VI. Management Standards and Implementation Program

A. General

To accomplish the goals and policies stated in Chapter III and to address the problems identified in Chapter V, the WMP proposes several programmatic, non-structural, and structural solutions. While many of the standards and solutions are interrelated, they are arranged in sections below to facilitate quick reference. The implementation of the programs and projects shown below should be coordinated to the greatest extent possible with city, county, regional, and state programs and projects.

The SWWD implementation program includes standards, programs, and projects. The general approach used by the SWWD is to emphasize the use of programmatic approaches such as standards and programs to address the important issues and prevent problems from occurring in the watershed. The use of watershed standards and programs provides an effective framework to minimize public capital expenditures and is consistent with Goal 6 of the WMP. In some cases projects are also needed to address the issues and problems that exist or that may occur in the future.

Prioritizing each component of the watershed~~=~~s implementation program is a difficult process. In order to ensure effective implementation of the WMP as described in Goal 8, the SWWD will conduct a biennial review of the priorities of the ~~watershed=s~~watersheds standards, programs, and projects. The biennial review will also serve to update the capital projects every two years as required by law in 103B.205 Subdivision 3. The review will be conducted by the TAC first with its recommendations forwarded on to the CAC and finally submitted to the Board of Managers for any action needed.

To be consistent with the ~~watershed=s~~watersheds emphasis on programmatic approaches over projects where possible, the overall priority will be, in ~~decending~~descending order of importance:

- ~~X~~Ensure standards are in place and are being implemented.
- ~~X~~Begin implementation of programs.

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- ~~X~~ Implement identified projects and evaluate need for additional projects.

While the above priorities give an overall framework, the ~~watershed=s~~watersheds approach will be flexible enough to respond to the various issues that the watershed is aware of. Therefore there will be concurrent implementation of standards, programs, and projects as needed. For example, all the programs identified are important and will be implemented as soon as practically possible.

B. Watershed Standards and Their Implementation

The SWWD standards will eventually be implemented by the member cities once they have their Local Plans approved and adopted unless the cities specify otherwise. Member cities that do not yet have Local Plans in place may assume authority to implement the SWWD standards if the member city has adopted the necessary local official controls to implement the standards. For cities implementing standards without their Local Plans, the SWWD will review the local official controls to ensure their ability to implement the SWWD standards before delegating the authority to member cities.

In the interim when standards must be enforced before Local Plans or approved local official controls are in place, the SWWD will adopt rules consistent with its WMP and implement the standards. The standards will be implemented through the review of development plans in coordination with the cities= review. The SWWD review will require that each site reviewed must meet the most restrictive standards for the downstream ~~waterbodies~~water bodies to which it drains. While this may be conservative, until there is a comprehensive analysis and approach developed through the Local Plan the most restrictive standards of the downstream ~~waterbodies~~water bodies will apply. A variance to the interim implementation of the standards will be considered by the Board in the case of undue hardship on a land owner or if a comprehensive analysis and approach is developed for a given area by the SWWD.

By statute, member cities operating under approved Local Plans have the authority and responsibility to implement the standards presented here in the WMP. The SWWD will conduct an annual review of conformance of implementation of the SWWD standards. The annual review will consist of a preliminary review by the TAC which will be presented to the CAC. The CAC will make recommendations to the SWWD Board on the adequacy of the present regulatory controls and their

implementation. If the review demonstrates that standards are not being implemented by a member city or cities the SWWD will take the necessary administrative actions to implement the standards or amend the standards in the WMP.

1. Water Quantity Standards

Water quantity standards are established to preserve a minimum level of protection from flooding to the citizens within the watershed. As required by law, the WMP must establish allowable peak discharge rates at key locations within the watershed. Allowable peak flow rates are based on the 24-hour, 100-year rainfall event unless otherwise noted. The peak flow rates are based on a large-scale watershed model which has incorporated more detailed, local hydrologic/hydraulic modeling where available. The locations chosen for the designation of peak flow rates are based on topography for hydrologic reasons and local jurisdictions for implementation reasons. Table VI-1 briefly describes the locations and the allowable peak flow rates. The AFlow Mgm=t No.≅ in Table VI-1 refers to the numbers shown on Map 1 at the back of the WMP.

The SWWD requires that ponding areas be designed so as to provide a minimum of two feet of freeboard from the 100-year high water level to the lowest opening of a structure.

Table VI-1. Allowable Peak Flow Rates for Full Development [1]

Flow Mgm't No.	Location [2]	Allowable Peak Flow (cfs)
1	At Co.Rd. 13 between 10th Street and 4th Street - Flow from Oakdale to Lake Elmo	135
2	At Co.Rd. 13 and 4th Street - Flow from Oakdale to Lake Elmo	220
3	At I-94 - Flow from Oakdale and Lake Elmo to Woodbury	35 [3]
4	At Co.Rd. 15, just south of Co.Rd. 18 (Bailey Rd.) - Flow from Afton to Woodbury	20
5	At Co.Rd. 15 just north of Dale Road - Flow from Afton to Woodbury	18
6	At outlet of proposed Pond CD-P86 - Flow from north half of Watershed to Mississippi River	150[5] ~~170~~ [3]
7	At Cottage Grove/Woodbury border west of Woodlane Drive - Flow from Woodbury to Cottage Grove	11 [3]
8	At Cottage Grove/Woodbury border between Woodlane and Tower Dr. - Flow from Woodbury to Cottage Grove	12 [3]
9	At Mississippi River near wastewater treatment plant - Flow from Cottage Grove and Woodbury to Mississippi River	1670 [4]
10	At Mississippi River due south of Kimbro Ave. - Flow from Cottage Grove to Mississippi River	270 [4]

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[1] Based on 24-hour, 100-year rainfall event.
[2] Locations are shown on Map 1, Summary Map.
[3] Further review will take place during implementation of projects identified in the WMP.
[4] There may be additional flow, depending on the recommendations of the Central Draw Outlet Study.

5 The SWWD supports a Bailey Lake lift station capacity of 150 cfs, further investigation of the downstream timing of flows will be required to ensure adequate downstream capacity, and to extent possible, eliminate mixing of local and regional flow. .

The most important quantity issues facing the watershed in the near future are high peak flows coming from the far northern portion of the watershed under I-94 into Woodbury~~=~~s existing system, the outlet for stormwater from the northern half of the watershed through Cottage Grove to the Mississippi River, and inter-community flows in the West Draw. The flow rates shown include locations where further analysis will be done as SWWD projects are being implemented (see footnote 3 of Table VI-1) and flow rates may be modified in the future during further analysis when more information is available. If the flow rates are changed in the future, modifications to infrastructure installed based on these flow rates will be the responsibility of the SWWD.

2. Lakes and Mississippi River Water Quality Standards

To manage the quality of runoff to the lakes and Mississippi River in the watershed, several systems of standards for water quality are available. The options for defining water quality standards include establishing target runoff concentrations, target pollutant loads to waterbodies (typically phosphorus), in-lake target pollutant concentrations (phosphorus), or developing desired use categories. The SWWD will use a combination of these types of standards for the lakes and Mississippi River for long-term management goals.

The traditional stormwater treatment option is wet detention ponding, which is usually fairly effective. In addition, there are other effective Best Management Practices (BMPs) that can be used, such as infiltration practices, grass swales, vegetated buffer strips, as well as many others that are discussed later in Section 4.

To determine the appropriate level of treatment for an area or development, the guiding parameter will be the downstream waterbody and its pretreatment requirements. Designating a performance standard at the downstream waterbody gives flexibility to the communities to implement the necessary improvements to meet those standards. As long as the treatment requirements for any water bodies in the drainage system have been addressed before reaching the waterbody, the water

quality improvement system can be designed in any fashion that accomplishes the overall standard for the waterbody.

In addition to specific SWWD standards, the DNR's floodplain and shoreland policies must be addressed by all the member cities. Those cities that do not have a DNR approved floodplain or shoreland ordinance must develop one as soon as possible. A copy of the DNR-approved floodplain and shoreland ordinance should be included in the Local Plan, as well as other applicable water and land resource ordinances.

Lake and River Classification

Management standards vary for each waterbody depending on its expected best use and its potential to sustain that use. The historic data for the lakes in the watershed is fairly scarce. The expected uses for the lakes are based on limited data and user perceptions. The following management strategy is intended as a starting point. Once lake water quality trends are better established with continued data collection, and the public value of the waterbodies is better defined, the management standards can be adjusted to reflect the better understanding of the lakes and their value to the watershed.

The standards identified here are intended to be consistent with DNR, Met Council, and MPCA guidelines to the extent practical. The MPCA has water quality standards for all waters of the state which are contained in Minnesota Rules Chapter 7050. The MPCA standards do not specifically address phosphorus, but as described later in this section, all water quality management approaches used to meet SWWD standards on phosphorus must also address other pollutants associated with stormwater. Adjustment of standards in the future will be coordinated with the cities, DNR, Met Council, and MPCA.

The watershed lakes were categorized in order to set standards for the various lakes. The standards are based on what is appropriate to the hydrologic setting of the lake and what meets the

requirements of the lake to maintain its public and natural value. The categorization was based on current water quality conditions, adjacent natural habitat, lake depth, public use of the lakes, past condition of the lakes, and current and planned size of the subwatershed draining to the lake. The three categories are **priority, concern,** and **stormwater,** in order from highest to lowest need for protection.

Priority lakes are defined as those that will support a quality fishery as well as serve as high quality recreation lakes for boating and aesthetics. **Concern** lakes are those that may support some fishery but are also well suited for supporting wildlife, aesthetic enjoyment, and boating or other special purpose uses. **Stormwater** lakes are those that are limited in their ability to support a sustained quality fishery due to depth and contributing subwatershed size and are best suited for flood control, aesthetic viewing, limited recreation, and wildlife habitat. Stormwater 1 lakes may have some potential for limited fisheries due to their depth. Stormwater 2 lakes have limited fisheries potential and only with intensive management primarily due to their shallow depths.

For **priority** lakes, the immediate need is to stop degradation of the lakes by limiting nutrient loads to the lakes and maintaining or improving adjacent natural areas for aesthetic and wildlife purposes. The long-term goal is to meet an in-lake target phosphorus concentration through watershed and in-lake projects, with the ultimate goal of maintaining its values.

For **concern** lakes, the immediate need is to stop or slow degradation of the lake by limiting nutrient concentrations of the incoming stormwater and maintaining or improving adjacent natural areas for aesthetic and wildlife purposes. The long-term goal is to limit phosphorus loads to the lake depending on land use and the geomorphology of the lake and its drainage area and potentially carry out in-lake treatments as needed to maintain special uses of the lake.

For **stormwater** lakes, the immediate need is to minimize the aesthetic impairment of the lake by treating incoming stormwater and maintaining adjacent natural areas for aesthetic and wildlife

purposes. The long-term goal for the lakes is to limit the incoming stormwater concentration to at least predevelopment levels if not below.

Management Standards

Table VI-2 summarizes the category for each lake and the stormwater runoff performance standards for each lake as well as the Mississippi River. The in-lake target concentration will be based on an average value using the summertime averages (May through September) for the last four years of data. The stormwater runoff loads and concentrations will be based on water quality modeling results using SWWD-approved modeling techniques that estimate annual average phosphorus loads and concentrations including consideration of soluble forms of pollutants especially phosphorus.

The removal of other pollutants such as sediments, heavy metals, and organics usually has a strong correlation to phosphorus removal, with sediments and heavy metals in particular having higher average removals than phosphorus. While phosphorus is the primary target pollutant, the other pollutants encountered in stormwater must also be effectively treated by the BMPs used. Any management scheme that addresses only phosphorus and fails to effectively control other pollutants is not acceptable. Special circumstances that justify a variance from this requirement will be considered by the SWWD on a case-by-case basis.

Concentration of pollutants is important in flow-through aquatic systems. Rivers, streams, and lakes with low hydraulic residence times are most impacted by high inflow concentrations of pollutants. In lakes with long hydraulic residence times, pollutant loadings are more significant to the waterbody's health and level of water quality impact due to stormwater. Loadings are important in this case because the lakes can serve as a sink for pollutants, especially phosphorus, which will be cycled through the aquatic system and settle out onto the lake's bottom. The buildup of pollutants on the lake bottom can serve as a source and be recycled back into the water column thus compounding the pollution problem.

Table VI-2. Waterbody Management Standards

Lake/River	Lake Mgm~~=~~t Category	Phosphorus Target Standard	Target Use
Armstrong	Concern	Maximum of 75% above Predevelopment Annual Loads	Waterfowl and wildlife habitat, aesthetics
Wilmes-North	Stormwater 1	10% below Predevelopment Runoff Concentrations	Waterfowl and wildlife habitat, some fishery
Wilmes-South	Stormwater 2	Predevelopment Runoff Concentrations	Aesthetics, waterfowl and wildlife habitat
Markgrafs	Concern	Maximum of 75% above Predevelopment Annual Loads	Waterfowl and wildlife habitat, some fishery, aesthetics
Powers	Priority	Maximum In-lake Concentration of 28 ppb	Quality fishery, recreation, boating
Colby	Stormwater 2	Predevelopment Runoff Concentrations	Aesthetics, waterfowl and wildlife habitat
Bailey	Stormwater 1	10% below Predevelopment Runoff Concentrations	Waterfowl and wildlife habitat, aesthetics, some fishery
Gables	Concern	Maximum of 75% above Predevelopment Annual Loads	Wildlife habitat
Regional Park	Concern	Maximum of 75% above Predevelopment Annual Loads*	Wildlife and waterfowl habitat
Mississippi River	Not Applicable	10% below Predevelopment Runoff Concentrations	Wildlife and waterfowl habitat, fishery, recreation

* Target must be reevaluated if the outlet for the north half of the watershed flows through this lake.

Predevelopment = (natural watershed conditions), which is assumed to correspond to a phosphorus runoff concentration of 200 ppb.
ppb = parts per billion (unit of concentration)

Wilmes Lake North currently demonstrates fairly good water quality, but its quality is expected to decline under its expanded, full-development watershed, based on Woodbury~~=~~s 1994 Surface Water Management Plan. The SWWD would like to collaborate with the City of Woodbury to maintain the water quality of the lake as high as possible including exploring potential fisheries management.

Implementation of Standards

The SWWD will adopt the water quality standards presented in the WMP for the lakes within the watershed as part of its rules. The SWWD expects the cities will adopt water quality standards at least as restrictive as the SWWD standards as part of their local plan. The water quality standards of cities will be reviewed and if the municipal standards are as restrictive or more restrictive the enforcement would be the responsibility of the cities.

Refer to the beginning of Section B for interim implementation of standards. Once a city has adopted an SWWD-approved Local Water Management Plan (Local Plan), the implementation of the water quality standards will be the responsibility of the city, unless desired otherwise by the city. Annual review of enforcement of the standards will be the role of the SWWD. If the local controls are being implemented, but are not sufficient to attain the standards in Table VI-2, the SWWD will evaluate the need for additional efforts in order to meet the standards or amend the WMP to include revised standards that are appropriate to the waterbody.

For existing developments, the WMP~~=~~s standards must be addressed in the Local Plan by prioritizing retrofitting improvements to the drainage system. Redevelopment must be addressed in the Local Plan with an overall strategy that will meet the above standards in Table VI-2.

All drainage to the Mississippi River, a regional resource, must be treated to a less than predevelopment concentration to fulfill the goals of the watershed to minimize impacts to the River. In the case of Powers Lake, further study is needed to identify how the in-lake concentration in Table VI-2 can be maintained over time. The standards for the other lakes are based on limited monitoring data and thus the standards establish a framework for controlling future impacts to watershed waterbodies. Eventually, with more monitoring data, it is hoped that in-lake target concentrations or other appropriate parameters, consistent with their special use category can be established. The lake assessment study identified in the WMP will provide an opportunity to evaluate and amend, if necessary, the standards for the lakes in the watershed.

3. Wetland Standards

The SWWD will focus its management efforts first on the wetlands outside the existing Metropolitan Urban Service Area (MUSA) of the cities within the watershed. Focusing on wetlands outside the 1996 MUSA first, allows the SWWD to target those basins with the greatest potential for protection with the least cost. However, an Urban Management Category is also used to address those wetlands inside the MUSA that provide significant benefits to urban quality of life. Most of the land within the MUSA has already been platted in Oakdale, Cottage Grove, and Woodbury limiting the ability to easily control impacts to wetlands within the MUSA. Wetland systems that straddle the current MUSA boundary may be included in the management scheme for wetlands outside the MUSA on a case-by-case basis, subject to the SWWD Board~~=~~s approval, and only for those areas not already platted at the time of WMP adoption.

The goal of these management standards is to provide a tailored management scheme for wetlands based on their functional values. Not all wetlands require the same degree or type of protection. The protection strategies set up for each wetland depend on the wetland's role in the watershed. A wetland~~=~~s function of retaining and cleaning stormwater is an important one in this watershed where surface outlets often do not exist. Accordingly, the SWWD requires that for all wetland impact in the watershed that require mitigation, the mitigation wetlands must be replaced in the SWWD.

All wetlands in the watershed will be provided the protection that federal and state laws require. The protection standards presented in this WMP are in addition to state and federal requirements. The protection strategies implemented by the SWWD deal primarily with water quality treatment of stormwater prior to entering the wetland and vegetative buffer strips around wetlands. Wetlands that have characteristics that can only be protected by limiting inundation by stormwater will be reviewed on a case-by-case basis. These wetlands will be evaluated to determine if they meet the noteworthiness functional value and require water quantity controls such as limiting bounce and duration of inundation. The protection requirements are discussed below.

Water Quality Pretreatment Needs

Increased pollutant loads to wetlands, especially nutrients and sediments, are a significant contributing factor to the degradation of diverse wetland systems. Some provision for water quality treatment before stormwater discharges into wetlands must be addressed. Since phosphorus is an important nutrient and pollutant and is related to the removal of other contaminants, stormwater pretreatment requirements for phosphorus of different levels is required for different wetlands depending on their needs to preserve their functional value.

In order to preserve those systems that still possess significant wildlife habitat, noteworthiness, ecological integrity, or fish habitat value, a stricter standard based on phosphorus loads is required. As discussed for lakes, wetlands can serve as nutrient sinks, thus loads become important rather than just concentration. Increased nutrient loadings can effect the plant community of a wetland and therefore a more restrictive total loadings standard is needed for Protect and Manage 1 wetlands. This is important since the wetland~~=~~s functional value is highly dependent on the plant community.

The wetland systems that provide educational potential, visual/aesthetic benefits, groundwater use potential, or urban quality of life values require some pretreatment to continue to function well. Therefore, a concentration based standard is required.

For those wetlands whose primary functional value is flood control or removal of sediments and nutrients, little or no pretreatment is required. Therefore, no standards are needed so long as state and federal regulations are observed.

Wet detention ponding along with other BMPs can be used to accomplish the pretreatment requirements of the interim standards given in Table VI-3.

Buffer Strips

A wetland buffer strip is a naturally vegetated area that surrounds a wetland and reduces negative impacts to wetlands from adjacent development. The establishment of a buffer around the wetland recognizes that the quality and function of the wetland is in many cases related to the upland areas

around it. While we may draw lines around ("delineate") a particular area as a "wetland" or "buffer" for regulation or classification purposes, in reality these areas function together and have important ties and interrelationships. These interrelationships, such as the movement of water, sediment, nutrients, plants, and the activities of animals and people, affect the functions of the wetland and how well it is able to fulfill the services or functions we associate with it.

The need for the existence and extent of wetland buffers is related to the functions that wetlands perform. As discussed in Chapter IV, wetlands perform a variety of functions. Buffers which are primarily put in place to filter sediments and nutrients from sheet flow of stormwater runoff can be narrower in width than buffers which are needed for wildlife habitat. Wildlife habitat functions require a larger buffer to accommodate feeding, roosting, breeding, nesting, and rearing of young, as well as cover for safety, movement, and thermal protection.

Assessment Methods and Management Standards

A description of the New Hampshire Method along with example data sheets is given in Appendix F. Eight of the 14 functional values described in the New Hampshire method were used by the SWWD. Table VI-3 shows the interim wetland requirements of the watershed until the functional values inventory of all the wetlands and management plan (discussed later in this chapter) is complete.

Table VI-3. Interim Wetland Assessment and Management Standards

Management Category	Wetland Functional Value	Minimum Score Required *	Buffer Strip (feet)	Stormwater Phosphorus Pretreatment Requirement
Protect	Wildlife habitat **	0.8	100	Maximum of 75% above Predev. loads or diversion
	Noteworthiness **	0.-5	25-100	Max of 75% above Predev. loads or diversion
Manage 1	Ecological integrity **	0.5	50	Maximum of 75% above Predev. loads
	Fish habitat **	0.7	50	Maximum of 75% above Predev. loads
Manage 2	Educational potential	0.6	25	Maximum of Predev. concentrations
	Visual/aesthetic quality	0.8	25	Maximum of Predev. concentrations
	Groundwater use potential	0.8	25	Maximum of Predev. concentrations
Urban Management	Urban quality of life	0.7	0 - 25	Maximum of Predev. concentrations

Predev. = Predevelopment (natural watershed conditions)

* Determined by the New Hampshire Method.

** These wetlands are considered High Priority Wetlands as defined in Minnesota Statutes 103B.231Subd. 6(a) 6 and described in Minnesota Rules 8420.0350 Subp.2, providing tax exempt status for these wetlands.

The Urban Management category applies to areas where urban development has already occurred around wetlands, namely, inside the MUSA. The buffer and pretreatment standards shown in Table VI-3 for the Urban Management category are goals that should be addressed for areas not yet developed around wetlands and for any redevelopment around wetlands that meet this category.

If a wetland does not meet any of the standards of the functional value classification, it will not receive additional protection, but will continue to be protected under the existing state and federal regulations. Of the wetlands inventoried and evaluated for the WMP, several did not score sufficiently high to warrant additional protection by the SWWD. Not all categories provided for in the New Hampshire Method were used for the wetlands evaluated by the SWWD.

Implementation of Standards

All wetlands in the watershed are subject to the requirements shown in Table VI-3. For those wetlands outside the 1996 MUSA (see Map 1) the Protect, Manage 1, and Manage 2 categories will be applied. For those wetlands inside the 1996 MUSA (see Map 1) the Urban Management category is the goal. Those wetlands that meet the numeric criterion of other functional values inside the MUSA will be managed according to the Urban Management category.

Refer to the beginning of Section B for interim implementation of standards. The requirements apply when a conversion in land use is proposed and is submitted to the City during the platting process or redevelopment of areas within the current MUSA. The functional evaluation of wetlands will be done by the SWWD until the wetland management plan is finalized as identified in the SWWD's projects.

Each wetland will be managed according to the most restrictive functional value category for which the wetland equals or exceeds the required score shown in Table VI-2, except those inside the 1996 MUSA, which will be managed by the Urban Management category. Incorporation of the wetlands meeting the above management criteria into the drainage system should not alter the wetland~~=~~s hydrologic regime to the extent that the wetland would no longer meet its functional value.

Wetland buffers are not to be graded or cleared of vegetation during site development unless to remove an undesirable plant community and replace it with a more desirable native plant community. Buffers should only be altered by home or business owners upon approval by the LGU. Modifying the buffer by planting native plant or tree species is permissible upon LGU approval. The SWWD

will develop a list of native plant species for buffer strip modification to guide LGUs in authorizing changes to the buffer strip. Plant species can be added to the list by the SWWD as needed. Wetland buffers must be clearly monumented during the site development process and be visible to land owners in order for residents to be aware of the buffer.

The buffer strip width is measured perpendicularly out from the wetland~~=~~s delineated boundary. The buffer strip width is an average width that must be maintained. Actual buffer strip width can vary in order to preserve higher quality adjacent areas and to accommodate site restrictions. However, the buffer strip width should not be less than 25% of the required width at any point in the buffer. The SWWD will adopt in its rules a variance procedure to be used by landowners when the wetland buffer requirements become overly burdensome. In all cases, an effort will be made to preserve the functional value of the wetland.

Compliance with water quality standards should be addressed as described in the previous section ALakes and Mississippi River Water Quality Standards≅ under the Management Standards heading. Ideally the issue of compliance will be addressed during the development and review of the Local Plan by the SWWD.

Wetlands which have been ranked as Urban Quality of Life or Noteworthiness wetlands shall be reviewed by the Watershed's Technical Advisory Committee (TAC) for appropriate buffer and water quality treatment requirements. This committee will provide recommendations, based on the guidelines in TableVI-3, on buffer strip and stormwater pretreatment requirements to the SWWD Board. The SWWD Board will consider the recommendations and make a decision on the specific requirements for these wetlands.

Wetland Replacement Areas

The SWWD supports the goal of establishing a greenway through the watershed. In order to promote and enhance the greenway, the areas identified on the Greenway and Natural Features Map at the back of the report that have hydric soils and are along a greenway corridor are priority potential wetland replacement sites. The cities as LGUs are encouraged to direct project proponents proposing wetland mitigation to place the replacement wetlands along the designated greenway corridor when on-site replacement is of lesser ecological value. Any wetlands established within the greenway will receive High Priority Wetland status and thus receive a tax exemption.

For all created and restored wetlands required for mitigation of SWWD - identified wetlands that are in a management category, each mitigation wetland must provide the equivalent buffer and stormwater pretreatment of the impacted wetland.

4. Best Management Practices (BMPs) for Water Quality and Quantity

Pollution source control is one of the most effective and sustainable methods of improving and maintaining water quality. Source control of pollutants starts with a good public education program. The cities are encouraged to develop a pollution prevention public education program in coordination with the SWWD. The SWWD will distribute at least two educational newsletter per year to all the residents in the watershed. Education efforts with the cities will be coordinated by obtaining water quality public information materials from appropriate governmental and non-government agencies and placing these materials in each city~~=~~s kiosk. These materials will be available for mailings as announced in the newsletters.

BMPs that are encouraged by the SWWD as effective at accomplishing the water quality performance standards are, in descending order of preference:

~~X~~• erosion and sediment control,

~~X~~• on-site infiltration practices,

~~X~~• wet detention ponds and constructed wetlands,

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- ~~X~~• grass swales,
- ~~X~~• street sweeping,
- ~~X~~• vegetative buffer strips,
- ~~X~~• fertilizer and pesticide application restrictions,
- ~~X~~• pet waste control ordinances, and
- ~~X~~• porous pavement.

This does not represent an exhaustive list and other BMPs are encouraged to be used assuming supporting information is available to demonstrate their effectiveness. Public education is also a very effective tool to utilize in targeting specific water quality problems, issues, and cultural practices.

The presence of a serious risk from ~~soluable~~soluble pollutants will require a careful application of the BMPs listed above. Preventing ~~soluable~~soluble pollutants from entering the system is a top priority due the difficulty of controlling ~~soluable~~soluble pollutants. Preventing the soluable pollutants from being released can best be addressed with education and ordinances or restrictions. Use of constructed wetlands or other biologically-active treatment systems should also be used to treat stormwater with soluable pollutants.

On-site infiltration practices are a means of controlling water quality and quantity problems and are strongly recommended. They include when linked with control of soluable pollutants practices such as (i.e. using ordinance/restrictions on fertilizers and pesticides):

- ~~X~~• parking lot islands as combination filter strips and infiltration points,
- ~~X~~• infiltration trenches, and
- ~~X~~• local ordinances requiring drainage from impervious areas (i.e., rooftops and parking lots) be directed to vegetated, pervious areas.

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The best example of the latter is an ordinance which requires homeowners to direct household gutter downspouts onto lawns or other vegetated areas instead of onto driveways that lead directly to street storm sewers. Care must be taken that vegetated areas are properly sized and configured so as not to create local erosion problems. The infiltration practices are intended to be emphasized in areas where the soils, geology, land use, and proximity to potable water wells are appropriate to accommodate infiltration. Map 3, the Infiltration Management Map, shows areas where infiltration practices are best suited and those areas where it may not be appropriate or may require special design considerations.

The infiltration management classes on Map 3 are provided to enable cities to tailor infiltration techniques to the site. Limitations on using infiltration as a BMP would be land use type and proximity to wells. Industrial land use may not be compatible with infiltration depending on the types of pollutants that are present.

Use of **wet detention ponds and constructed wetlands** is also encouraged as a cost effective, low maintenance method of controlling a wide range of urban pollutants. Wet ponding provides for removal of sediments, nutrients, and heavy metals attached to sediments. Biological uptake of pollutants, especially nutrients, can and should be encouraged by using pond designs that maximize the available shallow vegetative areas while maintaining the needed wet volume. Constructed wetlands for nutrient and pollutant removal are encouraged as ~~a~~an alternative for traditional open-water, wet detention ponds especially where ~~soluable~~soluble pollutants are a significant problem.

The use of ponds in series such as 2-cell and 3-cell ponds with vegetated divisions are also encouraged as an effective pond treatment system. Wet detention ponds should at least be designed to meet NURP removal or equivalent standards. See the MPCA~~=~~'s AProtecting Water Quality in Urban Areas~~=~~ or the Metropolitan Council's "Interim Strategy to Reduce Non-point Source Pollution to all Metropolitan Waterbodies" as a reference unless it is addressed in a Local Plan that meets SWWD standards. Ponds must be maintained by the City, unless otherwise provided for by agreement. Maintenance of ponds must be addressed in the local water plan of each City.

All wet detention ponds must include:

- ~~X~~• a vegetated fringe or aquatic bench with gradual slopes of typically 10:1 for the first foot or two of depth for nutrient uptake and safety reasons; the bench must be covered with topsoil to support the vegetation,
- ~~X~~• access to the detention pond to provide for future maintenance and sediment removal,
- ~~X~~• depths that are between four and ten feet (shallower depths for wetlands is acceptable),
- ~~X~~• a hydraulically efficient shape and configuration (calculations of removal efficiencies should be adjusted to account for only those portions of the pond that are hydraulically included in the pond=s flow pattern), and
- ~~X~~• skimming structures for commercial/industrial areas and for the last ponds within a ponding system that discharge to lakes, DNR protected wetlands, and Protect, Manage 1, and Manage 2 wetlands (see Table VI-3).

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Ponds that slowly drain due to infiltration are encouraged, especially in those areas shown on the Infiltration Management Map as appropriate for infiltration. Sealing of pond bottoms should not be a standard practice and is only needed in areas where groundwater contamination is a concern. Aesthetic and safety issues must be addressed with the residents in the area to provide a suitable pond design that serves the pond~~=~~s water quality function including infiltration while blending into the neighborhood's landscape.

Use of infiltration structural controls such as infiltration basins or trenches are encouraged but only when the site and target pollutants are appropriate and a maintenance program is established. Design of the infiltration basin should include pretreatment to settle out fine particles and should consider the basin~~=~~s effectiveness as a wet detention pond in case the basin seals in the future and cannot be corrected.

C. Watershed Programs

The SWWD has developed a set of programs to address several of the significant issues in the watershed. The programs represent an on-going, non-structural effort to identify future issues and problems, prevent problems from occurring, and evaluate the effectiveness of the various efforts to address problems in the watershed. The programs reflect the priorities developed by the CAC in the SWWD~~=~~'s Goals and Policies.

The five programs that will be implemented by the SWWD are shown in Table IV-4. The programs typically address several aspects of the SWWD~~=~~'s activities including water quantity, water quality, and natural resources.

Table VI-4. Watershed Programs

Program #	Program Title
1	Water Quality and Quantity Monitoring
2	Public Education
3	Groundwater Monitoring and Protection
4	Erosion and Sediment Control
5	Interim Review of Development Plans

1. **Water Quality and Quantity Monitoring**

The SWWD has begun implementing a surface water monitoring program to address water quality and quantity issues. The monitoring program will be a coordinated effort between the cities and state and regional agencies. The overall goal of the monitoring program is to document the current status of the watershed~~=~~'s water quality and evaluate the effectiveness of City and SWWD~~=~~'s programs. The program will also aid in evaluating proposed and future projects, including discharges to the Mississippi River.

The specific goals of the SWWD water quality monitoring program are:

- ~~X~~ To determine average annual total phosphorus (TP), total nitrogen (TN), and total suspended solids (TSS) loadings to the Mississippi River,
- ~~X~~ To determine the TP, TN, and TSS loading contribution of the major drainage areas of the watershed at jurisdictional boundaries,
- ~~X~~ To assess the level of contamination in stormwater of toxic substances.
- ~~X~~ To assess ambient water quality conditions in the watershed~~=~~s lakes, and
- ~~X~~ To evaluate the effects of stormwater infiltration on groundwater quality and quantity.

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To accomplish these goals, the SWWD shall establish a stormwater monitoring network. The monitoring network will measure flows and TP, TN, and TSS concentrations on an on-going basis. Periodical sampling for toxic substances such as heavy metals, pesticides, and bioaccumulation substance such as mercury. The stormwater monitoring network will be phased in as needed to measure stormwater events at four points in the watershed. The first two stations have been installed to monitor storm events from the subwatersheds coming from north of I-94 and into Bailey Lake. In the future, as the stormwater flows become significant in the two major draws that enter the Mississippi River in the south, additional stations will be installed at these locations. Currently, these two draws appear to have only minimal, very local flows. As the drainage systems are expanded for the urbanizing areas, the two draws will experience regional flows which will require monitoring of the draws at that time.

Lake water quality monitoring of most lakes is presently carried out by the City of Woodbury through the Metropolitan Council~~=~~s ACitizen-Assisted Monitoring Program~~=~~ (CAMP). The City of Oakdale will be encouraged to monitor Armstrong Lake. The City of Cottage Grove will be encouraged to monitor Gables Lake and the Regional Park Lake. The City of Woodbury will be encouraged to monitor Bailey Lake. If the cities do not monitor these lakes and land use or drainage

changes are planned in their contributing watersheds, then the SWWD will coordinate monitoring of the lakes.

The monitoring program includes flow monitoring. The flow monitoring will be used and potentially expanded to collect data on water quantity. The water quantity data will be used specifically to develop options for the Central Draw Outlet study.

As monitoring data becomes available, the SWWD will evaluate the data to estimate the effectiveness of the cities and ~~SWWD=s~~SWWD's ~~acitivites~~activities. Additional monitoring may be needed as the SWWD programs evolve. Any additional monitoring will be coordinated with state and regional agencies.

2. Public Education

The SWWD public education program is intended to raise the awareness of the citizens of the watershed about water quality and natural and water resource issues as well as water quantity issues. The goal of the program is to inform residents about the direct and indirect impacts they have on the water quality of the ~~watershed=s~~watersheds waterbodies as well as on regional resources such as the Mississippi River. As part of the educational program, information on the role and activities of the watershed district will be disseminated.

To accomplish the goal of the public education program, the SWWD will distribute at least two educational ~~newsletter~~newsletters annually to all the residents in the watershed. In addition, water quality public information materials will be collected from appropriate agencies and put in each ~~city=s~~city's kiosk as well as being available for mailings as announced in the newsletters. The SWWD has established a phone line to inform callers about SWWD meetings and activities and record the comments and suggestions of callers. The SWWD will hold special meetings and use local media to inform residents about specific issues and projects on an as-needed basis.

The SWWD will also require each city to inform its residents annually regarding local water and natural resources related projects and the status of programs that address water or natural resources protection. The cities are required to coordinate with the SWWD to periodically distribute pertinent information on how residents can participate in maintaining and enhancing the quality of their water and natural resources.

The SWWD will coordinate with local schools to develop environmental and water quality education learning centers to enhance the experiential learning process for school children. The projects should include outdoor settings for studying water and natural resources. The SWWD will continue to coordinate efforts to establish an outdoor learning center at the wetlands on the new Oakdale Elementary-Middle School site in School District 622, between 10th and 15th Streets in Oakdale. The site has several quality wetlands with diverse wetland types within a short distance of each other and represents the headwaters of the watershed. The SWWD will also coordinate at least two additional outdoor education projects at school sites in the watershed to be coordinated with the greenway plan.

3. Groundwater Monitoring and Protection

The majority of the ~~watershed=s~~watersheds shallow groundwater resources have been identified as sensitive to contamination. The need to prevent potentially contaminated water from impacting the groundwater must be balanced with the need to replenish the aquifers with recharge water. Accordingly, measures outlined in this section must be prudently implemented to manage our surface water and groundwater resources simultaneously. This section outlines monitoring and protection measures that will be taken to ensure protection of the groundwater.

The SWWD intends to follow the general recommendations given in the draft Washington County Groundwater Management Plan. In order to protect the groundwater resources of the watershed, the following lists of specific programs will be implemented by the SWWD and coordinated with the cities and appropriate agencies. The SWWD will reevaluate and amend this portion of this program as necessary once the Washington County Groundwater Management Plan is adopted.

Wells and Water Supply Protection

- ~~3~~ Encourage wellhead protection planning for all public supply wells and require the cities to provide a copy of the plan in their Local Plan.
- ~~3~~ Coordinate with cities in implementing their wellhead protection plans
- ~~3~~ Complete an inventory of unused, unsealed wells; feedlots; drywells; injection wells; old solid waste disposal areas; storage tanks; and permitted discharge points using the Potential Contaminant Source Inventory (PCSI).
- ~~3~~ Periodically review status of known contamination site remediation systems
- ~~3~~ Share information with the cities and the county on groundwater protection efforts
- ~~3~~ Establish a monitoring network of existing wells to sample semi-annually
- ~~3~~ Encourage the proper sealing of all unused, unsealed wells according to Minnesota Statutes Chapter 103I which includes their repair/reuse or sealing by a licensed contractor or under certain conditions obtain an annual maintenance permit from the MDH.

Commercial and Industrial Practices Monitoring

- ~~3~~ Ensure that all hazardous waste generators have emergency spill response plans
- ~~3~~ Encourage BMPs for salt storage (contact the MPCA for BMPs)

Appropriate Sewage Treatment and Waste Disposal

- ~~3~~ Ensure cities adopt state standards (MN Rules Ch 7080) for septic system construction and maintenance
- ~~3~~ Assist local and state officials in notifying septic system owners and service providers of the April 1, 1996 requirements for all systems to be inspected by a licensed or qualified inspector.

Surface Water - Groundwater Interconnection Awareness

- ~~3~~ Identify surface water bodies that are connected to the water table system
- ~~3~~ Evaluate effects of stormwater infiltration on groundwater flow system

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- ~~∃~~ Use groundwater sensitivity analyses as an aid in decision-making

4. Erosion and Sediment Control

The erosion and sediment control needs of the watershed are primarily programmatic in nature. The existing policies and standards of the MPCA and the cities are mostly adequate. The problem of implementation must be addressed. However, the SWWD will require that the BMPs identified in the MPCA standards as well as those identified by the SWWD apply to all grading and exposed soils for new development. Local plans must develop approaches to regulate redevelopment. The cities must demonstrate that they have an Erosion Control Inspector/Specialist or appropriate personnel to adequately inspect grading and construction sites to assure conformance with MPCA and city standards. The Erosion Control Inspector/Specialist would serve the following roles:

- ~~X~~• Provide guidance on restoration and maintenance.
- ~~X~~• Inspect active projects for routine erosion control.
- ~~X~~• Provide Apunch lists≅ to contractors.
- ~~X~~• Review grading plans.
- ~~X~~• Inspect sites upon submittal of permit termination notices.
- ~~X~~• Inspect seeding and mulching applications during restoration periods.
- ~~X~~• Ensure adherence to MPCA and city permit conditions.
- ~~X~~• Provide a visible presence and be accessible to contractors.

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In addition to MPCA regulations, the SWWD will emphasize preventing erosion from occurring at the source by requiring:

- ~~X~~• All exposed soils, excluding roadways, must be restored (seed and mulch or sod) or mulch protection provided within 14 days of being disturbed or by MPCA deadlines which ever is sooner. Contractors shall phase construction and schedule multiple restoration events as necessary.
- ~~X~~• All construction sites with more than one acre of exposed soil entering the winter season shall restore or protect those areas.

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- Dormant seed and mulch will be required on areas where grading activities are completed after October 1. Areas where grading is not completed by winter, but is to continue promptly the following spring, will be covered by a heavy coat of straw mulch. The Contractor must schedule restoration work difficult to complete.
- Each city shall develop an erosion and sediment control ordinance and incorporate erosion and sediment control standards into the building inspection process and ensure that vegetative cover or comparable protection is established before a lot is certified by the city.

Annual review of the adequacy of the cities= enforcement procedures will be carried out by the TAC with the results presented to the Board of Managers. The measure of success of the program will be that MPCA and local erosion and sediment control permits and policies are being implemented and are being enforced consistently across the watershed. If the erosion and sediment control program is not functioning properly, the SWWD will require that copies of the MPCA=s NPDES stormwater permit inspection logs and notices of permit applications and terminations be sent to the SWWD monthly. The SWWD will assist the cities in locating and training Erosion Control Inspectors/Specialists. The SWWD will also develop a map identifying soils that are prone to erosion and will develop a model ordinance for cities to use as a guide.

5. Interim Review of Development Plans

After the WMP is approved and adopted and watershed rules are developed, but before the member cities= local plans are approved and adopted, there will be an interim period when the SWWD=sSWWD□s standards must be implemented by the watershed. The implementation of standards involves reviewing development plans to verify compliance with the SWWD=sSWWD□s standards. The SWWD standards include water quantity, water quality, and wetland standards. The review of development plans will be coordinated to the extent possible with the cities= normal review process.

D. Watershed Projects

The SWWD has identified nine projects to be implemented during the time frame of this WMP. The projects include issues in water quantity, water quality, and natural resources.

The criteria considered in determining the need for SWWD involvement in a project are:

- ~~X~~ Consistent with the SWWD Goals and Policies and is not being addressed at the local level.
- ~~X~~ Intercommunity flow issues.
- ~~X~~ Effects regionally significant resources, e.g., lakes, Mississippi River.
- ~~X~~ State-mandated programs.
- ~~X~~ Requests from local government(s) for SWWD involvement.
- ~~X~~ Activities more effectively and efficiently implemented on a watershed scale.

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The process to implement watershed projects will vary based on the type of project, size of project, public interest in the project, and timing requirements of the project. In all cases, public involvement in the planning and implementation of the projects is a key goal of the watershed as described in Goal 5, Chapter III. Likewise, providing an efficient and effective project implementation process that minimizes public capital expenditures is a goal of the watershed as described in Goal 6, Chapter III.

The following process will be used as a model to accomplish the above mentioned goals for implementing capital improvements in the watershed.

- Identify potentially affected interests (PAIs) and form a Study Advisory Committee (SAC) (if necessary).
- Address project specific issues:
  - Project need
  - Role of responsible government units
  - Project approach and goals
  - Input from the public and PAIs
  - Innovative financing alternatives

- Preliminary Feasibility Study coordinated with appropriate advisory committee(s) to define feasible alternatives for further analysis; must address the following issues:
  - Project service areas or affected areas
  - Technically feasible options
  - Social issues
  - Environmental issues
  - Financing options
  - Coordination with other units of government or organizations
- Board selects a project alternative and financing method
- Amend the WMP (if necessary) to include the selected alternative and financing method
  - Amendment Review by local units of government, the County, the Met Council, and state review agencies (if necessary)
  - Public Meeting
  - Review Amendment and modify (if necessary)
  - Adoption by the SWWD Board
- Final Feasibility Study and conduct environmental review and draft permitting
- Public Hearing on the project
- Final recommendation to the Board
- Public Hearing on the project
- Board approval of the project
- Design and Permitting for the Project
- Implement/construct the Project

The following is a list and description of the SWWD projects.

1. Central Draw Outlet Study

The SWWD has identified potential flood damages in the central draw. The flooding estimates developed thus far have assumed no infiltration during the critical runoff event (spring snow melt).

The assumption of no infiltration is based on two factors. First, the occurrence of the runoff event is assumed to occur in spring on frozen ground conditions which raises doubts if or when the frozen ground in the ponding areas would be capable of infiltrating significant amounts of water. The second factor is that the literature on infiltration and input from two reviewing agencies, the MPCA and the Met Council, indicate that over time infiltration basins tend to seal up and infiltration rates are reduced significantly.

Preliminary investigations of options such as storage, treatment for reuse, and an outlet to the Mississippi River have been examined. The various alternatives are discussed in this section. An ultimate structural solution is not yet being proposed at this time since the analysis is still at a preliminary level. Additional detailed studies of the particular hydrologic characteristics of the watershed, in particular the infiltration and management options, will be examined during the Central Draw Outlet Study.

The Central Draw Outlet Study will be coordinated with the cities' current update of their comprehensive plans to define the ultimate drainage area or service area for the central draw and to develop phasing alternatives for any needed improvements. The potential for phasing in a solution to prevent flooding could provide a less costly solution.

Another aspect of the Central Draw Outlet Study will be to evaluate possible financing alternatives for a future project that are equitable and do not put a significant burden on residents of the watershed. Important aspects of the financing approach are:

- ~~X~~ Developer area charges.
- ~~X~~ Equitable payments for residents over the life of the project.
- ~~X~~ Rural-sensitive.
- ~~X~~ Build up funds for operation, maintenance, and future repairs.
- ~~X~~ Potentially assume responsibility for the intercommunity trunk facilities in the Central Draw

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A description of the development of the current drainage system and a summary of the preliminary findings regarding storage, treatment, and outlet options is described below.

The existing improvements to Bailey Lake by the City of Woodbury include a lift station that can pump stormwater into a large depression west of Bailey Lake South known as CD-P85. The water can overflow from CD-P85 into a series of depressions collectively known as CD-P86. CD-P86 crosses the Woodbury-Cottage Grove municipal boundary. At the point that the stormwater enters CD-P86, the project involves an intercommunity flow of water. With a fully developed watershed and little infiltration, significant flows are anticipated into CD-P86 during large storm events. The possibility of significant flows has required the SWWD to examine the need for an outlet or other projects to accommodate the stormwater flows in order to prevent flooding.

~~The SWWD will consider assuming maintenance and upgrade responsibilities through ownership or joint powers agreement of the Bailey Lake Lift Station if requested to do so. Assuming responsibility for the Bailey Lake Lift Station would include taking on all future costs associated with the lift station. The future costs would include capacity upgrades, operation, maintenance, and replacement of pumps and controls. The SWWD would look to obtain CD-P85 from Woodbury and would acquire additional land around CD-P85 (buffer area) if necessary to ensure the basin=s continued use as an infiltration area.~~

Estimating the exact time the project is needed is difficult to specify since it is hard to estimate the infiltration capacities within several areas in Woodbury such as in Pond CD-P85 and CD-P86, which have not operated as infiltration basins extensively yet. Another factor is that some drainage areas are currently isolated or landlocked.

There are no documented observations of water levels in CD-P85 or CD-P86, nor have these areas been subject to anything other than local flows which are relatively small. However, it is assumed for the immediate future that a cumulative 25 cfs of infiltration will occur in the system. It is also

assumed that a few major drainage areas will continue to be partially or totally landlocked within the watershed for the near future, but that will ultimately drain to CD-P86. As described in Chapter V, based on these assumptions, once full development of the existing MUSA areas in the ~~subwatershed~~sub watershed occurs, a 100-year rainfall event would slightly exceed the storage and infiltration capacity of CD-P85 and CD-P86. For a 100-year snowmelt event with the existing drainage area, the flooding would be significant effecting may residences and causing environmental impacts.

To better quantify the uncertainties of the timing of a project the SWWD will conduct a thorough study of the infiltration characteristics of the drainage system and examine frozen ground runoff in order to define if the construction of an outlet is necessary and when. In addition, phasing opportunities will be further explored to ascertain if the financial burden of the project can be reduced. The timing of the project will be defined based on the findings of this study.

In order to allow time for public participation and local input and for the required analysis and environmental and regulatory reviews, it is necessary to begin the study as soon as possible within the framework of the WMP and the funding limitations of the watershed district.

To address the environmental concerns of the project, the Central Draw Outlet Study will likely identify the need for an Environmental Assessment Worksheet (EAW). The EAW would address the environmental effects of the future project, including groundwater issues. The EAW should help provide a design solution that will minimize the environmental impacts of the future projects. Once the EAW is submitted, the Regional Governmental Unit will review the EAW and receive public comments and make a determination as to whether a more in-depth Environmental Impact Statement (EIS) is necessary.

Several storage, treatment, and outlet scenarios were investigated for the anticipated excess stormwater, based on the 100-year, 24-hour rainfall event and the 10-day runoff event. The 24-hour

event is based on 6.0" of rainfall and the SCS~~=5~~ Type II rainfall distribution. The 10-day runoff event is an evenly distributed 7.2" of runoff on frozen ground.

All outlet options would include coordination with City, County and Regional improvements. City improvements could include road construction/re-construction, storm sewer installation, and park and open space improvements. County improvements could include future expansion of Co.Rd. 19, linear parks, and possible work in the Regional Park. Regional improvements may include MCES~~=~~s installation of a sanitary sewer interceptor or School District facilities improvements.

The potential alternatives that were investigated are listed below:

(1.) **Complete Storage** of all the stormwater.

(2.) **Treatment** of all the stormwater for reuse as potable water.

(3.) **Bypass the Regional Park** with a piped conveyance system along County Road 19 by:

- (a) pumping,
- (b) deep gravity pipe.

(4.) **Through the Regional Park** with a piped conveyance system for the first portion and then open channel through the Regional Park for the second portion with

- (a) pumping along County Road 19 until discharging to a channel
- (b) deep gravity pipe along County Road 19 until discharging to a channel
- (c) connecting Gables Lake, East Cottage Grove Wetland, and the ravine in the Regional Park with a deep gravity pipe system and discharging to a channel in the Regional Park.

(5.) **Upgrading** the existing gravity storm drainage system and open channel through Cottage Grove's eastern system.

All discharge options (Alternatives 3, 4, and 5) utilize open channel flow from T.H. 10 and 61 to the Mississippi River with Alternatives 3 and 4 utilizing the easterly drainageway in Sections 26, 27, 34, and 35 and Alternative 5 utilizing the westerly drainageway in Sections 21, 27, 28, and 34.

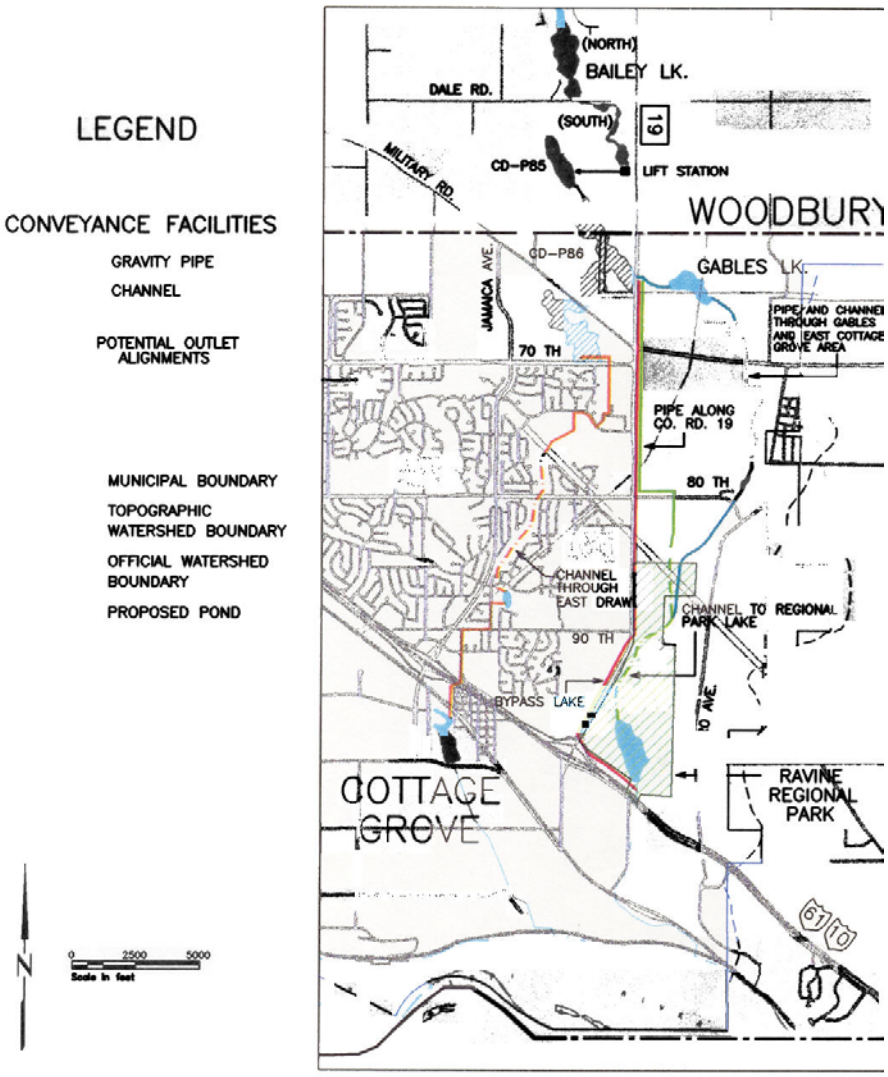
Figure VI-1 shows the alignments of the various outlet options. A discussion of each alternative is presented below numbered in the order given above.

Alternatives 3, 4, and 5 all include storage of the stormwater in CD-P85 and CD-P86, which includes area to the southwest along Military Road. The storage is needed to maximize ponding for peak flow control and to provide infiltration capacity for the stormwater. Infiltration is especially important in smaller, more frequent storms to minimize the volume of water and pollutants that reach downstream waterbodies including the Mississippi River. The ponding area CD-P85 and CD-P86 would include a 100 to 150-foot setback from the HWL in order to maintain the areas as infiltration basins. The setback can also be used in the development of the greenway (see later in this chapter) and used for parks and outdoor recreation.

While infiltration currently occurs in CD-P85 and presumably in CD-P86 and will be encouraged during normal operation in the future, the long-term outlook for infiltration is not certain. The assumption of minimal infiltration was used for initial sizing of the outlet facilities. Assumed low infiltration is based on the problematic long-term performance of infiltration basins nationwide per discussions with the MPCA and Metropolitan Council, and possible frozen ground conditions during a snowmelt event.

Figure V1-1 shows the outlet alignment alternatives considered. The following is a description of each alternative considered.

(1.) Complete Storage of the runoff for the 100-year design event would require construction of a basin, since the existing topography does not possess a basin of the required size. Infiltration was considered as an option for managing the stormwater coming through the system. The required size of the basin, if one assumes a 15.5 foot average depth which would require significant excavation, would be approximately one square mile or 640 acres. This area would cover an entire section of land, limiting the ~~land-s~~landσ potential uses in the future.



POTENTIAL CENTRAL DRAW OUTLET CONVEYANCE ALTERNATIVES

SOUTH WASHINGTON WATERSHED DISTRICT FIGURE VI–

WATERSHED MANAGEMENT PLAN

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Bonestroo Rosene Anderlik & Associates

~~Fig~~

~~ure VI-1 SE Trunk alignment (8-1/2 x 11) (Color)~~

Releasing the stored water before the next storm occurs is a problem that must be resolved. Using infiltration as the sole outlet for this storage area is a concern since the long-term reliability of infiltration is not well documented. Infiltration basins appear to gradually seal themselves over several years in many sites in the United States. Two agencies familiar with infiltration practices, the MPCA and the Metropolitan Council, were consulted on the infiltration issue and they both strongly recommended against using infiltration as the primary or only outlet for a major watershed of this size. Also of concern is the fact that the 10-day runoff event would occur on frozen ground conditions. With frozen ground there may be little or no infiltration capacity in the basins for some time. Based on these factors, the approach of infiltrating all the stormwater with no other outlet appears to be a risky long-term solution.

(2.) Treatment of all the stormwater for reuse as potable water was also investigated. First reuse as irrigation water on adjacent farms was examined, but does not appear feasible. The surrounding farms have invested in pump and irrigation systems and do not need the water, especially during very wet periods, such as after a large storm that would produce the peak flows that must be used.

To design a treatment plant to match the design peak flow would require a treatment capacity of 126 MGD. In addition to ~~The~~the cost of treatment, there is not enough demand or infrastructure to handle such a large flow. Utilizing storage (433 acres at 15.5 feet deep) and releasing the treated water at a slower rate (20 MGD) similar to the capacity of Cottage ~~Grove=s~~Grove s municipal water system is possible. At the higher flow rate, it appears that there would not be enough demand to utilize the water at such a high flow rate. In both cases the issue of providing additional infrastructure to convey the treated water from the treatment plant to the existing distribution system must be addressed.

(3.) Bypass the Regional Park as an outlet option was investigated.

(a) It can be accomplished by pumping the water over the high point along Co. Rd. 19 and then pipe the water by gravity along Co. Rd. 19 around the Regional Park to T.H. 10 and 61.

(b) A second variation on this alternative is to pipe the water from CD-P86 to T.H. 10 and 61 in a deep gravity pipe system along Co. Rd. 19 around the Regional Park. The environmental impacts are not expected to be great with this alternative, with the possible exception of infringing on a DNR Natural Heritage identified dry prairie on the west side of Co. Rd. 19 or a state endangered plant on the east side of Co. Rd. 19 in the Regional Park. The impacts to agricultural land should be moderate to low and temporary in nature.

(4.) Conveying stormwater **through the Regional Park** option could take one of two general routes. The two routes are either along Co. Rd. 19 and into the Regional Park from the north or through Gables Lake, the East Cottage Grove Wetland (DNR Wetland 84W) and into the Regional Park from the northeast. The first two options are along Co. Rd. 19 using pumping or gravity and the third is to the east through Gables Lake.

(a) The pumping option would run along Co. Rd. 19 to 80th Street where it could discharge to a surface drainageway that would then pass through the Regional Park and on to T.H. 10 and 61.

(b) A second option would be to run a deep gravity pipe from CD-P86 to an existing drainageway just south of 80th Street where it would then pass through the Regional Park in a channel.

(c) The third option explored would be to discharge water from CD-P86 to Gables Lake, raise the normal water level (NWL) of Gables Lake somewhat (four feet over existing levels), tunnel a deep pipe under East Cottage Grove to the DNR Protected Wetland 84W (East Cottage Grove Wetland), pipe into the Regional Park until it is possible to go above ground, and then as a channel through the Regional Park to T.H. 10 and 61. Environmental impacts of these alignments are potentially higher than in Alternative (3), especially in the third option. Mitigative measures could be designed into the project to lessen the overall impacts. The impacts to agricultural land should be moderate and temporary in nature.

The cost savings of using an open channel through the park is approximately $5.5 million over piping it the entire distance around the park to T.H. 10 and 61. Issues that would need to be addressed in selecting an alignment through the Regional Park include estimating the extent of environmental impacts of the open channel alignment on the park, the Regional Park Lake, and the ~~lake=s~~lakeσ adjacent habitat. Creation of a stream corridor through the park could create an amenity.

(**5.) Upgrading** Cottage ~~Grove=s~~Grove□s East Draw or Kingston and Woodridge Park corridor drainage system would require new storm sewers between 70th Street and Kingston Park, channel creation, channel improvements, and upgrading existing storm sewers. The difficulties of going through already developed areas has only been partially addressed at this level of planning. The use of the City of Cottage ~~Grove=s~~Grove□s natural drainage channel in the park system would be required. Natural area and park improvements and creation of a stream corridor would be coordinated with the city and implemented as part of the project. The downstream outlet would be the westerly drainageway south of T.H. 10 and 61 that leads to the Mississippi River. There appears to be some potential to phase in the improvements with this route, since Cottage ~~Grove=s~~Grove□s downstream storm sewer system is fairly large (designed for quick, large peak flows).

By routing the water through the westerly drainageway down to the Mississippi River, channel stabilization south of 100th Street could be coordinated with the City of Cottage ~~Grove=s~~Grove□s plans to develop a channel for stormwater through its industrial park area which would ultimately discharge through this same drainageway to the Mississippi River.

It is assumed that stream stabilization will be necessary between T.H. 10 and 61 and the Mississippi River in either the westerly or easterly drainageway and the improvements would be of similar magnitude.

Recommendations

Based on the planning-level evaluation, all five alternatives will be considered further in conjunction with the results of the infiltration analysis and phasing possibilities. The Central Draw Outlet Study will develop 1-3 alternatives, which could be combinations or hybrids of those presented above. The 1-3 alternatives would then be studied in more detail and include public participation, especially from residents that might be directly ~~effected~~affected by a project.

The SWWD intends to implement a capital improvement project based on the results of the Central Draw Outlet study. The potential for flooding which has led to the need for the study and capital improvement project is ~~identified in~~identified in the WMP. The capital improvement project is not yet well enough defined to provide the required specific information for a capital improvement project as described in Minnesota Statutes Section 103B.205, Subdivision 3. At the conclusion of the Central Draw Outlet Study, the SWWD intends to amend the WMP, potentially through the minor amendment process, to define the specifics of the capital improvement.

The Central Draw Outlet Study will follow a process as outlined below to study all the alternatives and include public input and participation. The process presented here is intended as a model that can be modified as needed during the implementation of the study. The Central Draw Outlet Study process will include the following steps:

- ~~3~~Identify potentially affected interests (PAIs) and form a Study Advisory Committee (SAC) that includes citizens; city, county, DNR, and Met Council officials; SWWD CAC members; and SWWD Board members.
- ~~3~~Form subcommittees of the SAC to address Financing and Public Involvement of PAIs
- ~~3~~Issues to address with the SAC and the public;
- ~~3~~project need
- ~~3~~role of responsible government units
- ~~3~~project approach and goals

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- input from the public and PAIs
- Preliminary Feasibility Study coordinated with the SAC, CAC, and TAC to define 1-3 feasible alternatives for further analysis;
- Comprehensive Planning alternatives and Project Service areas
- Infiltration Management Assessment and Alternatives
- Environmental Issues for an Environmental Assessment Worksheet (EAW)
- Financing Options
- Coordination with the MCES Southeast Regional Plant Interceptor(s) and Washington County
- Board selects a project alternative and financing method
- Amend the WMP to include the selected alternative and financing method
- Amendment Review by local units of government, the Met Council, and state review agencies
- Public Meeting
- Review Amendment and modify if necessary
- Adoption by the Board
- Final Feasibility Study, prepare EAW, and conduct draft permitting
- Public Hearing on the project
- Final Recommendation to the Board
- Board Approval of the project
- Design of the Project and Permitting
- Implement the Project

To address the potential for flooding around Wilmes Lake, flow rate controls are necessary for the drainage coming from the northern portion of the watershed north of I-94 and from the highway corridor itself. The hydrologic analysis indicates that a series of ponds north and south of I-94 could provide sufficient control of peak flows to maintain the HWL for Wilmes Lake that has been established by the City of Woodbury. One ponding scenario that has been analyzed is to form

ponding areas by restricting the flow through three existing road crossings and forming an additional ponding area by construction of an earthen berm in the ravine directly downstream of I-94.

Additional alternatives could be investigated including various ponding combinations, modifying the HWL for Wilmes Lake if possible, or providing additional overflow capacity at the outlet of Wilmes Lake. Water quality and natural resource aspects must also be integrated into the project as the project is being designed. The project will be coordinated with the DNR since the intermittent stream being affected by the project appears to include as a DNR protected stream. The financing of this improvement will be addressed as part of the financing analysis of the overall Central Draw Outlet Study.

1.10 Central Draw Overflow Minor Amendment

1.11 Project Purpose

Significant area upstream of Bailey Lake is within the Metropolitan Council's 2020 growth area. The only areas that are not within the 2020 growth area are small portions of Afton, Lake Elmo and Cottage Grove. The City of Woodbury has the largest landmass within the project watershed and has a comprehensive plan that results in significant development opportunities. Portions of the watershed have developed under the assumption that the outlet contemplated in the City of Woodbury's 1979 drainage plan and the 1984 Cottage Grove drainage plan would be provided. However, that outlet was never constructed. The project is intended to provide sufficient outlet capacity for development under existing conditions and includes Woodbury's Phase I AUAR area. A major plan amendment is being developed to address ultimate development conditions. It is important for the minor and major plan amendments to proceed in a timely manner so the communities can know the specific operating parameters of the Project in order to design their local drainage systems accordingly. To date, there has not been wide spread residential flooding within the watershed. However, modeling of design storms indicates that the threat is very real.

1.12 Central Draw Stormwater Management

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The short-term management approach for stormwater reaching Bailey Lake South, CD-P85, and CD-P86 is to maintain and encourage infiltration. It is assumed that infiltrating previously treated Stormwater from mostly residential land uses, as is the case here does not pose any serious threat to groundwater quality. This is based on the condition that there exists a significant thickness of granular material to filter the stormwater before it reaches an aquifer, which also appears to be the case in all three of the basins mentioned above. To ensure stormwater infiltration does not adversely impact groundwater quality, the SWWD will expand its groundwater monitoring program to provide long-term monitoring of groundwater resources. The SWWD has completed infiltration studies phase I and II which documents impacts to groundwater from infiltration as well as, establishes limited baseline data on infiltration rates at specific sites in the watershed.

The SWWD will actively manage CD-P86 as an infiltration basin and coordinate management of CD-P85 and Bailey Lake South with the City of Woodbury as infiltration areas. Encouraging infiltration to help maintain the hydrologic balance between surface water and groundwater in the watershed is a priority of the SWWD as stated in Policy D of Goal 2 and Policy A of Goal 3 (see Chapter III). The infiltration areas will be monitored to detect decreases in infiltration over time. An operation and maintenance plan will be prepared for the infiltration areas so the required improvements will be carried out to maintain and preserve the infiltration capacity of the basins to the greatest extent possible. Maintenance will consist of erosion and sediment control prevention practices on adjacent agricultural lands, periodic removal (typically every 5 to 10 years) of fine sediments from the pond bottom, and reducing local erosion in the basin by revegetation of erodible areas with natural plant species.

1.13 Establishing the Ponding Areas

Water quantity modeling has indicated a reasonable normal water level (NWL) for CD-P86 is 894.0 with a 100-year runoff event high water level (HWL) of approximately 905.5. The agricultural land comprising the natural depressions of CD-P86 will be purchased by the SWWD for ponding, infiltration, and open space purposes. To minimize conflicts with future homeowners and residents adjacent to CD-P85 and CD-P86, the SWWD will acquire a 100-foot to 150-foot buffer beyond the

HWL contour of the ponds; the buffer will only be acquired around the North Lobe of CD-P86. SWWD ownership of the property will also facilitate the ecological restoration of the ponding site and adjacent areas. This will allow it to become incorporated into the watersheds proposed greenway (see Section 7 and SWWD Greenway Plan 2000) at a key location where no existing quality natural areas are present along the greenway.

The SWWD will work cooperatively with the City of Cottage Grove on a final design of CD-P86 to be consistent to local land use plans. Ultimately, the final design of CD-P86 will attempt to maintain or increase the volume of storage and decrease the aerial extent of the basin. Techniques considered to accomplish this, are mass grading, mineral extraction, and compatible land uses such as parks or athletic fields.

As previously stated the SWWD will purchase those areas identified as CD-P86 in the plan. To provide adequate flood control and efficiently use the ponding areas the SWWD will construct the necessary stormwater conveyance system within CD-P85 and CD-P86. To provide the maximum flexibility in use of CD-P85/86 north lobe, the SWWD will determine the feasibility of a deep outlet for CD-P85. The proposed stormwater/flood control overflow system is designed to address existing conditions and the Woodbury East AUAR area. The proposed solution is based on hydraulic and hydrologic modeling results prepared by the SWWD and establishes high water elevations, freeboard elevations, sub-watershed hydrographs and flood storage areas for existing and Woodbury Phase I development areas. Details of the modeling results and specific design of the SWWD stormwater conveyance system is contained in the Engineers Report, Central Draw Project and Existing Flood Storage Area Identification, South Washington Watershed District, June 2002, prepared by HDR Engineering, Inc.

1.14 Projects

The following is a list of projects included in the minor amendment to efficiently use the storage capacity of CD-P85/86 and minimize downstream flooding risk.

ITEM DESCRIPTION	ESTIMATED COST	TIMING
CD-P85 Weir/Discharge Pipe[6]	$236,996.00	2003
CD-P86 North Lobe Pilot Channel	$169,885.00	2004
CD-P86 Berm	$52,448.00	2003
CD-P86 South Lobe Pilot Channel & Berm Spillway	$225,131.00	2004
Military Road Raise and Culvert	$263,369.00	2003
CSAH 19 Stormwater Retention and Outlet Structure	$80,677.00	2003
70th Street Stormwater Retention and Outlet Structure	$140,335.00	2004
Channel to Gables Lake	$204,388.00	2005
Subtotal	**$1,385,386**	
Contingencies (25%)	$346,347	
Engineering (12%)	$166,246	
Surveying and Geotechnical (10%)	$138,539	
Permitting (3%)	$41,562	
TOTAL	$2,078,080.00	

1.15 Water Quality

There are several areas of potential impact of the infiltration on the groundwater resources in the area. These potential impacts include

- Elevating the groundwater levels to cause adverse impacts to underground structures or unintended surface effects

6 Final design of the CD-P85/86 connection will consider the feasibility of a deep outlet for CD-P85 to allow for future maintenance, control, and use of CD-P86

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- Degrading the quality of the water in the aquifer(s) by potentially introducing pollutants via the infiltrated storm water;
- Interference with groundwater pumping systems, in terms of either water quality or hydraulic impacts.

These issues have been previously addressed in the Environmental Assessment Worksheet (EAW) prepared in 1994, the Infiltration Management Study (IMS) in 2000, or subsequent or on-going investigations. The HDR report, Central Draw Project and Flood Storage Area Maps, June 2002, presents updated information about these issues and re-evaluates the questions in light of the more recent data.

The degradation of groundwater quality by the potential introduction of pollutants via the infiltrated storm water was previously discussed in the original Bailey Lake EAW and the IMS (EOR, 2000). Ranges and averages of contaminant concentrations in storm water runoff of U.S. urban areas, including the Twin Cities, were evaluated against state and federal drinking water standards. These studies concluded that, based on these typical values, storm water runoff is potable.

Surface water chemistry data have since been collected from the infiltration basins. Table 5 (Engineers Report, HDR, 2002) summarizes chemistry monitoring results from basins CD-P82 and CD-P85 from September 2000 to June 2001. Table 6 (Engineers Report, HDR, 2002) is a summary of median concentrations of various chemicals in groundwater sampled from four aquifers in Cottage Grove. These data were collected in 1999 by the Minnesota Pollution Control Agency (MPCA) as part of a groundwater quality study in Cottage Grove and can be regarded as representative of ambient groundwater conditions in the area ("Ground Water Quality in Cottage Grove, Minnesota", Ground Water Monitoring and Assessment Program, Minnesota Pollution Control Agency, Ground Water and Toxics Monitoring Unit, Environmental Monitoring and Analysis Section, Environmental Outcomes Division, St. Paul, MN, June 2000). Minnesota Department of Health (MDH) Health Risk Limits (HRLs) for the analyzed

compounds are included when they exist.

The following inferences can be drawn from these tables.

- None of the chemical concentrations in the surface water samples exceed the MDH HRLs, confirming the infiltrated water is chemically potable.
- The infiltration basin water generally has a higher chloride concentration than the ambient groundwater. This may be attributable to road salts.
- The infiltration basin water is higher in phosphorous than the groundwater. This could be related to fertilizer use.
- The groundwater has a greater nitrate concentration than the surface water. The MPCA water quality study documents a groundwater nitrate problem in Cottage Grove. The cause of the elevated nitrated concentrations has not been identified.
- There is no consistent evidence of organic constituents in the infiltration basin water.

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The infiltration basin chemistry data supports the previous studies' conclusions that the storm water runoff is potable.

1.16 Project Timing

Currently, it is **PROJECTED** that construction of the ultimate overflow will need to begin in 2008 or when the City of Woodbury development Phase II begins, whichever is later. Timing of overflow construction will be determined by engineering study of the additional volume of stormwater generated by development phases in the City of Woodbury 2020 comprehensive land use plan. The City of Woodbury will evaluate development staging within the Phase II area to identify opportunities to minimize impacts on the downstream system. The ultimate watershed overflow will be coordinated and consistent with local planning efforts to the extent possible. Final analysis, and route will be included in the SWWD updated Plan due 2003.

Implementation of the minor amendment will be coordinated with currently proposed projects by the Metropolitan Council, Washington County, Cities or other projects identified with common goals. If

projects are not identified the SWWD will implement the improvements as watershed projects over the next 5 years.

1.17 Operation Plan

Operation of the Bailey Lake Lift Station will be defined in an operation plan cooperatively developed between the City of Woodbury and the SWWD. Future operation of the Bailey Lake Lift Station will attempt to balance adequate stormwater management/flood protection for upstream areas with infiltration capacity of CD-P85/86. For infiltration management purposes pro-longed dry periods will help to maintain infiltration capacity, therefore less frequent pumping will provide adequate drying time. The City of Woodbury owns and operates CD-P85, regular use of this basin will continue, the SWWD will work to define the level of use for CD-P86 North Lobe. The South Lobe of CD-P86 and Gables Lake will be reserved for the design and freeboard flood events. In addition while the SWWD supports a Bailey Lake lift station capacity of 150 cfs, further investigation of the downstream timing of flows will be required to ensure adequate downstream capacity, and to extent possible, eliminate mixing of local and regional flow. Operation of the lift station under a complete build-out may require pumping at full capacity and then at a reduced capacity upon discharge to the watershed overflow.

1.18 Citizen Participation

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The SWWD conducted an initial meeting of Interested Citizens, Local Government Officials, and State Agency Staff in March, 2000. The purpose of the meeting was to gather input from affected parties regarding overflow routes for the Northern watershed to the Mississippi River. Based on the information available in March, 2000, four alternatives were presented to the group. As a result of the meeting the SWWD Board focused planning of the watershed overflow within the County Road #19 corridor. Further discussion and updates were conducted on a routine basis with the SWWD Citizen Advisory Committee to gather additional input on the results of various studies.

The SWWD also hosted two technical advisory committees, one for the Infiltration Management Study and another for the County Road #19 Corridor Environmental Assessment. Both committees

were comprised on staff from State Agencies and Local Government. The purpose of these committees was to gather input from technical experts and review the data collected for each study.

The SWWD conducted a public meeting on June 11, 2002 to explain the Minor Amendment and answer questions. Comments on the Minor Amendment were received at the meeting, were watershed residents, property owners, State Agencies, Local Government Staff and Officials, and County Officials were present.

1.19 Project Evaluation

The SWWD will continue an annual monitoring program to collect water quantity and quality data throughout the watershed. This information will evaluate the effectiveness of the management practices implemented during development. These data will also assist in calibration of the surface water model developed for this project. The SWWD will continue to collect infiltration data to define specific hydrology for this watershed. Flow data can be a valuable component to develop the operation plan, and to define non-flood stormwater management scenarios.

1.20 Project Funding

Overall costs for the minor amendment, as well as the complete watershed overflow, will be split between the sub-watershed and the entire watershed 75% and 25% of the total cost, respectively. The SWWD will use a stormwater utility based on standard runoff coefficients to calculate the fee per parcel. The total sum of per parcel fees within a municipal boundary will to the total cost per city, each city will have the option to pre-pay.

The SWWD Board has reviewed its Financing Policy and elaborated on several key points to better define how the District will finance its projects and its activities. The Board has received valued input from the Cities within the District and is balancing the local needs of the communities and residents.

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Watershed Activity	**Method for Collection of Funds**	**Use of Subwatershed(s)**
Administration, Programs, Studies	Taxes or Stormwater Utility	No
Capital Project (<$500,000)	Taxes or Stormwater Utility	Yes
Capital Project (>$500,000)	Taxes or Stormwater Utility	Yes
Operation & Maintenance	Taxes or Stormwater Utility	Yes

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The boundary of the Subwatershed is project specific and will be based on the following:

- Hydrologic boundaries

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Key Elements of the Financing Policy:

1. **Stormwater Utility** - Use of the Stormwater Utility, which is based on how much runoff, is generated by the property, for major projects for the project subwatershed.
2. **Cost Allocation** - The cost allocation for Capital projects and Operation and Maintenance will be based on the nature of the project and distributed based on the project subwatershed according to:

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Nature of Project	**Portion Paid by Subwatershed**	**Portion Paid by Entire Watershed**
Water Quantity (Flood Control)	75%	25%
Water Quality	50%	50%
Natural Resources	0%	100%

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3. **Development Charges** - The SWWD will consider the use of development charges, to the extent feasible, to reduce SWWD charges by entering into joint powers agreements whereby the cities collect the development charges.

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4. **Regional Facilities** - The ownership and responsibility for operation, maintenance, and expansion of key regional facilities will be undertaken by the SWWD. For existing key regional facilities that the SWWD will assume responsibility for, the city will be reimbursed for the over sizing portion of these facilities with the reimbursement taking the form of a credit against the SWWD charges to properties within the city. The existing key regional facilities that the SWWD will be responsible for are:

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- Pond CD-P85 and 86
- Watershed Overflow

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5. **Community Impact** - The SWWD will minimize impacts on the watershed and its residents by utilizing the solution that is most environmentally sound, technically sound, cost effective, and socially (citizen and community) acceptable. Financial burdens on current residents will be maintained at acceptable levels by utilizing bonds, as needed, and structuring the repayment schedule to capture future growth. The District will also be looking to capture funds from future growth that will be served by any project.

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2. West Draw Drainage Improvements

The SWWD is aware that drainage improvements are being proposed by the City of Cottage Grove to be implemented in the West Draw drainage system possibly as soon as 1997. The drainage facilities will carry runoff from Cottage Grove and Woodbury and thus is an intercommunity flow issue. The major issues to resolve regarding this intercommunity flow project is the exact amount of capacity for upstream areas that should be included in the downstream improvements and a method to fund the improvements that is equitable. The SWWD prefers to play an advisory role on this

issue, but is prepared to take on the project as a capital improvement project. The watershed supports the goal of forming a cooperative agreement between the two cities to resolve the sizing and cost sharing issues of the drainage system.

In an advisory role, the SWWD would serve as a third party to review and/or prepare the technical analysis to define the appropriate capacity necessary in the drainage system for upstream areas. The SWWD could also provide guidance and review of funding methods that equitably distribute the costs to the areas served.

The cooperative agreement at the city-level is supported by the SWWD for two reasons. First, it is consistent with the SWWD's approach of local implementation where possible. Second, it would allow more time for the SWWD to finalize its WMP, study the various issues facing the watershed, and establishing its operating and administrative procedures before being involved in a major capital project. Currently the SWWD is discussing the sizing and funding options with the cities of Cottage Grove and Woodbury under its existing watershed – wide levy funds. This portion of the project constitutes a preliminary study and would likewise be funded under a watershed wide levy as described in Table VI-10.

However, if a cooperative agreement cannot be reached, the SWWD recognizes its responsibility to implement or assist in implementing necessary drainage improvements. The SWWD would become involved in order to provide a cost effective, long-term solution for the West Draw drainage issues.

To address the major issues it appears necessary to carefully review the hydrologic conditions and probable future land uses of the area in order to determine the capacity necessary to prevent flooding while minimizing costs. The funding of the improvement would also be studied. The area is relatively undeveloped currently and the improvements are being implemented to respond to the adjacent development being proposed, but also must account for upstream areas. As the area develops, collection of connection charges by the City could serve to fund much of the project costs

and reduce any levies or charges that would be collected by the watershed under its normal funding mechanisms.

Another issue for the SWWD is the timing of the improvements and their financing by the SWWD. It may be difficult for the SWWD to provide the funding at the time the costs are expected to be incurred. Two options to resolve the timing of the funding are possible. First would be to delay implementing the project until the SWWD has full financial authority to pay the costs. Second is to enter into an agreement with the City of Cottage Grove where the city would fund the project in 1998 and be reimbursed for costs at a later time when the SWWD has funding authority.

~~**3. Central Draw Interim Ponding Project**~~

~~The short-term management approach for stormwater reaching Bailey Lake South, CD-P85, and CD-P86 is to maintain and encourage infiltration. It is assumed that infiltrating previously treated stormwater from mostly residential land uses, as is the case here does not pose any serious threat to groundwater quality. This is based on the condition that there exists a significant thickness of granular material to filter the stormwater before it reaches an aquifer, which also appears to be the case in all three of the basins mentioned above. To ensure that infiltration of stormwater does not adversely impact groundwater quality and can serve as a benefit by replenishing groundwater supplies, the SWWD will closely examine the data from the groundwater monitoring program being carried out by Woodbury. The SWWD will continue the program with the cooperation of Woodbury until it is determined what impacts the infiltration has on the groundwater.~~

~~Based on the surface water and groundwater monitoring results at Bailey Lake South over the next few years, the SWWD will re-evaluate the suitability of infiltrating stormwater. If infiltration is deemed prudent, the SWWD will actively manage CD-P86 as an infiltration basin and coordinate management of CD-P85 and Bailey Lake South with the City of Woodbury as infiltration areas. Encouraging infiltration to help maintain the hydrologic balance between surface water and groundwater in the watershed is a priority of the SWWD as stated in Policy D of Goal 2 and~~

~~Policy A of Goal 3 (see Chapter III). The infiltration areas will be monitored to detect decreases in infiltration over time. An operation and maintenance plan will be prepared for the infiltration areas so the required improvements will be carried out to maintain and preserve the infiltration capacity of the basins to the greatest extent possible. Maintenance will consist of erosion and sediment control prevention practices on adjacent agricultural lands, periodic removal (typically every 5 to 10 years) of fine sediments from the pond bottom, and reducing local erosion in the basin by revegetation of erodible areas with natural plant species.~~

~~**Establishing the Ponding Areas**~~

~~Water quantity modeling has indicated a reasonable normal water level (NWL) for CD-P86 is 894.0 with a 100-year runoff event high water level (HWL) of approximately 905.5. The agricultural land comprising the natural depressions of CD-P86 will be purchased by the SWWD for ponding, infiltration, and open space purposes. To minimize conflicts with future homeowners and residents adjacent to CD-P85 and CD-P86, the SWWD will acquire a 100-foot to 150-foot buffer beyond the HWL contour of the ponds.~~

~~The buffer will be used to prevent adjacent property owners from developing a sense of ownership of the pond in which case they may desire permanent water to be maintained in the pond. Maintaining a permanent water level would be contradictory to the purpose of the pond as an infiltration area and would be detrimental to stormwater quantity control and especially to water quality control. SWWD ownership of the property will also facilitate the ecological restoration of the ponding site and adjacent areas. This will allow it to become incorporated into the watershed=s proposed greenway (see Section 7) at a key location where no existing quality natural areas are present along the greenway.~~

4. Wetland Assessment and Management Plan

As mentioned in the Water and Natural Resources Inventory chapter, the SWWD has carried out a partial wetland inventory including an assessment of functional values. The SWWD will complete

the inventory using the New Hampshire or an equivalent methodology. Once the inventory is complete, the SWWD will share the information with the cities to facilitate in their planning process. In addition, the SWWD will coordinate with the cities a review of its management standards and implement any necessary changes.

The complete inventory and assessment of wetlands will include as many of the functional values as possible. Wetlands within developed areas will be addressed separately and given consideration on a case-by-case basis.

5. Public Education Learning Centers

The SWWD will coordinate with local schools to develop environmental and water quality education learning centers to enhance the experiential learning process for school children. The projects should include outdoor settings for studying water and natural resources. The ~~SWWD=s~~SWWD□s role will be to help compile existing information, identify funding sources, develop a concept plan and help develop an implementation process. The SWWD will continue to coordinate efforts to establish an outdoor learning center at the wetlands on the new Oakdale Elementary-Middle School site in School District 622, between 10th and 15th Streets in Oakdale. The site has several quality wetlands with diverse wetland types within a short distance of each other and represents the headwaters of the watershed. One of the wetlands scored fairly high on the wetland evaluation as the methodology was being tested on this site. The SWWD will also coordinate at least two additional outdoor education projects at school sites in the watershed to be coordinated with the greenway plan.

6. Powers Lake Management Plan

A lake management plan for Powers Lake is needed to identify what additional measures, if any, are needed to maintain the high lake quality for fisheries and recreation. Any proposed measures would be in addition to the existing water quality ponding requirements enforced by the City of Woodbury.

The study would include continued monitoring of the lake by the Citizen-Assisted Monitoring Program, fisheries surveys, and investigation of lake and/or stormwater treatment or bypass options.

7. Lake Assessment Studies

Urbanization continues to threaten to degrade the water quality of the watershed's lakes while increased population near the lakes increases the public use and interest in the lakes. The standards presented in Section B of this chapter are based on the target uses of the lakes. However the target uses were estimated with limited data to document the feasibility of sustaining the target uses. The limited, preliminary data available for the lakes makes it difficult to provide the necessary integrated management approach likely needed to sustain the lakes' target uses.

Lake assessment studies will be developed for all the lakes in the watershed, except that Powers Lake is addressed under a separate project. The assessment studies will be tailored to reflect the unique setting and role of each lake in the landscape. The setting and role of the lakes can include fisheries, direct contact recreation, various wildlife habitats, ecological diversity, and scenic value.

The lake assessment study will better define the public value or "target use" for each waterbody that is identified in Table VI-2. With the information from the lake assessment study, the management categories and water quality standards (phosphorus standards at this point) shown in Table VI-2 can be refined and revised as necessary to be consistent with the goals and policies regarding lakes in Chapter III.

The study will use the information that is being collected in the lake monitoring program to help assess the lakes. The study will include four aspects:

- X assessment of the current conditions of the lakes through lake surveys
- X development of revised target uses through citizen participation
- X estimation of future impacts using stormwater runoff quality and lake modeling
- X development of appropriate standards and management approaches for each lake

8. Greenway Concept Plan

The focus for the SWWD is linking natural areas throughout the watershed through preservation and enhancement of existing or potential natural area linkages. Ultimately the goal is to link local parks and open space to regional natural areas and encourage that those regionally significant resources are connected. The specific regional areas of interest are the Lake Elmo Park Reserve in the north, the Cottage Grove Ravine Regional Park and Mississippi River corridor in the south, the Mississippi River in the west, and the St. Croix River in the east. The Mississippi River is one of the largest natural greenways in the state and is an important resource used by a wide variety of wildlife.

The linking of greenways throughout the watershed will aid in preserving natural areas without using a large amount of land. This will provide a valuable amenity to the cities within the watershed once they are fully developed. The greenways tentatively shown for the SWWD have been labeled as primary or secondary greenways on Map 2, the Greenway and Natural Features Map.

The primary greenway runs north to south through the watershed and encompasses the major drainage routes, or "backbone drainage system", for the watershed. The primary greenway has had many areas preserved because they are within existing drainage easements. In addition, major proposed drainageway areas will be acquired which would form important links in the north-south greenway.

Some of the larger existing parks follow the drainageway, resulting in a natural corridor which currently exists. The goal is to link these systems and widen the corridor where possible to encompass valuable wooded, prairie, wetland, and other natural features along the drainage system which will eventually reach the Mississippi River corridor.

The secondary greenways also include some drainageways which have potential to be widened and enhanced to promote wildlife passage and serve as passive parks as well as enhance water quality. The secondary greenways link laterally to the primary greenway or are secondary drainage routes to

the Mississippi River. Many of the secondary greenways link major city parks or valuable wooded and wetland areas to the primary greenway. The secondary greenway can also provide important links to existing natural areas outside the watershed. These include a link to Battle Creek Lake and the stream and park system which eventually flows to the Mississippi River; Carver Lake, which flows to the Mississippi through Fish Creek; and Valley Creek, a quality trout stream that flows to the St. Croix River. All these are regional natural areas and provide valuable wildlife passage corridors and amenities to the public.

Greenway Establishment

The SWWD will aid the cities technically and financially when possible in the creation of the greenways. The Greenway and Natural Features Map can be used as a tool by cities in the planning process. Preservation of the areas along perennial streams, intermittent streams, and ponding areas will provide valuable links in the system. Other links in the greenway can be established through park dedication and conservation easements. In some instances, widening a drainage easement will aid in the linking of these systems. The SWWD does not intend to interfere with the land use or park planning of the cities, but rather intends to provide information and cooperatively assist cities in identifying and establishing greenway corridors.

Another mechanism by which the greenway can be established is through the utilization of wetlands and hydric soil areas. Hydric soils as defined by the USDA's NRCS are soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part. Hydric soils generally support wetlands unless the hydrology has been altered. Wetlands in the watershed that have had their hydrology impacted by ditches or drained to some degree can often be restored for wetland mitigation. Restoring these systems and providing adjacent buffers as described in the wetland section of this report will provide some of the missing links in the greenway.

Cities acting as LGUs for the Wetland Conservation Act are strongly encouraged to guide wetland replacement projects to be done in the hydric soil areas within the greenways shown on the Greenways and Natural Features Map. This should be mutually beneficial since the hydric soil areas that are not currently wetlands have a high potential for wetland creation or restoration success and can also serve to link the greenway in historically connected drainage features.

The SWWD will work with the county to coordinate the county=s linear park with the SWWD greenway. Possible linkages will include low-use side trails that will not be paved. Leaving the trails in a natural state will help maintain the ecological integrity of the greenway. The low use trails can be designed to show natural features and can provide excellent wildlife viewing.

The SWWD will develop a Greenway Concept Plan. This plan will identify the areas most suitable for the greenway, the types of improvements and management desired, and potential implementation methods.

9. Pond/Wetland Treatment System in the Westerly Drainageway

For the southern portions of the watershed, many areas have developed and have little ponding provided before discharging to the natural drainageway that leads to the Mississippi River. The natural wetlands and sandy soils in the drainageways provide treatment for the stormwater currently,

but with future increases in flows, the treatment provided may be minimal and protection of the existing natural wetlands may be compromised. To treat the storm drainage from existing and future developments, the SWWD will design and construct a system of diversions, wetlands, ponds, and possibly infiltration areas in the westerly drainageway in Sections 21 and 28 shown on Map 1. This water quality system will provide treatment of the stormwater before reaching the Mississippi River from highly developed areas.

Design and construction of the Pond/Wetland Treatment System will take into consideration existing wetland systems and the soils of the site. Diversions will likely be used to route around existing high quality wetlands. The project will include creation of a pretreatment pond, constructed wetlands, and infiltration practices. The project will be phased in as development continues to occur in the watershed. The first phase will probably include approximately 20 acres of ponding and wetland areas. An additional 15 acres of treatment wetlands will be phased-in a 5 to 10 year period as development continues to occur and monitoring data indicates the need.

E. Priority Ranking of Watershed Projects

The watershed projects described in the previous section are all projects that are anticipated to be needed in the next five years. Some of the studies identified in the projects section will likely also lead to capital projects within the next five years. In addition to the watershed projects, there are several standards and programs the SWWD will be implementing.

The SWWD standard and programs address important issues facing the watershed and are cost effective since they typically provide long-term solutions at a relatively low cost. The standards and programs are cost effective, non-structural methods to achieve the watershed=s goals. Therefore the standards and programs identified in the WMP are high priority components of the ~~SWWD=s~~SWWD□s overall implementation strategy and will be initiated as soon as possible.

In order to help in the implementation process, the projects have been prioritized as presented below. The priorities were developed based on the timing of when the projects are expected to be needed. The priorities are also consistent with the SWWD Goals and Policies. Projects that address potential problems that could cause costly damages were considered to be a higher priority. The priority ranking was reviewed by the SWWD Board initially and will be reviewed biennially in conjunction with the review of the watershed Goals and Policies and Capital Improvements Program.

Table VI-5. Priority Ranking of Watershed Project

Priority Ranking	Proposed Project	Nature of Project
1	Central Draw Outlet Study	Water Quantity
2	West Draw Drainage Improvements	Water Quantity
3	Central Draw Interim Ponding	Water Quantity
4	Wetland Assessment and Management Plan	Natural Resources
5	Public Education Learning Centers	Water Quality
6	Powers Lake Management Plan	Natural Resources
7	Lake Assessment Studies	Natural Resources
8	Greenway Concept Plan	Natural Resources
9	Pond/Wetland Treatment System in Westerly Drainageway	Water Quality

F. Cost Estimates

Cost estimates for the proposed SWWD implementation programs and projects are presented in Table VI-6. These costs represent an engineer=s best estimate of costs. Both capital costs and maintenance or on-going costs are included in the table. Capital costs are initial costs and include construction, design, administration, contingencies, and easement and land acquisition costs. Maintenance costs or ongoing costs are annual costs and can include operation, maintenance, data collection, lab analysis, administration, and project evaluation and reporting costs.

Table VI-6. Watershed District Program and Project Costs

	Activity	Capital/Initial Cost	Annual Maintenance/ On-Going Cost
Programs			
1	Water Quality and Quantity Monitoring	$20,000	$19,000
2	Public Education	------	$35,000
3	Groundwater Monitoring and Protection	$37,000	$18,000
4	Erosion and Sediment Control	$19,000	$16,000
5	Interim Review of Development Plans	$36,000	$50,000
Projects			
1	Central Draw Outlet Study	$463,000	----
2	West Draw Drainage Improvements	$306,000 **	$2,000
3	Central Draw Interim Ponding*	$2,100,000	$40,000
4	Wetland Assessment and Management Plan	$71,000	$10,000
5	Public Education Learning Centers	$31,000	----
6	Powers Lake Management Plan	$30,000	----
7	Lake Assessment Studies	$76,000	----
8	Greenway Concept Plan	$30,000	----
9	Pond/Wetland Treatment System in Westerly Drainageway*	$885,000	$8,000
	TOTAL	$4,104,000	$198,000

* Projects that will likely be financed over a 10 year period.

** It is possible that member cities will assume responsibility for much of this project which would reduce the ~~SWWD's~~SWWD□s financial responsibility substantially.

1. Programs

Water Quality and Quantity Monitoring

The estimated cost for this program is primarily for on-going monitoring costs. The two monitoring and sampling stations needed at this time have already been purchased and are currently in operation. The parameters being tested are phosphorus (total and ortho), nitrogen (total Kjeldahl, nitrite-nitrate, and ammonia), total suspended solids, and periodically heavy metals. Based on the monitoring data, the need to continue metals testing will be reassessed in the future. The water quality monitoring stations include flow monitoring data. The flow monitoring data will be presented in reports in an effort to understand the water quantity dynamics in the watershed. The costs also include:

- X Collecting and analyzing ten sampling events annually
- X Equipment setup and maintenance
- X Data reduction, data analysis
- X Annual report

The initial cost would apply to the first two years to evaluate the effectiveness of the water quality and quantity monitoring system and make any necessary modifications. The initial evaluation will include monitoring for heavy metals and other toxics and refining the quantity measures to construct a water balance.

Public Education

The ~~SWWD=s~~SWWD□s public education program is an on-going effort to educate and inform the residents of the watershed. Education efforts are necessary to educate residents so that less costly source control methods can be used to address watershed problems where ever possible. The public education program also serves to inform residents about the activities of the watershed. Informed residents can provide input on SWWD programs and projects, which in turn effects the overall activities and costs that the SWWD carries out and which are paid for by the SWWD residents.

The public education program includes the following:

- X Two newsletters each year.
- X Information brochures at City Halls.
- X Press releases through local media.
- X Information public meetings.
- X Phone line for providing and receiving recorded messages.
- X Coordination with City Education efforts.

Groundwater Monitoring and Protection

The groundwater monitoring program can be divided into programmatic aspects as well as technical tasks. The costs of the programmatic and technical tasks include activities that are needed to monitor groundwater quantity and quality. The nature of the tasks may require on-going costs. The tasks involved are:

- X Survey of unused, unsealed wells and other potential point sources of pollution using the MDH=s PCSI.
- X Semi-annual monitoring of existing wells
- X Identifying surface waterbody - groundwater connections
- X Coordinate and encourage local wellhead protection efforts and initiatives.

The evaluation of the effects of stormwater infiltration on groundwater flow systems in the Bailey Lake area is a task whose cost has been accounted for in the Central Draw Outlet Study.

Erosion and Sediment Control

The erosion and sediment control program will serve to prevent costly future corrective actions in watershed waterbodies. The erosion and sediment control program will be closely coordinated with the member cities.

The following activities are part of the erosion and sediment control program:

- X Model ordinance for cities.
- X Identify and map soils sensitive to erosion.
- X Periodically train city staff.
- X Annual review of local enforcement.

Interim Review of Development Plans

Until the member cities have their local plans approved and adopted and have local control in place, the SWWD will need to review development plans. The review will be limited to the standards that are addressed in the ~~SWWD=s~~SWWD□s WMP and rules. The review will be coordinated with the member cities to the greatest extent possible.

The costs for the review of development plans consist of:

- X Develop rules for implementing the development reviews.
- X Develop a review process and framework.
- X Review of development plans for SWWD standards.

2. Projects

Central Draw Outlet Study

The Central Draw Outlet Study will be conducted prior to implementing any of the possible alternatives presented here or other that may be developed in the future. The study costs include all the various steps in the study implementation process as presented in Section D of this chapter down to the WMP Amendment step.

The study includes:

- X Public participation process modeled after the Systematic Development of Informed Consent approach.

- X Coordination with member cities in their comprehensive plan updates.
- X An infiltration management alternatives analysis.
- X Identification of environmental issues.
- X Preliminary feasibility study.
- X Analysis of alternatives.
- X Amending the WMP.

The preliminary alternatives investigated provide an estimate of the possible financial impacts of this project. Based on the potentially very significant financial impacts of this project, the SWWD will proceed to investigate all possible alternatives that can lower the financial impacts while still addressing the flooding potential. The options to be investigated include alternative technical approaches, re-examining the ultimate service area, staging the project, and combination financing approaches.

The various alternatives investigated during the development of the WMP are presented below. These alternatives are a basis for further study and will be used during the further analysis of the projects.

The Central Draw Outlet will potentially be the most significant project of the SWWD from a cost standpoint. The preliminary cost analysis for a project to address flooding for existing and future drainage areas in the Central Draw included examining five alternatives (some with various scenarios). For future reference the five alternatives examined are presented with their preliminary costs. The cost analysis at this level is very preliminary but serves to put different approaches in context.

Alternative 1, Complete Storage, involves retaining the 100-year volume of runoff in a 640 acre ponding area. Significant excavation is needed to provide the storage volume needed.

Alternative 2, Treatment, involves two scenarios for storing, treating, and reusing the 100-year volume of runoff. Option 2a stores whatever can be stored in CD-P86 and treats at the remaining peak flow rate. Option 2b treats the stormwater at 20 MGD and requires creating a large storage area.

Alternative 3, Bypassing the Regional Park, involves two scenarios, one pumping the stormwater over the plateau in Cottage Grove, the second using a deep gravity pipe through the plateau. Both options convey the stormwater along Co. Rd. 19, bypasses the Regional Park and lake, and convey the water under T.H. 10 and 61 to the Mississippi River. Option 3a includes approximately 1,800 feet of 72" force main and 20,500 feet of 72" storm sewer pipe. Option 3b assumes 22,300 feet of deeper 84" storm sewer pipe.

Alternative 4, Through the Regional Park, involves three scenarios for conveying the stormwater to T.H. 10 and 61. Option 4a follows the same alignment as Option 3a to 80th Street where it would then be routed to an above ground open channel. This alignment includes approximately 9,800' of 72" pipe and 11,000' of channel to T.H. 10 and 61. Option 4b follows the same alignment as Alternative 3.b, again being detoured to 80th Street to an open channel. This alignment assumes 10,600' of 84" pipe and 10,200' of channel to T.H. 10 and 61. Option 4c conveys the stormwater through a gravity system of pipes and open channels through Gables Lake, the East Cottage Grove Wetland (DNR Wetland #84), through the Regional Park and its lake to T.H. 10 and 61. This alignment assumes 15,900' of 72" pipe and 6,000' of channel to T.H. 10 and 61.

Alternatives 3a and 3b both assume that the stormwater from T.H. 10 and 61 would be routed through the existing ravine to the Mississippi River. Stream stabilization and erosion control measures in the ravine south of T.H. 10 and 61 are assumed to be necessary to allow for the higher flows.

Alternative 5, Upgrade, involves retrofitting, expanding, and using the existing system in Cottage Grove's easterly storm drainage system. From T.H. 10 and 61, the stormwater would be conveyed

through the flat terrace and ravine down to the Mississippi River. Stream stabilization and erosion control measures are assumed to be needed in the ravine to minimize damage.

Table VI- 7 summarizes the estimated total costs for the five alternatives and the options for each. The project costs for the alternatives below are preliminary and approximate. The costs include an additional 35% for administration, engineering, and interest contingencies and 10% for planning contingencies. The project costs consider assuming responsibility for the stormwater at CD-P85.

The capital costs and capitalized operating and maintenance costs for the pumping options are based on a facility life of 100 years and were converted to present worth.

Table VI- 7. Preliminary Costs for Storage, Reuse and Outlet Options in the Central Draw

Alternatives	Preliminary Costs:
(1.) **Complete Storage**	$46 million
(2.) **Treatment** - a. Treat at peak flow rate	$63 million (plus hookup costs)
b. Treat at 20 MGD	$41 million (plus hookup costs)
(3.) **Bypass the Regional Park** a. Pumping along Co. Rd. 19	$18.7 million
b. Deep Gravity along Co. Rd. 19	$18.6 million
(4.) **Through the Regional Park** a. Pumping - along Co.Rd. 19 & through Park	$13.3 million *
b. Deep Gravity - along Co. Rd. 19 and through Regional Park	$13.1 million*
c. Deep Gravity - through Gables Lake, East Cottage Grove Wetland and Regional Park	$14.7 million*
(5.) **Upgrade** Cottage Grove=s Easterly Storm Drainage System	$12.4 million

* Utilizes an open channel through the Regional Park; contingent on County & Agency approval.

Treatment costs in Alternative 2 were based on the construction of a water treatment plant so the stormwater could be used as potable water.

All alternatives include the construction of an outlet for CD-P85, estimated at $200,000. All alternatives include land acquisition costs. For alternatives 3, 4, and 5, the costs include land acquisition for CD-P86 which includes the area down to 70th Street in Cottage Grove. An Environmental Assessment Worksheet (EAW) would likely be done for the project at an estimated cost of roughly $100,000. Alternatives 3, 4, and 5 include the cost of natural plantings in and around CD-P86 to restore natural vegetation, improve wildlife habitat, and create recreational opportunities.

Costs for monitoring and maintaining CD-P85 and CD-P86 as infiltration basins have also been included as maintenance costs. This includes erosion control measures and periodic removal of fine sediments from the bottoms of the ponds.

For Alternative 4, in-depth study of the environmental impacts to the Regional Park Lake and its surrounding habitat will be required. The cost of this study is estimated to be $45,000.

West Draw Drainage Improvements

The costs for this project are an estimate of the analysis study needed to review and define the project design, the improvements, and construct the improvements. The costs presented in Table VI-6 are based on the SWWD implementing the entire drainage project. This represents a very high estimate for SWWD involvement since the SWWD funded portion of the project costs could be reduced significantly by two factors.

The first factor would be if a cooperative agreement between Woodbury and Cottage Grove for sharing construction costs could be reached, then the SWWD would effectively not be involved in the construction portion of the project. The second factor would be if locally collected area charges are used in funding the project. The area charges would likely be collected through the City of

Cottage Grove=s existing area charges system for trunk stormwater facilities. The area charges are typically collected from the developer at the time of development and could pay for a significant portion of the project.

The cost estimates for the West Draw Drainage Improvements include:

- X Review and analysis of flow rates in the system.
- X Facilitate discussions between the two cities.
- X Costs for construction of trunk drainage facilities for the next five years (if necessary).

Central Draw Interim Ponding

The ponding area CD-P86 is largely agricultural land to be purchased and managed as a stormwater ponding area. The costs associated with the initial acquisition and establishment of this ponding are largely for the purchase of land. The land purchased will include the land up to the HWL of CD-P86 and a 100 to 150 foot buffer or set back from the HWL for CD-P85 and CD-P86. Purchase of the area will prevent legal cost associated with damage claims if or when the area is flooded.

The cost estimate includes the following:

- X Appraisal and legal fees for the land purchase.
- X Land costs.
- X Natural revegetation of erodible areas.
- X Spillway stabilization.
- X Monitoring of water levels and local erosion.
- X Maintenance of basin - remove fine sediments periodically and maintain plantings.

Wetland Assessment and Management Plan

The cost for the wetland inventory and assessment will involve a field evaluation of each wetland in the watershed based on the New Hampshire Method. The inventory and assessment for wetlands in

the 1996 MUSA will utilize the AUrban Quality of Life≅ section from the New Hampshire Method. The cost for the management plan will involve:

- X Field inventory and assessment.
- X Compile of inventory and assessment data and review with Cities and CAC.
- X Meet with member cities to develop protection and management approaches
- X Modify interim management plan to create the final wetland management plan

Public Education Learning Centers

The capital/initial cost consists of preparing an outdoor environmental center concept plan for three school sites in the watershed. The tasks involved are:

- X identify partners.
- X develop goals and objectives.
- X identify existing resources; technical, programmatic, and financial.
- X establish a framework for who will establish and maintain the site.
- X design a conceptual site plan.

Powers Lake Management Plan

The costs for the Powers Lake management plan include basic data collection and formulating potential management approaches for the lake. The tasks identified for this project are:

- X Basic Assessment Study
- X Fisheries survey
- X Macrophyte survey
- X Bypass and treatment alternatives
- X Groundwater interactions with the lake
- X Fisheries management plan

Lake Assessment Studies

The costs associated with the lake assessment study includes assessing the status of the lakes and developing a management strategy for each lake. The study will include seven lakes in the

watershed. Some runoff and lake modeling exists for two of the watershed lakes, Markgrafs and Wilmes Lakes requiring less modeling effort for these two lakes.

The tasks for this project are:

- X Basic lake survey including fisheries, aquatic plant communities, sediments, and water quality.
- X Target uses through citizen input based on public values and role in the landscape.
- X Future impacts by modeling stormwater runoff quality and in-lake conditions.
- X Standards and management approaches for each lake based on data and public input.

Greenway Concept Plan

The costs associated with putting together a conceptual plan for a greenway in the SWWD includes:

- X Field visits.
- X Management strategies for passive greenway areas coordinated with the cities and the County.
- X Potential funding agencies.
- X Wetland mitigation possibilities.
- X Educational aspects.
- X Report preparation.

Pond/Wetland Treatment System in the Westerly Drainageway

The proposed treatment system includes costs for:

- X Minimal land easement costs.
- X Pond and wetland excavation.
- X Plantings for the constructed wetlands.
- X Permitting.

The land easement costs are assumed to be relatively low, on the order of $1,000 per acre, since it is assumed that the project will be on 3M land. Based on preliminary discussions, it appears that 3M

will be a willing partner in the project since this type of project is consistent with their environmentally-sensitive philosophy and consistent with their use of the land as a buffer for their industrial facilities. Permitting costs include DNR and wetland issues. If an EAW is needed, the permitting costs could be higher.

G. Implementation Plan

The implementation of the proposed SWWD programs and projects will be presented within the five year time frame of this WMP. To accomplish the identified programs and projects, it is necessary to develop and follow an implementation plan to guide the allocation of SWWD resources. Table VI-8 provides the time line for the implementation of the programs and projects. The portion covering the projects that include the capital projects is considered to be the ~~SWWD=s~~SWWD□s Capital Improvement Program (CIP).

Project planning and feasibility studies will be the first step for many of the structural projects. Next, the alternatives will be evaluated and a detailed plan of action adopted. Following adoption, time will be needed for obtaining the necessary permits, including in some cases the preparation of an EAW. Once permits are obtained, the project will enter the implementation stage, which for structural projects consists of creating detailed plans and specifications followed by the construction of the project.

In addition to any statutory requirements, it is the ~~SWWD=s~~SWWD□s policy to hold a public hearing on all its projects whose estimated cost is greater than $100,000.

Table VI-8. Program and Project Implementation Timeline

Activity	1998	1999	2000	2001	2002
Programs					
1. Water Quality and Quantity Monitoring	I, E	I, E	I, E	I, E	I, E
2. Public Education	I, E	I	I, E	I	I, E
3. Groundwater Monitoring and Protection	P	D, I	I, E	I	I, E
4. Erosion and Sediment Control	P, I	I, E	E	E	E
5. Interim Review of Development Plans	P, I, E	I, E	E	E	E
Projects					
1. Central Draw Outlet Study	P, I, E	I, E	To be determined later		
2. West Draw Drainage Improvements	I	E			
3. Central Draw Interim Ponding	P	P, I	I, E	I, E, M	E, M
4. Wetland Assessment and Management Plan	P, I	I, E			E
5. Public Education Learning Centers	P, I	E, I	E, I		
6. Powers Lake Management Plan	P, I, E				
7. Lake Assessment Studies		P, I	I		E
8. Greenway Concept Plan		P	E, I		
9. Pond/Wetland Treatment System in Westerly Drainageway			P, E	R, D	I, M

P = Planning
E = Evaluation
R = Regulatory Permitting
D = Design
I = Implementation
M = Maintenance/On-Going Operations

The Financial Implementation Plan in Table VI-9 provides a framework for financing the projects identified in the WMP. Some of the financing of the projects may extend beyond this five year plan since they will tentatively be financed over longer periods of time to reduce the annual expenditures on the projects.

Table VI-9. Costs By Year for Watershed Programs and Projects

Activity	**1998**	**1999**	**2000**	**2001**	**2002**
Programs					
1. Water Quality and Quantity Monitoring	$29,000	$29,000	$19,000	$19,000	$19,000
2. Public Education	$35,000	$35,000	$35,000	$35,000	$35,000
3. Groundwater Monitoring and Protection	$43,000	$30,000	$18,000	$18,000	$18,000
4. Erosion and Sediment Control	$35,000	$16,000	$16,000	$16,000	$16,000
5. Interim Review of Development Plans	$76,000	$60,000	$50,000	$50,000	$50,000
Projects – Capital Improvements Program					
1. Central Draw Outlet Study	$238,000	$225,000	To be determined later		
2. West Draw Drainage Improvements*	$38,000	$40,000	$40,000	$40,000	$40,000
3. Central Draw Interim Ponding*	$40,000	$431,000	$311,000	$311,000	$311,000
4. Wetland Assessment and Management Plan	$36,000	$28,000	$10,000	$10,000	$17,000
5. Public Education Learning Centers	$11,000	$10,000	$10,000	---	---
6. Powers Lake Management Plan	$30,000	---	---	---	---
7. Lake Assessment Studies	---	$35,000	$35,000	---	$6,000
8. Greenway Concept Plan	---	$18,000	$12,000	---	---
9. Pond/Wetland Treatment System in Westerly Drainageway*	---	---	$185,000	$108,000	$108,000
Total Annual Levy	$611,0000	$957,000	$741,000	$607,000	$620,000

* Assuming capital costs are financed over 10 years. Capital costs are annualized using an interest rate of 7%.

H. Financing Watershed Activities

1. Funding Approach and Rationale

The SWWD intends to distribute costs for programs and improvements as equitably as possible. At the same time the SWWD strives to maintain an efficient and effective implementation process that does not include unnecessarily high administrative costs for projects. Therefore the financing of the various watershed programs and projects is carried out using the various funding methods available to provide a balance between equity in paying for activities and an effective process that does not create unduly high administrative costs to implement. In order to serve the watershed as a whole as well as address specific issues, the SWWD will use a variety of funding mechanisms that are available to the watershed through State Statutes 103B and 103D.

Various programs are needed in the watershed to address the water and natural resource issues of the watershed. The programs often provide non-structural approaches to watershed issues and problems and prevent the need for costly corrective actions in the future. The programs are typically implemented at the watershed level and therefore will be financed by the entire watershed. Watershed-wide collection of funds is also generally less costly administratively which makes sense for the smaller costs typical of the programs implemented by the watershed.

The SWWD must carry out various non-capital projects (primarily studies) and plans and capital projects (primarily structural projects) to address watershed issues. The non-capital projects are implemented in order to identify potential problems, identify reasonable alternatives, and propose necessary actions. Capital projects are needed at times to prevent or correct problems that arise in the watershed or address opportunities that exist. The projects are a necessary part of the watershed's activities which serve to provide an effective management of the watershed and its resources.

The SWWD projects will serve all or parts of the watershed directly, depending on the project, as well as provide secondary benefits to all the residents of the watershed. The projects provide direct service to the contributing area. The nature and purpose of the projects vary, but generally fall within one of three categories: preventing flooding, managing surface water quality that would effect downstream waterbodies, and protecting natural areas. In addition to the service for the contributing area, all residents of the watershed will gain a common benefit from an effective watershed district that can respond to issues before costly corrective actions are needed.

The common benefits to all residents of the watershed include maintaining a property values in the community by resolving and preventing flooding and water quality problems. In addition, SWWD projects are intended to be integrated projects in their approach, including flood control, water quality protection, groundwater protection, and natural resources protection. Therefore, even with flood control projects that serve and protect specific areas, there will also be water quality, groundwater, and natural resource aspects included. The water quality, groundwater, and natural resource aspects have benefits that transcend or do not coincide with the flood control service areas, therefor the watershed district as a whole should contribute to the project. Lakes, wetlands, streams, rivers, groundwater, and natural areas are regional resources whose protection provides an enhanced community with a higher quality of life, thus benefiting the entire watershed.

Water quantity or flood control projects serve specific areas and protect areas and resources that might be damaged by flooding. These areas are the subwatershed of a particular project. For water quantity projects, the SWWD will distribute the majority of the costs of the project to the land owners of the subwatershed served. However, due to the common benefit to all those in the watershed as discussed above a small portion of the project cost will also be shared by the entire watershed.

Water quality projects serve to protect water quality within the drainage system and to protect specific downstream waterbodies. For water quality projects the areas that drain to the improvement or waterbody being protected will be responsible for funding a portion of the project since they are

impacting the waterbody. The entire watershed will pay a moderate portion of the project costs since the waterbody protected is typically a "public water." State and federal regulations designate the majority of waterbodies to be "public waters" that should be managed and protected for the public good. For instance lakes are public waters that are important recreational and natural habitat areas that are extensively managed for the public good. Likewise wetlands, streams, and rivers are public waters that provide valuable public benefits such as recreation, plant and wildlife habitat, transportation, and other benefits.

Natural resource projects are resource-oriented projects that protect or manage natural areas that are valuable habitat and recreational areas. The areas close to the resource within the subwatershed benefit from their proximity to the resource by increased property values and easy access to recreational amenities. However, all residents in the watershed benefit from the visual, ecological, and recreational amenities of the areas addressed by a SWWD natural resources project. The ecological stability maintained or created by natural resource projects will increase the visual and wildlife integrity of the region, providing watershed-wide benefits. For instance, many wildlife species use a variety of areas to sustain themselves. Therefore wildlife such as birds seen in a resident's back yard or neighborhood park may be using habitat from another area as well to survive, transcending subwatershed boundaries. Similar interrelations exist for native plants species whose seeds can be spread by wind or wildlife between different areas.

The SWWD's cost-sharing method for funding projects presented in the next section is a slightly modified version of the method presented to the watershed by BWSR staff as a model for funding different types and sizes of projects. The cost-sharing method was also reviewed and endorsed by the SWWD's Citizens Advisory Committee.

2. Funding Methods

The watershed will fund its general **operations and administration** through the funds authorized under Minnesota Statutes **103B241, 103D.905, and/or 103D.729 and Minnesota Chapter 444**.

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These funds can also be used for small projects and can serve as a contingency for activities not fully budgeted for in the WMP process.

As discussed above, watershed programs and projects will vary significantly in purpose and size depending on the issue being addressed. Therefore the SWWD financing methods must be flexible enough to provide equity in funding watershed activities while maintaining an effective and efficient funding process that does not create excess administrative costs.

Watershed **programs** will be funded through a district-wide ad valorem levy or stormwater utility. The levy authority for watershed programs is under **103B.241. Stormwater utility authority for watershed programs is under 103D.729 and Minnesota Chapter 444**.

To allocate costs to the contributing areas for capital projects, the SWWD will use project subwatershed to divide the project costs between the contributing or service area and the entire watershed. The **subwatershed** approach for contributing waters is used under authorities of ~~**103B.251**~~ **103D.729 and Minnesota Chapter 444**.

For funding purposes the SWWD projects are divided into three categories:

- X Non-capital projects
- X Small capital projects
- X Large capital projects

Non-capital projects, which are typically studies or plans, do not include construction of large capital-intensive facilities. The non-capital projects may lead to capital projects in the future. Small capital projects are typically structural projects that do not include significantly large expenditures. In order to prevent administrative costs from becoming too large for non-capital projects and small capital projects, ad valorem tax levies will be used rather than a stormwater utility approach.

For small and large capital projects a threshold ranging from $500,000 to $1,000,000 will be used to distinguish between small and large capital projects. Each project within this range is evaluated with regards to the issue of equity of funding the project and maintaining low financial administration costs. The goal for watershed projects is to maintain financing administration costs below 5% of the total project cost. The threshold range presented here is an initial approach that will be re-evaluated in the future to determine if another framework is better suited to maintain low project administrative costs while providing equity in project funding.

Non-capital projects or studies will be funded through watershed-wide ad valorem taxes under **103B.241 and/or 103D.729 and Minnesota Chapter 444**. The watershed-wide levy allows pertinent studies to proceed forward without undue administrative delay and collecting the necessary information with which to make informed decisions. The studies will then identify any necessary improvements, the costs of those improvements, and the appropriate subwatershed boundaries for financing if a capital project must be implemented.

Small capital projects will be funded through a combination of watershed-wide and subwatershed ad valorem taxes consistent with Table VI-11. The small capital projects will be funded under the authority granted by **103B241 ~~103B.251~~and/or 103D.729 and Minnesota Chapter 444**.

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Large capital projects will also be funded through a combination of funds from the watershed as a whole and the project's subwatershed consistent with Table VI-11. The collection of funds will be done through a stormwater utility approach ~~or~~ and water management district as provided for in **103D.729 and Minnesota Chapter 444 or with** ~~instead of~~ ad valorem taxes and the authorities granted under **103B.241**. ~~The large capital projects will also need to follow **103B.251** when county bonds are issued. The process described in 103B.251 includes county board review and a public hearing.~~ Table VI-10 summarizes the funding of watershed programs and projects.

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Table VI-10. Watershed Funding Methods

Type of Activity	Range of Costs	Distribution of Costs	Form of Payment	Statutory Authority
Operation and Administration	$~~125,000~~250,000	Entire Watershed	Tax or Stormwater Utility	103B.241 or 103D.905 or 103D.729 & Chap. 444
Programs	Any	Entire Watershed	Tax or Stormwater Utility	103B.241 or 103D.729& Chap. 444
Non-Capital Projects (studies or plans)	Any	Entire Watershed	Tax or Stormwater Utility	103B.241 or 103D.729& Chap. 444
Small Capital Projects	$0 to $500,000/ $1 million	Subwatershed/Entire Watershed split	Tax or Stormwater Utility	103B.241 ~~&~~or ~~103B.251~~103D.729& Chap. 444
Large Capital Projects	$500,000/ $1 million and up	Subwatershed/Entire Watershed split	Tax or Stormwater Utility	103B.241 or~~103B.251, &~~ 103D.729 & Chap. 444

The SWWD will continually coordinate with member cities to fairly and equitably allocate costs by entering into agreements with the cities to collect project funds through **area charges** on new development or redevelopment. The SWWD will also consider **accumulating funds** for specific projects in advance of expenditures for the project as authorized in **103B.241**. The funds collected before a project is implemented will be used to reduce the total project cost by reducing interest costs incurred when issuing bonds.

Table VI-11. Distribution of Funding for Projects

Nature of Project	Portion Paid by the Subwatershed	Portion Paid by the Entire Watershed
Water Quantity	75%	25%
Water Quality	50%	50%
Natural Resources	~~25%~~0%	~~75%~~100%

These percentages presented in Table VI-11 are guidelines for the watershed and can be altered if a specific project=s nature requires a different approach or distribution of costs. As part of the ~~SWWD=s~~SWWD□s public hearing on large capital projects, any variation from the funding guidelines will be addressed. In some cases, as with the natural resources projects identified in this plan, the Acontributing subwatershed≅ may encompass the entire watershed and therefore the subwatershed would be defined as the entire watershed.

In the case of the Central Draw Outlet, several financing alternatives will be investigated as part of the study. The financing options to be considered include but are not limited to:

- Ad valorem taxing by subwatershed and watershed.
- Stormwater utility.
- Bonding scenarios, including escalating payment schedules.
- Joint powers agreements with cities or other units of governments.
- Grants.
- Special legislation to provide other funding or financing methods.

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While many variables still must be defined on funding large projects, it is estimated that for the first few years, the average home in the watershed will pay around $50 per year. Once capital projects begin and a Central Draw Outlet project is defined, the costs will increase in the project subwatersheds and likely decrease in areas outside the project subwatersheds.

3. Description of Funding by Project

Table VI-12 presents the method of funding for each project and the subwatershed, if applicable, for each proposed SWWD project. The subwatershed numbers refer to designations on Map 1, the Summary Map, at the back of the report.

Table VI-12. Type of Projects and Potential Subwatersheds for Funding

Proposed Project	Type of Project	Potential Project Subwatersheds *	Portion Paid By the Subwatershed
1. Central Draw Outlet Study	Non-capital	AL-1; WL-1,2,3,4,5; ML-1; PL-1,2; CL-,2,3,4; BL-1,2,3,4,5,6,7,8; CP-1,2,3,4; GL-1,2; EW-1	---
2. West Draw Drainage Impr.	Small capital	WE-1, 2, 3, 4	75%
3. Central Draw Interim Ponding	Large capital	AL-1; WL-1,2,3,4,5; ML-1; PL-1,2; CL-,2,3,4; BL-1,2,3,4,5,6,7,8; CP-1,2,3,4; GL-1,2; EW-1	75%
4. Wetland Assessment and Management Plan	Non-capital	---	---
5. Public Education Learning Center	Non-capital	---	---
6. Powers Lake Management Plan	Non-capital	PL-1,2	---
7. Lake Assessment Studies	Non-capital	---	---
8. Greenway Concept Plan	Non-capital	---	---
9. Pond/Wetland Treatment in Westerly Drainageway	Small capital	** AL-1; WL-1,2,3,4,5, ML-1; PL-1,2; CL-1,2,3,4; BL-1,2,3,4,5,6,7,8; CP-1,2,3,4; GL-1,2; EW-1; and WD-1,2,3,4; SD-1,2,3; MR-1,2,3	50%

* To be defined at a public hearing for the project as required in Minnesota Statutes 103D.729. See Map 1 for subwatersheds.

** Include Central Draw Subwatershed if a future outlet for the Central Draw were to drain to this project.

I. Regulatory Controls and Enforcement

Upon adoption of the WMP, the SWWD will initiate its rule-making process. The rules of the SWWD shall detail the regulatory controls necessary to implement the programs outlined in the

WMP. The goal for the implementation of the programs is to work through the cities= existing programs and to encourage the cities to adopt new controls as necessary to adopt the WMP=s standards. If local city controls are at least as restrictive as the SWWD's rules, then it will not be necessary for the SWWD to review development plans in addition to city review.

For interim enforcement of the SWWD Standards (until Local Plans and/or local controls are in place) the SWWD will develop rules and review procedures to enforce the standards. The rules may include administrative fines for violations of standards to be used during the interim enforcement of the standards.

A review of SWWD programs and implementation of standards will be carried out annually by the Technical Advisory Committee (TAC) and presented to the Citizens Advisory Committee (CAC). The CAC will make recommendations to the SWWD Board of Managers on the adequacy of the present regulatory controls and implementation thereof. If during the annual review, the Board concurs that programmatic changes are necessary, the Board can amend the WMP to reflect the needed changes and/or adopt new rules that require the cities to amend their ordinances to effect the needed changes. If implementation of standards consistent with the WWP is a problem, the SWWD will take administrative or legal action to ensure that the standards are being implemented.

J. Impacts on Local Units of Government

The programs and standards put forth in the WMP are intended to be implemented by the cities. The cities must adopt the necessary controls to be solely responsible for implementing the programs and standards. The emphasis on implementation by the cities is in conformance with the ~~SWWD=s~~SWWD□s desires for efficient implementation of the WMP and the cities= desires to maintain local control in day-to-day operations affecting their city. An important part of cities taking control of the implementation of programs and standards is the City=s adoption of the SWWD approved Local Water Plan.

As local units of government maintain control of implementing programs at the local level, there will also be a greater effect on the local units to implement the policies of this WMP. The major areas of impact to local governments will be water quantity and quality standards, wetlands management standards, and implementation of the greenway.

The water quantity standards refer to the allowable peak flow rates which must be addressed in the cities= Local Plans. The water quality standards refer to comprehensive stormwater treatment to implement the necessary controls to accomplish the lake, river, and wetland standards outlined in the WMP.

Changes to the existing soil erosion and sediment control programs will be nonstructural in nature. Cities will adopt and enforce erosion control measures throughout the watershed with a periodic review of enforcement by the SWWD. The estimated cost to the cities varies and depends on the amount of active construction being carried out in the cities.

For the most actively developing communities, such as Woodbury and Cottage Grove, the work load could reach that of a full-time employee during the construction season. The cost to the cities based on a full-time position for seven months could range from $18,000 for an intern with training each year to $30,000 for a trained, experienced employee. For those communities with a smaller need for erosion control inspection, a smaller cost would be involved, possibly $5,000 per year, assuming that other job responsibilities would be available to occupy the person at other times. The cost of an employee would be borne by the cities and may currently be in place to enforce the existing regulations. The cost of training would be provided by the SWWD as needed. The estimated annual cost to the SWWD is $8,000, which includes training and an annual program review of the cities.

The lake, river, and wetland standards mainly include the appropriate use of BMPs to limit water quality impacts. The implementation of BMPs is most effectively done during the process of land development and is best financed through the development process. In this way, the controls needed to minimize the impacts of development are financed by the development that create the need for the

controls. In this case, the impact to the cities is minimal since it can be incorporated into their existing building controls and addressed in their Local Water Management Plans.

One specific standard that may require additional planning and improvements by the City of Woodbury is the maintenance of Powers Lake at the in-lake target set forth in the WMP. The cost of continued monitoring of the lake is necessary to aid in documenting the quality of the lake. Joint planning and study of alternatives by the SWWD and Woodbury is needed before specific improvements can be recommended and costs identified.

The cities that have 10 or more septic systems within the watershed are required to adopt the state standards for septic systems. The adoption process will require some staff time on the part of those communities that meet the 10 septic systems criteria.

The greenway concept plan is intended to be implemented through existing programs such as park dedications, drainage easement acquisition, and wetland mitigation projects. Additional attention may be placed on locating grant funding sources to acquire specific high priority areas. The cost to the cities is expected to be minimal, with some time allocated by existing staff for planning and grant application preparation.

Table VI-13 lists the aspects of the WMP that are expected to impact local units of government and the estimated financial or staff resources necessary to meet WMP requirements.

Table VI-13. Impacts on Local Units of Government

SWWD Plan Requirement	**Estimated Financial or Staff-Time Annual Needs**				
	Oakdale	Lake Elmo	Woodbury	Afton	Cottage Grove
Soil Erosion and Sediment Control	110 hrs.	40 hrs.	1120 hrs.	0 hrs.	700 hrs.
Specific Water Quality Standards	$900	$0	$4,300*	$0	$1,300
Septic System State Standards	0 hrs.	40 hrs.	40 hrs.	0 hrs.	40 hrs.
Wetland Buffer Strips	20 hrs.	20 hrs.	60 hrs.	5 hrs.	40 hrs.

Greenway Planning/Coordination	20 hrs.	20 hrs.	60 hrs.	20 hrs.	80 hrs.

*Possible future costs for improvements at Powers Lake could exceed this figure.

Local Water Management Plan (Local Plan) Specific Requirements

In addition to the statutory requirements of MN Rules Chapter 8410, the SWWD stresses the importance of including the following information in each city=s Local Plan:

1. Problems and Issues:
   - X Identify existing or future flooding problems
   - X Identify existing or future water quality problems
   - X Identify existing or future natural resource problems

2. Local, Regional, State, and Watershed District Controls:
   - X Adopt and include copies of DNR approved Floodplain and Shoreland ordinances
   - X Adopt a regional water quality protection strategy that is consistent with the Met Council=s Interim Strategy and the SWWD water quality and waterbody standards
   - X Adopt an erosion and sediment control ordinance and incorporate erosion and sediment control standards into the building inspection process and ensure that vegetative cover or comparable protection is established before a lot is certified by the city.
   - X Include a groundwater protection component consistent with Washington County=s Draft Groundwater Management Plan or method to adopt measures once the Draft is finalized
   - X Adopt a well head protection plan
   - X Develop methods to address flooding, water quality, and natural resource problems
   - X Adopt standards consistent with MN Rules Chapter 7080 for septic system construction and maintenance

X Establish 100-yr high water levels and peak flow rates for all waterbodies in the drainage system

X Plan for a ponding and drainage system that meets the SWWD allowable peak flow rates

X Establish a minimum 2 foot freeboard standard for ponding areas in the drainage system

3. Methods for Evaluating Proposed Controls:

X Develop a method to evaluate effectiveness of water quality improvements and programs

X Initiate and/or continue monitoring of all lake basins in the watershed