

**SWP#069**  
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TOWN OF FRIDAY HARBOR  
Community Development

**HUSE ENGINEERING, P.S.**  
685 Spring Street, PMB 2320  
Friday Harbor, WA 98250  
360 472 0469

**OFFICE  
COPY**

**STORMWATER SITE PLAN**

For

**Hamilton Ranch Apartments**

**Friday Harbor, WA**

**APPROVED**

**Subject to errors and omissions**

By *Wayne R. Harpelle*  
Friday Harbor Dept

Date *12-24-19*

November 20, 2019

**Introduction:**

The purpose of this report is to provide the basis for and a description of the plan for managing stormwater run-off from the proposed Hamilton Ranch Apartment complex located on Hamilton Ranch Road in Friday Harbor Washington.

**Project Description:**

The project is located in Friday Harbor, WA on Hamilton Ranch Road. The principal elements of the project consist of a single 2 story, XX unit apartment building, it's associated parking and the landscaping surrounding the building and parking area. The site also includes a stormwater treatment and detention facility. These project elements are shown on the attached plans, prepared by Holman Land Surveying, Inc which are incorporated into the Stormwater Site Plan by reference.

The building site is a 2.2 Acre tract which is located west of Hamilton Ranch Road and North of Grover Street. The overall 2.2 acre tract has been divided into two parcels, one a 1.1 acre parcel which is the site of the proposed apartment complex and a second 1.1 acre parcel which is reserved for future unspecified development. The stormwater treatment and detention facility described herein is intended to provide stormwater management for both parcels and has been designed accordingly.

**Basin Description:**

The 2.2 acre tract is located in the upper reaches of a small watershed referred to as Basin #1 by the Town. The Basin is shown on the attached copy of a portion of the "Friday Harbor, WA" USGS map quadrant. The upper reaches of the basin are on the Elementary School grounds. All run-off within the basin is conveyed northerly to the commercial center of the Town by the Malcolm Street Stormwater Drain.

In 1998, Friday Harbor constructed The Malcolm Street Storm Drainage Improvement Project. This project consisted of the construction of a storm drainage pipeline from Malcom Street northerly to the commercial center of Town where the outfall is located. The Project site and the Town's existing stormwater drainage system in the vicinity of the 2.2 acre tract and which includes the Malcolm Street SWD are shown on Attachment A.

Stormwater run-off from the elementary school, Grover Street and other areas in the upper reaches of the drainage basin is conveyed by pipeline to the Malcolm Street SWD by a pipeline located in Hamilton Ranch Road. The Heritage Court subdivision WP/DF to the West of this project's site is also connected to the Malcolm Street SWD but down stream of this project's site. Therefore, the 2.2 acre tract which is this project's site is isolated from the existing SWD system.

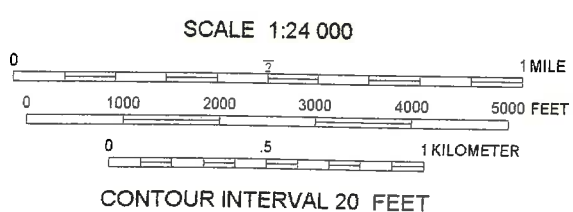
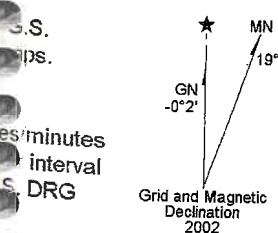
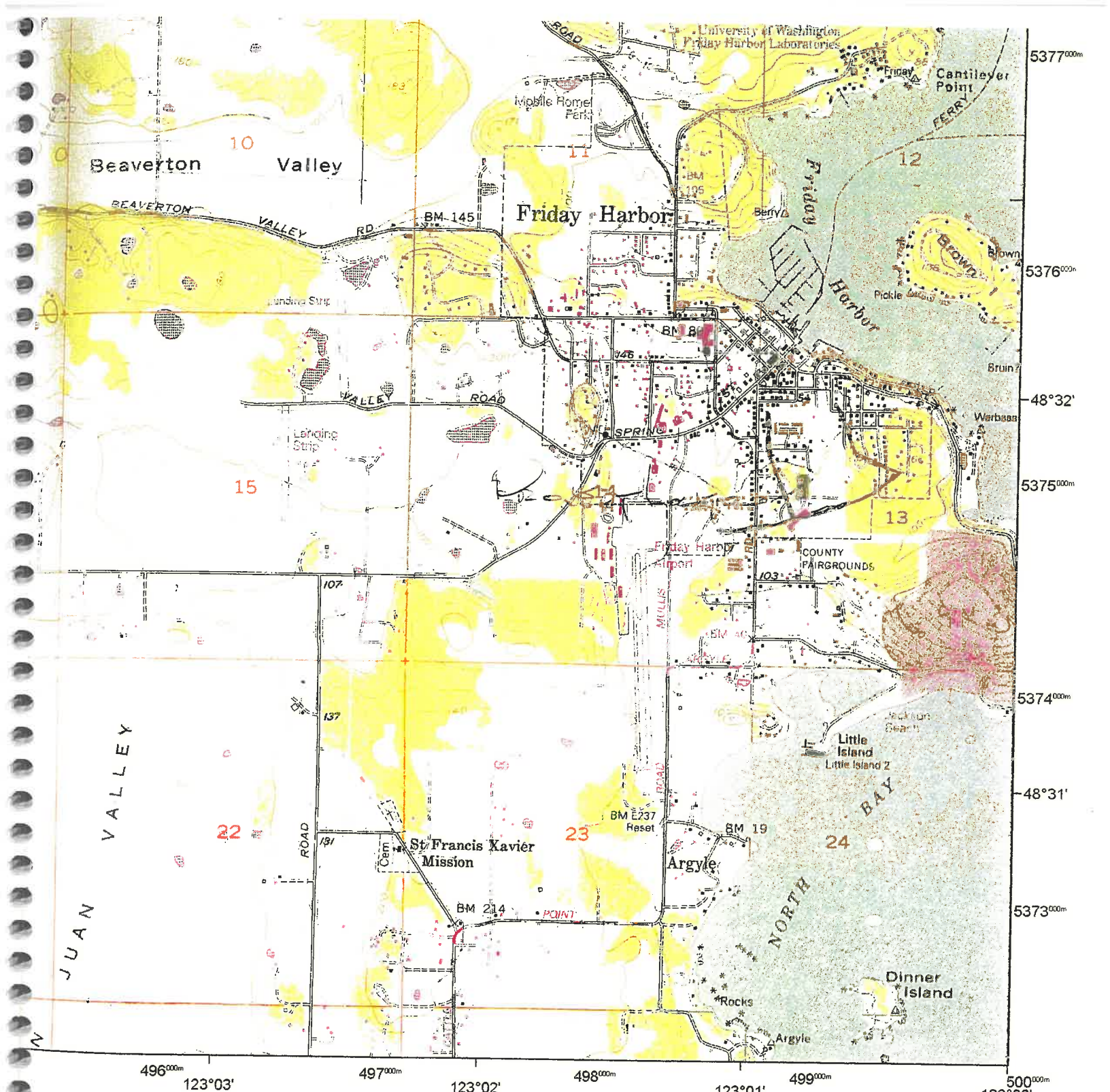
In 2013 and as a part of the construction of the Heritage Court Subdivision, the Malcolm Street storm drainage pipeline was extended south to the north boundary of the Hamilton Ranch site. Prior to the construction of the Maypole Meadows PUD, there was a small intermittent watercourse that flowed north to the PUD site. This watercourse would have been blocked by the construction of the PUD, however as a part of the PUD construction, a storm drain pipeline was extended east along the northerly Hamilton Ranch Apartment site boundary. An inlet structure was constructed at the east end of this pipeline to allow run-off from the Hamilton Ranch site to enter the Malcolm Road SWD system. This pipeline is also shown on Attachment A and on the included Site Plan.

Since the 2.2 acre tract is located in the upper reaches of the drainage basin and other areas of the upper basin have been diverted around this project's site, there is no off-site drainage area tributary to the site. Similarly, since run-off from the site is contained in the Malcolm Street SW drainage pipeline, there are no downstream watercourse impacts from the project's run-off.

**Applicable Codes and References:**

The site analysis and design for the proposed stormwater management system is in accordance with the Town of Friday Harbor's Stormwater Technical Manual.

The Washington State Department of Ecology's Stormwater Management Manual for Western Washington (WWHM) has been used as a technical reference.



Adjacent Pages

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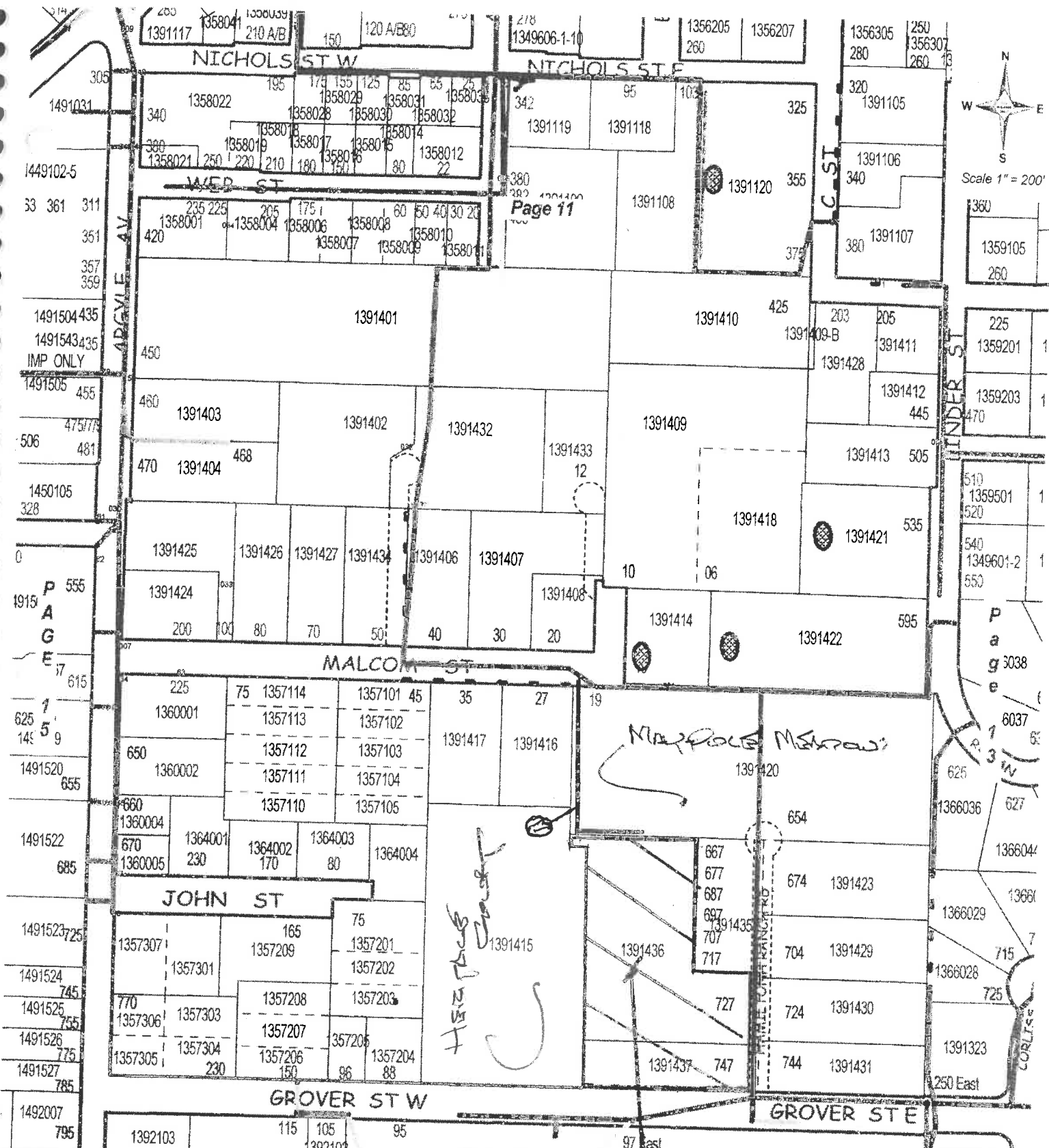
Friday Harbor, WA  
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**STORM LINE SIZE**

Line	808
10" Line	812
12" Line	812
15" Line	812
18" Line	812
24" Line	812
30" Line	812
36" Line	812
42" Line	812

ATAC

STORMWATER

### **Basin Analysis:**

The 2.2 acre tract has been analyzed as a isolated, single watershed and the combination treatment and detention facility has been located on the apartment building parcel as shown on the drawings. Since the development of the second, southern most 1.1 acre parcel is unspecified, the ratio of impervious to landscaped area of the apartment complex will also be applied to the second parcel.

The apartment complex parcel has 0.6 acres of impervious surface, roof and parking area, and 0.5 acres of lawn. Hydrologic data for the entire 2.2 acre tract is based on the same ratio of impervious surface to lawn area as the apartment complex.

It is proposed to construct the wet pond/detention basin first and use the pond as an erosion control settling pond during construction. When the site is stabilized, the pond will be redeveloped as SW treatment/detention facility as described herein.

### **Wet Pond/Detention Facility:**

The wet pond/detention facility (WP/DF) has been designed in accordance with BMP's T10.10 and T10.40 of the WWHM.

The design for the WP/D facility is constrained by the hydraulic grade line available. The invert elevation of the SWD inlet at the north boundary of the site is elevation 93.2'. The elevation of the bottom of the WP/DF is dictated by this pipeline and has been established at elevation 94.0'.

**Note:** The elevation datum used by Holman Surveying is 3.5 feet higher than the datum used by Bennett Engineering for the Maypole Meadows project.

Therefore, the top of the water quality pool and bottom of the storage pool is set at elevation 94.0 and the top of the top of the storage pool and spillway crest is set at elevation 98.0. With the overflow weir flowing, the maximum water surface elevation in the pond is 98.3'. One foot of freeboard above the maximum water surface elevation of 98.3 has been allowed which results in the top of the berm at a minimum elevation of 99.3. The elevation of the pavement at the north end of the parking area can be no lower than elevation 100.0' and would require that flow into the WP/DF is by a surface channel.

Wet Pond Design Criteria: The wet pond has been sized using the procedure in Section 2.3.2 of the WWHM. The required wet pond volume is based on the post-development 6 month – 24 hour run-off of 0.2 inches and is 726 cubic feet. The bottom area of the pond has been set at 720 square feet, therefore the wet pond depth is 1.0 foot. Aquatic tolerant species will be planted in the bottom of WP/D facility. Table 10.1 of the WWHM provides a list of recommended species.

Detention Pond Design Criteria: The detention pond has been sized using the T of FH requirements described in Section 7.04.8 of the Town's Stormwater Technical Manual.

The detention volume is 6,720 cubic-feet. The pond's location and dimensions are shown on the attached site plan prepared by Holman Land Surveying.

Detention Pond operating elevations are:

Orifice Plate/Bottom of Storage Pool	Elevation 94.0'
Overflow Weir Crest/Top of Storage Pool	Elevation 98.0'
Maximum Water Surface – Weir Overflowing	Elevation 98.3'
Top of Berm	Elevation 99.3'

A cross section of the pond showing construction details is attached as Attachment B. Copies of the Flow Restrictor MH and Overflow Structure details from the WWNM are enclosed as Attachments C and D. The 54" diameter flow restrictor manhole will be constructed without the upper restrictor plate in the 18" flow control riser as shown in the WWHM detail but will use the top of the riser as the overflow weir. The manhole will be equipped with a conical overflow structure as shown on Attachment D.

**Stormwater Technical Manual Large Parcel Requirements:**

The proposed project is a large parcel as described in Section 7.03 of the STM. The large parcel requirements are described in Section 7.04

Requirement 1 (Section 7.04.1) Erosion and Sediment Control:

Provided as a separate document to be submitted prior to the start of construction.

Requirement 2 (Section 7.04.2) Preservation of Natural Drainage Systems:

No changes to the natural drainage patterns are proposed. Run-off on the site will flow northerly to the WP/D facility and discharge from the pond will be to the existing SW drain installed as a part of the Heritage Court and Maypole PUD projects where run-off from the entire 2.2 acre tract currently flows.

Requirement 3 (Section 7.04.3) Source Control of Pollution:

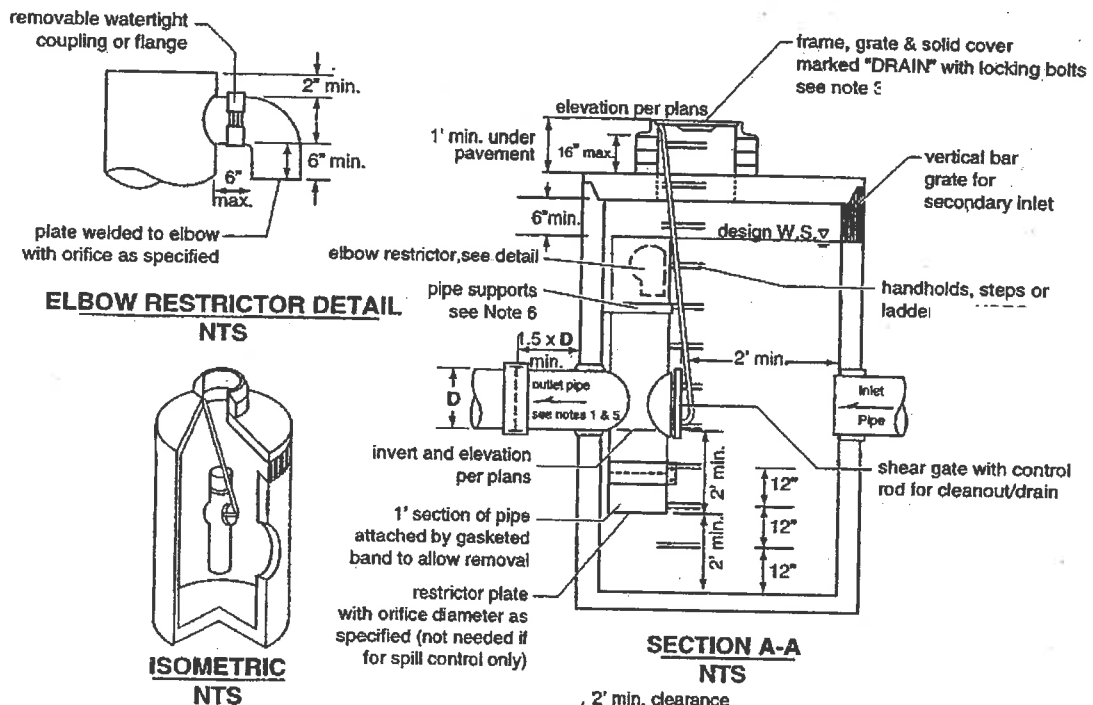
The only pollution generating surface on the developed site is the parking area. Run-off from the parking area will be conveyed to the wet pond for treatment prior to discharge.

Run-off from the site during construction will be conveyed to the WP/D facility which will be configured as a sedimentation pond. A cross section of the outlet structure for the sedimentation pond is enclosed as Attachment E.

Requirement 4 (Section 7.04.4) Run-off Treatment BMPs:

It is proposed to use a wet pond (WWHM BMP T10.10) treatment system for the proposed project. The wet pond design has been described herein and conforms to the WWHM requirements.





**NOTES:**

1. Use a minimum of a 54" diameter type 2 catch basin.
2. Outlet Capacity: 100-Year developed peak flow.
3. Metal Parts: Corrosion resistant. Non-Galvanized parts preferred. Galvanized pipe parts to have asphalt treatment 1.
4. Frame and ladder or steps offset so:
  - A. Cleanout gate is visible from top.
  - B. Climb-down space is clear of riser and cleanout gate.
  - C. Frame is clear of curb.
5. If metal outlet pipe connects to cement concrete pipe: outlet pipe to have smooth O.D. equal to concrete pipe I.D. less 1/4".
6. Provide at least one 3" X .090 inches support bracket anchored to concrete wall. (maximum 3'-0" vertical spacing)
7. Locate elbow restrictor(s) as necessary to provide minimum clearance as shown.
8. Locate additional ladder rungs in structures used as access to tanks or vaults to allow access when catch basin is filled with water.

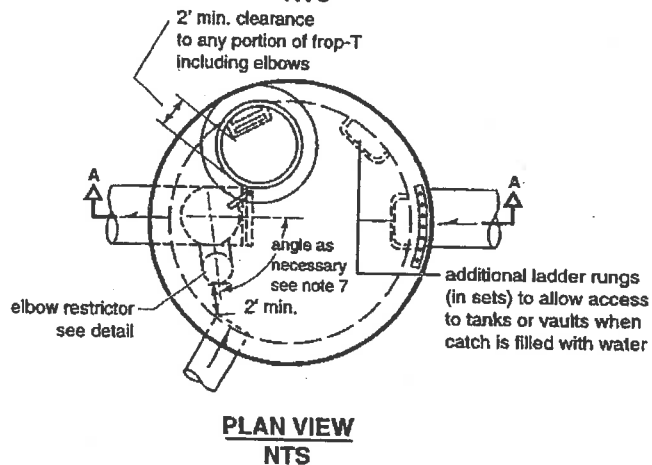
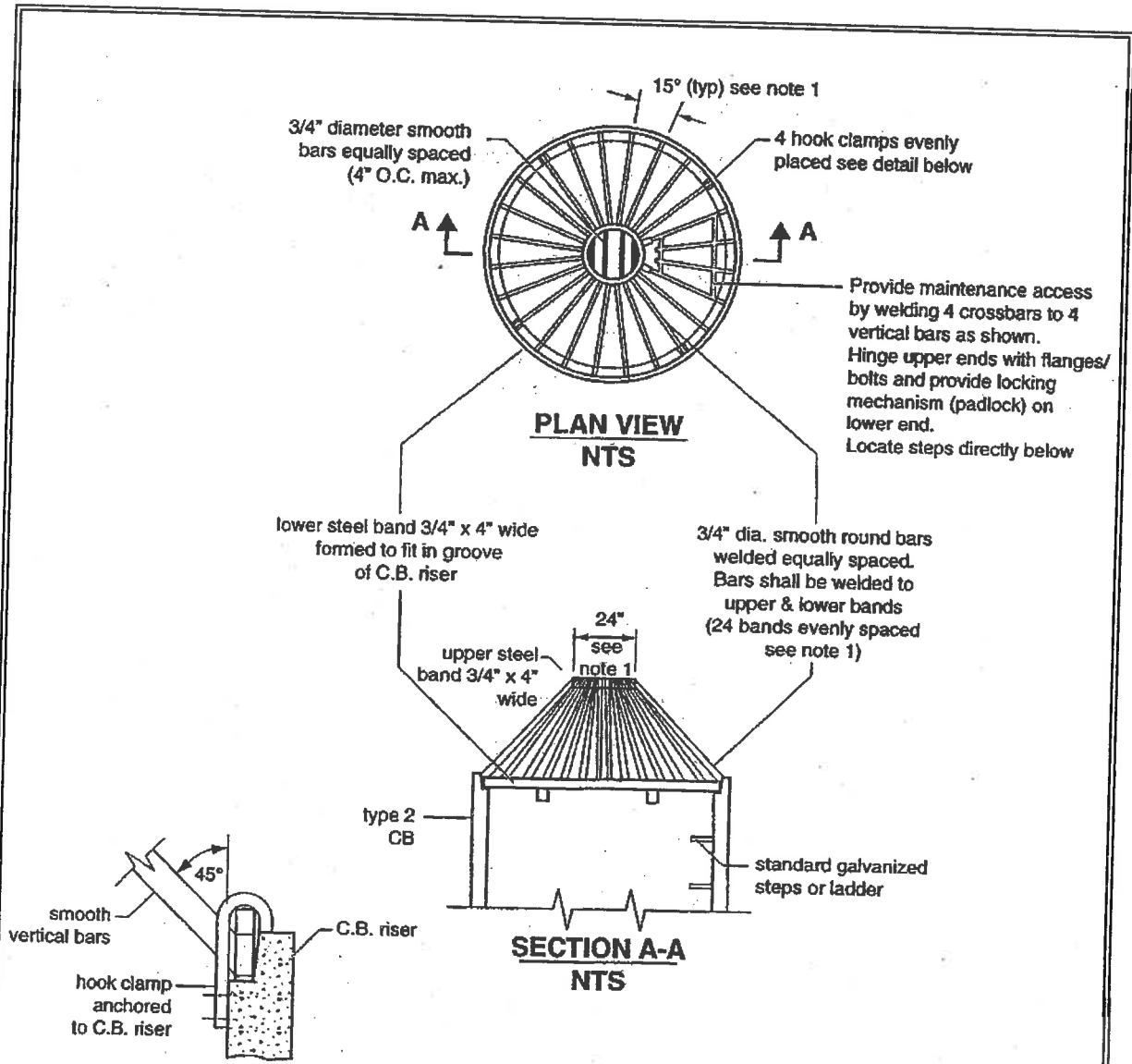


Figure 3.17 Flow Restrictor (TEE)



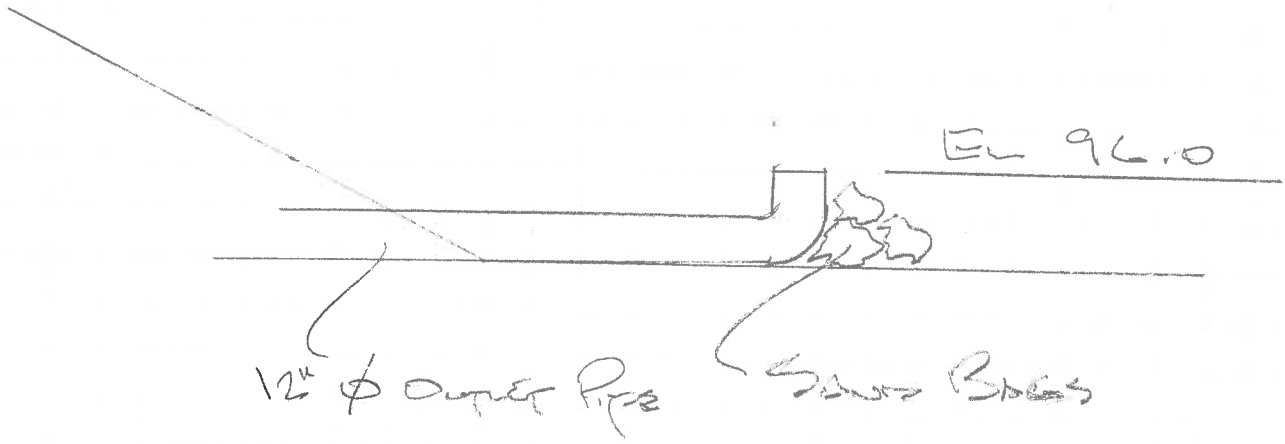


**DETAIL HOOK CLAMP**  
NTS

**NOTES:**

1. Dimensions are for illustration on 54" diameter CB For different diameter CB's adjust to maintain 45° angle on "vertical" bars and 7" o.c. maximum spacing of bars around lower steel band.
2. Metal parts must be corrosion resistant; steel bars must be galvanized.
3. This debris barrier is also recommended for use on the inlet to roadway cross-culverts with high potential for debris collection (except on type 2 streams)

Figure 3.11 Overflow Structure



TEEC Pass Outlet

Diameter "E"

Requirement 5 (Section 7.04.5) Streambank Erosion Control:

This section is not applicable to this project as all discharge from this project is to the existing Malcolm Street Storm Drainage System and this system uses no existing streams or open channels.

Requirement 6 (Section 7.04.6) Wetlands:

This section is not applicable to this project as all discharge from this project is to the existing Malcolm Street Storm Drainage System which affects no wetlands.

Requirement 7 (Section 7.04.7) Water Quality Sensitive Areas:

This section is not applicable to this project as all discharge from this project is to the existing Malcolm Street Storm Drainage System which currently discharges directly to the Harbor.

Requirement 8 (Section 7.04.8) Off Site Analysis and Mitigation:

As discussed previously, all run-off from the 2.2 acre tract will be to the Malcolm Street SWD which discharges to the Harbor south of the Downrigger Restaurant. The 2.2 acre tract which is this project's site would have been included in the basin hydrologic analysis conducted for the design of the Malcolm Street SWD. The design for the Malcolm Street SWD included pipeline capacity for the run-off from the 2.2 acre tract, most likely based on the 10 year storm. The capacities of the existing pipelines downstream of the WP/D facility are:

Pond to Easement	12" Diameter @ 0.70%	2.8 cfs
Easement to Malcolm St	12" Diameter @ 4.20%	4.0 cfs
Malcolm Street to Easement	18" Diameter @ 1.08%	11.0 cfs
Easement North to Web St	18" Diameter @ 2.50%	16.0 cfs

The pipeline from the easement along the northerly tract boundary has sufficient capacity for the 100 year storm run-off (2.33 cfs) with no attenuation. Since, the pond has no high flow discharge pathway other than this pipeline, this pipeline capacity is essential.

The pond itself has been designed to the 10 year developed/existing and the 100 year developed/existing standard required by the T of FH Stormwater Technical Manual. Run-off from the 2.2 acre tract was estimated using the "StormShed" computer model and the rainfall rates and run-off estimates are summarized below:

<b>10 Year Storm:</b>	Existing Condition	.32 cfs	Developed Condition	1.46 cfs
2.4 inches/hr	Run-off Volume	.272 ac-ft	Run-off Volume	.484 ac-ft
<b>100 Year Storm:</b>	Existing Condition	.87 cfs	Developed Condition	2.33 cfs

3.6 inches/hr      Run-off Volume      .553 ac-ft      Run-off Volume      .773 ac-ft

The diameter of the orifice in the control structure is 2.5" and is based on the 10-year existing condition run-off rate of .32 cfs and 4 feet of head. The rating curve for the sharp-crested weir at the top of the manhole riser is shown in Figure 3.24 of the WWHM.

Requirement 9 (Section 7.04.9) Basin Planning:

Since stormwater discharge from the project will be conveyed from the site to the Harbor by the previously constructed Malcolm Street SWD, no basin planning other than the downstream pipeline capacity analysis described in Requirement 8 above has been conducted. Since the stormwater discharge is conveyed entirely in pipeline, there are no adverse effects from the stormwater down stream of the project site.

Requirement 9 (Section 7.04.10) Operation & Maintenance:

By Owners

Requirement 9 (Section 7.04.11) Financial Liability:

By Owners