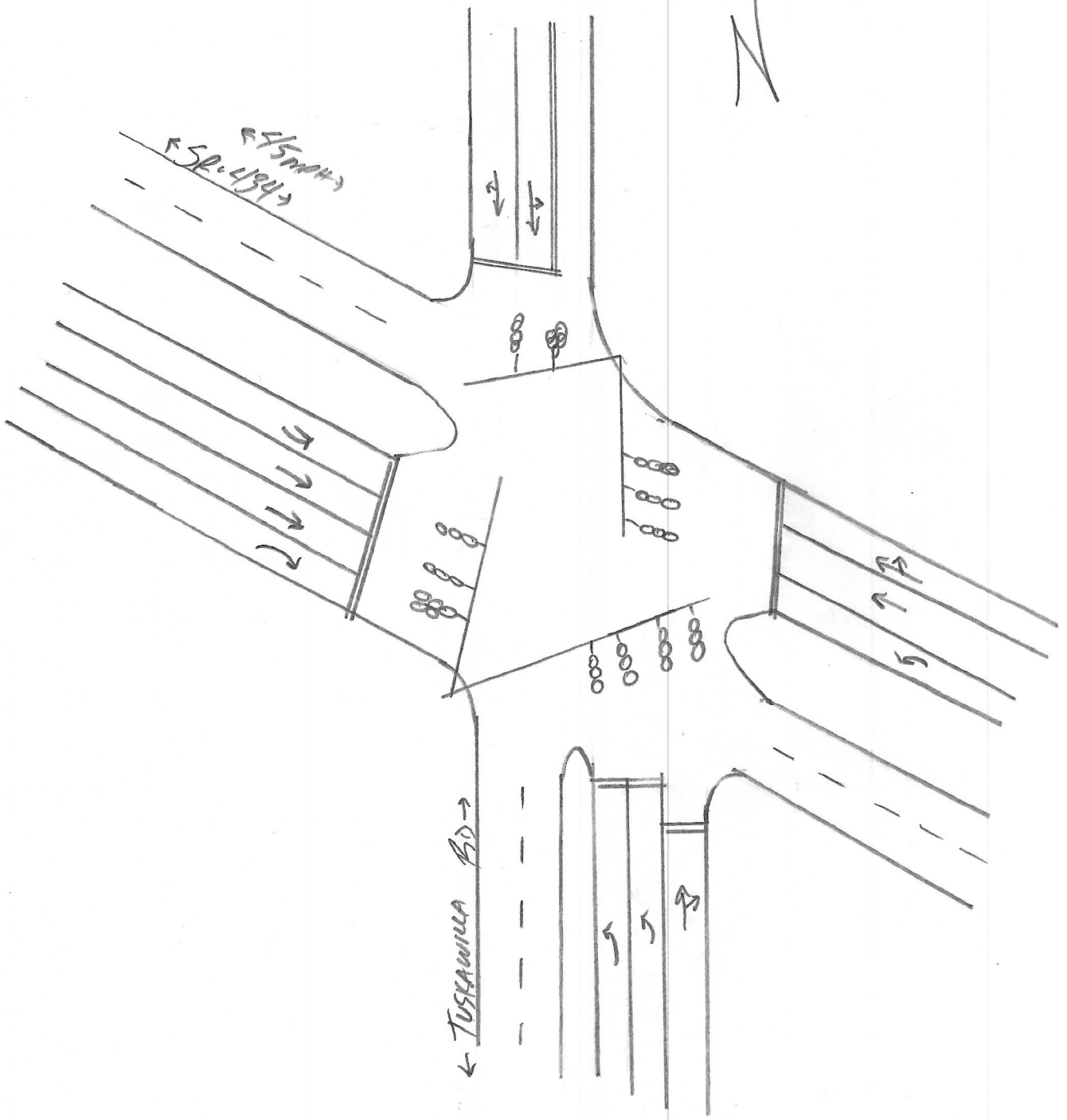
Tuskawilla Rd

Tuskawilla Rd

SR 434

SR 434

TIME BEGIN	NORTHBOUND					SOUTHBOUND					N/S TOTAL	EASTBOUND					WESTBOUND					E/W TOTAL	GRAND TOTAL
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		
07:00 AM	2	0	0	0	2	0	0	0	0	0	2	0	5	4	0	9	1	6	0	0	7	16	18
07:15 AM	1	0	1	0	2	0	0	0	0	0	2	0	5	3	0	8	1	6	0	0	7	15	17
07:30 AM	0	0	0	0	0	1	0	0	0	1	1	0	5	4	0	9	0	4	0	0	4	13	14
07:45 AM	1	0	0	0	1	1	0	0	0	1	2	0	3	5	0	8	0	9	1	0	10	18	20
TOTAL	4	0	1	0	5	2	0	0	0	2	7	0	18	16	0	34	2	25	1	0	28	62	69
08:00 AM	2	0	1	0	3	0	0	1	0	1	4	0	5	1	0	6	0	4	0	0	4	10	14
08:15 AM	2	0	0	0	2	0	0	0	0	0	2	1	10	2	0	13	2	4	0	0	6	19	21
08:30 AM	4	0	0	0	4	0	0	0	0	0	4	0	7	2	0	9	0	7	0	0	7	16	20
08:45 AM	3	0	0	0	3	0	0	0	0	0	3	1	6	4	0	11	2	4	0	0	6	17	20
TOTAL	11	0	1	0	12	0	0	1	0	1	13	2	28	9	0	39	4	19	0	0	23	62	75
04:00 PM	3	0	0	0	3	1	1	0	0	2	5	0	3	1	0	4	0	4	0	0	4	8	13
04:15 PM	2	0	1	0	3	0	0	0	0	0	3	0	2	1	0	3	0	10	1	0	11	14	17
04:30 PM	1	0	0	0	1	0	0	0	0	0	1	0	7	1	0	8	1	9	0	0	10	18	19
04:45 PM	1	1	0	0	2	0	0	0	0	0	2	0	3	0	0	3	0	4	0	0	4	7	9
TOTAL	7	1	1	0	9	1	1	0	0	2	11	0	15	3	0	18	1	27	1	0	29	47	58
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	4	0	0	4	10	10
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	2	3	3
05:30 PM	2	0	0	0	2	0	0	0	0	0	2	0	1	0	0	1	0	2	0	0	2	3	5
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	0	0	0	2	0	0	0	0	0	2	0	8	0	0	8	0	8	0	0	8	16	18
AM Peak																							
07:00 AM to 08:00 AM	4	0	1	0	5	2	0	0	0	2	7	0	18	16	0	34	2	25	1	0	28	62	69
PM Peak																							
04:45 PM to 05:45 PM	3	1	0	0	4	0	0	0	0	0	4	0	11	0	0	11	0	12	0	0	12	23	27



15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: October 31, 2018 (Wednesday)

CITY: Winter Springs

LATITUDE: 0

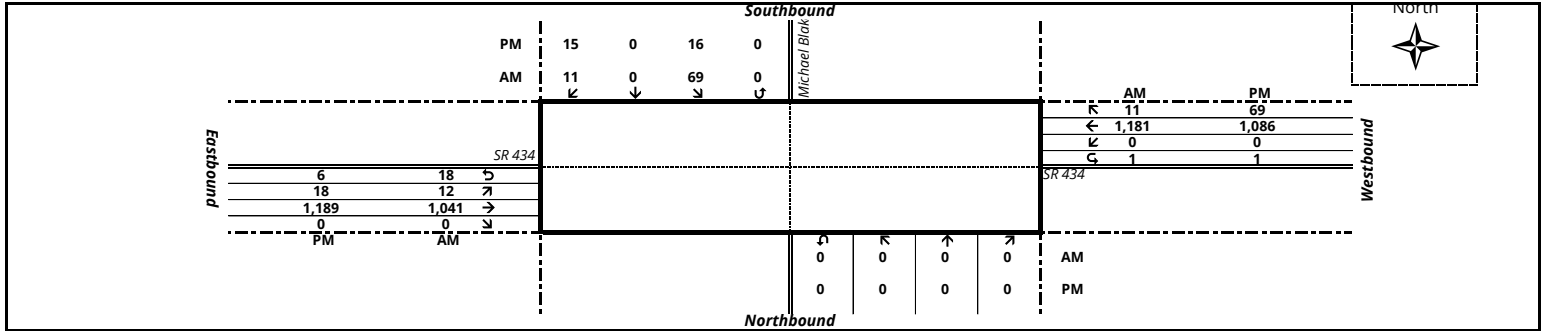
LOCATION: Michael Blake Bv & SR 434

COUNTY: Seminole County

LONGITUDE: 0

TIME BEGIN	Michael Blake Bv					SR 434					SR 434					E/W TOTAL	GRAND TOTAL						
	NORTHBOUND					SOUTHBOUND					N/S TOTAL	EASTBOUND						WESTBOUND					
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL			L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	
07:00 AM	0	0	0	0	0	15	0	2	0	17	17	4	204	0	1	209	0	255	3	0	258	467	484
07:15 AM	0	0	0	0	0	13	0	1	0	14	14	2	273	0	2	277	0	333	5	0	338	615	629
07:30 AM	0	0	0	0	0	17	0	0	0	17	17	3	258	0	5	266	0	318	0	1	319	585	602
07:45 AM	0	0	0	0	0	16	0	3	0	19	19	4	269	0	3	276	0	262	1	0	263	539	558
TOTAL	0	0	0	0	0	61	0	6	0	67	67	13	1,004	0	11	1,028	0	1,168	9	1	1,178	2,206	2,273
08:00 AM	0	0	0	0	0	23	0	7	0	30	30	3	241	0	8	252	0	268	5	0	273	525	555
08:15 AM	0	0	0	0	0	7	0	3	0	10	10	0	227	0	2	229	0	331	4	0	335	564	574
08:30 AM	0	0	0	0	0	5	0	0	0	5	5	1	296	0	2	299	0	252	0	0	252	551	556
08:45 AM	0	0	0	0	0	14	0	2	0	16	16	1	250	0	4	255	0	233	5	0	238	493	509
TOTAL	0	0	0	0	0	49	0	12	0	61	61	5	1,014	0	16	1,035	0	1,084	14	0	1,098	2,133	2,194
04:00 PM	0	0	0	0	0	4	0	3	0	7	7	6	255	0	2	263	0	253	8	0	261	524	531
04:15 PM	0	0	0	0	0	2	0	3	0	5	5	7	271	0	3	281	0	235	12	0	247	528	533
04:30 PM	0	0	0	0	0	2	0	2	0	4	4	3	342	0	2	347	0	247	8	0	255	602	606
04:45 PM	0	0	0	0	0	5	0	3	0	8	8	7	292	0	3	302	0	250	2	0	252	554	562
TOTAL	0	0	0	0	0	13	0	11	0	24	24	23	1,160	0	10	1,193	0	985	30	0	1,015	2,208	2,332
05:00 PM	0	0	0	0	0	1	0	4	0	5	5	1	321	0	1	323	0	279	10	1	290	613	618
05:15 PM	0	0	0	0	0	6	0	3	0	9	9	6	277	0	3	286	0	266	14	0	280	566	575
05:30 PM	0	0	0	0	0	5	0	5	0	10	10	6	305	0	2	313	0	286	26	0	312	625	635
05:45 PM	0	0	0	0	0	4	0	3	0	7	7	5	286	0	0	291	0	255	19	0	274	565	572
TOTAL	0	0	0	0	0	16	0	15	0	31	31	18	1,189	0	6	1,213	0	1,086	69	1	1,156	2,369	2,400

AM Peak																	Peak Hour Factor: 0.932						
07:15 AM to 08:15 AM	0	0	0	0	0	69	0	11	0	80	80	12	1,041	0	18	1,071	0	1,181	11	1	1,193	2,264	2,344
PM Peak																	Peak Hour Factor: 0.945						
05:00 PM to 06:00 PM	0	0	0	0	0	16	0	15	0	31	31	18	1,189	0	6	1,213	0	1,086	69	1	1,156	2,369	2,400



15 MINUTE TURNING MOVEMENT COUNTS

(Trucks Only)

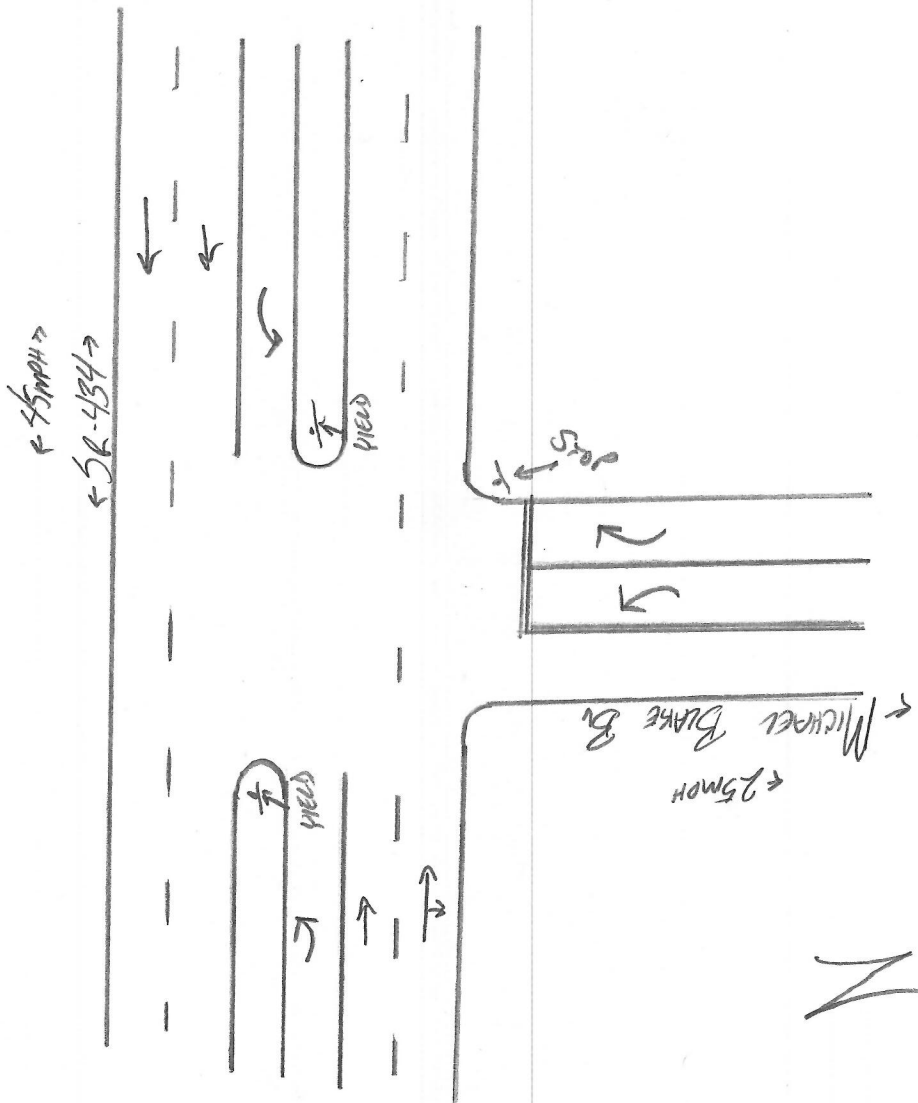
DATE: October 31, 2018 (Wednesday)

CITY: Winter Springs LATITUDE: 0

LOCATION: Michael Blake Bv & SR 434

COUNTY: Seminole County LONGITUDE: 0

TIME BEGIN	Michael Blake Bv					SR 434					SR 434					E/W TOTAL	GRAND TOTAL						
	NORTHBOUND					SOUTHBOUND					N/S TOTAL	EASTBOUND						WESTBOUND					
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		L	T	R	U-turn			TOTAL	L	T	R	U-turn	TOTAL
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7	0	2	2	0	4	11	11
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	7	0	0	7	12	12
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	0	6	0	0	6	15	15
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	5	0	6	0	9	1	0	10	16	16	
TOTAL	0	0	0	0	0	0	0	0	0	0	0	1	26	0	0	27	0	24	3	0	27	54	54
08:00 AM	0	0	0	0	0	0	0	1	0	1	1	0	7	0	0	7	0	4	1	0	5	12	13
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	0	5	0	0	5	15	15
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	7	0	0	7	13	13
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	8	0	0	8	14	14
TOTAL	0	0	0	0	0	0	0	1	0	1	1	0	29	0	0	29	0	24	1	0	25	54	55
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	3	0	0	3	5	5
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	11	0	0	11	17	17
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7	0	13	0	0	13	20	20
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	4	0	0	4	7	7
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	18	0	31	0	0	31	49	49
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	3	0	0	3	7	7
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	3	0	0	3	8	8
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	4	0	0	4	5	5
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	0	10	0	0	10	20	20
AM Peak																							
07:15 AM to 08:15 AM																							
0	0	0	0	0	0	0	0	1	0	1	1	1	26	0	0	27	0	26	2	0	28	55	56
PM Peak																							
05:00 PM to 06:00 PM																							
0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	0	10	0	0	10	20	20



N

Seminole County Traffic Engineering Timing Sheet

Intersection: SR 434 @ 35-Tuskawilla Rd #2392



Name	SR434	Tuskawilla	SR434	Tuskawilla												IP	010.046.174.024	Mask	255.255.255.0							
Direction	WL	ET	ST	EL	WT	NT										Gate	10.46.174.254	Port #	5083							
Channel	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Ph Mode	STD8	Com ID #	1365						
Phase/OL	1	2	3	4	5	6	7	8	9	10	11	12	2	4	6	8	Free Seq	9	Node #	2392						
Type	VEH	VEH	VEH	VEH	VEH	VEH	VEH	VEH	OLP	OLP	OLP	OLP	PED	PED	PED	PED	Date	7-Feb-17	Done By	EPrinciple						
	Phase Times																Alt Phase Times 1									
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Assign	3	4	7	8					
Min Grn	6	15	6	6	6	15	6	6									Min Grn	6	6	6	6					
Passage	3	4	3	4	3	4	3	4									Passage	6	10	10	6					
Max 1	15	70	50	65	15	70	65	50									Max 1	65	65	65	65					
Max 2	15	70	50	65	15	70	65	50									Max 2	65	65	65	65					
Yel Clr	4.8	4.9	4.8	3.4	4.9	4.9	3.4	4.8									Yel Clr	4.8	3.4	3.4	4.8					
Red Clr	2.6	2	3.9	4.1	2.4	2	4.1	3.9									Red Clr	3.9	4.1	4.1	3.9					
Walk		7		7		7		7									Walk		7		7					
Ped Clr		33		40		21		41									Ped Clr		40		41					
Red Rvrt	3	3	3	3	3	3	3	3									Alt Phase Times 2									
Added Init																	Assign									
Max Initial																	Min Grn									
Max3 Limit																	Passage									
Max3 Step																	Max 1									
Time B-4																	Max 2									
Cars B-4																	Yel Clr									
Time to Reduce By																	Red Clr									
Min Gap																	Walk									
																	Ped Clr									
	Phase Options																Alt Phase Opt 1									
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Assign	3	4	7	8					
Enable	X	X	X	X	X	X	X	X									Max2									
Min @		X				X											Max Inh									
Max @																	Cnf Ph	7	8	3	4					
Ped @																	Alt Phase Opt 2									
Soft @																	Assign	3	4	7	8					
Lock Call	X	X		X	X	X		X									Max2									
Flash Ent			X														Max Inh									
Flash Exit		X				X											Cnf Ph	7	8	3	4					
Dual Entry		X	X	X		X	X	X									Alt Phase Opt 3									
Sim Gap		X				X											Assign									
Cond Serv																	Max2									
Reservice																	Max Inh									
Cnf Phase			7	8				3	4								Cnf Ph									
																	Included Phase				Modifier Phase			Grn Yel Red		
Overlap - A	1																									
Overlap - B	2																									
Overlap - C	3																									
Overlap - D	4																									
Overlap - E	5																									
Overlap - F	6																									
Overlap - G	7																									
Overlap - H	8																									
Overlap - I	9																									
Overlap - J	10																									
Overlap - K	11																									
Overlap - L	12																									
Overlap - M	13																									
Overlap - N	14																									
Overlap - O	15																									
Overlap - P	16																									
	Enbl	Track Phase			Grn	Track Overlap			Dwell Phase				Dwl	Dwell Overlap		Exit Phase										
Pre Run 1																										
Pre Run 2																										
Pre Run 3	ON								3	8										1	5					
Pre Run 4	ON								4	7										1	5					
Pre Run 5	ON								2	5										2	6					
Pre Run 6	ON								1	6										2	6					

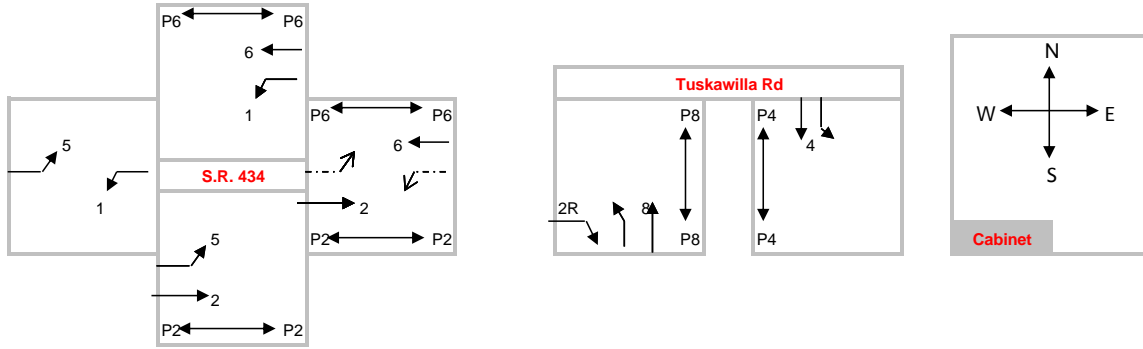
Coordination Splits 1-16																Day Plans 1-8										
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evnt	Hr	Min	Act
Split 1	27	67	58	28	18	76	28	58									Sun	1			99	Mon	1			99
Coord Ph		X																2	10		8		2	6	30	1
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON									D	3	10	30	18	D	3	6	45	11
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	4	11		8	A	4	7	10	21
Split 2	18	49	33	30	18	49	30	33									Y	5	12	30	18	Y	5	7	30	1
Coord Ph		X																6	13		8		6	9	30	2
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON									P	7	19	30	99	P	7	13	30	3
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	L	8				L	8	14	15	13
Split 3	19	54	43	24	18	55	24	43									A	9				A	9	14	45	3
Coord Ph		X															N	10				N	10	16		4
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON										11					11	19		5
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1	12				2	12	20	30	99
Split 4	23	82	40	25	18	87	25	40										13					13			
Coord Ph		X																14					14			
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON										15					15			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evt	Hr	Min	Act
Split 5	18	48	28	26	18	48	26	28									Tue	1			99	Wed	1			99
Coord Ph		X																2	6	30	1		2	6	30	1
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON									D	3	6	45	11	D	3	6	45	11
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	4	7	10	21	A	4	7	10	21
Split 6	18	49	28	25	18	49	25	28									Y	5	7	30	1	Y	5	7	30	1
Coord Ph		X																6	9	30	2		6	9	30	2
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON									P	7	13	30	3	P	7	13	15	13
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	L	8	14	15	13	L	8	13	45	3
Split 7																	A	9	14	45	3	A	9	16		4
Coord Ph																	N	10	16		4	N	10	19		5
Mode																		11	19		5		11	20	30	99
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	3	12	20	30	99	4	12			
Split 8	18	49	28	25	18	49	25	28										13					13			
Coord Ph		X																14					14			
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON										15					15			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evt	Hr	Min	Act
Split 9																	Thur	1			99	Fri	1			99
Coord Ph																		2	6	30	1		2	6	30	1
Mode																	D	3	6	45	11	D	3	6	45	11
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	4	7	10	21	A	4	7	10	21
Split 10																	Y	5	7	30	1	Y	5	7	30	1
Coord Ph																		6	9	30	2		6	9	30	2
Mode																	P	7	13	30	3	P	7	13	30	3
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	L	8	14	15	13	L	8	14	15	13
Split 11	23	45	78	34	20	48	34	78									A	9	14	45	3	A	9	14	45	3
Coord Ph		X															N	10	16		4	N	10	16		4
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON										11	19		5		11	19		5
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	5	12	20	30	99	6	12	20	30	99
Split 12																		13					13			
Coord Ph																		14					14			
Mode																		15					15			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evt	Hr	Min	Act
Split 13	20	42	30	48	18	44	48	30									Sat	1			99	Spc	1			99
Coord Ph		X																2	8		6	Plan	2	6	30	1
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON									D	3	20		99	D	3	6	45	11
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	4				A	4	7	10	21
Split 14																	Y	5				Y	5	7	30	1
Coord Ph																		6					6	9	30	2
Mode																	P	7				P	7	11	15	13
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	L	8				L	8	12		2
Split 15																	A	9				A	9	13	30	3
Coord Ph																	N	10				N	10	16		4
Mode																		11					11	19		5
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	7	12				8	12	20	30	99
Split 16																		13					13			
Coord Ph																		14					14			
Mode																		15					15			

Coordination Splits 17-32																Day Plans 9-16										
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evt	Hr	Min	Act
Split 17																		1					1			
Coord Ph																		2					2			
Mode																	D	3				D	3			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	4				A	4			
Split 18	18	34	28	40	18	34	40	28									Y	5				Y	5			
Coord Ph		X																6					6			
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON									P	7				P	7			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	L	8				L	8			
Split 19																	A	9				A	9			
Coord Ph																	N	10				N	10			
Mode																		11					11			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	9	12				10	12			
Split 20																		13					13			
Coord Ph																		14					14			
Mode																		15					15			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evt	Hr	Min	Act
Split 21	20	49	55	56	20	49	55	56									D	1				D	1			
Coord Ph		X																2					2			
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON									A	3				A	3			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Y	4				Y	4			
Split 22																		5					5			
Coord Ph																	P	6				P	6			
Mode																	L	7				L	7			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	8				A	8			
Split 23																	N	9				N	9			
Coord Ph																		10					10			
Mode																		11					11			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	11	12				12	12			
Split 24																		13					13			
Coord Ph																		14					14			
Mode																		15					15			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evt	Hr	Min	Act
Split 25																	D	1				D	1			
Coord Ph																		2					2			
Mode																	A	3				A	3			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Y	4				Y	4			
Split 26																		5					5			
Coord Ph																	P	6				P	6			
Mode																	L	7				L	7			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	8				A	8			
Split 27																	N	9				N	9			
Coord Ph																		10					10			
Mode																		11					11			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	13	12				14	12			
Split 28																		13					13			
Coord Ph																		14					14			
Mode																		15					15			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evt	Hr	Min	Act
Split 29																	D	1				D	1			
Coord Ph																		2					2			
Mode																	A	3				A	3			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Y	4				Y	4			
Split 30																		5					5			
Coord Ph																	P	6				P	6			
Mode																	L	7				L	7			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	8				A	8			
Split 31																	N	9				N	9			
Coord Ph																		10					10			
Mode																		11					11			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	15	12				16	12			
Split 32																		13					13			
Coord Ph																		14					14			
Mode																		15					15			

	Act	C	O	SP	Seq	TM	OPT	Det	CIR	Sh	Lng	No S	No S	Yld	Mx2	Flt	R Hld	In1	In2	In3	In4	In5	In6	In7	In8	YINH
Pattern - 1	1	180	176	1	5		1			12	22						X									
Pattern - 2	2	130	80	2	9		1			12	22						X									
Pattern - 3	3	140	92	3	9		1			12	22						X									
Pattern - 4	4	170	77	4	5		2			12	22					X	X									
Pattern - 5	5	120	11	5	9		1			12	22						X									
Pattern - 6	6	120	41	6	9		1			12	22						X									
Pattern - 7																										
Pattern - 8	8	120	41	8	9		1			12	22						X									
Pattern - 9																										
Pattern - 10																										
Pattern - 11	11	180	147	11	5	1	1			12	22						X									
Pattern - 12																										
Pattern - 13	13	140	92	13	9		2			12	22					X	X									
Pattern - 14																										
Pattern - 15																										
Pattern - 16																										
Pattern - 17																										
Pattern - 18	18	120	41	18	9		1			12	22						X									
Pattern - 19																										
Pattern - 20																										
Pattern - 21	21	180	176	21	9	1	1			12	22						X									
Pattern - 22																										
Pattern - 23																										
Pattern - 24																										
Pattern - 25																										
Pattern - 26																										
Pattern - 27																										
Pattern - 28																										
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Pattern - 48																										

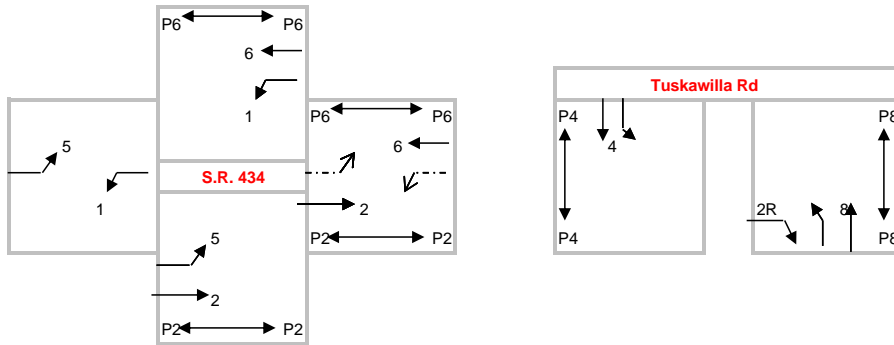
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Detector 1	1		6				17						33						49						
Detector 2	2						18						34						50						
Detector 3	2						19						35						51						
Detector 4	4						20						36						52						
Detector 5	4						21						37						53						
Detector 6	5		2				22						38						54						
Detector 7	6						23						39						55						
Detector 8	6						24						40						56						
Detector 9	6						25						41						57						
Detector 10	6						26						42						58						
Detector 11	8						27						43						59						
Detector 12	8						28						44						60						
Detector 13	8						29						45						61						
Detector 14							30						46						62						
Detector 15							31						47						63						
Detector 16							32						48						64						

Intersection Notes	T.O.D Notes
<p>Intersection set as concurrent sides. But operates as Q-Seq due to set up of controller (phases enabled and conflicting phases). Phases 1 + 5 are 5-sect. and Det. Switched. 2R hardwired to Phase 8.</p>	<p>Intersection re-timed January 2017. Patterns 11,13 & 21 are used for High School AM rush with Alt Time Plan 1. Alt Time Plan 1 to allow higher extend times to phase 4 for PM school rush time.</p>



Seq 5

Ring 1	1 2	3 4
Ring 2	5 6	8 7



Seq 9

Ring 1	1 2	4 3
Ring 2	5 6	7 8

Seminole County Traffic Engineering Timing Sheet

Intersection: SR 434 @ 34-Doran Dr #12076



Name	SR 434	Bear Spgs	SR 434	Bear Spgs												IP	010.046.174.022	Mask	255.255.255.0				
Direction	WL	ET		ST	EL	WT	SL	NT												Gate	10.46.174.254	Port #	5082
Channel	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Ph Mode	STD8	Com ID #	1360			
Phase/OL	1	2	3	4	5	6	7	8	1	2	3	4	2	4	6	8	Free Seq	1	Node #	12076			
Type	VEH	VEH	VEH	VEH	VEH	VEH	VEH	VEH	OLP	OLP	OLP	OLP	PED	PED	PED	PED	Date	7-Feb-17	Done By	EPrincipe			
Phase Times																	Alt Phase Times 1						
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Assign						
Min Grn	6	15		8	6	15	6	8									Min Grn						
Passage	3	5		3	3	5	3	3									Passage						
Max 1	30	70		25	30	70	20	20									Max 1						
Max 2	30	70		20	30	70	20	20									Max 2						
Yel Clr	4.8	4.8		3.4	4.8	4.8	3.4	3.4									Yel Clr						
Red Clr	2.3	2		3.8	2.4	2	2.9	3.8									Red Clr						
Walk		7		7		7		7									Walk						
Ped Clr		19		32		19		31									Ped Clr						
Red Rvrt	3	3		3	3	3	3	3									Alt Phase Times 2						
Added Init																	Assign						
Max Initial																	Min Grn						
Max3 Limit																	Passage						
Max3 Step																	Max 1						
Time B-4																	Max 2						
Cars B-4																	Yel Clr						
Time to Reduce By																	Red Clr						
Min Gap																	Walk						
																	Ped Clr						
Phase Options																	Alt Phase Opt 1						
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Assign						
Enable	X	X		X	X	X	X	X									Max2						
Min @		X				X											Max Inh						
Max @																	Cnf Ph						
Ped @																	Alt Phase Opt 2						
Soft @																	Assign						
Lock Call	X	X			X	X											Max2						
Flash Ent				X				X									Max Inh						
Flash Exit		X				X											Cnf Ph						
Dual Entry		X		X		X	X										Alt Phase Opt 3						
Sim Gap		X				X											Assign						
Cond Serv																	Max2						
Reservice																	Max Inh						
Cnf Phase																	Cnf Ph						
Included Phase																	Modifier Phase			Grn Yel Red			
Overlap - A	1																						
Overlap - B	2																						
Overlap - C	3																						
Overlap - D	4																						
Overlap - E	5																						
Overlap - F	6																						
Overlap - G	7																						
Overlap - H	8																						
Overlap - I	9																						
Overlap - J	10																						
Overlap - K	11																						
Overlap - L	12																						
Overlap - M	13																						
Overlap - N	14																						
Overlap - O	15																						
Overlap - P	16																						
Enbl		Track Phase			Grn	Track Overlap			Dwell Phase			Dwl	Dwell Overlap		Exit Phase								
Pre Run 1																							
Pre Run 2																							
Pre Run 3	ON								8								4	8					
Pre Run 4	ON								4	7							4	8					
Pre Run 5	ON								2	5							2	6					
Pre Run 6	ON								1	6							2	6					

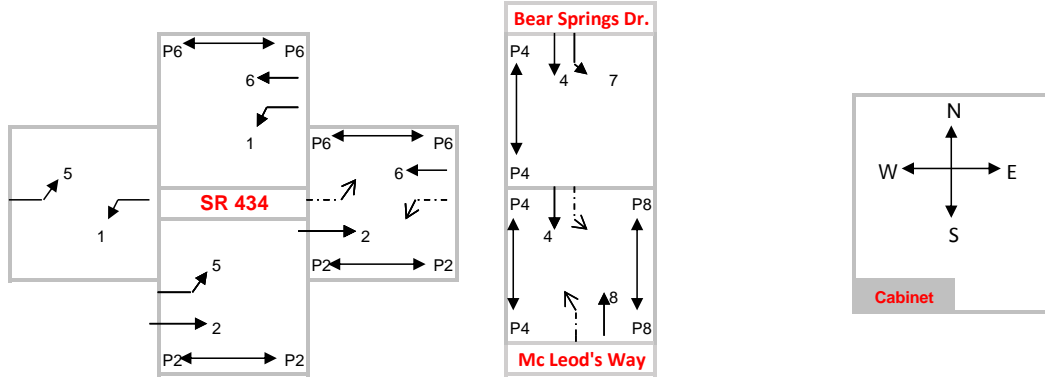
Coordination Splits 1-16																Day Plans 1-8												
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evnt	Hr	Min	Act		
Split 1	18	117		45	18	117	18	27									Sun	1			99	Mon	1			99		
Coord Ph		X																2	10		8		2	6	30	1		
Mode	NON	MAX		NON	NON	MAX	NON	NON									D	3	19	30	99	D	3	9	30	2		
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		A	4				A	4	13	30	3	
Split 2	18	75		37	20	73	18	19									Y	5				Y	5	14	20	13		
Coord Ph		X																6					6	14	45	3		
Mode	NON	MAX		NON	NON	MAX	NON	NON									P	7				P	7	15	15	13		
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		L	8			L	8	15	45	3		
Split 3	18	85		37	19	84	18	19										A	9				A	9	16		4	
Coord Ph		X																N	10				N	10	19		5	
Mode	NON	MAX		NON	NON	MAX	NON	NON											11					11	20	30	99	
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		1	12				2	12				
Split 4	18	115		37	24	109	18	19											13					13				
Coord Ph		X																	14					14				
Mode	NON	MAX		NON	NON	MAX	NON	NON											15					15				
Split 5	20	63		37	20	63	18	19									Tue	1			99	Wed	1			99		
Coord Ph		X																2	6	30	1		2	6	30	1		
Mode	NON	MAX		NON	NON	MAX	NON	NON										D	3	9	30	2	D	3	9	30	2	
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		A	4	13	30	3	A	4	13	15	3	
Split 6	18	65		37	19	64	18	19										Y	5	14	20	13	Y	5	14	20	13	
Coord Ph		X																	6	14	45	3		6	14	45	3	
Mode	NON	MAX		NON	NON	MAX	NON	NON											P	7	15	15	13	P	7	15	15	13
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		L	8	15	45	3	L	8	15	45	3	
Split 7																		A	9	16		4	A	9	16		4	
Coord Ph																		N	10	19		5	N	10	19		5	
Mode																			11	20	30	99		11	20	30	99	
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		3	12				4	12				
Split 8	18	65		37	19	64	18	19											13					13				
Coord Ph		X																	14					14				
Mode	NON	MAX		NON	NON	MAX	NON	NON											15					15				
Split 9																		Thur	1			99	Fri	1			99	
Coord Ph																			2	6	30	1		2	6	30	1	
Mode																			D	3	9	30	2	D	3	9	30	2
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		A	4	13	30	3	A	4	13	30	3	
Split 10																		Y	5	14	20	13	Y	5	14	20	13	
Coord Ph																			6	14	45	3		6	14	45	3	
Mode																			P	7	15	15	13	P	7	15	15	13
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		L	8	15	45	3	L	8	15	45	3	
Split 11																		A	9	16		4	A	9	16		4	
Coord Ph																		N	10	19		5	N	10	19		5	
Mode																			11	20	30	99		11	20	30	99	
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		5	12				6	12				
Split 12																			13					13				
Coord Ph																			14					14				
Mode																			15					15				
Split 13	18	85		37	19	84	18	19										Sat	1			99		1				
Coord Ph		X																	2	8		6		2				
Mode	NON	MAX		NON	NON	MAX	NON	NON											D	3	20		99	D	3			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		A	4				A	4				
Split 14																		Y	5				Y	5				
Coord Ph																			6					6				
Mode																			P	7				P	7			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		L	8				L	8				
Split 15																		A	9				A	9				
Coord Ph																		N	10				N	10				
Mode																			11					11				
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		7	12				8	12				
Split 16																			13					13				
Coord Ph																			14					14				
Mode																			15					15				

Coordination Splits 17-32																Day Plans 9-16										
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evt	Hr	Min	Act
Split 17																		1					1			
Coord Ph																		2					2			
Mode																	D	3				D	3			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	4				A	4			
Split 18																	Y	5				Y	5			
Coord Ph																		6					6			
Mode																	P	7				P	7			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	L	8				L	8			
Split 19																	A	9				A	9			
Coord Ph																	N	10				N	10			
Mode																		11					11			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	9	12				10	12			
Split 20																		13					13			
Coord Ph																		14					14			
Mode																		15					15			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evt	Hr	Min	Act
Split 21																		1					1			
Coord Ph																		2					2			
Mode																	D	3				D	3			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	4				A	4			
Split 22																	Y	5				Y	5			
Coord Ph																		6					6			
Mode																	P	7				P	7			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	L	8				L	8			
Split 23																	A	9				A	9			
Coord Ph																	N	10				N	10			
Mode																		11					11			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	11	12				12	12			
Split 24																		13					13			
Coord Ph																		14					14			
Mode																		15					15			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evt	Hr	Min	Act
Split 25																		1					1			
Coord Ph																		2					2			
Mode																	D	3				D	3			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	4				A	4			
Split 26																	Y	5				Y	5			
Coord Ph																		6					6			
Mode																	P	7				P	7			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	L	8				L	8			
Split 27																	A	9				A	9			
Coord Ph																	N	10				N	10			
Mode																		11					11			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	13	12				14	12			
Split 28																		13					13			
Coord Ph																		14					14			
Mode																		15					15			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		Evt	Hr	Min	Act		Evt	Hr	Min	Act
Split 29																		1					1			
Coord Ph																		2					2			
Mode																	D	3				D	3			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	A	4				A	4			
Split 30																	Y	5				Y	5			
Coord Ph																		6					6			
Mode																	P	7				P	7			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	L	8				L	8			
Split 31																	A	9				A	9			
Coord Ph																	N	10				N	10			
Mode																		11					11			
Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	15	12				16	12			
Split 32																		13					13			
Coord Ph																		14					14			
Mode																		15					15			

	Act	C	O	SP	Seq	TM	OPT	Det	CIR	Sh	Lng	No S	No S	Yld	Mx2	Flt	R Hld	In1	In2	In3	In4	In5	In6	In7	In8	YINH
Pattern - 1	1	180	57	1	1		1			12	22						X									
Pattern - 2	2	130	92	2	1		1			12	22						X									
Pattern - 3	3	140	109	3	1		2			12	22					X	X									
Pattern - 4	4	170	114	4	1		1			12	22						X									
Pattern - 5	5	120	12	5	1		1			12	22						X									
Pattern - 6	6	120	52	6	1		1			12	22						X									
Pattern - 7																										
Pattern - 8	8	120	52	8	1		1			12	22						X									
Pattern - 9																										
Pattern - 10																										
Pattern - 11																										
Pattern - 12																										
Pattern - 13	13	140	102	13	1		1			12	22						X									
Pattern - 14																										
Pattern - 15																										
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	Det	Call	SwT	Dly	Lck	Src	Det	Call	SwT	Dly	Lck	Src	Det	Call	SwT	Dly	Lck	Src	Det	Call	SwT	Dly	Lck	Src	
Detector 1	1		6				17						33	4					13	49					
Detector 2	2						18						34							50					
Detector 3	2						19						35							51					
Detector 4	2						20						36							52					
Detector 5	2						21						37							53					
Detector 6	8						22						38							54					
Detector 7	4			8			23						39							55					
Detector 8	5	2					24						40							56					
Detector 9	6						25						41							57					
Detector 10	6						26						42							58					
Detector 11	6						27						43							59					
Detector 12	6						28						44							60					
Detector 13	7						29						45							61					
Detector 14	8			8			30						46							62					
Detector 15							31						47							63					
Detector 16							32						48							64					

Intersection Notes	T.O.D Notes
<p>Intersection set up with concurrent sides.</p> <p>Phases 1 & 5 are 5_sec and use Det switching.</p> <p>Phase 7 extended with sourcing if no call on 8.</p>	<p>Intersection re-timed January 2017.</p>



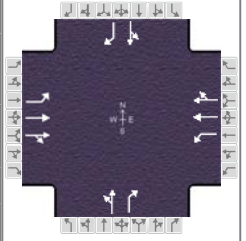
	Seq 1			
Ring 1	1	2	3	4
Ring 2	5	6	7	8

APPENDIX C

HCS7 Capacity Analysis Worksheets
Existing Conditions

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	TPD, Inc.			Duration, h	0.25
Analyst	TPD, Inc.	Analysis Date	11/15/2018	Area Type	Other
Jurisdiction	Seminole County	Time Period	A.M. Peak Hour (Existing)	PHF	0.96
Urban Street	SR 434	Analysis Year	2018	Analysis Period	1 > 7:00
Intersection	SR 434 & Doran Drive	File Name	SR 434 & Doran Dr.xus		
Project Description	Lot 5-Townhomes				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	58	1323	4	7	1447	44	19	0	9	26	0	40

Signal Information														
Cycle, s	140.0	Reference Phase	2											
Offset, s	0	Reference Point	End											
Uncoordinated	No	Simult. Gap E/W	On	Green	1.5	4.0	93.3	7.4	5.4	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.8	0.0	4.8	3.4	3.4	0.0				
				Red	2.3	0.0	2.0	3.8	3.8	0.0				

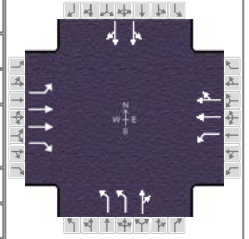
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		11.0		11.0
Phase Duration, s	12.6	104.1	8.6	100.1		12.6		14.6
Change Period, (Y+R _c), s	7.2	6.8	7.1	6.8		7.2		7.2
Max Allow Headway (MAH), s	4.0	0.0	4.0	0.0		4.4		4.5
Queue Clearance Time (g _s), s	3.4		2.2			3.5		5.5
Green Extension Time (g _e), s	0.2	0.0	0.0	0.0		0.1		0.2
Phase Call Probability	0.90		0.25			0.68		0.93
Max Out Probability	0.00		0.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	60	691	691	7	779	774		20	9		27	42
Adjusted Saturation Flow Rate (s), veh/h/ln	1795	1870	1868	1795	1870	1851		1795	1598		1795	1598
Queue Service Time (g _s), s	1.4	25.0	25.0	0.2	33.4	33.6		1.5	0.8		2.0	3.5
Cycle Queue Clearance Time (g _c), s	1.4	25.0	25.0	0.2	33.4	33.6		1.5	0.8		2.0	3.5
Green Ratio (g/C)	0.71	0.70	0.70	0.68	0.67	0.67		0.04	0.04		0.05	0.05
Capacity (c), veh/h	264	1300	1299	269	1246	1233		70	62		96	85
Volume-to-Capacity Ratio (X)	0.229	0.532	0.532	0.027	0.625	0.628		0.284	0.151		0.283	0.490
Back of Queue (Q), ft/ln (95 th percentile)	23.8	375.1	368.9	3.1	493.5	484.6		33.7	15.8		44.8	71.3
Back of Queue (Q), veh/ln (95 th percentile)	0.9	14.8	14.8	0.1	19.4	19.4		1.3	0.6		1.8	2.8
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
Uniform Delay (d ₁), s/veh	11.2	10.3	10.3	9.3	13.4	13.4		65.4	65.1		63.7	64.4
Incremental Delay (d ₂), s/veh	0.4	1.6	1.6	0.0	2.4	2.4		2.2	1.1		1.6	4.3
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Control Delay (d), s/veh	11.7	11.9	11.9	9.3	15.7	15.8		67.6	66.2		65.3	68.7
Level of Service (LOS)	B	B	B	A	B	B		E	E		E	E
Approach Delay, s/veh / LOS	11.9	B		15.7	B		67.1	E		67.4	E	
Intersection Delay, s/veh / LOS	15.6						B					

Multimodal Results	EB		WB		NB		SB	
	Pedestrian LOS Score / LOS	1.87	B	1.88	B	2.33	B	2.32
Bicycle LOS Score / LOS	1.68	B	1.77	B	0.54	A	0.60	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TPD, Inc.			Duration, h	0.25		
Analyst	TPD, Inc.			Analysis Date	11/15/2018		
Jurisdiction	Seminole County			Area Type	Other		
Urban Street	SR 434			Time Period	A.M. Peak Hour (Existing)		
Intersection	SR 434 & Tuskawilla R...			PHF	0.91		
Project Description	Lot5 - Townhomes			Analysis Year	2019		
				Analysis Period	1 > 7:00		
				File Name	SR 434 & Tuskawilla Rd.xus		



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	39	774	438	108	997	48	476	134	149	109	150	20

Signal Information				Signal Timing (s)											
Cycle, s	140.0	Reference Phase	2												
Offset, s	0	Reference Point	End	Green	4.9	2.7	57.6	14.5	29.9	0.0					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.9	0.0	4.9	3.4	4.8	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.4	0.0	2.0	4.1	3.9	0.0					

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	3.0	1.1	4.0		10.0		12.0
Phase Duration, s	12.2	64.5	14.9	67.2		38.6		22.0
Change Period, (Y+R _c), s	7.3	6.9	7.4	6.9		8.7		7.5
Max Allow Headway (MAH), s	4.0	0.0	4.0	0.0		5.1		5.0
Queue Clearance Time (g _s), s	3.9		7.3			26.3		14.1
Green Extension Time (g _e), s	0.1	0.0	0.3	0.0		3.6		0.4
Phase Call Probability	0.81		0.99			1.00		1.00
Max Out Probability	0.00		0.00			0.43		1.00

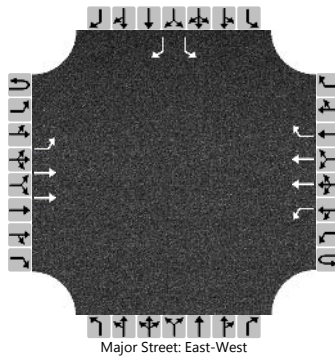
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	43	851	481	119	579	570	523	311		160		146
Adjusted Saturation Flow Rate (s), veh/h/ln	1795	1781	1598	1795	1870	1840	1743	1722		1817		1836
Queue Service Time (g _s), s	1.9	25.8	35.5	5.3	35.7	35.7	19.4	24.3		12.1		10.9
Cycle Queue Clearance Time (g _c), s	1.9	25.8	35.5	5.3	35.7	35.7	19.4	24.3		12.1		10.9
Green Ratio (g/C)	0.45	0.41	0.41	0.47	0.43	0.43	0.21	0.21		0.10		0.10
Capacity (c), veh/h	194	1466	658	296	806	793	745	368		188		190
Volume-to-Capacity Ratio (X)	0.221	0.580	0.732	0.401	0.718	0.718	0.702	0.845		0.852		0.771
Back of Queue (Q), ft/ln (95 th percentile)	37.1	422	526	102.4	596.4	580.6	336.4	432.7		278.3		243.6
Back of Queue (Q), veh/ln (95 th percentile)	1.5	16.6	20.9	4.1	23.5	23.2	13.3	17.2		11.1		9.7
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00
Uniform Delay (d ₁), s/veh	26.8	31.8	34.7	24.4	32.8	32.8	50.9	52.8		61.7		61.1
Incremental Delay (d ₂), s/veh	0.6	1.7	7.1	0.9	5.5	5.5	2.3	13.1		25.8		15.4
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Control Delay (d), s/veh	27.3	33.5	41.7	25.2	38.3	38.4	53.3	65.9		87.5		76.5
Level of Service (LOS)	C	C	D	C	D	D	D	E		F		E
Approach Delay, s/veh / LOS	36.2		D	37.1		D	58.0		E	82.2		F
Intersection Delay, s/veh / LOS	45.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.28	B	1.92	B	2.33	B	2.46	B
Bicycle LOS Score / LOS	1.62	B	1.53	B	1.86	B	0.74	A

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	TPD, Inc.			Intersection	SR 434 & Michael Blvd		
Agency/Co.	TPD, Inc.			Jurisdiction	Seminole County		
Date Performed	12/04/2018			East/West Street	SR 434		
Analysis Year	2019			North/South Street	Michael Blvd		
Time Analyzed	A.M. Peak Hour (Exis.)			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Lot5 - Townhomes						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	1		0	0	0		1	0	1
Configuration		L	T			L	T	R						L		R
Volume (veh/h)	0	30	1041		0	0	1181	11						69		11
Percent Heavy Vehicles (%)	1	1			1	1								1		1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type Storage	Left + Thru								3							

Critical and Follow-up Headways

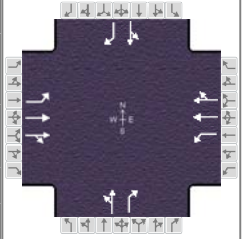
Base Critical Headway (sec)		4.1				4.1								7.5		6.9
Critical Headway (sec)		4.12				4.12								7.52		6.92
Base Follow-Up Headway (sec)		2.2				2.2								3.5		3.3
Follow-Up Headway (sec)		2.21				2.21								3.51		3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		32				0								74		12	
Capacity, c (veh/h)		543				626								169		424	
v/c Ratio		0.06				0.00								0.44		0.03	
95% Queue Length, Q ₉₅ (veh)		0.2				0.0								2.0		0.1	
Control Delay (s/veh)		12.1				10.8								42.0		13.7	
Level of Service (LOS)		B				B								E		B	
Approach Delay (s/veh)		0.3				0.0								38.1			
Approach LOS														E			

HCS7 Signalized Intersection Results Summary

General Information					Intersection Information			
Agency	TPD, Inc.				Duration, h	0.25		
Analyst	TPD, Inc.		Analysis Date	11/15/2018	Area Type	Other		
Jurisdiction	Seminole County		Time Period	P.M. Peak Hour (Existing)	PHF	0.97		
Urban Street	SR 434		Analysis Year	2018	Analysis Period	1 > 7:00		
Intersection	SR 434 & Doran Drive		File Name	SR 434 & Doran Dr.xus				
Project Description	Lot 5-Townhomes							



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	128	1833	11	25	1336	25	10	4	11	39	0	41

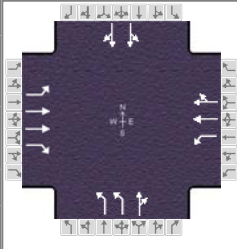
Signal Information				Signal Timing (s)									
Cycle, s	140.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	3.8	2.3	92.9	7.7	5.1	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.8	0.0	4.8	3.4	3.4	0.0			
				Red	2.3	0.0	2.0	3.8	3.8	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		11.0		11.0
Phase Duration, s	13.2	102.0	10.9	99.7		12.3		14.9
Change Period, (Y+R _c), s	7.2	6.8	7.1	6.8		7.2		7.2
Max Allow Headway (MAH), s	4.0	0.0	4.0	0.0		4.4		4.5
Queue Clearance Time (g _s), s	5.3		2.6			3.1		5.6
Green Extension Time (g _e), s	0.4	0.0	0.1	0.0		0.1		0.3
Phase Call Probability	0.99		0.63			0.63		0.96
Max Out Probability	0.00		0.00			0.00		0.00

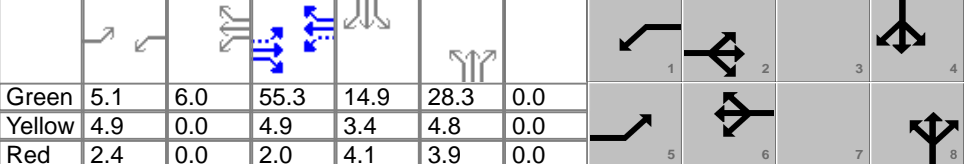
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	132	951	950	26	703	700		14	11		40	42
Adjusted Saturation Flow Rate (s), veh/h/ln	1795	1870	1866	1795	1870	1858		1820	1598		1795	1598
Queue Service Time (g _s), s	3.3	46.3	46.5	0.6	28.4	28.5		1.1	1.0		3.0	3.6
Cycle Queue Clearance Time (g _c), s	3.3	46.3	46.5	0.6	28.4	28.5		1.1	1.0		3.0	3.6
Green Ratio (g/C)	0.71	0.68	0.68	0.69	0.66	0.66		0.04	0.04		0.05	0.05
Capacity (c), veh/h	306	1271	1269	180	1241	1233		66	58		98	88
Volume-to-Capacity Ratio (X)	0.431	0.748	0.749	0.143	0.567	0.568		0.219	0.196		0.408	0.482
Back of Queue (Q), ft/ln (95 th percentile)	54.4	652.7	645	13	430	422.2		24.5	19.3		67.4	72
Back of Queue (Q), veh/ln (95 th percentile)	2.2	25.7	25.8	0.5	16.9	16.9		1.0	0.8		2.7	2.9
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
Uniform Delay (d ₁), s/veh	10.9	14.6	14.6	15.4	12.7	12.7		65.5	65.5		64.0	64.2
Incremental Delay (d ₂), s/veh	1.0	4.1	4.1	0.4	1.9	1.9		1.7	1.6		2.7	4.1
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Control Delay (d), s/veh	11.9	18.7	18.7	15.7	14.6	14.6		67.2	67.1		66.7	68.3
Level of Service (LOS)	B	B	B	B	B	B		E	E		E	E
Approach Delay, s/veh / LOS	18.2	B		14.6	B		67.2	E		67.5	E	
Intersection Delay, s/veh / LOS	18.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.88	B	1.88	B	2.33	B	2.32	B
Bicycle LOS Score / LOS	2.16	B	1.67	B	0.53	A	0.62	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	TPD, Inc.			Duration, h	0.25	
Analyst	TPD, Inc.	Analysis Date	11/15/2018	Area Type	Other	
Jurisdiction	Seminole County	Time Period	P.M. Peak Hour (Existing)	PHF	0.96	
Urban Street	SR 434	Analysis Year	2019	Analysis Period	1 > 7:00	
Intersection	SR 434 & Tuskawilla R...	File Name	SR 434 & Tuskawilla Rd.xus			
Project Description	Lot5 - Townhomes					

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	48	926	574	182	848	62	459	126	150	127	139	36

Signal Information												
Cycle, s	140.0	Reference Phase	2	Green	5.1	6.0	55.3	14.9	28.3	0.0	0.0	0.0
Offset, s	0	Reference Point	End	Yellow	4.9	0.0	4.9	3.4	4.8	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Red	2.4	0.0	2.0	4.1	3.9	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On									

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	3.0	1.1	4.0		10.0		12.0
Phase Duration, s	12.4	62.2	18.5	68.2		37.0		22.4
Change Period, (Y+R _c), s	7.3	6.9	7.4	6.9		8.7		7.5
Max Allow Headway (MAH), s	4.0	0.0	4.0	0.0		5.3		5.2
Queue Clearance Time (g _s), s	4.3		10.6			24.5		14.5
Green Extension Time (g _e), s	0.1	0.0	0.4	0.0		3.9		0.3
Phase Call Probability	0.86		1.00			1.00		1.00
Max Out Probability	0.00		0.00			0.35		1.00

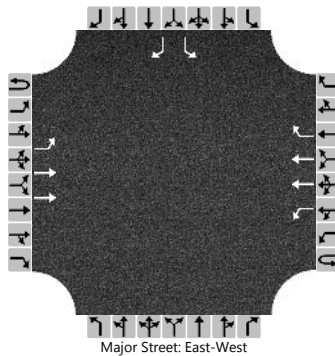
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	50	965	598	190	480	468	478	288		165		150
Adjusted Saturation Flow Rate (s), veh/h/ln	1795	1781	1598	1795	1870	1825	1743	1717		1812		1804
Queue Service Time (g _s), s	2.3	31.5	50.7	8.6	27.2	27.2	17.7	22.5		12.5		11.3
Cycle Queue Clearance Time (g _c), s	2.3	31.5	50.7	8.6	27.2	27.2	17.7	22.5		12.5		11.3
Green Ratio (g/C)	0.43	0.39	0.39	0.48	0.44	0.44	0.20	0.20		0.11		0.11
Capacity (c), veh/h	254	1406	631	293	819	799	705	347		192		192
Volume-to-Capacity Ratio (X)	0.197	0.686	0.948	0.647	0.586	0.586	0.678	0.828		0.857		0.781
Back of Queue (Q), ft/ln (95 th percentile)	44.4	504	792.1	169.6	465.3	449.2	319.8	410.4		292.2		255.1
Back of Queue (Q), veh/ln (95 th percentile)	1.8	19.8	31.4	6.7	18.3	18.0	12.7	16.3		11.7		10.2
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00
Uniform Delay (d ₁), s/veh	25.4	35.2	41.0	26.8	29.8	29.8	51.6	53.5		61.5		61.0
Incremental Delay (d ₂), s/veh	0.4	2.7	25.1	2.4	3.1	3.1	1.9	11.3		27.0		16.9
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Control Delay (d), s/veh	25.7	37.9	66.1	29.2	32.8	32.9	53.5	64.8		88.5		77.9
Level of Service (LOS)	C	D	E	C	C	C	D	E		F		E
Approach Delay, s/veh / LOS	48.0		D	32.3		C	57.7		E	83.5		F
Intersection Delay, s/veh / LOS	48.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	1.92	B	2.33	B	2.46	B
Bicycle LOS Score / LOS	1.82	B	1.43	A	1.75	B	0.75	A

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	TPD, Inc.			Intersection	SR 434 & Michael Blvd		
Agency/Co.	TPD, Inc.			Jurisdiction	Seminole County		
Date Performed	12/04/2018			East/West Street	SR 434		
Analysis Year	2019			North/South Street	Michael Blvd		
Time Analyzed	P.M. Peak Hour (Exis.)			Peak Hour Factor	0.94		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Lot5 - Townhomes						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	1		0	0	0		1	0	1
Configuration		L	T			L	T	R						L		R
Volume (veh/h)	0	24	1189		0	0	1086	69						16		15
Percent Heavy Vehicles (%)	1	1			1	1								1		1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type Storage	Left + Thru								3							

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1								7.5		6.9
Critical Headway (sec)		4.12				4.12								7.52		6.92
Base Follow-Up Headway (sec)		2.2				2.2								3.5		3.3
Follow-Up Headway (sec)		2.21				2.21								3.51		3.31

Delay, Queue Length, and Level of Service

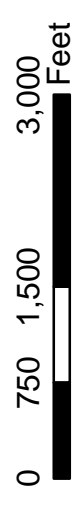
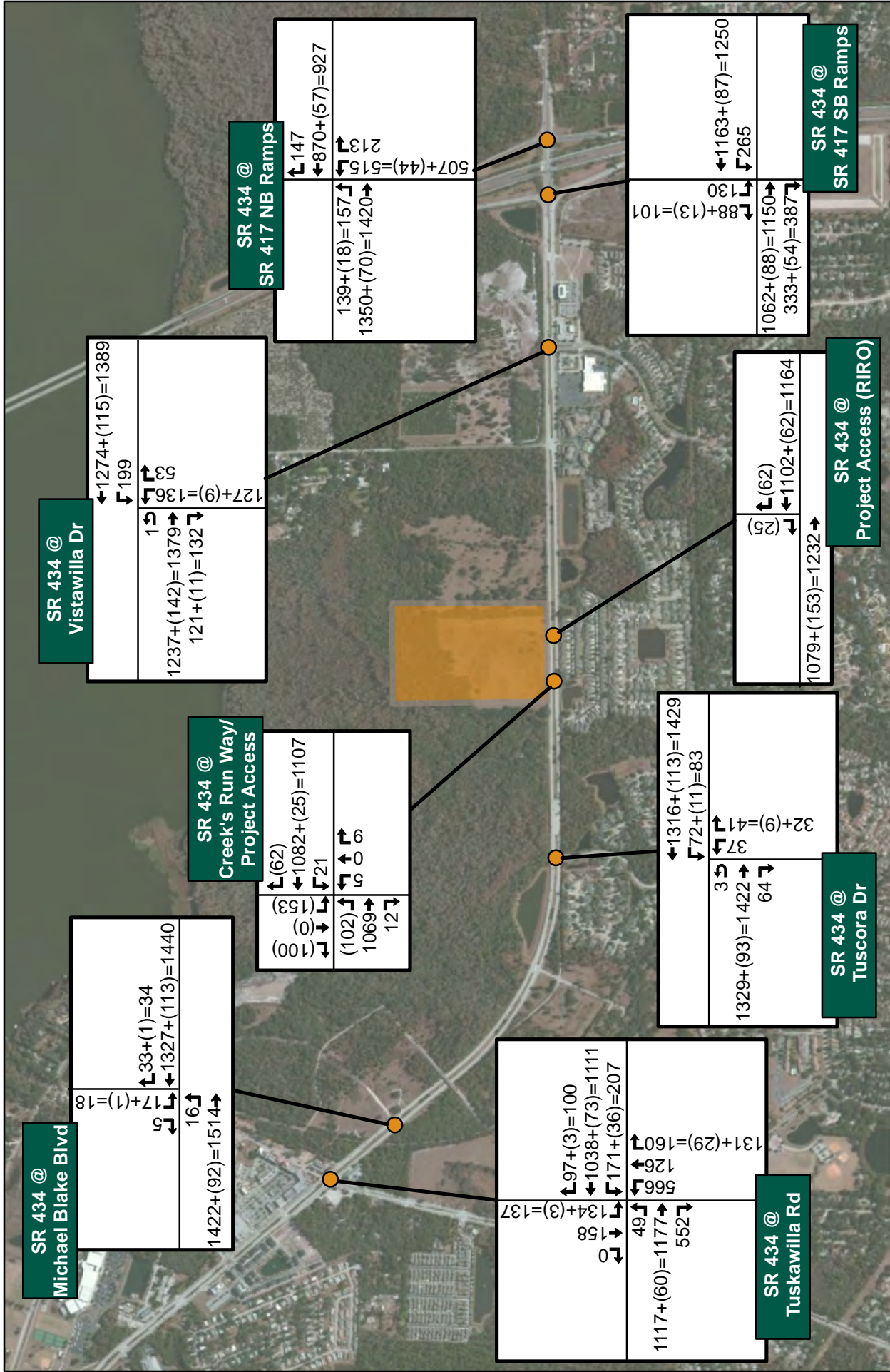
Flow Rate, v (veh/h)		26				0								17		16	
Capacity, c (veh/h)		569				551								194		462	
v/c Ratio		0.04				0.00								0.09		0.03	
95% Queue Length, Q ₉₅ (veh)		0.1				0.0								0.3		0.1	
Control Delay (s/veh)		11.6				11.5								25.3		13.1	
Level of Service (LOS)		B				B								D		B	
Approach Delay (s/veh)		0.2				0.0								19.4			
Approach LOS														C			

APPENDIX D

Model Distribution Plot

APPENDIX E

Approved Development Traffic Volumes



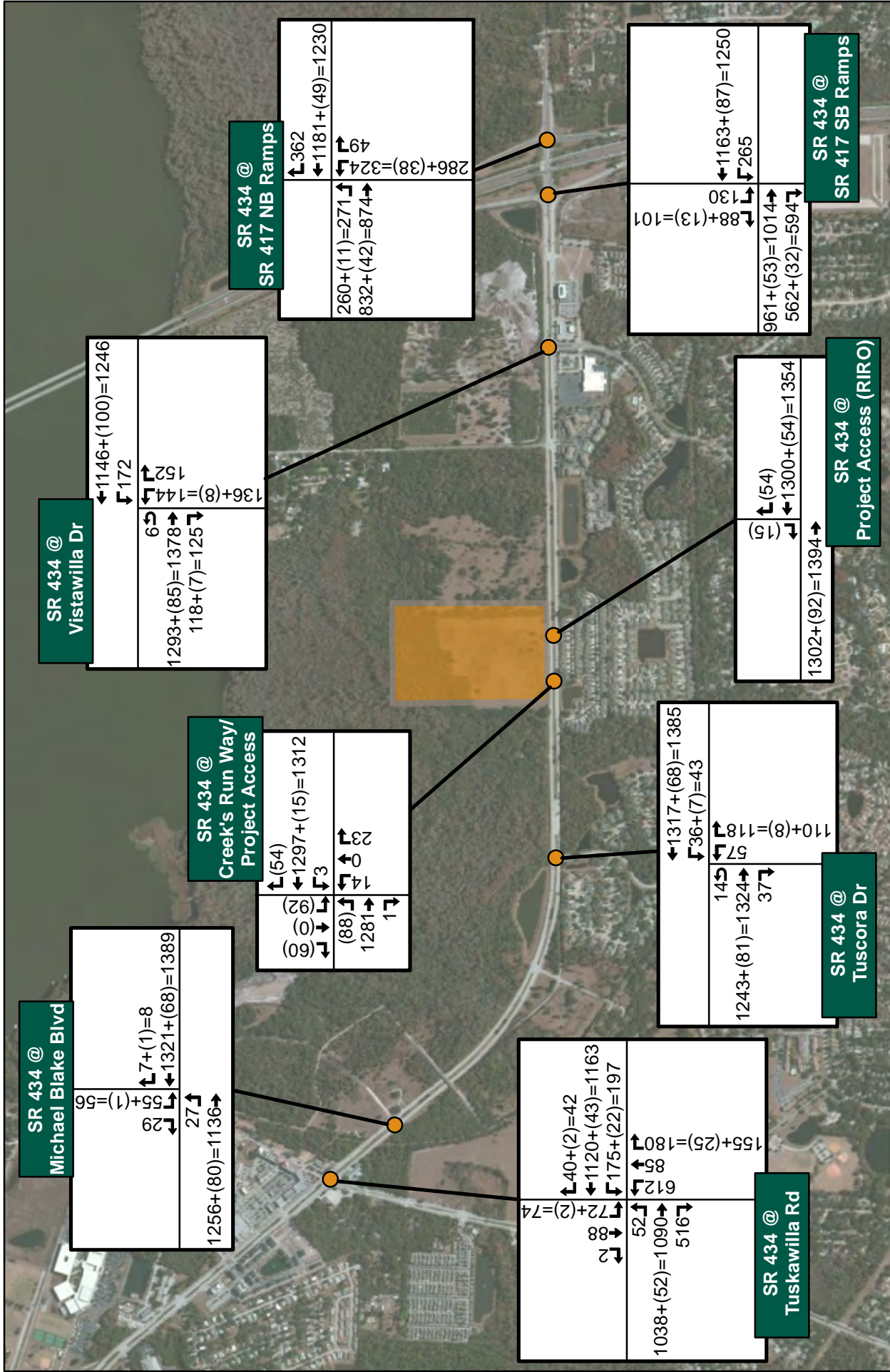
Project Site

Intersections Analysis

Background + (Project Trips) = Total Volume

Figure IV-2
Project Traffic
Assignment, PM Peak





Project Site

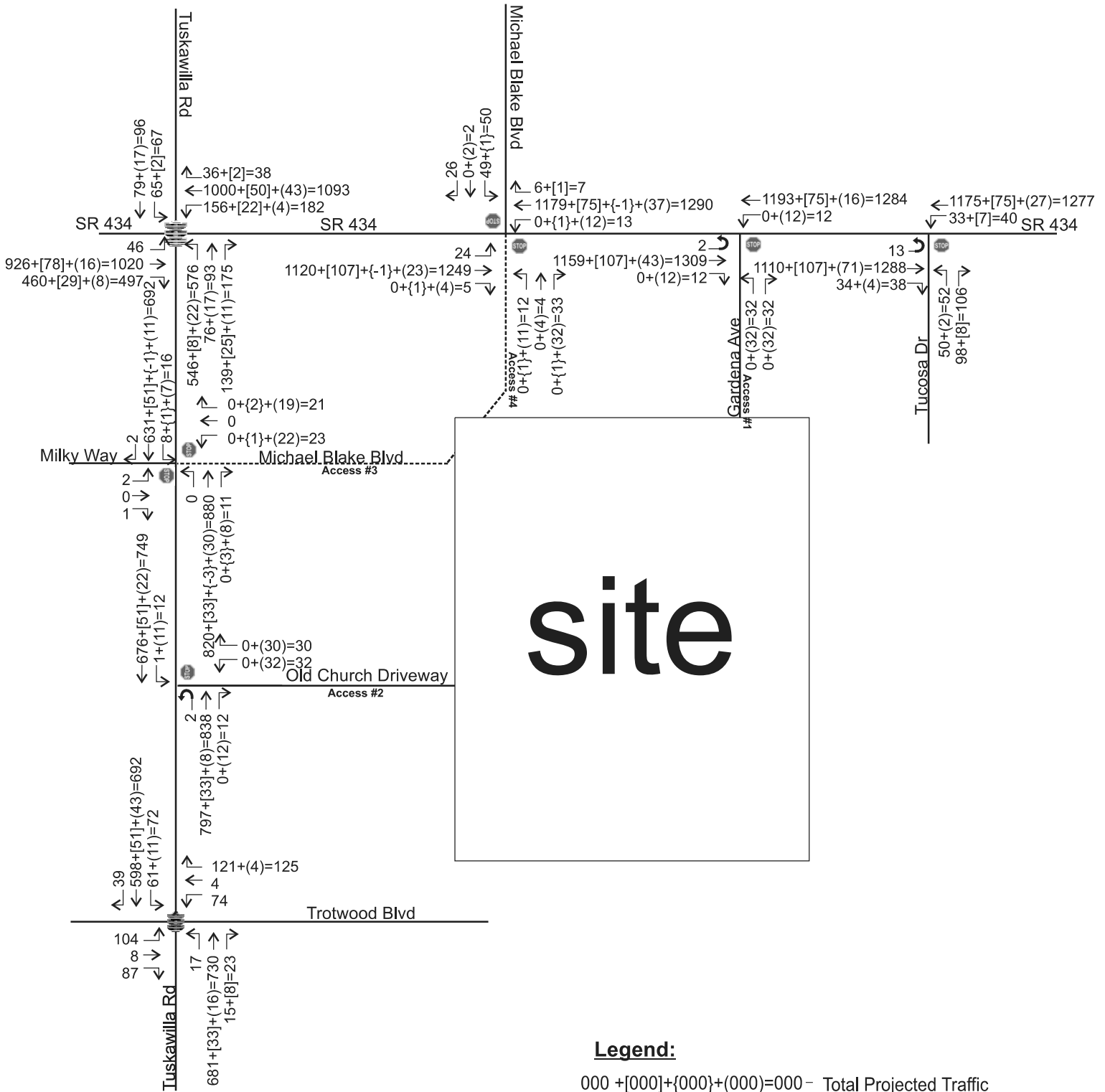
Intersections Analysis

Background + (Project Trips) = Total Volume



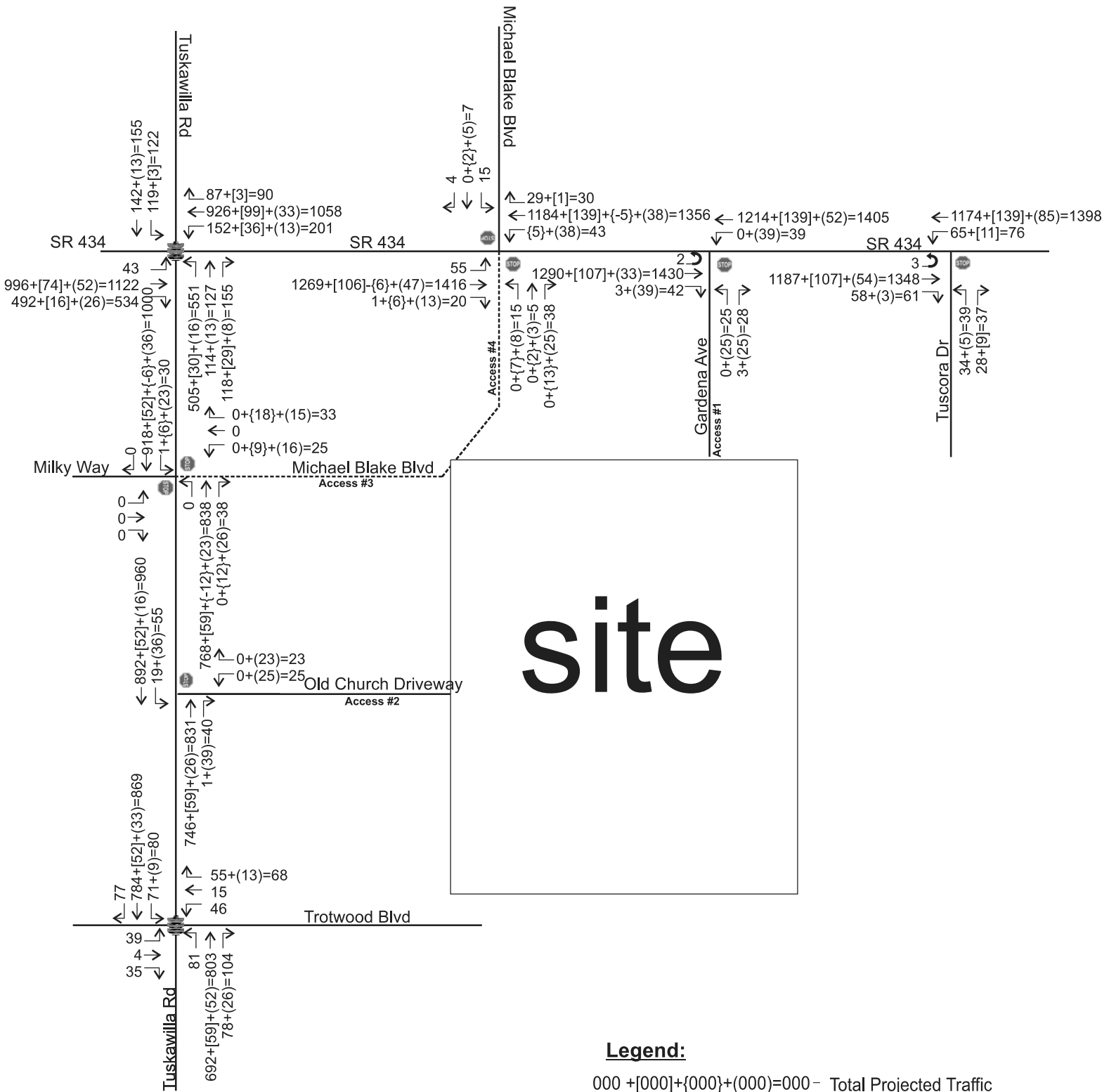
Figure IV-1
Project Traffic
Assignment, AM Peak





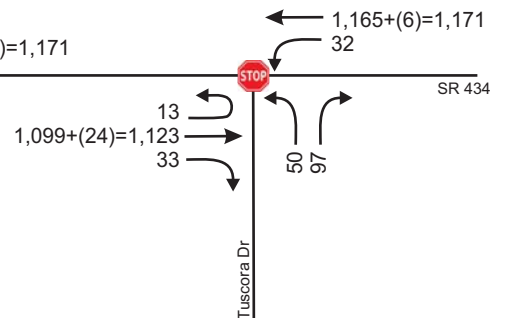
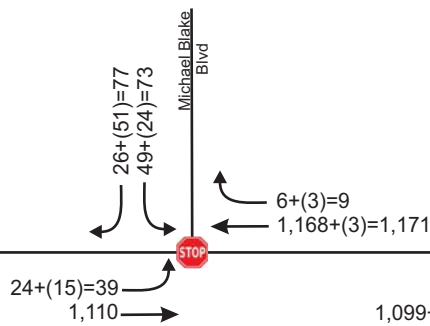
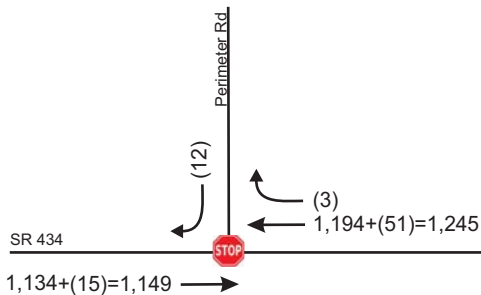
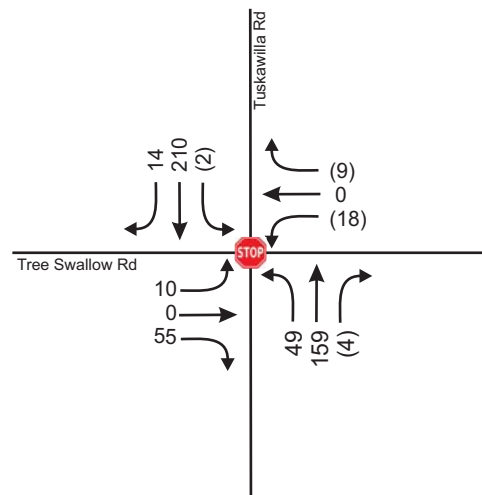
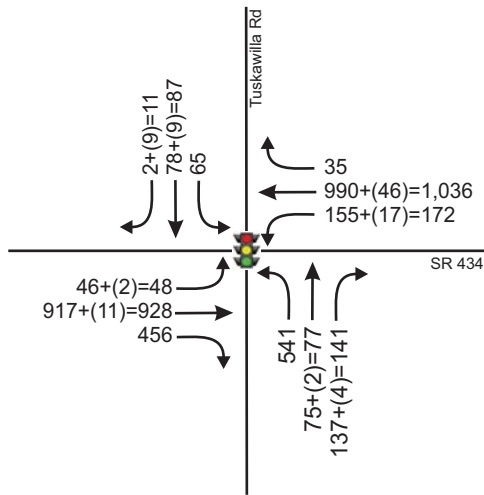
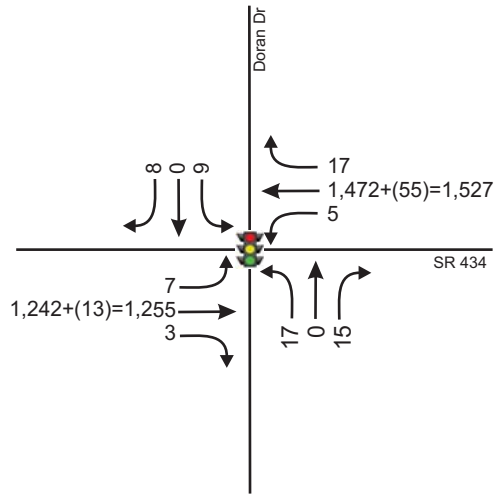
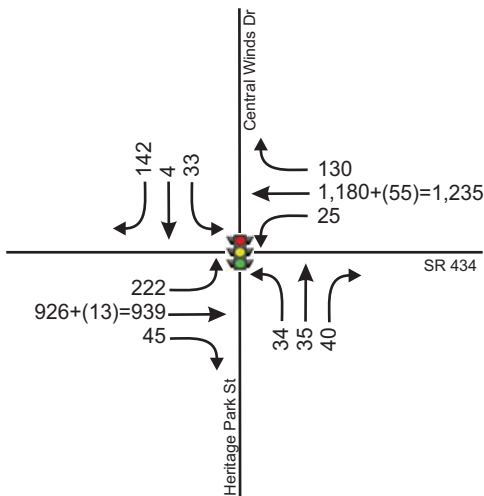
Legend:

- 000 +[000]+{000}+(000)=000 - Total Projected Traffic
- Project Trips
- Pass-by Trips
- Vested Trips
- Existing Traffic



Legend:

- 000 + [000] + {000} + (000) = 000 - Total Projected Traffic
- Project Trips
- Pass-by Trips
- Vested Trips
- Existing Traffic



Legend:
000 + (000) = 000
Total Traffic
Project Traffic
Background Traffic

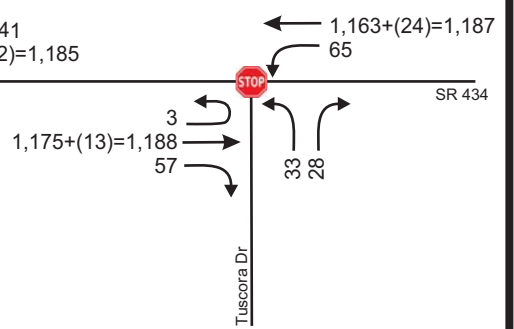
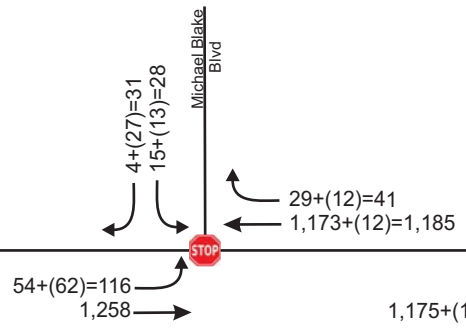
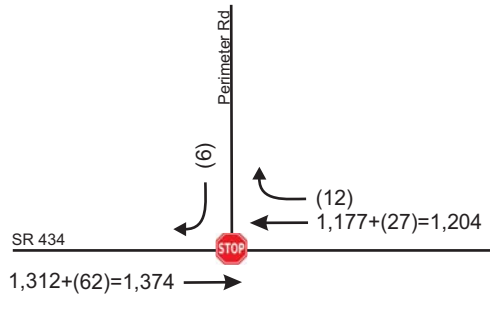
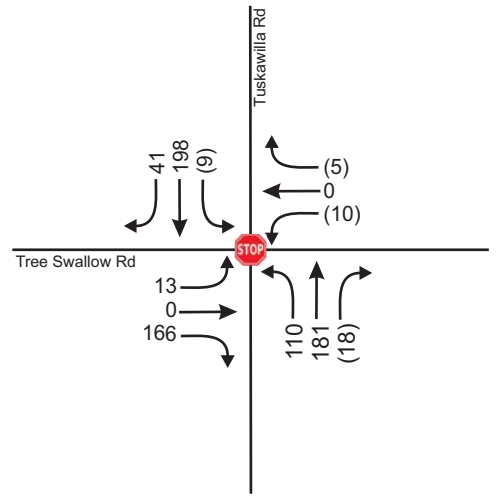
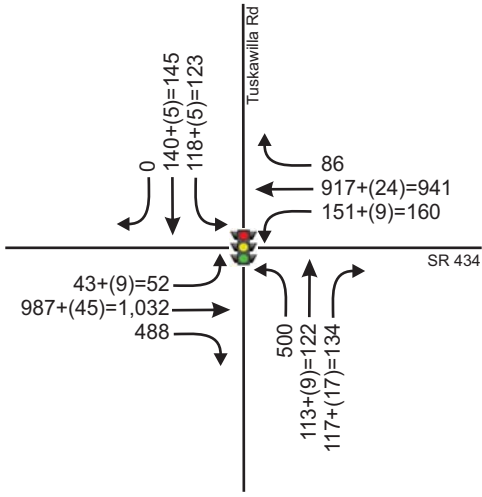
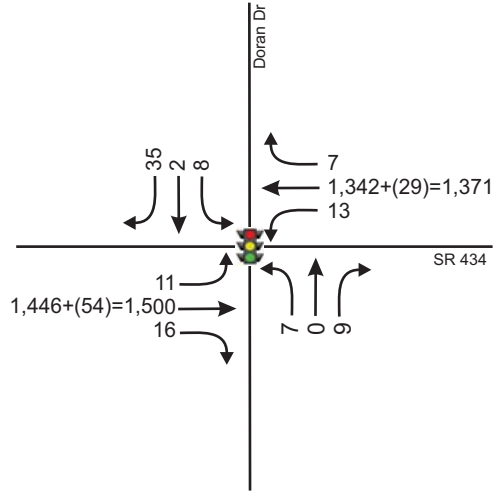
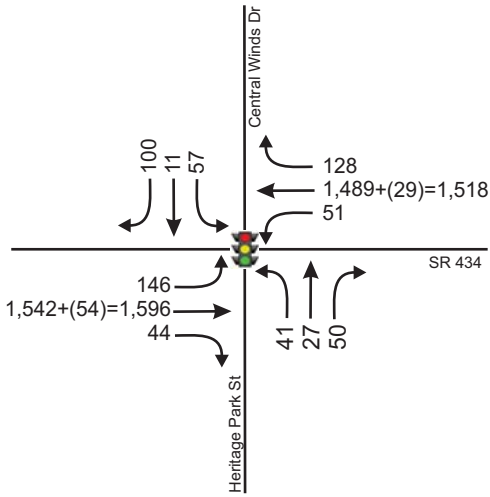


Winter Springs Apartments
Project No 4531.1

Figure 6

**Projected A.M. Peak Hour
Traffic Volumes**





Legend:
 000 + (000) = 000
 Total Traffic
 Project Traffic
 Background Traffic

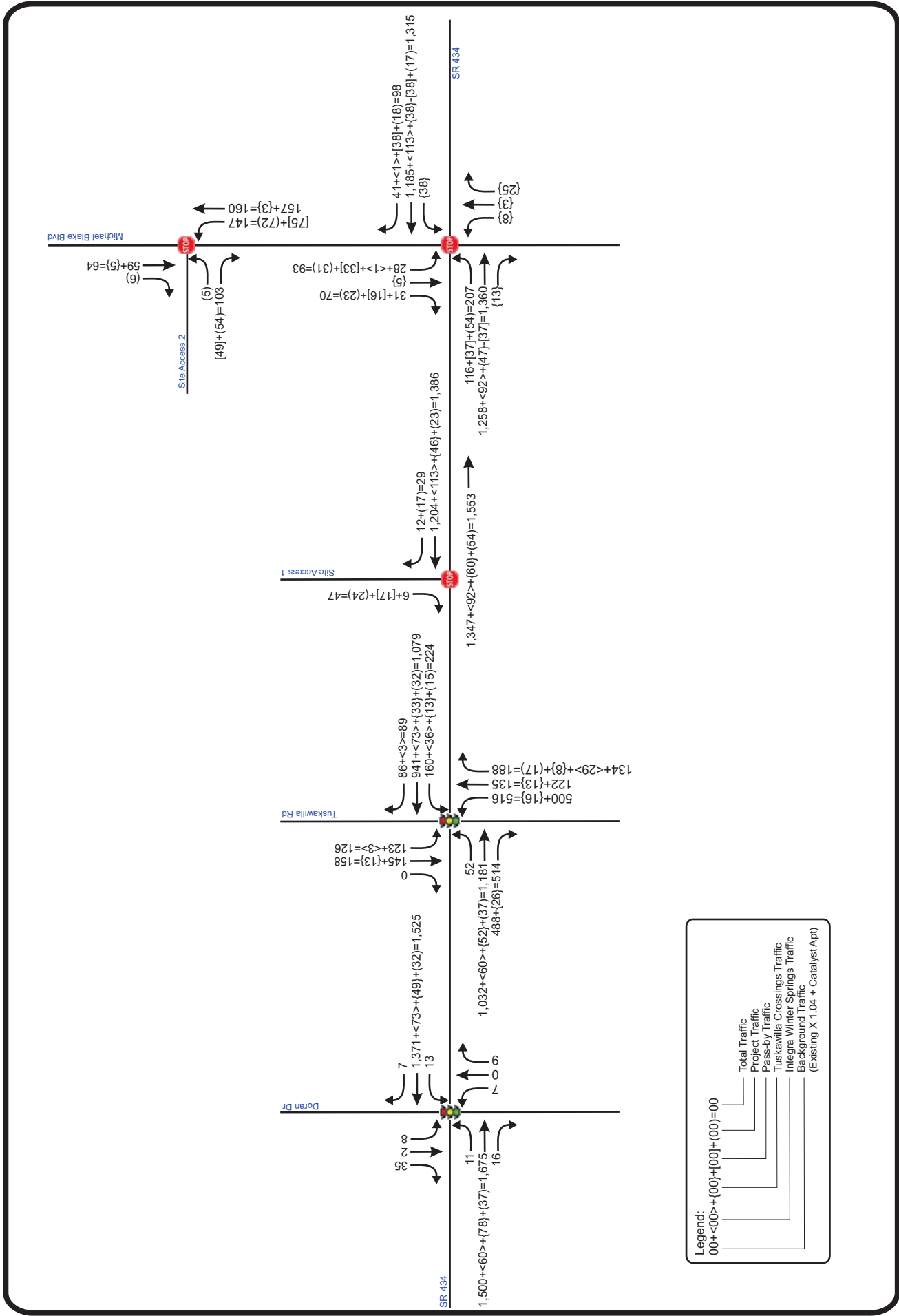


Winter Springs Apartments
 Project No 4531.1

Figure 7

**Projected P.M. Peak Hour
 Traffic Volumes**





Projected P.M. Peak Hour Traffic Volumes

Winter Springs Town Center Commercial Outparcels
 Project No 4887
 Figure 7



APPENDIX F

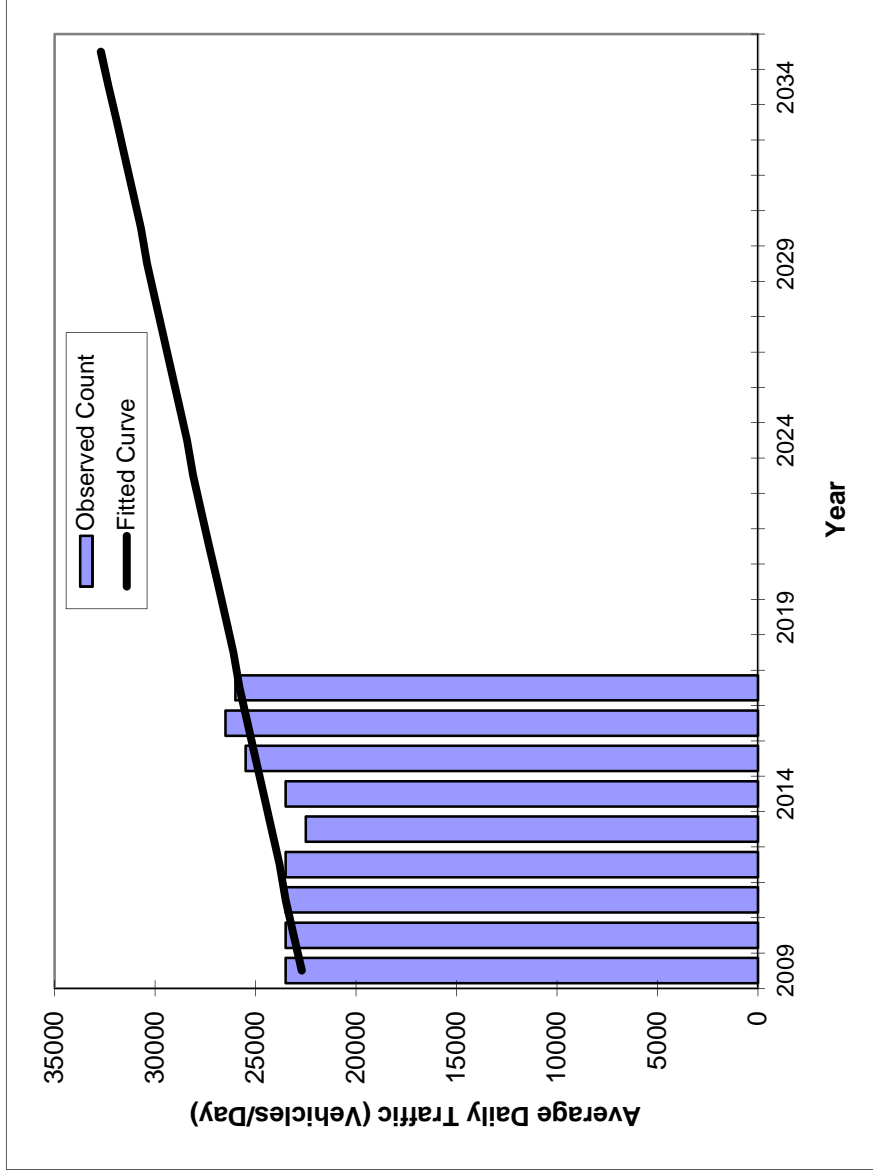
Trends Analysis

Traffic Trends - V3.0

SR 434 -- ON SR 434, 0.618 MI E OF TUSKAWILLA RD

FIN#	0
Location	1

County:	Seminole (77)
Station #:	0
Highway:	SR 434



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2009	23500	22700
2010	23500	23100
2011	23500	23500
2012	23500	23800
2013	22500	24200
2014	23500	24600
2015	25500	25000
2016	26500	25400
2017	26000	25800
2019 Opening Year Trend		
2019	N/A	26500
2020 Mid-Year Trend		
2020	N/A	26900
2021 Design Year Trend		
2021	N/A	27300
TRANPLAN Forecasts/Trends		

** Annual Trend Increase:	383
Trend R-squared:	56.68%
Trend Annual Historic Growth Rate:	1.71%
Trend Growth Rate (2017 to Design Year):	1.45%
Printed:	13-Nov-18
Straight Line Growth Option	

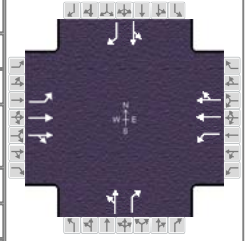
*Axle-Adjusted

APPENDIX G

HCS7 Capacity Analysis Worksheets
Projected Conditions

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	TPD, Inc.			Duration, h	0.25
Analyst	TPD, Inc.	Analysis Date	11/15/2018	Area Type	Other
Jurisdiction	Seminole County	Time Period	A.M. Peak Hour (Projected)	PHF	0.96
Urban Street	SR 434	Analysis Year	2018	Analysis Period	1 > 7:00
Intersection	SR 434 & Doran Drive	File Name	SR 434 & Doran Dr.xus		
Project Description	Lot 5-Townhomes				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	59	1493	4	7	1699	45	20	0	9	27	0	41

Signal Information				Signal Timing (s)									
Cycle, s	140.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	1.5	4.1	93.1	7.5	5.5	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.8	0.0	4.8	3.4	3.4	0.0			
				Red	2.3	0.0	2.0	3.8	3.8	0.0			

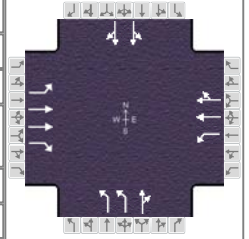
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		11.0		11.0
Phase Duration, s	12.7	104.0	8.6	99.9		12.7		14.7
Change Period, (Y+R _c), s	7.2	6.8	7.1	6.8		7.2		7.2
Max Allow Headway (MAH), s	4.0	0.0	4.0	0.0		4.4		4.5
Queue Clearance Time (g _s), s	3.5		2.2			3.6		5.6
Green Extension Time (g _e), s	0.2	0.0	0.0	0.0		0.1		0.2
Phase Call Probability	0.91		0.25			0.69		0.94
Max Out Probability	0.00		0.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	61	780	779	7	909	907		21	9		28	43
Adjusted Saturation Flow Rate (s), veh/h/ln	1795	1870	1869	1795	1870	1853		1795	1598		1795	1598
Queue Service Time (g _s), s	1.5	30.6	30.6	0.2	44.4	45.0		1.6	0.8		2.1	3.6
Cycle Queue Clearance Time (g _c), s	1.5	30.6	30.6	0.2	44.4	45.0		1.6	0.8		2.1	3.6
Green Ratio (g/C)	0.70	0.69	0.69	0.68	0.67	0.67		0.04	0.04		0.05	0.05
Capacity (c), veh/h	211	1299	1297	224	1244	1233		71	63		96	85
Volume-to-Capacity Ratio (X)	0.292	0.601	0.601	0.033	0.731	0.736		0.294	0.149		0.293	0.500
Back of Queue (Q), ft/ln (95 th percentile)	34.8	446	439.4	3.2	635.1	629.5		35.4	15.8		46.6	73.1
Back of Queue (Q), veh/ln (95 th percentile)	1.4	17.6	17.6	0.1	25.0	25.2		1.4	0.6		1.8	2.9
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
Uniform Delay (d ₁), s/veh	15.8	11.2	11.2	10.4	15.3	15.4		65.3	65.0		63.7	64.4
Incremental Delay (d ₂), s/veh	0.8	2.1	2.1	0.1	3.8	3.9		2.3	1.1		1.7	4.5
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Control Delay (d), s/veh	16.6	13.3	13.3	10.4	19.1	19.3		67.6	66.0		65.4	68.9
Level of Service (LOS)	B	B	B	B	B	B		E	E		E	E
Approach Delay, s/veh / LOS	13.4	B		19.2	B		67.1	E		67.5	E	
Intersection Delay, s/veh / LOS	17.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.87	B	1.88	B	2.33	B	2.32	B
Bicycle LOS Score / LOS	1.82	B	1.99	B	0.54	A	0.60	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TPD, Inc.			Duration, h	0.25		
Analyst	TPD, Inc.		Analysis Date	11/15/2018		Area Type	Other
Jurisdiction	Seminole County		Time Period	A.M. Peak Hour (Projected)		PHF	0.91
Urban Street	SR 434		Analysis Year	2019		Analysis Period	1 > 7:00
Intersection	SR 434 & Tuskawilla R...		File Name	SR 434 & Tuskawilla Rd.xus			
Project Description	Lot5 - Townhomes						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	42	923	455	181	1209	51	508	156	217	113	179	29

Signal Information																						
Cycle, s	140.0	Reference Phase	2																			
Offset, s	0	Reference Point	End																			
Uncoordinated	No	Simult. Gap E/W	On	Green	5.0	7.2	46.6	16.1	34.7	0.0	1			2			3			4		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.9	0.0	4.9	3.4	4.8	0.0	5			6			7			8		
				Red	2.4	0.0	2.0	4.1	3.9	0.0												

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	3.0	1.1	4.0		10.0		12.0
Phase Duration, s	12.3	53.5	19.5	60.7		43.4		23.6
Change Period, (Y+R _c), s	7.3	6.9	7.4	6.9		8.7		7.5
Max Allow Headway (MAH), s	4.0	0.0	4.0	0.0		5.1		5.0
Queue Clearance Time (g _s), s	4.3		11.9			35.3		16.0
Green Extension Time (g _e), s	0.0	0.0	0.2	0.0		0.0		0.1
Phase Call Probability	0.83		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		1.00

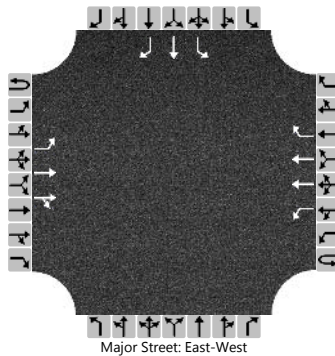
Movement Group Results	EB			WB			NB			SB														
	L	T	R	L	T	R	L	T	R	L	T	R												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14												
Adjusted Flow Rate (v), veh/h	46	1014	500	199	696	688	558	410		185		168												
Adjusted Saturation Flow Rate (s), veh/h/ln	1795	1781	1598	1795	1870	1843	1743	1706		1824		1823												
Queue Service Time (g _s), s	2.3	37.2	42.5	9.9	51.1	51.4	20.1	33.3		14.0		12.6												
Cycle Queue Clearance Time (g _c), s	2.3	37.2	42.5	9.9	51.1	51.4	20.1	33.3		14.0		12.6												
Green Ratio (g/C)	0.37	0.33	0.33	0.43	0.38	0.38	0.25	0.25		0.11		0.11												
Capacity (c), veh/h	117	1186	532	244	719	708	865	423		209		209												
Volume-to-Capacity Ratio (X)	0.395	0.855	0.939	0.815	0.969	0.972	0.645	0.968		0.882		0.803												
Back of Queue (Q), ft/ln (95 th percentile)	48.1	608.5	695.4	224.8	931.2	911.8	343.2	630.1		323.1		279.4												
Back of Queue (Q), veh/ln (95 th percentile)	1.9	24.0	27.6	8.9	36.7	36.5	13.6	25.0		12.9		11.2												
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00												
Uniform Delay (d ₁), s/veh	36.4	43.5	45.3	32.9	42.3	42.3	47.1	52.1		61.0		60.4												
Incremental Delay (d ₂), s/veh	2.2	8.0	26.6	15.4	26.8	27.5	1.9	35.6		32.2		20.0												
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0												
Control Delay (d), s/veh	38.5	51.5	71.9	48.3	69.1	69.9	49.0	87.6		93.3		80.4												
Level of Service (LOS)	D	D	E	D	E	E	D	F		F		F												
Approach Delay, s/veh / LOS	57.6			E			66.8			E			65.4			E			87.1			F		
Intersection Delay, s/veh / LOS	64.9												E											

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.30		B	1.93		B	2.33		B	2.46		B
Bicycle LOS Score / LOS	1.77		B	1.79		B	2.09		B	0.78		A

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	TPD, Inc.			Intersection	SR 434 & Michael Blvd		
Agency/Co.	TPD, Inc.			Jurisdiction	Seminole County		
Date Performed	12/04/2018			East/West Street	SR 434		
Analysis Year	2019			North/South Street	Michael Blvd		
Time Analyzed	A.M. Peak Hour (Pro.)			Peak Hour Factor	0.93		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Lot5 - Townhomes						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	1	2	0	0	1	2	1		0	0	0		1	1	1
Configuration		L	T	TR		L	T	R						L	T	R
Volume (veh/h)	0	126	1165	4	0	12	1336	44						155	2	118
Percent Heavy Vehicles (%)	1	1			1	1								1	3	1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type Storage	Left + Thru								3							

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1								7.5	6.5	6.9
Critical Headway (sec)		4.12				4.12								7.52	6.56	6.92
Base Follow-Up Headway (sec)		2.2				2.2								3.5	4.0	3.3
Follow-Up Headway (sec)		2.21				2.21								3.51	4.03	3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		135				13								167	2	127	
Capacity, c (veh/h)		454				555								116	98	374	
v/c Ratio		0.30				0.02								1.44	0.02	0.34	
95% Queue Length, Q ₉₅ (veh)		1.2				0.1								11.7	0.1	1.5	
Control Delay (s/veh)		16.3				11.6								309.3	42.6	19.5	
Level of Service (LOS)		C				B								F	E	C	
Approach Delay (s/veh)		1.6				0.1								183.0			
Approach LOS														F			

HCS7 Roundabouts Report

General Information				Site Information			
Analyst	TPD, Inc.			Intersection	Micheal Blvd & Site Acces		
Agency or Co.	TPD, Inc.			E/W Street Name	Site Acces(Tree Swallow R		
Date Performed	11/15/2018			N/S Street Name	Micheal Blvd		
Analysis Year	2018			Analysis Time Period (hrs)	0.25		
Time Analyzed	A.M. Peak Hour (Pro.)			Peak Hour Factor	0.92		
Project Description	Lot5-Townhomes			Jurisdiction	Seminole County		

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	7	0	74	0	18	0	0	0	97	72	5	0	0	183	8
Percent Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Flow Rate (v _{pc}), pc/h	0	8	0	81	0	20	0	0	0	106	79	5	0	0	201	9
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

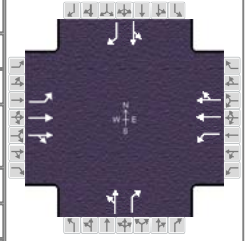
Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		89.00			20.00			190.00			210.00	
Entry Volume veh/h		88.12			19.80			188.12			207.92	
Circulating Flow (v _c), pc/h	221			193			8			126		
Exiting Flow (v _{ex}), pc/h	5			115			87			302		
Capacity (c _{pce}), pc/h		1101.49			1133.40			1368.78			1213.57	
Capacity (c), veh/h		1090.59			1122.18			1355.23			1201.55	
v/c Ratio (x)		0.08			0.02			0.14			0.17	

Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.0			3.4			3.8			4.5	
Lane LOS		A			A			A			A	
95% Queue, veh		0.3			0.1			0.5			0.6	
Approach Delay, s/veh	4.0			3.4			3.8			4.5		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	4.1						A					

HCS7 Signalized Intersection Results Summary

General Information					Intersection Information			
Agency	TPD, Inc.				Duration, h	0.25		
Analyst	TPD, Inc.		Analysis Date	11/15/2018	Area Type	Other		
Jurisdiction	Seminole County		Time Period	P.M. Peak Hour (Projected)	PHF	0.97		
Urban Street	SR 434		Analysis Year	2019	Analysis Period	1 > 7:00		
Intersection	SR 434 & Doran Drive		File Name	SR 434 & Doran Dr.xus				
Project Description	Lot 5-Townhomes							



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	131	2115	11	26	1556	26	10	4	11	40	0	42

Signal Information														
Cycle, s	140.0	Reference Phase	2											
Offset, s	0	Reference Point	End											
Uncoordinated	No	Simult. Gap E/W	On	Green	3.9	2.2	92.9	7.7	5.1	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.8	0.0	4.8	3.4	3.4	0.0				
				Red	2.3	0.0	2.0	3.8	3.8	0.0				

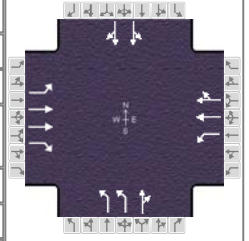
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		11.0		11.0
Phase Duration, s	13.2	101.8	11.0	99.7		12.3		14.9
Change Period, (Y+R _c), s	7.2	6.8	7.1	6.8		7.2		7.2
Max Allow Headway (MAH), s	4.0	0.0	4.0	0.0		4.4		4.5
Queue Clearance Time (g _s), s	5.3		2.7			3.1		5.7
Green Extension Time (g _e), s	0.4	0.0	0.1	0.0		0.1		0.3
Phase Call Probability	0.99		0.65			0.63		0.96
Max Out Probability	0.00		0.00			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	135	1096	1096	27	817	814		14	11		41	43
Adjusted Saturation Flow Rate (s), veh/h/ln	1795	1870	1867	1795	1870	1859		1820	1598		1795	1598
Queue Service Time (g _s), s	3.3	63.6	63.9	0.7	36.5	36.7		1.1	1.0		3.1	3.7
Cycle Queue Clearance Time (g _c), s	3.3	63.6	63.9	0.7	36.5	36.7		1.1	1.0		3.1	3.7
Green Ratio (g/C)	0.71	0.68	0.68	0.69	0.66	0.66		0.04	0.04		0.06	0.06
Capacity (c), veh/h	253	1270	1267	139	1241	1233		66	58		99	88
Volume-to-Capacity Ratio (X)	0.535	0.863	0.865	0.193	0.658	0.660		0.219	0.196		0.417	0.493
Back of Queue (Q), ft/ln (95 th percentile)	77.7	885.9	874.6	21.4	535.8	526.9		24.5	19.3		69.2	73.8
Back of Queue (Q), veh/ln (95 th percentile)	3.1	34.9	35.0	0.8	21.1	21.1		1.0	0.8		2.7	2.9
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
Uniform Delay (d ₁), s/veh	15.1	17.4	17.5	23.8	14.1	14.1		65.5	65.5		64.0	64.3
Incremental Delay (d ₂), s/veh	1.8	7.9	8.0	0.7	2.7	2.8		1.7	1.6		2.8	4.2
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Control Delay (d), s/veh	16.8	25.3	25.5	24.5	16.8	16.9		67.2	67.1		66.8	68.5
Level of Service (LOS)	B	C	C	C	B	B		E	E		E	E
Approach Delay, s/veh / LOS	24.9	C		17.0	B		67.2	E		67.6	E	
Intersection Delay, s/veh / LOS	22.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.88	B	1.88	B	2.33	B	2.32	B
Bicycle LOS Score / LOS	2.41	B	1.86	B	0.53	A	0.63	A

HCS7 Signalized Intersection Results Summary

General Information					Intersection Information			
Agency	TPD, Inc.				Duration, h	0.25		
Analyst	TPD, Inc.		Analysis Date	11/15/2018	Area Type	Other		
Jurisdiction	Seminole County		Time Period	P.M. Peak Hour (Projected)	PHF	0.96		
Urban Street	SR 434		Analysis Year	2019	Analysis Period	1 > 7:00		
Intersection	SR 434 & Tuskawilla R...		File Name	SR 434 & Tuskawilla Rd.xus				
Project Description	Lot5 - Townhomes							



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	58	1155	611	263	1037	66	484	151	232	138	160	37

Signal Information													
Cycle, s	144.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	5.5	1.8	50.1	16.9	31.9	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.9	4.8	4.9	3.4	4.8	0.0			
				Red	2.4	2.6	2.0	4.1	3.9	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	3.0	1.1	4.0		10.0		12.0
Phase Duration, s	12.8	57.0	22.0	66.2		40.6		24.4
Change Period, (Y+R _c), s	7.3	6.9	7.4	6.9		8.7		7.5
Max Allow Headway (MAH), s	4.0	0.0	4.0	0.0		5.3		5.2
Queue Clearance Time (g _s), s	5.1		16.6			33.9		16.3
Green Extension Time (g _e), s	0.1	0.0	0.0	0.0		0.0		0.6
Phase Call Probability	0.91		1.00			1.00		1.00
Max Out Probability	0.00		1.00			1.00		1.00

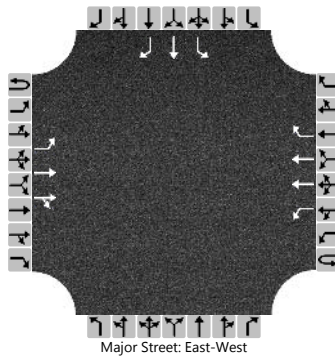
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	60	1203	636	274	580	568	504	399		183		166
Adjusted Saturation Flow Rate (s), veh/h/ln	1795	1781	1598	1795	1870	1831	1743	1700		1814		1810
Queue Service Time (g _s), s	3.1	47.9	50.1	14.6	38.1	38.1	18.9	31.9		14.3		12.9
Cycle Queue Clearance Time (g _c), s	3.1	47.9	50.1	14.6	38.1	38.1	18.9	31.9		14.3		12.9
Green Ratio (g/C)	0.39	0.35	0.35	0.46	0.41	0.41	0.22	0.22		0.12		0.12
Capacity (c), veh/h	184	1239	556	239	771	754	774	377		212		212
Volume-to-Capacity Ratio (X)	0.329	0.971	1.145	1.146	0.753	0.754	0.652	1.058		0.861		0.784
Back of Queue (Q), ft/ln (95 th percentile)	61.9	808.7	1147.5	582.4	640.7	620.8	338.8	721.9		318.5		278.4
Back of Queue (Q), veh/ln (95 th percentile)	2.5	31.8	45.5	23.1	25.2	24.8	13.4	28.6		12.7		11.1
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00
Uniform Delay (d ₁), s/veh	31.9	46.2	47.0	44.5	36.1	36.1	51.0	56.0		62.4		61.8
Incremental Delay (d ₂), s/veh	1.0	19.5	85.0	103.1	6.7	6.9	2.2	62.5		24.4		14.9
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Control Delay (d), s/veh	32.9	65.8	132.0	147.6	42.8	43.0	53.2	118.5		86.9		76.7
Level of Service (LOS)	C	E	F	F	D	D	D	F		F		E
Approach Delay, s/veh / LOS	86.9			F			63.1			E		
Intersection Delay, s/veh / LOS	78.2						E					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.29		B	1.93		B	2.33		B	2.46		B
Bicycle LOS Score / LOS	2.06		B	1.66		B	1.98		B	0.78		A

HCS7 Two-Way Stop-Control Report

General Information				Site Information			
Analyst	TPD, Inc.			Intersection	SR 434 & Michael Blvd		
Agency/Co.	TPD, Inc.			Jurisdiction	Seminole County		
Date Performed	12/04/2018			East/West Street	SR 434		
Analysis Year	2019			North/South Street	Michael Blvd		
Time Analyzed	P.M. Peak Hour (Projecte)			Peak Hour Factor	0.94		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Lot5 - Townhomes						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	1		0	0	0		1	1	1
Configuration		L	T	TR		L	T	R						L	T	R
Volume (veh/h)	0	164	1201	13	0	38	1288	119						71	5	79
Percent Heavy Vehicles (%)	1	1			1	1								1	1	1
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized					No								No			
Median Type Storage	Left + Thru								3							

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1								7.5	6.5	6.9
Critical Headway (sec)		4.12				4.12								7.52	6.52	6.92
Base Follow-Up Headway (sec)		2.2				2.2								3.5	4.0	3.3
Follow-Up Headway (sec)		2.21				2.21								3.51	4.01	3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		174				40								76	5	84	
Capacity, c (veh/h)		449				538								93	54	393	
v/c Ratio		0.39				0.08								0.81	0.10	0.21	
95% Queue Length, Q ₉₅ (veh)		1.8				0.2								4.3	0.3	0.8	
Control Delay (s/veh)		18.0				12.2								126.3	79.6	16.6	
Level of Service (LOS)		C				B								F	F	C	
Approach Delay (s/veh)		2.1				0.3								68.9			
Approach LOS														F			

HCS7 Roundabouts Report

General Information					Site Information				
Analyst	TPD, Inc.				Intersection	Micheal Blvd & Site Acces			
Agency or Co.	TPD, Inc.				E/W Street Name	Site Acces(Tree Swallow R			
Date Performed	11/15/2018				N/S Street Name	Micheal Blvd			
Analysis Year	2018				Analysis Time Period (hrs)	0.25			
Time Analyzed	P.M. Peak Hour (Pro.)				Peak Hour Factor	0.92			
Project Description	Lot5-Townhomes				Jurisdiction	Seminole County			

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	5	0	103	0	10	0	0	0	72	258	18	0	0	118	6
Percent Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Flow Rate (v _{pc}), pc/h	0	5	0	113	0	11	0	0	0	79	283	20	0	0	130	7
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		118.00			11.00			382.00			137.00	
Entry Volume veh/h		116.83			10.89			378.22			135.64	
Circulating Flow (v _c), pc/h	141			367			5			90		
Exiting Flow (v _{ex}), pc/h	20			86			288			254		
Capacity (c _{pc}), pc/h		1195.14			949.09			1372.98			1258.96	
Capacity (c), veh/h		1183.31			939.69			1359.38			1246.49	
v/c Ratio (x)		0.10			0.01			0.28			0.11	

Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		3.9			3.9			5.1			3.8	
Lane LOS		A			A			A			A	
95% Queue, veh		0.3			0.0			1.1			0.4	
Approach Delay, s/veh	3.9			3.9			5.1			3.8		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	4.6						A					

DFC SEMINOLE CROSSING LLC

January 21, 2019

St. Johns River Water Management District
Maitland Service Center
601 South Lake Destiny Road, Suite 200
Maitland, FL 32751

**RE: Winter Springs Town Center – Townhomes
Environmental Resource Permit – Minor Modification**

To whom it may concern,

DFC Seminole Crossings LLC is the owner of 8.35± acres of land within the Winter Springs Town Center and is proposing to construct 114 townhome units within 20 buildings along with the associated sidewalks and roadway infrastructure. The site is currently undeveloped, but falls entirely within a previously approved master storm Environmental Resource Permit, **95027-2**. The master permit also included St. John's River Water Management District and Army Corps of Engineers jurisdictional wetlands that were mitigated for in the Bergmann Mitigation Tract.

Several developments have been previously approved and are currently under construction within the master permit area and the master storm treatment area / pond has been fully constructed. The master permit was approved with a total land area of 38.43 acres, with a total proposed impervious area of 30.01 acres.

The following construction project modifications have been approved:

Permit #	Project Name	Total Area	Impervious Area
95027-9	Winter Springs Town Center, Phase II (Apts)	12.83 ac	9.211 ac
95027-10	Starbucks – WSTC PH2 Commercial	2.79 ac	0.738 ac
95027-11	WSTC Public Parking Lot	2.196 ac	1.222 ac
		17.82 ac	11.216 ac

Project Name	Total Area	Impervious Area	Ratio
Master Approved Permit	38.43 ac	30.01 ac	78.1%
Previously Approved Projects	15.74 ac*	11.216 ac	62.9%
Remaining Areas within Permit Area	22.69 ac	18.79 ac	82.8%

* Area reduced to accommodate additional 2.08 acres of potential development within the permit area
This area was previously only mass graded. 17.82 ac – 2.08 ac = 15.74 ac

In the above calculations, there is about 18.79 ac of impervious area (approx. 82.8%) still available for development. The current Townhome project proposed 6.35 acres of impervious area (approx. 76.1%). Adding this project area into the overall calculation results in the following:

Project Name	Total Area	Impervious Area	Ratio
Master Approved Permit	38.43 ac	30.01 ac	78.1%
Previously Approved Projects	15.74 ac	11.216 ac	62.9%
Townhome Project	8.35 ac	6.35 ac	76.1%
Remaining Areas within Permit Area	14.34 ac	12.44 ac	86.8%

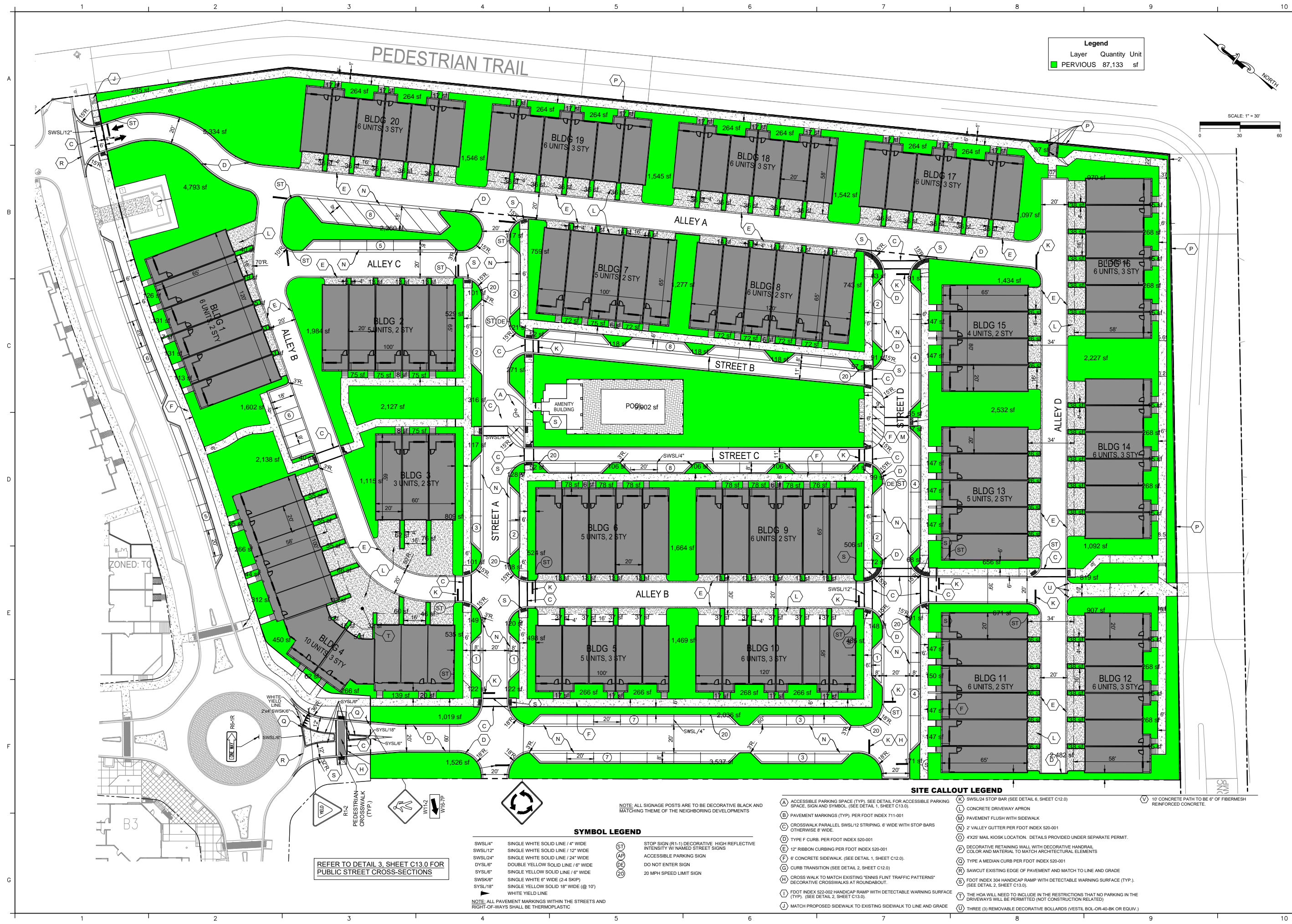
As demonstrated in the above table, the proposed Townhome project meets the impervious area requirements of the master permit. Furthermore, the remaining impervious area percentage of 86.8% exceeds the original ratio of 78.1%, resulting in future flexibility for the remainder of the master project buildout.

Respectfully Submitted,

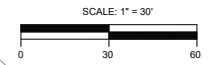
Engineering Consultant on behalf of **DFC Seminole Crossing LLC**



Franklin A. Porter, PE
Managing Technical Director / Civil Engineering | VP
NV5, Inc.
Florida P.E. Lic. No. 69092



Legend		
Layer	Quantity	Unit
PERVIOUS	87,133	sf



JOB #: 17063.20
 PROJECT: WINTER SPRINGS TOWNHOMES
 ENGINEER: FRANK A. PORTER, P.E.
 DATE: Jan. 31, 2019

WINTER SPRINGS TOWNHOMES
 MICHAEL BLAKE BLVD.
 WINTER SPRINGS, FLORIDA
 DREAM FINDERS HOMES LLC

SITE LAYOUT PLAN

201 S. BUMBAY AVE.
 ORLANDO, FL 32837
 WWW.NV5.COM

NV5
 CERTIFICATE OF AUTHORIZATION # 20065

SHEET: C06.0

REFER TO DETAIL 3, SHEET C13.0 FOR PUBLIC STREET CROSS-SECTIONS

SYMBOL LEGEND

SWSL4"	SINGLE WHITE SOLID LINE / 4" WIDE	(ST)	STOP SIGN (R1-1) DECORATIVE, HIGH REFLECTIVE INTENSITY W/ NAMED STREET SIGNS
SWSL12"	SINGLE WHITE SOLID LINE / 12" WIDE	(AP)	ACCESSIBLE PARKING SIGN
SWSL24"	SINGLE WHITE SOLID LINE / 24" WIDE	(DE)	DO NOT ENTER SIGN
DYSL6"	DOUBLE YELLOW SOLID LINE / 6" WIDE	(20)	20 MPH SPEED LIMIT SIGN
SYSL6"	SINGLE YELLOW SOLID LINE / 6" WIDE		
SWK6"	SINGLE WHITE 6" WIDE (2-4 SKIP)		
SYSL18"	SINGLE YELLOW SOLID 18" WIDE (@ 10')		
	WHITE YELLOW LINE		

NOTE: ALL SIGNAGE POSTS ARE TO BE DECORATIVE BLACK AND MATCHING THEME OF THE NEIGHBORING DEVELOPMENTS

SITE CALLOUT LEGEND

- | | | | |
|-----|---|-----|--|
| (A) | ACCESSIBLE PARKING SPACE (TYP). SEE DETAIL FOR ACCESSIBLE PARKING SPACE, SIGN AND SYMBOL. (SEE DETAIL 1, SHEET C13.0) | (K) | SWSL24 STOP BAR (SEE DETAIL 6, SHEET C12.0) |
| (B) | PAVEMENT MARKINGS (TYP). PER FDOT INDEX 711-001 | (L) | CONCRETE DRIVEWAY APRON |
| (C) | CROSSWALK PARALLEL SWSL12 STRIPING, 6" WIDE WITH STOP BARS OTHERWISE 8" WIDE. | (M) | PAVEMENT FLUSH WITH SIDEWALK |
| (D) | TYPE F CURB. PER FDOT INDEX 520-001 | (N) | 2" VALLEY GUTTER PER FDOT INDEX 520-001 |
| (E) | 12" RIBBON CURBING PER FDOT INDEX 520-001 | (O) | 4X25" MAIL KIOSK LOCATION. DETAILS PROVIDED UNDER SEPARATE PERMIT. |
| (F) | 6" CONCRETE SIDEWALK. (SEE DETAIL 1, SHEET C12.0). | (P) | DECORATIVE RETAINING WALL WITH DECORATIVE HANDRAIL COLOR AND MATERIAL TO MATCH ARCHITECTURAL ELEMENTS |
| (G) | CURB TRANSITION (SEE DETAIL 2, SHEET C12.0) | (R) | TYPE A MEDIAN CURB PER FDOT INDEX 520-001 |
| (H) | CROSS WALK TO MATCH EXISTING "ENNIS FLINT TRAFFIC PATTERNS" DECORATIVE CROSSWALKS AT ROUNDABOUT. | (S) | SAWCUT EXISTING EDGE OF PAVEMENT AND MATCH TO LINE AND GRADE |
| (I) | FDOT INDEX 522-002 HANDICAP RAMP WITH DETECTABLE WARNING SURFACE (TYP). (SEE DETAIL 2, SHEET C13.0). | (T) | FDOT INDEX 304 HANDICAP RAMP WITH DETECTABLE WARNING SURFACE (TYP). (SEE DETAIL 2, SHEET C13.0). |
| (J) | MATCH PROPOSED SIDEWALK TO EXISTING SIDEWALK TO LINE AND GRADE | (U) | THE HOA WILL NEED TO INCLUDE IN THE RESTRICTIONS THAT NO PARKING IN THE DRIVEWAYS WILL BE PERMITTED (NOT CONSTRUCTION RELATED) |
| | | (V) | THREE (3) REMOVABLE DECORATIVE BOLLARDS (VESTIBOL-BOL-OR-40-BK OR EQUIV.) |

(V) 10' CONCRETE PATH TO BE 6" OF FIBERMESH REINFORCED CONCRETE.

NOTE: ALL PAVEMENT MARKINGS WITHIN THE STREETS AND RIGHT-OF-WAYS SHALL BE THERMOPLASTIC



March 7, 2019

Mr. Bryant Smith, PE
City Engineer
City of Winter Springs
1126 East State Road 434

RE: Winter Springs Town Center Townhomes – Parking Requirements

Dear Bryant:

For our townhomes projects with 2-car garage components we have found that a parking count of 2 spaces per townhome unit is adequate to service the development.

The proposed Winter Springs Townhomes project consists of 114 townhome units, which would require 228 spaces. Per City code, each 2-car garage is counted as 1 space, giving 114 garage spaces. The remainder of the development provides 115 spaces of surface parking along streets and pockets of parking areas distributed through the project area, resulting in a total of 229 parking spaces, or a 2.01 ratio.

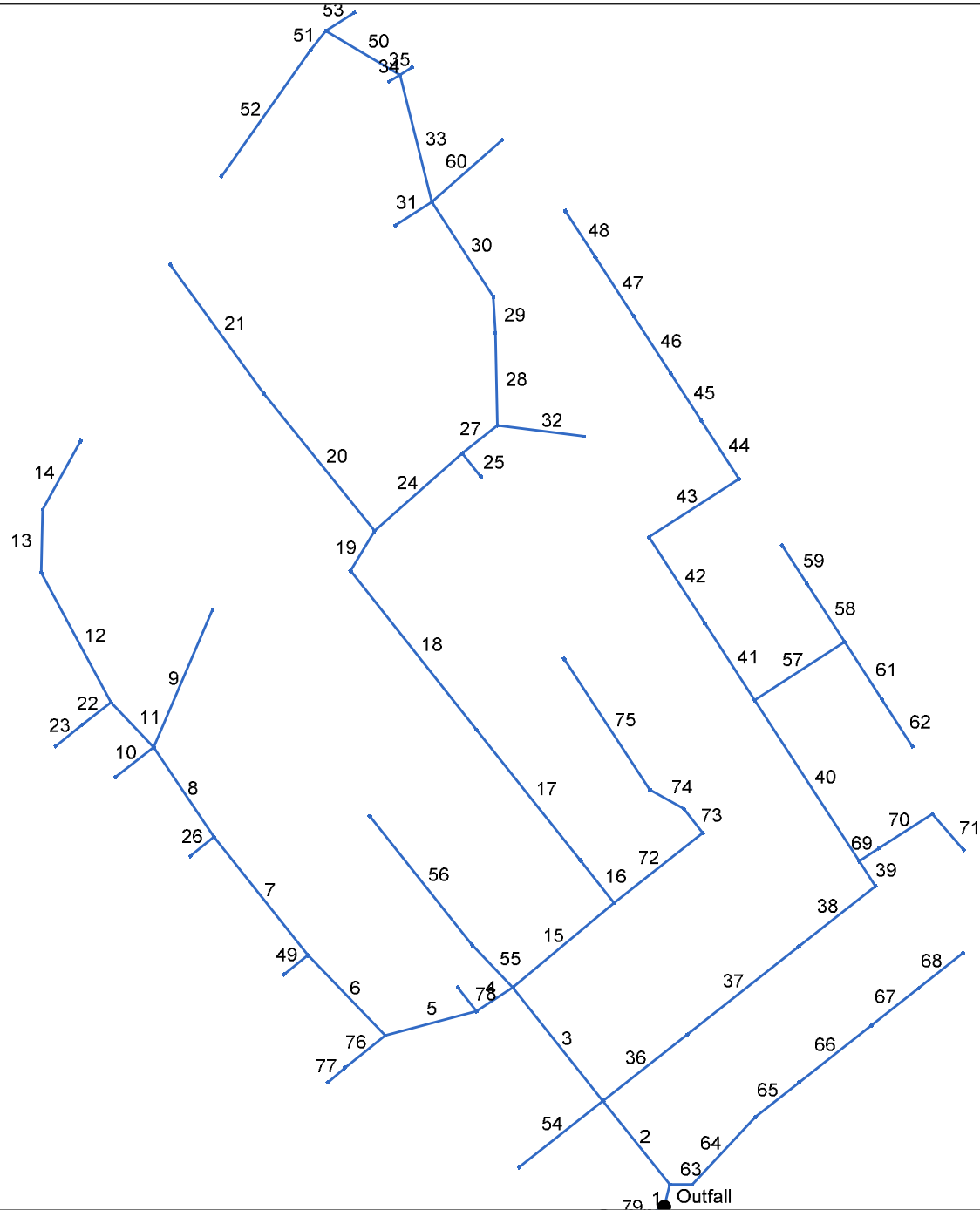
Please do not hesitate to contact me if I may provide additional information or be of any assistance in any manner.

Sincerely,

A handwritten signature in blue ink, appearing to be 'Dan Edwards', written in a cursive style.

Dan Edwards
Vice President of Land – Central Florida

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: PROPOSED STORM.stm

Number of lines: 80

Date: 7/29/2019

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	16.500	-75.692	Genr	0.00	0.00	0.80	15.0	9.83	20.18	13.16	60	Cir	0.012	1.46	19.55	Pipe 47
2	1	77.028	-52.860	Genr	0.00	0.02	0.80	15.0	13.16	0.22	13.33	60	Cir	0.012	2.25	24.25	Pipe 41
3	2	104.259	0.148	Genr	0.00	0.00	0.80	15.0	13.33	0.22	13.56	60	Cir	0.012	1.89	23.53	Pipe 26
4	3	31.064	-84.813	Genr	0.00	0.20	0.80	15.0	13.56	0.29	13.65	48	Cir	0.012	1.50	23.28	Pipe 28
5	4	67.924	18.291	Genr	0.00	0.12	0.80	15.0	16.03	0.29	16.23	48	Cir	0.012	1.56	23.86	Pipe 31
6	5	80.100	61.140	Genr	0.00	0.14	0.80	15.0	16.29	1.66	17.62	36	Cir	0.012	1.50	24.81	Pipe 34
7	6	108.751	5.418	Genr	0.00	0.11	0.80	15.0	17.62	1.66	19.43	36	Cir	0.012	1.50	26.21	Pipe 36R
8	7	77.720	4.517	Genr	0.00	0.05	0.80	15.0	19.43	1.66	20.72	36	Cir	0.012	1.52	27.59	Pipe 38R
9	8	108.055	56.931	Genr	0.00	0.39	0.80	15.0	23.00	1.39	24.50	18	Cir	0.012	1.00	29.00	Pipe 39
10	8	34.619	-94.159	Genr	0.00	0.03	0.80	15.0	22.90	0.29	23.00	18	Cir	0.012	1.00	27.59	Pipe 38A
11	8	44.770	-9.499	Genr	0.00	0.20	0.80	15.0	20.72	0.29	20.85	36	Cir	0.012	1.49	28.32	Pipe 40R
12	11	105.982	15.206	Genr	0.00	0.00	0.80	15.0	22.30	0.30	22.62	18	Cir	0.012	0.82	31.94	Pipe 43
13	12	45.525	29.311	Genr	0.00	0.00	0.80	15.0	22.62	0.31	22.76	18	Cir	0.012	0.78	31.48	Pipe 44R
14	13	56.472	27.790	Genr	1.33	0.00	0.80	15.0	22.76	0.30	22.93	18	Cir	0.012	1.00	30.60	Pipe 45R
15	3	94.970	88.395	Genr	0.00	0.17	0.80	15.0	13.56	0.22	13.77	60	Cir	0.012	1.50	22.25	Pipe 22
16	15	38.991	-88.305	Genr	0.00	0.16	0.80	15.0	13.77	0.21	13.85	60	Cir	0.012	0.50	22.20	Pipe 25
17	16	120.263	-0.031	Genr	0.00	0.40	0.80	15.0	13.85	0.22	14.12	60	Cir	0.012	0.50	22.54	Pipe 18
18	17	145.900	0.040	Genr	0.00	0.00	0.80	15.0	14.12	0.22	14.44	60	Cir	0.012	1.42	27.55	Pipe 19
19	18	33.515	69.196	Genr	0.00	0.37	0.80	15.0	14.44	0.21	14.51	60	Cir	0.012	1.78	27.10	Pipe - 16
20	19	127.298	-69.666	Genr	0.00	0.05	0.80	15.0	21.99	0.30	22.37	18	Cir	0.012	0.50	29.49	Pipe 17R
21	20	114.409	2.930	Genr	0.62	0.00	0.80	15.0	22.37	0.30	22.71	18	Cir	0.012	1.00	27.47	Pipe 18r
22	11	26.125	-84.763	Genr	0.00	0.08	0.80	15.0	20.85	0.31	20.93	36	Cir	0.012	0.50	28.32	Pipe 41R
23	22	24.566	-0.897	Genr	15.60	0.00	0.80	15.0	20.93	0.28	21.00	36	Cir	0.012	1.00	29.00	Pipe 42R

Project File: PROPOSED STORM.stm

Number of lines: 80

Date: 7/29/2019

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	19	84.241	17.506	Genr	0.00	0.00	0.80	15.0	14.51	0.23	14.70	60	Cir	0.012	1.66	25.97	Pipe - 14
25	24	21.761	93.308	Genr	0.00	0.03	0.80	15.0	21.64	0.28	21.70	15	Cir	0.012	1.00	25.97	Pipe - 15r
26	7	22.006	-90.691	Genr	0.00	0.05	0.80	15.0	21.63	0.32	21.70	15	Cir	0.012	1.00	26.21	Pipe 37R
27	24	32.323	2.971	Genr	0.00	0.23	0.80	15.0	14.70	0.22	14.77	60	Cir	0.012	1.71	26.12	Pipe - 12
28	27	66.496	-52.559	Genr	0.00	0.00	0.80	15.0	14.77	0.23	14.92	48	Cir	0.012	0.50	25.50	Pipe -11
29	28	26.368	-2.368	Genr	0.00	0.23	0.80	15.0	14.92	0.23	14.98	48	Cir	0.012	0.82	25.00	Pipe - 10RR
30	29	81.250	-29.271	Genr	0.00	0.00	0.80	15.0	14.98	0.22	15.16	48	Cir	0.012	2.23	26.00	Pipe - 7
31	30	31.255	-90.018	Genr	0.00	0.22	0.80	15.0	21.41	0.29	21.50	18	Cir	0.012	1.00	26.50	Pipe - 8R
32	27	62.508	45.934	Genr	0.00	0.14	0.80	15.0	21.23	0.30	21.42	15	Cir	0.012	1.00	25.67	Pipe - 13R
33	30	94.378	18.816	Genr	0.00	0.00	0.80	15.0	15.13	0.22	15.34	48	Cir	0.012	2.54	25.70	Pipe - 4R
34	33	9.203	-107.047	Genr	0.00	0.02	0.80	15.0	20.97	0.33	21.00	15	Cir	0.012	1.00	25.50	Pipe - 5R
35	33	10.041	71.451	Genr	0.00	0.02	0.80	15.0	20.97	0.30	21.00	15	Cir	0.012	1.00	25.50	Pipe 6R
36	2	77.083	90.199	Genr	0.00	0.21	0.80	15.0	15.11	0.30	15.34	30	Cir	0.012	0.50	24.10	Pipe 47R
37	36	101.866	-0.018	Genr	0.00	0.09	0.80	15.0	15.34	0.30	15.65	24	Cir	0.012	0.50	23.38	Pipe 48R
38	37	70.510	0.036	Genr	0.00	0.00	0.80	15.0	15.65	0.30	15.86	24	Cir	0.012	1.49	22.40	Pipe 49
39	38	21.452	-84.566	Genr	0.00	0.41	0.80	15.0	15.86	0.28	15.92	18	Cir	0.012	1.50	22.00	Pipe 48
40	39	138.249	0.024	Genr	0.00	0.13	0.80	15.0	15.92	0.30	16.33	18	Cir	0.012	1.50	23.35	Pipe 54
41	40	66.359	0.031	Genr	0.00	0.14	0.80	15.0	17.41	0.30	17.61	18	Cir	0.012	0.50	24.30	Pipe 60
42	41	73.662	0.013	Genr	0.00	0.00	0.80	15.0	17.61	0.30	17.83	18	Cir	0.012	1.50	25.50	Pipe 61
43	42	77.037	89.956	Genr	0.00	0.07	0.80	15.0	17.83	1.00	18.60	12	Cir	0.012	1.50	24.30	Pipe - 5 (2) (1) (
44	43	50.323	-89.969	Genr	0.00	0.03	0.80	15.0	18.60	0.99	19.10	10	Cir	0.012	0.50	24.40	Pipe - 63
45	44	40.026	0.007	Genr	0.00	0.03	0.80	15.0	19.10	1.00	19.50	10	Cir	0.012	0.50	24.40	Pipe - 64
46	45	49.741	0.017	Genr	0.00	0.07	0.80	15.0	19.50	1.01	20.00	10	Cir	0.012	0.50	24.30	Pipe - 65

Project File: PROPOSED STORM.stm

Number of lines: 80

Date: 7/29/2019

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
47	46	49.950	0.015	Genr	0.00	0.03	0.80	15.0	20.00	1.00	20.50	10	Cir	0.012	0.50	24.40	Pipe - 66
48	47	39.979	-0.066	Genr	0.00	0.03	0.80	15.0	20.50	1.00	20.90	10	Cir	0.012	1.00	24.40	Pipe - 67
49	6	21.999	-85.380	Genr	0.00	0.07	0.80	15.0	20.24	0.32	20.31	15	Cir	0.012	1.00	24.81	Pipe 35
50	33	62.000	-45.208	Genr	56.70	0.11	0.80	15.0	15.37	0.23	15.51	48	Cir	0.012	1.50	24.68	Pipe - 1
51	50	17.758	-82.551	Genr	0.00	0.00	0.80	15.0	19.82	0.28	19.87	18	Cir	0.012	0.50	24.76	Pipe - 4 (1)
52	51	111.345	-3.121	Genr	0.58	0.00	0.80	15.0	19.87	0.30	20.20	15	Cir	0.012	1.00	26.29	Pipe - 5 (1) (1)
53	50	24.448	116.538	Genr	0.00	0.06	0.80	15.0	19.82	0.29	19.89	15	Cir	0.012	1.00	24.97	Pipe 2A
54	2	76.855	-89.817	Genr	0.00	0.26	0.80	15.0	19.77	0.30	20.00	15	Cir	0.012	1.00	24.30	Pipe 68
55	3	42.684	-5.124	Genr	0.00	0.18	0.80	15.0	18.87	0.30	19.00	18	Cir	0.012	0.50	23.55	Pipe 28R
56	55	118.223	5.199	Genr	0.00	0.34	0.80	15.0	19.00	0.30	19.35	18	Cir	0.012	1.00	24.19	Pipe 29R
57	40	77.019	89.893	Genr	0.00	0.06	0.80	15.0	16.33	1.00	17.10	12	Cir	0.012	1.50	22.18	Pipe - 5 (2) (1) (
58	57	50.019	-89.848	Genr	0.00	0.04	0.80	15.0	17.10	3.16	18.68	10	Cir	0.012	0.50	23.10	Pipe - 58
59	58	32.752	0.005	Genr	0.00	0.03	0.80	15.0	18.68	3.27	19.75	10	Cir	0.012	1.00	23.55	Pipe - 59
60	30	67.240	81.343	Genr	0.00	0.13	0.80	15.0	18.58	1.00	19.25	12	Cir	0.012	1.00	23.50	Pipe - 9R
61	57	49.569	90.148	Genr	0.00	0.04	0.80	15.0	17.10	1.01	17.60	10	Cir	0.012	0.50	21.80	Pipe - 5 (2) (1) (
62	61	40.000	0.010	Genr	0.00	0.03	0.80	15.0	17.60	1.00	18.00	10	Cir	0.012	1.00	21.80	Pipe - 57
63	1	16.202	75.369	Genr	0.00	0.06	0.80	15.0	15.28	0.99	15.44	12	Cir	0.012	1.15	19.50	Pipe - 70
64	63	66.416	-46.782	Genr	0.00	0.04	0.80	15.0	15.44	0.99	16.10	12	Cir	0.012	0.50	23.80	Pipe - 71
65	64	39.831	8.726	Genr	0.00	0.04	0.80	15.0	16.10	1.00	16.50	12	Cir	0.012	0.50	23.80	Pipe - 72
66	65	66.000	0.016	Genr	0.00	0.08	0.80	15.0	16.50	1.00	17.16	10	Cir	0.012	0.50	22.00	Pipe - 73
67	66	43.706	0.005	Genr	0.00	0.04	0.80	15.0	17.16	1.01	17.60	10	Cir	0.012	0.50	22.00	Pipe - 74
68	67	40.493	0.004	Genr	0.00	0.03	0.80	15.0	17.60	0.99	18.00	10	Cir	0.012	1.00	22.00	Pipe - 5 (2) (1) (
69	39	16.909	89.516	Genr	0.00	0.05	0.80	15.0	16.78	1.01	16.95	12	Cir	0.012	0.50	22.00	Pipe - 51

Project File: PROPOSED STORM.stm

Number of lines: 80

Date: 7/29/2019

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
70	69	45.656	0.545	Genr	0.00	0.00	0.80	15.0	16.95	1.01	17.41	10	Cir	0.012	1.49	21.50	Pipe - 52
71	70	34.371	81.927	Genr	0.00	0.06	0.80	15.0	17.41	0.99	17.75	10	Cir	0.012	1.00	21.50	Pipe - 53
72	15	81.161	1.618	Genr	0.00	0.21	0.80	15.0	16.60	0.30	16.84	18	Cir	0.012	1.50	21.40	Pipe 23
73	72	22.108	-89.421	Genr	0.00	0.14	0.80	15.0	16.84	0.27	16.90	18	Cir	0.012	0.67	21.40	Pipe 24
74	73	28.139	-22.986	Genr	0.00	0.25	0.80	15.0	16.91	0.32	17.00	18	Cir	0.012	0.78	21.55	Pipe 25R
75	74	112.580	27.748	Genr	0.00	0.36	0.80	15.0	17.00	0.99	18.12	18	Cir	0.012	1.00	23.87	Pipe 26R
76	5	37.000	-24.051	Genr	0.00	0.07	0.80	15.0	16.23	0.32	16.35	36	Cir	0.012	0.50	23.90	Pipe 32
77	76	16.392	-1.733	Genr	15.60	0.00	0.80	15.0	16.17	0.31	16.22	36	Cir	0.012	1.00	24.50	Pipe 29
78	4	21.773	85.045	Genr	0.00	0.05	0.80	15.0	16.03	1.01	16.25	15	Cir	0.012	1.00	23.28	Pipe 35 (1)
79	End	45.000	154.607	Genr	0.00	0.04	0.80	15.0	9.83	14.49	16.35	10	Cir	0.012	0.50	23.40	Pipe - 77
80	79	39.893	-12.993	Genr	0.00	0.05	0.80	15.0	17.80	3.01	19.00	10	Cir	0.012	1.00	23.40	Pipe - 76

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	16.500	0.00	7.50	0.80	0.00	6.00	15.0	28.0	4.9	119.9	1239.7	7.77	60	20.18	9.83	13.16	14.83	16.29	19.50	19.55	Pipe 47
2	1	77.028	0.02	7.21	0.80	0.02	5.77	15.0	27.8	4.9	118.8	132.6	7.64	60	0.22	13.16	13.33	16.86	17.02	19.55	24.25	Pipe 41
3	2	104.259	0.00	5.38	0.80	0.00	4.30	15.0	26.9	5.0	112.0	132.5	5.70	60	0.22	13.33	13.56	19.07	19.23	24.25	23.53	Pipe 26
4	3	31.064	0.20	1.56	0.80	0.16	1.25	15.0	23.6	5.3	39.14	83.76	3.11	48	0.29	13.56	13.65	20.19	20.21	23.53	23.28	Pipe 28
5	4	67.924	0.12	1.31	0.80	0.10	1.05	15.0	23.3	5.3	38.12	82.58	3.08	48	0.29	16.03	16.23	20.43	20.48	23.28	23.86	Pipe 31
6	5	80.100	0.14	1.12	0.80	0.11	0.90	15.0	22.9	5.4	21.74	93.10	3.08	36	1.66	16.29	17.62	20.71	20.78	23.86	24.81	Pipe 34
7	6	108.751	0.11	0.91	0.80	0.09	0.73	15.0	22.3	5.4	20.88	93.21	4.52	36	1.66	17.62	19.43	21.00	20.90	24.81	26.21	Pipe 36R
8	7	77.720	0.05	0.75	0.80	0.04	0.60	15.0	21.8	5.5	20.22	93.08	5.95	36	1.66	19.43	20.72	20.90	22.16	26.21	27.59	Pipe 38R
9	8	108.055	0.39	0.39	0.80	0.31	0.31	15.0	15.0	6.3	1.96	13.52	4.47	18	1.39	23.00	24.50	23.39	25.03	27.59	29.00	Pipe 39
10	8	34.619	0.03	0.03	0.80	0.02	0.02	15.0	15.0	6.3	0.15	6.17	1.45	18	0.29	22.90	23.00	23.06	23.16	27.59	27.59	Pipe 38A
11	8	44.770	0.20	0.28	0.80	0.16	0.22	15.0	19.6	5.7	18.21	38.93	5.42	36	0.29	20.72	20.85	22.16	22.29	27.59	28.32	Pipe 40R
12	11	105.982	0.00	0.00	0.80	0.00	0.00	15.0	17.3	0.0	1.33	6.31	2.24	18	0.30	22.30	22.62	22.97	23.10	28.32	31.94	Pipe 43
13	12	45.525	0.00	0.00	0.80	0.00	0.00	15.0	16.3	0.0	1.33	6.36	2.42	18	0.31	22.62	22.76	23.19	23.24	31.94	31.48	Pipe 44R
14	13	56.472	0.00	0.00	0.80	0.00	0.00	15.0	15.0	0.0	1.33	6.30	2.45	18	0.30	22.76	22.93	23.33	23.41	31.48	30.60	Pipe 45R
15	3	94.970	0.17	3.30	0.80	0.14	2.64	15.0	26.5	5.0	71.20	129.8	3.69	60	0.22	13.56	13.77	20.19	20.25	23.53	22.25	Pipe 22
16	15	38.991	0.16	2.17	0.80	0.13	1.74	15.0	26.3	5.1	66.67	125.0	3.45	60	0.21	13.77	13.85	20.57	20.59	22.25	22.20	Pipe 25
17	16	120.263	0.40	2.01	0.80	0.32	1.61	15.0	25.7	5.1	66.11	130.7	3.42	60	0.22	13.85	14.12	20.68	20.75	22.20	22.54	Pipe 18
18	17	145.900	0.00	1.61	0.80	0.00	1.29	15.0	25.0	5.2	64.56	129.2	3.34	60	0.22	14.12	14.44	20.84	20.92	22.54	27.55	Pipe 19
19	18	33.515	0.37	1.61	0.80	0.30	1.29	15.0	24.8	5.2	64.58	129.0	3.29	60	0.21	14.44	14.51	21.17	21.19	27.55	27.10	Pipe - 16
20	19	127.298	0.05	0.05	0.80	0.04	0.04	15.0	20.5	5.6	0.84	6.27	2.46	18	0.30	21.99	22.37	22.36	22.74	27.10	29.49	Pipe 17R
21	20	114.409	0.00	0.00	0.80	0.00	0.00	15.0	15.0	0.0	0.62	6.26	1.99	18	0.30	22.37	22.71	22.79	23.01	29.49	27.47	Pipe 18r
22	11	26.125	0.08	0.08	0.80	0.06	0.06	15.0	15.2	6.3	16.00	39.98	3.05	36	0.31	20.85	20.93	22.97	22.98	28.32	28.32	Pipe 41R

Project File: PROPOSED STORM.stm

Number of lines: 80

Run Date: 7/29/2019

NOTES: Intensity = 273.31 / (Inlet time + 30.90) ^ 0.99; Return period = Yrs. 10 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	24.566	0.00	0.00	0.80	0.00	0.00	15.0	15.0	0.0	15.60	38.57	2.96	36	0.28	20.93	21.00	23.05	23.06	28.32	29.00	Pipe 42R
24	19	84.241	0.00	1.19	0.80	0.00	0.95	15.0	21.2	5.5	62.56	134.0	3.19	60	0.23	14.51	14.70	21.49	21.53	27.10	25.97	Pipe - 14
25	24	21.761	0.03	0.03	0.80	0.02	0.02	15.0	15.0	6.3	0.15	3.67	1.47	15	0.28	21.64	21.70	21.81	21.87	25.97	25.97	Pipe - 15r
26	7	22.006	0.05	0.05	0.80	0.04	0.04	15.0	15.0	6.3	0.25	3.94	1.80	15	0.32	21.63	21.70	21.84	21.91	26.21	26.21	Pipe 37R
27	24	32.323	0.23	1.16	0.80	0.18	0.93	15.0	21.0	5.6	62.44	131.3	3.18	60	0.22	14.70	14.77	21.79	21.81	25.97	26.12	Pipe - 12
28	27	66.496	0.00	0.79	0.80	0.00	0.63	15.0	20.8	5.6	60.81	73.91	4.84	48	0.23	14.77	14.92	22.07	22.18	26.12	25.50	Pipe -11
29	28	26.368	0.23	0.79	0.80	0.18	0.63	15.0	20.7	5.6	60.82	74.23	4.84	48	0.23	14.92	14.98	22.36	22.40	25.50	25.00	Pipe - 10RR
30	29	81.250	0.00	0.56	0.80	0.00	0.45	15.0	20.4	5.6	59.80	73.25	4.76	48	0.22	14.98	15.16	22.70	22.82	25.00	26.00	Pipe - 7
31	30	31.255	0.22	0.22	0.80	0.18	0.18	15.0	15.0	6.3	1.10	6.10	0.63	18	0.29	21.41	21.50	23.60	23.61	26.00	26.50	Pipe - 8R
32	27	62.508	0.14	0.14	0.80	0.11	0.11	15.0	15.0	6.3	0.70	3.85	0.93	15	0.30	21.23	21.42	22.07	22.08	26.12	25.67	Pipe - 13R
33	30	94.378	0.00	0.21	0.80	0.00	0.17	15.0	20.1	5.7	58.23	73.41	4.63	48	0.22	15.13	15.34	23.60	23.74	26.00	25.70	Pipe - 4R
34	33	9.203	0.02	0.02	0.80	0.02	0.02	15.0	15.0	6.3	0.10	3.99	0.08	15	0.33	20.97	21.00	24.58	24.58	25.70	25.50	Pipe - 5R
35	33	10.041	0.02	0.02	0.80	0.02	0.02	15.0	15.0	6.3	0.10	3.82	0.08	15	0.30	20.97	21.00	24.58	24.58	25.70	25.50	Pipe 6R
36	2	77.083	0.21	1.55	0.80	0.17	1.24	15.0	26.9	5.0	6.20	24.27	1.26	30	0.30	15.11	15.34	19.07	19.08	24.25	24.10	Pipe 47R
37	36	101.866	0.09	1.34	0.80	0.07	1.07	15.0	26.1	5.1	5.44	13.76	1.71	24	0.30	15.34	15.65	19.09	19.14	24.10	23.38	Pipe 48R
38	37	70.510	0.00	1.25	0.80	0.00	1.00	15.0	25.4	5.1	5.13	13.61	1.61	24	0.30	15.65	15.86	19.17	19.20	23.38	22.40	Pipe 49
39	38	21.452	0.41	1.25	0.80	0.33	1.00	15.0	25.3	5.1	5.14	6.07	2.89	18	0.28	15.86	15.92	19.26	19.30	22.40	22.00	Pipe 48
40	39	138.249	0.13	0.73	0.80	0.10	0.58	15.0	24.1	5.2	3.07	6.25	1.72	18	0.30	15.92	16.33	19.49	19.59	22.00	23.35	Pipe 54
41	40	66.359	0.14	0.40	0.80	0.11	0.32	15.0	23.1	5.3	1.71	6.30	0.96	18	0.30	17.41	17.61	19.66	19.68	23.35	24.30	Pipe 60
42	41	73.662	0.00	0.26	0.80	0.00	0.21	15.0	21.4	5.5	1.15	6.27	0.65	18	0.30	17.61	17.83	19.68	19.69	24.30	25.50	Pipe 61
43	42	77.037	0.07	0.26	0.80	0.06	0.21	15.0	20.6	5.6	1.17	3.86	1.48	12	1.00	17.83	18.60	19.70	19.77	25.50	24.30	Pipe - 5 (2) (1) (1)
44	43	50.323	0.03	0.19	0.80	0.02	0.15	15.0	20.1	5.7	0.86	2.36	1.60	10	0.99	18.60	19.10	19.82	19.88	24.30	24.40	Pipe - 63

Project File: PROPOSED STORM.stm

Number of lines: 80

Run Date: 7/29/2019

NOTES: Intensity = 273.31 / (Inlet time + 30.90) ^ 0.99; Return period = Yrs. 10 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
45	44	40.026	0.03	0.16	0.80	0.02	0.13	15.0	19.6	5.7	0.73	2.37	2.21	10	1.00	19.10	19.50	19.90	19.88	24.40	24.40	Pipe - 64
46	45	49.741	0.07	0.13	0.80	0.06	0.10	15.0	18.9	5.8	0.60	2.38	2.69	10	1.01	19.50	20.00	19.88	20.34	24.40	24.30	Pipe - 65
47	46	49.950	0.03	0.06	0.80	0.02	0.05	15.0	17.4	6.0	0.29	2.37	1.84	10	1.00	20.00	20.50	20.34	20.73	24.30	24.40	Pipe - 66
48	47	39.979	0.03	0.03	0.80	0.02	0.02	15.0	15.0	6.3	0.15	2.37	1.58	10	1.00	20.50	20.90	20.73	21.07	24.40	24.40	Pipe - 67
49	6	21.999	0.07	0.07	0.80	0.06	0.06	15.0	15.0	6.3	0.35	3.94	0.48	15	0.32	20.24	20.31	21.00	21.00	24.81	24.81	Pipe 35
50	33	62.000	0.11	0.17	0.80	0.09	0.14	15.0	19.8	5.7	58.05	73.95	4.62	48	0.23	15.37	15.51	24.58	24.67	25.70	24.68	Pipe - 1
51	50	17.758	0.00	0.00	0.80	0.00	0.00	15.0	18.9	0.0	0.58	6.09	0.33	18	0.28	19.82	19.87	25.17	25.17	24.68	24.76	Pipe - 4 (1)
52	51	111.345	0.00	0.00	0.80	0.00	0.00	15.0	15.0	0.0	0.58	3.80	0.47	15	0.30	19.87	20.20	25.17	25.18	24.76	26.29	Pipe - 5 (1) (1)
53	50	24.448	0.06	0.06	0.80	0.05	0.05	15.0	15.0	6.3	0.30	3.74	0.25	15	0.29	19.82	19.89	25.17	25.17	24.68	24.97	Pipe 2A
54	2	76.855	0.26	0.26	0.80	0.21	0.21	15.0	15.0	6.3	1.31	3.82	2.83	15	0.30	19.77	20.00	20.27	20.50	24.25	24.30	Pipe 68
55	3	42.684	0.18	0.52	0.80	0.14	0.42	15.0	17.1	6.0	2.50	6.33	1.58	18	0.30	18.87	19.00	20.19	20.20	23.53	23.55	Pipe 28R
56	55	118.223	0.34	0.34	0.80	0.27	0.27	15.0	15.0	6.3	1.71	6.25	1.32	18	0.30	19.00	19.35	20.22	20.25	23.55	24.19	Pipe 29R
57	40	77.019	0.06	0.20	0.80	0.05	0.16	15.0	18.7	5.8	0.93	3.86	1.18	12	1.00	16.33	17.10	19.66	19.71	23.35	22.18	Pipe - 5 (2) (1) (1)
58	57	50.019	0.04	0.07	0.80	0.03	0.06	15.0	17.0	6.0	0.34	4.22	0.62	10	3.16	17.10	18.68	19.74	19.75	22.18	23.10	Pipe - 58
59	58	32.752	0.03	0.03	0.80	0.02	0.02	15.0	15.0	6.3	0.15	4.29	1.11	10	3.27	18.68	19.75	19.75	19.92	23.10	23.55	Pipe - 59
60	30	67.240	0.13	0.13	0.80	0.10	0.10	15.0	15.0	6.3	0.65	3.85	0.83	12	1.00	18.58	19.25	23.60	23.62	26.00	23.50	Pipe - 9R
61	57	49.569	0.04	0.07	0.80	0.03	0.06	15.0	17.4	6.0	0.33	2.38	0.61	10	1.01	17.10	17.60	19.74	19.75	22.18	21.80	Pipe - 5 (2) (1) (1)
62	61	40.000	0.03	0.03	0.80	0.02	0.02	15.0	15.0	6.3	0.15	2.37	0.28	10	1.00	17.60	18.00	19.75	19.75	21.80	21.80	Pipe - 57
63	1	16.202	0.06	0.29	0.80	0.05	0.23	15.0	20.7	5.6	1.30	3.83	1.73	12	0.99	15.28	15.44	16.29	16.30	19.55	19.50	Pipe - 70
64	63	66.416	0.04	0.23	0.80	0.03	0.18	15.0	19.9	5.7	1.04	3.85	2.31	12	0.99	15.44	16.10	16.36	16.53	19.50	23.80	Pipe - 71
65	64	39.831	0.04	0.19	0.80	0.03	0.15	15.0	19.4	5.7	0.87	3.87	2.89	12	1.00	16.10	16.50	16.53	16.89	23.80	23.80	Pipe - 72
66	65	66.000	0.08	0.15	0.80	0.06	0.12	15.0	18.6	5.8	0.70	2.37	2.90	10	1.00	16.50	17.16	16.89	17.53	23.80	22.00	Pipe - 73

Project File: PROPOSED STORM.stm

Number of lines: 80

Run Date: 7/29/2019

NOTES: Intensity = 273.31 / (Inlet time + 30.90) ^ 0.99; Return period = Yrs. 10 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
67	66	43.706	0.04	0.07	0.80	0.03	0.06	15.0	17.4	6.0	0.33	2.38	1.93	10	1.01	17.16	17.60	17.53	17.85	22.00	22.00	Pipe - 74
68	67	40.493	0.03	0.03	0.80	0.02	0.02	15.0	15.0	6.3	0.15	2.36	1.51	10	0.99	17.60	18.00	17.85	18.17	22.00	22.00	Pipe - 5 (2) (1) (1)
69	39	16.909	0.05	0.11	0.80	0.04	0.09	15.0	17.4	6.0	0.53	3.87	0.67	12	1.01	16.78	16.95	19.49	19.50	22.00	22.00	Pipe - 51
70	69	45.656	0.00	0.06	0.80	0.00	0.05	15.0	16.0	6.1	0.29	2.38	0.54	10	1.01	16.95	17.41	19.50	19.51	22.00	21.50	Pipe - 52
71	70	34.371	0.06	0.06	0.80	0.05	0.05	15.0	15.0	6.3	0.30	2.36	0.55	10	0.99	17.41	17.75	19.51	19.52	21.50	21.50	Pipe - 53
72	15	81.161	0.21	0.96	0.80	0.17	0.77	15.0	17.3	6.0	4.59	6.24	2.58	18	0.30	16.60	16.84	20.57	20.70	22.25	21.40	Pipe 23
73	72	22.108	0.14	0.75	0.80	0.11	0.60	15.0	17.1	6.0	3.60	5.98	2.03	18	0.27	16.84	16.90	20.85	20.87	21.40	21.40	Pipe 24
74	73	28.139	0.25	0.61	0.80	0.20	0.49	15.0	16.8	6.0	2.95	6.49	1.66	18	0.32	16.91	17.00	20.92	20.94	21.40	21.55	Pipe 25R
75	74	112.580	0.36	0.36	0.80	0.29	0.29	15.0	15.0	6.3	1.81	11.45	1.02	18	0.99	17.00	18.12	20.97	21.00	21.55	23.87	Pipe 26R
76	5	37.000	0.07	0.07	0.80	0.06	0.06	15.0	15.1	6.3	15.95	41.15	2.26	36	0.32	16.23	16.35	20.71	20.72	23.86	23.90	Pipe 32
77	76	16.392	0.00	0.00	0.80	0.00	0.00	15.0	15.0	0.0	15.60	39.90	2.21	36	0.31	16.17	16.22	20.76	20.77	23.90	24.50	Pipe 29
78	4	21.773	0.05	0.05	0.80	0.04	0.04	15.0	15.0	6.3	0.25	7.02	0.20	15	1.01	16.03	16.25	20.43	20.43	23.28	23.28	Pipe 35 (1)
79	End	45.000	0.04	0.09	0.80	0.03	0.07	15.0	16.4	6.1	0.44	9.03	1.71	10	14.49	9.83	16.35	14.83	16.64	19.50	23.40	Pipe - 77
80	79	39.893	0.05	0.05	0.80	0.04	0.04	15.0	15.0	6.3	0.25	4.11	3.20	10	3.01	17.80	19.00	17.94	19.22	23.40	23.40	Pipe - 76

Project File: PROPOSED STORM.stm

Number of lines: 80

Run Date: 7/29/2019

NOTES: Intensity = 273.31 / (Inlet time + 30.90) ^ 0.99; Return period = Yrs. 10 ; c = cir e = ellip b = box



UNIVERSAL ENGINEERING SCIENCES

Consultants In: Geotechnical Engineering • Environmental Sciences
Geophysical Services • Construction Materials Testing • Threshold Inspection
Building Inspection • Plan Review • Building Code Administration

LOCATIONS:

- Atlanta, GA
- Daytona Beach
- Fort Myers
- Fort Pierce
- Gainesville
- Jacksonville
- Miami
- Ocala
- Orlando (Headquarters)
- Palm Coast
- Panama City
- Pensacola
- Rockledge
- Sarasota
- St. Petersburg
- Tampa
- Tifton, GA
- West Palm Beach

March 8, 2019

NV5, Inc.
201 South Bumby Avenue
Orlando, FL 32803

Attention: Mr. Frank Porter, P.E.
Managing Technical Director/Civil Engineering | VP
Frank.Porter@nv5.com

Reference: **Roadway Underdrain Evaluation**
WSTC Townhomes
Winter Springs, Seminole County, Florida
UES Project No. 0130.1800122.0002
UES Report No. 1654596

Dear Mr. Porter:

At the request of NV5, Inc., Universal Engineering Sciences Inc. (UES) has completed the roadway underdrain evaluation for the above-referenced project located in Winter Springs, Florida. The scope of our services was planned in conjunction with and was authorized by you per UES Proposal No. 1650537 dated February 22, 2019. Our findings, together with our assumptions and conclusions, are presented in the following paragraphs.

1.0 PROJECT DESCRIPTION

The proposed project consists of a new townhome residential development located in Winter Springs, Seminole County, Florida. UES has previously issued a geotechnical report for this project (UES Report No. 1626718, dated November 21, 2018). The results of the previous exploration were used for this analysis.

2.0 ROADWAY UNDERDRAIN EVALUATION

In accordance with Winter Springs Engineering Standards, the required separation between the estimated seasonal high water table and the bottom of the base course (RCA) is 12 inches. If this separation criterion is not met by grading, roadway underdrains are required. Where the estimated seasonal high water table will be greater than 12 inches below the bottom of the base course, underdrains will not be required.

Based on the Roadway Plan and Profile sheets provided to us by NV5, Inc. (Sheets C07.2 through C07.4, dated March 7, 2019) a comparison was made between the finished pavement grades and the plot of the estimated seasonal high groundwater elevation contours in order to determine those areas of the proposed pavements where the estimated seasonal high groundwater elevation will be within 12 inches of the estimated bottom of the base course elevation. We note that we were only requested to review Tree Swallow, "Street A" & "Street D" of the proposed development. UES understands that a majority of the site will be filled, but we recommend the remainder of the Plan & Profile sheets be reviewed to ensure that underdrains will not be required.



Accounting for the thickness of the proposed roadway base course and surface course, the required seasonal high water table separation, and the approximate roadway cross-slope, underdrains will be required where the estimated seasonal high water table occurs within approximately 2.0 feet of the finished pavement surface grades, based on the roadway sections provided by NV5, Inc. (including a 2% crown).

3.0 RECOMMENDATIONS

For all areas where the estimated seasonal high water table is expected to form within 12 inches of the bottom of the base course, underdrains will be required. The recommended underdrain locations are presented in Table 1.

**TABLE I
 RECOMMENDED UNDERDRAIN LOCATIONS**

Roadway	From Station	To Station
Tree Swallow	999+75	1004+00
“Street A”	2000+00	2001+25
“Street D”	3000+00	3001+25
Total Length of Roadway Underdrain (includes both sides of roadways)		1,350

All other roadway sections within the provided plan and profile sheets were found to meet the minimum separation from the seasonal high water table prescribed by Seminole County.

4.0 TYPICAL UNDERDRAIN DESIGN GUIDELINES

The following underdrain design guidelines are typically used in the industry in order to provide adequate separation between the pavement grades and the estimated seasonal high groundwater levels.

1. Roadway underdrains should be constructed with a minimum 6-inch diameter underdrain pipe, wrapped with filter fabric (ADS “Drainguard,” or equivalent) or smooth wall HDPE pipe without filter sock. **We note that local municipalities may require a larger diameter underdrain pipe. We recommend consulting with the local jurisdiction.**
2. Underdrains should be constructed along both sides of the roadways for the portions requiring underdrains to provide separation between the bottom of the base course and the seasonal high groundwater level.
3. The bottom of the underdrain piping should be placed a minimum of 24-inches below the bottom of base course.
4. The underdrains should be constructed in a trench a minimum of 18-inches wide, with the underdrain centered in the trench. Further, the underdrain trench should extend 6-inches below the invert of the underdrain piping.
5. Backfill placed in the underdrain trench should consist of “clean” filter sand meeting FDOT specifications for filter sand (FDOT Specification 902-4). Filter sand backfill should extend to 12 inches above the top of the underdrain pipe. Backfill above the FDOT filter sand may

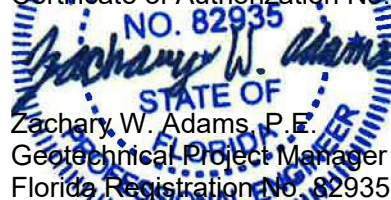


- consist of clean native material, provided these materials contain less than 10 percent soil fines.
6. Prior to the placement of underdrain piping or filter sand backfill, the perimeter of the underdrain trench should be lined with filter fabric (Mirafi 140N, or equivalent) to minimize the potential for intrusion of soil fines from the surrounding subgrade. The filter fabric should completely line the perimeter of the underdrain trench and overlap a minimum of 12 inches at the top of the filter sand backfill.
 7. Underdrains should be routed to a positive outfall.
 8. Underdrains should include capped and sealed inspection and clean-out ports extending to the ground surface at spacing no greater than 300 feet, at every bend or 45 degrees or greater, and at the terminus of each underdrain segment. We also recommend that a maintenance program be established to flush and inspect the underdrains on a periodic basis. Please note that without a proper maintenance program, the intended performance of the underdrains may be compromised.
 9. We recommend installing landscape drains along all medians, landscape areas and along all roadways where irrigation is present to protect the underdrains from excess fines deposits. Please understand that landscape drains are functionally different than roadside underdrains, in that it is intended mostly to handle or capture excess irrigation that could migrate laterally onto the pavement components and eventually compromise the roadway underdrain.
 10. We further recommend that all underdrains be installed under the full-time observation of a representative of Universal Engineering Sciences.

5.0 CLOSURE

We appreciate the opportunity to be working with you on this project and look forward to a continued association. Please do not hesitate to contact us if you should have any questions, or if we may further assist you as your plans proceed.

Respectfully Submitted,
UNIVERSAL ENGINEERING SCIENCES, INC.
Certificate of Authorization No. 549

A circular professional engineer seal for Zachary W. Adams, State of Florida, Registration No. 82935. The seal includes the text 'ZACHARY W. ADAMS', 'STATE OF FLORIDA', and 'PROFESSIONAL ENGINEER'. A handwritten signature 'Zachary W. Adams' and the date '3/8/19' are overlaid on the seal.
Zachary W. Adams, P.E.
Geotechnical Project Manager
Florida Registration No. 82935

A handwritten signature in blue ink, appearing to read 'Ricardo C. Kiriakidis L.'
Ricardo C. Kiriakidis L., Ph.D., P.E.
Geotechnical Department Manager

Cc: Client
Mr. Dan Edwards – Dream Finders Homes

Exhibit 6

DreamFinders Townhomes Development
Agreement

THIS INSTRUMENT WAS PREPARED BY
AND SHOULD BE RETURNED TO:

Anthony A. Garganese
City Attorney of Winter Springs
Garganese, Weiss, D'Agresta & Salzman, P.A.
111 N. Orange Avenue, Suite 2000
Orlando, FL 32802

(407) 425-9566

FOR RECORDING DEPARTMENT USE ONLY

DEVELOPMENT AGREEMENT

Dream Finders Townhomes

THIS DEVELOPMENT AGREEMENT ("Agreement") is made and executed this _____ day of _____, 2019, by and between the **CITY OF WINTER SPRINGS**, a Florida Municipal Corporation ("City"), whose address is 1126 East S.R. 434, Winter Springs, Florida 32708, and **DFC SEMINOLE CROSSING, LLC**, a Florida Limited Liability Company, whose address is 14701 Philips Highway, Suite 300, Jacksonville, Florida 32256-3743.

WITNESSETH:

WHEREAS, Developer is the owner of approximately 8.33 acres, more or less, of real property located in the Winter Springs Town Center, T5 Transect, generally east of the intersection of Tree Swallow Drive and Michael Blake Boulevard, Winter Springs, Seminole County, Florida, more particularly described herein ("Property"); and

WHEREAS, Developer is also the owner of approximately 10.37 acres, more or less, of real property located in the Winter Springs Town Center upon which a master detention pond facility has been constructed, more particularly described herein (the "Detention Pond Property"); and

WHEREAS, Developer has applied for Final Engineering/Site Plan Approval, Aesthetic Plan Approval, and certain Waivers from the Town Center Code in order to construct a 114-townhome unit subdivision on the Property and further intends to apply for final plat approval at a later date; and

WHEREAS, Preliminary Engineering Plans were approved by the City Commission on January 8, 2018; and

WHEREAS, pursuant to Chapter 20 Zoning, Article II, Division 1, Section 20-29.1 of the Winter Springs City Code (“City Code”), a community workshop for the Project was held on July 30, 2019; and

WHEREAS, Section 20-29(c) of the City Code requires that all site plans and waivers shall be binding on the use of the subject property and, further, that as a condition of approval by the City Commission, all development projects requiring a community workshop pursuant to Section 20-29.1 of the City Code shall be required to be memorialized in a binding development agreement; and

WHEREAS, this Development Agreement shall be recorded against the property so that the terms and conditions of approval related to the Project shall run with the land; and

NOW THEREFORE, in consideration of the mutual promises and covenants contained herein, the parties mutually agree as follows:

1.0 Recitals. The foregoing recitals are true and correct and are hereby incorporated herein by this reference.

2.0 Authority. This Agreement is entered into pursuant to the Florida Municipal Home Rule Powers Act.

3.0 The Property. The real property subject to this Agreement has a tax parcel identification number of 26-20-30-5AR-0A00-007K and is legally described in **EXHIBIT “A”**, attached hereto and fully incorporated herein by this reference (“Property”). In addition, the Detention Pond Property shall also be subject to this Agreement, having a tax parcel identification number of 26-20-30-5AR-0A00-007F and legally described in **EXHIBIT “B.”** (“Detention Pond Property”).

4.0 Project Description and Requirements. Developer shall, at its expense, design, permit and construct a townhome subdivision on the Property, not-to-exceed 114 townhome units on individually-platted lots with related improvements, in the City of Winter Springs Town Center. The townhomes, public and private project infrastructure, and all amenity buildings and structures shall be constructed in a single phase. The Developer is specifically required to develop the Project to include certain amenities, including the swimming pool and related improvements, which shall be of adequate size to service the intended number of residential units, and is incorporated into the Final Engineering/Site Plan.

(Hereinafter the project description and requirements are referred to as the **“Project”**).

The Developer shall construct the Project in a manner consistent with the approved Final Engineering/Site Plans, Aesthetic Plans, and Waivers that are on file with the City with the following file numbers and consistent with the requirements contained in this Agreement:

File No: ZP2018-00000023 - W.S. TOWNHOMES FINAL SITE PLAN

Specific conditions of approval for the above-referenced Plans and Waivers include the following, which are otherwise addressed in further detail in Sections 6.0 and 7.0 herein:

A. Planting Elm and Crepe myrtle trees along the northern boundary of the Project and within the Cross-Seminole Trail right-of-way, provided that should Seminole County object to the plantings, Developer shall be excused from this condition. Trees shall be alternating and maximum of 15' apart on center and at least 2.5" caliper;

B. Installing irrigation for the trees above, which shall be maintained as part of the future Project's community irrigation system, provided that should Seminole County object to the installation, Developer shall be excused from this condition;

C. Installing a minimum of five (5) dog stations at locations spread throughout the Project, which shall consist of doggie-bag stations to be stocked with baggies and maintained by the Homeowner's Association in perpetuity;

D. As more specifically described in Section 6.0, conveying the following land to the City by special warranty deed, free and clear of all mortgages, liens, and other encumbrances that are not deemed by the City to be permitted exceptions that will interfere with the City's intended purpose and use for the land:

1. The northwest corner of the Property, consisting of approximately 0.32 acres and surrounding, but not including, the lift station property (the "Northwest Corner Property Conveyance"); and

2. The northern portion of the Detention Pond Property bounded on the south by the bottom of the berm of the existing stormwater detention pond, approximately where the tree line begins, on the north by the northern boundary of the Detention Pond Property, on the west by the Cross-Seminole Trail right-of-way, and on the east by the eastern boundary of the Detention Pond Property, consisting of approximately 3.1 acres (the "Detention Pond Property Conveyance"); and

E. Making a cash contribution of \$125,000 to the City.

F. Cooperating with the City to relocate the current stormwater open conveyance system currently located on the Northwest Corner Property by installing a replacement stormwater pipe at a location deemed acceptable to the City. The City shall grant a stormwater easement over, under and through the Northwest Corner Property upon its conveyance to the City in a width sufficient to accommodate the stormwater pipe and maintenance thereof and in a form acceptable to the City Attorney to allow for installation and maintenance of the replacement stormwater pipe.

5.0 Future Permitting. Pursuant to Section 9-74 of the City Code, the Developer has elected to request approval of the Final Engineering/Site Plans separately and prior to

approval to record a final plat for the Project. Consistent with Section 9-74, the Developer shall be required to record a Final Plat within two (2) years of approval of the Final Engineering/Site Plan. Under no circumstances shall any townhome units or lots be conveyed and a sale closed for the purposes of residential occupation prior to recording the Final Plat. Sales of land prior to recording of the final plat shall be in accordance with Section 31.0 below. Developer further shall be required to receive building permits and substantially commence vertical construction of buildings, which shall at minimum include building foundations, for the Project within two (2) years of the Effective Date of this Agreement.

6.0 Neighborhood Square; Conveyance of Property. The Developer acknowledges that Section 2.1 of that certain Future Development Commitment Agreement with the City of Winter Springs, dated November 10, 2010 and recorded in Seminole County Official Records Book 7486, Page 146, requires the conveyance to the City of two small neighborhood square parks of a minimum of 0.44 acres and 0.42 acres each. The Developer has disputed its obligation to convey such neighborhood squares to the City. Without conceding that the Developer is required to do so, the Developer agrees that in lieu of such neighborhood square conveyances, the Developer consents and agrees to the specific conditions of approval set forth in Section 4.0 above, including the conveyances described in Section 4.0(D). The Developer acknowledges and agrees that the approval of the Final Engineering/Site Plan is and shall be conditioned upon the conveyances as provided Section 4.0, and further described in this Section.

A. **Timing of Conveyances.** The Northwest Corner Property Conveyance shall occur after the final plat has been recorded. The Northwest Corner of the Property shall be graded in accordance with the Final Engineering Plans, the relocation of the current open stormwater conveyance system shall be complete, and landscaping required in the Final Engineering Plans (Landscape Plans) shall be complete at the time of conveyance as described in Section 4.0(F). The City shall not issue any certificates of occupancy for the Project until after the Closing Date for the Northwest Corner of the Property and such conveyance has occurred, provided that certificates of occupancy shall not be unreasonably withheld if the City has delayed the Closing Date for reasons unrelated to the Developer having to cure defects in title.

The Detention Pond Property Conveyance shall occur prior to final plat approval. The Developer shall, within thirty (30) days of the Effective Date of this Agreement, submit an application for a Lot Split for the Detention Pond Property, which the City shall process in a timely fashion. The City shall waive the application fee for the Lot Split. Upon completion of the Lot Split, the Developer shall initiate the conveyance as provided in Subsection C below. The City shall not approve the final plat for recording until after the Closing Date and the Detention Pond Property conveyance has occurred, provided that final plat approval shall not be unreasonably withheld if the City has delayed the Closing Date for reasons unrelated to the Developer having to cure defects in title.

B. **Legal Status of Covenants.** The City and the Developer acknowledge and agree that the Northwest Corner Property and portion of the Detention Pond Property that shall be conveyed to the City shall be used for a public purpose and will not be subject to the terms,

covenants, conditions, restrictions, assessments, indemnity obligations, and possible liens created by and set forth in that Declaration of Covenants, Conditions and Restrictions recorded in the Seminole County Official Records Book 8871, Page 98, as amended by the First Amendment in Seminole County Official Records Book 8964, page 1579 (“Covenants”), pursuant, in part, to *Ryan v. Town of Manalapan*, 414 So.2d 193 (Fla. 1982). The Developer shall use its best faith efforts to provide, and likewise obtain from the other owners of property subject to the Covenants, an estoppel letter in favor of the City acknowledging such and record such estoppel letters prior to the Closing Date for any required conveyance.

C. Procedure for Conveyances. No later than thirty (30) days after the completion of the Lot Split, the Parties shall commence and then diligently complete the Closing for the Detention Pond Property Conveyance. No later than thirty (30) days after the recording of the Final Plat, the Parties shall commence and then diligently complete the Closing for the Northwest Corner Property Conveyance. In conjunction with the commencement of the Detention Pond Property Conveyance and Northwest Corner Property Conveyances, Developer must provide, at its expense, the survey and legal description, prepared by a duly registered and professional surveyor and certified to the City and Title Insurance Company, to be used for the subject Closing.

In addition, at the commencement of each of the Closings mentioned above, Developer shall provide the City with a commitment for an Owner’s Title Insurance Policy (ALTA FORM B-1970) from a title insurance company (“Title Company”) acceptable to the City, at the Developer’s expense, agreeing to insure the City’s title to the property to be conveyed to the City upon closing in an amount equal to the greater of \$75,000 or the prorated assessed value of the land, based on acreage, as determined from the total assessed value of the property from the Seminole County Property Appraiser’s database at the time of closing. If a Title Commitment reflects matters other than the standard exception for ad valorem real estate taxes for the current year and those matters which will be discharged by the Developer at or prior to Closing, then the City shall have twenty (20) days to examine the commitment and tender any objections thereto. If the title commitment discloses unpermitted exceptions or matters that render the title non-marketable or unacceptable to the City for its intended purposes and proposed land uses, the Developer, at its option, shall have forty-five (45) days from the date of receiving written notice of defects from the City within which to have the exceptions removed from the commitment or the defects cured to the reasonable satisfaction of the City. If the Developer fails to have the commitment exceptions removed or the defects cured within the specified time, the City may terminate this Agreement or the City may elect, upon notice to the Developer within ten (10) days after the expiration of the forty-five (45) day curative period, to take title as it then is notwithstanding such exceptions or title defects. Notwithstanding anything herein contained to the contrary, the Developer shall be required to pay and discharge any liens and obtain partial releases of any mortgages affecting the title status of the property to be conveyed. Each Conveyance shall be by special warranty deed, free and clear of all mortgages, liens, and other encumbrances that are not permitted exceptions. For the purposes of this Agreement, all matters and exceptions reflected in the Title Commitment that are either (a) contemplated or authorized

by this Agreement or (b) accepted by the City covered by such Title Commitment, shall be collectively referred to as “Permitted Exceptions.”

At closing, Title Company shall provide the City standard “gap” coverage in the custom as established by title insurance practices in Florida. Subsequent to closing, Title Company, at the Developer’s expense, shall provide an owner’s title policy showing title up to and including the recording of the deed delivered at closing, said policy showing the continuation of good and marketable title in the Developer to the moment of recording the special warranty deed and subject only to the permitted exceptions accepted by the City and any matters created at closing. In such event, the time of closing shall be thirty (30) days after delivery of the commitment or the time expressly specified in this Agreement, whichever is later. The Developer shall pay for the cost of recording any necessary curative instruments, the title insurance commitment, and the Owner’s policy if issued, and recording of the deed. Each party shall pay their respective attorney’s fees.

7.0 Additional Special Development Conditions. The following additional development conditions shall apply to the Project:

A. **Cash Contribution.** The cash contribution required in Section 4.0(E) shall be made within fifteen (15) days of approval of the Final Engineering/Site Plans, Aesthetic Plans, and Waivers. The City shall not issue any building permits or clearing and grading permits until such funds are paid.

B. **Landscaping and Irrigation.** Installation of the Elm and Crepe myrtle trees along the northern boundary of the Project and within the Cross-Seminole Trail right-of-way (“Trail Trees”) and irrigation to support the Trail Trees shall be completed by Developer prior to the issuance of any final certificates of occupancy being issued for the Project to the City’s satisfaction. Such Trail Trees shall be subject to the obligation of ongoing maintenance and replacement for the first two years following planting, at the Developer and/or Homeowner Association’s expense, if the City determines, after reasonable inspection, that any tree has become severely diseased or damaged to the point that the viability of the tree has been significantly compromised. Because the irrigation facilities to support the Trail Trees will be connected with the community’s irrigation system, such irrigation facilities shall be subject to the obligation of ongoing maintenance and payment of water utility costs at the Developer and/or Homeowner Association’s expense. Developer and Homeowner’s Association shall be jointly and severally liable hereunder until such time that the Developer has closed out the Project by completing the development of the entire Project and fully turning over the Project to the Homeowner’s Association. At such time the Project is fully turned over to the Homeowner’s Association, the Homeowner’s Association shall be fully responsible for the landscaping and irrigation requirements set forth in this subparagraph. In the event that Developer and/or the Homeowner’s Association fails to perform the necessary maintenance, repairs or replacements of any of the Trail Trees or irrigation facilities and equipment, the City shall have the right, but not obligation, to conduct said maintenance, repairs or replacements and recover the actual cost thereof from the Developer and/or Homeowner’s Association. Prior to exercising that right, the

City shall provide the Developer and/or Homeowner's Association written notice and an explanation of the specific default and at least thirty (30) days in which to cure the default. If Developer and/or Homeowner's Association fails to cure the default by the end of the cure period, the City may exercise its rights to maintain and replace at any time thereafter. The Developer shall additionally submit a Landscape Performance and Maintenance Bond in a form acceptable to the City Attorney prior to obtaining any clearing and grading permits, ensuring planting and installation of the Trail Trees and irrigation should the Project be abandoned after the Property has been cleared and proper maintenance of the trees for two (2) years after planting.

C. Sidewalks, Roads and Infrastructure. No later than final plat approval, public pedestrian access easements shall be dedicated or granted over private sidewalks.

8.0 Representations of the Parties. The City and Developer hereby each represent and warrant to the other that it has the power and authority to execute, deliver and perform the terms and provisions of this Agreement and has taken all necessary action to authorize the execution, delivery and performance of this Agreement. This Agreement will, when duly executed and delivered by the City and Developer, constitute a legal, valid and binding obligation enforceable against the parties hereto. Upon acquisition of the Property by the Developer and the recording of this Agreement in the Public Records of Seminole County, Florida, the Agreement shall be a binding obligation upon the Property in accordance with the terms and conditions of this Agreement. Developer represents that it has voluntarily and willfully executed this Agreement for purposes of binding himself and the Property to the terms and conditions set forth in this Agreement.

9.0 Successors and Assigns. This Agreement shall automatically be binding upon and shall inure to the benefit of the City and Developer and their respective successors and assigns. The terms and conditions of this Agreement similarly shall be binding upon the Property and the Homeowner's Association, and shall run with title to the same upon being duly recorded against the Property by the City.

10.0 Applicable Law; Venue. This Agreement shall be governed by and construed in accordance with the laws of the State of Florida. The venue of any litigation arising out of this Agreement shall be in Seminole County, Florida or, for federal court actions, in Orlando, Florida.

11.0 Amendments. This Agreement shall not be modified or amended except by written agreement duly executed by both parties hereto (or their successors or assigns) and approved by the City Commission.

12.0 Entire Agreement; Exhibits. This Agreement and all attached exhibits hereto supersede any other agreement, oral or written, regarding the Property and contain the entire agreement between the City and Developer as to the subject matter hereof. The Exhibits attached hereto and referenced herein are hereby fully incorporated herein by this reference.

13.0 Severability. If any provision of this Agreement shall be held to be invalid or unenforceable to any extent by a court of competent jurisdiction, the same shall not affect in any respect the validity or enforceability of the remainder of this Agreement.

14.0 Effective Date. This Agreement shall become effective upon approval by the City Commission and execution of this Agreement by both parties hereto.

15.0 Recordation. Upon full execution by the Parties, this Agreement shall be recorded in the Public Records of Seminole County, Florida by the City. The Developer shall be responsible for all recording fees associated with this Agreement.

16.0 Relationship of the Parties. The relationship of the parties to this Agreement is contractual and Developer is an independent contractor and not an agent of the City. Nothing herein shall be deemed to create a joint venture or principal-agent relationship between the parties, and neither party is authorized to, nor shall either party act toward third persons or the public in any manner, which would indicate any such relationship with the other.

17.0 Sovereign Immunity. The City intends to avail itself of sovereign immunity and other applicable limitations on City liability whenever deemed applicable by the City. Therefore, notwithstanding any other provision set forth in this Agreement, nothing contained in this Agreement shall be construed as a waiver of the City's right to sovereign immunity under section 768.28, Florida Statutes, or other limitations imposed on the City's potential liability under state or federal law. As such, the City shall not be liable under this Agreement for punitive damages or interest for the period before judgment. Further, the City shall not be liable for any claim or judgment, or portion thereof, to any one person for more than two hundred thousand dollars (\$200,000.00), or any claim or judgment, or portion thereof, which, when totaled with all other claims or judgments paid by the State or its agencies and subdivisions arising out of the same incident or occurrence, exceeds the sum of three hundred thousand dollars (\$300,000.00).

18.0 City's Police Power. Developer agrees and acknowledges that the City hereby reserves all police powers granted to the City by law. In no way shall this Agreement be construed as the City bargaining away or surrendering its police powers.

19.0 Interpretation. The parties hereby agree and acknowledge that they have both participated equally in the drafting of this Agreement and no party shall be favored or disfavored regarding the interpretation to this Agreement in the event of a dispute between the parties.

20.0 Third-Party Rights. This Agreement is not a third-party beneficiary contract and shall not in any way whatsoever create any rights on behalf of any third party.

21.0 Specific Performance. Strict compliance shall be required with each and every provision of this Agreement. The parties agree that failure to perform the obligations provided

by this Agreement shall result in irreparable damage and that specific performance of these obligations may be obtained by a suit in equity.

22.0 Attorney's Fees. In connection with any arbitration or litigation arising out of this Agreement, each party shall be responsible for their own attorney's fees and costs.

23.0 Development Permits. Nothing herein shall limit the City's authority to grant or deny any development permit applications or requests subsequent to the effective date of this Agreement in accordance with the criteria of the City Code and the requirements of this Agreement. The failure of this Agreement to address any particular City, County, State and/or Federal permit, condition, term or restriction shall not relieve Developer or the City of the necessity of complying with the law governing said permitting requirement, condition, term or restriction. Without imposing any limitation on the City's police powers, the City reserves the right to withhold, suspend or terminate any and all certificates of occupancy for any building, trailer, structure or unit if Developer is in breach of any term and condition of this Agreement.

24.0 Default. Failure by either party to perform each and every one of its obligations hereunder shall constitute a default, entitling the non-defaulting party to pursue whatever remedies are available to it under Florida law or equity including, without limitation, an action for specific performance and/or injunctive relief. Prior to any party filing any action as a result of a default under this Agreement, the non-defaulting party shall first provide the defaulting party with written notice of said default. Upon receipt of said notice, the defaulting party shall be provided a thirty (30) day opportunity in which to cure the default to the reasonable satisfaction of the non-defaulting party prior to filing said action.

25.0 Termination. The City shall have the unconditional right, but not obligation, to terminate this Agreement, without notice or penalty, if Developer fails to receive building permits and substantially commence vertical construction of buildings, which shall at minimum include building foundations, for the Project within two (2) years of the effective date of this Agreement. The Developer may apply to the City Commission for an extension of this Agreement, which may be granted upon good cause shown. In addition, the City shall have the right, but not obligation, to terminate the Agreement if Developer permanently abandons construction of the Project, provided, however, the City shall first deliver written notice and an opportunity to cure to the defaulting party as set forth in Section 24 above. If the City terminates this Agreement, the City shall record a notice of termination against the Property in the public records of Seminole County, Florida. However, as described in Section 4.0, the Trail Tree planting obligation, cash contribution obligation, Detention Pond Property Conveyance, and Northwest Corner Property Conveyance including the relocation of the open stormwater conveyance system shall survive the termination of this Agreement if not already completed prior to the termination of this Agreement.

26.0 Indemnification and Hold Harmless. Developer shall be solely responsible for designing, permitting, constructing, operating and maintaining this Project. As such, Developer hereby agrees to indemnify, release, and hold harmless the City and its commissioners, employees and attorneys from and against all claims, losses, damages, personal injuries

(including, but not limited to, death), or liability (including reasonable attorney's fees and costs through all appellate proceedings), directly or indirectly arising from, out of, or caused by Developer and Developer's contractor's and subcontractor's performance of design, permit and construction, and maintenance activities in furtherance of constructing the Project and maintaining the improvements of this Project including, but not limited to, the Trail Trees and irrigation facilities and equipment. This indemnification shall survive the termination of this Agreement.

27.0 Force Majeure. The parties agree that in the event that the failure by either party to accomplish any action required hereunder within a specified time period ("Time Period") constitutes a default under the terms of this Agreement and, if any such failure is due to any unforeseeable or unpredictable event or condition beyond the control of such party, including, but not limited to, acts of God, acts of government authority (other than the City's own acts), acts of public enemy or war, riots, civil disturbances, power failure, shortages of labor or materials, injunction or other court proceedings beyond the control of such party, or severe adverse weather conditions ("Uncontrollable Event"), then, notwithstanding any provision of this Agreement to the contrary, that failure shall not constitute a default under this Agreement and any Time Period proscribed hereunder shall be extended by the amount of time that such party was unable to perform solely due to the Uncontrollable Event. The extended time period shall be agreed to in writing by the parties and said agreement shall not be unreasonably withheld by either party.

28. Notice. Whenever either party desires to give notice to the other, notice shall be sent by hand delivery or certified mail, return receipt requested, and shall be sent to:

For the City:

Shawn Boyle, City Manager
City of Winter Springs
1126 East S.R. 434
Winter Springs, Florida 32708

With additional notice to:

Anthony A. Garganese, City Attorney
Garganese, Weiss, D'Agresta & Salzman, P.A.
111 N. Orange Avenue, Suite 2000
Orlando, FL 32802

For Developer:

Robert Riva, Vice President
DFC Seminole Crossing, LLC
14701 Philips Highway, Suite 300
Jacksonville, Florida 32256-3743

With additional notice to:

Robert Rosen
Burr & Forman, LLP
200 South Orange Avenue, Suite 800
Orlando, FL 32801

Either party may freely modify their respective contact person and address contained in this Paragraph by providing written notice of the modification to the other party. Any Notice given as provided herein shall be deemed received as follows: if delivered by personal service, on the date so delivered; and if mailed, on the third business day after mailing.

29.0 Assignment. Prior to completing the construction of the Project and reaching final build-out of the Project, Developer shall not assign this Agreement without the prior written consent of the City. Such assignment shall also require the written approval of the City by amendment to this Agreement, which shall not require a public hearing and shall not be unreasonably withheld. However, Developer shall be entitled to assign its rights and obligations under this Agreement to a parent, subsidiary, or affiliated entity in which Developer or its members are members or interest holders without City consent, provided that the City is given notice of such assignment in accordance with Section 28.0 herein. Any assignment authorized by this subparagraph shall require the assignee to be a formal signatory to this Agreement and fully assume all of Developer's obligations, commitments, representations, and warranties under this Agreement. In any assignment, the rights and obligations contained herein shall be binding on successors in interest to the Property, and the terms and conditions of this Agreement shall bind and inure to the benefit of the parties hereto and any respective successors and assigns.

30.0 Homeowner's Association. In conjunction with the approval of the final subdivision for the Project, the Developer shall create a mandatory homeowner's association to govern the Project in accordance with Chapter 720, Florida Statutes. The association shall also be governed by the covenants and restrictions created and recorded against the Property by the Developer as required by this Agreement. A copy of the association's articles of incorporation, by-laws and recorded covenants and restrictions shall be provided to the City prior to the approval of the final subdivision. The homeowner's association shall be responsible for the perpetual maintenance and operation of all common areas and amenities constructed for the Project, shall govern the Project in accordance with the requirements of Florida law including the recorded covenants and restrictions and by-laws of the association, have the power to levy assessments and collect HOA fees, which are used to pay for the maintenance of the community common areas and any other designated areas that are detailed in the covenants and deeds applicable to the Project.

31.0 Model Homes. The City agrees to allow the Developer or Developer's chosen homebuilder(s) (hereinafter referred to in this Section as "Builder") for the Project to construct both a sales office and up to five (5) model homes in two townhome buildings to be

used for the customary temporary marketing and sales activities of the Builder. The Builder shall have the right to utilize two garages in two model home units as the temporary sales office. The City represents that such marketing and sales activities shall be permitted through buildout of the Project. The City agrees to permit early construction of the model homes prior to or after plat approval, provided that, prior to construction of the model homes, stabilized access to the model home lots and adequate means of fire protection from a City-approved source of water are completed and the following conditions, which are deemed acceptable to Builder, are adhered to:

(a) The model homes shall remain under Builder's ownership and control until such time as a final certificate of occupancy for each model home unit is issued under the conditions set forth below. In other words, the Builder shall not contract for sale, sell, or lease, for the purposes of residential occupation, any of the individual model home units until such time as the City issues a final certification of occupancy for each model home unit. The City agrees that nothing in this Section shall be construed as restricting or preventing the Builder from selling or conveying, prior to final plat approval, any land that is intended to coincide with the eventual location of the model home lots as will be depicted and legally described on the final plat or other land within the Project, provided the following conditions are met: (1) the land in such sale shall be legally described by metes and bounds without reference to the intended lot numbers that will be used in the final plat; (2) the buyer of the land shall be required to sign and join the final plat and shall be considered a co-developer of the Project; and (3) the provisions of Section 29.0 are followed. After the final plat is recorded but prior to the time a final certificate of occupancy is issued for a model home, the Builder shall further be permitted to engage in sale and leaseback transactions of the model homes, provided they continue to be used for the customary temporary marketing and sales activities of the Builder and not for residential occupation purposes.

(b) The model homes shall be constructed on existing or proposed lots approved by the City, and any associated parking, pedestrian activity and other activities conducted by sales staff or the general public shall be adequately segregated from construction activities to ensure safety. Parking for the model homes shall be provided in a temporary parking lot to be located in an area approved by the City, which may consist of a mulch surface. Prior to a final certificate of occupancy being issued on the last remaining model home, the mulch surface shall be removed and the area shall either be prepared for home construction, open space or recreational amenity or seeded.

(c) The model sales office shall comply with all applicable state and city regulations regarding accessibility. In addition, Builder shall provide a minimal level of access to all model homes for potential homebuyers with disabilities by providing physical access (via ramp or lift) to the primary level each model home and making photographs of other levels within each home available to the customer.

(d) Prior to construction, the model homes shall be duly permitted by the City in accordance with the City's Code. As part of the building permit application, the Builder shall submit, along with all construction plans for the units, a duly certified boundary survey which

shall depict the location and legal description of each individual model lot. The Builder acknowledges and agrees that this legal description is intended to coincide with the eventual location of the lots as depicted and legally described on the final plat. The Builder shall assume full and complete responsibility in the event that said legal descriptions do not conform to the lot lines required by the City in the final plat. The Builder fully understands the construction of model homes before final plat is approved by the City may pose a risk to the Builder if the approved plat is not consistent with the layout of model home on the subject property, and that such risk may require modification or removal of the model home based on the approved plat before a final certificate of occupancy can be issued for the model home. The Builder agrees to defend, indemnify, and hold harmless the City from and against any and all damages, losses or claims arising from the layout and construction of the model home under this Agreement prior to preliminary and final plat approval as provided further in Section 26.0 of this Agreement.

(e) At such time as the City Building Official completes and approves a final inspection of the model homes, the City will issue a temporary certificate of occupancy. Said temporary certificate of occupancy shall be issued for each model home as a whole. Occupancy of the model home units shall be limited to the sales and marketing efforts for the Project until a final certificate of occupancy is issued for such model home units. It is intended that the model homes can be shown by sales staff to prospective buyers as long as the Building Official has issued the temporary certificate of occupancy and the model is not staffed continuously.

(f) Following completion of all required plat improvements, at the request of the Builder or at such time as the Project development is completed, whichever occurs sooner, the model home units shall be converted into permanent residential units and the City shall issue final certificates of occupancy for each model home unit, provided, that the City Building Official determines that such units are suitable for permanent residential occupancy and in compliance with the City Codes.

Nothing in this Section shall cause to limit the number of inventory homes (pre-sale, spec homes) that may be constructed on the Property. Violation of this Section will also constitute a violation of the City Code of Ordinances, and the provisions of this Section may also be enforced as provided therein. Any Builder desiring to construct a model home pursuant to this Section, other than Developer, shall be provided a copy of this Section by the Developer if Builder is not the owner of the subject property on which the model home will be constructed and shall automatically be deemed to have agreed to the terms and conditions herein as a condition of the issuance of a building permit by the City even if they are not the owner or have not consented, in writing, to the term and conditions of this Section.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seal on the date first above written.

CITY OF WINTER SPRINGS

By: _____

DEVELOPMENT AGREEMENT

City of Winter Springs and DFC Seminole Crossing, LLC.

Charles Lacey, Mayor

ATTEST:

By: _____
Andrea Lorenzo Luaces, City Clerk

APPROVED AS TO FORM AND LEGALITY
For the use and reliance of the City of Winter Springs,
Florida only.

CITY SEAL

Date: _____
By: _____
Anthony A. Garganese, City Attorney for
the City of Winter Springs, Florida

DRAFT

Signed, sealed and delivered in the presence of the following witnesses:

DFC Seminole Crossing, LLC

Signature of Witness

Print name and title: _____

Printed Name of Witness

Date: _____

Signature of Witness

Printed Name of Witness

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, 2019, by _____, the _____ of _____, a _____.

He is personally known to me or produced _____ as identification.

(NOTARY SEAL)

(Notary Public Signature)

(Print Name)

Notary Public, State of _____

Commission No.: _____

My Commission Expires: _____

DEVELOPER IS HEREBY ADVISED THAT SHOULD DEVELOPER FAIL TO FULLY EXECUTE, AND DELIVER TO THE CITY, THIS AGREEMENT WITHIN THIRTY (30) DAYS FROM THE DATE THAT THE CITY COMMISSION APPROVES THIS AGREEMENT, THIS AGREEMENT, AND THE DEVELOPMENT PERMIT APPROVALS REFERENCED HEREUNDER, SHALL AUTOMATICALLY BE DEEMED NULL AND VOID.

EXHIBIT A
PROPERTY LEGAL DESCRIPTION

Insert Legal

DRAFT

EXHIBIT B

DETENTION POND PROPERTY LEGAL DESCRIPTION

DRAFT

JOINDER AND CONSENT

For and in consideration of the mutual covenants, terms, and conditions and restrictions contained herein, together with other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, **the Varde Private Debt Opportunities Fund (Onshore), L.P.**, a Delaware limited partnership, as holder of that certain Mortgage, Security Agreement, Assignment of leases and Rents and Fixture Financing Statement (hereinafter referred to as the "Mortgage") which is recorded in Official Records Book 9342, Page 1701 of the Public Records of Seminole County, Florida, hereby joins in and consents to the foregoing Development Agreement by and between the City of Winter Springs, a Florida municipal corporation, and DFC Seminole Crossing, LLC, a Florida limited liability company, and further acknowledges and agrees that its Mortgage shall be subordinated to such Development Agreement and the obligations contained therein.

Dated this _____ day of _____, 2019.

Signed and sealed in the presence of:

The Varde Private Debt Opportunities Fund (Onshore), L.P.

By:

Print Name: _____

Name: _____

Title : _____

Print Name: _____

STATE OF _____)

) SS.:

COUNTY OF _____)

Personally appeared before me, the undersigned, a Notary Public within and for said State and County, duly commissioned and qualified, _____, with whom I am personally acquainted, or proved to me on the basis of satisfactory evidence, and who, upon oath, acknowledged themselves to be the _____ of the Varde Private Debt Opportunities Fund (Onshore), L.P., on behalf of the corporation, and that he/she as such _____, and being fully authorized to do so, executed the foregoing instrument, for the purposes therein contained by signing the name of the corporation by themselves as such officers.

WITNESS my hand and seal this _____ day of _____, 2019.

Notary Public

My Commission Expires: _____