CITY OF Hollywood
DEVELOPMENT SERVICES
PLANNING DIVISION

GENERAL APPLICATION

APPLICATION DATE: _____

2600 Hollywood Blvd
Room 315
Hollywood, FL 33022
Tel: (954) 921-3471
Email: Development@Hollywoodfl.org

SUBMISSION REQUIREMENTS:

- One set of digitally signed & sealed plans *(i.e. Architect or Engineer)*
- One electronic **combined** PDF submission *(max. 25mb)*
- Completed Application Checklist
- Application fee (per review)

NOTE:

- This application must be **completed in full** and submitted with all documents to be placed on a Board or Committee's agenda.
- The applicant is responsible for obtaining the appropriate checklist for each type of application.
- Applicant(s) or their authorized legal agent must be present at all Board or Committee meetings.

CLICK HERE FOR FORMS, CHECKLISTS, & MEETING DATES

APPLICATION TYPE (CHECK ONE):

- ☑ Technical Advisory Committee
- ☐ City Commission
- ☐ Variance/Special Exception Requested
- ☐ Administrative Approvals
- ☐ Historic Preservation Board
- ☐ Planning and Development Board

PROPERTY INFORMATION

Location Address: 3501 Johnson Street (specific project fronts Hospital Drive)
Lot(s): _____ Block(s): 46-48,pts 82-85 Subdivision: Hwd Hills 6-22
Folio Number(s): 5142 07 02 1000
HD
Zoning Classification: HD Land Use Classification: Community Facili
Existing Property Use: Hospital Sq Ft/Number of Units: 1,188,887 sq. ft.
Is the request the result of a violation notice? ( ) Yes ( ) No If yes, attach a copy of violation.
Has this property been presented to the City before? If yes, check all that apply and provide File/Resolution/Ordinance No.: PACO, PTAC, Other projects on campus over nea

DEVELOPMENT PROPOSAL

Explanation of Request: Expansion of surgical and bed facilities in a new 8
Curbside modification for patient drop off and pick up; hardscape elements
Phased Project: Yes / No ☑ Number of Phases: _____

Project	Proposal		
Units/rooms (# of units)		(Area:	S.F.)
Proposed Non-Residential Uses	Net increase of 292,662 sq. ft. of hospital		S.F.
Open Space (% and SQ.FT.)	N/A	(Area:	S.F.)
Parking (# of spaces)	584	(Area:	S.F.)
Height (# of stories)	8	(119.11	FT.)
Gross Floor Area (SQ. FT)	404,492 new construction after 111,830 dem		

Name of Current Property Owner: South Broward Hospital District
Address of Property Owner: 3111 Stirling Road, Hollywood, Fl 33312-6566
Telephone: 954-265-8670 Email Address: Mgreenspan@mhs.net

Applicant Calvin Giordano & Assoc. A ☑ Consultant | ☐ Representative | ☐ Tenant (check one)
Address: 1800 Eller Drive, Suite 600 Telephone: 954-921-7781
Email Address: Hholden@cgasolutions.com; Jmessick@cgasolutions.com
Email Address #2: Mgreenspan@mhs.net; Hcalhoun@miskelbackman.com
Date of Purchase: _____ Is there an option to purchase the Property? Yes ☐) No ☑)
If Yes, Attach Copy of the Contract.

Noticing Agent (FTAC & Board submissions only) : Christina Matthews of Cutro & A
E-mail Address: cutroplanning@yahoo.com

PLANNING DIVISION

2600 Hollywood Boulevard Room 315
Hollywood, FL 33022

File No. (internal use only): _____

GENERAL APPLICATION

CERTIFICATION OF COMPLIANCE WITH APPLICABLE REGULATIONS

The applicant/owner(s) signature certifies that he/she has been made aware of the criteria, regulations and guidelines applicable to the request. This information can be obtained in Room 315 of City Hall or on our website at www.hollywoodfl.org. The owner(s) further certifies that when required by applicable law, including but not limited to the City's Zoning and Land Development Regulations, they will post the site with a sign as approved by the Division of Planning & Urban Design. The owner(s) will photograph the sign the day of posting and submit photographs to the Office of Planning and Development Services as required by applicable law. Failure to post the sign will result in violation of State and Municipal Notification Requirements and Laws.

(I)(We) certify that (I) (we) understand and will comply with the provisions and regulations of the City's Zoning and Land Development Regulations, Design Guidelines, Design Guidelines for Historic Properties and City's Comprehensive Plan as they apply to this project. (I)(We) further certify that the above statements and drawings made on any paper or plans submitted herewith are true to the best of (my)(our) knowledge. (I)(We) understand that the application and attachments become part of the official public records of the City and are not returnable.

Signature of Current Owner: Kimberly Paez Date: 5/21/24

PRINT NAME: Kimberly Paez Date: 5/21/24

Signature of Consultant/Representative: _____ Date: 5/21/24

PRINT NAME: Jenna Martinetti Date: _____

Signature of Tenant: _____ Date: _____

PRINT NAME: _____ Date: _____

Current Owner Power of Attorney

I am the current owner of the described real property and that I am aware of the nature and effect the request for Site Plan Approval to my property, which is hereby made by me or I am hereby authorizing Calvin Giordano & Assoc. to be my legal representative before the City of Hollywood (Board and/or Committee) relative to all matters concerning this application.

Sworn to and subscribed before me
this 21st day of May

Ricardo Correa
Notary Public
State of Florida
My Commission Expires: 1/10/28 (Check One) X Personally known to me; OR ___ Produced Identification _____

RICARDO CORREA
Notary Public - State of Florida
Commission # HH 479738
My Comm. Expires Jan 10, 2028
Bonded through National Notary Assn.

Kimberly Paez
Signature of Current Owner

Kimberly Paez
Print Name

Memorial Healthcare System

MEMORIAL REGIONAL HOSPITAL • MEMORIAL REGIONAL HOSPITAL SOUTH • JOE DIMAGGIO CHILDREN'S HOSPITAL
MEMORIAL HOSPITAL WEST • MEMORIAL HOSPITAL MIRAMAR • MEMORIAL HOSPITAL PEMBROKE

April 4, 2024

To Whom It May Concern:

Please be advised that the following employees are authorized to sign Permit Applications, Notices of Commencement, and other construction documents, as required for the Memorial Healthcare System:

Mark Greenspan, Vice President, Construction & Property Management
Carmen Gonzalez, Director, Construction Services
Marta McNab, Assistant Director, Construction Services
Kim Paez, Assistant Director, Construction Services
Michelle Acherman, Project Manager, Construction Services
Ines Castillo Maguina Senior Project Manager, Construction Services
Leetal Dana, Project Manager, Construction Services
Berna Espinoza, Senior Project Manager, Construction Services
Rebeca Kanakis, Senior Project Manager, Construction Services
Francisco Robles, Senior Project Manager, Construction Services
Rebecca Smith, Senior Project Manager, Construction Services
Adam Mayle, Administrative Director Facilities Management

If you have any questions, please feel free to contact me at 954-265-8673.

Sincerely,

Mark Greenspan
Vice President,
Construction & Property Management

ALEXANDRA J. ARGUEZA
Notary Public - State of Florida
Commission # HH 356971
My Comm. Expires Mar 15, 2027
Bonded through National Notary Assn.

Alexandra J. Argueza
Commission #HH 356971

Memorial Hospital Master Plan Narrative
May 24, 2024

Consistent with the Second Amendment to Interlocal Agreement, entered into on July 16, 2018 ("Amendment"), the South Broward Hospital District (the "District"), is submitting a site plan to the city of Hollywood ("City") which includes a portion of the improvements outlined in Phase 3 of the Districts Phasing Plan. Specifically, the District is submitting a site plan to construct a new and improved 3 story outpatient platform which will include surgical and critical care services and a 5 story ICU patient tower to accommodate 150 private critical care patient rooms. The proposed construction will total 8 stories (119' feet) to match the existing hospital.

In addition to the vertical expansion. The two exiting drop-off areas on the south side of Hospital Drive will be modified to create a single drop off lane in order to improve the existing valet services. Lastly, in connection with the described site work, vehicular circulation will be improved, and exterior signage will be updated.

STORMWATER MANAGEMENT REPORT

PROJECT:

MEMORIAL REGIONAL HOSPITAL
O.R. EXPANSION

Hollywood, Florida

Prepared For:

THE MEMORIAL HEALTHCARE SYSTEM

Prepared By:

Calvin, Giordano & Associates, Inc.

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS℠
1800 Eller Drive, Suite 600 · Fort Lauderdale, FL 33316
(phone) 954.921.7781 · (fax) 954.266.6487
Certificate of Authorization #514

May 2024

_____

James D. Messick , P.E.
License Number 70870

TABLE OF CONTENTS

EXHIBITS

APPENDICES

1.0 INTRODUCTION

The Memorial Healthcare Systems (the "Owner") is proposing to expand the existing hospital structure to an additional building area of ±0.44 AC (the "Project"). The Project's scope of work includes associated site infrastructure together with improvements to the existing stormwater management system. The existing Memorial Regional Hospital is located at 3501 Johnson St., Hollywood, FL 33021, with an existing master stormwater license permit for an overall project area of ±20.80 AC, the Project site specific area is of ±4.67 AC. The proposed improvements to the Memorial Regional Hospital complex are specifically located at the intersection of Hospital Drive and N 37th Avenue.

The existing stormwater management system consists of interconnected pipes, structures and exfiltration trench. The proposed stormwater management system includes an exfiltration trench length for the Project site specific area, in addition to the existing underground storage system in place.

This report has been prepared to define and analyze the site conditions and stormwater peak stages that would occur as a result of the post-development site runoff. This report analyzes a pre-development vs post-development scenario for the permitted drainage criterion to establish the requirements for this project. This report describes related information discovered during site reconnaissance and project research.

2.0 PROJECT BACKGROUND

2.1 Location

The proposed project is located in Section 8, Township 51 South, Range 24 East, Broward County, Florida. The enclosed Location Map includes the approximate limits of the proposed project site.

The Memorial Regional Hospital complex has a Broward County parcel identification number 51-42-07-02-10-00. The complex has a total contributing drainage area of ±20.80 AC. The subject property is located within the jurisdiction of South Florida Water Management District (SFWMD), Broward County Environmental Resources and Growth Management Division (BCERGMD), and the City of Hollywood. The subject property is located at the northwest corner of the intersection between Johnson St. and N 35th Ave.

2.2 Project Description

The Owner is proposing to expand the existing hospital structure to an additional building area of ±0.44 AC. The Project's scope of work includes associated site infrastructure together with improvements to the existing stormwater management system. The proposed stormwater management system includes an exfiltration trench length for the Project site specific area, in addition to the existing underground storage system in place.

3.0 EXISTING CONDITIONS

3.1 Topography

For the purposes of consistency, the remainder of this report and plans have been prepared utilizing the North American Vertical Datum of 1988 (NAVD).

The existing topography is highly impervious and is relatively flat where the elevations range between 12.60 and 8.50. Refer to the Paving, Grading, & Drainage Plan enclosed.

The FEMA FIRMette Map 12011C0568H indicates that the site is in Zone AH, elevation 10. Refer to Broward FEMA flood map enclosed in the attachments.

3.2 USDA Soil Survey

Based on a review of the Custom Soil Survey by the Natural Resources Conservation Service (NRCS) of the United States Department of Agriculture (USDA), there is one (1) type of soil onsite. The site is defined as Urban land. The USDA soil survey map is enclosed. Flatwoods is the soil type used to calculate the site soil storage depth.

3.3 Wet Season Water Table/ Control Elevation

According to the Broward County Future Conditions Average Wet Season Groundwater Elevation Map, enclosed, the wet season water table, or control elevation, is 1.50 feet.

3.4 Previously Approved Drainage Conditions per BCERGMD

The Memorial Regional Hospital complex is part of a master permit granted by BCERGMD SWM1990-088 for a total area of ±20.80 AC. Since the approval of the master permit there have been several modifications to the stormwater license. There are three (3) modifications that are directly associated to the system in the Project site specific area. These are: a. SWM1993-059-0 (related to the parking garage south of Garfield), b. SWM1992-019-6 (related to the central energy plant project on N 37th Ave.) and c. SWM1992-019-7 (related to the parking garage west of N 37th Ave.)

The permit in place does not limit the exfiltration trench credit to the SFWMD 3.28" maximum exfiltration trench credit rule; therefore, it was not included as part of this analysis.

Permits a, b and c listed above include an exfiltration trench system that provides a total volume of 0.38 ac-ft to the Project site specific area, see enclosed calculations. Finally, the aforementioned permits have an established finished floor elevation (F.F.E.) of 12.60.

The pre-development drainage area includes +/- 0.47 AC of existing roof area runoff attenuation of which +/- 0.19 AC will be redirected to a different stormwater system on the complex under separate permit SWM1992-019-3, by others.

Based on the findings of the existing permits Geotechnical investigations included double-ring infiltration tests, the results obtained revealed an infiltration rate averaging 6.23x10-4 cfs/sqft per ft head which is utilized for the exfiltration trench calculations.

4.0 DESIGN CRITERIA AND OVERVIEW

4.1 Proposed Drainage System

The proposed stormwater management design for the Project site specific area will utilize site grading strategies, series of interconnected inlets, underground drainage exfiltration trench and pipe system to satisfy the stormwater quantity requirements.

4.2 Water Quality Treatment Volume

Per Environmental Resource Permit Applicant's Handbook Volume II, Part IV- Stormwater Quality Section 4.2.1.a; the required design treatment volume for new development is the greater of the following:

a. The first inch of runoff from the entire contributing area
b. 2.5 inches times the percentage of imperviousness for the contributing area.

Post-Development Land Uses

Post-development Land Uses	Area (AC)
Buildings	0.81
Pavement Areas (Roads, sidewalks, misc. impervious)	3.29
Garage Ramp	0.28
Landscape/Grass	0.21
Total Impervious	4.38
Total Pervious	0.21
Total	4.59

For the subject property, the greater of the two above-mentioned options is option (b). Based on the post-development land values above, a treatment volume of 0.74 ac-ft is required. This treatment volume corresponds with stage elevation 2.80, which can be found using interpolation of the stage storage table within the exfiltration trench cross section. The calculations for these design parameters are available in the Drainage Calculations enclosed in the Appendices of this report.

Post-Development Stage Storage

Post-development Stage Storage Elevation	Site Storage Volume (ac-ft)
1.00	0.00
1.50	0.21
2.00	0.41
2.50	0.62
3.00	0.82
3.50	1.03
4.00	1.23
4.50	1.44
5.00	1.65
5.50	1.85
6.00	2.06
6.50	2.26
7.00	2.47
7.50	2.68
8.00	2.88
8.50	3.09
9.00	3.29
9.50	3.50
10.00	3.63
10.50	3.64
11.00	3.90
11.50	4.62
12.00	5.73
12.50	7.23
13.00	9.40

4.4 Water Quantity

The storm events utilized to determine minimum inlet elevation, perimeter berm elevation, and FFE are as follows:

- The 5-year/24-hour storm (3.20 inches) was used to determine the minimum inlet grate elevation.
- The 10-year/24-hour storm (9.30 inches) was used to determine minimum road crown elevation.
- The 25-year/72-hour storm (14.41 inches) was used to determine the minimum perimeter berm elevation (for informational purposes; not required).
- The 100-year/72-hour storm (19.37 inches) was used to verify the minimum FFE of 12.60 is adequate.

The TR-55 calculations with no discharge, were completed for the post-development site conditions with the aforementioned details. See the appendices of this report for the Drainage Calculations. Exfiltration trench is utilized for both water quality and water quantity purposes.

5.0 DESIGN MODELING, SUMMARY, AND RESULTS

The rainfall data for the 5-year/1-hour, 10-year/24-hour, and 100- year/72-hour has been incorporated in determining the stormwater design for the post-development site conditions in order to attenuate the runoff effectively. The Project has a minimum inlet grates elevation of 10.65, and minimum crown of road elevation of 11.39 with the Finished Floor Elevation at 12.60 and the site will be graded accordingly. The inlets catch runoff from the site and allow it to be routed and treated in the exfiltration trench.

Storm Frequency (Duration-Hour)	Pre-Development Routed Peak Stage Elevation	Post-Development Routed Peak Stage Elevation	Post-Development Design Grading Parameter Elevation
5-year/1-hour	**10.95**	**3.65**	10.65 (Min. Inlet)
10-year/24-hour	**11.66**	**9.31**	11.39 (Min. Crown of Road)
100-year/72-hour	**12.54**	**12.51**	12.60 (Finished Floor Elevation)

These results demonstrate that the proposed elevations meet the requirements set forth by BCERGMD.

6.0 CONCLUSION / RECOMMENDATION

The post-development site conditions have been designed with provisions for the safe and efficient control of stormwater runoff in a manner that will not adversely impact the pre-development drainage patterns, adjacent roadways or adjacent parcels. We respectfully request your review and approval of the requested stormwater permits for construction.

7.0 REFERENCE MATERIAL

1. USDA Urban Hydrology for Small Watersheds TR-55
2. SFWMD Environmental Resource Permit Information Manual 2014
3. BCERGMD Design Criteria

GARFIELD STREET

EXISTING CONFERENCE CENTER

N 37TH AVENUE

EXISTING GARAGE RAMP AREA

EXISTING MULTI-STORY PARKING GARAGE

EXISTING M.O.B.

HOSPITAL DRIVE

PROJECT PRE DEVELOPMENT AREA (±4.78 AC)

PROPOSED LANDSCAPE AREA

PROJECT POST DEVELOPMENT AREA (±4.59 AC)

EXISTING LANDSCAPE AREA

PROPOSED BUILDING LIMITS

SANITARY MANHOLE
RIM EL.=11.67'
S.E. INV. EL. 5.25' 8" PVC
W. INV. EL. 5.17' 8" PVC

PROPOSED BED TOWER (8 STORY)
PROP. F.F.E. = 12.60' NAVD

EXISTING BUILDING LIMITS

EXISTING PARKING GARAGE STRUCTURE

PROPOSED SURGERY PLATFORM & LEVEL 03 CONNECTOR

EXISTING MEMORIAL HOSPITAL

N 35TH AVENUE

GRAPHIC SCALE
0 10 20 40
(IN FEET)
1" = 20'

EXH DRAINAGE AREA EXHIBIT
1" = 20'-0"

HKS

ARCHITECT
HKS ARCHITECTS, INC.
2020 SALZEDO STREET, 4TH FLOOR
CORAL GABLES, FL 33134

INTERIOR DESIGNER
HKS ARCHITECTS
225 EAST ROBINSON ST. SUITE #405
ORLANDO, FL 32801

CIVIL & LANDSCAPE
CALVIN, GIORDANO & ASSOCIATES
1800 ELLER DRIVE, SUITE 600
FORT LAUDERDALE, FL 33316

STRUCTURAL ENGINEER
GMG STRUCTURAL ENGINEERS
14335 COMMERCE WAY
MIAMI LAKES, FL 33016

MEP & FIRE PROTECTION
TLC ENGINEERING SOLUTIONS, INC.
800 FAIRWAY DRIVE
DEERFIELD BEACH, FL 33441

TELECOM & EQUIPMENT
SMITH SECKMAN REID, INC.
2995 SIDCO DRIVE
NASHVILLE, TN 37204

OWNER
MEMORIAL HEALTHCARE SYSTEM
3501 JOHNSON STREET
HOLLYWOOD, FL 33021

Memorial Regional Hospital

SURGICAL & CRITICAL CARE TOWER EXPANSION
3501 JOHNSON STREET. HOLLYWOOD, FL 33021

INTERIM REVIEW ONLY

These documents are incomplete, and are released for interim review only and are not intended for regulatory approval, permit, or construction purposes.

Engineer: James D. Messick
P.E. License No.: 70870
Date: 06/26/2023

REVISION

JAMES D. MESSICK, P.E. STATE OF FLORIDA REGISTERED STATE OF FLORIDA PROFESSIONAL ENGINEER LICENSE NO. 70870 THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY JAMES D. MESSICK ON THE DATE INDICATED HERE. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

HKS PROJECT NUMBER
23459.000
DATE
JUNE 26, 2023
ISSUE
DESIGN DEVELOPMENT PROGRESS PRINT
SHEET TITLE
PAVING, GRADING, & DRAINAGE PLAN
SHEET NUMBER
EXHIBIT

MARTY KIAR
BROWARD COUNTY
PROPERTY APPRAISER

Site Address	3501 JOHNSON STREET, HOLLYWOOD FL 33021
Property Owner	SOUTH BROWARD HOSPITAL DISTRICT ATTN: PROPERTY MANAGEMENT
Mailing Address	3111 STIRLING RD FORT LAUDERDALE FL 33312-6566

ID #	5142 07 02 1000
Millage	0513
Use	85-04

Abbr Legal Description	HOLLYWOOD HILLS 6-22 B ALL OF BLKS 46,47,48,POR OF BLK 82,83,84,85 AS IN OR 46465/713 TOG W/STS & ALLEYS VAC IN DB 764/208 & 21384/16 & A POR OF ALLEY DESC'D IN OR 48015/989, TOG W/POR OF BLK 15,16,17 DESC AS BEG NW COR LOT 37 BLK 17, E 215,S 790,E 85,S 125,W 190, N 140,W 110,N 775 TO POB,TOG W/LOT 32 BLK 16

The just values displayed below were set in compliance with Sec. 193.011, Fla. Stat., and include a reduction for costs of sale and other adjustments required by Sec. 193.011(8).

* 2023 values are considered "working values" and are subject to change.

Property Assessment Values

Year	Land	Building / Improvement	Just / Market Value	Assessed / SOH Value	Tax
2023*	$8,981,140	$171,359,000	$180,340,140	$180,340,140	
2022	$8,981,140	$171,359,000	$180,340,140	$165,635,380	$35,313.64
2021	$8,981,140	$141,596,480	$150,577,620	$150,577,620	$31,472.40

2023* Exemptions and Taxable Values by Taxing Authority

	County	School Board	Municipal	Independent
Just Value	$180,340,140	$180,340,140	$180,340,140	$180,340,140
Portability	0	0	0	0
Assessed/SOH	$180,340,140	$180,340,140	$180,340,140	$180,340,140
Homestead	0	0	0	0
Add. Homestead	0	0	0	0
Wid/Vet/Dis	0	0	0	0
Senior	0	0	0	0
Exempt Type 91-93	$178,536,740	$178,536,740	$178,536,740	$178,536,740
Taxable	$1,803,400	$1,803,400	$1,803,400	$1,803,400

Sales History

Date	Type	Price	Book/Page or CIN

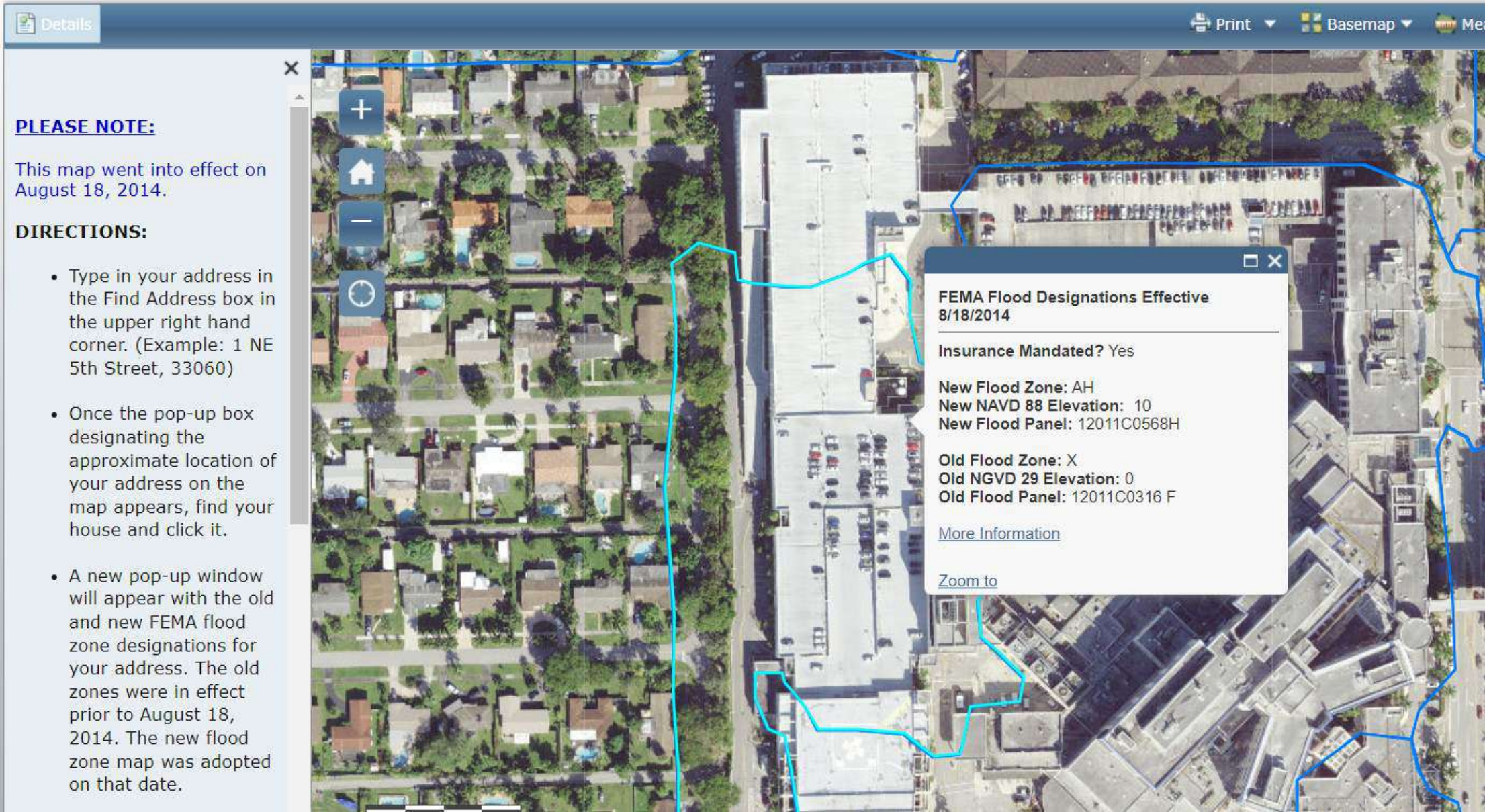
Land Calculations

Price	Factor	Type
$8.00	1,122,642	SF
Adj. Bldg. S.F. (Card, Sketch)		2632641
Eff./Act. Year Built: 1980/1952		

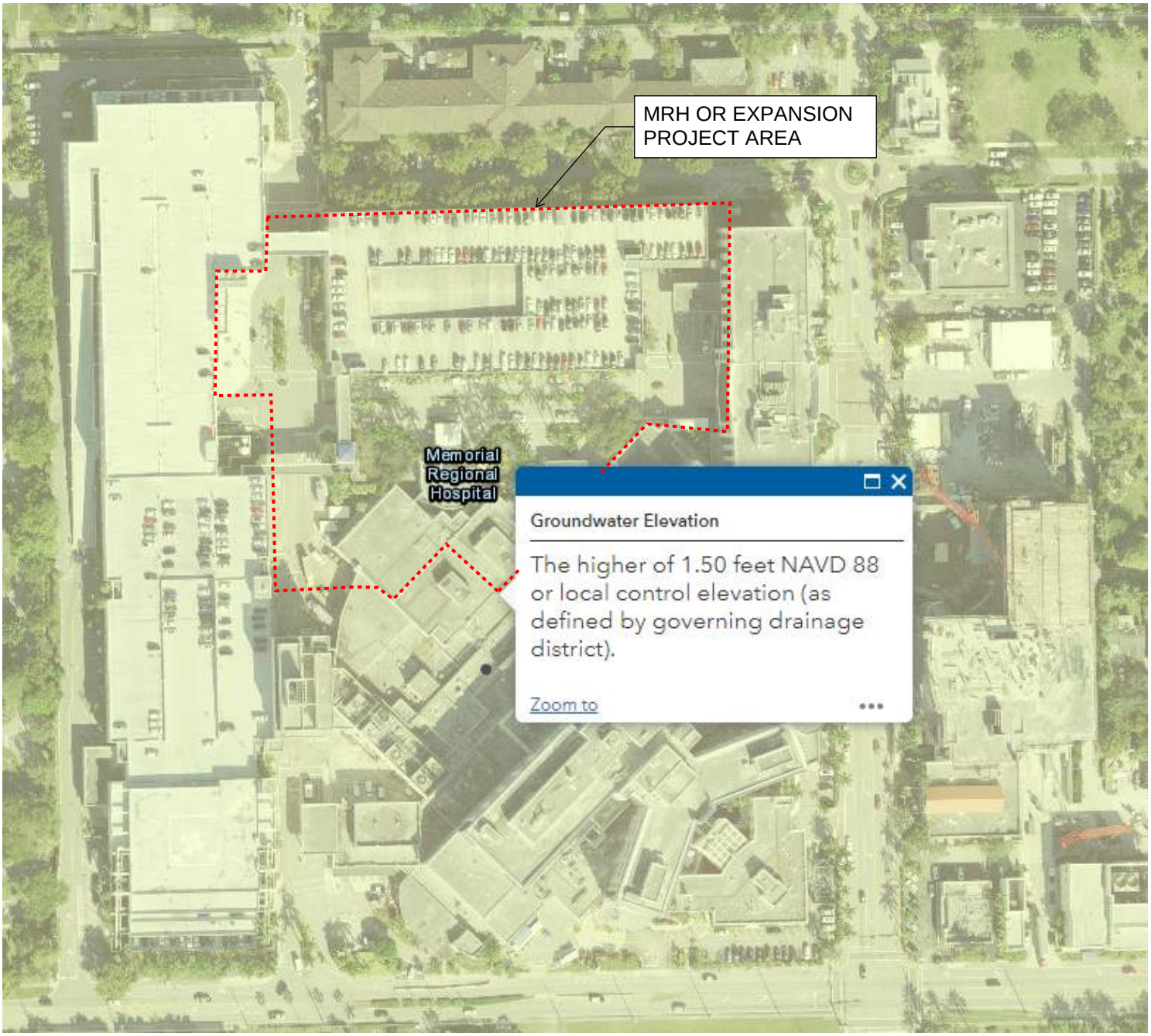
Special Assessments

Fire	Garb	Light	Drain	Impr	Safe	Storm	Clean	Misc
05								
Q								
30572								

Broward FEMA Flood Map Effective August 18, 2014



MRH OR Expansion - Broward County Future Conditions Average Wet Season Groundwater Elevation Map



United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Broward County, Florida, East Part

August 4, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Map Scale: 1:3,970 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Broward County, Florida, East Part
Survey Area Data: Version 18, Sep 1, 2022

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

Date(s) aerial images were photographed: Jan 14, 2022—Jan 24, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
11	Dade-Urban land complex	38.9	55.2%
40	Urban land, 0 to 2 percent slopes	31.6	44.8%
Totals for Area of Interest		**70.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Broward County, Florida, East Part

11—Dade-Urban land complex

Map Unit Setting

National map unit symbol: 1hn8q
Elevation: -20 to 30 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Dade and similar soils: 55 percent
Urban land: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dade

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits over soft limestone

Typical profile

A - 0 to 8 inches: gravelly sand
E - 8 to 27 inches: fine sand
Bh - 27 to 35 inches: fine sand
Cr - 35 to 39 inches: weathered bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 60 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

Minor Components

Basinger

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

Immokalee, limestone substratum

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Margate

Percent of map unit: 1 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

40—Urban land, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x9fc
Elevation: 0 to 200 feet
Mean annual precipitation: 40 to 68 inches
Mean annual air temperature: 68 to 79 degrees F
Frost-free period: 345 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Flatwoods on marine terraces, rises on marine terraces, knolls on marine terraces, ridges on marine terraces, hills on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser, talf, rise
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

St. augustine

Percent of map unit: 3 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Matlacha

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf

Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Adamsville

Percent of map unit: 1 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G155XB131FL), Upland Hardwood Hammock (R155XY008FL)
Hydric soil rating: No

Eaugallie

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Paola

Percent of map unit: 1 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G155XB111FL), Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

Immokalee

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Brynwood

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: Yes

Myakka

Percent of map unit: 1 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Pomello

Percent of map unit: 1 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G155XB131FL), Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

Apopka

Percent of map unit: 1 percent
Landform: Ridges on marine terraces, hills on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G155XB111FL), Longleaf Pine-Turkey Oak Hills (R155XY002FL)
Hydric soil rating: No

Cypress lake

Percent of map unit: 1 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: Yes

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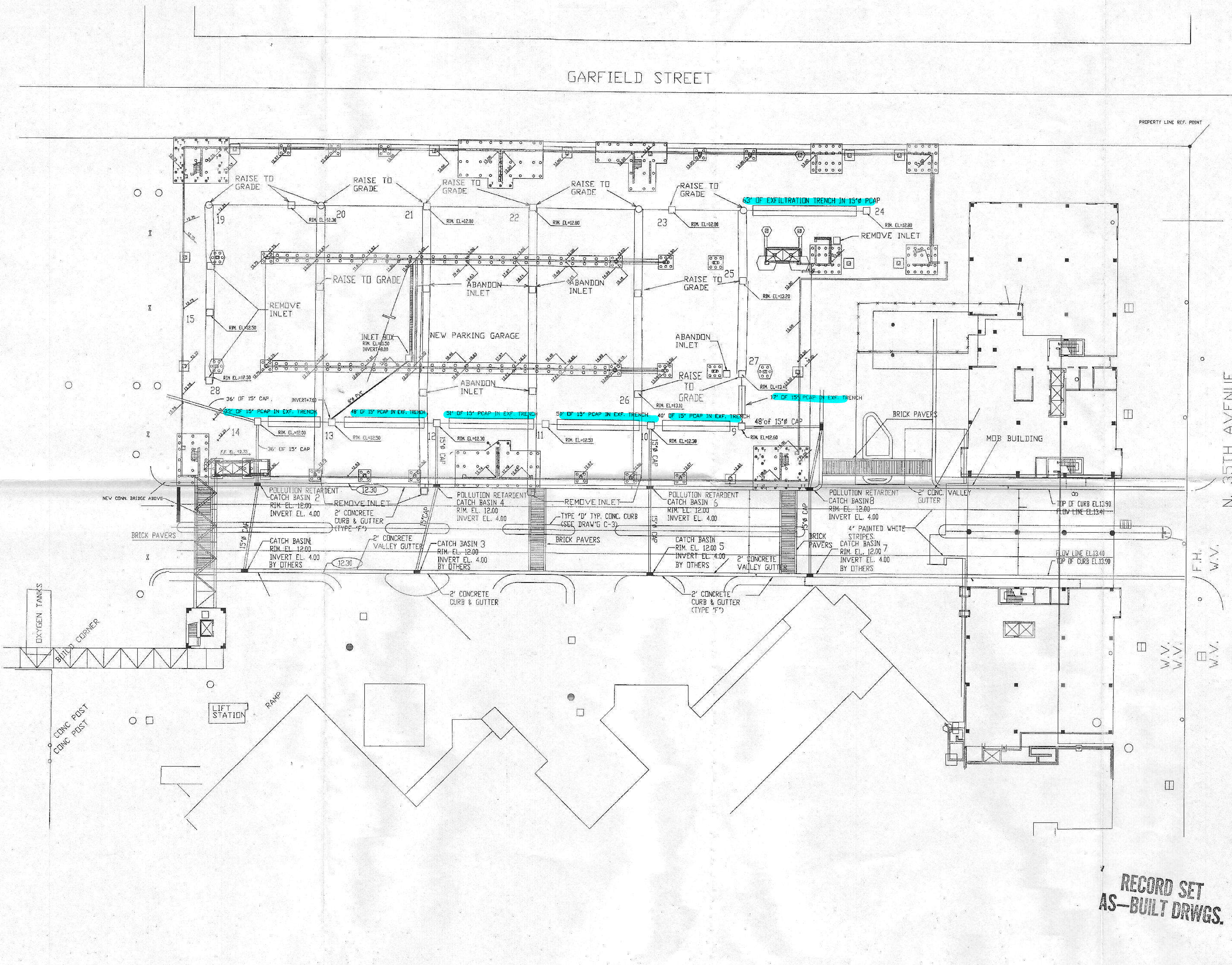


REVISIONS

Date	Issued For	By
7/23/93	PERMITTING	B.P.
1/20/94	REVISED DRAINAGE	

CHARLES WALER, P.E., INC.
STRUCTURAL ENGINEERING

PARKER ENGINEERING COMPANY, INC.

RICH AND ASSOCIATES
Architecture
Parking Consultants
Engineering

PROPOSED PARKING STRUCTURE FOR
MEMORIAL HOSPITAL
HOLLYWOOD FLORIDA

DRAINAGE

Drawn By
Checked By
Approved By
Approved For
Construction By
Date Plotted

File No.
Date 2/28/94
Scale 1"=20'
Last Rev.
Dwg. No C-1

RECORD SET
AS-BUILT DRWGS.

MEMORIAL REGIONAL HOSPITAL OR EXPANSION

SWM1993-059-0 WATER QUALITY CALCULATIONS:

Permitted under Broward County Stormwater License No. SWM1993-059-0 the volume of first inch of runoff from the entire contributing area:

= 1.00 inch X 0.540 acres X (1 foot / 12 inches)
= **0.045** **ac-ft for the first inch of runoff required of wet detention storage**

The first inch of runoff from the entire developed site = 0.045 ac-ft

The volume permitted is	**0.045**	**ac-ft**

EXFILTRATION TRENCH CALCULATIONS

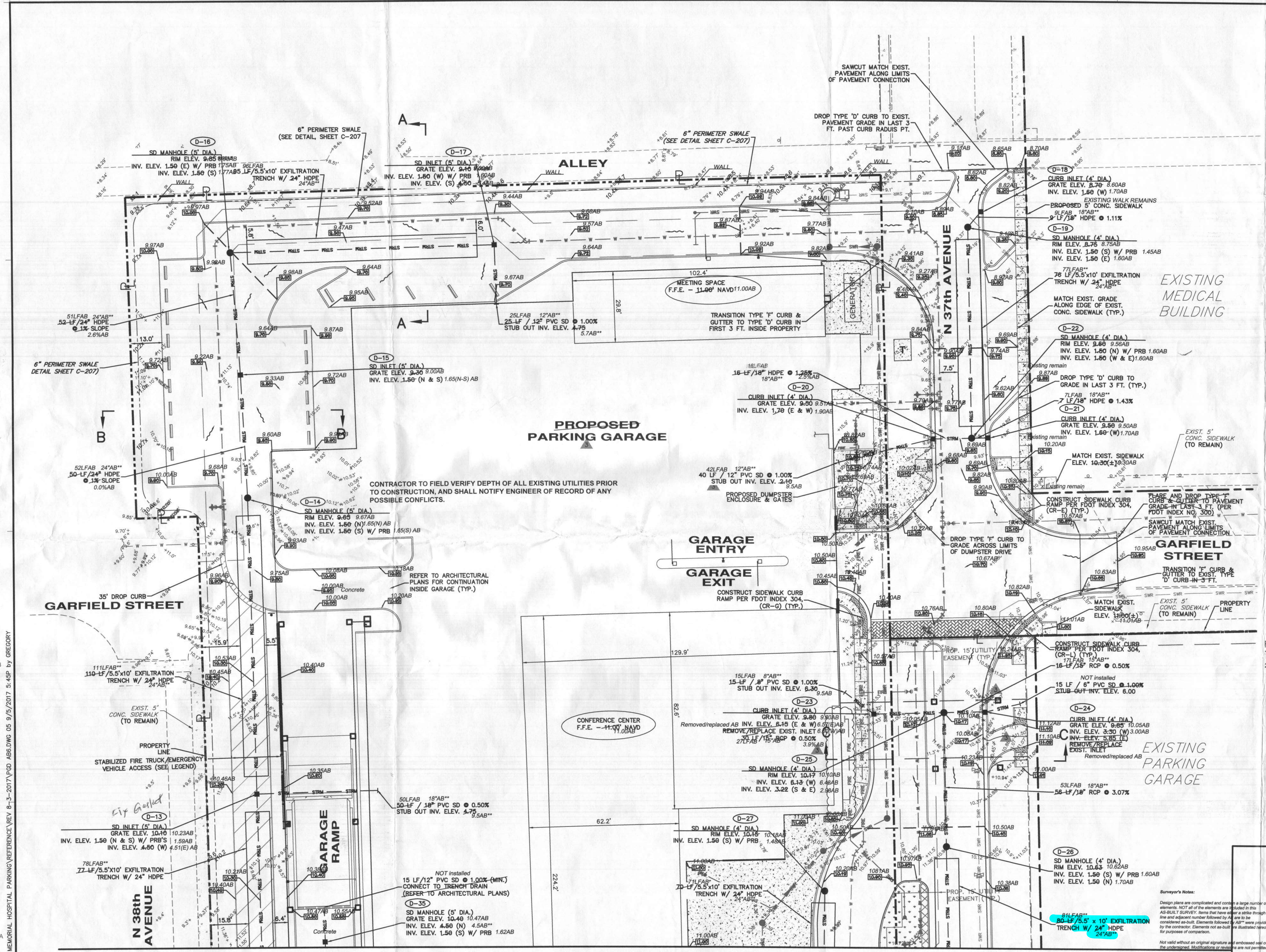
Design Formula: L = 2*(0.5*Vwq + Vadd) / (K((H2*W) + (2*H2*Du) - (Du^2) + (2*H2*Ds)) + (1.39x10^4*W*Du))
Exfiltration Trench Section:

0.50 Control Water Elevation (NAVD)

Weir Proposed:	No	
Weir Elevation:	0.00	
V_{wq} = Water Quality Vol. to be Exfiltrated:	0.54	ac-in
W = Trench Width:	6.00	ft.
K = Hydraulic Conductivity:	4.900E-05	cfs/sq-ft per ft head
H2 = Depth of Water Table:	6.00	ft.
Du = Non-Saturated Trench Depth:	6.50	ft.
Ds = Saturated Trench Depth:	1.00	ft.
Total Exfiltration Trench Depth:	7.50	ft.
Exfiltration Trench Required (Quality):	57	**ft.**
Total Maximum Effective Exfiltration Trench Required:	**57**	**ft.**
Exfiltration Trench Provided:	**309**	**ft.** Per SWM1992-019-0 As-built survey of record

Storage/Treatment Volume Provided:

Total Exfiltration Trench Detention Volume:	**0.045**	**ac-ft**
(50% Volume in Pipes) + (50% Voids for length beyond maximum effective length):	**0.117**	**ac-ft**
Total Storage Volume Provided in Exfiltration Trench	**0.162**	**ac-ft**



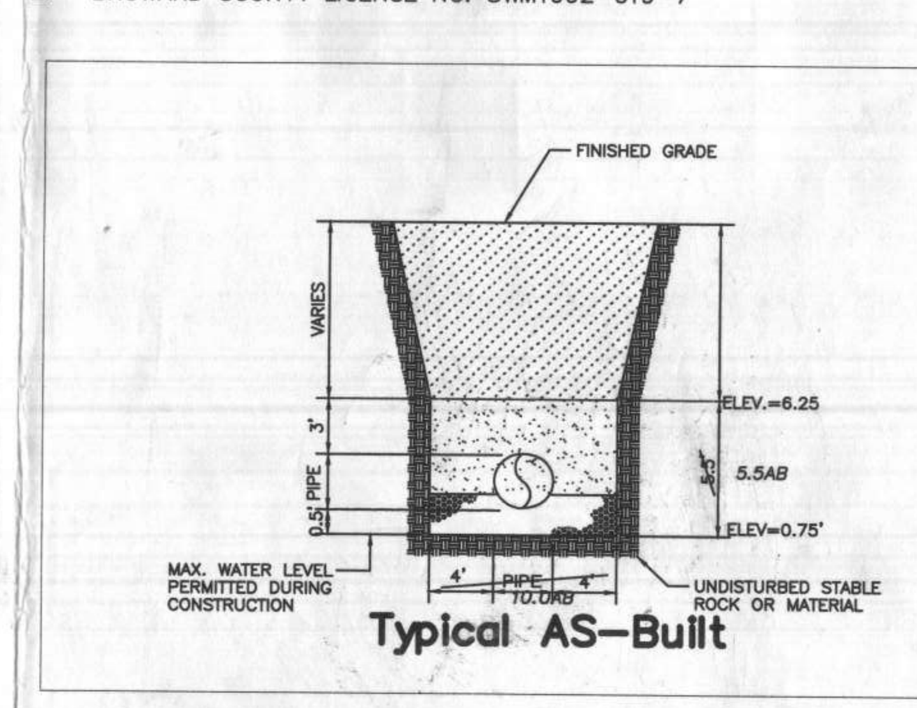
SEE SHEET C-201 FOR CONTINUATION

Legend

- EXISTING GAS LINE
- EXISTING COMMUNICATION LINE
- EXISTING ELECTRIC LINE
- EXISTING SANITARY SEWER
- EXISTING WATER LINE
- EXISTING STORM DRAIN LINE
- EXISTING FIRE LINE
- EXISTING ELEVATION FROM SURVEY
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- CENTER LINE OR ROAD
- PROPOSED GAS LINE
- PROPOSED COMMUNICATION LINE
- PROPOSED ELECTRIC LINE
- PROPOSED SANITARY SEWER
- PROPOSED WATER LINE
- PROPOSED STORM DRAIN LINE
- PROPOSED STORM EXFILTRATION TRENCH
- PROPOSED FIRE LINE
- GRADE BREAK
- SURFACE FLOW ARROW
- PROPOSED FINISHED PAVEMENT ELEVATION
- PROPOSED CURB INLET / SD INLET
- PROPOSED STORM MANHOLE
- PROPOSED CONCRETE SIDEWALK WITH SCOREMARKS
- PROPOSED ASPHALT PAVEMENT
- STABILIZED FIRE TRUCK/ EMERGENCY VEHICLE ACCESS LANE (MIN. 16' WIDE) HAVING GRASS TURF REINFORCED BY CONCRETE GRIDS CAPABLE OF SUPPORTING FIRE TRUCK/ APPARATUS WEIGHTING 32 TONS (H-20 WHEEL LOADING)

PERMIT APPROVALS:

1. BROWARD COUNTY ERP NO. 06-03944-P
2. BROWARD COUNTY LICENSE NO. SWM1992-019-7



Typical AS-Built

AS-BUILT prepared by:
TEAM SURVEYING SOLUTIONS
1120 Southwest 19th Avenue
Fort Lauderdale, Florida 33312
(954) 709-5995

Surveyor's Notes:

Design plans are complicated and contain a large number of elements. NOT all of the elements are included in this AS-BUILT SURVEY. Items that have either a strike through line and adjacent number followed by AB are to be considered as-built. Elements followed by AB** were provided by the contractor. Elements not as-built are illustrated hereon for purposes of comparison.

Not valid without an original signature and embossed seal of the undersigned. Modifications or revisions are not permitted.

Invert elevation information shown hereon is derived from the measurements obtainable, relative to the conditions and physical features existing at any given structure location. The accuracy of said measurements may be impaired by accessibility and visibility issues; moving or standing water, siltation or debris, etc.,as may be noted hereon. Elevations are based on the site benchmark shown.

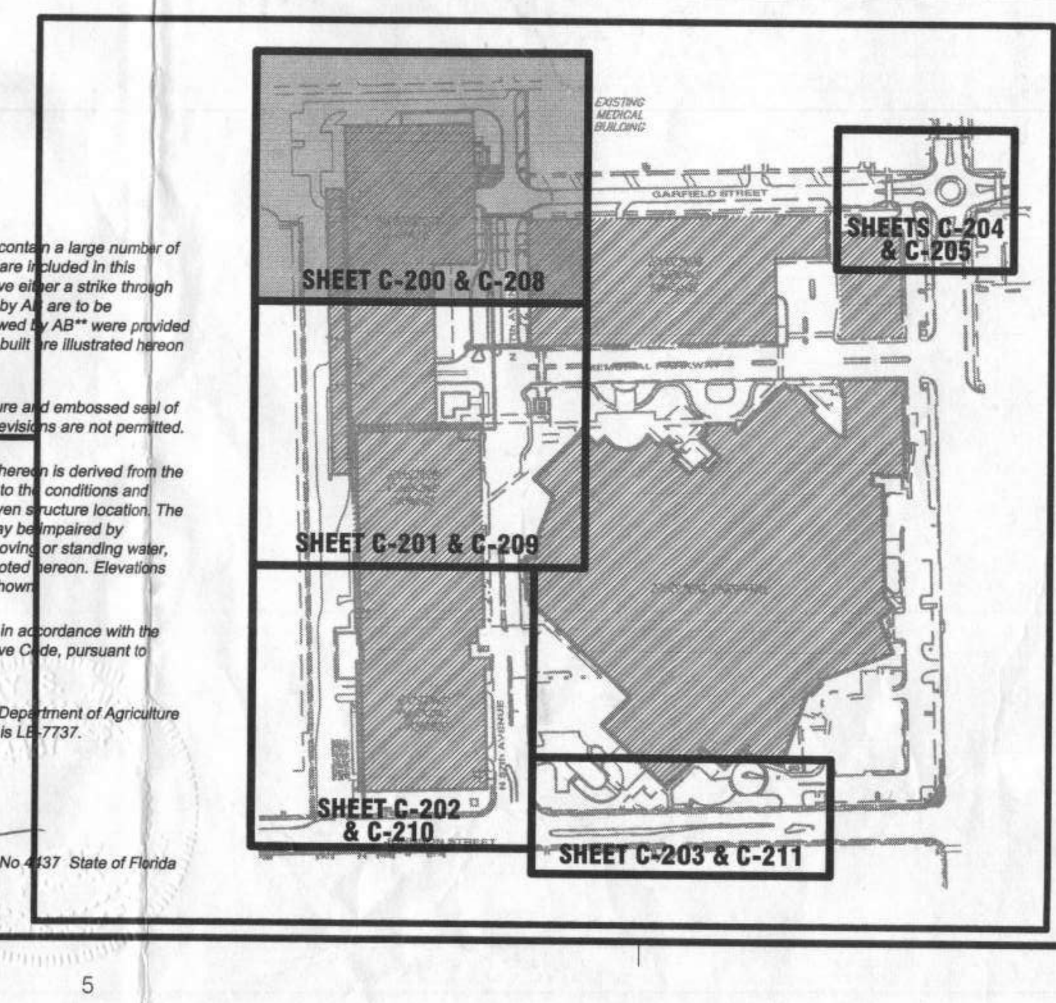
This As-Built Survey was prepared in accordance with the Chapter 5J-17, Florida Administrative Code, pursuant to Chapter 472, Florida Statutes.

Team Surveying Solutions' Florida Department of Agriculture Certificate of Authorization number is LB-7737.

TEAM SURVEYING SOLUTIONS

Gregory Mire

Professional Surveyor and Mapper No 4437 State of Florida
Date of Last Field Work 8/30/2017



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4930 SW 74th Ct. Suite 600
Miami, FL 33155
(305) 666-0711 Tel
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5747 North Andrews Way
Fort Lauderdale, FL 33309
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Parking Consultant
TIMOTHY HAAHS & ASSOCIATES, Inc.
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Project
Memorial Healthcare System
Memorial Regional Hospital
NEW PARKING GARAGE
3501 Johnson Street / Hollywood, Florida 33021

Design Build Team
STILES | THORNTON
ZYSCOVICH ARCHITECTS

Seal
JOAQUIN ALEJANDRO MOJICA, P.E. LICENSE No 60488 STATE OF FLORIDA PROFESSIONAL ENGINEER
JOAQUIN A. MOJICA, P.E.
Reg. No. 60488
9-6-17

Rev	Date	Note
D	06-24-16	PERMITTING REVISIONS
E	08-04-16	ADDL PERMITTING REVS
1	11-10-16	REVISION #1

PAVING, GRADING AND DRAINAGE PLAN

1582MRHP 06/24/2016

C-200

MEMORIAL REGIONAL HOSPITAL OR EXPANSION

SWM1992-019-7 WATER QUALITY CALCULATIONS:

Permitted under Broward County Stormwater License No. SWM1992-019-7 the volume of first inch of runoff from the entire contributing area:

= 1.00 inch X 0.08 acres X (1 foot / 12 inches)

= **0.007 ac-ft for the first inch of runoff required of wet detention storage**

The first inch of runoff from the entire developed site = 0.007 ac-ft

The volume permitted is	**0.007**	**ac-ft**

EXFILTRATION TRENCH CALCULATIONS

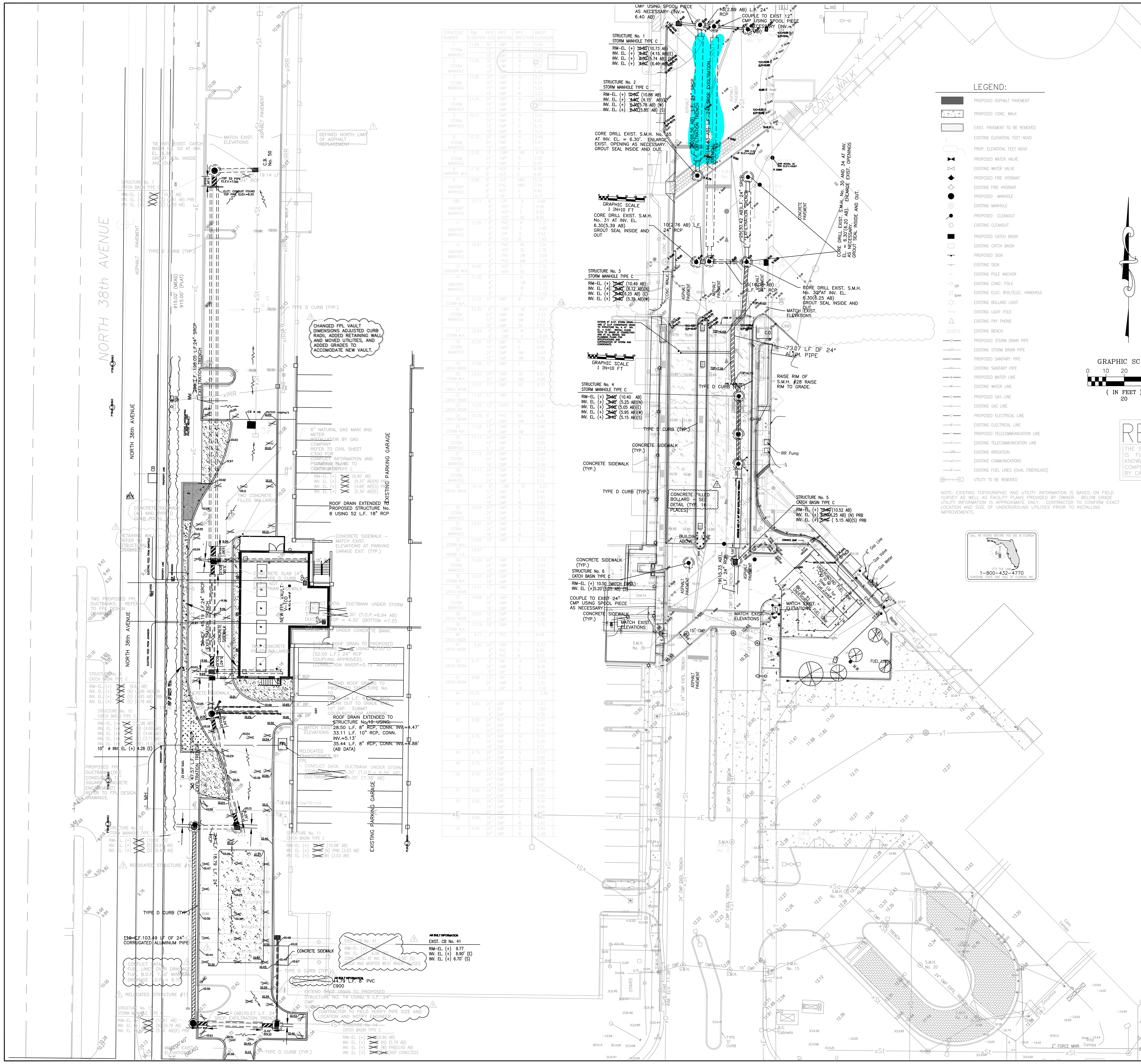
Design Formula: L = 2*(0.5*Vwq + Vadd) / (K((H2*W) + (2*H2*Du) - (Du^2) + (2*H2*Ds)) + (1.39x10^4*W*Du))

Exfiltration Trench Section:

Weir Proposed:	No	
Weir Elevation:	0.00	
V_{wq} = Water Quality Vol. to be Exfiltrated:	0.08	ac-in
W = Trench Width:	10.00	ft.
K = Hydraulic Conductivity:	3.910E-04	cfs/sq-ft per ft head
H2 = Depth of Water Table:	7.50	ft.
Du = Non-Saturated Trench Depth:	6.50	ft.
Ds = Saturated Trench Depth:	0.00	ft.
Total Exfiltration Trench Depth:	5.50	ft.
Exfiltration Trench Required (Quality):	**1**	**ft.**
Total Maximum Effective Exfiltration Trench Required:	**1**	**ft.**
Exfiltration Trench Provided:	**81**	**ft.** Per SWM1992-019-7 As-built survey of record

Storage/Treatment Volume Provided:

Total Exfiltration Trench Detention Volume:	**0.007**	**ac-ft**
(50% Volume in Pipes) + (50% Voids for length beyond maximum effective length):	**0.061**	**ac-ft**
Total Storage Volume Provided in Exfiltration Trench	**0.067**	**ac-ft**



RECORD DRAWING

THE SURVEY INFORMATION PROVIDED ON THIS RECORD DRAWING IS FURNISHED BY OTHERS, AND BASED UPON THE BEST KNOWLEDGE AND BELIEF OF THE ENGINEER, IS IN SUBSTANTIAL COMPLIANCE WITH THE INTENT OF THE DOCUMENT AS DESIGNED BY CALVIN, GIORDANO & ASSOCIATES, INC.

SURVEYOR'S NOTES

1. THE SPECIFIC PURPOSE OF THIS AS-BUILT SURVEY IS TO DOCUMENT THE LOCATION AND ELEVATION OF THE FINISHED INTERNAL ROAD,RETAINING WALL PARKING AREA AND STORM DRAINAGE IMPROVEMENTS.
2. "THIS IS NOT A BOUNDARY SURVEY"
3. THE SURVEY DEPICTED HERE IS NOT COVERED BY PROFESSIONAL LIABILITY INSURANCE.
4- ELEVATIONS ARE BASE UPON A BM #2059: IS A BROWARD COUNTY BRASS DISC ABOUT 0.5 MILES WEST ALONG HOLLYWOOD BLVD. FROM THE CITY AT HOLLYWOOD, 278' WEST OF THE WEST TRACK OF THE SEA-BOARD COASTLINE RAILROAD IN THE NORTH SIDEWALK AT THE NORTHWEST CORNER OF THE BRIDGE OVER THE HOLLY-WOOD CANAL, 57' NORTH OF THE CENTERLINE OF ASPHALTOF HOLLYWOOD BOULEVARD, 161' E. OF THE CENTERLINE OF ASPHALT OF N. 31 AVE., 0.7' ABOVE THE ASPHALT OF HOLLYWOOD BOULEVARD. ELEVATION 6.847 NGVD
5. NO ATTEMPT WAS MADE TO LOCATE ANY EXISTING IMPROVEMENTS SHOWN ON THIS PLAN OR TO VERIFY ANY PLAN INFORMATION SHOWN HEREIN OTHER THAN THE AS-BUILT INFORMATION PROVIDED.
6. THE SYMBOLS REFLECTED IN THE LEGEND AND ON THIS SURVEY MAY HAVE BEEN ENLARGED FOR CLARITY. THE SYMBOLS HAVE BEEN PLOTTED AT THE CENTER OF THE FIELD LOCATION AND MAY NOT REPRESENT THE ACTUAL SHAPE OR SIZE OF THE FEATURE.
7. THE INFORMATION DEPICTED ON THIS SURVEY REPRESENTS THE RESULTS OF THE SURVEY ON THE DATE INDICATED AND CAN ONLY BE CONSIDERED TO REPRESENT THE GENERAL CONDITIONS EXISTING AT THAT TIME.
8. ALL ELEVATIONS REFERRED TO ON THIS PLAN ARE BASED UPON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.
9. THE AS-BUILT INFORMATION DOCUMENTED AND CERTIFIED HEREIN WAS PROVIDED BY ORLANDO GRANDAL, P.S.M. NO. 6677, STATE OF FLORIDA AND CERTIFIED TO MARKS BROTHERS, INC, 9455 N.W. 104th STREET MEDLEY FLORIDA 33178.

SURVEYOR'S CERTIFICATION

I HEREBY CERTIFY THAT THE AS-BUILT MEASUREMENTS SHOWN HEREON ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AS PREPARED UNDER MY DIRECTION AND SUPERVISION. I FURTHER CERTIFY THAT THIS SURVEY MEETS THE MINIMUM TECHNICAL STANDARDS AS SET FORTH BY THE FLORIDA BOARD OF PROFESSIONAL SURVEYORS AND MAPPERS IN CHAPTER 61G17-6, FLORIDA ADMINISTRATIVE CODE, PERSUANT TO SECTION 427.027, FLORIDA STATUTES.

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

______________________ DATE __________

ORLANDO GRANDAL, P.S.M. NO. 6677, STATE OF FLORIDA

G S & P ®
Design Services For The Built Environment
Nashville Fort Lauderdale Louisville Tampa Charlotte Jacksonville Indianapolis Dallas Columbus Atlanta Richmond Birmingham
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WWW.GSPNET.COM
Firm Certification Numbers
AAP000034/EB0003806

SSR
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600 W. Hillsboro Blvd. Suite 300
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Alfred Esquivel PE - 45863
John E. Moulder PE - 33200
SSR JOB # 0434078.0

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PHONE: 305-273-4204
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LUIS M. RODRIGUEZ PE No. 22132

Memorial Healthcare System
Memorial Regional Hospital
CENTRAL ENERGY PLANT
PHASE 1
3501 JOHNSON STREET HOLLYWOOD, FLORIDA 33021

JONATHAN N. COOPER, P.E. 09/15/06
PROFESSIONAL ENGINEER #45840
CERTIFICATE OF AUTHORIZATION #514

No.	REVISION	DR.	DATE
1	ADDENDUM #1	JNC	04/19/06
3	ADDENDUM #3	JNC	09/15/06
9	CRANE BASE DRAINAGE REVISION	NS	07/18/08

PAVING AND DRAINAGE PLAN

C200

PROJECT: 24390.00
DATE: MARCH 31, 2006
AHCA #: 23/100038-144

MEMORIAL REGIONAL HOSPITAL OR EXPANSION

SWM1992-019-6 WATER QUALITY CALCULATIONS:

Permitted under Broward County Stormwater License No. SWM1992-019-6 the volume of first inch of runoff from the entire contributing area:

= 1.00 inch X 0.96 acres X (1 foot / 12 inches)

= **0.080** **ac-ft for the first inch of runoff required of wet detention storage**

The first inch of runoff from the entire developed site = 0.080 ac-ft

The volume permitted is	**0.080**	**ac-ft**

EXFILTRATION TRENCH CALCULATIONS

Design Formula: L = 2*(0.5*Vwq + Vadd) / (K((H2*W) + (2*H2*Du) - (Du^2) + (2*H2*Ds)) + (1.39x10^4*W*Du))

Exfiltration Trench Section:

0.50 Control Water Elevation (NAVD)

Weir Proposed:	No	
Weir Elevation:	0.00	
V_{wq} = Water Quality Vol. to be Exfiltrated:	0.96	ac-in
W = Trench Width:	6.00	ft.
K = Hydraulic Conductivity:	3.910E-04	cfs/sq-ft per ft head
H2 = Depth of Water Table:	8.80	ft.
Du = Non-Saturated Trench Depth:	5.80	ft.
Ds = Saturated Trench Depth:	0.00	ft.
Total Exfiltration Trench Depth:	5.80	ft.
Exfiltration Trench Required (Quality):	18	**ft.**
Total Maximum Effective Exfiltration Trench Required:	**18**	**ft.**
Exfiltration Trench Provided:	**182**	**ft.** Per SWM1992-019-6 As-built survey of record

Storage/Treatment Volume Provided:

Total Exfiltration Trench Detention Volume:	**0.080**	**ac-ft**
(50% Volume in Pipes) + (50% Voids for length beyond maximum effective length):	**0.068**	**ac-ft**
Total Storage Volume Provided in Exfiltration Trench	**0.148**	**ac-ft**

Drainage Calculations
For
Broward County Resilient
Environmental Deparment
Memorial Regional Hospital OR Expansion

3501 Jonhson St., Hollywood, FL 33021

CGA Project Number 215560

Prepared by:

Calvin, Giordano & Associates, Inc.
A SAFEBUILT COMPANY

James D. Messick, P.E.
FLORIDA REGISTRATION No. 70870
5/31/2024

Table of Contents

Project Name:	Memorial Regional Hospital OR Expansion	Designed:	SRS
Project Number:	215560	Checked:	JDM

I. Site Data

		Pre	Post	
A. Acreage				
Total		5.60	5.60	ac
1. Impervious				
a. Buildings (roofs)		1.04	1.49	ac
b. Pavement Areas (Roads, sidewalk, misc. impervious)		3.87	3.46	ac
c. Garage Ramp		0.28	0.28	ac
	Total Impervious	5.18	5.22	ac
3. Pervious				
a. Landscape/ Grass		0.42	0.38	ac
	Total Pervious	0.42	0.38	ac

B. Minimum Elevations		
1. Road Crown	11.39	ft-NAVD
2. Finished Floor	12.60	ft-NAVD
C. Allowable Discharge		
1. On-Site Retention	N/A	CSM
D. Water Level Elevation (per Broward County Future Conditions Map)		
1. Wet season water table	0.50	ft-NAVD
2. Control elevation	0.50	ft-NAVD
3. Receiving body water level	N/A	ft-NAVD
E. Rainfall Amounts (per NOAA Atlas 14)		
1. Exfiltration (5-year 1-Hour)	3.20	inches
2. Roadway (10-year 1-Day)	9.30	inches
3. Design Storm (25-year 3-Day)	14.41	inches
4. Finish Floor (100-year 3-Day)	19.37	inches

Project Name:	Memorial Regional Hospital OR Expansion	Designed:	SRS
Project Number:	215560	Checked:	JDM

II. Water Quality Design Criteria

A. Water Quality Retention / Detention Criteria (Taken from Section 4.2, Environmental Resource Permit Applicants Handbook (AH) Vol. II (August 10, 2014. Refer to original document for further information.)

Volumetric Requirements (4.2.1)

(a) Retention, detention or both retention and detention in the overall system, including swales, lakes, canals, greenways, etc., shall be provided for one of the three following criteria or equivalent combinations thereof:

1. Wet detention volume shall be provided for the first inch of runoff from the development project, or

the total runoff of 2.5 inches times the percentage of imperviousness, whichever is greater.

2. Dry detention volume shall be provided equal to 75 % of the above amounts computed for wet detention.

3. Retention volume shall be provided equal to 50 % of the above amounts computed for wet detention. Retention volume included in flood protection calculations requires a guarantee of long term operation and maintenance of the system bleed-down ability. Examples of such guarantee include evidence of excellent soil percolation rates, such as coastal ridge sands, or an operations entity which specifically reserves funds for operation maintenance and replacement...

b. Systems with inlets in grassed areas will be credited with up to 0.2 inches of required wet detention amount for the contributing areas. Full credit will be based on a ratio of 10:1 impervious area (paved or building area) to pervious area (i.e. the grassed area) with proportionately less credit granted for greater ratios.

Land Use and Coverage Criteria (4.2.2)

(a) Commercial or industrial zoned projects shall provide at least 1/2 inch of dry detention, unless reasonable assurances can be offered that hazardous materials will not enter the project's surface water management system.

(b) Project having greater that 40% impervious area and which discharge directly to the following receiving waters shall provide at least 1/2 inch of dry detention or retention pretreatment as part of the required retention/detention.

(c) Water surface and roofed areas can be deducted from site areas only for water quality pervious/impervious calculations. The water surface area meeting dimensional criteria may also be subtracted from the total site are when making final water quality treatment calculations.

Project Name:	Memorial Regional Hospital OR Expansion	Designed:	SRS
Project Number:	215560	Checked:	JDM

III. Computations

A. Water Quality Retention / Detention Criteria (Section 4.2, AH Vol. II - August 10, 2014)

Volumetric Requirements (4.2.1)

1. Wet detention volume shall be provided for the first inch of runoff from the developed project, or the total runoff of 2.5 inches times the percentage imperviousness, whichever is greater.

A. Compute the first inch of runoff from the developed project for wet detention:
= 1 in X Total Area - Lake Area X (1ft/12in)
= 0.47 ac-ft. for the first inch of runoff

B. Compute 2.5 inches times the percentage of imperviousness for wet detention:
1. Site area for water quality pervious/impervious calculations only:
= Total Area - Roof Area - Lake Area X (1ft/12in)
= 4.11 ac of site area for water quality pervious/impervious
2. Impervious area for water quality pervious/impervious calculation only:
= (site area for water quality pervious/impervious) - pervious
= 3.74 ac of impervious area for water quality pervious/impervious
3. Percentage of imperviousness for water quality:
= (Impervious area for water quality/site area for water quality) 100%
= 90.86 % impervious
4. For 2.5 inches times the percentage impervious:
= 2.5 X percent impervious
= 2.27 inches to be treated
5. Compute volume required for water quality detention:
= Inches to be treated X (Total site - Lake)
= 0.78 ac-ft. for the 2.5 inches times the percentage imperviousness
6. Compare the first inch of runoff to 2.5 times the percentage imperviousness.
0.78 ac-ft. for the 2.5 inches times the percentage imperviousness
0.47 ac-ft. for the first inch of runoff
0.78 ac-ft. of wet detention is required.

Project Name:	Memorial Regional Hospital OR Expansion	Designed:	SRS
Project Number:	215560	Checked:	JDM

III. Computations

B. SCS Curve Number

1. The wet season water/control elevation and the control elevation 0.50 ft-NAVD

2. Average site finished grade - Refer to "Storage" tab.
   Weighted Site Grade = 11.97 ft-NAVD

3. Average depth to water table will be
   = Weighted site grade - average water table/control elevation
   = 11.47 ft

4. Soil type: Flatwoods

5. From the soil storage calculation sheet, inches of moisture stored under the pervious areas for this type of soil is: 6.75 inches

6. Compute available soil storage
   = Storage available X pervious area
   = 0.21 ac-ft available soil storage onsite

7. Convert available soil storage to site-wide moisture storage, S
   = Available soil storage onsite/site area
   = 0.45 inches of site-wide storage, S

6. SCS Curve Number, CN
   = 1000/(S+10)
   = 96 SCS Curve Number

Project Name: Memorial Regional Hospital OR Expansion
Project Number: 215560

Designed:	SRS
Checked:	JDM

III. Computations

C. Soil Storage

Depth to Water Table (feet)	Coastal (1) Cumulative Water Storage (inches)	Coastal (1) Compacted Water Storage (inches)	Flatwoods (2) Cumulative Water Storage (inches)	Flatwoods (2) Compacted Water Storage (inches)	Depressional (3) Cumulative Water Storage (inches)	Depressional (3) Compacted Water Storage (inches)
1	0.60	0.45	0.60	0.45	0.60	0.45
2	2.50	1.88	2.50	1.88	2.10	1.58
3	6.60	4.95	5.40	4.05	4.40	3.30
4*	10.90	8.18	9.00	6.75	6.80	5.10

(1) Sandy Soil 0-40" thick with water tables dropping below 40" - St. Lucie series is representative.
(2) Water tables 15"-40" - Immokalee series is representative
(3) Water tables above ground - 15" - Riviera and Pompano series are representative

*4 feet is the maximum depth of percolation assumed possible in three days for any soil.

A. From the calculation the average depth to the water table is 11.47 ft
B. The Soil Type is Flatwoods (2)
C. Assuming 25% compaction
D. Inches of moisture stored under pervious area

Depth to Water Table (feet)	Compacted Water Storage (inches)
4.00	6.75
11.47	6.75
4.00	6.75

III. Computations

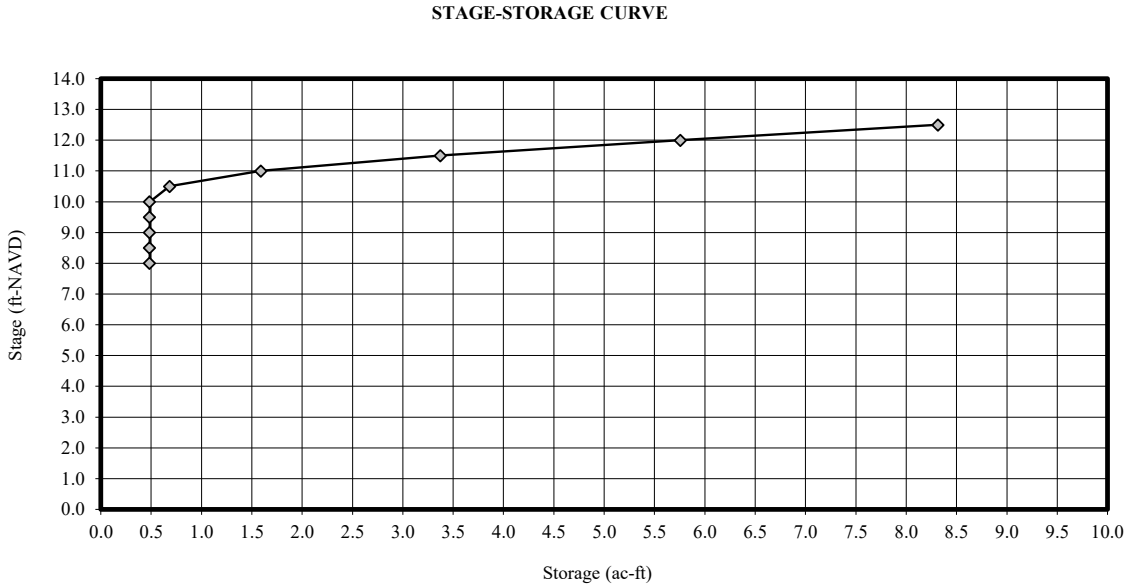
D. Surface Storage **(PRE)**

1. Assumptions (weighted values)

Land Use	Start	End	Average	Area	AreaXAvg
Buildings (roofs)	11.03	12.57	11.80	1.04	12.26
Pavement Areas (Roads, sidewalk, misc. impervious)	10.12	11.52	10.82	3.87	41.82
Garage Ramp	11.93	20.67	16.30	0.28	4.55
Landscape/ Grass	10.62	11.52	11.07	0.42	4.61
			Total =	5.60	63.24
			Weighted Site Grade =		11.29

2. For Stage-Storage curve data, please refer to table attached.

3. Stage-Storage curve.



III. Computations

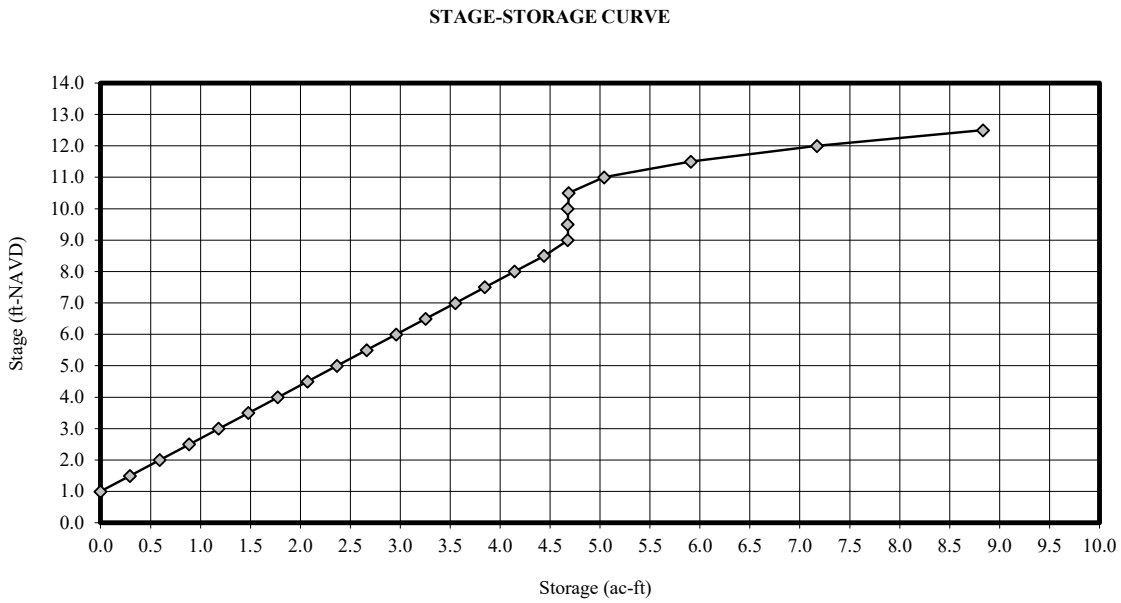
D. Surface Storage **(POST)**

1. Assumptions (weighted values)

Land Use	Start	End	Average	Area	AreaXAvg
Buildings (roofs)	12.57	12.60	12.59	1.49	18.73
Pavement Areas (Roads, sidewalk, misc. impervious)	10.39	12.58	11.48	3.46	39.70
Garage Ramp	11.93	20.67	16.30	0.28	4.55
Landscape/ Grass	10.65	11.00	10.83	0.38	4.07
		pr	Total =	5.60	67.04
		Weighted Site Grade =			11.97

2. For Stage-Storage curve data, please refer to table attached.

3. Stage-Storage curve.



Project Name: Memorial Regional Hospital OR Expansion
Project Number: 215560

Designed: SRS
Checked: JDM

III. Computations

E. Stage-Storage **(PRE)**

Stage-Storage Curve Data

Area (ac)	1.04	3.87	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00	N/A	N/A	
Start (ft-NAVD)	11.03	10.12	11.93	9.30	0.00	0.00	0.00	0.00	0.00	10.62	8.90	0.00	0.00	
Ends (ft-NAVD)	12.57	11.52	20.67	9.35	0.00	0.00	0.00	0.00	0.00	11.52	9.20	0.00	0.00	
Difference	1.54	1.40	8.74	0.05	0.00	0.00	0.00	0.00	0.00	0.90	0.30	0.00	0.00	
Stage (ft-NAVD)	Buildings (roofs)	Pavement Areas (Roads, sidewalk, misc. imperviou s)	Garage Ramp	Sidewalk Site	Sidewalk Park	Wet detention	Wet detention slopes	Dry detention	Dry detention slopes	Landscape / Grass	Asphalt Swales	Trench Storage	Exfiltration Credit	Total
8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.49
8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.49
9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.49
9.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.49
10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.49
10.50	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.68
11.00	0.00	1.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.49	0.00	1.59
11.50	0.07	2.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.49	0.00	3.37
12.00	0.32	4.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.49	0.00	5.76
12.50	0.73	6.50	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00	0.49	0.00	8.32
13.00	1.25	8.43	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	0.49	0.00	10.99

Project Name: Memorial Regional Hospital OR Expansion
Project Number: 215560

Designed: SRS
Checked: JDM

III. Computations

E. Stage-Storage **(POST)**

Stage-Storage Curve Data

Area (ac)	1.49	3.46	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	N/A	N/A	
Start (ft-NAVD)	12.57	10.39	11.93	9.30	0.00	0.00	0.00	0.00	0.00	10.65	8.90	-4.67	-4.67	
Ends (ft-NAVD)	12.60	12.58	20.67	9.35	0.00	0.00	0.00	0.00	0.00	11.00	9.20	8.40	8.40	
Difference	0.03	2.20	8.74	0.05	0.00	0.00	0.00	0.00	0.00	0.35	0.30	13.07	13.07	
Stage (ft-NAVD)	Buildings (roofs)	Pavement Areas (Roads, sidewalk, misc. imperviou s)	Garage Ramp	Sidewalk Site	Sidewalk Park	Wet detention	Wet detention slopes	Dry detention	Dry detention slopes	Landscape / Grass	Asphalt Swales	Trench Storage	Exfiltration Credit	Total
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.27	0.30
2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.55	0.59
2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.82	0.89
3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	1.10	1.18
3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	1.37	1.48
4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	1.64	1.78
4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	1.92	2.07
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	2.19	2.37
5.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	2.47	2.66
6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	2.74	2.96
6.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	3.02	3.26
7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	3.29	3.55
7.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	3.56	3.85
8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	3.84	4.15
8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	4.11	4.44
9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	4.33	4.68
9.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	4.33	4.68
10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	4.33	4.68
10.50	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	4.33	4.69
11.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.35	4.33	5.04
11.50	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.35	4.33	5.91
12.00	0.00	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.35	4.33	7.17
12.50	0.00	3.52	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.35	4.33	8.84
13.00	0.74	5.25	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.35	4.33	11.51

IV. Flood Routing (PRE)

Design Storm Stages

A. Stage Summary

Design Storm	Stage (ft)
10-Year 1-Day	11.65
5-Year 1-Hour	10.82
25-Year 72-Hour	12.14
100-Year 72-Hour	12.59

The following are zero discharge stages:

B. Minimum Road Crown elevation

1. The rainfall of the 10-year 1-day storm = 9.30 inches
2. Inches of runoff, Q = $\frac{(P-0.2\times S)^2}{(P+(0.8\times S)}$ = 8.78 inches of runoff
3. Runoff Volume, V = Inches of runoff X Site area = 4.10 ac-ft runoff volume
4. The zero-discharge stage corresponding to the volume of runoff = 11.65 feet, see table below

Stage (ft)	Storage (Ac-ft)
11.50	3.37
11.65	4.10
12.00	5.76

C. Minimum Parking Lot Elevation (for informational purposes; not required)

1. The rainfall of the 5-year 1-hour storm = 3.20 inches
2. Inches of runoff, Q = $\frac{(P-0.2\times S)^2}{(P+(0.8\times S)}$ = 2.71 inch of runoff
3. Runoff Volume = Inches of runoff X Site area = 1.27 ac-ft runoff volume
4. The zero-discharge stage corresponding to the volume of runoff = 10.82 feet, see table below

Stage (ft)	Storage (Ac-ft)
10.50	0.68
10.82	1.27
11.00	1.59

D. Minimum Berm Elevation

1. The rainfall of the 25-year 72-hour storm = 14.41 inches
2. Inches of runoff, Q = $\frac{(P-0.2\times S)^2}{(P+(0.8\times S)}$ = 13.88 inch of runoff
3. Runoff Volume = Inches of runoff X Site area = 6.48 ac-ft runoff volume
4. The zero-discharge stage corresponding to the volume of runoff = 12.14 feet, see table below

Stage (ft)	Storage (Ac-ft)
12.00	5.76
12.14	6.48
12.50	8.32

E. Minimum Finished Floor

1. The rainfall of the 100-year 72-hour storm = 19.37 inches
2. Inches of runoff, Q = $\frac{(P-0.2\times S)^2}{(P+(0.8\times S)}$ = 18.84 inch of runoff
3. Runoff Volume = Inches of runoff X Site area = 8.79 ac-ft runoff volume
4. The zero-discharge stage corresponding to the volume of runoff = 12.59 feet, see table below

Stage (ft)	Storage (Ac-ft)
12.50	8.32
12.59	8.79
13.00	10.99

Project Name: Memorial Regional Hospital OR Expansion
Project Number: 215560

Designed: SRS
Checked: JDM

IV. Flood Routing (POST)

Design Storm Stages

A. Stage Summary

Design Storm	Stage (ft)
10-Year 1-Day	7.92
5-Year 1-Hour	3.14
25-Year 72-Hour	11.72
100-Year 72-Hour	12.49

The following are zero discharge stages:

B. Minimum Road Crown elevation

1. The rainfall of the 10-year 1-day storm = 9.30 inches
2. Inches of runoff, Q = $\frac{(P-0.2\times S)^2}{(P+(0.8\times S)}$ = 8.78 inches of runoff
3. Runoff Volume, V = Inches of runoff X Site area = 4.10 ac-ft runoff volume
4. The zero-discharge stage corresponding to the volume of runoff = 7.92 feet, see table below

Stage (ft)	Storage (Ac-ft)
7.50	3.85
7.92	4.10
8.00	4.15

C. Minimum Inlet Grate Elevation

1. The rainfall of the 5-year 1-hour storm = 3.20 inches
2. Inches of runoff, Q = $\frac{(P-0.2\times S)^2}{(P+(0.8\times S)}$ = 2.71 inch of runoff
3. Runoff Volume = Inches of runoff X Site area = 1.27 ac-ft runoff volume
4. The zero-discharge stage corresponding to the volume of runoff = 3.14 feet, see table below

Stage (ft)	Storage (Ac-ft)
3.00	1.18
3.14	1.27
3.50	1.48

Project Name: Memorial Regional Hospital OR Expansion
Project Number: 215560

Designed: SRS
Checked: JDM

D. Minimum Berm Elevation (for informational purposes; not required)

1. The rainfall of the 25-year 72-hour storm = 14.41 inches
2. Inches of runoff, Q = $\frac{(P-0.2\times S)^2}{(P+(0.8\times S)}$ = 13.88 inches of runoff
3. Runoff Volume, V = Inches of runoff X Site area = 6.48 ac-ft runoff volume
4. The zero-discharge stage corresponding to the volume of runoff = 11.72 feet, see table below

Stage (ft)	Storage (Ac-ft)
11.50	5.91
11.72	6.48
12.00	7.17

E. Minimum Finished Floor

1. The rainfall of the 100-year 72-hour storm = 19.37 inches
2. Inches of runoff, Q = $\frac{(P-0.2\times S)^2}{(P+(0.8\times S)}$ = 18.84 inch of runoff
3. Runoff Volume = Inches of runoff X Site area = 8.79 ac-ft runoff volume
4. The zero-discharge stage corresponding to the volume of runoff = 12.49 feet, see table below

Stage (ft)	Storage (Ac-ft)
12.00	7.17
12.49	8.79
12.50	8.84

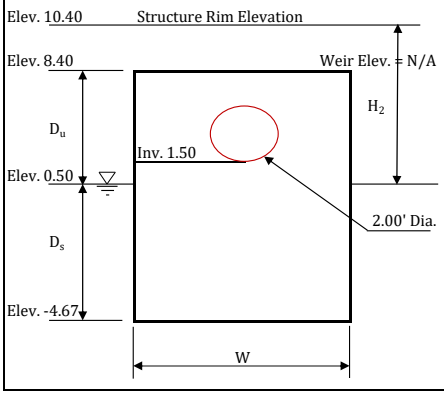
Project Name: Memorial Regional Hospital OR Expansion
Project Number: 215560

Designed: SRS
Checked: JDM

V. Supporting Documentation

A. Exfiltration Computations

Exfiltation Parameters



Catch Basin Grate Elevation	10.40	ft-NAVD
Minimum Cover Required	24	Inches
Top of Trench Elevation	8.40	ft-NAVD
Control Structure Weir Elevation	--	ft-NAVD
Pipe Invert	1.50	ft-NAVD
Pipe Diameter	24.00	Inches
Control Elevation	0.50	ft-NAVD
Top of Pipe Elevation	3.50	ft-NAVD
Minimum Pipe Cover	6.90	ft
Depth to Water Table H_2	9.90	ft
Non-Saturated Depth D_u	7.90	ft
Saturated Trench Depth D_s	5.17	ft
Trench Width W	7.00	ft
Bottom of Trench Elevation	-4.67	ft-NAVD
Trench Depth	13.07	ft

Hydraulic Conductivity
(see Appendix B)

K1	1.43E-03	cfs/ft^2-ft Head
K2	3.91E-04	cfs/ft^2-ft Head
K3	4.90E-05	cfs/ft^2-ft Head
K4		cfs/ft^2-ft Head
K5		cfs/ft^2-ft Head
K6		cfs/ft^2-ft Head
K7		cfs/ft^2-ft Head
K8		cfs/ft^2-ft Head
K9		cfs/ft^2-ft Head
K10		cfs/ft^2-ft Head
K11		cfs/ft^2-ft Head
K12		cfs/ft^2-ft Head
Average K =	6.23E-04	cfs/ft^2-ft Head

A) Exfiltration Quality Volume for Water Quality, Vwq = 0.78 acre-feet (Refer to Quality calculations.) X 12 inches /ft = 9.34 acre-inches

% WQ = 50% for dry retention
FS = 2.0

*L_1 = FS (%WQ)(Vwq) / [(K *((H2*W)+(2*H2*Du)-(Du^2)+(2*H2*Ds))) + (1.39x10^-4*W*Du)]
*For use when Saturated Depth is less than or equal to Non-Saturated Depth, and when Trench Width is less than or equal to two times Trench Depth.

Required Length (L_1) = 54 ft

**L_2 = FS (%WQ)(Vwq) / [(K *((2*H2*Du)-(Du^2)+(2*H2*Ds))) + (1.39x10^-4*W*Du)]
**For use when Saturated Depth is greater than Non-Saturated Depth, or when Trench Width is greater than two times Trench Depth.

Required Length (L_2) = 76 ft

Required Length (Either L_1 or L_2) Based on Trench Dimensions = 54 ft
Provided Length = 54 ft or 0.78 Acre-ft of exfiltration

B) Exfiltration Quantity Volume Provided by Additional Length of Trench =

Provided Additional Length = 492 ft or 3.55 Acre-ft of exfiltration

C) Total Length of Exfiltration Trench Provided = 546 ft or 4.33 Acre-ft of exfiltration

Project Name:	Memorial Regional Hospital OR Expansion	Designed:	SRS
Project Number:	215560	Checked:	JDM

V. Supporting Documentation

C. Trench Storage

Trench Depth Du (ft) *1	Trench Width W (ft)	Trench Length L (ft)	Stage (ft-NAVD)	Increment (ft)	Trench Area (sf) / 2	Trench Volume (cf)	Storage Volume (ac-ft)
7.90	7.00	546	0.50	0.00	0.00	0.00	0.00
			1.00	0.50	1.75	955.50	0.02
			1.50	1.00	3.50	1911.00	0.04
			2.00	1.50	5.25	2866.50	0.07
			2.50	2.00	7.00	3822.00	0.09
			3.00	2.50	8.75	4777.50	0.11
			3.50	3.00	10.50	5733.00	0.13
			4.00	3.50	12.25	6688.50	0.15
			4.50	4.00	14.00	7644.00	0.18
			5.00	4.50	15.75	8599.50	0.20
			5.50	5.00	17.50	9555.00	0.22
			6.00	5.50	19.25	10510.50	0.24
			6.50	6.00	21.00	11466.00	0.26
			7.00	6.50	22.75	12421.50	0.29
			7.50	7.00	24.50	13377.00	0.31
			8.00	7.50	26.25	14332.50	0.33
			8.50	7.90	27.65	15096.90	0.35
			9.00	7.90	27.65	15096.90	0.35
			9.50	7.90	27.65	15096.90	0.35
			10.00	7.90	27.65	15096.90	0.35
			10.50	7.90	27.65	15096.90	0.35
			11.00	7.90	27.65	15096.90	0.35
			11.50	7.90	27.65	15096.90	0.35
			12.00	7.90	27.65	15096.90	0.35
			12.50	7.90	27.65	15096.90	0.35
			13.00	7.90	27.65	15096.90	0.35

1: Refer to exfiltration calculation.
2: Area is calculated at 50% POROSITY.

Project Name:	Memorial Regional Hospital OR Expansion	Designed:	SRS
Project Number:	Mar-90	Checked:	JDM

V. Supporting Documentation

D. Exfiltration Credit

Trench Depth Du (ft)	5-year 1-hour Rainfall (inches) *	Site Exfiltration (ac-ft)	Stage (ft-NAVD)	Saturation Increment (ft)	Exfiltration Volume (ac-ft)
7.90	3.20	4.33	1.00	0.00	0.00
			1.50	0.50	0.27
			2.00	1.00	0.55
			2.50	1.50	0.82
			3.00	2.00	1.10
			3.50	2.50	1.37
			4.00	3.00	1.64
			4.50	3.50	1.92
			5.00	4.00	2.19
			5.50	4.50	2.47
			6.00	5.00	2.74
			6.50	5.50	3.02
			7.00	6.00	3.29
			7.50	6.50	3.56
			8.00	7.00	3.84
			8.50	7.50	4.11
			9.00	7.90	4.33
			9.50	7.90	4.33
			10.00	7.90	4.33
			10.50	7.90	4.33
			11.00	7.90	4.33
			11.50	7.90	4.33
			12.00	7.90	4.33
			12.50	7.90	4.33
			13.00	7.90	4.33