

## **Barnum Park East**

### **1. Background and General Goals of the Project**

Barnum Park East is a heavily used park owned and maintained by the Denver Parks and Recreation Department. The park is located at the southeast corner of Federal Boulevard and 6<sup>th</sup> Ave. The park provides multiple athletic facilities including an adult sized baseball field and a youth sized baseball field. In addition, other field sports such as soccer and football are played in the outfields of both baseball fields. Other existing park amenities include a parking lot with 168 parking spaces, a plumbed restroom facility, a plaza area, free standing bleacher seating for the adult baseball field, built-in bleacher seating for the youth baseball field, sports lighting for both fields, pedestrian and parking lot lighting, extensive mature landscaping throughout the park, a sand play area, and an irrigation system among other improvements.

Portions of Barnum Park East, (in particular the eastern half of the park) will be significantly impacted by the Project improvements to 6<sup>th</sup> Ave. The City's intent is to redesign portions of the park to maintain a similar type and level of use on the site that exists today. As this will require significant reconstruction of large portions of the park, the City recognizes an opportunity to upgrade certain systems in the park to bring those to current park standards as well.

As shown on the Basic Configuration, the City intends to preserve the existing adult baseball field and western parking lot, with some minor modifications. The eastern portion of the park will require significant re-design and re-construction in order to provide the required functionality. The City intends to replace the youth baseball field with a synthetic turf multi-use sports field. The parking on the eastern portion of the site will need to be redesigned, and the City intends for the re-constructed park to maintain the current number of parking spaces (168). The City also plans to add a play area to provide more opportunities for families with young children. The intent is to remove the existing restroom building and replace it with a new plumbed restroom that meets the standards for Denver Parks restroom facilities (included in Book 3 – Standards). Also, the irrigation system for the entire park will be replaced with a new system that meets the current Denver Parks standards.

In addition, other Denver Park properties will be impacted by the project. These include Barnum Park North and South, Frog Hollow Park, portions of the South Platte River Trail, and some other properties. All work within Denver Park properties must adhere to the requirements of Section 17 Appendix A.

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**2. Recreational Park Design Manager Qualifications**

As a consequence of the Park’s size, scope, and the overall importance, CDOT has established minimum designer manager qualification requirements to ensure that the Contractor has the requisite experience, skill, and ability to perform the work.

The Recreational Park Design Manager for the Barnum Park East design shall be a licensed landscape architect in the state of Colorado with a minimum of 5 years of experience in landscape architecture. Other design consultants shall be licensed in fields appropriate to their scope of work.

For purposes of satisfying these qualification requirements, an “Athletic Field Facility” must include, but is not necessarily limited to, the following elements: (1) new sports field consisting of either irrigated bluegrass turf or synthetic turf, designed for use for club level, high school or higher level of play; (2) paved parking area; (3) paved areas for pedestrian circulation. In addition, a “Synthetic Turf Field” must include, but is not necessarily limited to, the following elements: (1) an athletic field constructed of synthetic turf with rubber and/or sand infill; (2) installation and fine grading of aggregate base course and subsurface drainage system, and (3) concrete edging. At a minimum, each proposer submitting a proposal for this contract must meet the following requirements:

Prior to commencing the work on the Project, the Contractor must provide information sufficient to demonstrate that:

- On or before the time of such submission, the landscape architect has prepared 100% construction documents for a minimum of five (5) constructed Athletic Field Facilities as the project’s prime designer in the past five (5) years. Each Athletic Field Facility project must have had a verifiable construction value of at least \$500,000.
- On or before the time of such submission, the landscape architect has prepared 100% construction documents for a minimum of three (3) constructed Synthetic Turf Fields as the project’s prime designer in the past five (5) years. Each Synthetic Turf Field shall have a minimum size of 30,000 square feet.
- On or before the time of such submission, the landscape architect has experience working with the City and County of Denver Parks and Recreation Department.
- On or before the time of such submission, the landscape architect has prepared 100% construction documents for ten (10) projects working as the prime consultant and managing a design team of at least five (5) subconsultants.
- The landscape architect (Recreational Park Design Manager) will be in direct charge of the design work for Barnum Park East and all work on

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portions of the project located on Denver Parks property, and will be the primary point of contact for design related issues. The landscape architect shall be a Key Employee of the Contractor and the Contractor shall not change this Key Personnel at any time during the specified period of performance without the written permission of CDOT. The Contractor is required to submit documentation of the landscape architect's qualifications.

In addition, and prior to commencing Work, the Contractor must submit a minimum of 5 references from clients for these listed projects. (3 for Athletic Field Facilities, and 2 for Synthetic Turf Field projects). Whether or not the landscape architect meets or exceeds the minimum requirements will be at the sole discretion of CDOT in coordination with Denver Parks and Recreation.

**3. Recreational Park Construction Manager Qualifications**

As a consequence of the Park's size, scope, and the overall importance, the City has established minimum contractor qualification requirements to ensure that the Contractor for this contract has the requisite experience, skill, and ability to perform the work.

See previous sections for definition of "Athletic Field Facility" and "Synthetic Turf Field".

1. The Contractor must provide information sufficient to demonstrate that:

- On or before the time of such submission, the Recreational Park Construction Manager (Site Superintendent) or any subcontractors performing more than 20% of the work in the park has successfully completed (notice of substantial completion or beneficial occupancy issued) construction of a minimum of five (5) Athletic Field Facilities as the project's prime contractor in the past five (5) years. Each Athletic Field Facility project must have had a verifiable construction value of at least \$500,000.
- On or before the time of such submission, Recreational Park Construction Manager or any subcontractors performing more than 20% of the work in the park has successfully completed (notice of substantial completion or beneficial occupancy issued) construction of a minimum of three (3) Synthetic Turf Fields as the project's prime contractor in the past five (5) years. Each Synthetic Turf Field shall have a minimum size 30,000 square feet.
- On or before the time of such submission, the Recreational Park Construction Manager or any subcontractors performing more than 20% of the work in the park has experience working with the City and County of Denver Parks and Recreation Department.

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- Has one of the following certifications: Irrigation Association (IA) Certified Irrigation Contractor (CIC) or a Certified Landscape Irrigation Auditor (CLIA), or a Professional Landcare Network (PLANET) Landscape Industry Certified Manager (formerly known as the CLP) or a Planet, Certified Industry Technician (formerly known as a CLT).
- The Recreational Park Construction Manager shall be a Key Personnel of the Contractor and the Contractor shall not change this Key Personnel at any time during the specified period of performance without the written permission of CDOT. Proposers are required to submit documentation of the Recreational Park Construction Manager's qualifications.

In addition, the Contractor must submit a minimum of 5 references from clients for these projects. (3 for Athletic Field Facilities, and 2 for Synthetic Turf Field projects). Whether or not the Contractor meets or exceeds the minimum requirements will be at the sole discretion of CDOT in coordination with Denver Parks and Recreation.

#### **4. Design Process**

To ensure that the City has sufficient opportunity to review all aspects of the park re-design, and to eliminate inefficiencies in the design process, the design team will be required to keep Denver Parks well informed of the design progress through regular design meetings. In addition, the design team will be required to submit design drawings for review at several stages of design. These submittals shall include design progress drawings and specifications for all aspects of the design. The following design review submittals are required:

- A. Design Development (30% Construction Documents)*– this submittal shall include preliminary plans depicting the general layout of all site elements with critical dimensions, preliminary grading and drainage information including spot elevations and 1' contours, preliminary utility plans showing points of connection and general utility alignment, irrigation plans showing points of connection and mainline layout, landscape plans showing preliminary tree, shrub and ground cover layout and potential plant species, elevations of any walls or other structures, and preliminary details. This submittal shall also include proposed material choices for the site work (paving types, wall finishes, site furnishings, etc).

The intent of this submittal is to provide Denver Parks with an understanding of the proposed site design, the location of, and relationship between various site elements, and to provide sufficiently detailed information to demonstrate that the design can be constructed as

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shown. In addition, this submittal gives Denver Parks an opportunity to provide direction on design themes, material selections, color choices, etc.

- B. 60% Construction Documents* – this submittal shall include more detailed plans including demolition plans, erosion control plans, layout plans, materials plans, grading and drainage plans, landscape plans, lighting plans, utility plans, irrigation plans, restroom building plans, construction details, and an outline of any specifications that may be required for materials that are not included in the appendix for section 17.

The purpose of this submittal is to provide Denver Parks with an opportunity to review more refined and developed site plans. This submittal should provide a level of detail on all aspects of the design so that Denver Parks can review all site elements, park systems, and critical park functions. The plans should include detailed information showing aesthetic design of any pavements, walls, or other park structures.

- C. 95% Construction Documents* – this submittal represents a nearly complete set of construction documents. This submittal shall include erosion control plans, demolition plans, layout plans, materials plans, grading and drainage plans, landscape plans, lighting plans, utility plans, irrigation plans, restroom building plans, any required enlargement plan areas, scoring plans for concrete areas, construction details, and specifications.

The intent of this submittal is to provide Denver Parks with a nearly complete set of construction documents for review. This set will include detailed plans, details, and specifications of all site elements and systems.

- D. 100% Construction Documents* – Final drawings and specifications.

All drawing submittals shall be formatted on 22"x34" sheets utilizing Denver Park's standard title block. The scale for overall site plans shall be 1"=40' unless otherwise noted. Detailed area plans should be developed at a larger scale as required to provide the appropriate level of detail.

## **5. Design and Construction Requirements**

All aspects of the site design and construction shall meet the requirements for all applicable design standards and guidelines including:

- A. The specifications included Section 17 Landscaping (Appendix A – Barnum Park East)

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- B. The Planning Design and Construction Standards for Denver Parks and Recreation (PDCS) included in Book 3 - Standards
- C. The most recent edition of the Americans with Disabilities Act (ADA) Design Guidelines

**6. Barnum Park East Site Design Elements and Project Requirements**

**A. Vehicular Circulation/Access**

Vehicular access to Barnum Park East will be altered due to the roadway work occurring along Federal Blvd. and 5<sup>th</sup> Ave as part of the project. The western access drive to the parking lot (from Federal Blvd.) will be removed. Therefore all vehicular access to the site will be from 5<sup>th</sup> Ave. The parking lot must be designed to meet the Denver Fire Department access criteria. In addition, the site design shall not include dead-end parking lots.

The design should include at a minimum the same number of parking spaces currently available on the site (168 spaces). The minimum size for parking spaces shall be 9' wide x 18' long, except accessible parking spaces which shall meet the requirements of the ADA Design Guidelines. As shown on the Basic Configuration, the intent is to protect the western parking lot in place. To achieve the required number of parking spaces, the existing parking lot may be re-stripped to provide additional parking spaces.

The site design shall include a drop-off at least 95' long. The drop-off area shall be sited to provide convenient access to the main plaza area.

Parking lot surfacing shall be asphalt paving except in areas where the existing parking lot is renovated where concrete pavement shall be utilized to match the existing pavement.

Maximum slopes for parking areas or drop-off areas shall be 5%, except accessible parking spaces or drop-off areas which shall meet the requirements of the ADA design guidelines. Maximum slopes for driveways shall be 10%.

**B. Maintenance Access**

The site design includes a maintenance access road. The intent is for the maintenance road to be accessed from Federal Blvd. the road continues east along the north edge of the site, then turns south along the east edge of the multi use field and accesses the driveway to the site. The maintenance access road will include fencing and gates to control access

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to the road. The maintenance road must be 14' wide as shown on the basic configuration plans.

The site design must provide routes for maintenance vehicles to access various portions of the site. In general, maintenance vehicles will include pick-up trucks, larger trucks to empty dumpsters, mowing equipment, and field grooming equipment. Access routes shall be designed so that they will not be blocked by parked cars in the parking lots.

Access routes for pick-up trucks must be provided throughout the site including access to each sport field, to the restroom building, to all parking lot and pedestrian light standards, to all trash receptacles, and to the play area.

These access routes shall be a minimum of 8' wide, and shall be paved with concrete per the specifications included in Book 2 – Section 17 – Landscaping (Appendix A – Barnum Park East), or with another approved material. The access routes must allow acceptable turning radii for the pick-up trucks to adequately maneuver the site.

Access for mowers shall be a minimum of 8' wide. All bluegrass and dryland seed areas shall be a minimum of 8' wide, and have an access route to the area that is a minimum of 8' wide.

Three trash dumpsters will be placed on the site adjacent to the parking lot. The Contractor shall coordinate with Denver Parks maintenance staff for the location of the dumpsters. Dumpster enclosures shall be provided per the Planning, Design, and Construction Standards (PDCS). The locations shall allow ease of access for garbage trucks to empty the bins.

**C. Pedestrian Circulation/Access**

Pedestrian access shall provide safe and efficient routes to all points ingress and egress on the site, and to all park and recreation amenities on the site including the fields, spectator areas, restroom building, and play area. Pedestrian access should be included to the sidewalk along Federal Blvd. The site design shall also include a sidewalk along 5<sup>th</sup> Ave. extending from Federal Blvd to at least the eastern most driveway entrance to Barnum Park East.

All sidewalks and pedestrian routes within the park shall be a minimum of 8' wide. Walks may be wider where appropriate. Sidewalks and walkways shall be paved with concrete per the Contract Documents.

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In an effort to reduce maintenance, the City would like to eliminate stairs from the design wherever possible. At the same time the City understands that there is significant grade change between the east and west portions of the site and there is a need to provide direct access from the eastern portion of the site to the western portion. To provide the access, the plans include a single stairway between the two areas as shown on the Basic Configuration.

**D. Design Palette**

A palette of design materials, colors, textures, etc. will need to be developed for the various design elements on the site. Among other things, these design elements will include the plaza area, other pavements, retaining walls, seat walls, and the restroom building. It is critical that each of these elements work together to create a cohesive aesthetic expression for the site. The aesthetic design of these elements will also need to consider other elements such as the existing pavements that will remain on the site, and the wall that is proposed as part of the 6<sup>th</sup> Ave. ramp located along the north side of the park.

All materials and color selections shall be reviewed and approved by the Denver Parks Representative.

**E. Plaza Area**

The Basic Configuration includes a plaza area behind the adult baseball field backstop providing connections to the restroom building, the play area, and along the south side of the ball field to provide a connection to the sidewalk along Federal Blvd. This area serves as the central gathering area in the park and should be designed to accommodate large groups of people and spectators.

Due to its relative importance to the function and character of the park, the City plans for the plaza to be constructed with a material that includes an aesthetic quality. The material must withstand loading similar to 6" thick concrete pavement.

In addition, as the plaza will provide spectator viewing areas for the adult baseball field, areas for people to gather, and areas for parents to watch their children at the play area, shade will be an important component of the plaza design. This could be accomplished through various design elements including shade trees, shelters over spectator seating, tables with umbrellas, etc. Again, the intent is to provide shade in a manner that improves the aesthetic quality of the plaza area.

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**F. Adult Baseball Field**

As previously mentioned, the intent is to preserve the adult baseball field in place. Preserved items would include the turfgrass outfield, the dugouts, the backstop, the maintenance and pedestrian access gates, the skinned infield, the **foul line**, fencing to the extent possible, and the sport lighting to the extent possible.

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The outfield fencing and sport lighting will likely have to be removed due to the planned reconstruction of Federal Blvd. The sport lighting shall be salvaged and re-set. Any fencing that is removed shall be disposed of and new fencing meeting the specifications included in Book 2 – Section 17 Landscaping (Appendix A – Barnum Park East) shall be provided. In addition, a “safety tube” meeting the specifications shall be installed on all outfield fencing, existing or new. The scoreboard shall be removed and disposed of.

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The adult baseball field shall have the following minimum sizes:

1. From right foul line to west outfield fence: ~~345'~~
2. From left foul line to east outfield fence: ~~350'~~

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The field size shall be kept as large as possible.

If additional soil is required to be imported for the skinned infield for any reason, the material shall meet the specifications included in Book 2 – Section 17 Landscaping (Appendix A – Barnum Park East).

The press box building located behind the backstop shall be removed in its entirety including foundations. Denver Parks no longer has a need for press boxes at this facility.

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The existing spectator bleachers shall be salvaged and re-installed along the backstop in the plaza area.

**G. Multi-use Field**

The multi-use field shall be a synthetic turf field meeting the specifications listed in section 02850. The field shall accommodate a play field with a minimum size of 50 yards x 85 yards, as well as a 10 yard safety zone surrounding the entire play field. Colored striping shall be integral to the synthetic turf and shall include the colors and dimensions shown on the conceptual plans.

Fencing and netting (as shown on the Basic Configuration) should be installed as necessary to prevent balls from leaving the field area at locations near hazards or downhill slopes where errant balls would be difficult and dangerous to retrieve.

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H. Fencing

Fencing shall meet the requirements of the specifications included in Section 17 – Appendix A Denver Parks Properties. The following fencing is included in the project:

1. 20' high outfield fencing along the north, northwest, and west portions of the adult baseball outfield
2. 4' high fencing along the south side of the multi-use field
3. 8' high fencing along the south side of the maintenance access
4. 16' high fencing, 70' wide centered on the goal on the east side of the multi-use field
5. 8' high fencing along the rest of the east side of the multi use field
6. Three maintenance gates along the access route at the locations shown on the plan.
7. Two pedestrian gates on the south side of the multi-use field.

I. Spectator viewing

Spectator viewing will be required for both fields. As previously mentioned, the adult baseball field will have bleachers installed behind the backstop. The multi-use field will not be required to have bleachers, however spectator viewing should still be considered as part of the design. Spectators may sit around the edges of the field.

Shade will be an important consideration for spectators for both fields. While trees cannot be planted in the synthetic turf field, the areas surrounding the fields could provide shade trees or shelters to provide some relief for spectators. Any areas that are designed for spectator use around the synthetic turf field should be planted with bluegrass sod or should be paved.

J. Play Area

The site design shall include a play area. The City's intent is for the play area to include non-traditional play features that will be appropriate for both 2-5 year olds and 5-12 year olds. The play equipment shall include elements that are climbable, durable, low maintenance materials appropriate for use in public play areas. Post and deck play structures will not be allowed. The play surfacing shall consist of poured in place rubberized surfacing. The play area shall be a minimum of 950 square feet of play area.

The play area shall be sited to allow viewing of either the existing adult baseball field or the new multi-use field. The site design shall include

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seating areas for parents and/or guardians to watch children on the play area.

The design theme, play equipment, materials, etc. shall be reviewed and approved by the Denver Parks Representative.

**K. Restroom/Storage Building**

Both of the existing press box buildings, and the existing restroom building shall be demolished and removed from the site. A new restroom building meeting the requirements shown on the Basic Configuration and Book 2 – Section 17 Landscaping (Appendix A – Barnum Park East) shall be installed on site. The restroom shall include a 10' wide utility chase that will also be used as storage by Parks and Recreation staff.

The building shall be sited to provide convenient access to both fields, the play area, and the plaza area. The siting shall also allow sufficient room for doors to open without intruding on the main pedestrian route near the restroom building.

The site will require two separate water taps – one for potable uses such as the restroom building and drinking fountains, and another for the irrigation system.

**L. Site Lighting**

Lighting shall be provided for the sports fields, parking lots, and pedestrian walkways.

The intent is to protect in place as many light standards as possible for the adult size baseball field. Any light standards that have to be moved due to construction should be salvaged and re-installed. If any sports lighting equipment needs to be replaced as part of the Work, replacement equipment must be supplied by the same sports lighting manufacturer as the existing equipment, and must be of equal or better quality than the existing equipment.

The light standards for the youth baseball field shall be salvaged and reinstalled for the multi-use field. The contractor shall develop a photometric plan for the multi-use field. The field shall receive a horizontal average of 30 foot candles. The designer shall determine if any modifications to the existing lights are required to obtain that level of light on the field.

The parking lot and pedestrian walkway on the site shall also be lighted. These areas will utilize light standards installed by XCEL Energy through

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an agreement with the City of Denver. The contractor is responsible for costs associated with XCEL Energy installing the lights. The contractor shall coordinate with XCEL Energy throughout the design and construction process. The design shall utilize fixtures listed in the PDCS that provide a full cut-off light distribution. Parking lot and pedestrian areas shall have a horizontal average of 1 foot candle, and a minimum of 0.2 foot candles. The lighting plans shall show the type and locations of the light standards on the site. The contractor shall layout these locations in the field and coordinate with XCEL Energy for the light installation.

**M. Site Grading and Drainage**

Due to the grade change from the west to east edges of the site, and due to the large relatively flat areas required for the sports fields, some relatively steep slopes will likely be required on some portions of the site. As a general rule, slopes of dryland seed areas shall not exceed 4:1. However, Denver Parks will consider designs with slopes steeper than 4:1 if they provide benefits such as eliminating or reducing heights of retaining walls. Slopes of dryland seed areas shall not exceed 3:1 in any areas.

Maximum slopes for various surfaces include:

- Bluegrass turf – 4:1
- Dryland seed – 3:1 (4:1 preferred)
- Shrub beds – 4:1
- Paved areas – Per ADA Design Guidelines
- Synthetic turf fields – 1.5%

Slopes of landscape areas shall be a minimum 2% slope. Slopes for synthetic turf fields shall range from 1% to 1.5%.

The site shall be graded so that no drainage shall flow onto sports fields, whether they be natural turf or synthetic turf. Drainage elements such as drain pans can be utilized to prevent drainage onto the sports fields.

The site shall be designed to prevent concentrated drainage from landscape areas draining onto paved areas.

Slopes for paved areas shall meet all requirements of the ADA Design Guidelines.

**N. Walls and Other Vertical Structures**

The site design may include vertical structures such as retaining walls, seat walls, entry features, etc. These elements can have a strong impact on the aesthetic quality and character of the site. Therefore, all walls included in the site design and construction shall include some type of

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architectural treatment. This treatment could include material selection such as stone, brick, or other veneers, colored concrete, formliners, wall caps, etc. The final wall treatment must be designed so that graffiti can be easily removed.

The concept plans for the 6<sup>th</sup> Ave. ramp include a retaining wall along most of the north side of Barnum Park East. This will have a significant visual presence on the park site.

Therefore it may be appropriate to visually link any new walls with the wall along 6<sup>th</sup> Ave. by utilizing a similar design vocabulary. This could include utilizing similar materials, similar colors, and/or similar architectural treatments such as wall caps or formliners, etc.

Heights of retaining wall should be kept to a maximum height of 9'. Where tall walls are required, terraced walls should be utilized to reduce the individual wall height as shown on the concept plans. This also provides opportunities to provide landscape screens to soften the appearance of the walls.

Grffiti has been an issue in Barnum Park in the past. Vertical elements in the park should be coated with a graffiti treatment approved by the Denver Parks Representative.

O. Landscaping

1. Seed and Sod

In general, bluegrass sod shall be installed only on areas that will be utilized for sports fields or for areas that are expected to receive substantial pedestrian traffic such as spectator viewing areas. All other landscape areas on the site shall either be planted with dryland seed or with shrub and perennial beds.

Some landscape areas on the site may require conversion from bluegrass to dryland grasses. This shall be accomplished by stripping the bluegrass sod and re-seeding the area with dryland seed.

Concrete mowstrips with a minimum width of 1' shall be installed on site to ease maintenance. Mowstrips shall be installed centered along all fencing, at all locations where seed or sod areas are directly adjacent to walls or other vertical elements, and to delineate all planting beds.

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2. Trees and Shrubs

The City realizes that many existing trees will have to be removed from the site due to the park construction. At the same time, the City would like to preserve as many healthy existing trees as possible on the site. Trees that will be preserved shall be protected in place per the specifications included in Book 2 – Section 17 Landscaping (Appendix A – Barnum Park East).

The landscape plans shall include trees, shrubs, and perennials, with the following minimum sizes:

- a. Deciduous trees: 2.5" cal.
- b. Evergreen trees: 8' ht.
- c. Shrubs: #5
- d. Perennials: #1

Plant selections shall be made based on existing site features such as soils, topography, and available space. All plants shall be drawn on the landscape plan shown at 80% of their expected mature size.

General goals of the landscape design include: specifying low maintenance and low water use species, screening the park from traffic along 6<sup>th</sup> Ave, Federal Blvd., and 5<sup>th</sup> Ave, screen the wall along the north side of the park as much as possible, improving the general aesthetics of the site, and providing shade for park users at locations such as spectator areas, plazas, the play area, and the parking lot.

The plan shall include sufficient plant material to meet the goals stated above. The minimum number of trees will be 210, as included in the Basic Configuration.

P. Site Furnishings

Site furnishings shall meet the Denver Parks standard for site furnishings. Site furniture could include picnic tables, benches, trash receptacles, bike racks, or other furnishings.

The site design will include one drinking fountain located at the restroom building.

Q. Restoration of Areas to Remain

Some portions of the existing site improvements are planned to remain in place. This includes the western parking lot, surrounding curb and gutter, and the adult baseball field. Portions of these items are currently in poor condition due to cracking and heaving of the concrete. The design should provide for the restoration of damaged portions of the park amenities to

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remain. For pavements and curb and gutter, this should include sawcutting and removing whole stones of concrete at the nearest joint, and replacing those damaged areas with a color and finish of pavement to match the adjacent work to remain.

**R. Irrigation System**

The contractor shall provide complete irrigation design services for a fully automatic irrigation system including all irrigation planning, design and construction documentation services as set forth and specified below. The irrigation designer shall be a Certified Irrigation Designer with 10 years experience, and shall have completed 5 projects with Denver Parks.

**1. Irrigation System Planning:**

- A. Water pressure verification: The contractor shall coordinate and arrange for Denver Water Board personnel to place a data logger at the closest fire hydrant to the proposed point of connection for the renovated irrigation system to record static water pressure fluctuations in the existing municipal water main over a minimum period of seventy two hours.

The data logger read out shall be formatted as required and included in the irrigation renovation construction drawing / document package.

- B. Water budget preparation: The contractor shall calculate the square footage for each of the Denver Water Board water budgeting plant type classifications identified on the Denver Water Board water budget form and included in the landscape design. Using the area calculations above, the contractor shall prepare an annual water budget using the Denver Water Board water budgeting format showing both gallons and cubic feet of water required during the entire irrigation season. Water volumes shall be based on the historical evapotranspiration rates as calculated by Denver Water at Weather Region No.50 at the Denver Water Administration Building.

The water budget shall be formatted as required and included in the irrigation renovation construction drawing / document package.

- C. Tap sizing calculation: The contractor shall calculate the maximum potential irrigation system gallon per minute demand as required to apply the historical July evapotranspiration precipitation rate across

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the entire square footage of each of the Denver Water Board water budgeting plant type classifications identified in the Denver Water Board water budget form and included in the landscape design. The cumulative total “worst case” gallon per minute demand shall be identified.

The tap sizing calculation table shall be formatted as required and included in the irrigation renovation construction drawing / document package.

- D. Friction loss analysis: The contractor shall prepare a friction loss calculation showing the total cumulative friction loss from the point of connection at the municipal water main through the water meter, the back flow assembly, the entire irrigation main line and secondary piping network (including all valves and fittings) to the last large area gear drive head on the zone located the maximum distance from the irrigation system point of connection. The friction loss analysis shall additionally calculate the net effect of cumulative head caused by elevation changes across the site.

The friction loss analysis shall identify the water pressure boost required at the point of connection assuming a minimum dynamic water pressure requirement of seventy five P.S.I. at the last large area gear drive head on the zone located the maximum distance from the point of connection.

The friction loss analysis shall be formatted as required and included in the irrigation renovation construction drawing / document package.

- E. Hydrozone and densogram preparation: The contractor shall prepare a hydrozone map of the entire site showing areas with different precipitation requirements including at a minimum areas of bluegrass sod, native seed and shrub and tree beds. The contractor shall prepare a densogram diagram for the entire irrigated area of the site using the Center for Irrigation Technology, (C.I.T.), Sprinkler Profile and Coverage Evaluation (SPACE) software or available equal.

2. Irrigation System Design

- A. Irrigation layout plans: The contractor shall prepare irrigation layout plans using Auto Cad release 2012 compatible design software in 22” by 34” format at a scale of 1” = 30’. Each sheet shall include a

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title block; a scale and north arrow and all sheets shall be oriented with north in the same direction. Each sheet shall include match lines indicating the number reference of all adjacent sheets. A reduced size sheet key shall be included on each of the irrigation layout sheets with the current sheet identified by shading.

Irrigation mainline piping, irrigation wire runs and irrigation secondary piping shall be represented by different line types. Mainline pipe shall be dashed, secondary pipe shall be continuous, and wire runs shall be represented by the letters (VCW) with an alternating dashed symbol pattern. Mainline pipe shall be represented by a heavier line weight. All irrigation line work shall be represented at 100% screening.

All other non-irrigation related line work (such as contours, pavement, fencing or plant material) shall be screened back to a gray scale between 35% and 40% screening.

Existing trees to remain shall be redrawn on the irrigation base map to indicate the physical limit of the drip line representing the extent of the critical root zone which is to be protected in conformance with all Denver Forestry standards and specifications which are made part of these requirements by reference.

The contractor shall prepare an irrigation equipment symbol legend showing the graphic symbol used for each irrigation component indicated on plan. A description of each component symbol shall be included in the legend indicating the manufacturer and model number of the irrigation component. A detail reference for the Denver Parks standard installation detail specific to each irrigation component shall be included in the symbol description. See the attached sample irrigation equipment symbol legend for the graphic representation of all irrigation components to be used on the irrigation system design drawings.

The contractor shall prepare an irrigation equipment schedule in tabular form showing each zone / electric control valve number, the electric control valve manufacturer, model and size, the sprinkler head manufacturer, model number and nozzle specification, the gallons per minute for the entire zone and the operating pressure required at the head.

- B. Packaged booster pump: The contractor shall specify and detail the installation of a packaged booster pump as manufactured by

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Rain Bird Corporation in conformance with all Denver Parks requirements. The packaged booster pump shall be sized as required to provide a dynamic / working pressure of 75 P.S.I. at the last large area gear drive head on the zone located the maximum distance from the irrigation system point of connection while flowing the maximum required G.P.M. based on the July evapotranspiration tap sizing calculation.

Booster pump detailing shall be developed at a scale of  $\frac{1}{4}'' = 1' = 0''$  and be drawn to scale in both plan and section showing the location of the backflow assembly, all drains, isolation and quick coupler valves and the location of the master valve and flow sensor relative to the booster pump and the water supply point of connection.

- C. Electrical: The contractor shall provide all electrical engineering and local utility provider coordination required for a 120v 20a dedicated electrical service for the new irrigation controller the installation of a dedicated three phase booster pump and electrical service sized as required to energize the booster pump,.
- D. New irrigation water tap: The contractor shall provide all design services necessary for the approval and construction of a new irrigation only water tap including, but not limited to, the preparation of a complete water plan submittal package stamped by a civil engineer, the payment of all fees, and the acquisition of all necessary permits. Water plan submittal shall be in conformance with all Denver Water Board construction, design, and graphic standards and specifications and shall be submitted, reviewed and revised at the direction of Denver Water. The tap shall be sized as required to supply the maximum gallon per minute irrigation system demand identified in the tap sizing calculation above within the recognized safe flow velocity of 5.5 feet per second. Additionally the water plan submittal shall show all required improvements necessary to abandon the existing irrigation water tap.
- E. Asbestos concrete pipe mitigation: The contractor shall provide all planning and design services necessary to coordinate and manage the removal and disposal of any asbestos concrete pipe encountered during construction. Asbestos concrete pipe encountered during construction shall be removed and disposed of by a licensed abatement contractor in conformance with all Denver Health and all Colorado Department of Public Health and Environment requirements and according to all other requirements of the Contract.

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- F. Existing irrigation equipment salvage: The contractor shall provide all design services necessary to develop an irrigation equipment salvage plan / schedule identifying all existing irrigation equipment to be salvaged and stipulating where and how the material is to be delivered to Denver Parks Southwest Maintenance District personnel, as well as the documentation process required to confirm the delivery.
- G. Minimum design standards: The contractor shall provide all design services necessary to completely layout and detail a fully operational and self-contained automatic irrigation system in conformance with all Denver Parks standards and specifications made fully part of these requirements by reference, including but not limited to the following:
- i. All gear drive head spacing shall provide a minimum of 5' of coverage beyond head to head in all directions.
  - ii. Zones shall be backed up along all grade breaks with one zone irrigating uphill of the grade break and another zone irrigating downhill of the grade break.
  - iii. Zones shall be backed up along each hydro zone interface between native seed and bluegrass turf with one zone irrigating native areas and another zone irrigating bluegrass turf areas.
  - iv. Pop-up sprays shall be located to trim out any pavement radius larger than 5'.
  - v. Zones shall be designed to water out from uphill to downhill across the athletic fields and the perimeter of the stripped infields shall be trimmed out with small area gear drive heads.
  - vi. New secondary piping shall be installed by directional boring to provide irrigation to existing trees to remain in parking islands and tree grates.
  - vii. Quick couplers shall be located near all improvements that may need to be washed down or hand watered. Examples would include but are not necessarily limited to; picnic areas, bleacher pads, restrooms, synthetic turf fields, play areas,

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other facilities that could be permitted for events and flower beds.

- viii. Isolation valves shall be located along the mainline as required to isolate the mainline into three roughly equal sections.
- ix. Vacuum / air relief valves shall be located at each high point and manual drains shall be located at each low point within each of the three isolated mainline sections.
- x. The irrigation system shall be designed with a system efficiency of: D.U. (distribution uniformity = .80) and S.C. (scheduling coefficient = 1.25).
- xi. All trees in native areas shall have pop-up tree maintenance sprays (two per tree located 5' from trunk) for long term maintenance.
- xii. All shrub beds shall be irrigated with pop-up spray heads.
- xiii. The irrigation mainline line shall be installed in a looped configuration around the perimeter of the site beginning at, and returning to, the point of connection. No main line is to be installed under any synthetic playing surface. No valve boxes are to be located inside the outfield and foul line fencing around the ball fields. Valve boxes are to be located at least 24" from any paved surface.
- xiv. Any mainline piping, secondary piping, valve control wire, flow sensor cable and master valve wire located under any paved surface and located within the drip line of any existing tree to remain is to be installed in sleeving. Piping installed under existing paving to remain and within the drip line of any existing tree to remain is to be installed by directional boring. Any sleeving installed under proposed pavement is to be installed by open trenching with additional compaction requirements.

F. Special project considerations: The irrigation system shall provide the following items:

- i. A sleeved mainline under 5<sup>th</sup> Ave. to service the Denver Park property on the south side of 5<sup>th</sup> Ave.

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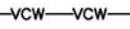
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- ii. Spray irrigation for native seed establishment in the Denver Park Property on the south side of 5<sup>th</sup> Ave (unless ARE's provide for more development of that property and require a more extensive irrigation system.)
- iii. Irrigation coverage for the skinned infield of the baseball field.
- iv. Spray irrigation coverage for all native seed areas.

G. Specification and detailing compliance: All irrigation improvements are to be designed and installed in conformance with Denver Parks standard irrigation specification Section 02810 and in conformance with all Denver Parks standard installation detailing which is made part of these requirements by reference and shall be included in the construction documents for the project.

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SAMPLE IRRIGATION EQUIPMENT SYMBOL LEGEND:	
Symbol:	Description:
	NEW WATER METER
	NEW BACK FLOW ASSEMBLY
	NEW DRAIN VALVE
	NEW ISOLATION VALVE
	NEW BACK QUICK COUPLER VALVE
	NEW MASTER VALVE
	NEW FLOW SENSOR
	NEW VACUUM / AIR RELEASE VALVE
	NEW RAIN SENSOR
	NEW IRRIGATION CONTROLLER
	NEW ELECTRIC ZONE CONTROL VALVE COUNT TO BE AS DESIGNED
	NEW LOW VOLTAGE VALVE CONTROL WIRE
	NEW MAIN LINE PIPE
	NEW SECONDARY PIPE
	NEW LARGE AREA GEAR DRIVE HEAD
	NEW SMALL AREA GEAR DRIVE HEAD
	NEW POP-UP SPRAY HEAD
	NEW PIPE OR WIRE SLEEVING
	NEW NETAFIM DRIPPER LINE FOR SHRUB BEDS

All components are per D.P.R. standard Irrigation Specification Section 02810 and all D.P.R. standard installation detailing

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**7. Barnum Park Pedestrian Bridge**

Barnum Park is comprised of three segments of park that are located on opposite sides of 6<sup>th</sup> Ave and Federal Blvd. These are commonly referred to as Barnum Park North (north of 6<sup>th</sup> Ave., west of Federal Blvd.), Barnum Park South (south of 6<sup>th</sup> Ave., west of Federal Blvd.), and Barnum Park East (south of 6<sup>th</sup> Ave., east of Federal Blvd.). As part of the 6<sup>th</sup> Ave Roadway Improvements project, a new pedestrian bridge will be installed over 6<sup>th</sup> Ave. west of the Federal Blvd. overpass. This bridge will provide 2 critical connections: It will provide direct access for park users between Barnum Park North and Barnum Park South, and it will provide a critical regional trail connection completing a missing piece of the Weir Gulch Trail.

As the bridge will serve as part of a regional trail, the trail approaches to the bridge, the bridge itself, and any new segments of trail developed as part of the project must adhere to the recommendations of the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Planning, Design, and Operation of Bicycle Facilities. A minimum design speed of 18 mph. should be utilized for trail design. Switchbacks or other tight radii curves will not be acceptable. In addition, the design shall adhere to the Americans with Disabilities Act (ADA) Design Guidelines, and the City and County of Denver standards for regional trail design. In addition, the project must provide an ADA accessible route from the parking lot in Barnum Park North to the pedestrian bridge. This will require the modification of some walkways in Barnum Park North. The City and County of Denver would prefer that the trail grades do not exceed 5% to avoid the use of ramps and landings which are not ideal for bicycle traffic.

The trail shall be constructed of 6" thick concrete and shall be 10' wide. Any bridge segments shall have a clear width of 12' from inside of rail to inside of rail. Bridge segments shall have concrete decks. The trail alignment for the approaches must minimize impacts to the park.

The trail connection to the bridge on the south side of 6<sup>th</sup> Ave. (in Barnum Park South) will impact an existing un-fenced dog off-leash park. Fencing will be required as part of the project between the trail and the dog off-leash park to protect both cyclists and dogs. The fencing shall meet Denver Parks standards for dog park fencing.

**8. Barnum Park North**

A paved access route will be required in Barnum Park North to provide maintenance access to the proposed walls along the south side of Barnum Park North. The intent is for access route to connect between the 6<sup>th</sup> Ave. entrance

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ramp and Federal Blvd. The access route paving and geometry shall be designed to accommodate CDOT's maintenance vehicles.

This maintenance access could be designed to be utilized by pedestrians in the park as well. An existing walkway in that portion of the park will be removed as part of the 6<sup>th</sup> Ave. widening, so this maintenance access could help serve to replace that walkway.

**9. South Platte River Trail**

Portions of the South Platte River Trail may be disturbed as part of the project. Any new segments of trail developed as part of the project must adhere to the recommendations of the AASHTO Guide for the Planning, Design, and Operation of Bicycle Facilities. A minimum design speed of 18 mph. should be utilized for trail design. In addition, the design shall adhere to the ADA Design Guidelines, and the City and County of Denver standards for regional trail design. This includes a 12' wide, 6" thick concrete trail, an adjacent 4' wide crusher fines trail on one side, and 3' wide grass shoulder safety zones on both sides of the trail. In addition, the trail will need to be placed above the 10 year flood level.