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BELLA VITA ASSISTED LIVING FACILITY
HIGHLAND ROAD (M-59)
HARTLAND, MICHIGAN 48353
SECTION 22, T3N, R6E, HARTLAND TOWNSHIP, LIVINGSTON COUNTY

PREPARED FOR
GBCM, LLC
10751 S. SAGINAW ST
BUILDING A - SUITE K
GRAND BLANC, MICHIGAN 48439
(810) 603-7228

PROJECT NO. 17004000
DATE DRAWN: 9-13-17
DATE REVISED: 10-26-17

SHEET NUMBER
C4

GRADING NOTES

- CHECK LOCATION OF ALL UTILITY LINES PRIOR TO DIGGING. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO UTILITIES AND/OR THE OWNER'S PROPERTY AND SHALL REPAIR, REPLACE, OR RESTORE SAME AT THE CONTRACTOR'S EXPENSE. CALL MISS DIG (3) WORKING DAYS BEFORE DIGGING AT 1-800-482-7171 (811).
- SLOPE ALL SITE WORK UNIFORMLY BETWEEN NEW GRADES OR BETWEEN NEW GRADES AND EXISTING GRADES. THIS INCLUDES SLOPING ALL SITE WORK BETWEEN NEW GRADES AND RIM ELEVATION GRADES AT CATCH BASINS. TRANSITIONS BETWEEN CHANGE IN GRADES SHALL BE CONSTRUCTED WITH A MINIMUM 25 FOOT VERTICAL CURVE. PLAN GRADES INDICATE POINT OF INTERSECTION ELEVATIONS. AVOID ABRUPT GRADE CHANGES AT CATCH BASINS AND HIGH POINTS.
- AREA OF BUILDINGS, WALKS, AND PAVING SHALL BE STRIPPED OF TOPSOIL. TOPSOIL SHALL BE STORED ON THIS CONSTRUCTION SITE FOR RE-USE. EXCESS EXCAVATED MATERIAL SHALL BE REMOVED FROM THIS CONSTRUCTION SITE.
- ALL FILL NECESSARY TO PROVIDE SUBGRADES FOR INTERIOR CONCRETE FLOOR SLABS AND CONCRETE APRONS SHALL BE MICHIGAN DEPARTMENT OF TRANSPORTATION, CLASS II.
- OBTAIN PERMIT AND PROVIDE SOIL EROSION AND SEDIMENTATION CONTROL MEASURES IN ACCORDANCE WITH LIVINGSTON COUNTY REQUIREMENTS.
- THE CONTRACTOR SHALL SUBMIT A DETAILED EROSION CONTROL PLAN AND OBTAIN A PART 91 OF ACT 451 SOIL EROSION AND SEDIMENTATION PERMIT, INCLUDING THE PAYMENT OF FEES AND THE PROVIDING OF NECESSARY BONDS. NO EARTH CHANGES OR EXCAVATION SHALL BE STARTED PRIOR TO THE INSURANCE OF THIS PERMIT. THE DEVELOPER SHALL PROTECT ALL EXISTING AND PROPOSED STORM SEWER FACILITIES ON AND ADJACENT TO THE SITE DURING EXCAVATION AND CONSTRUCTION. ALL SEDIMENT SHALL BE CONTAINED ON-SITE. ANY SILT IN COUNTY DRAINS, AS A RESULT OF THIS PROJECT SHALL BE REMOVED BY THE CONTRACTOR.
- SEE SHEET C8 FOR ROADWAY CENTERLINE PLAN AND PROFILE.

Detention Pond Volume Calculation

Oakland County Method	
On-Site Area (A1) =	5.02 acres
Future Development (A2) =	2.56 acres
Future Development (A3) =	1.75 acres
Total Area (A) =	9.33 acres
Net C =	0.50
Q _A = (A) (0.2 cfs/acre) =	1.87 cfs
Q ₀ = Q _A /AC =	0.40 cfs/acre
Storage time for 100-year storm	
T ₁₀₀ = -25 + (10,312.5/Q ₀) ^{1/2}	
T ₁₀₀ =	135.57 minutes
V ₅ = 16,500 (T ₁₀₀)/(T ₁₀₀ +25) - 40(Q ₀)(T ₁₀₀)	
V ₅ =	11,762 cubic feet/acre-impervious
V ₇ = V ₅ AC =	54,869 cubic feet
	1.26 acre-feet

POND STORAGE CALCULATIONS

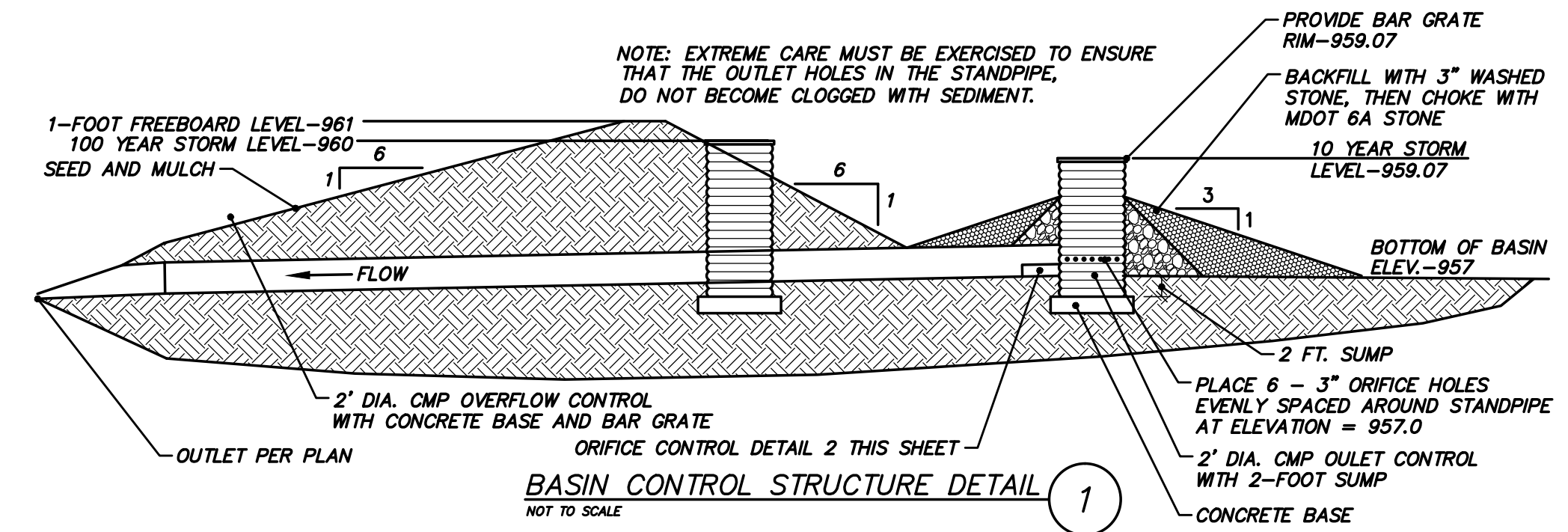
Elevation	Area (sf)	Volume (cft)	Accumulated Volume (cft)
957	11,573		
958	16,049	13,811	13,811
959	20,751	18,400	32,211
960	25,680	23,216	55,427

ORIFICE CONTROL CALCULATIONS

Allowable discharge =	1.87	cfs
Flow (Q) = CA (2gh) ^{0.5}		
C = 0.6		
Orifice Cross Section Area (A)		
gravity (g) = 32.2 feet/sec ²		
h = distance from highwater to center of pipe		
d = depth of pond =	3.0	feet
Orifice		
Diameter (D)	Area (A)	h
(inches)	(ft ²)	(ft)
5	0.14	2.79
6	0.20	2.75
7	0.27	2.71

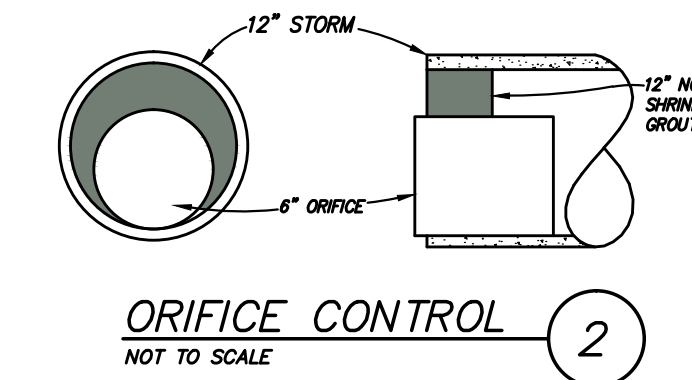
DETENTION CALCULATIONS - 10 YEAR STORM

Intensity = 166.37/(T+22.35)	
Duration (Minutes)	Intensity
0 yr. Stormflow (In/Hr)	On-Site (cfs)
10	23.99
20	18.33
30	14.83
40	12.45
50	10.73
60	9.42
Maximum Total Required =	33,929 cft
Storage Elevation =	959.07



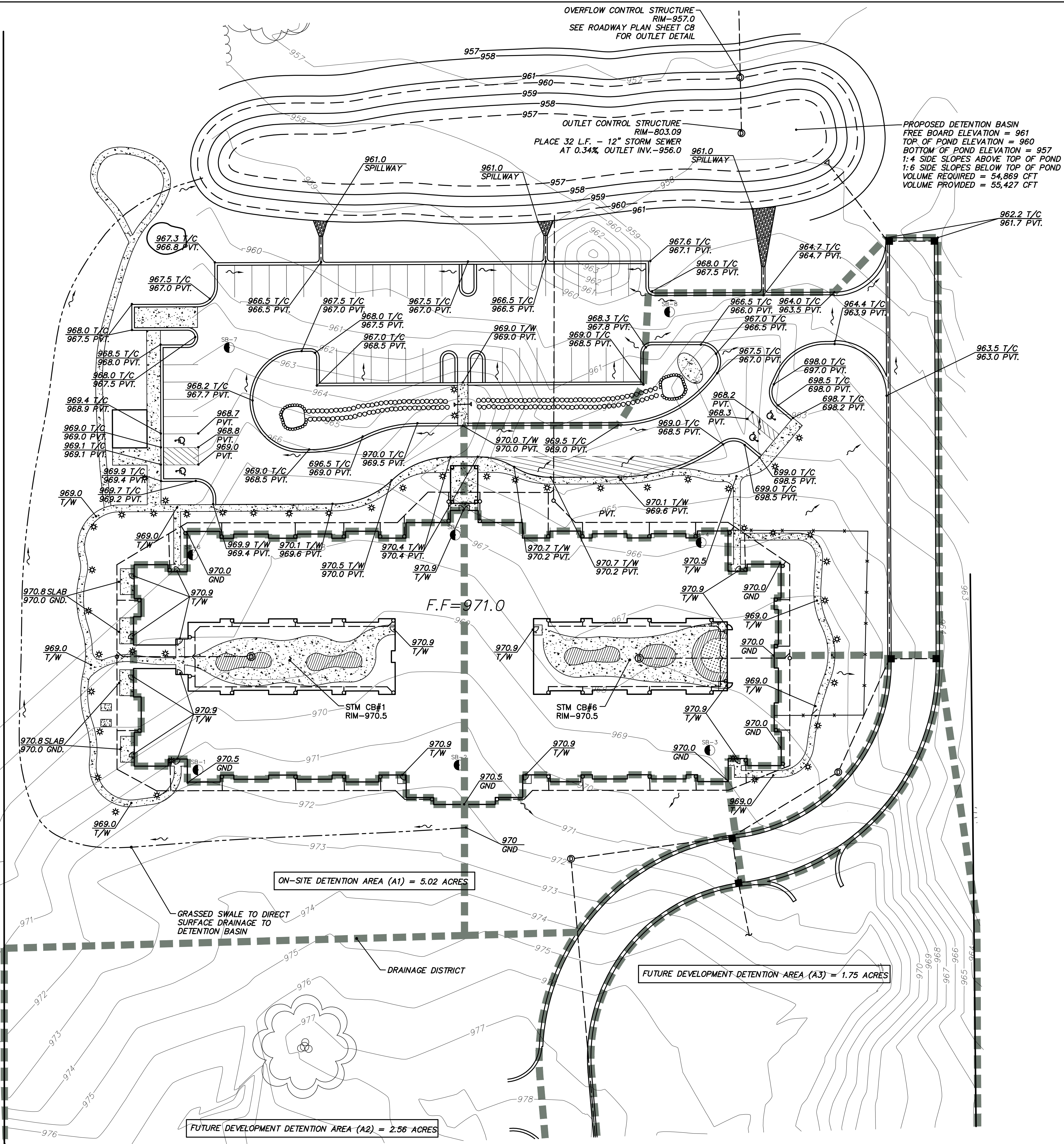
STANDPIPE CALCULATIONS

Orifice Diameter (inches)	Area (ft ²)	h (in)	Flow per Orifice Q (cfs)	Holes per Level	Flow per Level (cfs)	Elevation
3	0.0491	36.00	0.409	6	2.46	957.00



ASP— TOP OF ASPHALT
PVT.— TOP OF PAVEMENT
T/C— TOP OF CURB
T/W— TOP OF WALK
T/FTN— TOP OF FOUNTAIN
DRAINAGE FLOW
EXISTING CONTOURS

GRADING PLAN



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