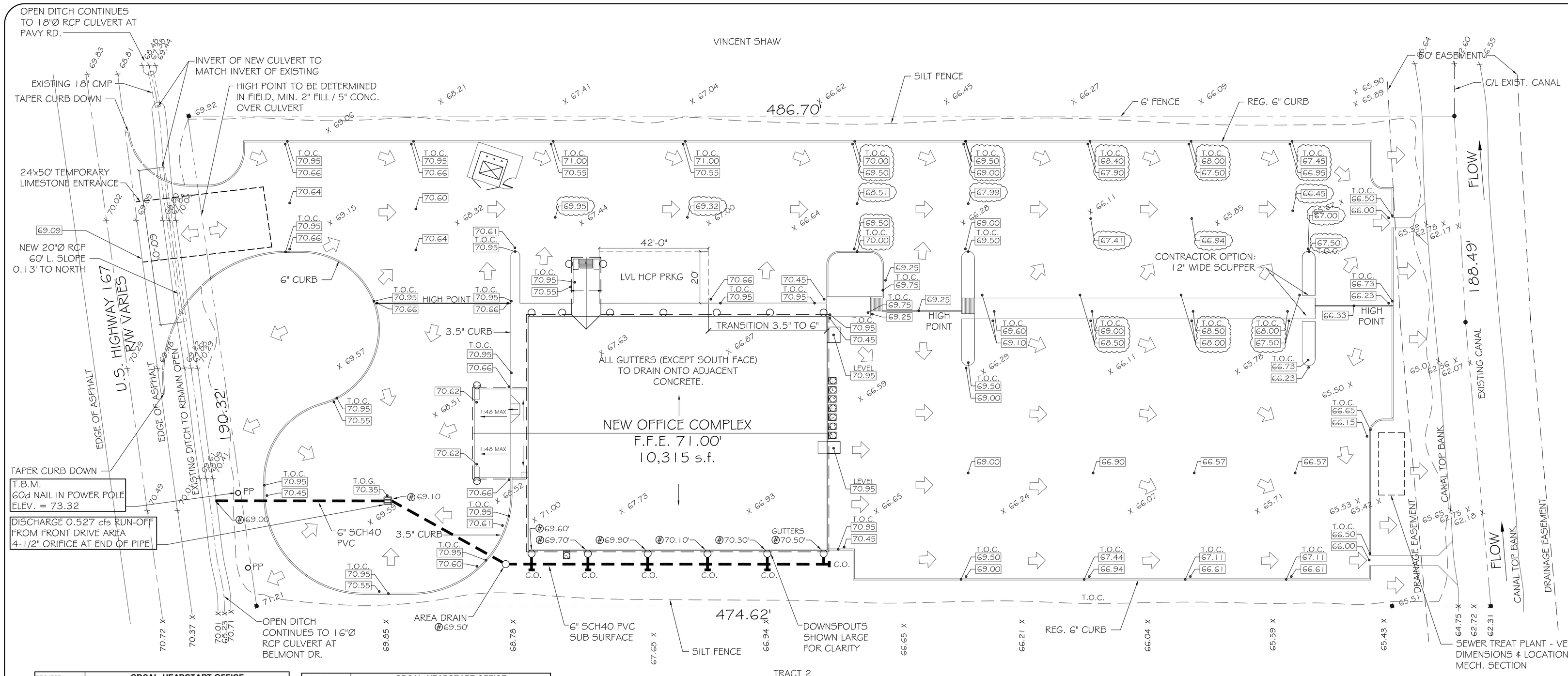

DRAINAGE PLAN

SCALE: 1"=20'-0"

LEGEND

- PROPERTY LINE
- X 70.96 - EXISTING GRADE ELEVATIONS
- 72.50 - NEW ELEVATIONS
- T.O.C. 73.00 - NEW ELEVATION, TOP OF CURB
- GRADE SLOPE
- # - INVERT ELEVATION
- NEW DRAIN LINE
- TEMPORARY SILT FENCING
- DIRECTION OF DRAINAGE FLOW
- NEW 24"x24" DRAINAGE CATCH BASIN

NOTES:

1) DRAIN PIPE & FITTINGS WITHIN PROPERTY LINE SHALL BE POLYVINYL CHLORIDE PLASTIC PIPE, MEETING CLASS 100 C-900 PVC.
2) ELEVATIONS SHOWN ARE M.S.L.
3) FIELD VERIFY ALL ELEVATIONS AND DRAINAGE SYSTEM PLACEMENT PRIOR TO START OF WORK.
4) DOWN SPOUTS SHALL FLOW ONTO SURFACE DRAINAGE EXCEPT FOR SUB-SURFACE DRAINAGE ALONG SOUTH SIDE OF BUILDING.
5) THERE IS NO EVIDENCE OF EXISTING OFF-SITE FLOW CROSSING THE PROPERTY.

GUTTERS AND DOWN SPOUTS TO BE SEAMLESS ALUMINUM 24 GAUGE, COLOR TO BE SELECTED BY OWNER. GUTTERS TO BE "OGEE" IN CROSS SECTION, MINIMUM 6" WIDTH.

PROJECT: CDCAI - HEADSTART OFFICE
STORMWATER RUN-OFF CALCULATIONS

Formulas used:

[1] RATIONAL METHOD: Q=Aci

where:
- Q= Peak discharge of watershed in cubic feet per second (cfs) due to maximum storm assumed.
- A= Area of watershed in acres.
- c= Coefficient of run-off [2].
- i= Intensity of rainfall in inches per hour based on concentration time. [3]

[4] $TC = \frac{\left(L^{0.8}\left(\frac{1000}{s}-9\right)^{0.7}\right)}{(1140(s^{0.5}))}$

where:
- TC= Time of concentration= time required for rain falling at most remote point to reach discharge point.
- c= Site run-off coefficient based or conditions shown.
- s= Percent slope of overland flow.

AREA OF WORK - PRIOR DEVELOPMENT
10 Year Frequency

$Q_1 = Aci$

Watertight Surfaces		0	sqft =	0.000	Acres
c(1) =	0.9				
Gravel Surface		0	sqft =	0.000	Acres
c(2) =	0.25				
Green Space		90517.68	sqft =	2.078	Acres
c(3) =	0.15				
Summary		90517.68	sqft =	2.078	Acres
c =	0.15				

Duration (D) = Time of concentration (TC)

where	L = 462	run-off length ft	Elev diff =	7
	c = 0.15	run-off coef		
	S = 1.5152	percent slope		
therefore	TC = D = 69.40	minutes		
Expected rainfall intensity	i = 3.15	in/hr		
Q_1 =	0.982 cfs			

AREA OF WORK - POST DEVELOPMENT
10 Year Frequency

$Q_2 = Aci$

Watertight Surfaces		60728	sqft =	1.394	Acres
c(1) =	0.9				
Gravel Surface		0	sqft =	0.000	Acres
c(2) =	0.25				
Green Space		29789.68	sqft =	0.684	
c(3) =	0.15				
Summary		90517.68	sqft =	2.078	Acres
c =	0.65				

D = Time of concentration (TC)

where	L = 430	Runoff length ft	Elev diff =	2
	c = 0.65	Runoff coef		
	S = 0.4651	Percent Slope		
therefore	TC = D = 12.92	minutes or		
and from Rainfall Intensity Table	i = 3.15	in/hr		
Q_2 =	4.275 cfs			

References:
1. Chen, W.F. The Civil Engineering Handbook, 1995. Eq.# 31.1, pg. 1036
2. Seelye, Elwyn E. Data Book for Civil Engineers, Vol.1 1960. Tbl. B, pg. 18-02
3. Seelye, Elwyn E. Data Book for Civil Engineers, Vol.1 1960. Fig.B, pg. 18-01
4. Chen, W.F. The Civil Engineering Handbook, 1995. Tbl. 31.2 Regan Equation (n=0.013)
5. Chen, W.F. The Civil Engineering Handbook, 1995. Eq.# 28.32, pg. 969

PROJECT: CDCAI - HEADSTART OFFICE
STORMWATER RUN-OFF CALCULATIONS

Formulas used:

[1] RATIONAL METHOD: Q=Aci

where:
- Q= Peak discharge of watershed in cubic feet per second (cfs) due to maximum storm assumed.
- A= Area of watershed in acres.
- c= Coefficient of run-off [2].
- i= Intensity of rainfall in inches per hour based on concentration time. [3]

[4] $TC = \frac{\left(L^{0.8}\left(\frac{1000}{s}-9\right)^{0.7}\right)}{(1140(s^{0.5}))}$

where:
- TC= Time of concentration= time required for rain falling at most remote point to reach discharge point.
- c= Site run-off coefficient based on conditions shown.
- s= Percent slope of overland flow.

WATERSHED SERVICED BY DOTD DRAINAGE - POST DEVELOPMENT
10 Year Frequency

$Q_1 = Aci$

Watertight Surfaces		13100	sqft =	0.301	Acres
c(1) =	0.9				
Gravel Surface		0	sqft =	0.000	Acres
c(2) =	0.25				
Green Space		0	sqft =	0.000	Acres
c(3) =	0.15				
Summary		13100	sqft =	0.301	Acres
c =	0.90				

Duration (D) = Time of concentration (TC)

where	L = 46	run-off length ft	Elev diff =	0.5
	c = 0.90	run-off coef		
	S = 1.0870	percent slope		
therefore	TC = D = 2.64	minutes		
Expected rainfall intensity	i = 3.15	in/hr		
Q_1 =	0.853 cfs			

DISCHARGE END AREA REQUIREMENTS
10 Year Frequency
Area requirements for pipe servicing swale located in Zone #1 of the corresponding Key Plan

[5] $A = \frac{Q}{(c\sqrt{(2gh)})}$

where:
- A= Discharge Area required
- g= Acceleration of gravity
- c= Discharge coefficient
- h= Hydraulic head
- Q= Flow volume from run-off

Pipe #1: Servicing swale located in Zone #1 of the corresponding Key Plan.

Q =	0.853 cfs	H =	1.00	feet
c =	0.85 coefficient	A =	0.13	sqft
g =	32.16 ft/ft/sec			

REQUIRED CONDUIT = 4.75 inch diameter

References:
1. Chen, W.F. The Civil Engineering Handbook, 1995. Eq.# 31.1, pg. 1036
2. Seelye, Elwyn E. Data Book for Civil Engineers, Vol.1 1960. Tbl. B, pg. 18-02
3. Seelye, Elwyn E. Data Book for Civil Engineers, Vol.1 1960. Fig.B, pg. 18-01
4. Chen, W.F. The Civil Engineering Handbook, 1995. Tbl. 31.2 Regan Equation (n=0.013)
5. Chen, W.F. The Civil Engineering Handbook, 1995. Eq.# 28.32, pg. 969

DAMMON ENGINEERING, INC.

CHIEF ENGINEER
EMMETT
DAMMON, P.E.

CHIEF ARCHITECT
ROBERT
WILTSE

1095 FLORIDA AVENUE
SLIDELL, LA. 70458
OFFICE: 985-649-5832
FAX: 985-641-5950

WEBSITE:
WWW.DAMMONENGINEERING.COM

EMAIL:
DAMMONENG@BELLSOUTH.NET

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DRAINAGE PLAN

REV: 12-7-09 CONST.
5-4-10 AS-BUILT
5-27-10 AS-BUILT

SCALE: AS NOTED

JOB#: 2030

DATE: 10-19-09

SHEET 4

C-3

OF 26