STORMWATER CALCULATIONS

Prepared for:

HOWEY SELF STORAGE

Howey in the Hills, FL

Prepared by:

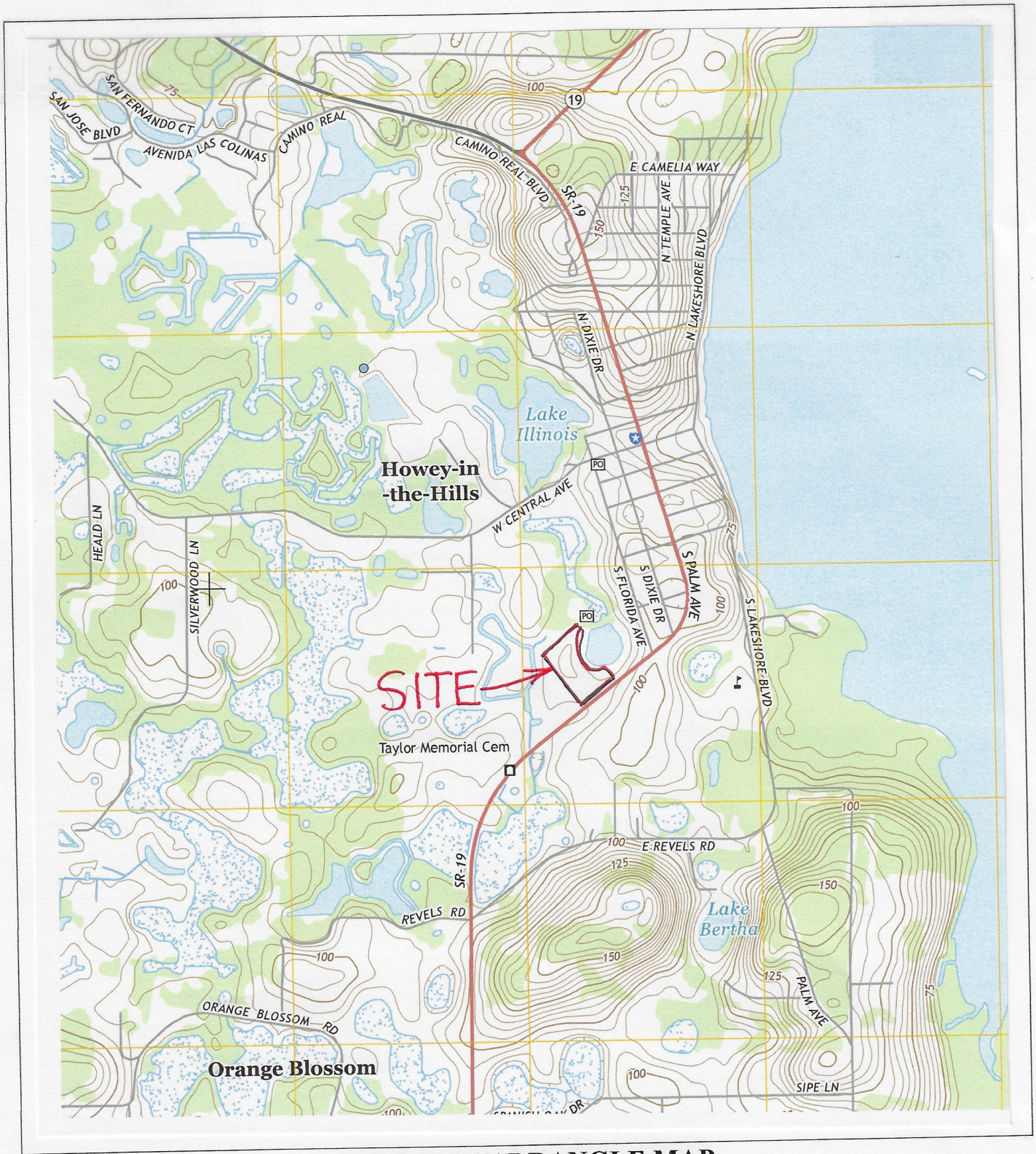
june engineering
consultants, inc.

Certificate of Authorization No. 00031567
P.O. BOX 770609
Winter Garden, FL 34777

March 17, 2022

Jeffrey A Sedloff, PE 51506

TABLE OF CONTENTS



U.S.G.S. QUADRANGLE MAP

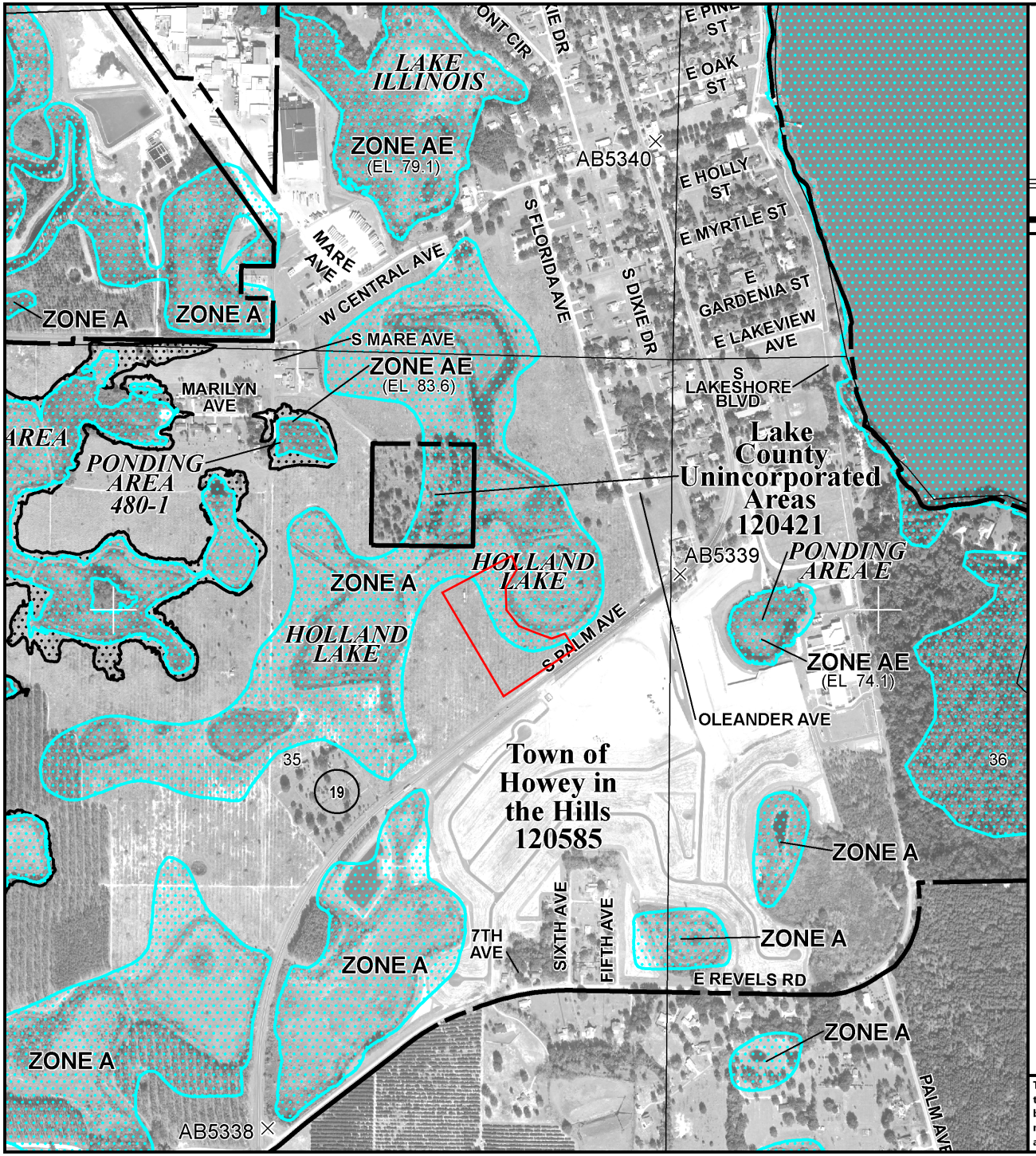
U.S.G.S. Quadrangle Map	Howey in the Hills, FL		
S 35 T20S R25E			
Lattitude 28°42'17"		Longitude -81°46'30"	

N.R.C.S. SOILS SURVEY

Natural Resources Conservation Survey

8,9 Candler Sand (A)

44 Tavares Sand (A)



MAP SCALE 1" = 1000'

500 0 500 1,000 1,500 2,000 FEET

0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0485E

FIRM

FLOOD INSURANCE RATE MAP

LAKE COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 485 OF 750

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ASTATULA, TOWN OF	120581	0485	E
HOWEY IN THE HILLS, TOWN OF	120585	0485	E
LAKE COUNTY	120421	0485	E
TAVARES, CITY OF	120138	0485	E

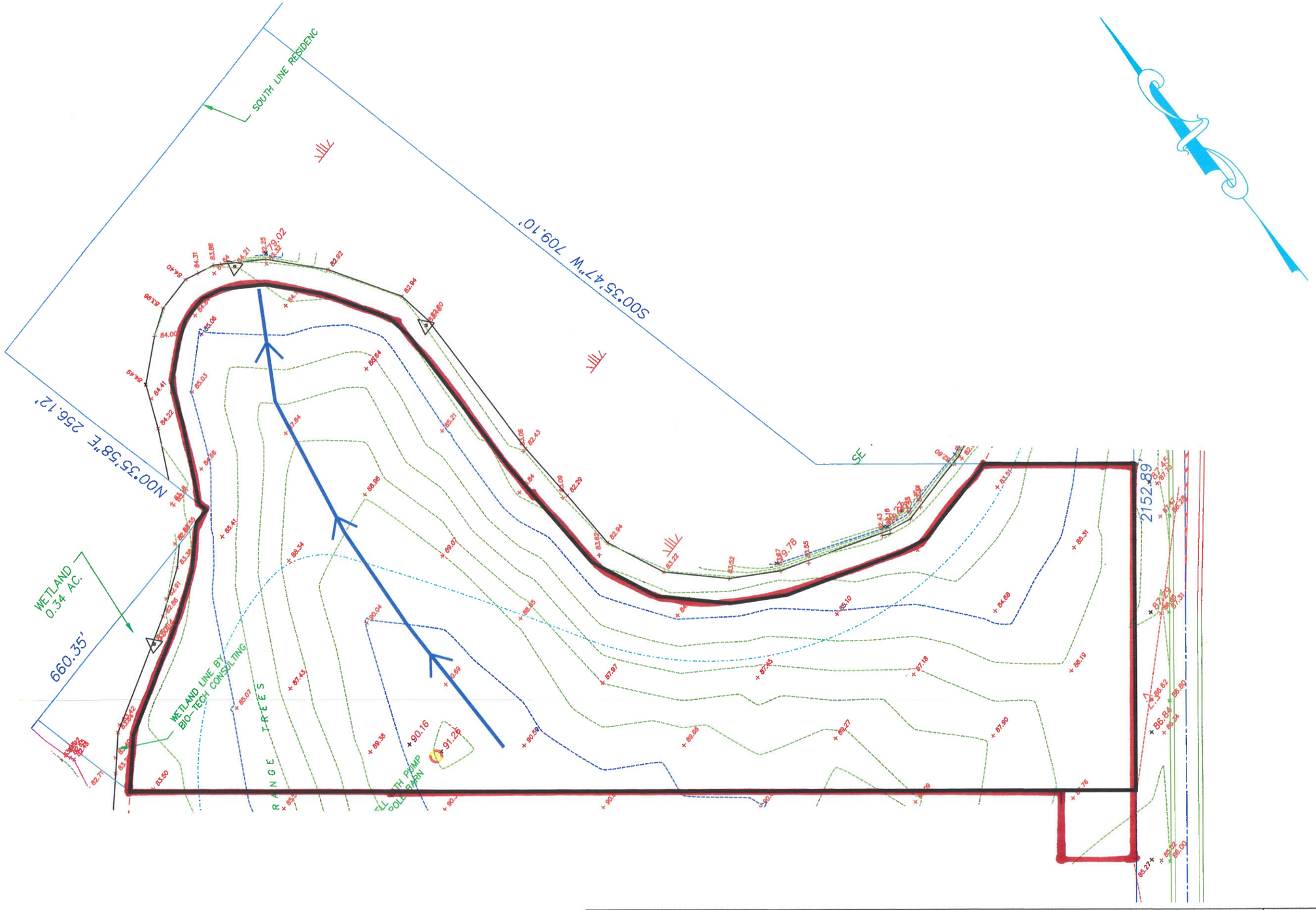
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12069C0485E

MAP REVISED
DECEMBER 18, 2012

Federal Emergency Management Agency

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

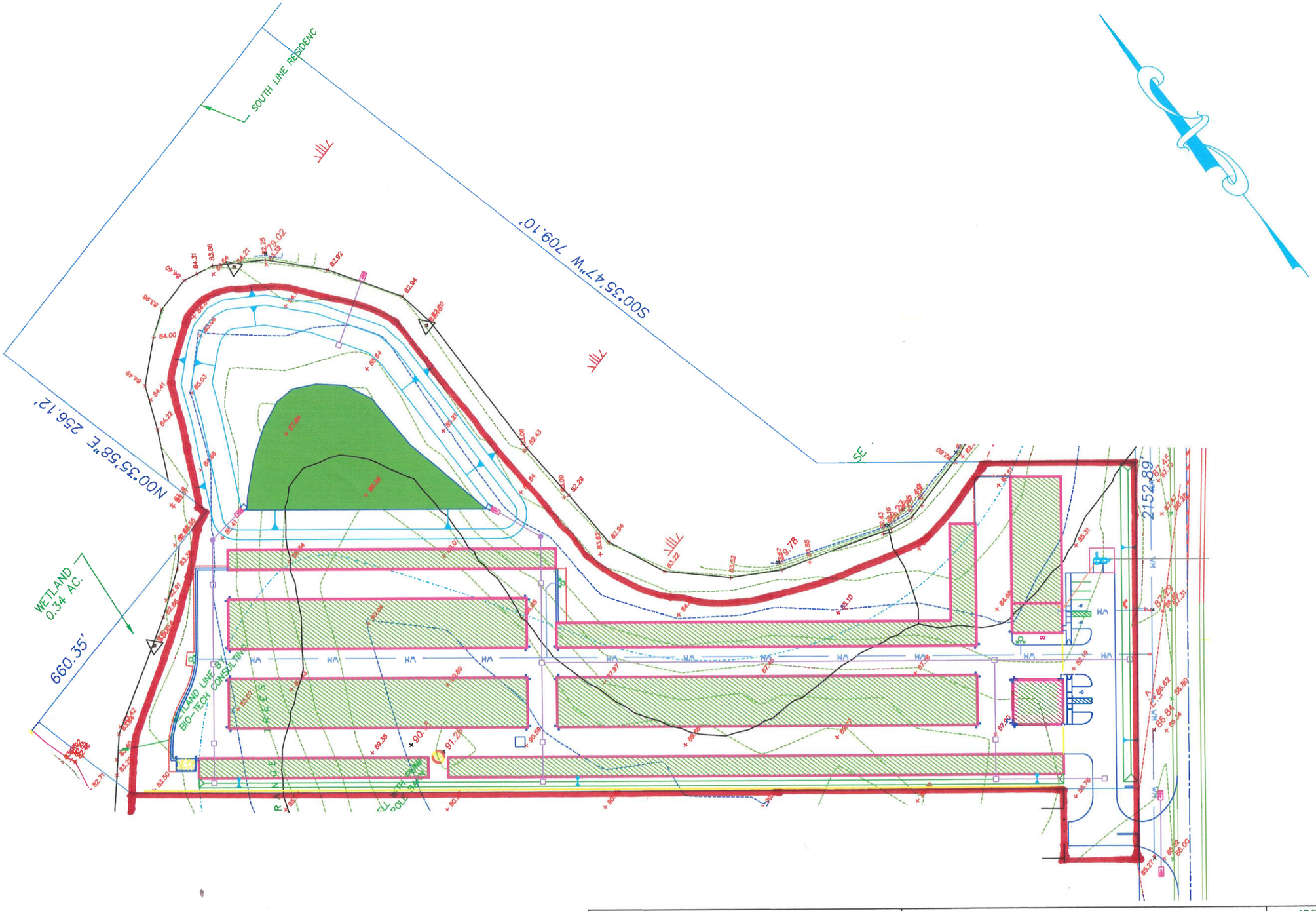


Pre Development Basin Map

Howey Self Storage

June engineering consultants, inc.
23 W. Joiner Street
Winter Garden, FL. 34787
Ph. 407-905-8180
Fax 407-905-6232
Certificate of Authorization #00031357

DRAWN BY: CLK	DRAWN BY: RAJ	SCALE 1" = 100'	JOB NO. 01-0398	
DATE: 3/22/22	DATE: 3/22/22		SHEET 1	OF 1



Post Development Basin Map

Howey Self Storage

JEC
june engineering consultants, inc.
23 W. Joiner Street
Winter Garden, FL. 34787
Ph. 407-905-8180
Fax 407-905-6232
Certificate of Authorization #00031357

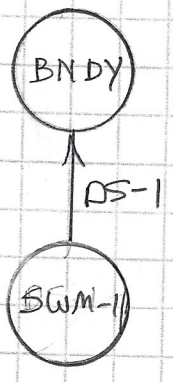
DRAWN BY: CLK	DRAWN BY: RAJ	SCALE 1" = 100'	JOB NO. 01-0398
DATE: 3/22/22	DATE: 3/22/22		SHEET 1 OF 1

June Engineering Consultants	Made by	Date	Job No. 0398
	Checked by	Date	Sheet No.

For NODAL DIAGRAM

PRE- DEVELOPMENT

POST- DEVELOPMENT



NARRATIVE

The existing site is an old orange grove with oak trees and grass. The runoff from the existing site flows overland to the wetland areas to the north side of the property which discharges into Lake Illinois. Lake Illinois discharges to Lake Harris through a network of culverts, canals, lakes and ditches. The site is underlain primarily with Candler and Tavares sands.

The proposed development consists of a commercial self-storage facility with a stormwater management system.

The proposed stormwater management system consists of a dry retention pond. The pond was designed to meet the following criteria:

Post Development Peak Discharge shall not exceed the Pre-Development Peak Discharge for the following events

- SCS Type II Florida Modified 25 Year 24 Hour Storm
- SCS Type II Florida Modified 10 Year 24 Hour Storm
- SJRWMD Mean Annual 24 Hour Storm

Additional 50% Treatment Volume will need to be provided to meet the Outstanding Florida Water requirement

HOWEY SELF STORAGE

Time of Concentration						Pre-Development			
	Kinematic Wave					Shallow Conc. Flow			
Basin Number	Length (ft)	N	Slope (ft/ft)	Intensity (in/hr)	Time (min)	Length (ft)	Velocity (ft/s)	time (min)	Time of Conc(Min)
PRE-1	300	0.5	0.023	4.8	47.7	215	1.6	2.2	50.0

Time of Concentration						Post-Development			
	Kinematic Wave					Shallow Conc. Flow			
Basin Number	Length (ft)	N (decimal)	Slope (ft/ft)	Intensity (in/hr)	Time (min)	Length (ft)	Velocity (ft/s)	time (min)	Time of Conc(Min)
POST-1	110	0.24	0.01	4.8	16.6	50	1.4	0.6	17.2

T = 0.007[(nL)^0.8] /[(I^0.5)(S^0.3)] Equation 3-3, SCS-USDA TR-55

Intensity is for 2 year 24 hour storm event

PRE-DEVELOPMENT SITE DATA

Basin	Area (Acres)	Impervious Area (Ac)	Impervious (%)	USDA-SCS Soil Type	CN	Tc (Min)
PRE-1	7.387	0.000	0.0	A	43	50.0

Total Area (Onsite) = 7.387 Ac

CN= Curve Number = 43 (Fair Condition woods-grass cover, type A soils, TR-55)

POST-DEVELOPMENT SITE DATA

Basin	Area (Acres)	Impervious Area (Ac)	Impervious (%)	USDA-SCS Soil Type	CN	Tc (Min)
POST-1	7.387	4.321	58.5	A	39	17.2

Total Area = 321781 sf = 7.387 ac
Onsite = 316531 sf
Offsite = 5250 sf

Impervious Area = 188209 sf = 4.321 ac
Buildings = 97636 sf
Pvmt/sidewalk = 87813 sf
Offsite pavement = 2760 sf

Impervious = 58.5 %

CN= Curve Number = 39 (Good Condition grass cover, type A soils, TR-55)

POLLUTION ABATEMENT VOLUME REQUIREMENT

NODE	Area (Ac)	Imperv. (Ac)	PAV (ac-ft)	Add 50%	PAV Tot (ac-ft)
SWM-1	7.387	4.321	0.758	0.379	1.137

PAV Required = Pollution Abatement Volume = 1/2" Runoff over basin or 1.25" Runoff over impervious area plus 1/2" Runoff over the basin area.

SWM-1

PAV Required = 0.758 ac-ft

V=(0.5")(Area-Basin A)(1ft/12in) = 0.308 ac-ft

or V=(1.25")(Impervious Area)(1ft/12in) = 0.450 ac-ft

\+ V=(0.5")(Area-Basin A)(1ft/12in) = 0.308 ac-ft

STAGE VS. STORAGE

SWM-1

Stage	Area (ac)	Volume (ac-ft)
83.5	0.880	0.000
84.5	0.960	0.920
85.5	1.030	1.915
86.5	1.110	2.985
87.5	1.200	4.140

PAV Provided = 1.137 ac-ft @ EL 84.72 ft

TAILWATER CONDITIONS

BNDY

Water Level	81.0
Normal High Water Level	82.3
100 Year Flood Plain	83.6

SUMMARY

Peak Discharge Rate (cfs)		
Storm Event	Node BNDY	
	Pre	Post
SJRWMD Mean Annual 24 Hour	0.27	0.26
SCS Type II Florida Modified 10 Year 24 Hour	3.24	1.25
SCS Type II Florida Modified 25 Year 24 Hour	5.38	1.92
SCS Type II Florida Modified 100 Year 24 Hour	9.72	3.29

Pollution Abatement Volume		
Node	PAV (Ac-ft)	
	Required	Provided
SWM-1	1.137	1.137

```
            Basin Name: PRE-1
            Group Name: BASE
            Simulation: 100yr 24hr
             Node Name: BNDY
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh484
         Peaking Fator: 484.0
   Spec Time Inc (min): 6.67
   Comp Time Inc (min): 5.00
         Rainfall File: Flmod
  Rainfall Amount (in): 10.400
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 50.00
      Time Shift (hrs): 0.00
             Area (ac): 7.387
  Vol of Unit Hyd (in): 1.001
          Curve Number: 43.000
              DCIA (%): 0.000

        Time Max (hrs): 12.50
        Flow Max (cfs): 9.72
    Runoff Volume (in): 2.860
   Runoff Volume (ft3): 76694


--------------------------------------------------------------------------------

            Basin Name: PRE-1
            Group Name: BASE
            Simulation: 10yr 24hr
             Node Name: BNDY
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh484
         Peaking Fator: 484.0
   Spec Time Inc (min): 6.67
   Comp Time Inc (min): 5.00
         Rainfall File: Flmod
  Rainfall Amount (in): 7.200
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 50.00
      Time Shift (hrs): 0.00
             Area (ac): 7.387
  Vol of Unit Hyd (in): 1.001
          Curve Number: 43.000
              DCIA (%): 0.000

        Time Max (hrs): 12.58
        Flow Max (cfs): 3.24
    Runoff Volume (in): 1.163
   Runoff Volume (ft3): 31180


--------------------------------------------------------------------------------

            Basin Name: PRE-1
            Group Name: BASE
            Simulation: 25yr 24hr
             Node Name: BNDY
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh484
         Peaking Fator: 484.0
   Spec Time Inc (min): 6.67
   Comp Time Inc (min): 5.00
         Rainfall File: Flmod
  Rainfall Amount (in): 8.400
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 50.00
      Time Shift (hrs): 0.00
             Area (ac): 7.387
  Vol of Unit Hyd (in): 1.001
          Curve Number: 43.000
              DCIA (%): 0.000

        Time Max (hrs): 12.58
        Flow Max (cfs): 5.38
    Runoff Volume (in): 1.740
   Runoff Volume (ft3): 46655


--------------------------------------------------------------------------------

            Basin Name: PRE-1
            Group Name: BASE
            Simulation: Mean Annual 24h
             Node Name: BNDY
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh484
         Peaking Fator: 484.0
   Spec Time Inc (min): 6.67
   Comp Time Inc (min): 5.00
         Rainfall File: Flmod
  Rainfall Amount (in): 4.500
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 50.00
      Time Shift (hrs): 0.00
```

```
            Area (ac): 7.387
  Vol of Unit Hyd (in): 1.001
          Curve Number: 43.000
              DCIA (%): 0.000

       Time Max (hrs): 13.00
       Flow Max (cfs): 0.27
    Runoff Volume (in): 0.226
   Runoff Volume (ft3): 6071
```

==========
==== Basins ====
==========

Name: POST-1 Node: SWM-1 Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Flmod Storm Duration(hrs): 24.00
Rainfall Amount(in): 8.600 Time of Conc(min): 17.20
Area(ac): 7.387 Time Shift(hrs): 0.00
Curve Number: 39.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 58.50

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

Name: BNDY Base Flow(cfs): 0.000 Init Stage(ft): 81.000
Group: BASE Warn Stage(ft): 82.300
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	81.000
12.00	82.300
24.00	81.000
300.00	81.000

Name: SWM-1 Base Flow(cfs): 0.000 Init Stage(ft): 83.500
Group: BASE Warn Stage(ft): 87.500
Type: Stage/Area

Stage(ft)	Area(ac)
83.500	0.8800
84.500	0.9600
85.500	1.0300
86.500	1.1100
87.500	1.2000

==========
==== Drop Structures ====
==========

Name: DS-1 From Node: SWM-1 Length(ft): 76.00
Group: BASE To Node: BNDY Count: 1

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	18.00	18.00
Rise(in):	18.00	18.00
Invert(ft):	81.500	81.350
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Friction Equation: Automatic
Solution Algorithm: Most Restrictive
Flow: Both
Entrance Loss Coef: 0.000
Exit Loss Coef: 1.000
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dc
Solution Incs: 10

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

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

*** Weir 1 of 2 for Drop Structure DS-1 ***

TABLE

Count: 1 Bottom Clip(in): 0.000
Type: Horizontal Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200
Geometry: Rectangular Orifice Disc Coef: 0.600

Span(in): 49.00 Invert(ft): 86.500
Rise(in): 37.00 Control Elev(ft): 86.500

*** Weir 2 of 2 for Drop Structure DS-1 ***

TABLE

Count: 1 Bottom Clip(in): 0.000
Type: Vertical: Mavis Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200
Geometry: Rectangular Orifice Disc Coef: 0.600

Span(in): 6.00 Invert(ft): 84.720
Rise(in): 21.40 Control Elev(ft): 84.720

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

Name: 100yr 24hr
Filename: G:\Shared drives\Project Files\ENGINEERING\ICPR Job Files\0398 Howey storage\100yr 24hr.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00

```
          Rainfall File: Flmod
    Rainfall Amount(in): 10.40

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

------------------------------------------------------------------------------------------------
         Name: 10yr 24hr
     Filename: G:\Shared drives\Project Files\ENGINEERING\ICPR Job Files\0398 Howey storage\10yr 24hr.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 7.20

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

------------------------------------------------------------------------------------------------
         Name: 25yr 24hr
     Filename: G:\Shared drives\Project Files\ENGINEERING\ICPR Job Files\0398 Howey storage\25yr 24hr.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 8.40

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

------------------------------------------------------------------------------------------------
         Name: Mean Annual 24h
     Filename: G:\Shared drives\Project Files\ENGINEERING\ICPR Job Files\0398 Howey storage\Mean Annual 24hr.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 4.50

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

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

         Name: 100YR24HR           Hydrology Sim: 100yr 24hr
     Filename: G:\Shared drives\Project Files\ENGINEERING\ICPR Job Files\0398 Howey storage\100YR24HR.I32

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

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

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


------------------------------------------------------------------------------------------------
         Name: 10YR24HR            Hydrology Sim: 10yr 24hr
     Filename: G:\Shared drives\Project Files\ENGINEERING\ICPR Job Files\0398 Howey storage\10YR24HR.I32

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

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

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


------------------------------------------------------------------------------------------------
         Name: 25YR24HR            Hydrology Sim: 25yr 24hr
     Filename: G:\Shared drives\Project Files\ENGINEERING\ICPR Job Files\0398 Howey storage\25YR24HR.I32

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

```
       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                    End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

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


-------------------------------------------------------------------------------------------------------
        Name: MA24HR              Hydrology Sim: Mean Annual 24h
    Filename: G:\Shared drives\Project Files\ENGINEERING\ICPR Job Files\0398 Howey storage\MA24HR.I32

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

       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                    End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages:                         Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

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

```
            Basin Name: POST-1
            Group Name: BASE
            Simulation: 100yr 24hr
             Node Name: SWM-1
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh484
         Peaking Fator: 484.0
   Spec Time Inc (min): 2.29
   Comp Time Inc (min): 2.29
         Rainfall File: Flmod
  Rainfall Amount (in): 10.400
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 17.20
      Time Shift (hrs): 0.00
             Area (ac): 7.387
  Vol of Unit Hyd (in): 1.001
          Curve Number: 39.000
              DCIA (%): 58.500

       Time Max (hrs): 12.08
       Flow Max (cfs): 34.69
    Runoff Volume (in): 6.971
   Runoff Volume (ft3): 186927


--------------------------------------------------------------------------------

            Basin Name: POST-1
            Group Name: BASE
            Simulation: 10yr 24hr
             Node Name: SWM-1
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh484
         Peaking Fator: 484.0
   Spec Time Inc (min): 2.29
   Comp Time Inc (min): 2.29
         Rainfall File: Flmod
  Rainfall Amount (in): 7.200
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 17.20
      Time Shift (hrs): 0.00
             Area (ac): 7.387
  Vol of Unit Hyd (in): 1.001
          Curve Number: 39.000
              DCIA (%): 58.500

       Time Max (hrs): 12.08
       Flow Max (cfs): 21.72
    Runoff Volume (in): 4.495
   Runoff Volume (ft3): 120524


--------------------------------------------------------------------------------

            Basin Name: POST-1
            Group Name: BASE
            Simulation: 25yr 24hr
             Node Name: SWM-1
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh484
         Peaking Fator: 484.0
   Spec Time Inc (min): 2.29
   Comp Time Inc (min): 2.29
         Rainfall File: Flmod
  Rainfall Amount (in): 8.400
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 17.20
      Time Shift (hrs): 0.00
             Area (ac): 7.387
  Vol of Unit Hyd (in): 1.001
          Curve Number: 39.000
              DCIA (%): 58.500

       Time Max (hrs): 12.08
       Flow Max (cfs): 26.40
    Runoff Volume (in): 5.398
   Runoff Volume (ft3): 144734


--------------------------------------------------------------------------------

            Basin Name: POST-1
            Group Name: BASE
            Simulation: Mean Annual 24h
             Node Name: SWM-1
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh484
         Peaking Fator: 484.0
   Spec Time Inc (min): 2.29
   Comp Time Inc (min): 2.29
         Rainfall File: Flmod
  Rainfall Amount (in): 4.500
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 17.20
      Time Shift (hrs): 0.00
```

```
            Area (ac): 7.387
   Vol of Unit Hyd (in): 1.001
           Curve Number: 39.000
               DCIA (%): 58.500

         Time Max (hrs): 12.08
         Flow Max (cfs): 12.95
     Runoff Volume (in): 2.615
    Runoff Volume (ft3): 70131
```

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
BNDY	BASE	100YR24HR	12.00	82.30	82.30	0.0018	0	13.52	3.29	0.00	0.00
SWM-1	BASE	100YR24HR	13.52	86.34	87.50	0.0050	47784	12.08	34.50	13.52	3.29
BNDY	BASE	10YR24HR	12.00	82.30	82.30	0.0018	0	14.82	1.25	0.00	0.00
SWM-1	BASE	10YR24HR	14.82	85.57	87.50	0.0050	45108	12.08	21.60	14.82	1.25
BNDY	BASE	25YR24HR	12.00	82.30	82.30	0.0018	0	14.15	1.92	0.00	0.00
SWM-1	BASE	25YR24HR	14.15	85.85	87.50	0.0050	46091	12.08	26.25	14.15	1.92
BNDY	BASE	MA24HR	12.00	82.30	82.30	0.0018	0	22.95	0.26	0.00	0.00
SWM-1	BASE	MA24HR	22.95	85.02	87.50	0.0050	43403	12.08	12.87	22.95	0.26