

Section 10

Implementation

The successful implementation of the Master Plan recommendations will involve addressing multiple issues, including identifying physical constraints, avoiding downstream impacts, property owner and government agency coordination issues, maintenance agreements, funding, and education programs. The following paragraphs provide a discussion of these various issues.

10.1 Capital Improvement Project Implementation

The 12 improvement projects recommended in Section 8 were grouped into four categories: (1) stormwater conveyance improvements, (2) dry detention basins, (3) local flood control, and (4) water quality projects. The stormwater conveyance improvement projects (projects 1 through 4) and dry detention basins (projects 5 and 6) form the recommended watershed solution and are interrelated in their ability to maximize the effectiveness of each individual project. A watershed-based implementation approach for the construction of these recommended projects is critical in maximizing the benefits of each project, as well as avoiding adverse downstream impacts. The local flood control and water quality projects are independent of each other and can be implemented in a less rigid approach.

The implementation approaches for the recommended projects are included below.

10.1.1 Watershed Solution

The implementation of the watershed solution, which consists of projects 1 through 6, will involve additional engineering analysis, landowner coordination discussions, and a construction sequencing plan to avoid adverse downstream impacts.

Preliminary Engineering Report

The next step in the process is to develop a preliminary engineering report (PER) that further evaluates the details of each project, including identifying the physical constraints, exploring the subsurface conditions, evaluating various construction materials and aesthetics issues, agency coordination, environmental impacts, permitting, easement requirements, maintenance agreements, project costs, and construction limits. In addition, the BCR should be updated using modified project information, as well as integrating the damages caused by loss of function, emergency management, and casualties. The PER will establish the overall limitations of the watershed solution and provide a framework for approaching affected property owners with respect to acquiring temporary and/or permanent easements.

One of the key technical issues that must be further evaluated during the PER effort is determining the balance between increased channel conveyance and stormwater detention requirements. As discussed previously, the stormwater conveyance projects (projects 1 through 4) decrease flood water surface elevations but also increase flows to the downstream system. When the flows increase above a critical threshold, adverse flooding impacts could occur including increased water surface elevations or not realizing the net benefits of the downstream stormwater conveyance projects. To offset the increase in

flows, the Master Plan recommends stormwater detention basins at two locations, namely projects 5 and 6.

Once the final channel configuration of projects 1 through 4 is determined, the size and configuration of the detention basins can be optimized with the overall goal of avoiding downstream impacts. As part of the optimization process, the feasibility of constructing a single detention basin at the project 5 site location would be evaluated.

Once the PER is completed, preliminary and final design documents can be prepared, followed by construction. However, the construction process must follow a sequencing plan to avoid adverse downstream impacts as described below.

Construction Sequencing Plan

Two separate alternative construction sequencing plans can be implemented based on desired timeframes, budget, and results from the preliminary engineering report.

Construction Sequence Plan A

The first construction sequence plan is based on a three-phased approach as described below.

Phase I: Phase I includes the construction of projects 1 and 2, which can be completed without building either stormwater detention basin project (projects 5 and 6). The channel improvements throughout these areas provide enough conveyance to avoid overtopping, despite the additional flow increase. The construction must start with project 1, beginning with location 1, followed by locations 2 and 3. Once project 1 is completed, project 2 can be constructed.

Phase II: The continued construction of channel conveyance projects upstream of project 2, without building stormwater detention basins, will result in adverse downstream impacts. Therefore, either project 5 or project 6, or a combination of both projects, would need be constructed before moving forward with project 3. As discussed above, depending on the physical limitations at project site locations 5 and 6, one or both facilities may be required.

Phase III: Following the completion of the stormwater detention projects, projects 3 and 4 can be implemented. Similar to Phase I, the channel conveyance projects must progress moving upstream; therefore, project 3 must be completed before project 4.

Construction Sequence Plan B

Construction Sequence Plan B is based on a two-phased approach as described below.

Phase I: Phase I includes the construction of both stormwater detention basins (projects 5 and 6), which will provide flood benefit before construction of the channel conveyance improvements.

Phase II: Phase II includes the construction of the channel conveyance improvements (projects 1 through 4), which can be implemented with similar restrictions to Construction Sequence Plan A. The construction must start with project 1, beginning

with location 1, followed by locations 2 and 3. Once project 1 is completed, project 2, then project 3, and finally project 4 can be constructed.

10.1.2 Local Flood Control

The implementation of project 7, the Seacrest Park Berm, can occur at any point without adversely impacting downstream areas. The localized drainage patterns from adjacent property owners should be carefully evaluated when designing the berm to avoid localized adverse impacts. In addition, coordination with the City of Lincoln Parks and Recreation Department is recommended.

10.1.3 Water Quality Projects

The water quality projects, namely projects 8 through 12, are independent of each other, and can be constructed at any time. The water quality projects should be coordinated with the respective adjacent landowners to address their concerns, including aesthetics, recreational features, construction easements, and maintenance responsibilities.

10.2 Maintenance Agreements

The maintenance of Deadmans Run main channel is currently the responsibility of NRD and will likely continue after construction of the improvement projects. Regarding the water quality projects, the City will need to develop a maintenance plan to ensure the long-term functionality of these facilities. In addition, as part the PER process, the long-term maintenance of the stormwater detention projects, specifically project 5, which may involve the City and NRD, will need to be evaluated.

10.3 Coordination Efforts

A cooperative agreement between the various City departments and NRD needs to be established to guide the implementation of the Master Plan. For example, as roadways are upgraded, the Master Plan recommendations regarding bridge and culvert upgrades need to be followed. In addition, as future phases of the Antelope Valley project are completed in the downstream areas of the Deadmans Run watershed, coordination between the City and NRD will be required to achieve both improvements in transportation and stormwater conveyance.

The City of Lincoln Parks and Recreation Department will also need to be involved with several projects. Projects 3, 6, and 9 will be constructed either adjacent or within University Place Park, Taylor Park, and Bethany Park to achieve improvements in channel conveyance, stormwater detention, and water quality while maintaining the usability of these important City parks.

10.4 Project Funding

The traditional funding sources used to finance stormwater improvement projects will need to be supplemented with other funding options to finance the recommended improvement projects. The traditional funding options include City storm sewer bonds; general revenue appropriation; cost sharing between the City, NRD, and private entities; and City roadway project improvements.

Because of the magnitude of projects 1 through 6, other state and federal funding sources will need to be pursued, including appropriations through FEMA, USACE, and EPA.

Preliminary finance discussions have occurred at the federal and state level. Based on these discussions, USACE encouraged the City and NRD to pursue federal funding, probably as a General Investigation Project. USACE agreed that the project was similar to Antelope Valley and a similar funding approach could be considered. In addition to federal funding, the Deadmans Run flood control projects are currently on the State of Nebraska's list of potential projects for Nebraska Resources Development Funds.

10.5 Education Program

Water Quality Education – A proactive education program focusing on water quality issues should be developed to educate homeowners associations and private facility owners. The program may include a water quality seminar to address the primary sources of stormwater pollution and the methods for pollution reduction and removal, including both nonstructural and structural BMPs.

Demonstration Project – The City and NRD are in the process of constructing two demonstration projects that incorporate water quality BMPs into stormwater detention facilities through a partnership with the private sector. Once constructed, an evaluation should be completed to determine benefits and challenges of BMP incorporation into traditional stormwater detention facilities and to provide education on incorporating water quality features into private development in the future.

For the Deadmans Run watershed, this public-private partnership should be pursued to identify locations where structural BMPs within large parking lot areas can be incorporated, which have the potential to greatly improve water quality.

Structural BMP Design Workshop - A structural BMP design workshop could be held to educate engineers and business owners on designing and constructing structural BMPs. Providing this education will ensure proper BMP design, which will streamline the plan review process. The workshop would primarily focus on design guidance for BMPs such as grass swales and bioretention facilities, which can be used to treat stormwater runoff from parking lots.

10.6 Additional Studies

Additional studies should be conducted to identify source pollutants contributing to elevated bacteria that impair the primary contact recreation beneficial use within Deadmans Run. Dry weather illicit sanitary sewer connection investigations and inflow and infiltration studies of the sanitary sewer system will identify areas where the collection system (manholes and pipelines) may contain maintenance issues, such as breaks and cracks, which may be contributing to the bacteria issues. A comprehensive monitoring program is essential to the *E. coli* TMDL to assess the future beneficial use status and to determine if the water quality is improving based on the implementation of the recommended BMPs.