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Piedmont High School Track and Field Renovation

Drainage Calculations of Existing Drainage and Renovated Track and Field to the City Box Culvert

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Purpose: To determine peak flow in a 25 year rain event at the Point of Connection (POC, which is a storm drain manhole (SDMH) located inside of the field) at the City Box Culvert

Attachments: Exhibit A, Drainage Area Map

Drainage Areas (see Exhibit A, map):

A1 - Synthetic Turf Area = 110,713 SF
A2 - All Weather Track Area = 50,627 SF
A3 - Hardscape = 67,414 SF
A4 - Softscape = 152,188 SF

Pipe Runs to furthest drainage area using two pipe runs due to varying slopes and sizes (see Exhibit A, map):

Pipe L1 = 337' Slope (S1) = 19% Pipe type: 8" avg dia, old, concrete, n=0.13
Pipe L2 = 561' Slope (S1) = 1.4% Pipe type: 12" avg dia, new, CHDPE, n=0.09

Pipe Velocities and Time of Concentration

V1 = 1.49/0.13 x (0.66/4)^{2/3} x (0.19)^{1/2} = 11.5(0.30)(0.44) = 1.52 ft/sec
V2 = 1.49/0.09 x (1/4)^{2/3} x (0.014)^{1/2} = 16.56(0.39)(0.12) = 0.78 ft/sec

t(c1) = L1/V1 = 337'/1.52 x 1 min/60 sec = 3.7 min
t(c2) = L2/V2 = 561'/0.78 x 1 min/60 sec = 11.99 min

t(c total) = t(c1) + t(c2) = 15.7 min

Intensity of 25 year event with a 16 minute time of concentration in Piedmont, CA from NOAA table:

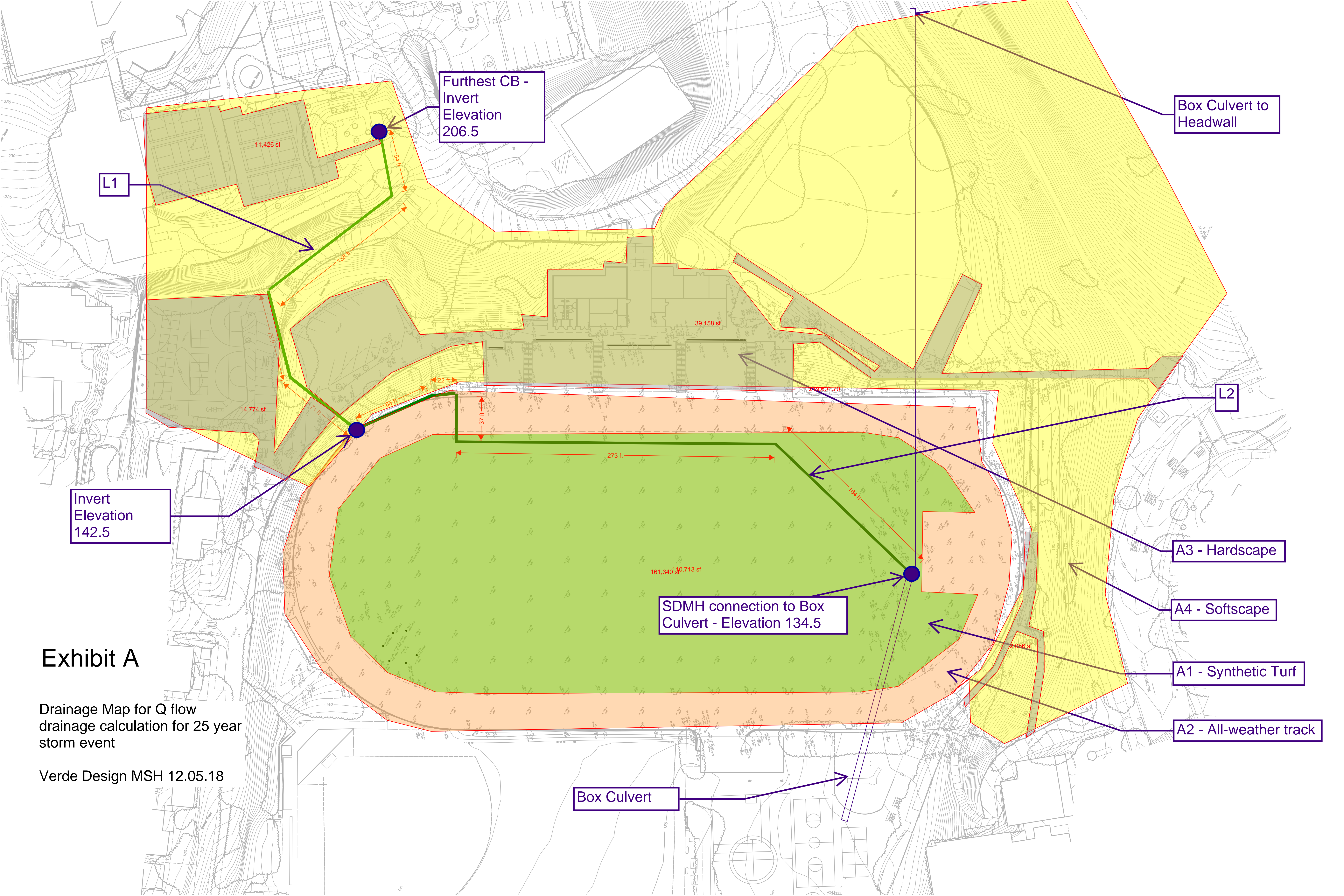
i* = 0.558in/16 mins x 60 min/hr = 2.09 in/hr

Flow Rate Table and Total Flow to the POC of the City Box Culvert

Type	Area SF	Coefficient	I - 25 year	Q cfs
Synthetic Turf	110,713	0.45	2.09	2.41
All-weather track	50,627	0.85	2.09	2.08
Hardscape - outside of track perimeter	67,414	0.9	2.09	2.94
Softscape - outside of track perimeter	152,188	0.2	2.09	1.47
Total	380,942			8.90



Total Flow to Box Culvert at the SDMH Located in the Field= 8.9 CFS



Furthest CB -
Invert
Elevation
206.5

Box Culvert to
Headwall

L1

L2

Invert
Elevation
142.5

A3 - Hardscape

SDMH connection to Box
Culvert - Elevation 134.5

A4 - Softscape

A1 - Synthetic Turf

A2 - All-weather track

Exhibit A

Drainage Map for Q flow
drainage calculation for 25 year
storm event

Verde Design MSH 12.05.18

Box Culvert

11,426 sf

14,774 sf

39,158 sf

161,340 sf

2,956 sf

138 ft

273 ft

164 ft

59 ft

75 ft

66 ft

37 ft

22 ft

71 ft

219,601.70

WILLOW AVENUE