

Executive Summary

Introduction

The City of Lincoln (City) and the Lower Platte South Natural Resources District (NRD) are in the process of developing a Comprehensive Watershed Management Plan for the City of Lincoln and its future growth areas. This comprehensive watershed plan is being developed basin by basin, through the completion of watershed master plans for individual basins. Watershed master plans are used as planning tools to be referenced in conjunction with proposed development and as a guide in the preparation of future capital improvement projects.

The City and NRD have previously adopted watershed master plans for the Beal Slough, Stevens Creek, Cardwell Branch, Deadman's Run and Southeast Upper Salt Creek basins. Figure ES-1 shows the basins in the Comprehensive Watershed Master Plan. The Little Salt Creek Watershed Master Plan (Master Plan) is the sixth master planning effort to date and is summarized in this report. The Master Plan for the Little Salt Creek Watershed has been prepared because some near-term growth within the basin is expected, as identified in the Lincoln-Lancaster County Comprehensive Plan.

The Little Salt Creek Watershed is located north of the City of Lincoln as illustrated in Figure ES-2. The watershed drains approximately 46 square miles from the headwaters north of West Ashland Road to the confluence with Salt Creek located southeast of I-80 at North 27th Street. The watershed is approximately 14 miles in length with a maximum width of about 5.5 miles. The purpose of the Master Plan is to outline long-term planning tools and improvement projects to address water quality, flood management, and stream stability to provide guidance for sustainable urban growth in the watershed.

The project team was led by the City and NRD, in cooperation with Lancaster County (County). The City/NRD retained the consultant team of Intuition & Logic (I&L), in association with the Heartland Center for Leadership Development (HC), PBS&J, E&A Consulting Group, Inc. (E&A), University of Nebraska (UNL), and Terracon.

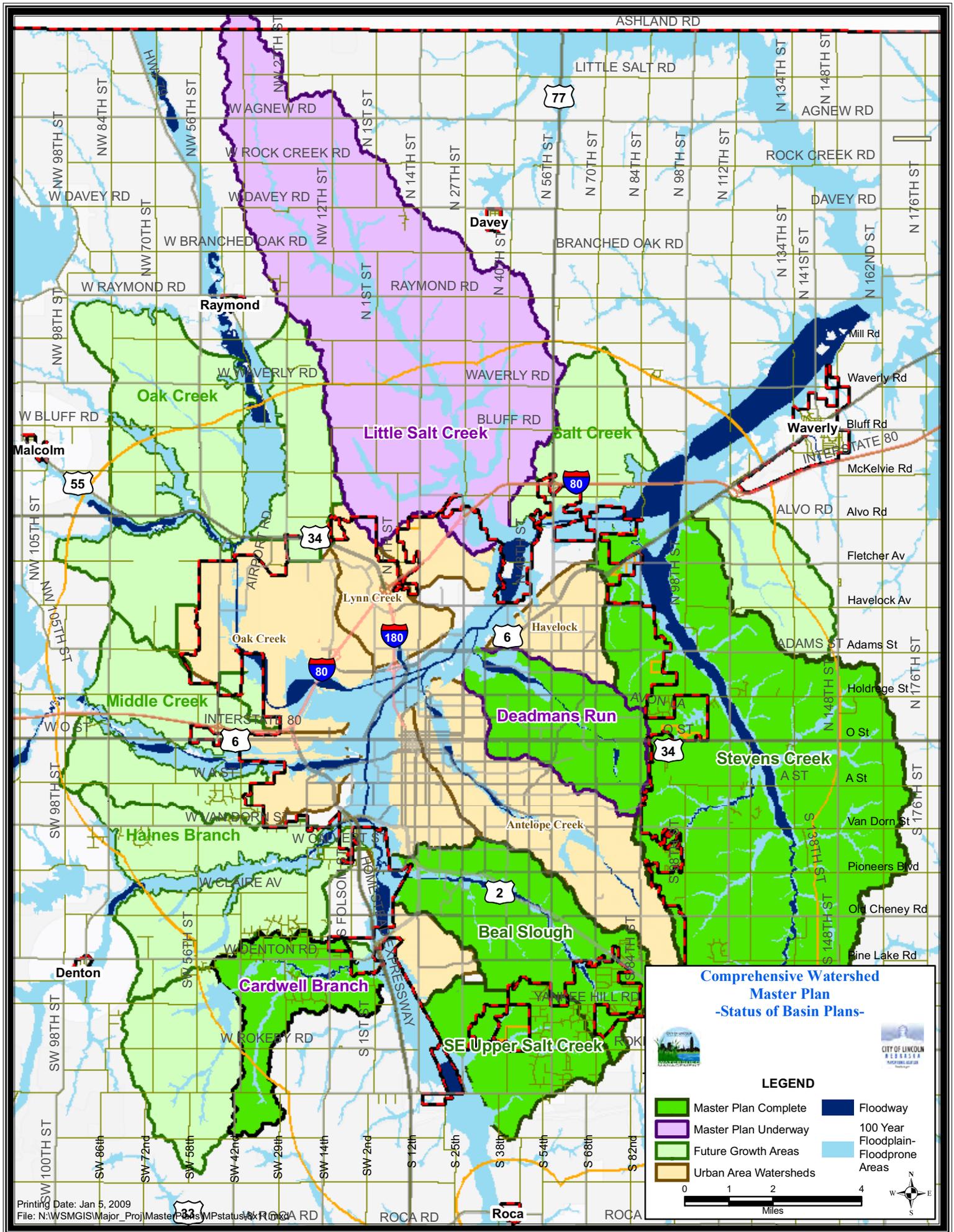


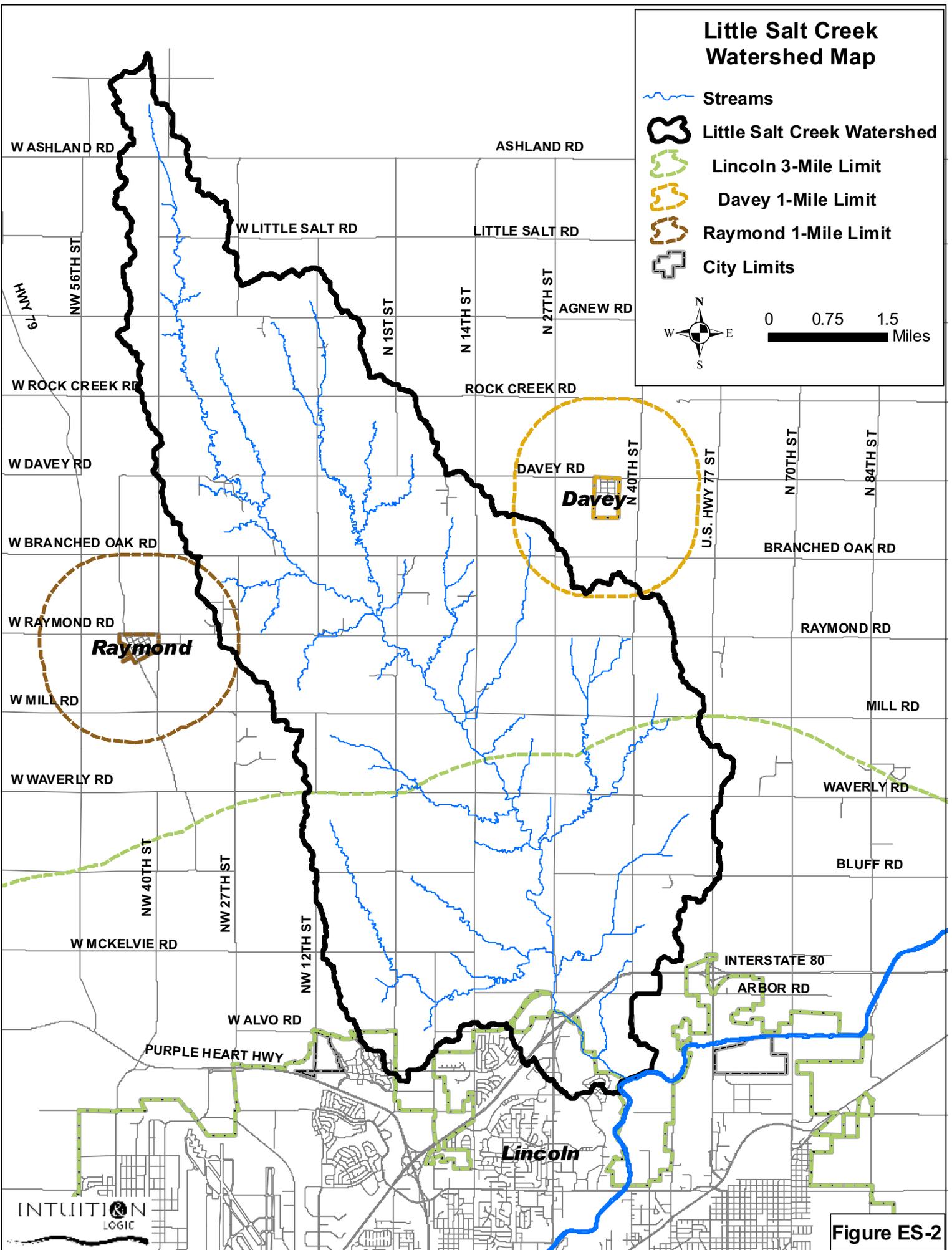
Figure ES-1

Little Salt Creek Watershed Map

-  Streams
-  Little Salt Creek Watershed
-  Lincoln 3-Mile Limit
-  Davey 1-Mile Limit
-  Raymond 1-Mile Limit
-  City Limits



0 0.75 1.5 Miles



Public Participation

As part of the Master Plan development, a public participation process was used to solicit input from area residents and other interested parties. The public participation process included the following:

- Two open houses in July 2008 and February 2009
- Project updates and information on the City's website to post preliminary results and upcoming events
- A series of five newsletters and one postcard mailed to over 800 individuals and organizations
- Input from a 16-member Citizens Advisory Committee (CAC) that included three farmers, six landowners, three developer/business owners, a representative of the Nature Conservatory, and three elected officials representing the City of Lincoln, Lancaster County, and the Lower Platte South NRD. Three CAC meetings were held throughout the watershed master planning process.
- The involvement of a 14-member Technical Advisory Committee (TAC) that was selected based on technical knowledge of water resource issues as well as local, state and national standards and trends. Four TAC meetings were held throughout the watershed master planning process.

The public input and feedback received during this process was used by the project team to formulate and refine the master plan recommendations. Section 1 of the Master Plan provides further details regarding the public participation process.

Master Plan Elements

The Master Plan consists of four major elements: 1) Floodplain Management Tools, 2) Capital Improvement Projects, 3) Stormwater Best Management Practices, and 4) Other Improvement Recommendations. A brief summary of each major element follows:

Floodplain Management Tools

One of the major elements of the Little Salt Creek Master Plan is the incorporation of updated floodplain and floodway boundary maps. Accurate floodplain and floodway boundaries alert property owners to flood hazards as well as provide guidance for future growth and development within the watershed. Figure ES-3 illustrates the nearly 86 miles of streams and updated floodplain and floodway boundaries delineated as part of this Master Plan following the specifications and procedures set by the Federal Emergency Management Agency (FEMA).

This floodplain mapping update increased the accuracy of currently-mapped stream reaches and also identified flood hazards for upper stream reaches not previously mapped by FEMA. Consistent with other watershed master plans, the floodplain mapping limits included all streams draining 150 acres or more, as shown on Figure ES-3. The more detailed mapping identifies that approximately 3,560 acres are within the 100-year floodplain. This includes approximately 875 acres that were not previously known to be prone to flooding and were not identified on the FEMA maps. However, the mapping update also determined that approximately 475 acres shown to be in the floodplain on the FEMA maps are not within the

100-year floodplain as updated. Section 5 of this Master Plan includes further detail regarding the revised floodplain delineation.

The Little Salt Creek floodplain maps resulting from the present study are anticipated to be submitted to FEMA for preliminary review and comment when FEMA's MapRISK program begins in the Fall of 2009. However, the FEMA review process has the potential to take more than a year following the final submittal. In the meantime, the Master Plan recommends the adoption of this information for local regulatory purposes within the jurisdiction of both the City of Lincoln and Lancaster County.

Little Salt Creek Floodplain Map Updates

-  Little Salt Creek Watershed
-  Floodway
-  Updated Floodprone Area
-  Lincoln 3-Mile Limit
-  Davey 1-Mile Limit
-  Raymond 1-Mile Limit
-  City Limits



0 0.75 1.5
Miles

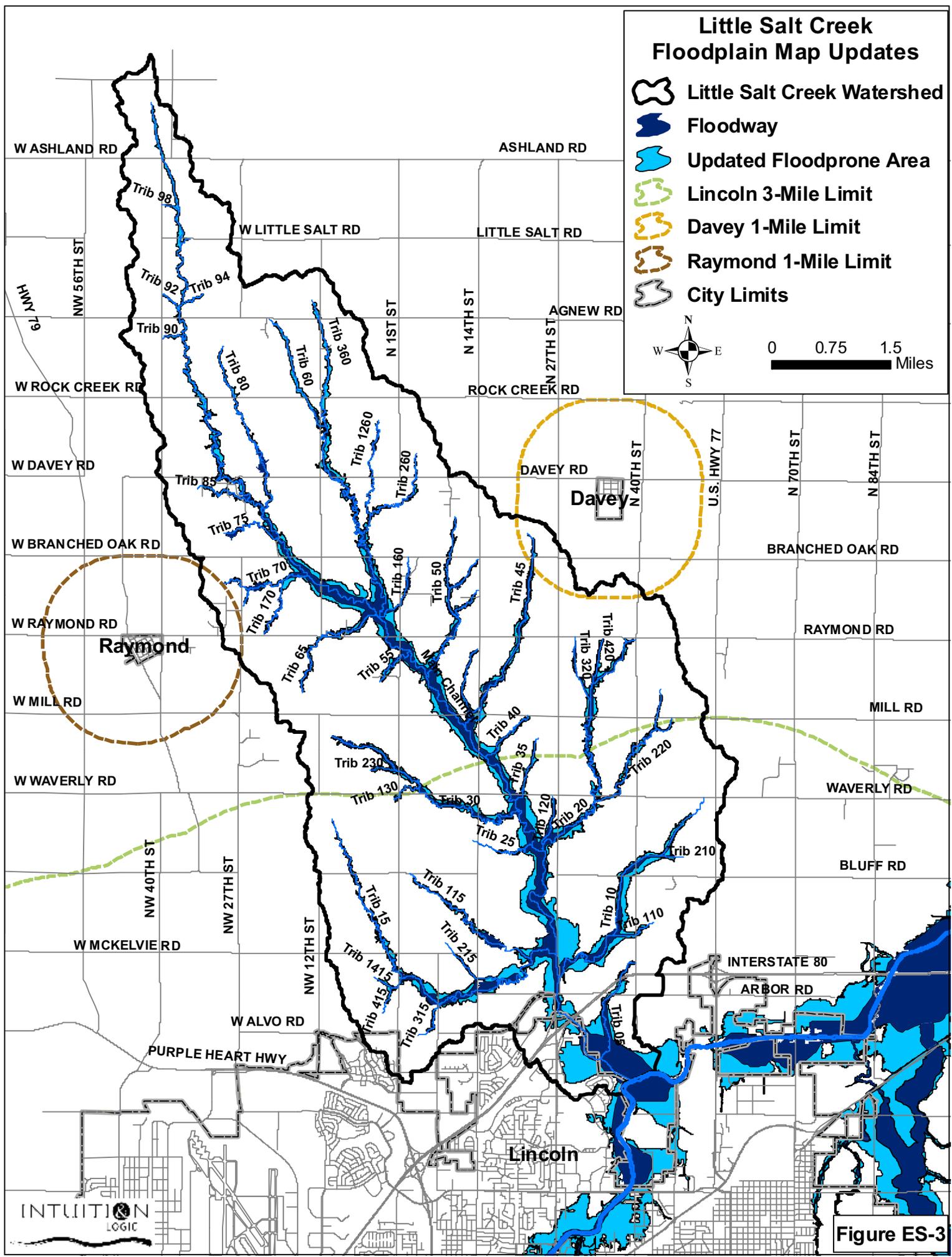


Figure ES-3

Capital Improvement Projects

The results of the hydrologic, hydraulic, and geomorphic evaluations formed the foundation for identifying problem areas in the watershed. Potential improvement projects addressing each problem area were evaluated based on design considerations, economic feasibility, and overall efficiency.

The Master Plan includes 18 stream stability capital improvement projects. The general locations of the projects are shown in Figure ES-5 Capital Improvements Project Location Map. Projects 1 through 10 are grade controls along the main stem immediately downstream of bridge crossings. The main stem of the stream is incising, and continued incision will cause erosion that could compromise bridge footings and stability. Sediment released from incision and subsequent bank failures could threaten property and natural resources along the channel. These grade controls will hold the profile grade of the channel, reducing the erosion and sediment released.

Projects 11 through 18 are stilling basins at the outfall of existing culverts. Channel erosion and incision have caused eight existing culvert outfalls to be perched from one to three feet above the channel, thereby threatening the stability of the culverts. The stilling basin at the downstream end of culvert will dissipate energy and protect the outfall.

The total cost for all 18 capital improvement projects is estimated to be approximately \$1.6 million using 2009 material and construction costs. Traditional funding options for the Capital Improvement Projects include City stormwater bonds, funding from the Lower Platte South Natural Resources District, and County funding for stream stability measures where appropriate in association with County road improvement projects. More discussion on funding is detailed further in Section 10 of this report.

The recommended projects were categorized using the prioritization categories from the Prioritization Methodology Report for Watershed Master Planning Projects, City of Lincoln, Nebraska, 2006. The prioritization methodology was developed for the City of Lincoln to set priorities and implement projects for watershed master planning each year. The prioritization system contains five major categories including flooding impacts, stream stability, water quality, safety factor, and miscellaneous factors. For each project, a ranking worksheet is used to assign points under each category, with the goal of developing an overall score. The projects with the highest point score are considered a higher priority. Table ES-1 lists the results of the estimated project cost and ranking scores for the 18 projects within the Little Salt Creek study area. Further detail on each project, including the problem description and recommendations are found in Section 9 of this Master Plan.

Little Salt Creek Capital Improvement Project Location Map

Stream Stability CIP

- 1-10 Grade Control
- 11-18 Stilling Basin



0 0.75 1.5
Miles

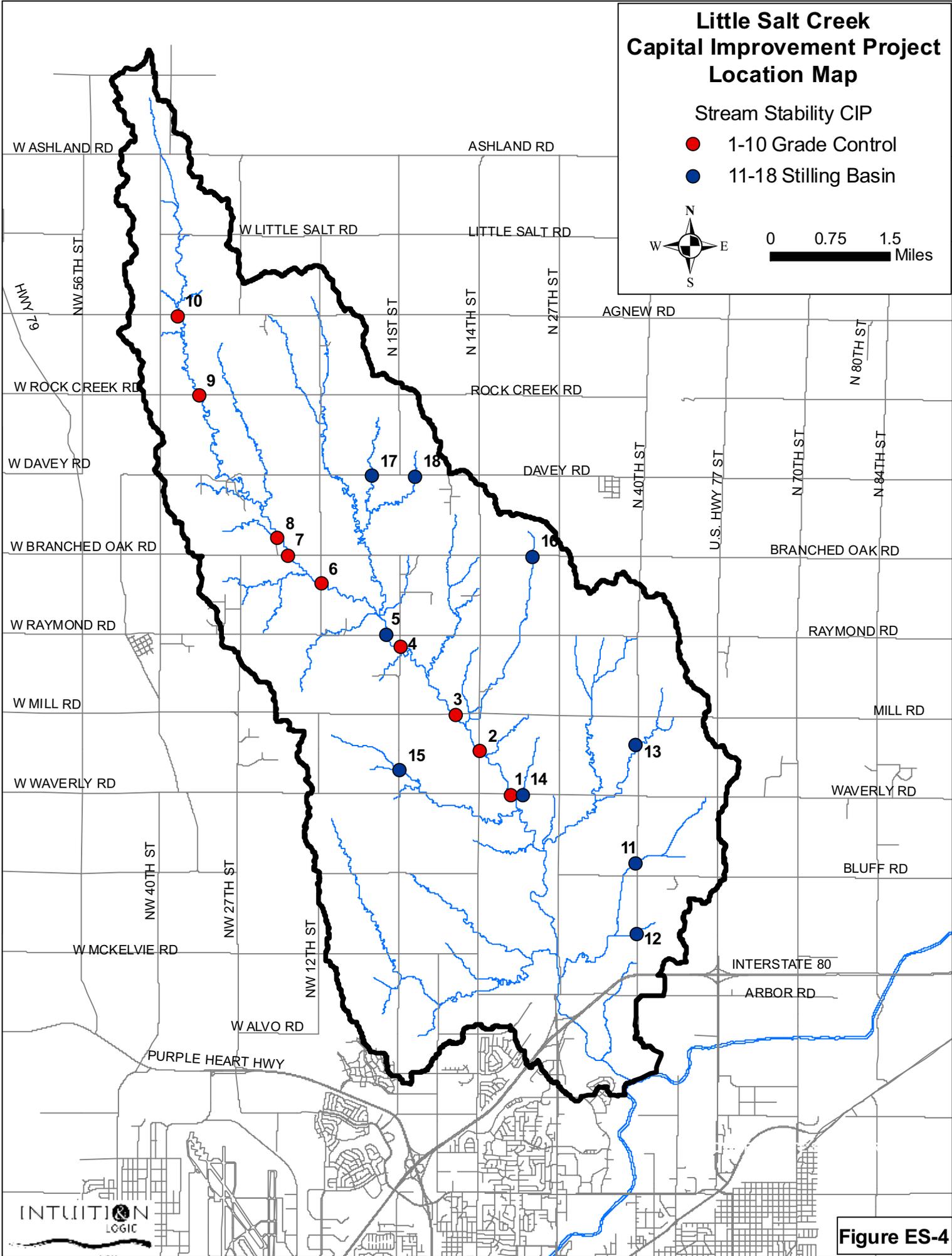


Table ES.1 Capital Improvement Project Summary Results

Project No.	Project Name	Classification	Priority Score	Project Ranking	Project Cost
1	Grade Control Main Stem, Waverly Road Bridge	Secondary	255	3	\$95,000
2	Grade Control Main Stem, North 14 th Street Bridge	Secondary	260	1	\$113,000
3	Grade Control Main Stem, Mill Road Bridge	Secondary	250	7	\$91,000
4	Grade Control Main Stem, North 1st Street Bridge	Secondary	255	4	\$110,000
5	Grade Control Main Stem, W Raymond Road Bridge	Secondary	260	2	\$115,000
6	Grade Control Main Stem, NW 12th Street Bridge	Secondary	240	8	\$91,000
7	Grade Control Main Stem, W Branched Oak Road Bridge	Secondary	255	5	\$71,000
8	Grade Control Main Stem, NW 19th Street Bridge	Secondary	240	9	\$84,000
9	Grade Control Main Stem, W Rock Creek Road Bridge	Secondary	240	10	\$78,000
10	Grade Control Main Stem, W Agnew Road Bridge	Secondary	255	6	\$69,000
11	Stilling Basin at N 40 th Street Culvert Outfall, Tributary 10	Secondary	105	11	\$78,000
12	Stilling Basin at N 40 th Street Culvert Outfall, Tributary 110	Secondary	95	14	\$77,000
13	Stilling Basin at N 40 th Street Culvert Outfall, Tributary 220	Secondary	100	13	\$67,000
14	Stilling Basin at Waverly Road Culvert Outfall, Tributary 35	Secondary	90	15	\$75,000
15	Stilling Basin at N 1 st Street Culvert Outfall, Tributary 30	Secondary	100	12	\$85,000
16	Stilling Basin at Branched Oak Road Culvert Outfall, Tributary 45	Secondary	85	16	\$95,000
17	Stilling Basin at W Davey Road Culvert Outfall, Tributary 1260	Secondary	80	17	\$113,000
18	Stilling Basin at Davey Road Culvert Outfall, Tributary 260	Secondary	80	18	\$85,000
Total =					\$1,591,000

Stormwater Best Management Practices (BMPs)

In the Little Salt Creek Watershed, the highly erodible nature of the soils cause the main channel and tributaries to be very susceptible to erosion resulting from changes in runoff volumes and rates for storms which are more frequent than the 2-year event. The key to preserving water quality, maintaining long-term stream stability, and providing flood control benefits is to install stormwater facilities that control the full range of hydrologic conditions, including the smaller rain events in addition to the 2-, 10-, and 100-year storm events. Site-specific structural best management practices (BMPs) are recommended to control the smaller rain events, with detention basins being used to control the larger rain events (2-, 10-, and 100-year design storms). Two approaches to manage both the larger storm events and smaller more frequent storm events are 1) Integrated Detention Facility, and 2) Alternative Site Design. This Master Plan recommends changing the City's current stormwater BMP program from a voluntary to a mandatory program for site-specific structural BMPs as outlined in the Stevens Creek Watershed Master Plan, to include options for both the integrated detention facility and the alternative site design approaches. Further discussion of these two approaches can be found in Section 7 of this Master Plan under subsection 7.2 Stormwater BMPs.

Other Improvement Recommendations

The City's Capital Improvement Program generally includes the design and construction of physical improvements with a minimum useful life of fifteen years. For Watershed Master Plans, the City's Capital Improvement Program has been used for stream stability, water quality, channel improvement, flood reduction and conservation projects. Some recommendations have measureable benefits but provide no substantial flood reduction, stream stability and water quality benefits. Others are improvements that are more appropriately made in conjunction with street improvements. Projects such as these are identified as recommended projects for the Watershed Capital Improvement Program, but are included in this Master Plan as other evaluated projects to be used as a reference. The three types of recommendations are 1) Bridge and Culvert Improvements, 2) Natural Resources, and 3) Riparian Corridor Enhancement. These types of recommendations are briefly summarized below.

The Bridge & Culvert Improvement recommendations address the problem of frequent roadway topping on paved roads. The recommended approach is to replace or enhance the hydraulic structure to convey a minimum of the 25-year storm event without topping the road or compromising channel geomorphic parameters. Although these recommendations provide measurable benefits, they are not included as projects in this Watershed Master Plan because they do not impact habitable structures and are not within an urbanized or otherwise artificially altered drainage system. These structural improvement projects are road projects and would come into effect when the bridge/culvert is replaced due to condition or capacity issues. Details on these recommendations are found in Appendix L of the Master Plan.

Natural Resources recommendations recognize that Saline Wetlands and the Salt Creek Tiger Beetle are major resources of the Little Salt Creek Watershed. Several issues and approaches were discussed during multiple Technical Advisory Committee meetings and in subsequent conversations throughout the Master Plan process. As a result, the impact of the Capital

Improvement Projects on Salt Creek Tiger Beetle habitat is addressed as part of this Master Plan. Currently, the University of Nebraska at Lincoln and other agencies are working to develop potential plans to restore and protect the natural resources within the Little Salt Creek watershed. It was determined that more research needs to be done before any specific projects can be developed. Discussions on Natural Resources issues are found in Section 9 of this Master Plan under subsection 9.3.1.2 Natural Resources and Water Quality Problem Identification and 9.3.2.2 Natural Resources Evaluation Approach.

The Riparian Corridor Enhancement Program is a watershed management program with the goal of re-establishing the corridor and reducing erosion and stream downcutting. A woody riparian buffer could be re-planted along Little Salt Creek and its tributaries along reaches where soil and saline content will support it. Over the past decades, the woody riparian corridor has been substantially depleted. This management measure will contribute to a more robust, self-managing stream system and provide abundant opportunity for habitat and improved water quality. There is over 68 miles of corridor that may qualify for this type of restoration. The Riparian Corridor Enhancement is a voluntary program for the landowners and developers and is not considered a Capital Improvement Project because it does not meet the funding requirements under the Capital Improvement Program. More details on the Riparian Corridor Enhancement can be found in Appendix L of this report.

Summary

The Little Salt Creek Watershed Master Plan provides the necessary planning tools and improvement projects to address water quality, flood management, and stream stability and provide guidance for sustainable urban growth in the watershed. This master plan is a reference for the implementation of improvement projects in the Watershed through the City and County Capital Improvement Programs and the NRD's Long Range Implementation Plan, and as a guide for future growth.

By using the detailed study information and applying the Master Plan elements described above, multiple goals will be achieved including:

- Protection of future homes and businesses from flood hazards
- Reduction of future impacts to water quality and stream stability due to urbanization
- Preservation of aquatic and riparian habitat
- Preservation of natural resources and endangered species
- Long-term stream stability that protects public infrastructure
- Development guidelines that address stormwater quantity and quality

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