City of Ferndale

Comprehensive Stormwater Management Plan

October 18, 2005

Prepared by:

Reichhardt and Ebe Engineering, Inc.

Table of Contents

Chapter 1 - Introduction

Project Purpose 1.1

The purpose of this Plan is to provide a comprehensive storm water management plan for the City of Ferndale. The vicinity and study area map (Figure 1.1) on the following page shows the geographic coverage of this plan. This plan covers all areas within the City of Ferndale city limits and most of the areas within the urban growth boundary were included, where practicable.

The City of Ferndale has made a contractual loan agreement with the Department of Ecology for the production of a Comprehensive Stormwater Plan. The requirements of the plan are clearly defined in the said loan agreement in section 5 titled, "Scope of Work." The following plan addresses all required elements under section 5 of the loan agreement.

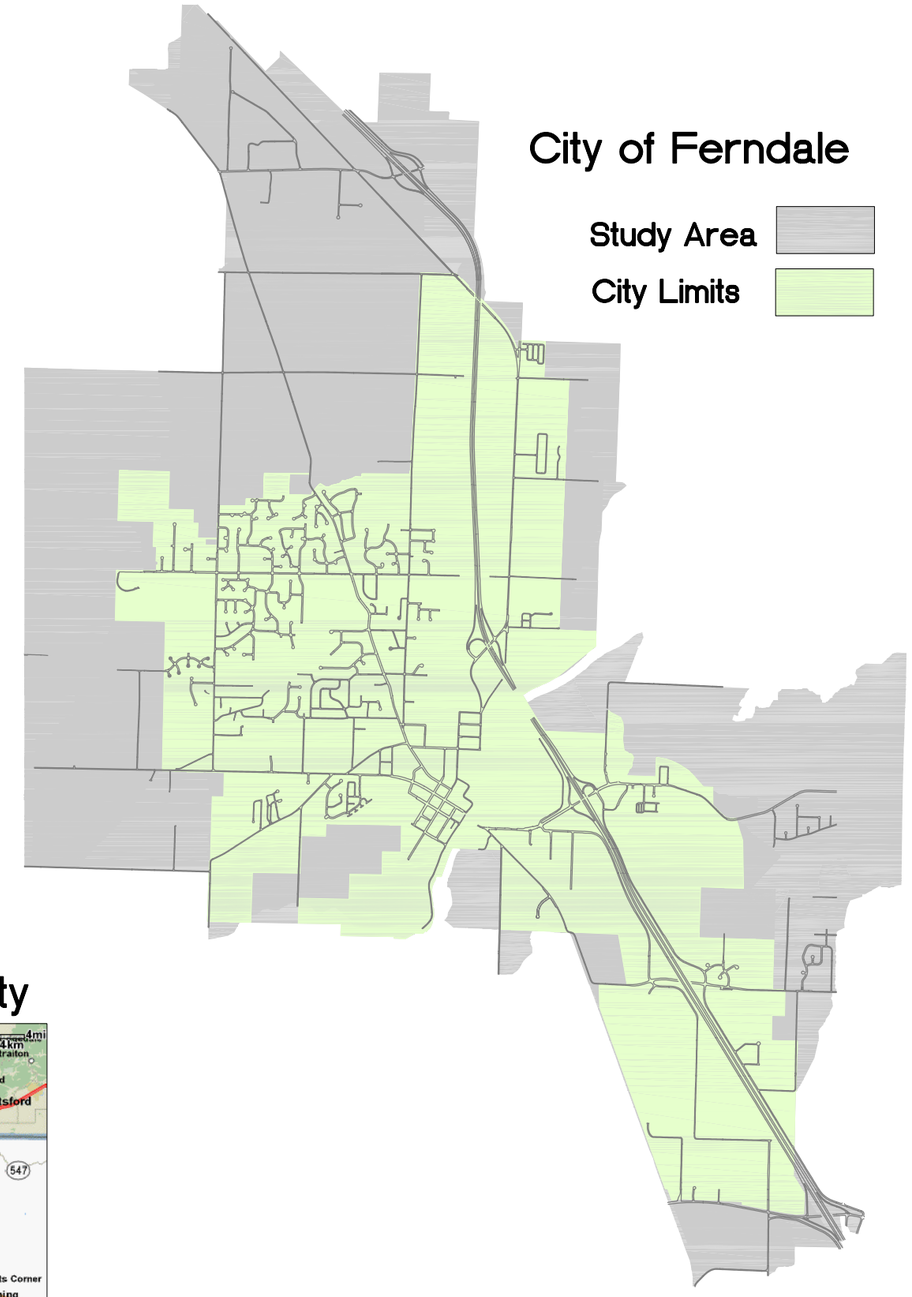
The loan defines Reichhardt and Ebe Engineering, Inc. as the Engineering Company of Record for this project. Dale Buys, PE of Reichhardt and Ebe Engineering, Inc. has been set apart as the Engineer of Record for the project.

Project Objectives 1.2

The primary objectives of the City of Ferndale Comprehensive Stormwater Plan are as follows:

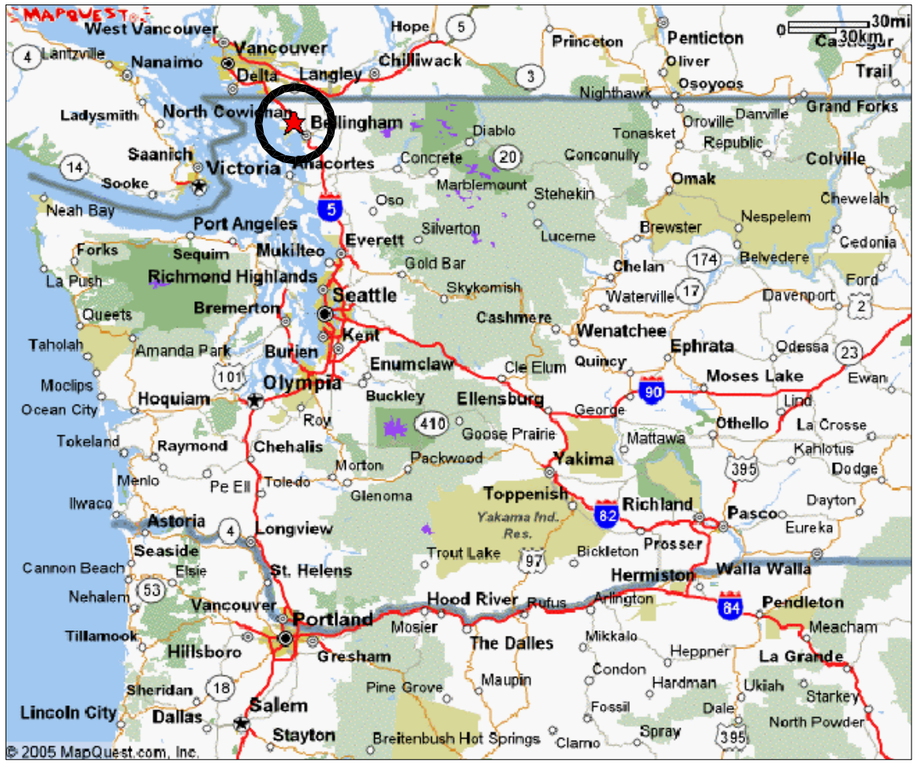
- Change the City stormwater ordinance and development standards to reflect 2001 DOE standards and to provide for an illicit discharge ordinance.
- Analyze the existing storm drainage system
- Identify existing stormwater capacity and quality problems
- Analyze the future storm drainage system
- Identify future stormwater capacity and quality problems
- Prepare a capital improvements plan to correct problems
- Prepare a maintenance plan to maintain the storm system
- Emergency spill response plan
- Update the development and redevelopment review process
- Update the construction inspection process
- Prepare and initiate a public education and involvement process
- Review zoning and development standards to encourage low impact development
- Start a stormwater utility fee to fund an ongoing stormwater capital improvements and maintenance program.

City of Ferndale
Comprehensive Storm Plan
Vacinity and Study Area



Not to Scale

City of Ferndale
Location in State of Washington



City of Ferndale
Location in Whatcom County

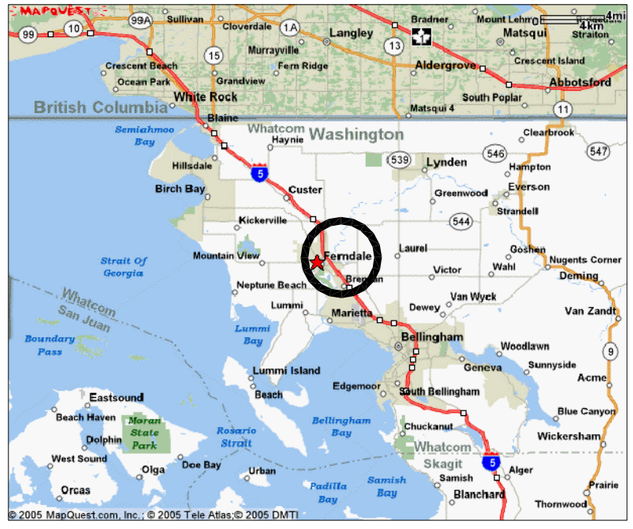


Figure 1.1
Dave C. Bren
7-23-05

Project Recognition 1.3

The following organizations provided technical support, digital data, and examples of watershed plans.

- City of Bellingham, Stormwater Section
- Whatcom County, Public Works Engineering
- Bellingham Technical College, Civil Engineering Technology and Survey Technology Programs
- Natural Resources Conservation Service, Lynden Office

The following organizations conducted the engineering calculations, graphic production, and technical writing for this plan:

- City of Ferndale, Public Works Department
- City of Ferndale, Planning and Building Services Department
- Reichhardt and Ebe Engineering, Inc.
- Bren Technical Services
- Osborn Consulting Incorporated

State and Federal Regulatory Authority Summary 1.4

The City of Ferndale must comply with a number of state and federal regulations for stormwater discharge. The following provides a summary of these regulations:

Benefits to Regulatory Compliance – 1.4.1:

1. **Access to Grants and Loans:** Staying within compliance will provide access to various grants and loans from the State.

2. **Avoidance of Fines:** Staying within compliance will help the City avoid various compliance fines that could be levied by the State.

3. **Avoidance of Law Suites:** Staying within compliance provides a measure of protection from private environmental damage law suites. It shows that the City is meeting the State standards to the best of its ability to protect the environment.

4. **Improving Water Body Habitat and Environment:** Staying within compliance will increase the quality of the many water bodies and wetlands throughout the City.

Federal Regulations Summary – 1.4.2:

This Comprehensive Storm Plan was written to help the City of Ferndale comply with the following federal regulations.

1. **Endangered Species Act (ESA):** The Endangered Species Act became relevant to local stormwater programs in 1999 when the National Marine Fisheries Service (NMFS) listed as "threatened" several species of salmonid fish, including the Puget Sound Chinook salmon and Bull Trout that use streams and rivers draining into Puget Sound.

   Under Section 4(d), the Endangered Species Act requires that activities of state and local governments, tribes, and private citizens be controlled so they do not lead to extinction of listed species.

2. **National Pollutant Discharge Elimination System (NPDES):** Congress amended the federal Clean Water Act (CWA) to address stormwater discharge and to further protect our nation's streams, rivers, and beaches from polluted stormwater runoff.

   Federal regulations established two phases for the stormwater permit program which require controls to reduce stormwater pollutant discharges to the maximum extent practicable. In 1990, the NPDES Phase I Rule was adopted, which addressed priority sources of pollutant runoff, including stormwater pollution from medium and large Municipal Separate Storm Sewer Systems (MS4s), industrial sources, and construction sites. In 1999, the Phase II rule was adopted which extended coverage of the NPDES program to certain "small" municipal separate stormwater sewer systems (MS4s) not covered under Phase I that are part of urbanized areas, plus construction activities of between one and five acres.

A detailed explanation for each of these regulations can be found in Chapter 17 of this plan.

State Regulations Summary – 1.4.3:

This Comprehensive Storm Plan was written to help the City of Ferndale comply with the following state regulations.

1. **Puget Sound Water Quality Management Plan (PSWQMP):** The 2000 PSWQMP renews the original 1987 requirement for local governments in the Puget Sound region to implement municipal stormwater management programs.

2. **Ecology's Stormwater Manual:** The PSWQMP also requires that in conjunction with the runoff control ordinances for new development and redevelopment, each jurisdiction shall adopt a stormwater management technical manual containing state-approved BMPs.

3. **Hydraulic Project Approval (HPA):** The Washington Department of Fish and Wildlife (WDFW) requires a Hydraulic Project Approval for construction activities that use, divert, obstruct, or change the natural flow or bed of any waters of the state (RCW 75.20.100). The purpose of the requirements, which are administered through the HPA permit process, is to protect fish habitat in stream channels, to prevent erosion, and to protect freshwater and nearshore marine aquatic life.

4. **Growth Management Act:** Enacted on July 1, 1990, the Growth Management Act is intended to manage growth in Washington's fastest-growing counties through the adoption of local comprehensive land use plans and development regulations. A 1995 GMA amendment requires all counties and cities in Washington to include the best available science in developing policies and development regulations to protect the functions and values of **critical areas**.

5. **State Floodplain Regulations:** Chapter 86.16 RCW establishes statewide authority through regulations promulgated by Ecology for coordinating the floodplain management regulation elements of the National Flood Insurance Program (NFIP). Under Chapter 173-158 WAC, Ecology requires local governments to adopt and administer regulatory programs compliant with the minimum standards of the NFIP. Ecology provides technical assistance to local governments for identifying the location of the 100-year (base) floodplain.

A detailed explanation for each of these regulations can be found in Chapter 17 of this plan.

Chapter 2
Facility Ownership, Operations, and Maintenance

Public Stormwater System 2.1

Public Ownership – 2.1.1

The City is responsible for storm structures within the **City right-of-way** or within **drainage easements in favor of the City** including; stormwater pipes, ditches, streams, detention facilities, control structures, and pumping facilities.

The only exception to the above is lot storm stubs, also called private storm side services. These lot services typically encroach onto public lands to make connection to City stormwater mains. These individual lot service pipes are typically very small, around 4" to 6" in diameter. The City has consistently defined these private services/stubs as privately maintained up to the point of connection to the City main.

Public Operation – 2.1.2

The public stormwater system in the City of Ferndale is operated solely by the City of Ferndale. The day-to-day operation is conducted by the City of Ferndale Public Works Department. Prior to the adoption of this plan, the City of Ferndale did not have a stormwater utility fee to provide specific monies for the operation of the stormwater system. Therefore, long term stormwater planning and stormwater capital improvements were typically conducted in reaction to problems as they arose.

With a stormwater utility fee providing a consistent funding source, long term stormwater system planning and proactive capital improvements can be conducted.

Public Maintenance – 2.1.3

Given the historic funding situation, previous maintenance of the stormwater system was inconsistent and tended to be conducted in reaction to problems as they arose. In addition, maintenance tended to be conducted in areas visible to the general public.

A stormwater utility fee is required to provide a consistent funding source for regular maintenance of the storm system. Section 8 of this plan provides a maintenance plan for the consistent maintenance of the City of Ferndale stormwater system. The Public Works Department shall be responsible for all maintenance as set forth under the maintenance plan.

Private Stormwater System 2.2

Private Ownership – 2.2.1

Private individuals and companies are responsible for storm structures on private lands including; stormwater pipes, ditches, streams, detention facilities, control structures, and pumping facilities.

Homeowners associations are responsible for storm structures that are on commonly owned reserve tracts including; stormwater pipes, ditches, streams, detention facilities, control structures, and pumping facilities that reside on commonly owned reserve tracts.

A maintenance agreement with an associated stormwater easement is an exception to the above. However, it is rare that the City would enter into an agreement to maintenance private stormwater facilities without fee.

Another exception to the above is lot storm stubs or private storm side services. Lot services typically encroach onto public lands to make connection to City stormwater mains. These individual lot service pipes are typically very small, around 4" to 6" in diameter. The City has consistently defined these private services/stubs as privately maintained up to the point of connection to the City main.

Private Operation – 2.2.2

Private individuals, companies, and homeowner associations are responsible for the operation of all private stormwater systems on private lands. The procedure for proposed changes or alteration to private stormwater systems due to Development or Redevelopment is specifically covered under **Chapter 9 of the City of Ferndale Development Standards**. The standard defines that in most cases an engineered storm study and City review is required for any changes to private stormwater systems. These standards specifically adopt the most recent edition of the Department of Ecology Stormwater Management Manual for Western Washington.

Private Maintenance – 2.2.3

Private individuals, companies, and homeowners associations are responsible for the maintenance of all private stormwater systems on private lands.

An engineered maintenance plan for private stormwater systems is required for all Development and Redevelopment projects where private stormwater systems are proposed as addressed under **Chapter 11 of the City of Ferndale Development Standards**. This engineered maintenance plan will help the private owners to maintain their stormwater system.

The inspection and compliance program for private stormwater systems is addressed under **Chapter 12 of the City of Ferndale Development Standards**. In short, if the private owner does not comply with maintenance of their private stormwater system the City will correct the problem and submit an itemized bill for collection from the owner. Ultimately the City can cut utilities to the property, issue monetary penalties, or conduct legal action to gain compliance. The procedure is well defined in City standards and ordinances and will likely need little change to support this comprehensive stormwater plan.

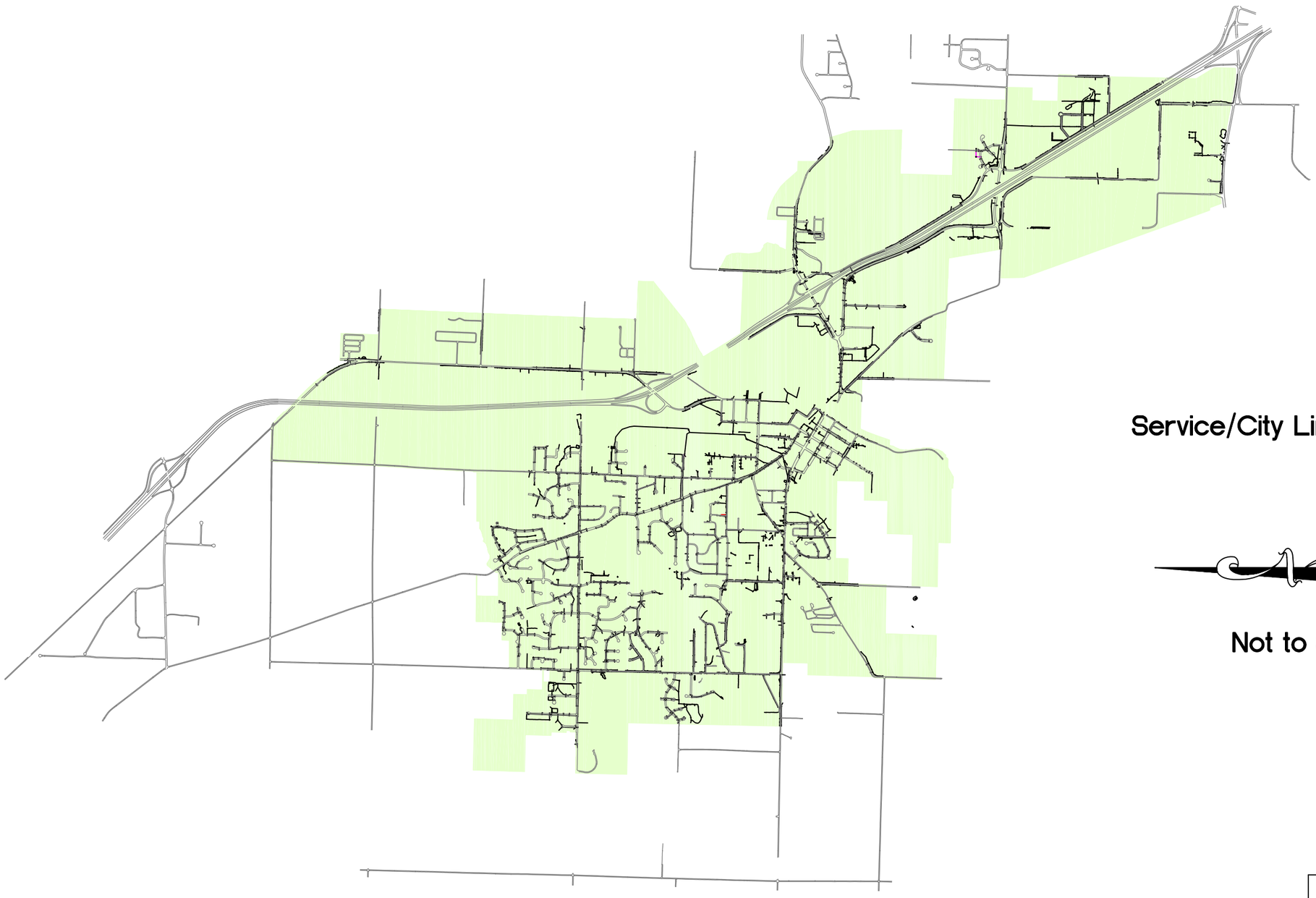
Chapter 3
Stormwater Service Boundaries

Current Service – City Boundary 3.1

The City currently provides stormwater service for the public stormwater system within the City limits.

Figure 3.1 on the following page shows the Current Stormwater Service Limits.

City of Ferndale
Current Stormwater Service Limits



Service/City Limits

Not to Scale

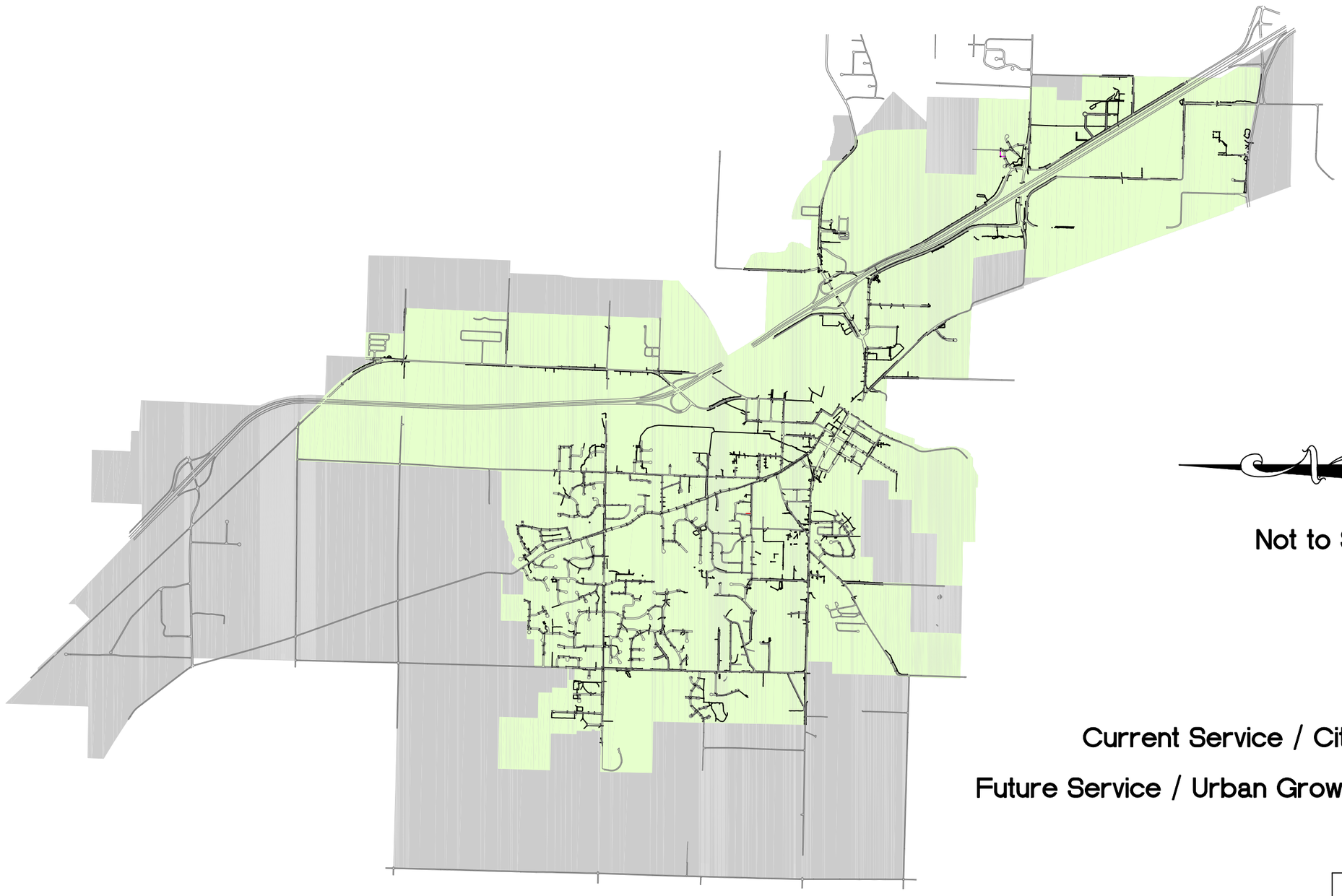
Figure 3.1
Dave C. Bren
7-23-05

Future Service – Urban Growth Boundary 3.2

The City proposes to provide future public stormwater service out to the Urban Growth Boundary, as these areas are annexed into the City limits.

Figure 3.2 on the following page details the proposed future stormwater service limits for the City of Ferdnale.

City of Ferndale
Future Stormwater Service Limits



Not to Scale

Current Service / City Limits

Future Service / Urban Growth Area

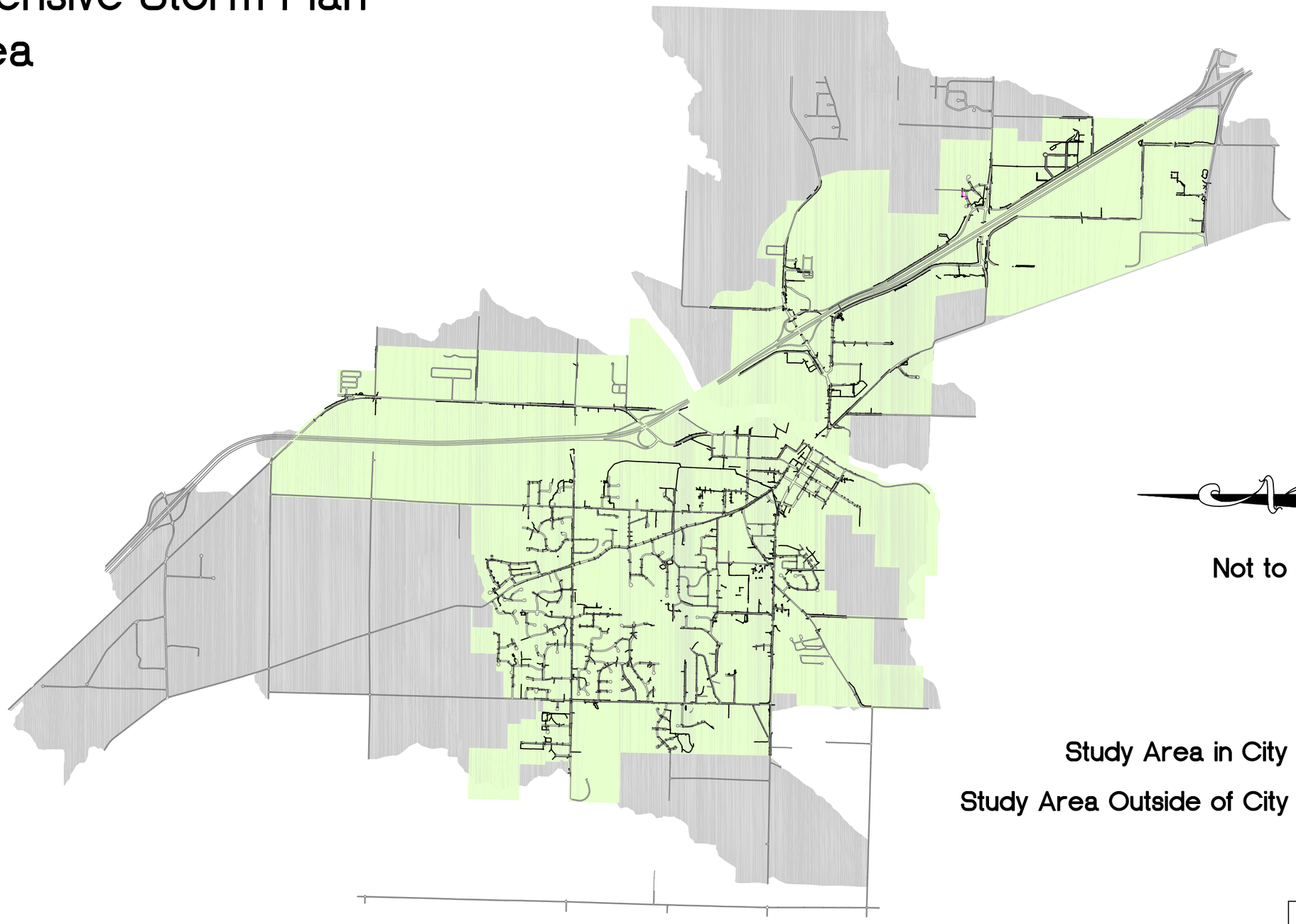
Figure 3.2
Dave C. Bren
7-23-05

Study Area 3.3

It was the goal of this comprehensive stormwater plan to cover all lands within the City limits and the Urban Growth Area. However, the aerial and GPS data gathered in 2000, 2001, and 2002 focused on City limits lands and did not cover the entire Urban Growth Area.

Figure 3.3 on the following page shows the Comprehensive Storm Plan Study Area.

City of Ferndale
Comprehensive Storm Plan
Study Area



Not to Scale

Study Area in City Limits

Study Area Outside of City Limits

Figure 3.3
Dave C. Bren
7-23-05

Chapter 4
Study Area Physical Description

Vicinity 4.1

The City of Ferndale lies in west central Whatcom County. The northern line of Whatcom County borders the Canadian province of British Columbia. Whatcom County is the most northerly county on the east side of the Puget Sound located in western Washington State.

The Nooksack River drains (14) major basins totaling 4605.2 acres directly or from several tributaries including Cedar Creek, Silver Creek, Deer Creek, and Tenmile Creek. The Red River drains (5) major basins to the southwest totaling 1941.6 acres. California Creek drains one major basin to the northwest totaling 562.1 acres at the northern most area of the City.

In general, the eastern and southern areas of the City of Ferndale are characterized as low lying plain areas, with mild slopes, and ranging in elevation from 10 to 50 feet above mean sea level. The areas to the north and west are characterized with rolling hills, larger slopes, and ranging in elevation from 50 to 375 feet above mean sea level.

Basins 4.2

The City of Ferndale was divided into 20 major basins using contributing area methodology. These major basins were further subdivided into 156 sub-basins using contributing area methodology. The basins were defined by area topography, location of drainage courses, and existing storm drainage facilities. The following data was used for basin delineation:

- 1971 Walker and Associates, Inc. Aerial Topography (5 foot contours)
- 1993 Walker and Associates, Inc. Aerial Topography (2 foot contours)
- 2000 City of Ferndale Storm Drainage Inventory Map (Mapping Grade GPS).
- 2001 City of Ferndale Elevation Inventory (Level Loop Survey)
- 2002 Walker and Associates, Inc Aerial Topography (2 foot contours)

The following table provides a list of the City of Ferndale major storm water basins in alphabetical order.

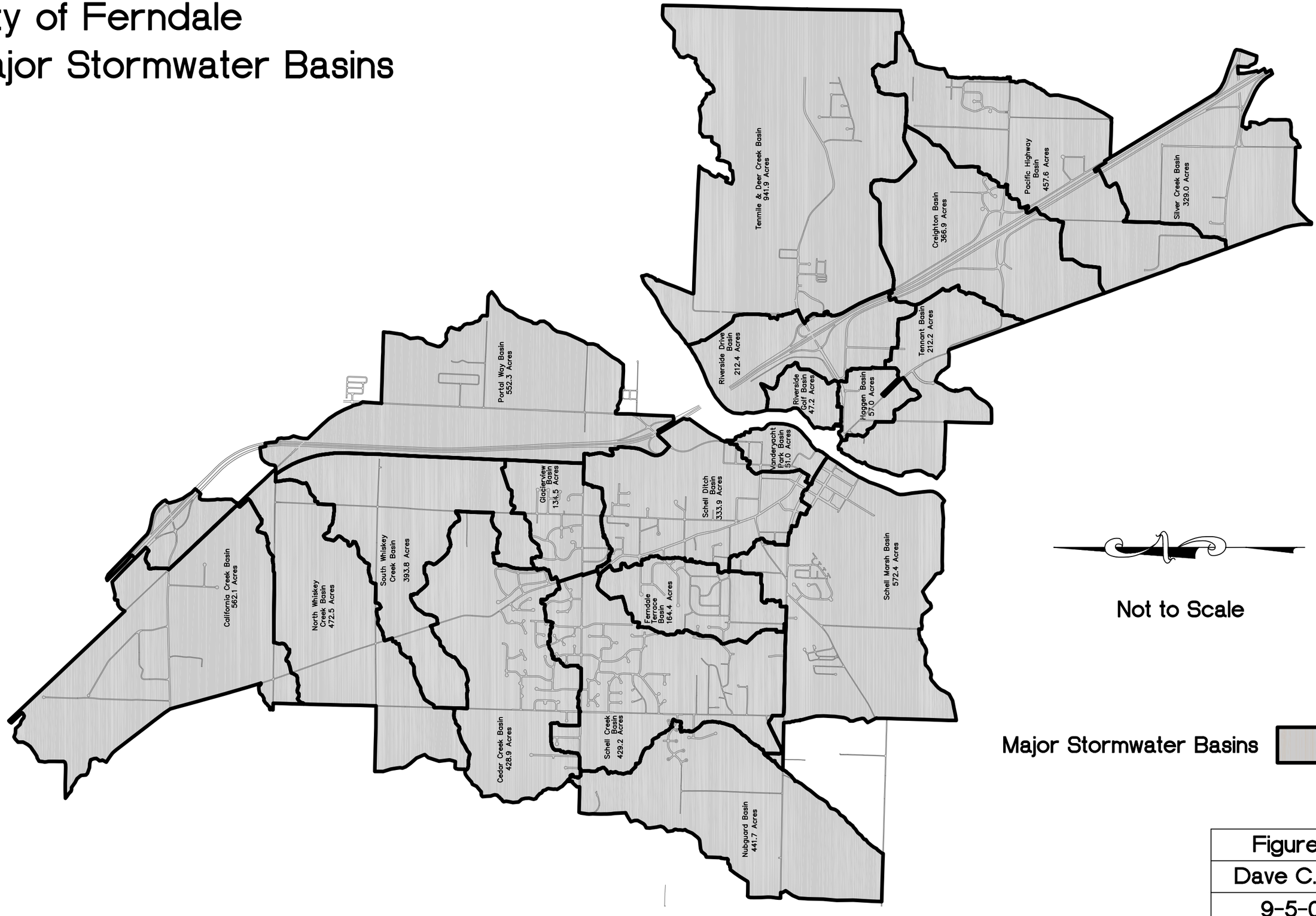
Table 4.1 – Defined Major Basins

Basins	Acres	Sub-basins
California Creek	562.1	11
Cedar Creek	428.9	15
Chreighton	366.9	5
Ferndale Terrace	164.4	8
Glacierview	134.5	8
Haggen	57.0	3
Nubguard	441.7	5
Pacific Highway	457.6	6
Portal Way	552.3	9
Riverside Drive	212.4	5
Riverside Golf	47.2	2
Schell Creek	429.2	22
Schell Ditch	333.9	15
Schell Marsh	572.4	10
Silver Creek	329.0	3
Tenmile-Deer Creek	941.9	4
Tennant	212.2	4
Vanderyacht Park	51.0	5
(North) Whiskey Creek	472.5	9
(South) Whiskey Creek	393.8	7
Study Area Totals:	7,108.9	156

Major basins and Sub-basins define contributing areas that concentrate all overland storm water to a single conveyance point.

Figures 4.1 and 4.2 on the following pages show the location of all major basins and sub-basins within the study area.

City of Ferndale
Major Stormwater Basins

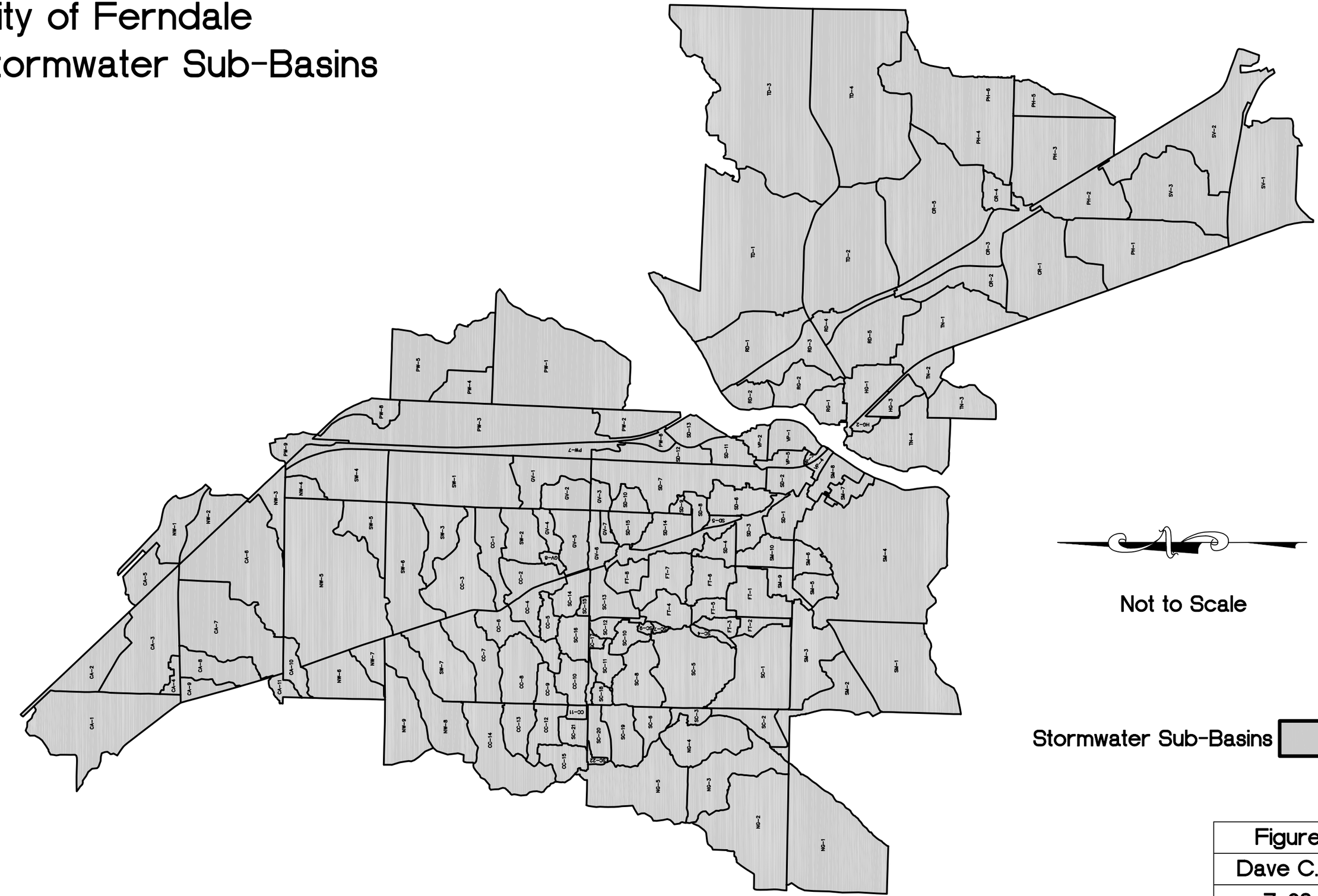


Not to Scale

Major Stormwater Basins

Figure 4.1
Dave C. Bren
9-5-05

City of Ferndale
Stormwater Sub-Basins



Not to Scale

Stormwater Sub-Basins

Figure 4.2
Dave C. Bren
7-23-05

Historic Rainfall Intensities 4.3

The following table shows the historic rainfall intensities used for the City of Ferndale Comprehensive Stormwater Management Plan.

Table 4.2 - Rainfall Intensities Used

Storm Event	Inches in 24 hours
6 Month	1.37
2 Year	1.90
10 Year	2.80
25 Year	3.25
100 Year	4.00

All stormwater modeling conducted for this plan was based on a type 1A, 24 hour storm event, using the Santa Barbara Unit Hydrograph.

Soils 4.4

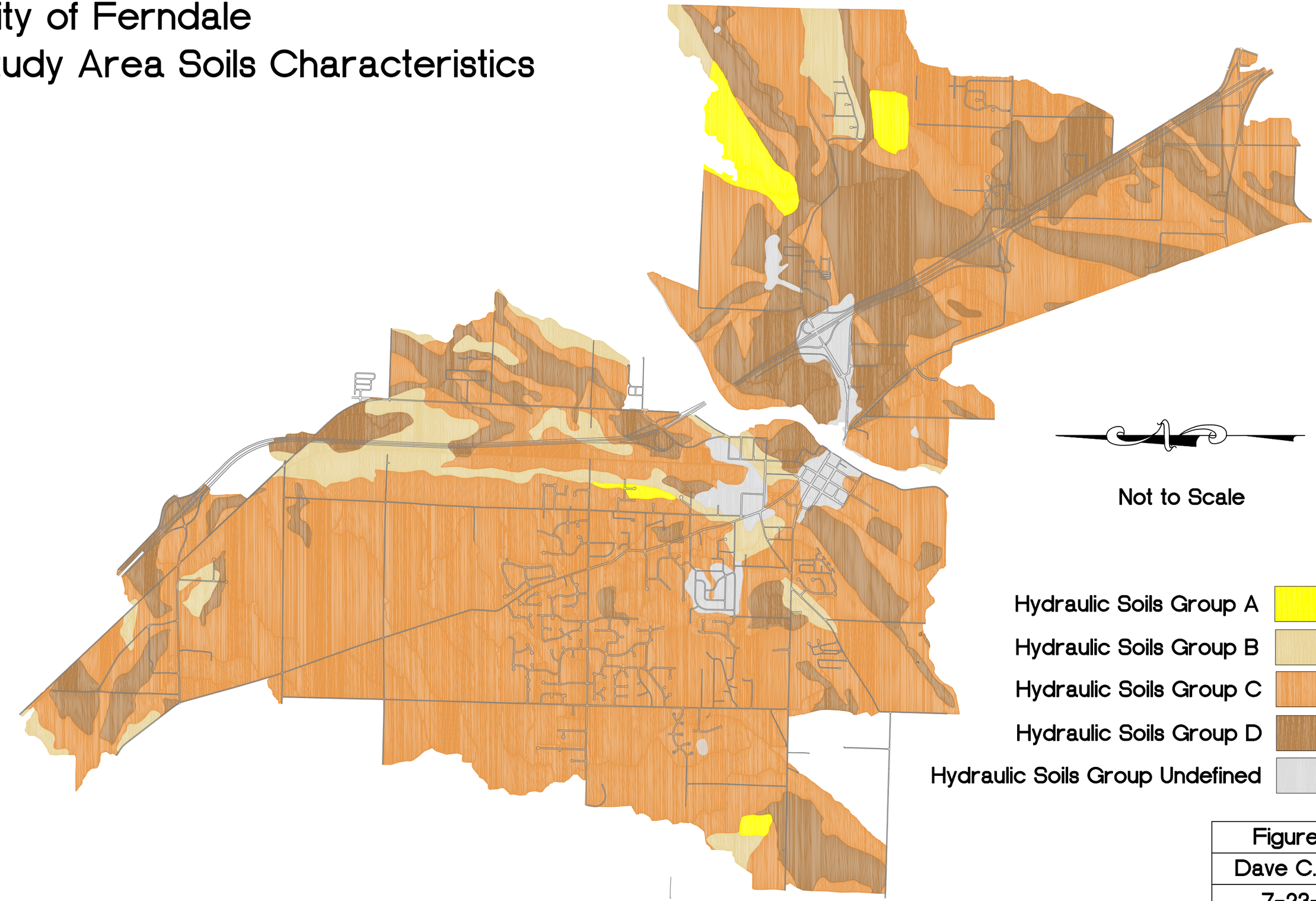
The following data was used to define the hydrologic soils group information for this study:

- 2001 Whatcom County Digital Soils Map - National Resource Conservation Service
- 1992 Soil Survey of Whatcom County – Soil Conservation Service (Now NRCS)

The Lynden Office of the National Resource Conservation Service provided the digital copy of the City of Ferndale soils. This digital data was provided in the same projection as all other City of Ferndale products (Washington State Plane North Zone projection and a NAD 83 horizontal datum).

Figure 4.3 on the following page shows the Study Area Soil Characteristics.

City of Ferndale
Study Area Soils Characteristics



Not to Scale

- Hydraulic Soils Group A
- Hydraulic Soils Group B
- Hydraulic Soils Group C
- Hydraulic Soils Group D
- Hydraulic Soils Group Undefined

Figure 4.3
Dave C. Bren
7-23-05

Existing Land Cover Characteristics 4.5

The following data was used to define the existing land cover characteristics for the study area:

- Spring 2002 Walker and Associates, Inc. City of Ferndale Aerial Vector CAD drawings
- Spring 2002 Walker and Associates, Inc. City of Ferndale Aerial Photo Images

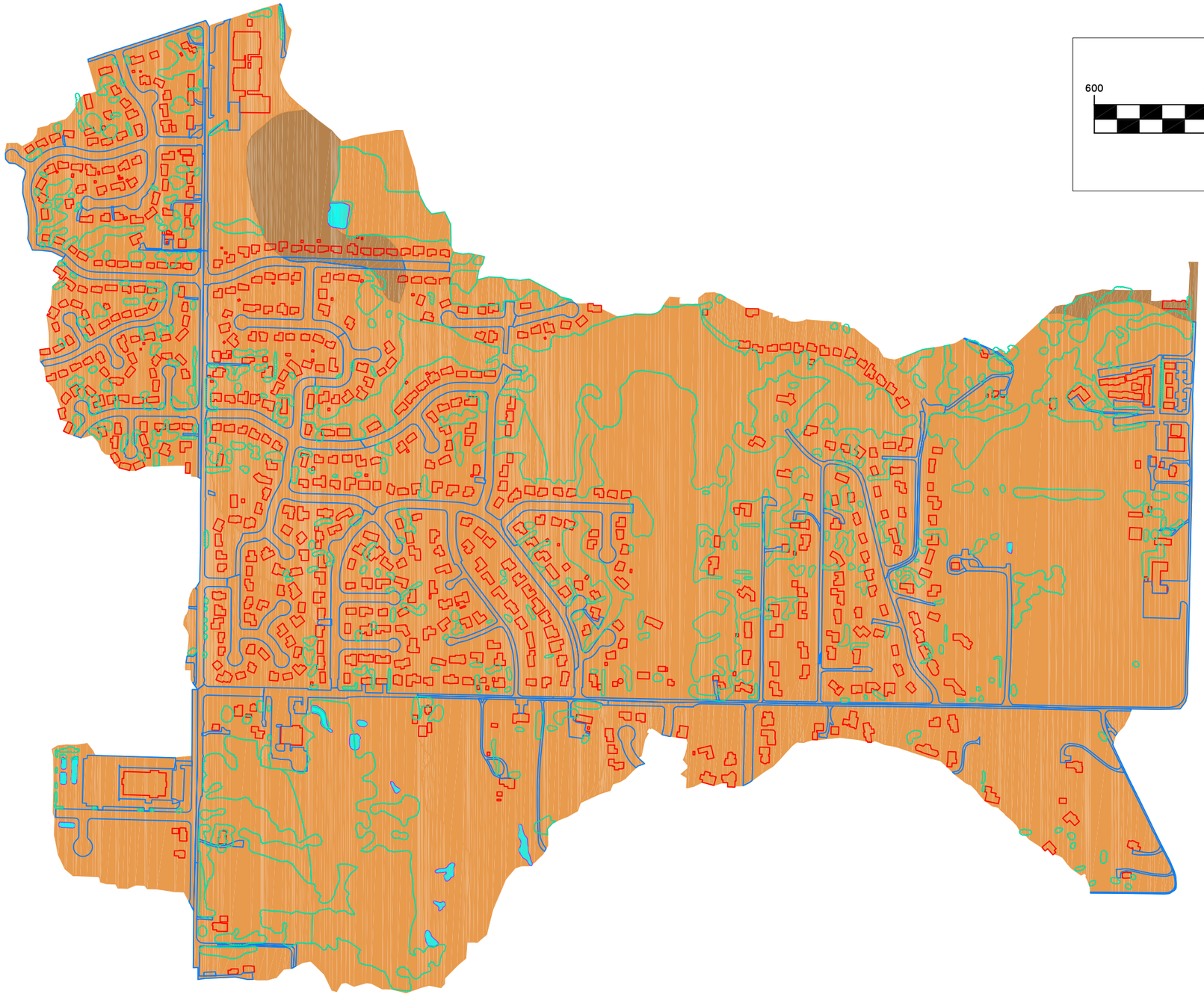
The existing land cover characteristics were defined by what was observable on the aerial data. The CAD vector lines and photo images provided a detailed snapshot of the land cover characteristics for the study area. The following land cover map layers were defined for each of the 156 sub-basins using GIS and CAD software:

- Hydro area
- Building area
- Driveway area (800 SF per house)
- Paved area (roads and parking)
- Gravel area (roads and parking)
- Tree area
- Lawn area
- Pasture area

The detailed definition of land cover areas was necessary for an accurate stormwater model of the City to be conducted.

Figure 4.4 on the following page shows Land Cover Characteristics for an Example Major Basin.

City of Ferndale
Land Cover Characteristics - Example Major Basin



GRAPHIC SCALE

600 0 300 600 1200 2400

(IN FEET)

1 inch = 600 ft.

Ponds

Houses and Trees

Paved Roads

Hydraulic Soils Group C

Hydraulic Soils Group D

Figure 4.4
Dave C. Bren
7-23-05

Future Land Cover Characteristics 4.6

The following data was used to define the future land cover characteristics for the study area:

- 2004 City of Ferndale Buildable Land Study
- Spring 2002 Walker and Associates, Inc. City of Ferndale Aerial Vector CAD drawings
- Spring 2002 Walker and Associates, Inc. City of Ferndale Aerial Photo Images

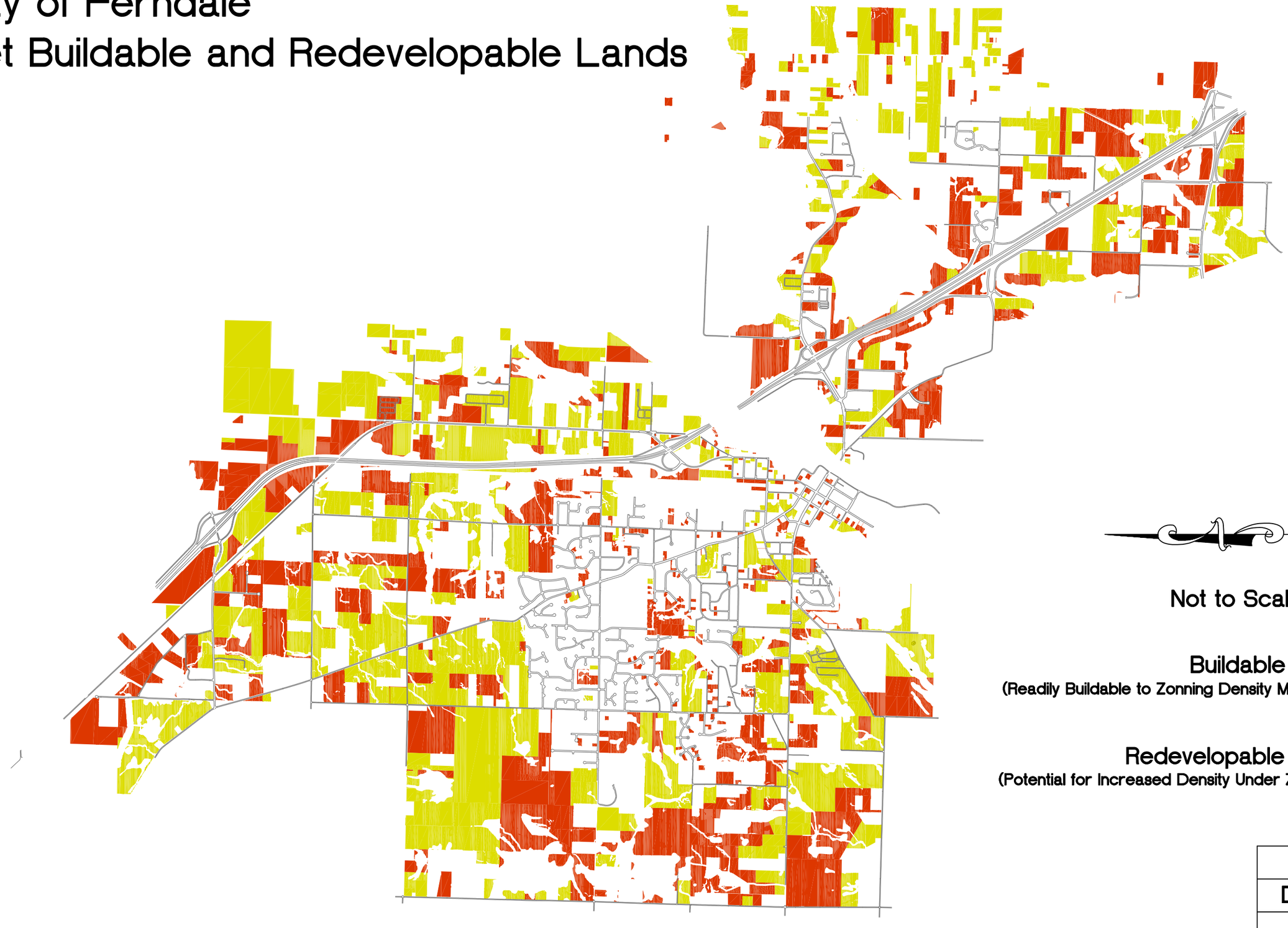
The results of the Buildable Lands Study were used to define what areas would become fully developed in the future. The methodology of the Buildable Lands Study provided a wealth of information for this Comprehensive Stormwater Plan.

The Buildable Lands Study first defined gross vacant land, gross re-developable lands, and gross fully developed lands. Then public lands and un-developable critical area lands were subtracted from the gross lands. The net result of the Buildable Lands Study was the total vacant lands and re-developable lands available for future development.

To define future land cover characteristics we assumed a full build out of the net vacant and re-developable lands at maximum density for the zoning they fell into. A composite future land cover map was then made using existing land cover for all areas defined as fully developed lands, critical area lands, and public lands under the Buildable Lands Study.

Figure 4.5 on the following page shows the Buildable and Redevelopable Lands for the Study Area.

City of Ferndale
Net Buildable and Redevelopable Lands



Not to Scale

Buildable Land
(Readily Buildable to Zonning Density Maximum)

Redevelopable Land
(Potential for Increased Density Under Zonning)

Figure 4.5
Dave C. Bren
7-23-05

Chapter 5
Stormwater Control Ordinance Adoption

Previous Ordinance 5.1

The City of Ferndale did not have a specific Stormwater Control Ordinance in place or proposed prior to this plan. However, Ordinance Number 1103 adopts the April 1995 City of Ferndale Development Standards. The City of Ferndale Development Standards regulate the minimum standards to safeguard public safety, health, and welfare for improvements including the regulation and control of existing and proposed stormwater control facilities.

Development Standard Chapters Regulating Stormwater – 5.1.1

Chapter 9 – Stormwater Management Review and Studies
Chapter 10 – Stormwater Management Systems – Design Regulations
Chapter 11 – Stormwater Quality
Chapter 12 – Stormwater System Maintenance

Proposed Ordinance 5.2

This plan proposes the adoption of a City of Ferndale Stormwater Control Ordinance that is substantially equivalent to the EPA model ordinance. The full text of the proposed Stormwater Control Ordinance can be found in Appendix A at the end of this plan.

In addition to the new ordinance, changes in the City of Ferndale Development Standards are required, including providing additional authority and compliance measures to the City as follows:

Proposed Changes to Inspection Authority 5.2.1: Section 1201.B.1 of the City of Ferndale Development Standards should be adjusted to read as follows:

> *The City is authorized to inspect during regular working hours and at other reasonable times all **existing or proposed** stormwater drainage systems to determine compliance with the provisions of the Maintenance Plan **or the applicable provisions of the most current edition of the Department of Ecology Stormwater Management Manual, should a maintenance plan not exist**.*

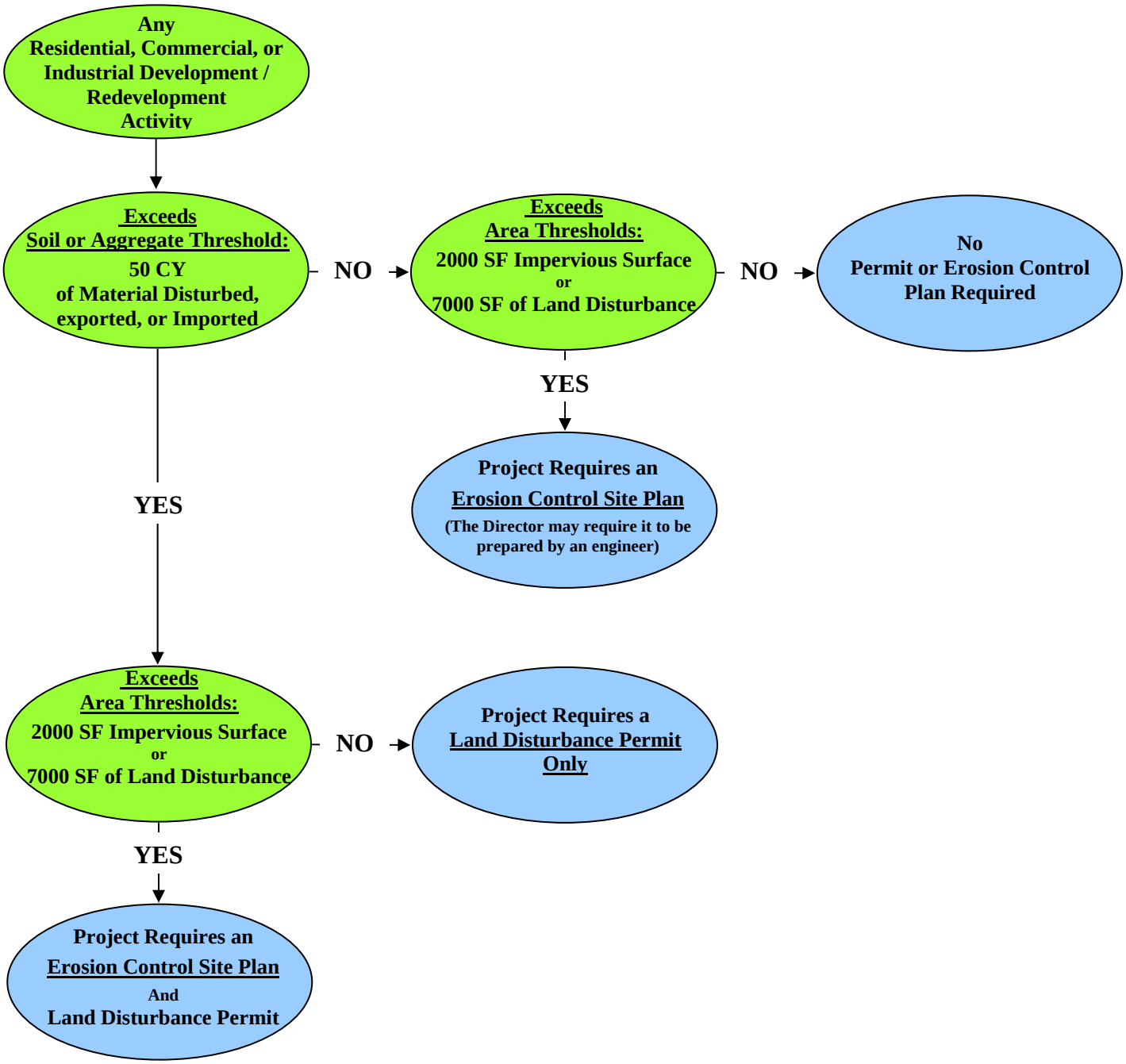
The above change will provide clear authority to inspect existing storm structures as well as storm structures under construction. In addition, the Department of Ecology Stormwater Management Manual shall be held if no site specific Maintenance Plan exists for small storm systems or individual private structures.

Proposed Changes to Compliance Authority 5.2.2: The second paragraph of Section 1201.B.2 of the City of Ferndale Development Standards should be adjusted to read as follows:

> *If the City, upon inspection of the Stormwater system finds deficiencies, the City will first make a reasonable effort to **notify** the owner or other person(s) having charge or control of the property or portions of the property **in writing with a list of corrections required to meet compliance**.*
>
> *If, after **45 days from the date of the written notification** the deficiencies are not corrected **or a reasonable effort to do so has not commenced** the City may execute corrective measures. Following completion of all corrective measures, the City will submit an itemized billing to the responsible party for reimbursement to the City.*

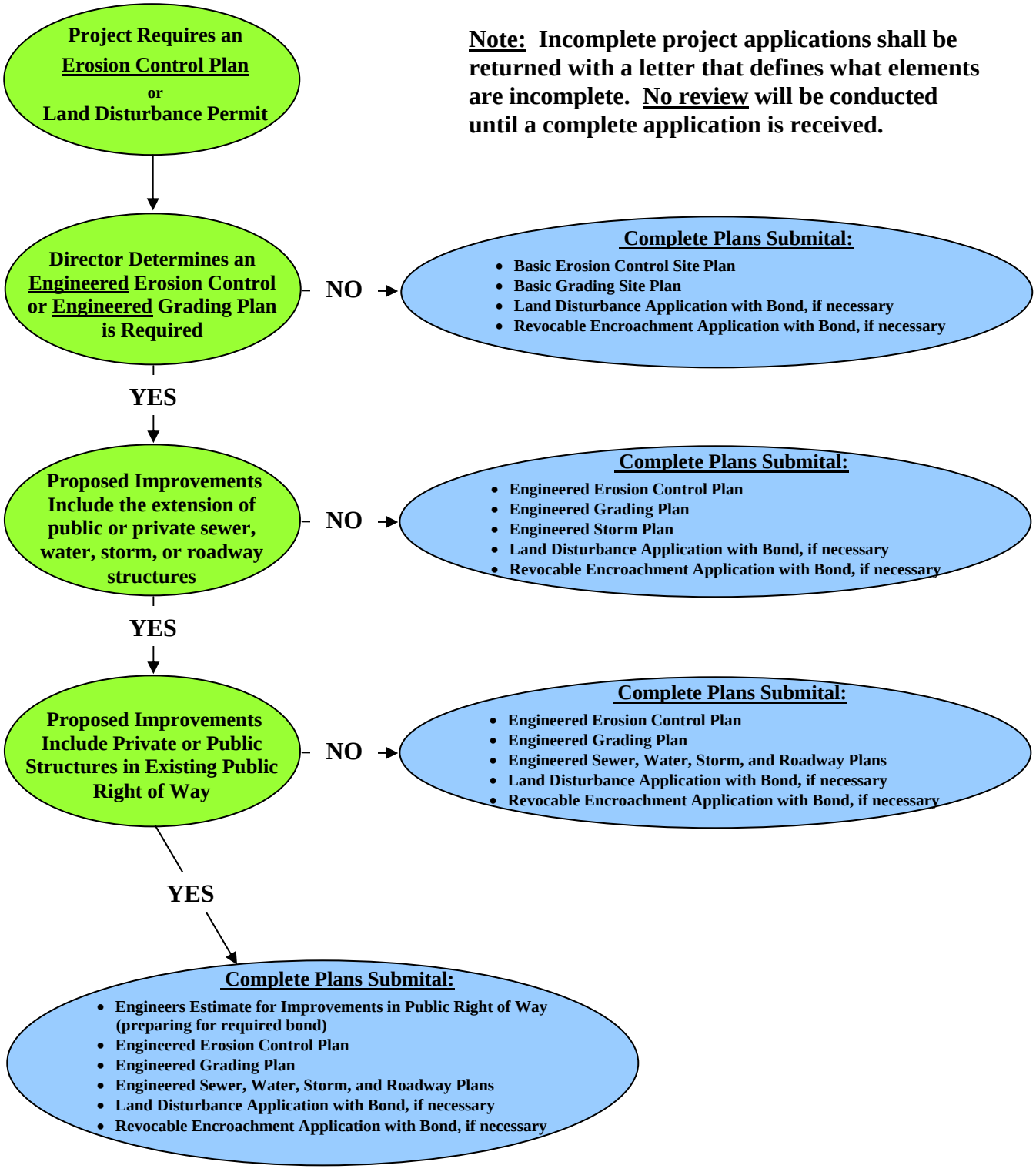
Chapter 6
Development and Redevelopment Review Process

Land Disturbance Permit Review Process 6.1

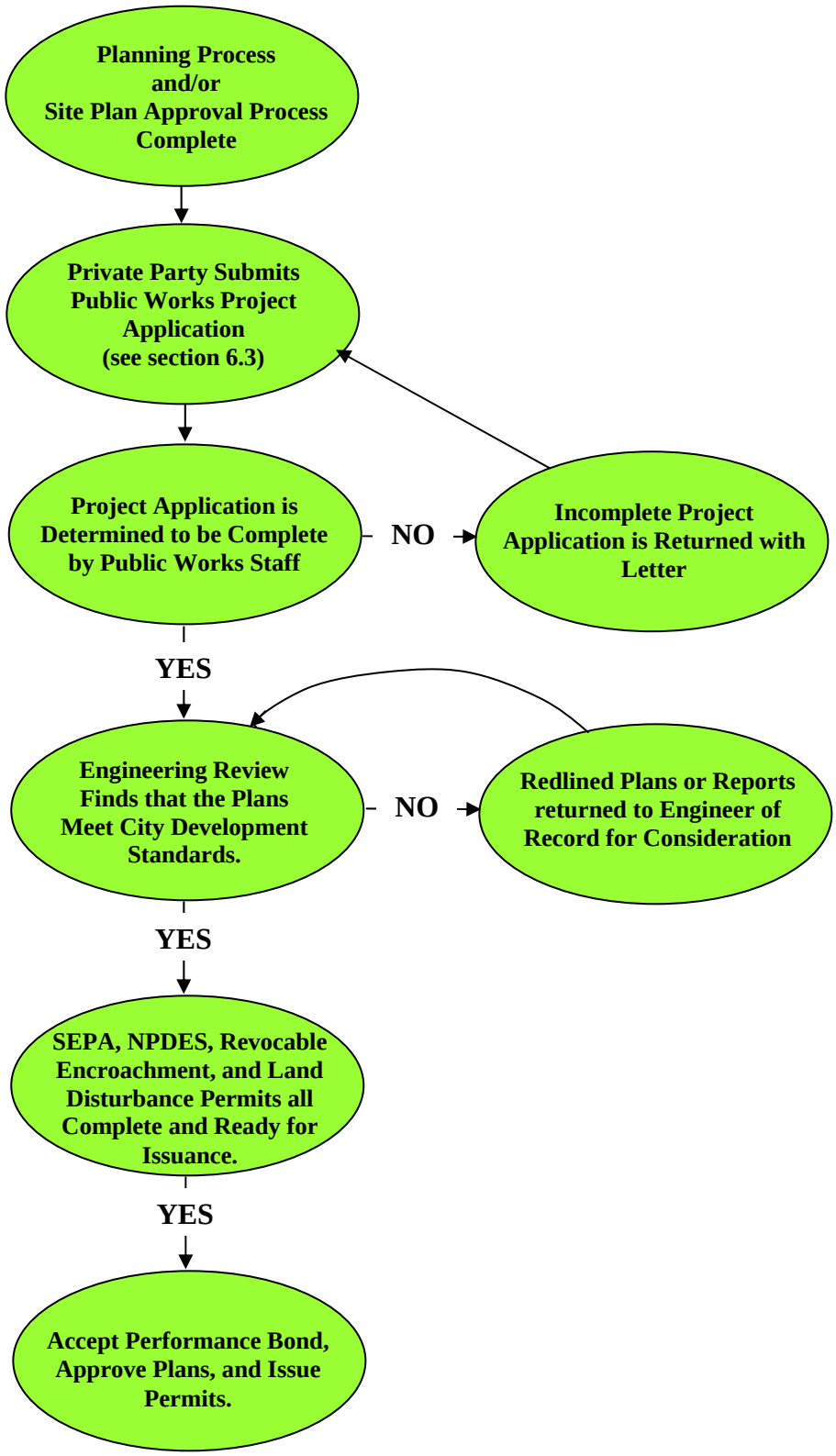


Planning Review Process 6.2

Public Works – Completed Project Application 6.3



Public Works Review Process 6.4



Chapter 7
Inspection of Construction Sites

Building Services Enforcement 7.1

Erosion control has focused on the large development activities since the advent of the 1992 DOE standards. Large development requires an engineered Stormwater Pollution Prevention Plan, BMPs installation before any work, and ongoing city inspection of BMPs. However, small development activities such as the construction of a single house on an old in-fill lot are often overlooked.

Large development / heavy civil contractors are the first to point out the small residential contractors get away with site work erosion to a large degree. Residential contractors have been protected in the past by the small-scale nature of their work. However, these small residential projects make up for individual project scale by the quantity of houses.

The threshold for a City of Ferndale Land Disturbance Permit is 50 cubic yards of material disturbed, exported, or imported. Most single residential projects disturb less than 50 cubic yards of material and do not require a Land Disturbance Permit. Since a Land Disturbance Permit is the key administrative tool to require erosion control measures and stormwater controls single residential project received limited erosion control inspection in the past, unless a gross violation has occurred.

Single Residence Construction – 7.1.1

Small residential projects are under the same DOE erosion control standard and should be held accountable for erosion control measures. It does not make sense to require engineered erosion control for small residential projects. However, a basic list of BMPs should be reflected on each residential site plan and should be reviewed as part of the residential building review process. The DOE Stormwater Management Manual has attempted to cover this through Minimum Requirement #1 “Preparation of Stormwater Site Plans”, of which the creation of 2,000 square feet of impervious surfaces and/or the disturbance of 7,000 square feet of land is the threshold. This Minimum Requirement includes the submittal of a Construction Stormwater Pollution Prevention Plan. This should be enforced on projects of any scale which disturb soils within the City limits.

The following basic BMP text list shall be added to the face of each residential site plan:

- BMP C105: Stabilized Construction Entrance
- BMP C151: Concrete Handling
- BMP C180: Small Project Construction Stormwater Pollution Prevention
- BMP C220: Storm Drain Inlet Protection
- BMP C233: Silt Fence

The additional duty of erosion control inspection and compliance officer should be added to the building official or inspector in the building services section. A common sense type of erosion control inspection should be conducted as part of the usual residential inspections.

Ordinance and Authority – 7.1.2

To keep it simple, the same process of compliance should be used as with standard residential inspections. The City ordinance should be modified to provide this authority to the building inspector.

Public Works Enforcement 7.2

In most cases, private work that is inspected by the Public Works Department requires a Land Disturbance Permit. Therefore, in many cases there will be an engineered Stormwater Pollution Prevention Plan accompanying the project drawings. The City of Ferndale Development Standards adopts the Department of Ecology Stormwater Management Manual for Western Washington, and therefore is used as the guidelines for the Stormwater Pollution Prevention Plan.

Commercial Construction – 7.2.1

Commercial construction is unusual in that there will be Public Works inspection for site work and Building Services inspection for building work. However, erosion control inspection shall be the domain of the Public Works Department for all commercial construction. In most cases commercial construction will include an engineered Stormwater Pollution Prevention Plan with the construction drawings. The initial erosion control installation shall be inspected to meet the requirements of this engineered plan. If the erosion control measures become inadequate due to changing site conditions the private engineer of record shall make field or drawing changes to the plan and the City shall review those changes prior to their implementation. Inspection shall commence with the engineered changes.

In many cases commercial projects include the installation of private stormwater systems. Private stormwater system improvements should be inspected by the Public Works Department for the following reasons:

1. The stormwaters conveyed by these pipes ultimately terminate at Public facilities.
2. When failures occur within private systems the City normally receives the call to fix the problems. There are numerous reasons for this including, the slow response of homeowners associations, their lack of manpower and equipment, and the general assumption that all stormwater facilities are owned and maintained by the City.
3. The DOE has defined that all stormwater and associated conveyances as under their jurisdiction, requiring standards of practice and inspection.

This inspection authority over private stormwater systems should be specifically addressed in the City ordinance and City Development Standards.

Short Plat Construction – 7.2.2

Short Plat construction is entirely in the realm of Public Works inspection. In most cases the work will require an engineered Stormwater Pollution Prevention Plan. The initial erosion control installation shall be inspected to meet the requirements of this engineered plan. If the erosion control measures become inadequate, due to changing site conditions, the private engineer of record shall make field or drawing changes to the plan and the City shall review those changes prior to their implementation. Inspection shall commence with the engineered changes.

Long Plat Construction – 7.2.3

Long Plat construction is entirely in the realm of Public Works inspection. In all cases the work will require an engineered Stormwater Pollution Prevention Plan. The initial erosion control installation shall be inspected to meet the requirements of this engineered plan. If the erosion control measures become inadequate, due to changing site conditions, the private engineer of record shall make field or drawing changes to the plan and the City shall review those changes prior to their implementation. Inspection shall commence with the noted engineered changes.

Public Construction – 7.2.4

Public construction erosion control inspection should meet the same standard as private construction erosion control inspection. However, the Public Works Department does not inspect public projects. Instead, the project engineer of record, as the City's representative inspects them.

Chapter 8
Stormwater System Maintenance Program

Existing Conditions 8.1

The City of Ferndale's drainage system represents a century of piecemeal planning, design, and construction standards. Maintenance efforts have focused on populated areas and chronic problem areas. However, systematic system wide planning, maintenance, and capital improvements have not been proposed until this plan.

The drainage system inventory was the key tool in defining the condition of the existing system. The inventory shows a City that needs much work. Some areas of the City have no drainage system whatsoever, other areas have inadequate or failing drainage systems, and other areas of the City are in excellent working order.

Cleary, a long-term plan to reconstruct, replace, repair, and maintain the drainage system is required. In addition, this plan must be detailed, span decades, and provide for regular system re-evaluation. The following plan section begins the process of planning, scheduling, and maintenance for the City drainage system.

Maintenance Plan 8.2

At present, a portion of the City of Ferndale's drainage system is not in a maintainable state. There are many pipes and culverts full of silt or collapsing. **A maintainable drainage system is one that only requires the catch basin sumps to be cleaned regularly by vactor truck.** The existing drainage system needs major repair before a regular maintenance schedule is possible.

Therefore, the maintenance plan has been written into two sections as follows:

Initial Drainage System Cleaning – 8.2.1

Recent efforts have focused on keeping the catch basin sumps clean. The idea was to let the pipes and culverts slowly clean themselves out by depositing accumulated pipe silt in the next down slope catch basin sump. Unfortunately, the theory does not work in practice. In short, the pipes are obstructed with compacted silt and gravel and do not self clean anymore. It should be noted that pipes with build up typically do not have sufficient slope to produce scouring velocities.

The practical approach is to jet the obstructed pipes clean and collect the silt-laden waters. In short, use the vactor truck to suck up silt-laden waters or pump silt-laden waters to an appropriate storm water BMP. The basic phases for the initial drainage system clean up are as follows:

Phase 1 – Pre-clean all catch basin sumps
Phase 2 – Define all pipes and culverts requiring cleaning
Phase 3 – Schedule work, plan silt-laden water processing, and jet each obstructed pipe one at a time
Phase 4 – Post-clean all catch basin sumps

Drainage System Maintenance – 8.2.2

After the system is initially cleaned of built-up silt, a regular maintenance program can be implemented. A regular maintenance program includes system evaluation, problem area determination, and long-term repair and replacement planning.

The system has approximately 1750 catch basins. This would require 34 catch basin sumps to be cleaned in a week in a yearly cleaning cycle. However, this number could be drastically reduced by careful inspection and documentation during the cleaning process. In short, many catch basins will build up little silt and others will consistently build up silt. Those with little silt buildup could go on a two-year cleaning cycle.

The regular drainage system maintenance schedule has been split into 1, 2, 5, and 10-year cycle activities. The maintenance cycle scheduling is detailed in section 10.3. However, the basic cycles are as follows:

One-year cycle activities:

- Clean and document catch basin sumps of consistent silt builders
- Update the drainage system map with new construction and old system finds
- Repair or replace long-term corrective measures planned for the year

Two-year cycle activities:

- Clean catch basin sumps of slow silt builders
- Have a summer intern evaluate the conditions of the entire drainage system, given specific instructions and an evaluation log.
- Revaluate drainage system and long-term corrective measures planned
- Clean and maintain storm detention structures and associated treatment swales

Five-year cycle activities:

- Clean and maintain all roadside ditches
- Clean and maintain all culverts

Ten-year cycle activities:

- Revise the City of Ferndale Comprehensive Storm Plan

Maintenance Scheduling 8.3

Maintenance scheduling has split into the two parts, as was the maintenance plan section as follows:

Initial Drainage System Cleaning – 8.3.1

A 2 year initial drainage system cleaning period should be set aside after this comprehensive plan is initiated. Every stormwater system structure in the City of Ferndale shall be evaluated and maintained if possible. Structures requiring repair or re-construction shall be documented for future scheduled work.

Upgrades in equipment will be needed since many pipes will require jetting or augering. In some cases the pipes will have to be replaced as they can no longer be jetted or augered out. These pipes will also be documented for future scheduled work.

If stormwater system structures are found that are not on the inventory map they should be mapped. The approximate location should be sketched on the inventory map and the project engineer should be contacted for mapping the structure.

A systematic approach to an initial cleaning of the entire stormwater system in detail should be conducted.

Drainage System Maintenance – 8.3.2

The regular drainage system maintenance schedule is split into 1, 2, 5, and 10 year cycle activities. All of the following maintenance cycles begin on January 1, 2006.

One-year cycle activities: These activities must be completely conducted each year. The appropriate section supervisors shall make specific scheduling plans for the yearly activity to be completed within a year.

Number	Activity Description	Activity Supervisor
1	Clean and document catch basin sumps of consistent silt builders	Public Works Foreman
2	Update the drainage system map with new construction and old system finds	Consulting Engineer or City Project Engineer
3	Repair or replace long-term corrective measures planned for the year	Public Works Foreman

Two-year cycle activities: These activities must be completely conducted within a two-year period. The appropriate section supervisors shall make specific scheduling plans for these activities. The activities should be divided into equal parts between the two years.

Number	Activity Description	Activity Supervisor
1	Clean catch basin sumps of slow silt builders	Public Works Foreman
2	Have a summer intern evaluate the conditions of the entire drainage system, given specific instructions and an evaluation log.	Consulting Engineer or City Project Engineer
3	Revaluate drainage system and long-term corrective measures planned	Consulting Engineer or City Project Engineer
4	Clean and maintain storm detention structures and associated treatment swales	Public Works Foreman

Five-year cycle activities: These activities must be completely conducted within a five-year period. The appropriate section supervisors shall make specific scheduling plans for these activities. The activities should be divided into equal parts between the five years.

Number	Activity Description	Activity Supervisor
1	Clean and maintain all roadside ditches	Public Works Foreman
2	Clean and maintain all culverts	Public Works Foreman

Ten-year cycle activities: This activity must be conducted every ten years.

Number	Activity Description	Activity Supervisor
1	Revise the City of Ferndale Comprehensive Storm Plan	Consulting Engineer or City Project Engineer

Maintenance and Evaluation Logs 8.4

Maintenance Log – 8.4.1

Those conducting maintenance on the drainage system shall keep a maintenance log. The maintenance log will record the block or street maintained, maintenance activity conducted, date of maintenance, condition of maintained facility, and document failing structures. The log shall be initialed.

This log will be used to determine future maintenance intervals of structures. In addition, the log will be used to determine drainage system problems and evaluate required corrective measures.

The maintenance log is a daily and continuous log.

Two-Year Drainage System Evaluation Log

Once every (2) years the entire system should be evaluated. The Public Works Department will evaluate the condition of the entire drainage system by detailed inspection. The staff will receive detailed training, conduct trials, use specific documented instructions and a prepared evaluation log.

The drainage system evaluation log will evaluate the following structures:

- Catch basins and their associated sump build up
- Culverts
- Roadside ditches
- Detention ponds and vaults
- Treatment swales

The two-year drainage system evaluation log is a full inspection record.

Chapter 9
Development and Redevelopment Source Control

Source Control Program Development 9.1

The intention of Source Control is to prevent stormwater from coming in contact with pollutants. They are a cost-effective means of reducing pollutants in stormwater, and, therefore, should be a first consideration in all projects. The City of Ferndale, through their adoption of the most current edition of the Department of Ecology Stormwater Management Manual (SWMM) already has a developed source control program. Per the adopted standard, "All known, available and reasonable source control BMPs (Best Management Practices) shall be applied to all projects. Source control BMPs shall be selected, designed, and maintained according to this manual (SWMM)."

Source Control Program Implementation 9.2

The City of Ferndale has adopted the most current edition of the SWMM within its Development Standards. The implementation of a Source Control Program takes place through the Development and Redevelopment Review Process as described in Chapter 6 of this document. Through this process the City reviews development and redevelopment plans to ascertain compliance with the City's Development Standards, and therefore, the SWMM.

Chapter 10
Illicit Discharge Response

Dumping and Illicit Discharge Ordinance 10.1

Illicit discharges are any discharges to a storm sewer system that is not composed entirely of storm water, such as sanitary wastes, industrial process wastewater, and interior floor drains. EPA requires, as part of the NPDES Phase II permit process, that jurisdictions develop, implement and enforce a program to detect and eliminate illicit discharges into a storm water system. This includes:

- Develop a stormwater system map, showing the location of all outfalls and the names and location of all waters that receive discharges from those outfalls;
- Through ordinance or other regulatory mechanism, effectively prohibit non-storm water discharges into storm sewer systems and implement appropriate enforcement procedures and actions;
- Develop and implement a plan to detect and address non-storm water discharges, including illegal dumping; and,
- Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.

Currently the City of Ferndale Stormwater ordinance does not have an Illicit Discharge component. The following Illicit Discharge Ordinance should be added to the City's municipal code.

This plan proposes the adoption of a City of Ferndale Dumping and Illicit Discharge Ordinance. The full text of the proposed Illicit Dumping and Discharge Ordinance can be found in Appendix B at the end of this plan.

Dumping and Illicit Discharge Detection 10.2

The City of Ferndale will be implementing the following stormwater management practices, as discussed in this plan, which will help to detect illegal dumping and illicit discharges.

- Map the route of the storm system and the locations of storm drains.
- Set up an anonymous tip line
- Apply new development and redevelopment construction inspection requirements

Chapter 11
Identification of Storm System Issues

Stormwater System Inventory 11.1

Prior to the summer of 2000 the City of Ferndale did not have a stormwater system map. Capital improvements to the system were only conducted in reaction to chronic problems and storm water design was conducted in a piecemeal fashion. Thus, proactive planning for the City of Ferndale stormwater system was non-existent.

During 2000, 2001, and 2002 the City conducted a quality inventory of the entire stormwater system. The following describes these stormwater inventory activities:

Relationship with Bellingham Technical College –11.1.1:

The City of Ferndale formed a close relationship with the Civil Engineering Technology Program at Bellingham Technical College to inventory the City stormwater system. In a win-win relationship, the City received storm mapping data and the students and their instructor received practical experience during the Summer of 2000 and 2001.

Summer 2000 – GPS Mapping – 11.1.2.

The Civil Engineering Technology Instructor from Bellingham Technical College and three of his students mapped the storm water system of the City of Ferndale with mapping grade GPS equipment. All catch basins, culverts, ditchlines, and detention facilities were located. In addition, each catch basin was opened, measure downs to inverts were conducted, pipe materials recorded, pipe sizes recorded, and condition of structure evaluated. **This provided excellent mapping grade horizontal data for the storm system of the City of Ferndale.**

All horizontal data was gathered with a mapping grade Trimble XRS Pro GPS unit with sub meter accuracy. The data was projected and edited in Washington State Plane North Zone - NAD 83 horizontal datum. Horizontal inventory included all of the following:

- Catch basins
- Culvert ends
- Drainage ditches
- Detention ponds
- Bioswales and associated treatment structures

Each catch basin and culvert was evaluated with regard to its current condition. The following describes field evaluation for each structure observed:

- Replace - Inoperable structure that cannot be repaired
- Repair - Inoperable structure that can be repaired
- Obstructed - Pipes or Culvert filling with silt
- Needs Cleaning - Catch basin sump full or culvert is beginning to silt
- Clean - Clean catch basin sump and pipes or clean culvert

Summer 2001 – Vertical Inventory – 11.1.3:

The horizontal accuracy of mapping grade GPS is good, however the vertical accuracy is not acceptable for storm modeling. Therefore, it was planned to conduct a level loop of the entire stormwater system the following summer 2001. The vertical data was gathered using an engineer grade SECO Autolevel and simple level loop survey methods.

All level loop work was conducted by (2) students from the Civil Engineering Technology Program at Bellingham Technical College under the supervision of their instructor. The level loops utilized HARN monuments placed by Northwest Surveying and GPS. These HARN survey monuments have vertical accuracies of 2-4 cm. Therefore, short level loops utilizing them would be excellent data for storm modeling on the scale of a City. In addition to level loops the students metal punched each catch basin rim with a unique (4) digit number. **This provided excellent engineering grade vertical data for the storm system of the City of Ferndale.**

All vertical data was gathered using an engineering grade Seco Autolevel and simple level loop methods, utilizing HARN monuments placed by Northwest Surveying and GPS. Vertical inventory included all of the following:

- Catch basin rims
- Culvert inverts
- Catch basin pipe inverts were calculated by measure downs

Spring 2002 – Aerial Mapping – 11.1.4:

Walker and Associates conducted an aerial survey that provided 2’ contours for the City of Ferndale**. This aerial survey provided excellent land use, ground cover, and contour information for basin delineation and curve number definition.**

Stormwater Modeling Methodology 11.2

The City of Ferndale stormwater modeling effort targeted the following goals:

1. Provide a detailed model that analyzes major conveyance reaches through City.
2. Provide a model that future development would have to utilize and match.
3. Provide a model that would match existing known problems.
4. Provide a model that would show future problems.

The above goals go far beyond a conceptual stormwater model. In short, the goals require a detailed stormwater model methodology similar to what is required for a sub-division. The following sections detail the stormwater model methodology used:

Stormwater Basin Delineation –11.2.1:

A stormwater basin is a region where all surface waters eventually drain to one point. In the developed urban setting surface waters are drained by natural and man made features including: terrain breaklines, terrain slopes, streams, ditches, pipes, gutterlines, roads, and buildings.

In a process called "Basin Delineation" an engineer considers the drainage features and defines a divide line between the basins. The basin divide lines show regions where surface waters all flow to one point. It should be noted that a basin can be broken down into smaller basins, just as there are branches from a stream. Therefore, basin scale, also called order, is very important.

Basin delineation for the City of Ferndale was conducted in two scales/orders to provide the detail necessary for the model as follows:

1. Delineation of **20** major stormwater basins
2. Further delineation of **154** sub-basins within the major stormwater basins

Figures 4.1 and 4.2 in Chapter 4 show the results of the basin delineation work.

Time of Concentration Definition –11.2.2:

The time of concentration is the longest time it takes surface water to travel within a defined storm basin. The longest time for water to travel is often not the longest distance. Surface water travels much slower over flat rough terrain than heavy sloped smooth terrain. This time of concentration indicates a time period when all the effects of surface waters can be felt at the single outfall from the basin.

In a process called "Time of Concentration Definition" an engineer considers the drainage features and defines a route and time for the basin. This time of concentration is directly input into the model.

Basin Surface Cover and Soils Characteristics –11.2.3:

Basin soils characteristics have a large effect on how much surface water goes into the ground water table. All soils characteristics were defined utilizing AutoCAD polygon area calculations based on the NRCS digital soils map for Whatcom County. Figure 4.3 in Chapter 4 shows the Study Area Soils Characteristics.

Basin surface cover characteristics have a large effect on how much surface waters will be retained or how fast surface waters will move in the basin. Surface cover characteristics are divided into two major categories as follows:

1. Pervious Cover Including: trees, lawns, meadows, agricultural land, and parks.
2. Impervious Cover Including: roads, parking, buildings, sidewalks, and water bodies

All surface cover characteristics were defined utilizing AutoCAD polygon area calculations based on the 2002 Aerial Mapping Survey. Figure 4.4 in Chapter 4 provides an example of the surface cover characteristics work conducted in AutoCAD.

Existing vs. Future Conditions –11.2.4:

Existing basin lines, time of concentration, land cover, and soils conditions were defined by what was observed in the 2000 GPS Storm Inventory, NRCS soils data, and 2002 Aerial Mapping Survey.

Future basin lines, time of concentration, and soils were defined as being the same as in the existing conditions. However, the land cover was expected to drastically change as the buildable land is developed to the current zoning density maximums. Therefore, land cover change was estimated given the following data:

1. Buildable and Redevelopable Lands Inventory
2. Current Zoning Density Maximums

Figure 4.5 in Chapter 4 shows the amount of Buildable or Redevelopable Land still available in the City of Ferndale. It should be noted that redevelopable land represents land that has a potential for increased density under the current zoning.

Major Conveyance Routes – 11.2.5:

With over 2,000 catchbasins, over 700 culverts, and thousands of storm pipes it was not feasible to model the entire City stormwater system. Therefore, the modeling efforts focused on the major conveyance routes through the city.

Each of the 154 stormwater sub-basins was defined with a conveyance route. Each of these routes has several reaches of pipe, ditch, or stream to convey the water through the basin. A detailed model of these pipes, ditches, and streams was defined for each sub-basin.

Existing Detention – 11.2.6:

Existing public and private detention around the city is sparse. Many of the older facilities are not functioning properly or are inadequately sized. Therefore, all existing detention was ignored for the purposes of the City wide model. In short, their effects are negligible in the overall scope.

Stormwater Modeling Software – 11.2.7:

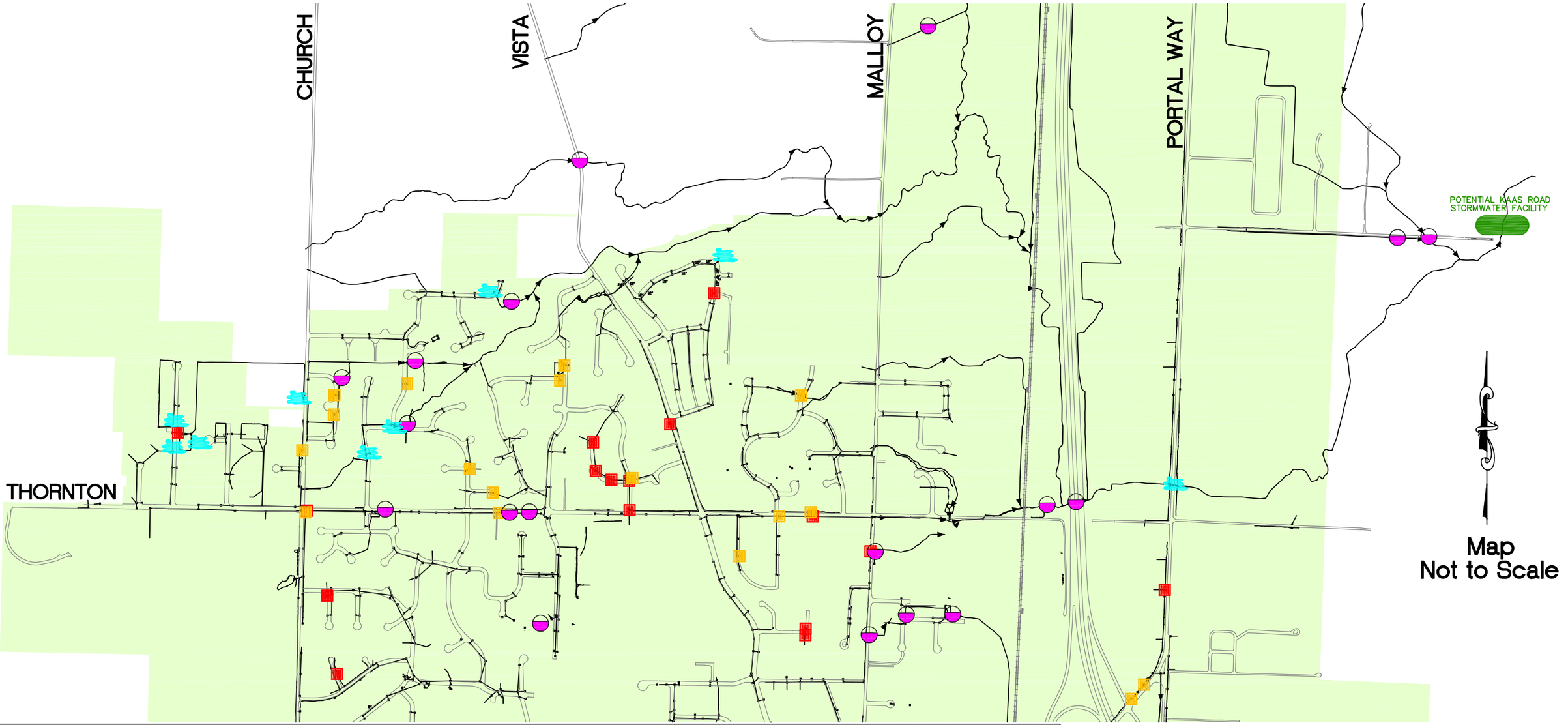
Each basin was modeled using a stormwater modeling package called "Storm Shed." It was decided to use a detailed modeling package like Storm Shed instead of a conceptual level product due to the detailed goals of the project. In short, it was decided to use the same product the private development engineers use so that they could use and match our model.

Stormwater Model Calibration – 11.2.8:

Once all of the modeling data was entered for each of the 154 sub-basins an initial modeling run identified system problems. To calibrate the storm water model, the model identified problems were then compared to the known problems in the City of Ferndale storm system. The model correctly identified known problems.

In addition, the model identified future problems with the storm system as the City continues to grow.

City of Ferndale
Storm System Deficiencies and Proposed Improvement Locations
North Side - Thornton Area



Map
Not to Scale

LEGEND

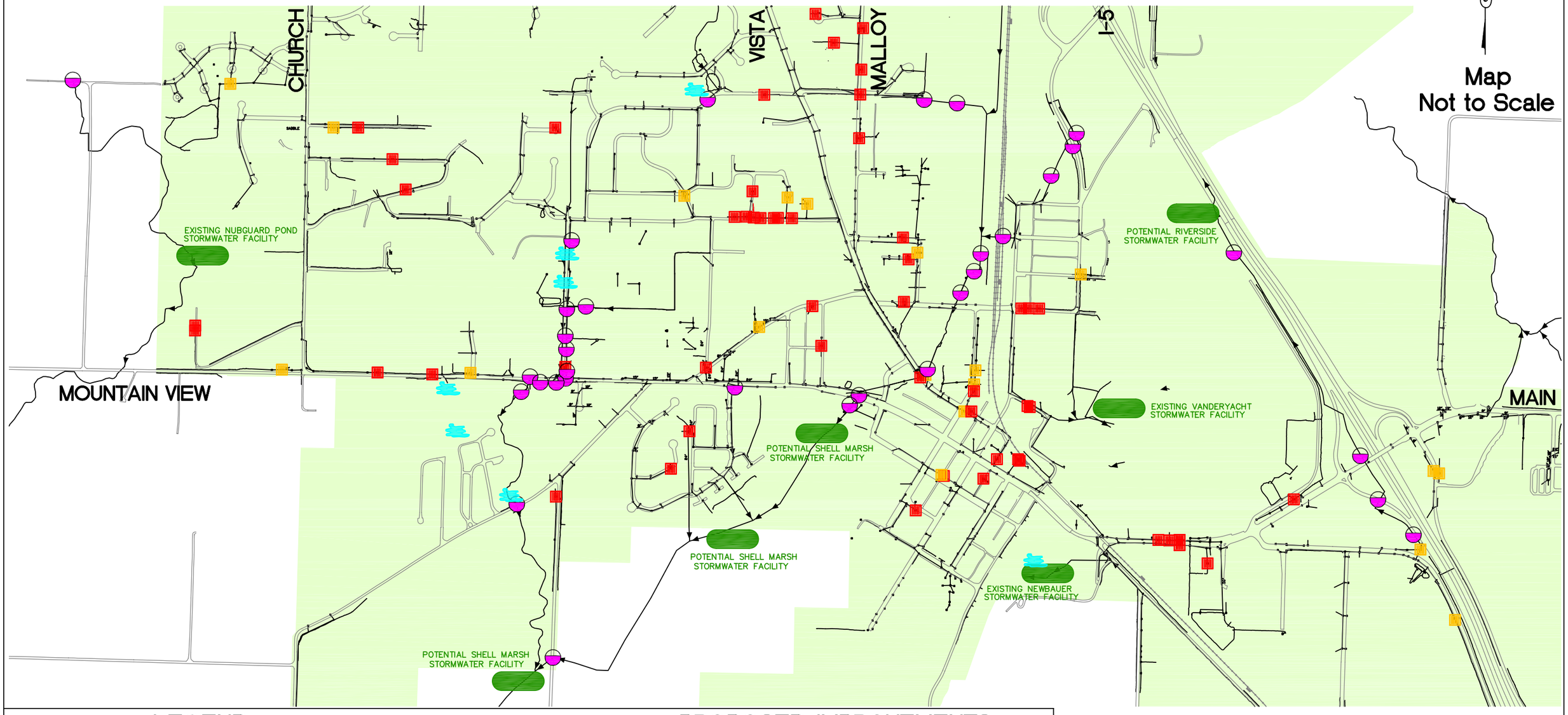
- City Limits
- Existing Roads
- Existing Storm Pipes and Catch Basins
- Ponds and Ditch Lines
- Observed Flooding Areas

PROPOSED IMPROVEMENTS

- Replace Pipes (2–40) Times Over Rated Capacity During a 25 Year Storm
- Catch Basins Requiring Replacement
- Catch Basins Possibly Requiring Replacement
- Construct Regional Stormwater Detention and Treatment Facility

Figure 11.1
Dave C. Bren
7-24-05

City of Ferndale
Storm System Deficiencies and Proposed Improvement Locations
Mid-Town - Main Street Area



Map
Not to Scale

LEGEND

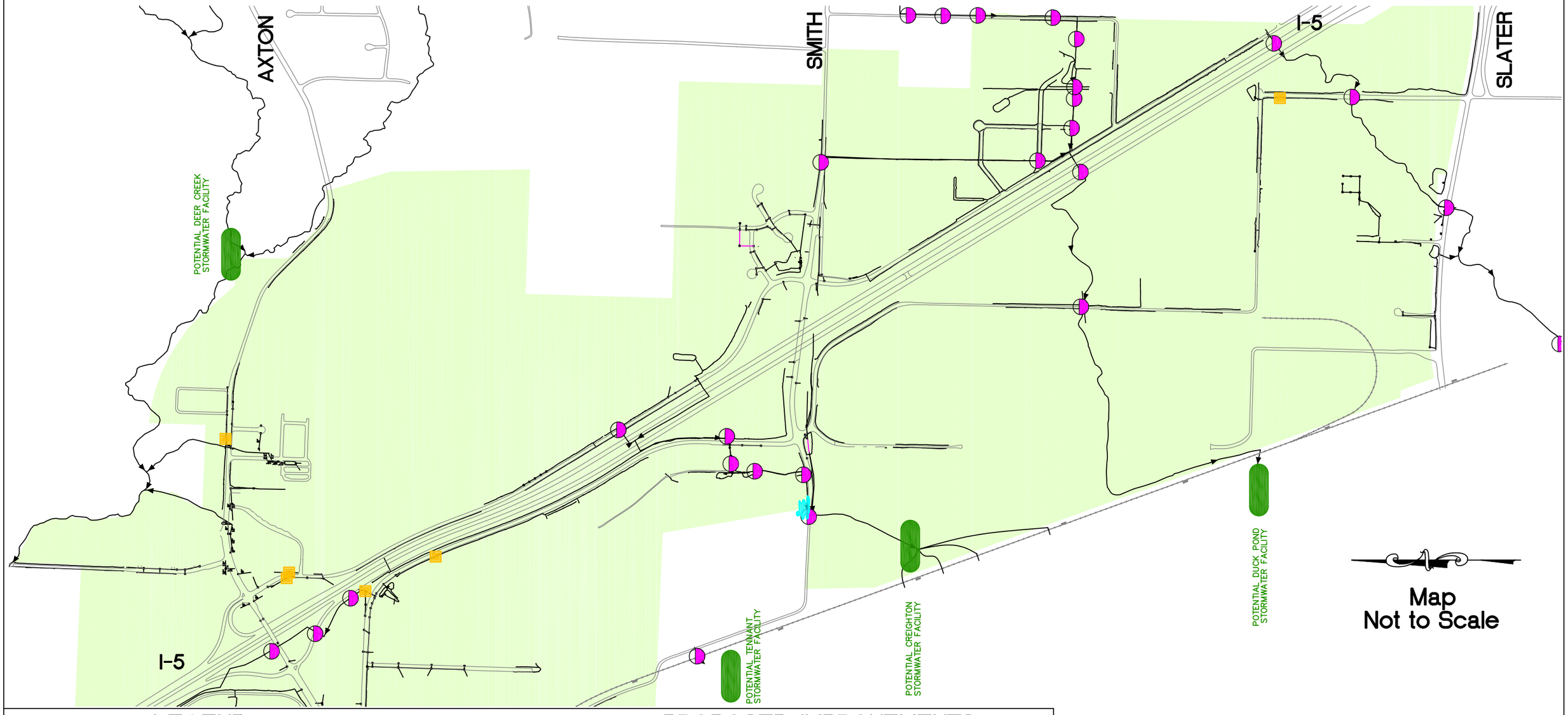
- City Limits
- Existing Roads
- Existing Storm Pipes and Catch Basins
- Ponds and Ditch Lines
- Observed Flooding Areas

PROPOSED IMPROVEMENTS

- Replace Pipes (2–40) Times Over Rated Capacity During a 25 Year Storm
- Catch Basins Requiring Replacement
- Catch Basins Possibly Requiring Replacement
- Construct Regional Stormwater Detention and Treatment Facility

Figure 11.2
Dave C. Bren
7-24-05

City of Ferndale
Storm System Deficiencies and Proposed Improvement Locations
South Side - Industrial Area



Map
Not to Scale

LEGEND

- City Limits
- Existing Roads
- Existing Storm Pipes and Catch Basins
- Ponds and Ditch Lines
- Observed Flooding Areas

PROPOSED IMPROVEMENTS

- Replace Pipes (2-40) Times Over Rated Capacity During a 25 Year Storm
- Catch Basins Requiring Replacement
- Catch Basins Possibly Requiring Replacement
- Construct Regional Stormwater Detention and Treatment Facility

Figure 11.3
Dave C. Bren
7-24-05

Basis for Proposed Improvements – 11.3.2:

The following resources were used to build a list of proposed improvements:

- Storm System Model (Spring 2005)
- Storm System Inventory (Summer 2000)
- Community and City Crew (Ongoing Observations)

Existing Capacity Deficiencies – 11.3.3:

The attached maps show areas throughout the City that experience consistent or regular flooding. In many cases the pipes or ditches down stream simply do not have the capacity to handle the storm water being collected.

The following table shows the size and quantity of pipe that would need to be installed to correct all major conveyance routes through the existing City of Ferndale:

Storm Structure	Quantity
12” Pipe	600 LF
15” Pipe	1150 LF
18” Pipe	2150 LF
24” Pipe	3400 LF
30” Pipe	1050 LF
36” Pipe	2000 LF
42” Pipe	600 LF
54” Pipe	300 LF
60” Pipe	250 LF
78” Pipe	120 LF
84” Pipe	80 LF

Future Capacity Deficiencies – 11.3.4:

In addition, to looking at the existing deficiencies the study looked into future deficiencies. In short, as the City fully develops, to the current zoning level, there will be an impact to the storm system. In theory, each new development should provide for its own storm water. However, in practice there will be additional capital improvements required to pass, redirect, pump, detain, or treat these storm waters.

The following table shows the size and quantity of pipe that would need to be installed to correct all major conveyance routes through a fully-developed City of Ferndale.

Storm Structure	Quantity
12” Pipe	250 LF
15” Pipe	200 LF
18” Pipe	200 LF
24” Pipe	4650 LF

30” Pipe	1050 LF
36” Pipe	200 LF
48” Pipe	1100 LF
66” Pipe	230 LF
84” Pipe	700 LF

These pipe quantities represent additional pipe required for future deficiencies. These costs would likely be borne somewhat by future developers.

Collection Deficiencies – 11.3.5:

Catch basins and culverts throughout the City collect storm water into pipes for conveyance. In some cases these catch basins or culverts have collapsed and/or are completely destroyed. The following table shows the quantity of catch basins that require full reconstruction:

Storm Structure	Quantity
Catch Basins	99
Culverts	12

It should be noted that there are **(39)** catch basins and culverts throughout the City that are still functional, but are critically obstructed or require major repair. These critically obstructed structures have been included in the above numbers.

Detention and Treatment Deficiencies – 11.3.6:

One of the better ways to provide stormwater detention and treatment is with large regional facilities utilizing existing drainage features. There are several locations throughout the City that could possibly accommodate this concept. However, there are large **regulatory issues** to solve prior to this concept becoming a reality. In addition, these lands would have to be purchased from the private owners. Please find the possible locations noted on the attached maps.

Storm Structure	Quantity
Regional Detention / Treatment Facility	5

These regional facilities would benefit future developers greatly, as they would reduce the need for on-site detention and treatment. Therefore, the cost of these facilities should be borne somewhat by future developers via a latecomers type process.

Stormwater Capital Improvements 11.4

The deficiencies in the City of Ferndale storm water system are so numerous that the improvements would have to be budgeted and conducted over several decades of time.

The only way to conduct ongoing capital improvements over a period of decades is to have a stable funding source in the form of a stormwater utility fee. It should be noted that a stormwater utility fee will have to provide for maintenance as well as capital improvements.

Methodology for Cost Estimation – 11.4.1:

In most cases the proposed new storm pipes would be installed as public improvements under the contract process. In addition, most new pipes will be installed under the curb and gutter line of City streets. Therefore, the costs for installation must include the following:

- Replace curb, gutter, and sidewalk
- Replace 5' wide strip of pavement
- New Pipe
- Mobilization
- Erosion Control
- Traffic Control
- Removal of Structures and Obstructions
- Seeding
- Striping
- Survey
- Design
- Construction Management
- Contract Administration

Estimated Costs for Capital Improvements - 11.4.2:

Storm Structure	Existing Needs	Future Needs	Total	Unit Cost/LF	Total Cost	
12” Pipe	600 LF	250 LF	850 LF	$110	$93,500	
15” Pipe	1150 LF	200 LF	1350 LF	$120	$162,000	
18” Pipe	2150 LF	200 LF	2350 LF	$130	$305,000	
24” Pipe	3400 LF	4650 LF	8050 LF	$150	$1,207,500	
30” Pipe	1050 LF	1050 LF	2100 LF	$170	$357,000	
36” Pipe	2000 LF	200 LF	2200 LF	$170	$374,000	
42” Pipe	600 LF	-	600 LF	$210	$126,000	
48” Pipe	-	1100 LF	1100 LF	$210	$231,000	
54” Pipe	300 LF	-	300 LF	$225	$67,500	
60” Pipe	250 LF	-	250 LF	$240	$60,000	
66” Pipe	-	230 LF	230 LF	$255	$58,650	
78” Pipe	120 LF	-	120 LF	$270	$32,400	
84” Pipe	80 LF	700 LF	780 LF	$290	$226,200	$3,301,250
Catch Basin	99	-	99	$2500	$247,500	
Culvert	12	-	12	$5000	$60,000	$307,500
Detention & Treatment Facilities	5	-	5	$1,000,000	$5,000,000	$5,000,000

Estimated Total Improvement Costs: $8,608,750

Chapter 12
Public Education and Involvement

EPA requires that at a minimum, jurisdictions must comply with state, tribal and local public notice requirements when implementing a public involvement/participation program. The City of Ferndale will meet all pubic notice requirements as it begins to develop and implement the proposed public involvement/participation and education program.

The City of Ferndale has included the public as it reviews, develops, and implements the City of Ferndale's storm water management program. The City has provided opportunities for the public to participate by attending public hearings, such as City Council Meetings and upcoming Public Meetings.

In addition to making sure the public is involved in the changes to the Stormwater Management Program, the City is planning to implement an Anonymous Tips Line and hold an annual Town Meeting dedicated to Stormwater Management.

The anonymous tips line will be a local number with an automated voice messaging service. The tip line will be used for residents to report possible illicit discharges or voice stormwater concerns or comments. The appointed Stormwater Compliance Official will be responsible for addressing all messages received by the anonymous tips line.

The annual town meeting, focused on Stormwater Management, will be held to provide the public with an opportunity to voice concerns, ask questions and learn more about the City's current Stormwater Management policies. The meeting or open house will also serve as an opportunity for the City to educate the community on pertinent stormwater projects or policy news.

As part of this comprehensive stormwater plan the City of Ferndale will fund a Stormwater Public Education and Involvement fund. The budget is small but the intent is to spark volunteerism and community service, which has the potential to multiply these dollars many fold.

There are many creative ways to engage, involve, and educate the public to the needs of this comprehensive storm plan. The following sections describe activities that can educate the public to the need for surface water quality controls, long-term maintenance, capital improvements, and water quality monitoring.

Involving Primary and Secondary Education 12.1

Chapter 16 of this plan describes the need and methods for a surface water quality monitoring program. Surface water monitoring is a wonderful way to involve and educate the Ferndale School Science Programs. It is hoped that a long-term relationship can be forged with a Ferndale science teacher interested in Ferndale surface water quality.

In short, each year's class would conduct the field work monitoring, send out to the lab, receive results, and documents those results. The City will pay for all lab / testing costs. However, the City would save the costs of fieldwork and documentation.

This is an obvious win-win relationship. It involves education, community service, provides useful stream data, and benefits the public greatly. Please see chapter 16 for details on the monitoring program.

Public Education and Outreach 12.2

The Environmental Protection Agency (EPA) requires that Phase II jurisdictions implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps that the public can take to reduce pollutants in storm water runoff.

In order to meet this requirement the City of Ferndale plans to distribute an annual Stormwater Flyer accompanying a utility bill. The overall goal of the flyer will be to inform individuals and households about the steps they can take to reduce storm water pollution, such as:

- Ensuring proper septic system maintenance;
- Ensuring proper use and disposal of landscape and garden chemicals (fertilizers and pesticides);
- Protecting and restoring riparian vegetation; and
- Properly disposing of used motor oil and household hazardous wastes.

The Ferndale Stormwater Flyer will also inform individuals and groups how to become involved in local stream restoration activities, including activities coordinated by youth service, conservation corps, citizen groups or other government agencies such as:

- Nooksack Salmon Enhancement Association
- Nooksack Recovery Team
- Whatcom Conservation District

- Lummi Nation
- U.S. Forest Service
- U.S. Fish and Wildlife Service
- Washingotn State Department of Fish and Wildlife, Natural Resources

In addition the stormwater flyer will be a great communication tool that the City can use to inform the public. The flyer will include the phone number for the Anonymous Tips Line and identify the current Public Compliance Official at the city. The flyer will also be used to announce the annual town meeting.

As the City of Ferndale continues to grow and more funding becomes available other public education strategies will be implemented including:

- Distributing additional brochures or fact sheets;
- Sponsoring speaking engagements before community groups;
- Providing public service announcements;
- Implement educational programs targeted at school age children; and
- Conduct community-based projects such as storm drain stenciling and watershed cleanups.

Additional Public Education topics to be covered in the annual Stormwater Flyer or future expanded Public Education programs include:

- Lawn and garden activities.
- Water conservation practices for homeowners.
- Proper disposal of household hazardous wastes.
- Pet waste management.
- Trash management.
- Education/outreach for commercial activities.
- Tailoring outreach programs to minority and disadvantaged communities and children.
- Classroom education on storm water.
- Storm water educational materials.
- Low impact development.
- Educational displays, pamphlets, booklets and utility stuffers.
- Using the media.
- Promotional giveaways.
- Pollution prevention for businesses.

EPA has a series of BMP Fact Sheets available for each of the above topics. They can be found over the internet at their website: www.epa.gov/npdes/menuofbmps. In addition to the information available through the EPA, the City of Ferndale plans to get ideas for future educational materials and programs from neighboring communities.

The following items included in the flyer will help the community be aware of the advantages of a stormwater utility fee:

- How much money the stormwater utility fee collects
- Listing of where the collected funds go
- Describe upcoming stormwater capital improvements
- Describe how the City maintains the stormwater system
- Discuss ways the public can support maintenance efforts

A yearly reminder will help the public understand that water quality is a long-term issue that requires long term funding.

Stormwater Quality Marketing 12.3

Marketing to continue awareness is as important as one time educational activities. Therefore, some long-term marketing activities are described as follows:

Stormwater Flyer with Utility Bill 12.3.1:

Once per year a stormwater flyer or brochure will go out with a utility billing. The flyer will inform citizens what household steps they can take to reduce storm water pollution and how they can get involved with habitat restoration and enhancement.

Clean Surface Water Symbols 12.3.2:

Some Cities have prepared special clean water symbols that are glued down with epoxy on the curbs above catch basins. This same clean water symbol is then used for all stormwater correspondence and by local non-profit groups to support that clean water program. This type of marketing encourages long-term awareness in the public.

Occasional Newspaper Advertisements 12.3.3:

Another way to educate and make the public aware of stormwater issues is to occasionally advertise in the local Ferndale newspaper the "Record Journal." Alternatively, the City could invite the newspaper to cover a stormwater maintenance, capital improvement, or education activity as an article. Upcoming events and improvements could be described.

Chapter 13
Low Impact Development Practices

One of the requirements under the Puget Sound Water Quality Management Plan is for local governments to adopt ordinances that allow and encourage low impact development practices. These are practices that infiltrate stormwater (using proper safeguards to protect groundwater) on-site rather than collecting, conveying and discharging stormwater off site. The goals of low impact development practices are to enhance overall habitat functions, reduce runoff, recharge aquifers, maintain historic in-stream flows and reduce maintenance costs. Low impact development provides a variety of benefits, including cost savings and added market appeal, additional green space for recreational users and greater esthetic appeal than traditional facilities. Low impact development practices may not be appropriate for all sites. Low impact principles include:

- Maintain the pre-developed, undisturbed stormwater flows and water quality;
- Retain native vegetation and soils to intercept, evaporate and transpire stormwater on the site (rather than using traditional ponds and conveyances);
- Emphasize a higher standard of soil quality in disturbed soils (by using compost and other methods) to improve infiltration, reduce runoff and protect water quality;
- Cluster development and roads on the site and retain natural features that promote infiltration; and
- Reduce impervious surface area and use permeable surfaces instead.

Currently the City of Ferndale does not address Low Impact Development practices in its municipal code. To meet PSWQMP and Department of Ecology requirements the updated stormwater ordinance should provide developers with the option of using low impact development practices. The updated ordinance should allow and encourage LID practices that are used in accordance with the DOE manual or as approved by the Public Works Director.

In addition, the Planning Department will continue to evaluate current zoning regulations, when completing the annual comprehensive plan revisions, insuring that the regulations are providing ample green space.

Encouraging Low Impact Design 13.1

The City of Ferndale adopts the most current edition of the Department of Ecology Stormwater Management Manual (SWMM) not only because it is the best resource for stormwater controls to minimize the impacts of development, but also to minimize their exposure to third party lawsuits related to stormwater. If the proposed development was reviewed to assure compliance with the SWMM, it is thought that the best available science has been applied to mitigate the potential impacts of said development. Being that the Department of Ecology is the lead agency for stormwater runoff quality and control, it is the City's contention that the best way to minimize their liability is to require compliance with the SWMM. As, per the adopted standard, "All known, available and reasonable source control BMPs (Best Management Practices) shall be applied to all projects. Source control BMPs shall be selected, designed, and maintained according to this manual (SWMM)."

As stated above the City of Ferndale requires that all projects within their jurisdiction comply with the SWMM. It is stated in Volume V, of the February 2005 SWMM that "Efforts are underway to further develop these "low impact development" concepts in Western Washington. Ecology will update these BMPs as local standards are established." Being a small municipality, it is difficult to venture any further than that which is documented in the SWMM to allow for LID design and still feel that exposure to third party lawsuits is minimized. Therefore, the City will adapt its review process to encourage LID design as the SWMM develops methods to apply these design concepts.

Chapter 14
Participation in Greater Watershed Planning

One of the EPA's objectives in developing the NPDES Phase II regulations is to facilitate and promote watershed planning as a framework for implementing water quality programs wherever possible. In addition the Department of Ecology has included Basin/Watershed planning as a minimum requirement for controlling stormwater discharges in the *Stormwater Management Manual for Western Washington.*

By adopting the Department of Ecology's Stormwater Management Manual, Basin/Watershed planning will be required under Minimum Requirement #9. This means, projects within the City may be subject to equivalent or more stringent minimum requirements for erosion control, source control, treatment, and operation and maintenance, and alternative requirements for flow control and wetlands hydrologic control as identified in other local Basin/Watershed Plans.

The City of Ferndale will coordinate with the local jurisdictions in order to pool resources and meet minimum requirements identified in their basin planning efforts. These local jurisdictions include.

- Whatcom County
- WRIA 1
- Lummi Nation
- City of Bellingham
- Public Utilities
- Nooksack Tribe
- Neighboring Cities

WRIA 1 14.1

The 1998 legislature passed ESHB 2514, codified into RCW 90.82, to set a framework for developing local solutions to watershed issues on a watershed basis. The law provides a process to allow citizens in a watershed to join together, forming Water Resource Inventory Areas (WRIA), to assess the status of the water resources in their watershed and determine how best to manage them. Located in northwest Washington, Water Resource Inventory Area No. 1 (WRIA 1) encompasses the surface and ground water in the Nooksack River basin and certain adjacent watersheds. The City of Ferndale is located entirely within the WRIA 1 Surface Water Drainage Boundary. Since 2001, WRIA 1 has been developing a Watershed Plan. The watershed plan will be the blueprint for managing water resources in WRIA 1, outlining policies and programs to manage water supplies, protect water quality, and restore fish habitat.

The WRIA 1 Watershed Management Plan has been approved by Whatcom County planning and will be sent to the Whatcom County Council for approval in May of 2005.

In accordance with DOE's Minimum Requirement #9 – Basin/Watershed Planning, the City of Ferndale will support and abide by minimum requirements and policies of the approved and adopted WRIA 1 Watershed Plan. In addition, the City of Ferndale should become involved with the WRIA 1 Small Cities caucus, one of 12 caucuses which represent a different water resource interest and has a seat on the planning unit.

Chapter 15
Stormwater Utility and Compliance Funding

As part of this comprehensive stormwater plan the City of Ferndale needs to adopt a stormwater utility fee to provide a budget for continuous improvement, maintenance, and stormwater compliance. The stormwater utility fee is proposed as a simple flat fee. In addition, the stormwater utility fee is assessed as a simple line item on the bi-monthly water and sewer bill. The following sections provide a detailed breakdown of the projected costs used to define the stormwater utility fees.

Projected Capital Improvements Costs 15.1

As noted in Chapter 11 of this plan the City requires system wide stormwater capital improvements. The required capital improvements are proposed to be annualized over a 35-year period.

Table 15.1 – Estimated Capital Improvement Costs

Storm System Activity	Estimated Yearly Cost	Over Years	Replacement Period
Stormwater System Capital Improvements (Average yearly project cost)	$250,000	Every Year	1 Year
Repay Department of Ecology loan ($100,000)	$20,000	5	
Public Education and Involvement Program	$10,000	Every Year	1 Year
(10) Year update of Stormwater Comprehensive Plan ($50,000)	$5,000	10	10 Year

This assumes that some of the water quality monitoring and data analysis is performed by volunteers in an educational partnership with the City.

Example Capital Improvement Project 15.1.1:

Chapter 11 noted a recent emergency stormwater capital improvement project as an example of capital improvements costing. A 36" culvert collapsed along the old Schell Ditch conveyance route. Over a two year period the City spent $37,700 on engineering and $172,200 on construction to replace this section of 36" main line storm pipe. This represents approximately $105,000 per year in stormwater capital improvements over 2003 and 2004 expenditure years. This project represents a good example of what stormwater capital improvements will involve and cost.

Projected Maintenance and Compliance Costs 15.2

As noted in Chapter 8 the City requires continuous system wide stormwater maintenance and compliance. Chapter 8 also defines a list of required maintenance activities and schedules for their completion. However, before maintenance can proceed the entire system needs an initial heavy duty clean out. Therefore, the following table includes large up front costs to get the system in shape for long term maintenance.

Table 15.2 – Estimated Maintenance Costs

Storm System Activity	Estimated Yearly Cost	Over Years	Replacement Period
2 Temporary FTE - (2) year crew for initial stormwater system clean out ($220,000) + (6) months of unemployment (55,000) worst case	$110,000	2.5	
Purchase vactor truck ($265,000) Specialized pipe auger and jet for truck ($35,000)	$30,000	10	10 Year
Use of existing crew labor for yearly cleaning of 1750+ catch basin sumps after initial system clean out	$50,000	Starts Year 3	1 Year
Use of existing crew labor for yearly mowing and (5) year clean out of roadside ditches and 600+ culvert ends	$25,000	5	5 Year
Use of existing crew labor for (2) year clean out of detention and control structures	$10,000	2	2 Year
¼ FTE - Use of existing public works staff as a **stormwater compliance officer** to support the Building Services and Public Works inspection staff for erosion control inspection needs	$10,000	Every Year	1Year

- **Averaging $185,000 / year for the first (2) years**
- **Averaging $180,000 for year (3)**
- **Averaging $125,000 / year for all remaining years**

Projected Costs Over 10 Years 15.3

The projected capital improvement costs, projected maintenance costs, and projected compliance costs were totaled to generate the following table. The following yearly costs do not include possible inflation or interest effects. A time value of money analysis should be conducted to further refine the following projected costs:

Table 15.3 – 10 Year Projected Total Costs

Year After Adopting Comprehensive Plan	Estimated Cost by Year
1	$470,000
2	$470,000
3	$465,000
4	$410,000
5	$410,000
6	$390,000
7	$390,000
8	$390,000
9	$390,000
10	$390,000

Previous Stormwater Revenue Sources 15.4

The City of Ferndale has put together revenue for past stormwater expenditures from several sources. The sources should be reviewed and considered for termination with the initiation of a Stormwater Utility Fee. The following table shows the stormwater revenue sources over (5) years:

Table 15.4 – Previous Stormwater Revenue Sources

Revenue Source	2001 Actual	2002 Actual	2003 Actual	2004 Estimated	2005 Budgeted
Sales Taxes	$95,708	$50,000	$70,000	$50,500	$50,000
Flood Mitigation Fees	0	$1,481	$7,469	$30,000	$30,000
Investment Interest	$4,293	$1,409	$4	0	0
Rural / Sunset Transfer #350	0	0	0	0	$19,780
Miscellaneous Revenue	$823	$1,180	$1,180	$15,000	$15,000
Totals:	$100,824	$54,070	$79,313	$95,500	$114,780

- The Sales Tax that is presently paying for stormwater related costs could gradually be diverted to other critical needs as the stormwater utility starts generating its own revenue.
- The Miscellaneous Tax Revenue that is presently paying for stormwater related costs could gradually be diverted to other critical needs as the stormwater utility starts generating its own revenue.
- The Flood Mitigation Fees should be kept. Flood mitigation is a direct application of the stormwater utility and should be included.

Simple Flat Fee Assessment 15.5

Many cities have gone with a detailed square footage of impervious surface method to determine how much of a storm fee should be assessed to each tax parcel. In short, those with more pavement and building area pay more. This is a very fair method in theory. However, in practice it has proven to be complex. This method requires the computation of the paved and built square footage for each of thousands of parcels. In addition, each parcel owner has the right to contest the determination. The square footage fee is a more accurate method of establishing cost based on actual runoff generated, however it is problematic.

The City has chosen to go with a simple flat fee, which is simple to understand, simple to adjust, and simple to bill.

Stormwater Utility Fee Breakdown 15.6

The following costs do not include inflation or interest. Since the utility fee is based on estimates it will have to be re-evaluated and adjusted in future as the true costs are determined. The initial storm utility fee schedule has been set to generate $396,000 per year to provide a funding level just over the $390,000 per year shown on Table 15.3.

Residential Unit Storm Water Fee

Monthly Fee		Residential Units		Months		Revenue
$5	x	3,500	x	12	=	$210,000

Small Commercial Unit Storm Water Fee

Monthly Fee		Small Commercial Units		Months		Revenue
$15	x	250	x	12	=	$45,000

Large Commercial and Industrial Unit Storm Water Fee

Monthly Fee		Small Commercial Units		Months		Revenue
$50	x	60	x	12	=	$36,000

New Residential, Commercial, or Industrial Unit Development Fees

Flat Fee		New Residential, Commercial, or Industrial Units		Revenue
$250	x	300	=	$75,000

Flood Mitigation Fees

Fee		Number of Parcels		Projected Revenue
Varies	x	Varies	=	$30,000

Total Estimated Monthly Revenue =	$396,000

Chapter 16
Stormwater Monitoring

Under the NPDES Phase II rule, regulated communities must conduct periodic evaluations and assessments of their stormwater management practices, maintain records, and prepare required reports. The City of Ferndale will develop a monitoring program that will gauge the effectiveness of the stormwater program implementation. The monitoring program will include an Illegal/Illicit Connection Detection and Elimination Program, a "Wet Weather" sampling program, and a "Dry Weather" sampling program. These programs will be developed to assess and characterize stormwater quality conditions in key locations of the municipal storm sewer system. They will also provide knowledge and feed back which can be used to determine the overall effectiveness of adopted municipal Best Management Practices or BMPs, discussed throughout this plan, used to manage the City's storm sewer system and maximize stormwater quality conditions.

The Illegal/Illicit Connection Detection and Elimination Program will be implemented immediately as discussed in Chapter 10. The goal of the Illegal/Illicit Connection Detection and Elimination Program consists of two primary objectives:

1. Annual field investigations designed to identify potential illegal discharges, illicit connections, or illegal dumping into the municipal storm sewer system.
2. Follow-up activities with dischargers or dumpers to assure that the practice is eliminated.

The "Wet Weather" and "Dry Weather" sampling programs will be developed as funding, staff, and volunteers become available. The Stormwater System Inventory Map, discussed in Chapter 11 will be key to implementing the sampling programs and identifying key outfall locations to be monitored.

The goal of the wet weather monitoring program will be to sample for pollutants in the municipal storm sewer system during a rain storm. When it rains, pollutants such as oil, pesticides, sediment, and bacteria are picked up from streets, parking lots, and lawns and carried into the storm drain system. Sampling could be achieved by automated samplers or hand collection completed by community volunteers.

The baseline stormwater quality data obtained during rain storm events will help provide a better understanding of the types and amount of pollutants carried by stormwater and aid in developing improved BMPs to improve stormwater quality throughout the City.

In addition, water samples will be taken at the major outfalls annually during a time of dry weather. Dry weather surface runoff is the result of water entering the municipal storm sewer from every day activities such as lawn watering, car washing, and perennial flows. The goal of the dry weather monitoring program has two primary objectives:

1. To target potential illegal or illicit discharges or connections to the municipal storm sewer system.
2. To develop a baseline of dry weather surface water quality data against which future changes can be measured and which can be used to compute urban pollutant concentrations within the City.

Dry weather sampling is an effort to isolate potential illegal discharges. Occasionally, people knowingly or unknowingly discharge hazardous waste or other non-storm related waste into the municipal storm sewer system. When the water quality tests show there may be a problem, an investigation is started. Code enforcement officers can then trace the source of the activities and make corrective or enforcement actions, as discussed in Chapter 10.

Samples collected during Wet and Dry Weather monitoring will be analyzed using identical methodologies in the laboratory. The samples will be tested for specific pollutants generally associated with urban activity such as bacteria, nutrients (nitrates, phosphates, etc), oil, detergents, glycol, turbidity, pH, dissolved oxygen, conductivity, Total Suspended Solids (TSS), temperature, etc. Levels of these pollutants tend to increase with the level of urban development.

Measuring and characterizing urban pollutants as they enter the municipal storm sewer over time is important. Based on the sampling results and qualitative factors, the City can determine the overall effectiveness of Best Management Practices as well as develop improvements. The monitoring programs will be an effective tool in understanding the impact of urban runoff on downstream water quality.

Involving Education in Monitoring 16.1

Monitoring is a wonderful opportunity to engage the Ferndale School Science Programs with the needs of this comprehensive storm plan. It is hoped that a long-term relationship can be forged with a Ferndale science teacher interested in Ferndale stream quality.

In short, each year's class would conduct the monitoring, send out to the lab, receive results, and documents those results. The City would pay for all lab / testing costs. However, the City would benefit by saving the costs of fieldwork and documentation.

This is an obvious win-win relationship. It involves education, community service, provides useful stream data, and benefits the public greatly.

It is proposed that the science class conduct monitoring as defined in section 16.2 and 16.3 of this plan at least once per year on each stream. However, additional monitoring would provide a better data set.

It is understood that the Ferndale School Science Programs will change over time. So it is important that the City keep informed of program changes by communication with the school district. In addition, there will be initial monitoring training needs for the teacher that will be conducting the program. Therefore, it will be required that the City train the teacher prior to commencement of this program. **The public education and involvement program funds will be used to provide for this program.**

Stormwater Monitoring Points 16.2

The proposed stormwater monitoring will focus on the major natural conveyance routes for overland stormwaters within the City limits. Monitoring will be expanded in the future to the Urban Growth Areas as the City grows. The (12) major conveyance routes to be monitored are shown in the following table:

Table 16.1 – Monitoring Points

Conveyance Route	Point of Monitoring
Schell Creek	Culvert outfall at Main Street crossing
Schell Ditch	Culvert outfall to Schell Marsh behind Public Work Building
Ferndale Terrace	Culvert outfall to Schell Marsh
Glacierview	Northside ditch at east end of Thornton Road just prior to culvert under railroad tracks.
Cedar Creek	Culvert outfall at Malloy Road crossing
S. Whiskey Creek	4x4 box culvert outfall under railroad tracks north of Thornton Road.
Portal Way	Culvert outfall at the Newkirk Road crossing
Vanderyacht Park	36” outfall to the Nooksack River
Haggen	Outfall to Nooksack River from the City Detention Pond
Riverside Drive	Outfall to Nooksack River under the I-5 bridge.
Riverside Golf	Outfall to Nooksack north of old Carnation Building.
Tenmile & Deer Creek	200’ upstream prior to outfall to Nooksack River

Figure 16.1 on the following page graphically shows the location of sites to be monitored. A consistent location and testing method should be used over time at each monitoring point.

City of Ferndale
Stormwater Monitoring Sites

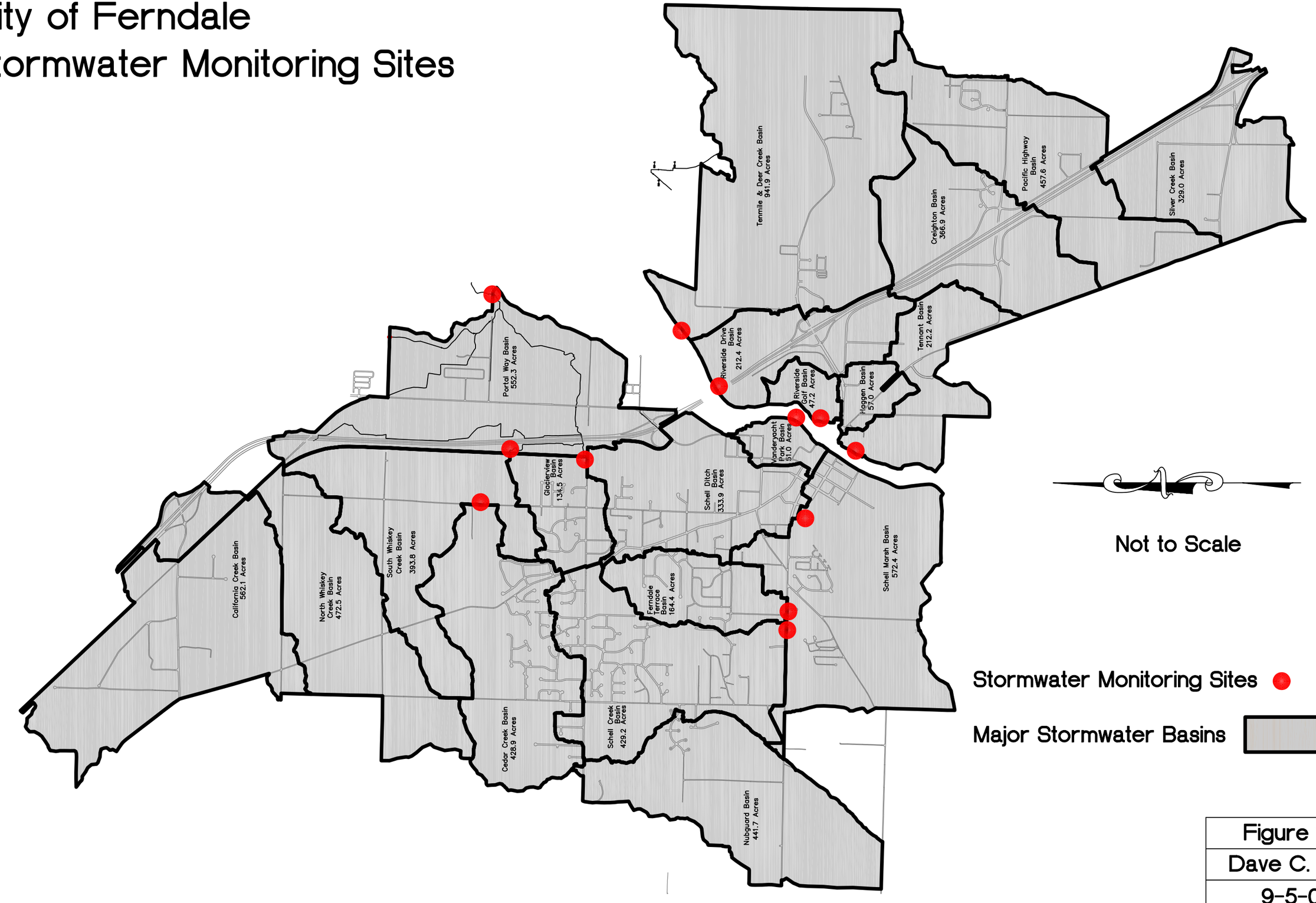


Figure 16.1
Dave C. Bren
9-5-05

Monitoring Methods 16.3

The following methods and procedures shall be used for the monitoring program:

- Monitoring must be conducted at consistent monitoring points defined in section 16.2.
- Monitoring shall be conducted at least once per year at each monitoring point. It is preferable to monitor 2-3 times per year at each monitoring point.
- If possible, monitoring should occur during the peak of the construction season in August or September. Since schools typically start back in September fieldwork monitoring should commence very early in the school year.
- Monitoring shall be conducted during the same week of the year, each year. This will provide a consistent data set for analysis.
- Monitoring shall be conducted with approved procedures, equipment, and containers as defined by the chosen testing lab.
- Monitoring shall be conducted at the midpoint of stream flow.
- The City shall pay for all lab test fees and containers.
- The Class shall conduct all fieldwork, send to lab, receive results, and conduct all documentation.
- The City shall pay for all training for the teacher that conducts the monitoring program. The Public Education and Involvement budget shall be used.

Chapter 17
State and Federal Regulatory Details

The City of Ferndale's surface water program must comply with a number of state and federal regulations that are pertinent to stormwater. A detailed review of the existing federal, state, and city policies, regulations, and ordinances relevant to stormwater management is presented in this chapter.

Federal Regulations

Endangered Species Act 17.1

The Endangered Species Act (ESA) became relevant to local stormwater programs in 1999 when the National Marine Fisheries Service (NMFS) listed as "threatened" several species of salmonid fish, including the Puget Sound Chinook salmon and Bull Trout (native char) that use streams and rivers draining into Puget Sound.

This report discusses salmonids and certain forage fish that are priority species and are known to occur in City of Ferndale stream systems. More information on other species, including birds, shellfish, and marine fish, is included in the 2005 update to the Ferndale Comprehensive Plan.

Endangered Species Act Background – 17.1.1:

When evaluating the City's stormwater program, it is important to be aware of how the ESA (as it relates to fish species) can impact the City's activities. Puget Sound and its tributary streams in the vicinity of the City of Ferndale provide habitat, or may provide habitat, for aquatic species listed as threatened or endangered under the Endangered Species Ac of 1973. The ESA prohibits killing or harming any endangered species in any way, including significant modification of critical habitat for that species. The ESA requires federal agencies to develop programs to conserve endangered and threatened species and assist in species recovery. Under the ESA, a species likely to become extinct in the foreseeable future is categorized as "endangered," while one likely to become endangered unless action is taken is categorized as threatened.

The ESA is jointly administered by the Secretaries of the Department of Commerce (DOC) and the Department of the Interior (DOI) (16 USC 1532 [15]). The National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries), an agency under the DOC, is responsible for marine species including anadromous fish, some sea turtles, and marine mammals. (Until recently, NOAA Fisheries was known as the National Marine Fisheries

Service, or NMFS.) The U.S. Fish and Wildlife Service (USFWS), an agency under the DOI, is responsible for terrestrial species and resident aquatic species.
Although the ESA is a federal statute, its implementation can affect local jurisdictions and their citizens in several ways. A listing can potentially affect a wide variety of activities including, but not limited to, stormwater management practices, infrastructure improvements, land use planning, maintenance of existing facilities, and private development proposals.

The body of federal legislation that is commonly termed the "Endangered Species Act" is comprised of 11 sections, six of which are commonly referenced in relation to regulatory actions. These are:

- Section 4: Determination of Endangered and Threatened Species
- Section 6: Cooperation with States
- Section 7: Interagency Cooperation
- Section 9: Prohibited Acts
- Section 10: Exceptions
- Section 11: Penalties and Enforcement.

The following describes these six sections of the ESA.

- **Section 4: The 4(d) Rulemaking Process:** Following the listing of several species of salmonid fish, the NMFS developed protective regulations for conservation of species, known as the "4(d) rule". The 4(d) rule prohibits "take" (which includes harass, harm, pursue, hunt, shoot, wound, kill, trap, or collect; or to attempt any of these things) of the 14 groups of salmon and steelhead listed as threatened under the ESA listed species. The 4(d) rule prohibits killing or injuring protected species without specific authorization. It does not apply this prohibition where programs adequately protect fish. The rule does not prohibit actions, it prohibits killing or injuring protected species. NOAA adopted the rule in July of 2000, and it became effective on January 8, 2001.

  In addition to the 4(d) rule, the ESA provides a variety of tools for saving species threatened with extinction. Under Section 7 of the ESA, no federal agency may fund, permit, or carry out any activity that will jeopardize their continued existence. Projects that require a federal permit or have federal funding must go through a "consultation" with NOAA Fisheries (for salmon and steelhead) or the USFWS (for bull trout). This "consultation" is to make sure that the project will adequately limit any impacts and qualify for an "incidental" take of listed species. Another tool, under Section 10 of the ESA, allows NOAA Fisheries to issue incidental take permits for specific activities such as research that usually do not apply to a municipality.

  Under Section 4(d), the ESA requires that activities of state and local governments, tribes, and private citizens be controlled so they do not lead to extinction of listed species. To comply with this, NOAA Fisheries has established protective rules for threatened species. The rules need not prohibit all "take,"

however. The 4(d) rule can "limit" the situations to which the take prohibitions apply. But NOAA Fisheries offers 4(d) "limits" only for those programs or activities that will not impair properly functioning habitat of listed species. In accordance with this provision, NOAA Fisheries has established 13 general categories of programs that can qualify for 4(d) limits on the take prohibitions. NOAA Fisheries will evaluate programs under these 13 categories that wish to be granted a 4(d) limit on take prohibitions.

The ESA does not directly require jurisdictions to change their practices to conform to the take limits described in the final rule. The take limits provide a way for jurisdictions to make sure an activity or program does not violate the take prohibitions. Without this assurance, jurisdictions would risk ESA penalties when an activity in question is determined to result in a take of a listed fish.

The 4(d) rule also provides a list of activities that have a high risk of resulting in a "take" of the listed threatened or endangered salmonids. The following list includes items that the 4(d) rule has determined are likely to result in injury or harm to listed salmonids. City design standards should prohibit:

- Construction of structures like culverts, berms, or dams that eliminate or impede a listed species' ability to migrate or gain access to habitat
- Removal, addition, or alteration of rocks, soil, gravel, vegetation, or other physical structures that are essential to the integrity and function of a listed species' habitat
- Construction of dams or water diversion structures with inadequate fish screens or passage facilities
- Construction of inadequate bridges, roads, or trails on stream banks or unstable hill slopes adjacent to or above a listed species' habitat
- Removal of water or otherwise altering streamflow in a manner that significantly impairs spawning, migration, feeding, or other essential behavioral patterns
- Operations that substantially disturb soil and increase the amount of sediment going into streams.

The following list includes items that should be included in the City's regulations so that these activities that the 4(d) rule has determined are likely to result in injury or harm to listed salmonids would be illegal.

- Discharge of pollutants, such as oil, toxic chemicals, radioactivity, carcinogens, mutagens, teratogens, or organic nutrient-laden water (including sewage water) into a listed species' habitat is prohibited.
- The release of non-indigenous or artificially propagated species into a listed species' habitat or into areas where they may gain access to that habitat is prohibited.

The 4(d) rule has determined that the following maintenance-related items are likely to result in injury or harm to listed salmon. The City's maintenance program should not:

- Maintain structures like culverts, berms, or dams if maintenance eliminates or impedes a listed species' ability to migrate or gain access to habitat
- Remove, poison, or contaminate plants, fish, wildlife, or other biota that the listed species requires for feeding, sheltering, or other essential behavioral patterns
- Remove, add, or alter rocks, soil, gravel, vegetation, or other physical structures that are essential to the integrity and function of a listed species' habitat
- Remove water or otherwise alter streamflow in a manner that significantly impairs spawning, migration, feeding, or other essential behavioral patterns
- Operate dams or water diversion structures with inadequate fish screens or passage facilities
- Maintain or operate inadequate bridges, roads, or trails on stream banks or unstable hill slopes adjacent to or above a listed species' habitat.

Chinook salmon in Puget Sound were federally listed as threatened species by the National Marine Fisheries Service in March 1999. Bull trout in Puget Sound and coastal waters were listed as threatened species by the U.S. Fish and Wildlife Service in October 1999, and Coho salmon are currently candidate species in the Puget Sound.

- **Section 6: Cooperation with States:** Although Section 6 is titled "Cooperation with States," the law only requires agencies to "cooperate to the maximum extent practicable" with the states. Such cooperation includes "consultation with the states concerned before acquiring any land or water, or interests therein, for the purpose of conserving any endangered species or threatened species" (16 USC 1535[a]). The ESA does not require the federal government to delegate any authority to state or local governments concerning the conservation or recovery of listed species, although provisions for this are made in Section 10 of the ESA (described later in this section).

- **Section 7: Federal Responsibilities:** This section requires the federal government and its agencies to conserve listed species and to ensure that any projects or actions it authorizes, funds, or implements are not likely to jeopardize listed species or destroy or adversely modify their critical habitat. Under Section 7, the federal agency with permit or funding authority must review a project to determine if the project "may affect" a listed species (50 CFR 402.07). If a project is determined to affect a listed species, the federal agency must consult with the

USFWS or NOAA Fisheries (or both), depending on the species (50 CFR Section 402.14). An informal or "conference" process is required if a project may affect a proposed species (50 CFR 402.13). Section 7 requires the preparation of a Biological Assessment (BA) (also termed Biological Evaluation, or BE) for projects with a federal link or "nexus" to determine what, if any, effects the project or action may have on a listed species (50 CFR 402.12). A BA/BE may also be required for species that are proposed for listing, but are not yet formally listed. At this time, coho is a candidate species in the Puget Sound region.

The purpose of a BA/BE is to review the biological requirements of a listed species to determine potential effects of the project or action on those species (50 CFR 402.12). After the consultation process is complete, the USFWS or NOAA Fisheries will issue a Biological Opinion (BO) (50 CFR 402.15). The BO will determine if the project or action would result in "jeopardy" or the destruction or modification of critical habitat (50 CFR 402.14[h][3]). If a project or action is determined to affect a species that has been proposed for listing, the federal lead agency must complete an informal consultation with either the USFWS or NOAA Fisheries, but the results of the subsequent conference is non-binding.

Section 7 consultation is only required for projects that may lead to construction. If a local construction project has a federal nexus, either through federal funding or a requirement for a federal permit, review of that action will be necessary under Section 7. Common federal permits or actions requiring review under Section 7 include:

- National Environmental Policy Act (NEPA) reviews for proposed construction projects
- Corps of Engineers Clean Water Act Section 10 and Section 404 permits
- Funding for construction projects derived from a federal source.

Funding does not have to be in the form of a direct grant from a federal agency. Many types of grant programs are administered by state or local agencies, but these programs often include full or partial federal funding. Such programs include urban development block grants, clean water programs, and most forms of transportation funding.

- **Section 9: Prohibition of "Take:"** Under Section 9 of the ESA, individuals and groups within U.S. jurisdiction are specifically prohibited from "taking" or otherwise harming a listed species (16 USC 1538 [a][1][b]). "Take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct," any fish, wildlife, or plant that has been listed as threatened or endangered (16 USC 1532 [19]). Subsequent interpretation and clarification by federal courts and agencies have expanded "harm" to include indirect actions which may result in the death or injury of protected species

including significant habitat modification which may impair "essential behavior patterns, including breeding, feeding, or sheltering" (50 CFR 17.3).

Whereas the Section 7 process, as stated in the law (16 USC 1536) and implementing regulation (50 CFR 402), includes specific instructions and requirements for review by federal agencies, Section 9 simply states "with respect to any endangered species of fish or wildlife listed pursuant to [Section 4 of the ESA] it is unlawful for any person subject to the jurisdiction of the United States to take any such species within the United States or the territorial sea of the United States" (16 USC 1538[a][1][b]). While Section 9 arguably includes a much broader range of prohibited actions by simply prohibiting take, unlike Section 7, the language of Section 9 does not include a parallel process by which take is evaluated and adjudicated. To deal in part with the ambiguity, the 4(d) rulemaking process often includes criteria that NOAA Fisheries or USFWS will use in determining what constitutes "take."

- **Section 10: State and Local Involvement:** Although the ESA does not require the federal government to impart any authority to state or local governments or private parties concerning the conservation or recovery of listed species, the recent policy of federal agencies has been to provide state and local governments and large private landowners the opportunity to develop and implement their own protection and conservation measures. These are accomplished through voluntary, although legally binding, agreements provided for under Section 10 of the ESA (16 USC 1530). The types of agreements allowed under Section 10 include candidate Conservation Agreements, Safe Harbor Agreements, and Habitat Conservation Plans (HCPs). These plans can provide specific legal protection for actions not included as exemptions under 4(d) rules, but these agreements require a significant amount of coordination and legal efforts to implement.

- **Section 11: Third-Party Lawsuits:** Section 11 of the ESA specifically enables "citizen suits" for the purpose of: (1) enjoining a person or agency alleged in violation of any provision in the ESA; (2) compelling federal agencies to list a specific species; and (3) compelling the government to enforce protective measures upon the listing of a species (16 USC 1540 [g][1]). In addition, Section 11 provides specific penalties for violations of the ESA including civil fines and criminal judgments (16 USC 1540 [a] and (16 USC 1540 [b], respectively).

City Response to Endangered Species Act – 17.1.2:

ESA-regulated species occurring or having the potential to occur in the vicinity of the City of Ferndale, as indicated in ESA Section 4 including several runs of chinook salmon have been documented in the Nooksack River.

The City of Ferndale Critical Areas Map on the following page graphically shows the location of critical creeks, streams, and waterways.

REMOVE THIS PAGE

INSERT

“CITY OF FERNDALE CRITICAL AREAS MAP”

The City of Ferndale will continue to develop policies, programs and operating procedures that will aid in conservation and recovery of the salmon species listed above, as well as address other environmental considerations such as water quality. In particular with the adoption of this plan the City of Ferndale will be taking action sufficient to achieve 4(d) protection in regards to stormwater management. The City of Ferndale's proposed stormwater management program elements are listed in table 17.1 below. The stormwater elements are very similar to the elements required under Puget Sound Water Quality Management Plan (PSWQMP) and the anticipated requirements under NPDES Phase II. Each of these elements is addressed in greater detail throughout this document.

Table 17.1 STORMWATER PROGRAM ELEMENTS
Technical Standards
Inspection and Enforcement
Maintenance Standards/Programs
Source Control
Illicit Discharge Reduction
Public Education
Public Involement/Outreach
Intergovernmental/Intragovernmental Coordination
Monitoring
Stormwater Planning
Capital Improvement Programs
Land Use Decisions/Regulations
Habitat Enhancement/Rehabiltiation
Habitat Acquisition

County Response to Endangered Species Act – 17.1.3:

At the time when ESA listings of threatened fish species occurred, it was recognized by all levels of government that planning and regulatory activities in the region needed to be re-evaluated. In addition, development and business interests began to inquire as to how this listing would affect them. To prepare a response to the listings that would attempt to consider all public and private needs in a coordinated fashion, several different planning and analysis efforts were begun. The following section presents a brief description of ESA response activities that are currently underway and could affect stormwater planning in the City of Ferndale.

As a response to the federal Endangered Species Act listings of Chinook salmon and Bull Trout (native char) Whatcom County established a program to aid in the recovery of salmon in Whatcom County. There are four pieces to this program area:

- Whatcom County participates in salmon recovery and watershed management planning for the Nooksack River and adjacent streams.
- Whatcom County coordinates the local citizen stakeholder process and project grant applications for salmon recovery funding.

- Technical assistance on salmon habitat recovery is provided to other Public Works divisions, to county departments, and to the public and private projects that are implemented via a Whatcom County funded Washington Conservation Corps Crew that employs 6 young people in daily salmon recovery project activities.
- Salmon recovery oriented public outreach and education remains an ongoing focus for Whatcom County Water Resources Staff.

According to the Whatcom County website, the Lummi Nation and Nooksack Tribe, City of Bellingham and other local governments, state and federal agencies, non-profit organizations, and the public together with Whatcom County are working on a long-term strategy to ensure the protection and restoration of healthy salmon populations. The local plan developed to recover salmon in Whatcom County will "roll-up" into the regional salmon recovery plan known as the Shared Strategy for the Recovery of Puget Sound Salmon. The "Shared Strategy" will become the official ESA recovery plan when it is completed over the next several years. Whatcom County is also participating in the development of the watershed management plan that will guide water resource management in Whatcom County into the future. Salmon habitat recovery is intricately linked to, will be affected by, and will be most successful if salmon recovery objectives are carefully coordinated with watershed management plan objectives. Whatcom County plays a pivotal role in developing these planning linkages and implementation strategies.

The City of Ferndale, along with the Nooksack Tribe, Lummi Nation, City of Everson, Lynden, Sumas, Nooksack, Blaine, and Bellingham; and Skagit and Whatcom counties, have passed a resolution naming Whatcom County the Lead Entity for the purpose of the state Salmon Recovery Act (also known as the ESHB 2496) process. The central focus is to organize and support the local piece of the Salmon Recovery Funding Board grant application process, the main source of salmon recovery funding. Project applicants are guided by a habitat restoration strategy developed jointly by Water Resources, Nooksack Natural Resources, Lummi Natural Resources, Washington Department of Fish and Wildlife, and the City of Bellingham. The strategy guides technical and citizen project review. The Salmon Habitat Restoration Citizen Advisory Committee appointed by the County Executive does the latter. The creation of a habitat project list and work schedule is also a lead entity core responsibility and has been accomplished in partnership with the Nooksack Recovery Team (NRT). The NRT is a broad-based non-profit group coordinating salmon recovery projects and resources in Whatcom County since 1994.

While Whatcom County must clearly plan and operate within the context of a general statewide recovery plan and the applicable regulatory sections of the ESA, the county and others are not waiting for completion of a recovery plan to implement a meaningful local response. The Governor's Salmon Recovery Office issued The Statewide Strategy to Recover Salmon - Extinction is Not an Option to provide statewide guidance for salmon recovery. Local salmon habitat and population information has been gathered by the Lummi Nation, Nooksack Tribe, Washington Department of Fish and Wildlife, and others. With this background information as guidance, Whatcom County is committed to an emphasis on non-regulatory approaches to protecting and restoring salmon habitat while recognizing that regulatory options is appropriate and necessary in certain circumstances.

The Washington Conservation Corps crew funded by Whatcom County is a good example of a proactive and voluntary approach to salmon recovery. The six-member crew is coordinated by the Nooksack Salmon Enhancement Association and works mostly with landowners who voluntarily want to restore streamside vegetation and salmon habitat. The crew also works on public ownership when the need arises and are available to the City of Ferndale to help out in emergencies such as flooding. The crews bring a lot of welcome youthful enthusiasm to their labors.

The annual Nooksack Recovery Team Salmon Summit is a day of presentations, displays, and dialog about the over 500 salmon recovery projects completed or underway in Whatcom County and provides a forum to learn from the partnerships involved. As part of an effort to coordinate with other local agencies, the City of Ferndale will participate in the annual Summit.

National Pollutant Discharge Elimination System (NPDES) 17.2

Federal Stormwater Management Policy – 17.2.1:

Congress amended the federal Clean Water Act (CWA) to address stormwater discharge and to further protect our nation's streams, rivers, and beaches from polluted stormwater runoff. Federal regulations established two phases for the stormwater permit program which require controls to reduce stormwater pollutant discharges to the maximum extent practicable. In 1990, the NPDES Phase I Rule was adopted, which addressed priority sources of pollutant runoff, including stormwater pollution from medium and large Municipal Separate Storm Sewer Systems (MS4s), industrial sources, and construction sites. In 1999, the Phase II rule was adopted which extended coverage of the National Pollutant Discharge Elimination System (NPDES) program to certain "small" municipal separate stormwater sewer systems (MS4s) not covered under Phase I that are part of urbanized areas, plus construction activities of between one and five acres.

NPDES Phase II Objectives – 17.2.2:

The EPA's objectives in developing the Phase II regulations include:

- Providing a comprehensive stormwater program that designates and controls additional sources of stormwater discharges to protect water quality, pursuant to CWA Section 402 (p)(6)
- Addressing discharges of stormwater from activities not addressed by Phase I, including:
  - All construction site activities involving clearing, grading, and excavating land equal to or greater than one acre (including projects that are comprised of several sites of less than one acre each)
  - "Light" industrial activities not exposed to stormwater (light industrial activities exposed to stormwater are covered under Phase I)
  - MS4s located in urbanized areas not covered under Phase I
  - Municipally owned industrial facilities that were addressed under Phase I but granted an extension under ISTEA (Intermodal Surface Transportation Efficiency Act)
- Facilitating and promoting watershed planning as a framework for implementing water quality programs wherever possible.

EPA aims to achieve these objectives by balancing nationwide automatic designation and locally based designation. EPA will designate, on a nationwide basis, that the NPDES Phase II rule is applicable to the following:

- Stormwater discharges from small MS4s located in urbanized areas
- Construction activities that result in land disturbance equal to or greater than one acre.

EPA believes that these designation criteria address the main sources of stormwater pollution causing significant degradation of surface waters. Permitting authorities (Ecology, in Washington State) may designate additional Phase II permittees, such as additional small MS4s and categories of individual sources of stormwater discharges that are problematic in specific communities.

NPDES Phase II State Permitting Authority – 17.2.3:

The State of Washington is authorized to administer the federal NPDES program and Ecology is the state agency with responsibility for the following:

- Issuing NPDES permits
- Issuing the menu of appropriate BMPs in cases of general permits
- Supporting local programs by:
  - Overseeing programs
  - Ensuring municipalities have adequate legal authority
  - Providing technical assistance
- Providing waivers for some or all permit requirements.

Ecology has stated that it will issue one general permit for all Phase II permit tees that will describe permit conditions for all small MS4s in order for them to be in compliance with the federal NPDES Phase II Rule.

According to the federal rule, the NPDES permitting authority (Ecology) was supposed to issue a final general permit by December 8, 2002. Based on recent conversations with Ecology, the expected date for issuance of the final general permit is between fall 2003 and fall 2004. The expiration date of the first permit term for the general permit will be five years after its issuance.

The federal rule specifies that the regulated MS4 programs, described in this case in Ecology's general permit, must be developed and implemented within the first five-year permit term.

NPDES Phase II Stormwater Requirements – 17.2.4:

Stormwater Management Requirements for entities affected by the NPDES Phase II Rule are as follows:

- **For MS4s:** The EPA requires, under the Phase II regulation, that all owners/operators of small MS4s reduce the discharge of pollutants from a regulated system to the "maximum extent practicable" to protect water quality (Federal Register Vol. 63, p. 1574). At a minimum, jurisdictions regulated under Phase II must:
  - Specify BMPs for six minimum control measures and implement them to the "maximum extent practicable"
  - Identify measurable goals for control measures
  - Show an implementation schedule of activities or frequency of activities
  - Define the entity responsible for implementation.

- **For Construction and Other Activities:** Construction activities that disturb one to five acres must also be regulated under an NPDES Phase II permit. The NPDES permitting authority may also require that other facilities and industrial and construction activities, as well as small MS4s outside urbanized areas, be designated on a case-by-case or categorical basis.

Each of these requirements is discussed in more detail in the following section:

BMPs for Six Minimum Control Measures – 17.2.5:

Six minimum control measures have been established by the EPA that must be included in a Phase II stormwater program to protect water quality.

1. Public Education and Outreach
   - A public education program must be implemented to distribute educational materials to the community.
   - The community should be made aware about the impacts of stormwater discharges to water bodies and the steps needed to reduce stormwater pollution.
   - Municipalities are encouraged to work with other governmental entities and civic, environmental, and industrial organizations to develop an education/outreach program more efficiently.
2. Public Participation/Involvement
   - The public must be involved in developing the municipality's stormwater program by following applicable state, tribal, and local public notice requirements.
   - All economic and ethnic groups should be included.
   - Examples of public involvement/participation that should be considered include public hearings, citizen advisory boards, and working with citizen volunteers.
3. Illicit Discharge Detection and Elimination

- The goal of this control measure is for the Phase II MS4 permittee to demonstrate awareness of its system, using maps or other existing documents.
- Phase II MS4 permittees must develop a storm sewer system map, showing the location of all outfalls and the names and location of all waters that receive discharges from those outfalls;
- Through ordinance or other regulatory mechanism, effectively prohibit non-storm water discharges into storm sewer systems and implement appropriate enforcement procedures and actions;
- Develop and implement a plan to detect and address non-storm water discharges, including illegal dumping; and,
- Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.

4. Construction Site Runoff Control
    - Phase II MS4 permittees must develop, implement, and enforce a program to reduce nonpoint source pollution from construction sites with a land disturbance of more than one acre.
    - A regulatory mechanism must be used to control erosion and sediment from applicable construction sites to the maximum extent practicable and allowable under state, tribal, or local law.
    - Existing erosion and sediment control ordinances may suffice, if approved by the NPDES permitting authority.
5. Post-Construction Runoff Control
    - Phase II MS4 permittee must develop, implement, and enforce a program that addresses stormwater runoff from new development and redevelopment projects that result in land disturbances of at least one acre and that discharge to their MS4.
    - Appropriate structural and non-structural BMPs must be used.
    - Controls must ensure that water quality impacts are minimized.
    - Adequate long-term operation and maintenance of BMPs connected to a regulated MS4 must be addressed.
    - The goal, at a minimum, should be to maintain pre-development runoff conditions.
    - EPA encourages the use of preventive measures, including non-structural BMPs, which are usually thought to be more cost-effective.
6. Pollution Prevention/Good Housekeeping
    - Phase II MS4 permittees must develop and implement cost-effective operation and maintenance, as well as training programs, with the goal of preventing or reducing pollutant runoff from municipal operations.

The federal rules identify <u>two additional standards</u> with which an operator of a regulated MS4 must comply:

7. Fulfillment of requirements of an approved TMDL (water-cleanup plan).
8. Record keeping, evaluation, and reporting on the progress of the program.

Measurable Goals for Control Measures – 17.2.6:

The requirement allowing each permittee to identify its own measurable goals for each control measure is unique to Phase II. Communities regulated under Phase I were subject to more prescriptive compliance requirements. Examples of measurable goals include:

- Inspecting or repairing a certain number of drain inlets each year
- Conducting street-sweeping operations a certain number of times each year
- Inspecting municipal right-of-ways to identify illicit discharges
- Conducting a certain number of training classes for municipal operations each year
- Reporting the help of a certain number of volunteers each year to perform water quality monitoring or education/outreach activities

Implementation Schedule of Activities – 17.2.7:

Regulated communities must show an implementation schedule of activities or frequency of activities that will be done as part of the stormwater management program. An example might include the following entries:

Sweep City streets	X times per year
Vacuum storm drain inlets	Y times per year
Conduct classroom stormwater education	Z times per year

Entity Responsible for Implementation – 17.2.8:

Regulated communities must also indicate who is responsible for the stormwater management program. There must be one entity or person responsible for the entire program.

The Phase II regulations are amenable to creative implementation strategies, as they encourage communities to take a watershed or cooperative approach. Communities may also be covered under a neighboring Phase I community, or allow another entity, such as a county, to implement certain minimum control measures or portions of minimum control measures. The regulated entity, however, is still responsible for complying with the requirements of the permit.

Phase II Process – Small MS4 Communities – 17.2.9:

A general permit will most likely be issued by Ecology to cover Phase II MS4s in Washington, although the timeframe is currently unknown. Permittees will need to submit a permit application to Ecology to be covered under a general permit. As part of this application, an applicant may be required to identify and submit the following information:

- The BMPs that will be implemented
- The measurable goals for the minimum control measures

- The month and year in which each BMP will be started and completed or the frequency of action if it is ongoing
- The person(s) responsible for implementing or coordinating the stormwater management program.

Phase II Regulated Construction Site – 17.2.10:

Under the Phase I program, for land-disturbing activities greater than five acres, a Notice of Intent (NOI - also known as construction stormwater general permit)) was required for coverage under a general construction permit. For the Phase II Rule, EPA is not specifying NOI requirements for construction sites of between one and five acres applying for coverage under a general permit. While EPA recognizes the benefit of NOIs—which allow for better outreach and dissemination of information—federal regulators are sensitive to the burden being placed on the regulated community and on the NPDES regulators. Therefore, it is up to Ecology, as the NPDES permitting authority, to determine whether it will require NOI submission for construction sites disturbing less than five acres. Ecology is currently revising its construction stormwater general permit and is expected to require an NOI for sites disturbing one to five acres. Ecology has not announced a date on which the permit will be reissued. The NOI for construction projects disturbing greater than five acres can be used to obtain coverage for smaller projects in the interim.

Phase II Industrial Stormwater Permit – 17.2.11:

Industrial sites requiring permits, as determined by standard industrial classification (SIC) codes, are required to obtain an NPDES permit for industrial activities.

Phase II Ongoing Requirements – 17.2.12:

Under the Phase II rule, regulated communities must conduct periodic evaluations and assessments of their stormwater management practices, maintain records, and prepare required reports. These requirements are summarized in 17.2 below:

Table 17.2 NPDES Phase II Minimum Reporting Requirements		
Evaluation and Assessment Requirements	**Recordkeeping Requirements**	**Reporting Requirements**
▪ Evaluate program compliance ▪ Evaluate the appropriateness of identified BMPs ▪ Evaluate progress toward achieving measurable goals ▪ The NPDES permitting authority may determine monitoring requirements appropriate to your watershed. EPA encourages participation in a group monitoring project.	▪ Keep records required by the NPDES permitting authority for at least three years. ▪ Submit the records when requested by the permitting authority. ▪ Make records and stormwater management plan accessible to the public during regular working hours – A reasonable copying fee may be charged – Advance notice of up to two days for copying may be requested	▪ Submit annual reports to the permitting authority for the first permit term. In subsequent terms, submit reports in years two and four or more frequently as required ▪ Reports should include: – Status of permit condition compliance – Appropriateness of identified BMPs – Progress toward achieving measurable goals for each measure – Results of data collected and analyzed during the reporting period – A summary of the activities that will take place during the next reporting period – Any changes in measurable goals

Clean Water Act Section 303(d) – 17.2.13:

Section 303(d) of the federal Clean Water Act requires NPDES-authorized states, such as Washington states to develop a list of polluted water bodies every two years. For each of those waterbodies, the law requires states to develop Total Maximum Daily Loads (TMDLs). A TMDL is the amount of pollutant loading that can occur in a given water body (river, marine water, wetland, stream, or lake) and still meet water quality standards. TMDLs are implemented through permits to point source dischargers and through non-regulatory programs for nonpoint sources. Local entities are responsible for implementing programs to address the water quality problems.

Tennant Creek, Silver Creek, Tenmile-Deer Creek, and the Nooksack River are all listed as water quality impaired water bodies on the 303(d) list. TMDLs have not been established for the creeks, but in 2000 a TMDL plan was established for the Nooksack River, to limit bacteria loading. Ferndale's sewage treatment plants must meet waste load allocation (WLA) in the Nooksack TMDL plan. Ferndale's permit will be reopened in December 2004 and reissued with new bacteria limits reflecting the WLA. Therefore to abide by the TMDL plan the City of Ferndale is already adhering to the stricter fecal cloriform limits in regards to their sewage treatment facilities.

According the TMDL plan Ferndale must incorporate stormwater management meeting the guidelines of the Puget Sound Action Team 2001-2003 work plan and reflect the new Ecology Stormwater Guidance Manual. The Nooksack Bacteria TMDL Plan requires the City of Ferndale to monitor implementation, conditions, budget needs and resources, and environmental trends over time. Implementation of this Comprehensive Plan will meet the guidelines set forth in the Nooksack River TMDL plan.

State Regulations

Puget Sound Water Quality Management Plan (PSWQMP) 17.3

The 2000 PSWQMP renews the original 1987 requirement for local governments in the Puget Sound region to implement municipal stormwater management programs. All jurisdictions in the Puget Sound basin are now required to adopt comprehensive stormwater programs, whereas in the previous PSWQMP smaller communities were only required to implement a pared-down version called the *basic* stormwater management program. The goal of the PSWQMP is to restore and protect the biological health and diversity of Puget Sound by:

- preserving and restoring wetlands and aquatic habitats and the natural processes and functions that created them;
- preventing increases in the introduction of pollutants to the Sound and its watersheds;
- and reducing and ultimately eliminating harm from the entry of pollutants to the waters, sediments and shorelines of Puget Sound.

Puget Sound Water Quality Action Team – 17.3.1:

The Puget Sound Water Quality Protection Act, passed during the 1996 Legislative session, creates a new approach to water quality protection in the Puget Sound Basin. A 17-member Puget Sound Action Team and 12-member Puget Sound Council now lead water quality protection efforts in the Puget Sound Basin. The Action Team assumed responsibility for implementing the 1994 Puget Sound Water Quality Management Plan, which had previously been the responsibility of the Puget Sound Water Quality Authority (PSWQA). The Action Team, with guidance from the Puget Sound Council, must also develop biennial work plans that identify both state and local actions necessary to correct regional water quality problems.

The Puget Sound Water Quality Management Plan (PSWQMP) establishes a comprehensive plan to protect and improve water quality and aquatic resources in Puget Sound. The PSWQA was directed to identify water quality problems and corresponding pollution sources affecting marine life and human health, and to develop effective pollution control and management programs that could be implemented in a comprehensive multijurisdictional manner throughout the Puget Sound Basin.

As noted above, the Puget Sound Action Team replaced the PSWQA during the 1996 Legislative session. While the PSWQA no longer exists, the intent of the Puget Sound Action Team is to guide the implementation of the many elements of the 1994 Puget Sound Plan (and subsequent plans). A number of programs regarding stormwater management were included in the 1994

plan. State authority to require jurisdictions to implement the provisions contained within the 1994 Puget Sound Plan is inherent in the 1996 Puget Sound Water Quality Protection Act, discussed previously.

Comprehensive Municipal Stormwater Programs – 17.3.2:

According to the PSWQMP each municipality must develop and implement a comprehensive stormwater management program in order to:

- Control erosion and manage the quantity and the quality of stormwater runoff from public and private activities
- Protect and enhance water quality, and achieve water quality and sediment quality standards
- Reduce the discharge of pollutants to the maximum extent practicable within the constraints of federal and state laws
- Protect beneficial uses, as described in Chapter 173-201 WAC Achieve the four items above in a manner that makes efficient use of limited resources to address the most critical problems first.

The specific elements to be addressed by municipal stormwater programs have been modified in the 2000 Plan. The updated program elements, described in 17.3 below, are both preventative and corrective in nature.

Table 17.3
2000 Puget Sound Water Quality Management Plan Stormwater Program Elements

Element	Description
Stormwater controls for new development and redevelopment	▪ Adopt ordinances that require the use of best management practices (BMPs) to control stormwater flows, provide treatment, and prevent erosion and sedimentation from all new development and redevelopment projects. ▪ Adopt and require the use of Ecology's stormwater technical manual (or an alternative manual) to meet these objectives
Stormwater site plan review	▪ Review new development and redevelopment projects to ensure that stormwater control measures are adequate and consistent with local requirements
Inspection of construction sites	▪ Regularly inspect construction sites and maintain temporary BMPs. ▪ Adopt ordinances to ensure clear authority to inspect construction sites, to require maintenance of BMPs and to enforce violations. ▪ Provide local inspectors with training on erosion and sediment control practices.
Maintenance of permanent facilities	▪ Adopt ordinances that require that all permanent stormwater facilities be regularly maintained according to approved guidance.

	▪ Develop provisions as necessary, such as agreements to maintenance contracts, to ensure that facilities on private land are maintained. ▪ Provide training for professionals who maintain stormwater facilities.
Source control	▪ Develop and implement a program to control sources of pollutants from new development and redevelopment projects and from existing developed lands.
Illicit discharges and water quality response	▪ Adopt ordinances to prohibit dumping and illicit discharges. ▪ Carry out activities to detect, eliminate and prevent illicit discharges, and respond to spills and water quality violations.
Identification and ranking of problems	▪ Identify and rank existing problems that degrade water quality, aquatic species and habitat, and natural hydrologic processes. ▪ Conduct a hydrologic analysis and map stormwater drainages, outfalls and impervious surfaces by watershed. ▪ Develop plans and schedules and identify funding to fix problems.
Public education and involvement	▪ Educate and involve citizens, businesses, elected officials, site designers, developers, builders and other members of the community to build awareness and understanding of stormwater and water quality issues. ▪ Provide practical alternatives to actions that degrade water quality and biological resources.
Low impact development practices	▪ Adopt ordinances that allow and encourage low impact development practices.
Watershed or basin planning	▪ Participate in watershed or basin planning processes such as planning under Chapter 400-12 WAC or Chapter 90.83 RCW.
Funding	▪ Create local funding capacity, such as a utility, to ensure adequate, ongoing funding for program activities and to provide funding to contribute to regional stormwater projects.
Monitoring	▪ Monitor program implementation and environmental conditions and trends over time to measure the effectiveness of program activities.
Schedule for implementation	▪ Develop an implementation schedule with specific target dates and funding sources to help plan program activities.

Each urban stormwater program shall seek to control the quality and quantity of runoff from public facilities and industrial, commercial, and residential areas, including streets and roads. Each program shall cover both new and existing development. Early action by urbanized areas that are prepared to implement stormwater control programs is encouraged. Emphasis shall be placed on controlling stormwater through source controls and BMPs. Where local programs are not effectively solving stormwater problems, ecology shall ensure compliance through its oversight role. Each municipality shall have the flexibility to design its own program, but the

content, priorities, and deadlines for compliance shall be subject to review by Ecology for consistency with the Puget Sound Plan.

In some cases, significant stormwater problems may be originating in urbanized areas outside of a local jurisdiction. In those situations, the sequencing of areas for urban stormwater programs may be modified to address problems in shared watersheds. The neighboring jurisdictions will develop local coordination mechanisms to cooperatively resolve the identified problems. Where joint programs are not developed, Ecology shall ensure consistency in programs through its oversight role.

Stormwater quality in public stormwater systems in commercial and industrial areas shall have a high priority in the municipal programs. Ecology shall determine, in compliance with U.S. Environmental Protection Agency (EPA) regulations and in consultation with local governments, the appropriate approach to controlling stormwater discharges from industrial and commercial facilities that are not currently required to have stormwater National Pollutant Discharge Elimination System (NPDES) or point source discharge permits.

Stormwater controls are included in NPDES permits for discharges of stormwater from commercial and industrial point source facilities, which are addressed in the Industrial Discharges Program.

Ecology shall have oversight responsibilities for the urban stormwater programs. Ecology shall review each urban stormwater program every two years to ensure consistent and adequate implementation and report to the Action Team.

Municipality Development Standards and Operations and Maintenance – 17.3.3:

The provisions within the PSWQMP for achieving the program's goal of controlling pollution from stormwater is to implement best management practices (BMPs), assess their effectiveness, and, as necessary, require further water quality controls that may include treatment. This includes a requirement for jurisdictions to adopt a stormwater management ordinance (or ordinances) with minimum standards for new development and redevelopment. The ordinances are to be substantially equivalent to the EPA and Ecology's model ordinances. **See Appendix A for the City of Ferndale Stormwater Control Ordinance.**

These ordinance address: (1) the control of water quality and quantity impacts from new development and redevelopment sites; (2) the use of source control best management practices and treatment best management practices; (3) the effective treatment, using best management practices, of the 6-month design storm for proposed development; (4) the use of infiltration, with appropriate precautions, as the first consideration in stormwater management; (5) the protection of stream channels and wetlands; (6) erosion and sedimentation control for new construction and redevelopment projects; and (7) local enforcement of these stormwater controls. In addition, each municipality shall also develop and enforce operation and maintenance programs and ordinances for new and existing public and private stormwater systems.

Consistent with the Growth Management Act, each local jurisdiction in the Puget Sound Basin is expected to cooperate with neighboring jurisdictions in growth management, stormwater planning, and stormwater basin planning.

Ecology will monitor compliance with these requirements, reviewing the status of municipality operation and maintenance and runoff control programs every two years to ensure consistent and adequate implementation. Ecology's oversight role shall pertain only to compliance with the objectives of the plan's stormwater program and appropriate rules and statutes and technical suggestions to improve implementation. This should ensure maximum flexibility and creativity for local governments to resolve site-specific stormwater problems in accordance with their land use and other local policies.

Department of Ecology Stormwater Manual – 17.3.4:

The PSWQMP also requires that in conjunction with the runoff control ordinances for new development and redevelopment, each jurisdiction shall adopt a stormwater management technical manual containing state-approved BMPs. To add consistency and help local jurisdictions with this requirement, the plan directed the Department of Ecology to develop minimum standards for controlling stormwater discharges. Ecology's minimum requirements shown in table 17.4 below are contained in the *Stormwater Management Manual for Western Washington*.

Table 17.4
2001 Ecology Stormwater Manual
Minimum Requirements for Controlling Stormwater Discharges

Minimum Requirements

1. Preparation of Stormwater Site Plans
2. Construction Stormwater Pollution Prevention
   - Element 1: Mark Clearing Limits
   - Element 2: Establish Construction Access
   - Element 3: Control Flow Rates
   - Element 4: Install Sediment Controls
   - Element 5: Stabilize Soils
   - Element 6: Protect Soils
   - Element 7: Protect Drain Inlets
   - Element 8: Stabilize Channels and Outlets
   - Element 9: Control Pollutants
   - Element 10: Control Dewatering
   - Element 11: Maintain BMPs
   - Element 12: Mange the Project
3. Source Control of Pollution
4. Preservation of Natural Drainage Systems and Outfalls
5. On-Site Stormwater Management
6. Runoff Treatment
7. Flow Control
8. Wetlands Protection
9. Basin/Watershed Planning
10. Operation and Maintenance

Optional Guidance

1. Financial Liability
2. Off Site Analysis and Mitigation

Ecology's manual provides a commonly accepted set of standards and technical guidance on measures necessary to control the quality and quantity of runoff from new development and redevelopment so that runoff from those activities will comply with water quality standards and protect beneficial uses. The manual also contains design standards for state approved best management practices (BMPs) that can be used to meet the minimum standards.

A local government may adopt Ecology's technical manual or prepare its own technical manual as long as it has technical standards equivalent to those included in Ecology's 2001 *Stormwater Management Manual for Western Washington.* The first version of this manual was published in 1992; it was updated in September 2001 and is currently being updated again in 2004 to correct errors, clarify statements, update design criteria and procedures, and apply recent research.

Many local governments, including the City of Ferndale, have based their development design standards on the 1992 Stormwater Management Manual. To meet PSWQMP, ESA, NPDES Phase II, and other environmental permit requirements the City of Ferndale will convert to new Ecology Manual-equivalent standards. The key changes to Ecology's Stormwater Management Manual form the 1992 to the 2001 include the following:

- The manual was originally written for the Puget Sound area, although it has been used for construction and industrial activities statewide since it was written. The revised manual is more appropriate and useful for application throughout western Washington.
- The format of the manual has been updated from four volumes to five. It is available in print, on compact disks, and on the Internet.
- Thresholds for the selection of best management practices (BMPs) are written to allow for the most appropriate sizing and placement of flow control and treatment BMPs. Fewer projects will require engineered structures, but all projects will be required to use appropriate BMPs.
- Runoff flow control requirements will now address problems of both increased peak flow and the duration of high flows. This will require the use of more sophisticated stormwater runoff models and will generally result in the construction of larger runoff control facilities.
- Higher levels of treatment will be required to remove and reduce pollution from runoff to lakes and smaller streams to provide more assurance that the treated stormwater runoff is not harmful to fish and other aquatic life and is protective of the environment.
- New BMPs have been added for controlling runoff from construction sites and for preventing stormwater pollution at the source. These BMPs will help to further remove contaminants from runoff.
- Ecology proposes to establish a Technical Review Committee to evaluate new treatment technologies and to maintain an updated list of approved treatment technologies.

Local Government Stormwater Assistance Service – 17.3.5:

The intent of the 2000 PSWQMP and subsequent Puget Sound Water Quality Work Plans is to provide technical assistance to local governments through staff who have handson experience with (1) the design and implementation of stormwater programs at the local level, (2) current BMPs for stormwater, and (3) local basin characteristics. Ecology shall assist the municipality with current stormwater expertise to establish a technical assistance service.

This service will support the exchange of technical information and assistance on stormwater among local governments, will train Ecology and local government staff in current practices and real world application and problems in stormwater technology, and will operate as an integral part of the state technical assistance program. The service will have the goal of acting as an in-the-field branch of Ecology's technical assistance program.

Guidance and Model Ordinances – 17.3.6:

Ecology will prepare and update guidance and model ordinances for stormwater programs for all municipalities and for comprehensive urban stormwater programs. All municipalities will adopt stormwater programs that include minimum requirements for new development and redevelopment set by the plan and in guidance developed by Ecology.

The guidance shall include:

- Procedures for developing local programs, including procedures for review and approval of programs
- Minimum requirements for runoff controls and system maintenance required in local ordinances
- Minimum requirements for control of private sector maintenance of private drainage systems
- Minimum requirements for operation and maintenance programs, including record keeping requirements for drainage systems and facilities
- Methods for assuring practical and appropriate disposal procedures for decant water, solid, and other substances from drainage system cleanout and maintenance.

Methods shall address catch basins, oil/water separators, pipelines, wells (wells?), detention/ retention basins, and other appropriate drainage elements.

Additionally, the guidance for the comprehensive urban stormwater programs will include:

- Procedures for identification and ranking of significant pollutant sources and their relationship to the drainage system and water bodies
- Procedures for source tracing investigations, including sampling of problem storm drains
- Procedures for investigations, implementation of spill-control measures, enforcement, and remedial actions
- Methods for assuring adequate local funding for the urban stormwater program
- Provisions for agreements with neighboring jurisdictions when stormwater and watersheds do not follow jurisdictional boundaries
- Requirements for public education programs
- Requirements for retrofitting and/or treatment measures, if necessary
- Procedures for inspection, compliance, and enforcement measures
- Requirements for implementation schedules
- Methods to coordinate stormwater management with other watershed habitat protection and growth management activities.

The guidance will lay out acceptable approaches to control stormwater from new development and redevelopment, such as water quality policies for use in SEPA, NPDES, and other permit decisions; density controls to limit development in sensitive areas; development standards to limit the amount of impervious surfaces; regional detention ponds; oil separators or other treatment facilities; grading and drainage ordinances; erosion control programs; buffers next to waterways; preservation of wetlands; and other appropriate elements.

Hydraulic Project Approval (HPA) 17.4

The Washington Department of Fish and Wildlife (WDFW) requires a Hydraulic Project Approval (HPA) for construction activities that use, divert, obstruct, or change the natural flow or bed of any waters of the state (RCW 75.20.100). The purpose of the requirements, which are administered through the HPA permit process, is to protect fish habitat in stream channels, to prevent erosion, and to protect freshwater and nearshore marine aquatic life.

Any construction activity such as channel widening or culvert improvements within the ordinary high water mark of any stream would fall under the HPA permit requirements. In some instances, WDFW is also extending its permitting authority to include developments creating new impervious surfaces in excess of 5,000 square feet even if the project does not include work within the ordinary high water mark. The rationale for extending its permit authority is that such a project will affect the hydrologic regime of downstream stream habitats.

Growth Management Act 17.5

Enacted on July 1, 1990, the Growth Management Act (GMA) is intended to manage growth in Washington's fastest-growing counties through the adoption of local comprehensive land use plans and development regulations. A 1995 GMA amendment requires all counties and cities in Washington to include the best available science in developing policies and development regulations to protect the functions and values of critical areas. The City of Ferndale's Critical Areas Ordinance and other Planning Department actions comply with the GMA.

State Floodplain Regulations 17.6

Chapter 86.16 RCW establishes statewide authority through regulations promulgated by Ecology for coordinating the floodplain management regulation elements of the National Flood Insurance Program (NFIP). Under Chapter 173-158 WAC, Ecology requires local governments to adopt and administer regulatory programs compliant with the minimum standards of the NFIP. Ecology provides technical assistance to local governments for identifying the location of the 100-year (base) floodplain.

Ecology also establishes land management criteria in the base floodplain area by adopting the federal standards and definitions contained in 44 CFR Parts 59 and 60 as minimum state standards. In addition to adopting the federal standards, the state regulations provide for additional regulation of residential development in the floodplain.

Appendix A
Proposed Stormwater Control Ordinance

Ordinance Table of Contents

Section 1. General Provisions

1.1. Findings of Fact

It is hereby determined that:

Land development projects and associated increases in impervious cover alter the hydrologic response of local watersheds and increase stormwater runoff rates and volumes, flooding, stream channel erosion, and sediment transport and deposition; This stormwater runoff contributes to increased quantities of water-borne pollutants, and; Stormwater runoff, soil erosion and nonpoint source pollution can be controlled and minimized through the regulation of stormwater runoff from development sites.

Therefore, the **City of Ferndale** establishes this set of water quality and quantity policies applicable to all surface waters to provide reasonable guidance for the regulation of stormwater runoff for the purpose of protecting local water resources from degradation. It is determined that the regulation of stormwater runoff discharges from land development projects and other construction activities in order to control and minimize increases in stormwater runoff rates and volumes, soil erosion, stream channel erosion, and nonpoint source pollution associated with stormwater runoff is in the public interest and will prevent threats to public health and safety.

1.2. Purpose

The purpose of this ordinance is to establish minimum stormwater management requirements and controls to protect and safeguard the general health, safety, and welfare of the public residing in watersheds within this jurisdiction. This ordinance seeks to meet that purpose through the following objectives:

(1). minimize increases in stormwater runoff from any development in order to reduce flooding, siltation, increases in stream temperature, and streambank erosion and maintain the integrity of stream channels;

(2). minimize increases in nonpoint source pollution caused by stormwater runoff from development which would otherwise degrade local water quality

(3). minimize the total annual volume of surface water runoff which flows from any specific site during and following development to not exceed the pre-development hydrologic regime to the maximum extent practicable.

(4). reduce stormwater runoff rates and volumes, soil erosion and nonpoint source pollution, wherever possible, through stormwater management controls and to ensure that these management controls are properly maintained and pose no threat to public safety.

1.3. Applicability

This ordinance shall be applicable to all subdivision or site plan applications, unless eligible for an exemption or granted a waiver by the **City of Ferndale** under the specifications of Section 4 of this ordinance. The ordinance also applies to land development activities that are smaller than the minimum applicability criteria if such activities are part of a larger common plan of development that meets the following applicability criteria, even though multiple separate and distinct land development activities may take place at different times on different schedules. In addition, all plans must also be reviewed by local environmental protection officials to ensure that established water quality standards will be maintained during and after development of the site and that post construction runoff levels are consistent with any local and regional watershed plans.

To prevent the adverse impacts of stormwater runoff, the **City of Ferndale** has developed a set of performance standards that must be met at new development sites. These standards apply to any construction activity disturbing _7000_ or more square feet of land. The following activities may be exempt from these stormwater performance criteria:

1. Any logging and agricultural activity which is consistent with an approved soil conservation plan or a timber management plan prepared or approved by the **Department of Natural Resources**, as applicable.
2. Additions or modifications to existing single family structures
3. Developments that do not disturb more than _2000__ square feet of land, provided they are not part of a larger common development plan;
4. Repairs to any stormwater treatment practice deemed necessary by the **City of Ferndale**.

When a site development plan is submitted that qualifies as a redevelopment project as defined in Section 2 of this ordinance, decisions on permitting and on-site stormwater requirements shall be governed by special stormwater sizing criteria found in the current stormwater design manual. This criteria is dependent on the amount of impervious area created by the redevelopment and its impact on water quality. Final authorization of all redevelopment projects will be determined after a review by the **City of Ferndale**.

1.4. Compatibility with Other Permit and Ordinance Requirements

This ordinance is not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, stature, or other provision of law. The requirements of this ordinance should be considered minimum requirements, and where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, whichever provisions are more restrictive or impose higher protective standards for human health or the environment shall be considered to take precedence.

1.5. Severability

If the provisions of any article, section, subsection, paragraph, subdivision or clause of this ordinance shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any article, section, subsection, paragraph, subdivision or clause of this ordinance.

1.6. Development of a Stormwater Design Manual

The **City of Ferndale** may furnish additional policy, criteria and information including specifications and standards, for the proper implementation of the requirements of this ordinance and may provide such information in the form of a Stormwater Design Manual.

This manual will include a list of acceptable stormwater treatment practices, including the specific design criteria and operation and maintenance requirements for each stormwater practice. The manual may be updated and expanded from time to time, at the discretion of the local review authority, based on improvements in engineering, science, monitoring and local maintenance experience. Stormwater treatment practices that are designed and constructed in accordance with these design and sizing criteria will be presumed to meet the minimum water quality performance standards.

Section 2. Definitions

“Accelerated Erosion” means erosion caused by development activities that exceeds the natural processes by which the surface of the land is worn away by the action of water, wind, or chemical action.

“Applicant” means a property owner or agent of a property owner who has filed an application for a stormwater management permit.

“Building” means any structure, either temporary or permanent, having walls and a roof, designed for the shelter of any person, animal, or property, and occupying more than 100 square feet of area.

“Channel” means a natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.

“Dedication” means the deliberate appropriation of property by its owner for general public use.

“**Detention**" means the temporary storage of storm runoff in a stormwater management practice with the goals of controlling peak discharge rates and providing gravity settling of pollutants.

“Detention Facility” means a detention basin or alternative structure designed for the purpose of temporary storage of stream flow or surface runoff and gradual release of stored water at controlled rates.

“Developer” means a person who undertakes land disturbance activities.

“Drainage Easement” means a legal right granted by a landowner to a grantee allowing the use of private land for stormwater management purposes.

“Erosion and Sediment Control Plan” means a plan that is designed to minimize the accelerated erosion and sediment runoff at a site during construction activities.

“Fee in Lieu” means a payment of money in place of meeting all or part of the storm water performance standards required by this ordinance.

“**Hotspot**” means an area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater.

“**Hydrologic Soil Group (HSG)**” means a Natural Resource Conservation Service classification system in which soils are categorized into four runoff potential groups. The groups range from A soils, with high permeability and little runoff production, to D soils, which have low permeability rates and produce much more runoff.

“**Impervious Cover**” means those surfaces that cannot effectively infiltrate rainfall (e.g., building rooftops, pavement, sidewalks, driveways, etc).

“**Industrial Stormwater Permit**” means an National Pollutant Discharge Elimination System permit issued to a commercial industry or group of industries which regulates the pollutant levels associated with industrial stormwater discharges or specifies on-site pollution control strategies.

“**Infiltration**” means the process of percolating stormwater into the subsoil.

"**Infiltration Facility**” means any structure or device designed to infiltrate retained water to the subsurface. These facilities may be above grade or below grade.

“**Jurisdictional Wetland**" means an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

“Land Disturbance Activity” means any activity which changes the volume or peak flow discharge rate of rainfall runoff from the land surface. This may include the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, substantial removal of vegetation,, or any activity which bares soil or rock or involves the diversion or piping of any natural or man-made watercourse.

“Landowner” means the legal or beneficial owner of land, including those holding the right to purchase or lease the land, or any other person holding proprietary rights in the land.

“**Maintenance Agreement**" means a legally recorded document that acts as a property deed restriction, and which provides for long-term maintenance of storm water management practices.

“**Nonpoint Source Pollution”** means pollution from any source other than from any discernible, confined, and discrete conveyances, and shall include, but not be limited to, pollutants from agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.

“Offset Fee” means a monetary compensation paid to a local government for failure to meet pollutant load reduction targets.

“Off-Site Facility” means a stormwater management measure located outside the subject property boundary described in the permit application for land development activity.

“On-Site Facility” means a stormwater management measure located within the subject property boundary described in the permit application for land development activity.

“Recharge” means the replenishment of underground water reserves.

“**Redevelopment**” means any construction, alteration or improvement exceeding ___ square feet in areas where existing land use is high density commercial, industrial, institutional or multi-family residential.

“Stop Work Order” means an order issued which requires that all construction activity on a site be stopped.

“Storm Water Management” means the use of structural or non-structural practices that are designed to reduce storm water runoff pollutant loads, discharge volumes, peak flow discharge rates and detrimental changes in stream temperature that affect water quality and habitat.

“Storm Water Retrofit” means a stormwater management practice designed for an existing development site that previously had either no stormwater management practice in place or a practice inadequate to meet the stormwater management requirements of the site.

"**Stormwater Runoff**" means flow on the surface of the ground, resulting from precipitation.

“**Stormwater Treatment Practices (STPs)**” means measures, either structural or nonstructural, that are determined to be the most effective, practical means of preventing or reducing point source or nonpoint source pollution inputs to stormwater runoff and water bodies.

“**Water Quality Volume (WQ_v)**” means the storage needed to capture and treat 90% of the average annual stormwater runoff volume. Numerically **(WQ_v)** will vary as a function of long term rainfall statistical data.

“Watercourse” means a permanent or intermittent stream or other body of water, either natural or man-made, which gathers or carries surface water.

Section 3. Permit Procedures and Requirements

3.1. Permit Required.

No land owner or land operator shall receive any of the building, grading or other land development permits required for land disturbance activities without first meeting the requirements of this ordinance prior to commencing the proposed activity.

3.2. Application Requirements

Unless specifically excluded by this ordinance, any land owner or operator desiring a permit for a land disturbance activity shall submit to the **City of Ferndale** a permit application on a form provided for that purpose.

Unless otherwise excepted by this ordinance, a permit application must be accompanied by the following in order that the permit application be considered: a stormwater management concept plan; a maintenance agreement; and a non-refundable permit review fee.

The stormwater management plan shall be prepared to meet the requirements of Sec. 5 of this ordinance, the maintenance agreement shall be prepared to meet the requirements of Sec. 9 of this ordinance, and fees shall be those established by the **City of Ferndale**.

3.3. Application Review Fees

The fee for review of any land development application shall be based on the amount of land to be disturbed at the site, and the fee structure shall be established by the **City of Ferndale**. All of the monetary contributions shall be credited to a local budgetary category to support local plan review, inspection and program administration, and shall be made prior to the issuance of any building permit for the development.

3.4. Application Procedure

1. Applications for land disturbance activity permits must be filed with the **City of Ferndale** on any regular business day.
2. A copy of this permit application shall be forwarded to **City of Ferndale** for review
3. Permit applications shall include the following: two copies of the stormwater management concept plan, two copies of the maintenance agreement, and any required review fees.
4. Within 90 business days of the receipt of a complete permit application, including all documents as required by this ordinance, the **City of Ferndale** shall inform the applicant whether the application, plan and maintenance agreement are approved or disapproved.
5. If the permit application, stormwater management plan or maintenance agreement are disapproved, the applicant may revise the stormwater management plan or agreement. If additional information is submitted, the **City of Ferndale** shall have 90 business days from the date the additional information is received to inform the applicant that the plan and maintenance agreement are either approved or disapproved.

6. If the permit application, final stormwater management plan and maintenance agreement are approved by the **City of Ferndale**, all appropriate land disturbance activity permits shall be issued.

3.5. Permit Duration

Permits issued under this section shall be valid from the date of issuance through the date the **City of Ferndale** notifies the permitholder that all stormwater management practices have passed the final inspection required under permit condition.

Section 4. Waivers to Stormwater Management Requirements

4.1. Waivers for Providing Stormwater Management

Every applicant shall provide for stormwater management as required by this ordinance, unless a written request is filed to waive this requirement. Requests to waive the stormwater management plan requirements shall be submitted to the **City of Ferndale** for approval. The minimum requirements for stormwater management may be waived in whole or in part upon written request of the applicant, provided that at least one of the following conditions applies:

1. It can be demonstrated that the proposed development is not likely to impair attainment of the objectives of this ordinance.
2. Alternative minimum requirements for on-site management of stormwater discharges have been established in a stormwater management plan that has been approved by the **City of Ferndale** and the implementation of the plan is required by local ordinance.
3. Provisions are made to manage stormwater by an off-site facility. The off-site facility is required to be in place, to be designed and adequately sized to provide a level of stormwater control that is equal to or greater than that which would be afforded by on-site practices and there is a legally obligated entity responsible for long-term operation and maintenance of the stormwater practice.
4. The **City of Ferndale** finds that meeting the minimum on-site management requirements is not feasible due to the natural or existing physical characteristics of a site.
5. Non-structural practices will be used on the site that reduce: a) the generation of stormwater from the site, b) the size and cost of stormwater storage and c) the pollutants generated at the site. These non-structural practices are explained in detail in the current design manual and the amount of credit available for using such practices shall be determined by the **City of Ferndale**.

In instances where one of the conditions above applies, the **City of Ferndale** may grant a waiver from strict compliance with these stormwater management provisions, as long as acceptable mitigation measures are provided. However, to be eligible for a variance, the applicant must demonstrate to the satisfaction of the **City of Ferndale** that the variance will not result in the following impacts to downstream waterways:

Deterioration of existing culverts, bridges, dams, and other structures;
Degradation of biological functions or habitat;
Accelerated streambank or streambed erosion or siltation;
Increased threat of flood damage to public health, life, property.

Furthermore, where compliance with minimum requirements for stormwater management is waived, the applicant will satisfy the minimum requirements by meeting one of the mitigation measures selected by the jurisdictional stormwater authority. Mitigation measures may include, but are not limited to, the following:

- The purchase and donation of privately owned lands, or the grant of an easement to be dedicated for preservation and/or reforestation. These lands should be located adjacent to the stream corridor in order to provide permanent buffer areas to protect water quality and aquatic habitat,
- The creation of a stormwater management facility or other drainage improvements on previously developed properties, public or private, that currently lack stormwater management facilities designed and constructed in accordance with the purposes and standards of this ordinance,
- Monetary contributions (Fee-in-Lieu) to fund stormwater management activities such as research and studies (e.g., regional wetland delineation studies, stream monitoring studies for water quality and macroinvertebrates, stream flow monitoring, threatened and endangered species studies, hydrologic studies, and monitoring of stormwater management practices.

4.2. Fee in Lieu of Stormwater Management Practices.

Where the **City of Ferndale** waives all or part of the minimum stormwater management requirements, or where the waiver is based on the provision of adequate stormwater facilities provided downstream of the proposed development, the applicant shall be required to pay a fee in an amount as determined by the **City of Ferndale**.

When an applicant obtains a waiver of the required stormwater management, the monetary contribution required shall be in accordance with a fee schedule (unless the developer and the stormwater authority agree on a greater alternate contribution) established by the **City of Ferndale**, and based on the cubic feet of storage required for stormwater management of the development in question. All of the monetary contributions shall be credited to an appropriate capital improvements program project, and shall be made by the developer prior to the issuance of any building permit for the development.

4.3. Dedication of land

In lieu of a monetary contribution, an applicant may obtain a waiver of the required stormwater management by entering into an agreement with the **City of Ferndale** for the granting of an easement or the dedication of land by the applicant, to be used for the construction of an off-site stormwater management facility. The agreement shall be entered into by the applicant and the **City of Ferndale** prior to the recording of plats or, if no record plat is required, prior to the issuance of the building permit.

Section 5. General Performance Criteria for Stormwater Management

Unless judged by the **City of Ferndale** to be exempt or granted a waiver, the following performance criteria shall be addressed for stormwater management at all sites:

(A). All site designs shall establish stormwater management practices to control the peak flow rates of stormwater discharge associated with specified design storms and reduce the generation of stormwater. These practices should seek to utilize pervious areas for stormwater treatment and to infiltrate stormwater runoff from driveways, sidewalks, rooftops, parking lots, and landscaped areas to the maximum extent practical to provide treatment for both water quality and quantity.

(B). All stormwater runoff generated from new development shall not discharge untreated stormwater directly into a jurisdictional wetland or local water body without adequate treatment. Where such discharges are proposed, the impact of the proposal on wetland functional values shall be assessed using a method acceptable to the **City of Ferndale**. In no case shall the impact on functional values be any less than allowed by the Army Corp of Engineers (ACE) or the **Department of Ecology** responsible for natural resources.

(C). Annual groundwater recharge rates shall be maintained, by promoting infiltration through the use of structural and non-structural methods. At a minimum, annual recharge from the post development site shall mimic the annual recharge from pre-development site conditions.

(D). For new development, structural stormwater treatment practices shall be designed to remove the average annual post development total suspended solids load (TSS) per the adopted Stormwater Design Manual. It is presumed that a STP complies with this performance standard if it is:

- sized to capture the prescribed water quality volume (WQ_v).
- designed according to the specific performance criteria outlined in the local stormwater design manual,
- constructed properly, and
- maintained regularly.

(E). To protect stream channels from degradation, a specific channel protection criteria shall be provided as prescribed in the current stormwater manual.

(F). Stormwater discharges to critical areas with sensitive resources (i.e., cold water fisheries, shellfish beds, swimming beaches, recharge areas, water supply reservoirs) may be subject to additional performance criteria, or may need to utilize or restrict certain stormwater management practices.

(G). Certain industrial sites are required to prepare and implement a stormwater pollution prevention plan, and shall file a notice of intent (NOI) under the provisions of the National Pollutant Discharge Elimination System (NPDES) general permit. The stormwater pollution prevention plan requirement applies to both existing and new industrial sites.

(H). Stormwater discharges from land uses or activities with higher potential pollutant loadings, known as “hotspots”, may require the use of specific structural STPs and pollution prevention practices.

(I). Prior to design, applicants are required to consult with the **City of Ferndale** to determine if they are subject to additional stormwater design requirements.

(J). The calculations as found in the Stormwater Design Manual shall be used for sizing all stormwater management practices.

Section 6. Basic Stormwater Management Design Criteria

6.1. Minimum Control Requirements

All stormwater management practices will be designed so that the specific storm frequency storage volumes (e.g., recharge, water quality, channel protection, 10 year, 100 year) as identified in the current stormwater design manual are met, unless the **City of Ferndale** grants the applicant a waiver or the applicant is exempt from such requirements.

In addition, if hydrologic or topographic conditions warrant greater control than that provided by the minimum control requirements, the **City of Ferndale** reserves the right to impose any and all additional requirements deemed necessary to control the volume, timing, and rate of runoff.

6.2 Site Design Feasibility

Stormwater management practices for a site shall be chosen based on the physical conditions of the site. Among the factors that should be considered:

1. Topography
2. Maximum Drainage Area
3. Depth to Water Table
4. Soils
5. Slopes
6. Terrain
7. Head
8. Location in relation to environmentally sensitive features or ultra-urban areas

Applicants shall consult the Stormwater Design Manual for guidance on the factors that determine site design feasibility when selecting a stormwater management practice.

6.3. Conveyance Issues

All stormwater management practices shall be designed to convey stormwater to allow for the maximum removal of pollutants and reduction in flow velocities. This shall include, but not be limited to:

1. Maximizing of flowpaths from inflow points to outflow points
2. Protection of inlet and outfall structures
3. Elimination of erosive flow velocities
4. Providing of underdrain systems, where applicable

The Stormwater Design Manual shall provide detailed guidance on the requirements for conveyance for each of the approved stormwater management practices.

6.4. Pretreatment Requirements

Every stormwater treatment practice shall have an acceptable form of water quality pretreatment, in accordance with the pretreatment requirements found in the current stormwater design manual. Certain stormwater treatment practices, as specified in the Stormwater Design Manual, are prohibited even with pretreatment in the following circumstances:

A. Stormwater is generated from highly contaminated source areas known as "hotspots"

B. Stormwater is carried in a conveyance system that also carries contaminated, non-stormwater discharges

C. Stormwater is being managed in a designated groundwater recharge area.

D. Certain geologic conditions exist (e.g., karst) that prohibit the proper pretreatment of stormwater.

6.5. Treatment/Geometry Conditions

All stormwater management practices shall be designed to capture and treat stormwater runoff according to the specifications outlined in the Stormwater Design Manual. These specifications will designate the water quantity and quality treatment criteria that apply to an approved stormwater management practice.

6.6. Landscaping Plans Required

All stormwater management practices must have a landscaping plan detailing both the vegetation to be in the practice and how and who will manage and maintain this vegetation. This plan must be prepared by a registered landscape architect or soil conservation district.

6.7. Maintenance Agreements

All stormwater treatment practices shall have an enforceable operation and maintenance agreement to ensure the system functions as designed. This agreement will include any and all maintenance easements required to access and inspect the stormwater treatment practices, and to perform routine maintenance as necessary to ensure proper functioning of the stormwater treatment practice. In addition, a legally binding covenant specifying the parties responsible for the proper maintenance of all stormwater treatment practices shall be secured prior to issuance of any permits for land disturbance activities.

6.8. Non-Structural Stormwater Practices

The use of non-structural stormwater treatment practices is encouraged in order to minimize the reliance on structural practices. Credit in the form of reductions in the amount of stormwater that must be managed can be earned through the use of non-structural practices that reduce the generation of stormwater from the site. These non-structural practices are explained in detail in the current design manual and applicants wishing to obtain credit for use of non-structural practices must ensure that these practices are documented and remain unaltered by subsequent property owners.

Section 7. Requirements for Stormwater Management Plan Approval

7.1. Stormwater Management Plan Required for All Developments.

No application for development will be approved unless it includes a stormwater management plan detailing in concept how runoff and associated water quality impacts resulting from the development will be controlled or managed. This plan must be prepared by an individual approved by the **City of Ferndale** and must indicate whether stormwater will be managed on-site or off-site and, if on-site, the general location and type of practices.

The stormwater management plan(s) shall be referred for comment to all other interested agencies, and any comments must be addressed in a final stormwater management plan. This final plan must be signed by a licensed professional engineer (PE), who will verify that the design of all stormwater management practices meet the submittal requirements outlined in the Submittal Checklist found in the stormwater design manual. No building, grading, or sediment control permit shall be issued until a satisfactory final stormwater management plan, or a waiver thereof, shall have undergone a review and been approved by the **City of Ferndale** after determining that the plan or waiver is consistent with the requirements of this ordinance.

7.2. Stormwater Management Concept Plan Requirements

A stormwater management concept plan shall be required with all permit applications and will include sufficient information (e.g., maps, hydrologic calculations, etc) to evaluate the environmental characteristics of the project site, the potential impacts of all proposed development of the site, both present and future, on the water resources, and the effectiveness and acceptability of the measures proposed for managing stormwater generated at the project site. The intent of this conceptual planning process is to determine the type of stormwater management measures necessary for the proposed project, and ensure adequate planning for management of stormwater runoff from future development. To accomplish this goal the following information shall be included in the concept plan:

1. A map (or maps) indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural stormwater management and sediment control facilities. The map(s) will also clearly show proposed land use with tabulation of the percentage of surface area to be adapted to various uses; drainage patterns; locations of utilities, roads and easements; the limits of clearing and grading; A written description of the site plan and justification of proposed changes in natural conditions may also be required.

2. Sufficient engineering analysis to show that the proposed stormwater management measures are capable of controlling runoff from the site in compliance with this ordinance and the specifications of the Stormwater Design Manual.

3. A written or graphic inventory of the natural resources at the site and surrounding area as it exists prior to the commencement of the project and a description of the watershed and its relation to the project site. This description should include a discussion of soil conditions, forest cover, topography, wetlands, and other native vegetative areas on the

site. Particular attention should be paid to environmentally sensitive features that provide particular opportunities or constraints for development.

4. A written description of the required maintenance burden for any proposed stormwater management facility.

5. The **City of Ferndale** may also require a concept plan to consider the maximum development potential of a site under existing zoning, regardless of whether the applicant presently intends to develop the site to its maximum potential.

For development or redevelopment occurring on a previously developed site, an applicant shall be required to include within the stormwater concept plan measures for controlling existing stormwater runoff discharges from the site in accordance with the standards of this Ordinance to the maximum extent practicable.

7.3. Final Stormwater Management Plan Requirements

After review of the stormwater management concept plan, and modifications to that plan as deemed necessary by the **City of Ferndale**, a final stormwater management plan must be submitted for approval. The final stormwater management plan, in addition to the information from the concept plan, shall include all of the information required in the Final Stormwater Management Plan checklist found in the Stormwater Design Manual. This includes:

1. Contact Information

   The name, address, and telephone number of all persons having a legal interest in the property and the tax reference number and parcel number of the property or properties affected.

2. Topographic Base Map

   A 1" = 200' topographic base map of the site which extends a minimum of 50 feet beyond the limits of the proposed development and indicates existing surface water drainage including streams, ponds, culverts, ditches, and wetlands; current land use including all existing structures; locations of utilities, roads, and easements; and significant natural and manmade features not otherwise shown.

3. Calculations

   Hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in this ordinance. Such calculations shall include (i) description of the design storm frequency, intensity and duration, (ii) time of concentration, (iii) Soil Curve Numbers or runoff coefficients, (iv) peak runoff rates and total runoff volumes for each watershed area, (v) infiltration rates, where applicable, (vi) culvert capacities, (vii) flow velocities, (viii) data on the increase in rate and volume of runoff for the design storms referenced in the Stormwater Design Manual, and (ix) documentation of sources for all computation methods and field test results.

4. Soils Information

   If a stormwater management control measure depends on the hydrologic properties of soils (e.g., infiltration basins), then a soils report shall be submitted. The soils report shall be based on on-site boring logs or soil pit profiles. The number and location of required soil borings or soil sits shall be determined based on what is needed to determine the suitability and distribution of soil types present at the location of the control measure.

5. Maintenance and Repair Plan

   The design and planning of all stormwater management facilities shall include detailed maintenance and repair procedures to ensure their continued function. These plans will identify the parts or components of a stormwater management facility that need to be maintained and the equipment and skills or training necessary. Provisions for the periodic review and evaluation of the effectiveness of the maintenance program and the need for revisions or additional maintenance procedures shall be included in the plan.

6. Landscaping plan

   The applicant must present a detailed plan for management of vegetation at the site after construction is finished, including who will be responsible for the maintenance of vegetation at the site and what practices will be employed to ensure that adequate vegetative cover is preserved. This plan must be prepared by a registered landscape architect or by the soil conservation district.

7. Maintenance Easements

   The applicant must ensure access to all stormwater treatment practices at the site for the purpose of inspection and repair by securing all the maintenance easements needed on a permanent basis. These easements will be recorded with the plan and will remain in effect even with transfer of title to the property.

8. Maintenance Agreement

   The applicant must execute an easement and an inspection and maintenance agreement binding on all subsequent owners of land served by an on-site stormwater management measure in accordance with the specifications of this ordinance.

9. Erosion and Sediment Control Plans for Construction of Stormwater Management Measures. The applicant must prepare an erosion and sediment control plan for all construction activities related to implementing any on-site stormwater management practices.

10. Other Environmental Permits

    The applicant shall assure that all other applicable environmental permits have been acquired for the site prior to approval of the final stormwater design plan.

7.4. Performance Bond/Security

The **City of Ferndale** may, at its discretion, require the submittal of a performance security or bond prior to issuance of a permit in order to insure that the stormwater practices are installed by the permit holder as required by the approved stormwater management plan. The amount of the installation performance security shall be the total estimated construction cost of the stormwater management practices approved under the permit, plus 25%. The performance security shall contain forfeiture provisions for failure to complete work specified in the stormwater management plan.

The installation performance security shall be released in full only upon submission of "as built plans" and written certification by a registered professional engineer that the stormwater practice has been installed in accordance with the approved plan and other applicable provisions of this ordinance. The **City of Ferndale** will make a final inspection of the stormwater practice to ensure that it is in compliance with the approved plan and the provisions of this ordinance. Provisions for a partial pro-rata release of the performance security based on the completion of various development stages can be done at the discretion of the **City of Ferndale**.

Section 8. Construction Inspection

8.1. Notice of Construction Commencement

The applicant must notify the **City of Ferndale** in advance before the commencement of construction. Regular inspections of the stormwater management system construction shall be conducted by the staff of the **City of Ferndale** or certified by a professional engineer or their designee who has been approved by the jurisdictional stormwater authority. All inspections shall be documented and written reports prepared that contain the following information:

1. The date and location of the inspection;
2. Whether construction is in compliance with the approved stormwater management plan
3. Variations from the approved construction specifications
4. Any violations that exist

If any violations are found, the property owner shall be notified in writing of the nature of the violation and the required corrective actions. No added work shall proceed until any violations are corrected and all work previously completed has received approval by the **City of Ferndale**.

8.2. As Built Plans

All applicants are required to submit actual “as built”plans for any stormwater management practices located on-site after final construction is completed. The plan must show the final design specifications for all stormwater management facilities and must be certified by a professional engineer. A final inspection by the **City of Ferndale** is required before the release of any performance securities can occur.

8.3. Landscaping and Stabilization Requirements

Any area of land from which the natural vegetative cover has been either partially or wholly cleared or removed by development activities shall be revegetated within ten (10) days from the substantial completion of such clearing and construction. The following criteria shall apply to revegetation efforts:

Reseeding must be done with an annual or perennial cover crop accompanied by placement of straw mulch or its equivalent of sufficient coverage to control erosion until such time as the cover crop is established over ninety percent (90%) of the seeded area.

Replanting with native woody and herbaceous vegetation must be accompanied by placement of straw mulch or its equivalent of sufficient coverage to control erosion until the plantings are established and are capable of controlling erosion.

Any area of revegetation must exhibit survival of a minimum of seventy-five percent (75%) of the cover crop throughout the year immediately following revegetation. Revegetation must be repeated in successive years until the minimum seventy-five percent (75%) survival for one (1) year is achieved.

In addition to the above requirements, a landscaping plan must be submitted with the final design describing the vegetative stabilization and management techniques to be used at a site after construction is completed. This plan will explain not only how the site will be stabilized after construction, but who will be responsible for the maintenance of vegetation at the site and what practices will be employed to ensure that adequate vegetative cover is preserved. This plan must be prepared by a registered landscape architect or by the soil conservation district, and must be approved prior to receiving a permit.

Section 9. Maintenance and Repair of Stormwater Facilities

9.1. Maintenance Easement

Prior to the issuance of any permit that has a stormwater management facility as one of the requirements of the permit, the applicant or owner of the site must execute a maintenance easement agreement that shall be binding on all subsequent owners of land served by the stormwater management facility. The agreement shall provide for access to the facility at reasonable times for periodic inspection by the **City of Ferndale**, or their contractor or agent, and for regular or special assessments of property owners to ensure that the facility is maintained in proper working condition to meet design standards and any other provisions established by this ordinance. The easement agreement shall be recorded by the **City of Ferndale** in the land records.

9.2. Maintenance Covenants

Maintenance of all stormwater management facilities shall be ensured through the creation of a formal maintenance covenant that must be approved by the **City of Ferndale** and recorded into the land record prior to final plan approval. As part of the covenant, a schedule shall be developed for when and how often maintenance will occur to ensure proper function of the stormwater management facility. The covenant shall also include plans for periodic inspections to ensure proper performance of the facility between scheduled cleanouts.

The **City of Ferndale**, in lieu of an maintenance covenant, may accept dedication of any existing or future stormwater management facility for maintenance, provided such facility meets all the requirements of this chapter and includes adequate and perpetual access and sufficient area, by easement or otherwise, for inspection and regular maintenance.

9.3. Requirements for Maintenance Covenants

All stormwater management facilities must undergo, at the minimum, an annual inspection to document maintenance and repair needs and ensure compliance with the requirements of this ordinance and accomplishment of its purposes. These needs may include; removal of silt, litter and other debris from all catch basins, inlets and drainage pipes, grass cutting and vegetation removal, and necessary replacement of landscape vegetation. Any maintenance needs found must be addressed in a timely manner, as determined by the **City of Ferndale**, and the inspection and maintenance requirement may be increased as deemed necessary to ensure proper functioning of the stormwater management facility.

9.4. Inspection of Stormwater Facilities

Inspection programs may be established on any reasonable basis, including but not limited to: routine inspections; random inspections; inspections based upon complaints or other notice of possible violations; inspection of drainage basins or areas identified as higher than typical sources of sediment or other contaminants or pollutants; inspections of businesses or industries of a type associated with higher than usual discharges of contaminants or pollutants or with discharges of a type which are more likely than the typical discharge to cause violations of state or federal water or sediment quality standards or the NPDES stormwater permit; and joint inspections with other agencies inspecting under environmental or safety laws. Inspections may include, but are not limited to: reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in drainage control facilities; and evaluating the condition of drainage control facilities and other stormwater treatment practices.

9.5. Right-of-Entry for Inspection

When any new drainage control facility is installed on private property, or when any new connection is made between private property and a public drainage control system, sanitary sewer or combined sewer, the property owner shall grant to the **City of Ferndale** the right to enter the property at reasonable times and in a reasonable manner for the purpose of inspection. This includes the right to enter a property when it has a reasonable basis to believe that a violation of this ordinance is occurring or has occurred, and to enter when necessary for abatement of a public nuisance or correction of a violation of this ordinance.

9.6. Records of Installation and Maintenance Activities.

Parties responsible for the operation and maintenance of a stormwater management facility shall make records of the installation and of all maintenance and repairs, and shall retain the records for at least 20 years. These records shall be made available to the City of Ferndale during inspection of the facility and at other reasonable times upon request.

9.7 Failure to Maintain Practices

If a responsible party fails or refuses to meet the requirements of the maintenance covenant, the **City of Ferndale**, after reasonable notice, may correct a violation of the design standards or maintenance needs by performing all necessary work to place the facility in proper working condition. In the event that the stormwater management facility becomes a danger to public safety or public health, the **City of Ferndale** shall notify the party responsible for maintenance of the stormwater management facility in writing. Upon receipt of that notice, the responsible person shall have 45 days to effect maintenance and repair of the facility in an approved manner. After proper notice, the **City of Ferndale** may assess the owner(s) of the facility for the cost of repair work and any penalties; and the cost of the work shall be a lien on the property, or prorated against the beneficial users of the property, and may be placed on the tax bill and collected as ordinary taxes by the county.

Section 10. Enforcement and Penalties.

10.1. Violations

Any development activity that is commenced or is conducted contrary to this Ordinance, may be restrained by injunction or otherwise abated in a manner provided by law.

10.2. Notice of Violation.

When the **City of Ferndale** determines that an activity is not being carried out in accordance with the requirements of this Ordinance, it shall issue a written notice of violation to the owner of the property. The notice of violation shall contain:

(1) the name and address of the owner or applicant;
(2) the address when available or a description of the building, structure or land upon which the violation is occurring;
(3) a statement specifying the nature of the violation;
(4) a description of the remedial measures necessary to bring the development activity into compliance with this Ordinance and a time schedule for the completion of such remedial action;
(5) a statement of the penalty or penalties that shall or may be assessed against the person to whom the notice of violation is directed;
(6) a statement that the determination of violation may be appealed to the municipality by filing a written notice of appeal within fifteen (15) days of service of notice of violation.

10.3. Stop Work Orders

Persons receiving a notice of violation will be required to halt all construction activities. This "stop work order" will be in effect until the **City of Ferndale** confirms that the development activity is in compliance and the violation has been satisfactorily addressed. Failure to address a notice of violation in a timely manner can result in civil, criminal, or monetary penalties in accordance with the enforcement measures authorized in this ordinance.

10.4. Civil and Criminal Penalties

In addition to or as an alternative to any penalty provided herein or by law, any person who violates the provisions of this Ordinance shall be punished by a fine of not less than Dollars ($500) or by imprisonment for a period not to exceed 7 days, or both such fine and imprisonment. Such person shall be guilty of a separate offense for each day during which the violation occurs or continues.

10.4. Restoration of lands

Any violator may be required to restore land to its undisturbed condition. In the event that restoration is not undertaken within a reasonable time after notice, the **City of Ferndale** may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

10.5. Holds on Occupation Permits

Occupation permits will not be granted until corrections to all stormwater practices have been made and accepted by the **City of Ferndale**.

Approved by: _____ Date _____

References

Collins, A. , D. Walling, and G. Leeks. 1997. Source Type Ascription for Fluvial Suspended Sediment Based on a Quantitative Composite Fingerprinting Technique. Catena, 29: 1-27

MacRae, C. 1993. An alternate design approach for the control of instream erosion potential in urbanizing watersheds. pp. 1086-1091. In proceedings of the Sixth International Conference on Urban Storm Drainage. Niagra Falls, Ontario. Marsalek and Torno (eds.)

Maine Dept. of Environmental Protection (MDEP). 1992. Phosphorus Control in Lake Watersheds: A Technical Guide to Evaluating New Development. Augusta, Maine.

Maryland Department of the Environment (MDE). 2000. Maryland Stormwater Design Manual. Baltimore, MD.

Neller, 1988. A comparison of Channel Erosion in Small Urban and Rural Catchments, Armidale, New South Wales. Earth Surface Processes and Landforms, 13(1): 1-7

Tapley, T, W. Jenkins and R. Gardner. 1996. Managing Stormwater Runoff: A New Direction. pp. 864-866. Proceedings of Watershed '96. Water Environment Federation.

United States Environmental Protection Agency. 1993. Guidance Specifying Management Measures for Sources if Nonpoint Pollution in Coastal Waters. EPA 840-B-92-002. USEPA, Office of Water, Washington, D.C.

United States Department of Agriculture (USDA). Natural Resources Conservation Service (NRCS). 1986. Technical Release 55: Urban Hydrology for Small Watersheds, 2nd Edition. Washington, D.C.

Walling, D. E. and J.C. Woodward. 1995. Tracing Sourcs of Suspended Sediment in River Basins: A Case Study of the River Culm, Devon, UK. Marine and Freshwater Research, 46: 324-336.

Appendix B
Proposed Dumping and Illicit Discharge Ordinance

Illicit Discharge Definition:

(1). Scope. This section shall apply to all water generated on developed or undeveloped land under the City of Ferndale's jurisdiction.

(2). Prohibition of illicit discharges. It is unlawful for any person to discharge either directly or indirectly, any organic or inorganic matter into the storm and surface water system that may cause or tend to cause water pollution, including but not limited to the following:

- trash or debris;
- construction materials;
- petroleum products including but not limited to oil, gasoline, grease, fuel oil, heating oil;
- antifreeze and other automotive products;
- metals in either particulate or dissolved form;
- flammable or explosive materials;
- radioactive material;
- batteries;
- acids, alkalis, or bases;
- paints, stains, resins, lacquers or varnishes;
- degreasers and solvents;
- drain cleaners;
- pesticides, herbicides or fertilizers;
- steam cleaning wastes;
- washing of fresh concrete for cleaning and/or finishing purposes or to expose aggregates;
- soaps, detergents or ammonia;
- swimming pool backwash;
- chlorine, bromine and other disinfectants;
- heated water;
- domestic animal wastes;
- sewage;
- recreational vehicle waste;
- animal carcasses;
- food wastes;
- bark and other fibrous materials;
- collected lawn clippings, leaves or branches;
- silt, sediment or gravel;
- dyes, except as stated in subsection C.1. of this section;
- chemicals not normally found in uncontaminated water;

- any hazardous material or waste not listed above.

The commencement, conduct or continuance of any non-stormwater discharge to the municipal separate storm sewer system is prohibited except uncontaminated discharges from the following sources:

- Potable water;
- Potable water line flushing;
- Uncontaminated water from crawl space pumps or footing drains;
- Lawn watering with potable water or collected rainwater;
- Materials placed as part of an approved habitat restoration or bank stabilization project;
- Natural uncontaminated surface water or ground water;
- Flows from riparian habitats and wetlands;
- The following discharges from boats: engine exhaust; cooling waters; effluent from sinks; showers and laundry facilities; and treated sewage from Type I and Type II marine sanitation devices;
- Diverted stream flows,
- Groundwater infiltration to storm drains,
- Pumped groundwater,
- Air conditioning condensation,
- Springs,
- Non-commercial washing of vehicles, recreational vehicles, and boats,
- Swimming pools (if dechlorinated - typically less than one PPM chlorine),
- Fire fighting activities, and
- Any other uncontaminated water source.
- Discharges specified in writing by the City of Ferndale as being necessary to protect public health and safety.
- Dye testing is an allowable discharge if the City of Ferndale has so specified in writing.

(3). Pavement washing prohibited. In addition to the prohibitions listed, washing of public or private streets and parking areas is not permitted unless all of the following conditions are met:

- No other feasible alternative exists to remove the undesirable material; and
- Prior written utility approval is obtained from the Public Works Director; and
- Facilities are provided to treat the wash water runoff and affected drainage facilities are cleaned.

(4). Prohibition of illicit connections. Any connection identified by the Public Works Director that could convey anything not composed entirely of surface and storm water directly to surface and storm water or ground water is considered an illicit connection and is prohibited with the following exceptions:

- connections conveying allowable discharges;
- connections conveying discharges pursuant to an NPDES permit, other than an NPDES storm water permit, or a State Waste Discharge Permit; and
- connections conveying effluent from onsite sewage disposal systems to subsurface soils.

This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

(5). Reduction of stormwater pollutants by the use of best management practices. Any person responsible for a property or premises, which is, or may be, the source of an illicit discharge, is required to implement, at the person's expense, the BMP's necessary to prevent the further discharge of pollutants to the municipal separate storm sewer system. Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of stormwater associated with industrial activity, to the extent practicable, shall be deemed compliance with the provisions of this section.

(6). Notification of spills. Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting in, or may result in, illicit discharges or pollutants discharging into surface and storm water or ground water, the person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials the person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, the person shall notify the City of Ferndale in person or by telephone or facsimile no later than the next business day. Notifications in person or by telephone shall be confirmed by written notice addressed and mailed to the City of Ferndale within three (3) business days of the telephone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least thee (3) years.

(7). Emergency response activities. Actions that must be undertaken immediately or within a time too short to allow full compliance with this ordinance in order to avoid an imminent threat to public health or safety shall be exempt from this section. The Public Works Director by public rule may specify actions that qualify for this exception in city procedures. A person undertaking emergency response activities shall take steps to ensure that the discharges resulting from such activities are minimized. In addition, this person shall evaluate BMPs and the site plan, where applicable, to restrict recurrence.

Illicit Discharge Enforcement:

(1). Enforcement authority. The Public Works Director or their designees shall have the authority to issue notices of violation and citations, and to impose the civil penalties provided in this section.

The Public Works Director shall initially rely on education and informational assistance as much as possible to gain compliance with this ordinance, unless the Public Works Director determines

a violation is a result of a flagrant act that should be addressed through immediate penalties or poses a hazard to human health or welfare.

(2). Notification of violation. Whenever the Public Works Director finds that any permittee or any other person discharging stormwater has violated or is violating this ordinance or a permit or order issued hereunder, the Public Works Director may serve upon such person written notice of the violation. Within ten (10) days of this notice, an explanation of the violation and a plan for the satisfactory correction and prevention thereof, to include specific required actions, shall be submitted to the Public Works Director. Submission of this plan in no way relieves the discharger of liability for any violations occurring before or after receipt of the notice of violation.

(3). Hazards. Whenever the Public Works Director determines that any violation of this ordinance poses a hazard to public health, safety, or welfare; endangers any property; or adversely affects the safety and operation of city right-of-way, utilities, and/or other property owned or maintained by the city; the person holding title to the subject property, and/or other person or agent in control of said property, upon receipt of notice in writing from the Public Works Director shall within the period specified therein address the cause of the hazardous situation in conformance with the requirements of this ordinance.

Notwithstanding any other provisions of this ordinance, whenever it appears to the Public Works Director that conditions covered by this ordinance exist requiring immediate action to protect the public health and/or safety, the Public Works Director is authorized to enter at all times in or upon any such property, public or private, for the purpose of inspecting and investigating such emergency conditions. The Public Works Director may without prior notice order the immediate discontinuance of any activity leading to the emergency condition. Failure to comply with such order shall constitute a misdemeanor.

Illicit Discharge Penalties:

(1). Violations. The enforcement provisions for water quality are intended to encourage compliance with this ordinance. To achieve this, violators will be required to take corrective action and comply with the requirements of this ordinance, and may be required to pay a civil penalty for the redress of ecological, recreational, and economic values lost or damaged due to their unlawful action.

(2). Penalties. The provisions in this section are in addition to and not in lieu of any other penalty, sanction or right of action provided by law. Any person who, through an act of commission or omission, aids or abets in a violation shall be considered to have committed the violation for the purposes of the civil penalty. Any person in violation of this ordinance shall be subject to civil penalties assessed as follows:

- An amount reasonably determined by the Public Works Director to be equivalent to the economic benefit the violator derives from the violation as measured by: the greater of the resulting increase in market value of the property or business value received by the

violator, or savings of construction or retrofitting costs realized by the violator performing any act in violation of this ordinance; and

- An amount, not less than one hundred dollars ($100.00) and not more than five thousand dollars ($5,000.00) per day for each day of violation, that is reasonably based upon the nature and gravity of the violation and the cost to the city of enforcing this ordinance
- Payment of a monetary penalty pursuant to this ordinance does not relieve the person of the duty to correct the violation.

(3). Multiple violators. In the event more than one person is determined to have violated the provisions of this ordinance, all applicable civil penalties may be imposed against each person, and recoverable damages, costs, and expenses may be allocated among the persons on any equitable basis. Factors that may be considered in determining an equitable allocation include:

- Awareness of the violation;
- Ability to correct the violation;
- Ability to pay damages, costs, and expenses;
- Cooperation with government agencies;
- Degree of impact or potential threat to water or sediment quality, human health, or the environment.

(4). Measuring civil penalties. Each violator is jointly and severally liable for a violation of this ordinance. The Public Works Director may take enforcement action, in whole or in part, against any violator. The decisions whether to take enforcement action, what type of action to take, and which person to take action against, are all entirely within the Public Works Director's discretion. Factors to be used in taking such enforcement actions shall be:

- Awareness of the violation;
- Ability to correct the violation;
- Cooperation with government agencies;
- Degree of impact or potential threat to water or sediment quality, human health, or the environment.
- Whether the civil penalty imposed will be a substantial economic deterrent to the illegal activity;
- The economic benefit gained by the violator;
- Any unusual or extraordinary enforcement costs incurred by the municipality;
- The amount of penalty established by ordinance or resolution for specific categories of violations; and
- Any equities of the situation which outweigh the benefit of imposing any penalty or damage assessment.

(5). Reduction of penalties. Penalties may be reduced based upon one or more of the following mitigating factors:

- The person responded to city attempts to contact the person and cooperated with efforts to correct the violation;

- The person showed due diligence and/or substantial progress in correcting the violation; or
- An unknown person was the primary cause of the violation.

(6). Recovery of damages and costs. In addition to the civil penalty in subsection (4) above, the municipality may recover all damages proximately caused by the violator to the municipality, which may include any reasonable expenses incurred in investigating violations of, and enforcing compliance with, this ordinance, or any other actual damages caused by the violation.

(7). Other remedies. The municipality may bring legal action to enjoin the continuing violation of this ordinance, and the existence of any other remedy, at law or equity, shall be no defense to any such actions.

(8). Remedies cumulative. The remedies set forth in this section shall be cumulative, not exclusive, and it shall not be a defense to any action, civil or criminal, that one (1) or more of the remedies set forth herein has been sought or granted.

(9). Use of funds. All civil penalties recovered during the enforcement of this ordinance shall be deposited into a fund of the stormwater utility and shall be used for the protection of surface and storm water or ground water as set forth in this ordinance, through education or enhanced implementation.