



Where Creativity Meets Functionality

PROJECT #: 15M053.000 SHEET _____ OF _____

PROJECT: THE OAKS (KEEP TRACTS 2 & 3)

CLIENT NAME: _____

SUBJECT: _____

DRAWN BY: _____ DATE: _____

CHECKED BY: _____ DATE: _____

SUMMARY OF W/Q STRATEGY FOR RESIDENTIAL POD & TAYLOR STREET:

1. BUILDING 1/2 : DIRECT ROOF TOP RUNOFF TO STORMTECH SYSTEM
LOCATED ON WEST SIDE OF BUILDING
2. BUILDING 3/4 : DIRECT ROOF RUNOFF TO STORMTECH SYSTEM
LOCATED ON EAST SIDE OF BUILDING.
3. BUILDING 5/6 & LARRIMORE HOMES: DIRECT ROOF RUNOFF & PARKING LOT to
STORMTECH SYSTEM LOCATED UNDER PARKING LOT.
4. PRIVATE STREETS C/D: ASSUME BAND OF PERMEABLE PAVEMENT ALONG
ENTIRE LENGTH OF STREET WILL SERVE TO
TREAT STREET RUNOFF.
5. TAYLOR STREET : STREET NOT TRIBUTARY TO WQV BMP.
ASSUME ALTERNATIVE PRACTICE EMPLOYED
AT/IN STREET CATCH BASINS.

Where Creativity Meets Functionality

BUILDINGS 1 & 2 W & Q DESIGN: (FUTURE)

PROJECT #: 15M053.000 SHEET _____ OF _____

PROJECT: THE OAKS & KEEFE TRACTS 2 & 3

CLIENT NAME: _____

SUBJECT: _____

DRAWN BY: JSD DATE: 6/15/16

CHECKED BY: _____ DATE _____

WQ_v Req'd = 1.67 Ft³ (SEE SPREADSHEET)

Use STORMTRAIL MC-4500 UNITS : $L = 52"$, $W = 100"$, $H = 60"$

- LENGTH INSTALLED CHAMBER = 48.3"
- LENGTH INSTALLED END CAP = 30.7"
- 9" STONE FOUNDATION
- STORAGE PER CHAMBER (MEASURED TO CROWN OF CHAMBER)

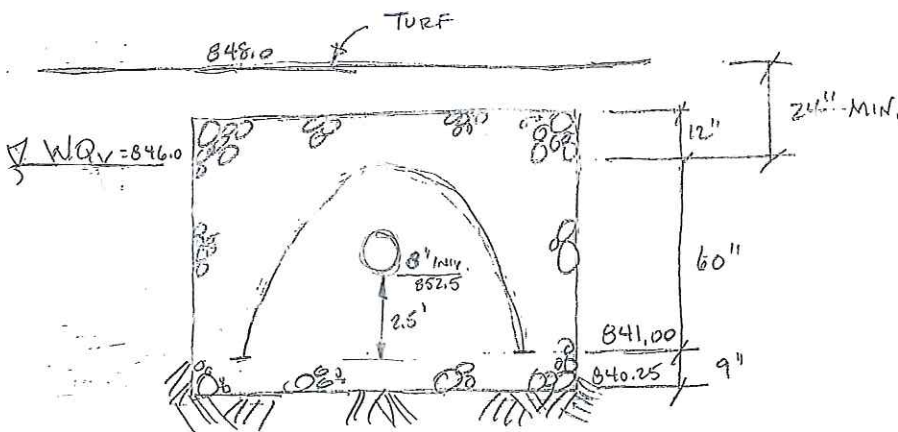
MIDDLE CHAMBER = 147.99 Ft³

END CAP = 95.76 ft³

LENGTH REQ'd TO ACHIEVE WQY @ CHAMBER CROWN :

$$L = \frac{1617 \text{ Ft}^3 - (2)(9576 \text{ Ft}^3)}{1462.99} = 9.63 \approx \underline{\underline{10}} \text{ Chambers}$$

$$\text{LENGTH OF SYSTEM} = (10 \times 48.3'') + (2 \times 30.7'') = 544.4'' = \underline{45.37'}$$





Water Quality Volume

Project: Keefe Tract 2 & 3 Designed By: JSD Date: 6/17/16
Job No.: 15M053.000 Checked By: Date:
Basin ID: Building 1/2 WQ Basin (Future) Revised By: Date:

Required Water Quality Volume

$$WQ_v = P C A / 12$$

Site Drainage Area (A) = 0.55 acres (To Basin) $WQ_v = 0.031$ acre-ft.

Rainfall Depth (P) = 0.75 in. Sediment Storage Allowance = 20 %
Sediment Storage Allowance = 0.01 Ac-ft

Runoff Coefficient (C) = 0.90

$C = 0.858i3 - 0.78i2 + 0.774i + 0.04$ (55% impervious)

Total $WQ_v = 0.037$ Ac-ft
= 1,617 cu.ft.

Water Quality Release Rate

$$Q_{wqv} = \text{Total } WQ_v / RT$$

Required Retention Time (RT) 48 hours

$Q_{wqv} = 0.009$ cfs

Provided Retention Time (PT) #DIV/0! hours

Water Quality Outlet Orifice

Contour Areas

	Elevation ft	Area ft ²	Volume ft ³	Cum. Vol. ft ³	Elevation at V	Storage at Elev
Basin Inv. =			0.00	0.00		#VALUE!
Contour 1 =					#VALUE!	#VALUE!
Contour 2 =						#VALUE!
Contour 3 =						#VALUE!
Contour 4 =						#VALUE!
Contour 5 =						#VALUE!
Contour 6 =						#VALUE!
Contour 7 =						#VALUE!
Contour 8 =						#VALUE!
Contour 9 =						#VALUE!
Contour 10 =						#VALUE!
Contour 11 =						#VALUE!
Contour 12 =						#VALUE!
Contour 13 =						#VALUE!
Contour 14 =						#VALUE!

$$Q = N C_d A_o (2 g \Delta h)^{1/2}$$

$C_d =$

$A_o = 0.0000 \pi D^2 / 4$ for circular orifices; $= h * w$ for rectangular orifices

$g =$ ft/sec²

$Q = 0.000$ cfs

Orifice h = inch Orifice w = inch (= 0 for circular orifice)
Number of orifices = N =

$\Delta h_{avg} = (\text{Elev at V} - \text{Basin Inv}) / 2 - 1/2 h =$ ft



Where Creativity Meets Functionality

BUILDING 3 & 4 WQ DESIGN: (FUTURE)

PROJECT #: 15M053.000 SHEET _____ OF _____

PROJECT: THE OAKS & KEEPER TRAILS 2 & 3

CLIENT NAME: _____

SUBJECT: _____

DRAWN BY: JSD DATE: 6/15/16

CHECKED BY: _____ DATE _____

$$WQ_v \text{ Req'd} = 1,617 \text{ FT}^3 \text{ (SEE SPREADSHEET)}$$

USE STORMTECH MC-4500 UNITS: L = 52", W = 100", H = 60"

- LENGTH INSTALLED CHAMBER = 48.3"
- LENGTH INSTALLED END CAP = 30.7"
- 9" STONE FOUNDATION
- STORAGE PER CHAMBER (MEASURED TO CROWN OF CHAMBER)

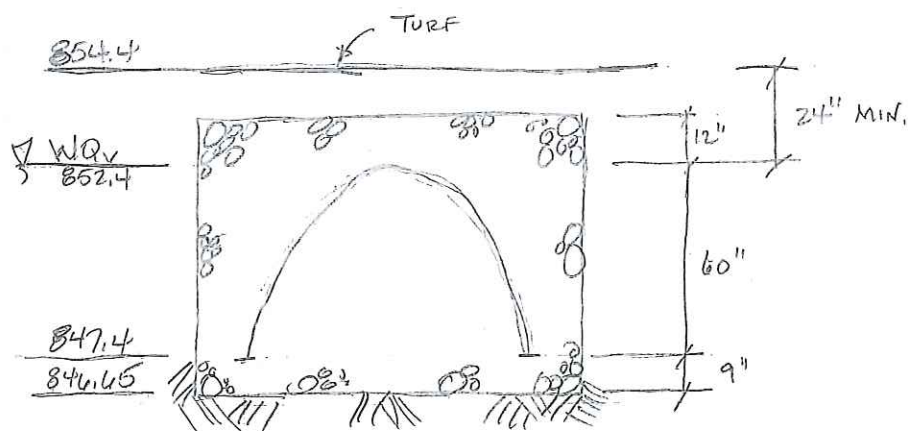
$$\text{MIDDLE CHAMBER} = 147.99 \text{ FT}^3$$

$$\text{END CAP} = 95.76 \text{ FT}^3$$

LENGTH REQ'D TO ACHIEVE WQ_v @ CHAMBER CROWN:

$$L = \frac{1617 \text{ FT}^3 - (2)(95.76 \text{ FT}^3)}{147.99} = 9.63 \approx \underline{\underline{10 \text{ CHAMBERS}}}$$

$$\text{LENGTH OF SYSTEM} = (10 \times 48.3") + (2 \times 30.7") = 544.4" = \underline{\underline{45.37'}}$$





Water Quality Volume

Project: Keefe Tract 2 & 3 Designed By: JSD Date: 6/17/16
 Job No.: 15M053.000 Checked By: _____ Date: _____
 Basin ID: Building 3/4 WQ Basin (Future) Revised By: _____ Date: _____

Required Water Quality Volume

$$WQ_v = P C A / 12$$

Site Drainage Area (A) = 0.55 acres (To Basin) $WQ_v =$ 0.031 acre-ft.

Rainfall Depth (P) = 0.75 in.

Sediment Storage Allowance = 20 %

Sediment Storage Allowance = 0.01 Ac-ft

Runoff Coefficient (C) = 0.90

$C = 0.858(3 - 0.78(2 + 0.774i + 0.04 (55\% \text{ impervious})))$

Total $WQ_v =$ 0.037 Ac-ft

= 1,617 cu.ft.

Water Quality Release Rate

$$Q_{wqv} = \text{Total } WQ_v / RT$$

Required Retention Time (RT) 48 hours

$Q_{wqv} =$ 0.009 cfs

Provided Retention Time (PT) #DIV/0! hours

Water Quality Outlet Orifice

Contour Areas

	Elevation ft	Area ft ²	Volume ft ³	Cum. Vol. ft ³	Elevation at V	Storage at Elev
Basin Inv. =			0.00	0.00		#VALUE!
Contour 1 =					#VALUE!	#VALUE!
Contour 2 =						#VALUE!
Contour 3 =						#VALUE!
Contour 4 =						#VALUE!
Contour 5 =						#VALUE!
Contour 6 =						#VALUE!
Contour 7 =						#VALUE!
Contour 8 =						#VALUE!
Contour 9 =						#VALUE!
Contour 10 =						#VALUE!
Contour 11 =						#VALUE!
Contour 12 =						#VALUE!
Contour 13 =						#VALUE!
Contour 14 =						#VALUE!

$$Q = N C_d A_o (2 g \Delta h)^{1/2}$$

$C_d =$ _____

$A_o =$ 0.0000 $\pi D^2/4$ for circular orifices; = $h * w$ for rectangular orifices

$g =$ _____ ft/sec²

$Q =$ _____ cfs

Orifice h = _____ inch Orifice w = _____ inch (= 0 for circular orifice)
 Number of orifices = N = _____

$\Delta h_{avg} = (\text{Elev at V} - \text{Basin Inv})/2 - 1/2 h =$ _____ ft



Where Creativity Meets Functionality

PROJECT #: 15M053.000 SHEET _____ OF _____

PROJECT: The Oaks & Keffe Trails 2^{1/3}

CLIENT NAME: _____

SUBJECT: _____

DRAWN BY: JSD DATE: 6/15/16

CHECKED BY: _____ DATE _____

BUILDINGS 5'6" WQ DESIGN: (PROPOSED)

WQ_V REQ'D = 2,491 FT³ (SEE SPREAD SHEET)

USE STORMTECH MC-4500 UNITS: L = 52" , W = 100" , H = 60"

LENGTH OF INSTALLED CHAMBER = 48.3"

LENGTH OF INSTALLED END CAP = 30.7"

9" STONE FOUNDATION

STORAGE PER CHAMBER (MEASURED TO CROWN OF CHAMBER)

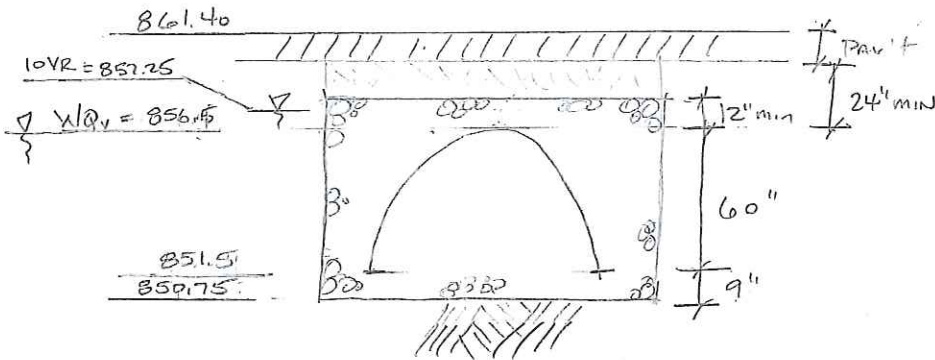
MIDDLE CHAMBER = 147.99 FT³

END CAP = 95.76 FT³

LENGTH REQ'D TO ACHIEVE WQ_V @ CHAMBER CROWN:

$$L = \frac{(2,491 \text{ FT}^3 - (2)(95.76 \text{ FT}^3))}{147.99 \text{ FT}^3} = 15.54 \text{ chambers} \approx \underline{16}$$

$$L = (16 \times 48.3") + (2 \times 30.7") = 834.2" = \underline{69.52 \text{ FT}}$$



SIZE WEIR IN DOWNSTREAM CB TO PASS 10 YEAR EVENT:

WEIR ELEV. = 856.5

LENGTH = 2'

Q₁₀ = 3.87 cfs

$$Q = CLH^{3/2} \rightarrow H = \left(\frac{Q}{CL} \right)^{2/3}$$

$$H = \left(\frac{3.87 \text{ cfs}}{(3.0)(2')} \right)^{2/3} = 0.75'$$

$$10 \text{ YEAR W.S.E.} = 856.5 + 0.75' = 857.25$$



Water Quality Volume

Project: Keefe Tract 2 & 3
Job No.: 15M053.000
Basin ID: Building 5/6 & Carriage Homes WQ Basin (Proposed)

Designed By: JSD
Checked By:
Revised By:

Date: 6/17/16
Date:
Date:

Required Water Quality Volume

$$WQ_v = P C A / 12$$

Site Drainage Area (A) = 1.23 acres (To Basin) $WQ_v = 0.047$ acre-ft.

Rainfall Depth (P) = 0.75 in. Sediment Storage Allowance = 20 %
Sediment Storage Allowance = 0.01 Ac-ft

Runoff Coefficient (C) = 0.61
 $C = 0.858i3 - 0.78i2 + 0.774i + 0.04$ (55% impervious)

Total $WQ_v =$	0.056 Ac-ft
=	2,451 cu.ft.

Water Quality Release Rate

$$Q_{wqv} = \text{Total } WQ_v / RT$$

Required Retention Time (RT) 48 hours

$Q_{wqv} =$	0.014 cfs
-------------	-----------

Provided Retention Time (PT) 48.33 hours

Water Quality Outlet Orifice

Contour Areas

	Elevation ft	Area ft ²	Volume ft ³	Cum. Vol. ft ³	Elevation at V	Storage at Elev
Basin Inv. =			0.00	0.00		#VALUE!
Contour 1 =					#VALUE!	#VALUE!
Contour 2 =						#VALUE!
Contour 3 =						#VALUE!
Contour 4 =						#VALUE!
Contour 5 =						#VALUE!
Contour 6 =						#VALUE!
Contour 7 =						#VALUE!
Contour 8 =						#VALUE!
Contour 9 =						#VALUE!
Contour 10 =						#VALUE!
Contour 11 =						#VALUE!
Contour 12 =						#VALUE!
Contour 13 =						#VALUE!
Contour 14 =						#VALUE!

$$Q = N C_d A_o (2 g \Delta h)^{1/2}$$

$$C_d = 0.60$$

$$A_o = 0.0017 \pi D^2 / 4 \text{ for circular orifices; } = h * w \text{ for rectangular orifices}$$

$$g = 32.20 \text{ ft/sec}^2$$

$$Q = 0.014 \text{ cfs}$$

$$\text{Orifice } h = 0.563 \text{ inch} \quad \text{Orifice } w = 0.00 \text{ inch (} = 0 \text{ for circular orifice)}$$
$$\text{Number of orifices } = N = 1$$

$$\Delta h_{avg} = (\text{Elev at V} - \text{Basin Inv}) / 2 - 1/2 h = 2.88 \text{ ft}$$