Elm Creek / 6th Street West Pond

Conceptual Design Report

March 2018

Prepared for : City of Tulsa, Oklahoma
Prepared by: GUY Engineering · Swift Water Resources Engineering · Alaback Design Associates

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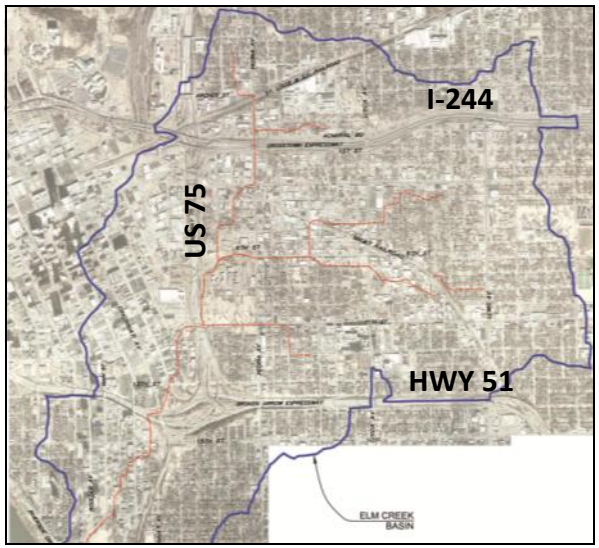
1.0 Introduction



Elm Creek Drainage Basin Location Map

Centennial Park's redevelopment and new community center are tangible examples of successful implementation that has positively impacted Tulsa.

1.1 Project Overview and Objectives

Project Scope

The Elm Creek drainage basin, shown in the photo to the left, is generally located on the east side of downtown Tulsa. This area encompasses almost three and one-half square miles of land that is fully developed with a broad range of land uses. Flooding in this area of Tulsa has been a problem for many years, with several floods occurring during the 1970s and 1980s. Flooding problems have significantly contributed to the disinvestment and decline that many neighborhoods in the basin have experienced. Consequently, planning to relieve these problems has been an on-going process for many decades.

As illustrated in the graphic to the right, the adopted flood control plan includes multiple drainage basins as well as a conveyance feature for several blocks of 6th Street. These proposed drainage basins will complement the detention pond / flood storage that was integrated within Centennial Park over 10 years ago. The focus for this study is the proposed West Pond, located north of Centennial Park and 6th Street.

There are two primary goals of for this important project. First and foremost, the construction of the West Pond will provide flood control benefits which will help eliminate a major barrier to redevelopment. And secondly, it is critical to maximize economic benefits from redevelopment through creative design and strategic public investment. To revitalize the Pearl District, significant investment and redevelopment will be required. It was important to recognize that the proposed flood control improvements represent an opportunity to create quality public spaces that can stimulate reinvestment. *Beyond their important function to relieve flooding, these new projects have tremendous potential to become catalysts that will accelerate the revitalization of the Pearl District and surrounding neighborhoods.*

Proposed Elm Creek Basin Detention Plan

(Source: March 2010 Elm Creek / 6th Street Drainage, Detention and Conveyance Plan)

Planning Objectives and Process

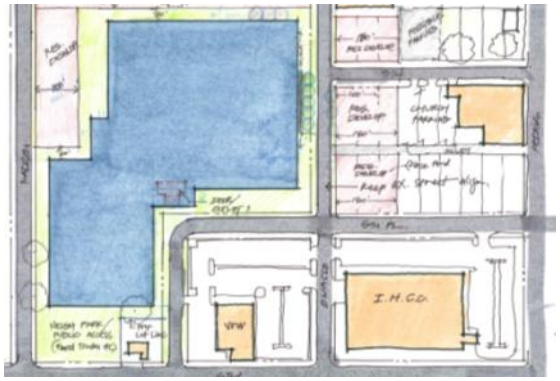
The Elm Creek / 6th Street West Pond project was managed by the City of Tulsa's Engineering Services Department. The City of Tulsa's Planning and Development Department was also extensively involved and provided excellent continuity with previous planning initiatives for the Elm Creek watershed. Regular progress meetings were held with members of the consultant team and City of Tulsa professional staff. The consultant team that was engaged for the project provided comprehensive experience in flood control planning, civil engineering and landscape architecture. The planning team, composed of three Tulsa firms, was led by Guy Engineering Services with sub-consultants Swift Water Resources Engineering and Alaback Design Associates.

Planning for the new West Pond was a continuation of an on-going planning process, building upon previous partnerships and decisions. The current design of the proposed detention basin has been guided by the previous conceptual design for the west basin that is illustrated in the March 2010 *Elm Creek / 6th Street Drainage, Detention and Conveyance Plan*. All of the planning for the proposed flood control projects was accomplished within the context of larger goals for revitalization of the neighborhoods within the Elm Creek basin.

The 2010 conceptual plan for the West Pond, shown above right, was developed through a collaborative approach that has been successfully used on previous City of Tulsa planning initiatives.

In July 2016, planning studies for the proposed West Pond continued with the development of six optional basin configuration options which examined different shapes for the pond as well as potential areas for redevelopment. Following the identification of a preferred basin configuration by City of Tulsa, the consultant team explored additional refinements to the 2010 West Pond Plan. Working with City of Tulsa engineering and planning staff over a period of several months, conceptual alternatives were condensed into three optional site plans that were summarized in a June 2017 conceptual report.

Following review of the concepts and cost estimates by the City of Tulsa, a single option for the West Pond was selected and presented for public review in a November 2017 meeting. This community meeting included a presentation of the proposed plans and opportunities for citizens to ask questions and express their ideas. The conceptual plan that is illustrated in this conceptual report includes revisions to the West Pond plan as a result of this community input. As part of this project's scope, 60% level construction drawings will be prepared along with preliminary cost estimates and right-of-way documents. (Section 7 of this study also provides further information on the next steps that are needed for funding and implementation of the West Pond improvements.)



1.2 Pearl District Vision

Prior to the current planning effort for the proposed West Pond, in-depth planning was done to establish a conceptual vision for both planned detention basins (West and East) as well as for the 6th Street conveyance. As described in the previous pages, this planning work was documented in the *Elm Creek / 6th Street Drainage, Detention and Conveyance Plan (March 2010)*. These proposed flood control projects are within the Pearl District, and consequently the Pearl District Association participated heavily throughout the design process. Several general design objectives for the Pearl District were identified in *The 6th Street Infill Plan* (January 2006). A visual preference survey, completed by the 6th Street Task Force, identified the following neighborhood preferences:

- A desire for pedestrian-oriented development,
- A lack of enthusiasm for suburban, car-oriented development
- A preference for quality of design over density and building type
- A preference for traditional urban design patterns
- Acceptance of mixed-use development.

The 6th Street Infill Plan also included a clear vision statement which remains relevant to the design of the currently proposed flood control projects:

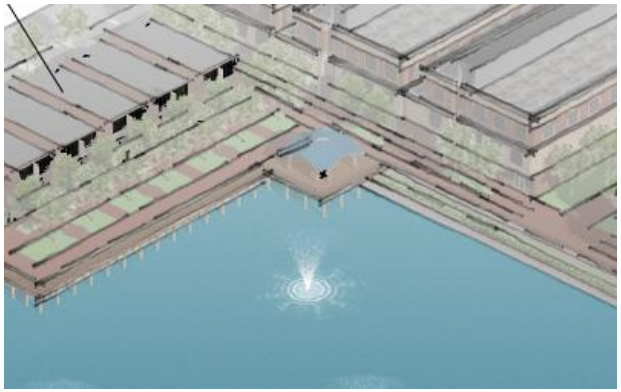
> "*To reinvent the art of city life in Tulsa. To develop from the grass-roots an urban neighborhood that is diverse, intriguing and charming; that adapts to the new realities of the 21st Century and has the character, humanity and convenience of the best, traditional cities; that offers a radical and attractive alternative to suburban living; where it is possible to work, play and shop without recourse to a car; where neighbors work to foster good schools and safe, attractive streets and civic spaces; and where a vibrant, civic environment is matched by enlightened public policies. To do all this before it is too late.*"

In April 2008, the Pearl District's Subcommittee drafted a *Design Brief* that articulated a clear vision for the new stormwater improvements as well as specific design goals and strategies. Design goals included the following:

- *To make the neighborhood safe from flooding.*
- *To accelerate the neighborhood's revitalization by developing sustainable, progressive, competitive, world-class, cost-effective, context-based, urban design solutions; and in so doing to take account of benchmark cities and best practices.*
- *To deliver the kind of distinctive, coherent, urban neighborhood infrastructure and sense of place that will enable the Pearl to compete effectively for new residents and neighborhood-scale businesses with any neighborhood in the world.*
- *To create an economically dynamic neighborhood in which neighborhood retail businesses can thrive.*
- *To restore Tulsans' belief in and enjoyment of our compact, urban neighborhoods at a time when demographic change, gas price trends, climate change, economic trends, health trends, and the unsustainable costs of low-density development necessitate a radical, new approach to urban development.*

The Pearl District's *Design Brief* also included detailed guidelines for architecture, transportation, landscape and streetscape components. An overall design philosophy was also clearly conveyed for pedestrian-focused, sustainable design that reflected the urban character of the existing neighborhood. This vision represents a foundation for the proposed West Pond concepts that are presented in this study.

A pedestrian-focused street is desired, where all modes of transportation are integrated into a walkable urban environment.
(Photo Credit: Jamie Jamieson / Pearl District Association)



The following is a brief overview of the information provided in the remaining chapters of this report:

2.0 The Neighborhood
Provides an overview of the Elm Creek basin's Pearl District neighborhood, including a summary of their goals for flood control improvements.

3.0 Elm Creek Flood Control Planning
Provides an overview of the Elm Creek drainage basin and the 2008 Elm Creek Master Drainage Plan Update.

4.0 Centennial Park Detention
Includes a summary of Centennial Park's renovation to integrate a large flood control basin, a new community center, and recreational enhancements.

5.0 West Pond Conceptual Design Options
Includes conceptual designs that were developed for the West Pond, including the preferred alternative.

6.0 Preliminary West Pond Plan
Provides illustrations and detailed description of the proposed plan for the West Pond.

7.0 Funding and Implementation
Includes a summary of estimated construction costs, potential funding sources and the next steps for implementation.

2.0 The Neighborhood

2.1 Overview of the Pearl District

The 6th Street Neighborhood, now known as the Pearl District, was east Tulsa in 1912.
(Photo Credit: The 6th Street Infill Plan)

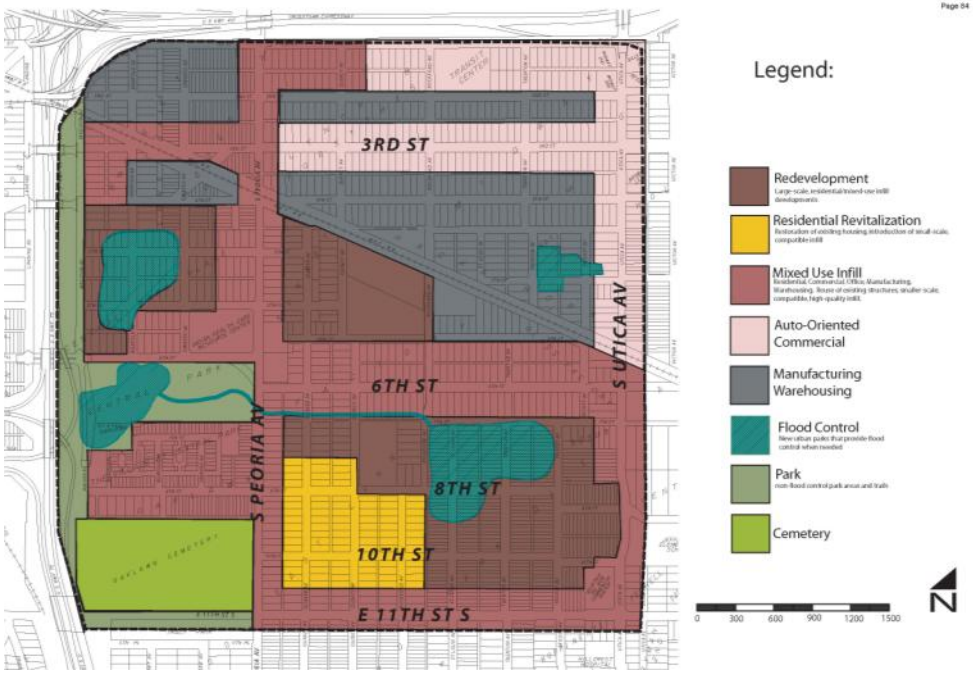
As noted in the introduction to this report, the Pearl District is located in the heart of the Elm Creek drainage basin on the east edge of downtown Tulsa. Because the West Pond and other planned detention basins are located within this urban neighborhood, planning for these new flood control projects has been done within the framework of both current conditions and future goals.

The neighborhood is represented by the Pearl District Association, which is among Tulsa's most progressive and proactive neighborhood associations. For several decades, the Pearl District Association has united residents, business owners, and city government behind a series of plans that are transforming this near-downtown neighborhood into a successful revitalization story. The Pearl District's vision is guided by *The 6th Street Infill Plan.* This neighborhood plan includes detailed recommendations for the transformation of an older, near-downtown neighborhood into a vibrant, pedestrian-oriented mixed-use district. *The 6th Street Infill Plan* provided a planning framework for developing alternatives for the new West Pond flood control project that are included in this study.

Originally known as the 6th Street Neighborhood, this neighborhood dates back to 1909 when the original subdivision of land began. According to *The 6th Street Infill Plan*, this area was firmly established by 1930 as a diverse, mixed-use urban neighborhood. Benefiting from excellent proximity to downtown Tulsa, these businesses thrived for many years. The 6th Street Neighborhood went through a long period of decline, with most of the neighborhood service businesses relocating to other areas of town with higher traffic volumes. Over recent years, the neighborhood has benefited from reinvestment that has created momentum for a significant revitalization that is ongoing.

The proposed land use plan for the Pearl District is included in the lower right corner of this page. As shown, flood control projects were incorporated into the future land uses with the objective that these new facilities can serve as catalysts for urban-style infill developments. The land use plan includes the detention pond in Centennial Park which was constructed several years ago. To the north of Centennial Park, the West Pond detention basin's approximate location is identified. The land use plan recommends large-scale, residential / mixed-use infill redevelopment around the perimeters of the West Pond and other planned detention basins. The open spaces that are created by Centennial Park and the two new detention basins will become a vital part of the Pearl District.

The Pearl District is bounded by I- 244, Utica Ave., 11th Street and US -75 / Inner Dispersal Loop.
(Source: The 6th Street Infill Plan)



Proposed Land Use Plan
(Source: The 6th Street Infill Plan*)*

The Pearl District benefits from a number of assets that provide momentum for its continued revitalization. These include:

- Close proximity to downtown, with good access using 11th, 6th, 4th and 3rd Streets. In recent years, the Pearl District has benefited from the significant growth in Downtown Tulsa, including the nearby East Village district.
- Access to healthcare, including Hillcrest Hospital, the St. John Medical Center, and the Indian Health Care Center.
- Recent investment / building activity, with a number of new projects and building restoration projects that have created economic vitality for the neighborhood. (See photographs on the facing page.) The Pearl District is now home to many restaurants and shops in addition to several breweries. In addition to a planned brewery at 1501 E. 6th Street, the Pearl District is already home to the Dead Armadillo Brewing Co. and the Cabin Boys Brewing Co. near 6th and Utica Avenue. Streetscape improvements, centered on 6th Street and Peoria Ave., have enhanced pedestrian accessibility and have been a boost to commercial redevelopment.
- Excellent public transportation service, making it very convenient to commute by bus to downtown and other destinations. Two bus rapid transit lines - The Peoria Avenue and Route 66 - are planned to converge in the Pearl, starting with the launch of the Peoria BRT in 2019.
- Close proximity to expressways, including I-244, the IDL / US-75 and the Broken Arrow Expressway (SH-51).
- Centennial Park provides an 11-acre recreational space with a lake, trails and an outstanding community center.
- The 6th Street Corridor provides a direct linkage between Tulsa University and downtown Tulsa.
- The Laura Dester Site offers 2.6 acres near the Pearl's most vibrant businesses and upcoming transit lines. The City of Tulsa has issued a Request for Proposals for new housing and mixed-use developments for this property.

The Village at Central Park

Indian Health Care Resource Center of Tulsa

Youth Services of Tulsa Donald W. Reynolds Center

In recent years, the Pearl District has benefited from a significant investment in new facilities that has complemented the architectural character of older buildings that have been preserved and renovated. These efforts create momentum for a return to a sustainable urban lifestyle and have made a major impact on the neighborhood's visual environment.

2.2 West Pond - Site Context

Prior to developing conceptual alternatives, it was important to observe both the positive and the negative elements that exist within the vicinity of the site that has been designated as the location for the West Pond. During 2017, the planning team conducted a visual assessment of the neighborhood streets to study existing conditions. On the facing page, photographs document the primary land uses and businesses that are in the area of the proposed flood control project. Although business ownership is continually changing, this data provided good baseline information for developing conceptual options that were responsive to the neighborhood context.

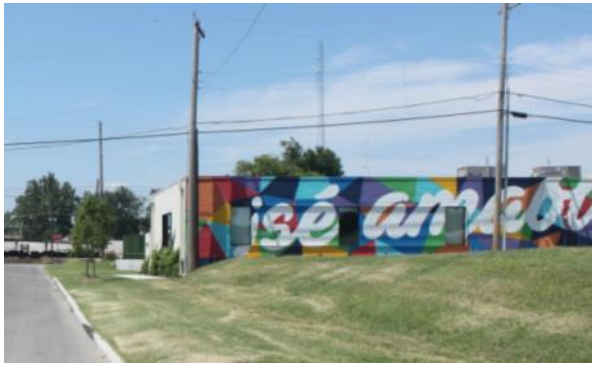
The proposed West Pond site is generally within the boundaries of 4th Street to the north, Owasso Avenue to the east, 6th Street to the south, and Madison Avenue to the west. As illustrated on the following pages, the West Pond site encompasses a broad range of land uses. As part of the Inner Disperal Loop (IDL), US-75 establishes a visual edge of the west side of the site. However, excellent east-west connectivity into Downtown Tulsa is provided via 6th Street and 4th Street. 4th Street also provides a strong linkage into the East Village District, which is located immediately west of the IDL. Commercial uses are primarily focused along 4th Street and Peoria Avenue. Southeast of the proposed pond site, VFW Post 577 and the Indian Health Care Center are readily accessible from 6th Street. Older single-family homes are located in the central portion of the proposed site, generally between Madison Avenue and Owasso Avenue.

Along the north boundary of the project area, the 4th Street corridor accommodates diverse business uses.

The Herbold Apartment Building
417 S. Madison Avenue

West Pond Vicinity - Existing Conditions (2017)








In the general area of the planned West Pond project, land uses vary considerably and include single-family housing, apartments, healthcare facilities, social service agencies, as well as businesses that are located along 4th Street and Peoria Avenue.

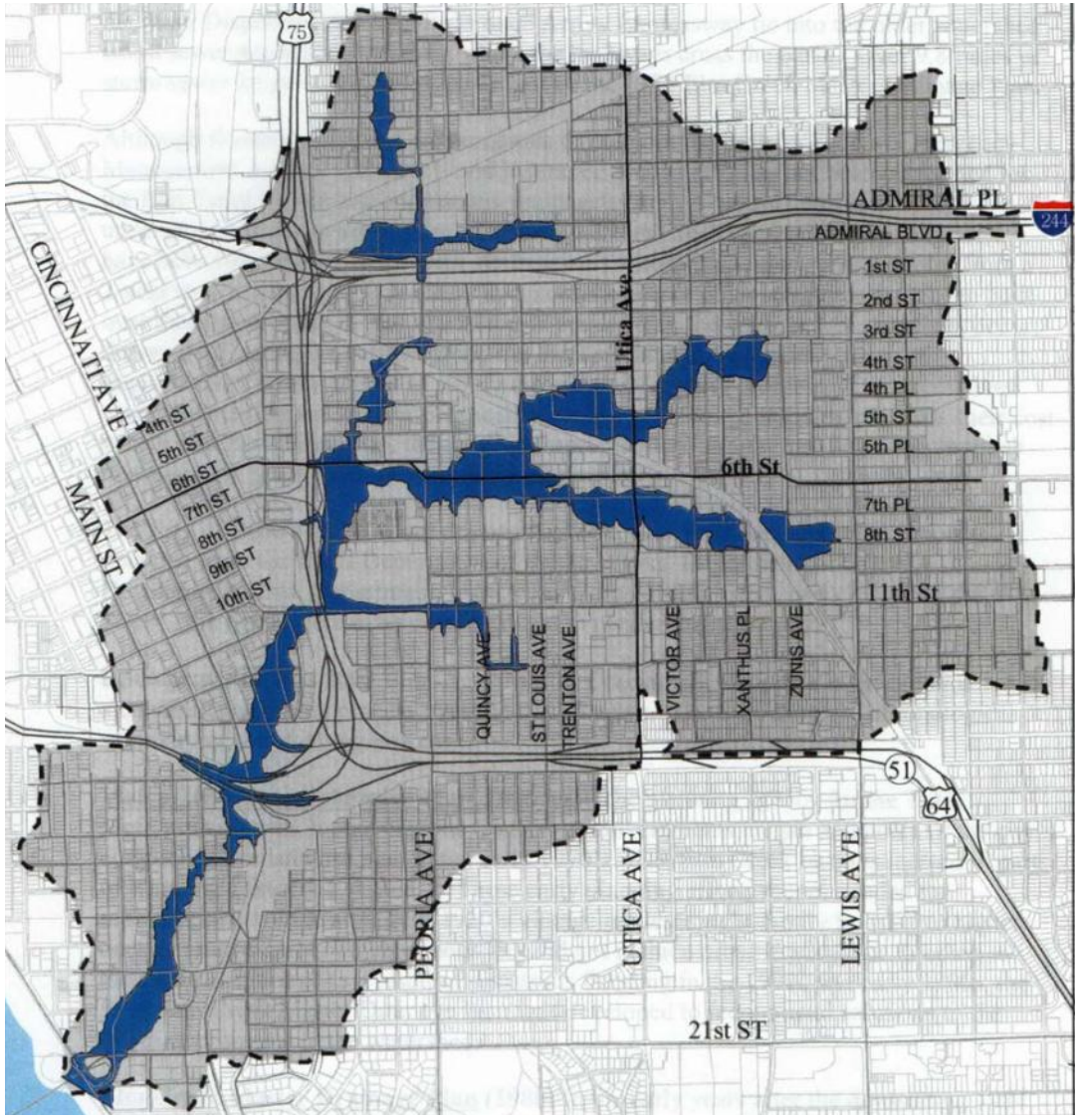
3.0 Elm Creek Flood Control Planning

The Elm Creek Basin

3.1 Elm Creek Watershed Overview

An important part of this report for the proposed West Pond is to summarize the flooding problems that have affected the neighborhoods and businesses within the Elm Creek drainage basin for many years. This section also includes an overview of the engineering requirements for the two new proposed detention ponds and for a storm sewer system referred to as the 6th Street Conveyance. A summary of the 2008 Elm Creek Master Drainage Plan Update that was previously completed is also provided.

As shown in the aerial photograph to the left, the Elm Creek drainage basin consists of 3.4 square miles of fully urbanized inner city which is generally located east of the downtown Tulsa area. It has its confluence with the Arkansas River near the 23rd Street Bridge and its northern boundary extends to the north of US-244. The Elm Creek basin includes the Pearl District, as well as parts of other neighborhoods including Kendall-Whittier. The watershed is identified by the name of the creek that formerly drained it, but the creek was replaced by a network of storm sewers which now drain into the "Elm Park Relief Sewer", designed in 1922. Urbanization in the watershed over the 87 year period since that time has served to overload the main sewer system as well as its contributing conduits. The watershed's drainage system is entirely enclosed in this extensive underground storm sewer system. The storm sewers have capacities that generally vary from a 2-year to l0-year rainfall event. When storms greater than those frequencies occur, the resulting surface overflows flood local streets, yards, and buildings. The drawing on the following page illustrates the existing 100-year floodplain conditions throughout the Elm Creek basin.



100-Year Floodplain - Existing Conditions

(Source: Elm Creek Master Drainage Plan Summary Report - August 2008)

Damage from the 1974 Tulsa Flood
(Photo Credit: Tulsa World)

3.2 Elm Creek Drainage Basin Planning

Previous Flood Control Plans

As a result of disastrous flooding in the 1970s and early 1980s, the 1988 Elm Creek Master Drainage Plan was developed to provide solutions to the flooding problems in the watershed. The numerous individual basin master drainage plans developed throughout the city were consolidated into a single citywide master drainage plan: *Flood and Stormwater Management Plan, 1990-2005.*

During the 1990s, the City of Tulsa committed to revitalize and renew the inner city. A study of the 11th Street corridor and a report of the Mayor's Infill Development Task Force reawakened community interest in the inner city and offered a vision of attractive, near-downtown neighborhoods. To revitalize and redevelop the older, deteriorating inner city would require a strong public-private partnership, creative planning and neighborhood design, and public infrastructure improvements.

A new and more realistic look at solving the flooding problems of Elm Creek was authorized by the Department of Public Works in 1998. The *1998 Elm Creek Hydrologic Engineering Study* recommended four new, feasible and acceptable detention pond sites and a limited amount of storm sewer improvements. The plan did not provide full protection for all of the basin's floodplain properties and left several areas with residual flooding. In May 2000, the Sixth Street Task Force was formed to oversee plans for the redevelopment of the upper Elm Creek basin.

2008 Elm Creek Master Drainage Plan Update

In a joint effort with the City of Tulsa Public Works Department, Urban Development Department, Parks Department, and various citizen groups, the *2008 Elm Creek Master Drainage Plan Update* was completed in August 2008. The common objective was to identify the most cost-effective, politically acceptable, and feasible storm water and flood control improvements. These improvements were designed to result in significant benefits related to flood control and revitalization of blighted urban neighborhoods. The master drainage plan (MDP) and planning process for the City of Tulsa's Elm Creek watershed has been successful through a combination of multi-objective planning, community cooperation, and innovative problem-solving.

The planning process included coordination by a multidisciplinary team of community representatives, public entities, and design professionals.

Implementation of the Master Drainage Plan and the related 6th Street Infill Plan will:

- Mitigate the flooding problems for the basin, which have impeded infill and redevelopment.
- Reduce the potential for loss of lives and property due to the threat of flooding.
- Provide amenities for the neighborhood and create momentum for other new and innovative urban developments.
- Facilitate and allow revitalization of the 6th Street corridor.
- Reinvigorate the near-downtown economy by enhancing public infrastructure and by providing new housing and shopping opportunities.

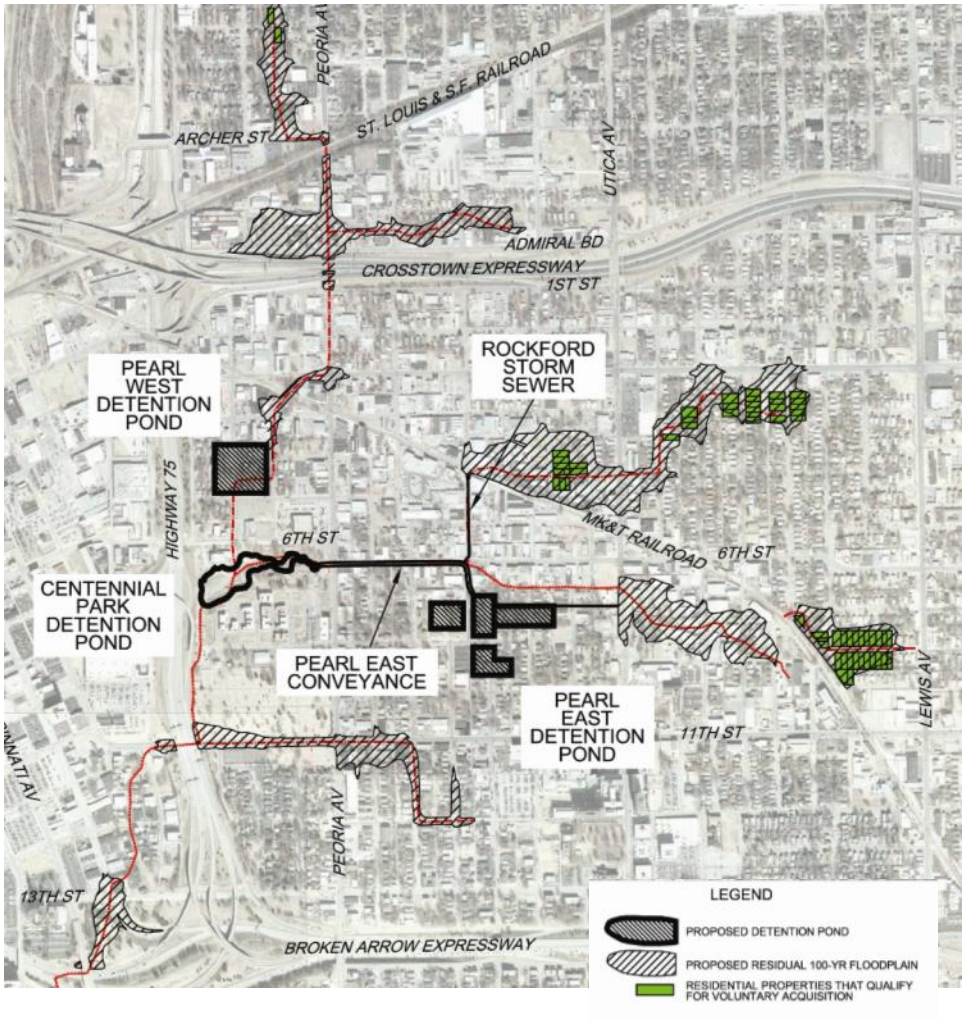
The 6th Street Infill Plan

Plan for the Reinvention of the Pearl District

The 6th Street Infill Plan, adopted in January 2006, provides a planning framework for the new flood control projects.

The recommended plan from the 2008 MDP Update consists of three multi-purpose regional stormwater detention ponds at carefully selected locations to enhance and complement urban revitalization plans, a conveyance system to connect the ponds, limited storm sewer improvements, and the acquisition of sixty residential properties in the residual floodplain. The goal was to design a plan that would alleviate flooding in key reaches, benefit the entire Elm Creek drainage basin and be acceptable to the general public. The recommended plan, as illustrated to the right, is the result of that process. In addition to these physical projects, the 2008 Elm Creek Master Drainage Plan also included voluntary acquisition of residential properties that remain in the residual 100-year floodplain.

Discussion on the pages that follow summarize the major features of these proposed improvements. Illustrations are included from the follow-up planning effort for these flood control projects that is reflected in the *Elm Creek / 6th Street Drainage, Detention and Conveyance Plan* (March 2010).



2008 Elm Creek Master Drainage Plan - Recommended Plan
(Swift Water Resources Engineering)

Centennial Park Detention Pond

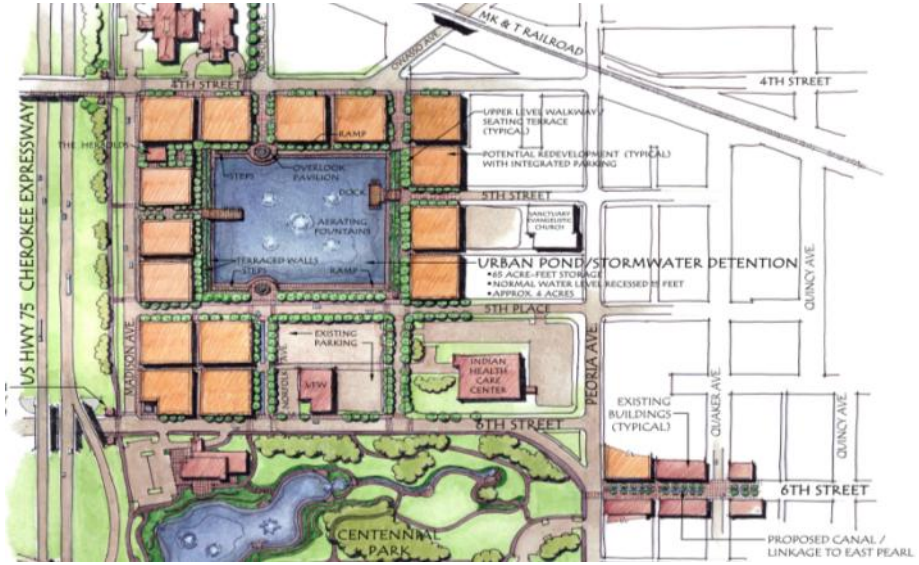
Centennial Park Detention Pond

The Centennial Park Pond provides 58.4 acre-feet of storage that has been integrated within the 11-acre Centennial Park. Construction was completed on this award winning, multi-use detention pond in 2007. The detention basin was designed to complement the park and new community center building, providing recreational opportunities, scenic overlooks, waterfalls, a recirculating stream, stone bridge, open space, and landscaped terraces. As illustrated in the images to the left, the project began with a conceptual vision and then a significant construction effort to achieve the finished flood control project. (Section 4 of this study provides additional photographs and details for Centennial Park's renovation.)

Site Plan for Centennial Park / Stormwater Detention Improvements (2003)

West Pearl Detention Pond

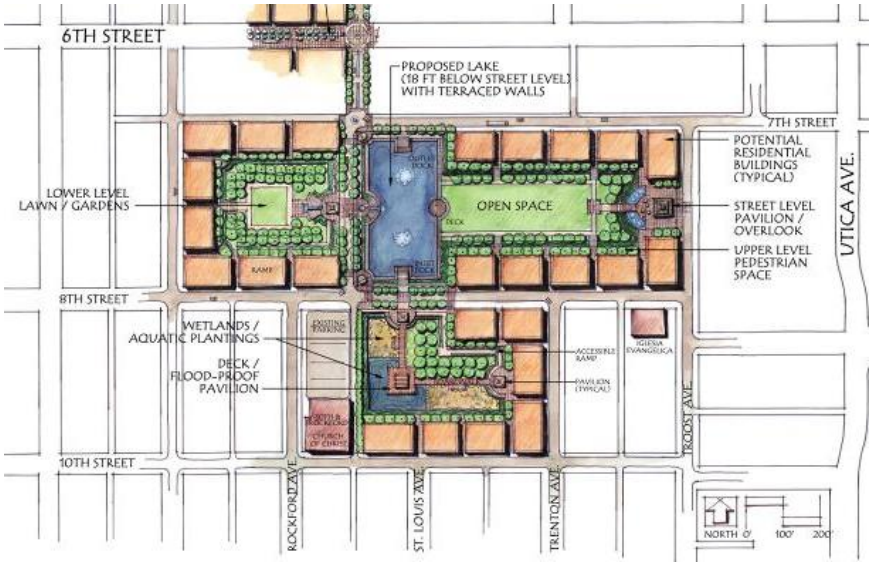
The West Pearl detention pond, which is the focus of this study, is proposed to be located north of Centennial Park and will provide a minimum of 64.5 acre-feet of storage. This pond is also located in an area slated for redevelopment by the City of Tulsa Urban Development Department (from 6th Street and Madison Avenue to 4th Street and Peoria Avenue). This urban revitalization project will include the purchase of over 85 properties and will allow opportunities for mixed-use redevelopment and urban residences. (Illustrations are included from the March 2010 *Elm Creek / 6th Street Drainage, Detention and Conveyance Plan*.)



Preliminary West Pond Site Plan (2010)

Proposed Site for West Pond (view looking south)

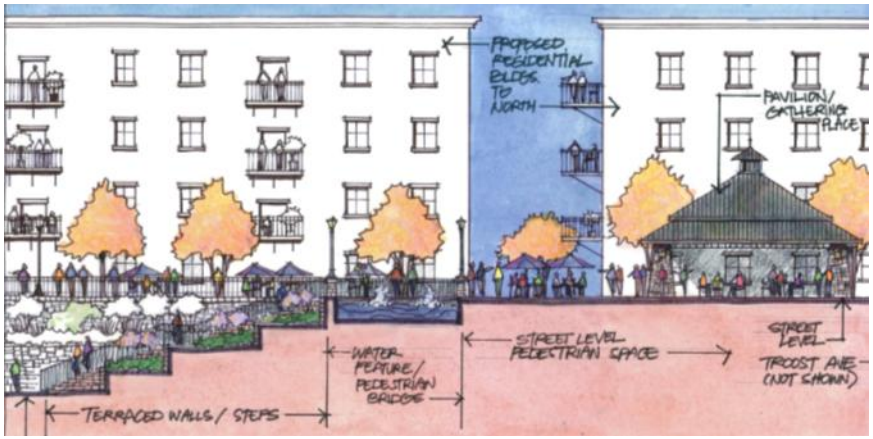
Proposed fishing dock



Preliminary East Pond Site Plan (2010)

East Pearl Detention Pond

The East Pearl detention pond is proposed to be located in the vicinity of 6th Street and Rockford Avenue and will provide 113.6 acre-feet of storage while covering about 7.3 acres. The East Pearl pond area has been carefully selected in conjunction with an area already chosen by the Urban Development Department for redevelopment. The redevelopment area extends from 6th Street and Rockford Avenue to 11th Street and Utica Avenue. It will include the acquisition of over 170 properties and will allow redevelopment of 30 acres as large-scale, residential / mixed-use infill.



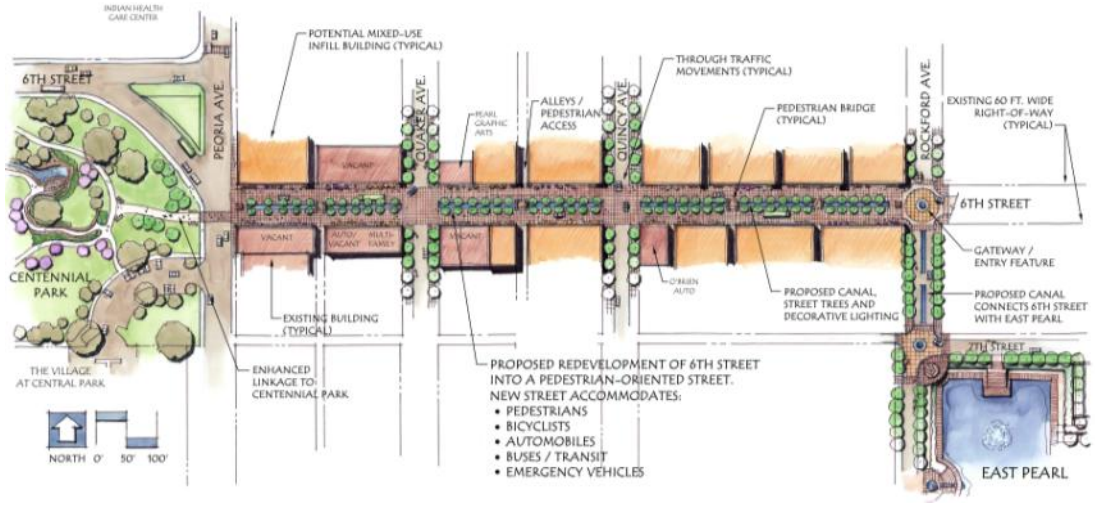
Planned pedestrian space and pavilions near Troost Avenue

Proposed overlooks, lower level walkways and landscaping

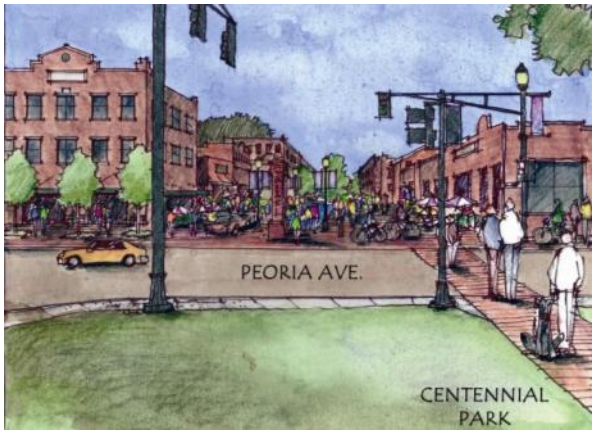
6th Street Conveyance

An integral part of the overall drainage plan and the key to relieving the flooding along 6th Street is the East Pearl Conveyance feature. This project is planned to provide stormwater conveyance from the East Pearl detention pond to the Centennial Park detention pond, and along with the recommended Rockford Storm Sewer improvements, will remove 75 buildings from the floodplain. In addition, this drainage feature has the potential to create a dramatic, pedestrian-focused streetscape. This three block long section of 6th Street includes several brick buildings with an attractive architectural character. Over the past few years, 6th Street has benefited from significant private investment that is helping transform this area into a popular mixed-used destination.

6th Street Canal - Character Sketch



Preliminary 6th Street Conveyance / Canal Site Plan (2010)

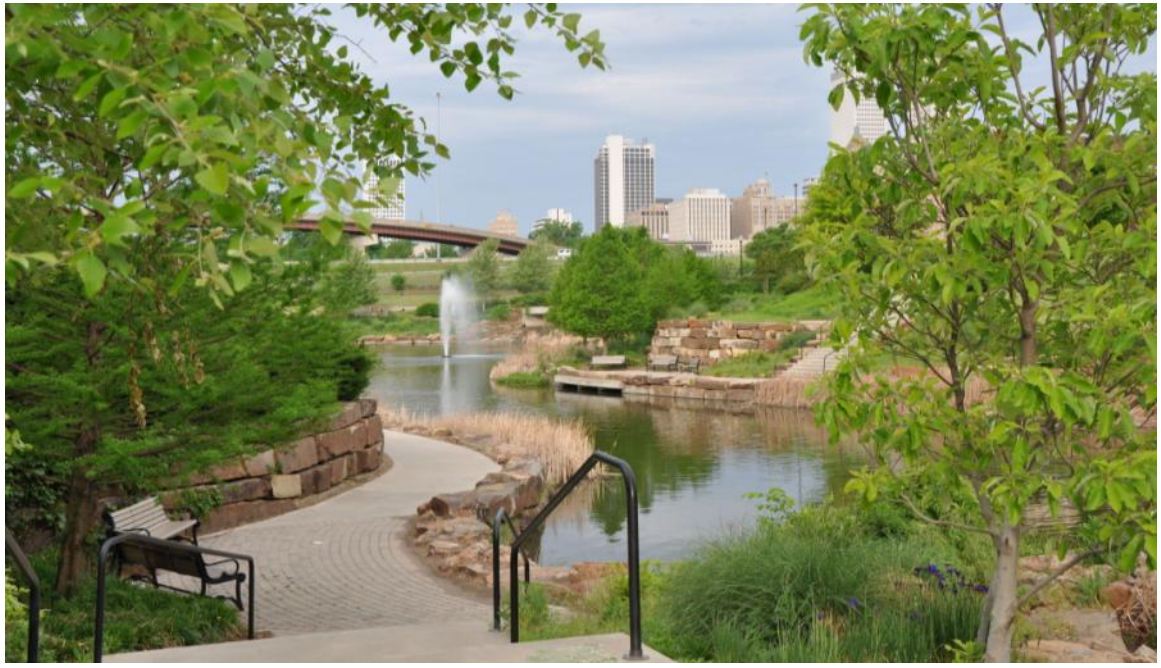


The new vision for 6th Street establishes a pedestrian-oriented environment that integrates all modes of transportation.

4.0 Centennial Park Detention

4.1 Centennial Park Redevelopment

Centennial Park has recently undergone a major transformation to provide the first successful implementation of the three needed detention basins in the Elm Creek watershed. In addition to significant flood control objectives, another important goal was to transform Centennial Park into one of Tulsa's best civic spaces. In partnership with the community, a multi-disciplinary team of design professionals worked to integrate flood-control into this wooded park in the most environmentally sensitive approach possible. The net result was a project that achieved the vision of incorporating floodwater storage without compromising the park's aesthetic qualities. Centennial Park integrates 58 acre-feet of stormwater detention in a lake at the park's west end. Stormwater detention is also accommodated in the open lawn areas at the east end of the park. Today, Centennial Park features a permanent lake, stream and waterfalls, lighted trails, open space and attractive landscaping. Since the park's completion, new trees and other landscape plantings have begun to mature and grow to complement the park's original tree canopy.



With it's location immediately east of the Inner Dispersal Loop, Centennial Park benefits from excellent views looking west toward the downtown Tulsa skyline.

Centennial Park's Pond and Community Center

View of Centennial Park's pond (Looking West)

As shown in the photograph above, a new 1.65 acre lake creates a focal point in the center of the park. The water level has the ability to rise 18 feet in elevation to contain 100-year floods. Visible on the left side of this view, the primary outlet structure was designed as an overlook and fishing dock. The pond is enhanced with three large aeration fountains that improve water quality and add dramatic focal points. The lake has natural boulder edging and a perimeter walkway to allow park patrons close proximity to the water.

Aerating Fountain and Observation Dock

Water-tolerant plants were used at lower elevations to be compatible with higher lake levels after rains. The basin is also enhanced with a wide variety of aquatic plants.

A large open space was reshaped in the south-east quadrant of the park for informal play, festivals and other events.

The center of the park is enhanced with a 5 foot tall waterfall that flows into the pond. An arched stone bridge provides a vantage point for excellent views throughout the park and has become an iconic photo spot for Tulsa. Proposed grading for the park was designed to create natural land forms that visually blended with the existing environment. A key element of the park's design was to retain as many of its large trees as possible. Natural sandstone boulder walls were utilized to retain the existing root zones of more than 50 trees that were preserved within the park. Retaining wall terraces were planted with over 50 varieties of trees and other plantings to create a pleasing and sustainable environment.

Another major feature in the park is a 400-foot long recirculating stream that begins at the park's east end with a dramatic 7 ft. height waterfall, and ends with a second waterfall into the lake. The stream was designed to have a natural character with a stone-lined bottom and boulder edges. It provides an excellent educational opportunity complete with small weirs, waterfalls, riffles, pools and point bars. New trails were also integrated throughout the park and adjacent to the lake to create opportunities for walking, jogging and biking. Centennial Park's walkways connect with Tulsa's regional trail network.

The stream begins with a 7 ft. tall waterfall which can be viewed from a large seating plaza.

Stone ledges create small waterfalls in the stream.

The new stream and walkways create a natural environment for enjoying Centennial Park.

Central Center at Centennial Park

The park's northwest corner accommodates the beautiful Central Center at Centennial Park. As a replacement for an old senior center building, the size was increased to 12,500 square feet to accommodate programs and activities for seniors as well as provide programming space for other age and special-interest groups. With spectacular views of the Tulsa skyline and Centennial Park, the center also is a prime location for special occasions such as weddings, receptions, reunions and community events.

Since its redevelopment was completed in 2006, Centennial Park has further enhanced its role as one of Tulsa's best parks. *With its close proximity to Tulsa's downtown, Centennial Park is well-positioned to become a significant part of the city's efforts to revitalize downtown and nearby urban neighborhoods*. In the years ahead, this park can provide much-needed flood control and a recreational space for the community to enjoy.

5.0 West Pond Conceptual Design Options

5.1 West Pond Conceptual Design Overview

Introduction

Following the clear definition of the neighborhood's vision and the completion of comprehensive master drainage planning, the next major planning task was to explore conceptual options for the proposed West Pond. These alternatives integrated the Pearl District's revitalization goals with the functional requirements for approximately 65 acre-feet of floodwater storage.

As discussed previously, a primary goal was to develop innovative concepts that created a pedestrian-friendly environment. Another key design objective for the detention basin alternatives was to create physical forms that reflected the urban fabric of the Pearl District neighborhood. To achieve the desired density and mixed-use development pattern, significant redevelopment will be necessary. In addition to providing a critical public safety function, the new detention basin represents an excellent opportunity to add momentum to the on-going revitalization of the Pearl District.

This section of the report presents a summary of the preliminary concepts that were developed, with the objective of creating the best possible plan for the West Pond. (Section 6 of this study presents the final version of the preliminary plans that are proposed for implementation.)

West Pond Design Goals and Considerations

A review of the specific goals for the West Pond was an important step to ensure that new ideas led to the development of the optimum plan to guide future funding and construction efforts. Beginning with the 2010 West Pond plan as a starting point, the following objectives were established as baseline goals for refining the design of the new pond and adjacent site areas:

Flood Control Criteria:

- Provide a minimum of 64.5-acre feet of flood storage.

"Big Picture" Focus for the conceptual plans:

- Determine the best shape and location for the pond that provides:
  - the optimum benefit to the neighborhood, and
  - the best redevelopment potential.
- Maximize the value of the project toward the Pearl District's vision to create a walkable neighborhood and mixed-use development for living, working, shopping and dining.

Specific Design Goals for the Pond:

- Provide a strong physical and visual connection to the neighborhood (not "hidden" behind redevelopment).
- Provide a strong connection to Centennial Park.
- Strive to maintain the existing street grid where possible.
- Provide good visibility from adjacent streets and US-75.
- Create an interesting pond shape. Maximize the aesthetic value of the pond.
- Create a larger pond footprint so that the water surface is closer to street / pedestrian level, and provide pedestrian accessibility to the pond.

Phased Approach:

- Adjacent to 4th Street, maintain the south edge of existing commercial lots so that there is flexibility for existing businesses to remain until redevelopment is feasible.

As part of the conceptual design phase for the West Pond project, three optional site plans were developed for review and discussion. Conceptual illustrations for these alternative plans are included in this section of the report. Option 1 is similar to the preliminary pond for the West Pond that was part of the March 2010 *Elm Creek / 6th Street Drainage, Detention and Conveyance Plan.* Options 2 and 3 provide variations of this plan with larger pond configurations and modified areas for potential redevelopment. The following discussion provides a brief summary of proposed features that all three alternatives provide.

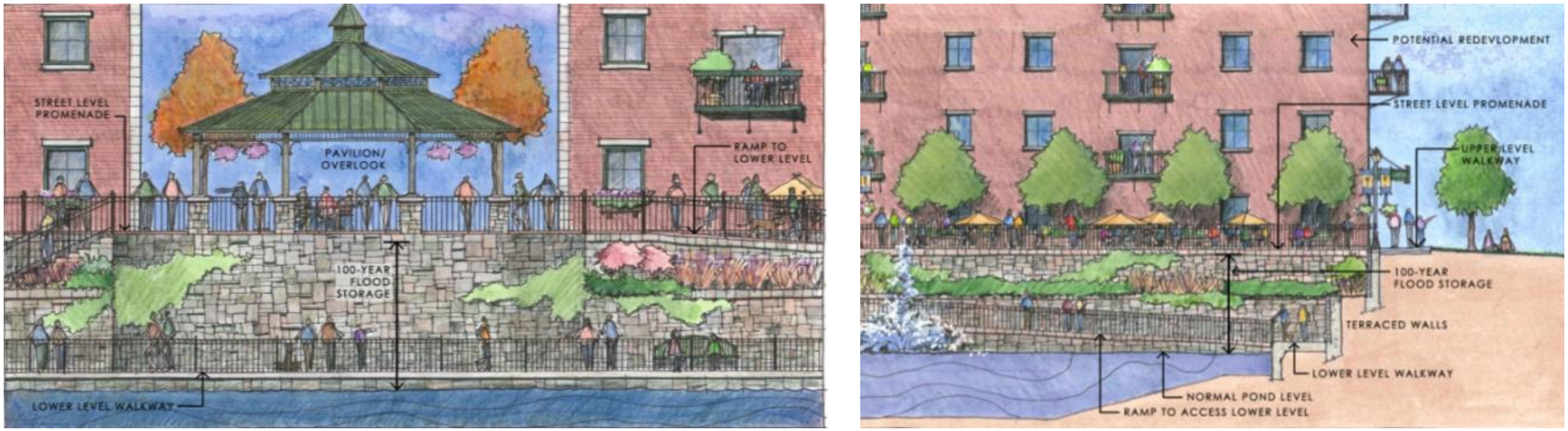
Each of the three optional plans provide the required 64.5 acre-feet of stormwater detention in a new pond that is located to enhance future residential and mixed-use redevelopment. Although the shape and configuration of the proposed pond varies between the three options, the water body is configured to create desirable development area around its perimeter. The proposed detention pond is generally bounded by Madison Avenue to the west, 4th Street to the north, Owasso Avenue to the east and 6th Street to the south. At the north edge of the pond (south of 4th Street), the south property line of the existing commercial lots is maintained to allow for these businesses to remain until redevelopment by the private sector occurs. The existing street grid is maintained as the physical framework for the new detention pond, with only the following blocks proposed to be closed:

- Norfolk Avenue between 5th Place and 4th Street
- 5th Street between Owasso Avenue and Madison Avenue
- Between Madison Avenue and Norfolk Avenue, 5th Place is maintained as a through street on Option 1 and removed on Options 2 and 3.

Between 4th Street and 5th Place, Owasso Avenue is proposed to remain in place along the east edge of the new pond. Potential residential redevelopment is proposed on the east side of Owasso Ave., benefiting from views of the pond to the west. Conceptual plans for all options illustrate areas around the perimeter of the pond for new residential and mixed-use developments that could be developed by the private sector.

Depending upon the pond size shown on each option, the normal water level of the pond would be approximately 12 feet to 15 feet below street level. An outlet structure at the south end of the pond is proposed to release stormwater at a controlled rate until it returns to normal pond level. This structure can be constructed similar to the one in Centennial Park to function as a fishing dock / observation deck. The West Pond conceptual plans include aeration fountains for improved water quality and aesthetic interest.

The proposed plans that are shown as Options 1, 2 and 3 feature wide pedestrian spaces that include open-air pavilions that overlook the pond and create inviting places for social interaction. At the south end of the new detention pond, each proposed plan includes open space that provides a linkage to Centennial Park and can also accommodate informal recreation and gatherings. The pages that follow provide a brief overview of the proposed features for the conceptual plans that are illustrated as West Pond Options 1, 2 and 3.

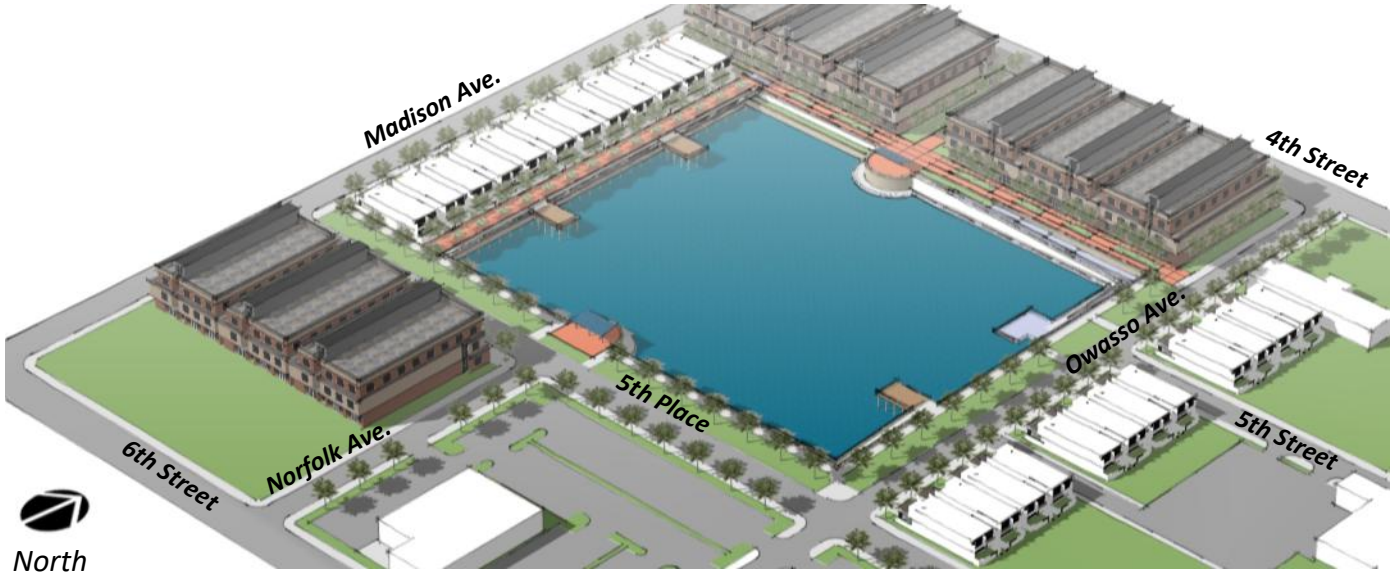


As envisioned in the illustrations for the three optional plans, the proposed West Pond has the potential to become a dynamic pedestrian space that can accommodate outdoor plazas, overlooks /piers, and boardwalks.

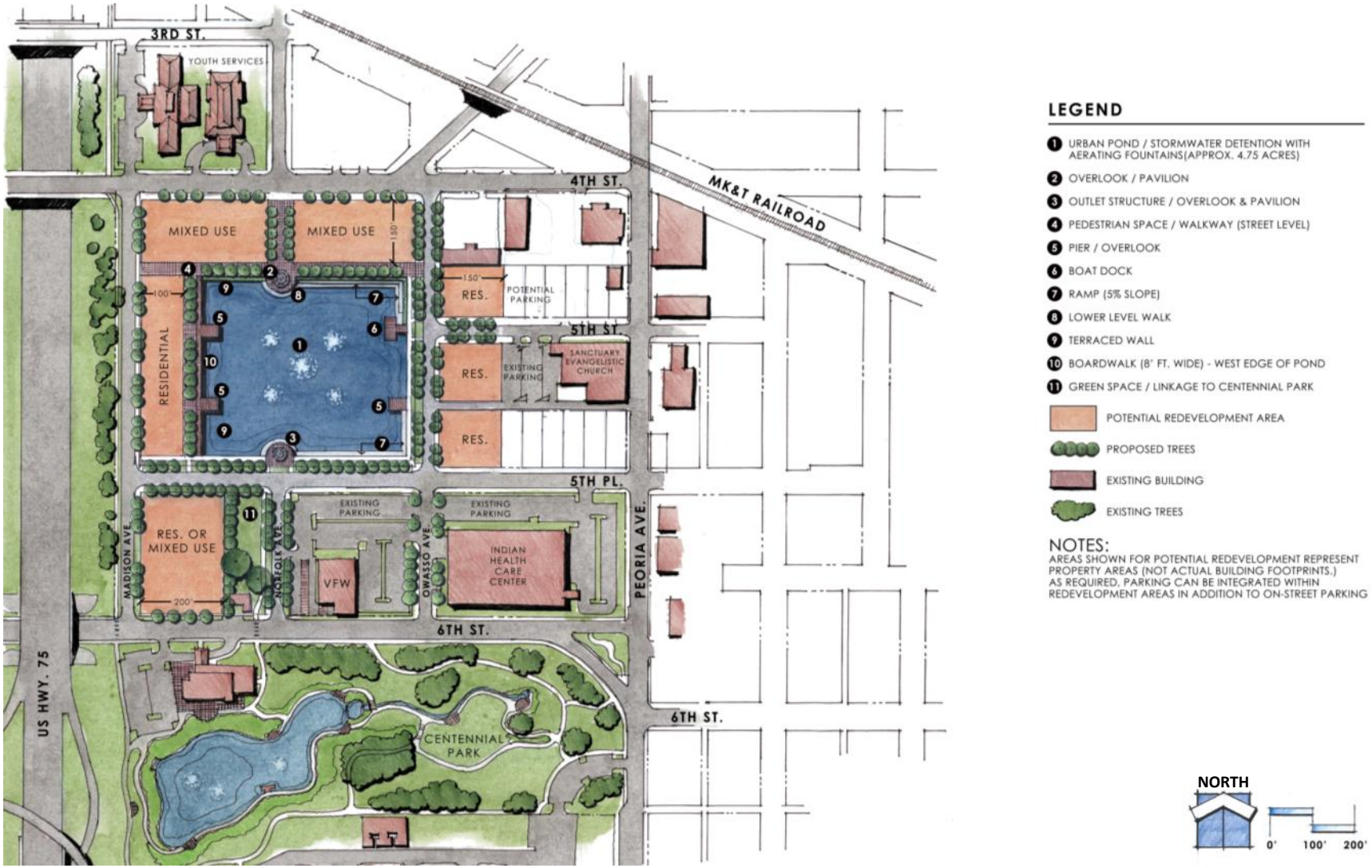
5.2 Conceptual Design Options

West Pond - Option 1

- Option 1 represents a refined version of the West Pond that was proposed in the previous 2010 planning effort. The proposed pond is rectangular in shape, with potential redevelopment to the west, north and east of the pond. Owasso Ave. and 5th Place remain as through streets on the east and south edges of the pond.
- Pond water surface area: 4.75 Acres
- Approximate depth from plaza level to normal water level: 15 feet
- Proposed features include two large pavilions / overlooks that are aligned with Norfolk Avenue. Ramps are provided that allow access to lower level walks that are adjacent to each of the pavilion locations. Piers and boardwalks are also provided in multiple locations for pond views.
- The potential for redevelopment is also shown south of the detention pond (south of 5th Place). This redevelopment could extend to take advantage of the 6th Street frontage, or could integrate open south along this edge. The green space along the west side of Norfolk Avenue can also provide a strong pedestrian linkage between the pond and Centennial Park.



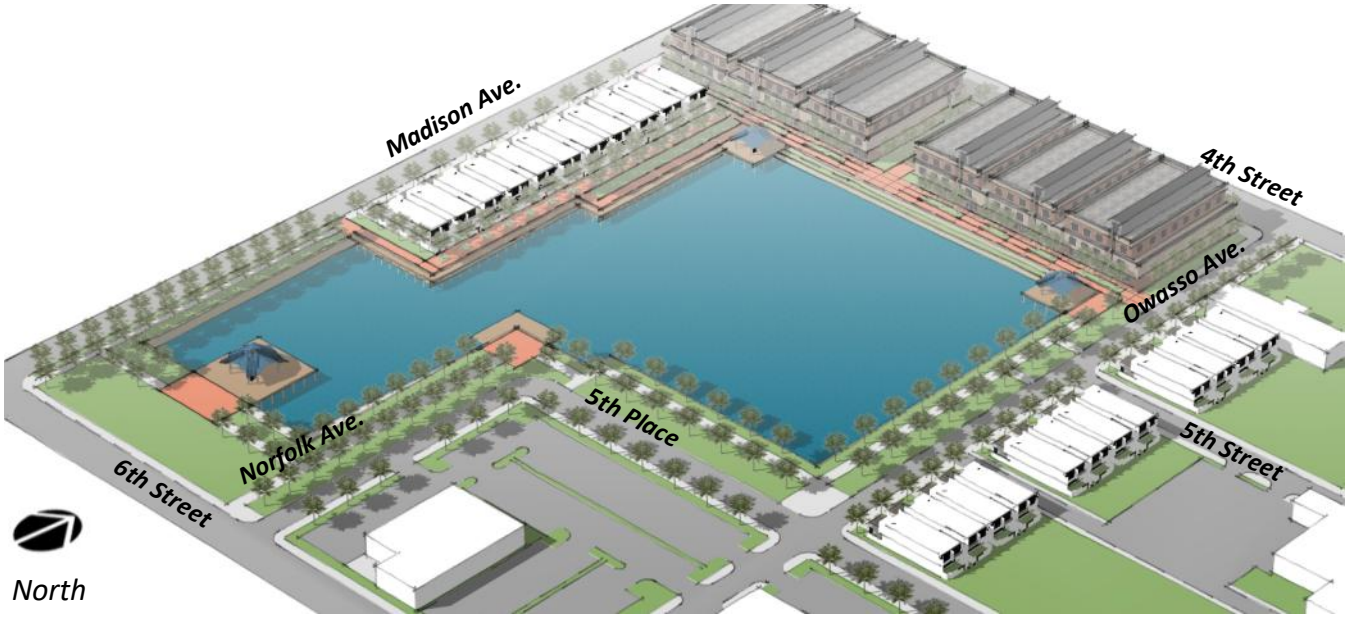
Option 1 - Site Perspective (looking northwest)



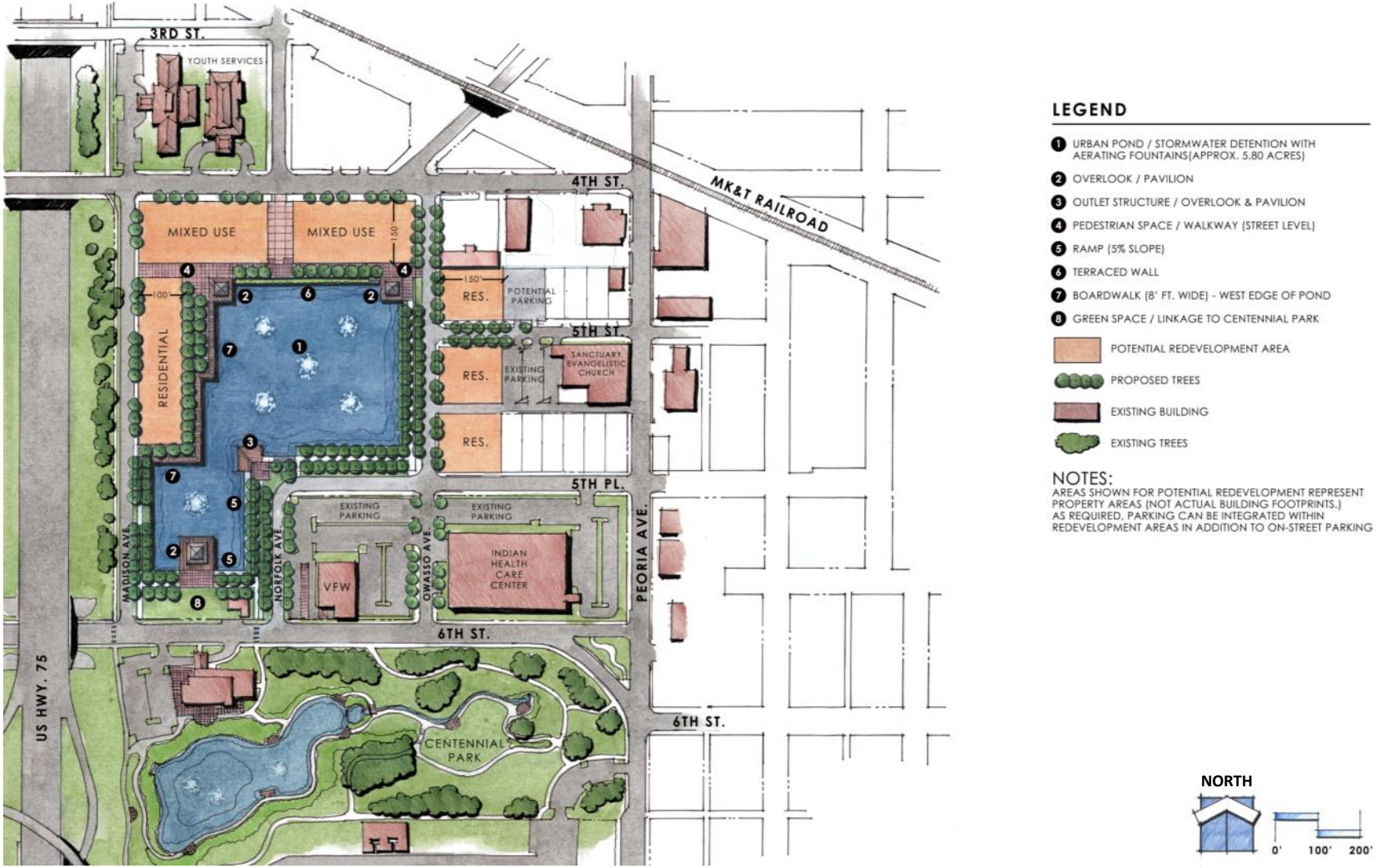
West Pond - Option 1

West Pond - Option 2

- Option 2 expands the pond to the southwest, with significant benefits in public access and visibility. The irregular configuration of the pond also adds visual interest. Similar to Option 1, Owasso Ave. is maintained as a through street on the east side of the pond with the potential for residential redevelopment. 5th Place would be removed for the block between Madison Ave. and Norfolk Ave. to create space for the expanded pond. As a trade off for extending the pond to the southwest corner of the project area, there would not be space for redevelopment at the northeast corner of Madison Ave. and 6th Street.
- Pond water surface area: 5.80 Acres
- Approximate depth from plaza level to normal water level: 12 feet
- Proposed features include boardwalks, piers and pavilions at the northwest and northeast corners of the pond. Ramps provide access to the new fishing dock / outlet structure.
- To complement a proposed open space that is north of 6th Street, a large pavilion and elevated deck are proposed as a new neighborhood gathering place that also enhances the physical connection to Centennial Park.



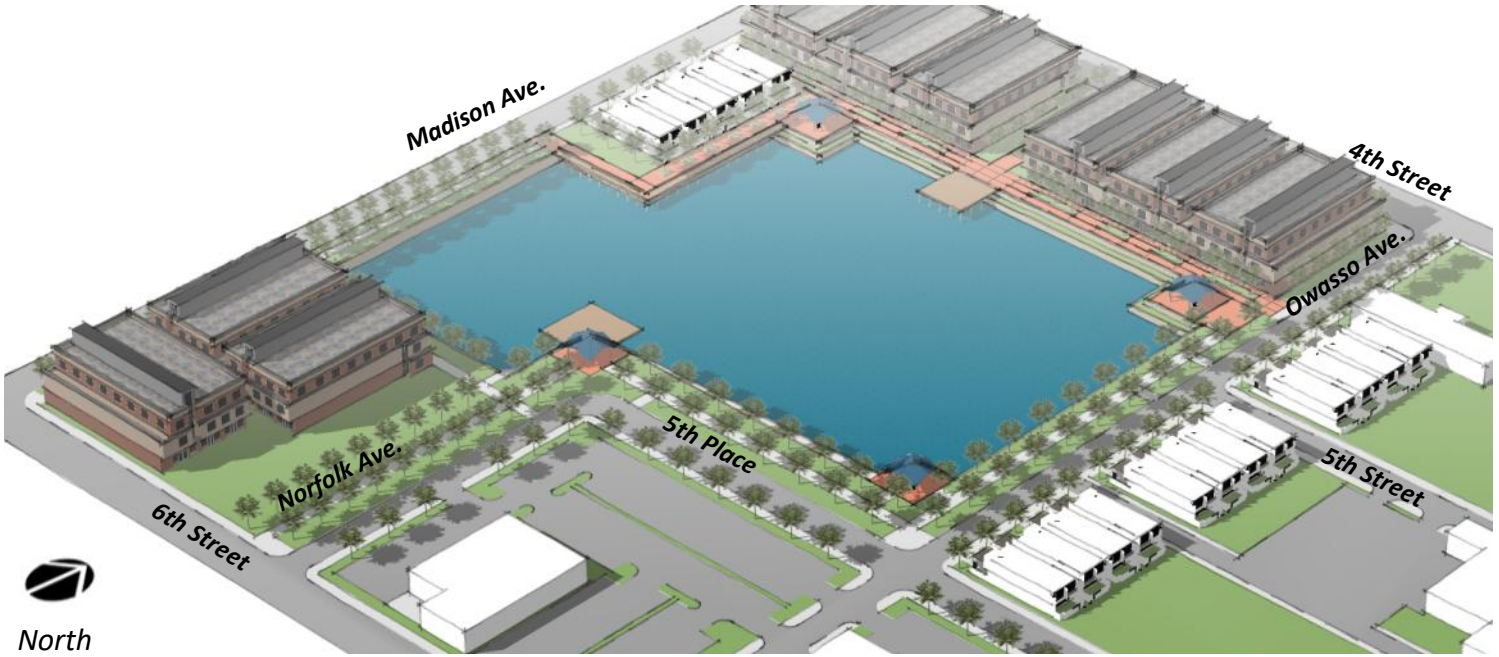
West Pond Option 2 - Site Perspective (looking northwest)



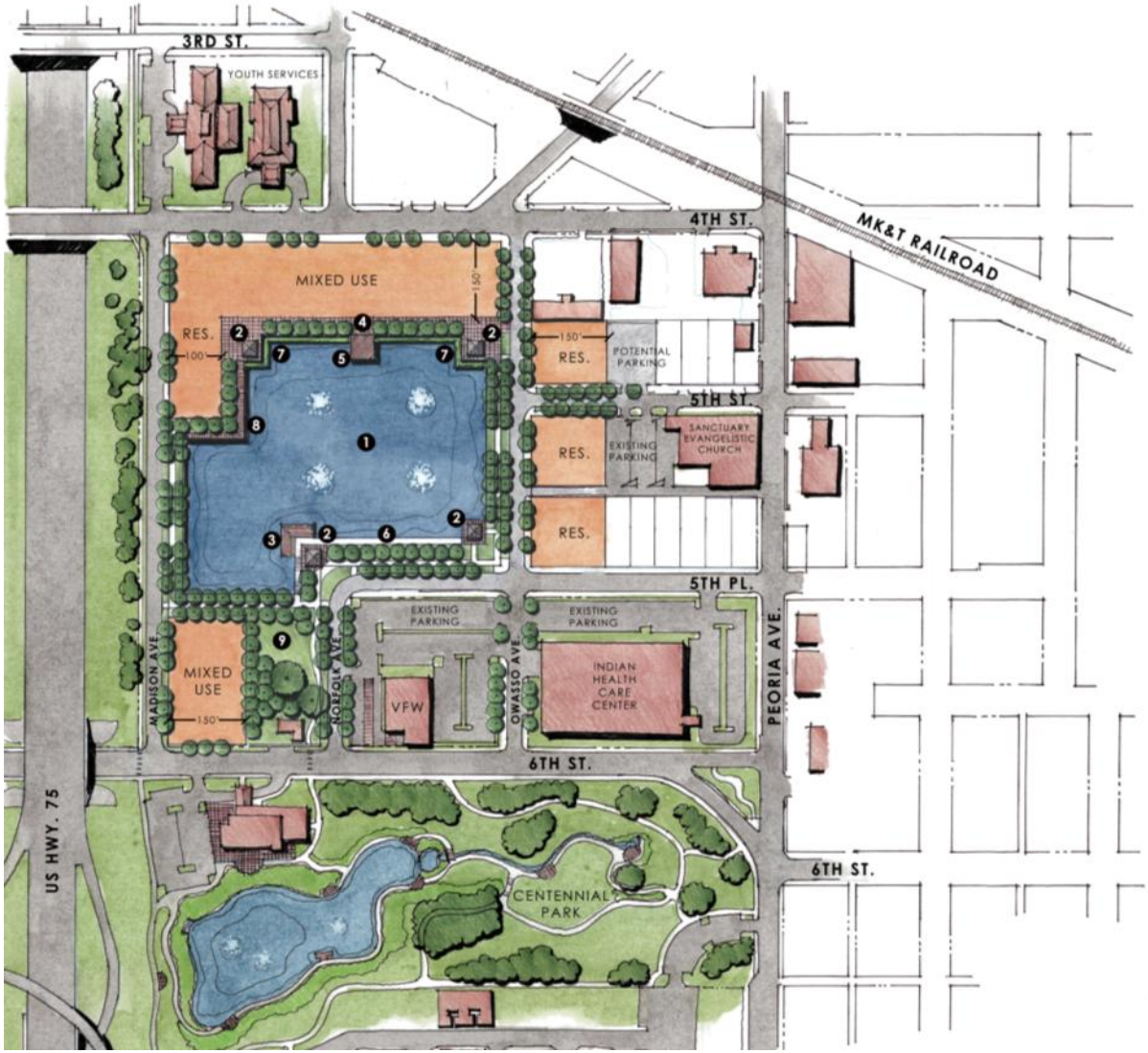
West Pond - Option 2

West Pond - Option 3

- Option 3 provides a modified version of a pond that is expanded to the southwest, creating visibility and public access from Madison Ave. and the adjacent highway. Similar to Options 1 and 2, Owasso Ave. is maintained as part of the neighborhood street grid. Adjacent to Madison Avenue, the potential for redevelopment is accommodated at both the southwest and north-west edges of the pond. Redevelopment opportunities extend south to take advantage of visibility from 6th Street frontage.
- Pond water surface area: 5.4 Acres
- Approximate depth from plaza level to normal water level: 13 feet
- Proposed features include overlooks, pavilions and boardwalks that are primarily focused along the north edge of the pond. Ramps provide access to the proposed fishing dock / outlet structure.
- On the south side of the pond, a linear 0.85 acre park area is proposed to create space for neighborhood gatherings and events. This new green space would also create an open space linkage between the new pond and Centennial Park.



West Pond Option 3 - Site Perspective (looking northwest)



LEGEND

1. URBAN POND / STORMWATER DETENTION WITH AERATING FOUNTAINS(APPROX. 4.75 ACRES)
2. OVERLOOK / PAVILION
3. OUTLET STRUCTURE / OVERLOOK & PAVILION
4. PEDESTRIAN SPACE / WALKWAY (STREET LEVEL)
5. PIER / OVERLOOK
6. RAMP (5% SLOPE)
7. TERRACED WALL
8. BOARDWALK (8' FT. WIDE) - WEST EDGE OF POND
9. GREEN SPACE / LINKAGE TO CENTENNIAL PARK

POTENTIAL REDEVELOPMENT AREA

PROPOSED TREES

EXISTING BUILDING

EXISTING TREES

NOTES:
AREAS SHOWN FOR POTENTIAL REDEVELOPMENT REPRESENT PROPERTY AREAS (NOT ACTUAL BUILDING FOOTPRINTS.) AS REQUIRED, PARKING CAN BE INTEGRATED WITHIN REDEVELOPMENT AREAS IN ADDITION TO ON-STREET PARKING

NORTH

0' 100' 200'

5.3 Preferred West Pond Conceptual Design

Following the development of West Pond Options 1, 2 and 3, City of Tulsa engineering and planning staffs reviewed the alternatives and conceptual cost estimates that the design team prepared. Option 2 was identified as the preferred concept, and it was refined and further developed for community review and feedback. A public meeting was held on November 6, 2017 to allow for presentation of the proposed plans. The following table provides a summary of public comments that were received. All comments were read and considered. To the extent possible, the proposed plan incorporates community comments and suggestions to create the best possible plan to achieve flood control and continued revitalization of the neighborhood. The proposed plan for the West Pond, which will provide direction for moving ahead into a preliminary construction plan phase, is illustrated in Chapter 6 of this report.

Issue	How Addressed in Proposed Plan
417 S Madison (Herbold Apts) - previously told the building would not be impacted	Modified the plan to not impact this building.
1014 E 5th Pl (Paul Harvey home) - the 2008 plan does not impact the structure while the current plan does impact the structure	The pond footprint impacts this structure. Investigations are being done to see if the structure can be moved to a different location.
Likes the public spaces and areas for redevelopment	
Likes the new design and that it ties in better with Centennial Park	
Concern about lack of parking	On-street parking was added; it is near the bus route and there is parking throughout the nearby neighborhoods
Need to have a maintenance plan to keep trash out of the pond	Design team will look at filtration system; more routine maintenance may be required
Use low impact development; comply with draft landscaping requirements; consider stocking the pond for fishing	A detailed landscaping plan is being developed.

Summary of Public Comments (November 2017)

The November 2017 community meeting included an overview of goals for the Pearl District and the need for flood control, along with a presentation of the preliminary concept for the West Pond. There were opportunities for questions and comments at individual breakout sessions. Comment forms were also provided for citizens to provide written feedback regarding the proposed design concepts.

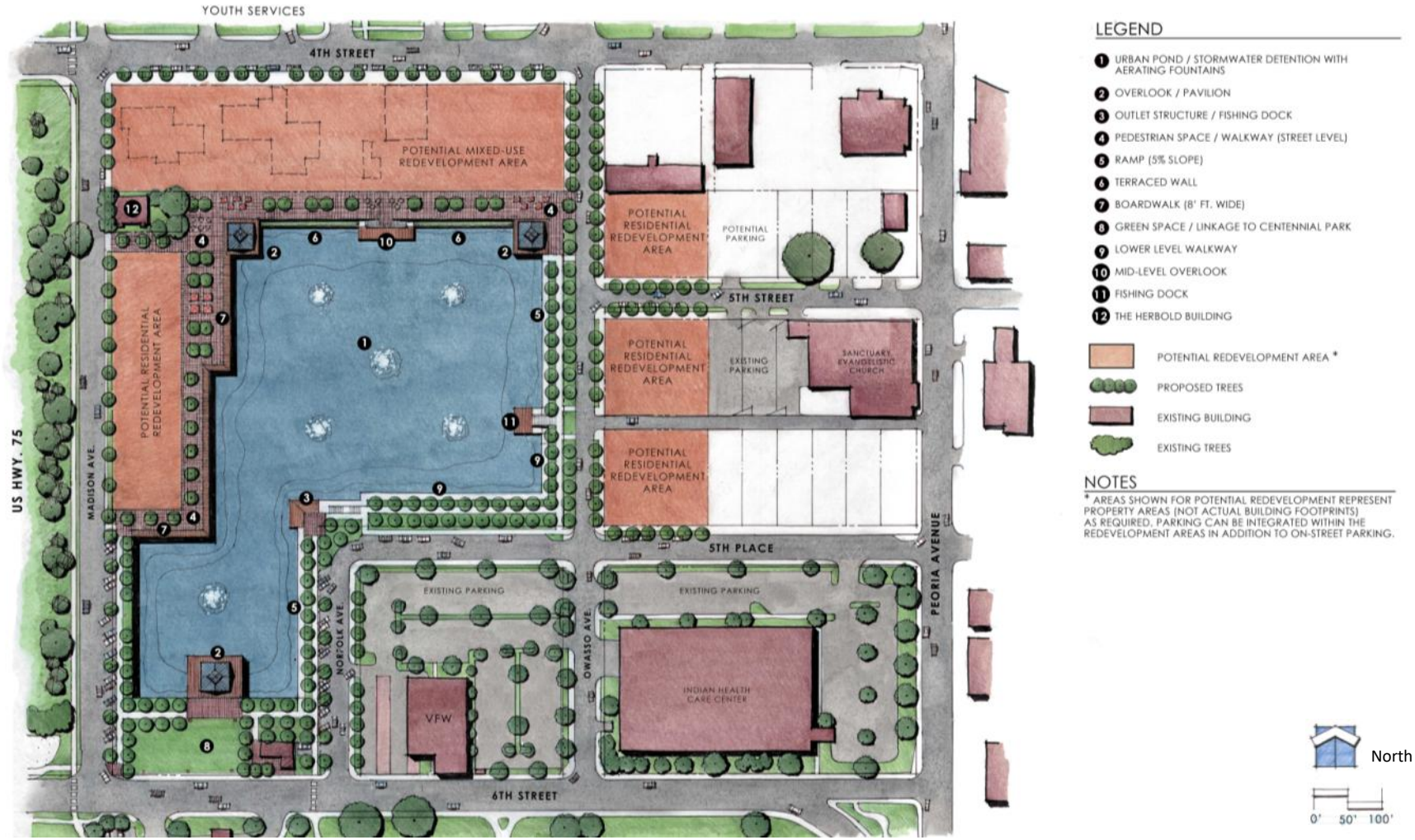
6.0 Preliminary West Pond Plan

6.1 Overview of Proposed West Pond Plan

The graphic on the facing page illustrates the proposed site plan for the West Pond. As described previously in Section 1, this preliminary plan is the result of a long-term planning process that allowed significant input from the City of Tulsa and the Pearl District neighborhood. This section of the report presents a detailed overview of the proposed West Pond plan, along with conceptual sketches to illustrate the aesthetic character that is envisioned. In addition to showing the stormwater detention improvements, the proposed plans and images also illustrate potential redevelopment that can be constructed by the private sector in adjacent areas. Large-scale redevelopment of this area, as originally envisioned in *The 6th Street Infill Plan*, could be significantly enhanced by the construction of the West Pond and urban amenities that contribute significant quality of life benefits. Along the north edge of the proposed pond, the potential redevelopment area lot depth matches the existing lot depths so that existing businesses along 4th Street may remain until further investment from the private sector is feasible.

The proposed plan integrates flood control in an urban pond that reflects the character of the Pearl District. The required floodwater storage is accommodated in a new 5.8 acre pond, strategically located as the focal point for infill redevelopment. The proposed pond is generally bounded by Madison Avenue to the west, 4th Street to the north, Owasso Avenue to the east and 6th Street to the south. The existing street grid is maintained as the physical framework for the new detention pond. To create space for the new pond, proposed street closures are required for several blocks of Norfolk Avenue, 5th Place and 5th Street. Madison Avenue and Owasso Avenue provide important north-south connectivity on each side of the pond between 6th Street and 4th Street. In addition, there are several existing streets that provide important east-west connections. (3rd, 4th and 6th Streets provide access across US-75 into Downtown Tulsa.)

As illustrated, the perimeter of the West Pond is envisioned to include outdoor terraces, boardwalks, overlooks, pavilions, and fishing docks. Pedestrian circulation is accommodated through the addition of upper level sidewalks and lower level walkways that are several feet above the normal pond level. Access to the lower pond level is provided through a combination of stairs and accessible ramps which will provide for both pedestrian and maintenance needs. Almost 6 acres in size, the pond is planned to include aeration fountains which will help maintain good water quality. The fountains will also create interesting focal points, particularly with night lighting. Another important feature of the proposed West Pond is the new green space at the southwest corner of the new basin. This space would allow excellent visibility of the pond from 6th Street and from US Hwy. 75, in addition to providing a strong physical connection with Centennial Park. Adjacent to this new park area, on-street parking is proposed along Madison Avenue, Norfolk Avenue and on 5th Place.



CENTENNIAL PARK

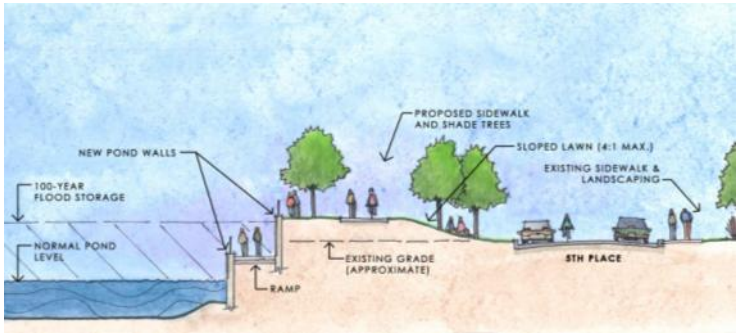
Preliminary West Pond Plan

6.2 West Pond Hydrology

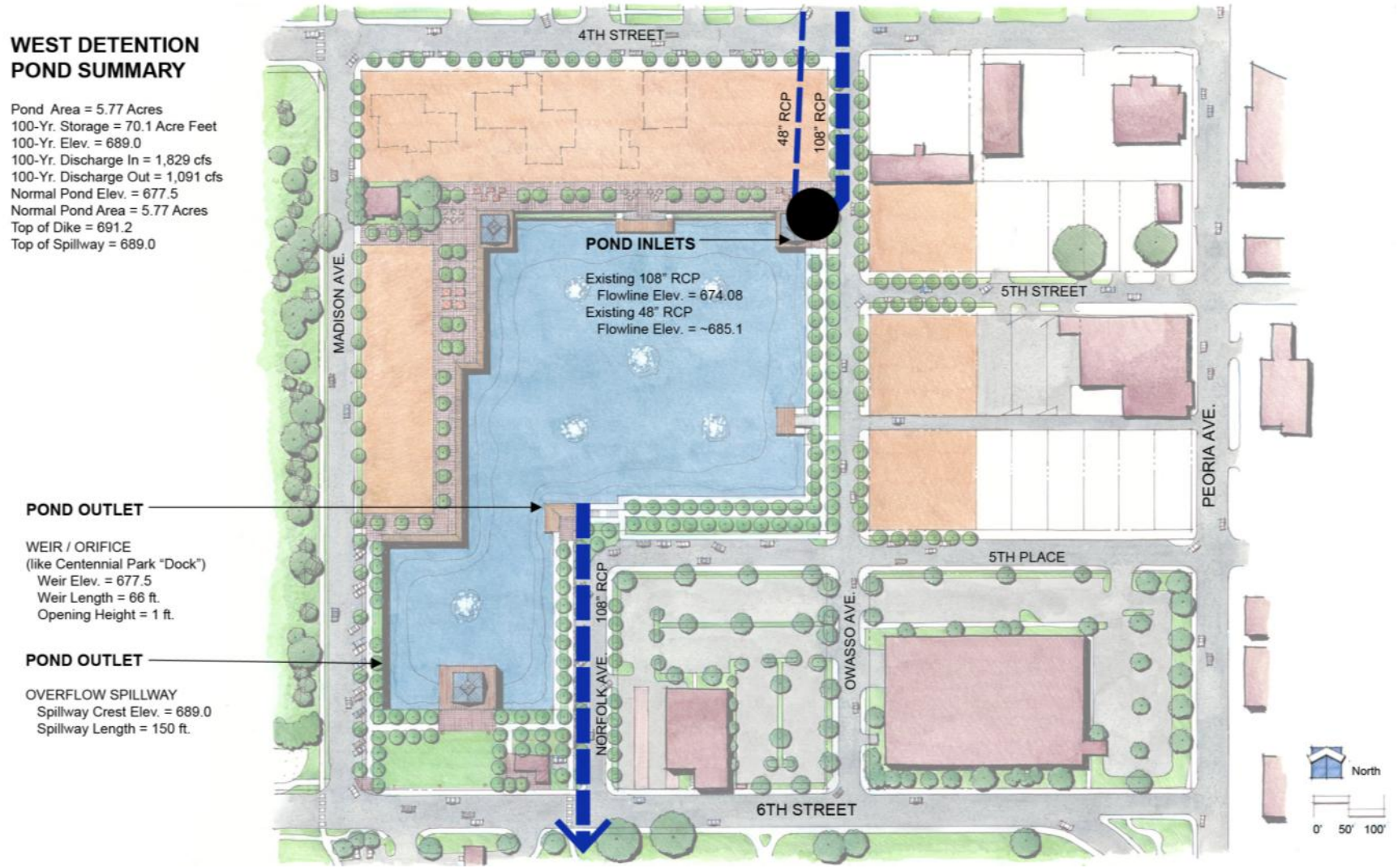
The preliminary storm drainage plan for the proposed West Pond is illustrated on the facing page. Designed as a "flow through" facility, this pond will receive water from the existing storm sewer system which consists of two separate lines flowing south along Owasso Avenue (one a 108" reinforced concrete pipe (RCP) and the other a 48" RCP). As water flows into the detention facility, an outflow structure will meter the outflow causing the detention pond to fill.

The West Pond will be constructed with vertical walls and will have a permanent wet pond at a depth of about 13.5 feet below street level. The pond will have an area of 5.8 acres at elevation 677.5, providing 70 acre- feet of flood storage. The normal pond elevation is set by the weir elevation of the proposed outlet structure, which will be shaped like a floating dock with an opening below the deck 1 foot high and 66 feet in length. During the 100-year flood event, the outlet structure restricts the flow rate to 1,091 cubic feet per second (cfs), compared to the inflow rate of 1,829 cfs, providing a 40% reduction in downstream flow rate. During the 100-year flood the pond elevation will rise to 689.0 which is about 2 feet below street level. During higher flood events, overflow from the pond will pass in a controlled manner through a designed spillway at the southwest corner of the pond. The spillway will have a crest elevation at 689.0 and a length of 150 feet and provides the required 1 foot of freeboard during the 500-year flood.

The proposed outlet structure for the West Pond may be similar in design to the structure that was built at Centennial Park. As shown above, the cantilevered dock creates a place for fishing and enjoying views of the pond.



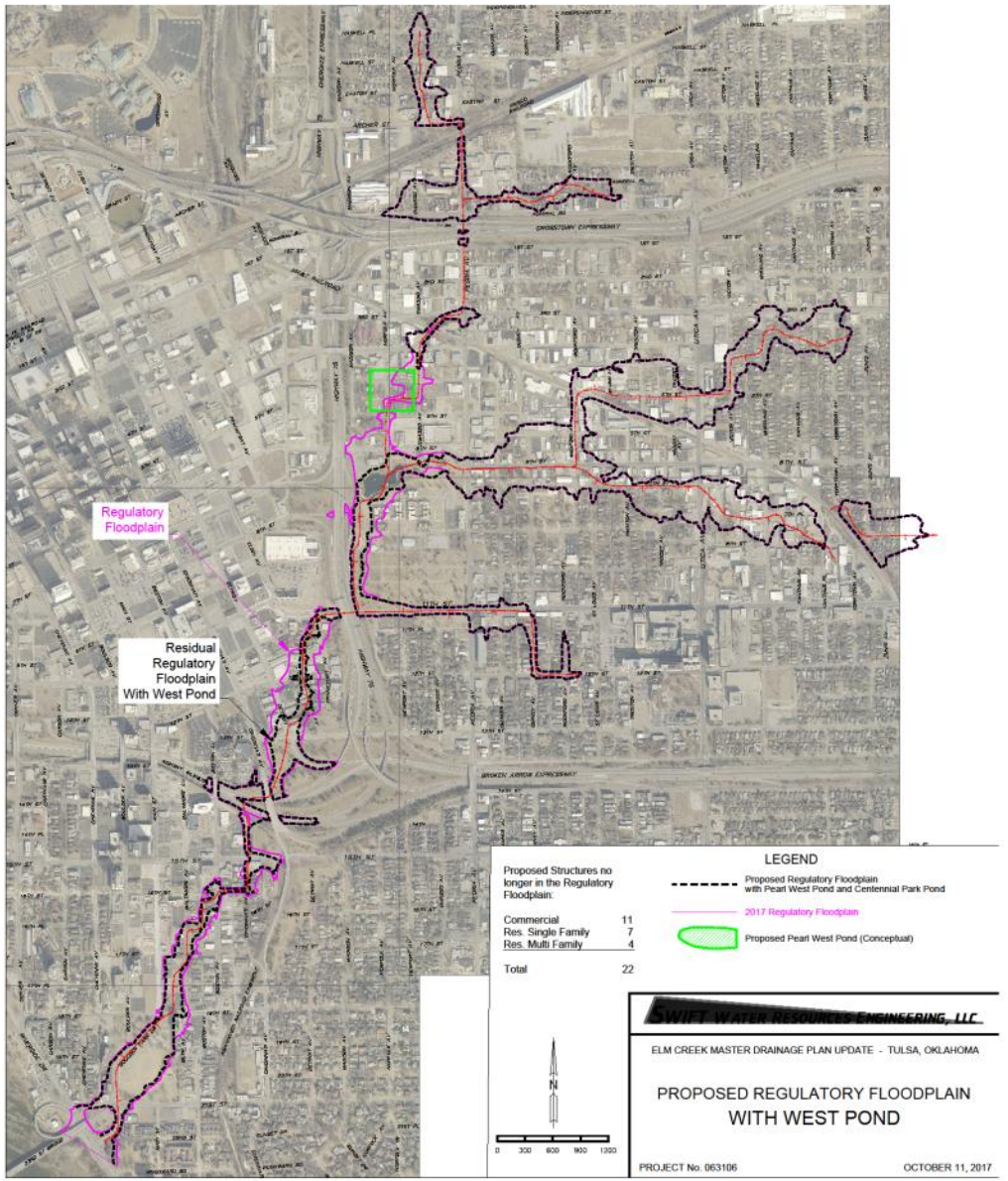
This conceptual section of the south end of the pond illustrates the normal water level and the 100-year flood storage level. Because the existing grades at the south end of the pond are lower, the ground level will need to be built up to provide the needed flood storage volumes.



West Pond - Preliminary Storm Drainage Layout

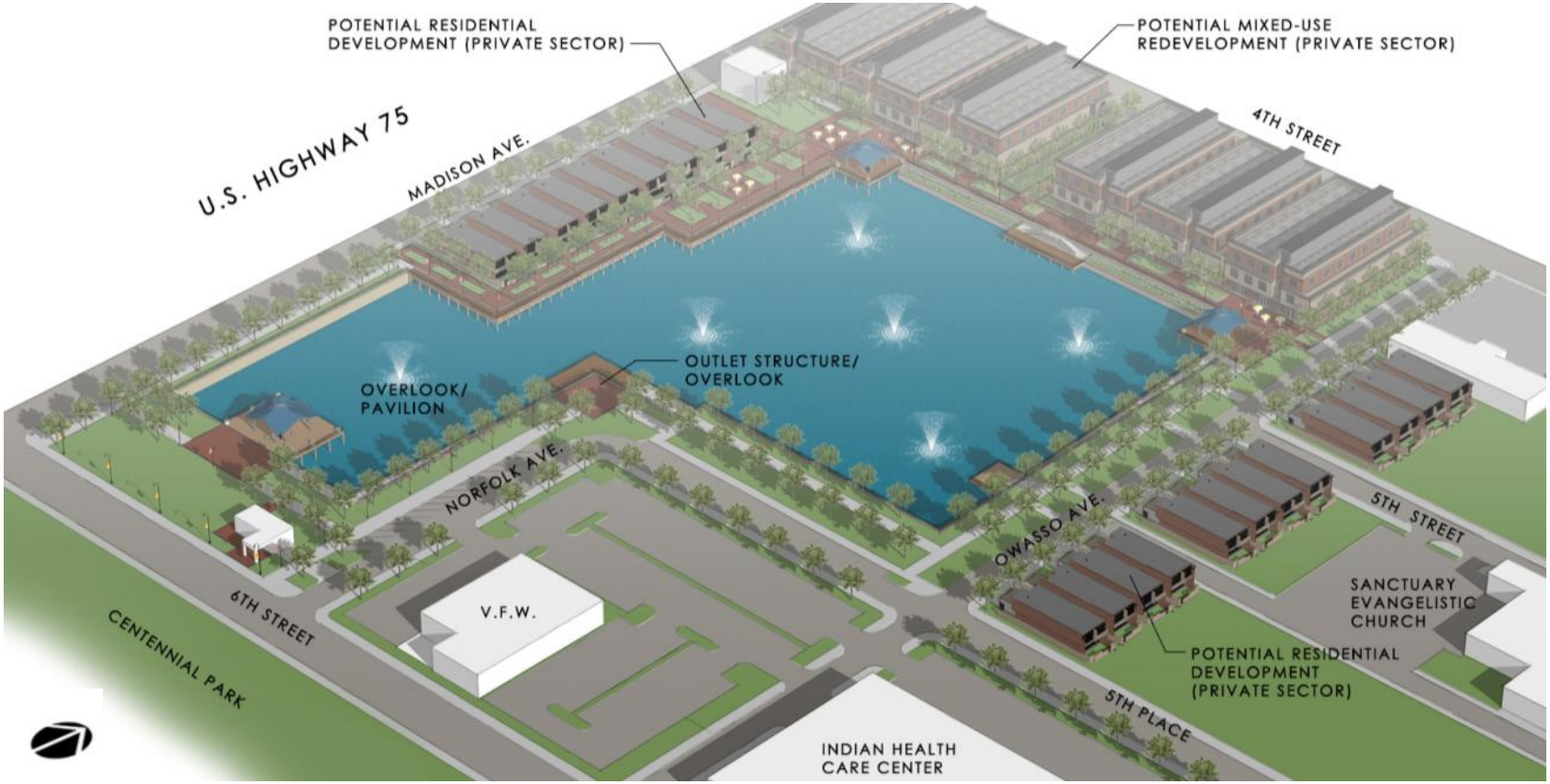
The preliminary rim of the proposed West Pond is set at elevation 691.2. The metered outflow from the West Pond flows directly into the Centennial Park Detention Pond via the existing 108" RCP southward along Owasso Avenue. *In tandem, these two detention ponds provide a substantial reduction in overland flooding downstream all the way to the Arkansas River near 23rd Street*.

The graphic shown to the right illustrates the proposed regulatory floodplain that would result from the construction of the proposed West Pond. By constructing the West Pond project, 22 structures will no longer be in the regulatory floodplain. This equates to approximately $5.1 million in structures that are protected from the 100-year floodplain. The majority of the floodplain reductions occur downstream of the proposed West Pond site (at 6th Street & Madison Avenue, 12th Street & Detroit Avenue, and 13th Street & Detroit Avenue).



6.3 Proposed West Pond Design

The conceptual sketch below provides an illustration of the proposed West Pond plan, viewed within the context of the existing neighborhood and street network. This perspective shows the configuration of the planned pond and pedestrian spaces, along with conceptual buildings around the perimeter of the pond for mixed-use and residential developments that could be developed by the private sector. These new developments would enjoy spectacular views of the downtown skyline, Centennial Park or the new West Pond. The conceptual sketch also illustrates the scale and configuration of the planned pond and its relationship to proposed and existing land uses.

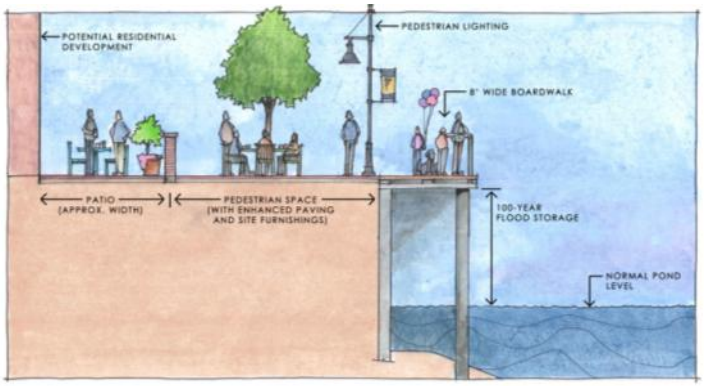


West Pond Perspective *- view looking northwest*

As envisioned in the sketch below, a wide pedestrian zone is proposed between the new residential / mixed-use buildings and the edge of the basin. This new terrace would overlook the pond and accommodate seating areas, outdoor dining, shade trees, pedestrians, bicycles and lighting. In addition, several large overlooks that are supported on piers are proposed at three locations around the pond's perimeter. The proposed open-air structures overlook the pond and create inviting places for social interaction. The pavilions also have the opportunity to create unique architectural landmarks that reinforce the urban character of the Pearl District. At the north edge of the new basin, the retaining walls are proposed to be terraced with water-tolerant landscape plantings.

Perspective Sketch - Northwest Corner of Detention Pond

The preliminary plan for the West Pond includes the potential for new residential development on the west side of the basin. As illustrated in the conceptual sketch below, townhomes (or similar housing density) would have street access from Madison Avenue. These new townhomes could have a small private courtyard adjacent to the pond, with pleasant views overlooking the water and convenient access to the new public terraces. As shown in the drawing to the right, an 8 ft. wide boardwalk is proposed along the west edge of the basin to enhance the pedestrian experience. This conceptual cross section also helps illustrate the relationship between the normal water level and the higher water level that would occur during 100-yr. flood events.



Conceptual Pedestrian Space / Pond Section

Perspective Sketch - New Residential Development / West Edge of Pond

Located at 417 S. Madison Avenue, the Herbold Building can complement new infill residential development that is planned along Madison Avenue to the south of this two-story brick apartment.

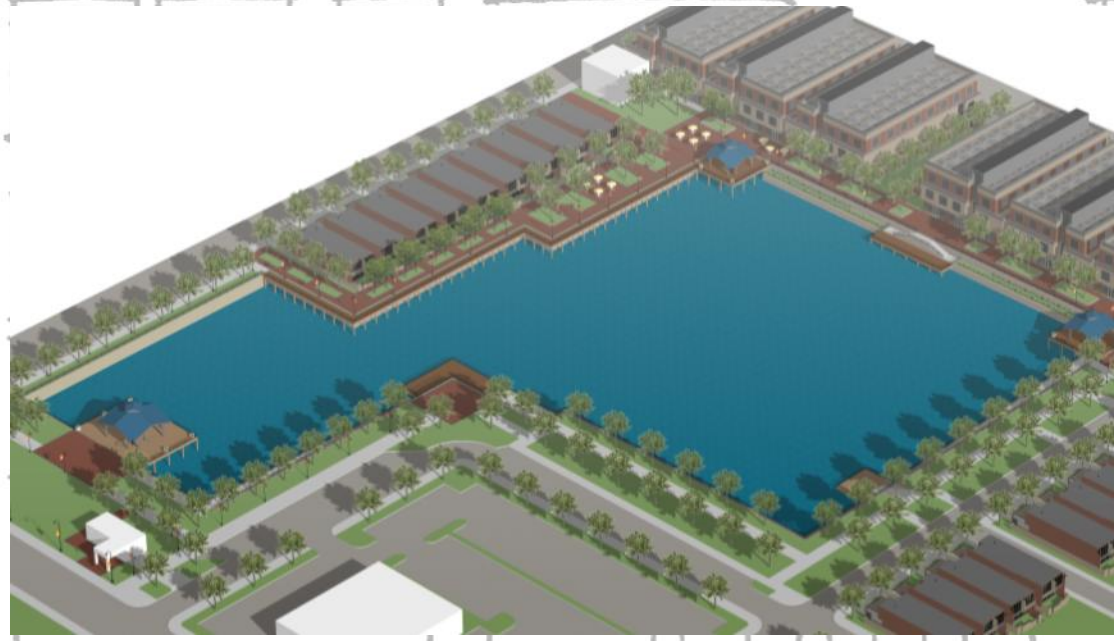
Two large pavilions are proposed to be built at the northwest and northeast corners of the basin. The proposed plan also includes a fishing/ observation deck on the east side of the basin. As illustrated below, an ADA accessible ramp along the east side of the pond provides access to the fishing dock and to a lower level walkway. In addition, potential residential development is shown on the east side of Owasso Avenue (by the private sector). Townhomes that front on Owasso Avenue would benefit from excellent views overlooking the new basin and the downtown Tulsa skyline.

Perspective Sketch - East Side of Pond

Perspective Sketch - Park at South End of New Pond

As shown in the character sketch above, a new open space is proposed at the south end of the new detention pond. In addition to allowing views of the West Pond from 6th Street and US-75, this new park area creates an excellent opportunity for recreation and social interaction. Complemented by a large overlook and pavilion, this space could function in a similar manner as Guthrie Green in Downtown Tulsa. The proposed lawn area and terraces can accommodate informal play, neighborhood events, festivals, exercise classes, etc. At the northwest corner of Norfolk Avenue and 6th Street, the old service station building has potential for adaptive re-use as a coffee shop, bike shop, or similar function. Another important benefit of this proposed park area is the strong connection that it provides with Centennial Park. In addition to new bicycle parking areas, on-street parking is also proposed along Madison Ave. and Norfolk Avenue to support park functions.

7.0 Funding and Implementation



7.1 West Pond - Preliminary Cost Summary

A detailed cost estimate of the preliminary West Pond plan shows that the construction cost is estimated to be $15,490,834. This estimated cost includes a 5-year inflation factor (projected to year 2023). The cost estimate includes construction of the detention pond, public areas and associated street & public utility work. On adjacent parcels, all redevelopment shown is anticipated to be provided by the private sector and is not included in this estimate. The remaining right of way acquisition that is required for the project is estimated at $8.4 million. Approximately $2,642,700 is already funded through an existing funding package, which leaves $5,757,300 as unfunded acquisition costs. The unfunded final design fees are estimated at 5% of the construction cost. The total unfunded cost is estimated at $21,937,634. The following summary provides estimated costs for major scope items for the proposed West Pond.

West Pond - Preliminary Construction Cost Estimate

Streets	$ 779,377.50
Pond	$ 5,257,300.00
Utilities	$ 962,000.00
Hardscaping / Landscaping	$ 404,665.00
Lighting / Electrical	$ 438,000.00
Pond Features	$ 3,438,200.00
Construction Subtotal	**$ 11,279,542.50**
Mobilization (5%) & Contingency (15%)	$ 2,340,505.07
Subtotal	**$ 13,620,047.57**
Construction Cost - 5 Yr Inflation (2.5%/yr)	**$ 15,409,834.00**
Right of Way	$ 5,757,300.00
Engineering	$ 770,500.00
Total Cost	**$ 21,937,634.00**

7.2 Potential Funding Sources

There are several options for potential funding sources that will allow for completion of design and construction of the West Pond. These potential sources include bonds and sales tax, stormwater utility fees, grants, and private partnerships. It is anticipated that all potential redevelopment on adjacent sites will be funded and built by private developers. However, there is also an opportunity to have a public-private partnership to build the pond and associated infrastructure.

Bonds and sales tax programs are the most likely source of funding since they have the ability to cover the entire cost of the West Pond project. These funding programs require significant efforts and a vote of the people, and consequently they would not be a guaranteed source of funding until the package is voted on and approved. In the past few years, Federal Emergency Management Agency (FEMA) grants have been pursued and denied. Other grant opportunities such as Community Development Block Grants could also be pursued. The City of Tulsa's stormwater utility fee could be used to fund part of the project. This fund does not currently have the capacity to fund a project of this size. If the stormwater utility fee rates were increased, this funding source could potentially pay for a bigger portion of the West Pond project.

7.3 Next Steps

Currently, property acquisition is underway and will continue until the current funding resources are depleted. The next major phase for this project will be to identify and secure funding for projects and begin detailed engineering / design and construction. Preliminary engineering plans, through a 60% completion level, are included in the current funding. This effort will begin in Spring 2018, with 60% design anticipated to be completed within 12 months.

The City of Tulsa, together with the Pearl District, will work towards a solution to secure the approximately $22 million in additional funds required to finish design and construct the detention pond. Once construction is complete, the Tulsa Development Authority will seek and engage private developers for the mixed-use and residential developments that are envisioned adjacent to the proposed West Pond. Through strong leadership and an effective public / private partnership, this visionary project can accomplish meaningful flood control and also be a significant catalyst for continued revitalization of the Pearl District.