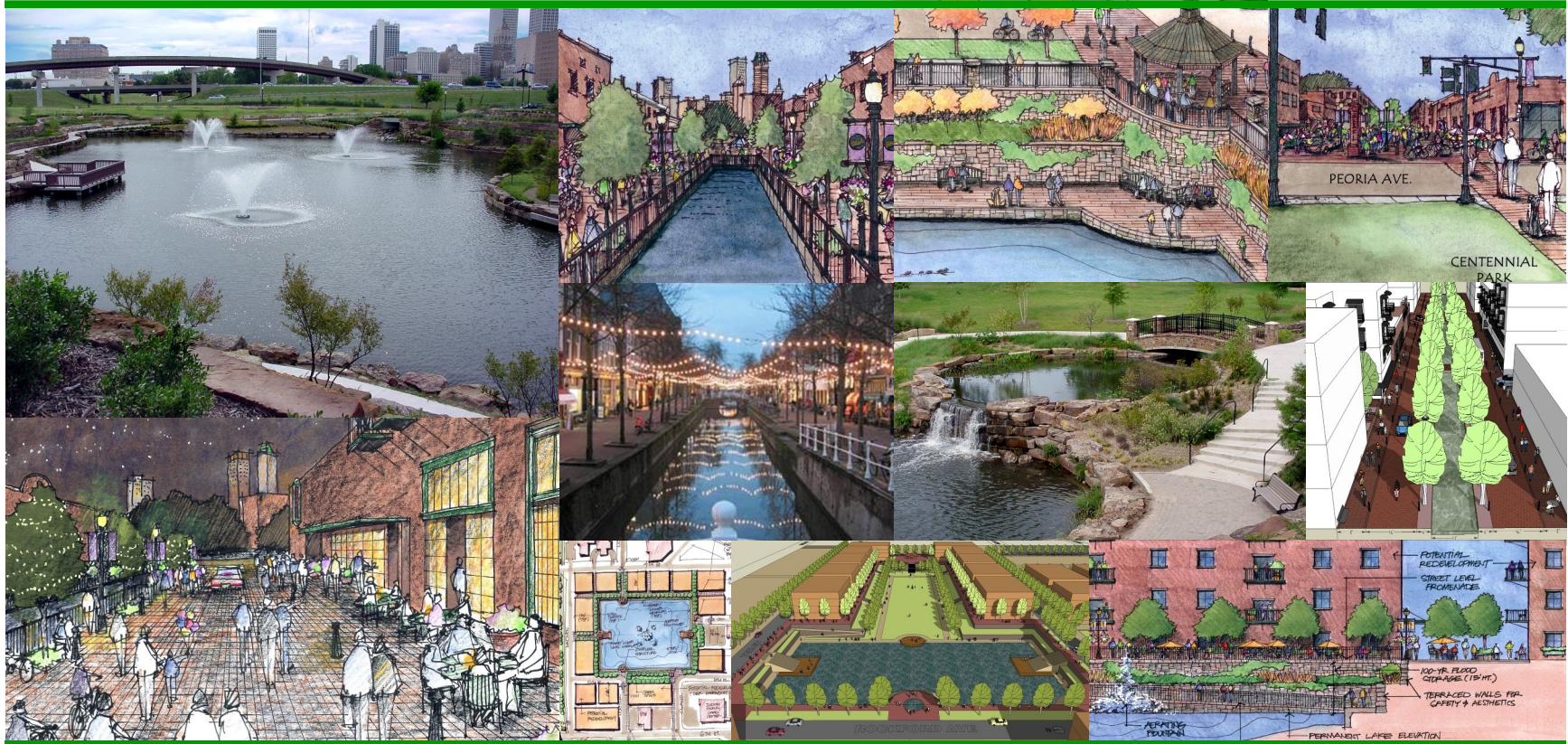


ELM CREEK / 6TH STREET

DRAINAGE, DETENTION AND CONVEYANCE PLAN



MARCH 2010

Prepared for : City of Tulsa, Oklahoma
Prepared by: Guy Engineering Services · Swift Water Resources
R.D. Flanagan & Associates · Alaback Design Associates

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ACKNOWLEDGEMENTS

The Elm Creek / 6th Street Drainage, Detention and Conveyance Plan was developed with the assistance and input of numerous organizations and individuals. Special thanks go to the many citizens, community leaders, neighborhood groups and elected officials who have provided valuable guidance to this planning effort.

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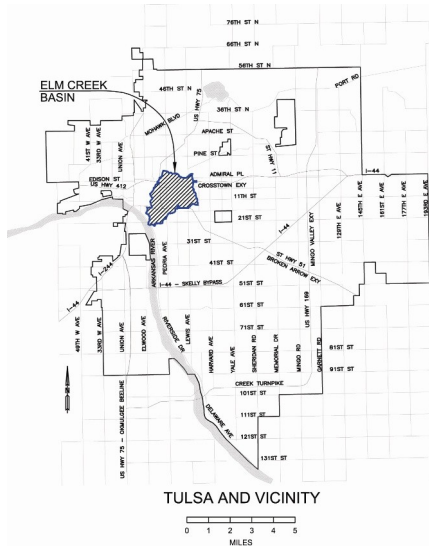
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1.0 Introduction





Elm Creek Drainage Basin Location Map



With its location immediately east of US Highway 75, Centennial Park and the Pearl District have excellent proximity to downtown Tulsa.

1.1 Project Overview and Objectives

Project Scope

The Elm Creek drainage basin, shown in the map to the left and in the aerial photograph on the facing page, 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 over the last 30 years.

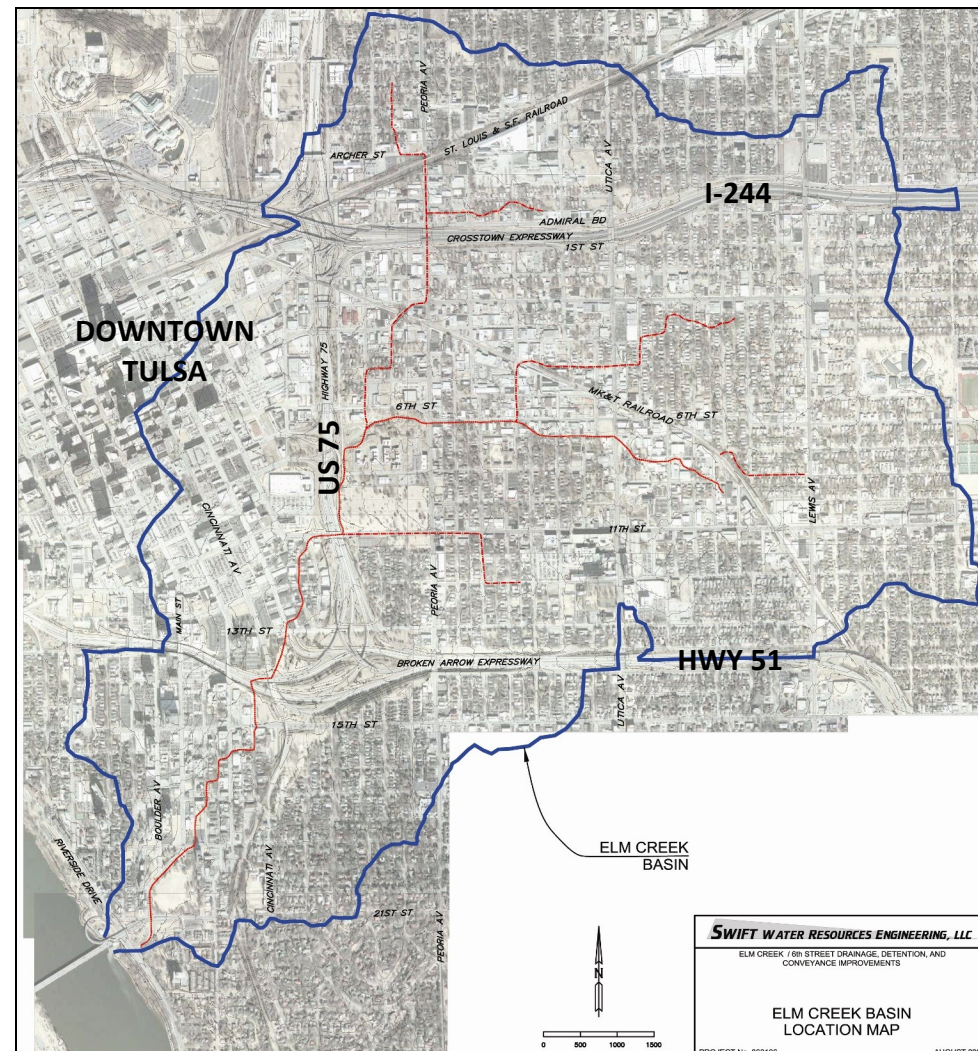
The primary goal of this project is to develop conceptual designs for two regional flood control detention basins and a conveyance system that have been previously planned for, most recently in the 2008 Elm Creek Master Drainage Plan Update. These two new drainage basins, now referred to as the East Pearl and the West Pearl detention basins, will complement the recently constructed detention pond in Centennial Park. The project scope also includes the preliminary design of a canal / conveyance feature that will carry floodwaters from the East Pearl basin to Centennial Park. *A second major component of this study was to prepare the 2008 Elm Creek Master Drainage Plan Update.* This work involves detailed hydrologic and hydraulic studies to reflect the effects of the Centennial Park pond and proposed East and West Pearl detention basins.

Planning Objectives and Process

The planning process continued the collaborative approach that has been successfully used on previous City of Tulsa planning initiatives. This community-based approach included many public meetings and continuous interaction with neighborhood representatives. All of the planning for the flood control projects was accomplished within the context of larger goals for stabilization of the neighborhoods within the Elm Creek basin.

With its central location in the middle of this urban watershed, the Pearl District Association was a significant partner in this planning process. The Pearl District Association has been actively involved in planning for the revitalization of their neighborhood, as described in *The 6th Street Infill Plan* which was adopted in 2006. Their mission statement is to “reinvent the art of city life”, with goals to resolve flooding problems while transforming the neighborhood into a “world class model of sustainability, community, economic reinvigoration and pedestrian-friendly lifestyle” (source: Pearl District website).

To stabilize and revitalize this and other near-downtown neighborhoods, significant investment and redevelopment will be required. The planning team recognized that the proposed flood control improvements, including the two new basins and urban waterway, represented an opportunity to create quality public spaces that could 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.*



Elm Creek Drainage Basin



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.

3.0 The Planning Process

A review of the community-based approach that was utilized to create preliminary plans for drainage improvements.

4.0 Elm Creek Master Drainage Plan

Provides an overview of the Elm Creek drainage basin and the new 2008 Elm Creek Master Drainage Plan Update.

5.0 Centennial Park Detention

Includes a summary of Centennial Park's recent redevelopment to integrate a large flood control basin.

6.0 Conceptual Design Alternatives

Includes conceptual designs that were developed for the two basins and canal, as well as criteria used to evaluate the alternatives.

7.0 Preliminary Detention / Conveyance Plan

Provides illustrations and detailed descriptions of the proposed plans for the East and West Pearl basins and the 6th Street Canal.

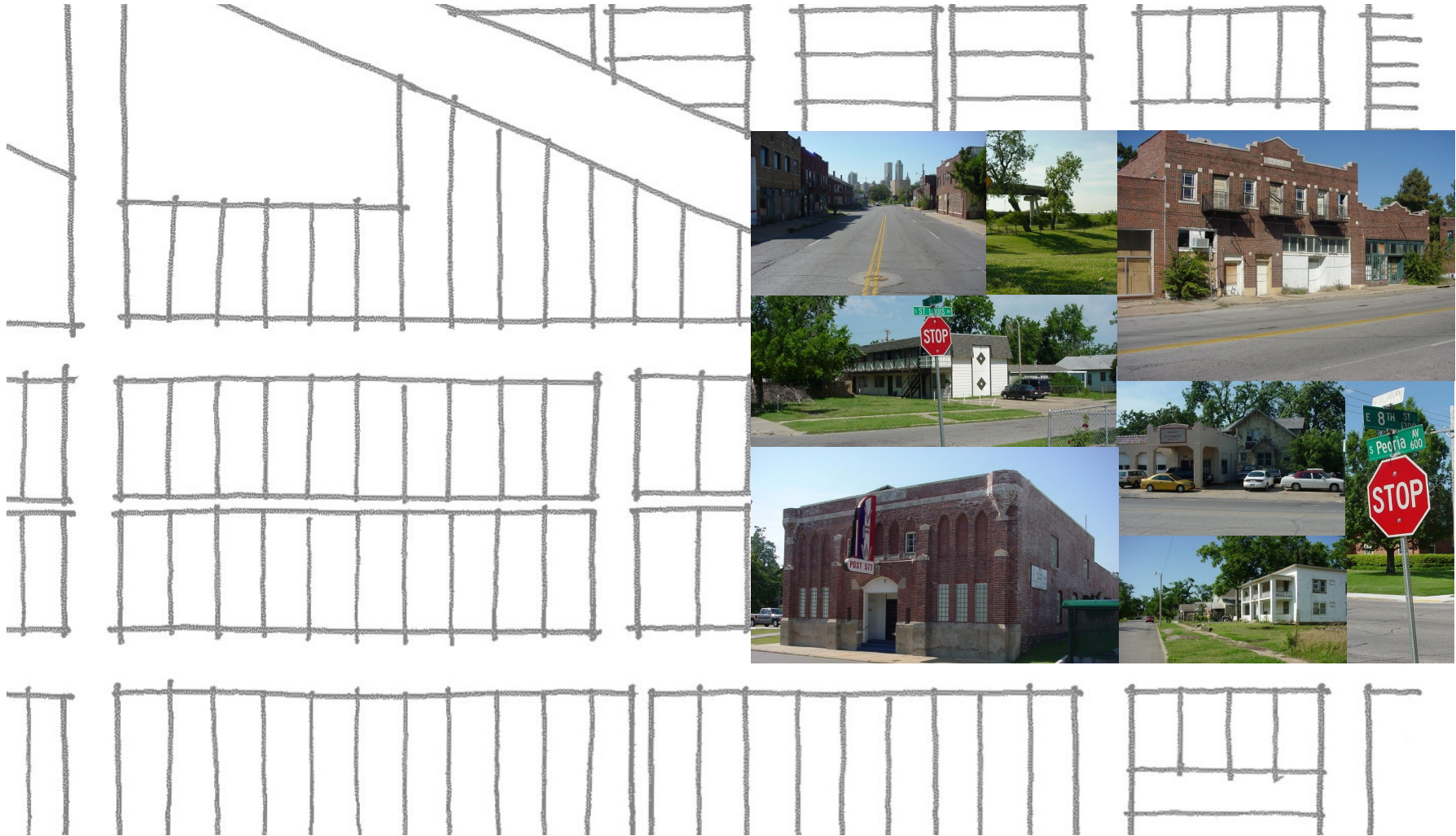
8.0 Funding and Implementation

Includes a summary of estimated construction costs, potential funding sources and steps for implementation.

In addition to this report, the following documents have been produced for this project:

- Executive Summary Brochure for the Elm Creek / 6th Street Drainage, Detention and Conveyance Plan*
- 2008 Elm Creek Master Drainage Plan Update*
- Data Reconnaissance Report for the Elm Creek / 6th Street Drainage, Detention and Conveyance Plan (Utility Locations, Property Ownership and Geotechnical Borings)*

2.0 The Neighborhood





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

2.1 Overview of the Pearl District

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 both planned detention basins and the 6th Street canal / conveyance are located within this urban neighborhood, planning for these new flood control projects has focused largely on the Pearl District. In addition to requiring the use of considerable land area for the new basins, these new projects will have a significant, long-term effect on adjacent properties. The neighborhood is represented by the Pearl District Association, which is among Tulsa’s most progressive and proactive neighborhood associations.

The Pearl District’s bold mission statement is “to reinvent the art of city life in Tulsa.” This new vision is guided by an exceptional planning document, known as *The 6th Street Infill Plan*. This detailed neighborhood plan was prepared by the 6th Street Task Force, a group of area residents, property owners and business owners with planning support from the City of Tulsa’s Urban Development Division. This plan includes a thorough assessment of existing conditions and recommendations to transform a struggling, near-downtown neighborhood into a desirable, vibrant, pedestrian-oriented mixed-use district. The 6th Street Infill Plan *provided a planning framework for developing alternatives for the new flood control projects that are included in this study.*

Originally known as the 6th Street Neighborhood, this neighborhood dates back to 1909 when the original “platting” (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. Today, most of the neighborhood service businesses have relocated to other areas of town with higher traffic volumes. Another damaging trend for this neighborhood is the transition from owner-occupied housing to rental properties.

This negative trend began in the mid-1950s, and currently only about 12% of the neighborhood is owner-occupied (source: *The 6th Street Infill Plan*). Today, visual observation of the neighborhood reveals that many homes are sub-standard and poorly maintained.



Several decades ago, 6th Street was a thriving corridor with a diverse mix of businesses. Today, 6th Street represents a unique opportunity for revitalization.



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

Although there are significant challenges facing the Pearl District, there are also a number of assets that provide hope for its revitalization. These include:

- Close proximity to downtown, with good access using 11th, 6th, 4th and 3rd Streets.
- Adjacent to healthcare, including Hillcrest Hospital and St. John Medical Center.
- Recent investment / building activity, including the Village at Central Park, Family and Children's Services offices and the Indian Healthcare Resource Center. Further recent investments include BKL's purchase and complete renovation of the TuOil Building, the new Pediatric Dental Clinic at 6th and Utica and plans for the renovation of the historic property at 1302 East 6th Street into a restaurant and retail space. Streetscaping improvements funded by the TIF are planned to be completed spring 2010. Other completed projects include the renovation of the Savoy Hotel, improvements to the VFW and Centennial Park / Central Center.
- Excellent public transportation service, making it very convenient to commute by bus to downtown and other destinations. In addition, the M. K. T. (Katy) railroad corridor bisects the neighborhood and preliminary plans for light rail commuter service utilize this existing infrastructure for the proposed alignment.
- Close proximity to expressways, including I-244, the IDL / US Highway 75 and the Broken Arrow Expressway.
- Centennial Park provides an 11-acre recreational space with a lake, trails and new community center.
- The 6th Street Corridor provides a direct linkage between Tulsa University and downtown Tulsa.

The Pearl District now has historic status with the recent designation of several buildings near 6th Street and Peoria Avenue as being historic properties worthy of preservation. According to the Oklahoma Historical Society, the National Park Service has listed the Sixth Street Commercial / Residential District in the National Register of Historic Places as of September 3, 2009.



The Village at Central Park

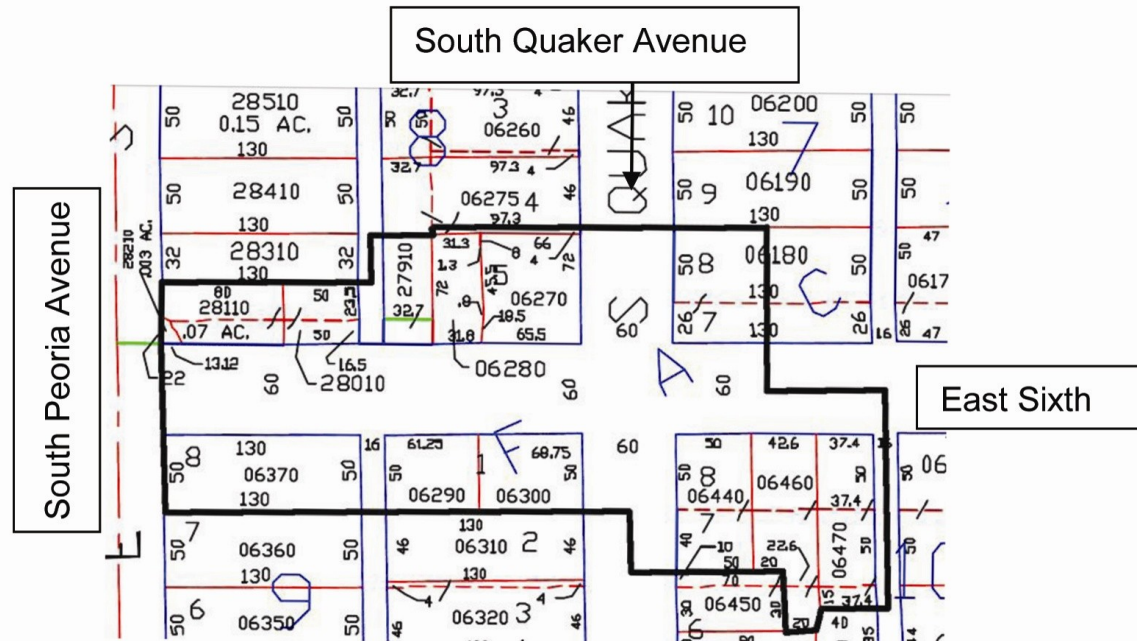


Indian Health Care Resource Center of Tulsa



*Youth Services of Tulsa
Donald W. Reynolds Center*

As shown in the map below, this new historic district is roughly bounded along East 6th Street from Peoria Avenue to the north / south alley between Quaker and Quincy Avenues. This new district, containing a key cluster of red brick buildings, is also listed in the State Register of Historic Places. There are multiple benefits of the new historic status of this district. Most importantly, tax incentives are available to the owners of those buildings for qualifying remodels and renovations. These tax incentives have proven to be a significant catalyst for reinvestment in other areas of Tulsa, including downtown.



*Sixth Street Commercial / Residential Historic District
(Source: National Register of Historic Places / US Department of the Interior National Park Service)*



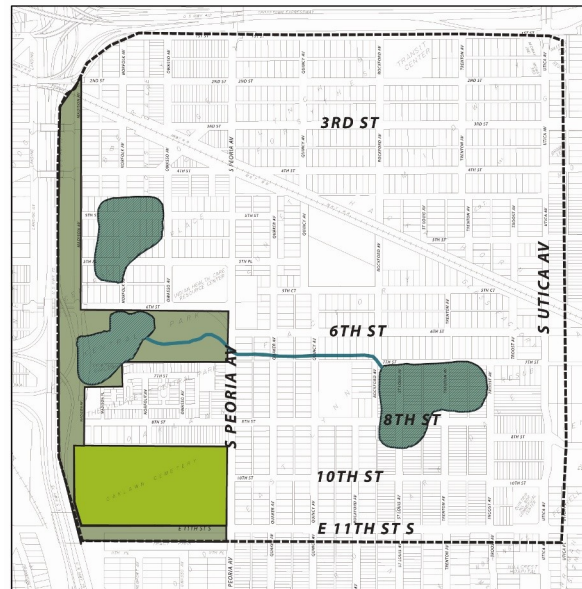
*Existing Buildings in Sixth Street
Commercial / Residential Historic District*

The proposed land use plan for the Pearl District is included on the facing page. *This plan was created as part of The 6th Street Infill Plan to guide redevelopment efforts toward the goal of a thriving, pedestrian-oriented neighborhood.* 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 new detention pond in Centennial Park, which was constructed several years ago. In addition, the plan illustrates the approximate location for the “East Pearl” pond, shown southeast of 7th Street and Rockford Avenue. The new canal / stormwater conveyance from the east basin to Centennial Park is also shown. To the north of Centennial Park, the “West Pearl” detention basin’s approximate location is identified. The land use plan recommends large-scale, residential / mixed-use infill redevelopment and mixed-use infill around the perimeters of the new detention basins.

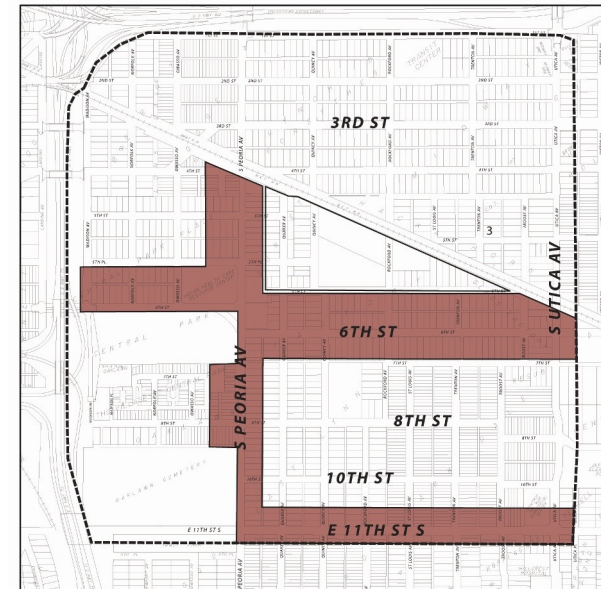
As shown in the diagram to the right, the open spaces that are created by Centennial Park and the two new detention basins will become a vital part of the Pearl District. These spaces provide a counterbalance to new high density developments that are proposed in the Pearl District. The diagram to the far right illustrates planned neighborhood commercial corridors that will abut the new detention pond sites. These existing streets provide opportunities for small-scale infill development that complements the neighborhood's urban fabric.



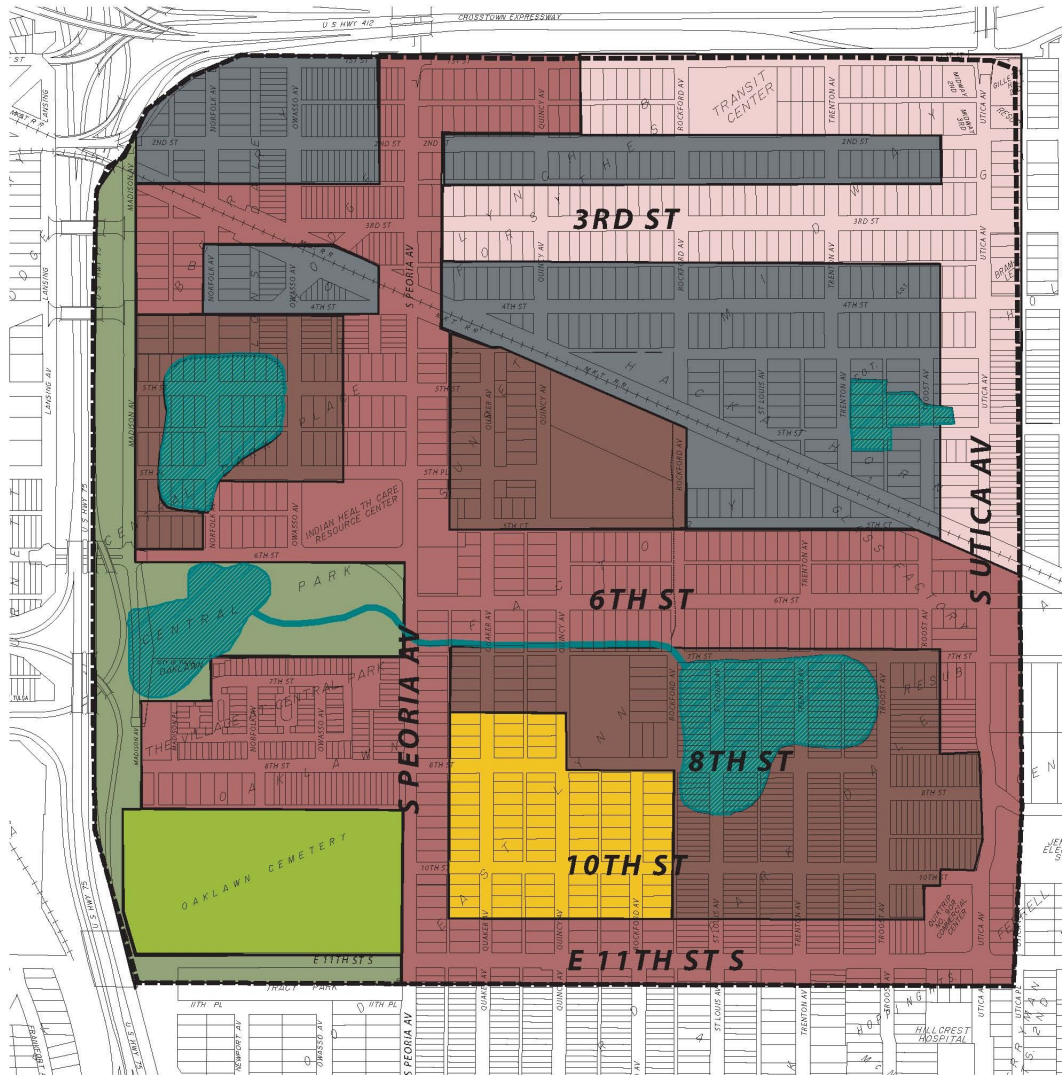
Aerial Photograph of Centennial Park and The Village at Central Park



*Public Space Design
(The 6th Street Infill Plan)*



*Neighborhood Commercial Corridors Subarea
(The 6th Street Infill Plan)*



Legend:

- Redevelopment**
Large-scale, residential/mixed-use infill developments
- Residential Revitalization**
Restoration of existing housing, introduction of small-scale, compatible infill
- Mixed Use Infill**
Residential, Commercial, Office, Manufacturing, Warehousing. Reuse of existing structures, smaller-scale, compatible, high-quality infill.
- Auto-Oriented Commercial**
- Manufacturing Warehousing**
- Flood Control**
New urban parks that provide flood control when needed
- Park**
non-flood control park areas and trails
- Cemetery**



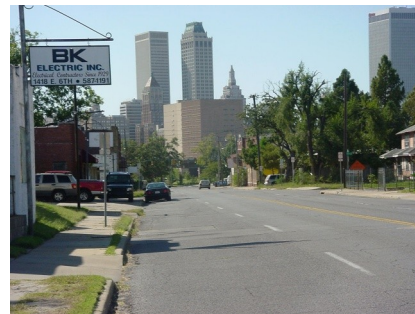
Proposed Land Use Plan
(Source: The 6th Street Infill Plan)

2.2 Pearl District Visual Inventory

Gaining an understanding of the existing conditions of the built environment is one of the critical first steps in the planning process. Prior to developing conceptual alternatives for the three new flood control projects, it was important to observe both the positive and the negative elements of the project sites. Beginning in Summer 2008, the planning team conducted a visual assessment of the Pearl District, with a specific emphasis on the two detention pond sites and the proposed 6th Street canal. Planners walked through the neighborhood streets to photograph existing conditions and record observations. The following pages provide a representative view of the Pearl District's visual environment.



Centennial Park / Wedding Bridge



*6th Street Corridor /
Stunning Views of Downtown Tulsa*



6th Street's building stock includes several classically designed brick structures that have great potential for renovation and reuse. These historic brick buildings are concentrated in several blocks directly east of Peoria Avenue in the newly designated Sixth Street Commercial / Residential District.



Architectural styles and the physical condition of existing housing varies considerably in the Pearl District. Throughout the residential and business areas, numerous examples of neglect and poor maintenance contribute to an overall feeling of apathy.



In recent years, the Pearl District has benefited from a significant investment in new facilities and parks. These recent projects create momentum for the trend to return to a sustainable urban lifestyle. Quality architecture and attractive parks make a major impact on the neighborhood's visual environment.



In the general area of the planned West Pearl basin, land uses vary considerably and include single-family housing, apartments as well as businesses that front onto 4th Street. Views west toward downtown are a positive factor for this area.

2.3 Context for Detention Pond Sites and 6th St. Corridor

On the following pages, illustrations are provided that document the existing land uses and businesses that are in the vicinity of the three proposed flood control projects. Utilizing an aerial photograph as the base map, existing uses are identified as observed during neighborhood surveys in 2008. Although land uses and business ownership is continually changing, this data provided good baseline information for developing conceptual options that were responsive to the neighborhood context. The following summary provides a quick overview of each site:

- **6th Street Corridor:** Between Peoria Avenue and Rockford Avenue, uses along these three blocks are primarily commercial with a wide variety of architectural styles and front setbacks. Currently, there are many vacant buildings.
- **East Pearl Detention Pond:** The general area is bounded by 7th Street, Troost Avenue, 10th Street and Quincy Avenue. The majority of this area contains single-family housing. Other major institutions include the 10th and Rockford Church of Christ and the Laura Dester / DHS site.
- **West Pearl Detention Pond:** This area encompasses diverse land uses, including single-family homes with industrial and commercial uses on the north side. The detention pond site is generally within the boundaries of 4th Street, Owasso Avenue, 5th Place and Madison Avenue. The VFW and the Indian Health Care Center are located on the southern edge of the detention site.



6th Street Corridor - Existing Conditions (June 2008)



East Pearl Detention Pond Vicinity - Existing Conditions (June 2008)

SECTION 2

THE NEIGHBORHOOD



West Pearl Detention Pond Vicinity - Existing Conditions (June 2008)

3.0 The Planning Process



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 Central Center at Centennial Park

3.1 Planning Approach and Participants

*Members of the Pearl District, Kendall-Whittier and other near-downtown neighborhoods have a proven track record and a long history of effective participation in planning projects. This commitment and willingness to be actively involved has resulted in the creation of plans that reflect the needs of the local community. Neighborhood residents have been significantly involved in projects that include *The 6th Street Infill Plan* as well as flood control plans that have been ongoing in this basin for over 30 years. Centennial Park's redevelopment and new community center are tangible examples of successful implementation that positively impacts adjacent neighborhoods.*


For this planning effort, the primary objective was to develop preliminary plans for two new stormwater detention basins and a conveyance system. The design process allowed for community participation and involvement from key stakeholder groups throughout the duration of the project. Several community meetings were held at the Central Center at Centennial Park, beginning with an initial meeting that was focused on communicating the project's scope and allowing neighborhood residents to express their concerns and ideas. Additional community meetings were held to allow for review of conceptual design alternatives. These meetings typically included a presentation by representatives of the City of Tulsa, the Pearl District Association and the consultant team. Following the presentations, "break out" sessions were facilitated to allow citizens to ask questions and express their ideas. Comment forms were also provided to all attendees to allow for written feedback.

This project was managed by the City of Tulsa's Public Works Department. Regular progress meetings were held with members of the consultant team and City of Tulsa engineering staff. The City of Tulsa's Planning Department was also extensively involved and provided excellent continuity with previous planning initiatives for the Elm Creek watershed.

The planning process also benefited from a strong partnership with the Pearl District Association. Represented by a subcommittee that was created to communicate the neighborhood’s perspectives and expectations, the Pearl District Association (PDA) provided valuable input and feedback throughout the planning effort. The design process included three design charrettes, which provided an interactive forum for exploring and evaluating conceptual options for the basins and canal features. In addition to these design workshops, the project also included meetings with the City of Tulsa staff and the PDA on a regular basis.



Community meetings were well-attended and provided good feedback to proposed design solutions.



August 12, 2008
Community Workshop
Elm Creek / 6th Street
Drainage, Detention and
Conveyance Project
Comments and Suggestions

The City of Tulsa recently completed a significant stormwater detention project in Centennial Park. This detention project is the first of several planned flood control improvement projects within the 1.4 square mile Elm Creek watershed which extends from the Arkansas River at 21st Street and continues up to the Cross Town Expressway at Lewis Avenue. Additional projects are planned by the City of Tulsa to make the neighborhood safer from flooding and to assist neighborhood associations in achieving their goal “to reinvent the art of city life in Tulsa.” The City of Tulsa has recently engaged a planning team to develop preliminary plans for two additional detention ponds in the watershed, as well as a waterway to connect two of the ponds. Tonight’s meeting is intended to be an opportunity to learn about the scope of these new stormwater improvements, as well as provide a forum for residents to express ideas. We welcome input from the community concerning the planned detention ponds and drainage improvements. In the space provided below, please tell us your suggestions, concerns and ideas (attach additional pages as necessary). The planning team will use this input to develop conceptual options for the stormwater improvements that will be presented to the community at meetings later this fall. Thank you!

Name (Address Optional): _____
Phone: _____ E-mail: _____

Please leave your forms with us tonight or forward to the design team by August 22 to:
Guy Engineering Services, Inc.
10759 E. Admiral Place Tulsa, OK 74116
Fax: 437-0540; Email: John33@GuyEng.com



The consultant team that was engaged for the project provided a broad range of experience in flood control planning, civil engineering and landscape architecture / urban design. The planning team, composed of four Tulsa firms, was led by Guy Engineering Services with sub-consultants Swift Water Resources, R. D. Flanagan and Associates and Alaback Design Associates.

3.2 Summary of the Planning Process

This collaborative approach proved to be very effective, with excellent attendance at community meetings and good exchange of ideas with the PDA subcommittee. The following summary provides an overview of major milestones / meetings that were held in conjunction with this project:



Design Charrettes

- **Community Meeting No. 1** August 7 and 12, 2008
- **Design Charrette No. 1** September 18, 2008
- **Design Charrette No. 2** October 7, 2008
- **Design Charrette No. 3** November 6, 2008
- **Design Review Session** December 2, 2008
- **Community Meeting No. 2** February 3, 2009
- **Presentation / Review Meeting with City of Tulsa Mayor's Office and Public Works Department** March 10, 2009
- **Community Meeting No. 3** June 30, 2009

One of the most important components of this project involved detailed engineering to create an updated master drainage plan for the Elm Creek basin. The next section of this report provides an overview of this effort.

4.0 Elm Creek Master Drainage Plan





The Elm Creek Basin

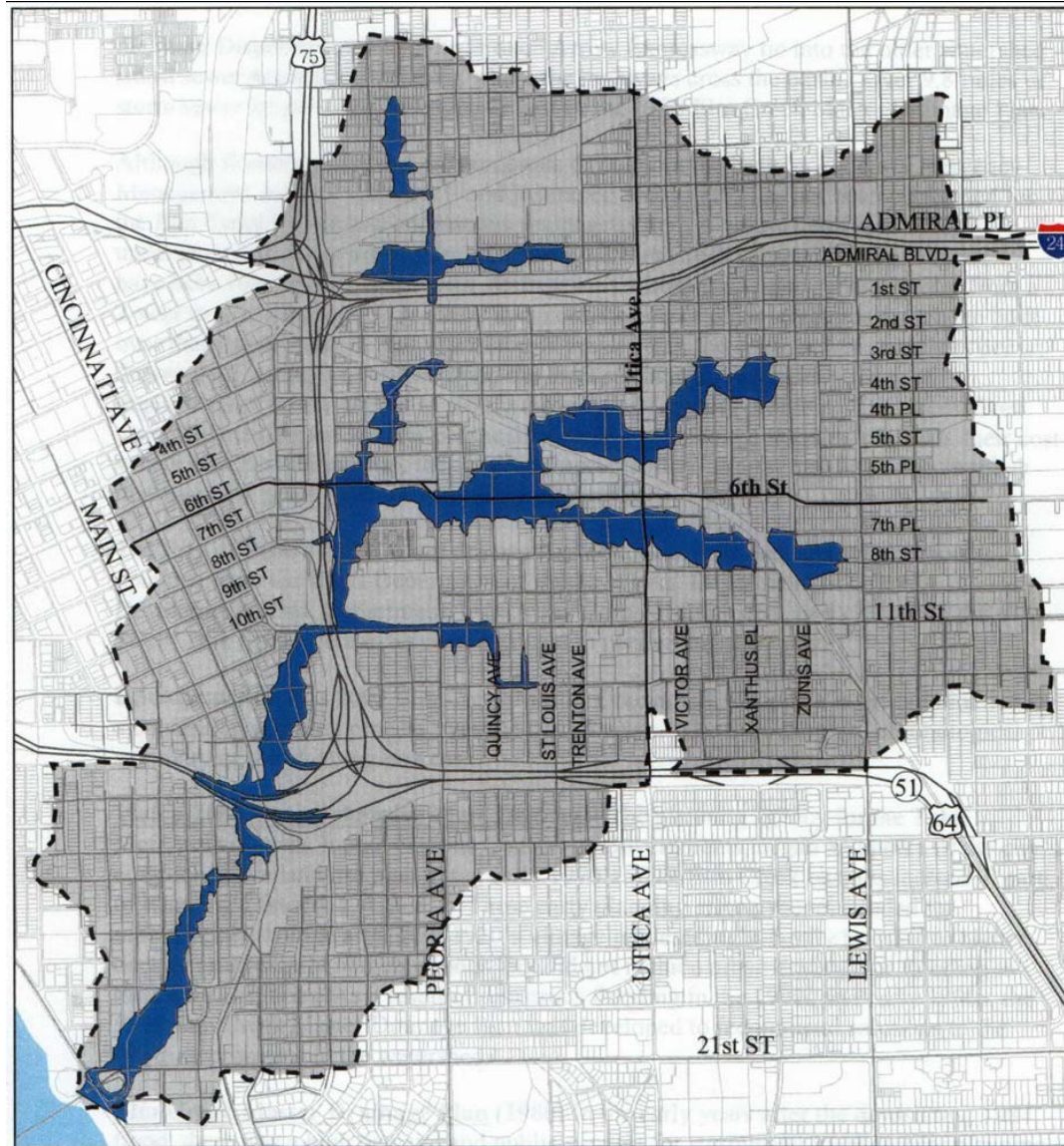
4.1 Introduction

A vital part of this study 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 completed in conjunction with this study is also provided.

4.2 Elm Creek Watershed Overview

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 U.S. Highway 244. The basin is totally developed with urban land uses, consisting primarily of older single family residences, with retail and service commercial uses along the major streets. 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 main sewer line is a 15' x 15' high arch storm sewer that is buried as much as 60 feet beneath the City and drains to the Arkansas River just downstream of the 23rd Street Bridge.

The watershed's drainage system is entirely enclosed in this extensive underground storm sewer system. In many instances, houses or other structures have been built over the storm sewers that have replaced the original Elm Creek channel and its tributaries. The storm sewers have capacities that generally vary from a 2-year to 10-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)*

4.3 Elm Creek Basin Flood Control Planning

The 2008 Elm Creek Master Drainage Plan Update is the culmination of a continuing planning process over the last 30 years which is well documented in the 6th Street Infill Plan. In 1974, the Vision 2000 Comprehensive Plan for the study area recommended the redevelopment of the area from 1920's vintage modest single-family housing to higher density multi-family neighborhoods. Then, 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*. The plan ranked and prioritized all of the city's recommended stormwater capital projects. The Elm Creek flood control improvements were all deferred or removed from the plan due to political and/or economic infeasibility.

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. Key to the revitalization efforts is to identify an acceptable solution to the flooding problems. A new and more realistic look at solving the flooding problems of Elm Creek was authorized by the Department of Public Works in 1998. In May 2000, the Sixth Street Task Force was formed to oversee plans for the redevelopment of the upper Elm Creek basin. The Urban Development Department coordinated a multi-disciplinary/multi-agency effort to solve the flooding problems and enhance the urban redevelopment planning program.

Previous drainage plan studies included the *1988 Elm Creek Master Drainage Plan* (MDP) which investigated three significantly different approaches to flood protection for the Elm Creek basin: enlarged storm sewers throughout the basin; detention ponds with a reduced amount of storm sewers; and acquisition/flood proofing of floodplain buildings. Alternative 2 (the Recommended Plan in the 1988 MDP) included 4 detention ponds and over 3.2 miles of new storm sewers. The plan was never implemented because it was felt that the proposed storm sewers were too expensive for the amount of protection they provided and the detention pond sites were unacceptable to the surrounding community. In particular, the Central Park Detention Pond converted the entire Park into a deep detention pond, and another detention pond required the acquisition of a viable industrial/commercial neighborhood. 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.

4.4 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 implementable storm water and flood control improvements. These improvements are designed to result in significant benefits related to flood control and revitalization of blighted urban neighborhoods. The master drainage plan and planning process for the City of Tulsa's Elm Creek watershed, and as documented in the *2008 Elm Creek Master Drainage Plan Update* is an outstanding example of sound multi-objective planning, community cooperation and coordination, and innovative problem-solving by a multidisciplinary team of community representatives, public entities, and design professionals.



*Central Park (Centennial Park)
January 2003
Before Detention Pond Construction*



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 serve as an impetus for other new and innovative urban developments.
- Alleviate the near-downtown trend of property devaluation and urban neighborhood depopulation.
- Facilitate and allow revitalization of the 6th Street corridor, consequently reestablishing the connection between downtown and the University of Tulsa.
- Reinvigorate the near-downtown economy by enhancing public infrastructure and by providing new housing and shopping opportunities.

The 2008 MDP Update included a review and formulation of alternative plans for basin wide flood control including: the three plans studied in the 1988 Elm Creek Master Drainage Plan; a four detention pond plan with limited storm sewer improvements that was recommended in the 1998 Elm Creek Hydrologic Engineering Study; and three additional basin wide plans that included combinations of detention ponds, storm sewerage and acquisition. The 2008 MDP Update Recommended Plan 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. Alternative detention pond and conveyance designs were evaluated as they were developed during the public plan formulation process and this recommended plan represents the final result.

During the alternative evaluation process, numerous public meetings were held to inform the public and gain input and approval. 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 on the facing page in Figure 1, is the result of that process. The following discussion summarizes the major features of these proposed improvements. Section 7 of this report also presents these proposals in greater detail.

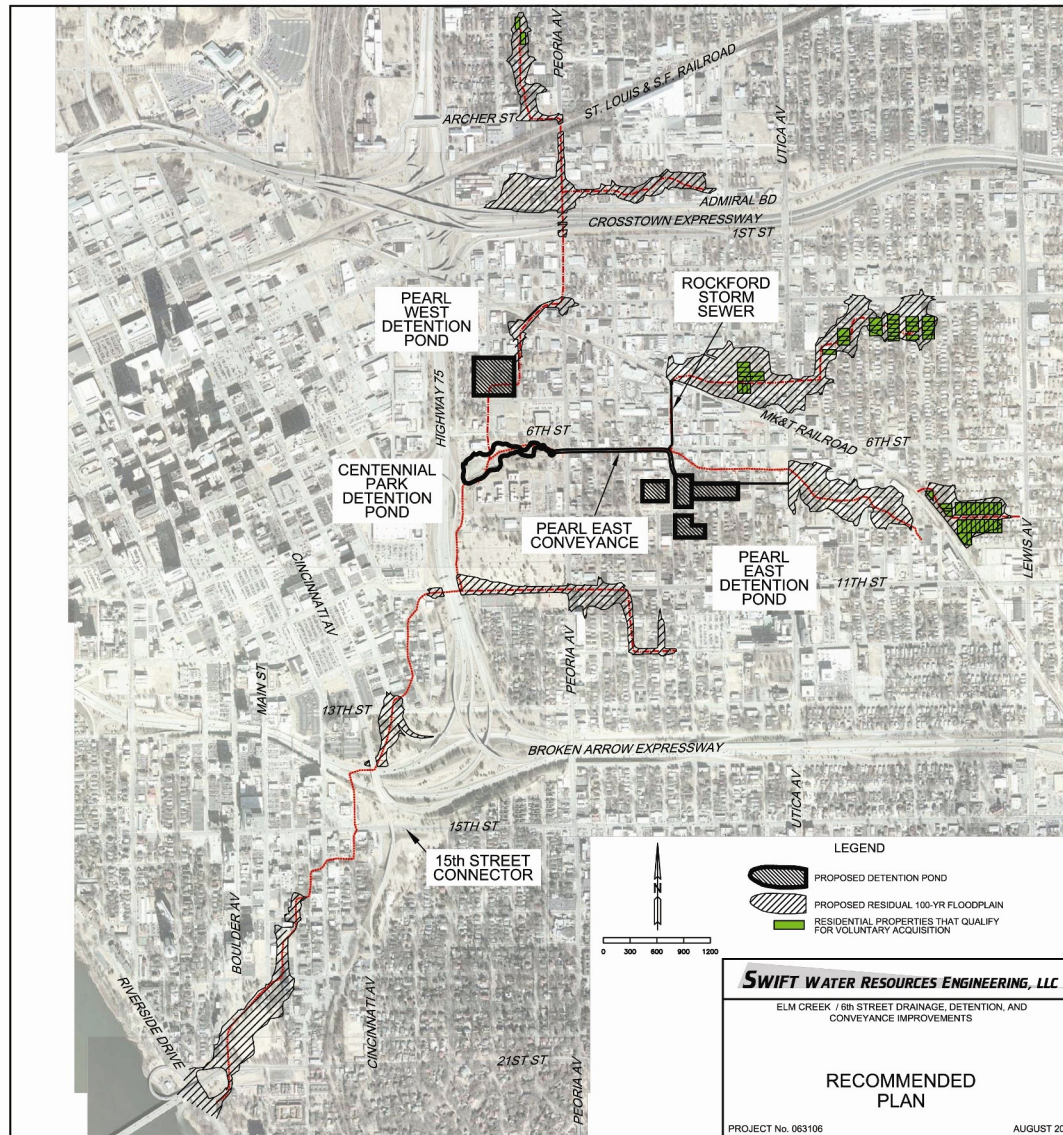


Figure 1
2008 ELM CREEK MASTER DRAINAGE PLAN UPDATE - RECOMMENDED PLAN



Centennial Park Detention Pond

The Centennial Park Pond provides 58.4 acre-feet of storage and has been laid out on 5.5 acres in 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 Central Center community building, providing recreational opportunities, scenic overlooks, waterfalls, a meandering “natural” stream with riffles and pools, aeration fountains, a stone bridge, stone bluffs, open space areas, landscaped terraces, aquatic plantings and riparian habitat. (Refer also to Section 5.0 of this report.)



West Pearl Detention Pond

The West Pearl detention pond, as shown previously in Figure 1, is proposed to be located north of Centennial Park and will provide 64.5 acre-feet of storage, covering approximately 4.7 acres. 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 for the conversion of over 15 acres into mixed-use development and urban residences.

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 in this blighted area and will allow redevelopment of 30 acres as large-scale, residential / mixed-use infill in accordance with the 6th Street Infill Plan’s land use plan. Through innovative design, the East Pearl detention ponds can also create public amenities that will encourage significant reinvestment in the area.

Centennial Park Detention Pond

6th Street Conveyance

An integral part of the Recommended Plan and the key to relieving the flooding along 6th Street is the East Pearl Conveyance feature. This feature will 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 that can stimulate the revitalization of 6th Street and the adjacent neighborhoods. Section 7 of this study illustrates the proposed concept for the 6th Street conveyance.

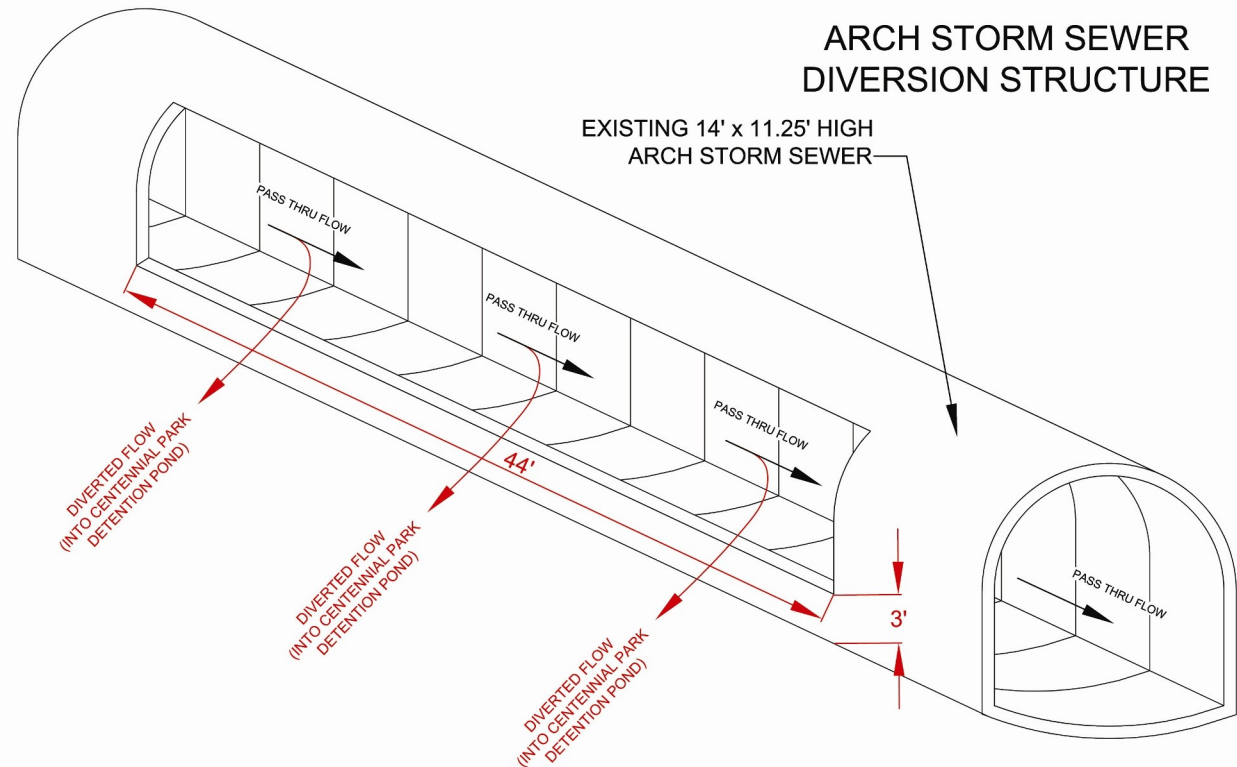
The 6th Street Conveyance feature will be a two cell 10' x 10' reinforced concrete box (RCB) that extends from Centennial Park (where it connects to the existing 14' x 11.25' high Arch storm sewer) upstream along 6th Street to Rockford Avenue. At that point it splits into two storm sewer lines. The first proceeds to the south along Rockford Avenue where it connects to the East Pearl detention pond. The second line proceeds north along Rockford Avenue to intercept overflow from the natural storage area created by the MK&T Railroad embankment at 5th Street and Rockford Avenue. The 6th Street Conveyance feature is designed to work in conjunction with an existing storm sewer that drains a southern branch of Elm Creek and also connects to the existing arch storm sewer in Centennial Park. The combined flows that enter the existing 14' x 11.25' high Arch storm sewer for the east will be partially diverted into the Centennial Park detention pond. As shown in the sketch on the following page, the diversion will be accomplished via a lateral weir structure that will be constructed in the north side wall of the existing Arch storm sewer. The weir structure will be 3' high (from the flowline of the Arch) and 44' long and will be an open-air structure connecting directly into the detention pond.



Existing Conditions on 6th Street



Elm Creek Arch Storm Sewer



Storm Sewer Improvements

Storm sewer improvements are proposed along Rockford Avenue to relieve flooding and direct the overland flow into the East Pearl conveyance feature (refer to Figure 1). Long storm sewer improvement reaches are not recommended because of high construction costs and intense disruption to the local community. Improvements to existing inlets throughout the basin are recommended to allow local runoff to fully utilize the existing storm sewer system.

Voluntary Acquisition

The voluntary acquisition of residential properties that remain in the residual 100-year floodplain is an important element of the 2008 Elm Creek Master Drainage Plan Update Recommended Plan, as shown previously in Figure 1. By acquiring these 60 residential properties, on a voluntary basis, flood damage will be greatly reduced in the basin. For more detailed engineering / technical information, the complete 2008 Elm Creek Master Drainage Plan Update is available through the City of Tulsa.

5.0 Centennial Park Detention





*Central Park Wading Pool, Built Circa 1925
(Photo Credit: City of Tulsa)*



*As shown in this 2003 photograph,
Centennial Park's many large trees
created a beautiful environment.*

5.1 Centennial Park History

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. Originally named Central Park, the 11.65 acre property is located southwest of the intersection of 6th Street and Peoria Avenue. The park was purchased in 1910 from L. K. Cone for \$7,500, according to the City of Tulsa's 2006 APWA awards entry for Centennial Park. It is Tulsa's third oldest park after Owen and Woodward, respectively. A wading pool was constructed around 1925 and a shelter and a bathhouse were added in 1948. The first community center was built in 1963 and expanded in 1976. *In 1998, as part of Tulsa's Centennial Celebration, the park's name was changed to Centennial Park.* Located in Tulsa's "Pearl District" and only a short walk from downtown Tulsa, the park has played a variety of roles throughout its many years.



*With its location immediately east of US Highway 75 and downtown,
Centennial Park is an integral part of Tulsa's urban core.*

5.2 Detention Basin Planning

Centennial Park is located on relatively low ground within the Elm Creek drainage basin, and is part of the flood-prone 6th Street Planning Area that has been a critical barrier to successful revitalization of adjacent neighborhoods and commercial districts. Though the need for flood control has been documented since the 1980s, efforts to implement ideas were hampered by a lack of public support. Many people in the neighborhood believed the introduction of flood control would mean they would have to sacrifice something - park land, housing opportunities or the senior center in Centennial Park. Through a model process of citizen involvement, a group called the 6th Street Task Force comprised of Senior Center users and neighborhood stakeholders, was allowed to introduce their own objectives and desired outcomes into the discussion. *The scope of the project was not centered solely around flood control, but also on the repopulation of a struggling urban neighborhood.* The 6th Street Task Force helped the City to recognize that exceptionally good stormwater designs could be a catalyst for the revitalization of the entire neighborhood.

As important as flood control is to the recovery of the neighborhood, this was not the only goal of this cooperative effort. Equally, it has been to transform Centennial Park into one of Tulsa's finest public open spaces. Through an effective process of community involvement, citizen groups and a multi-disciplinary team of design professionals worked together to integrate flood-control into this wooded park in the most environmentally sensitive approach possible. The net result was a project that was far from a typical "engineered" detention basin, achieving the vision of incorporating floodwater storage without compromising the park's aesthetic qualities. Through this collaboration, the varied goals of many parties were merged into a single comprehensive plan for improving the park and the neighborhood. The final design went beyond stormwater management to become a vital element of a neighborhood revitalization plan.



*Flooding Aftermath in Elm Creek Basin
(Photo Credit: City of Tulsa)*



Design review sessions were held to evaluate conceptual designs for the new community center.

5.3 Detention Basin Construction

Construction for the new features and facilities in Centennial Park was a significant undertaking, beginning with the removal of the old Central Center (community center) building in 2004. Site construction began in May 2006, with removal of massive quantities of earth to create the necessary space for stormwater detention. As shown in the photographs, significant excavation was required to dig a pond that was 26 feet below grade. Shale was encountered at the bottom of the pond, which has proven to hold water with very little leakage. The pond has remained full since its completion, aided by the storm sewers which drain into it.



The new detention pond can be seen taking shape in this December 2005 photograph. On the right side of this view, the 108 inch diameter drainage pipe and new community center are visible.



Large sandstone boulders were used to create a natural appearance where retaining walls were needed. Adjacent to the new pond, a boulder edge and lower level walkways were constructed to enhance views for park users.



In the center of the park, a new stone bridge, walkways and seating terraces created a major focal point.



Natural stone was used to cover and visually disguise large concrete drainage structures.



The primary outlet structure was nearly complete by March 2006. The horizontal edge of the weir opening maintains a constant water surface elevation in the pond and the cantilevered dock further contributes to the illusion of a dock constructed over piers into the water.

5.4 Centennial Park Redevelopment

As illustrated below, the final plan for Centennial Park integrated 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. A new 12,500 sq. ft. community center is located in the northwest corner of the park, with a large outdoor terrace that overlooks the new lake. Through sensitive site planning, engineering needs were met without sacrificing aesthetics. Today, Centennial Park features a permanent lake, stream and waterfalls, lighted trails, open space and attractive landscaping.



Final Site Plan for Centennial Park / Stormwater Detention Improvements



Centennial Park's New Pond and Community Center



Sandstone boulder walls were terraced for safety and to create opportunities for landscaping.



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



*Aerating Fountain and Observation Dock
(Outlet Structure)*



Conceptual Sketch of Waterfall / Bridge

Proposed grading for the park was designed to create natural forms that visually blended with the existing environment. A key element of the new park design was to preserve as many of its large trees as possible. Natural sandstone boulder walls were utilized to preserve the existing grade root zones of more than 50 trees that were preserved within the park. Retaining wall terraces were planted with over 50 varieties of trees, shrubs, grasses and perennials to create a pleasing and sustainable environment.



New Waterfall and Stone Bridge (Looking Northeast)

In the center of the park, conceptual designs were prepared that envisioned a focal point where a new stream would flow into the lake with a 5 foot tall waterfall. The photograph above illustrates the final completion of the new waterfall, complemented with walkways and a stone bridge. The new arched bridge provides a vantage point for excellent views throughout the park.

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. A walking trail adjacent to the stream allows continued interaction with the water. Seating areas with accent paving and benches create opportunities for enjoying the scenic views.



The stream begins with a 7 ft. tall waterfall which can be viewed from a large seating plaza. Lake water is pumped to this fall through two 7 hp submersible pumps.



Stone ledges create small waterfalls in the stream.



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



Constructed with colorful pavers, the community center's large terrace provides a flexible space for events.

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

trails were also integrated throughout the park and adjacent to the lake to create opportunities for walking, jogging and biking. An upper level trail loops around the entire park, and includes a linkage to Tulsa's regional trail network.

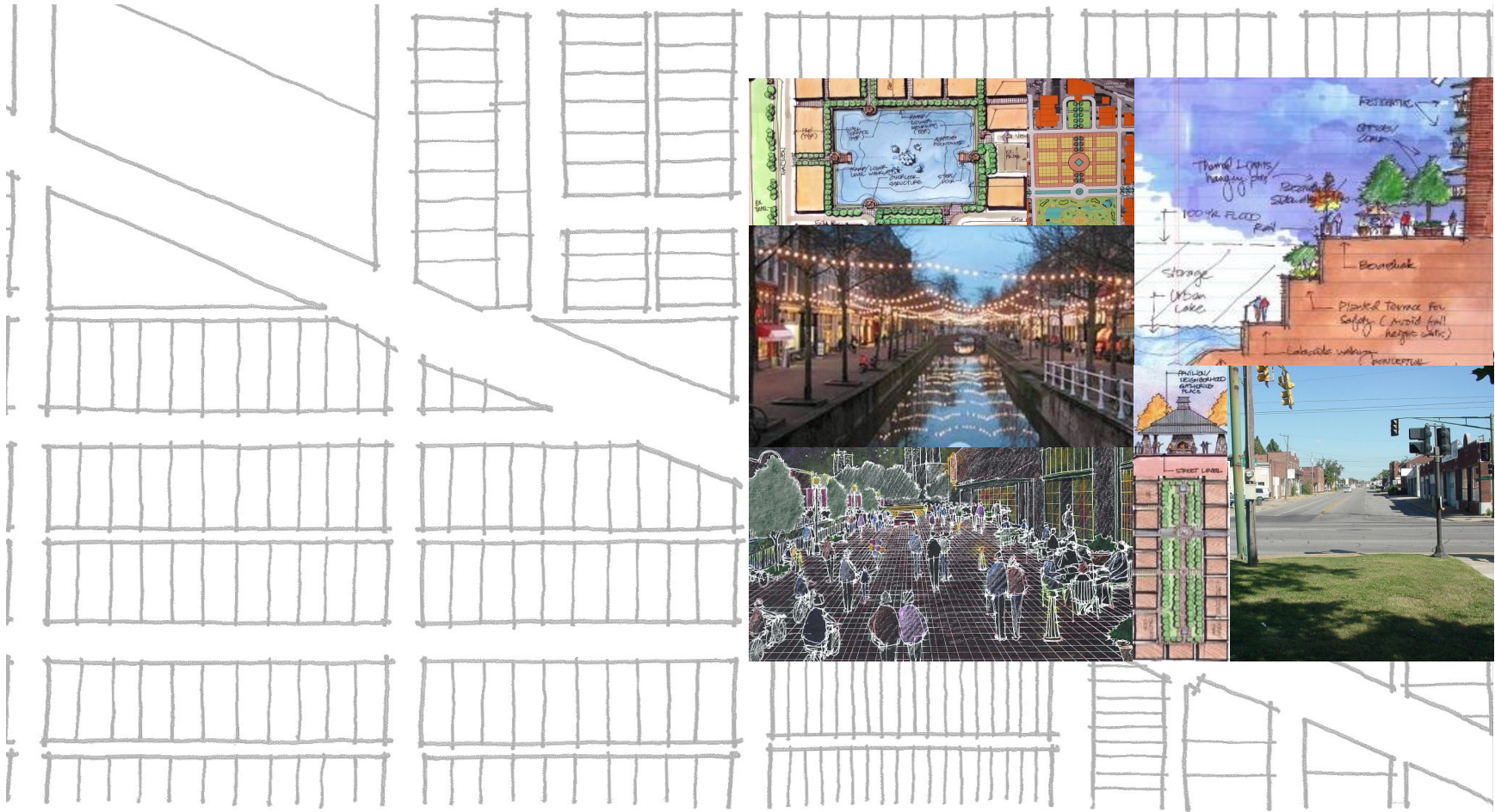
The park's northwest corner now accommodates the beautiful Central Center at Centennial Park. As a replacement for an old senior center building, the size was increased to 12,500 from 8,000 square feet to accommodate programs and activities for 750 seniors as well as provide programming space for other age and special-interest groups. With a spectacular view of the Tulsa skyline and stunning views of the newly renovated Centennial Park, the center also is a prime location for special occasions such as weddings, receptions, reunions and community events. The new center includes an auditorium with a stage, fitness room, visual arts room, commercial kitchen and several meeting rooms.

Since its redevelopment was completed in 2006, Centennial Park has further enhanced its role as one of Tulsa's best parks. It is regularly used for the Pearl District's Farmers Market and other events, and the Central Center is in high demand for meetings and special events. *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.



Central Center at Centennial Park

6.0 Conceptual Design Alternatives



6.1 Pearl District Vision

Prior to beginning the exploration of conceptual designs for the proposed detention basins and canal / conveyance features, it was essential to understand the vision and goals of citizens who would be directly impacted by these improvements. All three new 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 which were already featured in their existing neighborhood and
- Acceptance of mixed-use development.



*The creation of an urban waterway on 6th Street is an essential part of the Pearl District's vision to create an exceptional neighborhood.
(Photo Credit: Jamie Jamieson / Pearl District Association)*

The *6th Street Infill Plan* also included a clear vision statement which is highly relevant to the design of the currently proposed flood control projects. In response to the question “What do you want this neighborhood to be?”, the answer is:

“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.” (The 6th Street Infill Plan)

Prior to the beginning of design work by the consultant team, the Pearl District’s Subcommittee drafted a *Design Brief*, that provided excellent guidance. This *Design Brief*, included as Appendix A in this report, 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.*



*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 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.

During the conceptual design process, another useful resource was the review of the best urban design projects of benchmark cities. As illustrated in the photographs that accompany this section, there are a number of exceptional public spaces in other communities that provide inspiration for this design effort. Many of these successful spaces included pedestrian-oriented streets, urban waterways / canals and walkable urban neighborhoods.



*Design Inspiration / Examples of Successful Urban Neighborhoods
(Photo Credit: Jamie Jamieson / Pearl District Association)*



Addison, Texas



Denver, Colorado

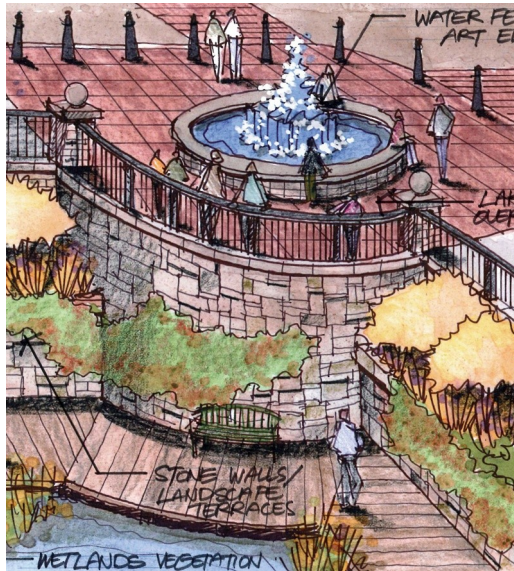


Louisville, Kentucky



Portland, Oregon

Other communities throughout the United States provide excellent examples of pedestrian-oriented urban design.

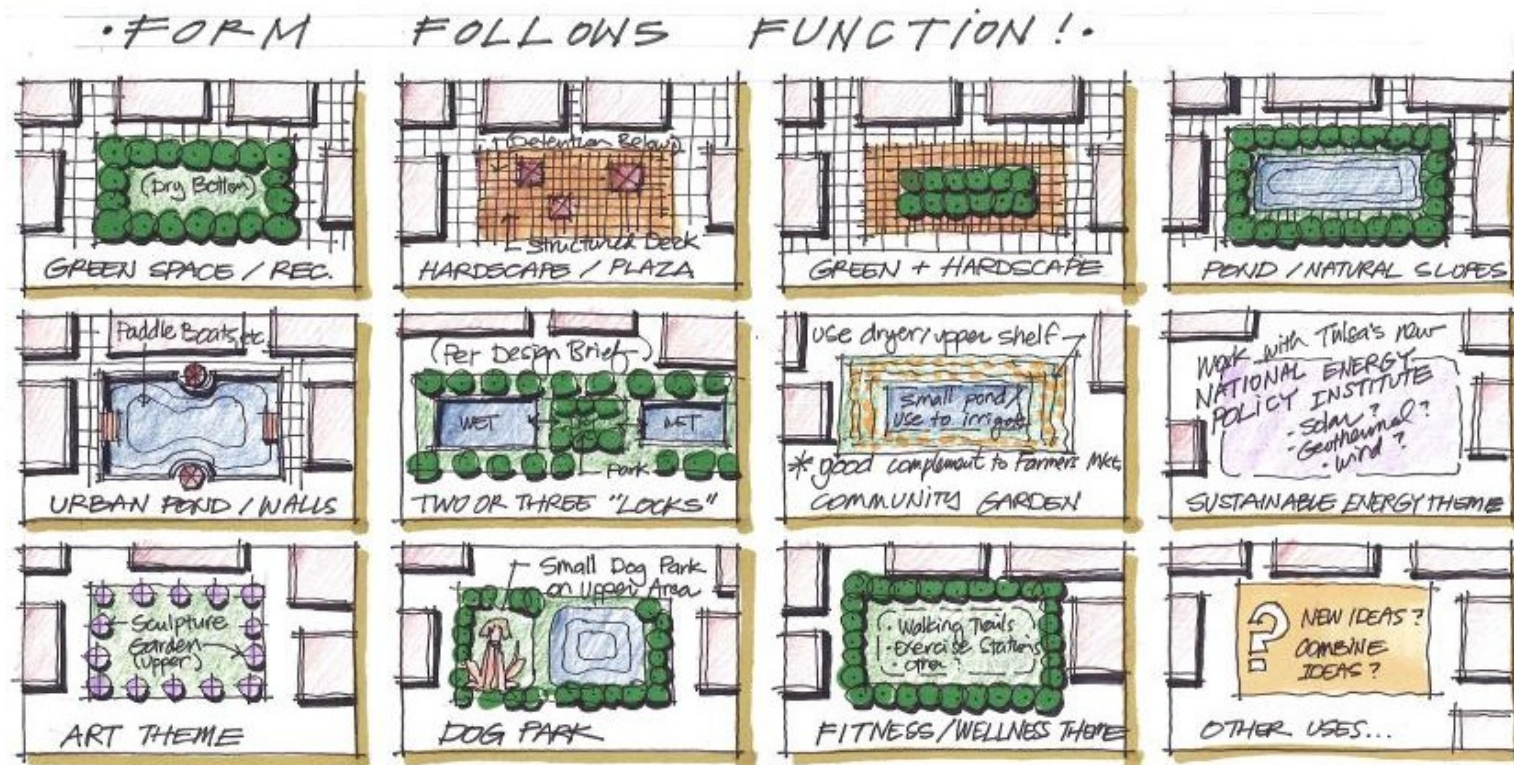


6.2 Conceptual Design Studies

Following the clear definition of the neighborhood’s vision and the completion of the flood control plan that was recommended in the 2008 Elm Creek Master Drainage Plan Update, the next major planning task was to explore conceptual options for the East Pearl, West Pearl and 6th Street Conveyance. These alternatives integrated the Pearl District’s mission “to reinvent the art of city life in Tulsa” with the functional requirements for a total of 236.5 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 basins and waterway system alternatives was to create physical forms that reflected the urban fabric of the Pearl District neighborhood. In addition to the first priority of making the neighborhood as safe as possible from flooding, these planned flood control improvements are also essential to “jump start” the neighborhood’s revitalization. To achieve the desired density and mixed-use development pattern, significant redevelopment will be necessary. The importance of the proposed detention ponds and waterway system cannot be overstated. By creating exceptional public spaces, these flood control improvements represent a tremendous opportunity to encourage private investment in the Pearl District. In summary, the “bar” has been set very high for the design of the new flood control improvements. In addition to providing a critical public safety function, the new detention basins represent an unparalleled opportunity to stimulate the transformation of the Pearl District into a sustainable, world-class neighborhood.

This section of the report presents a summary of the preliminary concepts that were developed, beginning with an evaluation of alternatives for the basic uses and physical forms for the three project areas. Working in coordination with the City of Tulsa and the Pearl District, these conceptual options were ultimately refined and further developed into a single preferred concept for the East Pearl, West Pearl, and 6th Street Conveyance. (Section 7 of this study presents the final version of the conceptual plans that are proposed for implementation.)

One of the best guidelines for good design is the mandate that “form follows function.” Prior to developing conceptual alternatives for the East and West Pearl basins, it was essential to explore how these important public spaces would be used. As demonstrated successfully by the redevelopment of Centennial Park, it is possible to achieve flood control in a manner that is aesthetically pleasing and useful as a public space. It was recognized that in addition to the requirement for large-scale flood control, the East and West Pearl basins could accommodate a variety of civic uses. As illustrated in the diagram below, there are many options for creating public spaces that reflect the Pearl District’s desire for a sustainable urban neighborhood. The preferred uses for the detention basins are reflected in the design concepts that are illustrated later in this section of the report.

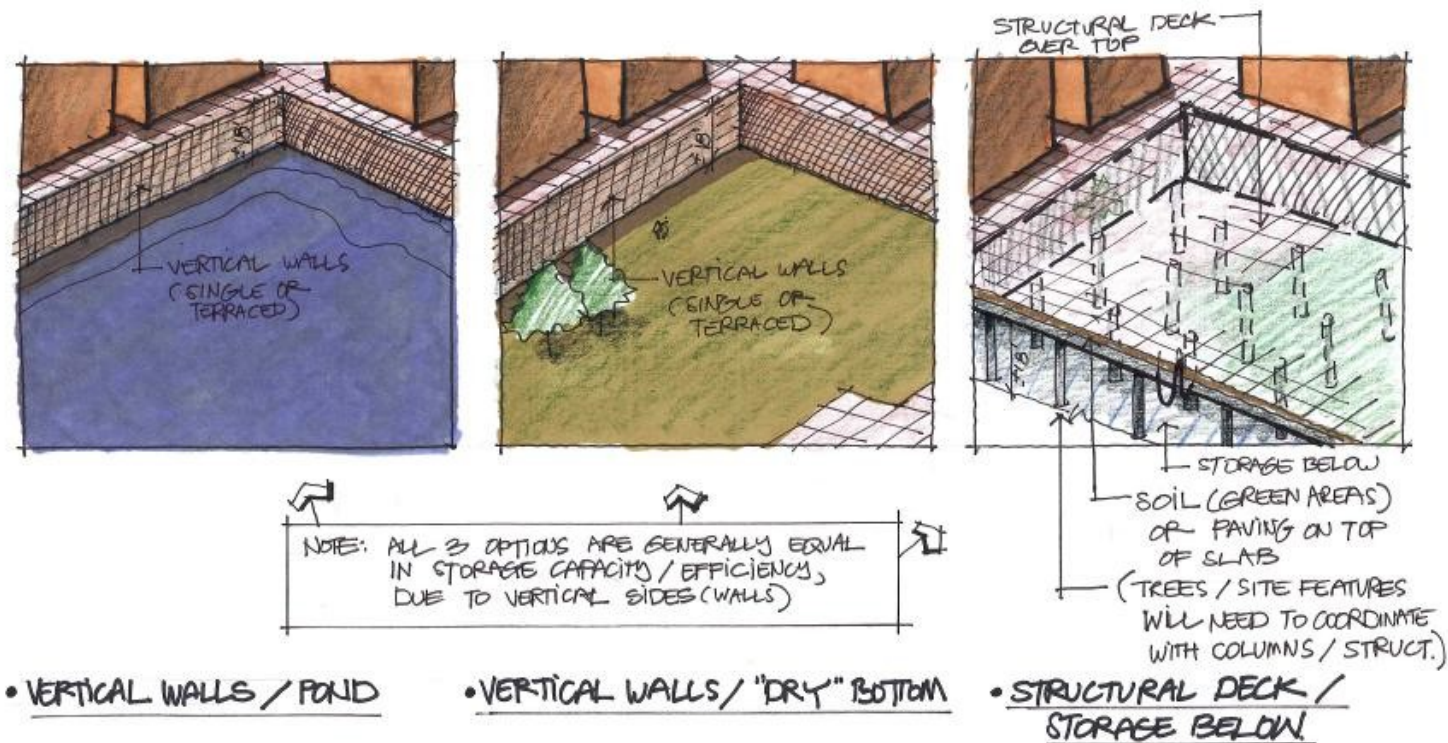


Potential Uses for the East and West Pearl Basins

In addition to the functions of the proposed basins, there are also several options for their physical forms. As illustrated in the graphic below, these options include:

- Vertical side walls with a permanent pool of water in the bottom of the pond. Floodwater storage would be accommodated between the normal pool level and the top of the basin walls.
- Vertical side walls with a basin bottom that is normally dry.
- A structured deck over the proposed detention area which would allow for hard-scaping or landscaping at street level. Stormwater detention would occur underneath the structural deck.

Proposed concepts for the East and West Pearl basins utilized these basic forms as the physical framework for potential solutions.





A. NATURAL SIDE SLOPES/
PERMANENT POND



B. NATURAL SIDE SLOPES/
"DRY" BASIN



C. VERTICAL WALLS/
PERMANENT POND



D. VERTICAL WALLS/
"DRY" BASIN



E. BELOW GRADE/
STRUCTURED DETENTION



F. COMBINATION OF WALLS/
NATURAL SLOPES

As shown in the diagrams above, there are multiple options for creating the new detention basins. Options A through F illustrate six potential basin configurations which include vertical walls, natural side slopes and structural decks over underground detention. During the design process, the option to use natural side slopes was ruled out because it lacks urban character and requires substantially larger areas to obtain the same flood storage requirements.

**DESIGN CHARRETTE**

September 18, 2008

East / West Pearl Committee
Elm Creek / 6th Street Drainage, Detention and Conveyance

Objectives

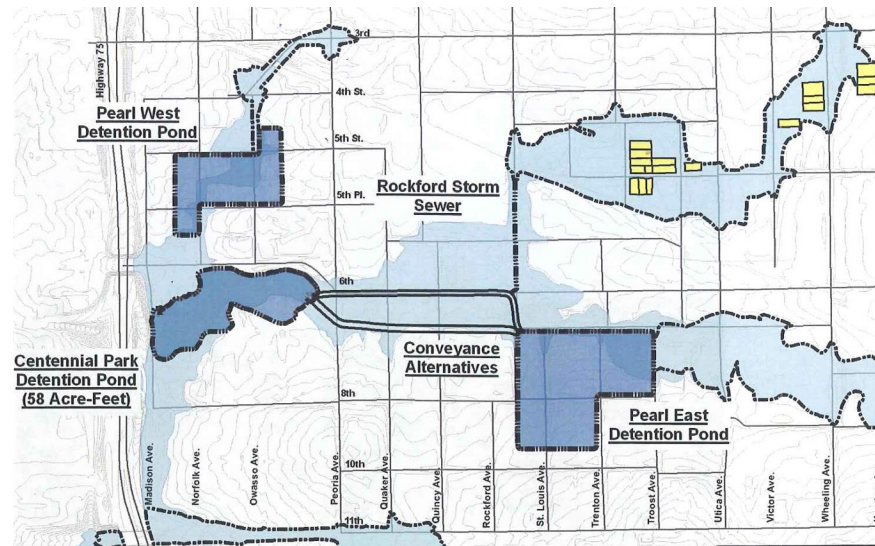
- Focus on “Big Picture” First (Not Details)
- Look at a Broad Range of Ideas
- Working Session (Everybody Gets to Draw!)
- Goal: Excellence
- Have Fun! (Eat)

Using the basic detention basin forms and potential uses that were illustrated on the preceding pages, the design team explored site-specific concepts for the West Pearl, East Pearl and the 6th Street conveyance. The design process included three interactive workshops with the Pearl District urban design committee allowing for the generation of many potential alternatives with immediate feedback. Generalized locations for the East and West Pearl ponds are shown below. This drawing also illustrates the conveyance alternatives (6th Street or 7th Street) between the East Pearl Basin and Centennial Park.

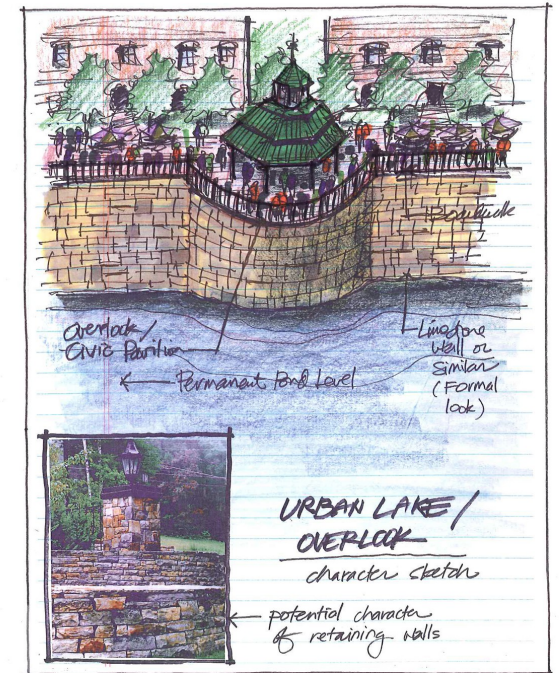
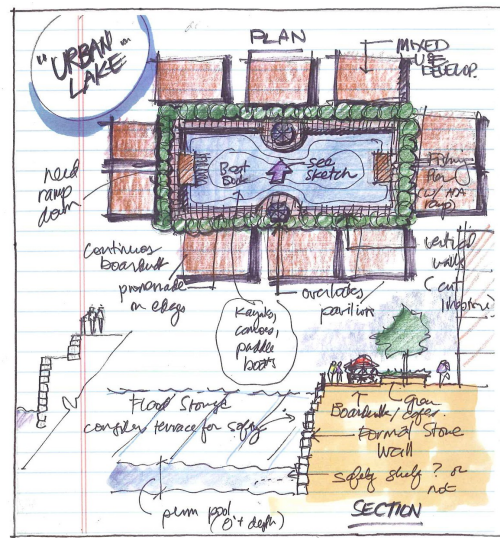
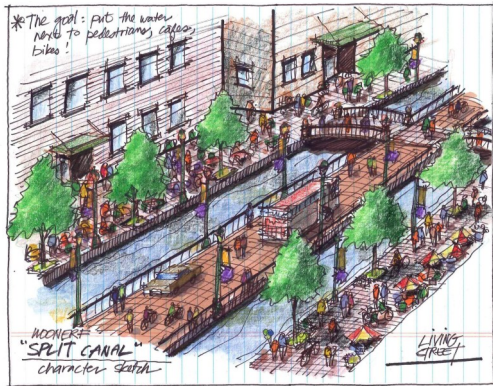
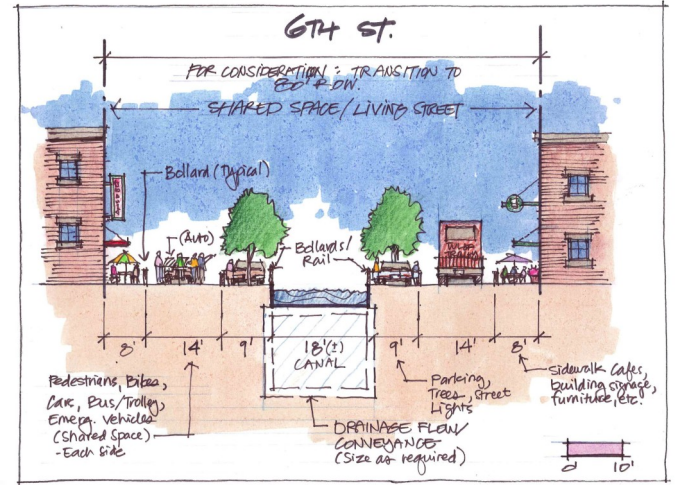
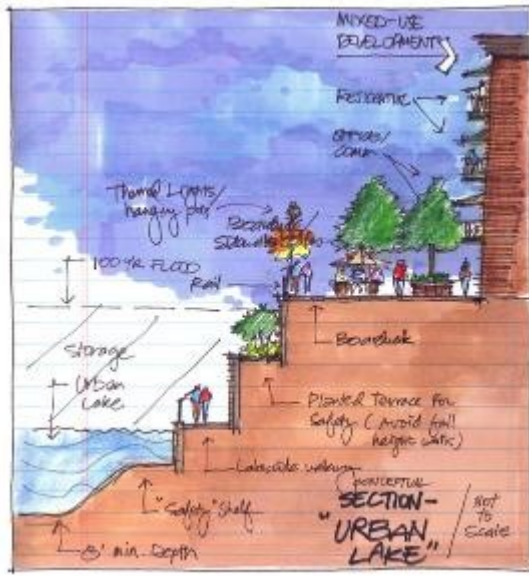
As shown in the sketches on the following page, preliminary ideas for detention basins included an “urban lake” that created a focal point for new residential buildings and pedestrian space. Different configurations were also studied for a conveyance system that would carry stormwater flows from the new East Pearl detention basin into the Centennial Park detention pond. The design solutions were focused on creating a pedestrian-oriented environment with a shallow canal at street level. Major stormwater flows would be carried through a large underground drainage structure.



Design charrettes provided an interactive environment for the exchange of ideas between the design team, the City of Tulsa and Pearl District leadership.



General locations for the East Pearl, West Pearl and Conveyance



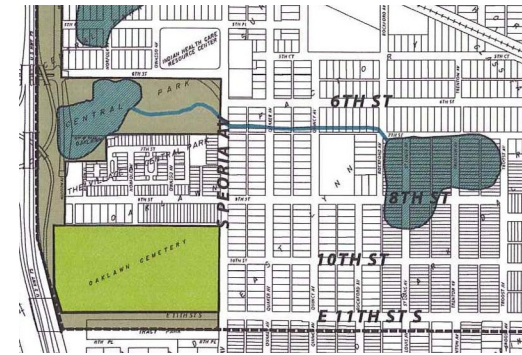
Conceptual Designs for Detention Basins and 6th Street Conveyance / Canal

6th Street Conveyance Concepts

As described previously, the proposed East Pearl basin will provide 113.6 acre-feet of flood water storage, which requires a significantly large structure to carry runoff into the Centennial Park pond. However, this conveyance feature, which extends between Rockford Avenue and Peoria Avenue, has potential value far beyond its engineering function to reduce flooding. There is a tremendous opportunity to create an attractive, urban amenity that will stimulate the revitalization of adjacent streets, shops and residences.

Several alternative routes for this conveyance structure have been proposed and studied during previous planning for the Pearl District. The 6th Street Infill Plan (adopted January 2006) proposed that the needed stormwater conveyance be constructed as an open canal along 7th Street, which is essentially an alley between Rockford Avenue and Peoria Avenue. *However, further evaluation of this alignment has led to a recommendation to shift the conveyance north one block to follow 6th Street between the East Pearl basin and Centennial Park.* On February 5, 2008, the East Pearl Design Sub-Committee unanimously approved the following resolution: “It is our recommendation that 6th Street be used for the waterway and we find that this is consistent with the 6th Street Infill Plan.” A comprehensive evaluation of the strengths and weaknesses of the 6th Street vs. 7th Street canal location by the sub-committee identified the following benefits for the 6th street alignment:

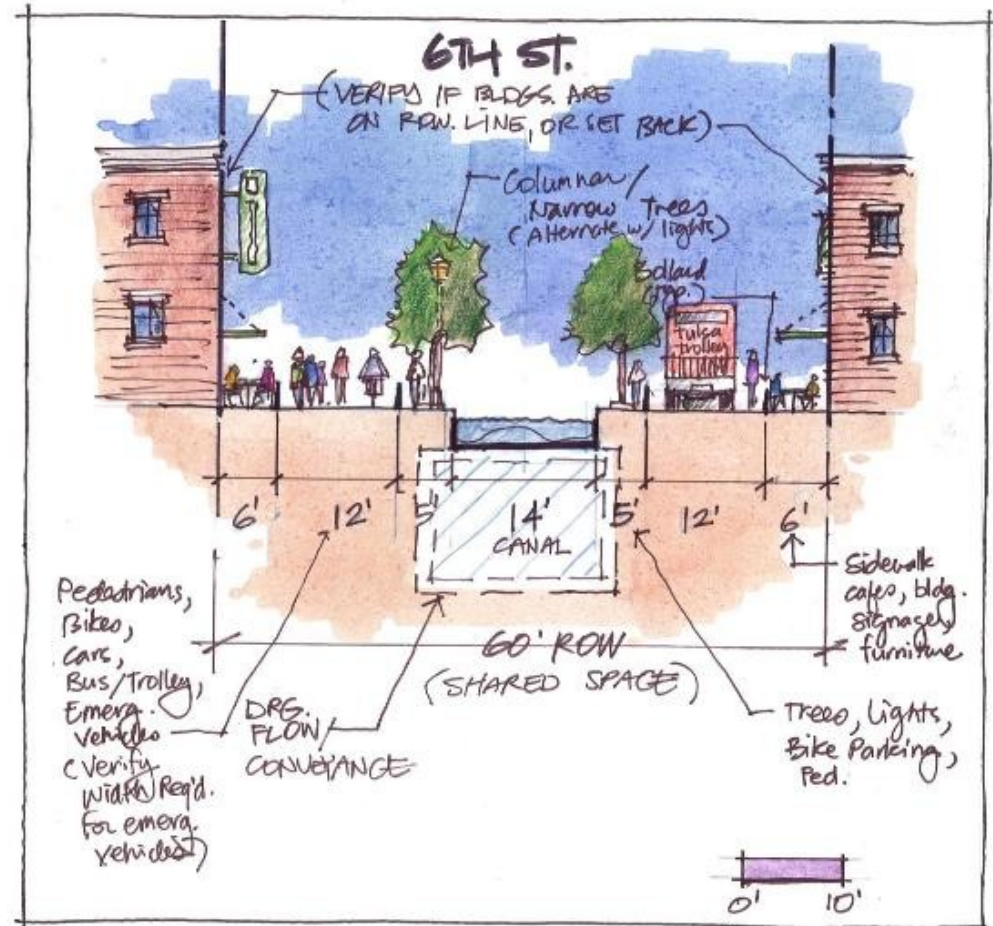
- Huge economic impact on businesses on 6th Street.
- Pedestrian focus makes local, independent retail business possible.
- Very visible, thus increasing viability of adjacent residential neighborhood.
- Little or no eminent domain required, making it much more attractive politically and financially.
- Facilitates restoration of 6th Street’s remaining good-quality buildings.
- A strong 6th Street thoroughfare would equip the Pearl with two strong east / west axes, complementing Route 66 / 11th Street.
- Nice view corridor of Downtown Tulsa.



*Original 7th Street Canal Alignment
(The 6th Street Infill Plan - January 2006)*

In summary, there are many factors that establish 6th Street as a better alignment for the stormwater conveyance canal. Creating an attractive urban waterway brings great potential for redevelopment of this section of 6th Street into a thriving, mixed-use corridor.

The preliminary concept for the stormwater conveyance between the East Pearl basin and Centennial Park is illustrated to the right. As shown in this preliminary sketch, the proposed design along the selected 6th Street alignment includes a large underground storm sewer. This underground drainage structure carries floodwaters to Centennial Park's pond to meet engineering requirements for flood control. A shallow canal at street level creates a unique focal point for a pedestrian oriented street that also accommodates bicycles, cars, public transit and emergency vehicles. This canal is an important amenity for the project that is desired by the neighborhood as a key element for redevelopment and revitalization.



Preliminary 6th Street Section



Night Sketch of 6th Street Canal Concept



6th Street Looking East from Peoria Avenue



6th Street Looking West from Quaker Avenue

During the early phases of the planning process, several options were explored and evaluated to determine the best width for the 6th Street public right-of-way. Currently, 6th Street has a 60 foot wide right-of-way where the conveyance system is needed. Consideration was given to increasing the street right-of-way to 70 feet or 80 feet in width, which would consequently result in additional space for cars, pedestrians and the proposed canal. After significant discussion at the design workshops, a decision was made that the current 60 foot right-of-way width should be maintained for reasons that included :

- Widening the 6th Street right-of-way beyond its current width would require the loss of a number of existing brick buildings that have excellent potential for renovation. (The 6th Street block between Peoria Avenue and Quaker Avenue, in particular, has several buildings with historic character and value for rehabilitation.)
- Maintaining the existing 60 foot right-of-way is consistent with the guidelines established by the Pearl District in the East Pearl Design Brief.
- After evaluating numerous options for widths of the basic elements of the street (pedestrians, bicycles, cars, transit, trees, lights and canal), it was determined that the existing 60 foot width adequately accommodates all needed functions. Traffic counts along this section of 6th Street do not justify the need for a four-lane street. In addition, there are numerous parallel alternative traffic routes, including 3rd Street, 11th Street or I-244.
- The existing 60 foot right-of-way width provides an appropriate, pedestrian-friendly scale for the desired mixed-use redevelopment of 6th street.

East Pearl Concepts

Four conceptual plans for the East Pearl detention basin were developed for review and consideration. With the requirement for 113.6 acre-feet of stormwater detention, the total capacity of this new basin is nearly twice the volume that is contained in Centennial Park's detention pond. The general location for the East Pearl (shown previously in Section 4.4) is bounded by 7th Street, Troost Avenue, 10th Street and Quincy Avenue. For each proposed concept, a land use plan shows the relationship of the proposed detention areas to the adjacent neighborhood. Detailed site plans and character sketches are also included to illustrate potential features of each alternative.

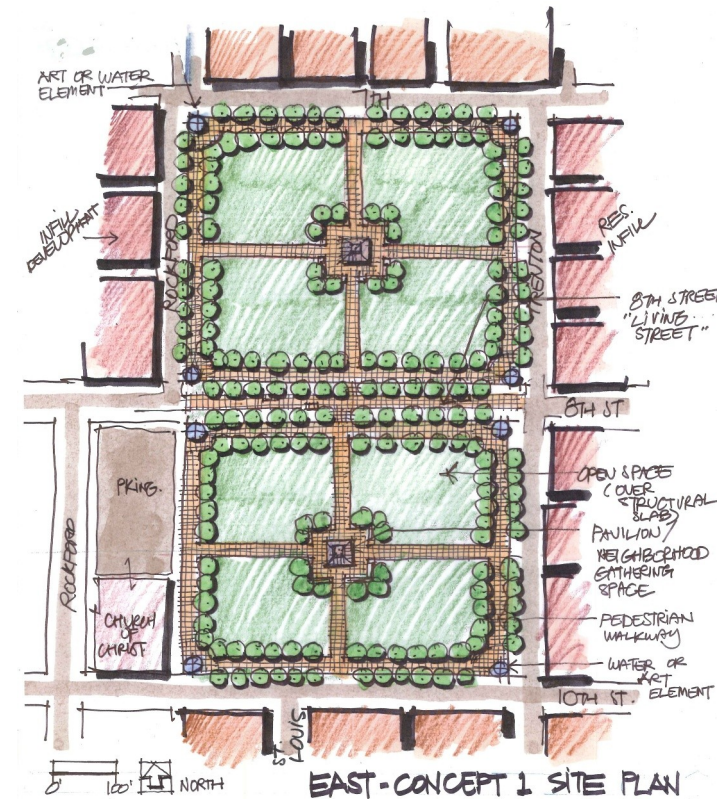
For the East Pearl alternatives, an important design guideline was to maintain the existing street grid and urban character of the neighborhood, with minimal disruption of the street system. Due to the large site area required, proposed plans illustrate different configurations with blocks of varying sizes and locations. Proposed concepts also include a combination of recessed ponds, recessed open spaces and structural decks with below-grade storage.





East Pearl Concept 1 - Character Sketch

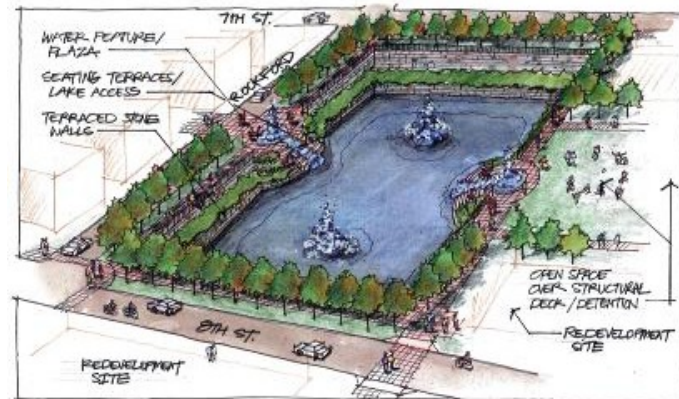
As illustrated on the facing page, Concept 1 for the East Pearl provides the required detention in two large blocks which are bounded by 7th Street, Trenton Avenue, 10th Street and Rockford Avenue. 8th Street maintains through east-west circulation as a pedestrian-oriented boulevard through the center of this new public park. Concept 1 utilizes structural decks with all detention below grade, resulting in street-level spaces that accommodate open spaces, linear tree plantings and two large pavilions that become neighborhood gathering places. As shown in the detailed site plan to the right, new infill residential development can be built around the perimeter of the detention area.



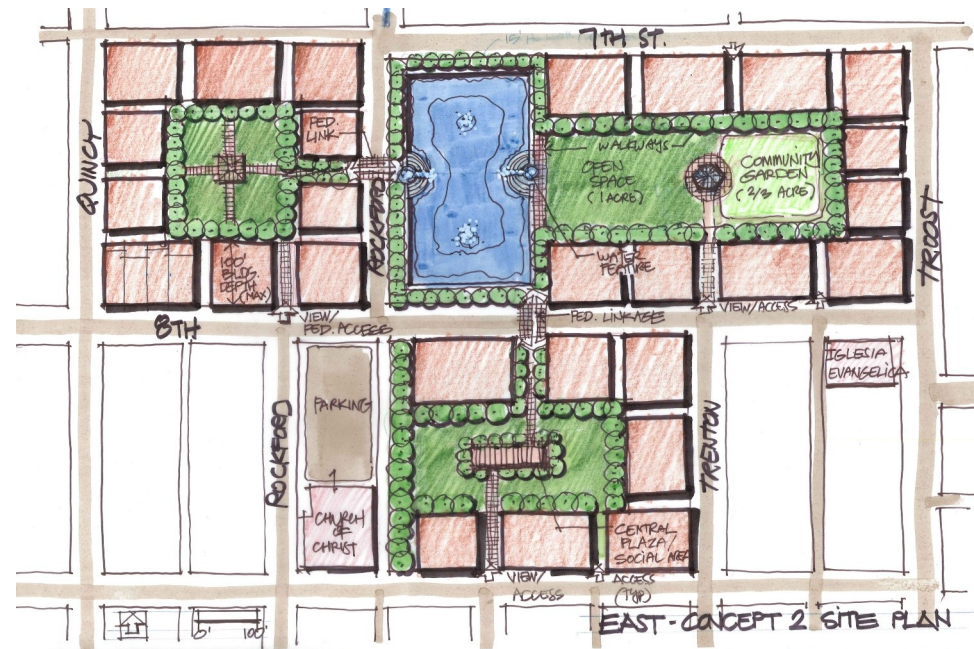
East Pearl Concept 1 - Site Plan

As shown in the plan on the facing page, the second proposed concept for the East Pearl is provided in three separate blocks that are defined by the existing street grid. The only needed change to the circulation system is the removal of Trenton Avenue between 7th Street and 8th Street. A key feature of this concept is the potential for new mid-rise residential development to be constructed around the perimeter of most of the new detention areas, enhancing the livability of this new housing.

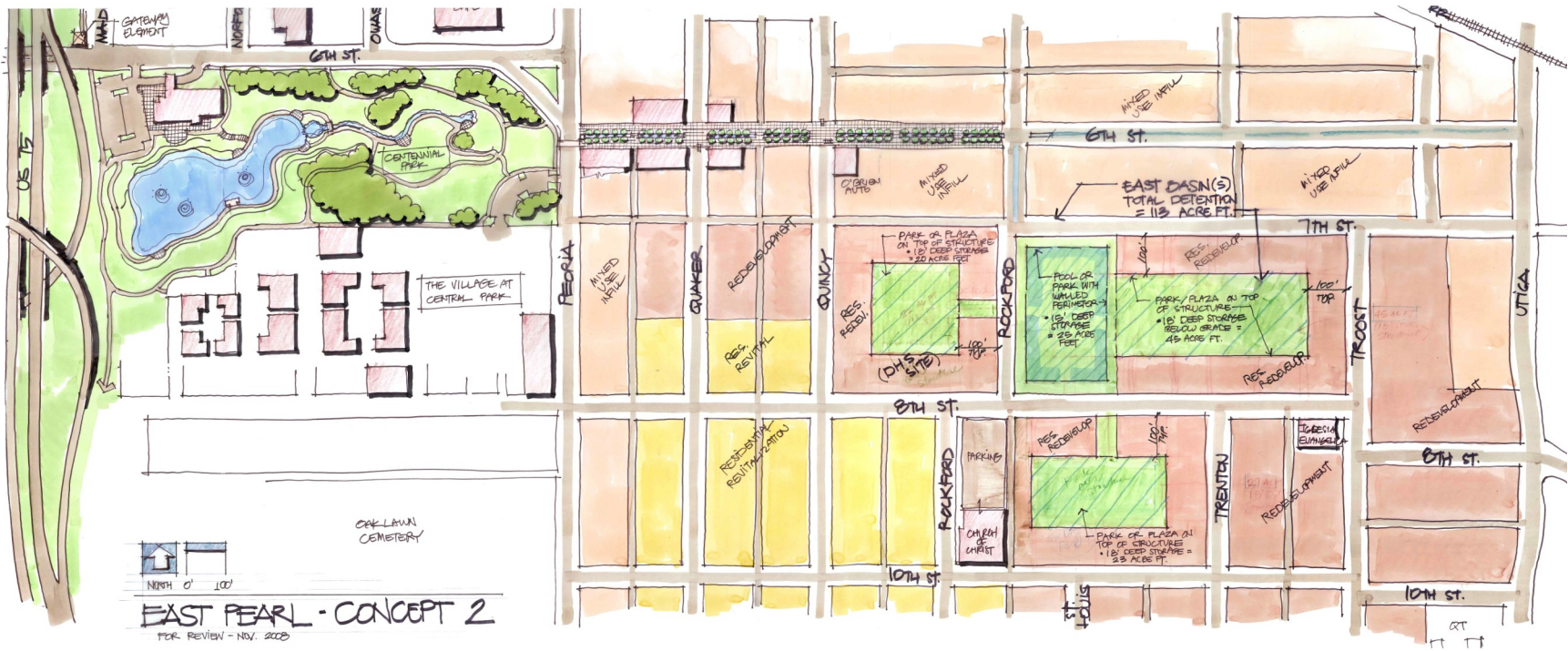
As illustrated to the right in the detailed site plan for Concept 2, a large percentage of the stormwater detention is accommodated below ground, covered by structural decks that provide street-level space for new parks and plazas. This proposed concept also includes an “urban pond” that is bordered by 8th Street, Rockford Avenue and 7th Street. As shown in the character sketch, this pond has the potential to create a unique focal point that would benefit the Pearl District and adjacent neighborhoods.



East Pearl Concept 2 - Character Sketch of Urban Pond

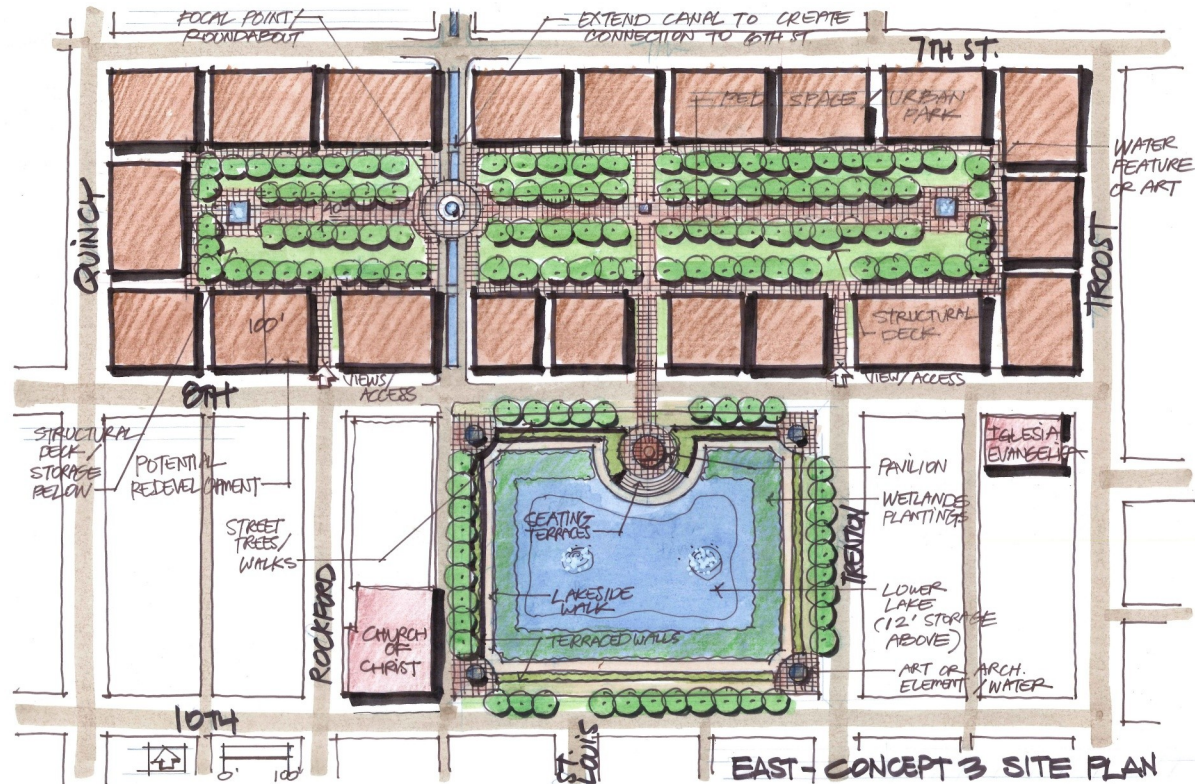


East Pearl Concept 2 - Site Plan

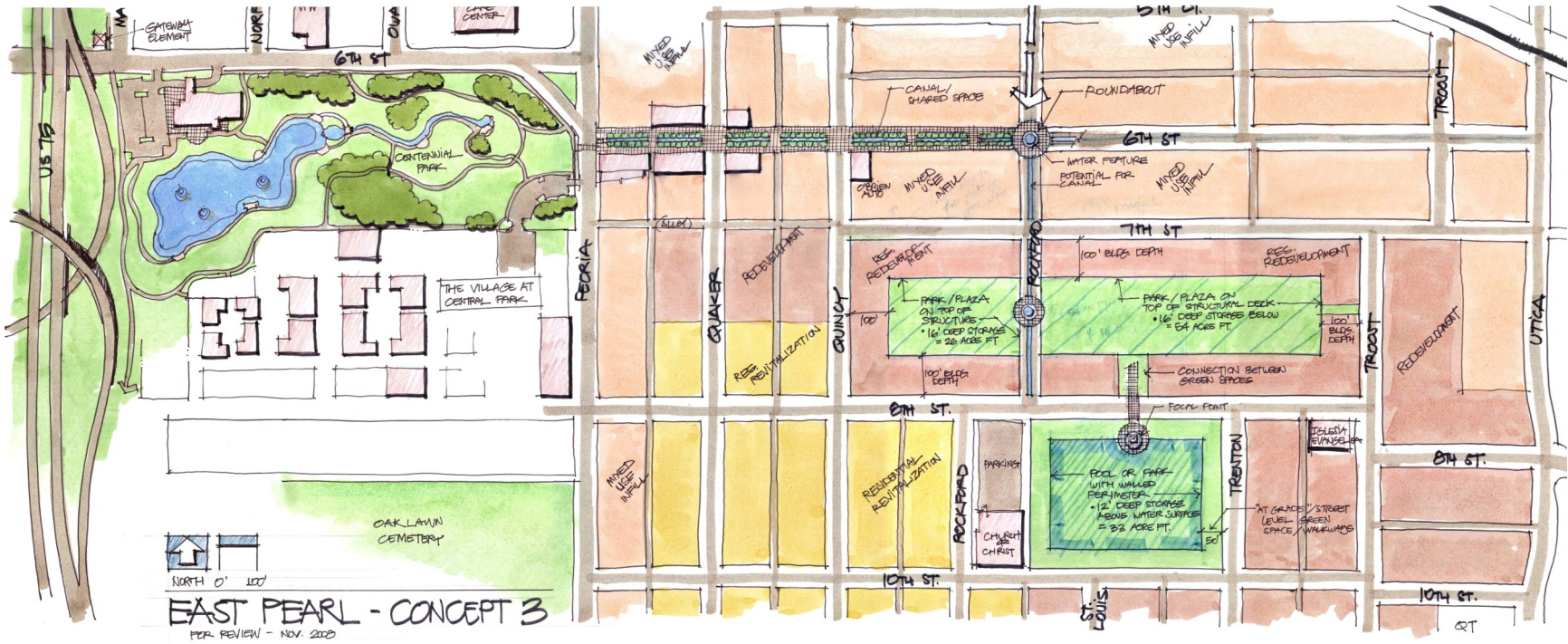


East Pearl Concept 2 - Land Use Plan

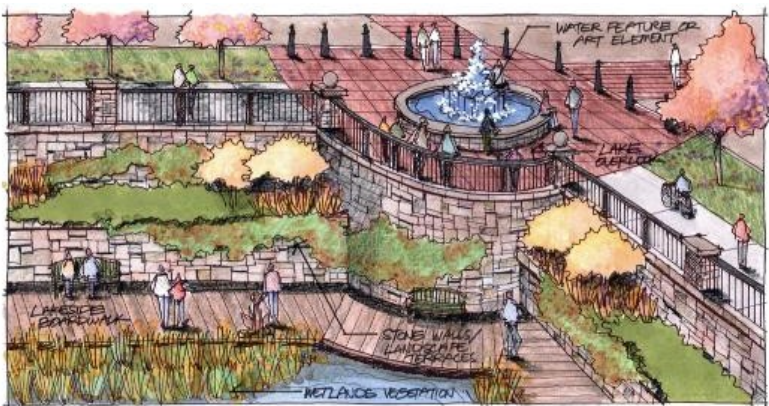
As shown in the land use plan to the right, Concept 3 for the East Pearl is proposed for the same site areas as Concept 2. The required 113.6 acre-feet of stormwater detention are provided by a combination of underground storage (covered by a structural deck) and a large pond. The site plan for Concept 3 illustrates the potential for significant residential redevelopment to be built facing 7th Street, Troost Avenue, 8th Street and Rockford Avenue. This new housing would also be adjacent to a new linear open space that is proposed over the detention basin deck, providing excellent views and opportunities for social interaction. Concept 3 also includes a large pond that would be enhanced with terraced stone walls, walkways, overlooks and pavilions. A proposed extension of the canal along Rockford Avenue provides a strong visual and physical connection to the proposed redevelopment of 6th Street.



East Pearl Concept 3 - Site Plan

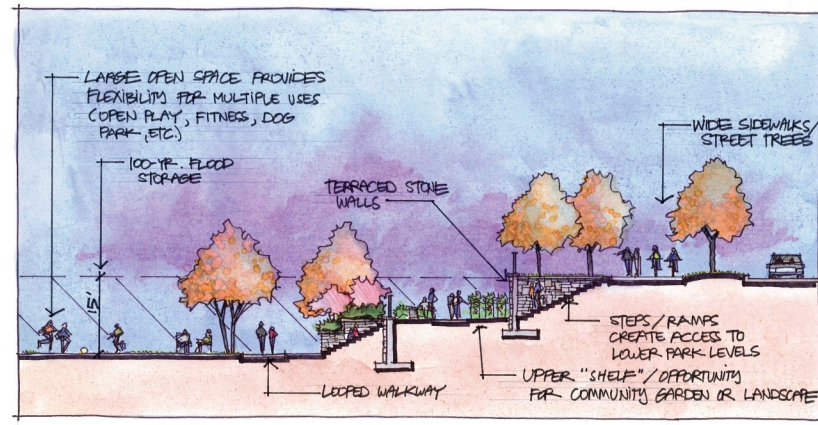


East Pearl Concept 3 - Land Use Plan

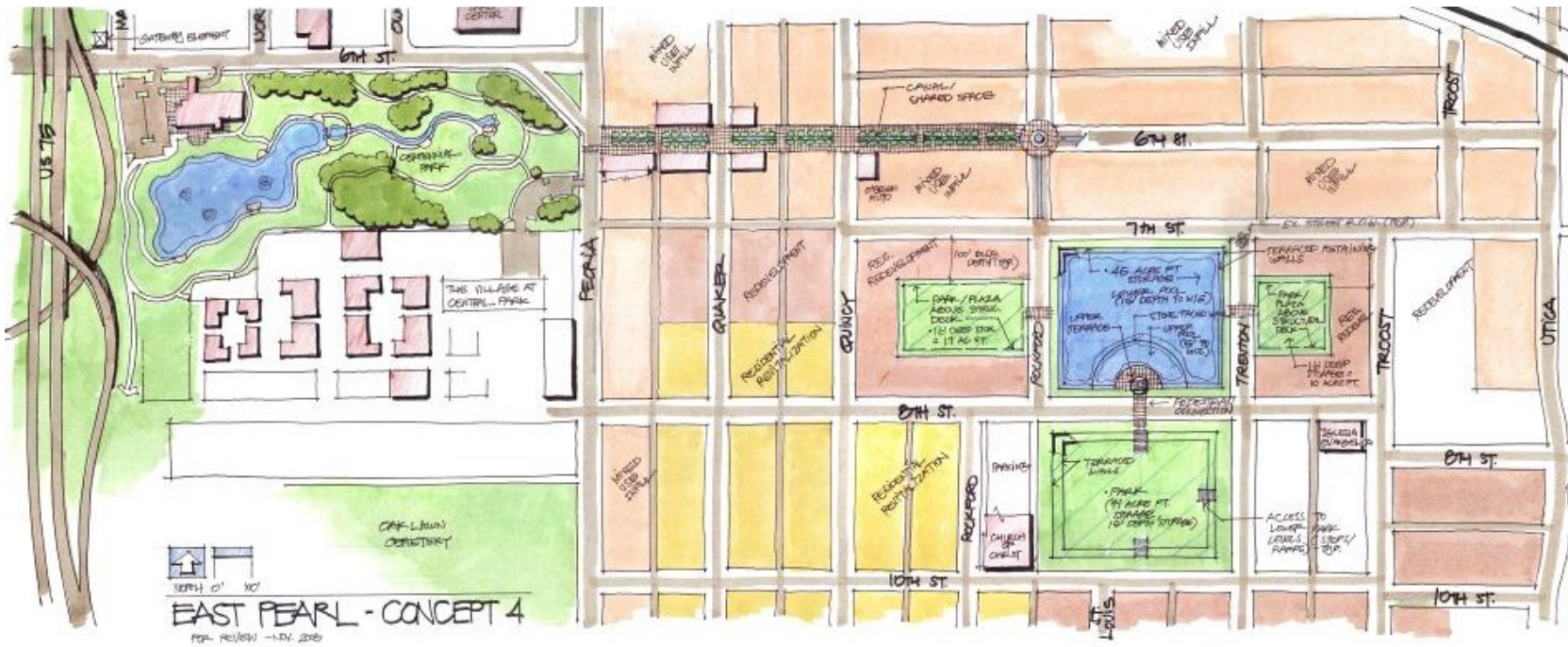


East Pearl Concept 3 - Proposed Pond Overlook Sketch

The fourth proposed concept for the East Pearl, as illustrated below and on the facing page, provides the required stormwater detention within four distinct blocks. Concept four maintains the existing street grid that is a core element of the neighborhood’s urban fabric, with no disruption to the current circulation patterns. As shown below, detention is provided with a combination of underground storage, recessed ponds and recessed open spaces. Of the four options that have been developed for the East Pearl, this concept relies more heavily on recessed basins (approximately 15 feet below street level) with significantly less below-ground storage covered by structural decks.

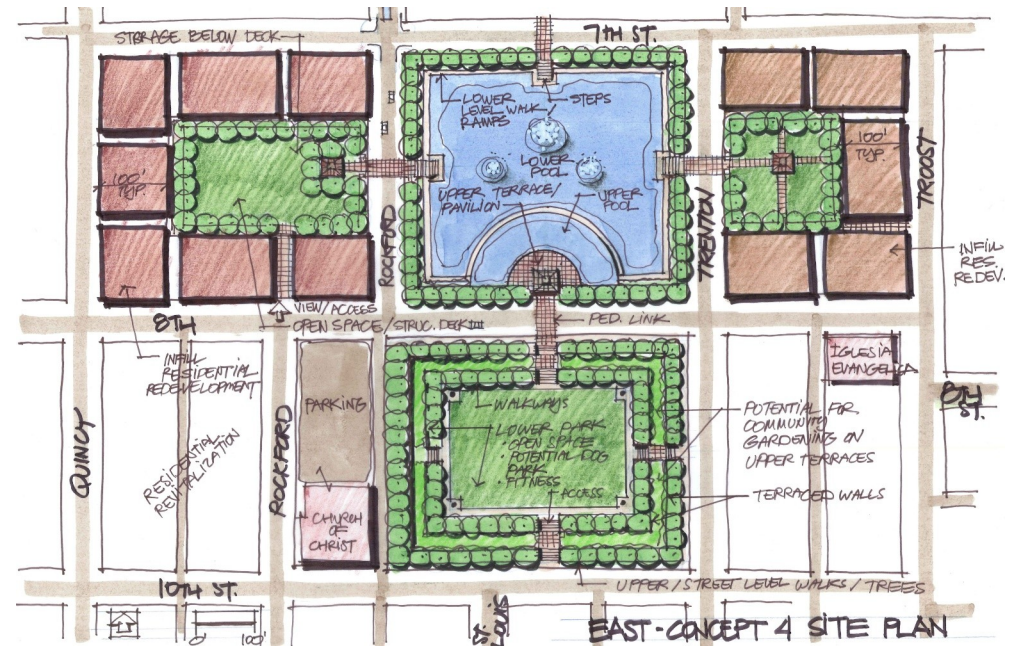


East Pearl Concept 4 - Basin Section

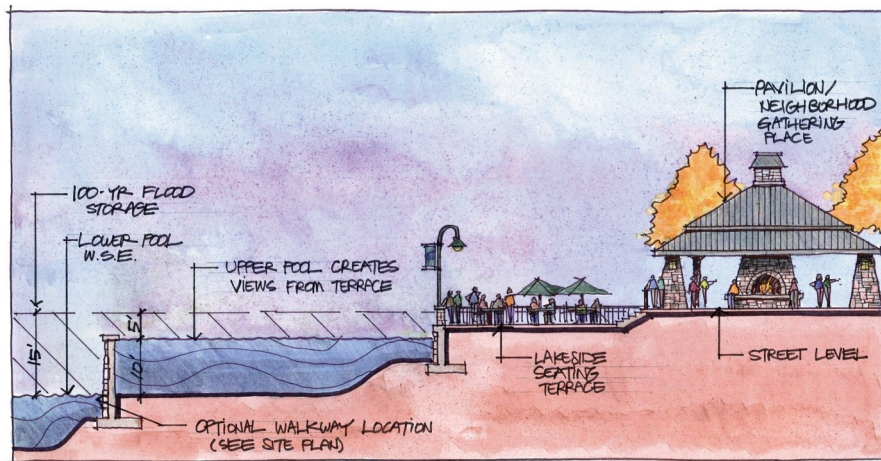


East Pearl Concept 4 - Land Use Plan

The site plan for Concept 4, shown to the right, illustrates diverse public spaces that are created with this proposal. An urban pond (bounded by 7th Street, Trenton Avenue, 8th Street and Rockford Avenue) becomes a central focal point that is highly visible and accessible for the neighborhood. On the east and west sides of the proposed pond, detention storage is accommodated below grade with street-level park areas above the structural decks. New infill residential development abuts these open spaces, taking advantage of nice views and recreational opportunities.



East Pearl Concept 4 - Site Plan



East Pearl Concept 4 - Terrace and Lake Section

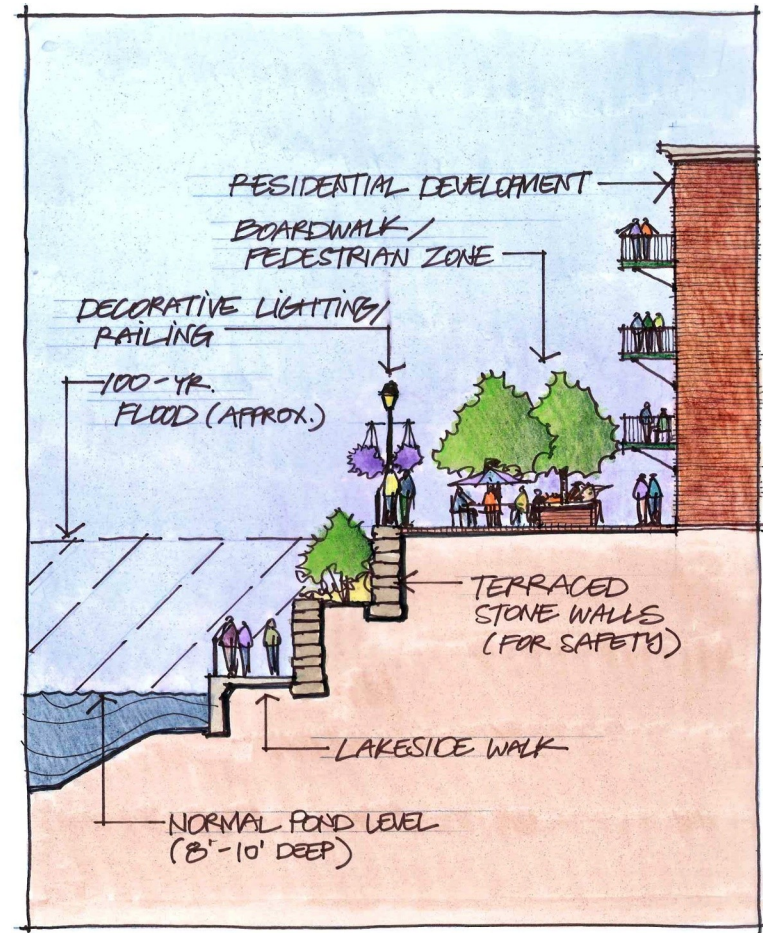
The character sketch shown to the left illustrates the potential for multiple pond levels, outdoor terraces and pavilions. South of the new pond, an open basin is proposed to complete the stormwater detention requirements. This large open space would normally be dry and usable as an urban park that includes walkways, open lawns, landscaped terraces and a community garden.

West Pearl Concepts

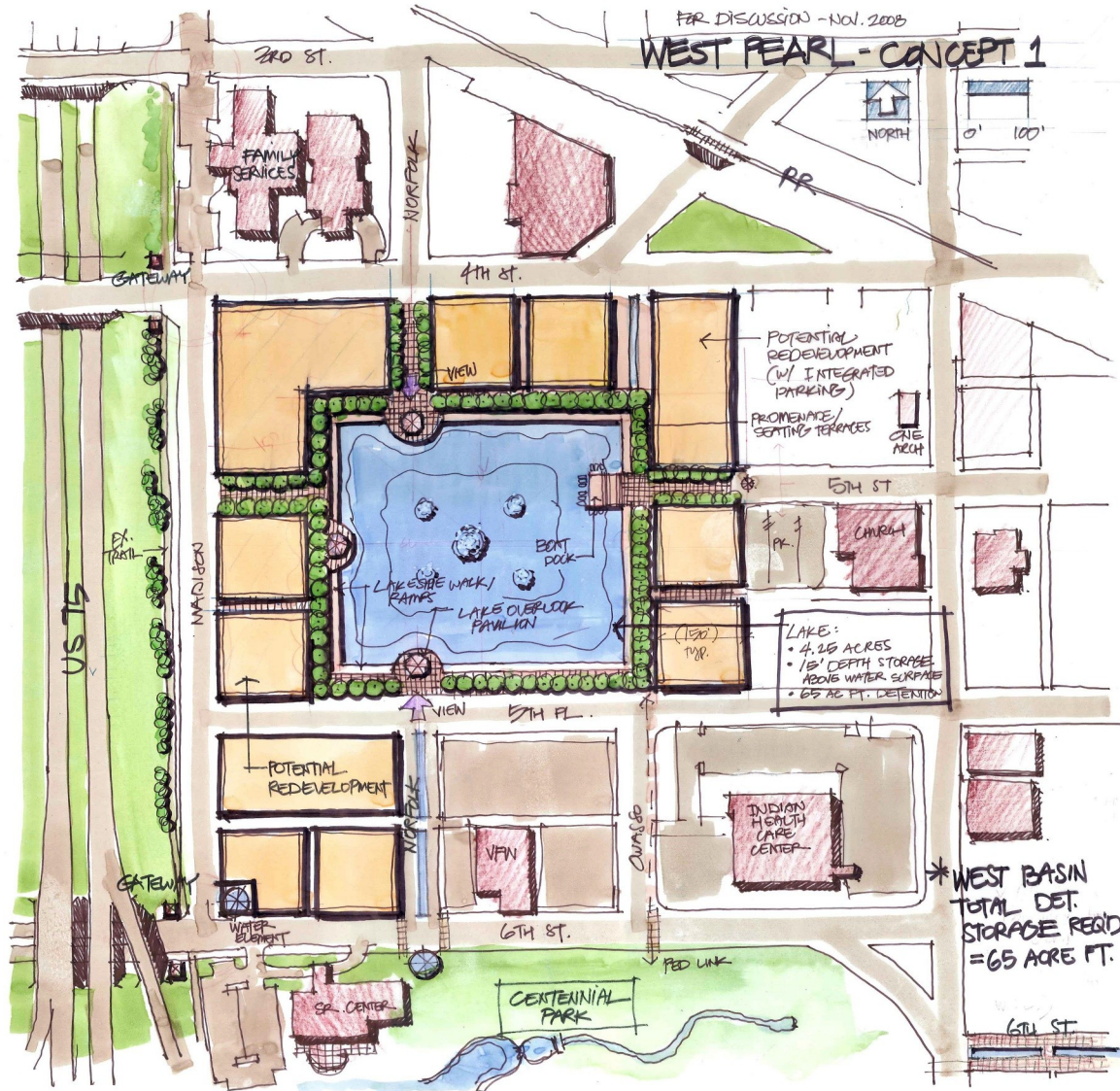
As described previously in Section 4 of this study, the required storm-water detention storage for the West Pearl basin is 64.5 acre-feet, which is slightly larger than the detention storage provided in Centennial Park. In accordance with the 2008 Elm Creek Master Drainage Plan Update, the general location for this new basin is within the limits of 6th Street, Madison Avenue, 4th Street and Peoria Avenue. Two conceptual planning options were developed for the West Pearl.

As shown on the facing page, Concept 1 for the West Pearl basin proposed to achieve the required detention in an “urban pond.” The proposed pond is bounded by 5th Place, Madison Avenue, 4th Street and Owasso Avenue. The new pond is approximately 400 feet by 500 feet, covering over 4 acres in area. The normal water level of the pond is proposed to be 15 feet below street level, allowing floodwater storage to occur above the normal water surface elevation.

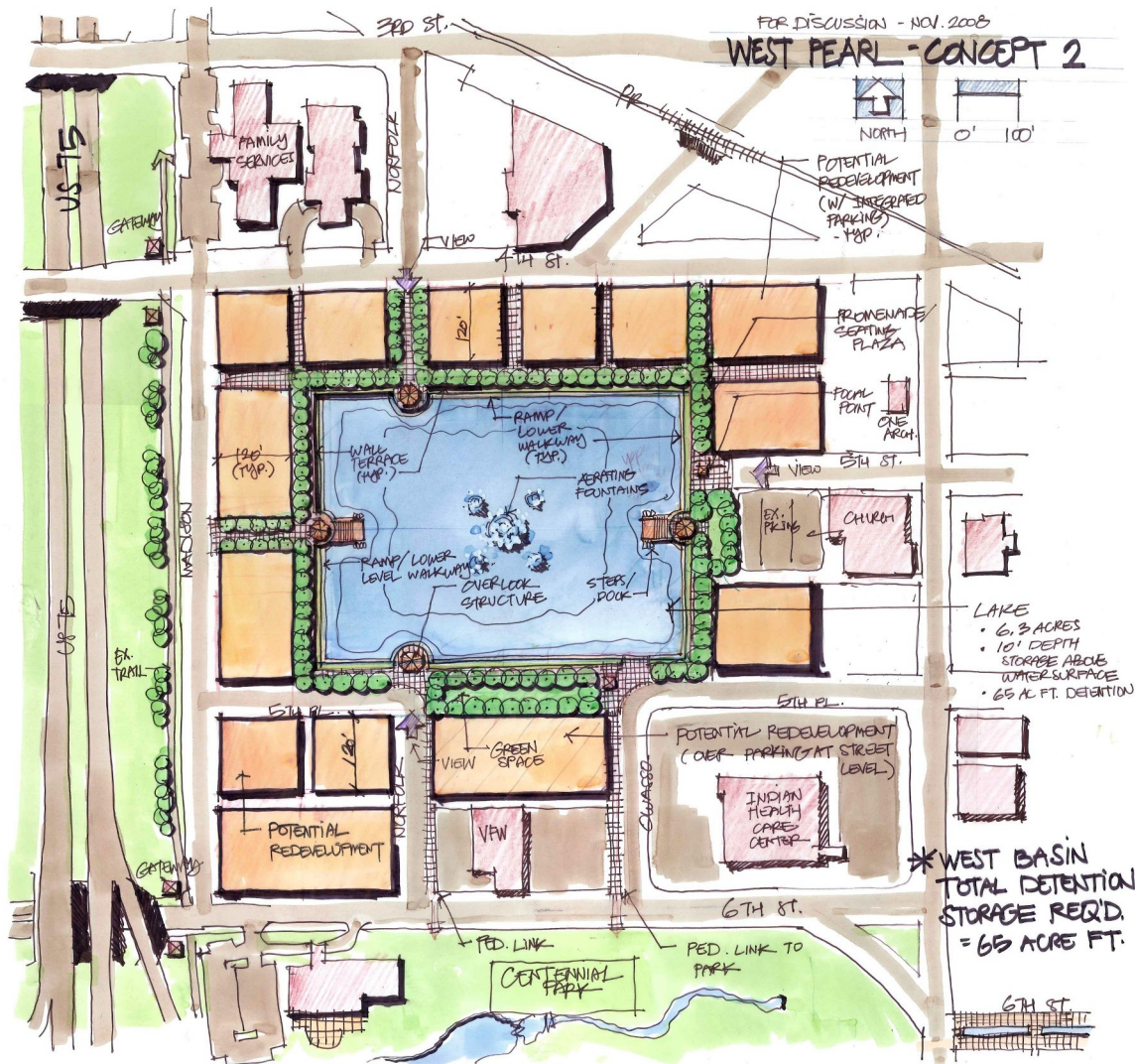
The geometric shape of the basin maintains the urban character of the Pearl District neighborhood, and also works with the existing grid of streets and alleys. The size of the required basin results in the need to vacate 2 block-long sections of 5th Street, Norfolk Avenue and Owasso Avenue. As shown in the West Pearl Concept 1 drawing, a key feature of this plan is the potential for dense infill redevelopment to be built around the perimeter of the new lake. These new private developments would benefit from excellent views of the downtown skyline and the new pond, as well as very close proximity to the Tulsa Central Business District. The proposed concept includes upper level and lower level walkways around the lake, in addition to dynamic pedestrian spaces and overlooks.



West Pearl - Urban Pond
Conceptual Section



West Pearl Concept 1 - Site Plan



West Pearl Concept 2 - Site Plan

The second concept for the West Pearl is similar to Concept 1, proposing an urban lake that can become the focal point for redevelopment. The most significant difference for Concept 2 is the proposal for a larger lake, which has the benefit of a normal lake level that is only 10 feet below street level (versus 15 feet in Concept 1). The larger surface area of the 600 feet long by 450 feet wide lake accommodates the necessary 64.5 acre-feet of floodwater storage with less depth, allowing for improved physical access to lake level and more intimate views.

The proposed lake has been carefully sited to allow adequate property depth for private redevelopment to surround the lake. A continuous pedestrian promenade around the lake's upper level provides a pleasant space for interaction and enjoyment of lake views.

6.3 Evaluation of Preliminary Concepts



Design Workshops

As illustrated in the previous section of this report, a wide variety of conceptual ideas were explored with the goal of providing flood control in a manner that also achieved the vision of the Pearl District for revitalization of their urban neighborhood. The next step in the planning process was to identify the option (or combination of options) that would establish a single preferred plan for the East Pearl, West Pearl and the 6th Street Conveyance. The design workshops and subsequent meetings provided a good forum for evaluation and discussion between the planning team, City of Tulsa representatives and the Pearl District Urban Design Sub-Committee. As the concepts were reviewed and analyzed, the Pearl District's Design Brief provided continued guidance to ensure that the selected plans met the mission to "reinvent the art of city life in Tulsa."

Two other factors were identified as being very important in the decision to select the best possible plans for both basins and the 6th Street conveyance / canal: long-term maintenance and construction cost. The following discussion provides a summary of these factors relative to the proposed concepts. Because the options for East Pearl are more diverse, these factors are particularly relevant for this stormwater detention basin.

General Maintenance Considerations

Future maintenance requirements affect lifecycle costs and should be an important factor in evaluating the preferred plan for the new stormwater detention facilities. *Since there will be an ongoing cost to properly maintain the new improvements, the decision of the physical elements of the preferred plan will impact funds needed for many years after its initial construction.* The following observations highlight general considerations related to maintenance of the planned stormwater improvements. (Centennial Park's stormwater facilities provide a relevant example for many of these comments.)

- Careful design and good quality construction will go a long way toward minimizing long-term maintenance needs. However, there are significant variations in maintenance requirements for different forms of improvements such as lawns, gardens / landscape plantings, hardscape plazas, ponds and water features.
- Paved hardscape areas generally require the least maintenance. Art elements, such as sculptures, also create an attractive setting with minimal upkeep.
- Lawns require regular mowing, but this is a routine maintenance task that city crews are equipped for. Consequently, turfgrass areas that can be readily accessed by equipment are not necessarily high maintenance. (Selection of the best turfgrass variety must be done in consideration of sun/shade patterns and moisture/potential for temporary flooding.)
- Garden areas that are planted with shrubs, ornamental or native grasses, etc. can be very attractive. However, they are also relatively maintenance intensive, especially during the first few years of establishment. Good design and plant selection is essential, but ongoing maintenance is required to remove weeds, prune, etc. Well-selected and carefully located trees generally require less maintenance than shrubs/gardens. An irrigation system should be provided for plantings in Tulsa's climate due to frequent hot/dry summers.
- Maintenance requirements for ponds with permanent pools can be minimized through proper design (sufficient water depth and integration of aeration systems such as subsurface air mixers, aerating fountains, etc.) *However, urban water bodies require some maintenance.* Aerating fountains and other aeration systems need technical maintenance, and there is an ongoing electrical cost for their operation. Algae bloom problems may require chemicals and/or physical removal of the algae plants. Water faucet connections should be provided on lower level walkways for ease of washing off silt and debris after they have been inundated by floodwaters.
- Especially in an urban setting, removal and cleanup of trash from ponds and "dry bottom" basins is important. Trash interceptors (trash racks) can be added for each storm sewer that flows into the detention basins. This would eliminate most of the trash in ponds that plugs up the water intakes on aerating fountains, as well as creates an unattractive nuisance as it floats on the pond and becomes tangled in landscape plantings. (If trash racks are used, they would have to be cleaned out by city crews after each rainfall event.)
- Water features (fountains, pumps, etc.) can provide outstanding visual effects. However, they can be maintenance intensive, and ongoing electrical costs for pumps/lighting should be considered. Maintenance of complex pumps/mechanical systems is highly technical and repairs can be expensive.

- From a long-range view, a structural deck (over below-grade floodwater storage) will eventually reach its lifespan and require replacement. This would result in the need to also replace all the physical elements (hardscape, landscape, etc.) that were constructed above the structural deck.
- Like most large cities in the U.S., the City of Tulsa is currently limited in its funding for maintenance of parks, public spaces, etc. (This will hopefully change in the future so that there are more resources to maintain the many wonderful parks and public places that already exist in Tulsa.) However, for the planned improvements in the Pearl District consideration might also be given to the idea of endowing a maintenance fund that could be used to supplement the City of Tulsa's efforts.
- And finally, consideration should be given to whether proposed detention areas are appropriate to become dedicated City of Tulsa parks. There may be maintenance benefits if larger areas meet the qualifications to become city parks in addition to their flood control functions.

General Construction Cost Considerations

In addition to long-term maintenance considerations, another important factor in the decision of a preferred plan for the detention basins is the initial construction cost. The different physical forms that are proposed in the East Pearl alternatives will have an effect on the cost to implement the plan, as highlighted in the discussion below. Because the options for the East Pearl are more diverse and include structural solutions, these factors are particularly relevant for this basin. (At later phases in this planning process, detailed cost estimates were provided for the preferred plan.)

All four concepts for the East Pearl utilize vertical walls on the basin perimeters, which is the most efficient technique to achieve the large storage area required for flood control. Although there would be minor variations in flood storage capacity depending on whether the perimeter walls were terraced or single walls, generally there is similar capacity with "wet" basins, "dry" basins and below ground storage covered with a deck. The primary difference with the structural deck approach is that the resulting public space is at street level, instead of 15 ft. to 18 ft. below street level.

The following discussion highlights several cost considerations:

- The most significant construction cost difference between East Pearl Concepts 2, 3, and 4 relates to the amount of structural deck proposed. Concept 1 for the East Pearl was identified as less desired early in the evaluation process, and was not analyzed in detail. Concept 2 proposes approximately 213,000 square feet of structural deck; Concept 3 proposes approximately 218,000 square feet of structural deck area, and Concept 4 proposes approximately 73,500 square feet of structural deck. For all three schemes, the underground storage below the deck varies between 16 and 18 ft. in height. Construction of the underground storage concept would likely be similar to construction of a parking garage, except the height of the columns below would be approximately twice as tall, and the structural loads on the top deck would likely be greater. Preliminary research in November, 2008 indicated the cost of a concrete parking structure in Tulsa was approximately \$75 per square foot. The cost of a structured deck over underground detention, as proposed for part of the East Pearl detention, could be significantly more than that due to the span below and potentially higher structural loads on the deck surface.

In summary, there is significant expense to create a structural deck over underground detention, and the primary benefit is having usable space at street level rather than 15 to 18 ft. lower. Concept 4 has substantially less structural deck proposed than Concepts 2 and 3, and consequently would likely be less expensive to construct. With Concept 4, more of available funds can be spent on creating a dynamic space through hardscape, landscape, etc. (Concept 4 proposes that 27 of the necessary 113.6 acre feet flood storage are accommodated by storage below a structural deck. Concept 4 could be revised to eliminate all structural decks / underground storage by deleting the two small decks that are shown, and using the entire block that is bounded by 7th, Trenton, 8th, and Troost in an open basin, 12 ft. deep.)

- For each plan, the cost of excavating for 113 acre feet of storage (approximately 182,300 cubic yards of soil) would be similar.
- East Pearl Concepts 2, 3 and 4 each propose varying amounts of lawns, ponds, gardens, and hardscape. The final design of these spaces greatly impacts their initial construction cost, but the following provides an expected “low to high” cost range for guidance:
 1. In general, the least expensive spaces to develop are lawn areas.
 2. Large ponds / urban lakes are also fairly cost effective, since the bottom is typically dirt and the rain water to fill them is free. As noted before, water bodies do require the expense of aeration systems.
 3. Landscape areas / gardens (shrubs, grasses, etc.) are typically mid-range in cost, with quite a bit of variation related to the size of plants that are installed.
 4. Hardscape areas (site furnishings, decorative paving, and lighting) can be fairly expensive to construct to a high level of quality. Associated architectural structures, such as pavilions, also have significant cost to build.
 5. Water features / fountains are typically the most expensive element. Their construction is complex and mechanical systems are costly.

A final consideration for East Pearl Concepts 2, 3 and 4 relates primarily to maintenance access. Stormwater detention areas will need to have some form of access to the bottom areas for periodic cleanup and maintenance. Larger detention areas that are bordered by streets are most accessible, such as the large “full block” basins on Concept 4. Below ground detention structures would also need some form of access for maintenance (silt and trash removal, etc.), probably through some type of large hatch from the upper deck. The long, linear structural storage that is proposed in Concept 3 (between Quincy and Troost) would potentially be very difficult to access and maintain.

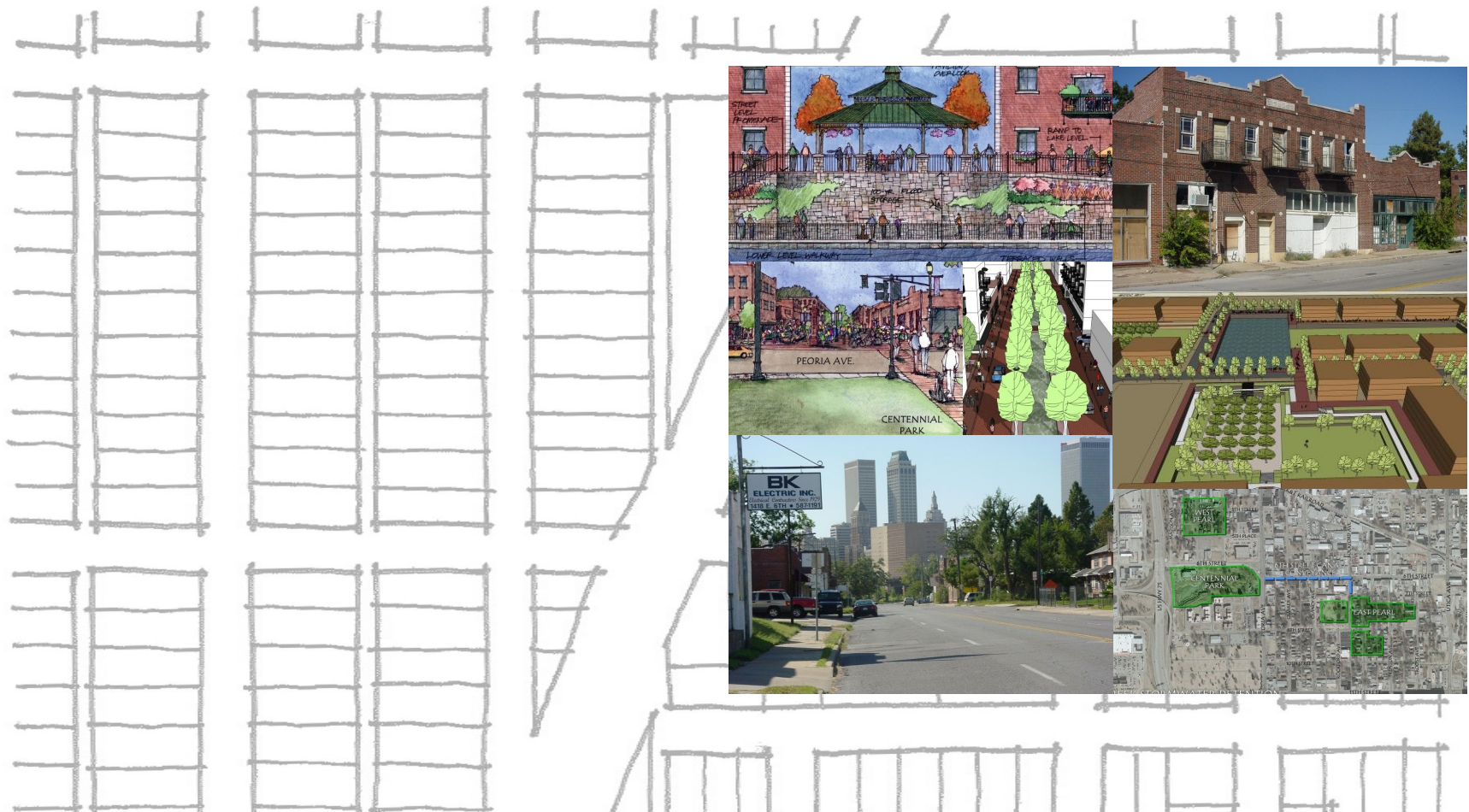
Summary

Following a thorough evaluation of the design objectives and considerations described above, a single preferred plan was selected for each basin and the 6th Street conveyance / canal. The following is a brief summary of the decisions reached:

- 6th Street Conveyance - Using the existing 60 foot-wide right-of-way on 6th Street, a surface canal will be constructed with a large below-ground structure to carry major flows. 6th Street will be developed as a pedestrian-oriented street that accommodates all modes of transportation. *As discussed previously, the proposed underground drainage structure achieves the necessary engineering function of conveying large floodwater flows from the East Pearl basin into the Centennial Park pond. At street level, the shallow canal creates an amenity that is planned as the focal point for revitalization of the Pearl District neighborhood.*
- East Pearl - Concept Two was selected as the preferred option with several refinements.
- West Pearl - Concept One was selected as the preferred alternative with minor modifications.

These plans were refined and developed in greater detail and are presented in the next section of this study.

7.0 Preliminary Detention / Conveyance Plan



7.1 Overview of Proposed Detention Plans

On the following page, Figure 2 illustrates the proposed stormwater detention plan for the West Pearl, East Pearl and 6th Street Conveyance. As described previously in Section 2, the proposed plans are the result of an interactive process that allowed significant input from the City of Tulsa, neighborhood residents and Pearl District representatives. The plans for each of the three project areas achieves the technical requirements needed for flood control. *The proposed plans also create unique public spaces that can significantly accelerate the desired revitalization of the Pearl District and nearby neighborhoods.*

The proposed plans for the West Pearl, East Pearl and 6th Street Conveyance incorporate the preferred combination of ideas explored in the conceptual design phase. As shown in the drawing on the following page, stormwater detention for the West Pearl is contained within a single pond. The East Pearl plan accommodates the required detention within three distinct spaces that allow for the majority of the existing street grid to remain. Flood waters are conveyed from the new East Pearl basins to Centennial Park north along Rockford Avenue and then west on 6th Street for three blocks with an innovative plan that creates a pedestrian-friendly environment.

This section of the report presents a detailed overview of all three proposed plans, along with conceptual sketches to illustrate the visual character that is envisioned. In addition to showing the actual stormwater detention limits, the proposed plans also illustrate potential redevelopment that can be constructed by the private sector in adjacent areas. This potential redevelopment is consistent with the land use strategy which was proposed in *The 6th Street Infill Plan*.

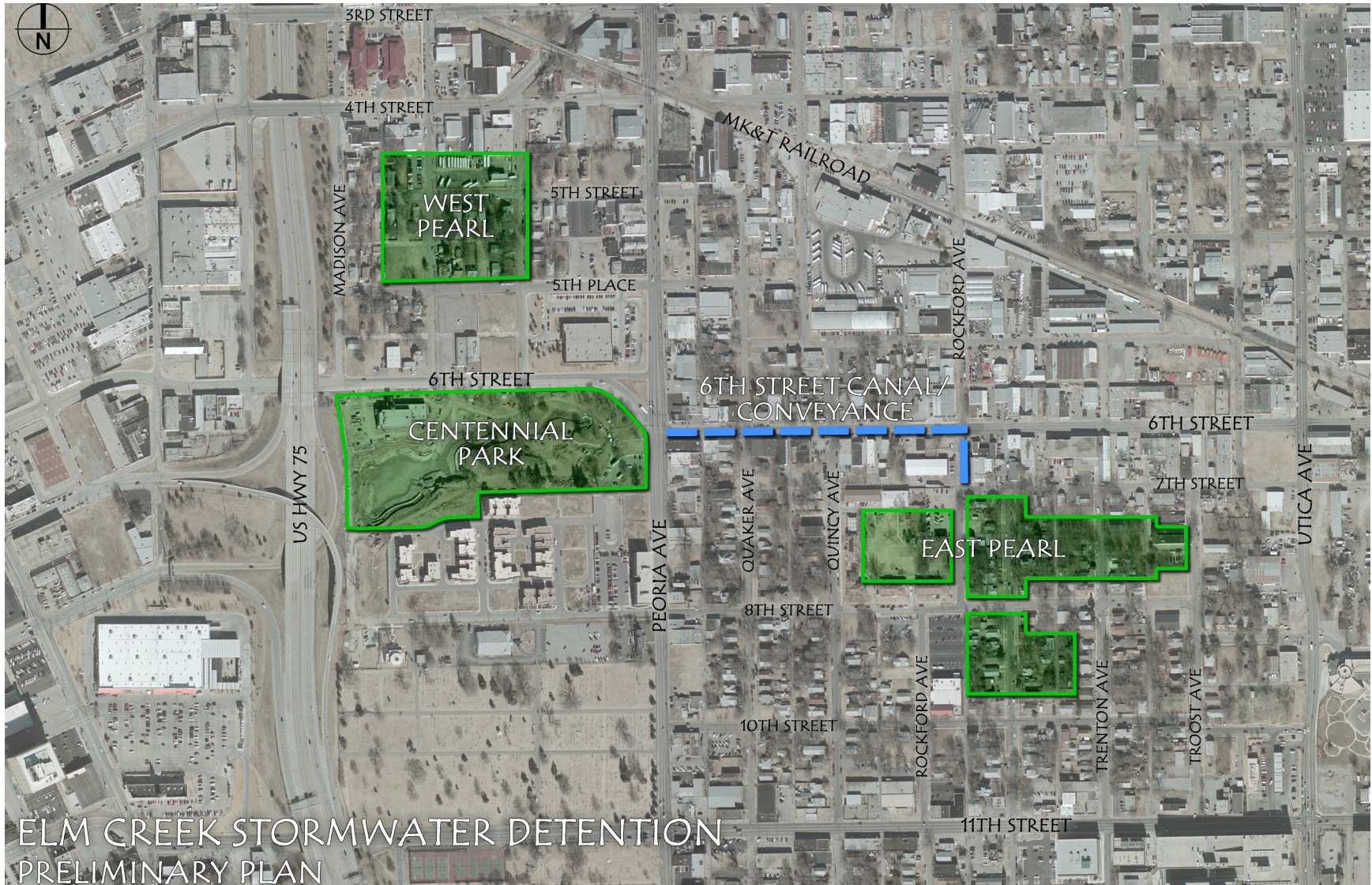


Figure 2
PROPOSED DETENTION AND CONVEYANCE PLAN



Looking west, 6th Street has outstanding views and proximity to downtown Tulsa.



6th Street has several brick buildings that have excellent potential for rehabilitation as mixed-use developments.

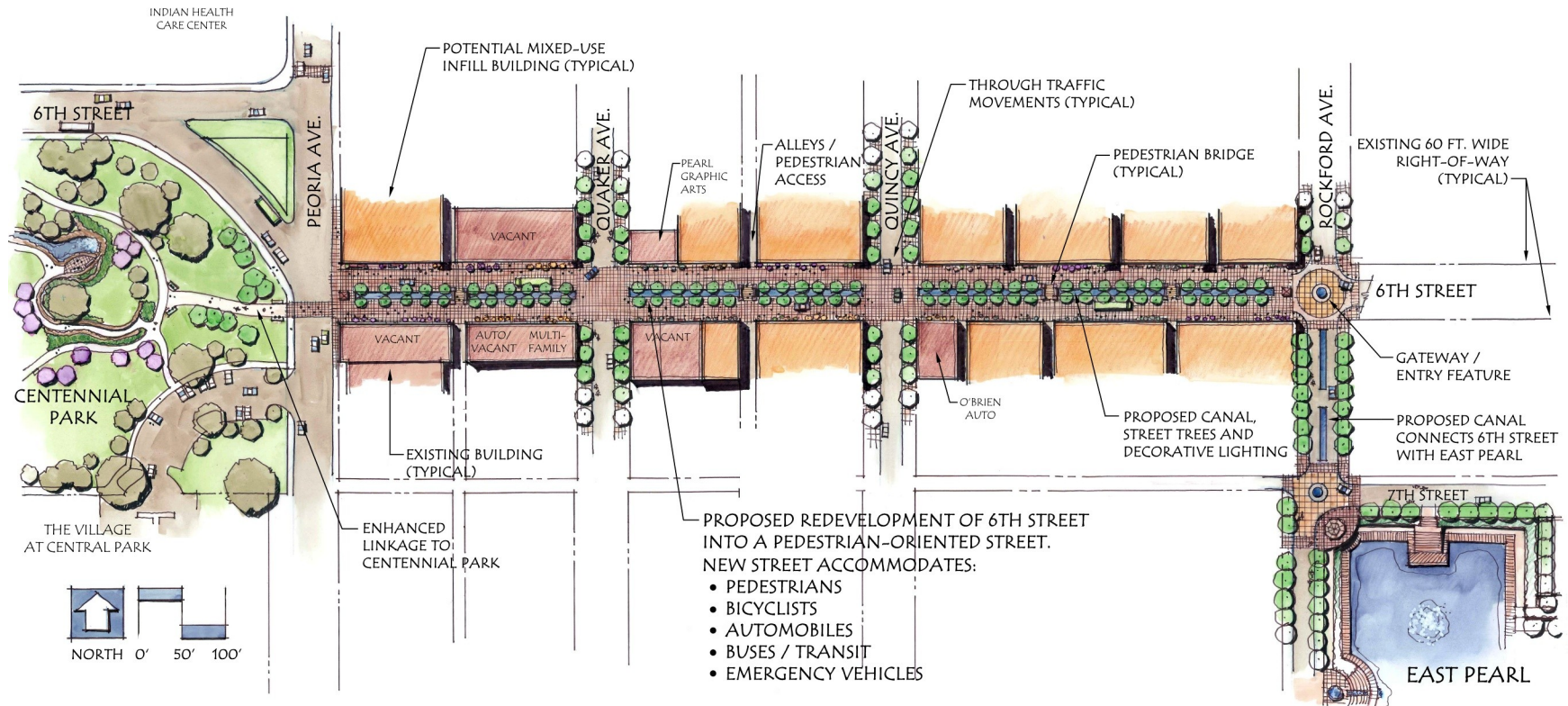
7.2 6th Street Conveyance

As discussed earlier in Section 4 of this study, a critical element of the 2008 Elm Creek Basin Master Drainage Plan Update is to relieve the flooding that has plagued 6th Street for many years. It was determined in the conceptual design phase that the preferred alignment to convey stormwater flows from the new East Pearl drainage basin into Centennial Park was along 6th Street. The proposed plan for the 6th Street Conveyance / Canal is illustrated in Figure 3.

The proposed plan conveys floodwaters below ground in a large concrete storm sewer, with a shallow canal at street level to create a unique urban amenity. As shown, the canal / storm sewer begins at the northwest corner of the East Pearl basin (7th Street / Rockford Avenue) and runs north for one block to 6th Street. At the intersection of 6th Street and Rockford Avenue, the proposed canal / conveyance runs west along the center of 6th Street to Peoria Avenue. The underground storm sewer continues west under Peoria Avenue to connect with the existing drainage system in Centennial Park.

In addition to solving the long-term flooding problems, the focus of the plan for 6th Street is to create a pedestrian-friendly street that will stimulate a radical transformation of this neglected corridor. As illustrated in Figure 3 and in the sketches on the following pages, the proposed plan for 6th Street reestablishes a pedestrian-oriented street that safely accommodates cars, bicycles and pedestrians in one system. Quaker and Quincy Avenues will continue to provide through north-south traffic movements across 6th Street, and the proposed canal includes pedestrian bridges at four locations for convenient pedestrian access to both sides of the street.

This three block-long section of 6th Street includes several brick buildings that have an attractive architectural character and potential for redevelopment. These buildings, illustrated with a dark brown color, are more heavily concentrated near Peoria and Quaker Avenue within the newly designated Sixth Street Commercial / Residential Historic District. Figure 3 also illustrates (in light tan) potential locations for infill buildings that are necessary to achieve the goal of a vibrant, mixed use district.



NOTE: UNDERGROUND STORM SEWER FROM EAST PEARL DETENTION POND TO CENTENNIAL PARK DETENTION POND IS NOT SHOWN.

Figure 3
PROPOSED 6TH STREET CONVEYANCE / CANAL PLAN

For the three blocks of 6th Street between Peoria Avenue and Rockford Avenue, there is currently a 60 ft. wide public right-of-way (ROW) and four traffic lanes. The drawing on the facing page illustrates the proposed transformation of these blocks to include:

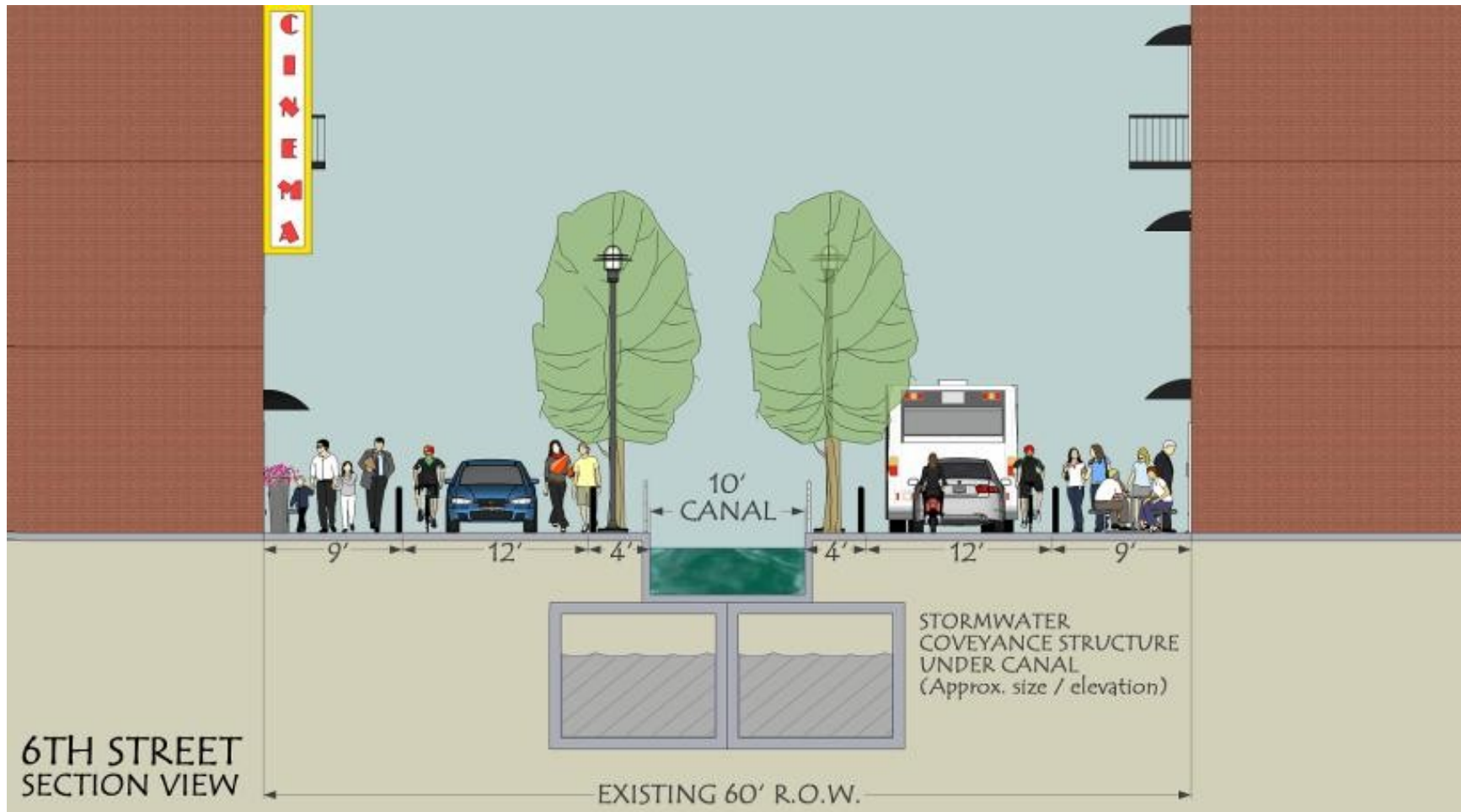
- A 10 ft. wide canal in the center of the ROW, with a two cell 10 ft. by 10 ft. concrete drainage structure underneath to convey major drainage flows. The two cell concrete drainage structure is sufficient to carry large flood water flows from the East Pearl basins into the Centennial Park pond. Planning for these high volume flows to be underground maximizes safety by eliminating the need for an open channel with steep or vertical side slopes. *At street level, the proposed canal creates a unique amenity that can become the focal point for successful neighborhood revitalization.*
- On each side of the canal, a 4 ft. wide zone provides space for street trees, themed lighting and bicycle parking.
- Adjacent to the 4 ft. wide strip, a 12 ft. wide lane on each side of the street provides through circulation in each direction. This space, defined by bollards on each side, accommodates pedestrians, bicyclists, automobiles, delivery trucks, buses / transit and emergency vehicles.



- On the outer edges of the 60 ft. ROW, a 9 ft. wide zone is provided adjacent to buildings that abut the street ROW. With bollards defining the inside edge of this space, the 9 ft. wide strip creates room for building signage / overhangs, site furnishings, food vendors and seating for sidewalk cafés.

This new street section, determined after thorough evaluation of many alternatives, establishes the physical framework for the redevelopment of 6th Street into a unique, mixed-use destination. The successful revitalization of 6th Street will be a vital element of the larger goals for the Pearl District and adjacent neighborhoods.

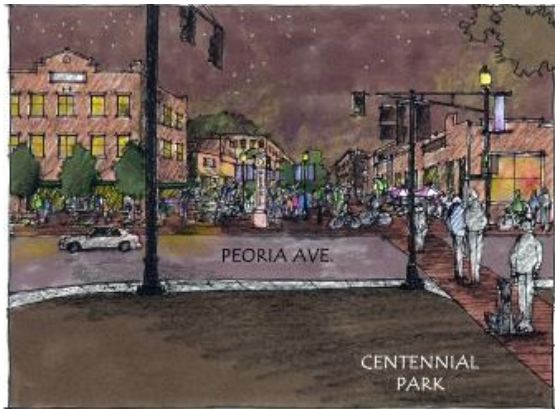
6th Street has the potential to become a unique urban district with a 10 foot wide canal as a new focal point. Conceptual building massing is shown to illustrate planned densities and pedestrian-friendly scale.



6th Street—Proposed Section



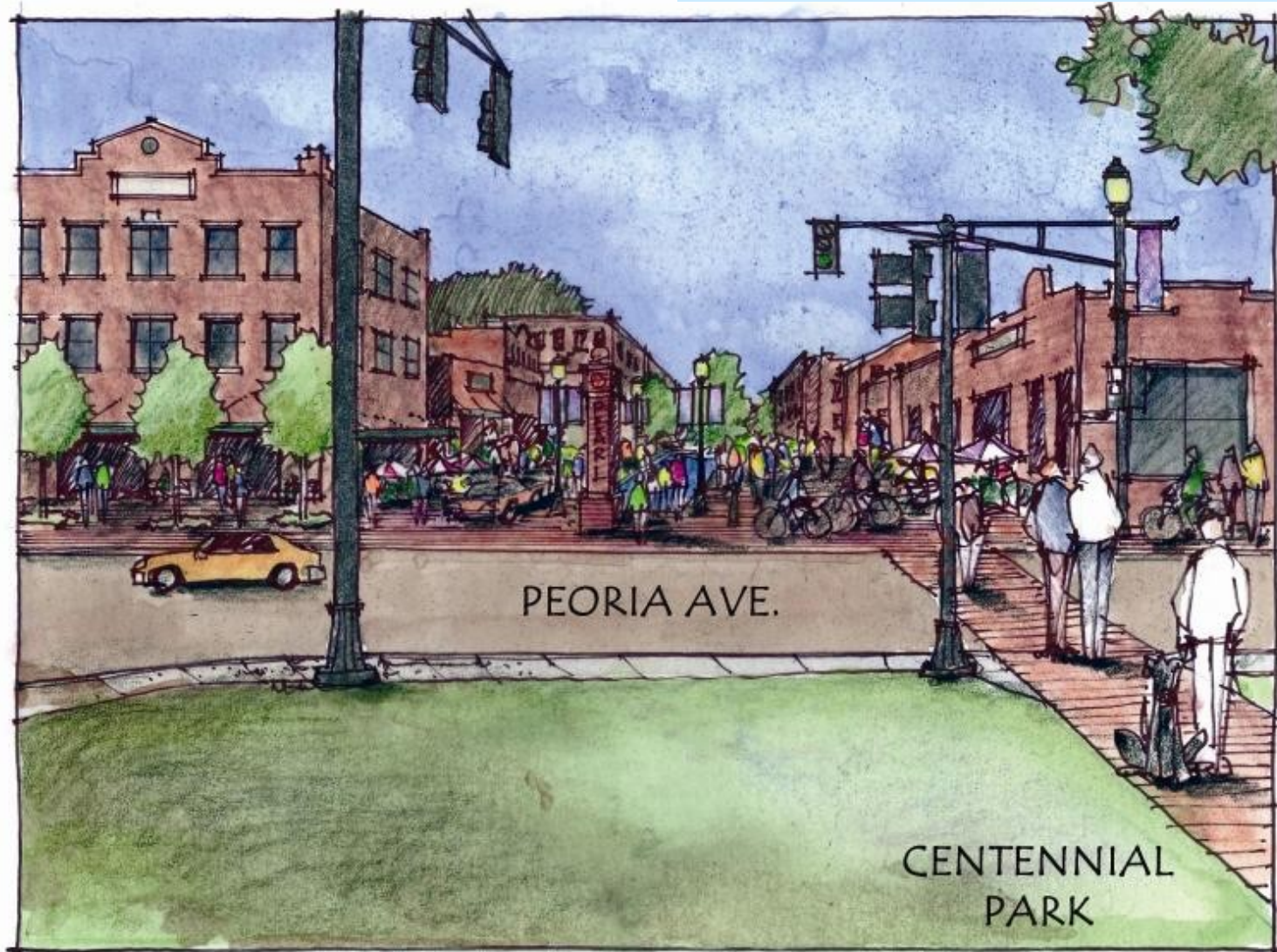
*6th Street - Existing Conditions
(View Looking East from Centennial Park)*



*6th Street - Character Sketch
(View Looking East from Centennial Park)*

The photograph to the left shows the existing visual environment of 6th Street, as viewed looking east from Peoria Avenue. This street, similarly to most streets in Tulsa (and throughout the United States), was designed almost exclusively for the automobile with little thought given to the needs of pedestrians and bicyclists. However, there is a growing movement in transportation design for safely accommodating bicyclists, pedestrians and automobiles into a single, integrated system. One rapidly growing initiative, known as “Complete the Streets,” is being advanced by a broad coalition of advocates and transportation professionals (National Complete Streets Coalition). It is being proven that all modes of travel can coexist in an urban environment that helps create sustainable, walkable communities.

Many European cities have taken transportation integration to a higher level. The shared space concept, developed more than thirty years ago, is an alternative approach to traffic calming that dramatically reduces speed limits for motor vehicles and recognizes the ability of drivers and pedestrians to resolve potential conflicts. The entire street is open to pedestrians and cyclists, too, creating a friendly and interactive environment.



Viewed looking east from Centennial Park, the new vision for 6th Street establishes a pedestrian-oriented environment that integrates all modes of transportation. The sketch illustrates a vibrant, mixed-use district that includes the renovation of a number of brick buildings. The tall building, shown to the left of the drawing, shows the potential to integrate new structures that add density and complement the existing architectural style.

The proposed plan for 6th Street, as illustrated in the sketches to the right, redefines the street as an important public space and gives bicyclists and pedestrians equal priority. As discussed previously, the proposed plan includes one through travel lane in each direction, separated by the new canal. A review of traffic counts for this area of 6th Street verified that two lanes, instead of the current four lanes, provide sufficient capacity. A key component to creating a safe, pedestrian-oriented 6th Street will be to significantly reduce the speed limit to approximately 10 to 15 miles per hour. Decorative paving, with a different color and texture, is proposed between Peoria and Rockford Avenues as an additional traffic calming measure. This alternative paving material also has aesthetic value that helps define 6th Street as a safe place for bicyclists and pedestrians. Reducing traffic speeds for three blocks of 6th Street can also be a significant factor in creating a pedestrian-friendly environment that truly enhances the success of new shops, restaurants, offices and other businesses.



*6th Street - Existing Conditions
(View Looking West)*



*6th Street - Character Sketch
(View Looking West)*



6th Street Architecture



The proposed plan for 6th Street transforms the existing four-lane road into a public space that gives bicyclists, pedestrians and cars equal priority. 6th Street has a great opportunity to become a unique place to shop, dine, work and live (with a great view of downtown).

The photograph to the right illustrates the existing 6th Street environment, looking directly west toward the prominent downtown skyline. The sketches, below and on the facing page, show this same view but with proposed concepts to illustrate the potential for a significant transformation. The new canal, planned to be 10 feet wide, creates a unique focal point that could also become a dramatic night-time attraction. As shown previously in Figure 3, the canal would include four pedestrian bridges for easy movement from one side of the street to the other. The canal would be relatively shallow for safety, and would re-circulate with a pumping system to maintain good water quality. As shown in the sketches, the new street setting is further enhanced with decorative lighting, banners, site furnishings, trees and outdoor dining areas.



6th Street - Existing Conditions



6th Street Architecture



6th Street Canal - Character Sketch



*6th Street Canal - Character Sketch
(View Looking West toward Downtown)*



The proposed plan for 6th Street, as conceptually illustrated in these perspectives, presents a bold vision to radically transform 3 city blocks. Although flood control is an essential first step in the revitalization effort, there is also a prime opportunity to create a new district that is unique, pedestrian-oriented and economically viable. In combination with the East and West Pearl detention improvements, the redevelopment of 6th Street can create an exceptional public space that stimulates reinvestment in the Pearl District.



6th Street - Perspectives of Proposed Concepts



6th Street - Proposed Canal and Streetscape



The Tenth and Rockford Church of Christ is an important neighborhood institution that abuts the west edge of proposed stormwater improvements.

7.3 East Pearl Detention Pond

The proposed plan for the East Pearl is illustrated in Figure 4. The plan is based upon Concept 2, with several refinements that included the elimination of costly structural decks over underground detention. Preliminary cost estimates for the proposed plans determined that the construction of concrete decks, spanning over below-grade stormwater detention, was extremely expensive for the benefit of creating street-level public space. Consequently, the proposed plan for the East Pearl provides the required 113.6 acre-feet of storage in open basins that are recessed approximately 18 feet below street level. This strategy results in a lower overall cost with more of the funding focused on amenities that create valuable public spaces.

The proposed East Pearl plan comprises three distinct blocks that are generally bounded by 7th Street on the north, Troost Avenue to the East, 19th Street to the south and Quincy Avenue to the west. Rockford Avenue and 8th Street are retained as pedestrian-oriented streets through the East Pearl, as shown in Figure 4. The proposed plan utilizes the existing grid of streets and alleys as the physical framework for the new basins to reinforce the Pearl District's urban character. Street closings will only be required for several short blocks:

- St. Louis Avenue between 10th Street and 8th Street,
- Trenton Avenue between 8th Street and 7th Street.

The proposed East Pearl plan illustrates the potential for new residential development around the perimeters of the majority of the new detention areas. The plan also provides the benefit of three unique public spaces that are interconnected, physically accessible and very visible from neighborhood streets.

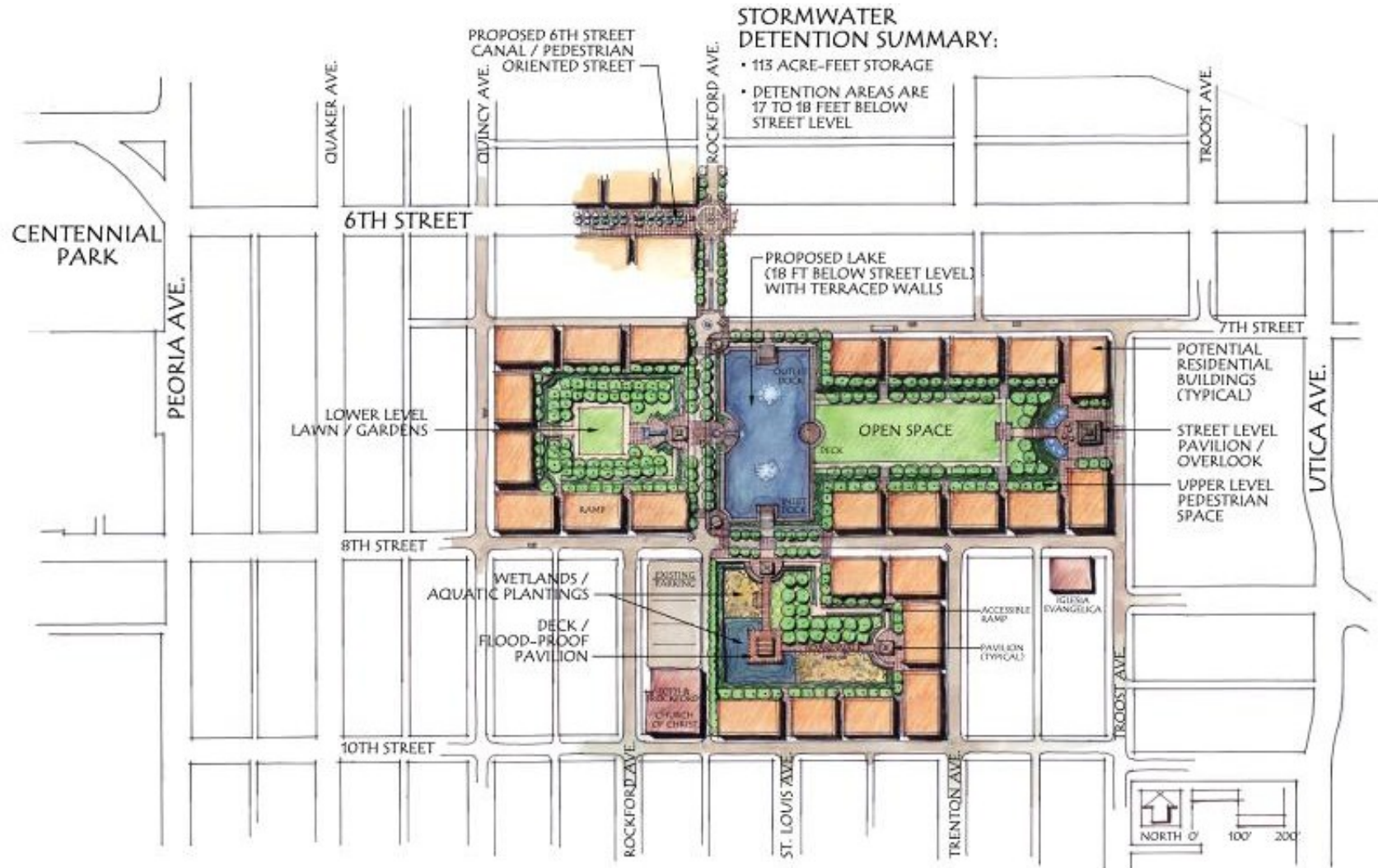
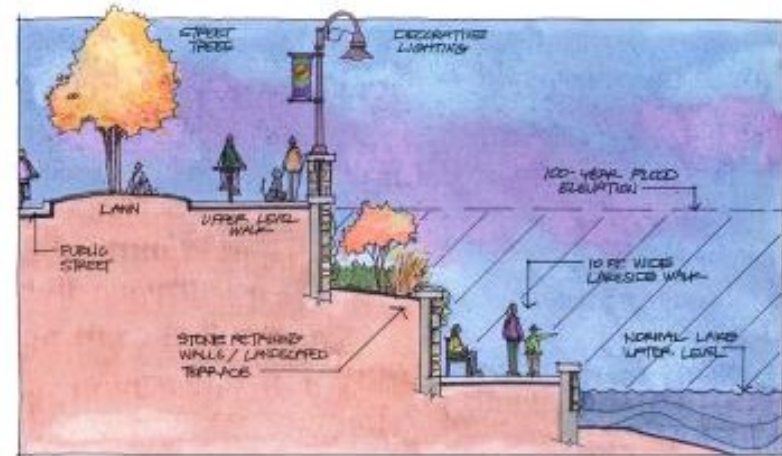


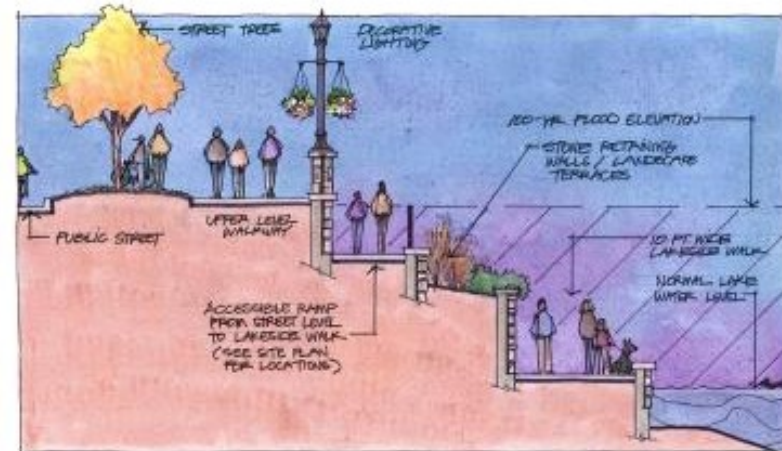
Figure 4
EAST PEARL - PROPOSED SITE PLAN

The central feature of the proposed East Pearl plan is a new lake, located east of Rockford Avenue between 7th Street and 8th Street. As illustrated in the perspective on the facing page, this new lake creates a pedestrian-oriented activity center for the surrounding neighborhood. Proposed features include:

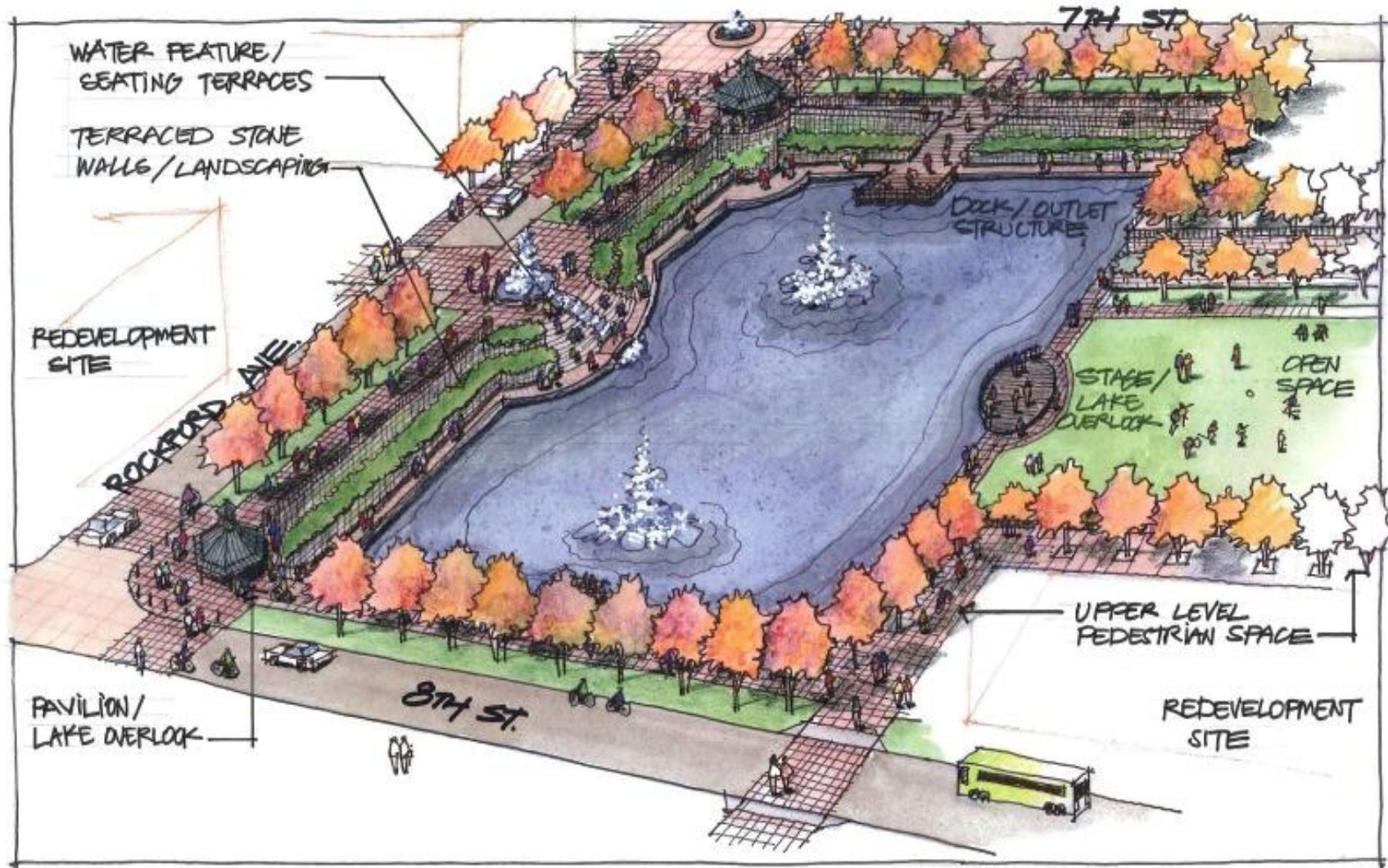
- New walkways around the lake's perimeter that create excellent recreational opportunities. As shown in the sections to the right, street level walks allow good connectivity to adjacent streets and the neighborhood. These upper level walks would be above the 100-year flood elevations and can be enhanced with decorative lighting. The new water feature is also enhanced with a lower level walk around its entire perimeter, accessible by stairs as well as ADA ramps on the north and south sides.
- The proposed lake is further enhanced by aerating fountains and a large water feature on the west edge. This proposed water feature creates a highly visible focal point adjacent to Rockford Avenue, with waterfalls that flow into the lake. Seating terraces adjacent to the waterfalls create a comfortable area for social interaction and enjoying views of the lake.
- Terraced masonry walls provide an attractive edge around the perimeter of the lake. These proposed walls create landscaped terraces that will be planted with water-tolerant trees, shrubs, grasses and vines.



Proposed Detention Pond Section

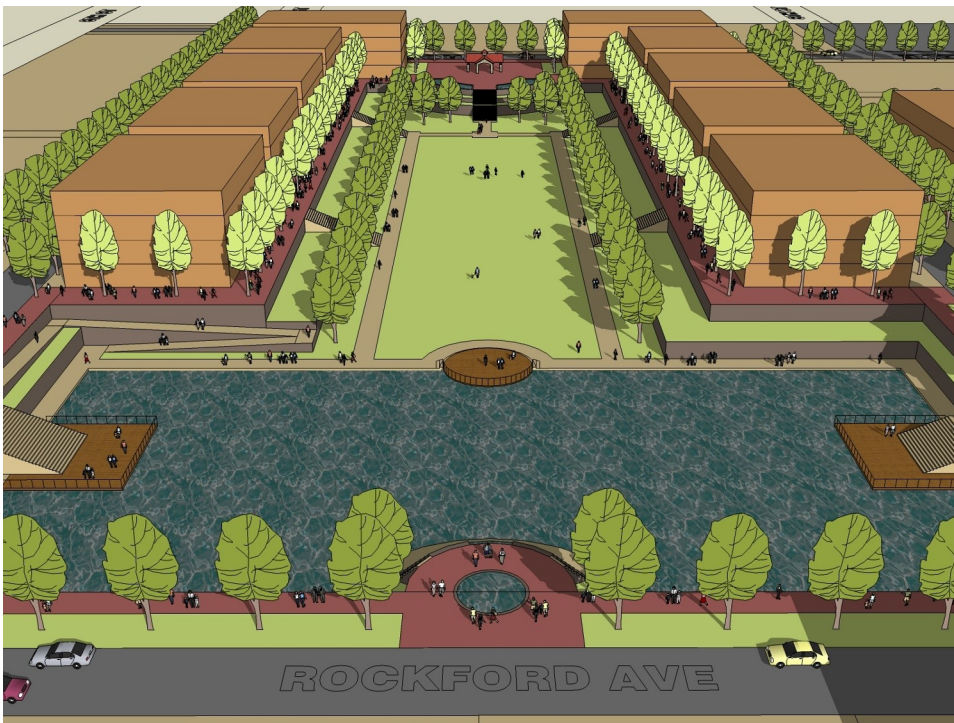


*Proposed Detention Pond Section
With Accessible Ramp*



East Pearl - Aerial Perspective of Proposed Detention Pond
(View Looking North)

The normal water level of the proposed lake is planned to be approximately 18 feet below current street level, creating space for flood storage that contributes significantly to the East Pearl's 113.6 acre-feet of required stormwater detention. The observation dock at the north end of the lake functions as the primary outlet structure for controlled release of floodwater.

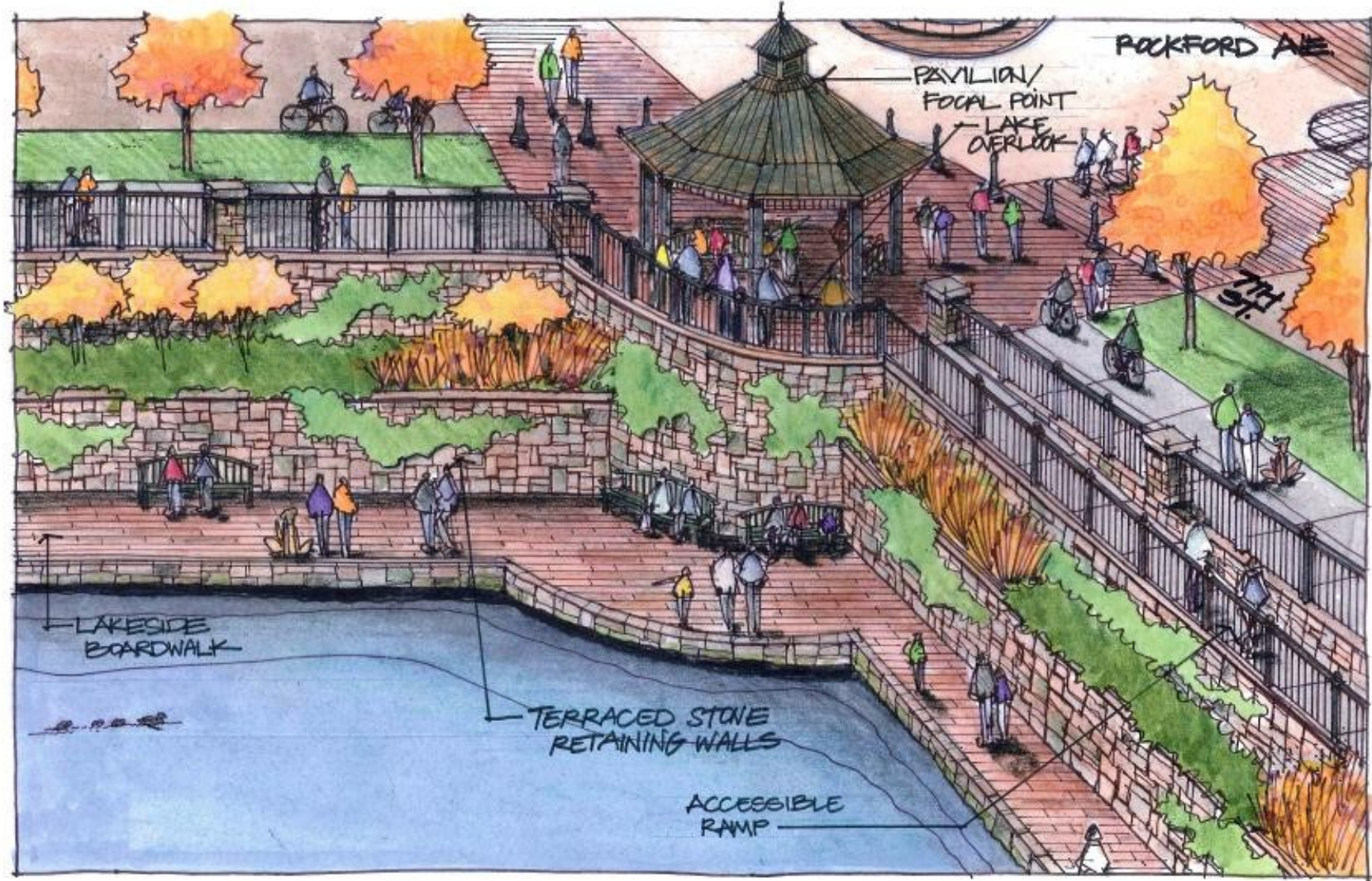


*Proposed East Pearl Perspective (View Looking East from Rockford Avenue)
On the east side of the proposed lake, a central lawn area creates
a flexible space for recreation and other activities.*



*Proposed East Pearl Perspective
(View Looking Southwest from 7th Street)*

At the corners of Rockford Avenue / 7th Street, and Rockford Avenue / 8th Street, large pavilions are proposed to create scenic lake overlooks. As illustrated in the sketch on the facing page, these overlooks can create neighborhood-scale landmarks that are comfortable places for neighbors to meet and enjoy views of the lake. The proposed overlook sketch also illustrates a wide lower level walkway and sustainable landscape materials that further enhance the proposed lake.



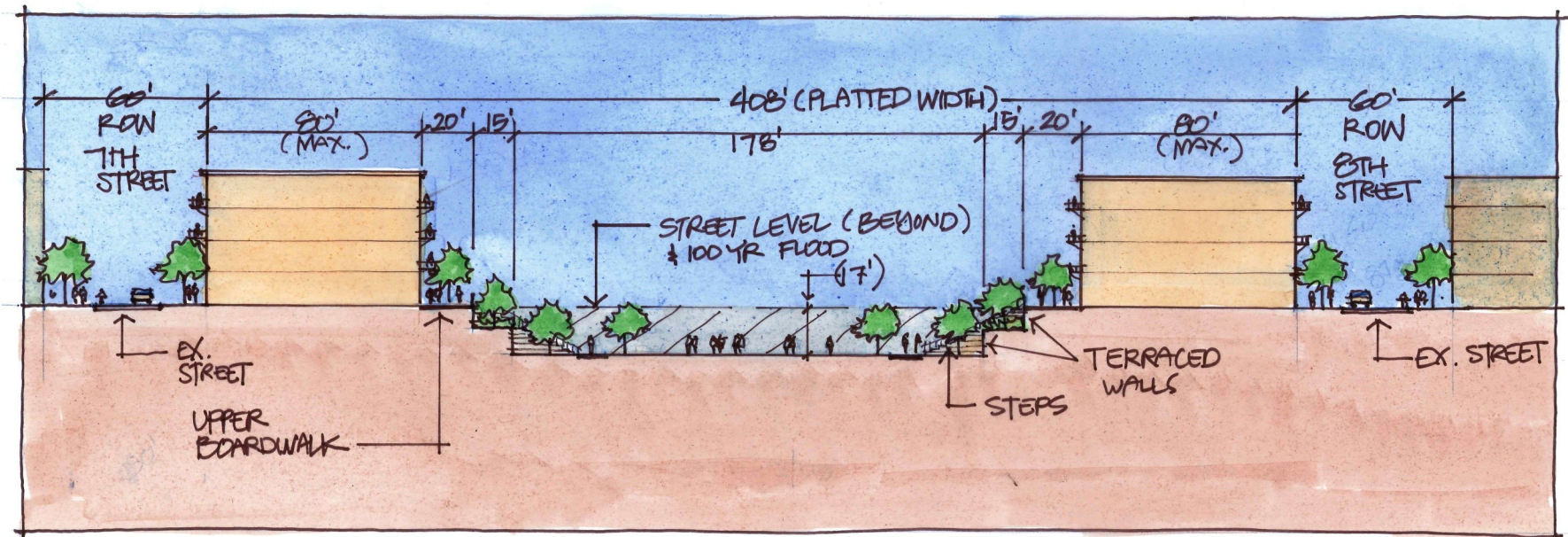
East Pearl - Proposed Lake Overlook

As shown in the perspective to the right and in the site section below, a large open space is planned to the east of the new lake. This lawn area, extending east almost to Troost Avenue, is planned to be recessed approximately 17 feet below the level of adjacent streets. This space would also provide significant stormwater detention, but since it would normally have a dry bottom, it will be fully usable by neighborhood residents except after heavy rainfalls. Particularly in light of the planned densities for infill residential development, this open space provides a much-needed activity area for all age groups. This open space would accommodate varied activities such as dog walking, throwing a football or Frisbee, informal play or simply sitting on a bench.

The proposed site section below illustrates the potential for new residential developments to be built on each side of the proposed open lawn.

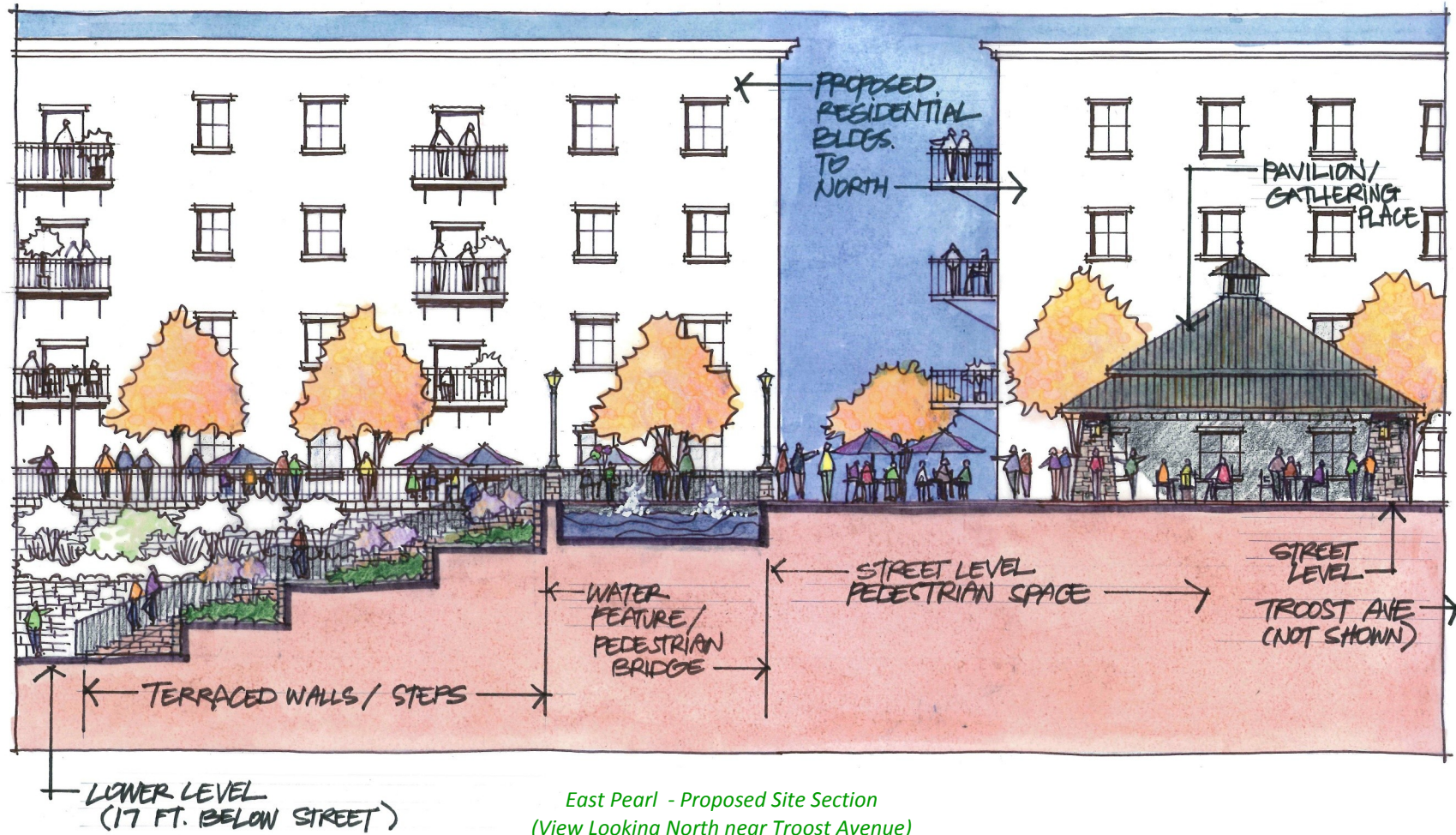


*Proposed East Pearl Perspective
(Looking West from Troost Avenue)*



*East Pearl - Proposed Site Section
(Looking East between 7th and 8th Streets)*

Below, a detailed section drawing shows the conceptual plan to transition from street level to the lower lawn elevations. In this view, looking north near Troost Avenue, a street level pedestrian space and pavilion are proposed to create a place for social interaction. This upper level pedestrian space is planned to continue along the rear of the proposed residential buildings. A large stair, flanked by landscaped terraces, provides access to the lower level lawn. Balconies on the new residential buildings would create excellent views of the pedestrian spaces below.



East Pearl - Proposed Site Section
(View Looking North near Troost Avenue)

As shown previously in Figure 4, the East Pearl plan proposed redevelopment of the block that is bounded by 7th Street, Rockford Avenue, 8th Street and Quincy Avenue. This site, currently occupied by DHS offices and the Laura Dester facility, will be vacated next year and made available for sale (according to Senate Bill 337 which was passed into law in April 2009). As illustrated in the foreground of the perspective below, the proposed plan for this block creates lower level lawns and gardens that are approximately 18 feet below street level. This open space is normally “dry” but contributes stormwater detention capacity. Potential residential development is proposed on three sides of the detention area that is enhanced with a pavilion, landscaped terraces, shade trees, seating plazas and walkways. The lower level spaces can be reached by using steps or accessible ramps.

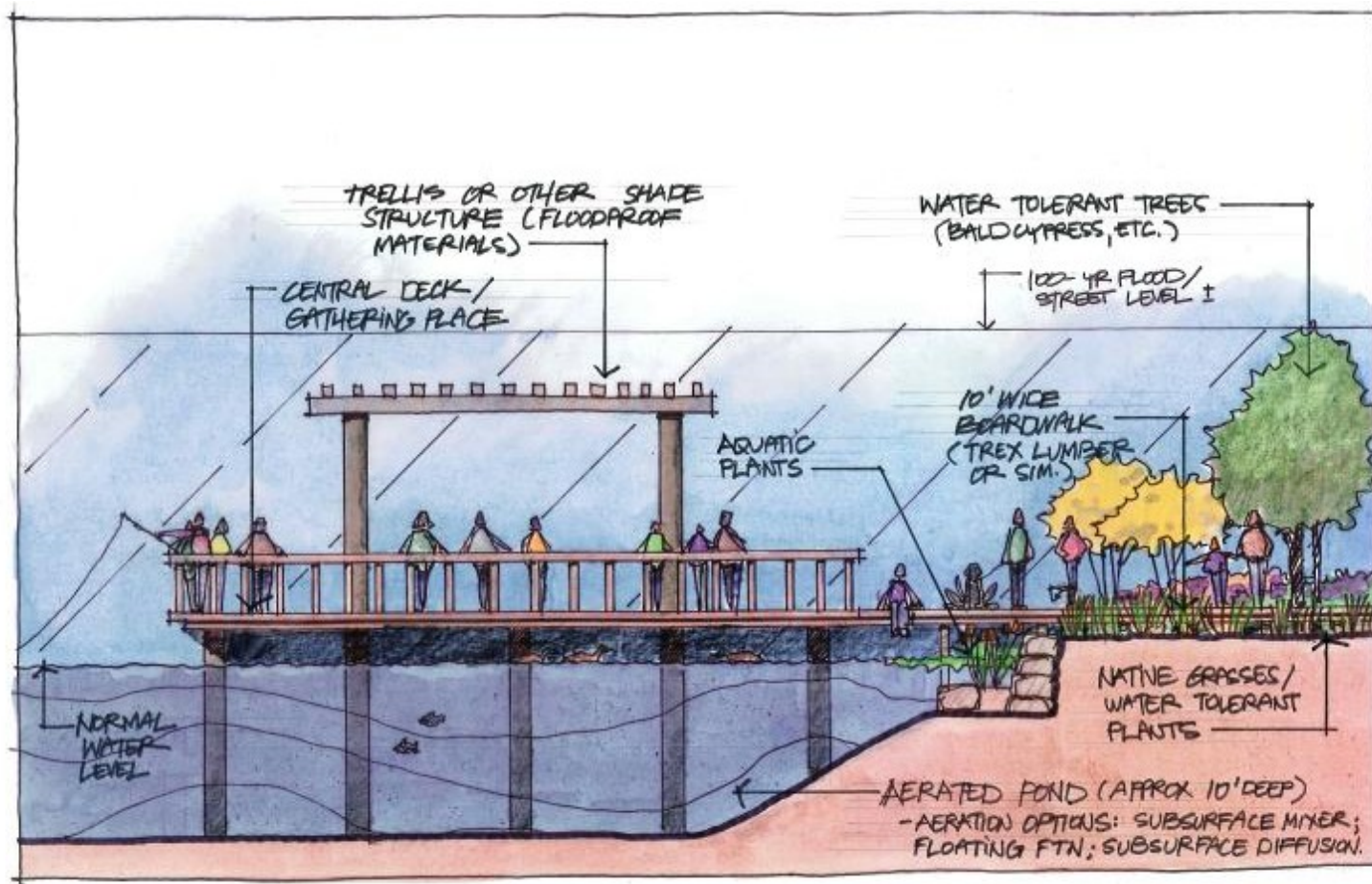


*East Pearl Perspective
(View Looking Southeast from Quincy Avenue / 7th Street)*



*Laura Dester Site
(8th Street / Rockford Avenue)*

The third major component of the East Pearl plan is within a site that is bordered by 8th Street, Trenton Avenue, 10th Street and the 10th and Rockford Church of Christ (see Figure 4). With potential residential development possible on three sides, this detention basin adds diversity with areas for lawns, water tolerant grasses and a pond. Accessible with steps and ramps, the lower elevations can be enjoyed by walking along a wide boardwalk. As illustrated below, a large deck and a flood-proof shade structure are envisioned to create a central gathering place overlooking the pond. The use of water tolerant, semi-aquatic plantings creates excellent opportunities for environmental education. These plantings also offer the benefits of helping to naturally filter pollutants from the urban runoff waters.



East Pearl - Proposed Deck / Basin Section



The West Pearl site has excellent views and connections to downtown Tulsa.



The Herbold Building (417 S. Madison Avenue) has great potential to complement new infill residential developments.

7.4 West Pearl Detention Pond

The proposed plan for the West Pearl is shown to the right in Figure 5. The required 64.5 acre-feet of stormwater detention is accommodated as an “urban pond”, strategically located as the focal point for infill residential redevelopment. The proposed pond, approximately 500 feet long and 450 feet wide, is configured to maximize redevelopable land 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 5th Place to the South. The proposed plan for the West Pearl includes outdoor terraces, overlooks and a pier at the west end of the new basin.

The proposed plan integrates regional flood control in an urban form that reflects the character and context of the adjacent neighborhood. 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 4th Street and 5th Place, Owasso Avenue is proposed to accommodate pedestrians and bicycles along the east edge of the new pond.

Figure 5 illustrates conceptual building footprints around the perimeter of the pond for new mid-rise residential developments that could be developed by the private sector. These new residential developments would enjoy spectacular views of the downtown skyline, Centennial Park or the new West Pearl Detention Pond. 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 Pearl pond and urban amenities. As shown on the proposed plan, there are several existing streets that provide important east-west connections for all modes of transportation. (3rd, 4th and 6th Streets currently provide access across U.S. Highway 75.) In addition, the plan for the West Pearl provides strong pedestrian linkages to Centennial Park along Norfolk and Owasso Avenues.

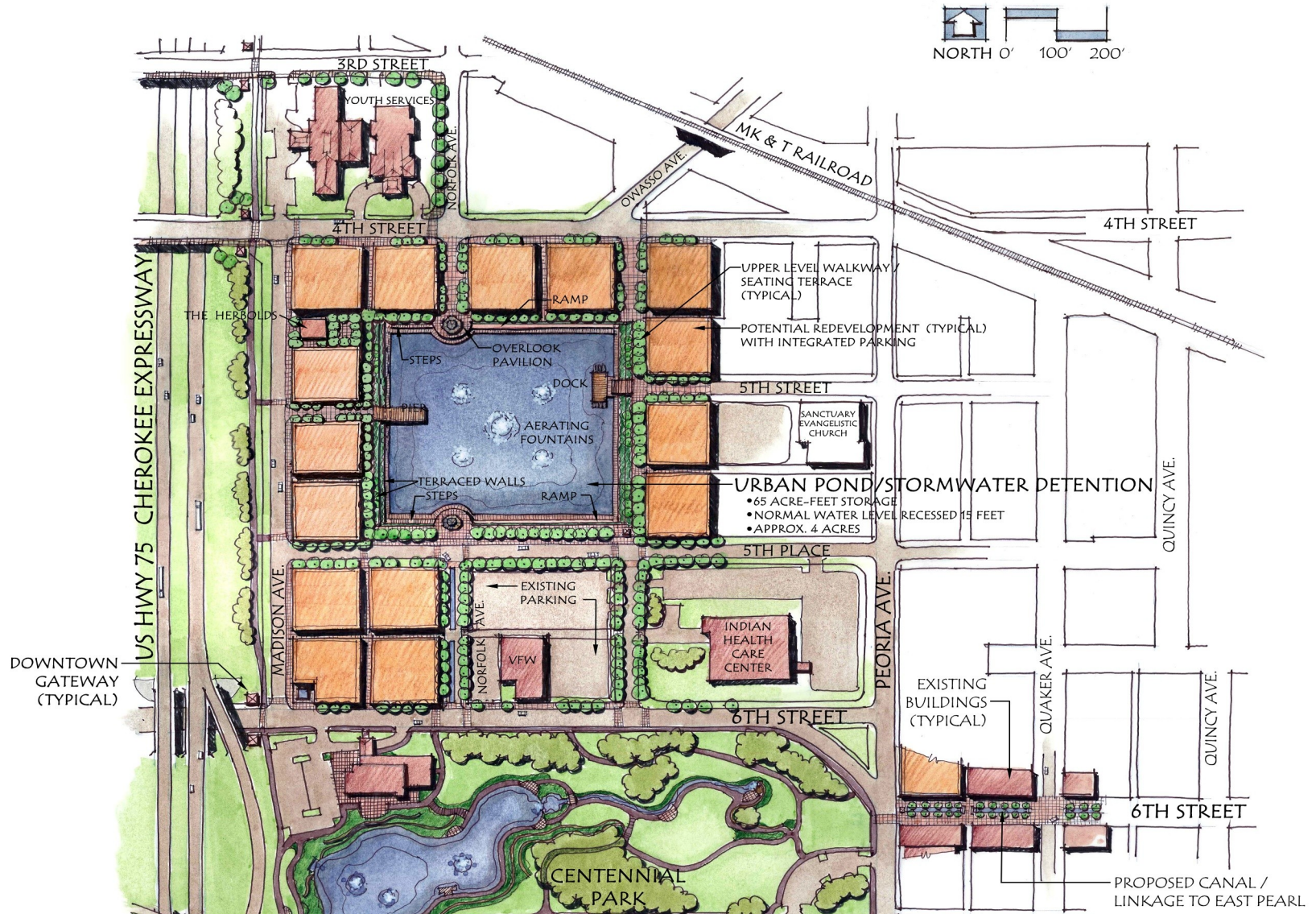
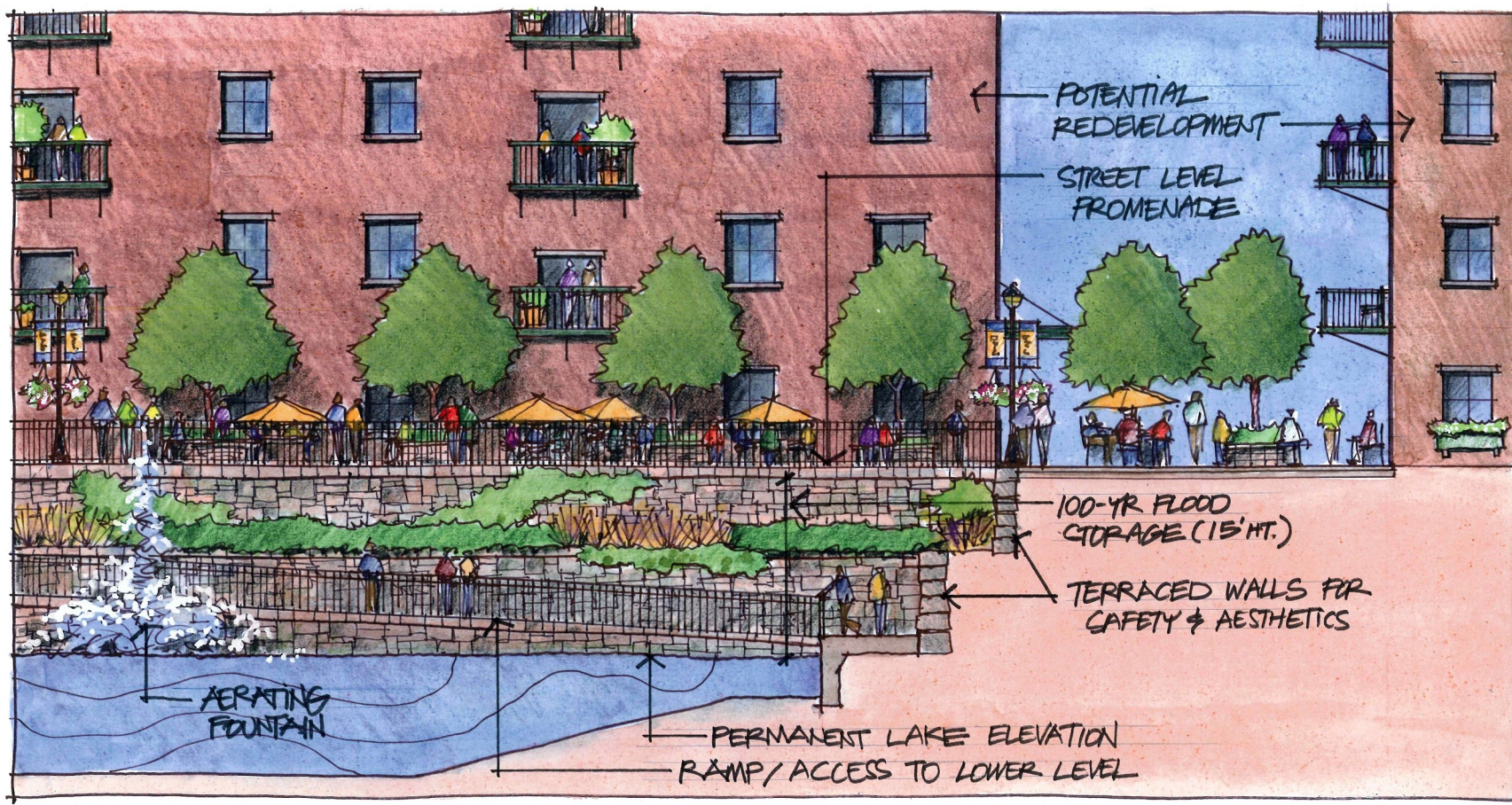


Figure 5
WEST PEARL - PROPOSED SITE PLAN

The cross section below illustrates the proposed basin depth and preliminary water levels. The pond would have a normal water level that is approximately 15 feet below street level, with the potential for the water level to rise during rainfall events. An outlet structure would release stormwater at a controlled rate until it returned to the normal pond level. The West Pearl plans include aeration fountains which will help maintain good water quality in the pond. The fountains will also create interesting focal points, particularly with night lighting. As envisioned in the sketch below, the proposed West Pearl detention basin has the potential to become a dynamic pedestrian space that provides benefits far beyond flood control. At street level, a 25 to 30 feet wide pedestrian

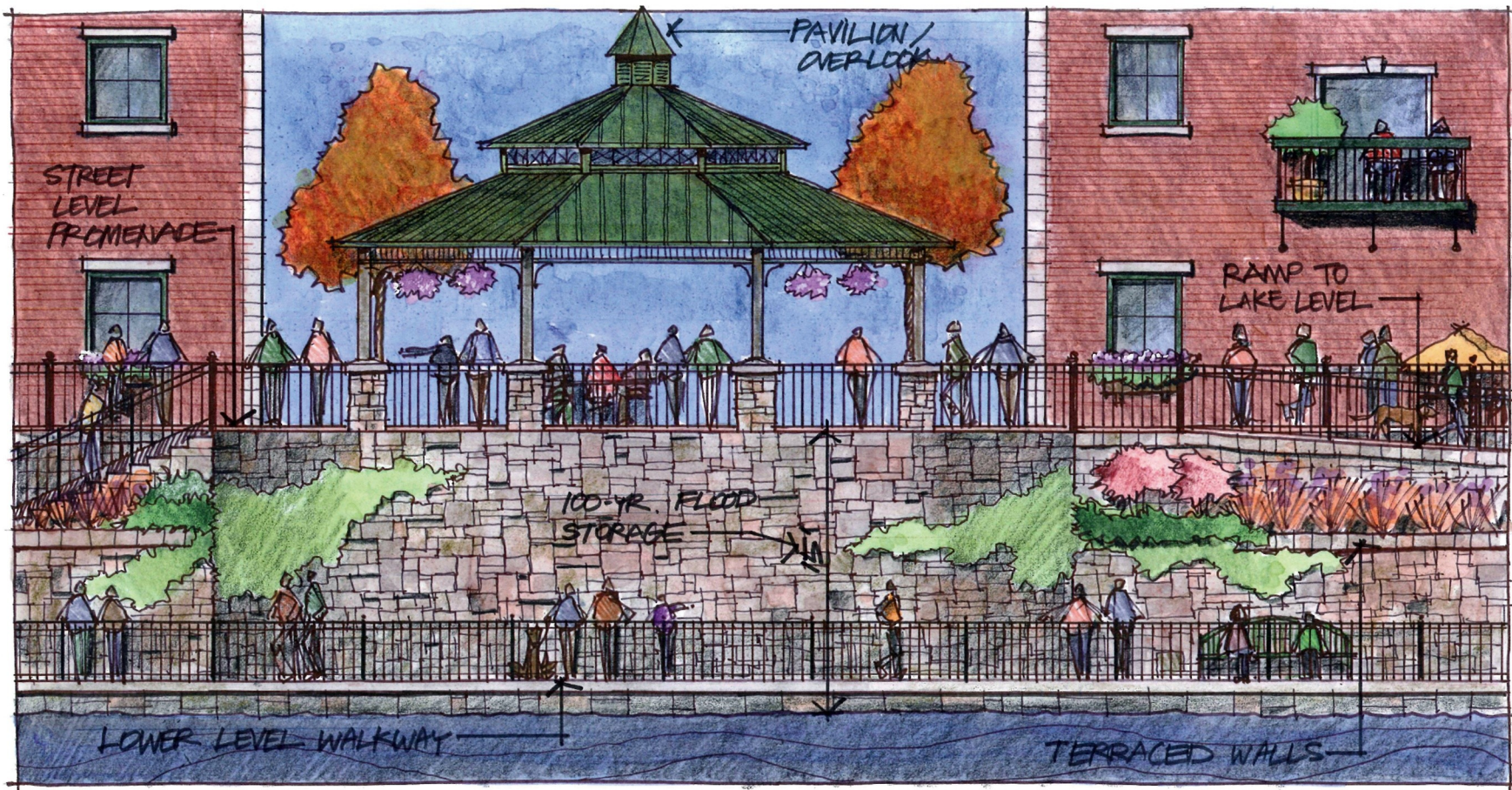


zone is proposed between the new residential structures and the edge of the basin. As illustrated, this space would overlook the pond and accommodate seating areas, trees, pedestrians, bicycles and lighting. Stone retaining walls around the perimeter of the new lake are proposed to be terraced for safety. The plan integrates steps and accessible ramps on the north and south edges of the basin to provide convenient access to a continuous lakeside walk. As shown in the sketch below, the proposed plan also includes a dock / observation deck on the east side of the lake. This dock would provide a functional storm drainage outflow, much like Centennial Park, that would also create a useful public amenity. Consideration should be given to allowing recreational use of small boats (kayaks, paddle boats or canoes) when the pond is at normal water levels.



West Pearl - Boat Dock Elevation

As shown previously in Figure 5, the West Pearl plan includes two large pavilions to be built on the north and south edges of the basin. These two pavilions are planned to be aligned with the centerline of Norfolk Avenue to enhance their visibility and physical access. As illustrated in the sketch below, 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.



West Pearl - Lake Overlook Elevation

8.0 Funding and Implementation



8.1 Project Estimates

Project estimates have been developed for each major project within the Elm Creek Drainage Basin. The projects are: 6th Street Conveyance / Canal, East Pearl Pond, West Pearl Pond, Storm Sewers, Redevelopment Acquisitions, and Voluntary Floodplain Acquisition. Each of these projects has associated subcomponents that make up a whole and complete project which may be funded independently. All costs included in this report are based on conceptual plans and 2009 construction values. Final costs may vary based on final design documents. The following table summarizes the projected costs for all proposed improvements.



COST SUMMARY

6th STREET CONVEYANCE / CANAL	\$ 11,479,014
EAST PEARL POND	\$ 25,195,190
WEST PEARL POND	\$ 13,225,562
STORM SEWERS	\$ 3,000,000
REDEVELOPMENT ACQUISITION	\$ 8,849,577
VOLUNTARY ACQUISITION	\$ 3,400,000

TOTAL \$ 65,149,342

Each project requires relocation of public and private utilities. The costs included in these estimates do not include the cost of any private utility relocations. The cost of public utility relocations is included in the estimates. Each of the major projects listed above are summarized in the following discussion.

6TH STREET CONVEYANCE / CANAL - This portion of the project costs includes the improvements along 6th Street from the existing drainage basin within Centennial Park east to Rockford Avenue to include the double-celled reinforced concrete box under the street, the surface canal, the street and sidewalk improvements and the connections to existing storm drainage systems. This portion also includes pedestrian bridges across the canal and the aesthetic urban amenities included in the conceptual plans. (Refer to Figure 3.)

EAST PEARL POND - This portion of the project costs includes the cost for the East Pearl drainage basin to include the basin, the street improvements, urban amenities, landscaping and public utility relocations. The small drainage structure and decorative canal connecting to the 6th Street canal is also included. This project also incorporates the connection with the storm sewer main to the east. (Refer to Figure 4.)

WEST PEARL POND - This portion of the project costs includes the cost for the West Pearl drainage basin to include the basin, the street improvements, urban amenities, landscaping and public utility relocations. The small drainage structure and decorative canal connecting the existing drainage basin within Centennial Park is also included in the cost. (Refer to Figure 5.)

STORM SEWERS - The Rockford Avenue storm sewer improvements extend from the 6th Street canal and RCB to the north side of the M. K. T. railroad. This storm sewer improvement is needed to relieve flooding to the north and east of the railroad embankment. Other smaller storm sewer connections are also included in these costs. (Refer to Figure 2.)

REDEVELOPMENT ACQUISITION - This redevelopment cost includes the cost of land acquisition outside the construction zone, but within the conceptual plans. The bounding lots and acreage may be acquired for redevelopment around the drainage basins and canal. The redevelopment areas generally extend from the drainage basins to the nearest public street of along the 6th Street canal.

VOLUNTARY ACQUISITION - For those areas which will remain within the floodplain (residual flooding), a voluntary acquisition program may be used. The estimated cost to acquire all residential properties which will remain within the floodplain following implementation of the master drainage plan are included in these costs. (Refer to Figure 2.)

The detailed costs of each project were also categorized based on potential funding limitations. The categories included are: Detention Pond, Roadway and Utilities; Urban Amenities and Redevelopment Property. Various funding streams have limitations which preclude them from funding certain types of work. For instance, a municipal bond passed by a vote of the people for roadway improvements cannot fund the construction of a detention pond. However, a municipal bond may fund the streets around the detention pond.

Pond, road and utility costs are generally public costs associated with development. Their funding may originate from a developer, however, the facility is for public access. The costs below include the land acquisition required for construction, basic cost of construction of drainage basins with required storm sewer connections, maintenance access and safety features. The roadway costs are for improvements to those roadways bounding each drainage basin site and along the 6th Street conveyance.

SUMMARY - POND, ROAD, & UTILITIES

6th STREET CONVEYANCE / CANAL	\$ 8,199,282
EAST PEARL POND	\$ 16,136,070
WEST PEARL POND	\$ 8,567,562

TOTAL \$ 32,902,913

The urban amenities include additional sidewalks, ramps, landscaping, pedestrian lighting, benches, gazebos and other amenities relating to pedestrians and parks. These amenities are essential to the urban design and character within the Pearl District's vision. All of the conceptual plans focus significantly on the amenities which create the pedestrian-friendly and aesthetically pleasing community gathering spaces. These amenities are generally funded through public or private sources.

SUMMARY - URBAN AMENITIES

6th STREET CONVEYANCE / CANAL	\$ 2,284,044
EAST PEARL POND	\$ 9,707,965
WEST PEARL POND	\$ 4,832,666
TOTAL	\$ 16,824,675

The redevelopment costs include the acquisition of additional land bounding the projects. These lands would be used during construction for temporary lay-down or stockpile areas. Upon completion of the construction, the areas would be sold, leased or provided to developers for revitalization of the area. The bounding properties provide an excellent development opportunity due to their proximity to the newly constructed drainage basins and all their amenities.

SUMMARY - REDEVELOPMENT PROPERTY

6th STREET CONVEYANCE / CANAL	\$ 1,733,109
EAST PEARL POND	\$ 4,203,997
WEST PEARL POND	\$ 2,912,471
TOTAL	\$ 8,849,577

8.2 Project Phasing

Projects must be phased in a coordinated manner to ensure floodplain reduction is associated with each project. If projects or smaller components are constructed without attention to floodplain hydraulics, areas within the drainage basin have the potential of receiving additional floodwaters aggravating the existing flooding problems.

The West Pearl pond project may be constructed independently as long as associated components of storm sewer improvements are incorporated into the west pond project. These improvements include capturing roadway storm drainage as well as a storm sewer conveyance from the west pond to the existing Centennial Park detention pond. The 6th Street conveyance storm sewer should be constructed in conjunction with the Rockford Avenue storm sewer (see 2008 Elm Creek Master Drainage Plan Update, section 6) to help relieve flooding along the 6th Street corridor. Complete flood reduction in this reach would then be accomplished by completion of the entire East Pearl detention pond providing 113.6 acre feet of storage.

The East Pearl pond may be constructed in whole or phased. Due to the project's large scale the pond may be constructed in phases as funding becomes available. The phasing will provide floodplain reduction in small portions as each phase is constructed. The East Pearl pond storm sewer improvements include capturing the roadway storm sewers, the storm sewer main coming from the east, and the connection to the proposed 6th Street conveyance. The outlet control design for the east pond must vary with each phase that is constructed as not to aggravate existing flooding downstream.

8.3 Potential Funding Sources

Numerous sources of funding are potentially available for these proposed flood control projects. There is a broad range of federal, state, and municipal funding streams which could be used to fund various portions of these projects. This is primarily a floodplain project with potential redevelopment opportunities. With each funding source, it will

take a varying number of years to produce construction-ready plans and initiate construction. The source of funding dictates the timeliness of the project due to environmental concerns or governmental oversight.

The potential funding sources and the approximate timeline to start the projects are identified below:

<u>POTENTIAL FUNDING SOURCE</u>	<u>TYPICAL TIMELINE*</u>
Federal Emergency Management Agency Grants	5 years
Congressional Earmarks	8-10 years
Corps of Engineers Section 205	8-10 years
Corps of Engineers General Investment	12-15 years
Oklahoma Emergency Management Grants	5 years
Municipal Bond Issue (2014)	10-12 years
Sales Tax (>2014)	12-15 years
Stormwater Fees	10 years
Tax Increment Finance	10-12 years
Community Development Block Grants	5 years
HUD Section 108	5 years
Private Donations	5 years
Foundation Loans	6 years
Private Development Funding	6 years

*NOTE: Number of years shown are minimum, and begin when funding is approved.

8.4 Current Funding

As of February 2010, some funding has been secured for these projects. The funding is primarily municipal and is a limited amount. The City of Tulsa funding will primarily be used as matching dollars for state or federal grants. These grant programs typically require a 25% match. The municipal matching funds will leverage four times the current funding available.

<u>Current Funding</u>	<u>Amount</u>	<u>Fiscal Year</u>
Bond Issue	\$ 1.6 million	2011
Fix our Streets	<u>\$ 4.2 million</u>	2014
	\$ 5.8 million	
	<u> X 4</u>	
Current Potential Funding	\$23.2 million	

8.5 Next Steps



The next major phase for this project will be to identify and secure funding for projects and begin detailed engineering / design and construction. For projects of this scale, final design and detailed engineering typically requires two to three years. For each major project, it is anticipated that construction will require an additional two to three years. The engineering design will coordinate with all stakeholders to ensure that the final design meets the intent of this conceptual design report. The City of Tulsa and the Pearl District will actively seek funding from federal, state and private sectors to make these projects a reality and promote redevelopment in the 6th Street corridor.

Through strong leadership and an effective public / private partnership, these visionary projects can be catalysts for revitalizing the Pearl District and surrounding neighborhoods.

Appendix A

The 'East Pearl' Design Brief

Source: Pearl District Association



The 'East Pearl'

A Design Brief for the reinvention of our *urban* neighborhood



1. Client Background

1.1 General

- 1.1.1 The Pearl District Association represents a long-neglected, blighted, inner-city neighborhood undergoing transformative change.
- 1.1.2 7 years of planning and thousands of hours of work by neighbors led to the '6th St. Infill Plan', facilitated by the Urban Planning team.
- 1.1.3 The 6th St. Infill Plan was approved by City Council in Jan. 2006.
- 1.1.4 The first stage of the Elm Creek basin, comprising a detention pond in Central Park, and
- 1.1.5 We changed the neighborhood's name to 'The Pearl District' in Jan 2006.
- 1.1.6 We obtained the go-ahead from the Mayor's office to adopt 'form-based' codes in 2007.
- 1.1.7 We are a diverse, informed, purposeful, neighborhood association (from backgrounds that include marketing, design, engineering, real estate development, architecture, medicine, churches, transportation, and other occupations).
- 1.1.8 We have developed a reputation in City Hall for progressive, strategic thinking and a good, purposeful relationship with the City's planners.
- 1.1.9 The present project is part of a much wider-ranging re-development strategy that includes land use policy reform, membership of the federal 'Main St.' program and a drive to become a 'sustainable' neighborhood.
- 1.1.10 *We consider this project to have huge significance for the future livability and competitiveness of Tulsa.*

1.2 Current Situation

- 1.2.1 The Association considers it essential that design principles and executional elements are coordinated throughout the Pearl District, to achieve a coherent neighborhood identity.
- 1.2.2 We regard ourselves as stewards responsible for ensuring we achieve this for future generations of Tulsans who live and work in the Pearl.
- 1.2.3 Accordingly we developed a design committee structure (set out below) to deal with several, connected projects. One sub-committee has worked throughout 2007 on streetscaping plans for sections of Peoria Avenue. *This project is likely to inform design and choice of materials for the East & West Pearl and any subsequent sectors.*
- 1.2.4 Since the Pearl District is contiguous with Downtown we aim to ensure that the two neighborhoods complement each other, whilst not identical in every design element.
- 1.2.5 There is potential to secure street-bond financing for 6th. St. streetscaping within two years.

- 1.3 Urban Design Committee
 - 1.3.1 The role of this over-arching committee is (i) safeguard **consistency** across various design sub-committees, (ii) to **coordinate** the plans and budgets, (iii) work to secure **funding** and (iv) **represent** the interests of the Pearl District Association to the City and other constituencies.
 - 1.3.2 The PDAs coordinating committee comprises Christine Booth (Pres.), Jamie Jamieson (Sec.), Dave Strader (V-P), Lorenda Greer (Treas.), Jerry Bowen (Chair, 'Peoria' & Park' sub-committee) and Rachel Navarro (Chair of the 'East & West Pearls' sub-committee).
 - 1.3.3 Three distinct neighborhood 'sub-sectors' are being addressed in sequence.
 - 1.3.4 A sub-committee populated with eligible Pearl members will deal with each of these.
 - 1.3.5 Sub- committees report to the 'Urban Design' committee (of which sub-committee Chairs are a member).
- 1.4 Sub-committees' areas
 - 1.4.1 **'Peoria & Park' Intersection Improvements:**
 - 1.4.1.1. Members: Jerry (Chair), Vicky O'Neil, Mickey O'Neil, Steve Olsen, Christine Booth, Jamie Jamieson.
 - 1.4.2 **'East & West Pearls'** (detention ponds; 6th St. canal):
 - 1.4.2.1 Members: Rachel Navarro (Chair), Christine Booth, Lorenda Greer, Dave Strader, Jamie Jamieson, Stacy Loeffler, Teddi Allen, Apostle Milford Carter, Shelby Navarro.
 - 1.4.3 **'Utica Ave. Project':**
 - 1.4.3.1 Members: Cr. Barnes (Chair) Christine, Becky, Justin, Jamie. Basic design development completed.
 - 1.4.3.2 *Project Design development stage reached at June 2007. Unfunded.*
- 1.5 Sub-committees' Role
 - 1.5.1 To write a design brief for the contracted design team of engineers and designers, representing the neighborhood's perspective and expectations.
 - 1.5.2 To work with the contractors in reviewing designs and 'best practices' of benchmark cities.
 - 1.5.3 To identify the above-ground improvements required, in consultation with the landscape architect.
 - 1.5.4 To evaluate and rank specific items for the purpose of funding.
 - 1.5.5 To review specifications with the contractors.
 - 1.5.6 To determine price/quality trade-offs.
 - 1.5.7 *To review with the PDA's Design Committee.*
 - 1.5.8 To present the finished Plan to the Pearl District Association alongside the contractors.
 - 1.5.9 To obtain a schedule from Public Works.
 - 1.5.10 To monitor progress and follows up as appropriate to safeguard design execution and expedite installation.
 - 1.5.11 To report progress to PDA monthly meetings.
 - 1.5.12 **To promote** the plan to the general public.
 - 1.5.13 To review the effectiveness of each element and the whole in planning subsequent stages of neighborhood improvement.

2. **Design Goals: all sub-committees**
 - 2.1 To play an important role in delivering the Pearl District's Mission, which is:
 - 2.1.1 "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 achieves 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 achieve all this before it is too late.*"
 - 2.2 To make the neighborhood **safe** from flooding.
 - 2.3 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**.
 - 2.4 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.
 - 2.5 To create an **economically dynamic** neighborhood in which neighborhood retail businesses can thrive.
 - 2.6 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.
3. **Design Brief: 'East & West Pearls'**
 - 3.1 To design an integrated, waterways and water detention pond system for the 'East Pearl' and 'West Pearl' that makes the neighborhood safe from flooding. This system to comprise:
 - 3.1.1 A detention pond or ponds (the 'East Pearl') located west of Utica Ave. and north of 11th St.;
 - 3.1.2 An above-ground waterway along 6th St., connecting Central Park to the East Pearl.
 - 3.1.3 A below-ground storm sewer connecting Central Park to the East Pearl (probably beneath the waterway).
 - 3.1.4 Inlets to the storm-water system from properties abutting 6th St. into the new waterway; this will eliminate the requirement for property-owners to provide wasteful, compensatory storage on private property or to pay stormwater fees as they increase the impermeable surface area alongside economic revitalization.
 - 3.1.5 A detention pond or ponds (the 'West Pearl') located immediately east of Highway 75 north of 6th St.
 - 3.2 To develop **pedestrian-focused** streetscaping around these amenities that clearly establishes that the pedestrian takes priority over the automobile. ('Access' vehicles will also use established alleys for deliveries, as at present).
 - 3.3 To create the potential for developing a plentiful and diverse supply of housing in a traditional, walkable, urban neighborhood format.

4. Design Strategy

- 4.1 Focus all design elements, scale and rhythms on meeting the needs of the *pedestrian*, the cyclist, children, the handicapped and the mass-transit user.
- 4.2 Restore the fabric and feel of a walkable, safe, 'traditional, urban neighborhood'.
- 4.3 In so doing, to seek ways to *blend the functions of street, sidewalk and open space*.
 - 4.3.1 Check out '*Woonerfs*' and '*Home Zones*' for detailed background and guidance.
- 4.4 Incorporate the most *progressive, sustainable* stormwater practices so as to replenish aquifers, minimize pollution, mitigate urban heat islands, reduce ozone problems, increase permeable surfaces, etc.
- 4.5 Take into account that we seek to become a *LEED-certified* neighborhood.
- 4.6 Take into account that the Pearl District is in the process of adopting *form-based codes*.
 - 4.6.1 These disfavor off-street parking; and they favor on-street parking.

5. Executional Guidelines

- 5.1 Infrastructure:
 - 5.1.1 Leverage the *older*, traditional, urban infrastructure and *vernacular* design already existing in the neighborhood
 - 5.1.2 Consider a 'lock'-like, rectilinear design of the East Pearl pond or ponds to go with the 'canal'-like waterway.
 - 5.1.3 Consider 2-3, connected 'East Pearl' 'locks' surrounded by pedestrian-oriented walks and grassy areas.
 - 5.1.4 Consider one such area being landscaped instead of being a permanent pond, so as to act as a small, neighborhood 'park'.
 - 5.1.5 Retain the current right-of-way width (60') along 6th St.
 - 5.1.6 Enhance the pedestrian connections between neighborhoods either side of 6th St. and the 6th St. corridor.
- 5.2 Architecture:
 - 5.2.1 Leverage the complementary *urban vernacular* implied by *new* buildings such as F&CS, the Village At Central Park, the Boathouse and the Indian Health Care Center.
- 5.3 Transportation:
 - 5.3.1 Take into consideration the possibility that in addition to the present bus system a *trolley bus or street-car system* (or similar) might be developed that passes through the neighborhood.
- 5.4 Materials:
 - 5.4.1 Favor *sustainable* materials, technologies and plantings wherever practical, durable and aesthetically consistent with the above points. (e.g. recycled content finishes/fixtures, solar street lighting and/or LED street lighting, directed lighting, permeable paving, hydropower possibilities, biofiltration of stormwater runoff, drought tolerant and native plants).
 - 5.4.2 Favor *traditional, urban* materials already in use in the Pearl, including:
 - 5.4.2.1 Red 'brick',
 - 5.4.2.2 Black 'wrought iron' (e.g. as guard rails; bollards, bike racks; street lights, benches),
 - 5.4.2.3 A 'Pearl' motif conveyed in design elements such as cap stones, benches, bollards, 'gateway' entrances to the neighborhood. *Note: Some items have already selected some items for the 'Peoria & Park' project.*

- 5.5 Street-scaping Elements to include:
 - 5.5.1 **There should be no curb-cuts.**
 - 5.5.2 Bollards to (i) replace curb-cuts, (ii) provide a sense of pedestrian 'buffer' zone, (iii) calm traffic;
 - 5.5.3 Good-quality, identical surface materials for 'sidewalks' and road-surface;
 - 5.5.4 Street trees selected for pedestrian comfort and retail visibility;
 - 5.5.5 Pedestrian-scale street-lighting (c. 10'), providing signage opportunities for adjacent businesses;
 - 5.5.6 Pedestrian-oriented signage, including attractive direction indicators;
 - 5.5.7 'Bridge' design elements at each intersection and as appropriate around detention ponds (e.g. railings brick pillars);
 - 5.5.8 Locations for 'Pearl' signage (awarded and funded by Vision 2025).
 - 5.5.9 Bicycle racks;
 - 5.5.10 Bus-stops (including specific locations);
 - 5.5.11 Maximize on-street parking spaces painted and permitted along **both sides** of all neighboring streets;
 - 5.5.12 Motorbike parking spaces.
- 5.6 Landscaping Plan
 - 5.6.1 Objectives
 - 5.6.1.1 Dignify the human, pedestrian experience.
 - 5.6.1.2 Deliver a charming, comfortable, urban 'public room'.
 - 5.6.2 Landscaping Design Strategy
 - 5.6.2.1 Develop a landscaping plan that reflects the formal, rectilinear rhythms of the built environment, not a faux-country or 'suburban' style. (*Cf. Louis-Napoleon's/Haussman's Paris. c. 1880*)
 - 5.6.2.2 Design an urban setting around the East Pearl detention pond so as to maximize its role as a characterful, neighborhood resource in terms of walking, views, shade and its integration with neighboring residential streets. Interesting, quirky, small urban spaces are strongly encouraged.
 - 5.6.2.3 Design for sustainable, low-maintenance, *native* plantings and rain gardens wherever possible (e.g. buffalo grass, wildflowers, trees). Bermuda grass is specifically ruled out.
 - 5.6.2.4 Design a sustainable environment that could include rain gardens; and permeable, hard surfaces.
- 6. **Budget Prioritization Strategy**
 - 6.1 Prioritize financial resources on creating a *pedestrian experience*.
 - 6.2 The relative benefit on the pedestrian's experience is the criterion by which we prioritize candidate elements, in keeping with the Pearl District's Vision.
 - 6.3 We strongly favor a **quality-driven** design strategy and **sustainable** materials, as opposed to a price-driven policy; on the basis that the neighborhood will thereby generate a much greater economic and social return.

7. Time Line

- 7.1 Meet to determine planning methodology and responsibilities April, 2008.
- 7.2 PDA sub-committee briefs Design team April, 2008.
- 7.3 Initial, weekly review meetings with Design team to get the ball rolling.
- 7.4 Regular, bi-weekly meetings with sub-committee until all design work is complete.
- 7.5 Determine phasing of design development (May, 2008)
- 7.6 Review and agree broad, schematic approach by August, 2008
- 7.7 Detailed designs for ponds, streets etc. complete by November, 2008.
- 7.8 Public Hearing and other presentations Jan., 2009.
- 7.9 TMAPC Presentation March, 2009.
- 7.10 Council Hearing April 2009.

8. Budgets

- 8.1 The PDA wishes to be fully involved in budgetary matters, particularly as the latter relates to streetscaping installation and design elements; in order to prioritize design elements and to lobby for funding.

