

FINAL PLANS

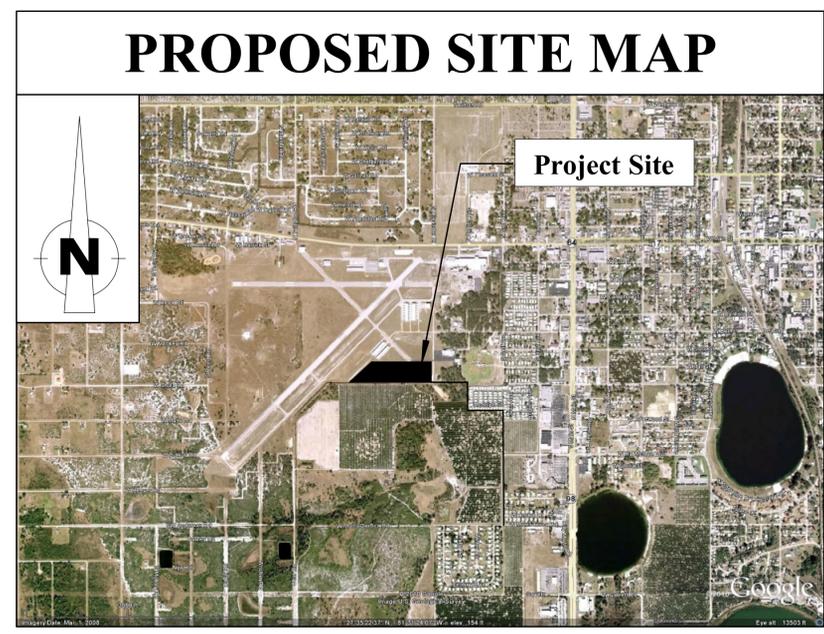
FOR

AVON PARK AIRPORT DRAINAGE

By

CITY OF AVON PARK

**SECTION 21 & 28,
TOWNSHIP 33 SOUTH,
RANGE 28 EAST**



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NOTE:
Plans have been revised from
Chastain-Skillman, Inc. plans dated: 12-22-10

PROJECT:
AVON PARK AIRPORT DRAINAGE
1545 SR 64 West
Avon Park, FL 33825

OWNER:
CITY OF AVON PARK
110 East Main St.
Avon Park, FL 33825
(863) 452-4400

SEAL:

**CERT. OF AUTHORIZATION #29713
FLA LICENSE NO 16921**
(863) 657-2323 Office
(863) 657-2324 Fax
ca1@coolandcobb.com

ENGINEER:
Cool & Cobb Engineering Co.
203 West Main Street
Avon Park, FL 33825

Revisions:	
03/17/11	Original
02/15/12	
06/12/12	

GENERAL NOTES:

1. B.M. DATA IS NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD-29).
2. ANY NGVD-29 MONUMENT WITHIN THE LIMITS OF CONSTRUCTION IS TO BE PROTECTED. IF IN DANGER OF DAMAGE, THE CONTRACTOR SHOULD NOTIFY:
 GEODETIC INFORMATION CENTER
 ATTN: MARK MAINTENANCE SECTION N/CG-162
 6001 EXECUTIVE BOULEVARD
 ROCKVILLE, MARYLAND 20852
 TELEPHONE NO.-(301)443-8319
3. EXISTING SECTION CORNERS AND 1/4 SECTION CORNERS, AND OTHER LAND MARKERS MONUMENTS LOCATED WITHIN PROPOSED CONSTRUCTION ARE TO BE REFERENCED PRIOR TO CONSTRUCTION AND RESET AFTER CONSTRUCTION. THE CONTRACTOR SHALL HAVE THIS WORK DONE BY A REGISTERED PROFESSIONAL LAND SURVEYOR (FLORIDA REGISTRATION).
4. THE MAINTENANCE OF TRAFFIC FOR THIS PROJECT SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS (U.S. DEPARTMENT OF TRANSPORTATION, FHWA).
5. RADII, ELEVATIONS AND DIMENSIONS ARE TO THE EDGE OF PAVEMENT, UNLESS OTHERWISE NOTED.
6. GRADES SHOWN ARE FINISHED GRADES.
7. PERMANENT TURNOUTS AND DRIVEWAY CONNECTIONS TO PRIVATE PROPERTY SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TURNOUT DETAILS AND STATE STANDARD SPECIFICATIONS REFERENCED ON THESE PLANS.
8. EXISTING DRAINAGE STRUCTURES WITHIN CONSTRUCTION LIMITS SHALL REMAIN UNLESS OTHERWISE NOTED.
9. THE APPROPRIATE UTILITY COMPANY SHALL BE NOTIFIED BY THE CONTRACTOR 48 HOURS IN ADVANCE OF ANY EXCAVATION INVOLVING THEIR UTILITIES SO THAT A COMPANY REPRESENTATIVE CAN BE PRESENT. THE CONTRACTOR SHALL CALL FOR FIELD LOCATIONS 48 HOURS BEFORE DIGGING NEAR UNDERGROUND UTILITIES.
10. THE CONTRACTOR IS TO USE CAUTION WHEN WORKING IN OR AROUND AREAS OF OVER-HEAD TRANSMISSION LINES OR UNDERGROUND UTILITIES.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES TO REMAIN IN PLACE.
12. PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AND STATE OF FLORIDA ROADWAY AND TRAFFIC DESIGN STANDARDS DATED JANUARY 2006.
13. PRIOR TO COMMENCEMENT OF ANY EXCAVATION, THE CONTRACTOR SHALL COMPLY WITH FLORIDA STATUTE 553.851 FOR THE PROTECTION OF UNDERGROUND GAS PIPELINES.
14. UTILITIES TO BE ADJUSTED BY OTHERS, AS DIRECTED BY THE ENGINEER, UNLESS OTHERWISE NOTED.
15. THE LOCATION OF THE EXISTING UTILITIES SHOWN IN THE PLANS ARE APPROXIMATE ONLY; THE EXACT LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY IF "OTHER" UTILITIES (NOT SHOWN IN THE PLANS) EXIST. WITHIN THE AREA OF CONSTRUCTION. SHOULD THERE BE UTILITY CONFLICTS, THE CONTRACTOR SHALL INFORM THE ENGINEER AND NOTIFY THE RESPECTIVE UTILITY OWNERS TO RESOLVE UTILITY CONFLICTS AND UTILITY ADJUSTMENTS, AS REQUIRED.
16. ALL VALVES WITHIN AREA OF CONSTRUCTION OR DISTURBED BY CONSTRUCTION TO BE ADJUSTED TO FINISHED GRADE. REPLACE VALVE COLLARS AND BOXES AS NECESSARY.
17. CONCRETE DRIVEWAY SHALL BE REPLACED "INKIND" UTILIZING 6" CONC. SIDEWALK OR ASPHALT, ACCORDING TO THE STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROADWAY AND TRAFFIC DESIGN STANDARDS, DATED JAN., 2006.
18. EXISTING DRIVEWAYS WITHIN THE LIMITS OF THIS PROJECT ARE TO BE REPLACED AT THE SAME LOCATION AND WIDTH, UNLESS OTHERWISE SHOWN IN THE PLANS.
19. THE LOCATION OF THE UTILITIES SHOWN IN THE PLANS ARE BASED ON LIMITED INVESTIGATION. THE CONTRACTOR WILL BE RESPONSIBLE FOR VERIFICATION.

EXISTING UTILITIES

UTILITY OWNER	ADDRESS	PHONE NO.
1. COMCAST CABLE	3010 HERRING AVE. SEBRING, FL 33870 ATTN: BRIAN E. DELANEY	(863) 385-4401
2. PROGRESS ENERGY	5020 KENILWORTH BLVD. SEBRING, FL 33870 ATTN: JIM BOLDEN	(800) 700-8744
3. EMBARQ	2523 S. MEMORIAL DR. AVON PARK, FL 33825 ATTN: SUZANNE CREAM	(863) 452-3132
4. AVON PARK UTILITIES	2301 US 27 SOUTH AVON PARK, FL 33825 ATTN: TED LONG	(863) 452-4427
5. HIGHLANDS COUNTY TRAFFIC	505 S. COMMERCE AVE. SEBRING, FL 33870 ATTN: DEBBIE CARNAHAN	(863) 402-6877
6. MCI	2400 N. GLENNVILLE RICHARDSON, TX 75082 ATTN:	(972) 729 6016
7. PEOPLES GAS	445 KATHLEEN RD. LAKELAND, FL 33815 ATTN: JENNIFER LOWERS	(863) 603-2226
8. FLORIDA GAS TRANSITION CO.	1544 N. COMBEE RD. LAKELAND, FL 33801 ATTN:	(407) 838-7171
9. LEVEL 3	1122 S CAPITAL OF TEXAS HWY AUSTIN, TX 78746 ATTN: JIM MOORE	(512)742-1433

CALL 1-800-432-4770 48 HOURS BEFORE YOU DIG.

TABULATION OF QUANTITIES

NO.	DESCRIPTION	QUANTITY	UNIT
1.	MOBILIZATION	1	LS
2.	MAINTENANCE OF TRAFFIC	1	LS
3.	STAKED SILT FENCE	6,200	LF
4.	CLEARING AND GRUBBING	LS	AC
5.	REGULAR EXCAVATION (RETENTION AND DITCH AREA)	75,000	CY
6.	SURVEYING	LS	EA
7.	GEO-TESTING	LS	EA
8.	AS-BUILTS	LS	EA
9.	NPDES	LS	
10.	FINE GRADE	LS	EA
11.	12" PVC CLASS 100	3,820	LF
12.	SEED AND MULCH	27,100	SY
13.	12" HDPE BORE	4	EA
14.	P-7 (4' DIA) TIE INTO EXISTING C.B.	1	EA
15.	TESTING	LS	
16.	PIPE CULVERT OPTIONAL MATERIAL (18" RCP)	265	LF
17.	PIPE CULVERT OPTIONAL MATERIAL (24" RCP)	230	LF
18.	PIPE CULVERT OPTIONAL MATERIAL (36" RCP)	40	LF
19.	PUMP STATION ELECTRIC	LS	LF
20.	PUMP STATION PUMPS	3	EA
21.	MITERED END SECTION (18")	10	EA
22.	MITERED END SECTION (24")	6	EA
23.	TYPE "H" INLET	1	EA
24.	WET WELL AND VALVE BOX	1	EA
25.	1-100 KW GENERATOR	1	EA
26.	FENCING (6FT. HEIGHT)	228	LF
27.	10' WIDE GATE	1	EA
28.	12' WIDE GATE	3	EA
29.	SODDING	20,600	SY
30.	STOCK PILE (FROM POND AND DITCHES)	86,500	CY
31.	1-1/2" ASPHALT	400	SY
32.	BASE ROCK	400	SY
33.	NO. 57 STONE	18	TN
34.			
35.			
36.			
37.			
38.			
39.			
40.			
41.			

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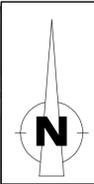
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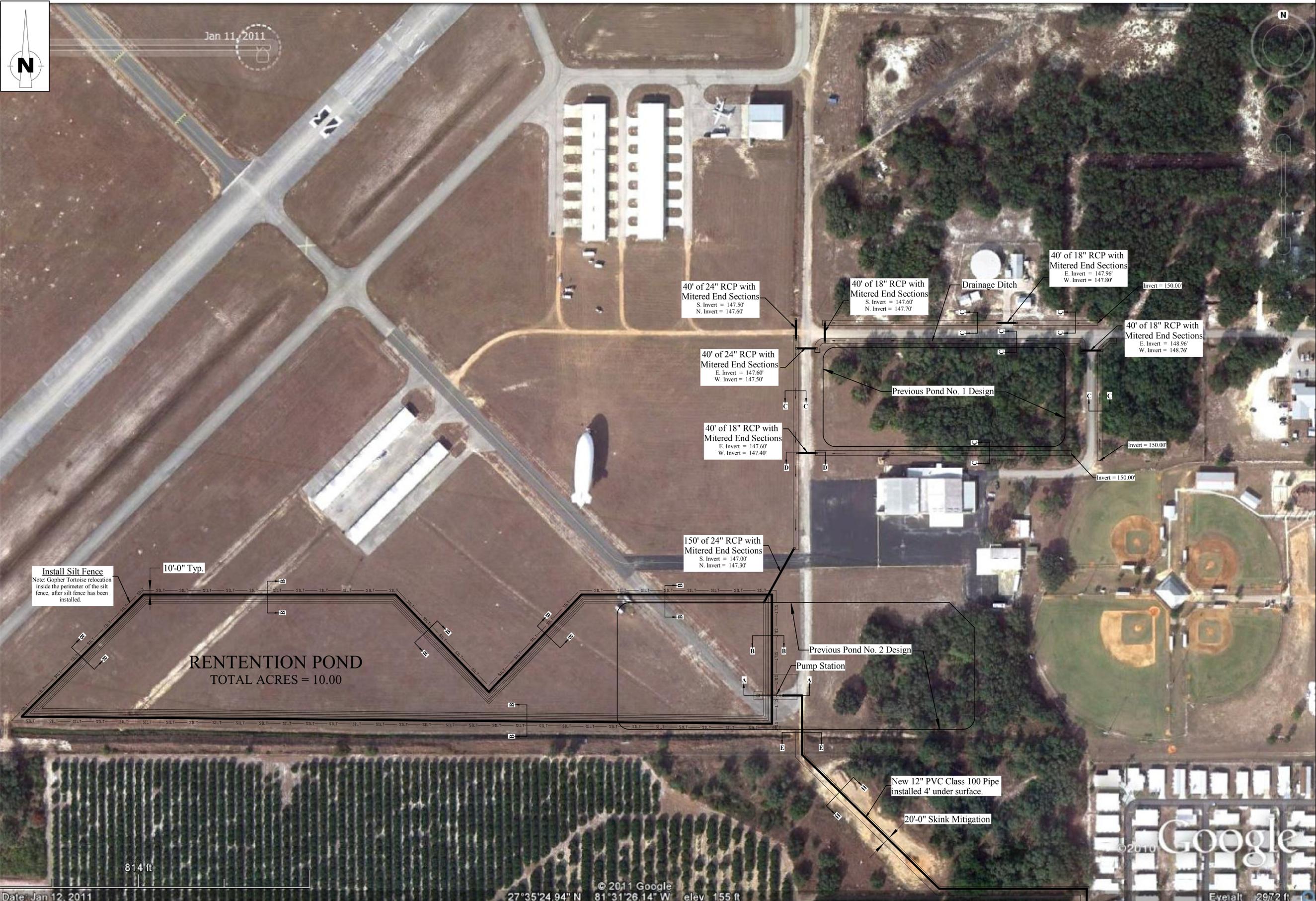
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Jan 11, 2011



Install Silt Fence
Note: Gopher Tortoise relocation inside the perimeter of the silt fence, after silt fence has been installed.

10'-0" Typ.

RENTENTION POND
TOTAL ACRES = 10.00

40' of 24" RCP with Mitered End Sections
S. Invert = 147.50'
N. Invert = 147.60'

40' of 24" RCP with Mitered End Sections
E. Invert = 147.60'
W. Invert = 147.50'

40' of 18" RCP with Mitered End Sections
E. Invert = 147.60'
W. Invert = 147.40'

150' of 24" RCP with Mitered End Sections
S. Invert = 147.00'
N. Invert = 147.30'

40' of 18" RCP with Mitered End Sections
S. Invert = 147.60'
N. Invert = 147.70'

40' of 18" RCP with Mitered End Sections
E. Invert = 147.96'
W. Invert = 147.80'

40' of 18" RCP with Mitered End Sections
E. Invert = 148.96'
W. Invert = 148.76'

New 12" PVC Class 100 Pipe installed 4' under surface.

20'-0" Skink Mitigation

Date: Jan 12, 2011

© 2011 Google
27°35'24.94" N 81°31'26.14" W elev 155 ft

Eye alt 297.2 ft

NOTE:
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Scale : 1" = 100'

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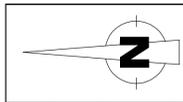
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12/21/12	



Imagery Date: Mar 1, 2008

Image U.S. Geological Survey
 © 2010 Google
 27°35'06.37" N 81°31'13.88" W elev 151 ft

©2010 Google
 Eye alt 2942 ft

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Cut = 49321
Fill = 0
Net = 49321 CUT

150' o
Miter
S
Z

RETENTION POND TOTAL ACRES = 10.00

800

420

2.5:1

Site name=
STOCK PILE VOL
Fill = 86000
Top Elev.=178.0

STOCK PILE IS TO BE
SEED AND MULCH
INSTALL SILT FENCE TO
REMAIN IN PLACE

CITY OF AVON PARK
AVON PARK AIRPORT
DRAINAGE

EARTH EXCAVATION
DISPOSAL PLAN

Site name=
STOCK PILE VOL
Fill = 86000
Top Elev.=178.0

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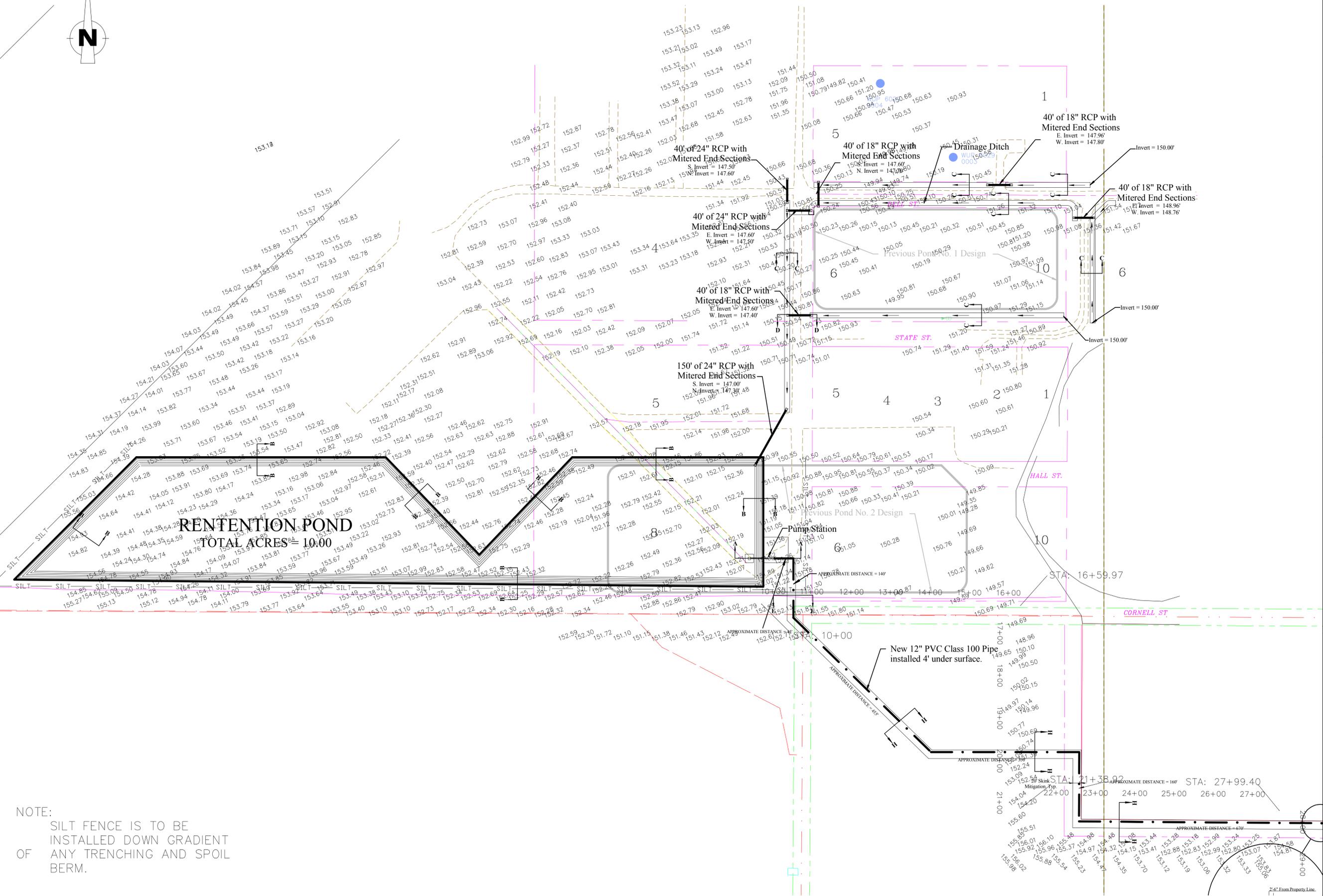
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NOTE:
SILT FENCE IS TO BE
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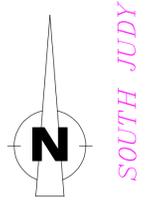
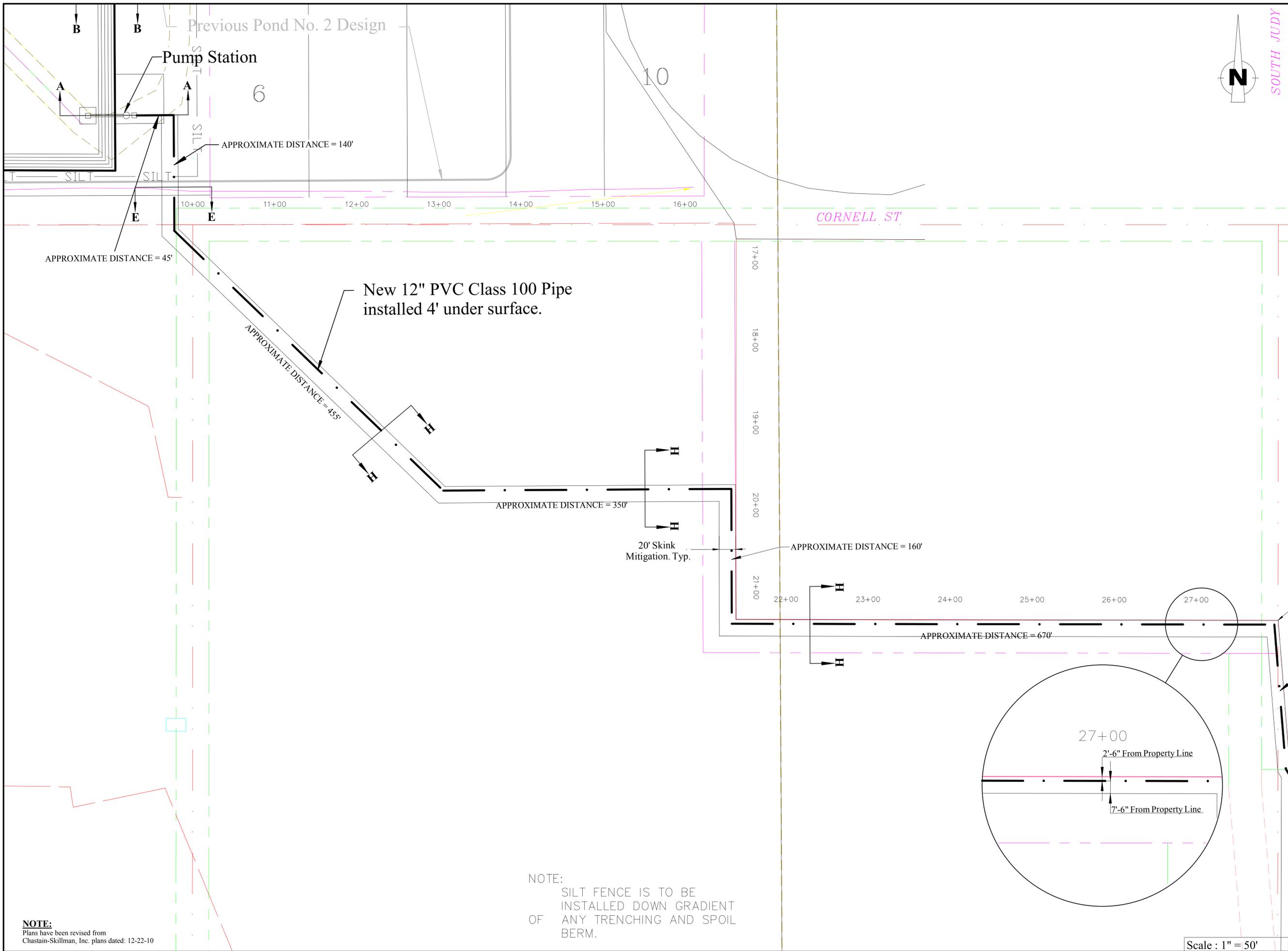
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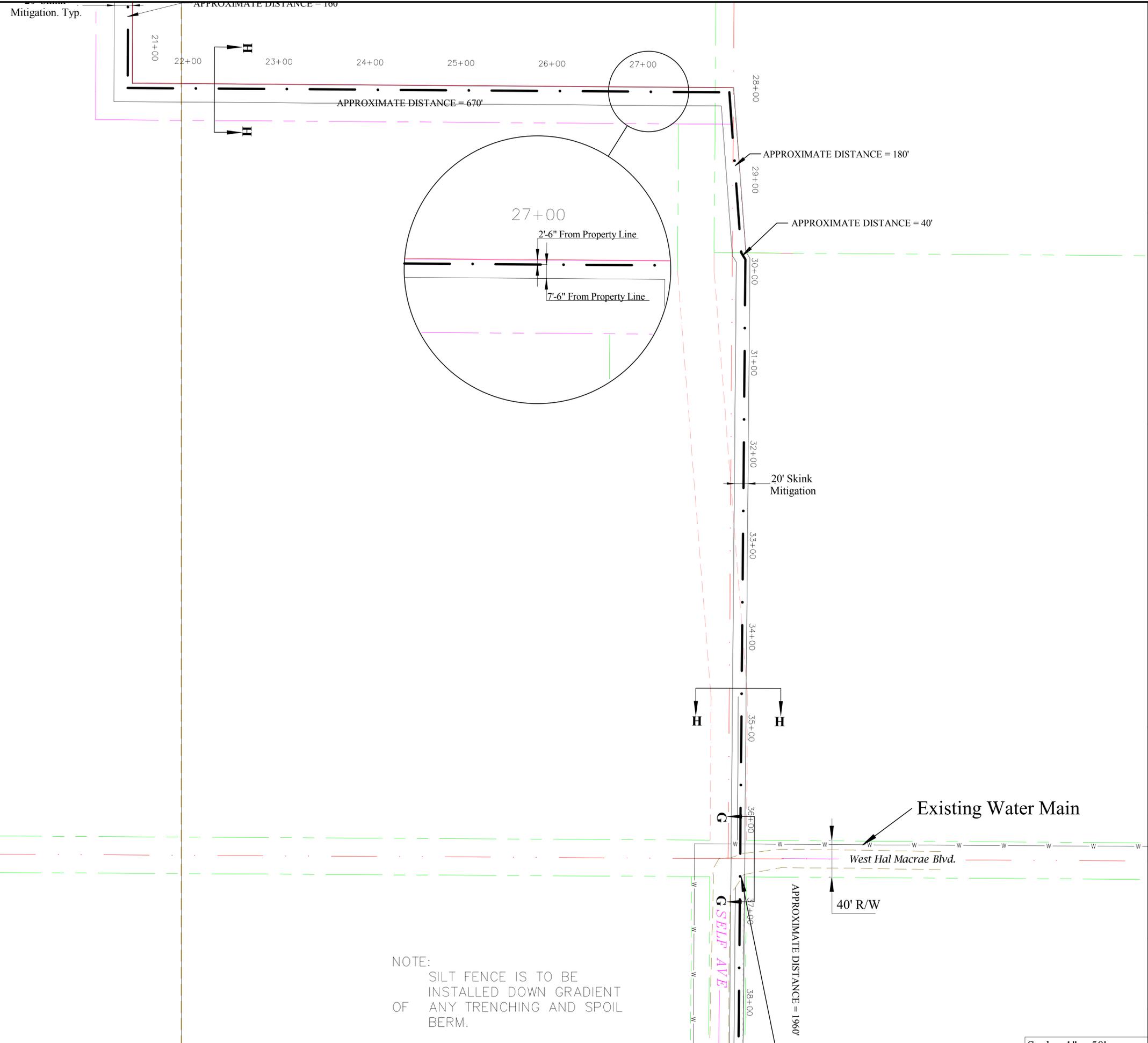
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NOTE:
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Scale : 1" = 50'

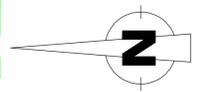
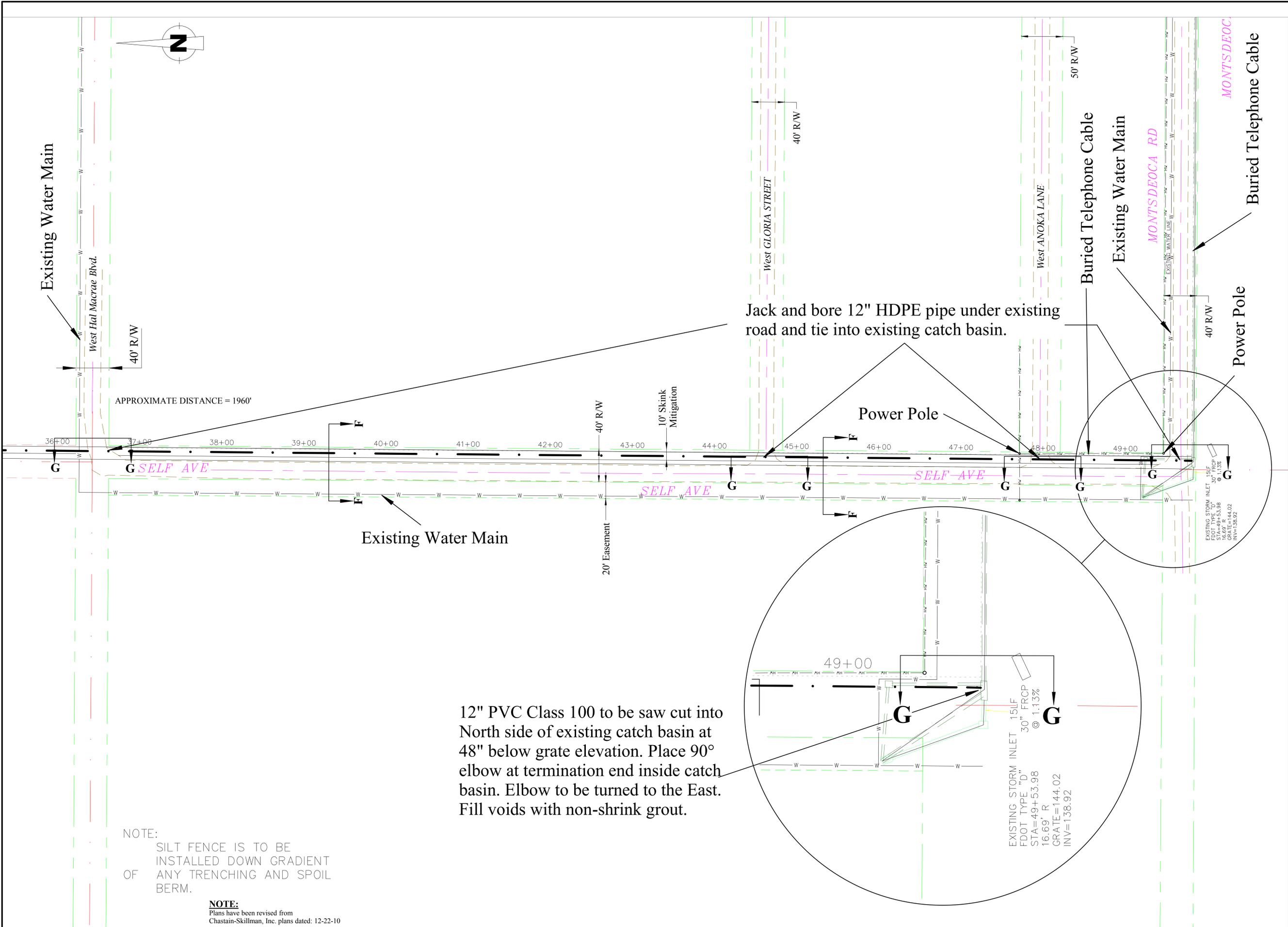


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Scale : 1" = 50'

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06/12/12											
07/16/12											
Sheet 8 of 16											



Existing Water Main

West Hal Macrae Blvd.

APPROXIMATE DISTANCE = 1960'

SELF AVE

Existing Water Main

20' Easement

10' Skink Mitigation

Jack and bore 12" HDPE pipe under existing road and tie into existing catch basin.

Power Pole

Buried Telephone Cable

Existing Water Main

MONTSDEOCA RD

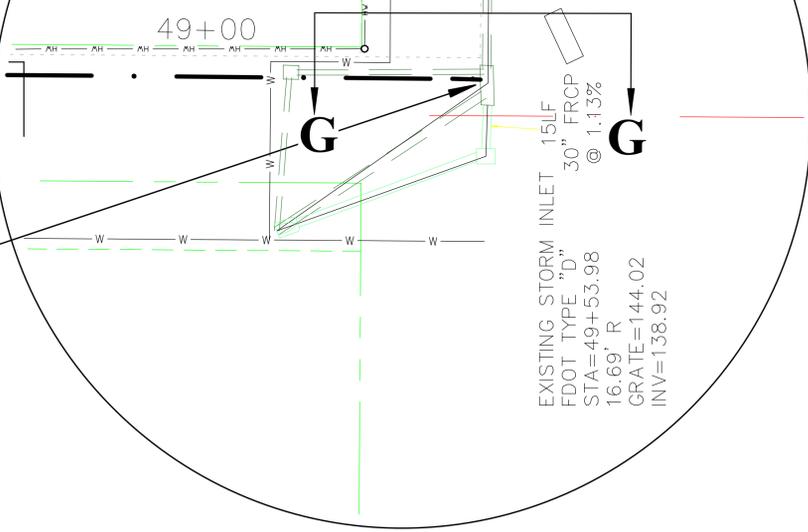
Power Pole

Buried Telephone Cable

12" PVC Class 100 to be saw cut into North side of existing catch basin at 48" below grate elevation. Place 90° elbow at termination end inside catch basin. Elbow to be turned to the East. Fill voids with non-shrink grout.

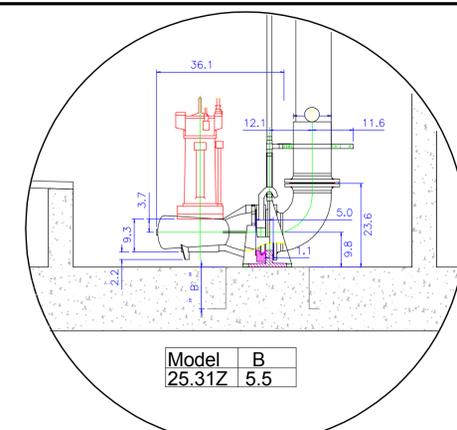
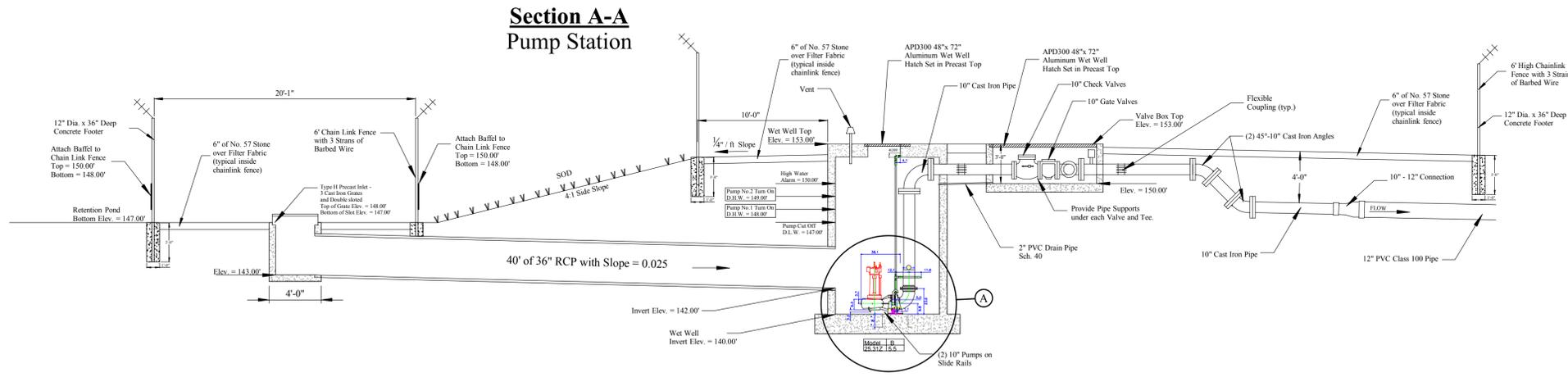
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Sheet 9 of 16											

Scale : 1" = 50'

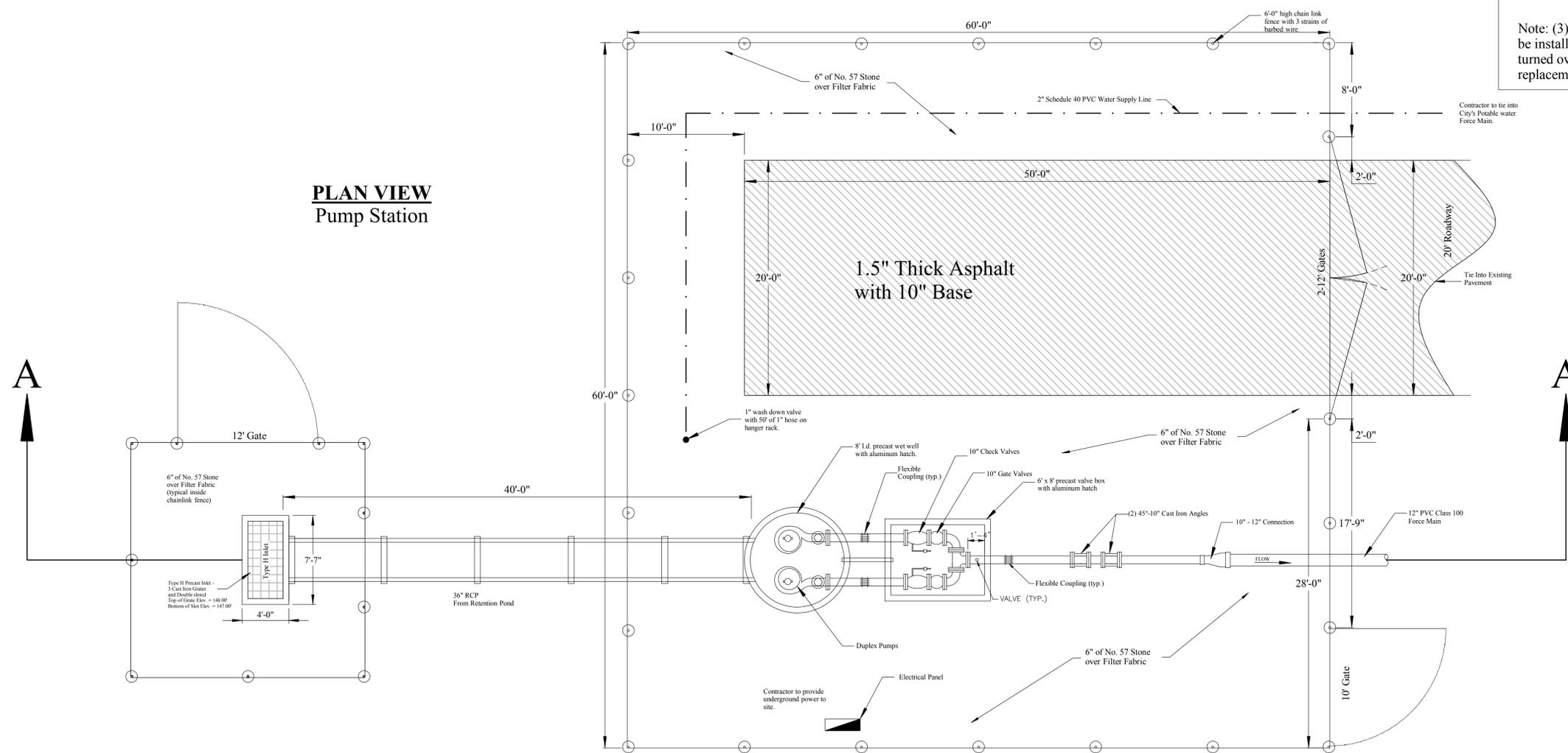


Pump Details

Pumps - 3 WILO (EMU)
 10" Model FA25.31Z
 18 H.P. - 1140 RPM
 460 V - 3 Phase

Supplier - Florida Bearings, Inc.
 (561) 863-3260

Note: (3) Pumps to be purchased. Two pumps to be installed in wet well and one pump to be turned over to the City of Avon Park for a replacement pump.



PLAN VIEW
Pump Station

Plan View
Pump Station

Scale : 3/16" = 1' - 0"

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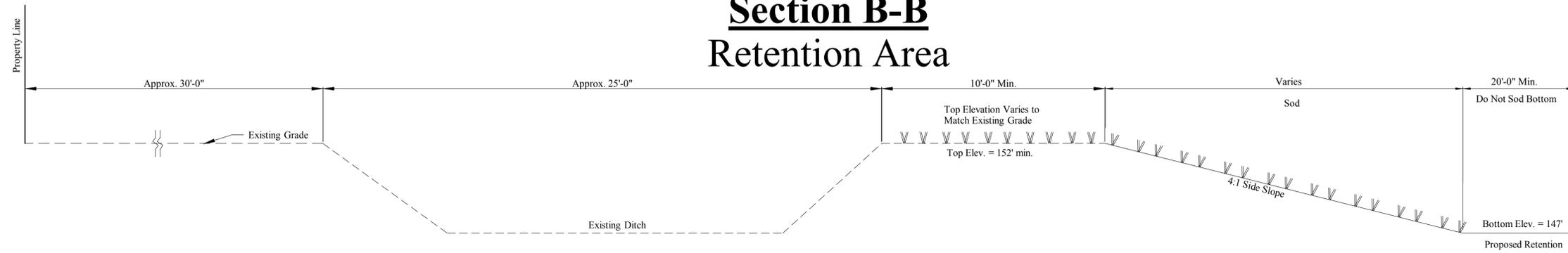
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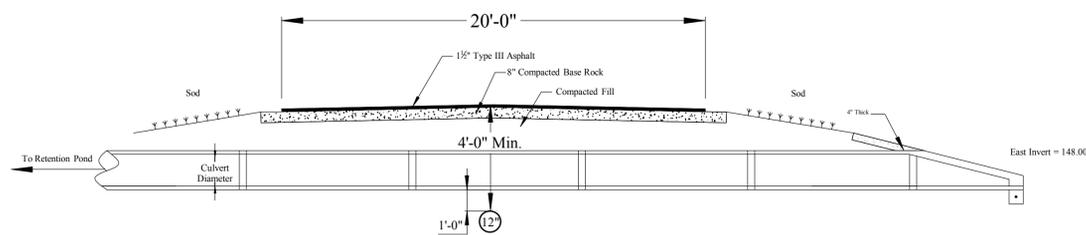
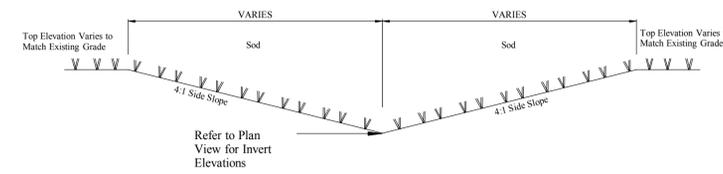
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Section B-B Retention Area

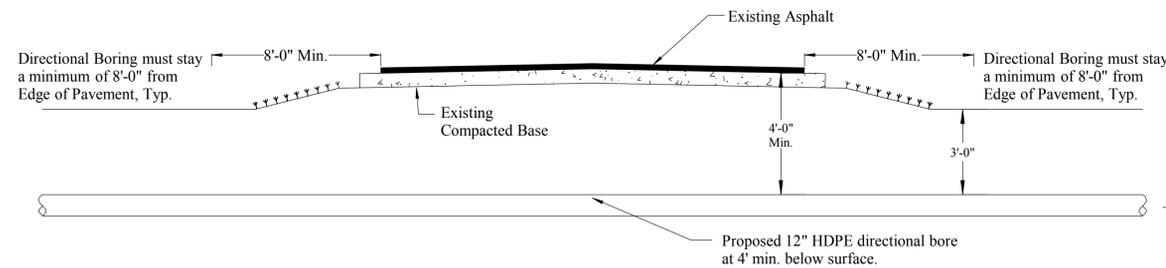


Section C-C Swale



Section E-E Culvert- Force Main

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

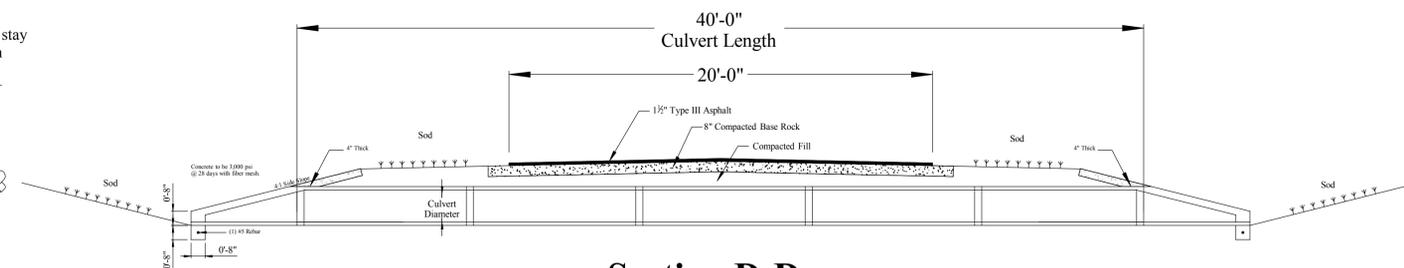


Section G-G Directional Bore

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

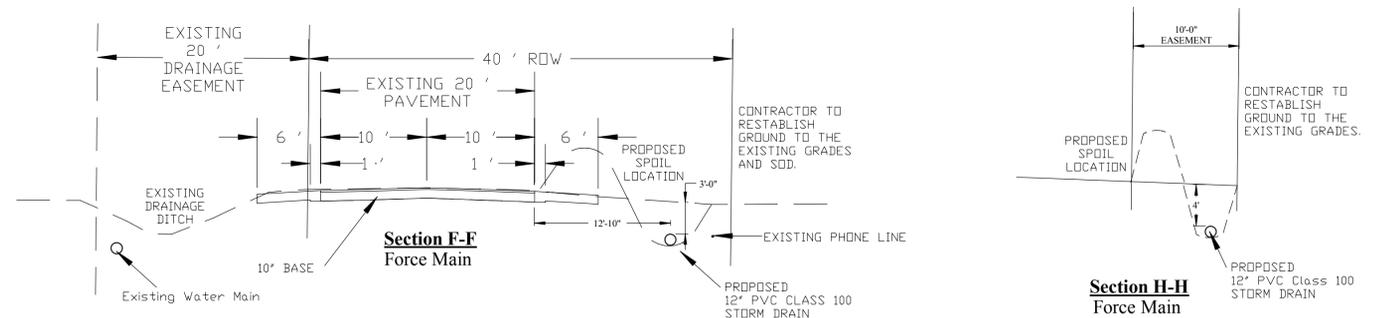
Section D-D Culvert Section Typ.

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



Galvanized Chainlink Fence Details

Height -	6'-0" +3 Strans of Barbed Wire
Mesh -	2"
Wire Gauge -	9 Gauge
Line Post -	2 3/8" O.D. x 0.130"
Corner Post -	2 7/8" O.D. x 0.160"
Wire Ties -	9 Gauge - 16" O.C.
Top Rail -	1 5/8"
Bottom Wire -	No. 7
Barbed Wire -	3 Strans - 12 1/2" Gauge with 4 - Point Barbs on 45° Metal Arms



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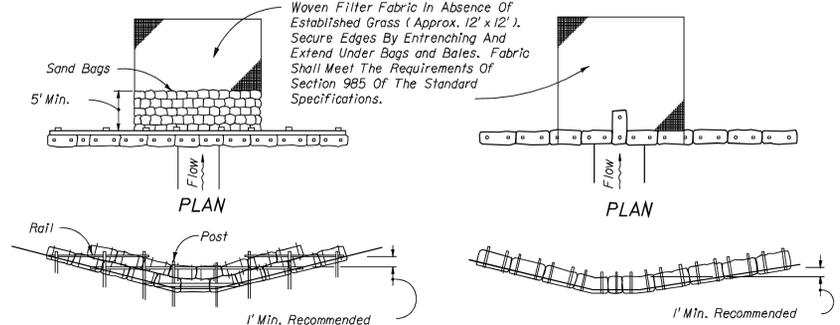
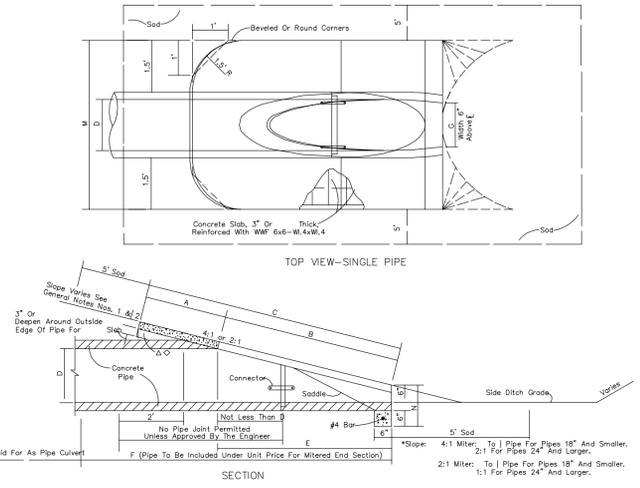
SEAL:

CERT. OF AUTHORIZATION #29713
FLA LICENSE NO 16921
(863) 657-2323 Office
(863) 657-2324 Fax
caul@coilandcobb.com

ENGINEER:
Cool & Cobb Engineering Co.
203 West Main Street
Avon Park, FL 33825

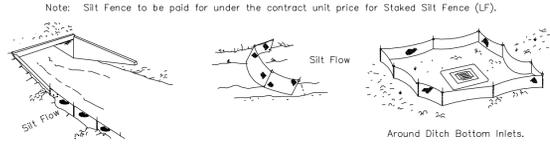
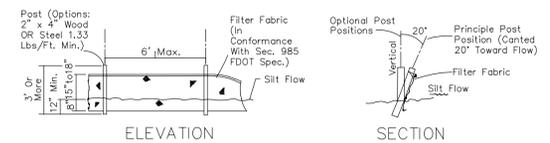
Revisions:	
03/17/11	Original
02/15/12	
06/12/12	
07/16/12	

	DIMENSIONS AND QUANTITIES																				
	D	X	A	B	C	E	F	G	M				N								
									Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe					
2:1 Slope	15	2'-7"	1.93	2.18	4.10	2.06	5'	1.22	4.63	7.21	9.79	12.37	1.19	0.38	0.58	0.77	0.86	21	24	27	30
4:1 Slope	15	2'-7"	2.27	4.09	6.30	4.03	8'	1.22	4.63	7.21	9.79	12.37	1.19	0.57	0.87	1.15	1.44	23	28	29	32



- ELEVATION TYPE II**
- ELEVATION TYPE I**
- NOTES FOR BALED HAY OR STRAW BARRIERS**
- Type I and II Barriers should be spaced in accordance with Chart 1, Sheet 1.
 - Hay bales shall be trenched 3" to 4" and anchored with 2 - 1" x 2" (or 1" dia.) x 4' wood stakes. Stakes of other material or shape providing equivalent strength may be used if approved by the Engineer. Stakes other than wood shall be removed upon completion of the project.
 - Rails and posts shall be 2" x 4" wood. Other materials providing equivalent strength may be used if approved by the engineer.
 - Adjacent bales shall be butted firmly together. Unavoidable gaps shall be plugged with hay or straw to prevent silt from passing.
 - Where used in conjunction with slit fence, hay bales shall be placed on the upstream side of the fence.
 - Bales to be paid for under the contract unit price for Baled Hay or Straw, EA. The unit price shall include the cost of filter fabric for Type I and II Barriers. Sand bags shall be paid for under the unit price for Sandbagging, CY. Rock bags to be paid for under the contract unit price for Rock Bags, EA.

BARRIERS FOR UNPAVED DITCHES
ROCK BAG, BALED HAY, BALED STRAW
AND SILT FENCE BARRIERS
 FDOT INDEX NO. 102



Note: Spacing for Type III Fence to be in accordance with Chart 1, Sheet 1 of 3 and ditch installations at drainage structures Sheet 2 of 3.
 Do not deploy in a manner that silt fences will act as a dam across permanent flowing watercourses. Silt fences are to be used at upland locations and turbidity barriers used at permanent bodies of water.

TYPE III SILT FENCE
SILT FENCE APPLICATIONS
 N.T.S.

NOTE:
 Plans have been revised from
 Chastain-Skillman, Inc. plans dated: 12-22-10

PROJECT:
AVON PARK AIRPORT DRAINAGE
 1545 SR 64 West
 Avon Park, FL 33825

OWNER:
CITY OF AVON PARK
 110 East Main St.
 Avon Park, FL 33825
 (863) 452-4400

SEAL:

CERT. OF AUTHORIZATION #29713
FLA LICENSE NO 16921
 (863) 657-2323 Office
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ENGINEER:
Cool & Cobb Engineering Co.
 203 West Main Street
 Avon Park, FL 33825

Revisions:	
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02/15/12	
06/12/12	

DIVISION : 2

TECHNICAL SPECIFICATIONS

Sec. 02.200 General: The Specifications and Drawings are an integrated part of the Contract Documents and as such will not stand alone if used independently as individual parts, paragraphs, or drawing sheets. The Drawings and Specifications establish minimum standards of quality for a project. They do not purport to cover all details entering into its design and construction or of all material and equipment required to complete the work.

Sec. 02.201. Maintenance of Traffic:

A. Control Devices: The Contractor shall be required to keep the entire work site in full compliance with the Florida Department of Transportation Roadway and Traffic Design Standards, current edition and the USDOT, FHWA Manual on Uniform Traffic Control Devices, current edition.

B. Detours: Detours shall be require approval by the County Engineer. Any detours approved as a part of the traffic circulation plan, shall be required to be properly posted and a minimum of 48-hours advance notice shall be given to the County Engineer's Office, Law Enforcement agencies, Fire Department, School Board and Emergency Services. Advance notice shall also be placed at the last intersection before the detour.

C. Driveways Kept Open: No business will have vehicular access totally blocked at any time. Driveway access to property will not be blocked for more than 8 hours on any day Property owners will be notified in written form by the Contractor 24 hours prior to the blocking of any driveway, business, or property access. Blocking of driveways will require advance approval by the County Engineer.

D. Maintenance of Traffic Violations: The County will report any known violation of the required maintenance of traffic to the Owner, Project Engineer, or Contractor. The Contractor will have 4 hours of regularly scheduled work time to bring the site into full compliance. If this is not done, the County will have the option to take any corrective measures it feels necessary and to bill the Owner for the cost of these measures.

E. Traffic Control Plan Approval: Prior to the commencement of work at the job site, the Project Engineer shall receive approval of his traffic control plan from the County Engineer. Access for local traffic shall be maintained throughout the construction period of the project.

Sec. 02.202. Driveway Ingress and Egress Maintenance: The specifications shall only apply where residences, businesses, and other types of property front on the road to be constructed or reconstructed, and driveway connections are to be disturbed.

A. Contractor will be required to place commercial base material in driveways and/or access points affected by the project, where considered necessary by the Project Engineer to provide safe, stable and reasonable access to residence, businesses, and property.

B. The materials to be used for the driveway maintenance shall be limerock, stone or oyster shell. The grade and quality of the material shall be that offered for commercial supply in the area. Commercial materials used in locations which have inadequate drainage or are prone to be wet, shall be of a stable character, unaffected by wet conditions.

C. The material shall be placed in the driveway as directed by the Project Engineer. The material shall be leveled, manipulated, compacted, to the extent appropriate for the intended use of the particular driveway.

D. As permanent driveway construction is accomplished at a particular location, previously placed commercial materials which are suitable for reuse may be salvaged and reused on other driveways as directed.

Sec. 02.203. Clearing and Grubbing:

A. Clearing and Grubbing shall consist of the complete removal and disposal of all timber, brush, vegetation, stumps, roots, boulders, pavement, rubbish and debris and all other materials and obstructions resting on or protruding through the surface of the existing ground and the surface of work areas. Material resulting from clearing and grubbing shall be disposed of by the Contractor in a proper place.

B. As an exception to the above provisions, where so directed by the Project Engineer and approved by the County Engineer, desirable trees within the roadway shall be trimmed, protected and left standing. Branches of trees extending over the area occupied by the roadway shall be trimmed as directed, to give a clear height of 16 feet above the roadway.

C. Within the right-of-way and within all swales and ditches, all stumps, roots, ect., protruding through or appearing on the surface of the completed excavation shall be removed or cut off below the finished excavation surface. Within all other areas where Clearing and Grubbing is to be done, roots and other debris, projecting through or appearing on the surface of the original ground, shall be removed to a depth of one foot below the bottom of the subgrade.

D. Burning of such materials will only be allowed when proper burn permit can be obtained and all such burning shall be subject to applicable laws, ordinances and regulations and shall be done at locations where trees and shrubs adjacent to the cleared area will not be harmed. Burning may be required to cease immediately if complaints are received by the Project Engineer or the County Engineer.

Sec. 02.204. Earthwork: All materials shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, and all activities performed in accordance with the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.205. Rigid Ditch Checks: All materials shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, and constructed in accordance with the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.206. Riprap (Sand-Cement): All materials shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, and constructed in accordance with the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.207. Inspections, Field Measurements and Laboratory Tests:

A. General: The Contractor shall notify the Project Engineer in advance of the time and date when any tests can be conducted, so that the Project Engineer may schedule the required testing with the independent testing laboratory. The test samples shall be taken by either an employee of the independent testing laboratory or the Project Engineer or his representative. In no case shall the Contractor take the samples or transport the samples to the laboratory. The Project Engineer shall inspect all construction and is authorized to call to the attention of the Contractor any failure of work or materials to conform with the plans and specifications. The following laboratory tests or field measurements and frequency of such shall be made in accordance with the Project Engineer's direction by the independent testing laboratory, at the Project expense, and in keeping with good engineering practices. The Contractor is required to conduct and/or stop his work so that the appropriate tests, samples and measurements can be made in a safe manner. The Contractor shall receive copies of the test reports from the Project Engineer. The independent testing laboratory shall mail or hand deliver copies of all tests directly to the office of the County Engineer.

B. Sub-Based and Shoulder: Sub-base and shoulder tests shall be made as follows:

1. Proctor: one per mile unless the native soils are significantly different. In that case, one per every major soils type. Sample shall be taken from the roadway after scarifying and mixing.

2. Width: every 200 feet after sub-base and shoulders have been mixed, and compacted and prior to any "boxing out" operation.

3. Depth:

a. Sub-base: every 200 feet within the area to be covered by the base material after final grading and compaction; just prior to the placement of the base material. Tests will be conducted in a zig-zag pattern covering the entire area described above.

b. Shoulder: every 400 feet, each side, within the shoulder areas prior to any "boxing out" operation, but after mixing and compaction.

1. Florida Bearing Value (FBV): At 200 foot, intervals take three samples. Samples shall be taken from one foot in from each outside edge of the shoulder and one from within the traffic lane (areas). Combine the top 1/2 of three consecutive samples into one composite sample and combine the bottom 1/2 of the same three samples into another single composite sample. Minimum acceptable FBV is 60 psi. (No tolerance acceptable)

2. Density:

a. Sub-base: every 200 feet, in a zig-zag pattern, and just prior to the placement of the base. Every other test will be made at the proposed edge of the pavement. Minimum acceptable value: 95% density as per AASHTO T-180.

b. Shoulder: every 400 feet, one to two feet in from the outside edge of the shoulder, on each side of the road. Density samples shall be taken just prior to the "boxing out" operation for the base. Minimum acceptable value: 95% density as per AASHTO T-180.

3. Failures: Any failure revealed by the required field measurements and laboratory tests requiring additional material shall require the Contractor to scarify the existing material, place the additional material and then reshape and re-compact the sub-base for a minimum distance of 50 feet each side of the failure. Deficient density will require additional compaction a minimum of 50 feet each side of the failure.

4. Placement of the base: The base shall be placed on the sub-base only after copies of the results of the required field measurements and laboratory tests for the sub-base have been received and approved by the Project Engineer.

C. Base (Limerock or Shellrock): Tests for the base shall be made as follows:

1. Material: For material whose source is an FDOT approved and certified mining pit, submittal of copies of the pit certification shall be required; for material from any other source, submittal of test results from an approved testing laboratory in accordance with a Base Material Testing Plan, approved in advance by the County Engineer, shall be required.

2. Proctor: one per mile unless the base material changes in quality; sample must be taken from an on-site stockpile.

3. Width, Depth, Crown: every 200 feet as shown on plans. See typical sections in Section Six: Illustrations for minimum requirements.

4. Density: every 200 feet in a zig-zag pattern within the areas to be covered by pavement. Minimum acceptable value: 95% density as per AASHTO T-180.

5. Base Failures: Any failures of the base revealed by the required field measurement and laboratory tests requiring additional base material shall require the Contractor to scarify the existing base material, place the additional material and then re-shape and re-compact the base for a minimum distance of 50 feet each side of the failure. Deficient density of the base will require additional compaction a minimum of 50 feet each side of failure.

6. Base Priming: Once the base is approved by the testing laboratory, the Contractor shall as soon as possible prime and sand-seal the base. Approval Engineer receives the results of the field measurements and laboratory tests directly from the independent testing laboratory.

D. Shoulder: The finished shoulder area is intended to be compacted to a smooth, firm condition that can accommodate vehicles without ruts being created. If in the opinion of the Project Engineer, excess unsuitable material has been incorporated into the top 6 inches of the shoulder, he may require that stabilizing material be added and mixed to produce a FBV of 60 psi, and be compacted to a minimum density of 95% as per AASHTO T-180.

E. Trenches for Underground Pipes or Structures: The following tests shall be made:

1. Proctor: one per mile of trench unless the material changes; if material changes one per each different soil material allowed for backfill.

2. Density: every 200 feet outside areas of vehicular traffic and every 10 feet where the trench crosses an area of vehicular travel, including driveways. Frequency of testing will be the same for each lift. Each compacted one foot depth of backfill is a lift. Testing of density will start when backfill is 12 inches over the top of the pipe. Tests will be done within the width of the trench as indicated by the Project Engineer.

3. Density Requirements: The density requirements are that:

a. In areas of proposed or existing pavement or vehicular traffic all backfill, sub-base, and base material shall be compacted to 98% of maximum density as per AASHTO T-180; and

b. In other areas not under proposed or existing paving or in areas not subject to vehicular traffic, the backfill shall be compacted to 90% density as per AASHTO T-180.

Sec. 02.208 Tolerances: The required thickness and widths shall be the absolute minimum allowable. No allowance will be made for failure in a width or depth dimension. Florida Bearing Value and density requirements shown on the plans and specifications are the absolute minimum allowable and no values less than those specified will be accepted. Grades on roadway centerline and ditch inverts shall be plus or minus 0.05 of a foot from plan dimensions.

Sec. 02.209. Stabilized subbase and Shoulders: All materials shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, and constructed in accordance with the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.210 Limerock or Shellrock Base: All materials shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, and constructed in accordance with the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.211. Asphalt: All materials shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, type S asphalt concrete shall be in accordance with the Florida Department of, Transportation Standard Specifications for Road and Bridge Construction, 2000 edition, and constructed in accordance with the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.212. Pavement Marking: All materials shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, and constructed in accordance with the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.213. Signs: All materials and installation methods shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, USDOT, FHWA Manual on Uniform Traffic Control Devices, current edition, and State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.214. Culverts/Storm Sewers: All materials shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, and constructed in accordance with the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.215. Grassing: All materials and installation procedures shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, and the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition. The areas on which the sod is to be placed shall contain sufficient moisture for optimum results after being placed. The sod shall be watered and kept in a moist condition for no less than two weeks (minimum) or until the entire project is accepted by the Project Engineer and the County Engineer. The moistened condition shall extend at least to the full depth of the rooting zone. Water shall not be applied, however, when there is danger of a freezing condition.

Sec. 02.216. Staked Slit Fences: All materials and installation procedures shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, and the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.217. Temporary Prevention, Control, and Abatement of Erosion and Water Pollution: All materials and installations shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, and constructed in accordance with the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.218. Fencing: All materials shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, and constructed in accordance with the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.219. Guardrail: All materials shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, and constructed in accordance with the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.220. Concrete: All materials shall be in accordance with the Florida Department Standard Specifications for Road and Bridge Construction, current edition, and constructed in accordance with the State of Florida Department of Transportation Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, current edition.

Sec. 02.221. Field Engineering, Surveying and Right-of-Way Staking:

A. Field engineering and surveying services shall include survey work to establish right-of-way lines and levels and to locate and lay out site improvements, structures, and controlling lines and levels required for the construction of the work. Also included are such Engineering services as are specified or required to execute Contractor's construction methods. Engineers and Surveyors shall be licensed professionals in the State of Florida.

B. Existing basic horizontal and vertical control points for the project are those designated on the Drawings. Contractor shall locate and protect control points prior to starting site work and shall preserve all permanent reference points during construction. In working near any permanent property corners or reference markers, Contractor shall use care not to remove or disturb any such markers. In the event that markers must be removed or are disturbed due to proximity of the construction work, Contractor shall have them referenced and reset by a Land Surveyor qualified under the laws of the State of Florida.

C. Contractor shall lay out the work at the location and to the lines and grades shown on the Drawings. Survey notes indicating the information and measurements used in establishing locations and grades shall be kept in notebooks and copies furnished to Project Engineer and the County Engineer. As a minimum the following items will be staked:

- 1. Right-of-way, staked at each station or wherever the right-of-way changes width or direction, at any offset desired;
- 2. Cut or fill to centerline grade and swale grade at each station or wherever changes occur at points of vertical intersection; and
- 3. Set proposed centerline elevation of all intersecting roads one time and noted those elevations in field book; compare those elevations and bring any discrepancies to the attention of the Project Engineer.

All the above mentioned survey work will be done by a Surveyor licensed to practice in the State of Florida.

Sec. 02.222. Obstructions in Right-of-Way:

A. Headwalls, fences, mail boxes, statues, walkways, and other obstructions placed in the right-of-way will be removed from the work area, as required to keep the work progressing, by the Contractor. In the event that the owner cannot be identified or is unable or unwilling to remove said obstructions themselves, the obstruction will be posted with a Notice, in Writing, by the Contractor 24 hours prior to any removal, that said object will be removed. The Contractor will not be responsible for any damage to said objects that occurs while being moved by the Contractor, after proper notification and the approval of the Project Engineer. Any objects that are removed from within the right-of-way, except mailboxes, will be hauled away and disposed of by the Contractor in a proper landfill.

B. Mailboxes moved during construction, will be replaced at a location 3 feet from the edge of pavement by the Contractor, providing the support pole is wood and less than 4 inches in diameter or is a breakaway type pole. If the original support pole is damaged or unsatisfactory, the Contractor will not be required to replace or relocate the mailbox.

Sec. 02.223. Shop Drawing Submittals: The following information and/or drawings shall be submitted to the Project Engineer prior to beginning work:

- A. Information on the pipe and culverts, indicating the type, class, size, and other relevant information;
- B. Asphalt mix design;
- C. Documentation on all other materials used including, but not limited to, filter fabric, guardrails, concrete, steel posts, curing compound, and joint material;
- D. Sample of tag for written notification of owners; and
- E. Traffic plan (a drawing to scale of each phase showing all barricades, signs and flag men is required).

PROJECT:
AVON PARK AIRPORT DRAINAGE
1545 SR 64 West
Avon Park, FL 33825

OWNER:
CITY OF AVON PARK
1110 East Main St.
Avon Park, FL 33825
(863) 452-4400

SEAL:

CERT. OF AUTHORIZATION #29713
FLA LICENSE NO 16921
(863) 657-2323 Office
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catl@coolandcobb.com

ENGINEER:

Cool & Cobb Engineering Co.
203 West Main Street
Avon Park, FL 33825

Revisions:	
03/17/11	Original
02/15/12	
06/12/12	

CONSTRUCTION SURFACE WATER MANAGEMENT PLAN

SITE DESCRIPTION AND GENERAL INFORMATION

Project Name and Location

This Construction Surface Water Management Plan (CSWMP) pertains to the improvement of drainage in the immediate vicinity of Avon Park Municipal Airport. The project is located in the City of Avon Park, Highlands County, Florida. The project can also be located in Section 02, Township 33S and Range 28E.

Owner Name and Address

City of Avon Park
Julian Deleon, Acting City Manager
110 East Main Street
Avon p-ark, FL 33825

Project Description

This project entails the construction of two (2) interconnected wet detention ponds and the installation of a storm conveyance system to direct discharge from the pond to Lake Anoka

Soil disturbing tasks will include: Clearing of the project area; trenching and road construction. Silt screen, hay bales and other sediment capturing and migration reduction and erosion protection devices shall be added prior to any soil disturbing activities. Sodding or other stabilization measures of all areas will be conducted as soon as practicable in disturbed areas during and upon completion of construction.

The NRCS Highlands County Soil Survey reports the presence of Tavares sands. The Hydrologic Soil Group is primarily A.

Runoff Coefficient

The final site conditions will be a mixture of pervious and impervious areas. The resulting runoff coefficient is estimated to be approximately 0.38.

Sequence of Major Activities

The order of major activities will be as follows:

1. Install silt screen and inlet protection as shown on plans. Silt fence shall be used in lieu of temporary perimeter swales. Install hay bales or other approved measures for inlet protection.
2. Clear and grub construction area.
3. Stabilize cleared areas within 14 days of last disturbance if runoff is not captured by stormwater swales.
4. Install stormsewer conveyance systems.
5. Complete grading and install permanent sodding or other suitable stabilization.
6. When all construction is complete, stabilize (e.g. sod, seed/mulch, etc.) any remaining disturbed areas.

Sufficient precautions shall be taken to prevent pollution of streams, canals, lakes, reservoirs, wetlands, and other water impoundments. Also, operations shall be conducted and scheduled so as to avoid pollution or siltation of streams, water bodies, etc.

The existing project area is a scrub area and pervious right-of-way. There is no existing storm water management system in the project area. Any existing runoff generated by a storm event follows the storm water conveyance system and drains into Lake Anoka.

STORMWATER POLLUTION PREVENTION

Erosion and Sediment Transport Prevention

The work specified in this section consists of measures required to control erosion and transport of sediments within and from the project area, so as to prevent the degradation of receiving waters, detrimental effects on public or private property adjacent to the project and damage within the project area. These measures will include the construction and maintenance of temporary and permanent erosion controls.

Construction operations shall be restricted to those areas where it is necessary to perform filling or excavation to accomplish the work shown on the drawings and to those areas which must be entered to construct temporary or permanent structures. As soon as the conditions will permit, rivers, streams, impoundment, stormwater storage and conveyance systems and any onsite receiving water bodies shall be promptly cleared of all obstructions placed therein or caused by construction operations. Under no conditions shall runoff from unstabilized areas be directed or be allowed to discharge directly to Waters of the State or across the site's property limits without onsite treatment.

Erosion Practices

Permanent erosion control features shall be incorporated into the project at the earliest practical time. Temporary control features will be used to correct conditions that develop during construction which were not foreseen at the time of design to control erosion prior to the time it is practical to construct permanent control features.

Temporary erosion control may be used in controlling erosion in areas where conditions not under the control of the contractor preclude completion of a section of a project in a continuous manner, and for controlling erosion in areas where construction operations must be performed subsequently will cause damage to permanent erosion control features. Temporary erosion and water pollution control features shall consist of, but not be limited to, grass, temporary mulching, sandbagging, sediment basins, sediment checks/earth ditch checks, berms, floating turbidity barriers, hay bales and silt fence.

Stabilization Practices

Temporary Stabilization - Soil stock piles and disturbed portions of the site where construction activity temporarily ceases for at least 21 days will be stabilized within 14 days from the last construction activity in that area. These areas shall be stabilized with temporary seed and mulch. The surface areas of unprotected erodible earth exposed by clearing and grubbing, excavation or filling operations shall be kept to a minimum as practicable.

Permanent Stabilization - All disturbed portions of the site where construction activities have permanently ceased will be stabilized by sod or seed and mulch in accordance with the Landscaping Plans and/or Construction Plans.

Structural Practices

Staked Silt Screens - Will be installed according to the plans to protect offsite areas from any possible adverse effects from sediments. Sediment will be removed from the upstream side of any silt screen once the accumulated sediment reaches 1/3 the height of the silt screen. Any sediment deposits or soil disturbance created during the installation and removal of silt screen shall be dressed to conform to the finished grade. The silt screen shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Where deficiencies exist, additional silt fences shall be installed or replaced. Attachment of silt screen to existing trees will not be permitted unless approved by Project Engineer.

Hay bales or other approved measures will be placed around existing inlets as indicated on the plans.

Floating turbidity barrier will be placed in Lake Anoka in proximity to the proposed outfall location.

Non-storm water discharges

The following discharges may be associated with this construction project:

- Discharges from fire fighting activities.
- Fire hydrant flushings.
- Potable water sources (including waterline flushings).
- Uncontaminated ground water (including dewatering ground water infiltration).
- Foundation or footing drains where flows are not contaminated with process materials such as solvents.
- Irrigation water.
- Exterior building wash downs.
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred and where detergents are not used.
- Air conditioning condensate.
- Springs, riparian habitats and wetlands.

Runoff from the above mentioned discharges will be directed to a temporary sediment basin prior to discharge to the receiving water. The location of the temporary sediment basin will be dictated by the amount and type of discharge anticipated. Due to the nature of construction activities the location of temporary basins is a dynamic function and will be determined by the on site contractor supervisor.

Receiving Water

The proposed discharge flows to Lake Anoka at approximately 27° 34' 49" N and 081° 30' 52" W.

Note: The following controls concern day-to-day activities on the site. The site superintendent is responsible for seeing that they are carried out appropriately.

Waste Disposal

Waste Materials - All waste materials will be collected and stored in metal dumpsters and then hauled to an approved disposal site. The dumpsters will meet all county and state solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpster. No construction waste will be buried on the site. All personnel will be instructed in the correct procedure for waste disposal. Employee waste and other loose materials, e.g., cups, cans, bags, etc., will be collected so as to prevent to release of "floatables" during runoff events.

Hazardous Waste - All hazardous waste materials will be disposed of in the manner specified by local or state regulations, or by the manufacturer.

Sanitary Waste - All sanitary waste will be collected from the portable units in a timely manner meeting all local and state regulations.

Offsite Vehicle Tracking

Monitoring of offsite tracking of sediments at the entrances is essential where silt fence will not be placed to enable access to the site. Daily inspections and street sweeping of the construction entrance areas are required to prevent offsite tracking of sediments. If it appears that significant amounts of sediment are being tracked off the site, gravel entrances are recommended to help dislodge the soil, sediment and dirt before the vehicles leave the site. Any dump trucks hauling material to and from the site shall be covered by a tarpaulin.

Timing of Control Measures

As indicated in the Sequence of Major Activities, the erosion and sediment control measures shall be placed prior to removal of the existing stabilized soils. Areas where the ground has been disturbed and construction activities temporarily will cease for more than 21 days shall be stabilized with a temporary seed and mulch within 14 days of the last disturbance. Once construction activity ceases permanently in an area where the ground has been disturbed that area will be stabilized with sod or other suitable stabilization materials. After the site is stabilized, all excess sediments and debris will be removed from the ponds receiving direct runoff from the area.

CERTIFICATION OF COMPLIANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS

The onsite practices shall comply with this stormwater pollution prevention plan as well as reflect the requirements of the:

1. FDEP's NPDES Generic Permit for Construction Activities, 62-621.300(4), F.A.C.)
2. EPA 832-R-92-005; Stormwater Management for Construction Activities.
3. All state requirements of stormwater management systems under chapters 40D-4, 40D-40 and 40D-400 of the Florida Administrative Code, as administered by the Southwest Florida Water Management District.

MAINTENANCE/INSPECTION PROCEDURES

Erosion and Sediment control Inspection and Maintenance Practices

The following practices will be utilized to maintain erosion and sediment controls:

All control measures will be inspected at least once every seven (7) days and within 24 hours of any rainfall exceeding 0.50 inches.

All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of its reporting.

The swales, ditches and drainage structures will be inspected for depth of sediments. Sediments will be removed at the completion of the construction.

Temporary seeding and permanent sodding or seeding/mulching will be inspected for bare spots, washouts, and healthy growth. Any problems will be corrected.

A qualified person will be designated to perform the inspections and fill out the inspection and maintenance report.

The silt screen and hay bales shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Where deficiencies exist, additional silt fences shall be installed or replaced. Sediment will be removed from the upstream side of any silt screen once the accumulated sediment reaches 1/3 the height of the silt screen. Any sediment deposits or soil disturbance created during the installation and removal of silt screen shall be dressed to conform to the finished grade.

INVENTORY OF BUILDING MATERIALS EXPECTED TO BE PRESENT ONSITE

Materials present onsite during construction will include those normally associated with this type of construction:

Concrete, steel reinforcing bars and related materials, lumber, paints, petroleum based products.

MATERIAL MANAGEMENT (POLLUTION PREVENTION) PRACTICES

The following material management practices will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff:

General Practices

The following general practices will be followed onsite during the construction project:

Sufficient precautions should be taken to prevent pollution of water bodies directly or indirectly with fuels, oils, bitumens, calcium chloride, or other harmful materials

An effort will be made to store only enough products required for this project.

All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.

Products will be kept in their original containers with the original manufacturer's label.

Substances will not be mixed with one another unless recommended by the manufacturer.

Whenever possible, all of a product will be used before disposing of the container.

Manufacturers' recommendations for proper use and disposal will be followed.

The site will be inspected daily to ensure proper use and disposal of materials.

Hazardous Products

The following practices will be utilized to reduce the risks associated with hazardous materials:

Products will be kept in their original containers unless they are not resealable.

Original labels and material safety data will be retained; they contain important product information.

If surplus product must be disposed of, manufacturers' or local and state recommended methods for proper disposal will be followed.

Product Specific Practices

The following product specific practices will be followed onsite:

Petroleum products - All onsite vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.

Paints - All containers will be tightly sealed and stored when not in use. Excess paint will not be discharged to the storm sewer, pond system, or receiving water but will be properly disposed of according to manufacturers' instructions or state and local regulations.

Concrete Trucks - Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water on the site.

Spill Prevention and Cleanup

In addition to the materials management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the locations of the information and cleanup supplies.

Materials and equipment necessary for spill cleanup will be kept in the material storage area that is onsite. Equipment and materials will include brooms, dust pans, gloves and plastic and metal trash containers, etc. specifically for this purpose.

All spills will be cleaned up immediately after discovery.

The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

Spills of toxic or hazardous material will be reported to the appropriate state or local government agency, regardless of the size.

The spill prevention plans will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up this type of spill if there is another one. A description of the spill, its cause, and the cleanup measures will also be included.

EROSION AND SEDIMENT CONTROL CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: _____
Acting City Manager
110 East Main St.
Avon Park, FL 33825

Date: _____

NOTE:
Plans have been revised from
Chastain-Skillman, Inc. plans dated: 12-22-10

PROJECT:

AVON PARK AIRPORT DRAINAGE
1545 SR 64 West
Avon Park, FL 33825

OWNER:

CITY OF AVON PARK
110 East Main St.
Avon Park, FL 33825
(863) 452-4400

SEAL:

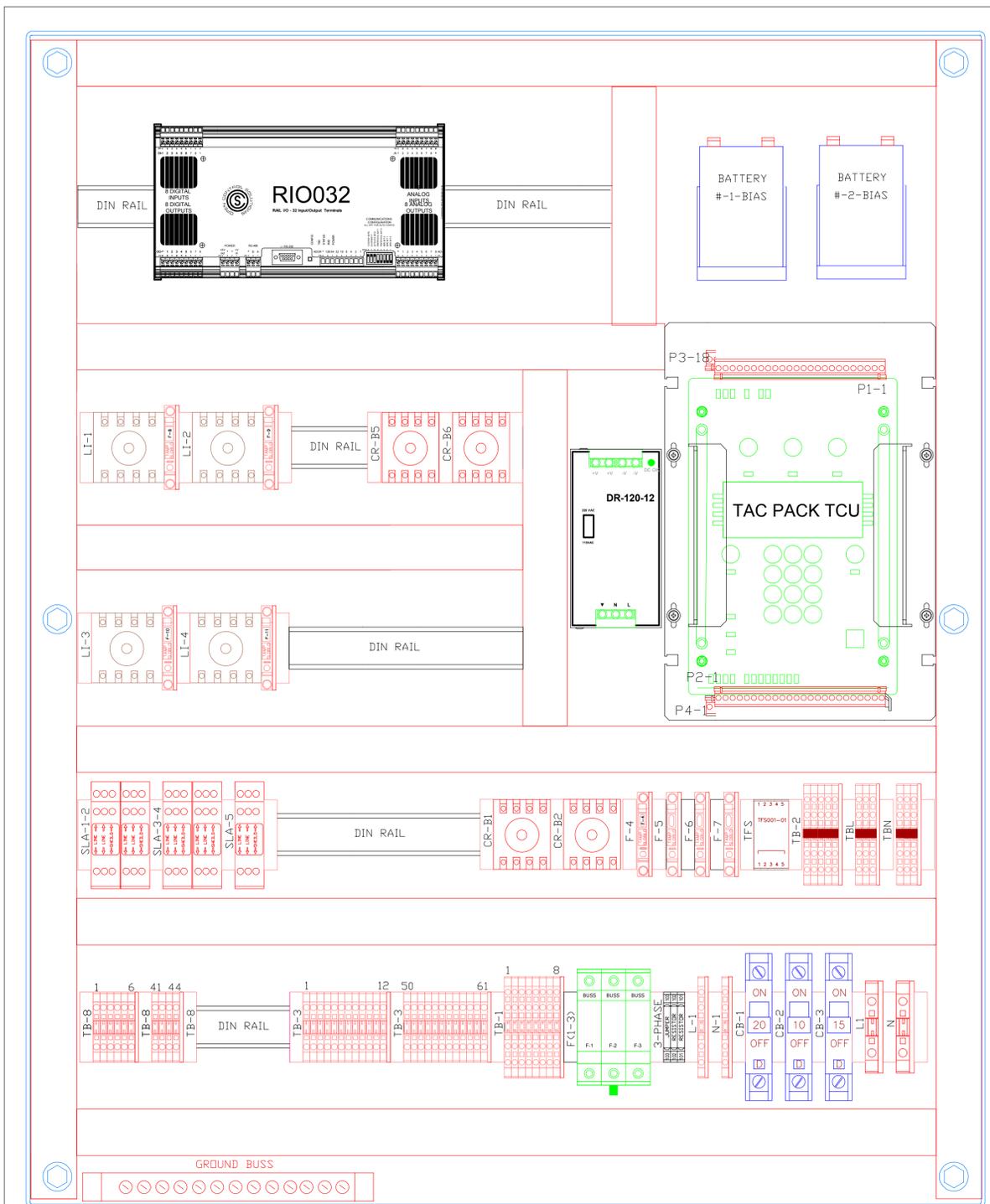
CERT. OF AUTHORIZATION #29713
FLA LICENSE NO 16921
(863) 657-2323 Office
(863) 657-2324 Fax
caul@coolandcobb.com

ENGINEER:

Cool & Cobb Engineering Co.
203 West Main Street
Avon Park, FL 33825

Revisions:

03/17/11	Original
02/15/12	
06/12/12	



PANEL IS FOR 36X30 ENCLOSURE

JOB NO.	DATA FLOW SYSTEMS, INC. MELBOURNE, FL		DFS-00000-000-000
DRAWN: MCV	TITLE:	TAC PACK TCU & RIO-32 2-PUMP VFD APPLICATION INNER PANEL LAYOUT	
CHK'D: X.X.X		REV.	B
ENGR: X.X.X			
DATE: 05/02	SCALE: NTS	SHEET:	1 OF 1



OVERVIEW

The RIO032 is a unique "open architecture" rail-mounted input / output device. Ideal for use in all industries, the RIO032 supports industry standard Modbus ASCII and RTU protocols; TCP protocol supported through optional network-to-serial converter (RAIL Network Adapter). This device is used for local and remote monitoring and control over wide-area Wireless and Ethernet networks. A built-in RS-232 serial connector is available for interfacing with communication equipment and an optional network adaptor is available for Ethernet.

Featuring 32 I/O points, the RIO032 is suitable for just about any application. The built-in RS-485 serial connector provides the ability to connect up to thirty-two RIO-032 devices for a total expansion to 1,024 I/O points.

This open architecture device not only ensures interoperability with other devices, it also provides compatibility with hundreds of popular SCADA / DCS software packages, PLCs, process controllers and instrumentation.

KEY FEATURES

- 8 Discrete Inputs
- 8 Discrete Outputs
- 8 Analog Inputs (12 Bit Resolution)
- 8 Analog Outputs (12 Bit Resolution)
- Use Analog Inputs as Discrete Inputs
- I/O Expansion up to 1,024 Points
- RS-232 & RS-485 Serial Connections
- Modbus ASCII and RTU Protocols
- Modbus TCP via RAIL Network Adapter (RNA)
- 1200-38400 Baud Rate
- Non-Isolated 0-24V Single-Ended I/O
- Standard Din Rail Mounted Device
- Size: 9.63"W x 5.69"H x 2.83"D
- 3 Year Parts & Workmanship Warranty

www.OPENCENTRALSOLUTIONS.COM

605 N. JOHN RODES BLVD., MELBOURNE, FL • 321-435-5010 • SALES@OPENCENTRALSOLUTIONS.COM



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TELEMETRY CONTROL UNIT

BRIEF OVERVIEW:

The Telemetry Control Unit (TCU) is a fully-programmable, dual-function device. The TCU can be factory-programmed to control up to three fixed speed pumps; or it can be custom programmed for a specialized control application.

As a pump control device, the TCU contains all the hardware and software needed to control up to three motor starters based on level input. Float ball switches, pressure transducers, or other types of analog level sensors are supported.

When used as a custom programmed device, the TCU can control up to six discrete devices, monitor up to 12 discrete inputs and monitor up to two analog devices.

The TCU features dual double-speed microcontrollers. One handles the control functions while the other manages the unit's communications. The TCU is available with an optional factory-integrated synthesized radio, network interface adapter, or a standard telephone line compatible autodialer.

The unit's AC phase monitor uses TrueRMS to produce accurate and exact 3-phase voltage readings. The analog inputs are 12-bit for superior accuracy and resolution. An auxiliary input function as a standard discrete input or pulse counter for a tipping bucket rain gauge. An RS-485 serial interface enables communication with industry-standard devices and VFD motor controllers. In addition, the unit features an RS-232 Modbus ASCII interface.

For ease of operator interface, the TCU incorporates a large 4x20-character LCD display and 12-button keypad. Eight LEDs surrounding the display are programmable for at-a-glance status indication.

KEY FEATURES:

- User Configurable for up to 3 Pumps
- Three "Fail-Safe" HOA Switches
- Integrated Elapsed Time Meters
- Use Floats and/or Level Transducer
- Integrated Pump Alternator
- 240 & 480 VAC 3-Phase Monitor
- Alarm Light & Horn Outputs
- On-Board Alarm Silence Button
- Integrated 115 VAC Power Supply
- 12V Back-up Battery Charger
- 12 LEDs for Input & Output Status
- Tipping Bucket Rain Gauge Input
- 4 x 20 Character LCD & Keypad
- RS-485 & RS-232 Interface
- M.O.V., Transorb & Opto-isolated
- Programmable for VFD Control
- Optional Radio & Network Hardware
- Three Year Parts & Labor Warranty
- Warranty includes Lightning Damage
- Compatible with TAC II SCADA System

Manufactured by: Data Flow Systems, Inc. • 605 N John Rodes Blvd. • Melbourne, FL 32934 • 321-259-5009

05/25/2005



TELEMETRY CONTROL UNIT

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- Integrated Elapsed Time Meters
- Use Floats and/or Level Transducer
- Integrated Pump Alternator
- 240 & 480 VAC 3-Phase Monitor
- Alarm Light & Horn Outputs
- On-Board Alarm Silence Button
- Integrated 115 VAC Power Supply
- 12V Back-up Battery Charger
- 12 LEDs for Input & Output Status
- Tipping Bucket Rain Gauge Input
- 4 x 20 Character LCD & Keypad
- RS-485 & RS-232 Interface
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- Programmable for VFD Control
- Optional Radio & Network Hardware
- Three Year Parts & Labor Warranty
- Warranty includes Lightning Damage
- Compatible with TAC II SCADA System

Manufactured by: Data Flow Systems, Inc. • 605 N John Rodes Blvd. • Melbourne, FL 32934 • 321-259-5009

05/25/2005



PROJECT:
AVON PARK AIRPORT DRAINAGE
1545 SR 64 West
Avon Park, FL 33825

OWNER:
CITY OF AVON PARK
110 East Main St.
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(863) 452-4400

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CERT. OF AUTHORIZATION #29713
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ENGINEER:

Cool & Cobb Engineering Co.
203 West Main Street
Avon Park, FL 33825

Revisions:	
03/17/11	Original
02/15/12	
06/12/12	

SECTION 00000

REMOTE TERMINAL UNIT AND PUMP STATION CONTROL STRATEGY SPEC

PART 1 - GENERAL

1.01 REMOTE TERMINAL UNIT (RTU)

- A. The specific attention of the contractor is directed to the fact that the Owner has an existing TAC II SCADA System manufactured by Data Flow Systems (DFS) of Melbourne, Florida (321) 259-5009. For compatibility purposes, the bidder is required to obtain the Remote Terminal Unit (RTU) as specified herein from DFS.
B. The Contractor shall coordinate tower and antenna requirements with DFS. A complete radio survey shall be conducted by DFS to verify antenna requirements.
C. The RTU shall be housed in a 36x30x10, NEMA 4X, 304SS enclosure, painted white. The RTU panel shall be pre-engineered and pre-assembled by DFS prior to delivery to the job site.
D. These specifications are intended to cover the furnishing, the shop testing, the delivery, complete installation and field testing of all equipment and appurtenances for the complete RTU system herein specified, whether specifically mentioned in the Specifications or not. This includes all discrete and analog signal isolation necessary for interfacing with the Owner's existing telemetry system.
E. For all units there shall be furnished and installed all necessary and desirable accessory equipment and auxiliaries whether specifically mentioned in these specifications or not. This installation shall include field-testing of the entire installation and instruction of the regular operating personnel in the care, operation, and maintenance of all equipment.

PART 2 - PRODUCTS

2.01 TELEMETRY CONTROL UNIT

- The Telemetry Control Unit (TCU) shall be a microprocessor-based multi-pump controller device. The TCU shall provide local automatic control from transducer level input as specified. All configurable operation parameters and alarms shall be selectable from the RTU's operator interface via a menu selection. Special programming will be provided by DFS for the VFD control application. The TCU shall incorporate an integrated Radio Transceiver compatible with the owner's existing frequency. As a minimum the TCU shall have the following features and functions:
A. Liquid Crystal Display (LCD) - The TCU shall incorporate a large 4-line x 20-character LCD, in conjunction with a 12-button keypad, to provide an interface for configuring, viewing and resetting alarms, and analyzing status information. The contrast of the LCD shall be controlled by an onboard temperature sensor to ensure that the LCD screen is easy to read in both high and low temperature conditions. The LCD shall provide the elapsed

- runtime of each pump, the average runtime of each pump, the flow of each pump, the flow of the station and the time of day.
B. 12-Button Keypad - The TCU shall incorporate a 12-button keypad to page through its menu items, scroll through configuration options, and enter numeric data. The keypad shall include the numbers 0-9, scrolling keys (up, down, left and right), an ENTER key, and an ESC (escape) key. Some buttons shall offer dual functionality. The decimal point and the escape function (Esc) shall share the same button. The number two and the up scrolling function shall share the same button. The function of the button shall be dependent on the unit's mode.
C. The TCU shall be programmed for automated level control utilizing 2 VFDs and analog (4-20 ma) level transducer. Floats shall not be used for level control purposes.
D. Integrated LED for visual pump on/off status of each pump. Pump run status shall be reported back to the Central Command Center and recorded with +/-2 second accuracy.
E. Local manual control provided by two (2) of its three (3) integral HOA switches. Each HOA switch shall be fail safe and operate in the OFF and HAND position even if the unit is failed or not powered. The TCU shall be configurable to alarm if HOA Switch has been left in the HAND or OFF position, per HOA, with user-selected delay period. HOA Switch Position alarms shall be reported back to Central Command Center.
F. Remote control capability from the Central Command Center and/or workstation PC(s) that shall provide individual pump override control and disable, station disable, alarm disable and alarm silence.
G. Pump alternation shall be an integral function with automated alternation around non-operational pump(s), out-of-service pump(s) or pump(s) in OFF position from HOA. Alternation will operate based on the number of pumps configured (1, 2 or 3).
H. Pump/Starter/Breaker Fault alarms shall be determined by the unit automatically and for each pump. The alarm shall be activated when a pump is called to run, but fails to run, or if the pump is turned off, but continues to run. A motor starter coil failure, a tripped overload contact, or a tripped motor breaker shall also generate the alarm.
I. Integrated 3-phase power monitor for shall be provided. The phase monitor shall be compatible with 240 and 480 VAC 3-phase power. The phase monitor shall be transformer-isolated and detect loss of phase, phase reversal, low phase and high phase faults. All phase monitor adjustments shall be adjustable from the integrated 12-button keypad. Phase voltages from phase A to B and from phase A to C shall be transmitted to the Central Command Center.
J. Integrated Alarm Light output and Alarm Horn output, each capable of driving 120 VAC loads to .5A. The unit shall incorporate an integrated alarm silence button. A discrete input shall be reserved for use with an external alarm silence button. Use of either, or both, shall be used to silence the Alarm Horn locally. The Alarm Horn shall be capable of being silenced remotely from the Central Command Center and/or workstation PC(s)

00000-2 0/00/00

- K. Integrated 115 VAC Power Supply. The power supply shall be surge protected. Power consumption shall not exceed 20 Watts. The power supply shall provide a battery backed, isolated 24 VDC bias voltage source. The 24 VDC bias voltage source shall be utilized to monitor the high well float so as to make sure the alarm is detected and reported during commercial power outages. The power supply shall keep the backup battery at a float charge.
L. All inputs and outputs shall be optically or magnetically isolated and surge suppressed. Input protection shall include M.O.V., Transorb, and Opto-isolation. Analog Inputs shall provide 12-bit accuracy and capable of accepting 4-20mA @ 250 ohm or 1-5V @ 100K ohm signals. Discrete inputs shall be capable of accepting 10-30V AC/DC and 31-600V AC/DC with voltage reducers/resistors. Discrete outputs shall provide 120/240 VAC control and include at least (4) solid state and (2) contact closure outputs. At least one digital pulse input shall be provided.
M. RS-232 service port shall provide local access to all the functions of the TCU. The service port shall provide local monitoring of the radio communications link with the Central Command Center. The service port shall provide an automatic antenna alignment function.
N. A RS-485 serial connection shall be provided and utilized to connect to the RIO-032 as required for additional I/O to meet the control and monitoring requirements.
O. Ambient operating temperature shall be -10°C to 60°C (14°F to 140°F). The upper temperature limit is 50°C (122°F) when using a backup battery. TCU shall be UL Listed and surge tested for EMI Susceptibility to IEC 61000-4-5 Surge Immunity Tests.
P. All signal and power wiring shall be connected to the TCU through removable terminal connectors. The TCU shall be easily removed / replaced by disconnecting the wire terminal connectors. The use of tools or re-wiring shall not be required to removed/replace the TCU.

2.02 RADIO TRANSCEIVER

- The Radio Transceiver shall be an integral component of the TCU and shall not require a separate power supply of power source. The radio transceiver shall communicate with the owner's existing Central Command Center. As a minimum, the Radio Transceiver shall have the following features:
A. Surge protected radio power
B. On board communications and functional firmware
C. Watchdog Timer
D. On board voltage regulation and radio power supply control
E. Access via the RTU's RS-232 service port
F. Utilize LEDs on TCU for transmit data and receive data indication
G. Test mode switch for radio service.
H. Radio current, receiver sensitivity and operating temperature are monitored for system diagnostics.

2.03 RAIL I/O DEVICE (RIO-032)

- A. Perform as an I/O component and include the following:
1) 8051-class micro controller
2) Minimum of 64K of Flash ROM
3) Minimum of 1 K of RAM
4) Capability to scan in 8 digital and 8 analog inputs
5) Capability to control 8 digital and 8 analog outputs
6) Power consumption of less than 12 watts
7) Configuration button
B. The RIO-032 shall have a total I/O count of 32 points. The 32 points shall consist of the following:
1) Eight (8) digital monitor points
2) Eight (8) digital control points
3) Eight (8) analog monitor points
4) Eight (8) analog control points
C. I/O shall have the following characteristics:
1) All I/O shall be non-isolated.
2) Each analog input and output shall have 12-bit resolution.
3) All analog points shall be capable of being used as digital I/O when not required as analog I/O.
4) Analog inputs and outputs shall be 0-5 V. Analog inputs may be converted to 4-20 mA externally through the use of an external 249 ohm .02% resistor.
5) Analog inputs and outputs shall be processed at a rate of 10-samples-per-second.
6) Analog outputs shall have an overall accuracy of +/- 1% of full scale.
7) Digital inputs shall be closure-to-ground for on and biased with the 10-15 VDC raw power through an onboard 5.6 Kohm resistor.
8) Digital inputs shall be processed at a rate of 120-samples-per-second with 100 mSec de-bouncing for on/off status.
9) Digital inputs shall be sampled at the raw 120 sample rate for pulse input accumulation. The maximum input pulse rate shall be 30 Hz.
10) Digital outputs shall be open collector with current capability to drive 12 or 24 VDC, 80 mA constant duty, 300mA in-rush current, ice cube-type relays.
D. Two part screw termination 8-pin connectors capable of handling up to 16 gauge wire.
E. Compatible with 35mm symmetrical or 32mm asymmetrical DIN-rail.
F. 10-15 VDC powered by separate power supply.
G. Moisture-free environment operation within a temperature range of 14°-140° F (-10°-60° C).
H. One RS-485 serial interface. This RS-485 shall be used for connection to the TCU and shall communicate with the TCU via Modbus ASCII protocol.
I. Removable address strap to enable the RIO-032 to be exchanged with another (spare) without requiring readdressing either device.

00000-4 0/00/00

- J. The RIO-032 shall have a learn mode that enables it to automatically determine and learn communication parameters (e.g., baud rate, parity, stop bits, and protocol) when the Configuration button is held down on power up.
K. The RIO-032 shall be supplied with a din-rail mountable power supply. The Power Supply shall be DR-120-12 as manufactured by Mean Well.
L. Analog Inputs / Outputs connected to the RIO-032 shall have an Isolated DC to DC Transmitter. The Isolated DC to DC Transmitter shall be Model API-4380-G-D-U as manufactured by Absolute Process Instruments, Inc.
M. Discrete Inputs / Outputs connected to the RIO-032 shall be external relay isolated with dry-contact. Relay shall be model AAE201 as manufactured by AA Electric with NDS-8 octal base

2.04 RTU BACKUP BATTERY

- The RTU shall include a 3.0 amp-hour backup battery. The battery shall provide 12V nominal voltage. The battery shall not be damaged by deep discharges.

2.05 ENCLOSURE

- The RTU shall be housed in a 36x30x10, NEMA 4X, 304SS enclosure, painted white.

2.06 ANTENNA SUBSYSTEM

- A. A high gain directional antenna shall be used to transmit and receive data at the RTU. It shall be supported on a mast/pole and have DC grounding for lightning protection. The antenna mast/pole shall be hot dipped galvanized for corrosion protection. All mounting hardware shall be made of stainless steel. The mast shall meet or exceed the quality and reliability of the AG20 manufactured by Rohn.
B. The coax cable shall be the type that utilizes an inert semi-liquid compound to flood the copper braid. The coax cable shall be of the RG-8 construction type and have the RF loss characteristic of foam flex. The coax cable shall be RTC 400 as supplied by Data Flow Systems, Inc.
C. Type N connectors shall be utilized at both ends of the coax. The Type N connectors shall be sealed with 3-inch sections of Alpha FIT321-1-0 sealant shrink tubing. The coax cable shall be secured to the mast/pole with E.V.A.-coated 316 stainless steel cable ties. The cable ties shall meet or exceed the quality, reliability and performance of AE112 cable ties manufactured by Band-It.
D. The antenna shall be an all welded aluminum elements. The antenna shall have a single radiator element connected to a type N female connector. The antenna shall be the RTA series as supplied by Data Flow Systems, Inc.
E. A coaxial surge protector model IS-B50LN-C2 as manufactured by Polyphaser shall be supplied with the RTU.

2.08 CENTRAL COMMAND CENTER (EXISTING)

- A. The Central Command Center shall be modified to incorporate a new HMI graphical screen for this station. The graphical screen shall be consistent with existing pump station screens.

00000-5 0/00/00

PART 3 - CONTROL SYSTEM PROGRAMMING

3.01 CONTROL STRATEGY

- The TCU shall include special programming developed by DFS for the VFD control application. The operator interface referenced herein is the TCU integrated LCD & Keypad. The TCU shall provide the Control Strategy defined below.
A. Up to three (3) pumps shall be monitored and controlled locally at the TCU pump station controller and monitored remotely via the Owner's existing TAC II SCADA system.
B. The pumps shall be either manually or automatically controlled, selectable using HAND-OFF-AUTO selector switches on the TCU.
C. In the HAND mode, the speed of the pumps shall be manually varied using INCREASE/DECREASE buttons on the TCU operator interface. In the OFF mode, the pumps shall be off.
D. In the AUTO mode, the pump station controller shall control the pumps in a Lead/Lag mode. One of the VFD's shall serve as the Lead Pump while the other VFD functions as the Lag Pump as required for level control operation. Lead Pump shall alternate between each pumping cycle.
E. In the AUTO mode, when multiple pumps are required, the pumps shall share the load equally.
F. The TCU shall be programmed for level control utilizing analog input from (4-20 ma) level transducer. Float inputs shall not be used for level control purposes.
G. The pump station controls shall be furnished with the capability to readily select and adjust all start/stop/operating signals and set-points from the TCU operator interface.
H. Pump(s) RUN and READY status shall be monitored by the TCU. Pump starter FAULT shall be generated by the TCU. All three conditions shall be displayed at the Owner's existing Central Command Center. Pump(s) motor SPEED shall be indicated locally at the VFD and remotely at the Central Command Center. FAULT shall also be part of a common visual alarm. In LOCAL operation the pump motors shall be started, stopped and speed set at the Variable Frequency Drive for each pump motor.
I. If a flow meter is connected to the TCU, the totalized flow shall be available at the Central Command Center.
J. If a flow meter is connected to the TCU, the instantaneous Flow in Gallons per Minute (GPM) shall be displayed at the Central Command Center

PART 4 - EXECUTION

4.01 INSTALLATION

- A. Install and place into operation a complete new RTU System at the Pump

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- Station site. This work shall include the new antenna system, all interconnecting wiring, conduit, and circuitry necessary to provide the owner with a fully operable control system/RTU.

- B. Install and mount equipment in accordance with the Contract Documents, manufacturer's instructions and shop drawings. Rigidity support and mount equipment level and plumb, and in such a manner as to provide accessibility; protection from damage; isolation from heat, shock, and vibration; and freedom from interference with other equipment, piping, and electrical components.

- C. Include the services of a factory trained, qualified service engineer of the equipment manufacturer to inspect the complete equipment installation to assure that it's installed in accordance with the manufacturer's recommendations, make all adjustments necessary to place the system into trouble-free operation and instruct the operating personnel in the proper care and operation of the equipment furnished. Provide services at both the field installation site as well as the central site.

- D. All workmanship utilized in the manufacture and installation of this system shall be of the highest quality and performed in a manner consistent with all accepted industry practices.

4.02 FIELD TESTS AND ACCEPTANCE

- A. Field tests shall consist of installation check-out, and a field acceptance test, in sequence. Each stage of testing shall not be commenced until the preceding stage is substantially complete as determined by the Engineer.
B. Field Test: When the facility is complete and ready for operation, the RTU and associated components shall be inspected and tested for compliance with the Contract Documents. Testing of the equipment shall be made by the Contractor in the presence of the Owner, Engineer, the Electrical Subcontractor, the Instrumentation Subcontractor, and the equipment manufacturer's representative. The test shall include, but not be limited to the following:
1. Electrical: CONTRACTOR shall record readings of the voltage and amperage on all electrical components at start and at steady state operating conditions. The results of the tests, including the serial number of the accessories tested, shall be given to the engineer.
2. Inspection: A thorough inspection of all mechanical and electrical equipment and controls, fittings, brackets, mountings, seals, conduit, painting, components, and features shall be made while the facility is being tested to determine performance and compliance with design requirements and specifications.
3. Repairs, Adjustments, and Replacements: The Contractor shall make any and all necessary repairs, adjustments, and replacements until performance has been demonstrated to the satisfaction of the Engineer. The Contractor shall bear the cost of any repair, adjustment, and replacement.

4.03 WARRANTY

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- A. The manufacturer shall warrant all hardware and software provided under this contract against all defects in material and workmanship for a period of one year. The TAC Pack TCU and RIO-032 shall carry an additional 2-year return-to-factory warranty. The TAC Pack TCU warranty shall also cover damage due to lightning.

4.04 SERVICE

- A. The manufacturer shall offer full factory support of the installed system through the use of factory employees. Service representatives who are not direct employees of the manufacturer, or who are not specifically trained in the service of the owner's existing SCADA System shall be unacceptable. The customer shall have 24 hour per day access to service personnel through the use of a pager.
B. Furnish the services of a manufacturer's representative onsite during start-up.

4.05 SPARES

- A. One TAC Pack TCU, RIO-032 and Power Supply utilized in remote terminal unit (RTU) shall be supplied.

END OF SECTION

- Notes:
1.) Contractor shall provide one 100KW - 460 volt 3 phase trailer mounted generator and controller with project. Generator shall be wired for quick connection of generator by city.
2.) Telemetry system shall be tested and connected to the city's existing telemetry system.

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PROJECT: AVON PARK AIRPORT DRAINAGE 1545 SR 64 West Avon Park, FL 33825

OWNER: CITY OF AVON PARK 110 East Main St. Avon Park, FL 33825 (863) 452-4400

SEAL:

CERT. OF AUTHORIZATION #29713 FLA LICENSE NO 16921 (863) 657-2323 Office (863) 657-2324 Fax carl@coollandcobb.com

ENGINEER: Cool & Cobb Engineering Co. 203 West Main Street Avon Park, FL 33825

Revisions: 03/17/11 Original 02/15/12 06/12/12