mse
morrissmith
engineering

Big Ideas...

...Little Tiny Space

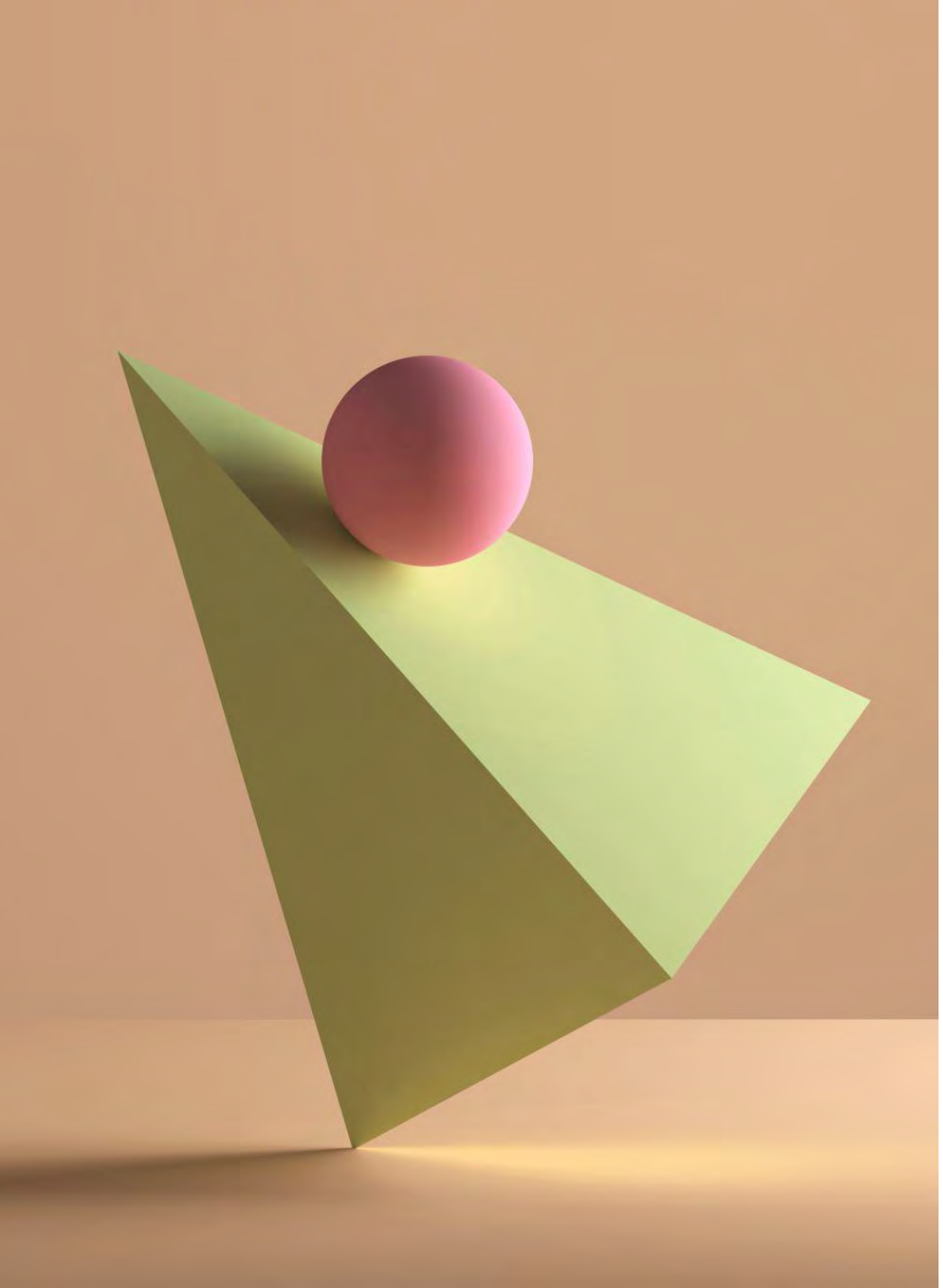
OSTDS Design and Install Challenges

PLEASE NOTE...

The materials being presented represent the opinions of the presenters and do NOT represent the opinions of NOWRA.

What does little space really mean...

- Lot size restrictions
- Soil restrictions
- Regulatory restrictions



Everyone wants to build their “dream” on their space...

New construction

Inheritance

Fixer – Upper

Retirement

... And those are just a few on the residential side.

What if they finally get to follow their bliss...

... START THAT NEW BUSINESS.

HOW DO YOU HELP MAKE THAT HAPPEN ?

SHIFT THE PARADIGM

Our Clients Are Requiring Designers And Installers To Make Maximum Use Of The Very Expensive Land To Which They Have Taken Title.

A Large ‘Shoebox’ Home On A ‘Postage Stamp’ Lot

Building Larger Homes on Smaller Lots

There is only one way to do this… Utilize the State's or Agencies OSTDS Design Codes (Septic Codes) to Your Advantage !!

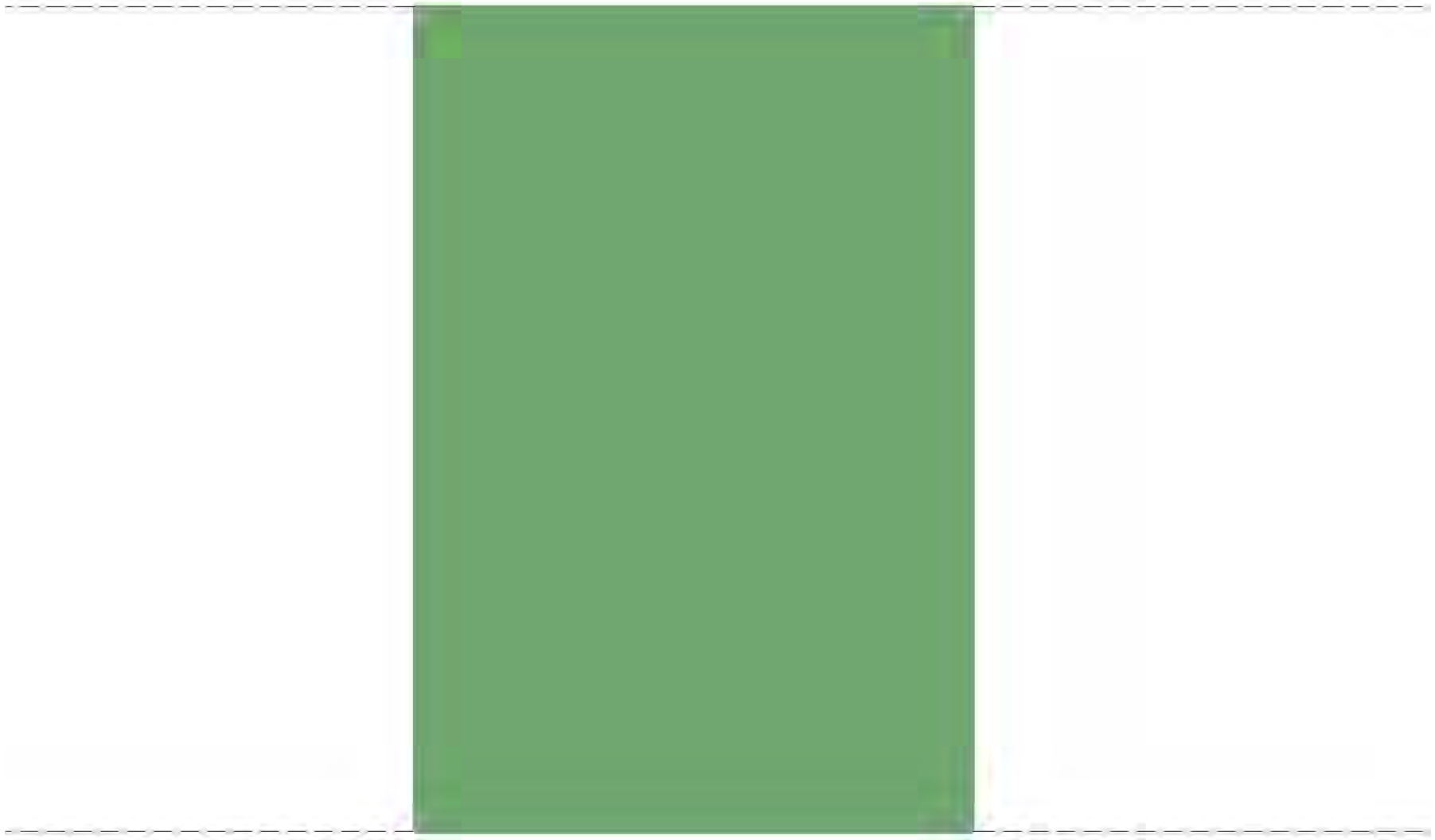
You Must Know the Code Better and in Greater Detail Than the Employees at the Permitting Agencies.

Designers and Installers Must Correct
How We See, What We are Looking at…

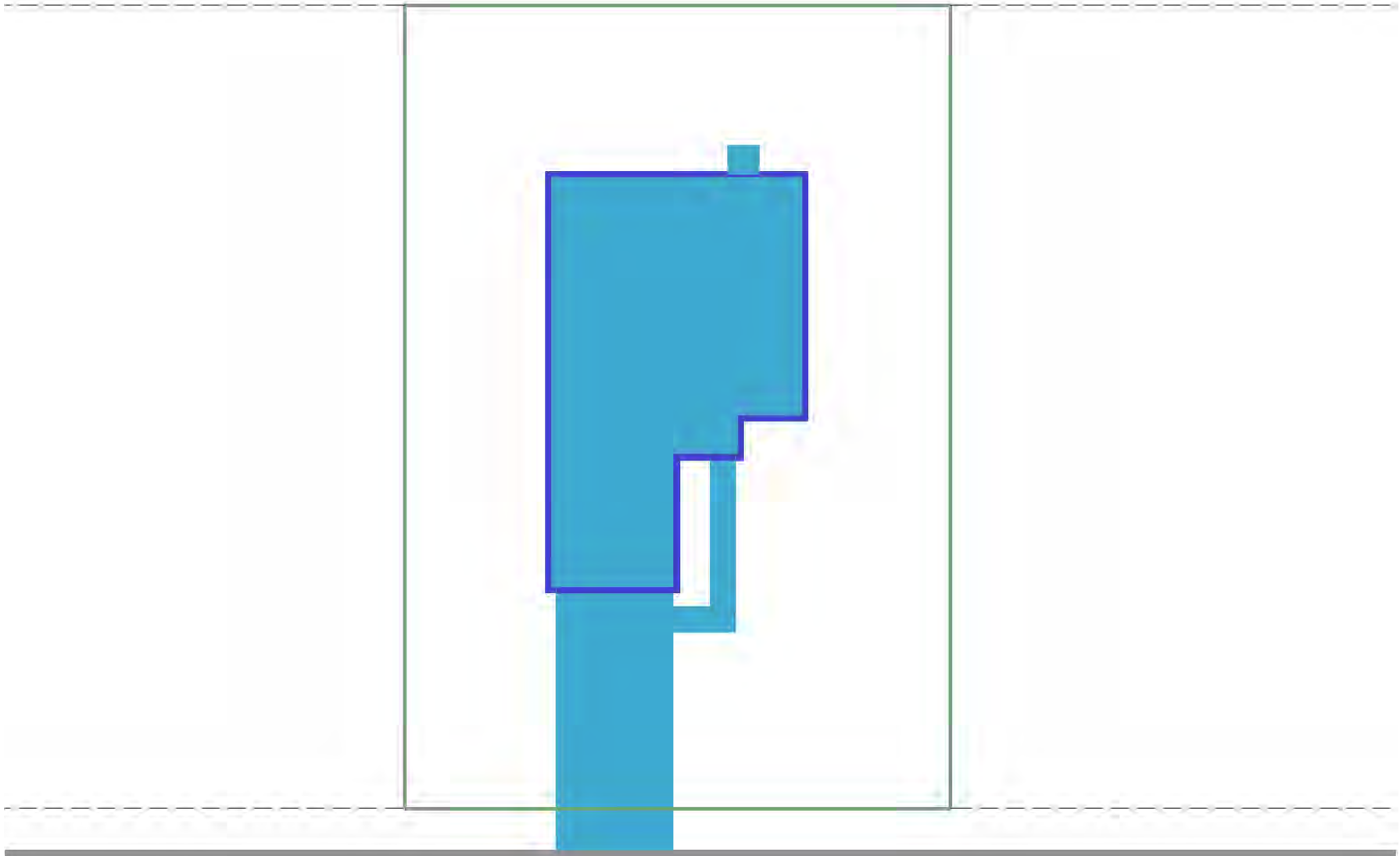
This Begins by Us Changing our View of the Project Site…

Men Look … … Women See

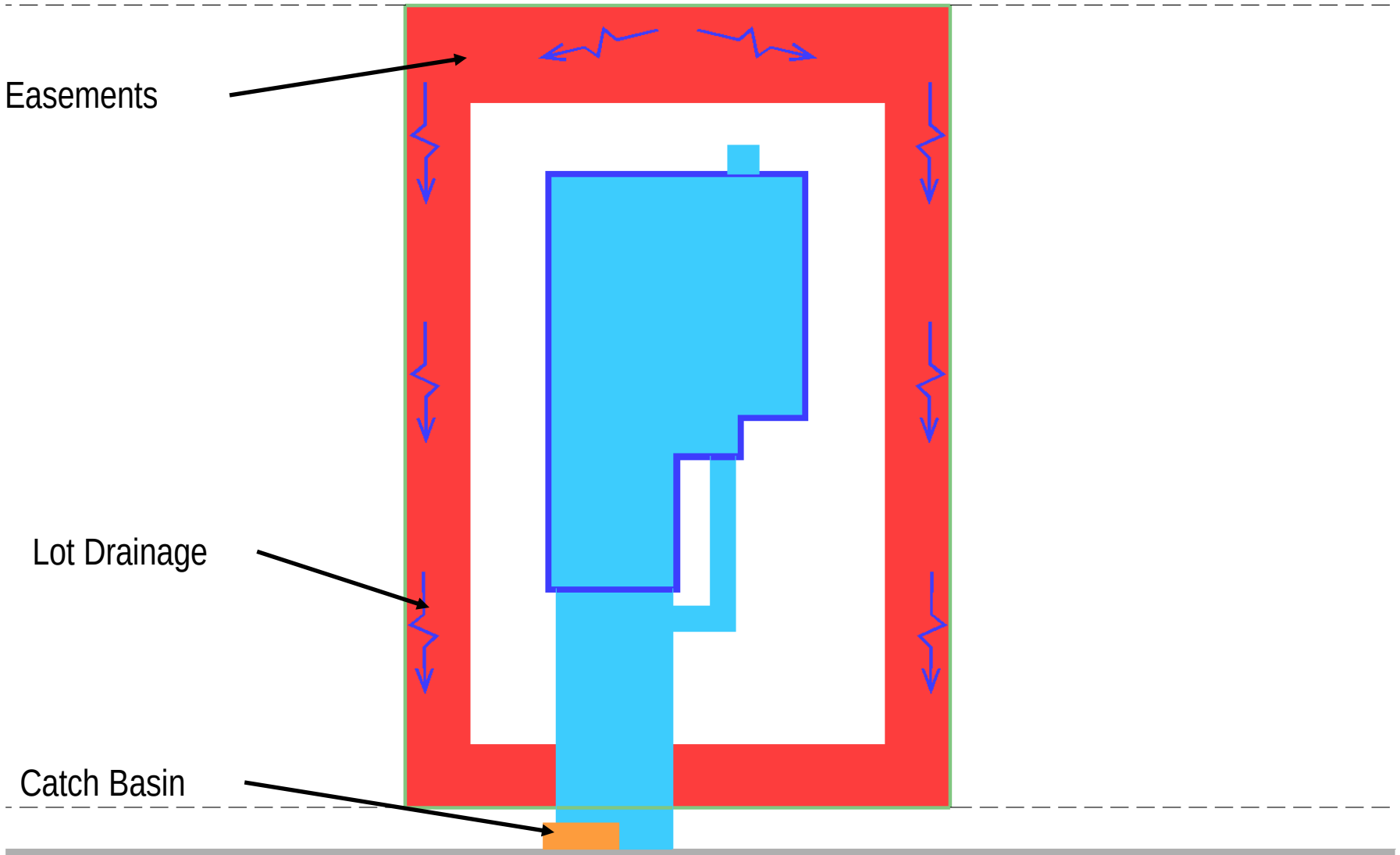
Use your Woman Eyes at the Job Site…



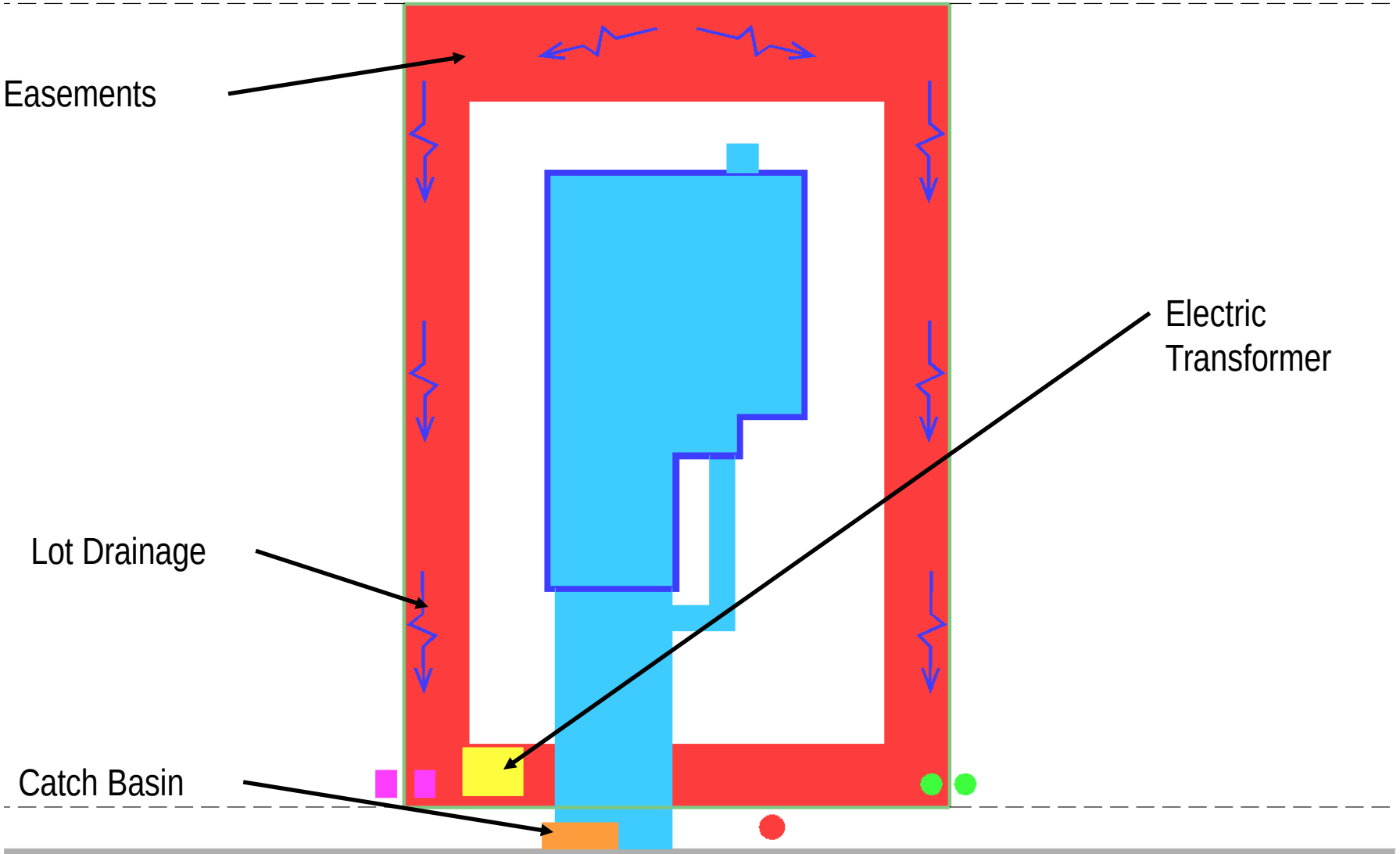
What a Homeowner Sees …



What a Builder Sees…



What a Septic Designer/Installer Should See…



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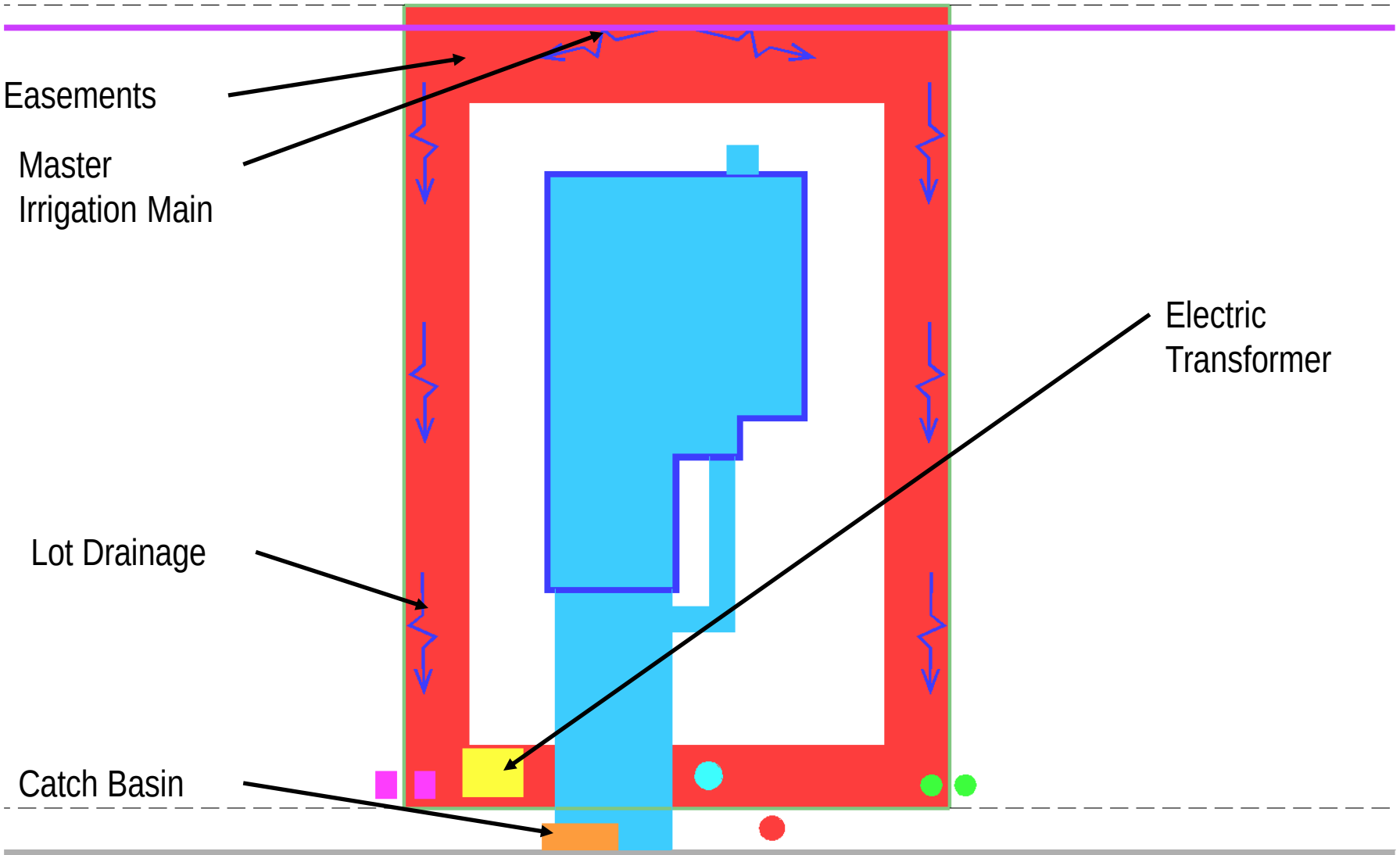

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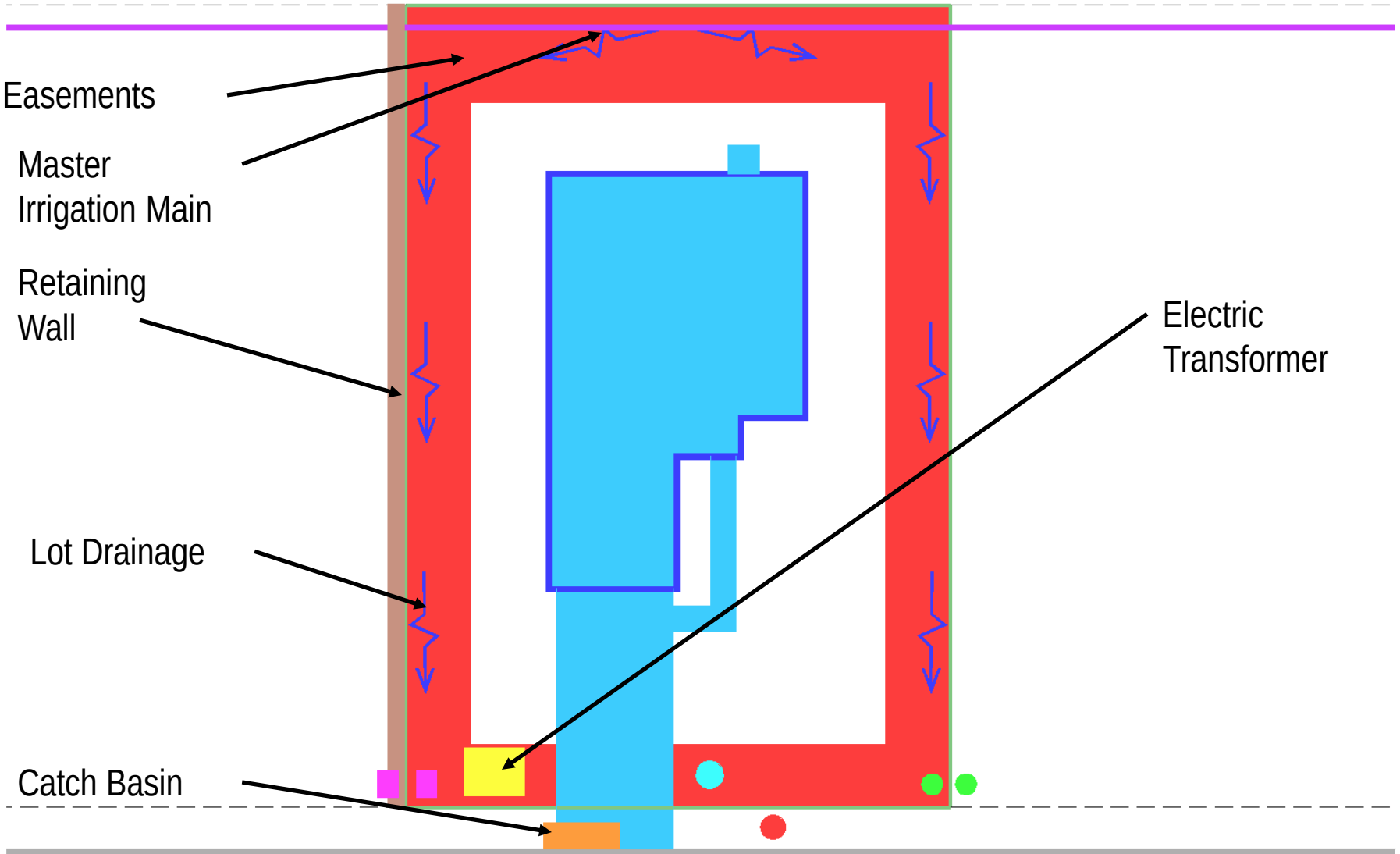

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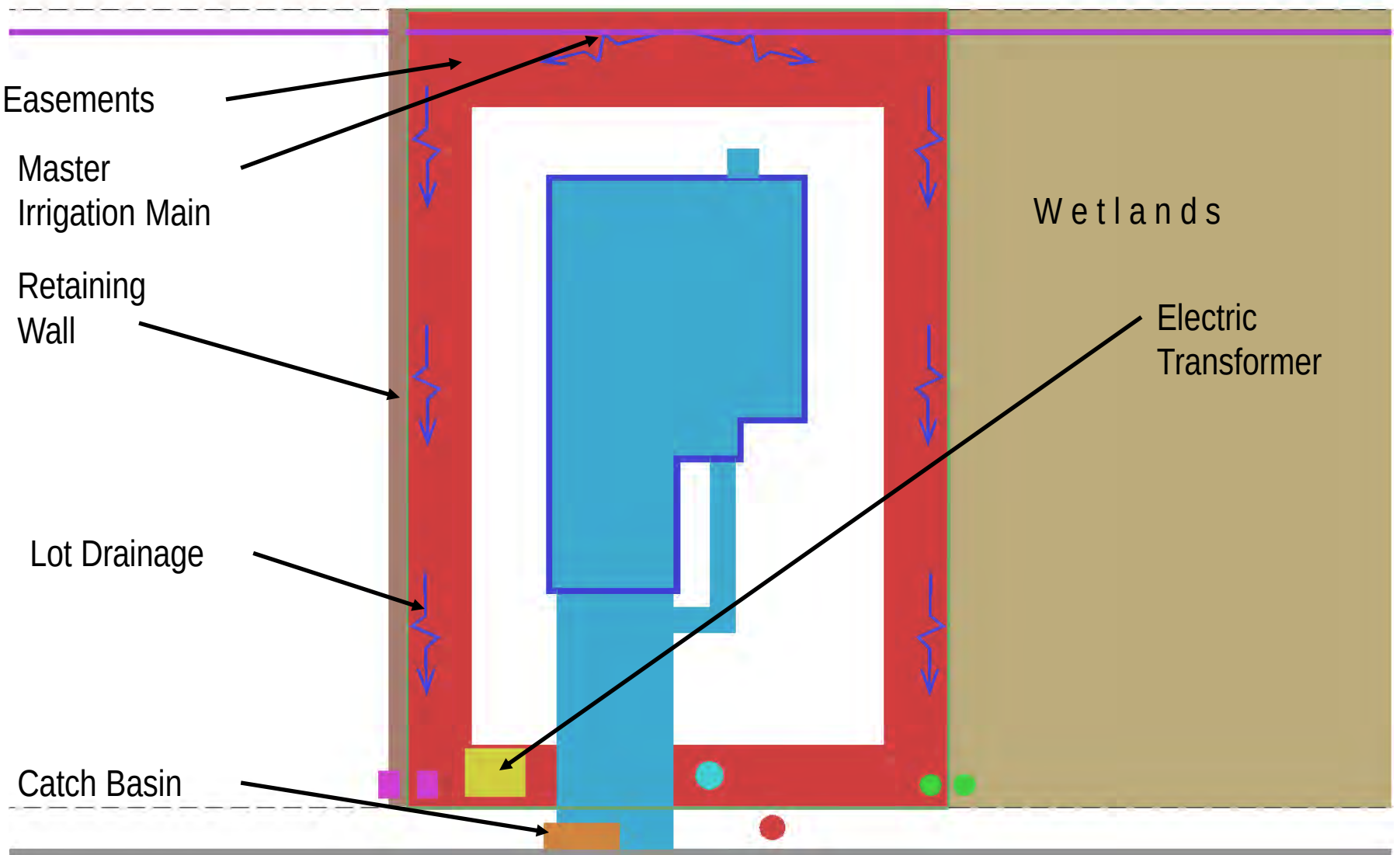

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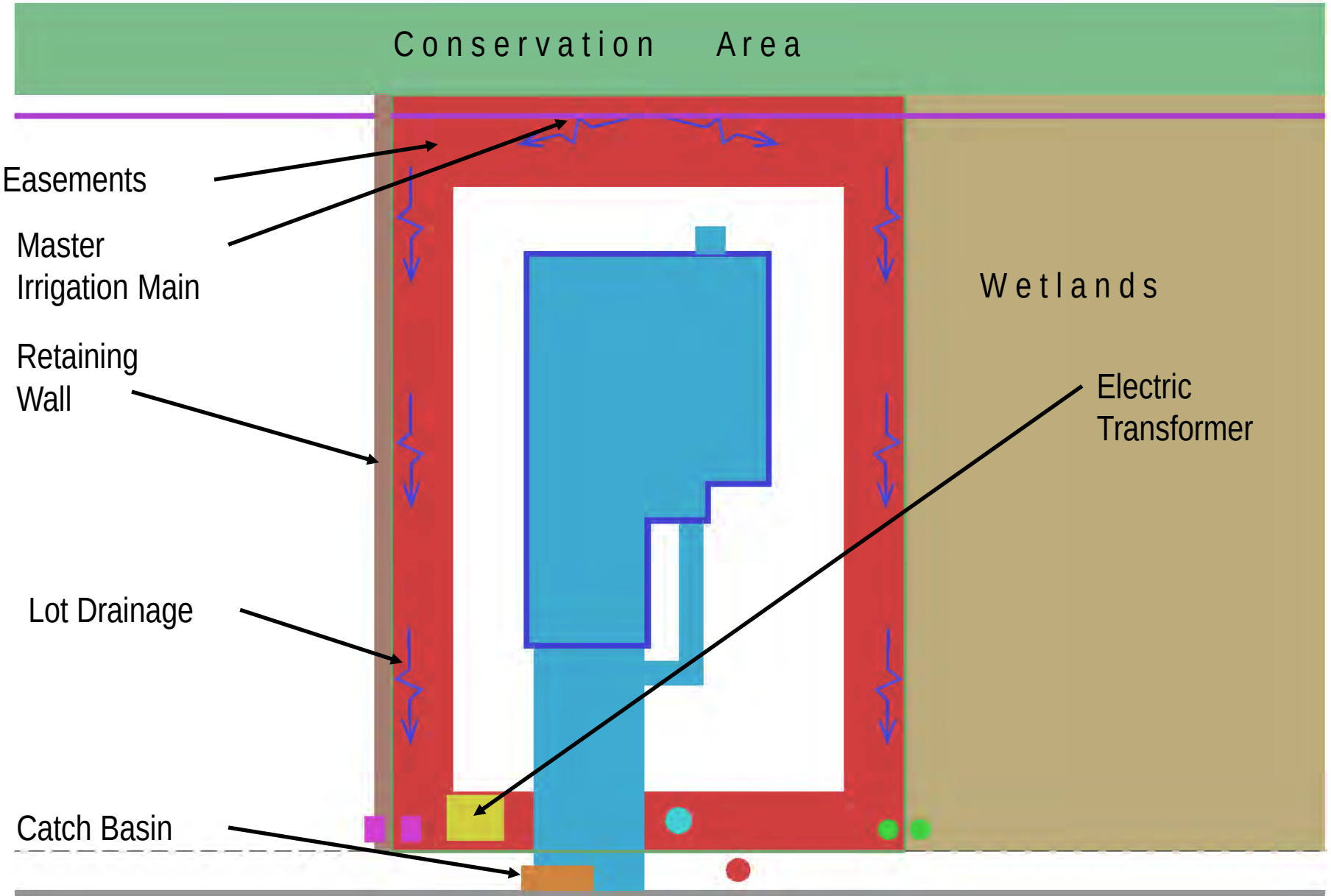

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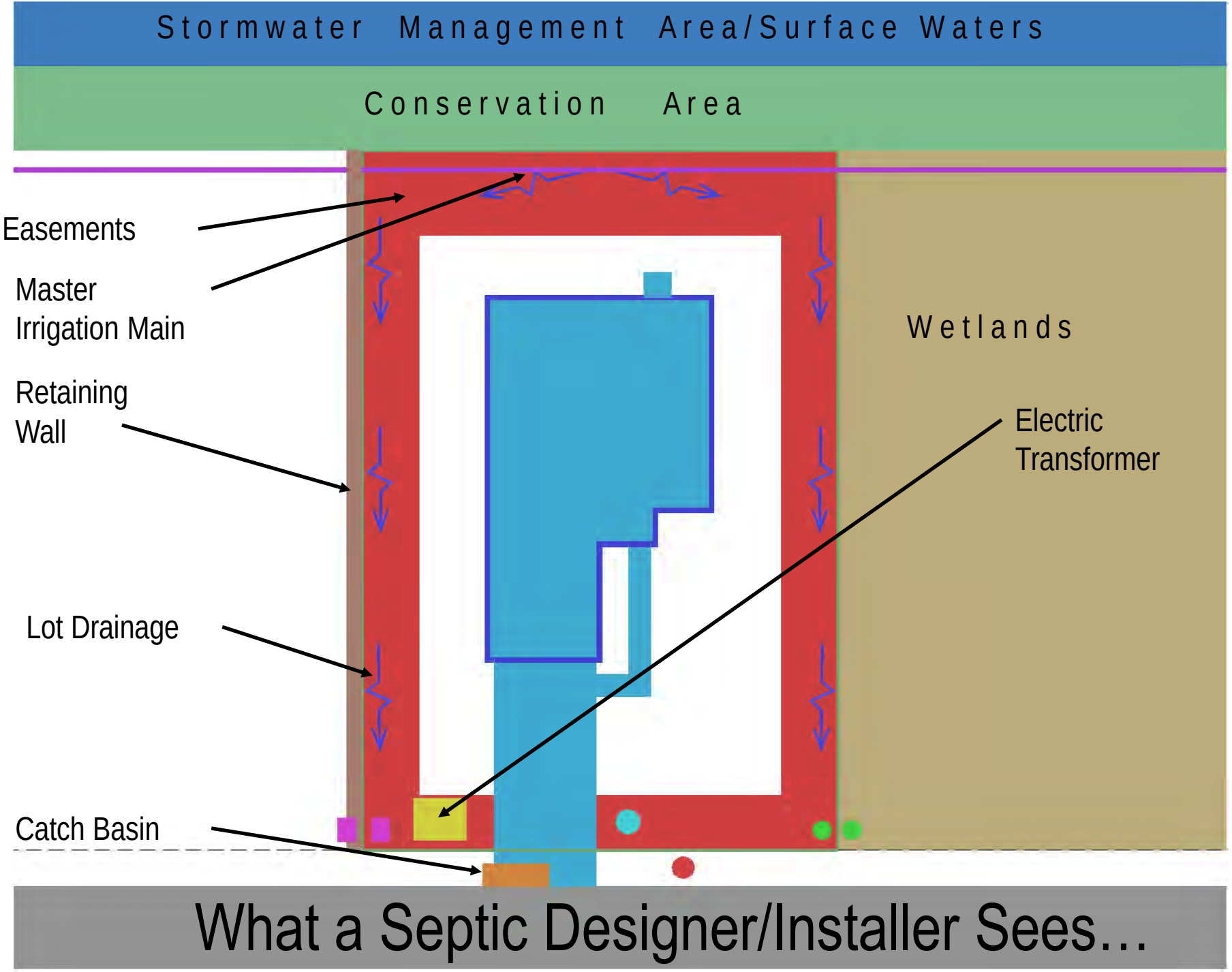

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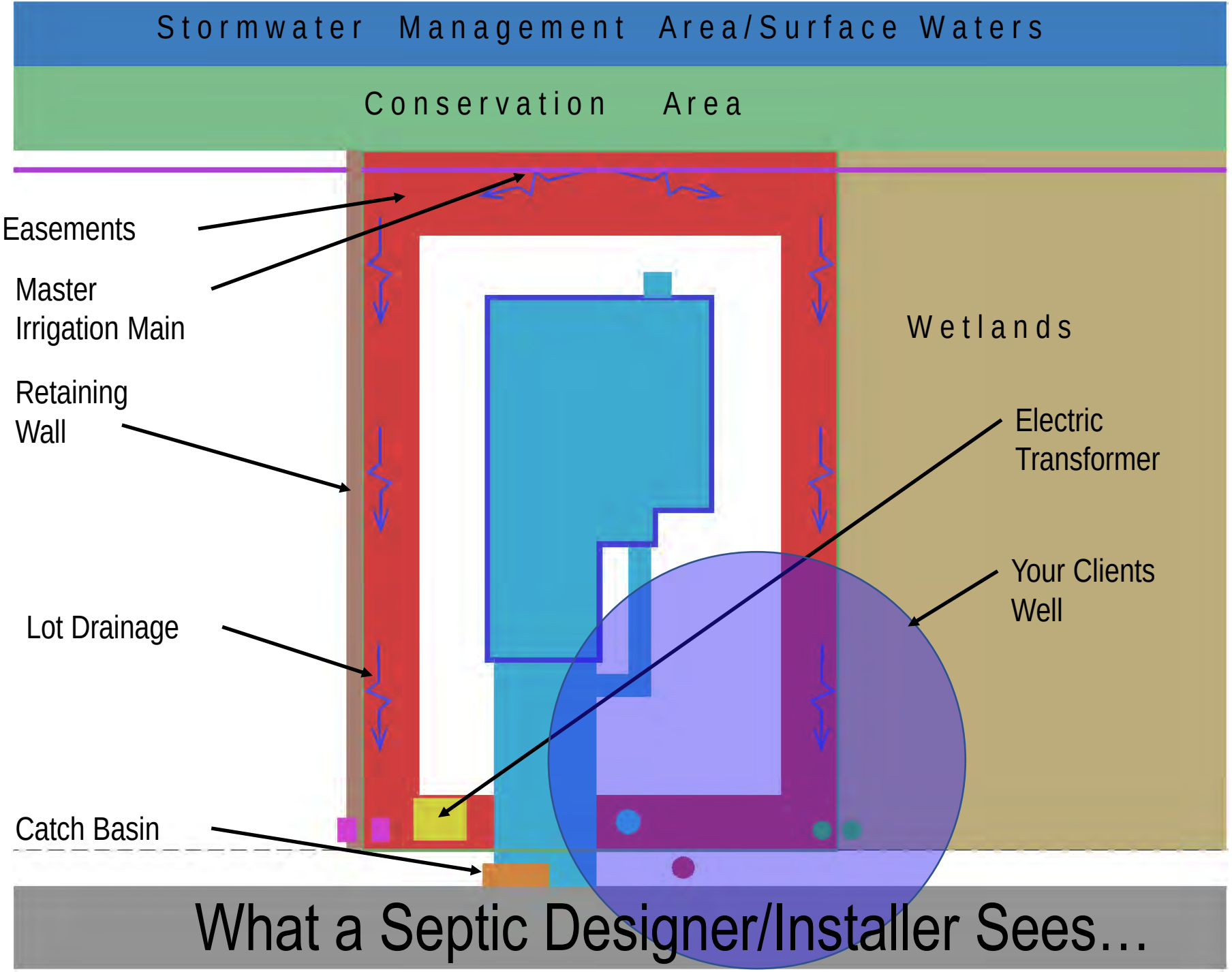

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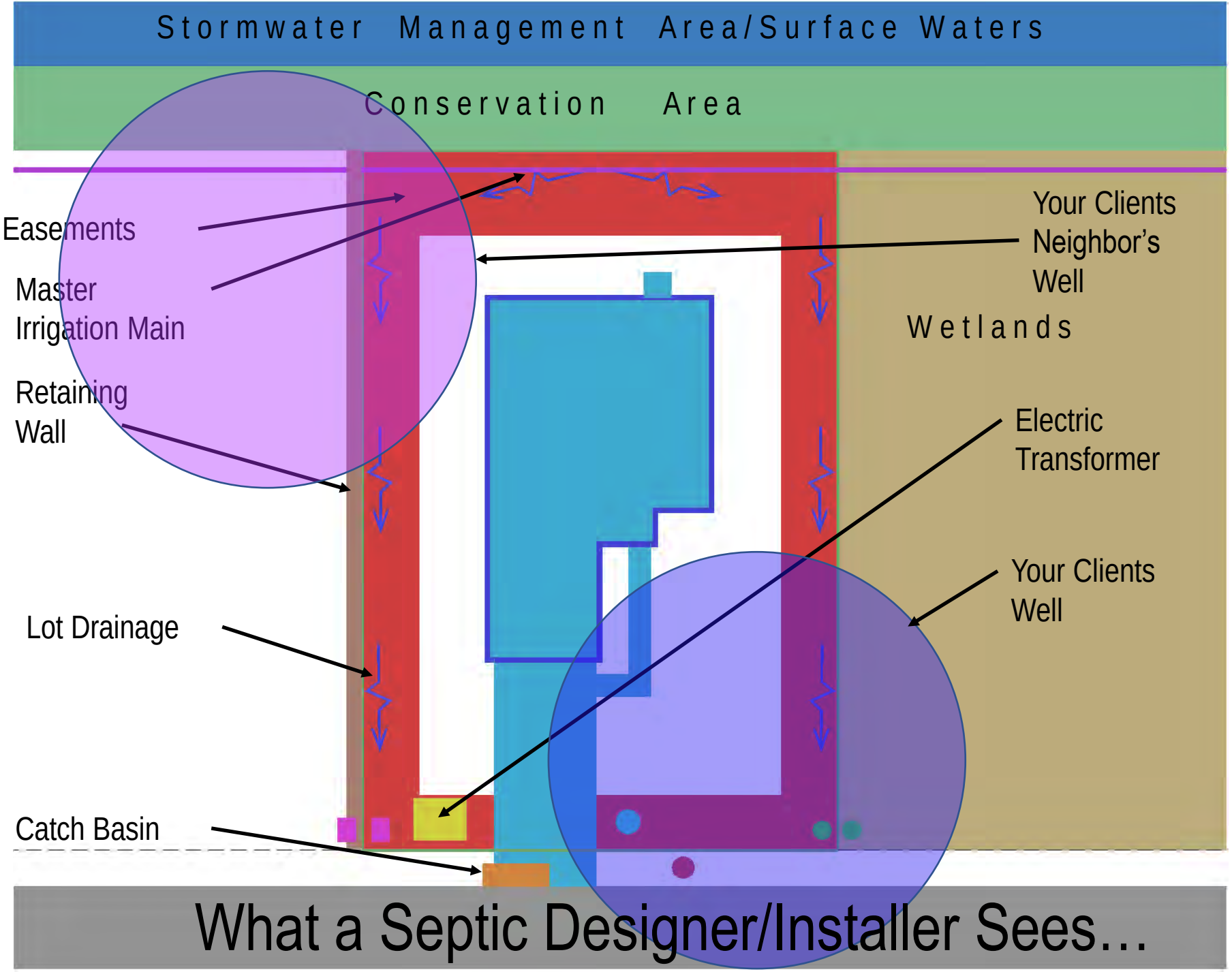


What a Septic Designer/Installer Sees…

Your Design & Construction Staff Need to Always Look at Each Project from a Septic Designer / Installer Viewpoint and Ask - *What are the Site Constraints???*

That Large Lot Becomes Tiny Very Quickly

To Place the **Large Shoebox Home**

on the Postage Stamp Lot Requires You to Investigate Several Types of Advanced Technologies for Onsite Sewage Treatment and Disposal Systems (OSTDS) – Septic Systems:

Aerobic Treatment Unit (ATU) OSTDS

ATU and Subsurface Drip Irrigation (SDI) Drainfield

Performance Based Treatment System (PBTS) OSTDS

PBTS Unit and Subsurface Drip Irrigation Drainfield

Our Focus for Today's Class Will be on:

Aerobic Treatment Unit (ATU) OSTDS
ATU and Subsurface Drip Irrigation (SDI) Drainfield

Performance Based Treatment System (PBTS) OSTDS
PBTS Unit and Subsurface Drip Irrigation (SDI) Drainfield

Aerobic Treatment Unit (ATU) OSTDS

An aerobic treatment unit or ATU, Aerobic treatment is a sewage treatment in which you introduce air into sewage to provide aerobic biochemical stabilization within a treatment receptacle. Blower Provides Cyclical or Continual Air Circulation

Performance Based Treatment System (PBTS) OSTDS

Performance Based Treatment Systems (PBTS) are the next level in sewage treatment when there are more restrictions than a standard septic system or aerobic treatment unit (ATU) can accommodate. Performance based treatment systems are defined by the Florida Department of Environmental Protection (FDEP) as…

“a specialized onsite sewage treatment and disposal system designed by a professional engineer with a background in wastewater engineering, licensed in the state of Florida, using appropriate application of sound engineering principles to achieve specified levels of CBOD5 (carbonaceous biochemical oxygen demand),TSS (total suspended solids), TN (total nitrogen), TP (total phosphorus), and fecal coliform found in domestic sewage waste, to a specific and measurable established performance standard.”

Why Select a Performance Based Treatment System (PBTS) OSTDS ??

STATE OF FLORIDA PERFORMANCE BASED SEPTIC STANDARDS - Florida Statutes 381.0065 & Florida Administrative Code 64E-6

POLLUTANT	BASELINE SYSTEM STANDARDS (SEPTIC TANK EFFLUENT)	AEROBIC SYSTEM STANDARDS (EFFLUENT)	SECONDARY SYSTEM STANDARDS (EFFLUENT)	ADVANCED SECONDARY TREATMENT STANDARDS (EFFLUENT)	ADVANCED WASTEWATER TREATMENT STANDARDS (EFFLUENT)
CBOD5	120-140 mg/l	<30 mg/l	=or <20 mg/l	=or<10 mg/l	=or<5 mg/l
TSS	65-176 mg/l	=or<30 mg/l	=or<20 mg/l	=or<10 mg/l	=or<5 mg/l
DRAINFIELD REDUCTIONS	*Not Applicable*	*25% (In Slightly Limited Soil)*	**25%**	*40%*	*40%*
TN	30-45 mg/l	Not applicable	Not applicable	=or<20 mg/l	=or<3 mg/l
TP	6-10 mg/l	Not applicable	Not applicable	=or<10mg/l	=or<1 mg/l
Fecal Coliform	TNTC	Not Applicable	=or<200 cfu/100 ml	=or<200 cfu/100ml	BDL in 100 ml
REDUCED: SETBACKS					
Surface Water	75'	75'	65'	50'	25'
Groundwater Drains	75'	75'	75'	10'	10'
Dry Retentions & Swales	75'	75'	75'	10'	10'
Separations from SHWT	24"	24"	24"	24"	12"
Increased Authorized Flows	No change	No change	25%	50%	100%

* Seasonal High Water Table

Note: Drainfield size reductions depend on CBOD5 and TSS. TN and TP and Fecal Coliform do not apply.

Note: Drainfield size reductions and Increase Authorized Flows - ALL Testing must apply.

Abreviations:

SHWT = Seasonal High Water Table
mg/l = Miligrams per Liter
cfu/100 ml = Colony Forming Unit per 100 mili liters
TNTC = To Numerious To Count

64E-6.028(4) for Drainfield Reductions

BDL = Below Detectable Limits.
CBOD5 = Carbonaceous Biological Oxygen Demand (5 Day Test)
TSS = Total Suspended Solids
TN = Total Nitrogen
TP = Total Phosphorous

5-Sep-19

The Source of the Potable Water for a Home/Commercial Construction Project Controls the Effluent Flow Allowed by the FDEP.

Is there a Well??
Is there Municipal Water??

Wells allow for 1,500 gallons per day per useable acre of land.

Municipal Water allows for 2,500 gallons per day per useable acre of land.

For Example, New House on a Well:

A One-quarter acre lot allows for 375 gallons per day of effluent flow.

(0.25 acres x 1,500 gallons per day per acre)

For Example, New House on Municipal Water:

A One-quarter acre lot allows for 625 gallons per day of effluent flow.

(0.25 acres x 2500 gallons per day per acre)

New House on Well with PBTS OSTDS:

A one-quarter acre lot allows for 375 gallons per day of effluent flow.

PBTS Standard Provides for a 50% Increase in Lot Effluent Flows

375 gallons per day x 1.5 = 562 gallons per day

Based Upon Table 1 of the Florida Administrative Code 62-6:

375 gallons per day of effluent flow Allows for a 3 Bedroom House, Maximum 2,250 Square Feet

562 gallons per day of effluent flow allows for a 5 Bedroom House, Maximum of 4,800 Square Feet

Based Upon of the Florida Administrative Code 62-6:

When Utilizing ATU Design Standards you receive a 25% Reduction in the Drainfield Size and a 25% Reduction in the Required Unobstructed Area.

When Utilizing PBTS Design Standards you receive a 40% Reduction in the Drainfield Size and a 40% Reduction in the Required Unobstructed Area.

Ask Your Clients…

“Are There Any Golden Calves (Items On The Site That Are Off Limits To Touch)…”

That Knowledge Will Help You To Fight For Your Design And Live With The Parameters That The Site and the Owner Presents You.

EXAMPLES:

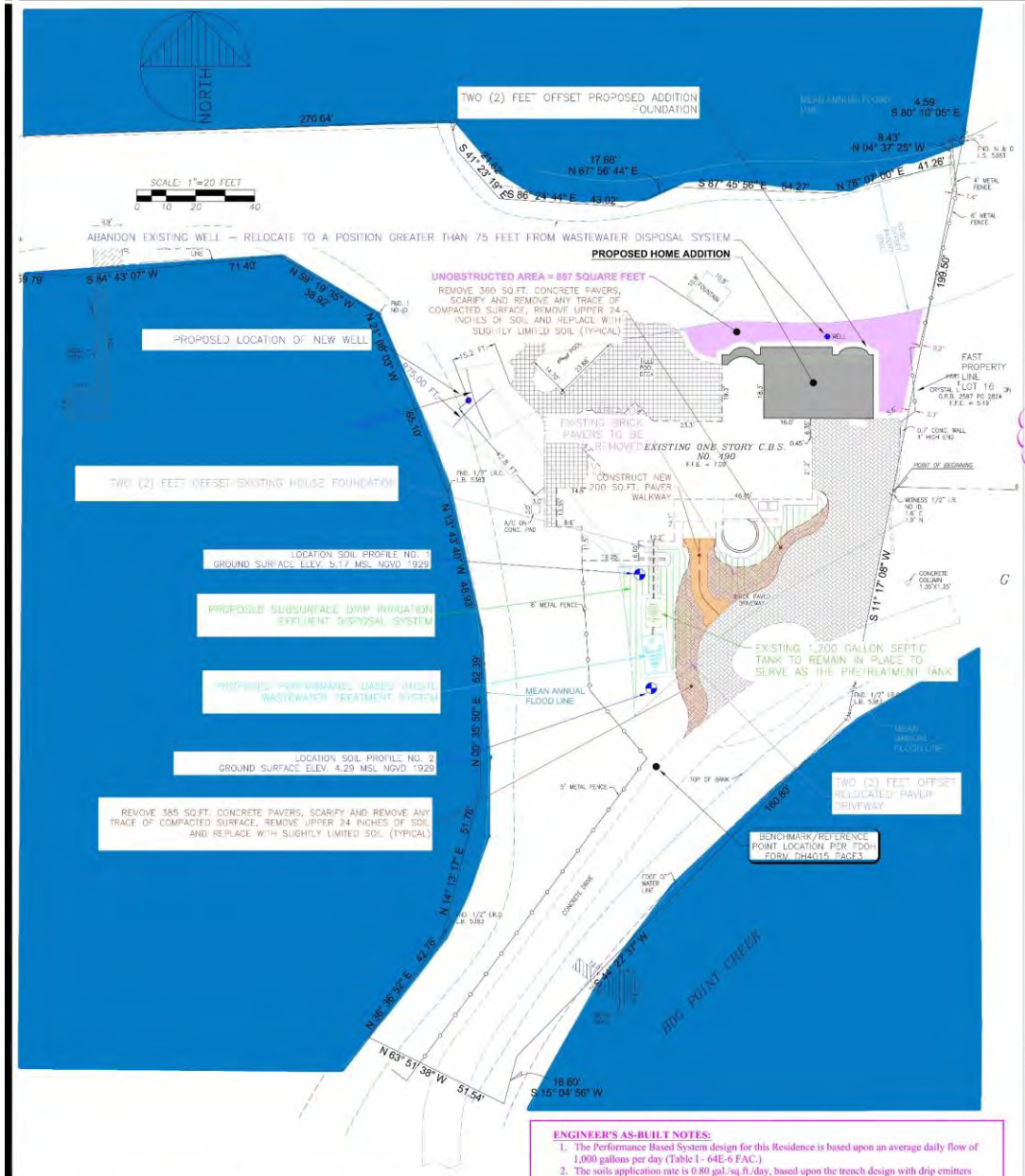
Big Ideas…

Little Tiny Spaces

in OSTDS Designs

Existing Single-Family Residence Need to Add a Full Second Floor – Double Space Under A/C

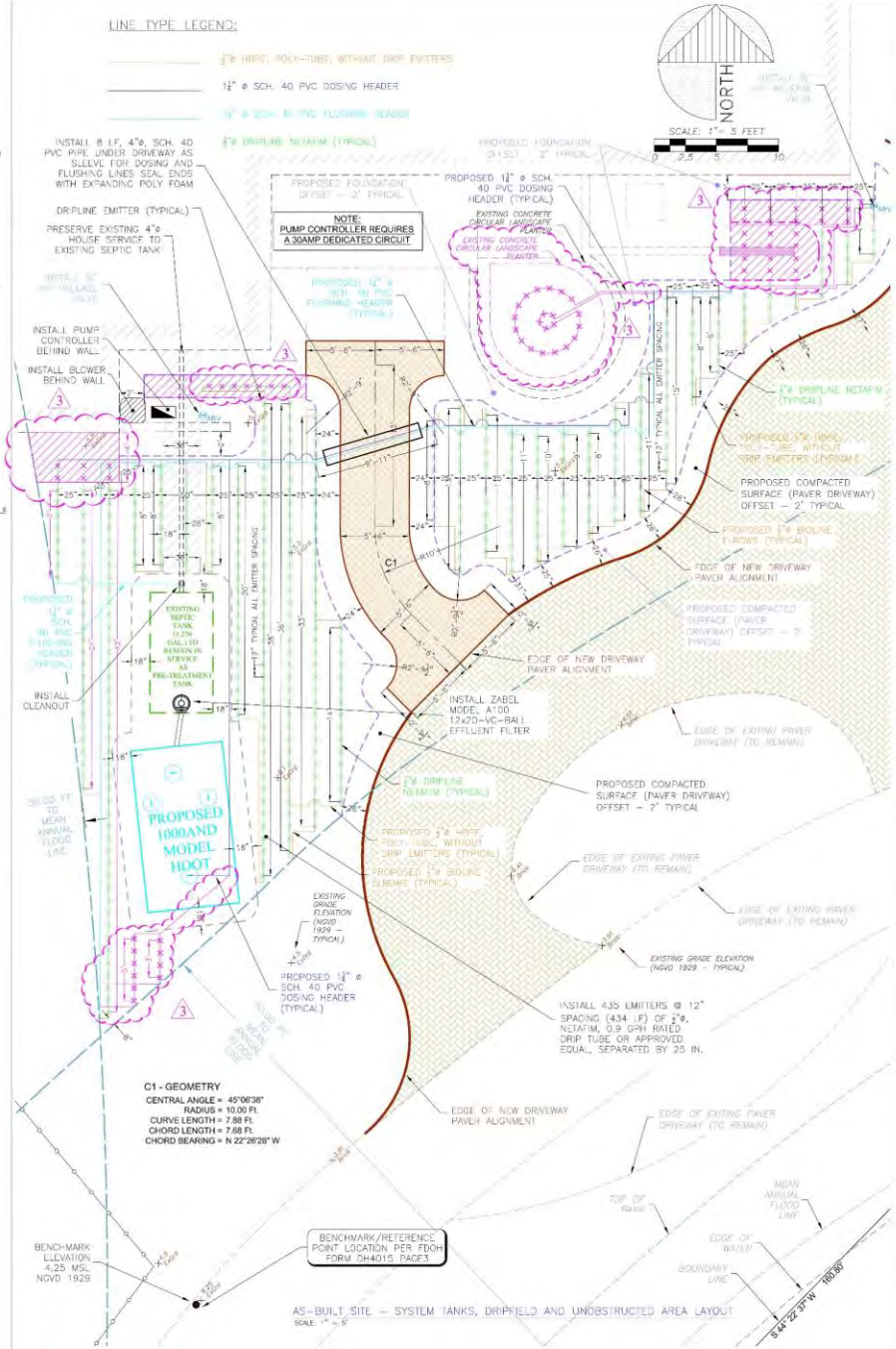
- Water (Canal) on the North Side of the Property
- Water (Indian River Lagoon) on the West Side of the Property
- Water (Mosquito Impound) on the Southeast Side
- Existing Site Geometry Not Acceptable
- Remove, Reduce and Replace Existing Paver Driveway



SITE – SYSTEM TANKS, DRIPFIELD AND UNOBSTRUCTED AREA LAYOUT
SCALE: 1" = 20'

ENGINEER'S AS-BUILT NOTES:

1. The Performance Based System design for this Residence is based upon an average daily flow of 1,000 gallons per day (Table I - 64E-6 FAC.)
2. The soils application rate is 0.80 gal./sq.ft./day, based upon the trench design with drip emitters separated by twenty-five (25) inches.
3. The required drip field area = 1,000 / 0.8 = 1,250 sq.ft. taking the drip field reduction allowed of 40%, the drip field area required for this project = 750 sq.ft.
4. The required number of emitters calculates as = 750 /2 = 375 emitters required.
5. The original design drawings and calculations for this site were approved with 435 emitters.
6. The loss of 35 emitters is due to home builder's construction techniques and the home owner's desire to keep existing trees.
7. The engineer was able to reconfigure the drip field layout to replace 32 of the 35 emitters loss, providing for a net loss of 3 emitters.
8. **Total Emitters Approved = 435; Total Emitters Installed 433; Total Emitters Required = 375**
9. Dosing and Flushing Header Geometry was modified to accommodate the deletion and addition of drip emitters. These headers are in compliance with the required set-back of 64E-6.



AS-BUILT SITE – SYSTEM TANKS, DRIPFIELD AND UNOBSTRUCTED AREA LAYOUT
SCALE: 1" = 5'

JAMES MORRIS SMITH, JR.
Professional Engineer
Professional Surveyor and Mapper
CIVIL ENGINEERING
LAND DEVELOPMENT PERMITTING
GEOGRAPHICAL INFORMATION SYSTEMS
LAND SURVEYING
1754 Barker Street NE
Palm Bay, Florida 32907
(321) 723-2371 Desk
(321) 745-0234 Cell
morris@morrissmitheng.com

Original Drawing Issue Date: 03-06-09

REVISIONS:

No.	Date	Description	By
1.	04-07-09	50 ft. Setback From Mean Annual Flood Line - Referenced	JMS
2.	05-20-10	Reconfigured Dripfield due to wall Change	JMS
		Added Dripfield to Rose Garden	
3.	06-16-10	As-Builts of Areas with Drip Emitters Lost Due to Home Contractor Wall Extension into Dripfield & Home Owner Keeping Two (2) Sets of Trees That Were Originally Expected to Be Removed	JMS

Randall A. & Wendy L. Pelling-Fine
490 Spoonbill Lane
Melbourne Beach, FL 32951

Variance Approval No. 11643
June 4th, 2009 for a Performance Based Onsite Wastewater Treatment System

Site Address
490 Spoonbill Lane
Melbourne Beach, FL 32951

Onsite Wastewater Disposal Layout Plan AS-BUILT

James Morris Smith, Jr., P.E.
Florida Registration No. 45392

Date: _____

Project No.	09-0302
Drawn By:	JMS
Site Designed By:	Randall & Wendy
Civil Design By:	JMS
Drawing Scale:	See Exhibits

Sheet AB1 1 of 1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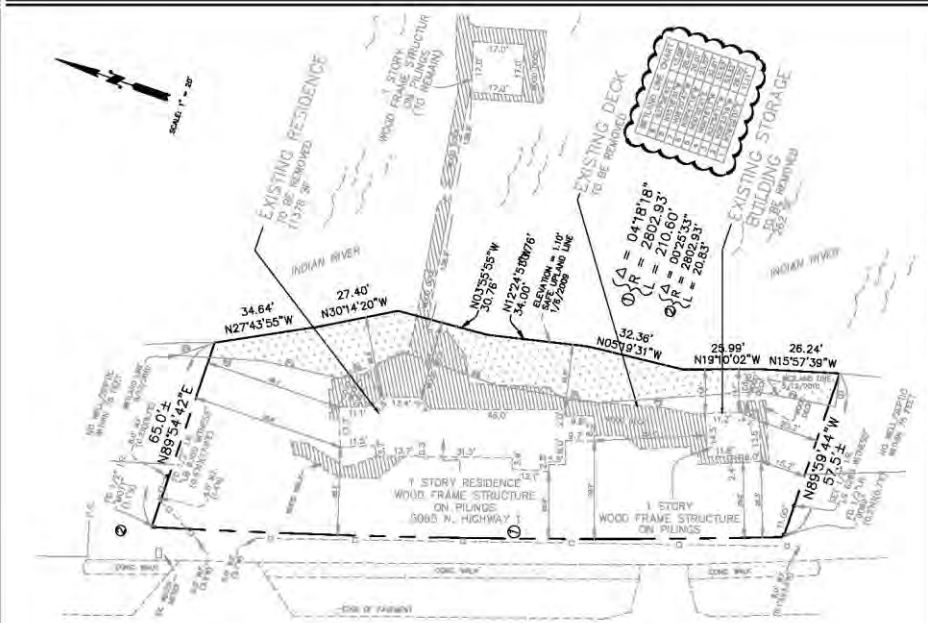
New Single-Family Residence
Very Limited Space

- Water (Indian River Lagoon) on the East Side of the Property
- US Highway 1 Right-of-Way on the West Side of the Property
- Extreme Sloped Embankment From Right-of-Way Line to the Shoreline



EXISTING SITE CONDITIONS – SURVEY DATA PROVIDED BY DAVID A. BLOCK SURVEYING & MAPPING

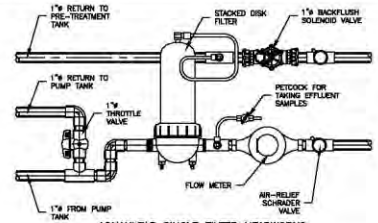
SCALE: 1" = 30'

GENERAL NOTES:

1. ALL CONSTRUCTION AND SYSTEM COMPONENTS SHALL CONFORM TO THE LATEST EDITION OF F.A.C.; CHAPTER 64E-6 AND THE APPROVED PLANS, SPECIFICATIONS AND PERMIT ISSUED FOR THIS PROJECT.
2. ALL COMPONENTS SHALL ADHERE TO THE FOLLOWING SETBACKS: 50' FROM A NON-POTABLE WELL; 75' FROM SURFACE WATERS; 75' FROM A PRIVATE POTABLE WELL; 100' FROM A NON COMMUNITY WELL; 200' FROM A PUBLIC WATER WELL; FOR TANKS, 5' FROM BUILDINGS & 5' FROM PROPERTY LINES; FOR DRIP TUBING, 2' FROM COMPACTED SURFACES & 2' FROM PROPERTY LINES, 10' FROM STORM SEWERS AND WATER LINES.
3. BOUNDARY, TOPOGRAPHIC & EXISTING UTILITIES INFORMATION INDICATED ON THESE DRAWINGS ARE PER FIELD DATA SUPPLIED BY DAVID A. BLOCK SURVEYING & MAPPING. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATION OF ALL UTILITIES AND PROTECT SAME FROM DAMAGE DURING THE CONSTRUCTION PHASE. DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE.
4. THIS IS A SPECIFIC PURPOSE DRAWING FOR A PERFORMANCE BASED ONSITE SEWAGE TREATMENT AND WASTEWATER DISPOSAL SYSTEM. NO OTHER USE IS CERTIFIED BY THE CONSULTING ENGINEER. ALL OTHER CIVIL ENGINEERING DESIGN AND CALCULATIONS ARE BY DAVID BOGGENRIEF, P.E.
5. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SETBACKS PRIOR TO STARTING CONSTRUCTION.
6. THE CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OF WASTEWATER DURING ANY SYSTEM(S) DOWN-TIME AND UNTIL THE NEW SYSTEM HAS BEEN CLEARED FOR USE & PLACED ON-LINE.
7. ALL AREAS DISTURBED BY THE CONTRACTOR SHALL BE SODDED UNLESS SPECIFIED OTHERWISE ON THE DRAWINGS.
8. WHEN A SEWER OR FORCEMAIN CROSSES A WATER MAIN OR STORM SEWER THERE SHALL BE A MINIMUM VERTICAL SEPARATION OF 24 INCHES BETWEEN THE OUTSIDES OF THE PIPES. IF SEPARATION CAN NOT BE ACHIEVED THE SEWER OR FORCEMAIN SHALL BE ENCASED IN A 20' LONG PVC SLEEVE CENTERED AT THE POINT OF THE CROSSING.
9. WHEN A SEWER OR FORCEMAIN PARALLELS A WATER MAIN OR STORM SEWER THERE SHALL BE A MINIMUM OR 10' HORIZONTAL SEPARATION BETWEEN THE OUTSIDES OF THE PIPES. IF SEPARATION CAN NOT BE ACHIEVED THE SEWER OR FORCEMAIN SHALL BE ENCASED IN A PVC SLEEVE TO 10' PAST THE WATER MAIN OR STORM SEWER. SEWER/FORCEMAIN JOINTS AND PIPE CASING JOINTS SHALL BE STAGGERED.

PROJECT SPECIFIC NOTES:

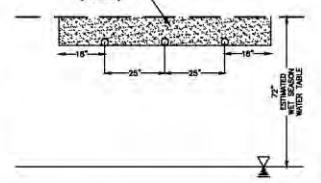
1. SYSTEM DESIGNED TO TREAT A PEAK FLOW OF 300 GALLONS PER DAY (GPD), CALCULATED FROM DESIGN SIZING STANDARD TABLE 1 64E-6.008, FOR A SINGLE FAMILY RESIDENCE.
2. DRIPFIELD SIZED FOR PEAK DAILY LOADING OF 0.60 GPD/SQ.FT. 64E-6 FOR TRENCH IN SANDY SOILS.
3. ALL GRAVITY SEWER LATERALS TO THE SEPTIC TANK, THE AQUAKLEAR AK500C AND THE PUMP TANK SHALL BE DESIGNED AND CONSTRUCTED WATERTIGHT IN ACCORDANCE WITH STATE AND LOCAL CODES. USE SCH 4"Ø, ASTM-D2729, PVC GRAVITY SEWER PIPE WITH CORRECT FITTINGS FOR ALL GRAVITY SEWER LINES.
4. THE ONSITE WASTEWATER SYSTEM IS BASED ON SITE EVALUATION PERFORMED BY SEAN FLYNN, ESI, BREVARD COUNTY DEPARTMENT OF HEALTH STAFF MEMBER. IF CONDITIONS ARE ENCOUNTERED DURING CONSTRUCTION DIFFERING FROM THOSE USED FOR DESIGN, CONTRACTOR SHALL CEASE WORK AND IMMEDIATELY NOTIFY THE DESIGN ENGINEER AND LOCAL AUTHORITY IN WRITING.
5. BEFORE THE START OF ANY CONSTRUCTION AT THE SITE, THE FOLLOWING MUST BE STAKED OUT AND PROTECTED FROM ALTERATION OR COMPACTION:
   (1) THE LOCATION OF THE DISPOSAL/REUSE DRIPFIELD,
   (2) THE 50 FEET OFFSET LINE FROM THE MEAN ANNUAL FLOOD LINE AND
   (3) THE PROPOSED EDGE OF THE DRIVEWAY AT ITS POINT NEAREST THE PRE-TREATMENT TANK.
6. A PERMIT FROM THE BREVARD COUNTY HEALTH DEPARTMENT MUST BE OBTAINED PRIOR TO THE START OF CONSTRUCTION.
7. THE BREVARD COUNTY HEALTH DEPARTMENT SHALL BE NOTIFIED PRIOR TO THE START OF CONSTRUCTION.
8. THE DISPOSAL (DRIP) FIELD MUST NOT BE CONSTRUCTED DURING PERIODS WHEN THE SOIL IS SUFFICIENTLY WET, AT THE SURFACE OR AT THE DEPTH OF INSTALLATION, TO EXCEED ITS PLASTIC LIMIT. CONSTRUCTION OF THE DISPOSAL/REUSE DRIPFIELD SHALL NOT OCCUR UNTIL SOIL CONDITIONS ARE ACCEPTABLE AS DETERMINED BY THE BREVARD COUNTY HEALTH DEPARTMENT.
9. IF A SURFACE DIVERSION IS REQUIRED IF RUNOFF FROM AN ADJOINING UPSLOPE LANDSCAPE AFFECTS THE DISPOSAL/REUSE SITE, SURFACE DIVERSIONS MUST HAVE A POSITIVE GRADE OF AT LEAST TWO AND FOUR-TENTHS (2.4) INCHES PER ONE HUNDRED (100) FEET, A GRADE OF 0.2%). THE SURFACE DIVERSION MUST BE OF SUFFICIENT DEPTH AND WIDTH TO MOVE SURFACE WATER AWAY FROM THE DISPOSAL/REUSE FIELD.
10. THE FILTERED EFFLUENT DOSING/PUMP TANK IS A 300 GALLON CONCRETE TANK. THE PRE'S TREATMENT UNIT IS A AQUAKLEAR MODEL #AS500C, (CONCRETE) RATED FOR 500 GALLONS PER DAY, AS MANUFACTURED BY THE AQUAKLEAR, INC. 878 NORTH BROADWAY ROAD PEARL, MISSISSIPPI 39208 (601) 939-7711.
11. TREATMENT UNIT DOSING PUMP SHALL PRODUCE AT LEAST 6 GPM AT 71.7 TDH DURING DOSING AND FLUSHING. BASE DOSING TIME OF PUMP IS 2 MINUTES EVERY HOUR, 24 DOSES PER DAY.
12. THE PROPOSED SINGLE FAMILY RESIDENCE RECEIVES POTABLE WATER FROM A MUNICIPAL WATER UTILITY SERVICES.
13. CONTRACTOR SHALL VERIFY BUILDING SEWER INVERTS AND ADJUST GRAVITY LATERALS ACCORDINGLY. ADJUST PRE-TREATMENT TANK, AQUAKLEAR AK500C PRTS AND PUMP TANK INVERTS TO AS SHALLOW AS POSSIBLE BASED ON FIELD VERIFICATION OF BUILDING SEWER.
14. SITE VEGETATIVE COVER IS SOLID SOD OR GROUND COVER OR ORNAMENTAL SHRUBS OR ANY COMBINATION THEREOF OVER DRIPFIELD, NO TREES SHALL BE PLANTED IN THE DRIPFIELD AND SYNTHETIC ROOS AROUND THE COMPONENTS



AQUAKLEAR SINGLE FILTER HEADWORKS

NOT TO SCALE

REMOVE THE UPPER SIX (6) INCHES OF GROUND SURFACE PRIOR TO INSTALLING THE DRIP LINES (TYPICAL)



TYPICAL SECTION THROUGH DRIP FIELD

NOT TO SCALE

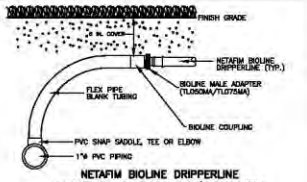
NOTE::

THE SURFACE OF THE DRIP FILED TO RECEIVE SOLID SOD OR GROUND COVERS OR ORNAMENTAL SHRUB PLANTING, OR ANY COMBINATION OF EACH. NO TREES ARE TO BE PLANTED IN THE DRIPFIELD AREA.

SPECIFICATIONS FOR PVC PIPE USED FOR DOSING AND FLUSHING MAINS:

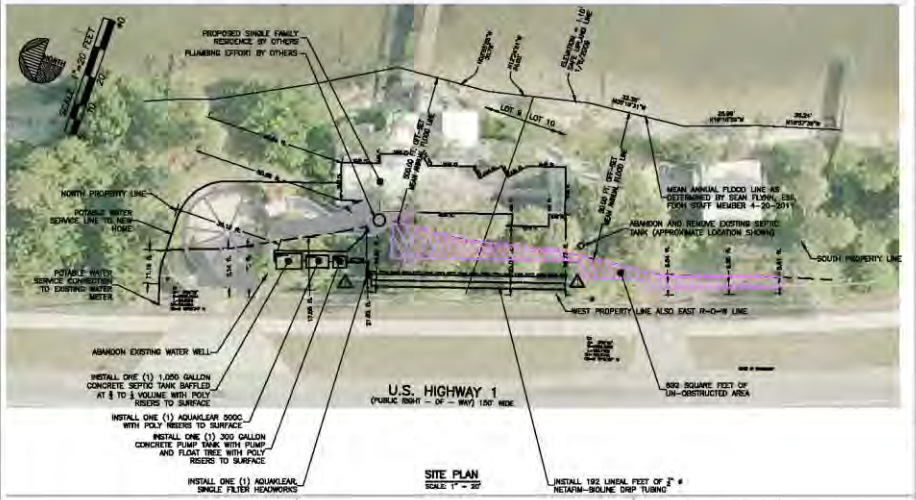
ALL SCH. 40 PVC PIPE TO BE USED FOR THE DOSING MAIN, DOSING HEADER, FLUSHING MAIN AND FLUSHING HEADER SHALL MEET OR EXCEED ASTM-D2672 AND ASTM-D1785-06, BELL END, SOLVENT WELD, POLY VINYL CHLORIDE (PVC) PIPE.

ALL PIPES TO BE PURPLE (VIOLET) IN COLOR FROM MANUFACTURER OR PAINTED IN FIELD TO PREVENT FUTURE CONFUSION WITH IRRIGATION PIPING IN THE YARD.



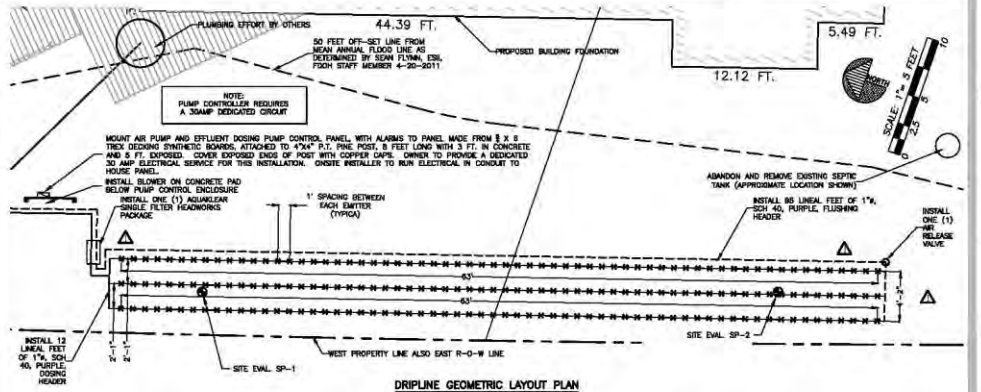
NETAFIM BIOLINE DRIPPERLINE END FEED CONNECTION W/ FLEX PIPE

SCALE: NOT TO SCALE



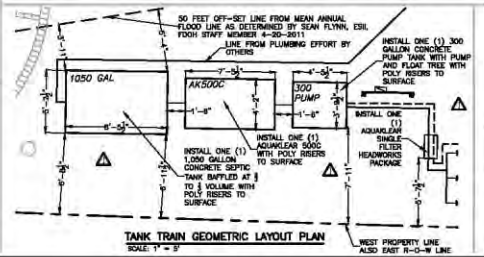
SITE PLAN

SCALE: 1" = 20'



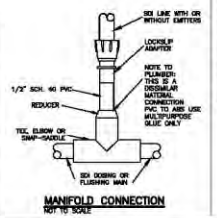
DRIPLINE GEOMETRIC LAYOUT PLAN

SCALE: 1" = 5'



TANK TRAIN GEOMETRIC LAYOUT PLAN

SCALE: 1" = 5'

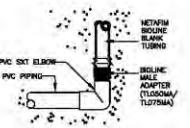


MANIFOLD CONNECTION

NOT TO SCALE

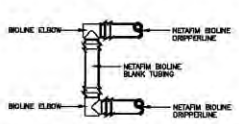
LENGTH	TYPE OF PIPE	USE OF PIPE
12 L.F.	1" ø SCH 40 PVC	DOSING MAIN
85 L.F.	1-1/4" ø SCH 40 PVC	FLUSHING MAIN
195 L.F.	1/2" POLYETHYLENE DRIPLINE (0.90 GPH)	DRIP–FIELD LINES
40 L.F.	4"ø ASTM D-2729, SCH 40 PVC PIPE	GRAVITY SEWER LINE

PIPING SCHEDULE



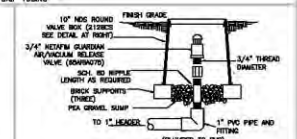
NETAFIM BIOLINE DRIPPERLINE – SERVICE ELL

SCALE: NOT TO SCALE



NETAFIM BIOLINE DRIPPERLINE – ELBOW CONNECTION

SCALE: NOT TO SCALE



3/4" AIR RELEASE VALVE

NOT TO SCALE

JAMES MORRIS SMITH, JR.
Professional Engineer
Professional Surveyor and Mapper
CIVIL ENGINEERING
LAND DEVELOPMENT PERMITTING
GEOGRAPHICAL INFORMATION SYSTEMS
LAND SURVEYING

1754 Barker Street NE
Palm Bay, Florida 32907
(321) 723-2371 Desk
(321) 745-0234 Cell

Original Drawing
Issue Date: 06/14/2011

REVISIONS:

No.	Date	By	Description
1.	3-12-13	JMS	Removed Visual Reference to Guardrail and Retaining Wall
2.			
3.			

Mrs. Lois R. Barber
5065 N. Highway 1
Palm Shores, FL 32940

Site Address
5065 N. Highway 1
Palm Shores, FL 32940

Proposed Performance Based Treatment System

James Morris Smith, Jr., P.E.
Florida Registration No. 45392

Date: _____

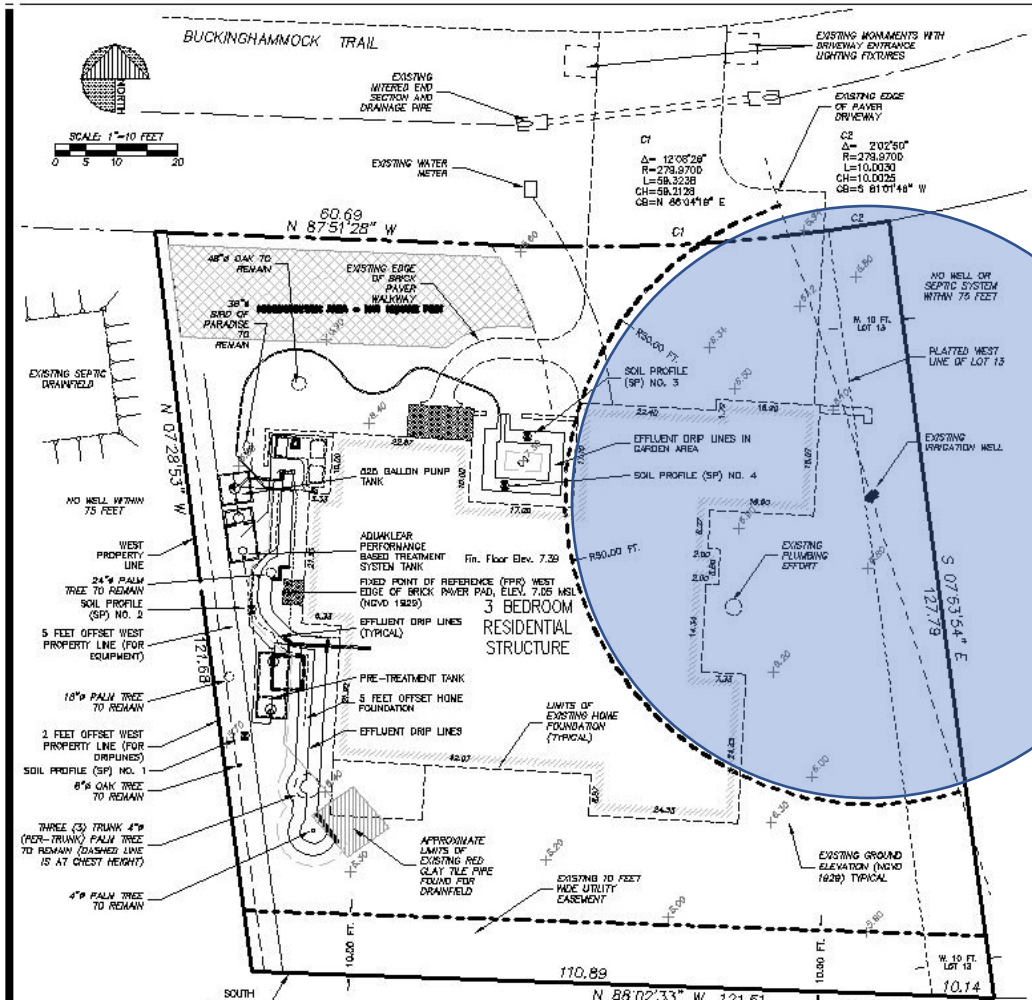
Project No.	11-0609
Drawn By:	JMS
Site Designed By:	D. Bogenrief
Civil Design By:	D. Bogenrief
Drawing Scale:	See Exhibits

Sheet OS1 1 of 1

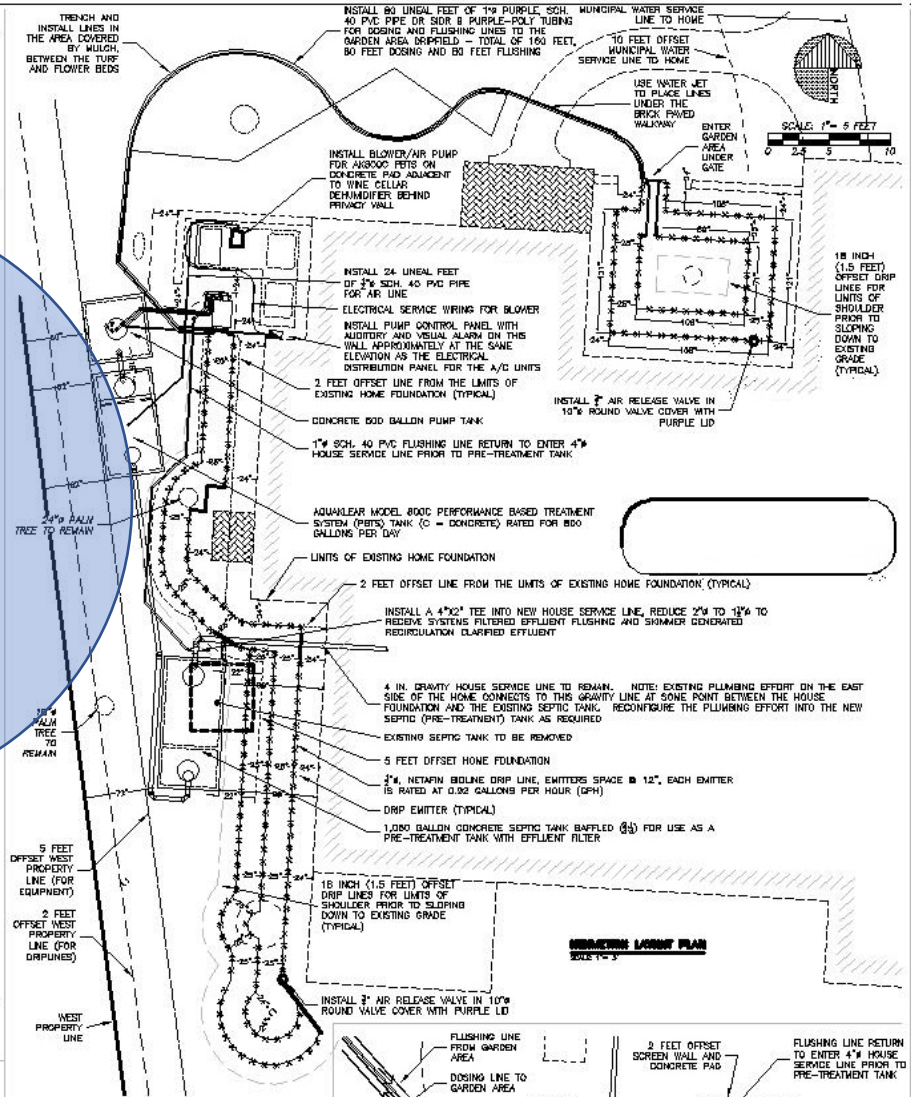

Steve
Hemmerle
Building Contractor, Inc.
Residential • Commercial
321-917-3308

Existing 1930's Single Family Residence Owner Wanted to Add a Full Second Floor From 1 Bathrooms to 3

- Vero Beach Country Club Fairway to the South
- Mature Landscaping on the West Side
- Manicured Lawn and Landscaping in All Areas of the Site
- Tripling the Effluent Flow
- 50 Feet Radius From an Irrigation Well

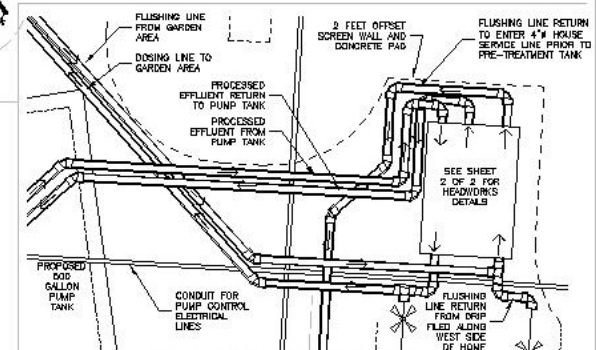


SITE PLAN - PROPOSED PERFORMANCE BASED TREATMENT SYSTEM LAYOUT
SCALE: 1"= 10'



LENGTH	SIZE OF PIPE	USE OF PIPE
80 L.F.	1" ø SCH 40 PVC	DOSING MAIN
82 L.F.	1" ø SCH 40 PVC	FLUSHING MAIN
336 L.F.	1/2" ø POLYETHYLENE (APPROX. 0.660 GPH)	DRIP-FIELD LINES
30 L.F.	1/2" ø SCH 40 PVC	AIR COMPRESSOR LINE TO AK800C

PIPING SCHEDULE



FRONT PERSPECTIVE LOOKING TO AIR FROM NORTHWEST
SCALE NOT TO SCALE

GENERAL NOTES:

1. ALL CONSTRUCTION AND SYSTEM COMPONENTS SHALL CONFORM TO THE LATEST EDITION OF F.A.C.; CHAPTER 64E-6 AND THE APPROVED PLANS, SPECIFICATIONS AND PERMIT ISSUED FOR THIS PROJECT.
2. ALL COMPONENTS SHALL ADHERE TO THE FOLLOWING SETBACKS: 50' FROM A NON-POTABLE WELL; 75' FROM SURFACE WATERS; 75' FROM A PRIVATE POTABLE WELL; 100' FROM A NON COMMUNITY WELL; 300' FROM A PUBLIC WATER WELL; FOR PIPES, 5' FROM BUILDINGS & 5' FROM PROPERTY LINES, FOR DRIP TUBING, 2' FROM COMPACTED SURFACES & 2' FROM PROPERTY LINES, 10' FROM SEWER SEWERS AND WATER LINES.
3. BOUNDARY, TOPOGRAPHIC & EXISTING UTILITIES INFORMATION INDICATED ON THESE DRAWINGS ARE PER HARD COPY OF FIELD DATA SURVEY FROM DARTER AND ASSOCIATES, INC., VERO BEACH, FL. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATION OF ALL UTILITIES AND PROTECT SAME FROM DAMAGE DURING THE CONSTRUCTION PHASE. DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE.
4. THIS IS A SPECIFIC PURPOSE DRAWING FOR THE DESIGN AND INSTALLATION OF A FLORIDA PERFORMANCE BASED TREATMENT SYSTEM (PBTS) AND WASTEWATER DISPOSAL SYSTEM. NO OTHER USE IS CERTIFIED BY THE CONSULTING ENGINEER.
5. CONTRACTOR SHALL VERIFY ALL INVERTS AND SETBACKS PRIOR TO STARTING CONSTRUCTION.
6. THE CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OF WASTEWATER DURING ANY SYSTEM(S) DOWN-TIME AND UNTIL THE NEW SYSTEM HAS BEEN CLEARED FOR USE & PLACED INTO SERVICE.
7. ALL AREAS DISTURBED BY THE CONTRACTOR SHALL BE SODDED UNLESS SPECIFIED OTHERWISE ON THE DRAWINGS.
8. WHEN A SEWER OR FORCEMAIN CROSSES A WATER MAIN OR STORM SEWER THERE SHALL BE A MINIMUM VERTICAL SEPARATION OF 24 INCHES BETWEEN THE OUTSIDES OF THE PIPES. IF SEPARATION CAN NOT BE ACHIEVED THE SEWER OR FORCEMAIN SHALL BE ENCASED IN A 20' LONG PVC SLEEVE CENTERED AT THE POINT OF THE CROSSING.
9. WHEN A SEWER OR FORCEMAIN PARALLELS A WATER MAIN OR STORM SEWER THERE SHALL BE A MINIMUM OR 10' HORIZONTAL SEPARATION BETWEEN THE OUTSIDES OF THE PIPES. IF SEPARATION CAN NOT BE ACHIEVED THE SEWER OR FORCEMAIN SHALL BE ENCASED IN A PVC SLEEVE TO 10' PAST THE WATER MAIN OR STORM SEWER. SEWER/FORCEMAIN JOINTS AND PIPE CASING JOINTS SHALL BE STAGGERED.

PROJECT SPECIFIC NOTES:

1. SYSTEM DESIGNED TO TREAT A PEAK FLOW OF 800 GALLONS PER DAY (GPD), CALCULATED FROM DESIGN SIZING STANDARD TABLE 1 64E-6.008, FOR A SINGLE FAMILY RESIDENCE.
2. DRIPFIELD SIZED FOR FINE SANDY LOAM/SAND OF 0.60 GPD/SQ.FT. 64E-6 FOR TRENCH IN SLIGHTLY LIMITED SANDY SOILS.
3. ALL GRAVITY SEWER LATERALS TO THE SEPTIC TANK, THE AQUAKLEAR AK800C AND THE PUMP TANK SHALL BE DESIGNED AND CONSTRUCTED WATERTIGHT IN ACCORDANCE WITH STATE AND LOCAL CODES. USE NEW 4"ø, ASTM-D2732, PVC GRAVITY SEWER PIPE WITH CORRECT FITTINGS AND GLUE FOR ALL GRAVITY SEWER LINES.
4. THE ONSITE WASTEWATER DISPOSAL SYSTEM DESIGN IS BASED ON SITE EVALUATION PERFORMED BY JAMES MORRIS SMITH, JR., PE, PSM, PALM BAY, FL. AND BEAR R. ROCHESTE, EHS, INDIAN RIVER COUNTY HEALTH DEPARTMENT. IF CONDITIONS ARE ENCOUNTERED DURING CONSTRUCTION DIFFERING FROM THOSE USED FOR DESIGN, CONTRACTOR SHALL CEASE WORK AND IMMEDIATELY NOTIFY THE DESIGN ENGINEER AND LOCAL AUTHORITY IN WRITING.
5. BEFORE THE START OF ANY CONSTRUCTION AT THE SITE, THE FOLLOWING MUST BE STAKED OUT AND PROTECTED FROM ALTERATION OR COMPACTION:
   (1) THE LOCATION OF BOTH AREAS OF THE DISPOSAL/REUSE DRIPFIELD.
6. A PERMIT FROM THE INDIAN RIVER COUNTY HEALTH DEPARTMENT MUST BE OBTAINED PRIOR TO THE START OF CONSTRUCTION.
7. THE INDIAN RIVER COUNTY HEALTH DEPARTMENT SHALL BE NOTIFIED PRIOR TO THE START OF CONSTRUCTION.
8. THE DISPOSAL (DRIP) FIELD MUST NOT BE CONSTRUCTED DURING PERIODS WHEN THE SOIL IS SUFFICIENTLY WET, AT THE SURFACE OR AT THE DEPTH OF INSTALLATION, TO EXCEED ITS PLASTIC LIMIT. CONSTRUCTION OF THE DISPOSAL/REUSE DRIPFIELD SHALL NOT OCCUR UNTIL SOIL CONDITIONS ARE ACCEPTABLE AS DETERMINED BY THE INDIAN RIVER COUNTY HEALTH DEPARTMENT.
9. IF A SURFACE DIVERSION IS REQUIRED IF RUNOFF FROM AN ADJOINING UPSLOPE LANDSCAPE AFFECTS THE DISPOSAL/REUSE SITE. SURFACE DIVERSIONS MUST HAVE A POSITIVE GRADE OF AT LEAST TWO AND FOUR-TENTHS (2.4) INCHES PER ONE HUNDRED (100) FEET, A GRADE OF 0.02%. THE SURFACE DIVERSION MUST BE OF SUFFICIENT DEPTH AND WIDTH TO MOVE SURFACE WATER AWAY FROM THE DISPOSAL/REUSE FIELD.
10. THE FILTERED EFFLUENT DOSING/PUMP TANK IS A FLORIDA SEPTIC 825 GALLON CONCRETE TANK, A FLORIDA SEPTIC CONCRETE TANK CONTAINS THE PBTS TREATMENT UNIT A KOMALEAR MODEL AK800C RATED FOR 800 GALLONS PER DAY, AS MANUFACTURED BY THE KOMALEAR, INC. 809 NORTH BERGEMAN ROAD PEARL, MISSISSIPPI 39208 (601) 939-7711 AND THE PRE-TREATMENT TANK IS A FLORIDA SEPTIC 1,250 GALLON CONCRETE TANK BAFFLED FOR A 2/3 & 1/3 SPLIT.
11. TREATMENT UNIT DOSING PUMPED SHALL PROVIDE AT LEAST 6.7 GPM AT 24.8 TDH TO MAINTAIN A MINIMUM 2.0 FT/SEC. DOSING AND FLUSHING VELOCITY. BASE DOSING TIME OF PUMP IS 5 MINUTES EVERY HOUR, 24 DOSES PER DAY.
12. THIS SINGLE FAMILY RESIDENCE RECEIVES POTABLE WATER FROM A MUNICIPAL WATER UTILITY SERVICE.
13. CONTRACTOR SHALL VERIFY BUILDING SEWER INVERTS AND ADJUST GRAVITY LATERALS APPROPRIATELY. ADJUST PRE-TREATMENT TANK AND AQUAKLEAR AK800C INVERTS TO AS SHALLOW AS POSSIBLE BASED ON FIELD VERIFICATION OF BUILDING SEWER.
14. THE PROPOSED SITE VEGETATIVE COVER ARE ORNAMENTAL SHRUBS AND GROUND COVERS OVER THE DRIPFIELD AREA AND SOLID SOD / MULCH OVER THE AREA CONTAINING THE COMPONENTS.

LEGAL DESCRIPTION:
[illegible]

JAMES MORRIS SMITH, JR.
Professional Engineer
Professional Surveyor and Mapper
[illegible]
1343 S. [illegible] Vero Beach, FL 32962
(561) 569-3851 Fax
(561) 569-6284 Cell
[illegible]

Original Drawing Issue Date: 01-12-2011

No.	Date	Revisions
1	3-4-11	Comments from Jr. Hoover, P.E. & Staff member
2	3-21-11	Comments from Jr. Hoover, P.E. & Staff member
3	4-5-11	Comments from Jr. Hoover, P.E. & Staff member
4	4-18-11	Comments from Jr. Hoover, P.E. & Staff member

John and Vanessa Struve

3336 Buckinghammock Tr.
Vero Beach, FL 32960

Project Site Address:
3336 Buckinghammock Tr.
Vero Beach, FL 32960

Proposed Performance Based Treatment System
Construction Details

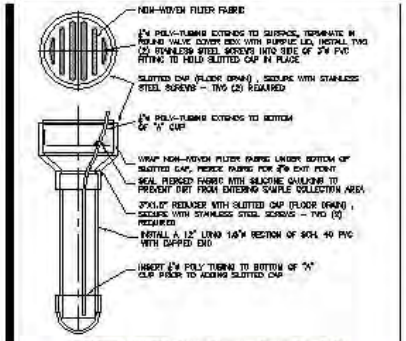
[illegible]

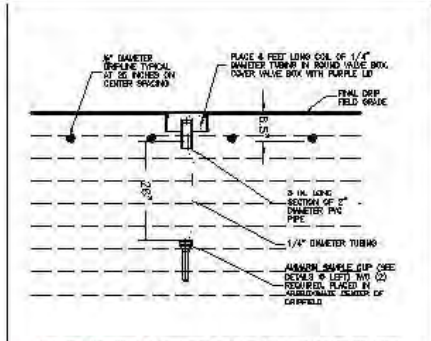
Project No:	[illegible]
Drawn By:	VS
Site Designed By:	V. Peirce
Civil Design By:	VS
Drawing Scale:	See Individual

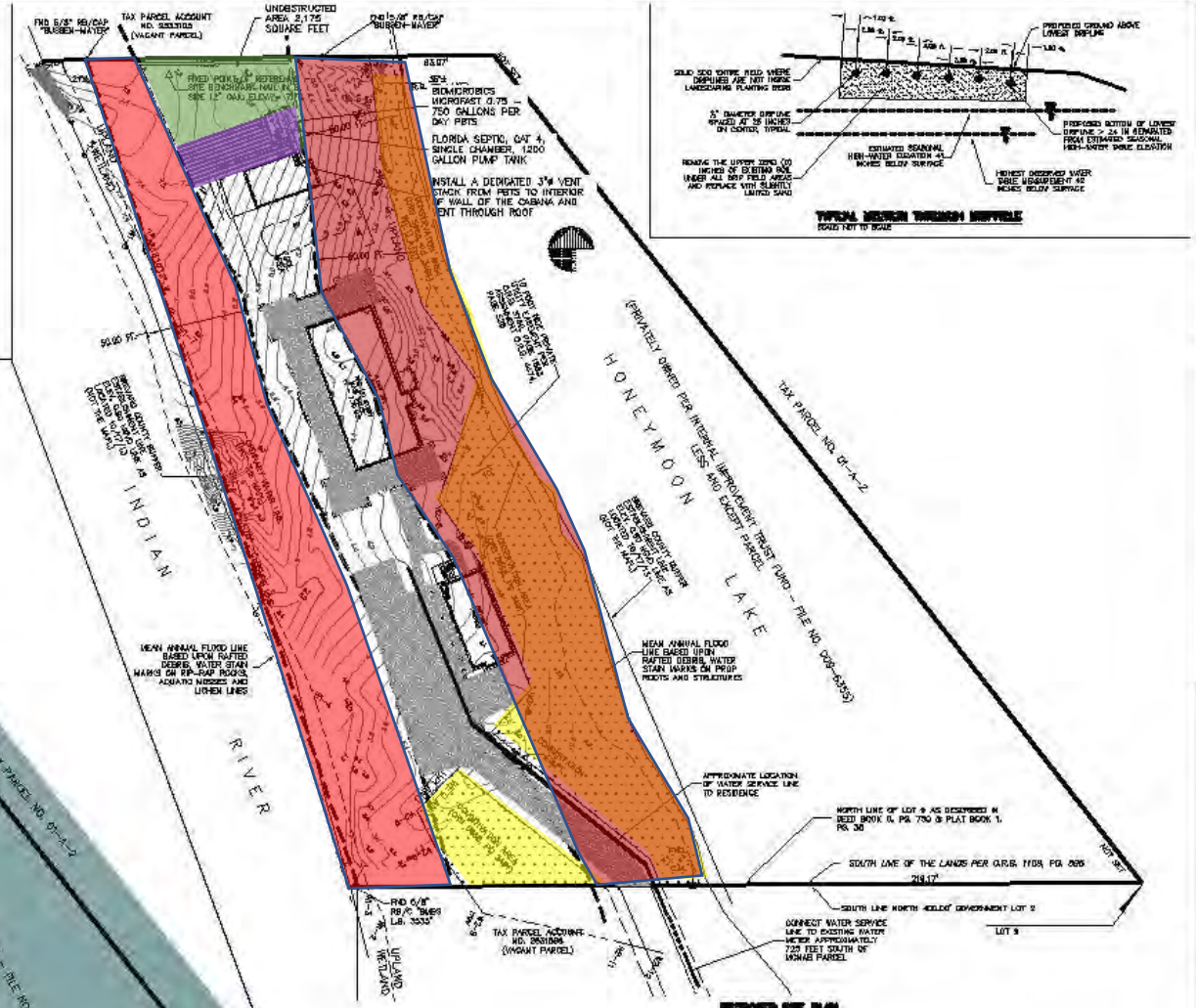
Sheet LP1 1 of 2

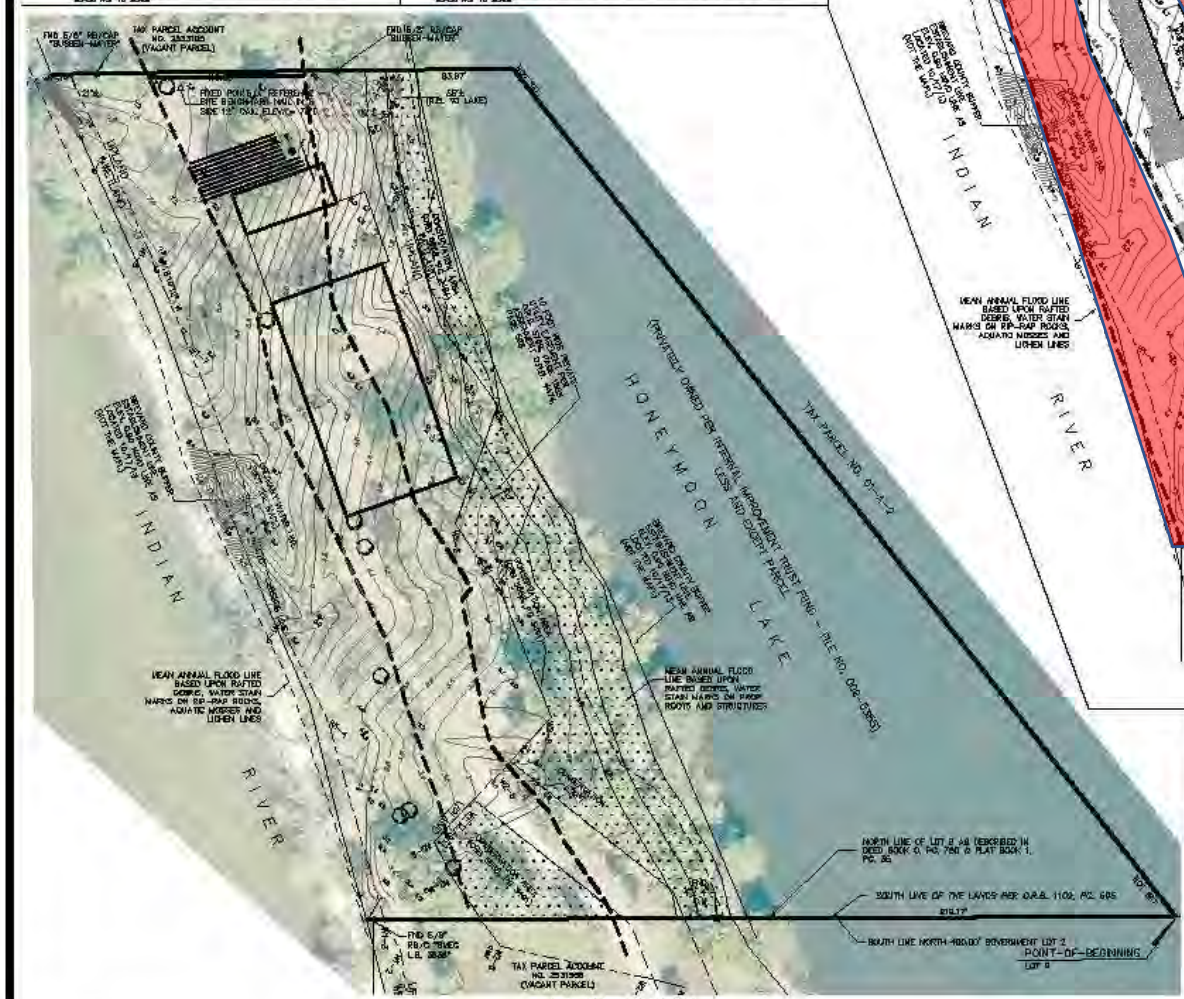
New Single-Family Residence
Buyer Will Not Close on the Property
Until Septic Permit in Hand

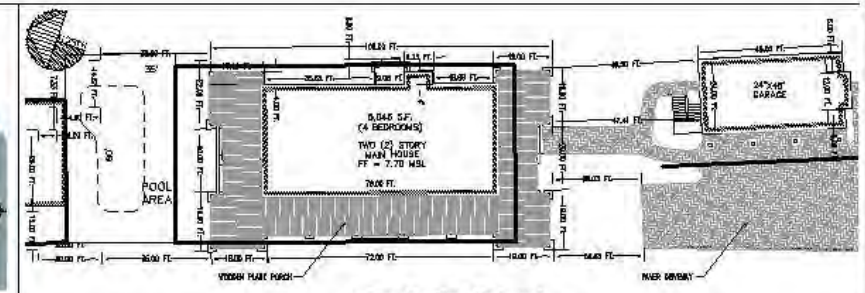
- Water - Lake Honeymoon on the East side of Property
- Water – Indian River Lagoon on the West side of Property
- Wetlands – Conservation Easement on the Southeast Side of Property











JAMES MORRIS SMITH, JR.
Professional Engineer
Professional Surveyor and Mapper
2348 Bellevue Avenue
Daytona Beach, Florida 32114
(386) 788-0214
(386) 788-0217 (Fax)
jmsmith@cfl.rr.com

Original Drawing Issue Date 01-17-14

REVISIONS:

No.	Date	By	Description
1	2-14-14	JMS	Revised per comments from Mike Henry
2	3-26-14	JMS	Revised per comments from Mike Henry

Mr. James McNab
3358 Cappio Drive
Melbourne, FL 32940

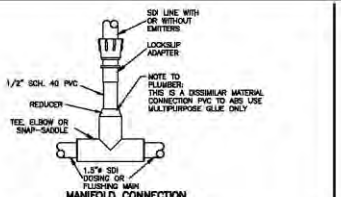
Tax Account No. 2524539

Site Address:
285 Stewart DR
Merritt Island, FL 32952

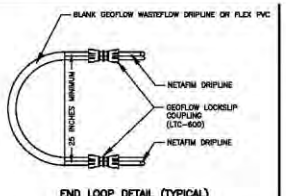
Proposed Performance Based OSTDS

Project No. 14-05
Drawn by: JMS
Site Design by: Mike Henry
Civil Design by: JMS
Drawing No. See Below

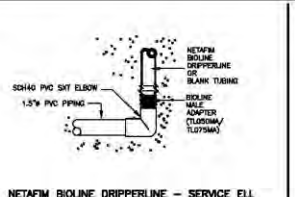
Sheet C1 Page of



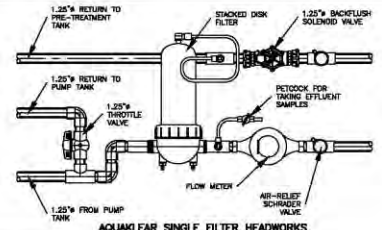
MANIFOLD CONNECTION
NOT TO SCALE



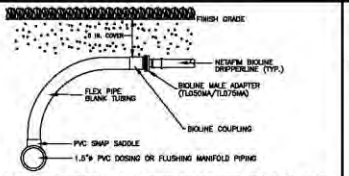
END LOOP DETAIL (TYPICAL)
NOT TO SCALE



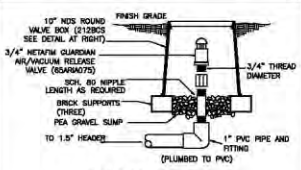
NETAFIM BIOLINE DRIPPERLINE – SERVICE ELL
NOT TO SCALE



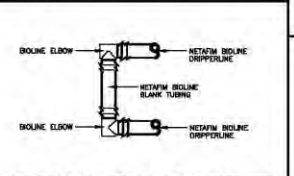
AQUAKLEAR SINGLE FILTER HEADWORKS
NOT TO SCALE



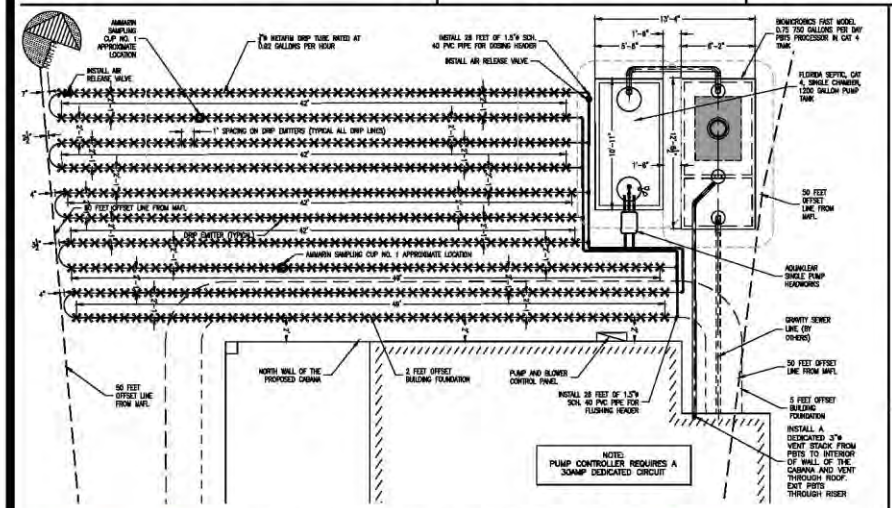
NETAFIM BIOLINE DRIPPERLINE – END FEED CONNECTION W/ FLEX PIPE
NOT TO SCALE



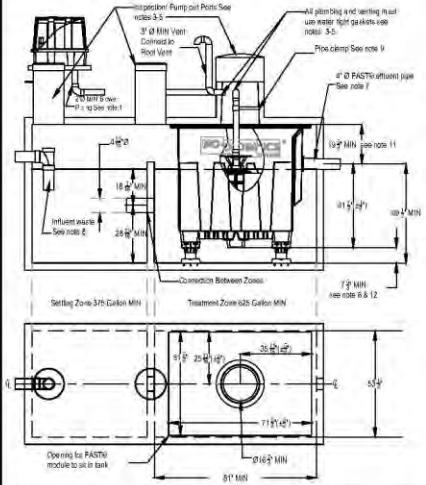
3/4" AIR RELEASE VALVE
NOT TO SCALE



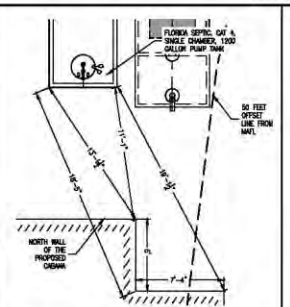
NETAFIM BIOLINE DRIPPERLINE – ELBOW CONNECTION
NOT TO SCALE



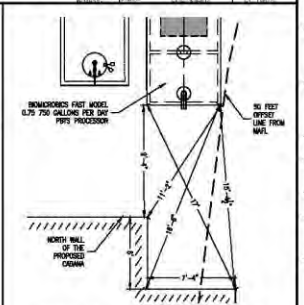
PROPOSED BIOMICROBICS MICROFAST 0.75 750 GPD PBTS LAYOUT PLAN
SCALE: 1" = 5'



1. Airline piping to PASTN may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above liquid levels on a concrete base 24" X 20" X 24" [65 X 50 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 7 sq in. [50 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to PASTN (e.g. tanks, access ports, electrical, etc.) must conform to all applicable county, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump-out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control by/ern by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after PAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Example include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. The air supply line into the PASTN unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 3' min [90 cm]. See alternate air supply option on sheet 4 of 4.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.
11. Min. height may be reduced, consult factor and reference "Low Profile Module Procedure.pdf".
12. Refer to sheet 4 of 4 for leg extensions requirements.



GEOMETRIC LAYOUT 1200 GALLON PUMP TANK
SCALE: 1" = 5'



GEOMETRIC LAYOUT BIOMICROBIC FAST 0.75
SCALE: 1" = 5'

Suggested Ground Covers:

Common Name	Botanical Name
African Iris	Dietes iridioides
Asiatic Jasmine	Trachelospermum asiaticum
Beach Sunflower	Helianthus debilis
Bromeliads	Various genera and hybrids
Cast iron Plant	Aspidistra elatior
Coontie	Zamia floridana
Firecracker Plant	Russelia equisetiformis
Fishtail Fern	Nephrolepis falcata 'Furcans'
Flax Lily	Dianella ensifolia
Golden Creeper	Ernodea littoralis
Heliconia	Heliconia angusta
Macho Fern	Nephrolepis falcata
Palm Grass	Curculigo capitulata
Perennial Peanut	Arachis glabrata

Suggested Ornamental Grasses:

Common Name	Botanical Name
Fountain Grass	Pennisetum alopecuroides
Oriental Fountain Grass	Pennisetum orientale
Maiden Grass	Miscanthus
Japanese Silver Grass	Miscanthus sinensis'
Muhly Grass	Muhlenbergia capillaris
Switch Grass	Panicum virgatum.
Love Grass	Eragrostic purvula

Basic Systems for MicroFAST 0.75 Wastewater Treatment Systems

1. GENERAL
The manufacturer, Bio-Microbics, Inc. (BIO-MICROBICS), hereby warrants that each MicroFAST 0.75 wastewater treatment system (hereinafter referred to as the "PBTS") shall be free from defects in workmanship and materials for a period of one (1) year from the date of installation, or 15 months from the date of shipment from the factory, whichever occurs first. Any part which is determined by BIO-MICROBICS to be defective in workmanship or materials shall be repaired or replaced, at BIO-MICROBICS's option, without charge to the original purchaser or owner. Proof of purchase and date of installation may be required before warranty service is rendered. This warranty does not cover failures or damages which occur during shipment or which are caused by failure to install, operate or maintain the PBTS in accordance with the printed instructions provided by BIO-MICROBICS. This warranty does not cover failures or damages which occur as a result of misuse, abuse, neglect or accident. This warranty does not cover normal wear and tear of system components due to age, erosion or corrosion. This warranty does not cover electrical components damaged by power surges, lightning, rodents or insects. This warranty does not cover any labor costs or other costs associated with the maintenance or replacement of defective components. This warranty does not cover any damages caused by improper electrical supply voltage or current. This warranty does not cover any damages caused by flooding of the PBTS electrical components. This warranty does not cover any PBTS that has been altered in any way, including but not limited to the addition of unauthorized treatment chemicals. This warranty does not cover any damages caused by the use of unauthorized components in conjunction with the PBTS. This warranty does not cover any PBTS installed outside the contiguous United States of America.
2. OPERATION AND MAINTENANCE
Municipal Code requirements necessary to obtain approval for the wastewater treatment and disposal system construction permit, along with the operation permit, will be complied with. The PBTS will be operated and maintained in strict accordance with the manufacturer's operation and maintenance manual provided for the PBTS. Failure to properly operate and maintain the PBTS in accordance with the manufacturer's operation and maintenance manual will void this warranty.
3. FOAM
The PBTS will not be damaged by normal operation of the system or by the presence of foam in the system. The owner shall be responsible for taking whatever steps are necessary to control the production of foam in the system, including but not limited to the addition of defoaming chemicals. Such chemicals shall be approved for use by the manufacturer. The use of such chemicals shall not void this warranty.
4. ACCESS
The PBTS shall be accessible for maintenance as required by the manufacturer's operation and maintenance manual. Access openings, manholes and risers shall be provided as required by the manufacturer's operation and maintenance manual. Access openings shall be secured to prevent unauthorized access.
5. ELECTRICITY REQUIRED TO POWER
The electrical service and wiring to the control panel, blower, etc. shall be adequately sized according to the manufacturer's recommendations and all applicable electrical codes.
6. CONTROLS
The control panel shall be provided with a visible and audible alarm situated in a location frequented by the owner, such that the owner will be alerted to any problem with the system. The control panel shall be provided with a set of normally open dry contacts for the purpose of connecting to a remote alarm. The control panel shall be provided with a timer capable of providing adjustable dosing frequencies as specified by the manufacturer's operation and maintenance manual.
7. INSTALLATION
The PBTS shall be installed in accordance with the manufacturer's installation instructions and all applicable local, state and federal codes. Any deviation from the manufacturer's installation instructions must be approved in writing by the manufacturer prior to installation. Failure to install the PBTS in accordance with the manufacturer's installation instructions will void this warranty.
8. PUMPING
Pumping of the septic tank and/or aerobic treatment unit shall be performed by the owner as frequently as necessary to prevent carry-over of solids to the PBTS. Failure to pump the septic tank and/or aerobic treatment unit as frequently as necessary to prevent carry-over of solids to the PBTS will void this warranty.
9. WARRANTY
Notwithstanding the foregoing, the entire PBTS, including all components, shall be warranted to be free of defects in workmanship and materials for a period of two (2) years from the date of installation. Any part which is determined by BIO-MICROBICS to be defective in workmanship or materials shall be repaired or replaced, at BIO-MICROBICS's option, without charge to the original purchaser or owner. Proof of purchase and date of installation may be required before warranty service is rendered. This warranty does not cover failures or damages which occur during shipment or which are caused by failure to install, operate or maintain the PBTS in accordance with the printed instructions provided by BIO-MICROBICS. This warranty does not cover failures or damages which occur as a result of misuse, abuse, neglect or accident. This warranty does not cover normal wear and tear of system components due to age, erosion or corrosion. This warranty does not cover electrical components damaged by power surges, lightning, rodents or insects. This warranty does not cover any labor costs or other costs associated with the maintenance or replacement of defective components. This warranty does not cover any damages caused by improper electrical supply voltage or current. This warranty does not cover any damages caused by flooding of the PBTS electrical components. This warranty does not cover any PBTS that has been altered in any way, including but not limited to the addition of unauthorized treatment chemicals. This warranty does not cover any damages caused by the use of unauthorized components in conjunction with the PBTS. This warranty does not cover any PBTS installed outside the contiguous United States of America.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED. NO BIO-MICROBICS DEALER, AGENT OR EMPLOYEE IS AUTHORIZED TO MAKE ANY WARRANTY IN ADDITION TO THIS WARRANTY OR TO ASSUME FOR BIO-MICROBICS ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF PBTS PRODUCTS. This limited warranty shall not be enlarged, amended or modified except in writing signed by the manufacturer. No attempt to enlarge, amend or modify this limited warranty shall be effective unless it is in writing signed by the manufacturer. This limited warranty gives you specific legal rights, and you may also have other rights which vary from state to state or province to province.

SPECIFICATIONS FOR PVC PIPE USED FOR DOSING AND FLUSHING MAINS:

ALL SCH. 40 PVC PIPE TO BE USED FOR THE DOSING MAIN, DOSING HEADER, FLUSHING MAIN AND FLUSHING HEADER SHALL MEET OR EXCEED ASTM-D2672 AND ASTM-D1785-06, BELL END, SOLVENT WELD, POLY VINYL CHLORIDE (PVC) PIPE.

ALL PIPES TO BE PURPLE (VIOLET) IN COLOR FROM MANUFACTURER OR PAINTED IN FIELD TO PREVENT FUTURE CONFUSION WITH IRRIGATION PIPING IN THE YARD.

NOTE:
UNOBSTRUCTED AREA REQUIRED = 840 SQUARE FEET
UNOBSTRUCTED AREA PROVIDED = 2,175 SQUARE FEET

NOTE:
EMITTERS ALLOWED BY CODE – WITH A 30% REDUCTION = 263
EMITTERS PROVIDED = 446

GENERAL NOTES FOR PBTS:

1) All construction and system components shall conform to the latest edition of F.A.C., Chapter 64E-6 and the approved plans, specifications and permit issued for this project.
2) All components shall adhere to the following setbacks; the System 50' from a non-potable well & surface waters; 75' from a private potable well; 100' from a non-community well; 200' from a public water well. Tanks 5' from buildings & Drip Lines 2' from property lines; 10' from storm sewers and water lines.
3) Boundary, topographic & existing utilities information indicated on these drawings are per field data supplied by Rausern Mayer Engineering, Inc. It is solely the contractor's responsibility to verify the location of all utilities and protect same from damage during the construction phase. Damage to existing utilities shall be repaired to the owner's satisfaction at the contractor's expense.
4) This is a specific purpose drawing for permitting and construction of a performance based onsite sewage treatment and wastewater disposal system. The engineer certifies it for no other permitting and construction use.
5) Contractor shall verify all dimensions and setbacks prior to starting construction.
6) The contractor is responsible for disposal of wastewater during any system(s) down-time and until the new system has been cleared for use & placed on-line.
7) All areas disturbed by the contractor shall be sodded unless specified otherwise on the drawings.
8) When a sewer or forcemain crosses a water main or storm sewer there shall be a minimum vertical separation of 24 inches between the outsides of the pipes. If separation cannot be achieved the sewer or forcemain shall be encased in a 20' long PVC sleeve centered at the point of the crossing.
9) When a sewer or forcemain parallels a water main or storm sewer there shall be a minimum or 10' horizontal separation between the outsides of the pipes. If separation cannot be achieved the sewer or forcemain shall be encased in a PVC sleeve to 10' past the water main or storm sewer. Sewer/forcemain joints and pipe casing joints shall be staggered.

PROJECT SPECIFIC NOTES:

1) System designed to treat a peak flow of 440 gallons per day (gpd), calculated from building area 5,964 Sq ft per design sitting standard Table IV - 64E-6.012.
2) Drainfield sized for peak daily loading of 0.60 gpd/sft. 64E-6 for Trench in Sandy Soils.
3) All gravity sewer laterals to the pre-treatment tank, to the BIOMICROBICS MICROFAST® 0.75 750 GPD, and to the Pre-Treatment tank shall be designed and constructed watertight in accordance with state and local codes. Use new 4"Ø, ASTM-D2729, PVC gravity sewer pipe with correct fittings for all gravity sewer lines.
4) The onsite wastewater system is based upon a site evaluation performed by Donald Steele RS, ES III, Brevard County Department of Health. If conditions are encountered during construction differing from those used for design, contractor shall cease work and immediately notify the local authority in writing.
5) Before the start of any construction at the site, the following must be staked out and protected from alteration or construction: the location of the disposal/reuse drainfield and the location of the un-obstructed area.
6) A permit from the Brevard County County Health Department must be obtained prior to the start of construction.
7) The Brevard County County Health Department shall be notified prior to the start of construction.
8) The disposal (drip) field must not be constructed during periods when the soil is sufficiently wet at the surface or at the depth of installation to exceed its plastic limit. Construction of the disposal/reuse drainfield shall not occur until soil conditions are acceptable as determined by the Brevard County County Health Department.
9) If a surface diversion is required if runoff from an adjoining on/site landscape affects the disposal/reuse site. Surface diversions must have a positive grade of at least two and four-tenths (2.4) inches per one hundred (100) feet, a grade of 0.2%). The surface diversion must be of sufficient depth and width to move surface water away from the disposal/reuse field.
10) Effluent pump tank is contained inside the 750 GPD Bio-Microbics MicroFAST® PBTS.
11) Treatment unit dosing pump shall produce at least 21.8 gpm at 129.5 ft. TDH. Base dosing time of pump is 5 minutes every hour to produce 29.0 gallons per dose with 24 doses per day.
12) The proposed house shall receive potable water from a Municipal Utility.
13) Contractor shall verify building sewer inverts and adjust gravity laterals accordingly. Adjust the 750 GPD Bio-Microbics MicroFAST® PBTS for inverts to be as shallow as possible based on field verification of building sewer.
14) Site vegetative cover is solid sod, ornamental shrubs and groundcover over drainfield and ornamental shrubs/grasses around (to shield) the components. See list of suggested plants.

JAMES MORRIS SMITH, JR.
Professional Engineer
Professional Surveyor and Mapper
CIVIL ENGINEERING
LAND DEVELOPMENT PERMITTING
GEOGRAPHICAL INFORMATION SYSTEMS
LAND SURVEYING
1754 Barker Street NE
Palm Bay, Florida 32907
(321) 745-0234 Cell
(321) 723-2371 Desk/FAX
jmsmith@morrissmithengr.com

Original Drawing Issue Date: 01-17-14

REVISIONS:

No.	Date	Description	By
1	2-28-14	Revise Comments 1-29-14 Landfill Front	JMS
2	3-4-14	Donald Steele, RS, ESIII	JMS
3	3-19-14	Bio-Microbics MicroFAST® 0.75 Based Design	JMS
4			
5			
6			

Mr. James McNab
3358 Cappio Drive
Melbourne, FL 32940

Tax Account No. 2524539

Site Address:
285 Stewart DR
Merritt Island, 32952

Proposed Performance Based OSTDS Construction Details

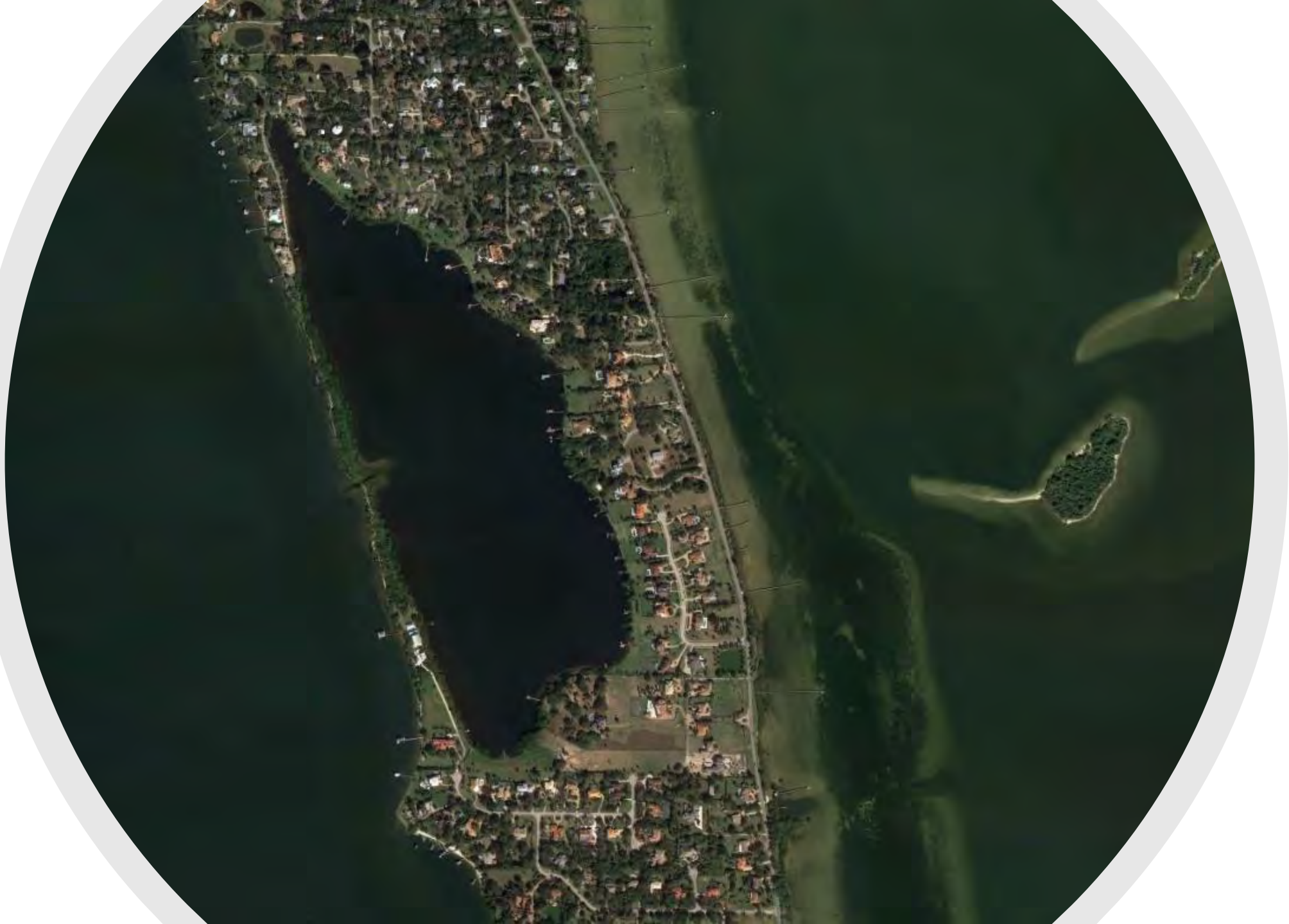
James Morris Smith, Jr., P.E.
Florida Registration No. 45193

Date: _____

Project No.	03-1108
Drawn By:	JMS
Site Designed By:	James McNab & Mike Lathan
Civil Design By:	JMS
Drawing Scale:	See Exhibits

Sheet C2 Page 3 of 3


Tyvek
Tyvek
Tyvek



New Home – Oceanfront – “Last Man In”

- Coastal Construction Control Line Location
- Brevard County Natural Resources 25 Feet Buffer West of the CCCL
- Existing Septic System to the North
- Existing Septic System to the South
- No Wells Allowed Inside the 25 Feet Wide Buffer
- FDEP Variance Board Approval for 43 Feet Separation of Well From OSTDS
- Chlorine Disinfection, Dechlorination, Grout Upper 60 Feet of Well

GENERAL NOTES FOR CHLORINATION AND DECHLORINATION:

1) Chlorination of the Treated Effluent Shall Utilize the Disinfection Cylinder Contained in the Aerobic Chamber/Outlet Chamber of the FujiClean Unit.
2) Disinfection Product Shall be Bio-Sanitizer® Disinfecting Tablets as Manufactured by Norweco®.
3.) A Norweco LF1000 Shall be Installed Between the FujiClean Unit and the Infiltrator Pump Tank.
4.) The De-Chlorination Product Shall be Bio-Max® Dechlorination Tablets as Manufactured by Norweco®.
5.) The FujiClean Internal Disinfection Cylinder and the Norweco LF1000 Shall Be Check and Restocked With Tablets During the Quarterly System Inspection.
6.) Sampling and Testing of the Effluent in the FujiClean Disinfection Chamber for Chlorine Level Shall be Made Quarterly.
7.) Sampling and Testing of the Effluent in the Infiltrator Pump Tank for Residual Chlorine Shall be Made Quarterly.

GENERAL NOTES NORWECO BIO-SANITIZER® AND BIO-MAX®

BIO-SANITIZER® TABLETS:

If the tablet feeder is to be used for the disinfection of water or wastewater. Bio-Sanitizer tablets insure dependable disinfection for water and wastewater treatment system flow and other applications where a predictable long-term source of chlorine is desirable. The tablets are manufactured from pure calcium hypochlorite and contain at least 70% available chlorine Bio-Sanitizer disinfecting tablets are registered with the USEPA for water and wastewater treatment. The tablets incorporate beveled edges to enhance the chemical dissolution pattern, providing effective and economical bacteria killing power. Each tablet is 2½" in diameter, compressed to a ½" thickness, has an approximate weight of 5 ounces and is white in color for easy identification. The chemical application rate of Bio-Sanitizer tablets remains consistent at peak flow factors as high as four (4).

BIO-MAX® DECHLORINATION TABLETS:

The LF1000 tablet feeder is to be used for the dechlorination wastewater. Containing 92% sodium sulfite, the tablets are manufactured to neutralize both free and combined chlorine. Bio-Max tablets incorporate beveled edges to enhance the chemical dissolution pattern. Each tablet is 2½" in diameter, compressed to a ½" thickness, weighs approximately 5 ounces and is green in color for easy identification. The tablets dissolve slowly, releasing controlled amounts of chemical for the instantaneous removal of residual chlorine from the water or wastewater flow. The chemical application rate of the tablets remains consistent at peak flow factors as high as four (4). Bio-Max tablets are formulated to remove chlorine residuals to non-detectable levels.

Formulated to provide a consistent release of sodium sulfite in response to water velocity, Bio-Max tablets deliver exceptional performance in Norweco's Bio-Dynamic tablet feeders and can be used with all other major brands of tablet feeders. A single 140 gram Bio-Max tablet will remove 1 ppm chlorine from over 19,000 gallons of water or wastewater. When used in Norweco's Bio-Dynamic tablet feeders, a single feed tube filled with Bio-Max tablets will dispense over 26 days of maintenance free treatment for the average 15,000 GPD wastewater facility.

GENERAL NOTES FOR PBTS:

1) All construction and system components shall conform to the latest edition of F.A.C. Chapter 64E-6 and the approved plans, specifications and permit issued for this project.
2) All components shall adhere to the following setbacks: the System 50' from a non-potable well & surface waters; 75' from a private potable well; 100' from a non-community well; 200' from a public water well. Tanks 5' from buildings & Drip Lines 2' from property lines and compacted surfaces. Keep 10' from storm sewers and water lines. For this PROJECT a Variance Board Application will be made to allow for a reduction in the setback to the existing and proposed private potable wells.
3) Boundary, topographic & existing utilities information indicated on these drawings are per field data supplied by Mr. Jeff Parker and Mr. David Bogenrief, PE. It is solely the contractor's responsibility to verify the location of all utilities and protect same from damage during the construction phase. Damage to existing utilities shall be repaired to the owner's satisfaction at the contractor's expense.
4) This is a specific purpose drawing set, for the permitting and the construction of a Performance Based Onsite Sewage Treatment and Wastewater Disposal System (OSTDS.) The engineer certifies these drawings ONLY for the construction of the PBTS - OSTDS and for no other permitting and construction uses.
5) Contractor shall verify all dimensions and setbacks prior to starting construction.
6) The contractor is responsible for disposal of wastewater during any system(s) down-time and until the new system has been cleared for use & placed on-line.
7) All areas disturbed by the contractor shall be sodded unless specified otherwise on the drawings.
8) Where a sewer or forcemain crosses a water main or storm sewer there shall be a minimum vertical separation of 24 inches between the outsides of the pipes. If separation cannot be achieved the sewer or forcemain shall be encased in a 20' long PVC sleeve centered at the point of the crossing.
9) When a sewer or forcemain parallels a water main or storm sewer there shall be a minimum or 10' horizontal separation between the outsides of the pipes. If separation cannot be achieved the sewer or forcemain shall be encased in a watertight-sealed PVC sleeve to 10' past the water main or storm sewer. Sewer/forcemain joints and pipe casing joints shall be staggered. Note the Florida Department of Health does not consider any type of expanding Polyurethane based foam as a waterproofing material.

PROJECT SPECIFIC NOTES:

1) System designed to treat a peak flow of 460 gallons per day (gpd), calculated from Table 1 - 64E-6.
2) Drainfield sized for peak daily loading of 0.60 gpd/sf, 64E-6 for Trench in Sandy Soils.
3) All gravity sewer laterals to the FujiClean CEN7 Unit and to the Pump Tank shall be designed and constructed watertight in accordance with state and local codes. Use new 4"Ø, ASTM-D2729, PVC gravity sewer pipe with correct fittings for all gravity sewer lines.
4) The onsite wastewater system is based upon a site evaluation performed by the staff of Brevard County Department of Health. If conditions are encountered during construction differing from those used for design, contractor shall cease work and immediately notify the local authority in writing.
5) Before the start of any construction at the site, the following must be staked out and protected from alteration or compaction: the location of the disposal/reuse drainfield and the location of the un-obstructed area.
6) A permit from the Brevard County County Health Department must be obtained prior to the start of construction.
7) The Brevard County County Health Department shall be notified prior to the start of construction.
8) The disposal (drip) field must not be constructed during periods when the soil is sufficiently wet, at the surface or at the depth of installation, to exceed its plastic limit. Construction of the disposal/reuse drainfield shall not occur until soil conditions are acceptable as determined by the Brevard County County Health Department.
9) If a surface diversion is required if runoff from an adjoining upslope landscape affects the disposal/reuse site. Surface diversions must have a positive grade of at least two and four-tenths (2.4) inches per one hundred (100) feet, a grade of 0.02%). The surface diversion must be of sufficient depth and width to move surface water away from the disposal/reuse field.
10) Effluent pump tank is a separate 540 HDPE tank with a Simplex Pumps dosing system.
11) The dosing pump in the Pump Tank shall produce at least 14.5 gpm at 88 ft. TDH. Based a dosing time of 6# each pump of 7 minutes, every hour to produce 17.5 gallons per dose, 24 doses per day. The cumulative pumped volume which will provide a total of 420 gallons per day of filtered effluent disposal.
12) The proposed residence shall receive water for potable water from proposed well onsite.
13) Contractor shall verify building sewer inverts and adjust gravity laterals accordingly. Adjust the FujiClean CEN7 Unit PBTS inverts to be as shallow as possible based on field verification.
14) Site vegetative cover is solid sod, ornamental shrubs and groundcover over drainfield and ornamental shrubs/grasses around (to shield) the components. NO TREES are allowed in the drip field. See list of suggested plants on details sheet.

DESCRIPTION: PER OFFICIAL RECORDS BOOK 1232, PAGE 1044
A portion of Lot 6-A, SUNNYLAND GROVES, a subdivision recorded in Plat Book 9, page 42, public records of Brevard County, Florida, and being more particularly described as follows: Commencing at a point in the centerline of State Road A1A as now laid out at the intersection of the south line of Lot 6-A, SUNNYLAND GROVES, and the said centerline of State Road A1A; THENCE N. 26°31'00"W. along said centerline of State Road A1A a distance of 85.22 feet; THENCE N.45°47'00"E. a distance of 52.43 ft. to the Easterly right of way line of State Road A1A; THENCE N. 26°31'00"W. along the said Easterly right of way line of State Road A1A a distance of 90 feet to the point of beginning; THENCE N. 26°31'00"W. still along the Easterly right of way line of State Road A1A a distance of 80 feet; THENCE N. 45°57'07"E. to the waters of the Atlantic Ocean; THENCE southerly along the waters of the Atlantic Ocean to the Easterly prolongation of the Southerly line of lands herein described; THENCE S. 45°57'07"W. to the Easterly right of way line of State Road A1A and the P.O.B. (Said property is bounded on the N. by property described in O.R. Book 975, pages 111, 112 and 113, public records of Brevard County, Florida).

SPECIFICATIONS FOR PVC PIPE USED FOR DOSING AND FLUSHING MAINS:

ALL SCH. 40 PVC PIPE TO BE USED FOR THE DOSING MAIN, DOSING HEADER, FLUSHING MAIN AND FLUSHING HEADER SHALL MEET OR EXCEED ASTM-D2072 AND ASTM-D1785-00, BELL END, SOLVENT WELD, POLY VINYL CHLORIDE (PVC) PIPE.

ALL PIPES TO BE PURPLE (MGLET) IN COLOR FROM MANUFACTURER OR PAINTED IN FIELD TO PREVENT POSSIBLE FUTURE CONFUSION WITH IRRIGATION PIPING IN THE YARD.

ITEMS REQUIRING VARIANCE CONSIDERATIONS:

CANNOT MEET UNOBSTRUCTED AREA REQUIREMENT:
UNOBSTRUCTED AREA REQUIRED = 460 SQUARE FEET
UNOBSTRUCTED AREA PROVIDED = 396 SQUARE FEET
NEED VARIANCE OF 64 SQUARE FEET

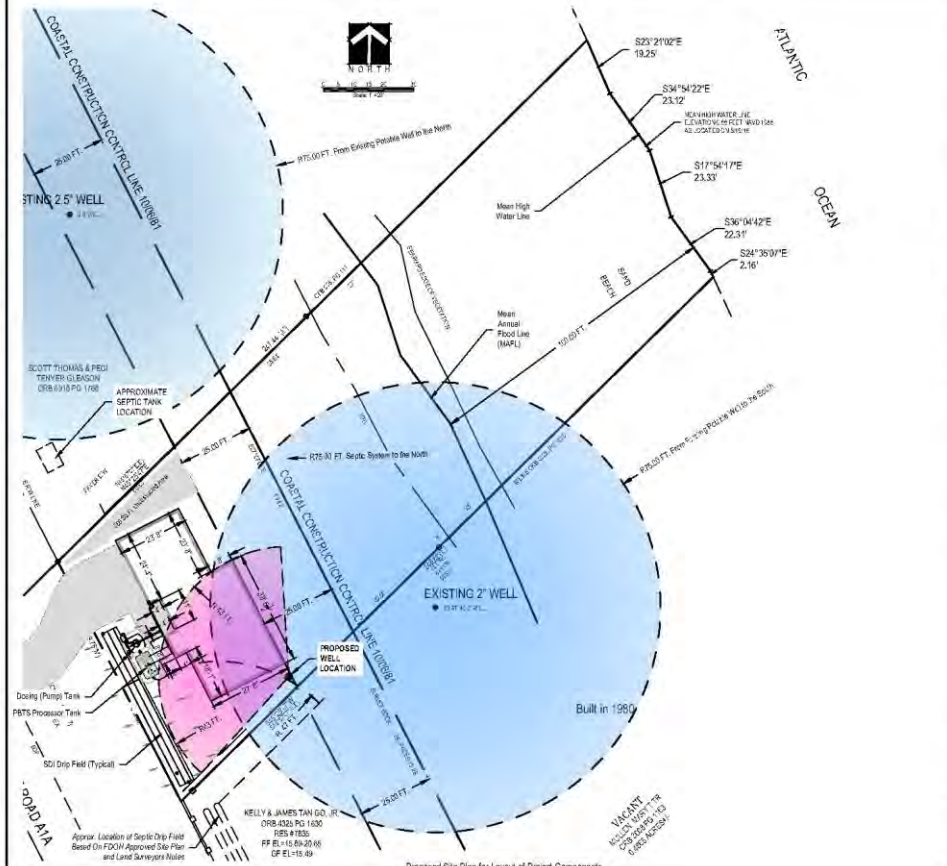
CANNOT MEET SETBACK FROM NEW WELL WITH PROPOSED PBTS:
SETBACK REQUIRED = 75 FEET
SETBACK PROVIDED = 43 FEET
NEED VARIANCE OF 32 FEET

CANNOT MEET SETBACK FROM NEIGHBOR TO SOUTH HOOT SYSTEM DRIP FIELD AND NEW WELL:
SETBACK REQUIRED = 75 FEET
SETBACK PROVIDED = 47 FEET
NEED VARIANCE OF 28 FEET

Aerial Photograph Provided By the FDEP www.labins.org Website

Existing Conditions of Project Site
Scale 1" = 20'

Existing Topographic Survey Data Provided to Engineer of Record by David Bogenrief, PE



Approx. Location of Septic Drip Field Based On FDOH Approved Site Plan and Land Surveyors Notes

Proposed Site Plan for Layout of Project Components
Scale 1" = 20'

James Morris Smith, Jr., PE, PSM LLC
Florida Board of Professional Engineers Cert. No. 71918
Civil Engineering
Land Development Permitting
Land Surveying
Visualization
1764 Barker Street NE
Palm Bay, Florida 32907
(321) 749-5234 Cell
(321) 723-2371 Desk
morris@morrissmithinc.com

Original Drawing Issue Date: 08-29-2016

REVISIONS:

No	Date	By	Description
1			
2			
3			
4			
5			
6			
7			

JAMES MORRIS SMITH, JR. LICENSE No. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER

James Morris Smith, Jr., P.E. 04-11-2017
Florida Registration No. 45392

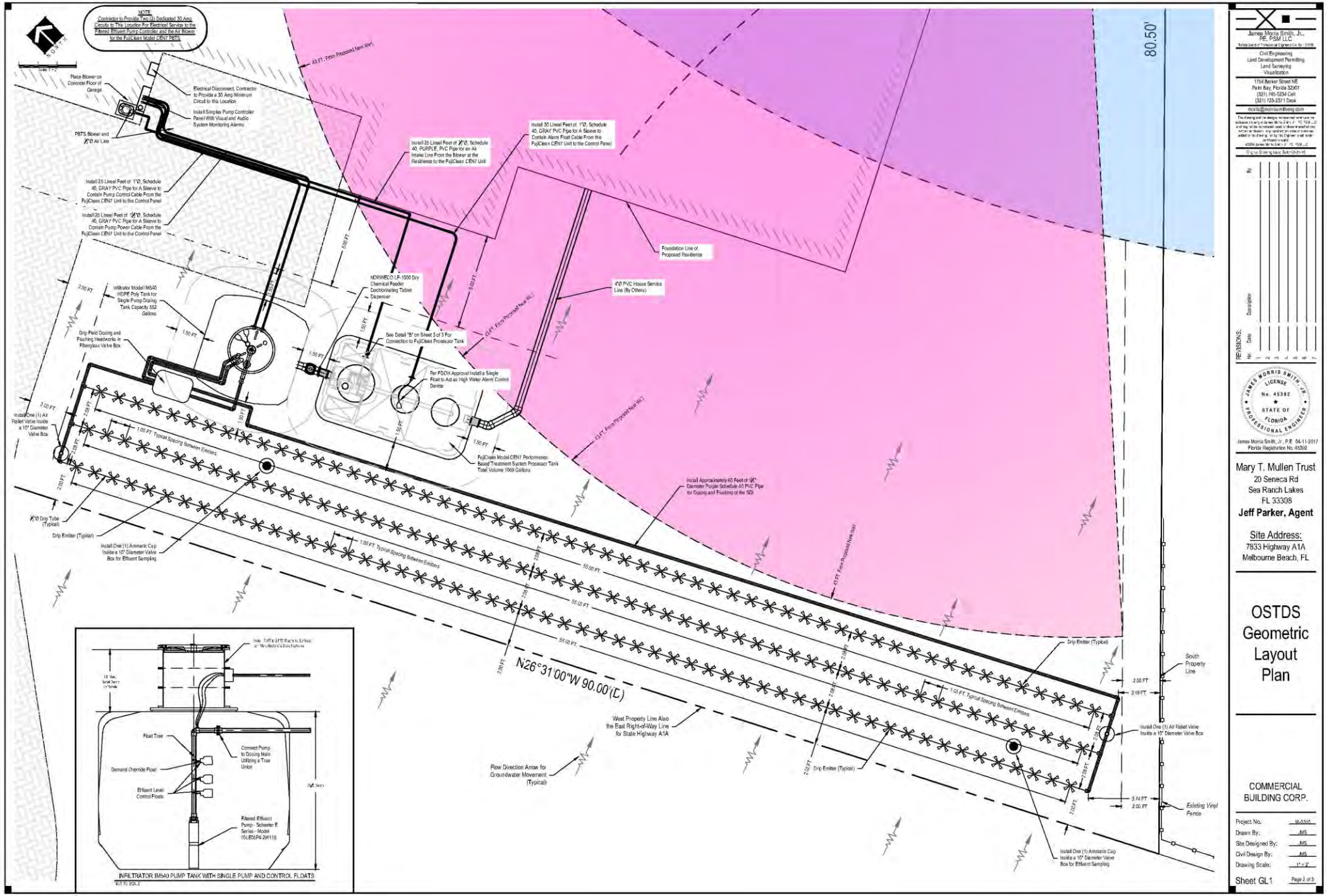
Mary T. Mullen Trust
20 Seneca Rd
Sea Ranch Lakes
FL 33308
Jeff Parker, Agent

Site Address:
7833 Highway A1A
Melbourne Beach, FL

Existing Conditions and Site Plan Layout of Proposed System Components

COMMERCIAL BUILDING CORP.

Project No.	16-0316
Drawn By:	MS
Site Designed By:	MS
Civil Design By:	MS
Drawing Scale:	1" = 20'
Sheet EC1	Page 1 of 3



James Morris Smith, Jr., PE, PSM LLC
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morris@morrissmithengr.com

Signature Drawing Issue Date: 04-11-17

REVISIONS:

No.	Date	Description
1		
2		
3		
4		
5		
6		
7		

JAMES MORRIS SMITH JR LICENSE No. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER

James Morris Smith, Jr., P.E. 04-11-2017
Florida Registration No. 45392

Mary T. Mullen Trust
20 Seneca Rd
Sea Ranch Lakes
FL 33308
Jeff Parker, Agent

Site Address:
7833 Highway A1A
Melbourne Beach, FL

OSTDS Geometric Layout Plan

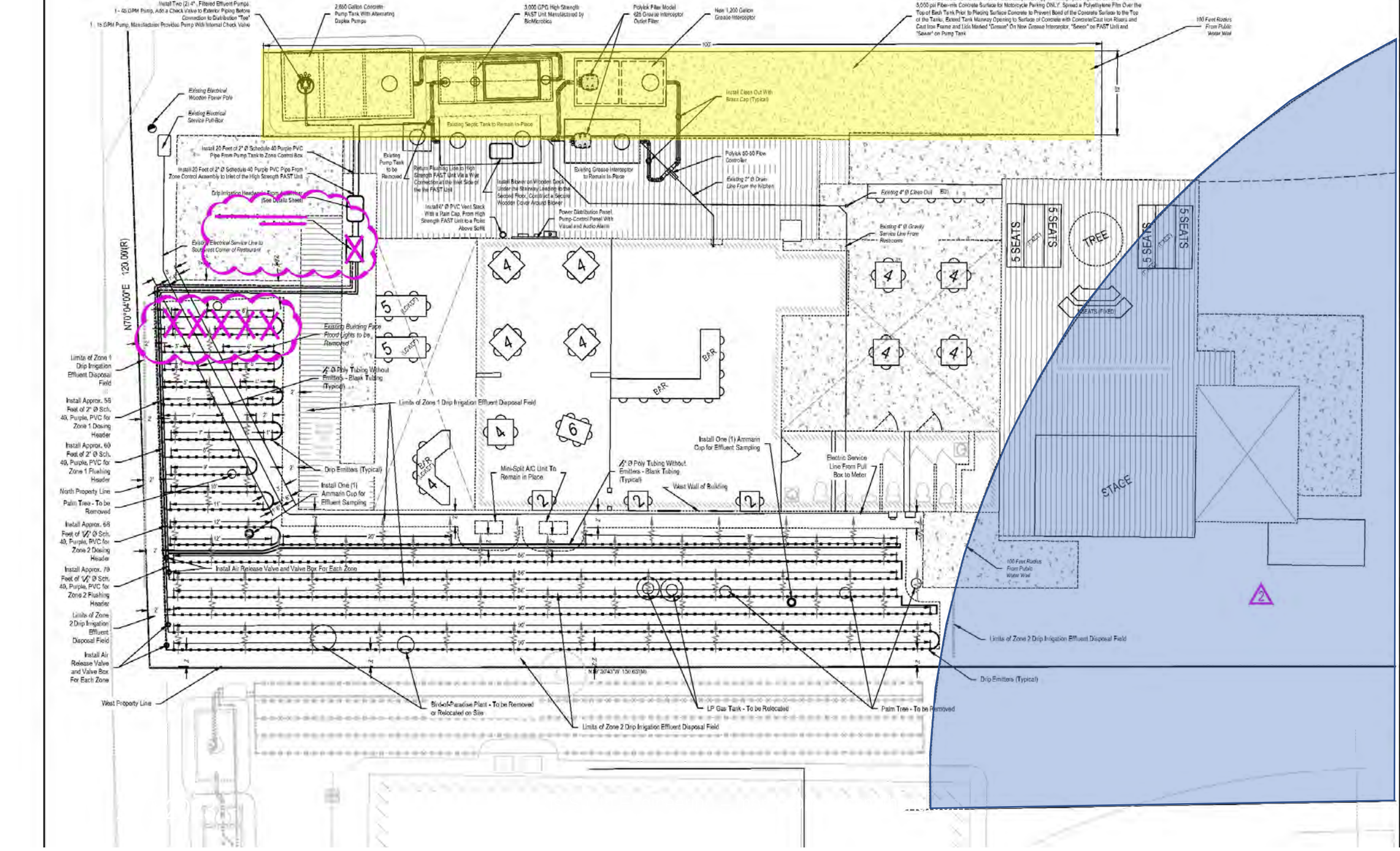
COMMERCIAL BUILDING CORP.

Project No.	16-0316
Drawn By:	MS
Site Designed By:	MS
Civil Design By:	MS
Drawing Scale:	1" = 2'

Sheet GL1 Page 2 of 3

Expansion of Restaurant in a Historical Building Obtain More Legal Seating Spaces

- Project Site has Original Building (Dormitory) Housing for FECRR Workers in the Early 1920's
- Popular Restaurant Spot
- Need to Increase Legal Seating Capacity
- Maintain a 100 Feet Well Radius Setback From Community Well
- Very Limited Green Space for Drainfield (Drip Field)
- Increased Legal Seating From 26 Seats to 96 Seats
- Added Hard Surface for Patrons to Park Their Motorcycles



1754 Barker Street NE
Palm Bay, Florida 32907
(321) 746-0234 Cell
(321) 723-2571 Desk
morris@morrissmitheng.com

REVISIONS:

No	Date	Description	By
1	06-17-16	Added Interceptor Cut-Sheet(s)	MS
2	06-23-16	Added Septic Layout, Revised the Aerobic Effluent Pumps	MS
3	07-13-2016	Title Block Corrections	MS

JAMES MORRIS SMITH JR. LICENSE No. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER
James Morris Smith, Jr., P.E. 8-17-2016
Florida Registration No. 45392

Mr. Willy Carmine
Carmine LLC
Malabar Mos

Site Address:
2805 Malabar Rd
Malabar, FL 32950

OSTDS Geometric Layout Plan

Project No. 16-0816
Drawn By: MS


Bobcat
Bobcat


KENWORTH

Existing Oceanfront “Triplex”
“First Man In” – Neighbors are Constraints

- Built in 1973
- Two (2) Septic Tanks
- Two (2) Drainfields – Rock and Pipe
- Septic Systems Between Tri-Plex and the Top of the Dune Line
- 100 Feet Radius Constraint From Onsite Community Well
- 75 Feet Radius From North Neighbors Potable Well
- 75 Feet Radius From South Neighbors Potable Well
- 50 Feet Radius From North Neighbors Irrigation Well
- 25 Feet Buffer Brevard County Natural Resources

GENERAL NOTES FOR PBTS:

1. All construction and system components shall conform to the latest edition of F.A.C.; Chapter 64E-6 and the approved plans, specifications and permit issued for this project.
2. All components shall adhere to the following setbacks: the System 50' from a non-potable well & surface waters; 75' from a private potable well; 100' from a non-community well; 200' from a public water well; Tanks 5' from buildings & Drip Lines 2' from property lines and compacted surfaces. Keep 18' from storm sewers and water lines.
3. Boundary, topographic & existing utilities information indicated on these drawings are per field data supplied by GAI Surveyors, LB No. 7928, 1 Oleander Street, Cocoa, FL 32922. It is solely the contractor's responsibility to verify the location of all utilities and protect same from damage during the construction phase. Damage to existing utilities shall be repaired to the owner's satisfaction at the contractor's expense.
4. This is a specific purpose drawing set for the permitting and the construction of a Performance Based Onsite Sewage Treatment and Wastewater Disposal System (OSTDS.) The engineer certifies these drawings ONLY for the construction of the PBTS - OSTDS and for no other permitting and construction uses.
5. Contractor shall verify all dimensions and setbacks prior to starting construction.
6. The contractor is responsible for disposal of wastewater during any system(s) down-time and until the new system has been cleared for use & placed on-line.
7. All areas disturbed by the contractor shall be sodded unless specified otherwise on the drawings.
8. Where a sewer or forcemain crosses a water main or storm sewer there shall be a minimum vertical separation of 24 inches between the outsides of the pipes. If separation cannot be achieved the sewer or forcemain shall be encased in a 20' long PVC sleeve centered at the point of the crossing.
9. Where a sewer or forcemain parallels a water main or storm sewer there shall be a minimum or 10' horizontal separation between the outsides of the pipes. If separation cannot be achieved the sewer or forcemain shall be encased in a watertight-sealed PVC sleeve to 10' past the water main or storm sewer. Sewer/forcemain joints and pipe casing joints shall be staggered. Note the Florida Department of Health does not consider any type of expanding Polyurethane based foam as a waterproofing material.
10. For the Fuji Clean Performance Based Treatment/Drip Design Only:
11. The Undersigned Florida Licensed Professional Engineer Makes No Guarantees or Representations Regarding Information Shown Herein Pertaining to Easements, Rights-of-Ways, Setback Lines, Agreements, Reservations and Other Similar Matters.
12. The Land Surveying Details of the Proposed Site Plan Shown Herein, were Developed/Provided by Others.
13. Existing and Proposed Elevations and Improvements (if any) Were Obtained from Information Provided by Others.
14. Contractor & Property Owner Should Ensure that the Power Source is of Appropriate Voltage/Amperage for the Pumps & Blower.
15. Install Local Electrical Quick-Disconnect Adjacent to the Pump control Panel.
16. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for System Function if Actual Sewage Flow Exceeds the Design Flow or if the Flow is not Sufficient to Maintain Proper ATU-PBTS Function/Health.
17. System Size Based on Requirements Set Forth in the Most Recent, Codified, Version of Florida Administrative Code (FAC) 64E-6.
18. Design Waste Flow Based on Building Use Information Provided by Property Owner/Contractor at Time of Design, Prior to Permitting, Construction and/or Occupancy.
19. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for System Function or Performance Issues Related to Temperature, Effluent Toxicity, Ph, Lack of Proper System Operation and/or Maintenance or Disregard of Commonly Accepted Good Practices for Treatment of Septic Systems by Owners/Tenants.
20. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for Ponding or Saturation in Drip/Field Resulting from Over Irrigating of the Lawn and/or Landscaping. No Irrigation Spray Heads Should be Set to Cover Area(s) of Drip/field(s).

GENERAL NOTES FOR PBTS (Continued):

21. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for System Function or Performance if a Water Softener is Installed.
22. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for System Function or Performance if the ATU-PBTS is not Pumped Every 3-5 Years or as Determined Necessary by the Maintenance Entity.
23. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for System Function or Performance Issues Related to Errors Made by the Florida Licensed Installer During Installation Such as But Not Limited to:
    a. Failure to Completely Follow These Design Specifications.
    b. Installer/Maintenance Entity Does Not Follow Manufacturers Installation Recommendations.
    c. Installer/Maintenance Entity Does Not Follow Manufacturers Maintenance Recommendations.
    d. System Not Properly Started-Up and/or.
    e. Dosing Program is Not Set to Submitted Design Specifications.
24. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for the Function/Performance of the Drip/field if Maintenance Entity/Technician Does Not Write Down (Record) Flow Totalizer Readings Which Represent the Actual Effluent Disposal Flow to Designer/Engineer During Routine Maintenance. This Information is Required to Ensure that the Appropriate Number of Doses per Day are Occurring.
25. No Liability will be Assumed in Any Way if the Undersigned Florida Licensed Professional Engineer is not Notified of System Installation in Order to Conduct a Final Inspection to Ensure that the Installation Meets the Submitted Design Specifications.
26. This System Must be Installed by a Reputable, Florida Licensed, Septic System Installation Contractor, Trained and Approved by Fuji Clean and Experienced in the Proper Installation of this Type/Size of System.
27. The Maintenance Entity Must be Approved by Fuji Clean and the Florida DOH.

GENERAL NOTES FOR ULTRAVIOLET LIGHT DISINFECTION:

1.) The UV Unit operates on 120 VAC single-phase (50 or 60 Hz) power and consumes 28 watts.
2.) Physical process not a chemical process: Water chemistry and characteristics, such as pH are unchanged.
3.) Does not create toxic compounds in wastewater that may affect the aquatic biota or a source of drinking water.
4.) Inactivates viruses and vegetative and spore forming bacteria in wastewater where chlorine is affected by ammonia.
5.) Inactivates Cryptosporidium and Giardia whereas chlorine does not.
6.) Is cost competitive with chlorination, ozonation and chlorination/dechlorination.
7.) Eliminates handling and storing of dangerous toxic chemicals.

SPECIFICATIONS FOR PVC PIPE USED FOR DOSING AND FLUSHING MAINS:

ALL SCH. 40 PVC PIPE TO BE USED FOR THE DOSING MAIN, DOSING HEADER, FLUSHING MAIN AND FLUSHING HEADER SHALL MEET OR EXCEED ASTM-D2072 AND ASTM-D1785-06, BELL END, SOLVENT WELD, POLY VINYL CHLORIDE (PVC) PIPE.

ALL PIPES TO BE PURPLE (VIOLET) IN COLOR FROM MANUFACTURER OR PAINTED IN FIELD TO PREVENT POSSIBLE FUTURE CONFUSION WITH IRRIGATION PIPING IN THE YARD.

PROJECT SPECIFIC NOTES:

1. System designed to treat a peak flow of 460 gallons per day (gpd), calculated from Table 1 - 64E-6.
2. Drip/field sized for peak daily loading of 0.80 gpd/sq.ft. 64E-6 for Trench in Sandy Soils.
3. All gravity sewer laterals to the Fuji Clean CEN7 Unit and to the Pump Tank shall be designed and constructed watertight in accordance with state and local codes. Use new 4"Ø, ASTM-D2729, PVC gravity sewer pipe with correct fittings for all gravity sewer lines. The gravity sewer lateral and the interconnection of the Fuji Clean CEN7 unit will be made with FERNCO Flexible Couplings.
4. The onsite wastewater system is based upon a site evaluation performed by the staff of Brevard County Department of Health. If conditions are encountered during construction differing from those used for design, contractor shall cease work and immediately notify the local authority in writing.
5. Before the start of any construction at the site, the following must be staked out and protected from alteration or compaction, the location of the disposal/reuse drip/field and the location of the un-obstructed area.
6. A permit from the Brevard County Health Department must be obtained prior to the start of construction.
7. The Brevard County Health Department shall be notified prior to the start of construction.
8. The disposal (drip) field must not be constructed during periods when the soil is sufficiently wet, at the surface or at the depth of installation, to exceed its plastic limit. Construction of the disposal/reuse drip/field shall not occur until soil conditions are acceptable as determined by the Brevard County Health Department.
9. If a surface diversion is required it must not impound runoff from an adjoining upslope landscape affects the disposal/reuse site. Surface diversions must have a positive grade of at least two and four-tenths (2.4) inches per one hundred (100) feet, a grade of 0.24%. The surface diversion must be of sufficient depth and width to move surface water away from the disposal/reuse field.
10. Effluent pump tank is a separate 552 Gallon HDPE tank with a Simplex Pumps dosing system.
11. The dosing pump in the Pump Tank shall produce at least 14.8 gpm at 45.8 ft. TDH. Based a dosing time of for each pump of 7 minutes for every hour to produce 19.4 gallons per hour, 24 doses per day. The cumulative pumped volume which will provide a total of 465 gallons per day of filtered effluent disposal.
12. The proposed residence shall receive water for potable water from a Community Well located onsite.
13. Contractor shall verify building sewer inverts and adjust gravity laterals accordingly. Adjust the Fuji Clean CEN7 Unit PBTS inverts to be as shallow as possible based on field verification.
14. Site vegetative cover recommended to be Dune Restoration groundcover over drip/field and ornamental shrubs/grasses around (to shield) the system components. NO TREES are allowed in the drip field. See list of suggested plants on details sheet. Plants shall be selected by Maple Street Natives, 7618 Henry Avenue, Melbourne, FL 32904. Contact Shanin or Brent Dolan, 321-223-6147 or email natscapes@gmail.com.

GENERAL NOTES FOR SALCOR MODEL 3G UNIT DISINFECTION:

1) Salcor's 3G unit is NEMA-6P certified, meaning it is flood-proof, and has been tested extensively by several Third Party testing sites, including 19 separate times by NSF. It's been used in residential, commercial and municipal projects and can be clustered to treat up to 100,000 GPD. Because it lamp has a Teflon™ cover. It resists fouling and reduces maintenance - which is limited to simply wiping it down every six months and replacing the lamp every two years. The unit can be installed in-ground or in a pump tank, so the footprint is minimal and includes an alarm circuit (N.O/N.C.) for reliable, continuous performance monitoring.
2.) The SALCOR Model 3G Unit requires a specific separate independent 16-15-amp circuit breaker on the main electrical panel. The Salcor UV Unit circuit breaker should be separate from the circuit breakers for the pumps, etc. No other electrical unit should be connected to the Salcor 3G Unit circuit breaker.
3.) The UV Unit operates on 120 VAC single-phase (50 or 60 Hz) power and consumes 30 watts.

PROPOSED PROJECT INFORMATION:

LOT USABLE AREA =	11,268 Square Feet Lot Area	= 0.26 Acres
ROW USEABLE AREA =	2,596 Square Feet ROW Area	= 0.06 Acres
		= 0.32 Acres
Gallons Per Day of Allowable Flow:		= 0.32 Acres x # 1,500 = 480 GPD
Proposed living area 3,524 square feet (under air conditioned space).		
Based upon FAC 64E-6 Table 1 - 2.2.2 I) to 3,500 square feet building area		= 460 Gallons Per Day
Additional Gallons Per Day Required for this Project:		
3,524 sq.ft. - 3,500 sq.ft. = 224 sq.ft.	224 sq.ft. / 750	= 0.30 (Roundup to 1.0)
1.0 x 60 gallons/day		= 60 Gallons Per Day
Total Gallons Per Day Required for this Project:		= 460 Gallons Per Day
The Fuji Clean CEN7 Model is Rated for		= 630 Gallons per Day
The Fuji Clean CEN7 Model has a Total Volume of		= 1,069 Gallons
The Infiltrator Model IM540, as a Pump Tank, has a Total Volume of		= 552 Gallons
Total Volume PROVIDED for System:		= 1,621 Gallons

The proposed PBTS is designed to meet Advanced Secondary Treatment Standards for CBODs, ≤ 10mg/L and TSS ≤ 10mg/L. Drainfield reduction is an 40%. Infiltrative surface area reductions shall be allowed for systems designed to reduce the wastewater strength of the effluent where the drainfield is sized based on slightly limited soils. System drip/field designed on trench standards in slightly-limited soils.

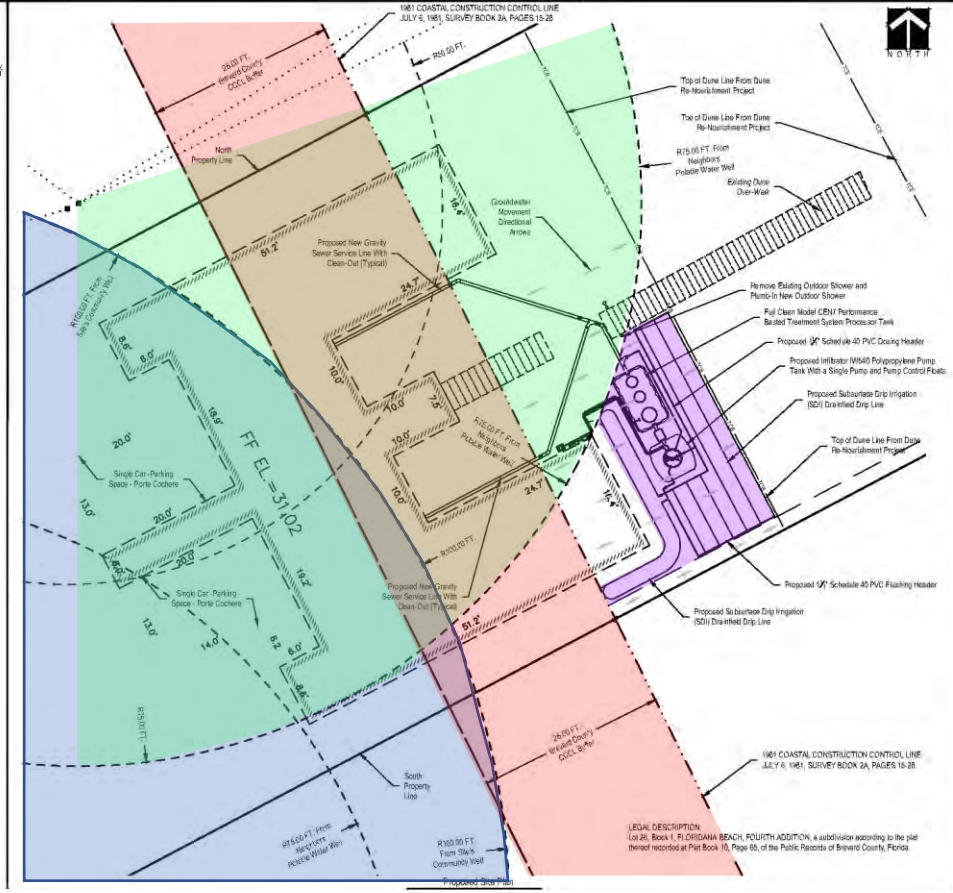
Required Drainfield =	575 Sq.Ft.	
40% Reduction Allowed =	575 x .6 = 345 Sq.Ft.	
Unobstructed Area required =	(1.5 x 345) - 345 = 173 Sq.Ft.	
Unobstructed Area Provided =	0 Sq.Ft.	
Subsurface Drip Irrigation tubing required =	173 feet	
Subsurface Drip Irrigation tubing provided =	181 feet	

Drip tubes are equal to or greater than 2 feet from the compacted spaces and the property lines and greater than 24 inches above the wet season water table.
Site is not taking an increase in Allowable Lot Flow.
A SALCOR Model 3G Unit generating Ultraviolet Light will be used for facal coliform treatment.
Samples for Effluent Testing shall be taken from the petcock provided in the headworks for the drip irrigation system.
Monitoring for Drip Field Ponding will be on a quarterly basis by a certified Fuji Clean maintenance entity.
Testing of Effluent for CBODs, TSS, Nitrogen, Phosphorous and Fecal Coliforms shall be made bi-annually.
The drip field is designed to use pressure compensating drip emitters. The drip field's slope will be away from the house foundation towards the top of the beach dunes, not exceeding 18 inches.

Aerial Photograph Provided By the Brevard County Property Appraiser's GIS Department

Existing Conditions of Project Site

Existing Topographic Survey Data Provided to Engineer of Record by GSS Surveying and Mapping, LLC JOB # 17-0067



Proposed Site Plan

mse morrissmith engineering
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Land Surveying
Visualization
1764 Banker Street NE
Palm Bay, Florida 32907
(321) 749-5234 Cell
(321) 723-2371 Desk
morris@morrissmithengineering.com

REVISIONS:			
No.	Date	Description	By
1	2-20-19	Added Proposed Dune Restoration Planting Notes	JMS

In Association With:

ASAP ONSITE SEPTIC & SEWER
4630 Lipscomb St - Suite A-1
Palm Bay, FL 32905
(321) 745-9111

George A. & Binnur Jutras
14750 89th Street
Fellsmere, FL 32948

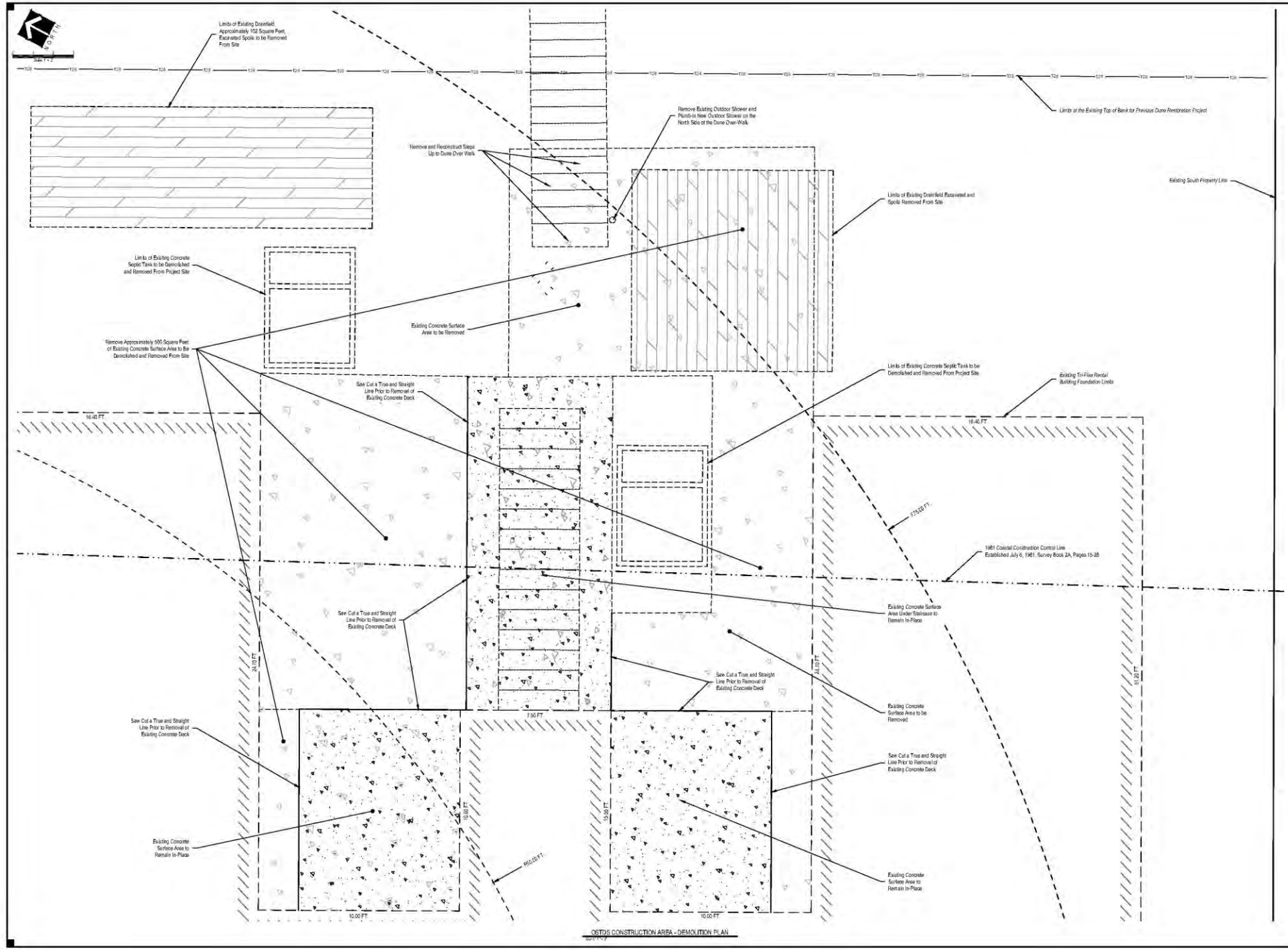
Roger Bell Agent

Site Address:
6811 Highway A1A
Melbourne Beach, FL

Existing Conditions Proposed Site Plan

James Morris Smith, Jr., P.E. 'MSE, LLC' 2019
Florida Registration No. 45392

Project No:	18-0310
Drawn By:	MS
Site Designed By:	MS
Civil Design By:	MS
Drawing Scale:	See Plotted
Sheet EC1	Page 1 of 6



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morris@morrissmitheng.com

Drawing Issue Date: 05-17-2019

REVISIONS:

No	Date	Description	By
1			
2			
3			
4			
5			
6			
7			

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Fellsmere, FL 32948

Roger Bell Agent

Site Address:
6811 Highway A1A
Melbourne Beach, FL

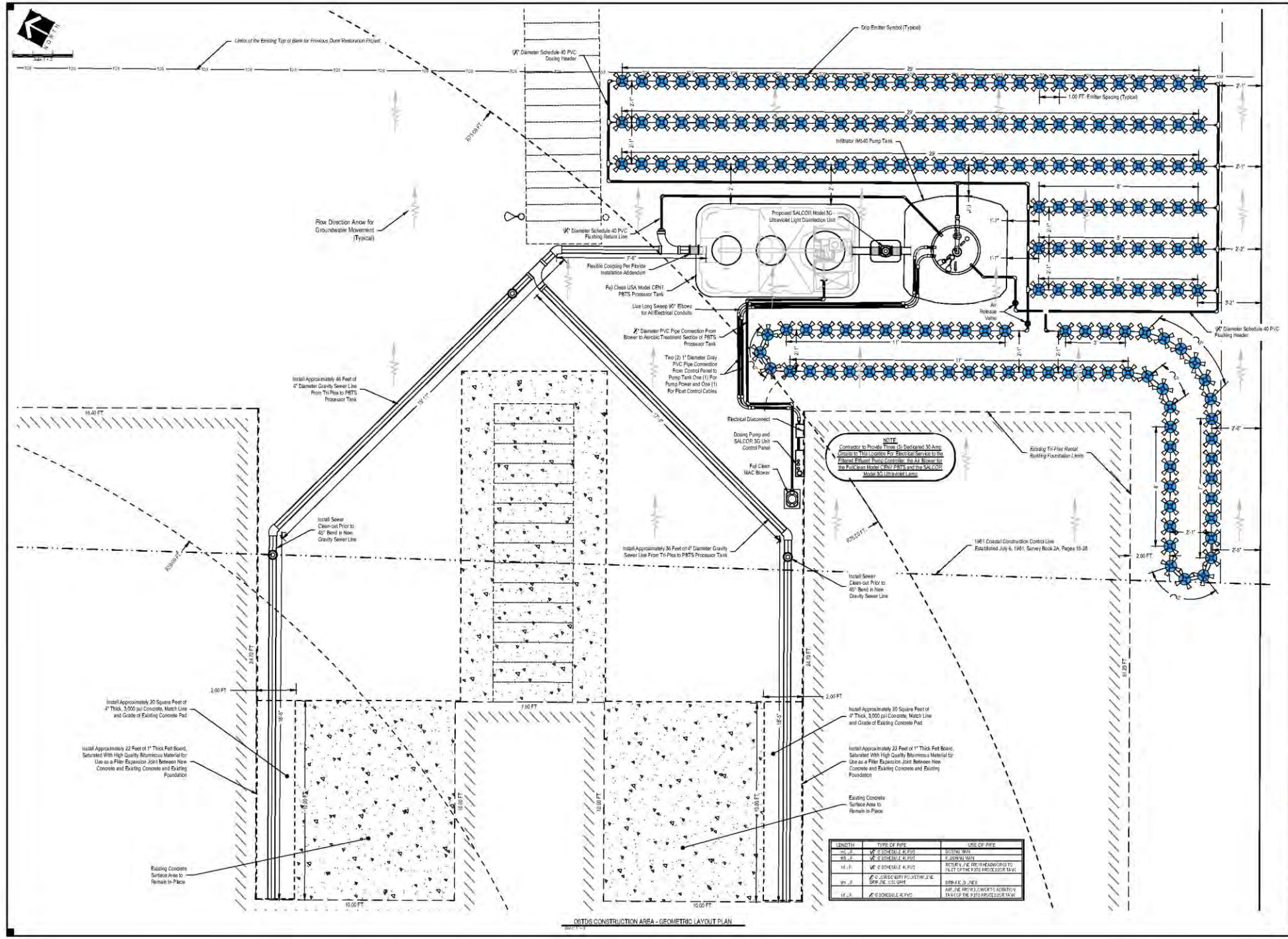
Existing Site Demolition Plan

JAMES MORRIS SMITH, JR. LICENSE No. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER

James Morris Smith, Jr., P.E. 05-17-2019
Florida Registration No. 45392

Project No.	18-05-05
Drawn By:	MS
Site Designed By:	MS
Civil Design By:	MS
Drawing Scale:	1" = 2'

Sheet GL1 Page 2 of 6



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morris@morrissmitheng.com

Digitally Signed and Sealed: 05/17/19

REVISIONS:

No	Date	Description
1		
2		
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7		

In Association With:

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14750 89th Street
Fellsmere, FL 32948

Roger Bell Agent

Site Address:
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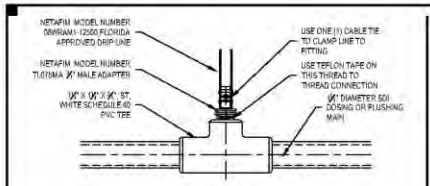
Melbourne Beach, FL

OSTDS Geometric Layout Plan

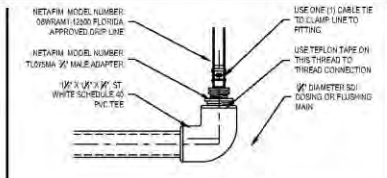
James Morris Smith, Jr., P.E. 05-17-2019
Florida Registration No. 45392

Project No.	18-0516
Drawn By:	MS
Site Designed By:	MS
Civil Design By:	MS
Drawing Scale:	1" = 2'

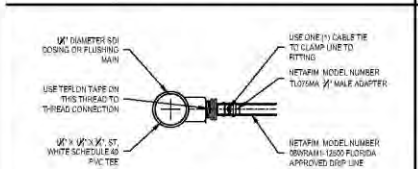
Sheet GL1 Page 3 of 6



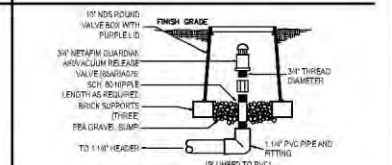
MANIFOLD TEE CONNECTION - PLAN VIEW



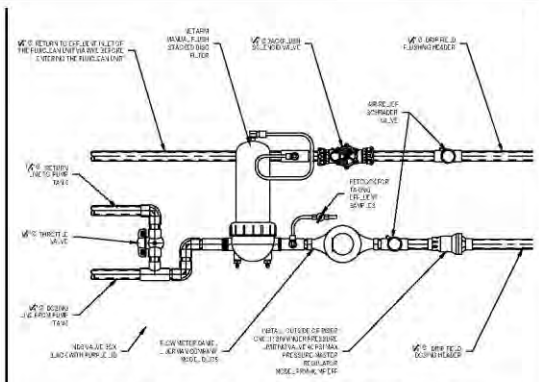
MANIFOLD TEE CONNECTION



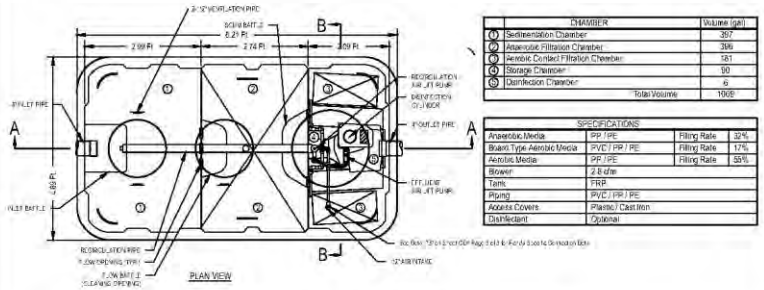
MANIFOLD TEE CONNECTION - SECTION VIEW



¾" AIR RELEASE VALVE



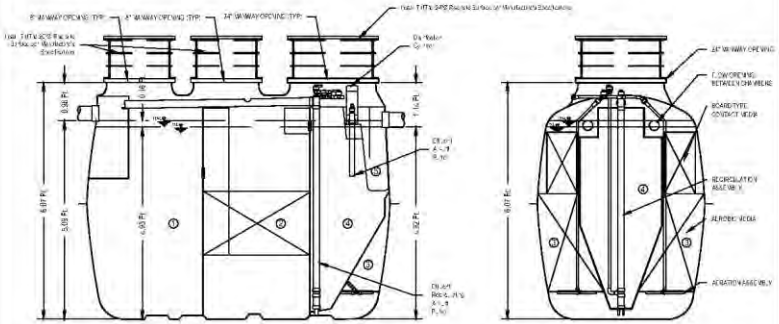
AQUAKLEAR SINGLE FILTER HEADWORKS - MODIFIED - INSTALLED IN PUMP TANK RISER



PLAN VIEW

	CHAMBER	Volume (gal)
1	Sedimentation Chamber	397
2	Anaerobic Filtration Chamber	396
3	Aerobic Contact Filtration Chamber	581
4	Storage Chamber*	99
5	Disinfection Chamber*	6
	Total Volume	1908

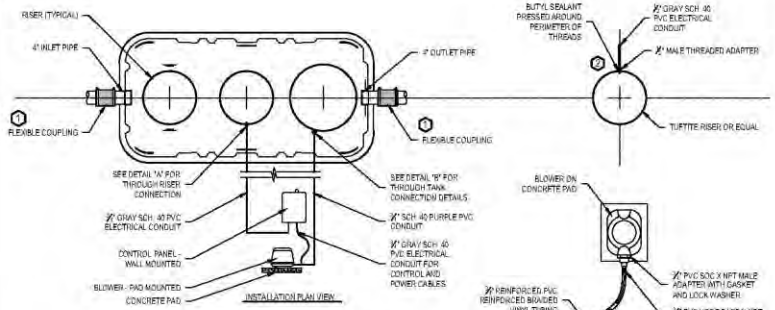
SPECIFICATIONS			
Anaerobic Media	PP / PE	Filling Rate	32%
Board Type Aerobic Media	PVC / PP / PE	Filling Rate	17%
Aerobic Media	PP / PE	Filling Rate	55%
Blower	2 ft-lbs		
Tank	FRP		
Piping	PVC / PP / PE		
Access Covers	Plastic / Cast Iron		
Disinfectant	Optional		



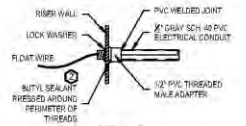
SECTION A-A VIEW

SECTION B-B VIEW

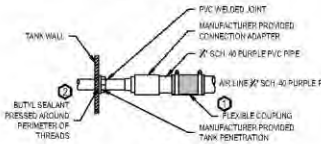
FUJI CLEAN MODEL CEN7 PBTS PROCESSOR DETAILS



INSTALLATION PLAN VIEW



DETAIL "A"



DETAIL "B"

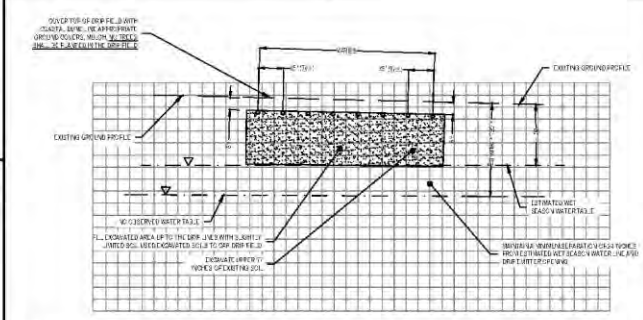
1. FLEXIBLE COUPLING MEETING ASTM C923 STANDARD EQUAL TO FERNCO P1056 SERIES WITH STAINLESS STEEL BANDS
2. SEALANT MEETING ASTM C920 STANDARDS EQUAL TO CONSEAL CS-101 (CR-RN-101) RAM-NEK BUTYL SEALANT

FUJI CLEAN MODEL CEN7 PBTS COMPONENT CONNECTION DETAILS - FLORIDA ADDENDUM

Site vegetative cover is dune line appropriate groundcover over dripfield, dune line appropriate shrubs/grasses around (to shield) the components.

Botanical Name	Common Name
Sesuvium portulacastrum	Sea Purslane
Muhlenbergia capillaris	Muhly Grass
Dyschoriste oblongifolia	Oblongleaf twinflower
Solidago sempervirens	Seaside Goldenrod
Ipomoea pes-caprae	Railroad Vine
Callisia pulchella	Blanketflower
Yucca filamentosa	Adam's needle

Engineer Specified Dune Restoration Vegetation



NOTE: This Typical Section Through the Drip Field Will Be Completed Once Staff has Delivered to the Design Engineer the Site Evaluation Performed. The Design Engineer Will Then Add His Reliance Statement to the Site Evaluation Form, Modify This Detail and Return the Form and Detail to Staff for Inclusion into the Project File at the PDOH Offices

TYPICAL SECTION THROUGH DRIP FIELD

Site vegetative cover is dune line appropriate groundcover over dripfield, dune line appropriate shrubs/grasses around (to shield) the components.

Suggested Ground Covers:

Common Name	Botanical Name
African Iris	*Dietes bicolor*
Asiatic Jasmine	*Trachelospermum asiaticum*
Beach Sunflower	*Helianthus debilis*
Bromeliads	*Various genera and hybrids*
Cast Iron Plant	*Aspidistra elatior*
Coontie	*Zamia floridana*
Firecracker Plant	*Russelia equisetiformis*
Pinktail Fern	*Nephrolepis falcata 'Furcans'*
Flax Lily	*Dianella tasmanica*

Suggested Ground Covers:

Common Name	Botanical Name
Golden Creeper	*Ernodea littoralis*
Heliotrop	*Heliotrop angiosta*
Macho Fern	*Nephrolepis falcata*
Palm Grass	*Setaria gracilis*
Perennial Peanut	*Arachis glabrata*

Suggested Ornamental Grasses:

Common Name	Botanical Name
Fountain Grass	*Pennisetum elopecuroides, Pennisetum orientale*
Oriental Fountain Grass	*Miscanthus*
Maiden Grass	*Miscanthus sinensis*
Japanese Silver Grass	*Muhlenbergia capillaris*
Muhly Grass	*Panicum virgatum*
Switch Grass	*Eragrostis corrugata*
Love Grass	

Broward County Land Development Code Specified Dune Restoration Vegetation

Fuji Clean USA CEN7 Units' contact filtration" treatment is a simple, well-engineered process that consists of a controlled, circuitous flow train through anaerobic and aerobic chambers and in direct contact with assorted proprietary fixed film media's on which biological digestion of organic matter occurs. Media is also designed and positioned to provide mechanical filtration of process wastewater. The system includes two air lift pumps (see diagram attached). The Recirculating Airlift Pump returns process water and sludge from the aerobic zone to the sedimentation chamber, recirculating 2-4 times inflow per day for CE models, and 4-6 times inflow for CEN (enhanced denitrification) models. The Effluent Airlift Pump is designed to help equalize flow and discharge treated effluent.

Florida Installation Notes

1. Float Wire Connection. Per Florida Code Chapter 64E-6.013(9)(c), please follow engineered drawing "Detail A" for proper installation of electrical wires exiting treatment tank.
2. Tank Wall Penetration – Air Lines and Float Wire Line. Per Florida Code Chapter 64E-6.013(2)(f), please follow engineered drawing "Detail B" for proper tank penetration of air line and float penetration line "Detail A," which meets ASTM C990-06.
3. Tank Wall Penetration – Inlet and Outlet Pipes. Per Florida Code Chapter 64E-6.013(2)(f), please follow engineered drawing "Installation Plan View," using a flexible coupling meeting ASTM C923-96 standards.
4. Electrical Circuits. Separate circuits shall be used for treatment system power and the system alarm (audio and visual) such that in the event blower malfunction, the alarm warning will continue to function.
5. Alarm Location. The alarm component shall be installed in a conspicuous location so that its' activation can be heard and seen by the property occupants.
6. Cover Security: Access covers to the Fuji Clean treatment system shall be secured in a tamper resistant configuration, such as through the use of #10 x ¾-3/4" stainless steel square-head or hex-head screws or a cover lid lock (available through your Fuji Clean USA distributor).

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REVISIONS:

No.	Date	Description
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George A. & Binnur Jutras
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Fellsmere, FL 32948

Roger Bell Agent

Site Address:
6811 Highway A1A
Melbourne Beach, FL

Construction and Installation Details

James Morris Smith, Jr., P.E. 05-17-2019
Florida Registration No. 45392

Project No.:	18-0510
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	See Exhibits
Sheet CD1	Page 5 of 6

NORTH

Scale: 1" = 2'

Limits of the Existing Top of Bank for Previous Dune Restoration Project

Proposed Subsurface Drip Irrigation (SDI) Line (Typical)

21 I.P.

35 G.P.

10 M.C.

51 D.O.

8 Y.F.

Muhly Grass

Oblongleaf twinflower

Railroad Vine

Blanket Flower

Adam's Needle

16.40 FT

24.60 FT

7.50 FT

10.00 FT

DRIP FIELD AND TANK AREA PLANT SCHEDULE

QTY.	SYM.	BOTANICAL NAME	COMMON NAME	SPECIFICATIONS
10	M.C.	Muhlenbergia capillaris	Muhly Grass	36" on center
48	D.O.	Dyschoriste oblongifolia	Oblongleaf twinflower	24" on center
32	I.P.	Ipomoea pes-caprae	Railroad vine	36" on center
35	G.P.	Gaillardia pulchella	Blanket Flower	24" on center
8	Y.F.	Yucca filamentosa	Adam's needle	48" on center

OSTDS CONSTRUCTION AREA - SDI DRIP FIELD LANDSCAPING LAYOUT PLAN

Scale: 1" = 2'

mse morrissmith engineering

Civil Engineering
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Drawing Issue Date: 05-01-2019

REVISIONS:

No.	Date	By	Description
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2			
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5			
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In Association With:

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14750 89th Street
Fellsmere, FL 32948

Roger Bell Agent

Site Address:
6811 Highway A1A
Melbourne Beach, FL

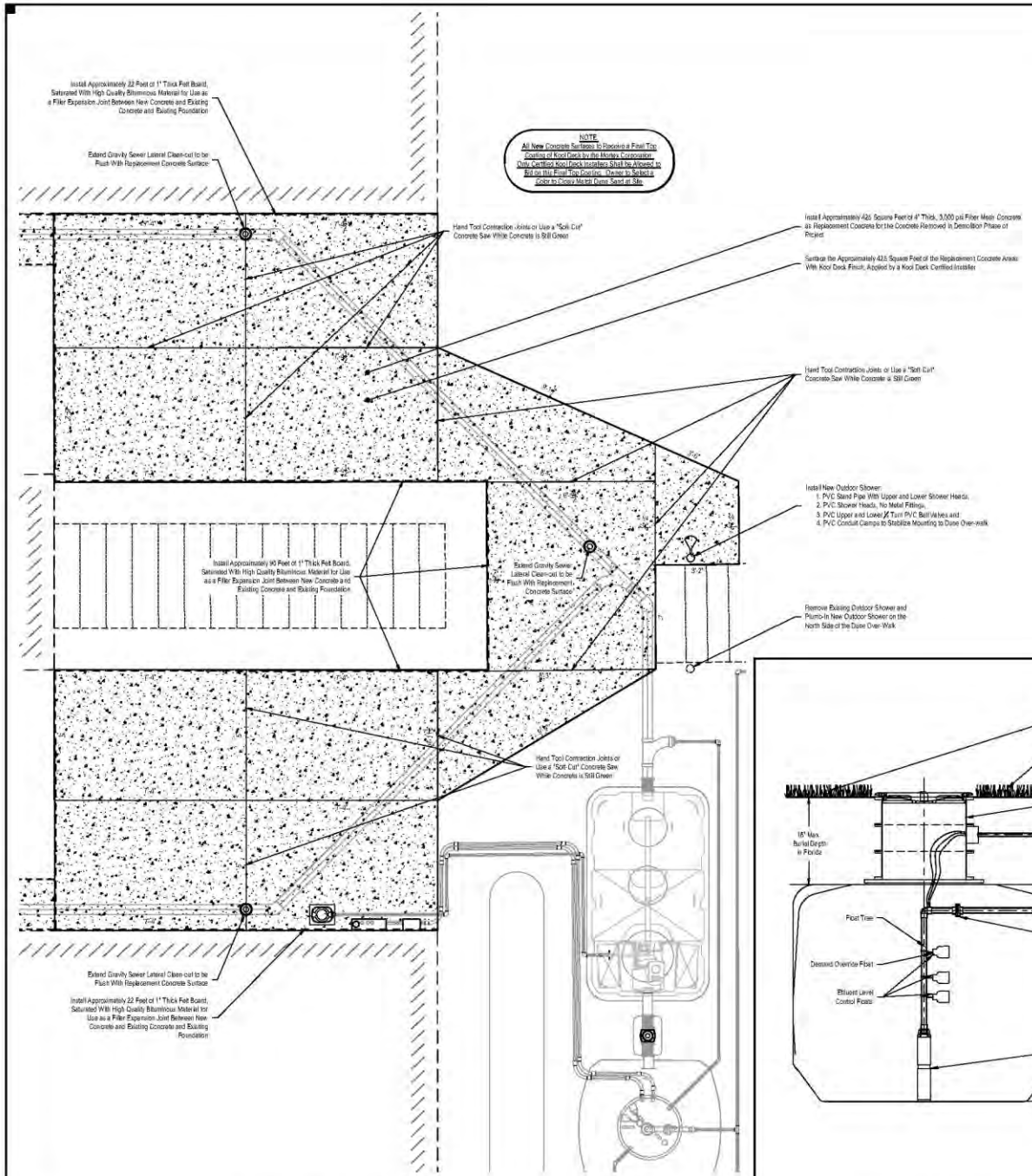
Drip Field Vegetative Cover Landscaping Plan

JAMES MORRIS SMITH, JR. LICENSE NO. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER

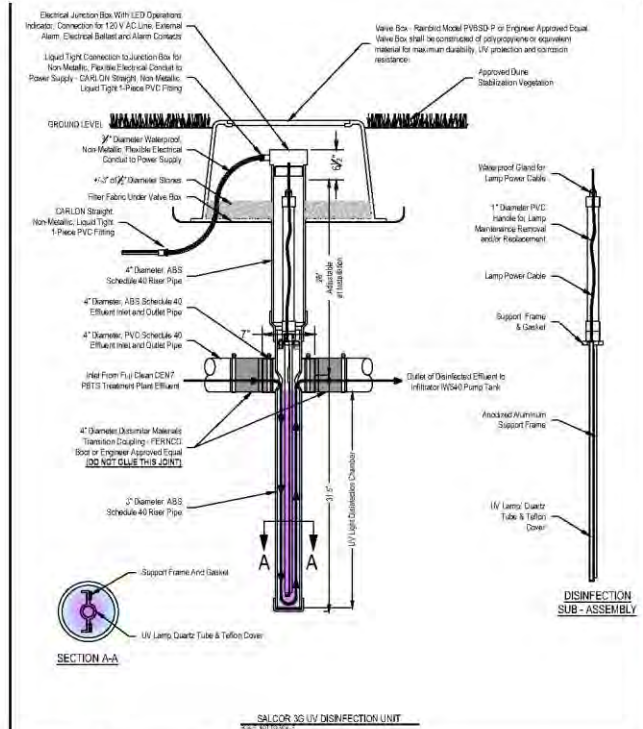
James Morris Smith, Jr., P.E. 05-17-2019
Florida Registration No. 45392

Project No.	18-05-05
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" = 2'

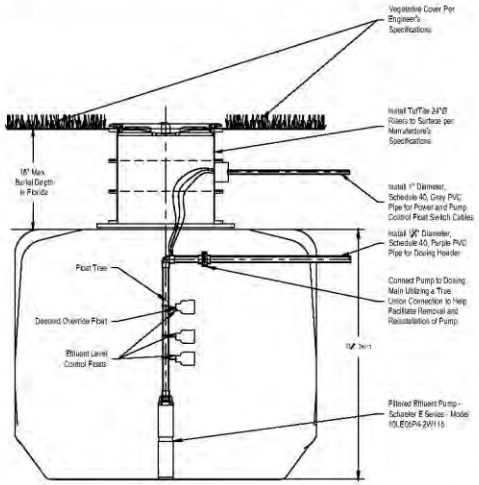
Sheet GL1



REPLACEMENT CONCRETE SURFACE DETAILS



SALCOR 3G UV DISINFECTION UNIT



INFILTRATOR IM540 PUMP TANK WITH SINGLE PUMP AND CONTROL FLOATS

SALCOR MODEL 3G - Narrative Description

The Salcor Model 3G ultraviolet disinfection unit (patent pending) was specifically designed for disinfecting the effluent from small aerobic treatment plants. It is able to reduce fecal coliform bacteria levels well below the most stringent US treatment standards even when the upstream treatment plant is operating in a mild upset condition.

Most small aerobic treatment plants are installed so that their discharge piping is below grade. The 3G disinfection chamber directly couples to the aerobic plant discharge pipe and is permanently installed below grade.

The ultraviolet light source for disinfection is mounted in a sub-assembly that can be inserted or removed through the top of the riser pipe for periodic servicing. The light source is mounted in the center of an anodized aluminum frame that divides the disinfection chamber in half. The frame seals against the inner surface of the disinfection chamber to prevent flow bypass.

When fully inserted, the disinfection sub-assembly is properly located by pins mounted near the top of the disinfection chamber. It causes the wastewater entering one side of the unit to flow vertically downward, make a 180° turn, and then flow vertically upward and out the other side of the unit. This well-defined flow path is designed to give the proper fluid exposure time.

The ultraviolet light source is surrounded by a clear fused quartz tube to control lamp surface temperature. A clear Teflon film covers the quartz tube to minimize surface fouling. This design feature incorporates the beneficial attributes of both quartz and Teflon. When the disinfection chamber is filled with water, the ultraviolet light source can operate continuously, whether or not water is flowing. Continuous operation within a lamp surface temperature range of 105-120° F provides optimum ultraviolet light output and long lamp life.

A fiber optic probe conveys visible light from the ultraviolet light source located underground to an electrical junction box mounted on the outside surface of the riser pipe above grade, allowing lamp operating status to be confirmed visually without the necessity for removing the disinfection sub-assembly. The disinfection sub-assembly is watertight throughout its length, which extends approximately one foot above grade. This protects the electrical connections against a fluid backup which could cause the wastewater effluent level to rise to the maximum height of the upstream treatment plant.

The UV system operates on 12 Volt DC power and consumes less than 25 watts. A DC power converter that plugs in to a standard 110-120 VAC outlet is mounted inside the residence. The two DC converter outlet wires are run from the residence to the UV disinfection system through underground conduit to the electrical junction box on the aboveground portion of the riser pipe. The power lead wires attach to a terminal strip inside the junction box. Two indicators located on the outside of the junction box show the operating status of the UV system. One is a green LED, which indicates the availability of 12 Volt DC electrical power in the junction box. The other is a terminus of the fiber optic probe and indicates that the ultraviolet light source is operating.

Specifications

Maximum flow through the unit is rated at 3 gallons per minute (gpm), or 4320 gallons per day (gpd), with the following effluent conditions:

Suspended Solids < 30 mg/liter

5-day BOD < 30 mg/liter

Under the above conditions, the fecal coliform reduction by the Salcor unit exceeds 3-logs, or 99.9%, at the end of the UV lamp life (one year of continuous operation).

Aerobic treatment plants for individual residences are typically sized for 400-1500 gpd, and designed to produce effluent of the following quality:

Suspended Solids < 10 mg/liter

5-day BOD < 10 mg/liter

Fecal coliform counts in the home aerobic treatment effluent typically range from 400-20,000 per 100ml. The Model 3G ultraviolet unit is well overdesigned to disinfect the effluent from home units. There are no adverse effects from overexposing the effluent to germicidal ultraviolet light, because UV disinfection does not form byproducts, in contrast to chlorination and other chemical disinfection methods.

The Model 3G ultraviolet disinfection units have been installed in conjunction with home aerobic treatment units manufactured by Bio-Microbics, Consolidated (Multiflow and Hydro), Delta Environmental (Whitewater), Jet, Fujiclean and Clearstream.

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REVISIONS:		
No.	Date	Description
1		
2		
3		
4		
5		
6		
7		

In Association With

ASAP ONSITE SEPTIC & SEWER
4630 Lipscomb St - Suite A-1
Palm Bay, FL 32905
(321) 745-0111

George A. & Binnur Jutras
14750 89th Street
Fellsmere, FL 32948

Roger Bell Agent

Site Address:
6811 Highway A1A
Melbourne Beach, FL

Construction and Installation Details

James Morris Smith, Jr., P.E. 05-17-2019
Florida Registration No. 45392

Project No.:	18-0510
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	See Exhibits

Sheet CD2 Page 6 of 6

PROPOSED PROJECT INFORMATION:

LOT USABLE AREA = 9,073 Square Feet = 0.2083 Acres

= 0.2083 Acres x 2,500 = 520.71 gallons per day
520.71 x 1.5 = 781.06 gallons per day allowable

Proposed living area 7,800 square feet (under air conditioned space).

Based upon FAC 64E-6 Table I - 2,221 to 3,300 square feet building area = 400 Gallons Per Day

Additional Gallons Per Day Required for this Project:
7,800 sq.ft. - 3,300 sq.ft. = 4,500 sq.ft. 4,500 sq.ft. / 750 = 6.0
6.0 x 60 gallons/day = 360 Gallons Per Day

Total Gallons Per Day Required for this Project = 760 Gallons Per Day

The FujiClean CEN15 Model is Rated for = 900 Gallons per Day
The FujiClean CEN10 Model has a Total Volume of = 1,406 Gallons
The Infiltrator Model TW900 Pump Tank has a Total Volume of = 1,060 Gallons
Total Volume PROVIDED for System = 2,558 Gallons

Proposed PBTS to meet Advanced Secondary Treatment Standards for cBOD5 and TSS. Drainfield reduction taken is 40%. Infiltrative surface area reductions shall be allowed for systems designed to reduce the wastewater strength of the effluent where the drainfield is sized based on slightly limited soils. System drip field designed on trench standards in slightly-limited soils.

Required Drainfield = 950 Sq.Ft.
40% Reduction Allowed = 950 x .6 = 570 Sq.Ft.

Unobstructed Area required = (1.8 x 570) - 570 = 285 Sq.Ft.
Unobstructed Area Provided = 350 Sq.Ft.

Subsurface Drip Irrigation tubing required = 285 feet

Subsurface Drip Irrigation tubing provided = 387 feet

Drip tubes are equal to or greater than 2 feet from the compacted spaces and the property lines and greater than 24 inches above the wet season water table.

Site is taking a 50% Increase in Allowable Lot Flow. Soil will be used for local coliform treatment. Two (2) Ammarin Cups shall be installed to take effluent samples for testing.

Monitoring for Drip Field Ponding will be on a quarterly basis by a certified FujiClean maintenance entity.

The drip field is designed to use pressure compensating drip emitters. The drip field's slope will be away from the house foundation towards the street not exceeding 18 inches.

PROJECT SPECIFIC NOTES:

1). System designed to treat a peak flow of 750 gallons per day (gpd), calculated from Table 1 - 64E-6.

2). Dripfield sized for peak daily loading of 0.80 (gpd/sq.ft. 64E-6) for Trench in Sandy Soils.

3). All gravity sewer laterals to the FujiClean CEN10 Unit and to the Pump Tank shall be designed and constructed watertight in accordance with state and local codes. Use new 4"Ø, ASTM-D2729, PVC gravity sewer pipe with correct fittings for all gravity sewer lines.

4). The onsite wastewater system is based upon a site evaluation performed by the staff of Brevard County Department of Health. If conditions are encountered during construction differing from those used for design, contractor shall cease work and immediately notify the local authority in writing.

5). Before the start of any construction at the site, the following must be staked out and protected from alteration or compaction, the location of the disposal/reuse dripfield and the location of the un-obstructed area.

6). A permit from the Brevard County County Health Department must be obtained prior to the start of construction.

7). The Brevard County County Health Department shall be notified prior to the start of construction.

8). The disposal (drip) field must not be constructed during periods when the soil is sufficiently wet, at the surface or at the depth of installation, to exceed its plastic limit. Construction of the disposal/reuse dripfield shall not occur until soil conditions are acceptable as determined by the Brevard County County Health Department.

9). If a surface diversion is required if runoff from an adjoining upslope landscape affects the disposal/reuse site. Surface diversions must have a positive grade of at least two and four-tenths (2.4) inches per one hundred (100) feet, a grade of 0.2%). The surface diversion must be of sufficient depth and width to move surface water away from the disposal/reuse field.

10).Effluent pump tank is a separate 750 gallon concrete tank with a Simplex Pumps dosing system .

11). The dosing pump in the Pump Tank shall produce at least 16.4 gpm at 87.2 ft. TDH. Based a dosing time of for each pump run of 8 minutes, every hour 24 doses per day producing 31.7 gallons per dose.

12).The proposed residence shall receive potable water from City of Cocoa Utilities.

13).Contractor shall verify building sewer inverts and adjust gravity laterals accordingly. Adjust the FujiClean CEN10 Unit PBTS inverts to be as shallow as possible based on field verification.

14).Site vegetative cover is solid sod, ornamental shrubs and groundcover over dripfield and ornamental shrubs/grasses around (to shield) the components. NO TREES are allowed in the drip field. See list of suggested plants on details sheet. Plants shall be selected by the owners from the provided pallet.

15.) The Manufacturer supplied calculation spreadsheet calculates the minimum and maximum number of laterals that the design parameters can operate within to maintain a flushing velocity between 2.0 feet per second and 5 feet per second. The pressure compensating drip emitters combined with the utilizing the appropriate number of laterals ensures that the flushing velocity will be the same or nearly the same inside the longest and shortest loops.

Legal Description:

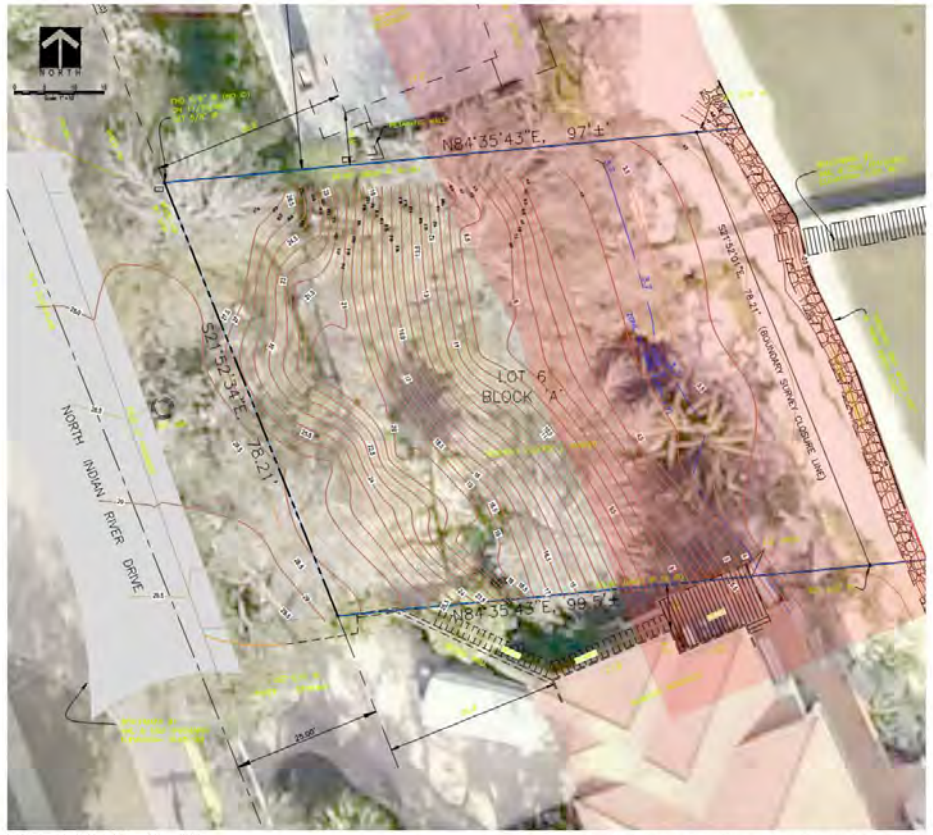
Lot 6, Block A, Carleton Terrace, according to the Plat thereof as recorded in Plat Book 5, Page(s) 90, of the Public Records of Brevard County, Florida.

The Property Appraiser's Parcel Identification Number is 24-36-17-54-00000A.0-0006.00.

Plat Recordation Date: March 6th, 1926

LENGTH	TYPE OF PIPE	USE OF PIPE
	1.25"Ø Sch 40 PVC	Dosing Main
	1.25"Ø Sch 40 PVC	Flushing Main
		Odor/Vent Lines
	10"Ø Sch 40 PVC	Air Blower Line From The Mac Blower To The Fujiclean Cen10

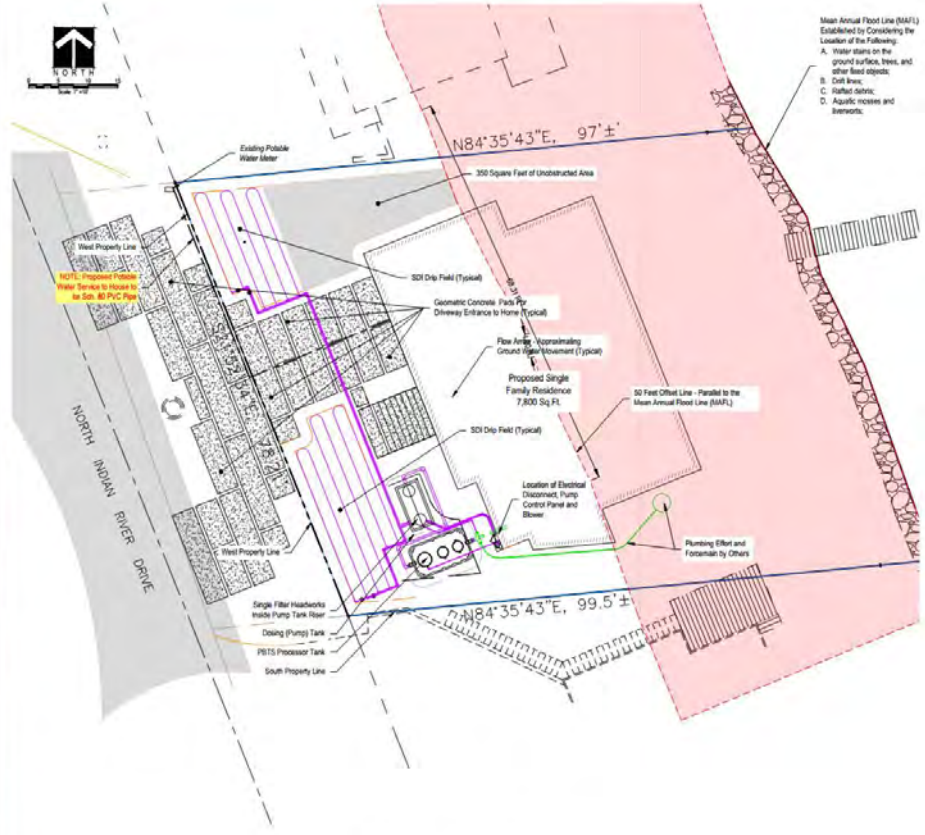
PIPING SCHEDULE



Aerial Photograph Provided By the FDEP www.labins.org Website

Existing Conditions of Project Site

Existing Topographic Survey Data Provided to Engineer of Record by R. M. Packard and Assoc., Inc., Surveying and Mapping - 157 Bougainvillea Drive - Suite "D" - Rockledge, Florida 32955 - Job # 00314



Proposed Site Plan for Layout of Project Components

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Visualization

1754 Barker Street NE.
Palm Bay, Florida 32907
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REVISIONS:

No.	Date	Description	By
1			
2			
3			
4			
5			
6			
7			

SLS Investments of Central Florida, LLLP

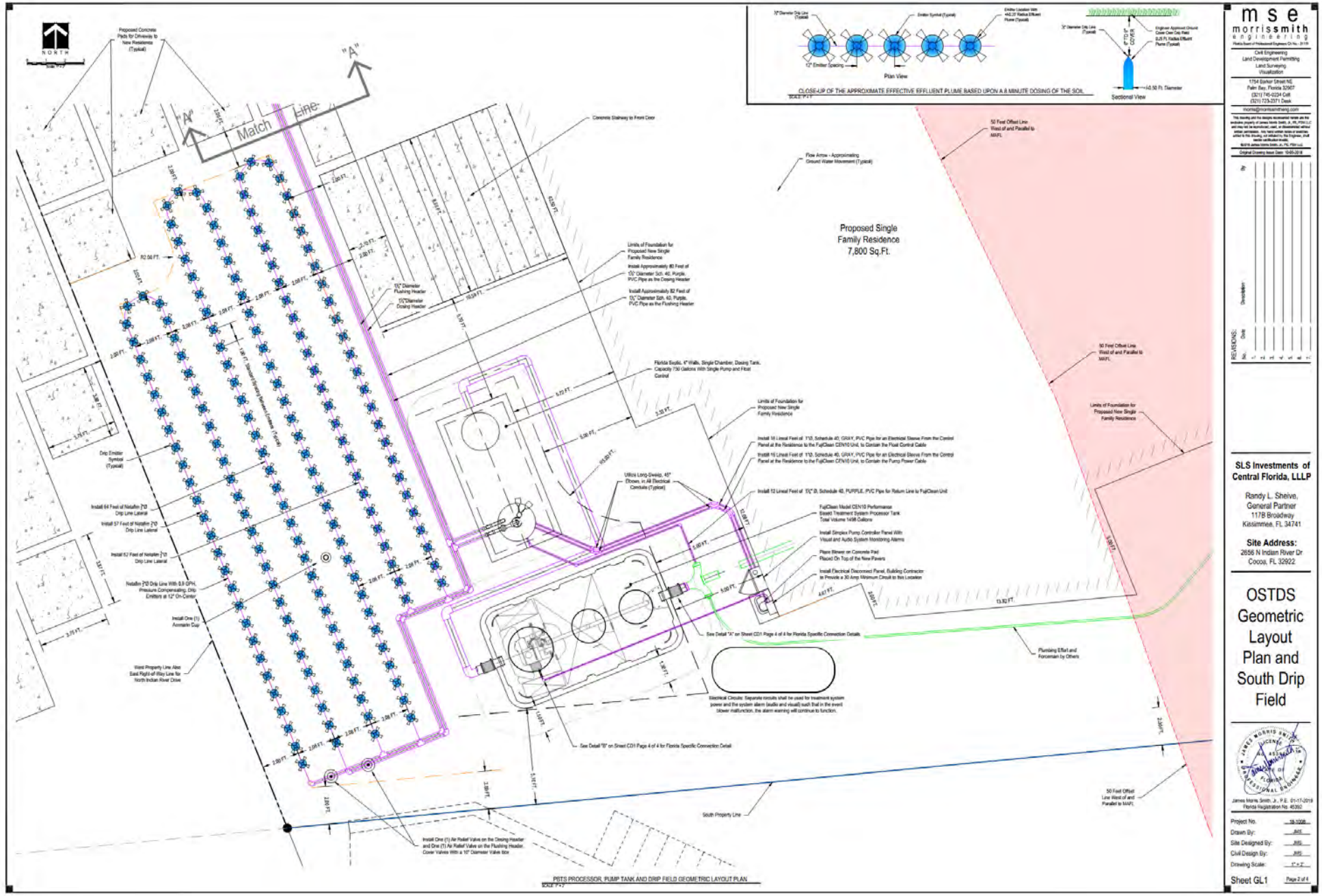
Randy L. Sheive,
General Partner
1178 Broadway
Kissimmee, FL 34741

Site Address:
2656 N Indian River Dr
Cocoa, FL 32922

Existing Conditions and Site Plan Layout of Proposed System Components

James Morris Smith, Jr., P.E. 02-19-2019
Florida Registration No. 45392

Project No.	18-1008
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" = 30'
Sheet EC1	Page 1 of 4


Proposed Single Family Residence 7,800 Sq.Ft.
Match Line
"A"
"A"
Proposed Concrete Pads for Driveway to New Residence (Typical)
Concrete Stairway to Front Door
Limits of Foundation for Proposed New Single Family Residence
Install Approximately 80 Feet of 1½" Diameter Sch. 40, Purple, PVC Pipe as the Dosing Header
Install Approximately 82 Feet of 1½" Diameter Sch. 40, Purple, PVC Pipe as the Flushing Header
1½" Diameter Flushing Header
1½" Diameter Dosing Header
Florida Septic, 4" Walls, Single Chamber, Dosing Tank, Capacity 750 Gallons With Single Pump and Float Control
Limits of Foundation for Proposed New Single Family Residence
Install 16 Lineal Feet of 1½", Schedule 40, GRAY, PVC Pipe for an Electrical Sleeve From the Control Panel at the Residence to the FujiClean CEN10 Unit, to Contain the Float Control Cable
Install 16 Lineal Feet of 1½", Schedule 40, GRAY, PVC Pipe for an Electrical Sleeve From the Control Panel at the Residence to the FujiClean CEN10 Unit, to Contain the Pump Power Cable
Install 12 Lineal Feet of 1½" Ø, Schedule 40, PURPLE, PVC Pipe for Return Line to FujiClean Unit
Utilize Long-Sweep, 45° Elbows, in All Electrical Conduits (Typical)
FujiClean Model CEN10 Performance Based Treatment System Processor Tank Total Volume 1498 Gallons
Install Simplex Pump Controller Panel With Visual and Audio System Monitoring Alarms
Place Blower on Concrete Pad Placed On Top of the New Pavers
Install Electrical Disconnect Panel, Building Contractor to Provide a 30 Amp Minimum Circuit to this Location
See Detail "A" on Sheet CD1 Page 4 of 4 for Florida Specific Connection Details
Plumbing Effort and Forcemain by Others
Electrical Circuits: Separate circuits shall be used for treatment system power and the system alarm (audio and visual) such that in the event blower malfunction, the alarm warning will continue to function.
See Detail "B" on Sheet CD1 Page 4 of 4 for Florida Specific Connection Detail
Drip Emitter Symbol (Typical)
Install 64 Feet of Netafim ¾" Drip Line Lateral
Install 57 Feet of Netafim ¾" Drip Line Lateral
Install 62 Feet of Netafim ¾" Drip Line Lateral
Netafim ¾" Drip Line With 0.9 GPH Pressure Compensating, Drip Emitters at 12" On-Center
Install One (1) Anemometer Drop
West Property Line Also East Right-of-Way Line for North Indian River Drive
Install One (1) Air Relief Valve on the Dosing Header and One (1) Air Relief Valve on the Flushing Header. Cover Valves With a 10" Diameter Valve Box
South Property Line
50 Foot Offset Line West of and Parallel to MHFL
50 Foot Offset Line, West of and Parallel to MHFL
Limits of Foundation for Proposed New Single Family Residence
Flow Arrow - Approximating Ground Water Movement (Typical)
50 Foot Offset Line West of and Parallel to MHFL
Plan View
Sectional View
CLOSE-UP OF THE APPROXIMATE EFFECTIVE EFFLUENT PLUME BASED UPON A 8 MINUTE DOSING OF THE SOIL
PBTS PROCESSOR, PUMP TANK AND DRIP FIELD GEOMETRIC LAYOUT PLAN
SCALE: 1"=1'
NORTH
mse morrissmith engineering
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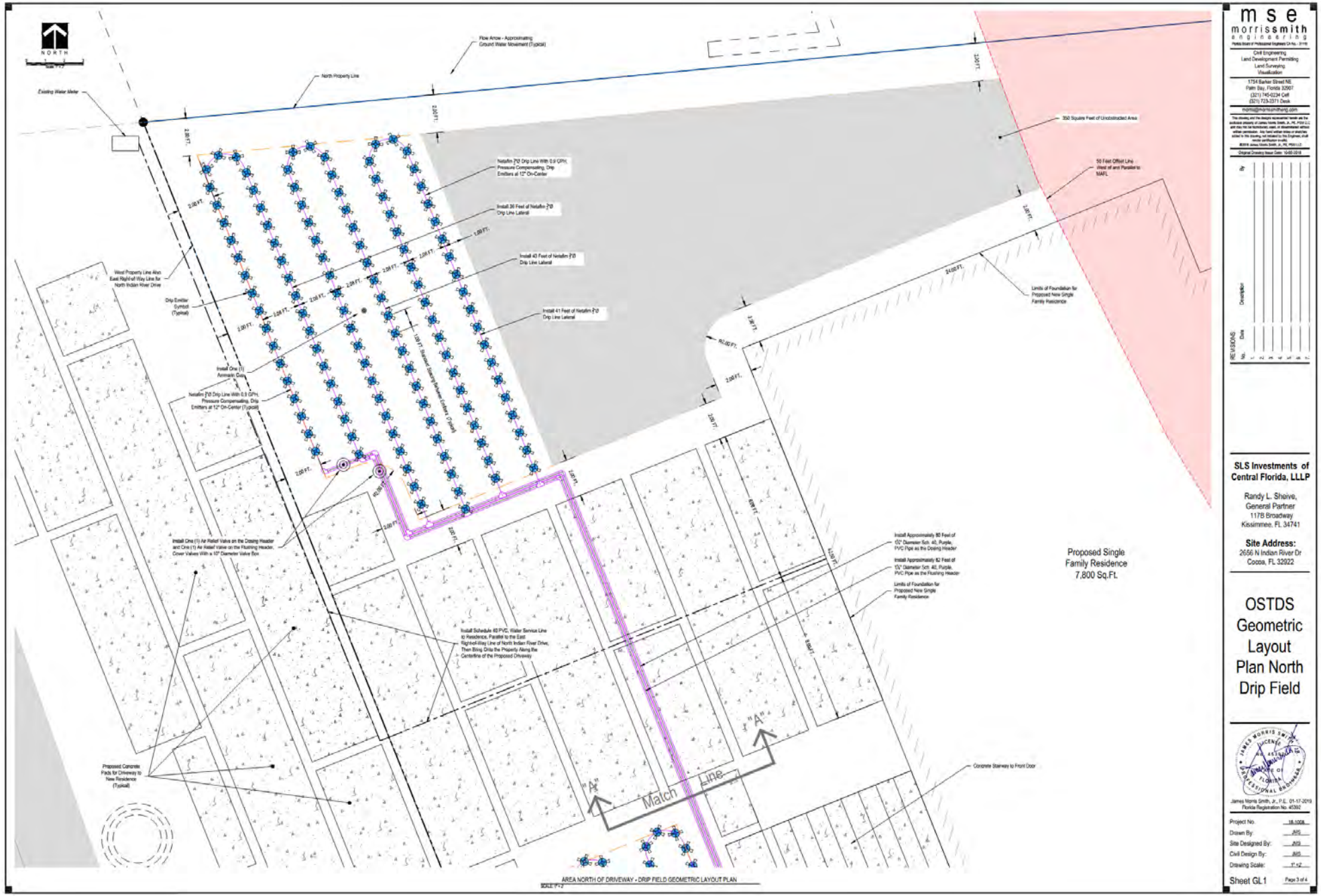
REVISIONS:
No. Date Description
SLS Investments of Central Florida, LLLP
Randy L. Sheive, General Partner
1178 Broadway
Kissimmee, FL 34741
Site Address:
2656 N Indian River Dr
Cocoa, FL 32922
OSTDS Geometric Layout Plan and South Drip Field
James Morris Smith, Jr., P.E. 01-17-2019
Florida Registration No. 45392
Project No. 18-1008
Drawn By: JMS
Site Designed By: JMS
Civil Design By: JMS
Drawing Scale: 1" = 2'
Sheet GL1 Page 2 of 4



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Original Drawing Issue Date: 10-05-2018

REVISIONS

No.	Date	By	Description

SLS Investments of Central Florida, LLLP

Randy L. Sheive,
General Partner
117B Broadway
Kissimmee, FL 34741

Site Address:
2656 N Indian River Dr
Cocoa, FL 32922

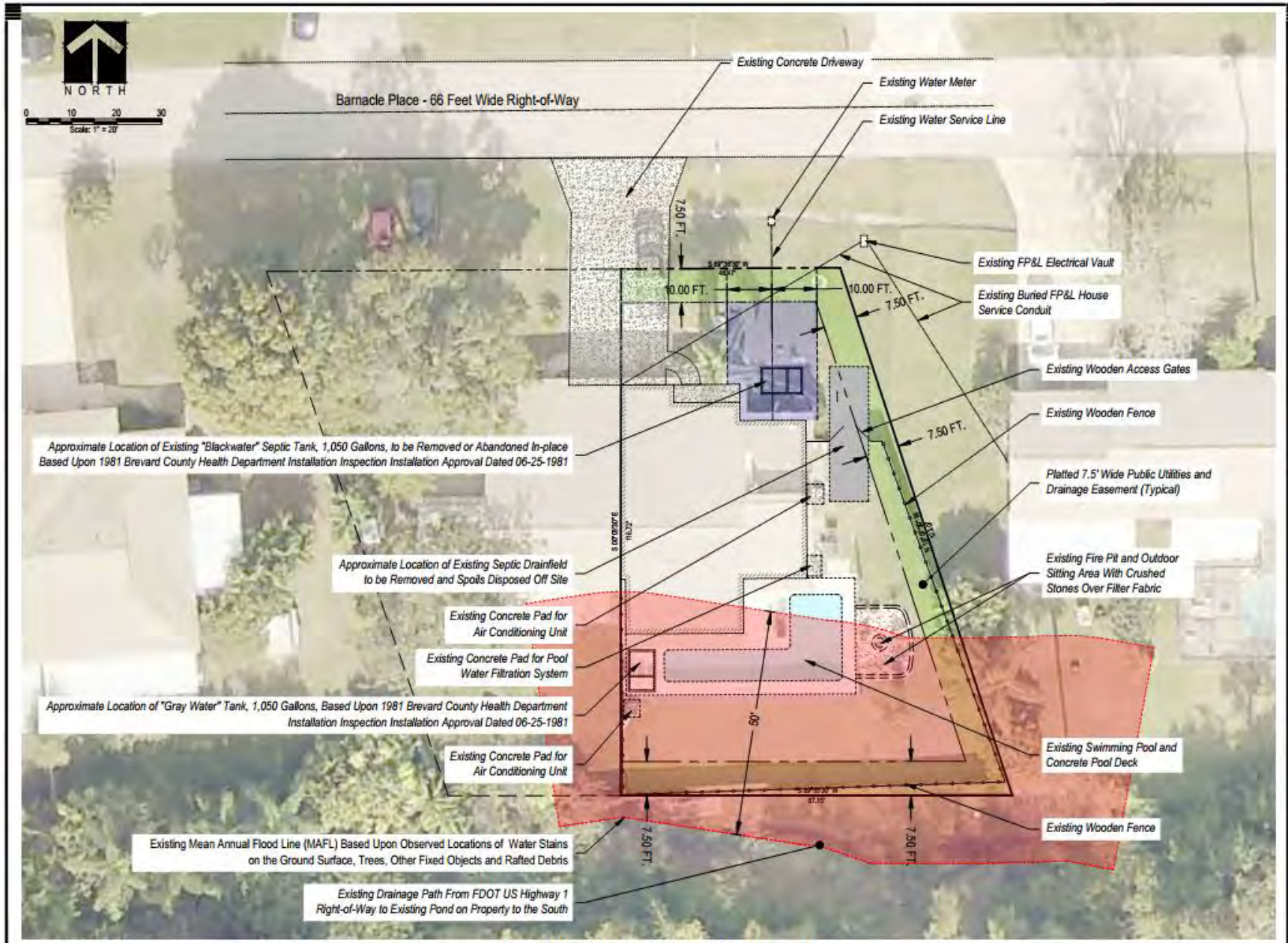
OSTDS Geometric Layout Plan North Drip Field

James Morris Smith, Jr., P.E. 01-17-2019
Florida Registration No. 45302

Project No.	18.1008
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" =2'

Sheet GL1 Page 3 of 4

Duplex Based Single Family Home Who (Unbeknownst To The Owner) Illegally Shared A Septic System With Neighbor



Existing Site Conditions and Background Aerial Photograph

Scale: 1" = 20'

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engineering
Florida Board of Professional Engineers CA No. - 31119

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Visualization

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Original Drawing Issue Date: 08-23-20

JAMES MORRIS SMITH LICENSE No. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER

James Morris Smith, Jr., P.E.11-12-20
Florida Registration No. 45392

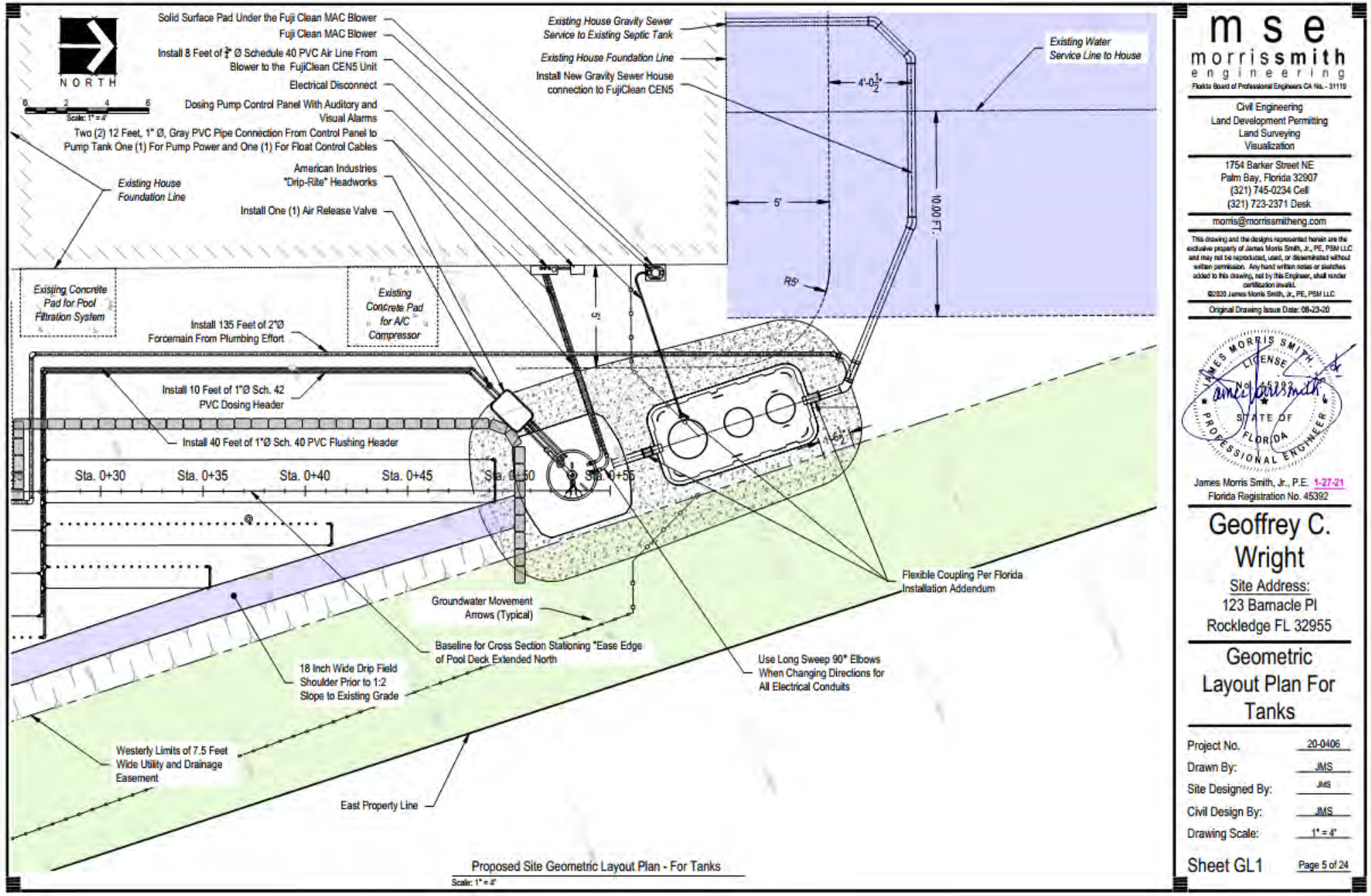
Geoffrey C. Wright

Site Address:
123 Barnacle Pl
Rockledge FL 32955

Existing Site Conditions

Project No.	20-0406
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" = 20'

Sheet EC1



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Original Drawing Issue Date: 08-23-20

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James Morris Smith, Jr., P.E. 1-27-21
Florida Registration No. 45392

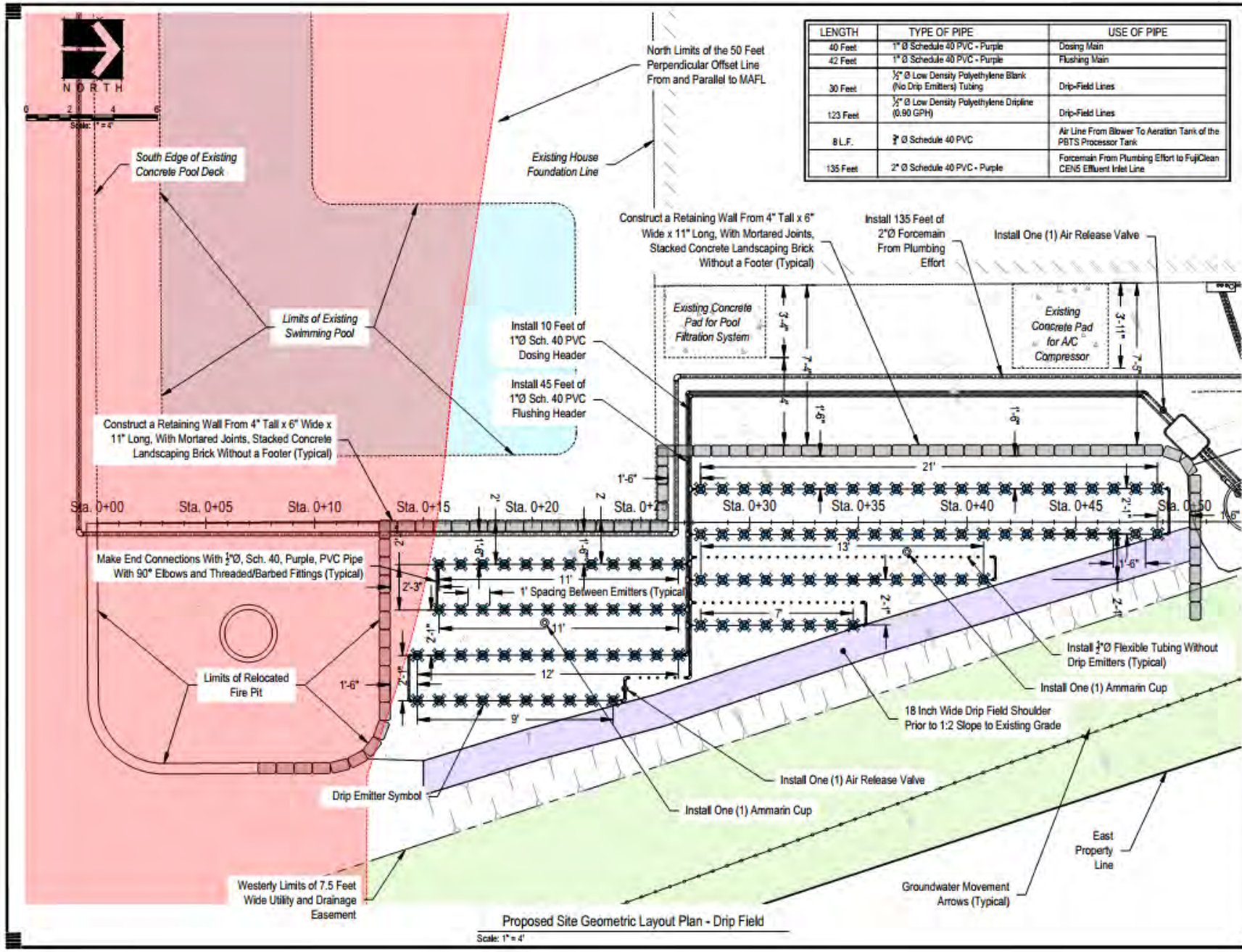
Geoffrey C. Wright

Site Address:
123 Barnacle Pl
Rockledge FL 32955

Geometric Layout Plan For Tanks

Project No.	20-0406
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" = 4'

Sheet GL1 Page 5 of 24



Proposed Site Geometric Layout Plan - Drip Field

Scale: 1" = 4'

LENGTH	TYPE OF PIPE	USE OF PIPE
40 Feet	1" Ø Schedule 40 PVC - Purple	Dosing Main
42 Feet	1" Ø Schedule 40 PVC - Purple	Flushing Main
30 Feet	½" Ø Low Density Polyethylene Blank (No Drip Emitters) Tubing	Drip-Field Lines
123 Feet	½" Ø Low Density Polyethylene Dripline (0.90 GPH)	Drip-Field Lines
8 L.F.	2" Ø Schedule 40 PVC	Air Line From Blower To Aeration Tank of the PBTS Processor Tank
135 Feet	2" Ø Schedule 40 PVC - Purple	Forcemain From Plumbing Effort to FujiClean CEN5 Effluent Inlet Line

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morris@morrissmitheng.com

Original Drawing Issue Date: 08-23-20

JAMES MORRIS SMITH LICENSE No. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER

James Morris Smith, Jr., P.E. 1-27-21
Florida Registration No. 45392

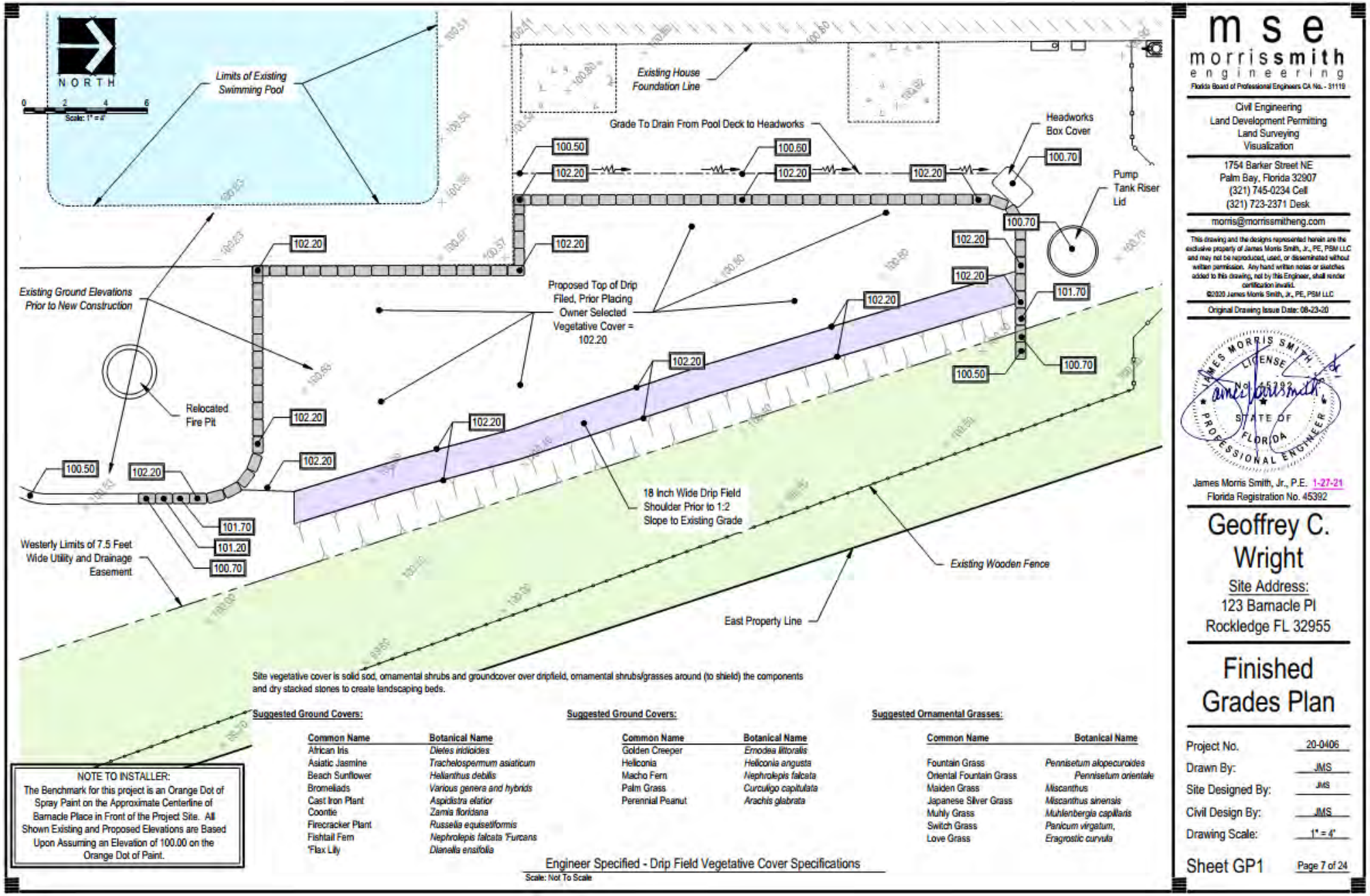
Geoffrey C. Wright

Site Address:
123 Barnacle Pl
Rockledge FL 32955

Geometric Layout Plan For Drip Field

Project No.	20-0406
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" = 4'

Sheet GL2



Site vegetative cover is solid sod, ornamental shrubs and groundcover over dripfield, ornamental shrubs/grasses around (to shield) the components and dry stacked stones to create landscaping beds.

Suggested Ground Covers:

Common Name	Botanical Name
African Iris	*Dietes iridioides*
Asiatic Jasmine	*Trachelospermum asiaticum*
Beach Sunflower	*Helianthus debilis*
Bromeliads	*Various genera and hybrids*
Cast Iron Plant	*Aspidistra elatior*
Coontie	*Zamia floridana*
Firecracker Plant	*Russelia equisetiformis*
Fishtail Fern	*Nephrolepis falcata 'Furcans*
'Flax Lily	*Dianella ensifolia*

Suggested Ground Covers:

Common Name	Botanical Name
Golden Creeper	*Ernodea littoralis*
Heliconia	*Heliconia angusta*
Macho Fern	*Nephrolepis falcata*
Palm Grass	*Curculigo capitulata*
Perennial Peanut	*Arachis glabrata*

Suggested Ornamental Grasses:

Common Name	Botanical Name
Fountain Grass	*Pennisetum alopecuroides*
Oriental Fountain Grass	*Pennisetum orientale*
Maiden Grass	*Miscanthus*
Japanese Silver Grass	*Miscanthus sinensis*
Muhly Grass	*Muhlenbergia capillaris*
Switch Grass	*Panicum virgatum,*
Love Grass	*Eragrostic curvula*

NOTE TO INSTALLER:
The Benchmark for this project is an Orange Dot of Spray Paint on the Approximate Centerline of Barnacle Place in Front of the Project Site. All Shown Existing and Proposed Elevations are Based Upon Assuming an Elevation of 100.00 on the Orange Dot of Paint.

Engineer Specified - Drip Field Vegetative Cover Specifications
Scale: Not To Scale

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Original Drawing Issue Date: 08-23-20

JAMES MORRIS SMITH LICENSE No. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER

James Morris Smith, Jr., P.E. 1-27-21
Florida Registration No. 45392

Geoffrey C. Wright

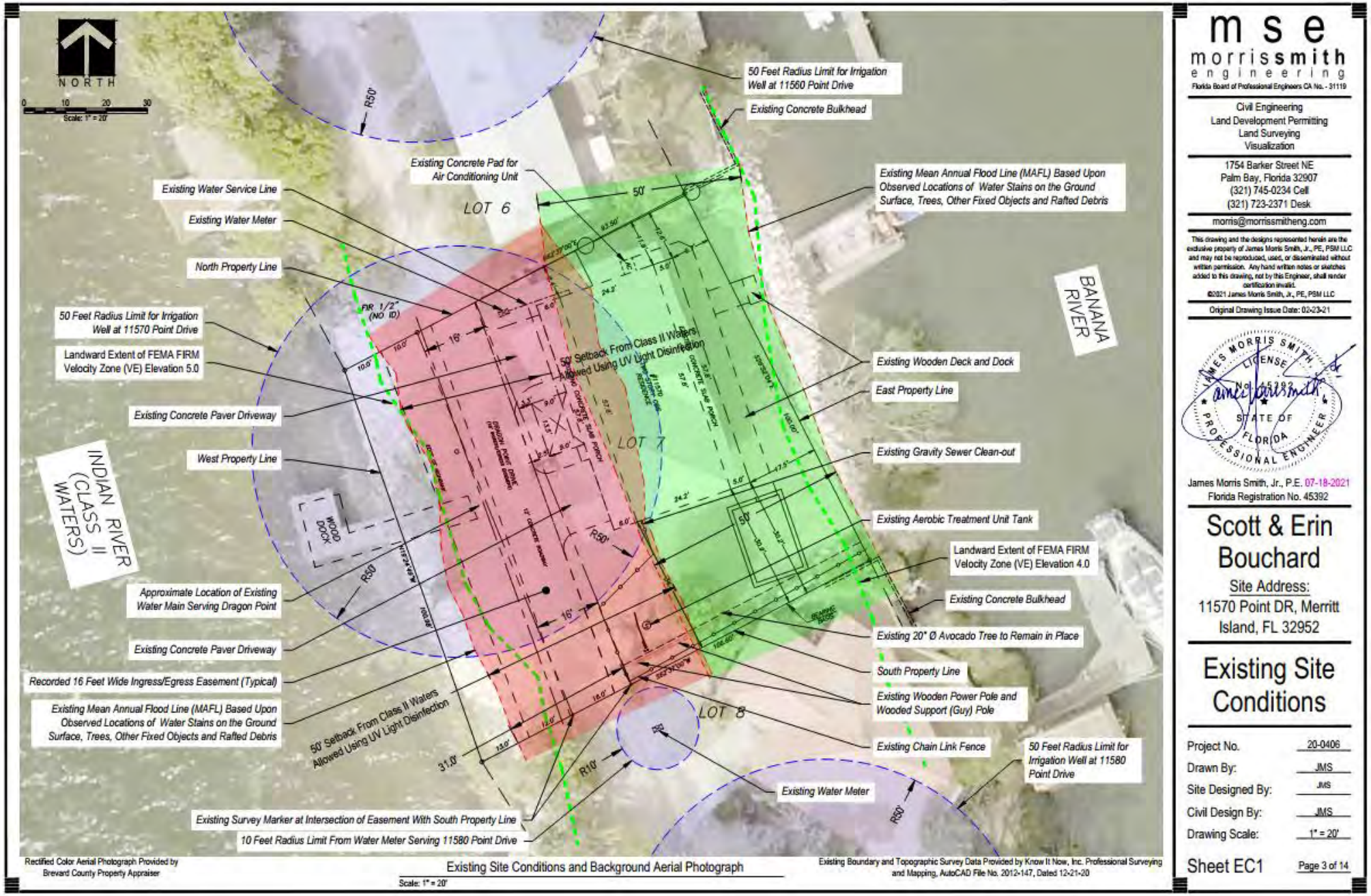
Site Address:
123 Barnacle Pl
Rockledge FL 32955

Finished Grades Plan

Project No.	20-0406
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" = 4'
Sheet GP1	Page 7 of 24

Adaptive Reuse of an Existing Home, Grandfathered to Original foundation of the Existing Single-Family Home

Required A Presentation Before The FDEP Variance Board



Rectified Color Aerial Photograph Provided by Brevard County Property Appraiser

Existing Site Conditions and Background Aerial Photograph

Scale: 1" = 20'

Existing Boundary and Topographic Survey Data Provided by Know It Now, Inc. Professional Surveying and Mapping, AutoCAD File No. 2012-147, Dated 12-21-20

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morris@morrissmitheng.com

Original Drawing Issue Date: 02-23-21

JAMES MORRIS SMITH, LICENSE No. 45392, STATE OF FLORIDA, PROFESSIONAL ENGINEER

James Morris Smith, Jr., P.E. 07-18-2021
Florida Registration No. 45392

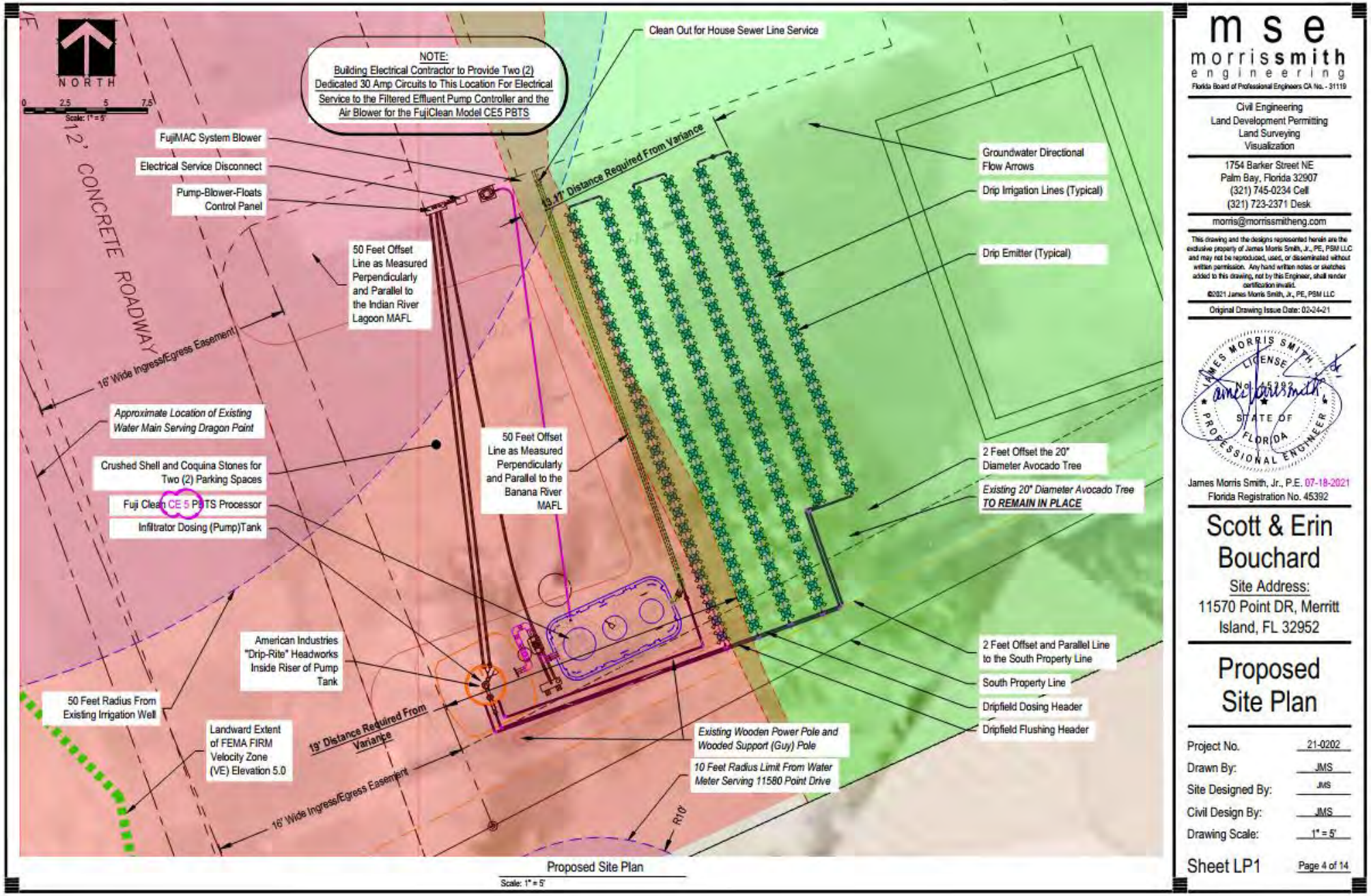
Scott & Erin Bouchard

Site Address:
11570 Point DR, Merritt Island, FL 32952

Existing Site Conditions

Project No.	20-0406
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" = 20'

Sheet EC1 Page 3 of 14



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engineering
Florida Board of Professional Engineers CA No. - 31119

Civil Engineering
Land Development Permitting
Land Surveying
Visualization

1754 Barker Street NE
Palm Bay, Florida 32907
(321) 745-0234 Cell
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morris@morrissmitheng.com

Original Drawing Issue Date: 02-24-21

JAMES MORRIS SMITH LICENSE No. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER

James Morris Smith, Jr., P.E. 07-18-2021
Florida Registration No. 45392

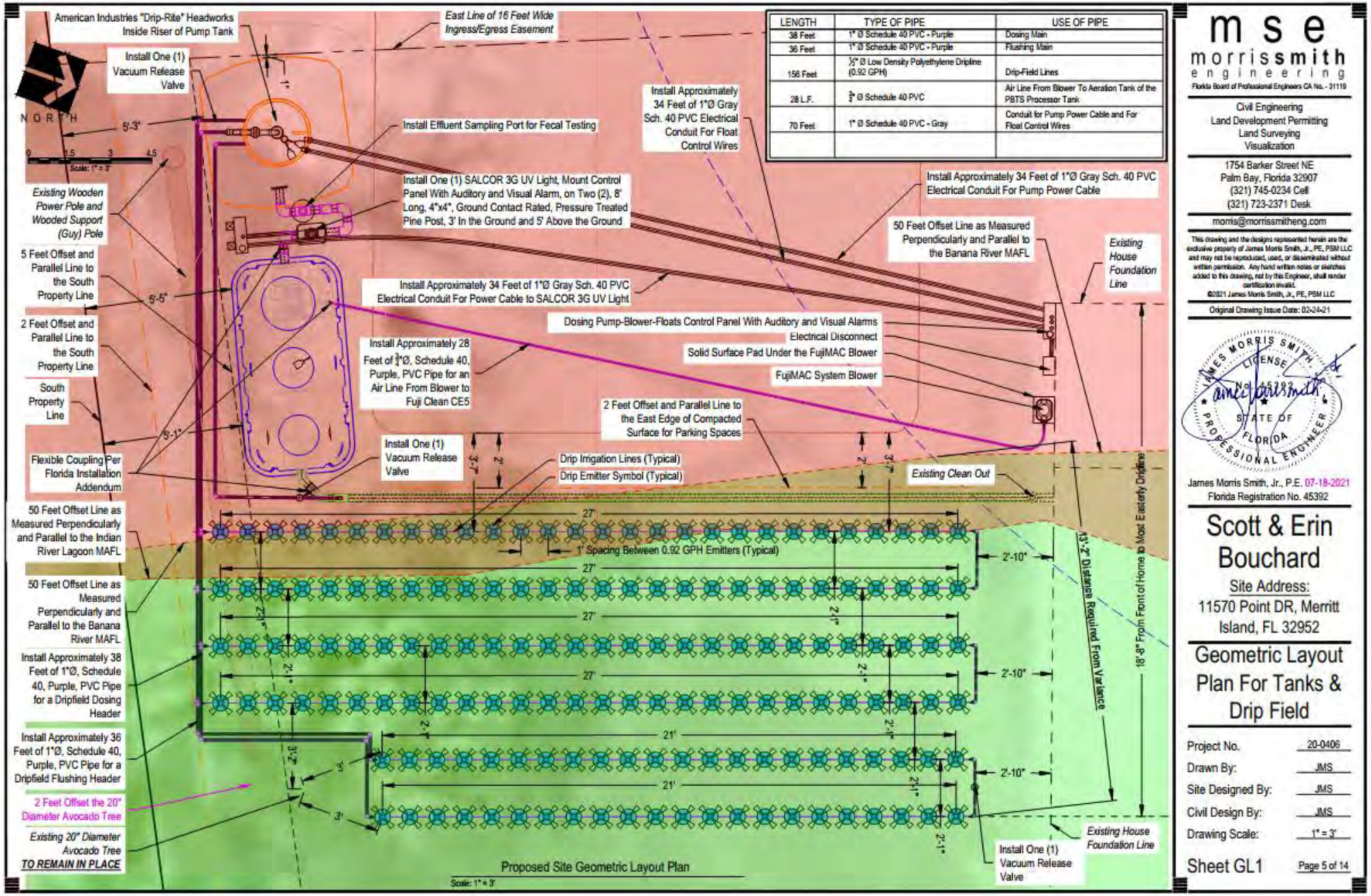
Scott & Erin Bouchard

Site Address:
11570 Point DR, Merritt Island, FL 32952

Proposed Site Plan

Project No.	21-0202
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" = 5'

Sheet LP1 Page 4 of 14



LENGTH	TYPE OF PIPE	USE OF PIPE
38 Feet	1" Ø Schedule 40 PVC - Purple	Dosing Main
36 Feet	1" Ø Schedule 40 PVC - Purple	Flushing Main
156 Feet	½" Ø Low Density Polyethylene Dripline (0.92 GPH)	Drip-Field Lines
28 L.F.	¾" Ø Schedule 40 PVC	Air Line From Blower To Aeration Tank of the PBTS Processor Tank
70 Feet	1" Ø Schedule 40 PVC - Gray	Conduit for Pump Power Cable and For Float Control Wires

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Original Drawing Issue Date: 02-24-21

JAMES MORRIS SMITH LICENSE No. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER

James Morris Smith, Jr., P.E. 07-18-2021
Florida Registration No. 45392

Scott & Erin Bouchard

Site Address:
11570 Point DR, Merritt Island, FL 32952

Geometric Layout Plan For Tanks & Drip Field

Project No.	20-0406
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" = 3'

Sheet GL1 Page 5 of 14

New Single-family Homes On The River Inside The Federal Emergency Management Agency (FEMA) FEMA Flood Insurance Rate Map (FIRM) Flood

Allow For Elevating All Of The Components For The PBTS And DSI To Live At Least 1 Foot Above The Published Flood Map Elevation.

GENERAL NOTES FOR PBTS:

1. All construction and system components shall conform to the latest edition of F.A.C.; Chapter 64E-6 and the approved plans, specifications and permit issued for this project.
2. All components shall adhere to the following setbacks; the System 50' from a non-potable well & surface waters; 75' from a private potable well; 100' from a non-community well; 200' from a public water well; Tanks 5' from buildings & Drip Lines 2' from property lines and compacted surfaces. Keep 10' from storm sewers and water lines.
3. Boundary, topographic & existing utilities information indicated on these drawings are per field data supplied by AAL Land Surveying Services Inc., Project No. 39252, AutoCAD File Named 39252.dwg. It is solely the contractor's responsibility to verify the location of all utilities and protect same from damage during the construction phase. Damage to existing utilities shall be repaired to the owner's satisfaction at the contractor's expense.
4. This is a specific purpose drawing set, for the permitting and the construction of a Performance Based Onsite Sewage Treatment and Wastewater Disposal System (OSTDS.) The engineer certifies these drawings ONLY for the construction of the PBTS + OSTDS and for no other permitting and construction uses.
5. Contractor shall verify all dimensions and setbacks prior to starting construction.
6. The contractor is responsible for disposal of wastewater during any system(s) down-time and until the new system has been cleared for use & placed on-line.
7. All areas disturbed by the contractor shall be sodded unless specified otherwise on the drawings.
8. When a sewer or forcemain crosses a water main or storm sewer there shall be a minimum vertical separation of 24 inches between the outsides of the pipes. If separation cannot be achieved the sewer or forcemain shall be encased in a 20' long PVC sleeve centered at the point of the crossing.
9. When a sewer or forcemain parallels a water main or storm sewer there shall be a minimum or 10' horizontal separation between the outsides of the pipes. If separation cannot be achieved the sewer or forcemain shall be encased in a watertight-sealed PVC sleeve to 10' past the water main or storm sewer. Sewer/forcemain joints and pipe casing joints shall be staggered. Note the Florida Department of Health does not consider any type of expanding Polyurethane based foam as a waterproofing material.
10. These Drawings are for the Construction of a Fuji Clean Performance Based Treatment System with SDI (Drip Design Only.)
11. The Undersigned Florida Licensed Professional Engineer Makes No Guarantees or Representations Regarding Information Shown Herein Pertaining to Easements, Rights-of-Ways, Setback Lines, Agreements, Reservations and Other Similar Matters.
12. The Land Surveying Details of the Proposed Site Plan Shown Herein, were Developed/Provided by Others.
13. Existing and Proposed Elevations and Improvements (if any) Were Obtained from Information Provided by Others.
14. Contractor & Property Owner Should Ensure that the Power Source is of Appropriate Voltage/Amperage for the Pumps & Blower.
15. Install Local Electrical Quick-Disconnect Adjacent to the Pump control Panel.
16. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for System Function if Actual Sewage Flow Exceeds the Design Flow or if the Flow is not Sufficient to Maintain Proper PBTS Function/Health.
17. System Size Based on Requirements Set Forth in the Most Recent, Codified, Version of Florida Administrative Code (FAC) 64E-6.
18. Design Waste Flow Based on Building Use Information Provided by Property Owner/Contractor at Time of Design, Prior to Permitting, Construction and/or Occupancy.
19. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for System Function or Performance Issues Related to Temperature, Effluent Toxicity, Ph, Lack of Proper System Operation and/or Maintenance or Disregard of Commonly Accepted Good Practices for Treatment of Septic Systems by Owners/Tenants.
20. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for Ponding or Saturation in Drip/field Resulting from Over Irrigating of the Lawn and/or Landscaping. No Irrigation Spray Heads Should be Set to Cover Area(s) of Drip/field(s).

GENERAL NOTES FOR PBTS (Continued):

21. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for System Function or Performance if a Water Softener is Installed in the Structure Which Discharges Into the Gravity Sewer Service Line of the Structure.
22. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for System Function or Performance if the PBTS is not Pumped Every 3-5 Years or as Determined Necessary by the Maintenance Entity.
23. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for System Function or Performance Issues Related to Errors Made by the Florida Licensed Installer During Installation Such as But Not Limited to:
    a. Failure to Completely Follow These Design Specifications.
    b. Installer/Maintenance Entity Does Not Follow Manufacturers Installation Recommendations.
    c. Installer/Maintenance Entity Does Not Follow Manufacturers Maintenance Recommendations.
    d. System Not Properly Started-Up and/or
    e. Dosing Program Timing is Not Set to Submitted Design Specifications.
24. The Undersigned Florida Licensed Professional Engineer Assumes No Liability for the Function/Performance of the Drip/field if Maintenance Entity Technician Does Not Write Down (Record) Flow Totalizer Readings Which Represent the Actual Effluent Disposal Flow to Designer/Engineer During Routine Maintenance. This Information is Required to Ensure that the Appropriate Number of Doses per Day are Occurring.
25. No Liability will be Assumed in Any Way if the Undersigned Florida Licensed Professional Engineer is not Notified of System Installation in Order to Conduct a Final Inspection to Ensure that the Installation Meets the Submitted Design Specifications.
26. This System Must be Installed by a Reputable, Florida Licensed, Septic System Installation Contractor, Trained and Approved by Fuji Clean and Experienced in the Proper Installation of this Type/Size of System.
27. The Maintenance Entity Selected by the Owner, After the First two (2) Years of Operation, Must be Approved by Fuji Clean and the Florida DOH.

SPECIFICATIONS FOR PVC PIPE USED FOR DOSING AND FLUSHING MAINS:

ALL SCH. 40 PVC PIPE TO BE USED FOR THE DOSING MAIN, DOSING HEADER, FLUSHING MAIN AND FLUSHING HEADER SHALL MEET OR EXCEED ASTM D2672 AND ASTM D1785-06, BELL END, SOLVENT WELD, POLY VINYL CHLORIDE (PVC) PIPE.

ALL PIPES TO BE PURPLE (VIOLET) IN COLOR FROM MANUFACTURER OR PAINTED IN FIELD TO PREVENT POSSIBLE FUTURE CONFUSION WITH IRRIGATION PIPING IN THE YARD.

PROJECT SPECIFIC NOTES:

1. System designed to treat a peak flow of 400 gallons per day (gpd), calculated from Table 1 - 64E-6.
2. Drip/field sized for peak daily loading of 0.80 gpd/sq.ft. 64E-6 for Trench in Sandy Soils.
3. All gravity sewer laterals to the FujiClean CEN5 Unit and to the Pump Tank shall be designed and constructed watertight in accordance with state and local codes. Use new 4"Ø, ASTM-D2729, PVC gravity sewer pipe with correct fittings for all gravity sewer lines. The gravity sewer lateral and the interconnection of the Fuji Clean CEN5 unit will be made with FERNCO Flexible Couplings.
4. The onsite wastewater system is based upon a site evaluation performed by Mr. Skylar Senti ESR . If conditions are encountered during construction differing from those used for design, contractor shall cease work and immediately notify the local authority in writing.
5. Before the start of any construction at the site, the following must be staked out and protected from alteration or compaction, the location of the disposal/reuse drip/field and the location of the on-obstructed area.
6. A permit from the Brevard County Health Department must be obtained prior to the start of construction.
7. The Brevard County Health Department shall be notified prior to the start of construction.
8. The disposal (drip) field must not be constructed during periods when the soil is sufficiently wet, at the surface or at the depth of installation, to exceed its plastic limit. Construction of the disposal/reuse drip/field shall not occur until soil conditions are acceptable as determined by the Brevard County Health Department.
9. If a surface diversion is required it runoff from an adjoining upslope landscape affects the disposal/reuse site. Surface diversions must have a positive grade of at least two and four-tenths (2.4) inches per one hundred (100) feet, a grade of 0.24%. The surface diversion must be of sufficient depth and width to move surface water away from the disposal/reuse field.
10. Effluent pump tank is a separate Infiltrator Model IW540 Polypropylene Pump Tank With a Single Pump and Pump Control Floats
11. The dosing pump in the Pump Tank shall produce at least 16.5 gpm at 107.5 ft. TDH. Based a dosing time of for each pump of 6 minutes every hour to produce 17.2 gallons per hour, 24 doses per day. The cumulative pumped volume which will provide a total of 413 gallons per day of filtered effluent disposal.
12. The proposed residence shall receive water for potable water from a Well located onsite.
13. Contractor shall verify building sewer inverts and adjust gravity laterals accordingly. Adjust the FujiClean CEN5 Unit PBTS inverts to be as shallow as possible based on field verification.
14. Site vegetative cover over drip/field and around the tanks can be ornamental shrubs/grasses around (to shield) the system components. NO TREES are allowed in the drip field. See list of suggested plants on details sheet.

LEGAL DESCRIPTION:

Beginning at an iron pipe on the East boundary of U.S. Highway No. 1, said point being 355 feet Southeasterly from the North line of Section 23, Township 30 South, Range 38 East, measured along said U.S. Highway No. 1, thence continue along the East line of said highway a distance of 196.2 feet, thence go on a line running from said point thru a point on the Section line between Sections 23 and 24, said Township and Range that is North 159.2 feet from the South line of San Sebastian Plat No. 1 to and into the Indian River, thence Northwesterly along the Indian River to a point that is North 71° 15 ½' East from Point of Beginning (being at right angles to U.S. Highway No. 1; thence South 71° 15 ½' West to Point of Beginning. Being a Part of Tracts B and D of San Sebastian Plat No. 1 as recorded in Plat Book 8, page 15, Public Records of Brevard County, Florida.

Parcel Identification Number: 30-38-23-HH-00008.0-0004.00

ACCORDING TO F.I.R.M. #12009C 0801 G, DATED MARCH 17, 2014, THIS PROPERTY IS LOCATED WITHIN FLOOD ZONES X &AE. BASE FLOOD ELEVATION 4.7 ABOVE SEA LEVEL

PROPOSED PROJECT INFORMATION:

LOT USABLE AREA = 25,264 Square Feet Lot Area = 0.58 Acres
Gallons Per Day of Allowable Flow = 0.58 Acres x 1,500 = 870 GPD

Proposed Two (2) Story Single Family Residence - 2nd Floor Living area 1,878 square feet (under air conditioned space) PLUS 745 Sq.Ft. of 1st Floor Storage. Total Square Feet for Residence = 1,878 + 745 = 2,623 Square Feet. 3 Bedrooms is Sized for 450 GPD.

Site has and Available 870 GPD for use in this project.

Based upon FAC 64E-6 Table 1 - 2,251 to 2,300 square feet building area = 450 Gallons Per Day

The FujiClean CEN5 Model is Rated for = 590 Gallons per Day
The FujiClean CEN5 Model has a Total Volume of = 749 Gallons
The Infiltrator Model IW540, as a Pump Tank, has a Total Volume of = 552 Gallons
Total Volume PROVIDED for System = 1,301 Gallons

The proposed PBTS is designed to meet Advanced Secondary Treatment Standards for cBOD5, ≤10mg/L and TSS ≤10mg/L. Drainfield reduction taken is 40%. Infiltrative surface area reductions shall be allowed for systems designed to reduce the wastewater strength of the effluent where the drainfield is sized based on slightly limited soils. System drip/field designed on trench standards in slightly-limited soils. No increase in lot flow or reductions to soil-backs are required.

Required Drainfield = 500 Sq.Ft.
40% Reduction Allowed = 500 x .6 = 300 Sq.Ft.

Unobstructed Area required = (1.5 x 300) - 300 = 150 Sq.Ft.
Unobstructed Area Provided = >150 Sq.Ft.

Subsurface Drip Irrigation tubing required = 150 feet

Subsurface Drip Irrigation tubing provided = 150 feet

Drip tubes are equal to or greater than 2 feet from the compacted surfaces, the property lines and are greater than 24 inches above the wet season water table.

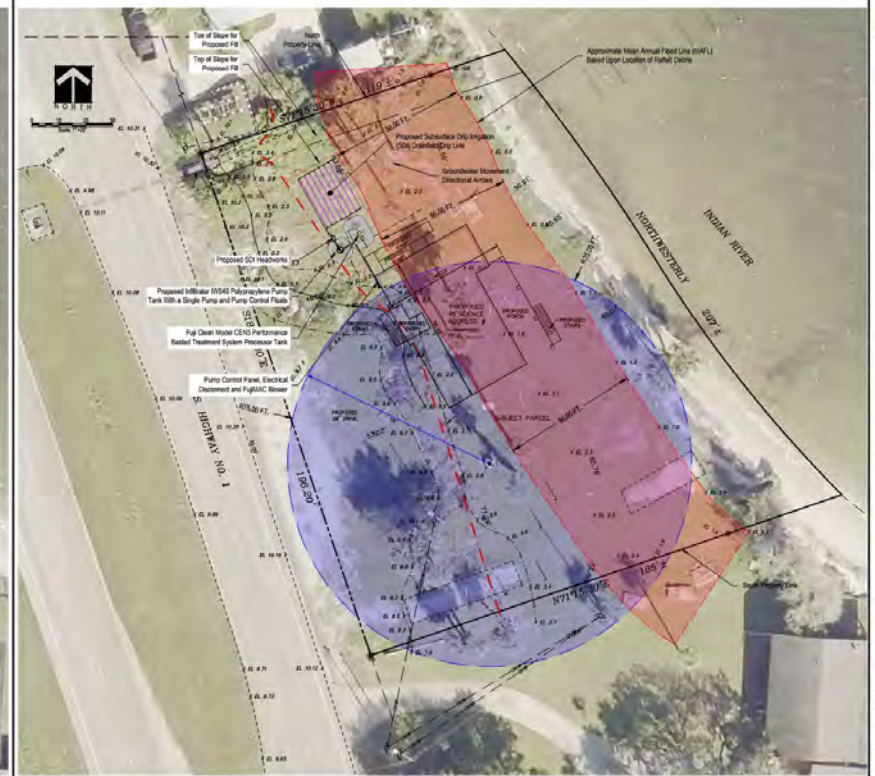
Monitoring for Drip Field Ponding will be on a quarterly basis by a certified FujiClean maintenance entity.

The drip field is designed to use pressure compensating drip emitters. The drip field's slope will be away from the house foundation, not exceeding 18 inches vertical drop.

Existing Conditions of Project Site

Aerial Photograph Provided By the Brevard County Property Appraiser's GIS Department

Existing Topographic Survey Data Provided to Engineer of Record by AAL Land Surveying Services Inc., Project No. 39252



Proposed Site Plan

mse morrissmith engineering
Civil Engineering
Land Development Permitting
Land Surveying
Visualization
1754 Barker Street NE
Palm Bay, Florida 32907
(321) 745-0234 Cell
(321) 723-2371 Desk
morris@morrissmitheng.com

Original Drawing Issue Date: 01-11-2023

REVISIONS:

No.	Date	By	Description
1	06-20-2023	JMS	Added 3rd Square Foot of Reserve Area. NOT Connected to the Drainfield
2	07-21-2023	JMS	Infill Total 3 Square Feet of Proposed Residence for Bldg (3 DOTS)
3		JMS	Added Additional 2nd Square Foot of Storage Area - Total 2,623 Under Air

In Association With:

ASAP SANITY SEPTIC & SEWER
4630 Lipscomb St - Suite A-1
Palm Bay, FL 32905
(321) 745-0111

Michael G. & Meagan G. Seay

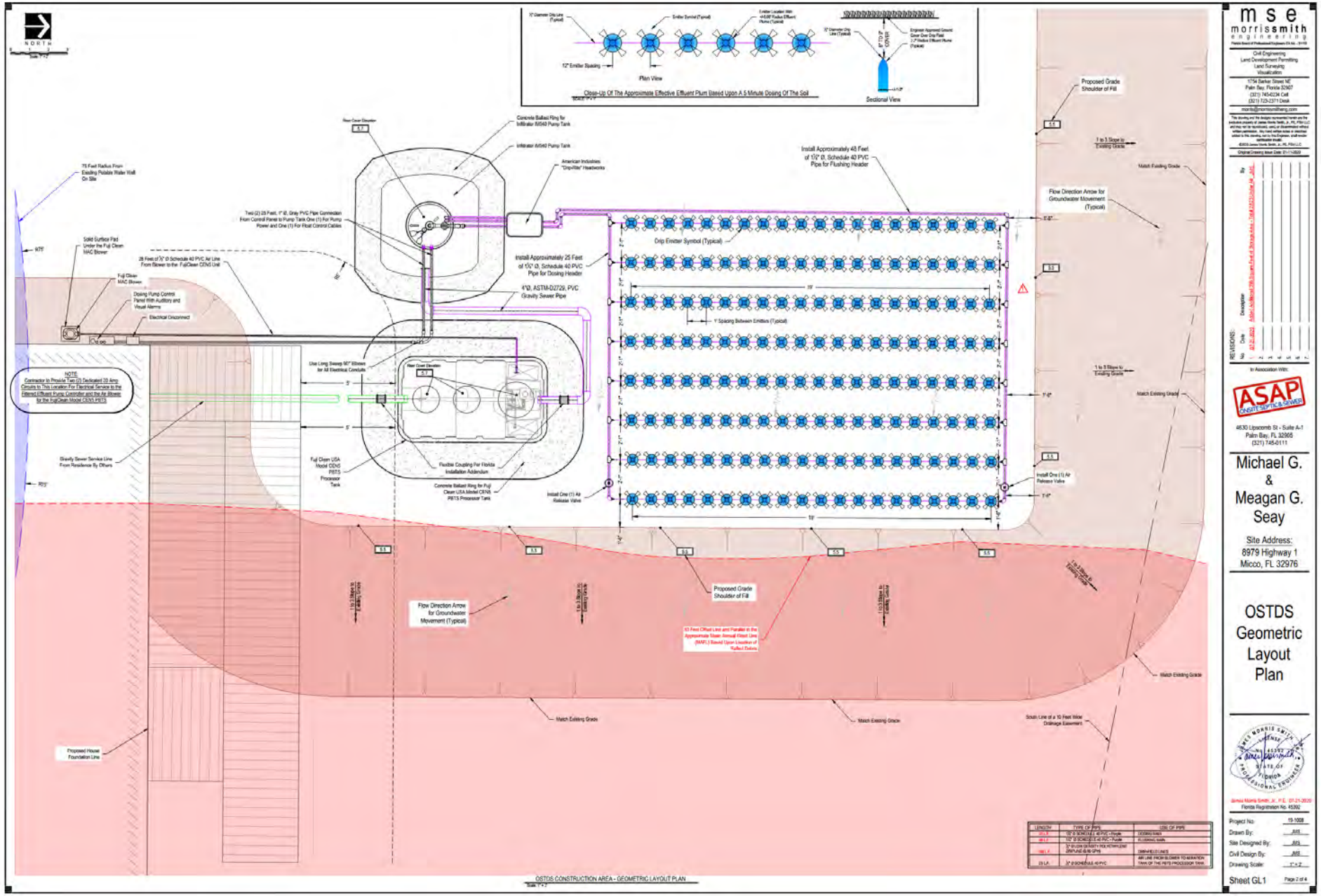
Site Address:
8979 Highway 1
Micco, FL 32976

Existing Conditions Proposed Site Plan

JAMES MORRIS SMITH, JR. No. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER

James Morris Smith, Jr., P.E. 01-21-2025
Florida Registration No. 45392

Project No.	19-1008
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	See Exhibits
Sheet EC1	Page 1 of 4


Close-Up Of The Approximate Effective Effluent Plum Based Upon A 5 Minute Dosing Of The Soil
Plan View
Sectional View
Proposed Grade Shoulder of Fill
Flow Direction Arrow for Groundwater Movement (Typical)
Install Approximately 48 Feet of 1½" Ø, Schedule 40 PVC Pipe for Flushing Header
Drip Emitter Symbol (Typical)
Install Approximately 25 Feet of 1½" Ø, Schedule 40 PVC Pipe for Dosing Header
4"Ø, ASTM-D2729, PVC Gravity Sewer Pipe
Concrete Ballast Ring for Infiltrator IM540 Pump Tank
Infiltrator IM540 Pump Tank
American Industries "Drip-Rite" Headworks
Two (2) 25 Feet, 1" Ø, Gray PVC Pipe Connection From Control Panel to Pump Tank One (1) For Pump Power and One (1) For Float Control Cables
75 Feet Radius From Existing Potable Water Well On Site
Solid Surface Pad Under the Fuji Clean MAC Blower
Fuji Clean MAC Blower
Dosing Pump Control Panel With Auditory and Visual Alarms
Electrical Disconnect
Use Long Sweep 90° Elbows for All Electrical Conduits
Fuji Clean USA Model CENS PBTS Processor Tank
Flexible Coupling Per Florida Installation Addendum
Concrete Ballast Ring for Fuji Clean USA Model CENS PBTS Processor Tank
Install One (1) Air Release Valve
Gravity Sewer Service Line From Residence By Others
Proposed House Foundation Line
Match Existing Grade
South Line of a 10 Feet Wide Drainage Easement
OSTDS CONSTRUCTION AREA - GEOMETRIC LAYOUT PLAN
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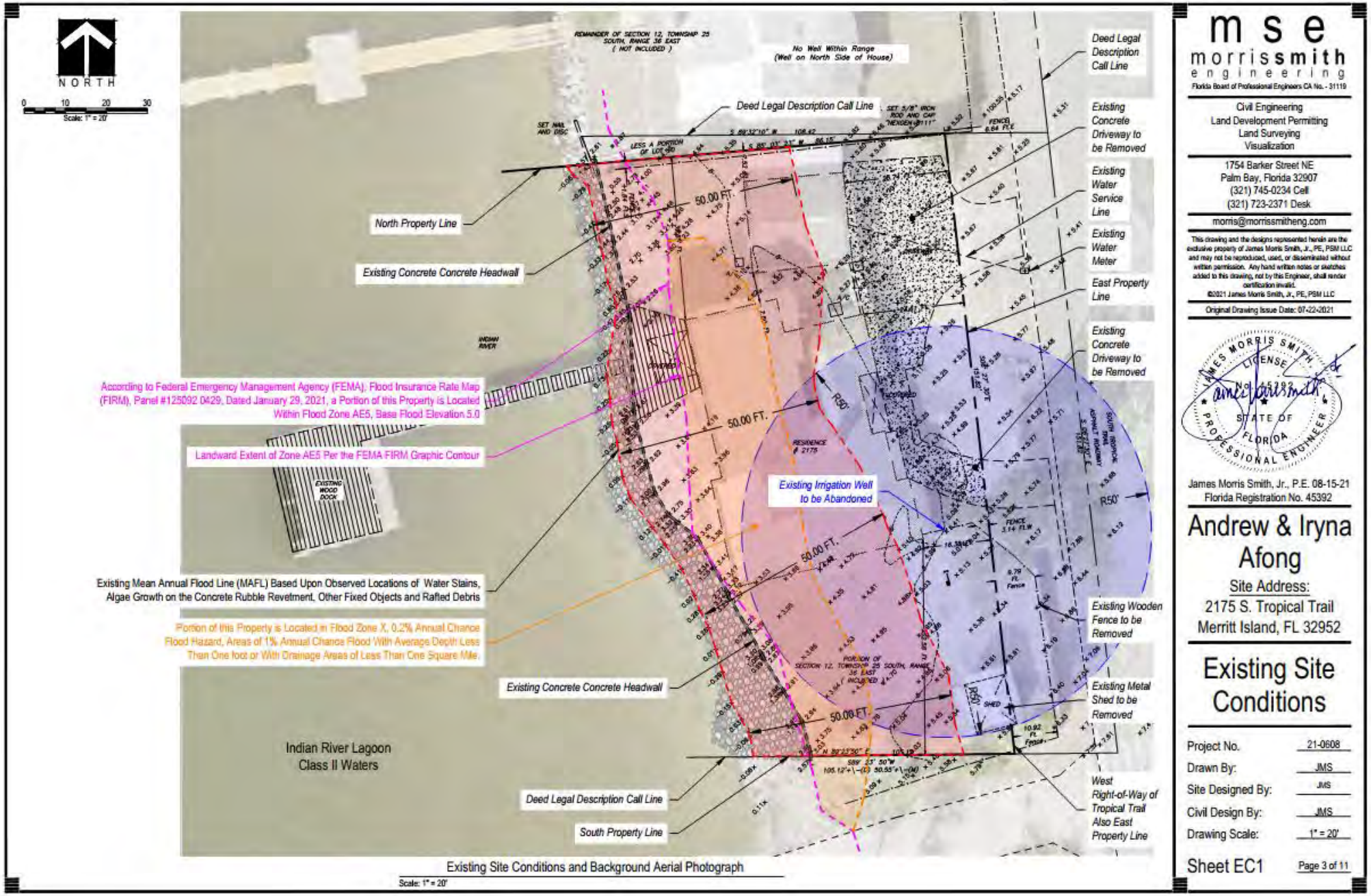
Civil Engineering
Land Development Permitting
Land Surveying
Visualization
1754 Barker Street NE
Palm Bay, Florida 32907
(321) 745-6234 Cell
(321) 723-2371 Desk
ASAP ONSITE SEPTIC & SEWER
4630 Lipscomb St - Suite A-1
Palm Bay, FL 32905
(321) 745-0111
Michael G. & Meagan G. Seay
Site Address:
8979 Highway 1
Micco, FL 32976
OSTDS Geometric Layout Plan
Project No: 19-1008
Drawn By: AMS
Site Designed By: AMS
Civil Design By: JMS
Drawing Scale: 1" = 2'
Sheet GL1
Page 2 of 4



Existing Site Conditions and Background Aerial Photograph

Scale: 1" = 20'

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morris@morrissmitheng.com

Original Drawing Issue Date: 07-22-2021

JAMES MORRIS SMITH LICENSE No. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER

James Morris Smith, Jr., P.E. 08-15-21
Florida Registration No. 45392

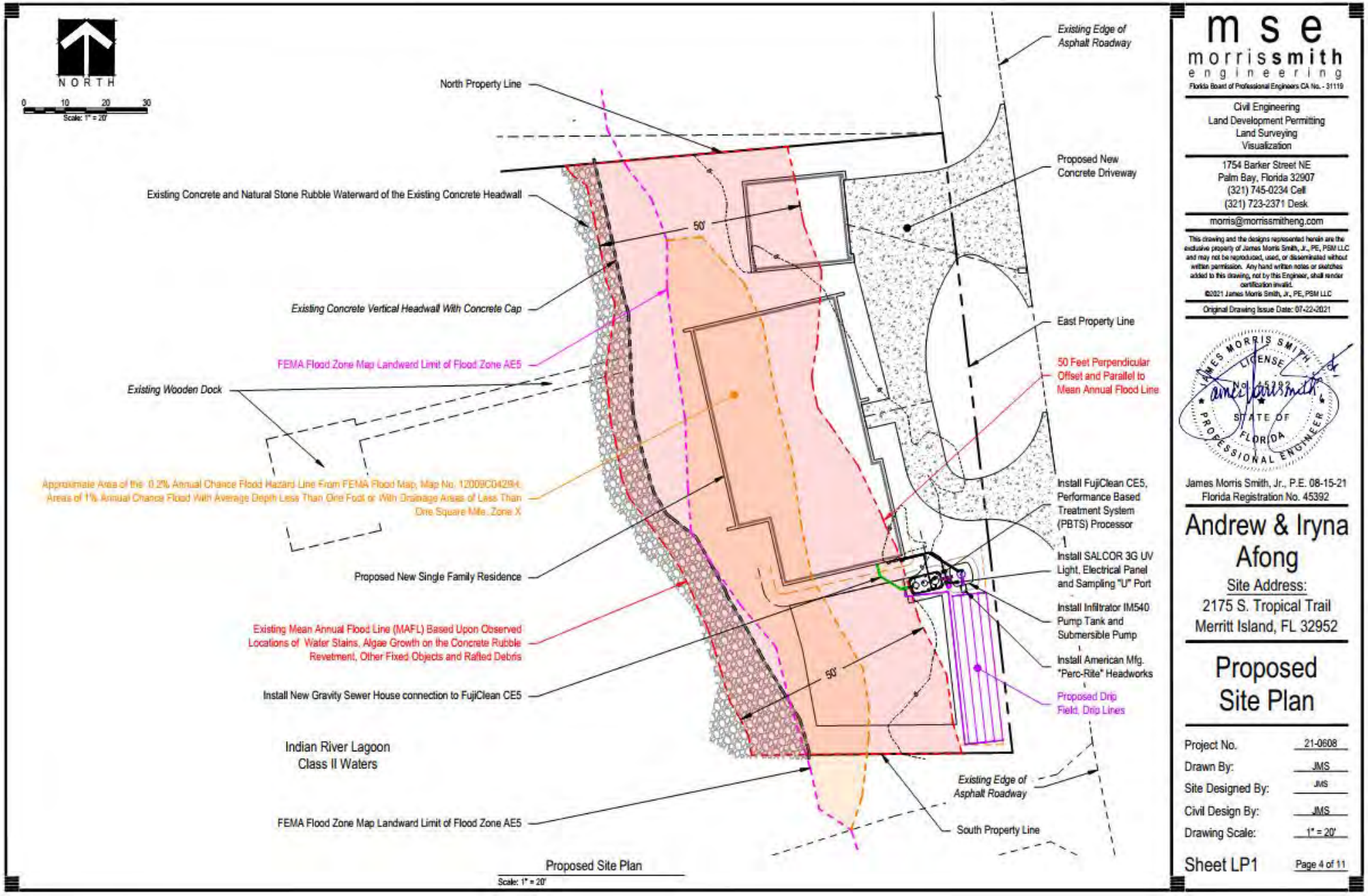
Andrew & Iryna Afong

Site Address:
2175 S. Tropical Trail
Merritt Island, FL 32952

Existing Site Conditions

Project No.	21-0608
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" = 20'

Sheet EC1 Page 3 of 11



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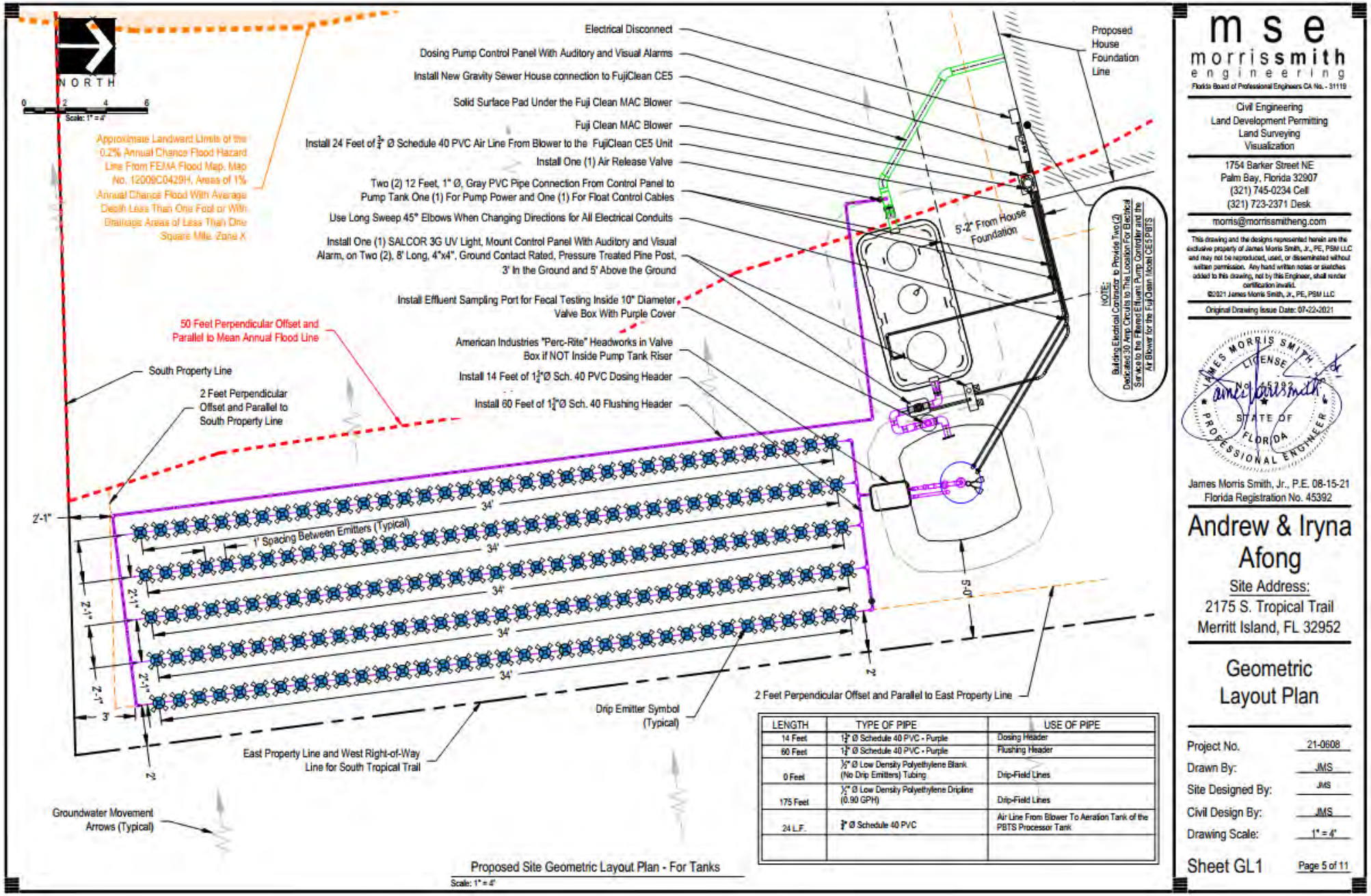
James Morris Smith, Jr., P.E. 08-15-21
Florida Registration No. 45392

Andrew & Iryna Afong

Site Address:
2175 S. Tropical Trail
Merritt Island, FL 32952

Proposed Site Plan

Project No.	21-0608
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" = 20'
Sheet LP1	Page 4 of 11



LENGTH	TYPE OF PIPE	USE OF PIPE
14 Feet	1½" Ø Schedule 40 PVC - Purple	Dosing Header
60 Feet	1½" Ø Schedule 40 PVC - Purple	Flushing Header
0 Feet	½" Ø Low Density Polyethylene Blank (No Drip Emitters) Tubing	Drip-Field Lines
175 Feet	½" Ø Low Density Polyethylene Dripline (0.90 GPH)	Drip-Field Lines
24 L.F.	¾" Ø Schedule 40 PVC	Air Line From Blower To Aeration Tank of the PBTS Processor Tank

Proposed Site Geometric Layout Plan - For Tanks

Scale: 1" = 4'

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Palm Bay, Florida 32907
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Original Drawing Issue Date: 07-22-2021

JAMES MORRIS SMITH LICENSE No. 45392 STATE OF FLORIDA PROFESSIONAL ENGINEER

James Morris Smith, Jr., P.E. 08-15-21
Florida Registration No. 45392

Andrew & Iryna Afong

Site Address:
2175 S. Tropical Trail
Merritt Island, FL 32952

Geometric Layout Plan

Project No.	21-0608
Drawn By:	JMS
Site Designed By:	JMS
Civil Design By:	JMS
Drawing Scale:	1" = 4'

Sheet GL1 Page 5 of 11

Eight Paradoxes of Creativity

- par·a·dox - noun
- a seemingly absurd or self-contradictory statement or proposition that when investigated or explained may prove to be well founded or true.
- From Michael Michalko, Author of the book Thinkertoys.
- To create, a person must
  - Have knowledge but forget the knowledge;
  - See unexpected connections in things but not have a mental disorder;
  - Work hard but spend time doing nothing;
  - Create many ideas yet most of them are useless;
  - Look at the same thing as everyone else, yet see something different;
  - Desire success but learn how to fail;
  - Be persistent but not stubborn; and,
  - Listen to experts but know how to disregard them.

fowa

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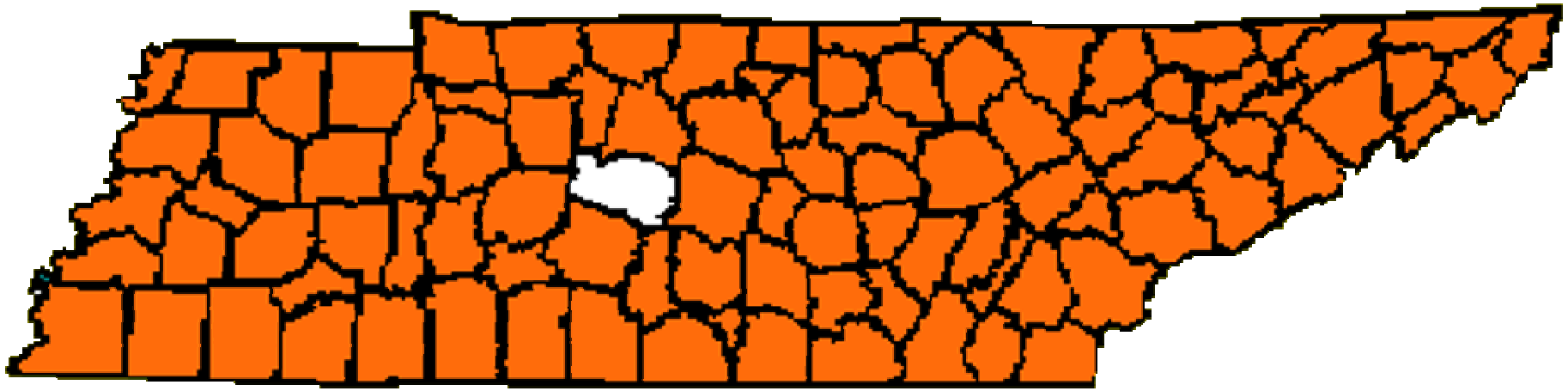
Thanks for Attending…

ENJOY YOUR DAY!!

Williamson County

Located in Middle TN; south of Nashville



Big Ideas…Little Tiny Space !!

Design & Install Challenges

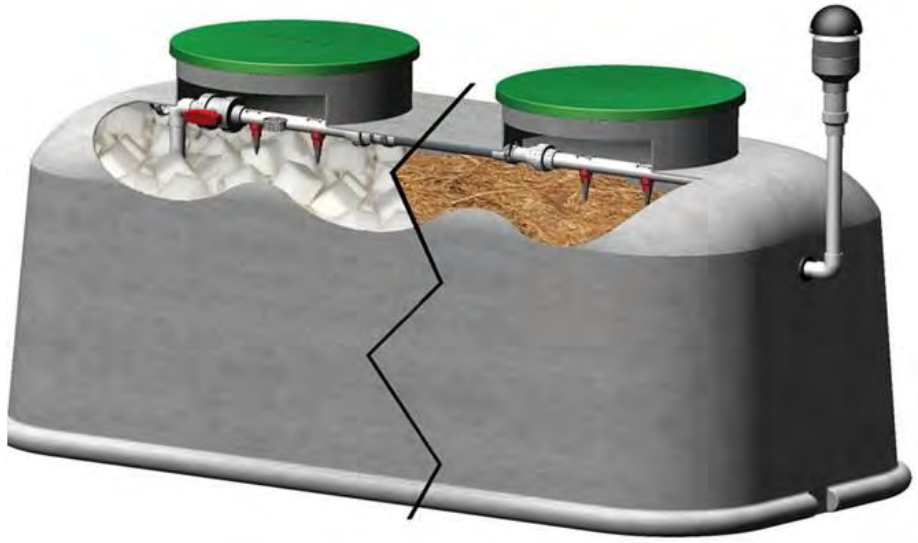
- Residential or Commercial
- A lot of our situations:
  - Un-permitted construction & renovations
  - Change of use (maybe now high strength)
- Non-compliant → Can't gain compliance
- No soil, bad soil or not enough soil
- Must think outside of the box

Examples….

Media Filter Pre-Treatment

(Clean up the wastewater prior to soil dispersal)

One technique used…

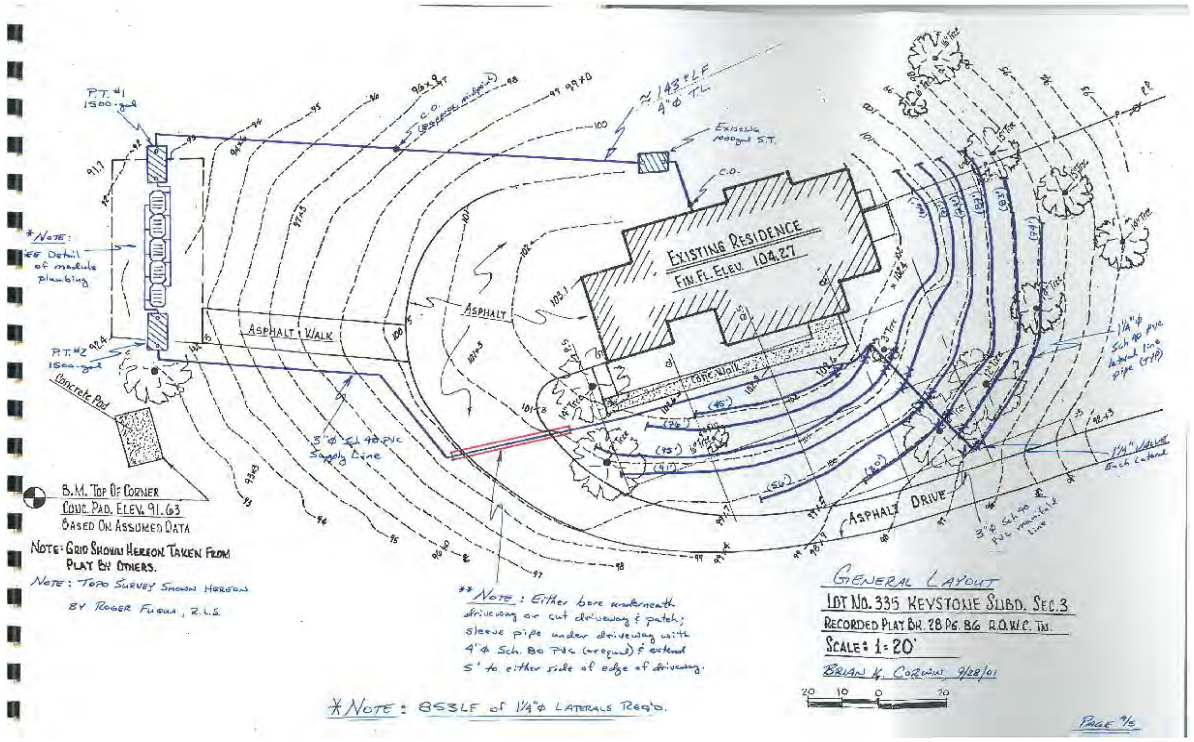


Experimental System Classification

Keystone Lot #335

(Peat with MLPP dispersal ~ 2004)

- 4-bdr & 60-gal
- 720-gpd
- 5 peat modules
- MLPP
  - 853-LF
  - 12” modification
  - 9,000-ft^2
- Soil
  - 16” silty fill
  - 75-mpi MWM



Keystone Lot #335

(Peat with MLPP dispersal ~ 2004)

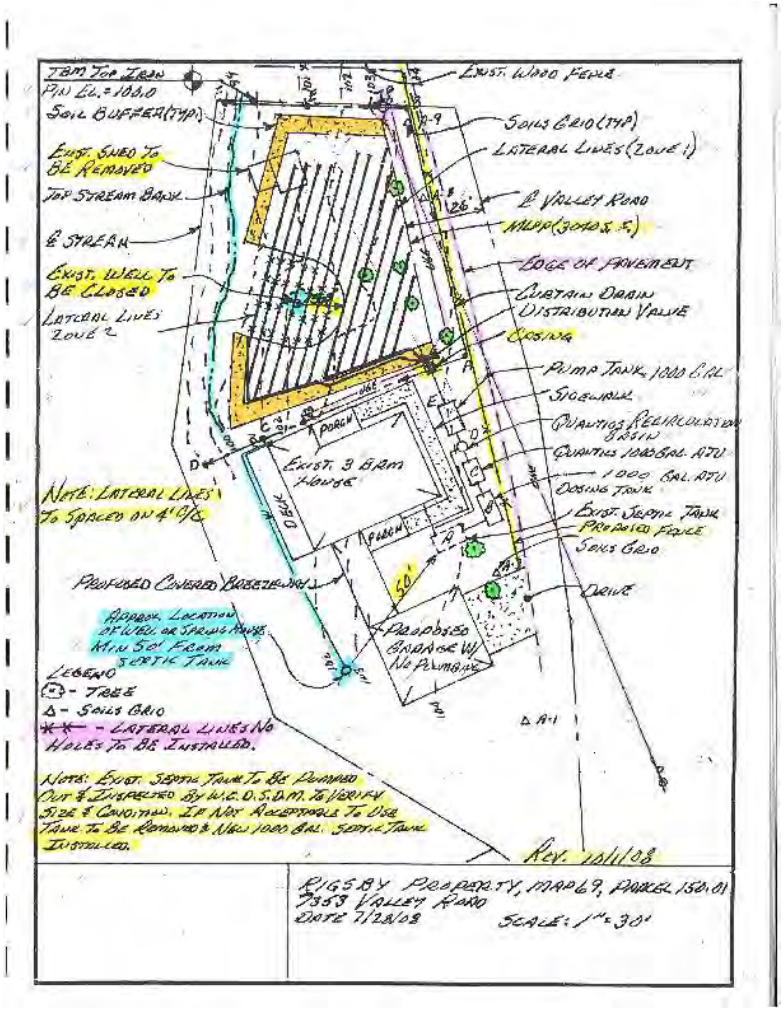
Keystone Lot #335

(Peat System ~ Final Landscaping)

Rigsby Residence

(Foam Media Filter with MLPP dispersal ~ 2012)

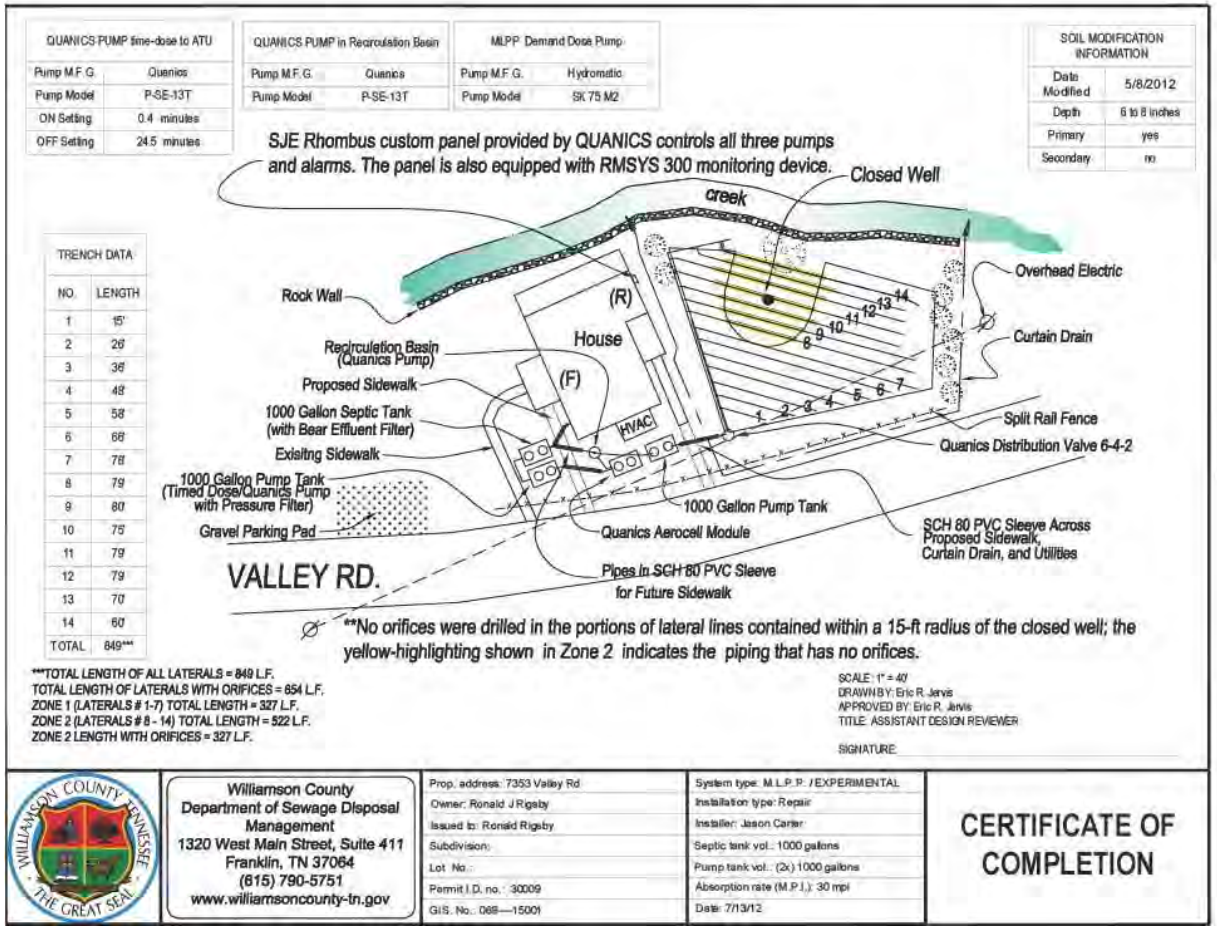
- 150-yr old clapboard church conversion
- 60% completed
- Without permits
- 0.6-ac lot
- Creek in rear
- Road in front
- Overhead utilities
- Well
- Sheds buildings
- Outhouse



Rigsby Residence

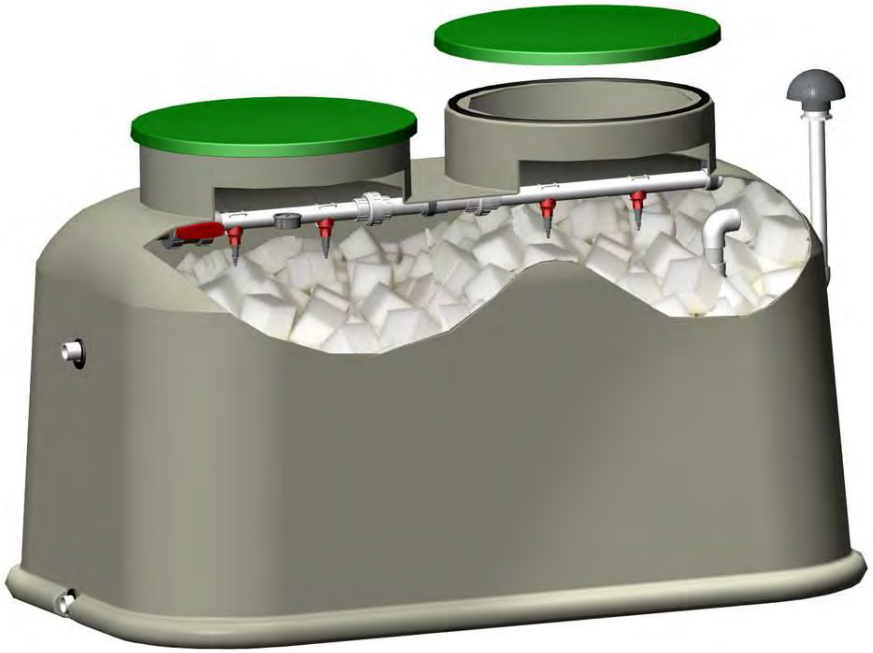
(Foam Media Filter with MLPP dispersal ~ 2012)

- 3-bedroom
- 450-gpd
- 1 foam modules
- 1,000-gal tanks (3)
- 2-zone MLPP
  - 327-LF ea
  - 654-LF total
  - 10” modification
- 3,040 sq-ft
- Loading rate
  - 30-mpi
  - 0.275-gpd/ft^2



Foam Media Filter

(Septic Tank Effluent Pre-treatment)



Rigsby Residence

(Foam Media Filter with MLPP Dispersal ~ 2012)

Rigsby Residence

(Foam Media Filter with MLPP Dispersal ~ 2012)

McColloch Residence

Un-Permitted Construction / Renovation

- Circa 1953
- 1,088 sq-ft
  - 2-bdr & 2-baths
- 0.26-acre
- No septic records
- Old ST & ~ 65-ft ± field line

McColloch Residence

Site & Soil Constraints

(Rear)

- Water main in front yard
- Roadside ditch
- Gravel driveway
- Overhead utilities
- Shed in rear
- Steep yard
- Rock & clay

McColloch Residence

Gutted to the Studs

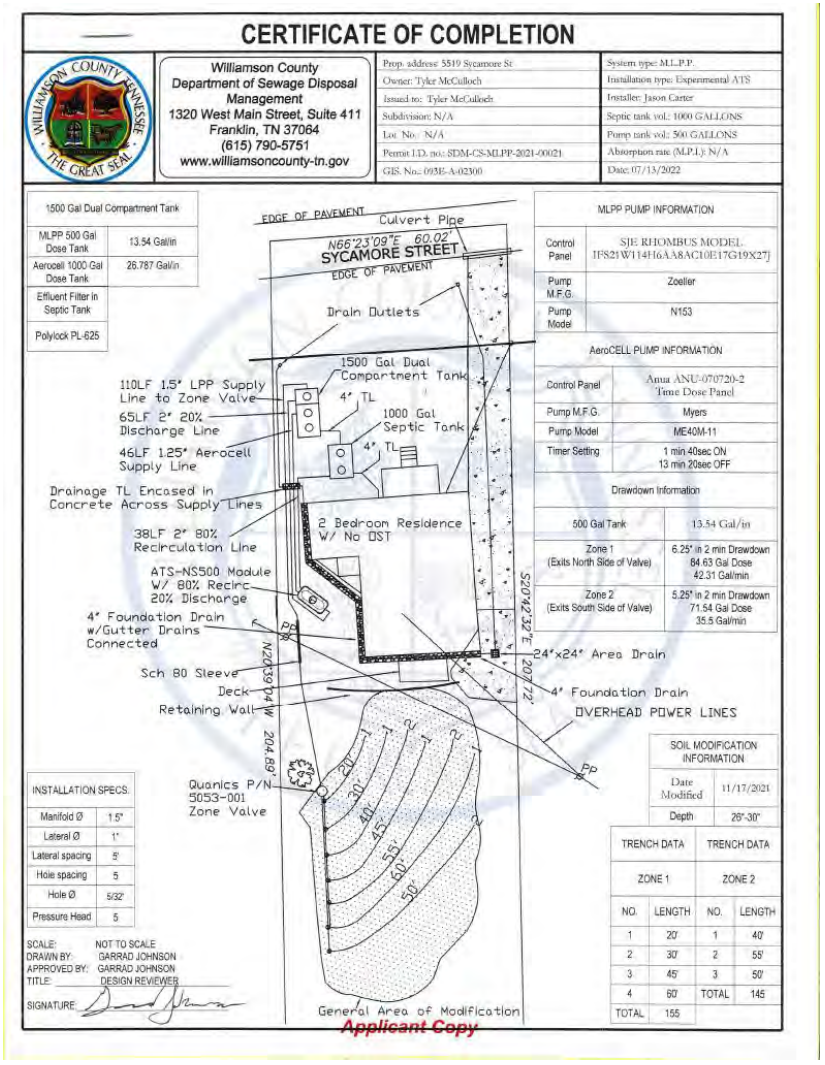
McColloch Residence

Replaced Floor Joists

(Down to dirt crawl space)

McColloch Residence

Foam Media Filter with MLPP Dispersal ~ 2022



CERTIFICATE OF COMPLETION

Williamson County
Department of Sewage Disposal Management
1320 West Main Street, Suite 411
Franklin, TN 37064
(615) 790-5751
www.williamsoncounty-tn.gov

Prop. address: 5519 Sycamore St	System type: M.L.P.P.
Owner: Tyler McCulloch	Installation type: Experimental ATS
Issued to: Tyler McCulloch	Installer: Jason Carter
Subdivision: N/A	Septic tank vol.: 1000 GALLONS
Lot No.: N/A	Pump tank vol.: 500 GALLONS
Permit I.D. no.: SDM-CS-MLPP-2021-00021	Absorption rate (M.P.I.): N/A
GIS. No.: 093E-A-02300	Date: 07/13/2022

1500 Gal Dual Compartment Tank	
MLPP 500 Gal Dose Tank	13.54 Gal/in
Aerocell 1000 Gal Dose Tank	26.787 Gal/in
Effluent Filter in Septic Tank	
Polylock PL-625	

MLPP PUMP INFORMATION

Control Panel	SJE RHOMBUS MODEL IFS21W114H6AA8AC10E17G19X27J
Pump M.F.G.	Zoeller
Pump Model	N153

AeroCELL PUMP INFORMATION

Control Panel	Anua ANU-070720-2 Time Dose Panel
Pump M.F.G.	Myers
Pump Model	ME40M-11
Timer Setting	1 min 40sec ON 13 min 20sec OFF

Drawdown Information

500 Gal Tank	13.54 Gal/in
Zone 1 (Exits North Side of Valve)	6.25" in 2 min Drawdown 84.63 Gal Dose 42.31 Gal/min
Zone 2 (Exits South Side of Valve)	5.25" in 2 min Drawdown 71.54 Gal Dose 35.5 Gal/min

SOIL MODIFICATION INFORMATION

Date Modified	11/17/2021
Depth	26"-30"

TRENCH DATA ZONE 1		TRENCH DATA ZONE 2	
NO.	LENGTH	NO.	LENGTH
1	20'	1	40'
2	30'	2	55'
3	45'	3	50'
4	60'	TOTAL	145
TOTAL	155		

INSTALLATION SPECS.	
Manifold Ø	1.5"
Lateral Ø	1"
Lateral spacing	5'
Hole spacing	5
Hole Ø	5/32"
Pressure Head	5

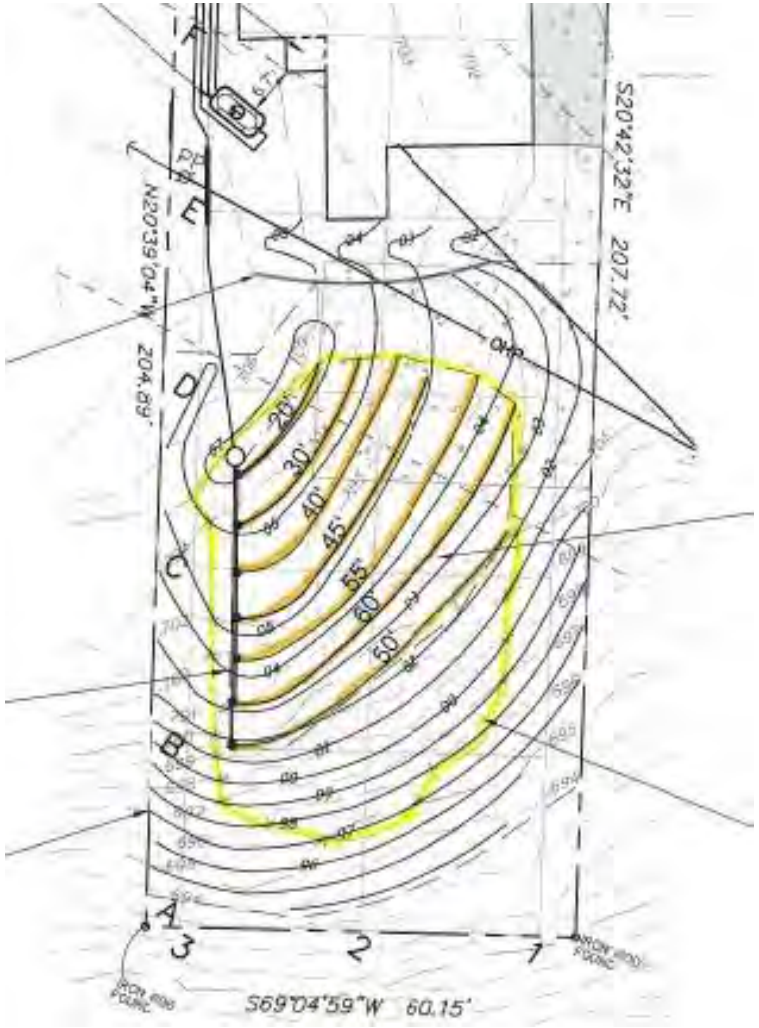
SCALE: NOT TO SCALE
DRAWN BY: GARRAD JOHNSON
APPROVED BY: GARRAD JOHNSON
TITLE: DESIGN REVIEWER
SIGNATURE:

EDGE OF PAVEMENT
Culvert Pipe
N66°23'09"E 60.02'
SYCAMORE STREET
EDGE OF PAVEMENT
Drain Outlets
1500 Gal Dual Compartment Tank
4" TL
1000 Gal Septic Tank
4" TL
110LF 1.5" LPP Supply Line to Zone Valve
65LF 2" 20% Discharge Line
46LF 1.25" Aerocell Supply Line
Drainage TL Encased in Concrete Across Supply Lines
2 Bedroom Residence W/ No DST
38LF 2" 80% Recirculation Line
ATS-NS500 Module W/ 80% Recirc 20% Discharge
4" Foundation Drain w/Gutter Drains Connected
Sch 80 Sleeve
Deck
Retaining Wall
S20°43'32"E 207.72'
N20°39'04"W 204.69'
24"x24" Area Drain
4" Foundation Drain
OVERHEAD POWER LINES
Quanics P/N 5053-001 Zone Valve
20' 30' 40' 45' 55' 60' 50'
General Area of Modification
Applicant Copy

- 2-bedroom
- 300-gpd
- 1 foam module
- 1,000-gal ST
- 1,500-gal dual PT
- 2-zone MLPP (1,585 sq-ft)
  - 155-LF & 145-LF ea
  - 300-LF total
  - 24”-36” modification soil
- 272-yd^3 of soil
- Loading rate
  - 0.19-gpd/ft^2

McColloch Residence

Soil Modification & Site Grading



- 24”-36” modification
- 272-yd^3 soil
- 6’ lifts
- Perimeter buffer
  - Slope to property lines
  - Large toe slope
- Alternating lateral zones — upslope

McColloch Residence

Soil Modification & Site Grading

(Erosion Control Mats)

McColloch Residence

Soil Modification & Site Grading

(Erosion Control Mats)

McColloch Residence

Soil Modification & Site Grading

(Erosion Control Mats)

McColloch Residence

Soil Modification & Site Grading

(Establish Grass Cover)

(Settle for 6 months)

McColloch Residence

Soil Modification & Site Grading

(Establish Grass Cover)

(Settle for 6 months)

McColloch Residence

MLPP Lateral Trenching

(Pressure Head Setting)

McColloch Residence

Final View of Lateral Field

(Lateral Streaks)

McColloch Residence

Retaining Wall & Foundation Drain

(Deck)

McColloch Residence

Foam Media Filter

(Gutter Drains)

Sidwell Residence

Un-Permitted Construction / Renovation

- Circa 1926
- 2,068 sq-ft
  - 3-bdr & 2½-baths
- 0.82-acre
- No septic records
- Old ST & unknown field line

Sidwell Residence

Un-Permitted Construction / Renovation

(Original structure)

(Garage on right)

Sidwell Residence

Un-Permitted Construction / Renovation

(Raised second floor)

Sidwell Residence

Un-Permitted Construction / Renovation

Stop Work Order

Sidwell Residence

Un-Permitted Construction / Renovation

(Raised second floor)

(Added 3rd doormer)

Sidwell Residence

Un-Permitted Construction / Renovation

(Added wrap around porch)

Sidwell Residence

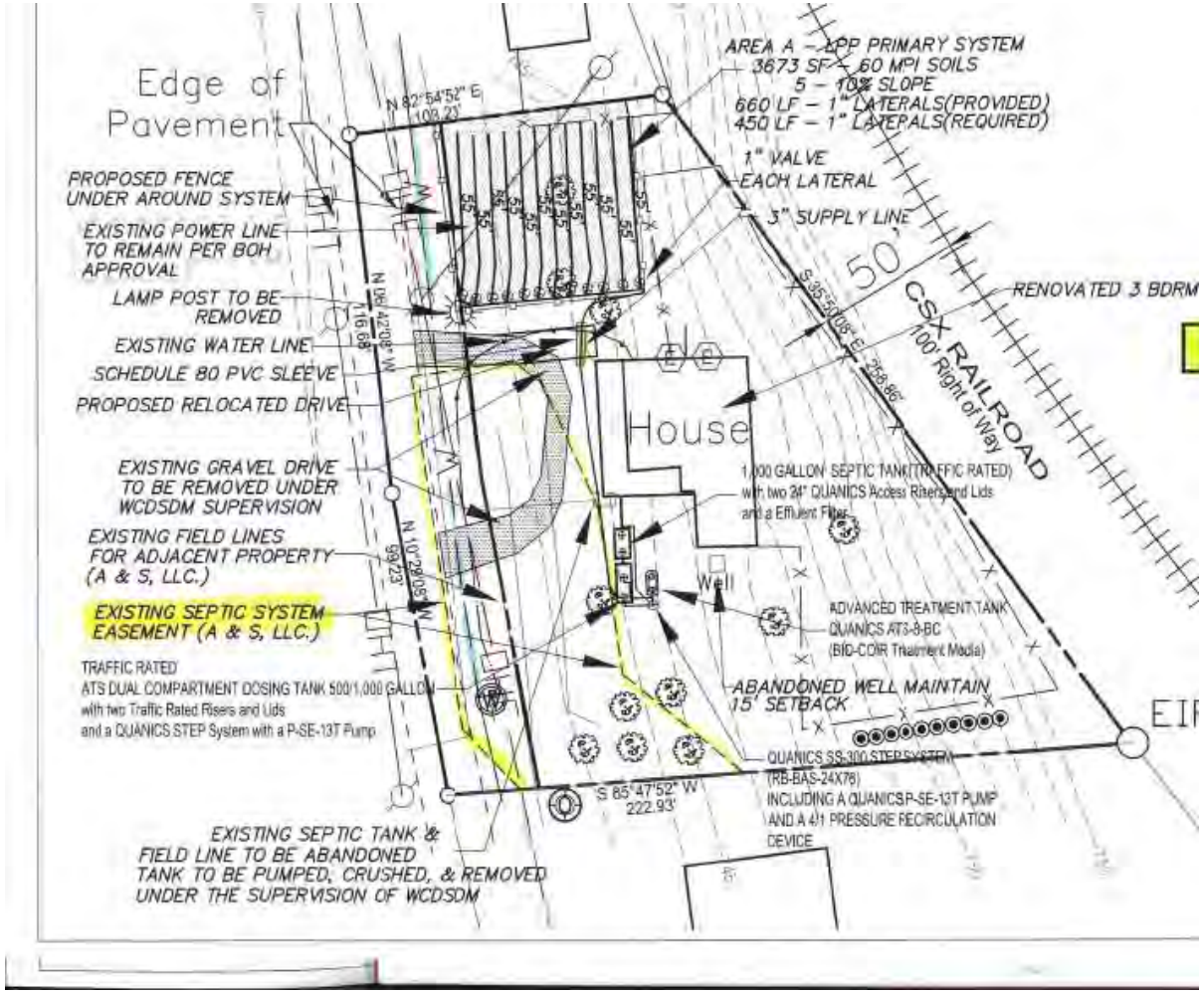
Un-Permitted Construction / Renovation

(Gutted to studs & raised 2nd floor)

(New internal stairs)

Sidwell Residence

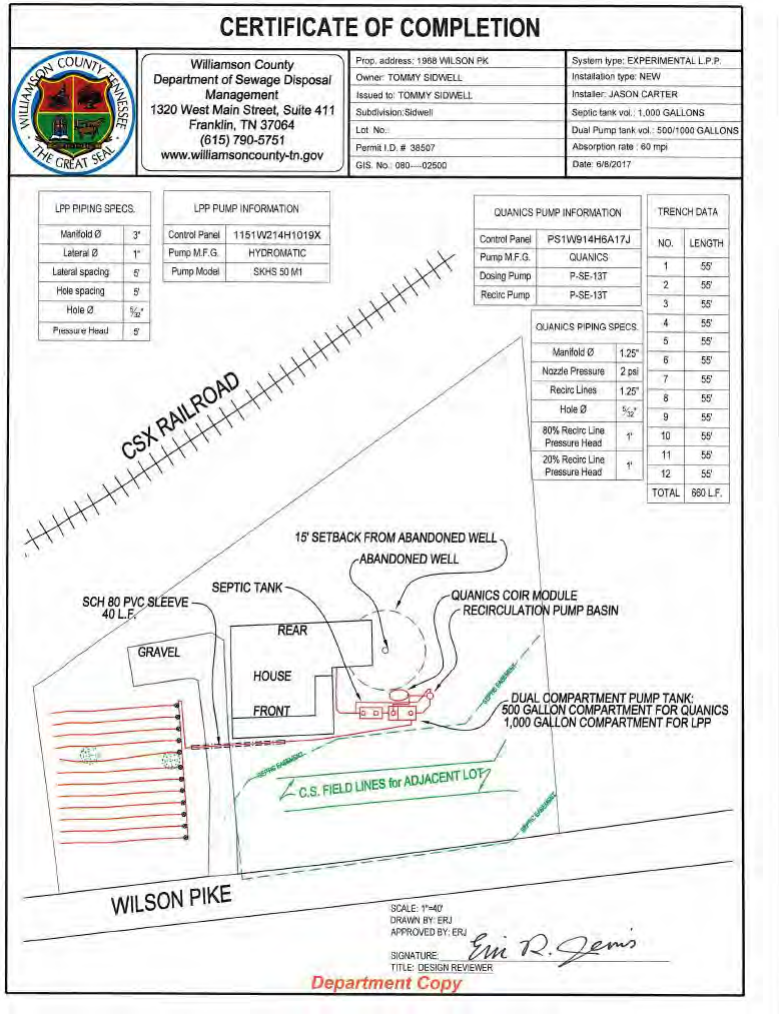
Site Constraints



- Railroad in rear
- Road ROW in front
- Septic easement
  - Entire front yard
  - Serves adjacent lot
- Rock & clay in rear
- Property lines
- OHE utilities
- Water line
- Driveway
- Well

Sidwell Residence

COIR Media Filter with MLPP Dispersal ~ 2017



CERTIFICATE OF COMPLETION

Williamson County
Department of Sewage Disposal Management
1320 West Main Street, Suite 411
Franklin, TN 37064
(615) 790-5751
www.williamsoncounty-tn.gov

Prop. address: 1968 WILSON PK	System type: EXPERIMENTAL L.P.P.
Owner: TOMMY SIDWELL	Installation type: NEW
Issued to: TOMMY SIDWELL	Installer: JASON CARTER
Subdivision: Sidwell	Septic tank vol.: 1,000 GALLONS
Lot No.:	Dual Pump tank vol.: 500/1000 GALLONS
Permit I.D. # 38507	Absorption rate : 60 mpi
GIS. No.: 080----02500	Date: 6/8/2017

LPP PIPING SPECS.	
Manifold Ø	3"
Lateral Ø	1"
Lateral spacing	5'
Hole spacing	5'
Hole Ø	5/32"
Pressure Head	5'

LPP PUMP INFORMATION	
Control Panel	1151W214H1019X
Pump M.F.G.	HYDROMATIC
Pump Model	SKHS 50 M1

QUANICS PUMP INFORMATION	
Control Panel	PS1W914H6A17J
Pump M.F.G.	QUANICS
Dosing Pump	P-SE-13T
Recirc Pump	P-SE-13T

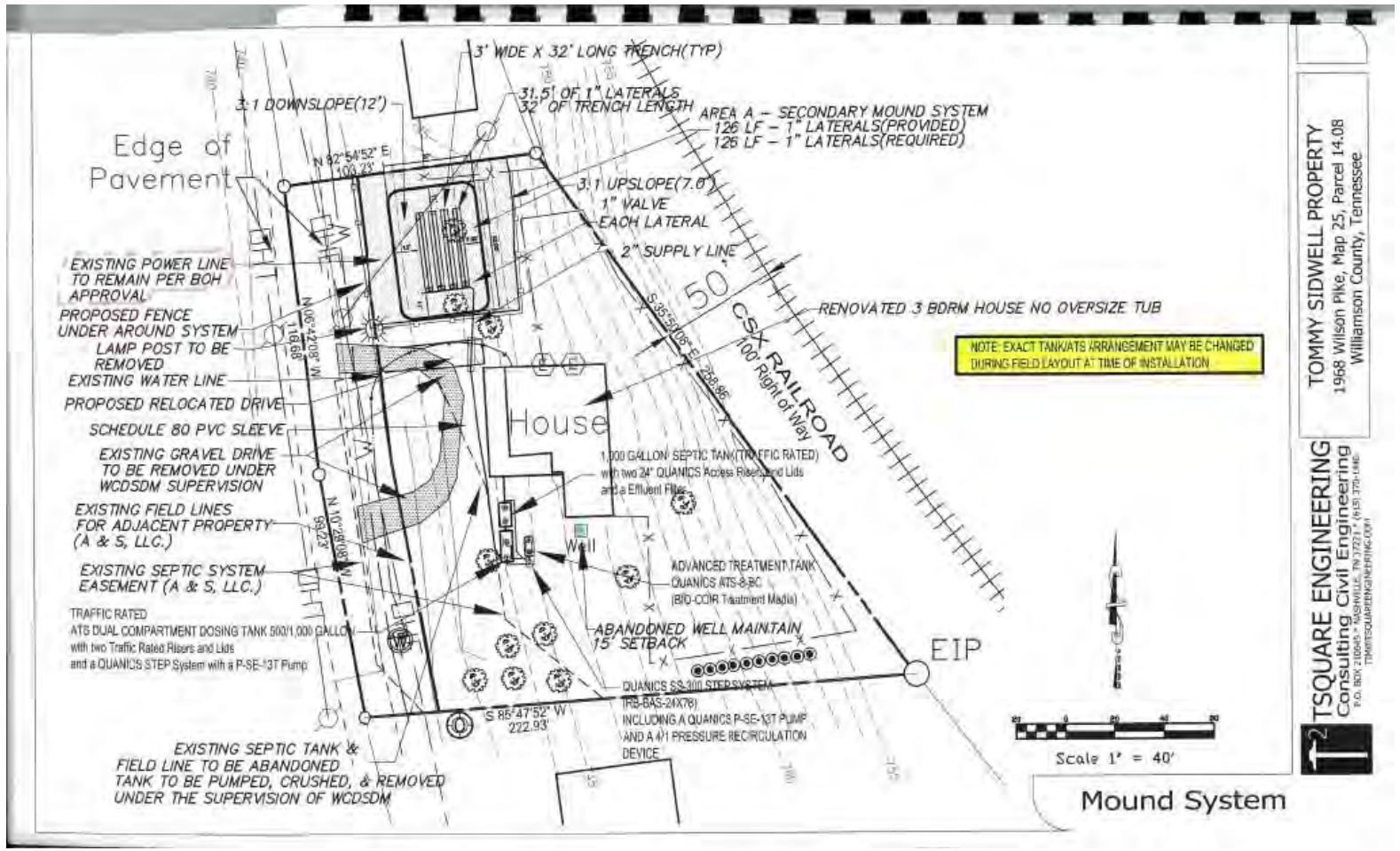
QUANICS PIPING SPECS.	
Manifold Ø	1.25"
Nozzle Pressure	2 psi
Recirc Lines	1.25"
Hole Ø	5/32"
80% Recirc Line Pressure Head	1'
20% Recirc Line Pressure Head	1'

TRENCH DATA	
NO.	LENGTH
1	55'
2	55'
3	55'
4	55'
5	55'
6	55'
7	55'
8	55'
9	55'
10	55'
11	55'
12	55'
TOTAL	660 L.F.

- 3-bedroom
- 450-gpd
- 1 COIR module
- 1,000-gal ST
- 1,500-gal dual PT
  - 500-gal to COIR filter
  - 1,000-gal to LPP laterals
- 1-zone LPP (3,673 sq-ft)
  - 660-LF total
  - (210-LF extra)
- Loading rate
  - 0.2-gpd/ft^2

Sidwell Residence

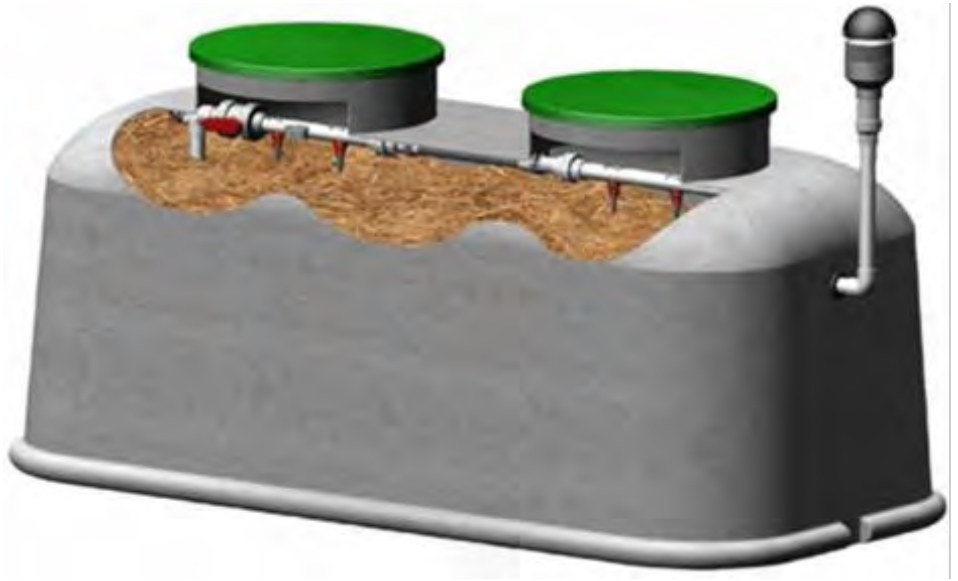
COIR Media Filter with Wisconsin Sand Mound Dispersal



Secondary System

COIR Media Filter

(Septic Tank Effluent Pre-treatment)



Coconut Husk Fibers

COIR Media Filter

(Septic Tank Effluent Pre-treatment)

Coconut Husk Fibers

Sidwell Residence

(Tank Installation)

- 1,000-gal ST
- Dual Compartment PT
  - 500-gal to media filter
  - 1,000-gal to MLPP
- Recirculation pump basin
- COIR media module

Sidwell Residence

(Typical / General LPP Installation)

Sidwell Residence

(Typical / General LPP Installation)

(Not specific to this project)

Sidwell Residence

Finished Product → New House

(MLPP field behind fence)

(Accessory structure with no plumbing)

Joe Natural's Café

(Bakery, Café & Farm Store)

Restaurant

(High Strength Wastewater & Site Constraints)

- 0.33-acre lot
- 90-yr old residential structure
- Converted to café
- Without permits
- Undocumented septic system
- Multiple buildings
- Driveway / parking area
- Setback constraints
- Limited soil area

Restaurant Challenges

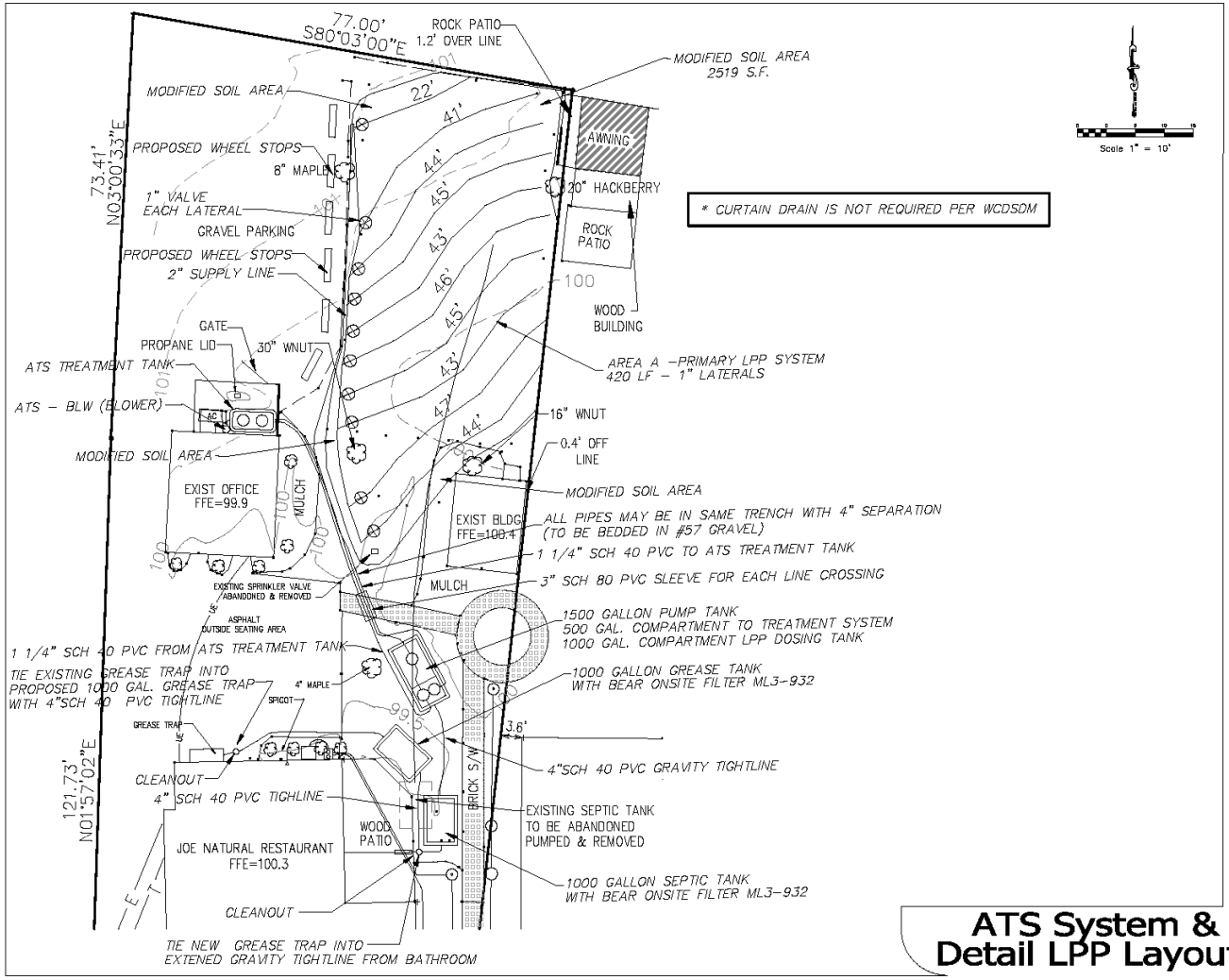
(Wastewater Strength & Soil Conditions)

- 500-gpd flow
- Strength:
  - BOD @ 763 mg/L
  - TSS @ 268 mg/L
  - FOG @ 139 mg/L
  - pH @ 5.86
- Goal:
  - BOD < 170 mg/L
  - TSS < 60 mg/L
  - FOG < 25 mg/L

- Soil Conditions:
  - 45-mpi with 0-12” fill overtop
  - >75-mpi; cut/fill >30”
  - Mottles
  - Compaction
- 2,500-ft^2 area

Joe Natural's Café

(Foam Media Filter & MLPP ~ 2012)



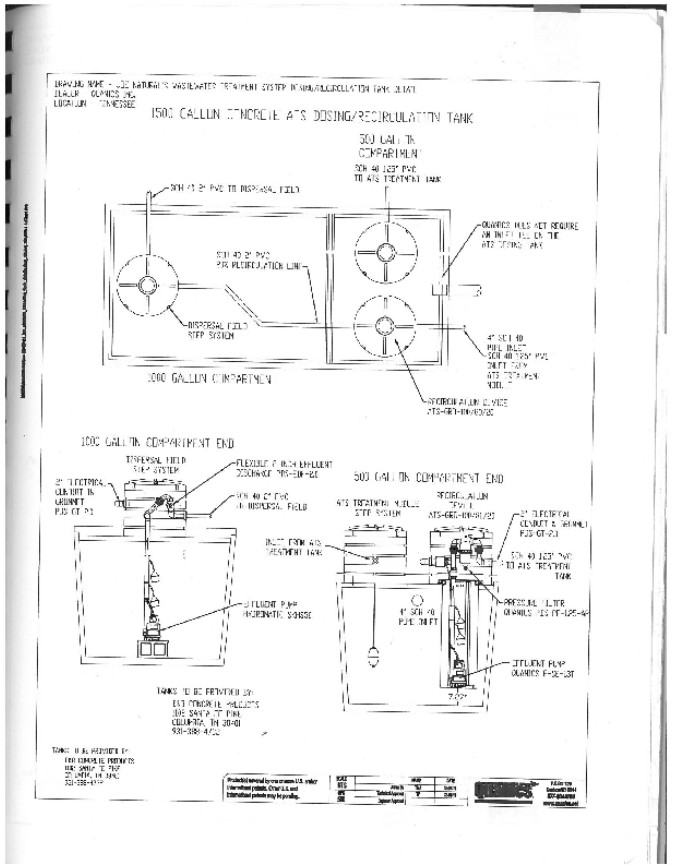
Joe Natural Restaurant
4150 Old Hillsboro Rd. - Tax Map 93E-B, Parcel 4
Williamson County, Tennessee

TSQUARE ENGINEERING
Consulting Civil Engineering
P.O. BOX 210645 * NASHVILLE, TN 37221 * (615) 207-8260
TIM@TSQUAREENGINEERING.COM

ATS System &
Detail LPP Layout

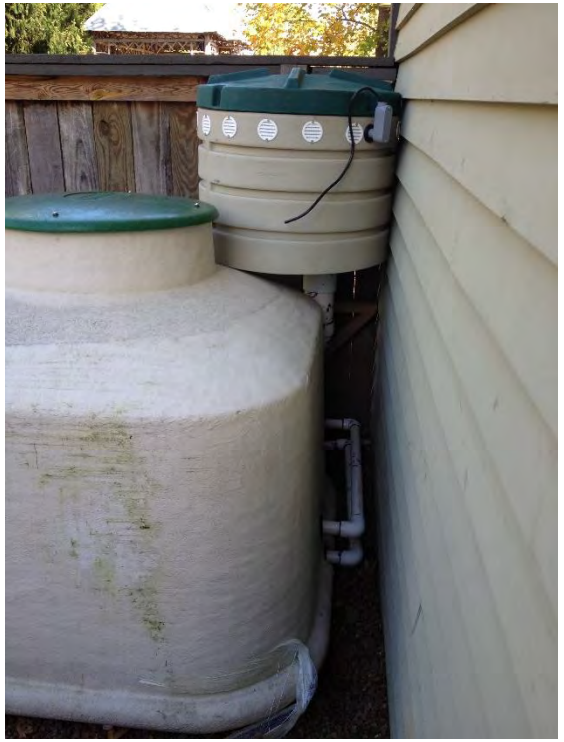
Joe Natural's Café

(GT, ST, Dual PT & MLPP ~ 2012)



Joe Natural's Café

(Foam Media Filter & Blower ~ 2012)



Joe Natural's Café

(Final Grading of MLPP Field ~ 2012)

QUESTIONS ?

Brian K. Corwin
Director

Williamson County
Department of Sewage Disposal Management
1320 West Main Street, Suite 411
Franklin, TN 37064
615.790.5751
brian.corwin@williamsoncounty-tn.gov
www.williamsoncounty-tn.gov

Now

Go and Build Larger Homes on Smaller Lots

Contact Information
brian.corwin@williamsoncounty-tn.gov morris@morrissmitheng.com
rgroover@myfowa.com