

# PARK & POOL STUDY



PREPARED FOR  
**CITY OF FAIRBURY**  
—  
**FAIRBURY, NEBRASKA**



COORDINATING PROFESSIONAL

**MAY 5<sup>TH</sup> 2016**

**OA PROJECT No. 015-2112**

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## **PURPOSE AND SCOPE**

The City of Fairbury requested an evaluation of the existing Community Parks System and Municipal Swimming Pool. This report, prepared by Olsson Associates and BVH Architects, will provide future direction to the City for Master Planning of the Community Park System and in evaluating the existing Fairbury Municipal Swimming Pool. The report is divided into two parts:

- Part I : Park Inventory and Assessment
- Part II : Fairbury Municipal Swimming Pool Assessment and Evaluation

The report will consist of:

- An assessment of the existing facilities related to physical condition, current codes, and design trends.
- A cost analysis and conceptual design to remodel existing recreational and swimming pool facilities.
- Conceptual designs for replacing the Fairbury Municipal Swimming Pool (Part II only)
- A cost analysis for replacing the Fairbury Municipal Swimming Pool (Part II only)

## **Part I: Recreation Facilities Evaluation**

### **Historical Background**

Historically, there are three main influences that can be utilized by the City of Fairbury in developing its recreation opportunities in the region:

- Little Blue River
- Pony Express/Oregon Trail
- Railroad Industry

Located on the banks of the **Little Blue River**, close to where the Oregon Trail begins to parallel the river on its way to the Platte River and other major routes westward, Fairbury has a rich history of pioneering spirit that presents unique opportunities to combine recreation with history. These recreation opportunities occur in an area that offers many natural areas along the river valley that enhance opportunities to combine the natural beauty of the Little Blue River valley with recreation.

Following drainage ways northwest from St. Louis, **Pony Express** riders followed the river to where the Pony Express Route intersected the southern branch of the Oregon Trail at Rock Creek Station, which was an important road ranch on the trek westward. With Fairbury's proximity to the historic **Oregon Trail** and the **Little Blue River**, there is a natural connection between City and recreation activities that involve natural history and the pioneer/explorer history of the region. The presence of the railroad has impacted Fairbury since 1872 and will continue to do so into the foreseeable future.

As the state continued to develop, the same routes followed by pony express riders and pioneers, became the route for a series of railroad companies. With the prospect of the railroads, entrepreneurs like James B. Mattingly, a frontiersman and freighter, and Woodford G. McDowell, came together to donate land to establish the town of Fairbury. With Fairbury becoming the Jefferson County seat in 1871, Fairbury became a natural rest area for settlers traveling west on this major route to the Pacific Ocean.

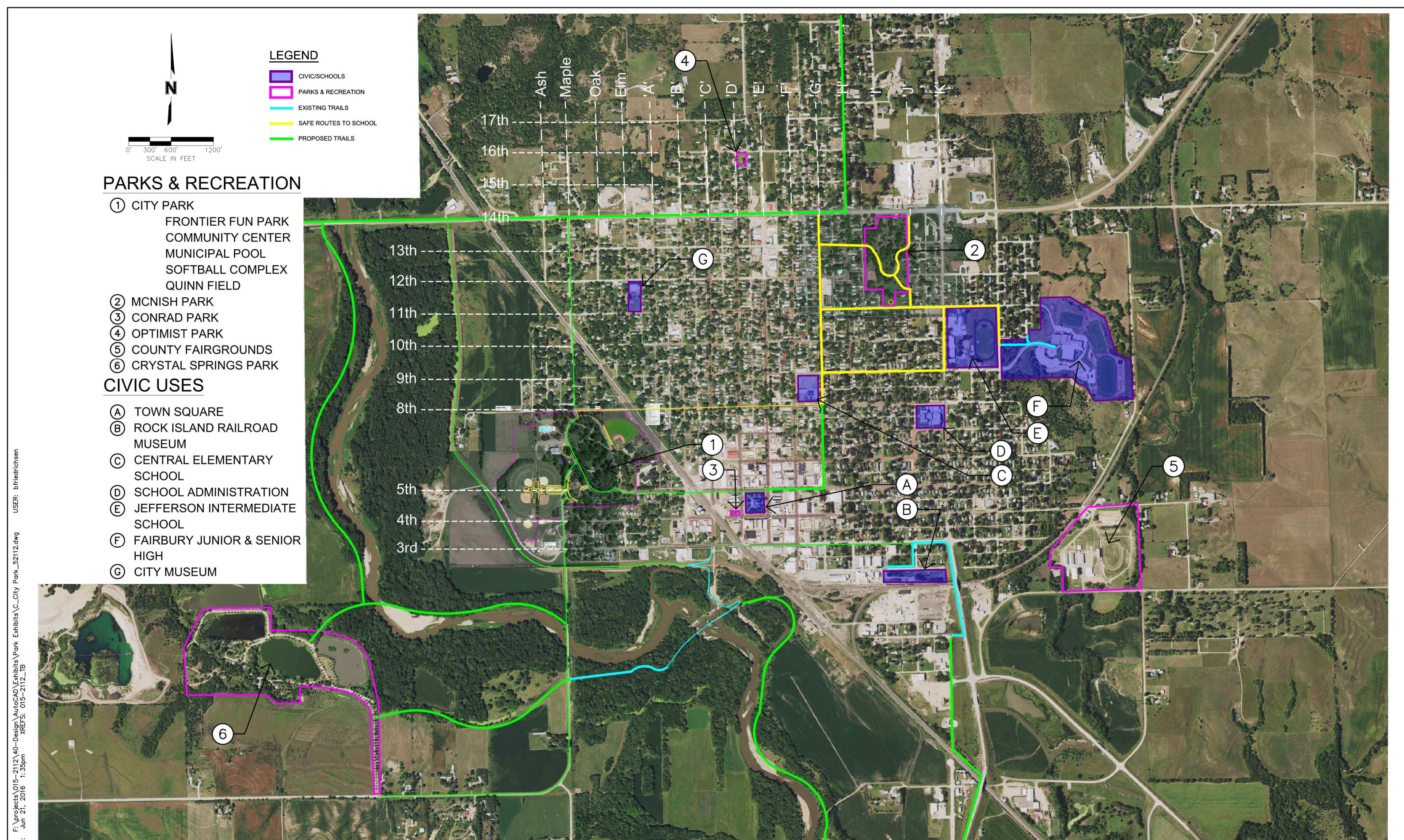
As the county seat along the trail westward, Fairbury has hosted regional recreation attractions such as **Campbell Brothers Circus**, once the second largest circus in the world, which started using Fairbury as their winter headquarters in 1885. Fairbury has hosted the **County Fair** since 1874. The **Shriner's Flea Market** at City Park is a major Fourth of July attraction that has been held since 1970.

## **Future Potential**

Reviewing the Comparison of Recreation Facilities to National Standards (Figure 1), Fairbury has over 220 acres of park ground. With Fairbury's population maintaining a constant level over the last few decades (Figures 2 and 3), the recreational need of the City is not for more parks. There are always opportunities to add variety to the available recreation opportunities.

Fairbury is unique in its park structure. Typically, park experts like to see a variety of sizes of parks distributed throughout a city area. With three large park areas, Fairbury provides several recreational opportunity in close proximity. Consolidating facilities into three main areas helps reduce maintenance costs. Other recommended improvements that could be added to the Fairbury parks system would be a skate park, dog run, and basketball courts.

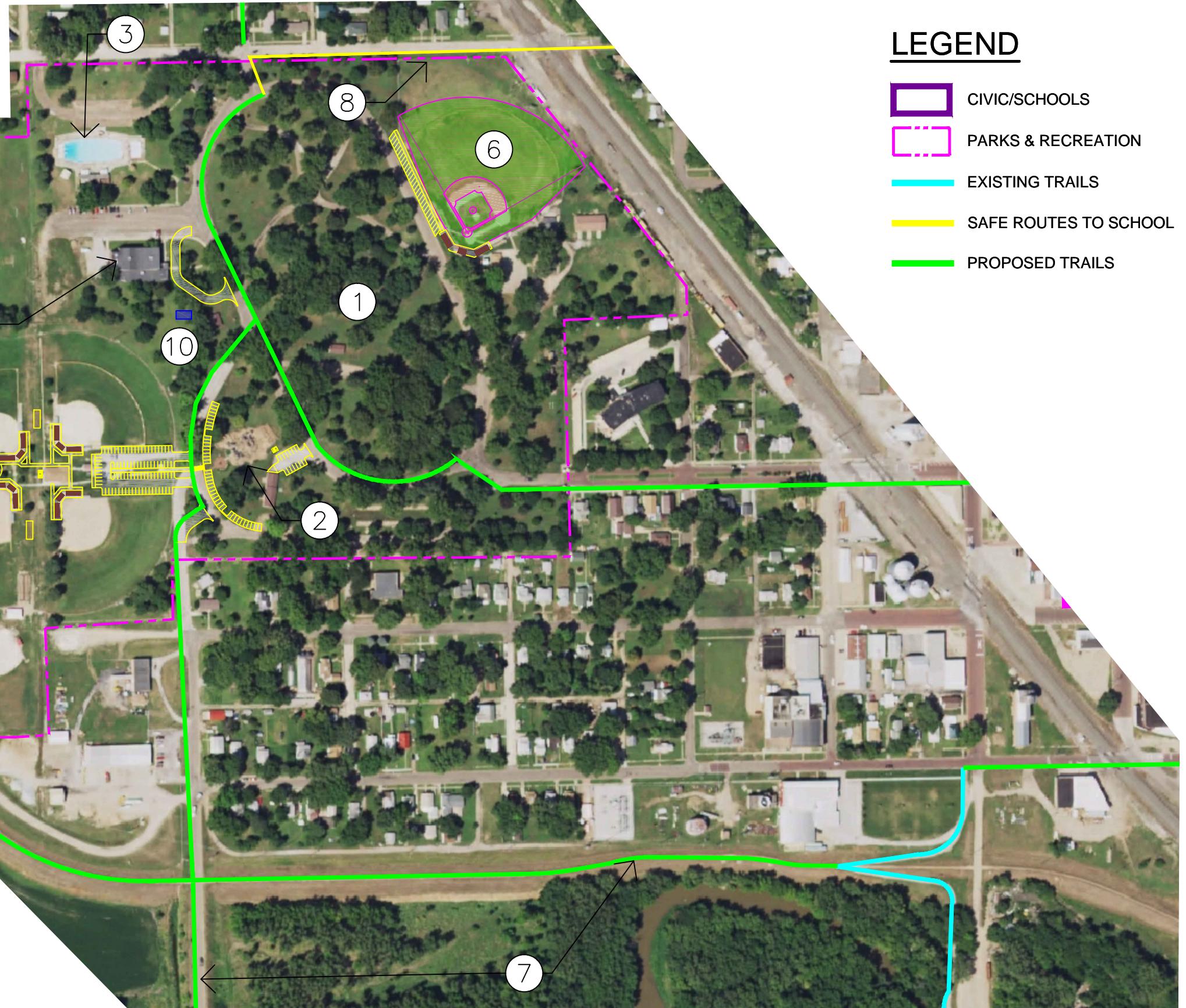
Fairbury parks exhibit historic ties to recreation and a love for natural beauty. With the start of a trail system along the south edge of the City, further developing a trail system associated with the river and the existing parks and natural areas around Fairbury would help citizen's access recreational opportunities. Tying the trail system to pedestrian corridors within the City, utilizing Safe Routes to School funding, would create endless opportunities for recreationalists to access and enjoy all that Fairbury parks have to offer.



0' 150' 300' 600'  
SCALE IN FEET

### LEGEND

- 1 CITY PARK MIDDLE LOOP
- 2 FRONTIER FUN PARK
- 3 MUNICIPAL POOL
- 4 COMMUNITY CENTER
- 5 SOFTBALL COMPLEX
- 6 QUINN FIELD
- 7 TRAIL CONNECTION TO CRYSTAL SPRINGS PARK
- 8 SAFE ROUTES TO SCHOOL
- 9 SOCCER FIELDS
- 10 STORM SHELTER / RESTROOMS



## **City Park – 75.2 acres**

- ❖ Middle Loop Picnic Area
- ❖ Frontier Fun Park
- ❖ Community Center
  - Senior Citizen Center
  - Community Gymnasium
- ❖ Softball Complex
- ❖ Municipal Pool
- ❖ Soccer Fields



City Park includes enough acreage to meet the recommended National Standard for parkland. This park offers the widest variety of recreational opportunities. In addition to improvements to the Municipal Pool facilities (covered in detail within this report), there are some suggestions for improvement that could be made:

❖ Middle Loop Picnic Area



**Middle Loop Fountain**

This central area of City Park is home to the largest Flea Market every Fourth of July. The area, shaded by a canopy of mature trees, includes:

- electrical hookups for Flea Market vendors
- individual picnic sites,
- picnic shelters
- 15 horseshoe pits and
- a large, unique, cast iron fountain

The main entrance to the Park is a landscaped brick boulevard entrance from the east on 5<sup>th</sup> Street and another entrance on the north side of the loop at Maple and 8<sup>th</sup> Streets.

Opportunities for Improvement:

1. Drainage system with curb and gutter to alleviate drainage problems around the inside of the drive loop.

2. Provide off-street parking at strategic locations around the loop. Some of these parking spaces should be ADA accessible with walks to appropriate uses.
  - At picnic shelters
  - At Frontier Fun Park
3. Provide a Storm Shelter/Restroom in a centralized location that could provide shelter to several uses within the park.
4. As an alternative, secured portable restrooms could be provided next to the playground so users would not need to cross to the community center to use restrooms.
5. Engage the local garden club and the Arbor Day Foundation to supplement the existing tree labels with additional labels to develop the park as an 'arboretum.'
6. Begin to consider new tree plantings to replace the aging tree canopy. Enlist the help of an arborist to prune existing tree canopies to improve overall health of existing trees and open canopy to allow addition of new trees.
7. Supply adequate electrical service and provide utility outlets to serve vendors of the Flea Market
8. Supply additional hydrants at picnic shelters and at appropriate locations within the Loop Area.

#### **Opinion of Probable Cost – Middle Loop**

##### **Middle Loop Picnic Area**

Item	Units	Qty	Costs		Total
Storm Sewer	LS	1	\$ 625,400.00	\$	625,400.00 *
Storm Shelter/Restrooms	LS	1	\$ 372,240.00	\$	372,240.00
Restrooms (alternate)					
Concrete Pad (12x14)	SF	168	\$ 8.00	\$	1,344.00
4 Portable	LS	4	\$ 750.00	\$	3,000.00
2 ADA Portable	LS	2	\$ 1,000.00	\$	2,000.00
Arboretum Development	LS	1	Donated		
New Tree Plantings	EA	20	\$ 300.00	\$	6,000.00
Vendor Outlets (per outlet)	LS	6	\$ 1,500.00	\$	9,000.00
<b>Middle Loop Subtotal</b>					<b>\$ 1,018,984.00</b>

❖ Frontier Fun Park



Entrance to the Fun Park

The Frontier Fun Park is wooden play structure built by community volunteers that provides multiple opportunities for play, ranging from a variety of climbing, swinging, and balancing stations to a make believe Pioneer Village. The entire play area is secured by a perimeter fence and an entrance to the site acknowledging donors to the project.



A variety of play opportunities

Opportunities for Improvement:

1. Pedestrian crossing to the Softball/Pool/Community Center could be established with pavement markings, a speed table, and signage to slow traffic for families cross between different areas of the park
2. Restrooms could be provided next to playground so users would not need to cross to the community center to use restrooms. These restrooms could be secured portable restrooms.
3. Security Lighting for use during evening hours and to lessen opportunities for vagrancy and vandalism.
4. More benches could be installed for parents



**Post repair is needed**

This area should be reserved for a play structure. The City should plan and budget for the replacement of the existing Frontier Fun Park with a new play facility.

## Opinion of Probable Cost - Frontier Fun Park

## Frontier Fun Park

## ❖ Community Center

The Community Center serves all ages providing athletic opportunities for the youths of Fairbury, and a Senior Center that serves the senior citizens and families of Fairbury. The Center can be rented for special family gatherings. The south wall of the gymnasium is a folding partition that opens to provide spectators in the dining area an opportunity to enjoy the youth basketball, indoor volleyball, and other gymnasium activities.

## Opportunities for Improvement:

1. ADA accessibility could be upgraded and there were some changes in the building including ADA accessible restrooms.
2. Installation of new windows to conserve on utility costs
3. Insulation for the building
4. Addition of patio door to open up the south side of the building to an outdoor seating area
5. Drop off lane to facilitate bus operations in inclement weather.

## Opinion of Probable Cost - Community Center

## Community Center

Item	Units	Qty	Costs	Total
Drop-off Lane - 6"	SF	8200	\$ 6.00	\$ 49,200.00
Outdoor Seating Area & Patio Door	LS	1	\$ 50,000.00	\$ 50,000.00
			<b>Community Center Subtotal</b>	<b>\$ 99,200.00</b>

❖ Softball Complex

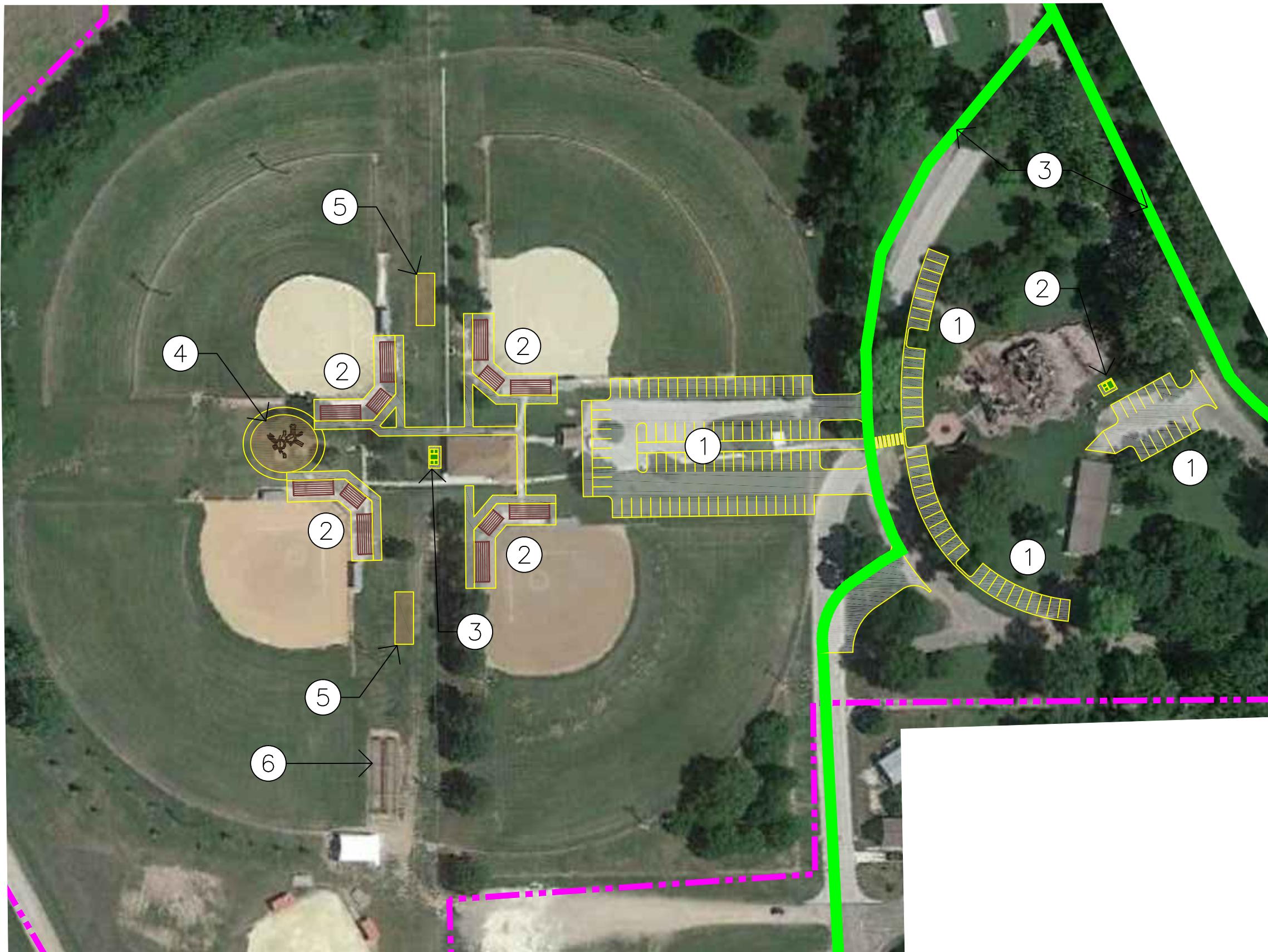
The Softball Complex is host to two to four tournaments during the summer, drawing participants from several surrounding communities. The Memorial Day tournament involves 24 to 30 teams. The complex is a typical 4 diamond cloverleaf configuration with an additional practice diamond. There is a centrally located concession building with restrooms, backstops, dugouts for each team and bleachers. There is also a double batting cage.

Opportunities for Improvements

1. Better parking could be developed at the entrance including concrete parking spaces for ADA accessibility.
2. More sidewalks to bleacher areas would provide ADA accessibility for spectators, including concrete pads to provide accessible seating areas at each diamond.
3. New bleachers to replace the weathered wood bleachers
4. The batting cages need to refurbished/upgraded
5. Add a bullpen(s) for warmup and practice between the diamonds
6. Refurbish/upgrade dug-outs
7. Addition of a storm shelter.
8. Additional restroom facilities
9. Repair the drainage issues associated with diamonds
10. Playground for younger siblings centrally located to serve all diamonds

**Opinion of Probable Cost - Softball Complex**

<b>Softball Complex</b>						
Parking (88 spaces) 28,000 sf compact gravel	CY	1040	\$	25.00	\$	26,000.00
Curb Stops (88)	EA	88	\$	100.00	\$	8,800.00
Sidewalks 300 lf x 8'w	SF	2400	\$	6.00	\$	14,400.00
Restrooms						
Concrete Pad (12x14)	SF	168	\$	8.00	\$	1,344.00
4 Portable	LS	4	\$	750.00	\$	3,000.00
1 ADA Portable	LS	1	\$	1,000.00	\$	1,000.00
New Bleachers						
Grading	LS	1	\$	2,500.00	\$	2,500.00
Concrete Pad (140x20)	SF	2800	\$	8.00	\$	22,400.00
Bleachers (170 seatings)	LS	4	\$	26,000.00	\$	104,000.00
Refurbished Batting Cages	LS	1	\$	5,000.00	\$	5,000.00
Bullpens	LS	2	\$	8,000.00	\$	16,000.00
Playground	LS	1	\$	50,000.00	\$	50,000.00
<b>Softball Complex Subtotal</b>						<b>\$ 254,444.00</b>



## LEGEND

- CIVIC/SCHOOLS
- PARKS & RECREATION
- EXISTING TRAILS
- SAFE ROUTES TO SCHOOL
- PROPOSED TRAILS

## SOFTBALL COMPLEX

- (1) PARKING IMPROVEMENT & EXPANSION
- (2) NEW BLEACHERS  
CONCRETE PAD  
SIDEWALK CONNECTION
- (3) RESTROOMS  
CONVERT EXISTING RESTROOM TO  
STORM SHELTER
- (4) PLAYGROUND
- (5) BULLPENS
- (6) REFURBISHED BATTING CAGE

## FRONTIER FUN PARK

- (1) PARKING IMPROVEMENT & EXPANSION
- (2) RESTROOMS / STORM SHELTER
- (3) PROPOSED TRAIL

❖ Municipal Swimming Facility

Besides being the community pool, the Municipal Pool is home to 2 to 3 club swim meets annually. Seventeen teams participate with swimmers from 5 year olds to 18 year olds. The needs of the facility are addressed in a separate section of this report.

❖ Soccer Fields

To the west of the Municipal Swimming Facility and the Community Center there are 3 youth soccer fields with goals and one junior high soccer field with goals.

Opportunities for Improvements

1. Provide bleachers for parent/spectators. As bleachers are replaced at the softball fields, some re-furbishing of those bleachers could make them useable for the soccer fields.
2. Shade structures for spectators
3. Restrooms could be provided next to playground so users would not need to cross to the community center to use restrooms. These restrooms could be secured portable restrooms.
4. The fields could be over-seeded with an athletic field, turf-type fescue after minor re-grading to improve the running surface and maintenance and to help combat a mole problem that exists, a granular herbicide should be applied before and after the soccer season to control grubs and other insects in the sod that moles are seeking for food.

**Opinion of Probable Cost – Soccer Fields**

Soccer Fields		Item	Units	Qty	Costs	Total
			SF	\$	\$	
		Soccer Fields - topdress & re-seed		115000	\$ 0.30	\$ 34,500.00
					<b>Soccer Fields Subtotal</b>	<b>\$ 34,500.00</b>

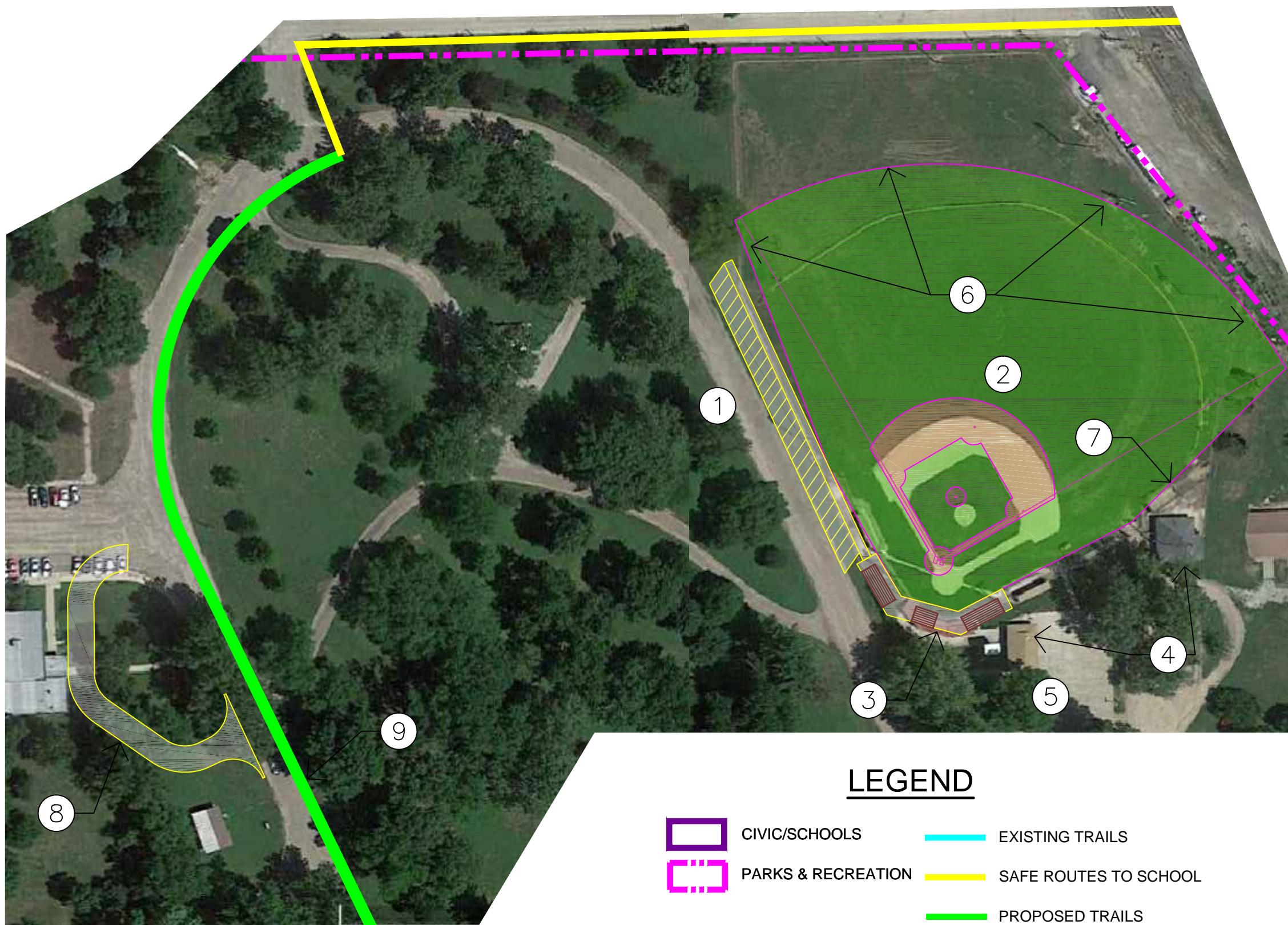
❖ Quinn Field

Quinn Field is the only regulation baseball diamond for the City. The overall facility could use upgrading. More specifically:

1. The field could be re-oriented and moved outward to provide additional space behind home plate.
2. Add underground drainage to the new field
3. Add irrigation to the new field
4. Maintain existing lighting as possible and supplement with additional field lighting, if needed.
5. The existing maintenance building and dugouts need new roofs. With re-orienting new dugouts would be built.

**Opinion of Probable Cost - Quinn Field**

Item	Quinn Field					Total
	Units	Qty	Costs	\$		
New Baseball Field	LS			\$	728,525.88	
Grading & Drainage			\$ 196,650.00			
Concrete work			\$ 57,200.00			
Fencing & Enclosures			\$ 70,987.00			
Equipment & Furnishings			\$ 108,500.00			
Field Surfacing			\$ 96,500.00			
Contingency (10%)			\$ 52,983.70			
Engineering services (25%)			\$ 145,705.18			
Parking (28 spaces) 5800 sf compact gravel	CY	215	\$ 25.00	\$	5,375.00	
Curb Stops (28)	EA	28	\$ 100.00	\$	2,800.00	
Sidewalks 300 lf x 8'w	SF	2400	\$ 6.00	\$	14,400.00	
Roofs for Accessory Buildings	SQ	50	\$ 150.00	\$	7,500.00	
Field Lighting (new and updated)	LS	1	\$ 120,000.00	\$	120,000.00	
<b>Quinn Field Grand Total</b>					<b>\$ 878,600.88</b>	



0' 50' 100' 200'  
SCALE IN FEET

N

## QUINN FIELD

- 1 PARKING IMPROVEMENT & EXPANSION
- 2 NEW BALLFIELD 40' BEHIND HOMEPLATE  
DRAINAGE SYSTEM  
IRRIGATION SYSTEM
- 3 NEW BLEACHERS  
CONCRETE PAD  
SIDEWALK CONNECTION
- 4 NEW ROOFS ON CONCESSION &  
MAINTENANCE
- 5 RENOVATE BASKETBALL COURTS  
BULLPENS
- 6 REFURBISH LIGHTING AND EXPAND
- 7 REFURBISHED BATTING CAGE

## COMMUNITY CENTER

- 8 DROP-OFF LANE & ADA ACCESS
- 9 PROPOSED TRAIL

## **McNish Park – 17.9 acres**



Located at the NE area of Fairbury, McNish Park was started with land purchased by the City in 1920 and enlarged later by land donated by Mrs. Sylvia McNish. The park was originally named Highland Park and renamed in 1941 as McNish Park in honor of the land and moneys donated by Mrs. McNish.

1. A sidewalk/path system could be added to provide better access to different areas of the park, including the shelter commemorating Mrs. McNish and the pond/waterfall feature. The path system could provide additional opportunity for walks and help direct Frisbee golf players.
2. Replace the floor of the shelter.
3. Provide a filtration system for the pond/waterfall feature.



4. Upgrade the Frisbee Golf Course with new signage to facilitate play by individuals new to the course.



5. Provide additional off-street parking along 14<sup>th</sup> Street and on-street parking at the playground area along 11<sup>th</sup> Street.
6. Upgrade the playground area along 11<sup>th</sup> Street with new equipment and safety surfacing

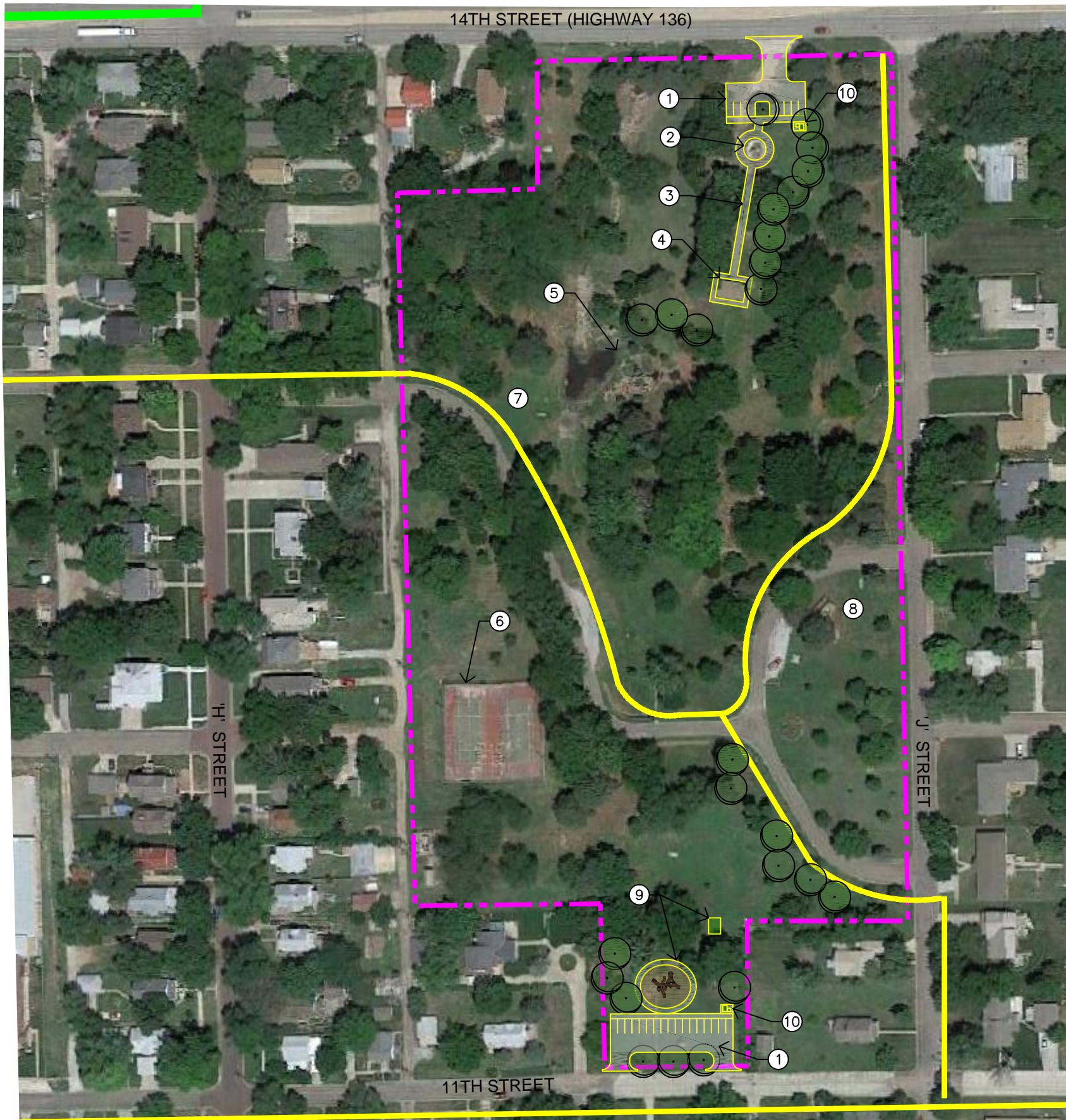


7. Begin to consider new tree plantings to replace the aging tree canopy. Enlist the help of an arborist to prune existing tree canopies to improve overall health of existing trees and open canopy to allow addition of new trees.
8. Remove tennis court concrete and consider replacing with a new recreational opportunity.
9. Addition of picnic shelter and play equipment.

#### Opinion of Probable Cost - McNish Park

#### McNish Park

Item	Units	Qty	Costs	Total
Playground	LS	1	\$ 50,000.00	\$ 50,000.00
Parking (26 spaces) 14,430 sf compact gravel	CY	1600	\$ 25.00	\$ 40,000.00
Curb Stops	EA	26	\$ 100.00	\$ 2,600.00
Sidewalks 300 lf x 8'w	SF	4300	\$ 6.00	\$ 25,800.00
Restrooms				
Concrete Pad (12x20)	SF	240	\$ 8.00	\$ 1,920.00
2 Portable	LS	2	\$ 750.00	\$ 1,500.00
1 ADA Portable	LS	1	\$ 1,000.00	\$ 1,000.00
Remove Tennis Court Concrete	SY	1600	\$ 8.00	\$ 12,800.00
Picnic Shelter / Play Equipment	EA	1	\$ 50,000.00	\$ 50,000.00
Trees	EA	24	\$ 300.00	\$ 7,200.00
Trails (1960 lf x 8'w)	SF	15680	\$ 6.00	\$ 94,080.00
<b>McNish Park Grand Total</b>				<b>\$ 286,900.00</b>



## MCNISH PARK

- ① PARKING IMPROVEMENT
- ② HISTORIC FOUNTAIN
- ③ SIDEWALKS TO MCNISH SHELTER
- ④ MCNISH SHELTER
- ⑤ WATER FEATURE
- ⑥ REMOVE FAILING TENNIS COURT CONCRETE
- ⑦ MEMORIAL
- ⑧ BOY SCOUT CABIN
- ⑨ NEW PLAYGROUND/PICNIC SHELTER
- ⑩ RESTROOMS

## LEGEND

- CIVIC/SCHOOLS
- PARKS & RECREATION
- EXISTING TRAILS
- SAFE ROUTES TO SCHOOL
- PROPOSED TRAILS



0' 75' 150' 300'  
SCALE IN FEET

PROJECT NO: 015-2112  
DRAWN BY: DNF  
DATE: 11/12/15



MCNISH PARK

OLSSON  
ASSOCIATES  
2111 South 67th Street, Suite 200  
Omaha, NE 68106  
TEL 402.341.1116  
FAX 402.341.5895  
EXHIBIT  
1

## **Optimist Park - .54 acres**



Optimist Park is an under-developed neighborhood park that could provide playground opportunities for Fairbury citizens north of Highway 136 (14<sup>th</sup> Street). The only improvement in this park is an outdated swing set. The mature trees along 'D' and 16<sup>th</sup> Streets provide a good beginning to what could be an easily accessible neighborhood park.

### **Opportunities for Improvement:**

1. On-street parking along 'D' Street
2. Upgrade the playground area with new equipment and safety surfacing.
3. Add a picnic shelter
4. Appropriate landscaping to supplement existing trees.
5. Signage mentioning the involvement of the Optimist Club.

**Opinion of Probable Cost - Optimist Park**

**Optimist Park**

Item	Units	Qty	Costs	Total
Playground	LS	1	\$ 50,000.00	\$ 50,000.00
Shelter	LS	1	\$ 20,000.00	\$ 20,000.00
Shelter Pad	SF	360	\$ 4.00	\$ 1,440.00
Signage	LS	1	\$ 2,000.00	\$ 2,000.00
Parking (6 spaces) 1,020 sf compact gravel	CY	37	\$ 25.00	\$ 925.00
Sidewalks 320 lf x 4'w	SF	1280	\$ 6.00	\$ 7,680.00
Restrooms				
Concrete Pad (?x?)	SF	240	\$ 4.00	\$ 960.00
1 Portable	LS	1	\$ 750.00	\$ 750.00
1 ADA Portable	LS	1	\$ 1,000.00	\$ 1,000.00
Trees	EA	7	\$ 300.00	\$ 2,100.00
<b>Optimist Park Grand Total</b>				<b>\$ 86,855.00</b>

## 14TH STREET (HIGHWAY 136)



## OPTIMIST PARK

- ① PARKING IMPROVEMENT
- ② PLAY STRUCTURE
- ③ SIDEWALKS
- ④ PICNIC SHELTER
- ⑤ OPEN PLAY
- ⑥ NEW TREES
- ⑦ SIGNAGE
- ⑧ RESTROOMS

## LEGEND

- █ CIVIC/SCHOOLS
- █ PARKS & RECREATION
- EXISTING TRAILS
- SAFE ROUTES TO SCHOOL
- PROPOSED TRAILS

N

  
SCALE IN FEET

## **Conrad Park - .17 acres**

Conrad Park is small 'pocket' park that has become over-grown and with some re-working, could be a nice feature of the Courthouse area. The wrought iron gazebo and benches could be re-arranged to provide a nice seating/lunch area for downtown visitors.

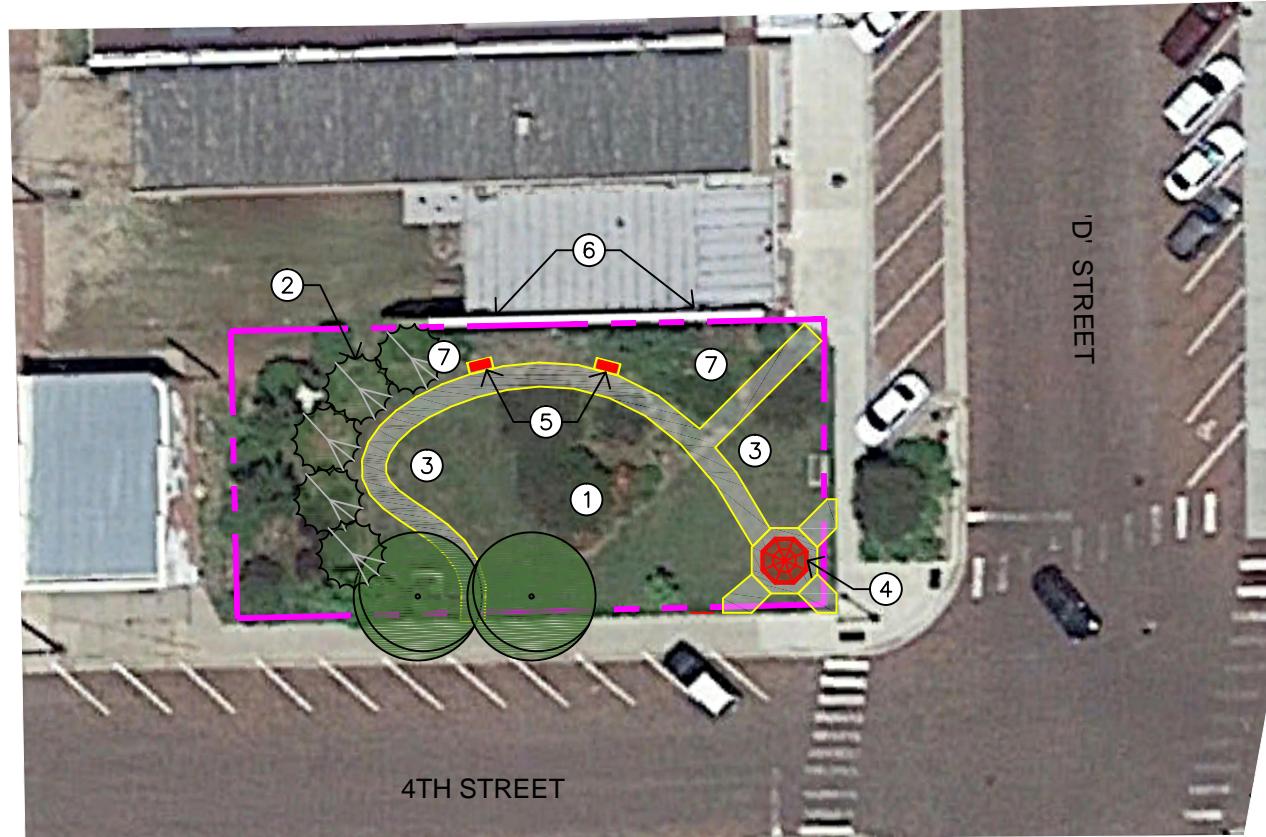


### **Opportunities for Improvement**

1. Remove existing landscaping that has become over-grown.
2. Re-design the park utilizing the gazebo and benches to provide a seating area with landscaping that doesn't obscure visibility into the area
3. Utilize the building wall as an opportunity for an historic mural commemorating the City's history. This mural could be painted or it could be a sculpted clay mural by local artist(s).

**Opinion of Probable Cost - Conrad Park****Conrad Park**

Item	Units	Qty	Costs	Total
Sidewalks 170 lf x 5'w	SF	850	\$ 6.00	\$ 5,100.00
Concrete Pad (Gazebo & benches)	SF	300	\$ 4.00	\$ 1,200.00
Trees	EA	6	\$ 300.00	\$ 1,800.00
Miscellaneous Landscape	LS	1	\$ 2,000.00	\$ 2,000.00
Mural	LS		Donated	
<b>Conrad Park Grand Total</b>				<b>\$ 10,100.00</b>



## LEGEND

- CIVIC/SCHOOLS
- PARKS & RECREATION
- EXISTING TRAILS
- SAFE ROUTES TO SCHOOL
- PROPOSED TRAILS

## CONRAD PARK

- ① REMOVE EXISTING LANDSCAPE
- ② EVERGREEN ADDED FOR SCREENING
- ③ SIDEWALKS
- ④ RELOCATED GAZEBO
- ⑤ RELOCATED BENCHES
- ⑥ MURAL  
CLAY RELIEF SCULPTURE OR  
PAINTED BY LOCAL ARTISTS
- ⑦ LOW PLANTINGS AS BASE FOR MURAL

N

0' 20' 40' 80'  
SCALE IN FEET

## **Crystal Springs Park – 69.75 acres**



**Middle Lake Water feature and bridge**

Maintained by the Utility Board this park is located southwest of the City, south of the Little Blue River. The two-lane entrance to the park is lined with ash trees, providing a formal entrance to a natural park that provides camping and fishing opportunities in a beautiful setting. There are 60 camp sites with full RV hook up. Among the amenities provided at this park are RV pads and hookups, picnic shelters, a shower house/restroom, and 3 inter-connected lakes that provide fishing opportunities and natural beauty.

### Opportunities for Improvement:

1. A planting plan needs to be prepared to replace the Ash trees along the entrance in anticipation of the trees dying. As the Emerald Ash Bore gets closer, different species should be planted maintaining the existing 'boulevard' appearance.
2. Add a dump station.
3. Install an aeration fountain in the middle lake to improve the water quality of the pond.
4. Upgrade playground area with new play structure and safety surfacing.



**Playground at west lake RV camping area**



**Typical Camp Site**



## LEGEND

- █ CIVIC/SCHOOLS
- █ PARKS & RECREATION
- EXISTING TRAILS
- SAFE ROUTES TO SCHOOL
- PROPOSED TRAILS

## CRYSTAL SPRINGS PARK

- ① TREE PLANTINGS
- ② AERATION FOUNTAIN
- ③ NEW PLAYGROUND
- ④ TRAIL CONNECTION



0' 75' 150' 300'  
SCALE IN FEET

## EXISTING INVENTORY

ITEM	McNish	City Park	Crystal Springs	Conrad Pocket Park	Optimist Park	TOTAL
Benches	4	2	6	2		14
Picnic Tables	1	33	33			67
Youth Picnic Table						
Trash Cans						
Bike Rack		2				2
Playground	1	1	1		1	4
Concessions		1				1
Restrooms	1	1	1			3
Water Fountain						
Grills		4	10			14
Dumpsters	4					4
Fireplace						
Water Feature	2	1				3
Pond/Lake			3			3
Pavillion						
Picnic Shelters	1	3	4			8
Interior Sidewalk 4'						
Trail 5'						
Trail 10'						
Community Center		1				1
Tennis Courts	2					2
Basketball Hoops (Quinn Field)		2				2
Swimming Pool		1				1
Softball		4				
Baseball (Quinn Field)		1				
Skate Park						
Horseshoe Lanes		15	2			17
Soccer Fields - Youth Size		4				4
Soccer Goals - Full Size		1				1
Soccer Goals - Youth		4				4
Public Art/Memorial	3			1		4
Adjacent Parking	1					1
Campsites			60			60
Parking - Handicapped						
<b>Unique Features</b>						
Boy Scout Cabin	1					1
Train Exhibit		1				1
War Memorial	1					1
Arboretum labels		1				1
*Shared with adjacent uses						
** Full size fields divided						

**City of Fairbury - Comparison of Recreation Facilities to National Standards**

		Population Trend			2010			2015			2030		
		Existing			-0.85%			-0.17%			0.05%		
		National Standards	Public	Total (ac)	Need	Surplus	Projected	Need	Surplus	Projected	Need	Surplus	
Park and Recreation Facilities													
<b>City of Fairbury, Nebraska</b>													
Mini Park	0.71 ac	25- 50 acres per 1,000	0.71	0.71	2	(1)	2	(1)	2	2	(1)	2	
Optimist Park - 17 acres	0.17 ac												
Neighborhood Park	0 ac	1 to 2 acres per 1,000	0	0	8	(8)	8	(8)	8	8	(8)	8	
School Park	58.18 ac	based on school need		3	58.18								
Central Elementary School	3.01 ac			1									
Jefferson Intermediate School	15.57 ac			1									
Fairbury Junior/Senior High	39.6 ac			1									
Community Park	17.9 ac	5 to 8 acres per 1,000	17.9	17.9	32	(14)	31	(13)	31	(14)	31	(14)	
McNish Park - 17.9 acres	17.9 ac												
Large Urban Park	75.2 ac	> 50 ac/ 10 acres per 1,000	75.2	75.2	40	36	39	36	39	36	39	36	
<b>City Park - 75.2 acres</b>	<b>75.2 ac</b>	<b>69.75 ac</b>	<b>75.2</b>	<b>75.2</b>	<b>0</b>	<b>70</b>	<b>0</b>	<b>70</b>	<b>0</b>	<b>70</b>	<b>0</b>	<b>70</b>	
Natural Resource Area													
Crystal Springs Park	69.75 ac	var.	69.75	69.75	0	70	0	70	0	70	0	70	
Sports Complex		var.			0	0	(0)	0	(0)	0	(0)	0	
Special Use Area		var.			0	0	0	0	0	0	0	0	
Private Park/Rec. Area		var.			0	0	(0)	0	(0)	0	(0)	0	
Linear Parks & Greenways			25 miles per 1000	0	0	0	0	0	0	0	0	0	
				221.74	82	83	83	83	83	83	83	83	
		National Standards			Existing								
		1 per 75,000	1	1	0	1	0	1	0	1	0	1	0
		1 per 3,000	1	1	0	1	0	1	0	1	0	1	0
		1 per 100,000	1	0	0	0	0	0	0	0	0	0	0
		1 per 10,000	1	1	0	1	0	1	0	1	0	1	0
		Outdoor Facilities											
		1 per 8,000	8	8	0	8	0	8	0	8	0	8	0
		1 per 75,000	1	1	0	1	0	1	0	1	0	1	0
		1 per 20,000	1	1	0	1	0	1	0	1	0	1	0
		1 per 7,000	2	2	0	2	0	2	0	2	0	2	0
		1 per region			0	0	(0)	0	(0)	0	(0)	0	(0)
		1 per 25,000			0	0	0	0	0	0	0	0	0
		1 per 20,000	1	1	0	1	0	1	0	1	0	1	0
		1 per 60,000			0	0	0	0	0	0	0	0	0
		1 per 60,000			0	0	(0)	0	(0)	0	(0)	0	(0)
		Courts and Fields											
		1 per 2,000	2	2	4	0	4	0	4	0	4	0	4
		1 per 5,000			0	0	0	0	0	0	0	0	0
		1 per 3,000	1	1	0	1	0	1	0	1	0	1	0
		1 per 5,000			2	0.5	3	0	3	0	3	0	3
		1 per 20,000			2	2	0	2	0	2	0	2	0
		1 per 30,000	1	1	0	1	0	1	0	1	0	1	0
		1 per 20,000			0	0	0	0	0	0	0	0	0
		1 per 50,000	1	1	0	1	0	1	0	1	0	1	0
		1 per 20,000			0	0	0	0	0	0	0	0	0
		1 per 2,000	15	15	0	15	0	15	0	15	0	15	0
		1 per 20,000			2	0	2	0	2	0	2	0	2
		1 per 10,000	4	4	0	4	0	4	0	4	0	4	0
		1 per 2,500	4	4	0	4	0	4	0	4	0	4	0
		Softball/Baseball Fields											

Fairbury City + 1 mile  
 City of Fairbury, United States  
 Rings: 1 mile radii

Prepared by Esri  
 Latitude: 40.14382  
 Longitude: -97.17650

	1 mile
<b>Population</b>	
2000 Population	4,305
2010 Population	3,954
2015 Population	3,919
2020 Population	3,931
2000-2010 Annual Rate	-0.85%
2010-2015 Annual Rate	-0.17%
2015-2020 Annual Rate	0.06%
2015 Male Population	48.2%
2015 Female Population	51.8%
2015 Median Age	45.1

In the identified area, the current year population is 3,919. In 2010, the Census count in the area was 3,954. The rate of change since 2010 was -0.17% annually. The five-year projection for the population in the area is 3,931 representing a change of 0.06% annually from 2015 to 2020. Currently, the population is 48.2% male and 51.8% female.

### Median Age

The median age in this area is 45.1, compared to U.S. median age of 37.9.

### Race and Ethnicity

2015 White Alone	93.9%
2015 Black Alone	0.6%
2015 American Indian/Alaska Native Alone	0.7%
2015 Asian Alone	0.4%
2015 Pacific Islander Alone	0.0%
2015 Other Race	1.6%
2015 Two or More Races	2.9%
2015 Hispanic Origin (Any Race)	4.6%

Persons of Hispanic origin represent 4.6% of the population in the identified area compared to 17.6% of the U.S. population. Persons of Hispanic Origin may be of any race. The Diversity Index, which measures the probability that two people from the same area will be from different race/ethnic groups, is 19.7 in the identified area, compared to 63.0 for the U.S. as a whole.

### Households

2000 Households	1,899
2010 Households	1,786
2015 Total Households	1,786
2020 Total Households	1,796
2000-2010 Annual Rate	-0.61%
2010-2015 Annual Rate	0.00%
2015-2020 Annual Rate	0.11%
2015 Average Household Size	2.14

The household count in this area has changed from 1,786 in 2010 to 1,786 in the current year, a change of 0.00% annually. The five-year projection of households is 1,796, a change of 0.11% annually from the current year total. Average household size is currently 2.14, compared to 2.16 in the year 2010. The number of families in the current year is 1,022 in the specified area.

**Data Note:** Income is expressed in current dollars

**Source:** U.S. Census Bureau, Census 2010 Summary File 1. Esri forecasts for 2015 and 2020. Esri converted Census 2000 data into 2010 geography.

July 28, 2015

Fairbury City + 1 mile  
 City of Fairbury, United States  
 Rings: 1 mile radii

Prepared by Esri  
 Latitude: 40.14382  
 Longitude: -97.17650

1 mile

### Median Household Income

2015 Median Household Income	\$40,072
2020 Median Household Income	\$48,986
2015-2020 Annual Rate	4.10%

### Average Household Income

2015 Average Household Income	\$56,538
2020 Average Household Income	\$66,241
2015-2020 Annual Rate	3.22%

### Per Capita Income

2015 Per Capita Income	\$25,768
2020 Per Capita Income	\$30,252
2015-2020 Annual Rate	3.26%

### Households by Income

Current median household income is \$40,072 in the area, compared to \$53,217 for all U.S. households. Median household income is projected to be \$48,986 in five years, compared to \$60,683 for all U.S. households

Current average household income is \$56,538 in this area, compared to \$74,699 for all U.S. households. Average household income is projected to be \$66,241 in five years, compared to \$84,910 for all U.S. households

Current per capita income is \$25,768 in the area, compared to the U.S. per capita income of \$28,597. The per capita income is projected to be \$30,252 in five years, compared to \$32,501 for all U.S. households

### Housing

2000 Total Housing Units	2,150
2000 Owner Occupied Housing Units	1,344
2000 Renter Occupied Housing Units	556
2000 Vacant Housing Units	250
2010 Total Housing Units	2,148
2010 Owner Occupied Housing Units	1,184
2010 Renter Occupied Housing Units	602
2010 Vacant Housing Units	362
2015 Total Housing Units	2,169
2015 Owner Occupied Housing Units	1,143
2015 Renter Occupied Housing Units	643
2015 Vacant Housing Units	383
2020 Total Housing Units	2,169
2020 Owner Occupied Housing Units	1,153
2020 Renter Occupied Housing Units	642
2020 Vacant Housing Units	373

Currently, 52.7% of the 2,169 housing units in the area are owner occupied; 29.6%, renter occupied; and 17.7% are vacant. Currently, in the U.S., 55.7% of the housing units in the area are owner occupied; 32.8% are renter occupied; and 11.6% are vacant. In 2010, there were 2,148 housing units in the area - 55.1% owner occupied, 28.0% renter occupied, and 16.9% vacant. The annual rate of change in housing units since 2010 is 0.43%. Median home value in the area is \$74,164, compared to a median home value of \$200,006 for the U.S. In five years, median value is projected to change by 4.48% annually to \$92,342.

**Data Note:** Income is expressed in current dollars

**Source:** U.S. Census Bureau, Census 2010 Summary File 1. Esri forecasts for 2015 and 2020. Esri converted Census 2000 data into 2010 geography.

July 28, 2015

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Based on current census data, the City of Fairbury has an LMI number of 47.74% which does not qualify them for CDBG funding. An updated income survey might improve eligibility.



## Recreation Expenditures

Fairbury City + 1 mile  
 City of Fairbury, United States  
 Ring: 1 mile radius

Prepared by Esri  
 Latitude: 40.14382  
 Longitude: -97.17650

Demographic Summary	2015	2020
Population	3,919	3,931
Households	1,786	1,796
Families	1,022	1,024
Median Age	45.1	45.4
Median Household Income	\$40,072	\$48,986
Spending Potential Index	Average Amount Spent	Total
<b>Entertainment/Recreation Fees and Admissions</b>		
Admission to Movies, Theater, Opera, Ballet	56	\$362.88
Admission to Sporting Events, excl.Trips	57	\$93.20
Fees for Participant Sports, excl.Trips	70	\$46.52
Fees for Recreational Lessons	53	\$63.82
Membership Fees for Social/Recreation/Civic Clubs	55	\$94.10
Dating Services	68	\$0.41
Rental of Video Cassettes and DVDs	75	\$17.56
<b>Toys &amp; Games</b>		
Toys and Playground Equipment	80	\$97.85
Play Arcade Pinball/Video Games	80	\$92.63
Online Entertainment and Games	68	\$2.09
	78	\$3.13
<b>Recreational Vehicles and Fees</b>		
Docking and Landing Fees for Boats and Planes	113	\$246.04
Camp Fees	81	\$7.95
Purchase of RVs or Boats	44	\$14.52
Rental of RVs or Boats	131	\$218.69
	65	\$4.88
<b>Sports, Recreation and Exercise Equipment</b>		
Exercise Equipment and Gear, Game Tables	90	\$170.98
Bicycles	91	\$69.75
Camping Equipment	56	\$16.83
Hunting and Fishing Equipment	57	\$9.61
Winter Sports Equipment	118	\$49.50
Water Sports Equipment	109	\$6.50
Other Sports Equipment	96	\$6.22
Rental/Repair of Sports/Recreation/Exercise Equipment	119	\$9.50
	100	\$3.07
<b>Photographic Equipment and Supplies</b>		
Film	63	\$50.85
Film Processing	60	\$0.72
Photographic Equipment	95	\$11.76
Photographer Fees/Other Supplies & Equip Rental/Repair	53	\$20.90
	62	\$17.47
<b>Reading</b>		
Magazine/Newspaper Subscriptions	78	\$118.83
Magazine/Newspaper Single Copies	87	\$47.13
Books	79	\$12.27
Digital Book Readers	73	\$46.48
	72	\$12.95
		\$84,180
		\$21,913
		\$83,007
		\$23,124

**Data Note:** The Spending Potential Index (SPI) is household-based, and represents the amount spent for a product or service relative to a national average of 100. Detail may not sum to totals due to rounding.

**Source:** Esri forecasts for 2015 and 2020; Consumer Spending data are derived from the 2011 and 2012 Consumer Expenditure Surveys, Bureau of Labor Statistics.

July 28, 2015

## **Part II: Municipal Swimming Pool Evaluation**

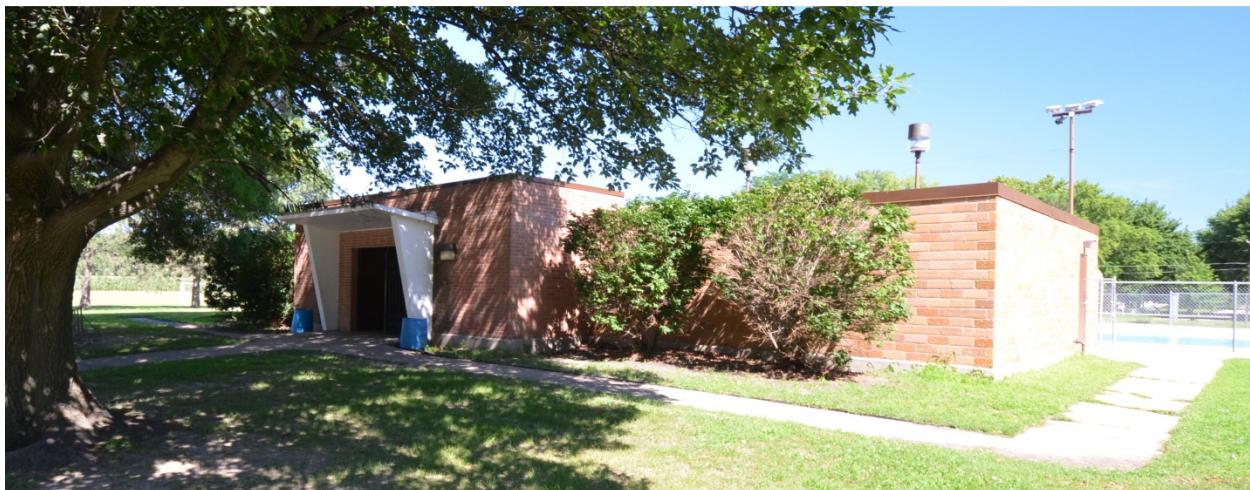
The Fairbury Municipal Swimming Pool is located in the northwest corner of the Fairbury City Park. Located within the Fairbury Pool complex, is a concession stand, park restrooms and a picnic shelter/gazebo. The Fairbury Municipal Swimming Pool was designed in 1952 by the engineering firm of Kenneth H. Larkin & Associates in Kansas City, Missouri and was constructed in 1953 and refurbished in 1990.

The Bathhouse has served the Fairbury community for the past 63 years and while it remains a solid building to this day, it lacks the functionality, efficiency and amenities that are expected of a modern bathhouse design. The assessment of the existing bath house identifies any deficiencies and design issues, including the functionality, efficiency and accessibility.

The assessment of the pool basin and associated equipment will consist of the evaluation of the Filter System, Recirculation System, Chemical Treatment System, Diving Boards, Slide, Deck Area, Pool Basin, Bathhouse, and Site Improvements. The Deficiencies were identified using Nebraska Health and Human Services, Title 178, NAC 4 standards, YMCA Competitive Swimming and Diving Programs standards, and NCAA Men's & Women's Swimming and Diving Standards.

### **Fairbury Municipal Pool - Bathhouse**

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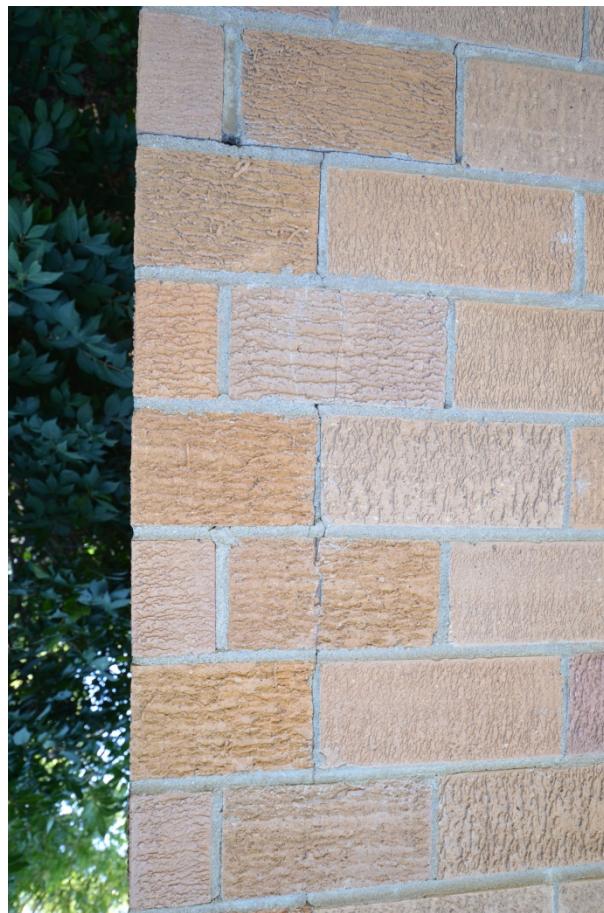
#### **Existing Bathhouse Condition Assessment:**

##### **Structural**

The existing bathhouse structure is comprised of clay masonry bearing walls with a structural concrete slab roof and concrete slab-on-grade floors. The structure has performed remarkably well given its 63 years of heavy usage and exposure to the elements with only the following issues of note:



The dressing areas are open to the sky which raises the concern about visual privacy and is an open invitation for trespassing and vandalism. While this is not a structural issue it is recognized that a roof structure will need to be added over the dressing areas if the existing bathhouse were to be saved and renovated.



Slight foundation settlement has occurred at the southwest corner as indicated by the stepped diagonal crack in the masonry mortar joints.





Slight foundation settlement has also occurred at the west door to the public restroom. All other areas of the bathhouse appear to be structurally stable.



The structural stability of the single wythe clay masonry partitions that are unsupported at the top present a significant safety concern. It is not known if these walls are reinforced, but it should be noted that it would be difficult to achieve the code required lateral resistance with new reinforced masonry walls of similar thickness that are unsupported at the top.

### **Roof**

A new roof and flashing system was installed in 2014.

## **Accessibility**

Toilet and shower facilities do not conform to ADA accessibility requirements in size, clearance, arrangement or fixture type.



Accessible maneuvering space is achieved in the male gender restroom by eliminating a toilet partition and door and presenting the toilet open to the dressing area.



**Female Gender Restroom**

## Infrastructure



Plumbing fixture and exposed piping upgrades have been made in years past. The plumbing system is still serviceable, but is aging and will need to be replaced in time.



The electrical power distribution and lighting systems have been upgraded in years past, but are aging and will need to be replaced in time.

## **Design Program & Considerations:**

### **Patron Capacity**

The Fairbury Municipal Pool Bathhouse will serve several user groups through the summer months according to the following typical daily schedule:

- 10:00 – 11:00am / Swim Team practice with 50 – 60 users.
- 11:00am – 8:00pm / Recreational and leisure use with 100 patrons per day on prime days.
- 8:30 – 10:30pm / Private parties.

The Fairbury Swim Team hosts one (1) competitive swim meet per year that involves four (4) teams. There are eight (8) teams in the league and on occasion Fairbury will host an all-league swim meet that will involve as many as 200 competitors with a total of 350 competitors and spectators present. As such, a maximum bathhouse patron load of 250 patrons is desirable in order to limit the toilet fixture requirement to four (4) toilets on the female side and two (2) toilets / two (2) urinals on the male side.

### **Family Changing Rooms**

Family changing rooms address the issue of parents taking their children into an open changing room populated by the opposite gender. They also allow care givers to accompany and attend to a person of the opposite gender.

### **Concessions**

Pool concessions is managed and operated on a day to day basis by the Fairbury Pool Staff. During swim meets, the Fairbury Swim Team operates the concessions as a fund raising endeavor. Concessions should be located such that they can also directly serve the patrons at the soccer field complex west of the swimming pool. The competitive soccer season begins one month before the opening of the swimming pool, so access to the concessions area will need to be provided outside of the pool season and hours.

### **Storage**

A separate metal shed provides much needed storage for the equipment that is required for swim meets as well as general recreational use. This storage should be integrated into the bathhouse structure.

### **Public Restrooms**

Separate public restrooms that are accessed directly from the park outside of the pool operation are included in the design. These restrooms should be located on the west side of the bathhouse to directly serve the soccer field patrons.

### **Storm Shelter**

Consideration should be given to design a portion of the bathhouse as a storm shelter that would be used by pool patrons during severe storm events when the pool is open and occupied.

## **Durability**

The existing bathhouse is a good example of durable and corrosion resistant construction that has endured many years of heavy use and exposure to the elements. The life-cycle cost benefit of the initial investment in 1952 is readily apparent.

## **Ventilation**

The bathhouse will rely on the ventilation of outside air through the building for patron and staff comfort. The design should integrate a mechanical intake and exhaust fan system as well as maximize the opportunity to effectively utilize natural ventilation. To that end, the long east-west orientation of the existing bathhouse with its narrow north-south section is ideal for taking advantage of the southeast breezes that are prevalent during the summer months. All three of the design options that are presented as part of this study feature ventilation louvers in the upper portion of the perimeter walls. These louvers are part of the secure building envelope and also serve to block vision into the dressing, shower and toilet areas.

Mechanical ventilation would be accomplished with through-wall exhaust fans located above the public restrooms on the west end and high in the storage room on the east end. Outside air is drawn in through the ventilation louvers and across the dressing, locker and toilet areas on calm, humid, summer days. The public restrooms and concessions would be connected to the exhaust system. The center pool office space would have its dedicated through-wall exhaust fans located high on the north wall to work in conjunction with prevailing summer breezes from the southeast. Intake air fans would be integrated into the upper ventilation louvers to assist in pulling outside air into the building. Overhead circulation fans could also be installed in the dressing areas to move air and improve patron comfort.

### **Design Options:**

The three design options that follow are presented as part of this study. Option "A" illustrates how the existing bathhouse could be reused, modified and added onto such that it meets the design program and considerations outlined above. Options "B" and "C" share a common floor plan and illustrate two approaches to design and construction type.

All three options are programmatically similar based on a maximum patron load of 250. Nebraska Department of Health and Human Services minimum bathhouse fixture count requirements for this patron load are as follows:

- Male / 2 toilets, 2 urinals, 1 sink and 3 showers.
- Female / 4 toilets, 2 sinks and 3 showers.

Each option includes two (2) family changing rooms. While one shared changing room could be adequate, one is shown on each of the two gender sides with one of each gender's required toilets accounted for in the family changing room.

#### **Renovated & Expanded Existing Pool House – Design Option A**

This option utilizes much of the existing bathhouse structural shell with internal modifications where necessary and additions at both the east and west ends. New roofs would be structured over the open dressing areas. The mechanical, electrical and plumbing systems would be completely removed and replaced.

#### **New Pool House – Design Option B**

This option replaces the existing bathhouse with a completely new facility. The design envisions both clay and concrete masonry construction to 10'-0" above the floor level.

The roof is comprised of precast concrete hollow core units and is supported by exposed steel beams and stub columns that are seated on the outside masonry bearing walls. The roof is shaped for internal rain water management and to support the use of solar hot water heat panels.

The space between the top of the walls and the roof is infilled with aluminum ventilation louvers that allow natural cross-ventilation, restrict sightlines into the bathhouse and provide secure building envelope.

#### **New Pool House – Design Option C**

This option is a variation of Option B as described above in that it utilizes architectural precast concrete wall panels as means of achieving both structural support of the roof and material durability in one system.

The roof is comprised of precast concrete hollow core units as Option - B, but in a single slope configuration that could support the use of hot water heating panels.

Cross-ventilation is achieved through aluminum louvers that are mounted in the opening of the pre-cast concrete wall panels.

**Statement of Probable Construction Cost:**

The following probable construction costs are based on \$/sf averages at the time of this study and do not include inflation factors for a future implementation date, movable equipment costs or design fees.

**Option A**

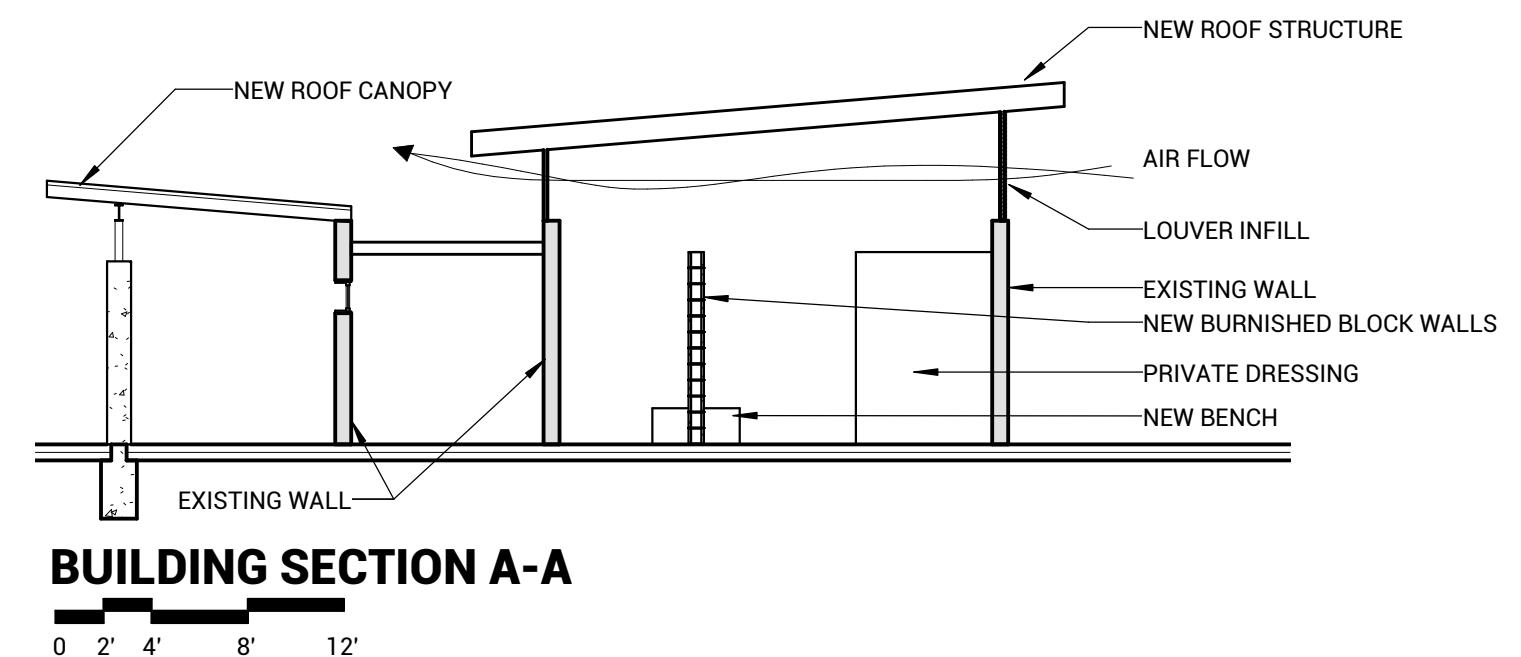
- Selective demolition	2,450 sf @ \$ 10/sf =	\$ 24,500
- Existing building remodel	2,450 sf @ \$100/sf =	245,000
- New additions	1,080 sf @ \$150/sf =	162,000
- <u>Covered deck</u>	<u>1,440 sf @ \$ 50/sf =</u>	<u>72,000</u>
Total Construction Cost		\$503,500

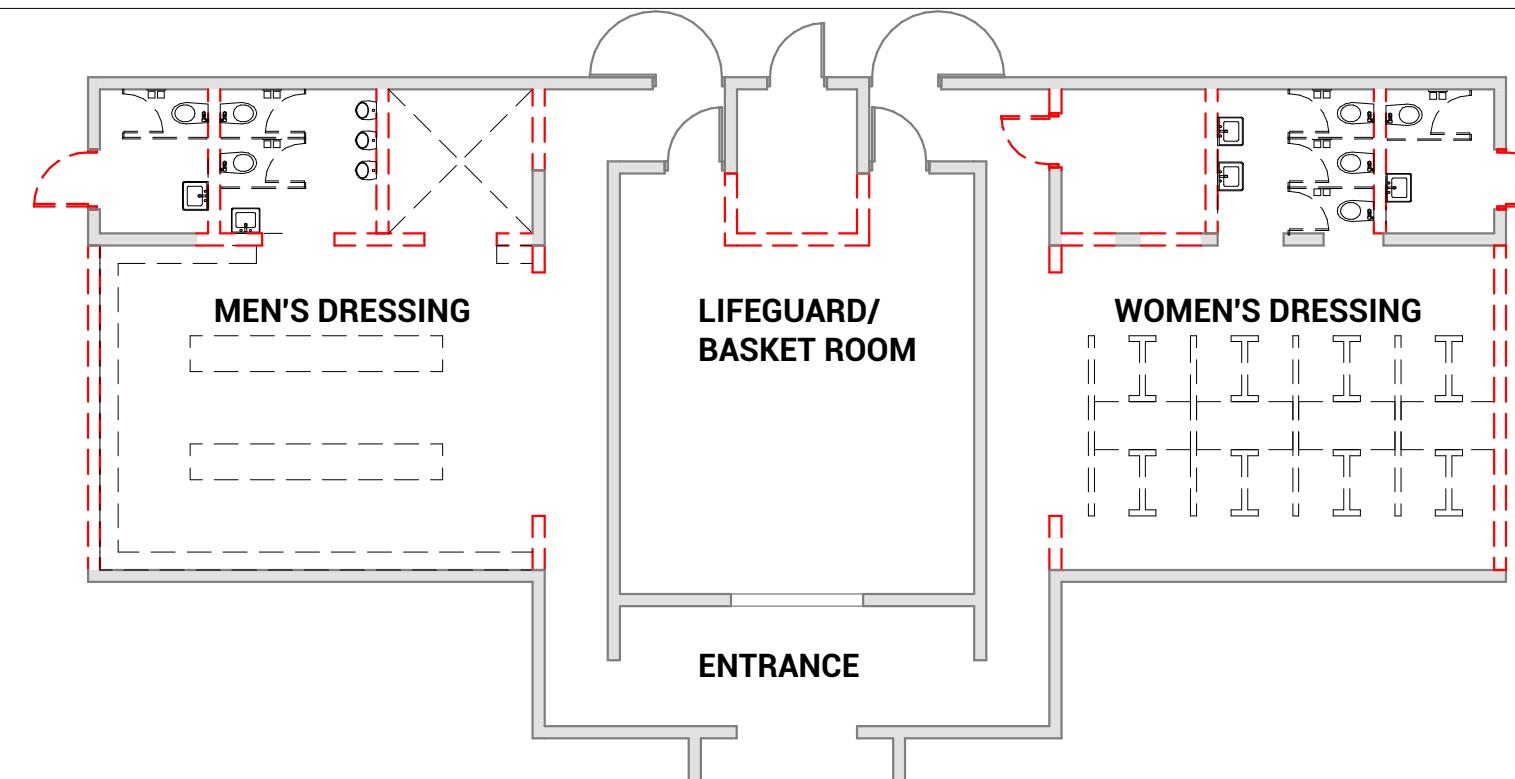
**Options B and C**

- Complete demolition	2,450 sf @ \$ 15/sf =	\$ 36,750
- New bathhouse	3,630 sf @ \$150/sf =	544,500
- <u>Covered deck</u>	<u>1,520 sf @ \$ 50/sf =</u>	<u>76,000</u>
Total Construction Cost		\$657,250



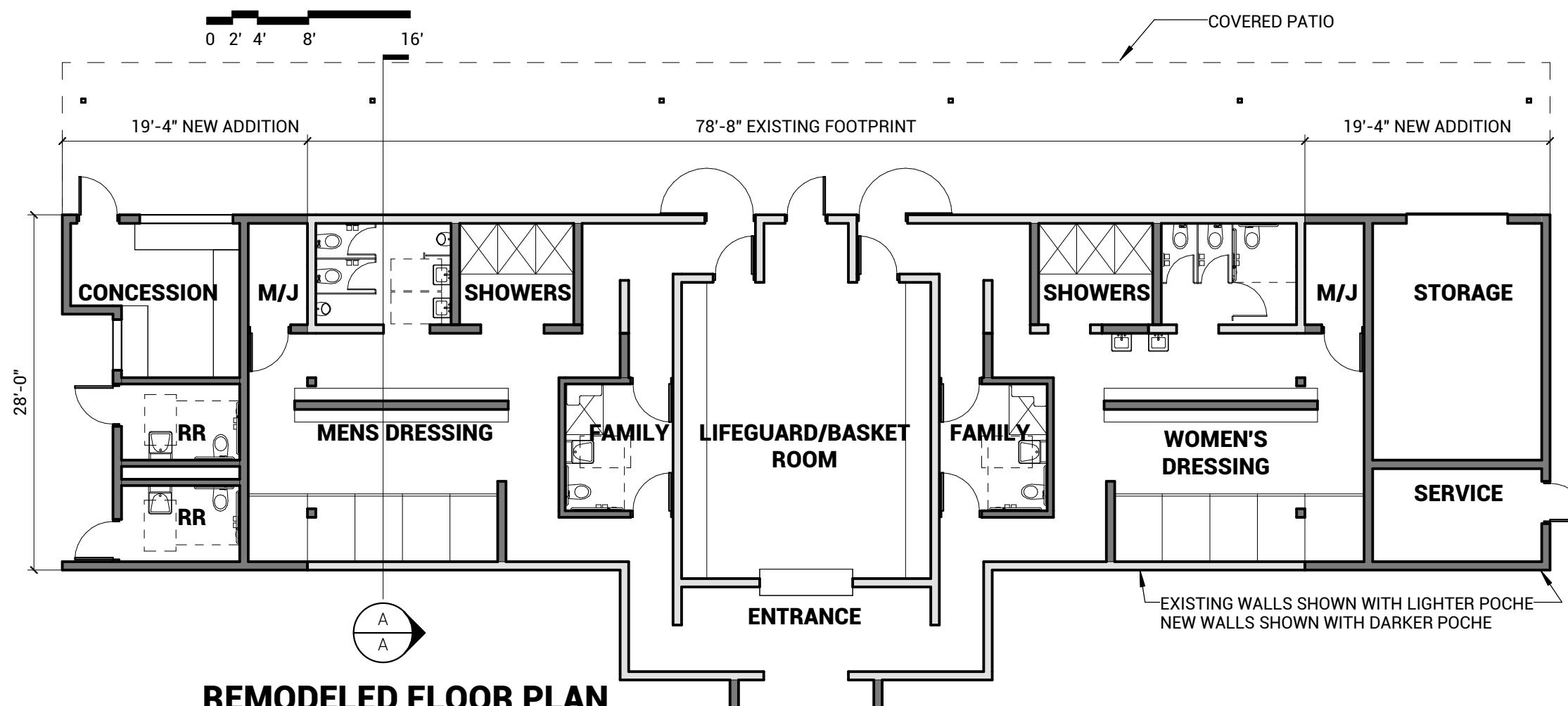
**EXTERIOR CONCEPT**





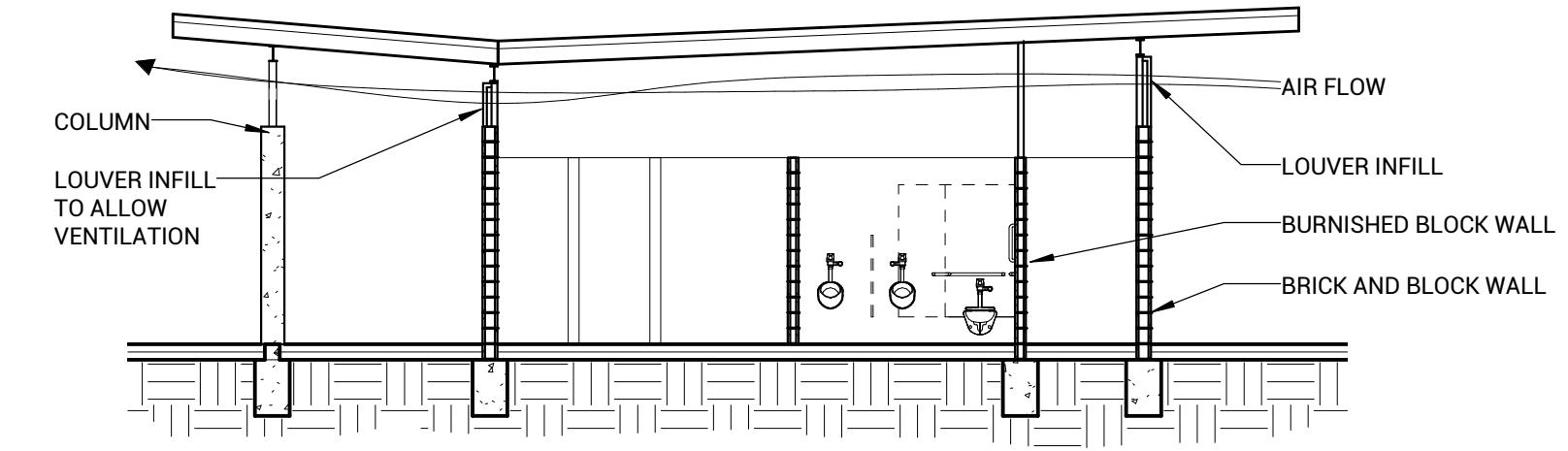
**EXISTING FLOOR PLAN SHOWING DEMOLITION**

0 2' 4' 8' 16'

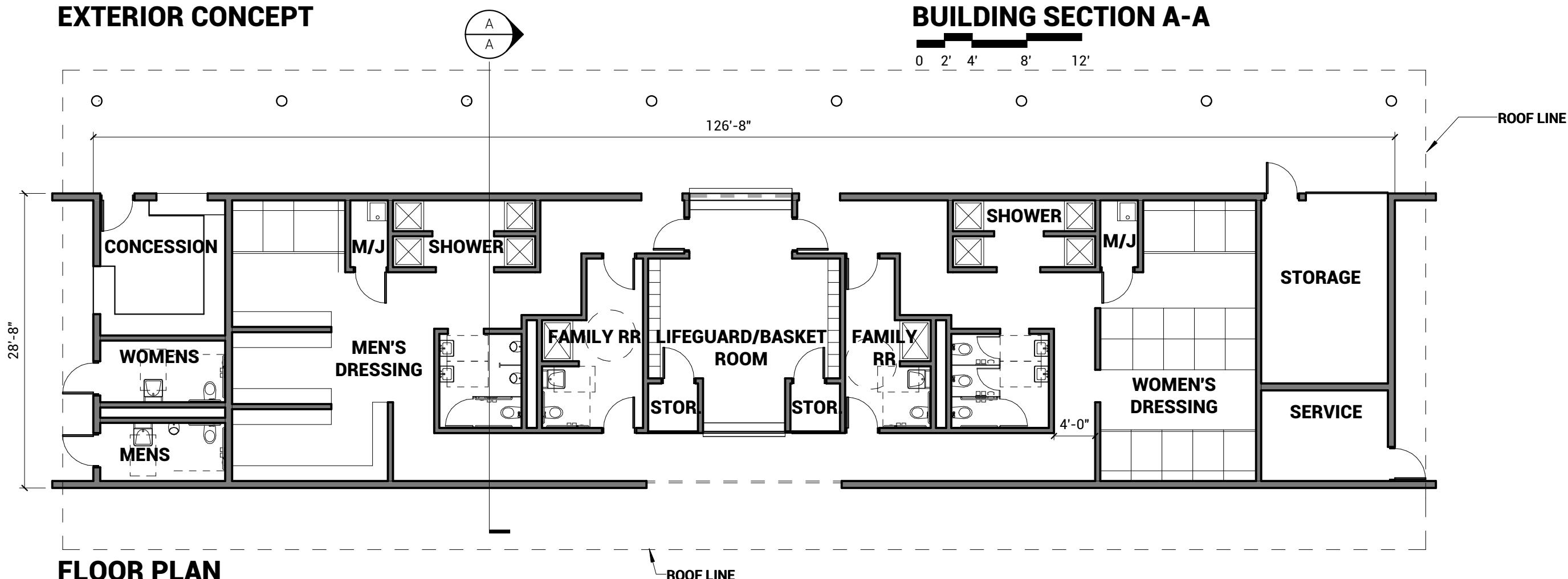


**REMODELED FLOOR PLAN**

0 2' 4' 8' 16'



**EXTERIOR CONCEPT**



**FLOOR PLAN**

0 2' 4' 8' 16'

PROJECT NO: 015-2112  
DRAWN BY:  
DATE: MARCH 2016

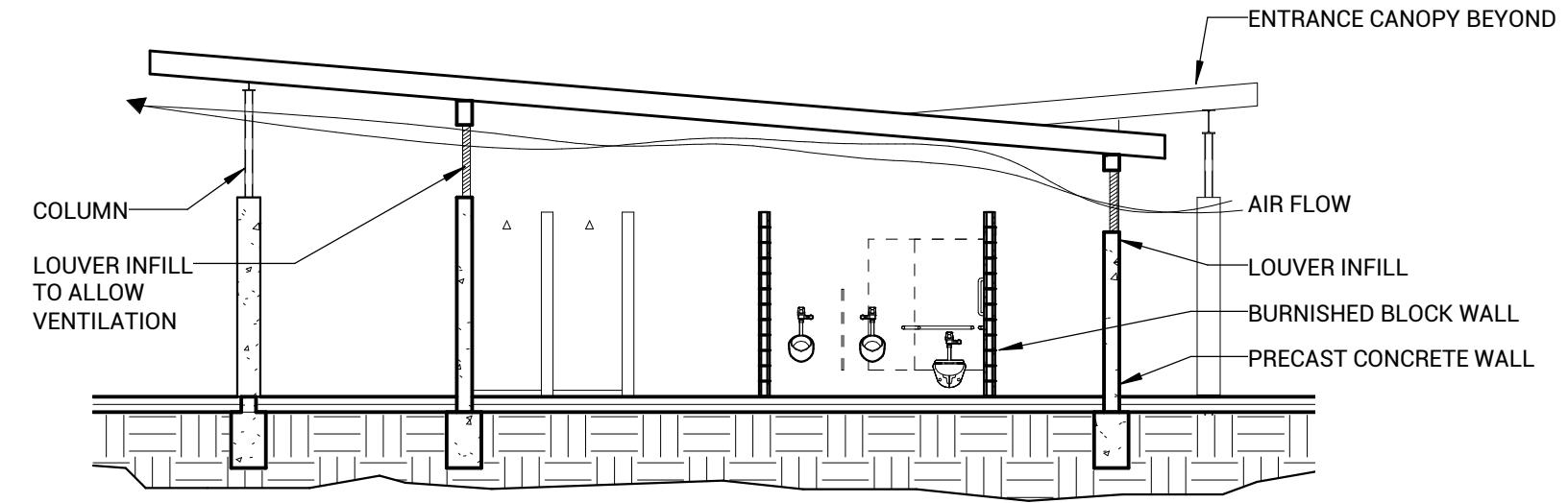


NEW BATHHOUSE  
FAIRBURY, NEBRASKA

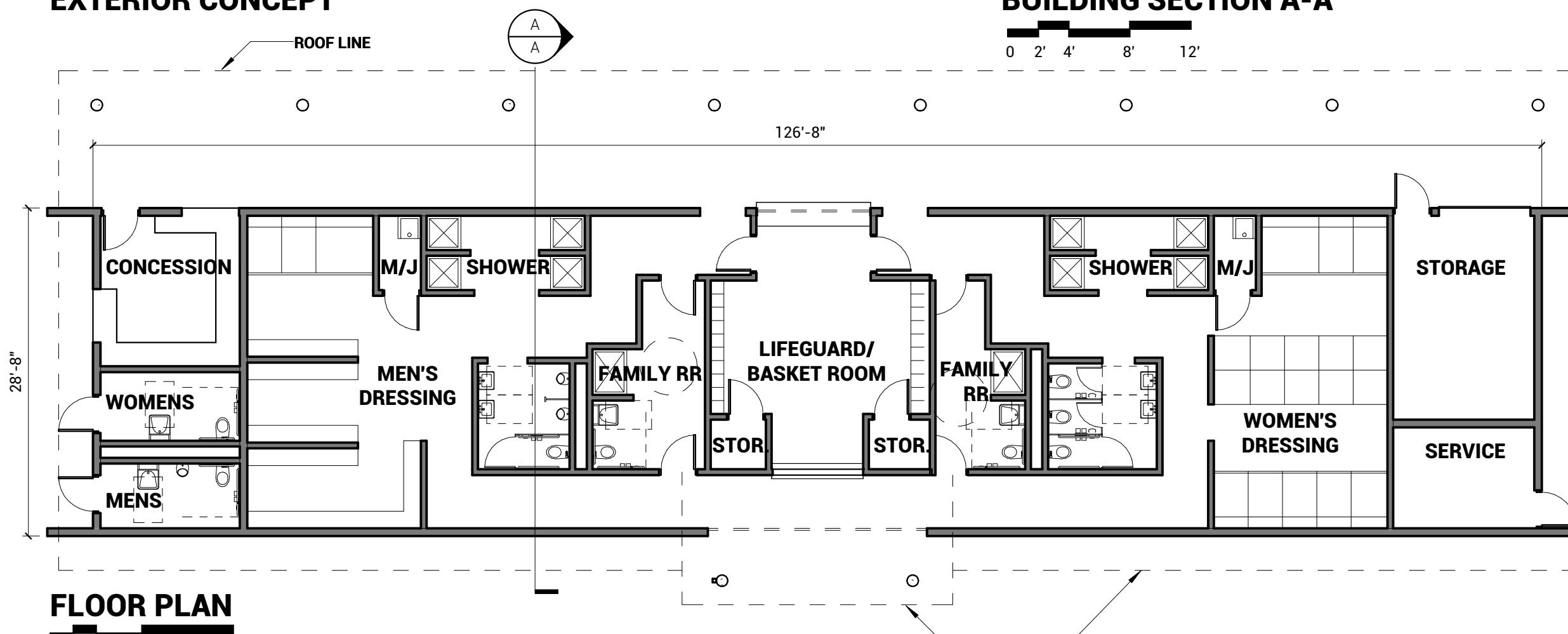
**OLSSON**  
ASSOCIATES

201 East 2nd Street  
P.O. Box 1072  
Grand Island, NE 68802-1072  
TEL 308.384.8750  
FAX 308.384.8752

FIGURE



**EXTERIOR CONCEPT**



**FLOOR PLAN**

PROJECT NO: 015-2112

DRAWN BY:

DATE: MARCH 2016



NEW BATHHOUSE  
FAIRBURY, NEBRASKA

## **Analysis of Existing Pool Basin**

The City of Fairbury contacted Olsson about the swimming pool, the City was having some issues with water loss. The City and pool staff were noticing that for the past several years during the swimming season the pool continued to lose water which made operation of the pool difficult. The staff had to adjust the pH levels more frequently and also more disinfectant was used due to the extra water needing to be added into the pool. The pool area is approximately 22,155 square feet within the fenced area, of which 8,770 square feet is the main pool basin and 820 square feet is the wading/kiddy pool area. The main pool has a capacity of 300,000 gallons of water with the depth ranging from 3 feet to 12 feet deep and the wading/kiddy pool has a capacity of 9,200 gallons of water with the depth ranging from 1 foot to 2 feet.

1. Pool Basin – The concrete pool basin is in fairly good condition. Visual and non-destructive testing were used to check for concrete cracking, concrete strength, sealant present, and any settling/separation of the pool basin. Non-destructive concrete tests (rebound hammer) on the pool basin yielded strengths greater than 4000 psi except where patchwork had been done in the diving well south of the main drain. These areas showed a considerable decrease in strength which could be due to a possible void under the concrete basin. This area was also sounded with a hammer which also indicated a void under the concrete basin. The remainder of the pool basin has hairline cracking in various areas and the construction joints are not properly sealed and may be allowing the pool basin to leak. The diving well meets the requirements for a one meter board but not a three meter board. Handicap access consists of a portable chair lift and requires staff to assist ADA patrons by setting up and operating the chair lift. The competitive swim lanes do not meet the current regulations for starting water depth for diving off of blocks as per the YMCA and NCAA guidelines.

2. Main Drain Structure & Piping - The main drain structure has severe cracking and deterioration. With the cracking and deterioration of the structure, it is a possibility that water is leaking out of the pool and could have caused the void on the south side of the main drain.



**Main Drain Structure**

During our inspection, the City of Fairbury's Utility Department ran a camera through the main drain to look at the pipe condition. After viewing the inspection, the main drain system piping was in fair condition. The pipe did have some scaling and buildup on the walls but the joints appeared to be tight and not leaking. There is also some debris throughout the line but could be cleaned by jetting. This area of the piping is the original piping installed in 1952.

3. Lighting – The original pool design included both underwater and overhead lighting for night swimming. The underwater lighting was abandoned during the pool remodel in 1990. The abandoned underwater light boxes had open conduits which currently are not in service and could have been a source of water leaking from the pool. Before the 2015 swimming season, the City staff placed caulking in the open conduit to mitigate potential leaking.



**Abandoned Underwater Light Boxes**

4. Pool Deck - The pool deck area is in good condition. The current deck area drains away from the pool and a drainage system was updated during the 1990 remodel. The pool deck area does meet the current standards for distances between the pool and fence but does not leave much room for layout areas or for spectators to watch swim competitions. Hose bids are available for deck washing near the bathhouse.

5. Wading Pool and Kiddie Pool



- a. Wading Pool – The concrete wading pool appears to be in good condition and only shows minor hairline cracks. The primary concern with the wading pool is the circulation system which will be discussed later in this report.
- b. Kiddie Pool – The concrete kiddie pool appears to be in good condition and only shows minor hairline cracks. The primary concern with the kiddie pool is the circulation system which will be discussed later in this report.

6. Filter System – The filter system for the pool is a gravity sand filter comprised of four chambers. The filter system appears to be in fair condition and the filter sand has been recently replaced. The filter capacity is approximately 850 gpm. The filter system does not have the capacity to meet the current required turnover rates for a pool this size. To meet the current turnover rate requirements the capacity would need to be about 1,375 gpm.

7. Circulation System

- a. Main Pool – The main pool currently utilizes a gravity main drain and a perimeter concrete gutter system. The circulation piping for the pool was updated in the 1990 remodel. These systems meet current standards for water skimming and draining but do not meet the current standards for turnover rates.

- b. Wading Pool – The wading pool currently utilizes one overflow mushroom pipe. Current standards require all pools to provide continuous skimming which the mushroom pipe does not allow. The turnover rate for the wading pool is unknown because there is no way to measure the return flow coming into the wading pool due to it being tied into the main pool circulation piping.
- c. Kiddie Pool – The kiddie pool currently utilizes one overflow mushroom pipe. Current standards require all pools to provide continuous skimming which the mushroom pipe does not allow. The turnover rate for the kiddie pool is unknown because there is no way to measure the return flow coming into the kiddie pool due to it being tied into the main pool circulation piping.

8. Chemical Treatment – The chemical treatment for the pool is a Rainbow Lifegard HC-3340 system which uses 1" chlorine tablets for disinfection. This setup is not automated and will need to be upgraded to meet current regulations. Water quality can be an issue with the existing pool. To control the pH levels in the pool, staff manually tests the levels and adds in the appropriate soda ash to bring the pH to an acceptable level. The water loss in the basin creates additional chemical costs due to the make-up water that is needed to maintain water levels in the pool. The existing chemical storage building is in poor condition with limited ventilation and will need to be upgraded to meet current regulations.

9. Diving Boards – The diving boards are 1 meter boards and are in fair condition and meet current standards. Whether a new pool basin is constructed or the existing pool basin is refurbished, these boards could be reused.



10. Slide – The existing slide is fairly new and in good condition. If the existing pool was to be updated, the current slide could be reused. If a new pool basin was constructed, the slide could potentially be reused depending on the new pool layout.



11. Lifeguard Chairs – There are currently 4 lifeguard chairs around the pool basin. The lifeguard chairs are in fair condition. They are placed in the appropriate locations so that the lifeguards are able to maintain surveillance of all pool floor areas.



12. Parking/Sidewalks – Parking is in place on both the north and south sides of the pool. Both parking areas are asphalt and in fair condition and should meet the demand for patron parking. These parking areas could use some paint striping to distinguish parking stalls. With these areas being close to the pool, they could possibly be damaged during construction of either a new basin or remodeling of the existing basin. If these were damaged it would be recommended to replace them with 6" concrete and add on 6" curb and gutter. Currently there are sidewalk all around the pool area. These sidewalks are in good condition and meet ADA

requirements. With any construction activities at the pool or bathhouse, these sidewalks would need to be replaced.

13. Site Improvements – The site around the pool area consists of mostly green space. While this is a great feature, the area does lack seating and viewing areas. The only sitting/viewing area close to the pool now is a gazebo structure just east of the bathhouse. This structure appears to be in good condition but has a limited number of seating.

For security at the pool there is a 6' chain link fence around the pool with a 4' chain link fence between the main pool basin and the wading and kiddie pools. The fence is in good condition and meets current regulations. Any construction activities at the pool or bathhouse would need to have the fence removed and it would be recommended that an 8' chain link take its place. This additional 2' would help improve security around the pool.

The existing pool area and site also utilize a small metal utility shed on the west side of the bathhouse. This shed is used to store pool equipment for everyday operations and equipment for swim competitions. The shed is in good condition but the staff must leave the pool area to access the equipment. It would be recommended to incorporate a storage area into the bathhouse for better security and easier access for the pool staff.

In 2010 Olsson Associates had completed a drainage study for the City of Fairbury. One of the areas of concern was the area around the pool. Currently this area has an area inlet east of the bathhouse and connects to a 24" storm pipe which flows south under Frederick Street and eventually outlets into the south side of the levee. The recommendation from the drainage study was to clean the line due to large amounts of debris limiting the amount of runoff that could be handled. According to the drainage study, this area does add a fair amount of storm water to the Frederick Street system and cannot take on much more of a drainage area without upsizing the Frederick Street system. If the north and south parking areas were to be reconstructed it would be recommended to install curb inlets to pick up the surface drainage and tie them into the existing 24" storm sewer pipe.

### Summary

The diving well of the pool basin is in need of replacement due to the water loss through the cracks in the main drain structure, poor concrete testing, and possible voids under the concrete floor. Temporary patching of the main drain structure could extend the life of the basin but should not be used as a permanent fix. In order to continue to host competitive swimming events, the pool depth needs to be increased to meet the YMCA diving standards. The current standards for competitive swimming require the shallow end of the pool to be at least 5 feet deep for YMCA regulations and 7 feet deep for NCAA regulations. To get to the minimum depth, the pool deck would need to be raised at least 2 feet. The deck is in good condition but would need to be removed in its entirety to allow the pool basin wall height to be extended to meet depth requirements for competitive swimming. The wading and kiddie pools are in good condition structurally. The circulation system needs upgraded. Installation of a new stainless steel gutter system is recommended. The filter system, recirculation system, and chemical treatment system all operate as originally designed in 1952 and 1990, but requires manual handling of chemicals and manual testing. A new chemical system is required to meet current standards. The current standards for the recirculation rates are:

1. A pool turnover rate of 1 pool every 1 hour or less for the wading and kiddie pools
2. A pool turnover rate of 1 pool every 4 hours or less for the 3 foot to 5 foot depths
3. A pool turnover rate of 1 pool every 6 hours or less for any depth over 5 feet

Based on the existing pool configuration and as mentioned before, the filtering requirements would need to be increased from 850 gpm to around 1,375 gpm. The current filter would need to be replaced to achieve this capacity.

The diving boards, slide, and lifeguard chairs are in fair condition and meet current standards. The current site improvements such as parking, sidewalk, and seating areas are in good condition but any pool modifications may require these areas to be modified. The complete pool evaluation can be seen in Appendix A.

## **Concepts and Cost Analysis**

As part of this study, Olsson Associates and BVH prepared possible concepts for rehabilitating the original pool basin and bathhouse and proposing new layouts with new bathhouse options. During our kick-off meeting, the City of Fairbury and the swim team coordinators requested to see specific activities incorporated into the new layouts. These activities included: 1. competitive swim lanes 2. a zero entry entrance with water activities 3. a diving well and slide and 4. open deck areas for patrons to relax and be able to view swim competitions. Below is a breakdown of each of the four concepts put together for this study.

### **1. Concept "A"**

Concept "A" utilizes the original pool basin and new bathhouse. This concept would consist of removing and replacing the pool floor in the diving basin and extending the pool walls up at least 2 feet to be able to meet the YMCA requirements for competitive swimming competitions. Additional water features include a double slide, and 1 and 3 meter diving boards. This design would also require all decking to be removed and replaced and would eliminate both the wading and kiddie pools and replace them with a double splash pad. Also with this concept would be a small green space area for resting and shade. The cost of Concept "A" can be seen below:

- Remodeled Pool Basin		<b>\$1,319,400.00</b>
o Demo Diving Basin	\$7,000	
o Remove Top Pool Curb	\$10,000	
o Concrete Diving Basin	\$26,000	
o Concrete Pool Curb	\$52,500	
o 5" Concrete Deck	\$161,200	
o Pumps, Piping, Filter	\$200,200	
- New Bathhouse		<b>\$657,250.00</b>
- Mechanical Building		<b>\$145,630.00</b>
- Splash Pads		<b>\$135,450.00</b>
o Splash Pads	\$60,000 Ea.	
o 5" Concrete Deck	\$15,500	
- Water Features		<b>\$250,700.00</b>
o Diving Boards	\$28,000	
o Double Slide	\$222,700	
- Greenspace w/ Shade Structures		<b>\$8,000.00</b>
o Shade Structures	\$1,000 Ea.	
o Sod	\$3,000	

-	Parking & Drainage Improvements	<b>\$379,400.00</b>
o	Earthwork	\$45,200
o	6" Concrete Paving	\$284,500
o	Remove Existing Parking	\$27,000
o	Storm Sewer Improvements	\$22,700
-	Seeding	<b>\$22,800.00</b>
	Construction Cost	<b>\$2,918,630.00</b>
	25% Engineering/Contingency	<b>\$729,700.00</b>
	<b>Total Construction Cost</b>	<b><u>\$3,648,330.00</u></b>

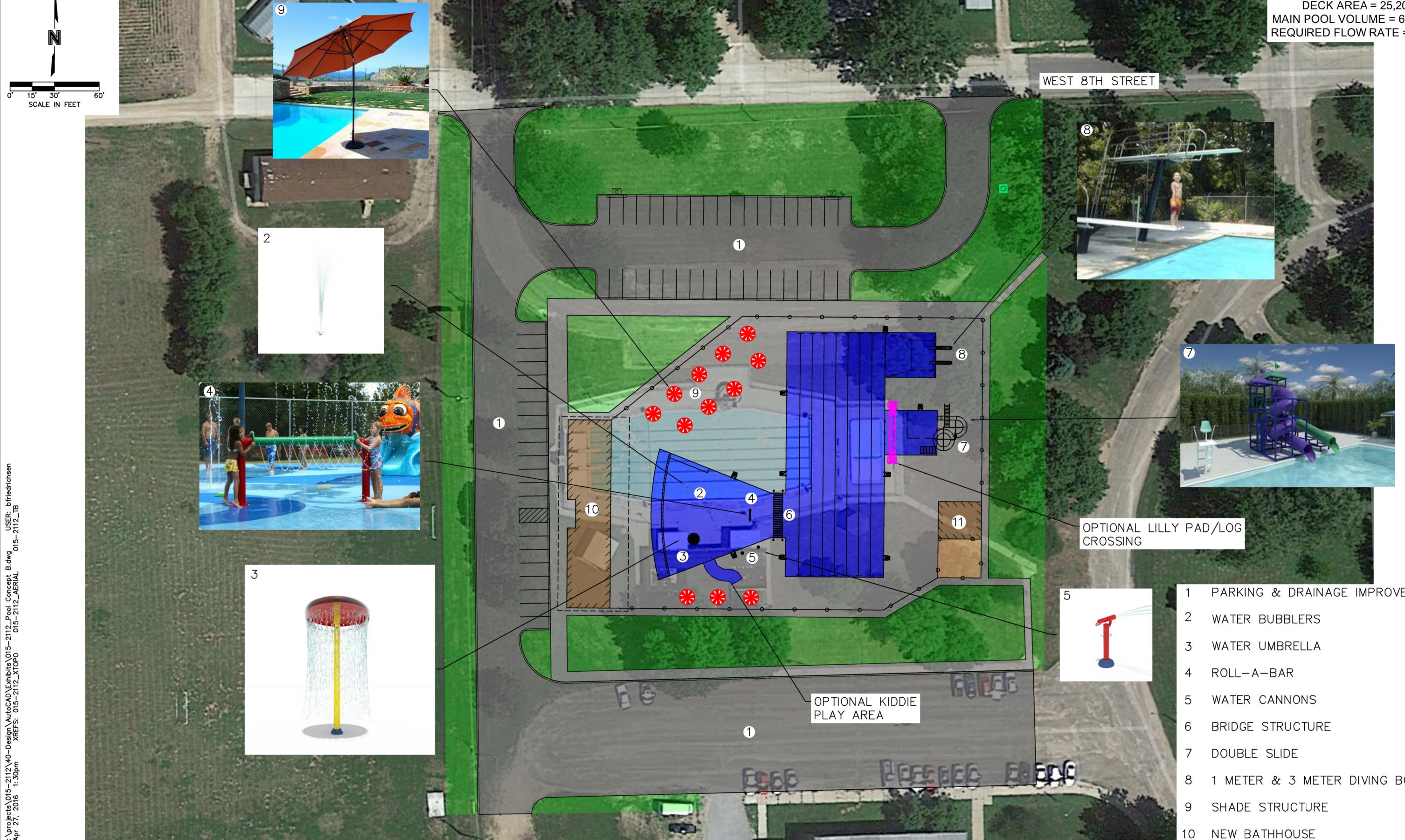


## 2. Concept "B"

Concept "B" consists of a new pool basin with the new bathhouse. The pool basin shown in this concept includes a zero entry entrance at the west end, the competitive lanes in the middle section running north and south, and separate slide and diving basins on the east end. Amenities for this concept includes 1 and 3 meter diving boards, double slide, 8-50 meter swim lanes, bridge structure, water cannons, roll-a-bar, water umbrella, water bubblers, and shade structures. Also shown in this concept but only as additional options are a small kiddie play area and a lily pad/log crossing. This concept includes removing and repaving the north and south parking areas as well as connecting the two parking areas along the west side with parking. By placing the bathhouse on the west end of the pool, the concession stand and parking could also be utilized by the ball fields. The cost of this concept can be seen below:

- New Pool Basin		<b>\$2,141,300.00</b>
o Concrete Basin	\$631,000	
o 5" Concrete Deck	\$226,820	
o Pumps, Piping, Filter	\$350,000	
- New Bathhouse		<b>\$657,250.00</b>
- Mechanical Building		<b>\$145,630.00</b>
- Water Features w/ Shade Structures		<b>\$343,200.00</b>
o Shade Structures	\$1,000 Ea.	
o Diving Boards	\$28,000	
o Double Slide	\$222,700	
o Bridge Structure	\$40,000	
o Water Bubblers	\$400 Ea.	
o Water Cannons	\$5,500 Ea.	
o Water Umbrella	\$7,300	
o Roll-A-Bar	\$5,000	
- Parking & Drainage Improvements		<b>\$460,350.00</b>
o Earthwork	\$52,200	
o 6" Concrete Paving	\$357,650	
o Remove Existing Parking	\$27,000	
o Storm Sewer Improvements	\$23,500	
- Seeding		<b>\$18,820.00</b>
Construction Cost		<b>\$3,766,550.00</b>
25% Engineering/Contingency		<b>\$941,640.00</b>
<b>Total Construction Cost</b>		<b><u>\$4,708,190.00</u></b>

- Kiddie Play Area		<b>\$60,000.00</b>
o Pumps, Piping		\$40,000
o Concrete Basin		\$10,000
o Water Features		\$10,000
- Lily Pad/Log Crossing		<b>\$60,000.00</b>
	Construction Cost	<b>\$120,000.00</b>
	25% Engineering/Contingency	<b>\$30,000.00</b>
	<b><u>Total Construction Cost</u></b>	<b><u>\$150,000.00</u></b>
<b><u>Total Construction Cost w/ Kiddie Play Area and Crossing</u></b>		<b><u>\$4,858,190.00</u></b>



### 3. Concept "C"

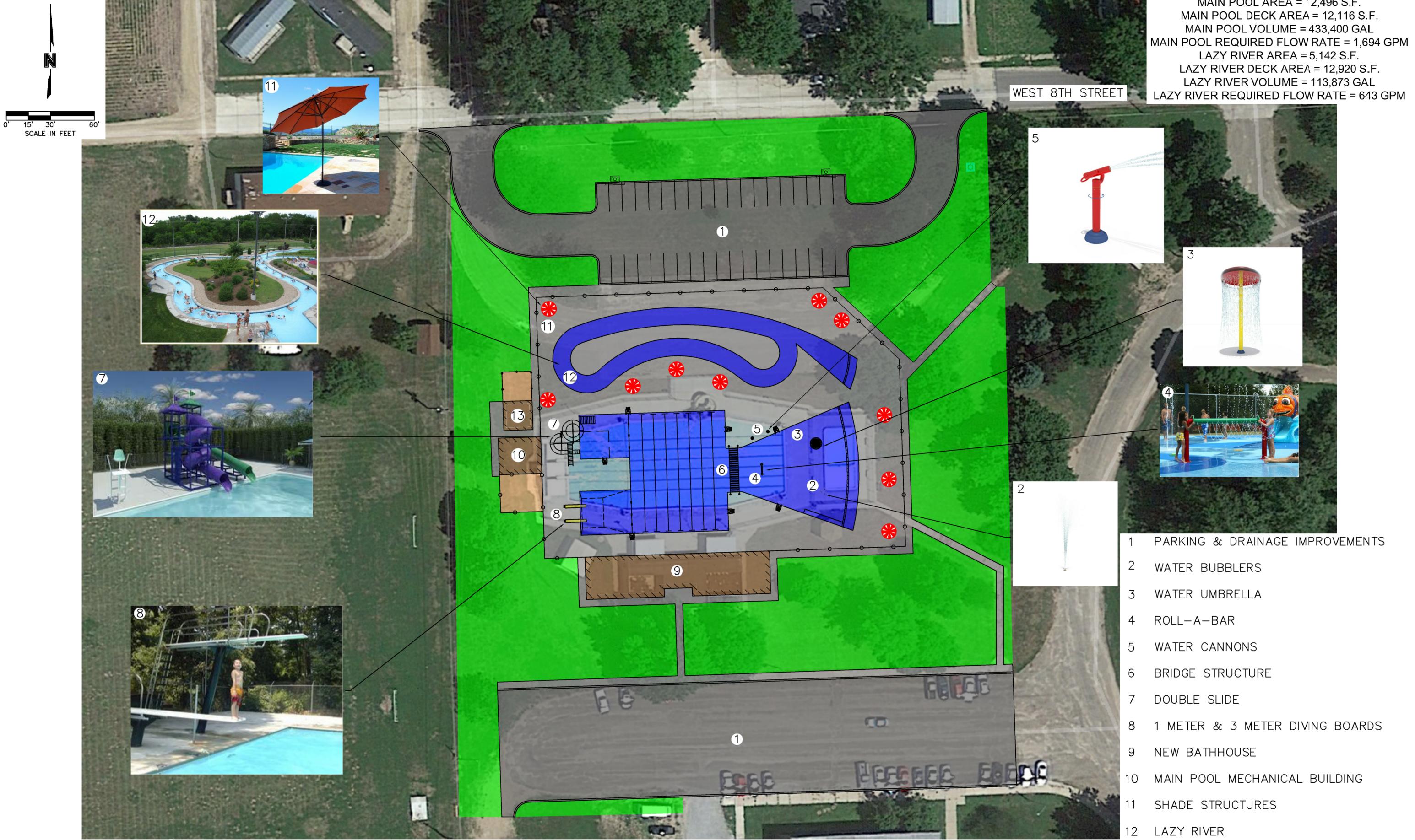
Concept "C" is a "U" shaped basin with a separate lazy river feature. The pool basin consists of the zero entry facing east, swim lanes in the center running north and south, and the diving and slide basins along the west. This concept has 8-25 meter competitive swim lanes, lazy river, zero entry, water umbrella, water cannons, roll-a-bar, water bubblers, bridge structure, double slide, and 1 and 3 meter diving boards. This concept uses the new bathhouse option. This concept fits the site well but does impact the north parking area with the lazy river feature. Patrons using the north parking area will need to walk around the pool basin to access the bathhouse. The cost of Concept "C" can be seen below:

- New Pool Basin	<b>\$1,754,050.00</b>
o Concrete Basin	\$469,000
o 5" Concrete Deck	\$109,000
o Pumps, Piping, Filter	\$340,000
- New Bathhouse	<b>\$657,250.00</b>
- Pool Mechanical Building	<b>\$145,630.00</b>
- Pool Water Features w/ Shade Structures	<b>\$338,200.00</b>
o Shade Structures	\$1,000 Ea.
o Double Slide	\$222,700
o Diving Boards	\$28,000
o Bridge Structure	\$40,000
o Water Bubblers	\$400 Ea.
o Water Cannons	\$5,500 Ea.
o Water Umbrella	\$7,300
o Roll-A-Bar	\$5,000
- Parking & Drainage Improvements	<b>\$379,300.00</b>
o Earthwork	\$63,800
o 6" Concrete Paving	\$266,000
o Remove Existing Parking	\$27,000
o Storm Sewer Improvements	\$22,500
- Seeding	<b>\$21,200.00</b>
Construction Cost	<b>\$3,295,630.00</b>
25% Engineering/Contingency	<b>\$823,900.00</b>
<b>Total Pool Construction Cost</b>	<b><u>\$4,119,530.00</u></b>
- Lazy River w/ Shade Structures	<b>\$662,200.00</b>
o Shade Structures	\$1,000 Ea.

o Pumps, Piping, Filter	\$232,770
o Concrete Basin	\$279,500
o 5" Concrete Deck	\$116,280
- Lazy River Water Features	<b>\$60,000.00</b>
o Wall Sprays	\$680 Ea.
o Water Jets	\$400 Ea.
o Geysers	\$1,900 Ea.
o Water Cannons	\$5,500 Ea.
- Lazy River Mechanical Building	<b>\$85,000.00</b>
Construction Cost	<b>\$807,200.00</b>
25% Engineering/Contingency	<b>\$201,800.00</b>
<b>Total Lazy River Construction Cost</b>	<b><u>\$1,009,000.00</u></b>

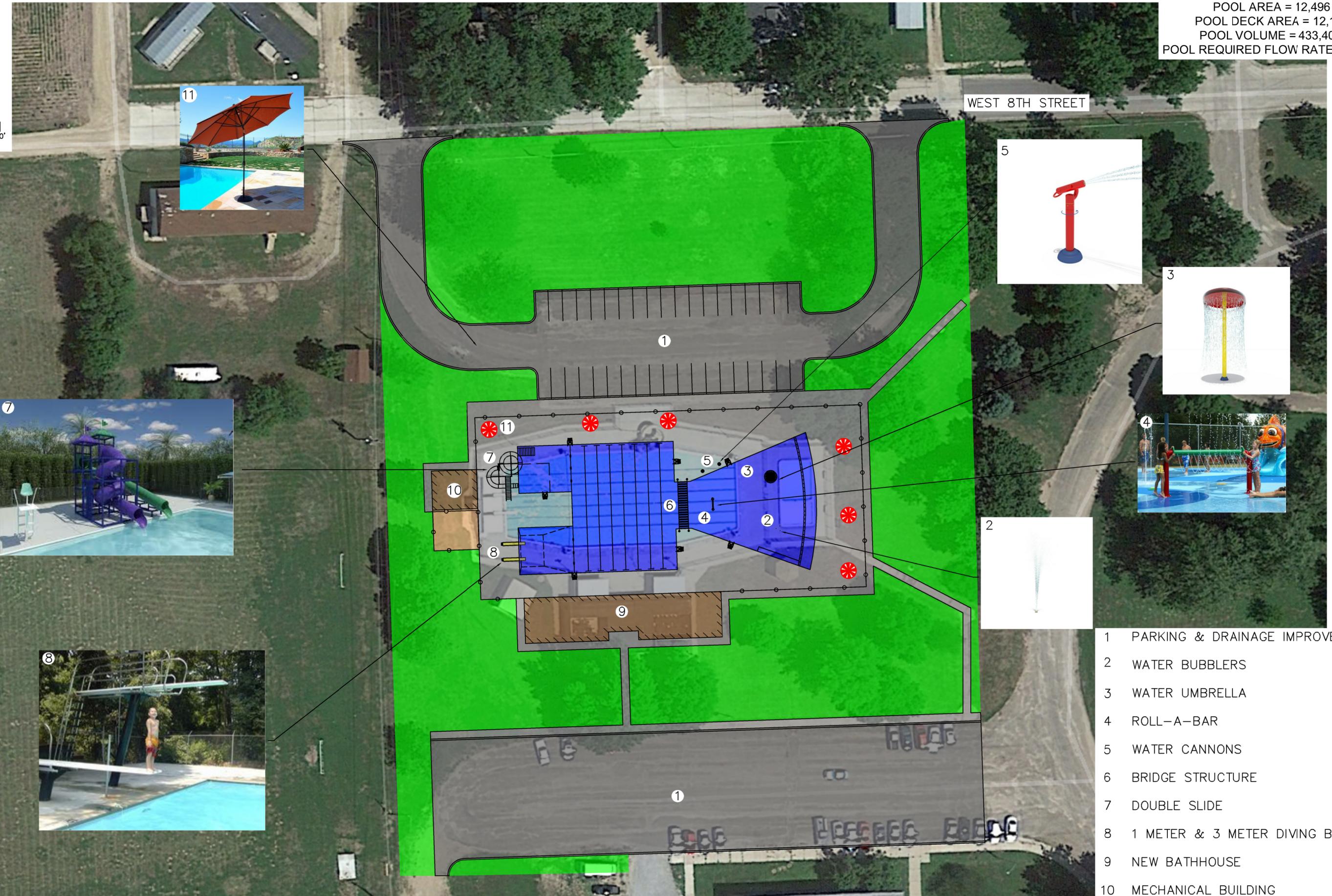
**Total Construction Costs w/ Lazy River Feature** **\$5,128,530.00**

With this option, the existing bathhouse could be remodeled and used instead of the new bathhouse design. The cost of remodeling the existing bathhouse would be approximately \$503,500. If this route was chosen, there could be a savings of \$153,750 on the construction cost.



DWG: F:\projects\015-2112\40-Design\AutoCAD\Exhibits\015-2112\_Pool Concept.Dwg  
DATE: May 04, 2016 10:35am  
XXEFS: 015-2112\_XTOPO  
015-2112\_AERIAL  
USER: bfriedrichsen  
015-2112\_TB

JECT NO: 015-2112  
WN BY: BJF  
E: MARCH 2016



POOL AREA = 12,496 S.F.  
POOL DECK AREA = 12,116 S.F.  
POOL VOLUME = 433,400 GAL  
POOL REQUIRED FLOW RATE = 1,694 GPM

CONCEPT "C-1" NEW POOL WITH NEW BATHHOUSE  
FAIRBURY, NEBRASKA



1 East 2nd Street  
D. Box 1072  
Sand Island, NE 68802-  
L 308.384.8750  
X 308.384.8752

## FIGURE

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# 4

## **Funding Options**

Funding options for Municipal Parks and Pools have typically been difficult to obtain. Only recently has funding opportunities opened up for qualifying Communities. A summary of funding opportunities are as follows:

### **Park & Pool Funding**

#### **1. CDBG**

The Community Development Block Grant (CDBG) can be utilized in eligible communities for eligible projects. CDBG funds are administered by the Nebraska Department of Economic Development (NDED) and are federal funds allocated from Housing and Urban Development (HUD). Fairbury is currently 47.74% LMI based on the census survey data and needs be at 51% or greater LMI to be eligible for projects. A community wide income survey can be completed in order to establish eligibility. CDBG is a competitive grant with an annual cycle, it may be difficult to have a competitive application with park improvements being the primary focus. Maximum CDBG award is \$250,000 with a required 25% match. The City should look at the priorities and estimated users in order to best utilize CDBG funds. Establishment and identification of need is the most important part of a CDBG application, and recreational project will be measured against all other public needs. NDED should be consulted prior to any grant application, to determine project eligibility. Federal funds come with various requirements and mandates that may increase project cost, scope of work, or timeline.

#### **2. LWCF**

The Land and Water Conservation Fund (LWCF) is a competitive matching grant offered periodically. LWCF is administered by Nebraska Game and Parks Commission (NGPC) and are federal funds allocated from the National Parks Service (NPS). These federal funds are available for municipal owned outdoor recreation projects. The Statewide Comprehensive Outdoor Recreational Plan (SCORP) identifies priority project for the NGPC for a given timeframe. Fairbury could utilize this funding source for priority projects in the park area. The funding amount is not set but a 50% match is required and grant awards are typically less than \$200,000. NGPC should be consulted prior to any grant application to determine project eligibility. Federal funds come with various requirements and mandates that may increase project cost, scope of work, or timeline.

### **3. CCCFF**

The Community Civic Center Financing Fund (CCFF) is state funds awarded annually through a competitive grant cycle. CCFF funds are administered by the Nebraska Department of Economic Development (NDED) and are state funds allocated through the Nebraska Legislature. Recreational Centers and sports fields have been established as eligible projects. Swimming pool repairs, swimming pools as a standalone project, and trail projects may not be eligible for CCFF grants. Once an eligible recreational project is identified Fairbury could be eligible for \$375,000 with a 50% matching grant requirement. NDED should be consulted prior to any grant application, to determine project eligibility.

### **4. CDA**

The Community Development Assistance Act (CDA) was created in 1985 by the Nebraska Legislature to encourage private investment to financially support nonprofit community betterment organizations in an effort to implement community service and development projects in chronic, economically distressed areas. A community betterment organization may apply to the Nebraska Department of Economic Development (DED), to qualify for awarding tax credits to eligible contributors. Upon the department's approval of a project, the nonprofit organization can award state tax credits of up to 40 percent of the value of a contribution to eligible businesses, corporations, insurance firms, financial institutions, or individuals.

### **5. Foundation Funding**

There are a number of private foundations throughout Nebraska that could be utilized for various park and recreational project funding. Based on the project type, user groups and project, different foundations may be utilized. NDED provides a list of Nebraska Foundation that may be solicited for project funds. One possible foundation is the Peter Kiewit Foundation. Foundations should be contracted directly to determine funding available and project eligibility.

## **Trail Funding**

### **1. RTP**

The Recreational Trails Program (RTP) is a competitive grant offered annually. RTP is funded by the Federal Highway Administration (FHWA) and administered by the Nebraska Game and Parks Commission. Federal assistance up to 80% from the RTP is allowed to match a project's cost or up to \$250,000. NGPC should be consulted prior to any grant application to determine project eligibility. Federal funds come with various requirements and mandates that may increase project cost, scope of work, or timeline.

## 2. TAP

Transportation Alternatives Program is a competitive grant offered periodically. TAP is funded by Federal Highway Administration (FHWA) and administered by the Nebraska Department of Roads (NDOR). Federal assistance up to 80% for TAP is allowed to match a project's cost. Project may include trail development and sidewalk improvements depending on the nature of the project. NDOR should be consulted prior to any grant application to determine project eligibility. Federal funds come with various requirements and mandates that may increase project cost, scope of work, or timeline.

These funds are all great potential opportunities for the City of Fairbury to consider as you complete the planning on the Park and Pool needs of the Community. Olsson has staff knowledgeable in applying for these funds and would be a great resource for the City of Fairbury to use to put this study into action.



## **Appendices**

- A. Acknowledgments
- B. Pool Facility Evaluation
- C. Available Water Features
- D. Geotechnical Report
- E. Preliminary Drainage Study

## Appendix A

## **ACKNOWLEDGMENTS**

### **Mayor**

- Homer Ward

### **City Council**

- Ed Friesen, Chair
- Roger Bailey
- Doug Brown
- Rick Carmichael
- Kelly Davis
- Brad Kuzelka
- Tim Polson
- Phil Rogge

### **Pool & Aquatic Committee**

- Brad Kuzelka, Chair
- Barb Bedlan
- Craig Bontrager
- Jake Friesen
- Mary Mach
- Valerie Snyder
- Crystal Stall

### **City Staff**

- Collin Bielser, City Administrator
- Mick Hynek, Street Superintendent
- Laura Bedlan, Zoning Administrator

### **Community Organizations**

- Blue Rivers Area Agency on Aging
- Fairbury Baseball/Softball Association
- Fairbury Fun Park Committee
- Fairbury Hoops
- Fairbury Master Gardeners
- Fairbury Optimist Club
- Fairbury Soccer Association
- Fairbury Swim Team
- Fairbury Tree Board
- Pioneer Shrine Club

## Appendix B

## SWIMMING POOL FACILITY EVALUATION FORM

Owner: City of Fairbury Project No.: 2015-2112 Date: July 30th 2015

Facility Name: Municipal Pool Facility Location: Fairbury, Nebraska

Facility Address: Fairbury City Park County: Jefferson

Record Plans Received: 1952/1990 Pictures Taken: yes

Other Documents Received:

### History:

Pool Built: 1953

Bathhouse Built: 1953

Pool Renovated: 1990

Bathhouse Renovated:

Pool No. 1 Description: Main Pool 3'-12' deep No. 2 Description: Kiddie Pool 2' deep

No.3 Description: Baby Pool 1' deep

Building No. 1 Description: No. 2 Description:

Do Pools Leak Water: Main Pool Amount:

Reported Location of Leaks: Main drain basin/electrical boxes/joints

Subsurface Conditions:

Open Water in close Proximity: none

High Ground Water: see geotech report

Ratings:

1 = Least, Worst or Lowest

5 = Most, Best or Highest

### 1.1 Pool Basin

Indoor:  Outdoor:  Shape: Rectangular  T  L

Free Form:

Current Pool Uses: Recreation  Wellness  Education  Competition

Pool Basin Type: Combination  Rec Only  Wellness Only  Diving Only

Pool Basin Activities

Competitive Features:

25-Yard Lanes  25-Meter Lanes  Water Depth Less than 3'  Zero Depth

50-Yard Lanes  50-Meter Lanes

Recreation Features:

Waterslide  Diving  Receiving Area  Lazy River  Special

Basin Construction/Condition:

Floor Constructed of: Concrete  Aluminum  Steel  Fiberglass

Floor Cracking:

Shallow Area: 1  2  3  4  5  Describe hairline cracking

Medium Area: 1  2  3  4  5  Describe hairline cracking

Diving Hopper: 1  2  3  4  5  Describe hairline cracking

Is Floor Repairable: Could reseal joints to help

Walls:

Wall Constructed of: Cast Concrete  Gunite  Aluminum  Fiberglass

Steel  Masonry

Condition: Rebar Exposed **no**

Disjointed Walls

Walls Straight **yes**

Evidence of Structural Failure **no**

Structural Cracks **small hairline cracks**

Wall and Floor Separate **yes**

Wall and Fillet Separate **no**

Are Walls Reparable **yes**

Expansion-Contraction Joints:

In Floor  Up Walls  At Intersection of Walls w/Floor  At Breakline  In DH

Joint Conditions: 1  2  3  4  5  N/A

Original Waterproofing of Joints: Sealant  Waterstop  Unknown

Waterstop: Present in Joints  Unknown  Shown on Plans

Recirculation Type: Conventional  Reverse  Mixed

Outlet System Type: Skimmer Pool  Gutter Pool

Pool Gutter:

Type: Roll Out  Amityville  Curb with Gutter

Manufactured Gutter Inserted into Cast Pool Wall

Constructed of: Gunite/Ceramic Tile Gutter  Cast Concrete  Masonry Units

Stainless Steel  Assembly  Pre-Cast Concrete  Aluminum Pool Gutter

Steel Pool Gutter  PVC Gutter Assembly

Pool Gutter is Level **no** if no, Approximate Difference **approx. 1/2"**

Comments:

**1.2 Pool Basin Finish**

Pool Finished: Paint  Plaster  Ceramic Tile  Unfinished

Condition: 1  2  3  4  5

Paint: Heavy Build Up **minor** Abrasion Blasting Required

Signage on Deck **yes**

Type: Paint  Tile

Depth Marking **yes**

Size of Numbers **6"**

Meet Code Distance of 24' apart **yes**

In Corners **no**

Changes in Pool Floor Depth **yes**

No Diving **no**

Size of Letters **n/a**

Meet Code Distance of 42' O.C. **n/a**

Signage in Pool **yes**

Type: Paint  Tile

Depth Marking **yes**

Size of Numbers **6"**

Meet Code Distance **yes**

In Corners **no**

Changes in Pool Floor Depth **yes**

Contracting Color Line at Breakline **yes**

At Stop Threads

Competition Lane Lines **yes**

Of: Paint  Tile  Meet Standards

Comments:

**1.3 Security Fence**

Exterior Perimeter Enclosure: Height **6'**

4" Gaps Under Enclosure **no**

4" Gaps at Ends **no**

North-east Corner of Bathhouse Type: Chain Link  Ornamental  Other

For Chain Link: Safety Woven  Top Bar  Barb Wire

For Ornamental: Gap Width between Bars or Pickets **n/a**

Gate(s) **walk** Number of Gates **1 (2 if count into main pool)** 4" Gaps in Gates **no**  
Emergency Exits **n/a**

Interior: Height **4'** 4" Gaps Under Enclosure **no**

4" Gaps at Ends **no**

Type: Chain Link  Ornamental  Other

For Chain Link: Safety Woven  Top Bar  Barb Wire

For Ornamental: Gap Width between Bars or Pickets **n/a**

Gate(s) **walk** Number of Gates **3 exterior including 1 in babypool area** 4" Gaps in Gates **no**  
Emergency Exits **no**

Concession Area Fence <b>6'</b>	Height	Location	Dimensions
	ft. X	ft.	

Are Interior Gates Self Closing **no**

Comments:

#### 1.4 Pool Vacuum System

Pool Vacuum Observed **yes** Brand **Harmsco** Model **Better Filter 155 SC**

Type: Central w/Wall Fittings  Skimmer Type  Portable  Robot  **secondary**

For Portable: Discharge Type: W/Filter Back to Pool  WO/Filter to Gutter System

Powered by: Gas Engine  Electric Motor  GFIC Protection

For Robot: Air Sensor  Remote Control

Comments:

#### 1.5 Pool Decking

Type: Unfinished Concrete  Decorative Concrete  Other

Slope Away from Pool **yes** Slope to Deck Drains **yes**

Slope to Grade **no** Min Width **14' to fence**

Shade Structure of Pool No. 2 and Pool No.3

Cracking: 1  2  3  4  5

Obstructions within 5' of Pool **no** Ramps **no** Meet ADA **no**

Comments: **no shade structure**

#### 1.6 Deck Drain

Deck Drains **20** Air Gap **yes** Discharges to: Storm  Sanitary

Location of Drains **4' from pool edge**

Comments:

#### 1.7 Deck Equipment

Number of Units: **3 (2 boards, 1 slide)**

2- Meter Diving Boards **no** Portable Lifeguard Chair **no**

Stair Case into Pool **no** 1-Meter Diving Boards **2**

Stationary Lifeguard Chair **4** Deck Pool Slide **1**

Deck Level Tower **no** Pool Ladder **6**

ADA Lifts **yes (upon request)**

#### Diving Boards:

Style: Single Pedestal  4 Leg  Site Built  Broken Fitting  
Brand **n/a** Overall Condition: 1  2  3  4  5   
Concrete Footings **yes (bolted)** Length of Board **14'**  
Other

Diving Board: 2 METER **n/a**

Distance End of Board Vertical Down to Diving Hopper Fillet

Distance Board above Water

Distance Board Extends over Diving Hopper Wall

Distance from Tower to Side Wall

Distance to Another Tower

Handrails Present

Handrails to Inside Pool Wall

Replace

Diving Board: 1 METER:

Distance End of Board Vertical Down to Diving Hopper Fillet **9.5'** or Floor **15'**  
Distance Board Above Water **3'** Distance Board Extends over Diving Hopper Wall **5'**

Distance from Tower to Side Wall **1'**

Distance to Another Diving Tower **12'**

Handrails Present **yes**

Handrails to Inside Pool Wall **yes**

Replace

#### Lifeguard Chairs:

Style: Single Pedestal  4 Leg  Site Built  Broken Fittings  
Brand **Paragon** Overall Conditions: 1  2  3  4  5   
Umbrellas **available** Fiberglass Seats  Wood Seats  Meet OSHA **yes**  
All Appear to Have Concrete Footings **bolted to deck** Replace Choose an item.

#### Pool Ladders:

Style: Stainless Steel  Other  Type: Overhand  Flush  Cross Braced  
Broken Fittings Overall Conditions: 1  2  3  4  5   
Brand **n/a** Replace  
ADA Access **yes** Type: Lift  Ramp  Chair  Zero Depth Wheel Chair   
Comments: **lift is available upon request, ladder steps are plastic**

#### 1.8 Surge Capacity

Surge Capacity Present Choose an item. Type: Tank  In Gutter  Other

Serves Pool No. 1  Serves Pool No. 2  Serves Pool No. 3

Location Click here to enter text. Condition: 1  2  3  4  5

Size: From Plans = Click here to enter text.gallons

From Field Measurements = L Click here to enter text. x W Click here to enter text. = Gallons Click here to enter text.

Reuse Choose an item. Flood Pumps/Basement Possible Choose an item. N/A

Automatic Fill Valve Choose an item. Type Click here to enter text. 6" Air Gap Choose an item.

Cross Connection: 6" Air Gap on Fill Choose an item. 6" Air Gap on Drain Choose an item.

Comments: Click here to enter text.

#### 1.9 Main Pool Piping

Conventional Flow  Reverse Flow  Combination  Original System Choose an item.

Main Drain: Number <b>1</b>	Size	x	
½" Maximum Opening	Description		
Main Drain Pipe Dia.	Constructed of PVC <input type="checkbox"/> Metal <input type="checkbox"/>		
Return Inlets: In Wall <input type="checkbox"/> In Floor <input type="checkbox"/> Floor Trench Inlet <input type="checkbox"/> Part of Manufactured Gutter <input type="checkbox"/>			
Spacing Per Code	Directional	Adjustable	Metallic <input type="checkbox"/> No.
Inlets			
Return Pipe Dia.	Constructed of:	PVC <input type="checkbox"/> Metal <input type="checkbox"/>	
Outlet System: Gutter	Skimmer		
Outlet Pipe Dia.	Constructed of: PVC <input type="checkbox"/> Metal <input type="checkbox"/>		
For Gutter Pool: No. of Drains	"L" Type <input type="checkbox"/> Flat Type <input type="checkbox"/>		
Location of Drains			
For Skimmer Pool: Number Skimmers	Constructed of: PVC <input type="checkbox"/> Metal <input type="checkbox"/>		
Comments:			

#### 1.10 Filtration Type

Brand	Model No.	No. Units	
Type: Pressure Sand <input type="checkbox"/> Vacuum Sand <input type="checkbox"/> Gravity Sand <input type="checkbox"/> Other Sand <input type="checkbox"/>			
Pressure DE <input type="checkbox"/> Vacuum DE <input type="checkbox"/> Bump DE <input type="checkbox"/> Cartridge <input type="checkbox"/>			
Tank Material: Steel <input type="checkbox"/> Fiberglass <input type="checkbox"/> Aluminum <input type="checkbox"/> Concrete <input type="checkbox"/> Other <input type="checkbox"/>			
Serves Pool No. 1 <input type="checkbox"/> Serves Pool No. 2 <input type="checkbox"/> Serves Pool No. 3 <input type="checkbox"/> Reuse Filter			
For Sand: High Rate <input type="checkbox"/> Rapid Rate <input type="checkbox"/> Dia.	or L <b>7.5'</b>		W <b>8.25'</b> each (4 total)
= Area <b>61.875</b> each (247.5 total) s.f.			
For DE: No. Septums	Dia.	or L	x W
= Area	s.f.		
For Cartridge: No. Cartridges	Dia.	or L	x W
= Area	s.f.		
Hydraulic Capacity: From Data Plate	: Loading of	gpm/s.f.	Flow of
gpm			
From Calculations	: Loading of	gpm/s.f. x area	s.f.
= Flow of	gpm		
Supply Piping: Manifold	Each Filter Lateral		
Independently Valved			
Manifold Piping D.I. <input type="checkbox"/> Valves: Gate <input type="checkbox"/> Butterfly <input type="checkbox"/>			
Backwash: Individually <input type="checkbox"/> Group <input type="checkbox"/> Backwash Pipe Size			
Air Gap	Sight Glass		
Backwash flow to: Storm <input type="checkbox"/> Sanitary <input type="checkbox"/> To Grade <input type="checkbox"/>			
Comments:			

#### 1.11 Recirculation Pump Assembly No. 1

Pump Brand <b>AP Aurora Pentair Pump Group</b>	Model No. <b>02-474572-2</b>	No. Units <b>2</b>	
Type: End Suction Centrifugal <input type="checkbox"/> Split Case Centrifugal <input type="checkbox"/> Vertical Turbine <input type="checkbox"/>		RPM = <b>1750</b>	
Long Coupled <input type="checkbox"/> Short Coupled <input type="checkbox"/> Serves Main Pool <input type="checkbox"/> Serves Baby Pool <input type="checkbox"/>		Type = <b>341A-BF</b>	
Serves Kiddie Pool <input type="checkbox"/>		Size = <b>6x6x12B</b>	
Capacity: From Data Plate	gpm @	ft. TDH	From Plans
gpm @	ft. TDH		
Pump Housing Suction Size <b>8"</b>	Pump Housing Discharge Size <b>6"</b>		
Pump Reusable <b>yes</b>	Data Plate Located <b>on pump motor</b>		

Pump Suction Pipe Commences: At Surge Tank  Direct from Main Drains  At Filter   
 Suction Pipe Size **8"** Pipe Type: D.I.  PVC  Flooded Suction  
 Hair and Lint Strainer Brand Size Model No.  
  
 Reuse Strainer Isolation Valve(s) for Strainer  
 Discharge Pipe Size **6"** Pipe Type: D.I.  PVC   
 Flow Meter **1** Brand **Water Specialties Propeller Meter** Model No. **20121240-06**  
 Pump Motor: Brand Model No. HP  
 Phase Voltage Amps  
 RPM Type Frame  
 ID No.  
 Starter Provided Model No.  
 Comments:

**1.12 Disinfectant Type No. 1**

Chlorinator Brand **Rainbow Lifegard** Model No. **HC-3340** No. Units **1 (1" tablets)**  
 Maximum Output in gpd **4.5 lb/hr** in pph

Location **Outside west side of pool in locked building**

Serves Pool No. 1  Serves Pool No. 2  Serves Pool No. 3

Form of Disinfectant: Gas  Liquid  Solid  Type: Chlorine  Bromine

Specific Type Chemical Used

Method of Operation: Vacuum  Manual Control  Automatic Control

Point of Injection Downstream of: Pump  Heater  Filter

Method of Inducing Flow Through Chlorinator:

Internal Pump  Bypass Valve in Return  Public Water  Booster Pump

For Booster Pump: Brand Model No.

Hp Volt Phase

Does Method of Inducing Flow Result in Direction Cross Connection

Chemical Operation

pH Balancing System: **yes, ash** If Yes, then Manual Control  Automatic Control

Brand Model No. No. Units

Maximum Output in gpd in ppd

Location

Serves Main Pool  Serves Baby Pool  Serves Kiddie Pool

pH Form: Gas  Liquid  Slurry  Type: Soda Ash  Co2  Muratic Acid

Specific Type Chemical Used

Separate Chemical Room **yes, east side of bath house**

Serves: Main Pool  Baby Pool  Kiddie Pool

Location of Chlorine Room(s) **west side of filter house**

Room Sealed **yes** Closed Ceiling **yes** Open Ceiling **only vent**

Constructed of: Masonry Walls  Wood Frame Walls

Chlorine Room has: Out Swing Door **yes** Vent **yes, ceiling** Window **no**

Chlorine Alarm **no** Outside Light Switch **no** Safety Mask **yes**

Outside Ventilation Switch **no**

Light Operational **no** Ventilator Operational **yes**

For Gas: Cylinder Chain  
Describe any Chemicals Present  
Comments:

Cylinder Scales

**1.13 Chemical Controller and Sampling Pump**

Chemical Controller	Serves Main Pool <input type="checkbox"/>	Serves Baby Pool <input type="checkbox"/>	Serves Kiddie Pool <input type="checkbox"/>
W/Recorder	W/Sampling Pump		
Controller Brand	Model No.	No. of Units	
Serial No.			
Recorder Brand	Model No.	No of Units	Serial
No.			
Sampling Pump Brand	Model No.		
Hp	Voltage		

Comments:

**1.14 Pool Heater**

Pool Heater	Serves Main Pool <input type="checkbox"/>	Serves Baby Pool <input type="checkbox"/>	Serves Kiddie Pool <input type="checkbox"/>
Type: Standard Pool Heater	Central Boiler w/Heat Exchanger		
Solar Collector <input type="checkbox"/>	Heat Pump <input type="checkbox"/>	Other <input type="checkbox"/>	Hot Water <input type="checkbox"/>
Steam <input type="checkbox"/>			
State Boiler No.			
Standard Pool Heater Brand	Model No		
No. of Units	Serial No.	Input	BTU/Hr Output
BTU/Hr			
From Data Plate on Unit	Gas Feed	Regulator before Appliance	
Temp/Pressure Relief Valve	6" Air Gap on Blow Off		
Water Supply	Water Return	Metal Pipe	
Energy Type: Electric <input type="checkbox"/>	Gas <input type="checkbox"/>	If Gas then: Natural Gas <input type="checkbox"/>	LPG <input type="checkbox"/>
Vent Size	Forced Draft	Common Chimney	Size
Combustion Air Source	50% High	50% Low	Motorized
Expansion Tank	Brand	Size	gallons
Central Boiler w/Heat Exchanger:	Serves Main Pool <input type="checkbox"/>	Serves Baby Pool <input type="checkbox"/>	Serves Kiddie Pool <input type="checkbox"/>
Boiler Brand	Model No.	No. of Units	
Burner Brand	Model No.	No. of Units	
Firing Data	Setting	Voltage	
Amperage	Phase		
Method of Inducing Flow: Recirculate Pump		Bypass Valve	
Recirculate Pump: Brand	Model No.	No. of Units	
Flow	gpm from Data Plate		
Motor Brand	H.P.	Phase	
Voltage	Amperage		

Comments:



Pool Vessel Features:

25-Yard Lanes  25-Meter Lanes  Water Depth Less than 3'  Zero Depth   
50-Yard Lanes  50-Meter Lanes  Waterslide Receiving Area  Lazy River  Special

Floor: **concrete**

Constructed of: Concrete  Aluminum  Steel  Fiberglass

Random Cracking in:

Shallow Area: 1  2  3  4  5

Medium Area: 1  2  3  4  5

Diving Hopper: 1  2  3  4  5

Is Floor Repairable **yes** Comments **hairline cracking**

Walls: Choose an item.

Constructed of: Cast Concrete  Gunite  Aluminum  Steel  Fiberglass   
Masonry

Condition: Rebar Exposed **no**

Disjointed Walls

Walls Straight **yes**

Evidence of Structural Failure **no**

Structural Cracks **no**

Wall and Floor Separate **yes**

Wall and Fillet Separate

Are Walls Repairable **yes**

Expansion-Contraction Joints:

In Floor  Up Walls  At Intersection of Walls w/Floors  At Breakline  In DH

Joint Condition: 1  2  3  4  5  N/A

Original Waterproofing of Joints: Sealant  Waterstop  Unknown

Waterstop: Present in Joints  Unkonwn  Shown on Plans

Recirculation Type: Conventional  Reverse  Mixed

Outlet System Type: Skimmer Pool  Gutter Pool

For Gutter Pool: **n/a**

Type: Roll Out  Amityville  Curb with Gutter

Manufactured gutter inserted into Case/Gunite Pool Wall:

Constructed of: Gunite/Ceramic Tile Gutter  Cast Concrete  Masonry Units  Stainless Steel  Assembly  Pre-Cast Concrete  Aluminum Pool Gutter  Steel Pool Gutter

PVC Gutter Assembly

Pool Gutter is Level if No, Approximate Difference

Comments:

**1.17 Baby Pool Piping**

Conventional Flow  Reverse Flow  Combination  Original System **mushroom riser**

Main Drain: Number **1** Size **x**

**½"** Maximum Opening **yes** Main Drain Pipe Dia.

Constructed of: PVC  Metal

Return: Inlets: In Wall  In Floor  Floor Trench Inlet  Part of Manufactured Gutter

Spacing Per Code  Directional  Adjustable  PVC  Metallic

Return Pipe Dia. Constructed of: PVC  Metal

Outlet System: Gutter Skimmer

Outlet Pipe Dia. **4"** Constructed of: PVC  Metal



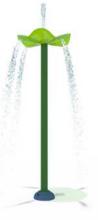
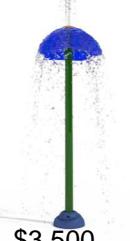
Capacity: From Data Plate	gpm @	ft. TDH	ft. TDH From Plans				
Pump Housing Suction Size	" Pump Housing Discharge Size	"					
Pump Reusable	Data Plate Located						
Pump Suction Pipe Commences: At Surge Tank	<input type="checkbox"/>	Direct from Main Drains	<input type="checkbox"/>	At Filter	<input type="checkbox"/>		
Suction Pipe Size	"	Pipe Type: D.I.	<input type="checkbox"/>	PVC	<input type="checkbox"/>	Flooded Suction	<input type="checkbox"/>
Hair and Lint Strainer	Brand	Size	Model No.				
Reuse Strainer	Isolation Valve(s) for Strainer						
Discharge Pipe Size	"	Pipe Type: D.I.	<input type="checkbox"/>	PVC	<input type="checkbox"/>		
Flow Meter	Brand	Model No.					
Pump Motor:							
Brand	Model No.	HP					
Phase	Voltage	Amps	RPM				
Type	Frame						
Starter Provided	Model No.						
Comments:							

#### 1.20 Disinfectant System

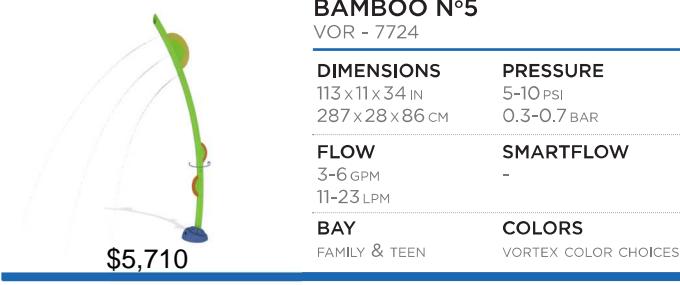
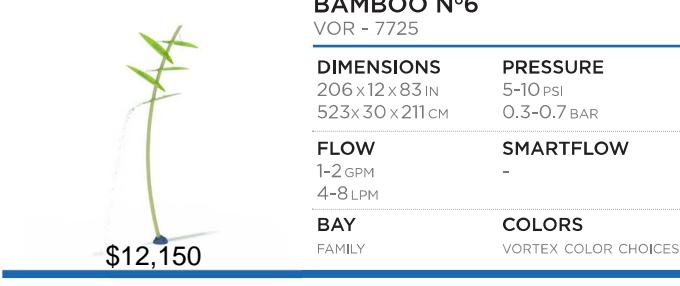
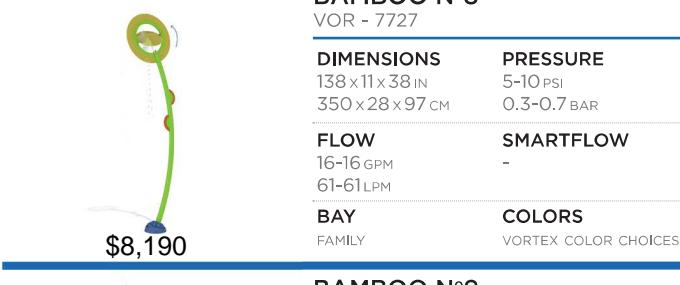
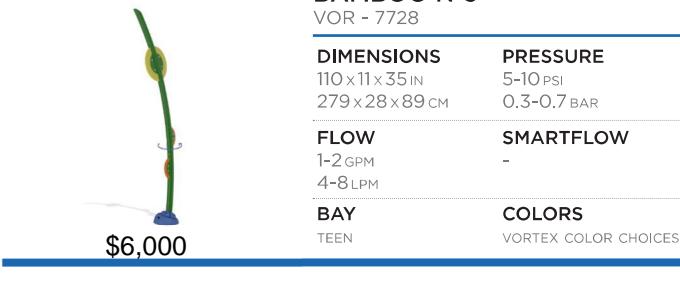
Chlorinator Brand	Model No.	No. of Units			
Maximum Output	in gpd	in ppd Location			
Main Pool	<input type="checkbox"/>	Baby Pool	<input type="checkbox"/>	Kiddie Pool	<input type="checkbox"/>

## Appendix C

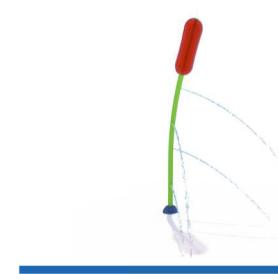
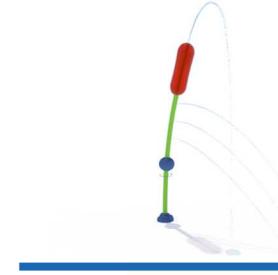
# PRODUCT INDEX

	<b>ACTIVATOR N°1</b>	VOR - 0612		<b>AQUALIEN FLOWER N°2</b>	VOR - 1331
\$3,690	<b>DIMENSIONS</b>	<b>PRESSURE</b>	\$3,500	<b>DIMENSIONS</b>	<b>PRESSURE</b>
39x17x11 IN 99x43x28 CM	-	-	86x30x30 IN 218x76x76 CM	5-7 PSI 0.3-0.5 BAR	-
<b>FLOW</b>	<b>SMARTFLOW</b>	<b>FLOW</b>	<b>SMARTFLOW</b>	-	-
<b>BAY</b>	<b>COLORS</b>	<b>BAY</b>	<b>COLORS</b>	VORTEX COLOR CHOICES	VORTEX COLOR CHOICES
	<b>ACTIVATOR N°2</b>	VOR - 0613		<b>AQUALIEN FLOWER N°3</b>	VOR - 7389
\$3,690	<b>DIMENSIONS</b>	<b>PRESSURE</b>	\$2,900	<b>DIMENSIONS</b>	<b>PRESSURE</b>
39x17x11 IN 99x43x28 CM	-	-	44x20x20 IN 112x50x50 CM	3-4 PSI 0.2-0.3 BAR	-
<b>FLOW</b>	<b>SMARTFLOW</b>	<b>FLOW</b>	<b>SMARTFLOW</b>	-	-
<b>BAY</b>	<b>COLORS</b>	<b>BAY</b>	<b>COLORS</b>	VORTEX COLOR CHOICES	VORTEX COLOR CHOICES
	<b>ANGLED TWISTER</b>	VOR - 0535		<b>AQUALIEN N°2</b>	VOR - 7569
\$4,600	<b>DIMENSIONS</b>	<b>PRESSURE</b>	\$4,700	<b>DIMENSIONS</b>	<b>PRESSURE</b>
51x14x35 IN 129x36x89 CM	10-15 PSI 0.7-1.0 BAR	<b>FLOW</b>	<b>SMARTFLOW</b>	124x59x58 IN 315x150x147 CM	4-5 PSI 0.3-0.3 BAR
<b>FLOW</b>	2-7 GPM 8-26 LPM	<b>FLOW</b>	-	10-25 GPM 38-95 LPM	-
<b>BAY</b>	<b>COLORS</b>	<b>BAY</b>	<b>COLORS</b>	TEEN	VORTEX COLOR CHOICES
	<b>AQUADOME N°1</b>	VOR - 0555		<b>AQUALIEN POWER FLOWER N°1</b>	VOR - 7631
\$2,700	<b>DIMENSIONS</b>	<b>PRESSURE</b>	\$4,700	<b>DIMENSIONS</b>	<b>PRESSURE</b>
45x14x14 IN 114x36x36 CM	5-10 PSI 0.3-0.7 BAR	<b>FLOW</b>	<b>SMARTFLOW</b>	219x112x148 CM	4-5 PSI 0.3-0.3 BAR
<b>BAY</b>	<b>COLORS</b>	<b>BAY</b>	<b>COLORS</b>	-	-
	<b>AQUADOME N°2</b>	VOR - 7530		<b>AQUALIEN POWER SPINNER</b>	VOR - 7620
\$3,100	<b>DIMENSIONS</b>	<b>PRESSURE</b>	\$7,900	<b>DIMENSIONS</b>	<b>PRESSURE</b>
72x14x14 IN 183x36x36 CM	5-10 PSI 0.3-0.7 BAR	<b>FLOW</b>	<b>SMARTFLOW</b>	313x76x149 CM	4-5 PSI 0.3-0.7 BAR
<b>BAY</b>	<b>COLORS</b>	<b>BAY</b>	<b>COLORS</b>	-	-
	<b>AQUALIEN FLOWER N°1</b>	VOR - 7388		<b>AQUALIEN RAINFOREST N°4</b>	VOR - 7000
\$3,500	<b>DIMENSIONS</b>	<b>PRESSURE</b>	\$7,900	<b>DIMENSIONS</b>	<b>PRESSURE</b>
98x30x30 IN 249x76x76 CM	4-6 PSI 0.3-0.4 BAR	<b>FLOW</b>	<b>SMARTFLOW</b>	112x133x145 CM	3-4 PSI 0.2-0.3 BAR
<b>BAY</b>	<b>COLORS</b>	<b>BAY</b>	<b>COLORS</b>	-	-
5-10 GPM 19-38 LPM	-	<b>FLOW</b>	<b>SMARTFLOW</b>	11-34 LPM	-
<b>BAY</b>	<b>COLORS</b>	<b>BAY</b>	<b>COLORS</b>	-	-
FAMILY	VORTEX COLOR CHOICES	FAMILY	VORTEX COLOR CHOICES	-	-

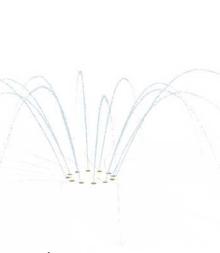
# PRODUCT INDEX

 <p><b>AQUALIEN RAINFOREST N°5</b> VOR - 7381</p> <p><b>DIMENSIONS</b> 98 x 72 x 75 IN 249 x 183 x 191 CM</p> <p><b>FLOW</b> 15-30 GPM 57-114 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 4-6 PSI 0.3-0.4 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$10,250</p>	 <p><b>BAMBOO N°4</b> VOR - 7723</p> <p><b>DIMENSIONS</b> 127 x 15 x 70 IN 323 x 38 x 178 CM</p> <p><b>FLOW</b> 3-5 GPM 11-19 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$8,100</p>
 <p><b>AQUALIEN RAINFOREST N°6</b> VOR - 7360</p> <p><b>DIMENSIONS</b> 86 x 67 x 78 IN 218 x 170 x 198 CM</p> <p><b>FLOW</b> 3-9 GPM 11-34 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 5-7 PSI 0.3-0.5 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> 24-27 GPM</p> <p><b>PRICE</b> \$10,250</p>	 <p><b>BAMBOO N°5</b> VOR - 7724</p> <p><b>DIMENSIONS</b> 113 x 11 x 34 IN 287 x 28 x 86 CM</p> <p><b>FLOW</b> 3-6 GPM 11-23 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$5,710</p>
 <p><b>ARCH</b> VOR - 0515</p> <p><b>DIMENSIONS</b> 87 x 14 x 74 IN 221 x 36 x 188 CM</p> <p><b>FLOW</b> 18-27 GPM 68-102 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 10-25 PSI 0.7-1.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> 9-18 GPM 34-68 LPM</p> <p><b>PRICE</b> \$4,900</p>	 <p><b>BAMBOO N°6</b> VOR - 7725</p> <p><b>DIMENSIONS</b> 206 x 12 x 83 IN 523 x 30 x 211 CM</p> <p><b>FLOW</b> 1-2 GPM 4-8 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$12,150</p>
 <p><b>BAMBOO N°1</b> VOR - 7722</p> <p><b>DIMENSIONS</b> 49 x 11 x 27 IN 124 x 28 x 69 CM</p> <p><b>FLOW</b> 5-10 GPM 19-38 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> 2-7 GPM 8-27 LPM</p> <p><b>PRICE</b> \$5,670</p>	 <p><b>BAMBOO N°7</b> VOR - 7726</p> <p><b>DIMENSIONS</b> 121 x 11 x 36 IN 307 x 28 x 91 CM</p> <p><b>FLOW</b> 2-3 GPM 8-11 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$5,400</p>
 <p><b>BAMBOO N°2</b> VOR - 7721</p> <p><b>DIMENSIONS</b> 49 x 11 x 32 IN 124 x 28 x 81 CM</p> <p><b>FLOW</b> 5-10 GPM 19-38 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> 2-7 GPM 8-27 LPM</p> <p><b>PRICE</b> \$5,670</p>	 <p><b>BAMBOO N°8</b> VOR - 7727</p> <p><b>DIMENSIONS</b> 138 x 11 x 38 IN 350 x 28 x 97 CM</p> <p><b>FLOW</b> 16-16 GPM 61-61 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$8,190</p>
 <p><b>BAMBOO N°3</b> VOR - 7720</p> <p><b>DIMENSIONS</b> 52 x 11 x 29 IN 132 x 28 x 74 CM</p> <p><b>FLOW</b> 5-10 GPM 19-38 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> 2-7 GPM 8-27 LPM</p> <p><b>PRICE</b> \$5,670</p>	 <p><b>BAMBOO N°9</b> VOR - 7728</p> <p><b>DIMENSIONS</b> 110 x 11 x 35 IN 279 x 28 x 89 CM</p> <p><b>FLOW</b> 1-2 GPM 4-8 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$6,000</p>

# PRODUCT INDEX

 <p><b>BAMBOO N°10</b> VOR - 7730</p>	<p><b>DIMENSIONS</b> 121x11x94 IN 307x28x239 CM</p> <p><b>FLOW</b> 10-10 GPM 38-38 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>		<p><b>BOW N°1</b> VOR - 7673</p> <p><b>DIMENSIONS</b> 46x25x79 IN 117x63x200 CM</p> <p><b>FLOW</b> 3-5 GPM 11-19 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</p> <p><b>COLORS</b> 4 COLOR OPTIONS</p>
 <p><b>BLOOM N°2</b> VOR - 7487</p>	<p><b>DIMENSIONS</b> 109x34x28 IN 277x86x71 CM</p> <p><b>FLOW</b> 5-12 GPM 19-45 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>		<p><b>BUCKET TRIO</b> VOR - 0103</p> <p><b>DIMENSIONS</b> 129x87x77 IN 328x221x196 CM</p> <p><b>FLOW</b> 9-15 GPM 34-57 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>
 <p><b>BLOOM N°1</b> VOR - 7486</p>	<p><b>DIMENSIONS</b> 120x55x64 IN 305x140x163 CM</p> <p><b>FLOW</b> 7-10 GPM 26-38 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>		<p><b>BULLFROG</b> VOR - 0524</p> <p><b>DIMENSIONS</b> 78x56x143 IN 197x141x362 CM</p> <p><b>FLOW</b> 22-33 GPM 83-125 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 10-25 PSI 0.7-1.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>
 <p><b>BOAT WHEEL N°1</b> VOR - 7678</p>	<p><b>DIMENSIONS</b> 52x22x29 IN 132x56x74 CM</p> <p><b>FLOW</b> 3-6 GPM 11-23 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>		<p><b>CACTUS</b> VOR - 7390</p> <p><b>DIMENSIONS</b> 124x14x37 IN 315x36x95 CM</p> <p><b>FLOW</b> 24-36 GPM 91-136 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 10-25 PSI 0.7-1.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>
 <p><b>BOLLARD ACTIVATOR N°2</b> VOR - 7399</p>	<p><b>DIMENSIONS</b> 39x14x14 IN 99x36x36 CM</p> <p><b>FLOW</b> -</p> <p><b>BAY</b> -</p> <p><b>PRESSURE</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>		<p><b>CATTAIL</b> VOR - 7538</p> <p><b>DIMENSIONS</b> 128x13x33 IN 325x33x84 CM</p> <p><b>FLOW</b> 2-6 GPM 8-23 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 6-6 PSI 0.4-0.4 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>
 <p><b>BOLLARD ACTIVATOR N°3</b> VOR - 0611</p>	<p><b>DIMENSIONS</b> 39x14x14 IN 99x36x36 CM</p> <p><b>FLOW</b> 0-0 GPM</p> <p><b>BAY</b> -</p> <p><b>PRESSURE</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>		<p><b>CATTAIL TWIRL</b> VOR - 7782</p> <p><b>DIMENSIONS</b> 143x12x35 IN 362x30x89 CM</p> <p><b>FLOW</b> 2-4 GPM 8-16 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 5-6 PSI 0.3-0.4 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>

# PRODUCT INDEX

 <p><b>CRAB N°1</b> VOR - 7208</p>	<p><b>DIMENSIONS</b> 26 x 24 x 25 IN 67 x 60 x 64 CM</p> <p><b>FLOW</b> 3-5 GPM 11-19 LPM</p> <p><b>BAY</b> TODDLER</p>	<p><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>	 <p><b>FISH N°1</b> VOR - 7218</p>	<p><b>DIMENSIONS</b> 33 x 27 x 14 IN 83 x 69 x 36 CM</p> <p><b>FLOW</b> 3-5 GPM 11-19 LPM</p> <p><b>BAY</b> TODDLER</p>	<p><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>
 <p><b>CRAB N°2</b> VOR - 7220</p>	<p><b>DIMENSIONS</b> 53 x 23 x 25 IN 134 x 59 x 64 CM</p> <p><b>FLOW</b> 16-23 GPM 61-87 LPM</p> <p><b>BAY</b> TODDLER</p>	<p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>	 <p><b>FIVE BELLS</b> VOR - 7383</p>	<p><b>DIMENSIONS</b> 135 x 89 x 93 IN 343 x 226 x 236 CM</p> <p><b>FLOW</b> 15-25 GPM 57-95 LPM</p> <p><b>BAY</b> TEEN</p>	<p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>
 <p><b>CYLINDER SPRAY</b> VOR - 0307</p>	<p><b>DIMENSIONS</b> 0 x 38 x 38 IN 0 x 97 x 97 CM</p> <p><b>FLOW</b> 35-50 GPM 132-189 LPM</p> <p><b>BAY</b> -</p>	<p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>SMARTFLOW</b> 16-32 GPM 61-121 LPM</p> <p><b>COLORS</b> -</p>	 <p><b>FLOWER</b> VOR - 0564</p>	<p><b>DIMENSIONS</b> 140 x 75 x 75 IN 356 x 191 x 191 CM</p> <p><b>FLOW</b> 20-30 GPM 76-114 LPM</p> <p><b>BAY</b> FAMILY</p>	<p><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>
 <p><b>DIRECTIONAL WATER JET</b> VOR - 0305</p>	<p><b>DIMENSIONS</b> 0 x 3 x 3 IN 0 x 8 x 8 CM</p> <p><b>FLOW</b> 3-5 GPM 11-19 LPM</p> <p><b>BAY</b> -</p>	<p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> -</p>	 <p><b>FLOWER N°1</b> VOR - 7549</p>	<p><b>DIMENSIONS</b> 135 x 28 x 65 IN 343 x 72 x 165 CM</p> <p><b>FLOW</b> 5-25 GPM 19-95 LPM</p> <p><b>BAY</b> FAMILY</p>	<p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>
 <p><b>DONUT SPRAY</b> VOR - 0306</p>	<p><b>DIMENSIONS</b> 0 x 26 x 26 IN 0 x 66 x 66 CM</p> <p><b>FLOW</b> 35-50 GPM 132-189 LPM</p> <p><b>BAY</b> -</p>	<p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>SMARTFLOW</b> 16-32 GPM 41-189 LPM</p> <p><b>COLORS</b> -</p>	 <p><b>FLOWER N°2</b> VOR - 7550</p>	<p><b>DIMENSIONS</b> 135 x 107 x 30 IN 343 x 272 x 76 CM</p> <p><b>FLOW</b> 15-30 GPM 57-114 LPM</p> <p><b>BAY</b> FAMILY</p>	<p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>
 <p><b>DUMPING PELICAN</b> VOR - 0109</p>	<p><b>DIMENSIONS</b> 159 x 64 x 17 IN 404 x 163 x 43 CM</p> <p><b>FLOW</b> 5-10 GPM 19-38 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p>	<p><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> AS SHOWN</p>	 <p><b>FLOWER N°4</b> VOR - 7552</p>	<p><b>DIMENSIONS</b> 154 x 79 x 30 IN 392 x 201 x 76 CM</p> <p><b>FLOW</b> 7-18 GPM 26-68 LPM</p> <p><b>BAY</b> FAMILY</p>	<p><b>PRESSURE</b> 7-10 PSI 0.5-0.7 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>

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 <p><b>FLOWER N°5</b> VOR - 7557</p> <p><b>DIMENSIONS</b> 153x15x102 IN 389x38x260 CM</p> <p><b>FLOW</b> 6-10 GPM 23-38 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRICE</b> \$8,210</p>	 <p><b>FOAMING GEYSER N°2</b> VOR - 8084</p> <p><b>DIMENSIONS</b> 1x11x11 IN 3x28x28 CM</p> <p><b>FLOW</b> 8-20 GPM 30-76 LPM</p> <p><b>BAY</b> -</p> <p><b>PRICE</b> \$2,500</p>
 <p><b>FLOWER N°6</b> VOR - 7558</p> <p><b>DIMENSIONS</b> 153x30x95 IN 389x76x242 CM</p> <p><b>FLOW</b> 15-25 GPM 57-95 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRICE</b> \$8,220</p>	 <p><b>FOOT ACTIVATOR</b> VOR - 0606</p> <p><b>DIMENSIONS</b> 0x5x5 IN 0x11x11 CM</p> <p><b>FLOW</b> 0-0 GPM</p> <p><b>BAY</b> -</p> <p><b>PRICE</b> \$1,720</p>
 <p><b>FLOWER N°7</b> VOR - 7559</p> <p><b>DIMENSIONS</b> 153x15x51 IN 389x38x130 CM</p> <p><b>FLOW</b> 3-5 GPM 11-19 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRICE</b> \$6,430</p>	 <p><b>FOUNTAIN SPRAY</b> VOR - 7513</p> <p><b>DIMENSIONS</b> 0x3x3 IN 0x8x8 CM</p> <p><b>FLOW</b> 3-7 GPM 11-26 LPM</p> <p><b>BAY</b> -</p> <p><b>PRICE</b> \$400</p>
 <p><b>FLOWER N°8</b> VOR - 7560</p> <p><b>DIMENSIONS</b> 153x30x44 IN 389x76x111 CM</p> <p><b>FLOW</b> 7-18 GPM 26-68 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRICE</b> \$6,090</p>	 <p><b>FOUNTAIN SPRAY N°2</b> VOR - 7676</p> <p><b>DIMENSIONS</b> 0x3x3 IN 0x8x8 CM</p> <p><b>FLOW</b> 3-7 GPM 11-26 LPM</p> <p><b>BAY</b> -</p> <p><b>PRICE</b> \$400</p>
 <p><b>FLOWER N°9</b> VOR - 7541</p> <p><b>DIMENSIONS</b> 153x94x76 IN 389x239x193 CM</p> <p><b>FLOW</b> 9-15 GPM 34-57 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRICE</b> \$11,060</p>	 <p><b>FROG N°1</b> VOR - 7200</p> <p><b>DIMENSIONS</b> 25x20x20 IN 64x51x51 CM</p> <p><b>FLOW</b> 10-13 GPM 38-49 LPM</p> <p><b>BAY</b> TODDLER</p> <p><b>PRICE</b> \$5,480</p>
 <p><b>FOAMING GEYSER N°1</b> VOR - 7020</p> <p><b>DIMENSIONS</b> 4x10x10 IN 10x25x25 CM</p> <p><b>FLOW</b> 8-20 GPM 30-76 LPM</p> <p><b>BAY</b> -</p> <p><b>PRICE</b> \$1,900</p>	 <p><b>FROG N°2</b> VOR - 7201</p> <p><b>DIMENSIONS</b> 25x20x20 IN 64x51x51 CM</p> <p><b>FLOW</b> 3-5 GPM 11-19 LPM</p> <p><b>BAY</b> TODDLER</p> <p><b>PRICE</b> \$5,960</p>

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## FROG N°4

VOR - 7203

DIMENSIONS	PRESSURE
47x20x20 IN 119x51x51CM	5-10 PSI 0.3-0.7 BAR
24-27 GPM 91-102 LPM	SMARTFLOW 24-27 GPM
TODDLER	VORTEX COLOR CHOICES

\$6,150



## FROG N°5

VOR - 7658

DIMENSIONS	PRESSURE
111x58x40 IN 282x147x102CM	5-10 PSI 0.3-0.7 BAR
80-100 GPM 303-379 LPM	SMARTFLOW -
FAMILY & TEEN	VORTEX COLOR CHOICES



## FROG N°6

VOR - 7659

DIMENSIONS	PRESSURE
111x58x40 IN 282x147x102CM	10-20 PSI 0.7-1.4 BAR
25-35 GPM 95-133 LPM	SMARTFLOW -
FAMILY & TEEN	VORTEX COLOR CHOICES



## FUMBLING FIVE

VOR - 7384

DIMENSIONS	PRESSURE
129x97x97 IN 328x246x246CM	5-10 PSI 0.3-0.7 BAR
15-25 GPM 57-95 LPM	SMARTFLOW 9-15 GPM 35-57 LPM
TEEN	VORTEX COLOR CHOICES

\$11,090



## GROUND GEYSER

VOR - 0301

DIMENSIONS	PRESSURE
0x4x4 IN 0x10x10CM	5-10 PSI 0.3-0.7 BAR
5-10 GPM 19-38 LPM	SMARTFLOW 2-7 GPM 8-27 LPM
-	-

\$400



## GROUND GUSHER

VOR - 0300

DIMENSIONS	PRESSURE
0x5x5 IN 0x13x13CM	5-15 PSI 0.3-1.0 BAR
12-35 GPM 45-132 LPM	SMARTFLOW -
-	-

\$700



## HUDDLE SPRAY N°3

VOR - 7565

DIMENSIONS	PRESSURE
96x123x85 IN 244x312x216CM	10-25 PSI 0.7-1.7 BAR
30-60 GPM 114-170 LPM	SMARTFLOW -
FAMILY	VORTEX COLOR CHOICES

\$10,710



## JELLYFISH N°1

VOR - 7215

DIMENSIONS	PRESSURE
108x40x42 IN 274x102x107CM	5-10 PSI 0.3-0.7 BAR
80-100 GPM 303-379 LPM	SMARTFLOW -
FAMILY & TEEN	VORTEX COLOR CHOICES

\$11,720

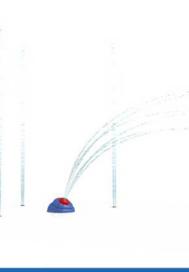


## JET STREAM

VOR - 7512

DIMENSIONS	PRESSURE
0x3x3 IN 0x8x8CM	5-10 PSI 0.3-0.7 BAR
2-3 GPM 8-11 LPM	SMARTFLOW -
-	-

\$390



## LAUNCH POD N°1

VOR - 7651

DIMENSIONS	PRESSURE
6x36x59 IN 15x91x150CM	3-8 PSI 0.2-0.5 BAR
14-25 GPM 52-95 LPM	SMARTFLOW -
-	-

\$10,940



## LAUNCH POD N°2

VOR - 7615

DIMENSIONS	PRESSURE
6x57x237 IN 15x145x602CM	3-8 PSI 0.2-0.5 BAR
27-50 GPM 104-190 LPM	SMARTFLOW -
-	-

\$6,090



## LEAF N°1

VOR - 7548

DIMENSIONS	PRESSURE
122x102x37 IN 310x259x94 CM	10-20 PSI 0.7-1.4 BAR
6-8 GPM 23-31 LPM	SMARTFLOW -
FAMILY	VORTEX COLOR CHOICES

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## LEAF N°2

VOR - 7657

DIMENSIONS	PRESSURE
122 x 102 x 37 IN 310 x 259 x 94 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
3-8 GPM 11-30 LPM	-
BAY	COLORS
FAMILY	VORTEX COLOR CHOICES



## LEAF N°3

VOR - 7672

DIMENSIONS	PRESSURE
129 x 94 x 112 IN 328 x 239 x 285 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
5-15 GPM 19-57 LPM	-
BAY	COLORS
FAMILY	VORTEX COLOR CHOICES



## LEAF N°4

VOR - 7675

DIMENSIONS	PRESSURE
129 x 102 x 41 IN 328 x 259 x 104 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
6-13 GPM 23-49 LPM	-
BAY	COLORS
FAMILY	VORTEX COLOR CHOICES



## LED LIGHT

VOR - 7050

DIMENSIONS	PRESSURE
0 x 7 x 7 IN 0 x 18 x 18 CM	-
FLOW	SMARTFLOW
-	-
BAY	COLORS
-	RGB COLORS



## LOBSTER

VOR - 7656

DIMENSIONS	PRESSURE
117 x 188 x 167 IN 297 x 478 x 424 CM	10-25 PSI 0.7-1.7 BAR
FLOW	SMARTFLOW
100-150 GPM 379-568 LPM	-
BAY	COLORS
FAMILY & TEEN	VORTEX COLOR CHOICES



## LOOP N°1

VOR - 7719

DIMENSIONS	PRESSURE
50 x 23 x 11 IN 127 x 59 x 28 CM	10-15 PSI 0.7-1.0 BAR
FLOW	SMARTFLOW
5-10 GPM 19-38 LPM	3-5 GPM 11-19 LPM
BAY	COLORS
TEEN	VORTEX COLOR CHOICES

\$4,520



## LOOP N°2

VOR - 7553

DIMENSIONS	PRESSURE
50 x 11 x 21 IN 127 x 28 x 53 CM	10-15 PSI 0.7-1.0 BAR
FLOW	SMARTFLOW
5-10 GPM 19-38 LPM	-
BAY	COLORS
TEEN	VORTEX COLOR CHOICES

\$900



## MAGIC MIST N°1

VOR - 7510

DIMENSIONS	PRESSURE
1 x 5 x 5 IN 3 x 13 x 13 CM	10 x 25 PSI 0.7-1.7 BAR
FLOW	SMARTFLOW
6-9 GPM 23 x 35 LPM	-
BAY	COLORS
-	VORTEX COLOR CHOICES

\$990



## MAGIC MIST N°2

VOR - 8099

DIMENSIONS	PRESSURE
0 x 5 x 5 IN 0 x 13 x 13 CM	10-25 PSI 0.7-1.7 BAR
FLOW	SMARTFLOW
6-9 GPM 23-34 LPM	-
BAY	COLORS
-	-

\$3,500



## OMBRELLO N°3

VOR - 7441

DIMENSIONS	PRESSURE
112 x 36 x 36 IN 310 x 91 x 91 CM	5-6 PSI 0.3-0.4 BAR
FLOW	SMARTFLOW
5-7 GPM 19-27 LPM	2-3 GPM
BAY	COLORS
FAMILY	AS SHOWN

\$3,500



## OMBRELLO N°1

VOR - 7445

DIMENSIONS	PRESSURE
122 x 36 x 36 IN 310 x 91 x 91 CM	5-6 PSI 0.3-0.4 BAR
FLOW	SMARTFLOW
5-7 GPM 19-27 LPM	2-3 GPM
BAY	COLORS
FAMILY	AS SHOWN

\$3,500



## OMBRELLO N°2

VOR - 7440

DIMENSIONS	PRESSURE
122 x 36 x 36 IN 310 x 91 x 91 CM	5-6 PSI 0.3-0.4 BAR
FLOW	SMARTFLOW
5-7 GPM 19-27 LPM	2-3 GPM 8-11 LPM
BAY	COLORS
FAMILY	VORTEX COLOR CHOICES

\$3,500



## OMBRELLO N°1

VOR - 7441

DIMENSIONS	PRESSURE
112 x 36 x 38 IN 284 x 91 x 96 CM	5-6 PSI 0.3-0.4 BAR
FLOW	SMARTFLOW
5-7 GPM 19-27 LPM	2-3 GPM 8-11 LPM
BAY	COLORS
FAMILY	VORTEX COLOR CHOICES

\$3,500

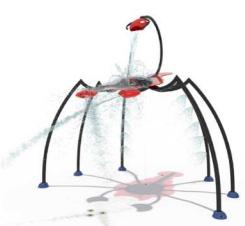
# PRODUCT INDEX

<p><b>OMBRELLO SPIN N°1</b> VOR - 7448</p>  <p><b>\$8,500</b></p> <table border="1"> <tr> <td><b>DIMENSIONS</b> 122 x 37 x 37 IN 310 x 94 x 94 CM</td><td><b>PRESSURE</b> 5-6 PSI 0.3-0.4 BAR</td></tr> <tr> <td><b>FLOW</b> 5-7 GPM 19-26 LPM</td><td><b>SMARTFLOW</b> -</td></tr> <tr> <td><b>BAY</b> FAMILY &amp; TEEN</td><td><b>COLORS</b> 6 COLOR OPTIONS</td></tr> </table>	<b>DIMENSIONS</b> 122 x 37 x 37 IN 310 x 94 x 94 CM	<b>PRESSURE</b> 5-6 PSI 0.3-0.4 BAR	<b>FLOW</b> 5-7 GPM 19-26 LPM	<b>SMARTFLOW</b> -	<b>BAY</b> FAMILY & TEEN	<b>COLORS</b> 6 COLOR OPTIONS	<p><b>PERISPRAY</b> VOR - 0533</p>  <table border="1"> <tr> <td><b>DIMENSIONS</b> 87 x 14 x 22 IN 221 x 36 x 55 CM</td><td><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</td></tr> <tr> <td><b>FLOW</b> 5-7 GPM 19-26 LPM</td><td><b>SMARTFLOW</b> 2-5 GPM 8-19 LPM</td></tr> <tr> <td><b>BAY</b> FAMILY &amp; TEEN</td><td><b>COLORS</b> VORTEX COLOR CHOICES</td></tr> </table>	<b>DIMENSIONS</b> 87 x 14 x 22 IN 221 x 36 x 55 CM	<b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR	<b>FLOW</b> 5-7 GPM 19-26 LPM	<b>SMARTFLOW</b> 2-5 GPM 8-19 LPM	<b>BAY</b> FAMILY & TEEN	<b>COLORS</b> VORTEX COLOR CHOICES
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<b>BAY</b> FAMILY & TEEN	<b>COLORS</b> VORTEX COLOR CHOICES												
<p><b>OMBRELLO SPIN N°2</b> VOR - 7449</p>  <p><b>\$8,500</b></p> <table border="1"> <tr> <td><b>DIMENSIONS</b> 42 x 37 x 37 IN 107 x 94 x 94 CM</td><td><b>PRESSURE</b> 4-6 PSI 0.3-0.4 BAR</td></tr> <tr> <td><b>FLOW</b> 5-7 GPM 19-27 LPM</td><td><b>SMARTFLOW</b> 4-6 GPM 15-23 LPM</td></tr> <tr> <td><b>BAY</b> TEEN</td><td><b>COLORS</b> 6 COLOR OPTIONS</td></tr> </table>	<b>DIMENSIONS</b> 42 x 37 x 37 IN 107 x 94 x 94 CM	<b>PRESSURE</b> 4-6 PSI 0.3-0.4 BAR	<b>FLOW</b> 5-7 GPM 19-27 LPM	<b>SMARTFLOW</b> 4-6 GPM 15-23 LPM	<b>BAY</b> TEEN	<b>COLORS</b> 6 COLOR OPTIONS	<p><b>PLAYSAFE DRAIN - PRESS &amp; PLAY N°1</b> VOR - 1001-4001</p>  <table border="1"> <tr> <td><b>DIMENSIONS</b> 0x30 x 30 IN 0x76 x 76 CM</td><td><b>PRESSURE</b> -</td></tr> <tr> <td><b>FLOW</b> -</td><td><b>SMARTFLOW</b> -</td></tr> <tr> <td><b>BAY</b> -</td><td><b>COLORS</b> AS SHOWN</td></tr> </table>	<b>DIMENSIONS</b> 0x30 x 30 IN 0x76 x 76 CM	<b>PRESSURE</b> -	<b>FLOW</b> -	<b>SMARTFLOW</b> -	<b>BAY</b> -	<b>COLORS</b> AS SHOWN
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<p><b>OMBRELLO TWIRL</b> VOR - 7446</p>  <p><b>\$5,400</b></p> <table border="1"> <tr> <td><b>DIMENSIONS</b> 122 x 36 x 36 IN 305 x 91 x 91 CM</td><td><b>PRESSURE</b> 5-6 PSI 0.3-0.4 BAR</td></tr> <tr> <td><b>FLOW</b> 5-7 GPM 19-27 LPM</td><td><b>SMARTFLOW</b> -</td></tr> <tr> <td><b>BAY</b> FAMILY &amp; TEEN</td><td><b>COLORS</b> VORTEX COLOR CHOICES</td></tr> </table>	<b>DIMENSIONS</b> 122 x 36 x 36 IN 305 x 91 x 91 CM	<b>PRESSURE</b> 5-6 PSI 0.3-0.4 BAR	<b>FLOW</b> 5-7 GPM 19-27 LPM	<b>SMARTFLOW</b> -	<b>BAY</b> FAMILY & TEEN	<b>COLORS</b> VORTEX COLOR CHOICES	<p><b>PLAYSAFE DRAIN - PRESS &amp; PLAY N°3</b> VOR - 1001-4003</p>  <table border="1"> <tr> <td><b>DIMENSIONS</b> 39 x 30 x 30 IN 99 x 76 x 76 CM</td><td><b>PRESSURE</b> -</td></tr> <tr> <td><b>FLOW</b> -</td><td><b>SMARTFLOW</b> -</td></tr> <tr> <td><b>BAY</b> -</td><td><b>COLORS</b> VORTEX COLOR CHOICES</td></tr> </table>	<b>DIMENSIONS</b> 39 x 30 x 30 IN 99 x 76 x 76 CM	<b>PRESSURE</b> -	<b>FLOW</b> -	<b>SMARTFLOW</b> -	<b>BAY</b> -	<b>COLORS</b> VORTEX COLOR CHOICES
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<p><b>OMBRELLO TWIRL N°2</b> VOR - 7447</p>  <p><b>\$5,400</b></p> <table border="1"> <tr> <td><b>DIMENSIONS</b> 120 x 36 x 36 IN 306 x 91 x 91 CM</td><td><b>PRESSURE</b> 5-6 PSI 0.3-0.4 BAR</td></tr> <tr> <td><b>FLOW</b> 5-7 GPM 19-27 LPM</td><td><b>SMARTFLOW</b> -</td></tr> <tr> <td><b>BAY</b> FAMILY &amp; TEEN</td><td><b>COLORS</b> VORTEX COLOR CHOICES</td></tr> </table>	<b>DIMENSIONS</b> 120 x 36 x 36 IN 306 x 91 x 91 CM	<b>PRESSURE</b> 5-6 PSI 0.3-0.4 BAR	<b>FLOW</b> 5-7 GPM 19-27 LPM	<b>SMARTFLOW</b> -	<b>BAY</b> FAMILY & TEEN	<b>COLORS</b> VORTEX COLOR CHOICES	<p><b>PLAYSAFE DRAIN - SPRAY &amp; PLAY N°1</b> VOR - 1001-4002</p>  <table border="1"> <tr> <td><b>DIMENSIONS</b> 0x5x5 IN 0x13x13 CM</td><td><b>PRESSURE</b> 5-15 PSI 0.3-1.0 BAR</td></tr> <tr> <td><b>FLOW</b> 5-10 GPM 19-38 LPM</td><td><b>SMARTFLOW</b> -</td></tr> <tr> <td><b>BAY</b> -</td><td><b>COLORS</b> AS SHOWN</td></tr> </table>	<b>DIMENSIONS</b> 0x5x5 IN 0x13x13 CM	<b>PRESSURE</b> 5-15 PSI 0.3-1.0 BAR	<b>FLOW</b> 5-10 GPM 19-38 LPM	<b>SMARTFLOW</b> -	<b>BAY</b> -	<b>COLORS</b> AS SHOWN
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<b>BAY</b> -	<b>COLORS</b> AS SHOWN												
<p><b>ORBIT</b> VOR - 7398</p>  <p><b>\$11,000</b></p> <table border="1"> <tr> <td><b>DIMENSIONS</b> 75 x 85 x 92 IN 190 x 215 x 234 CM</td><td><b>PRESSURE</b> 10-25 PSI 0.7-1.7 BAR</td></tr> <tr> <td><b>FLOW</b> 30-45 GPM 114-170 LPM</td><td><b>SMARTFLOW</b> 15-30 GPM 57-114 LPM</td></tr> <tr> <td><b>BAY</b> FAMILY</td><td><b>COLORS</b> VORTEX COLOR CHOICES</td></tr> </table>	<b>DIMENSIONS</b> 75 x 85 x 92 IN 190 x 215 x 234 CM	<b>PRESSURE</b> 10-25 PSI 0.7-1.7 BAR	<b>FLOW</b> 30-45 GPM 114-170 LPM	<b>SMARTFLOW</b> 15-30 GPM 57-114 LPM	<b>BAY</b> FAMILY	<b>COLORS</b> VORTEX COLOR CHOICES	<p><b>PLUX ARCH</b> VOR - 7397</p>  <p><b>\$5,900</b></p> <table border="1"> <tr> <td><b>DIMENSIONS</b> 89 x 14 x 74 IN 227 x 36 x 188 CM</td><td><b>PRESSURE</b> 10-25 PSI 0.7-1.7 BAR</td></tr> <tr> <td><b>FLOW</b> 20-30 GPM 76-114 LPM</td><td><b>SMARTFLOW</b> 10-20 GPM 38-76 LPM</td></tr> <tr> <td><b>BAY</b> FAMILY</td><td><b>COLORS</b> VORTEX COLOR CHOICES</td></tr> </table>	<b>DIMENSIONS</b> 89 x 14 x 74 IN 227 x 36 x 188 CM	<b>PRESSURE</b> 10-25 PSI 0.7-1.7 BAR	<b>FLOW</b> 20-30 GPM 76-114 LPM	<b>SMARTFLOW</b> 10-20 GPM 38-76 LPM	<b>BAY</b> FAMILY	<b>COLORS</b> VORTEX COLOR CHOICES
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<b>BAY</b> FAMILY	<b>COLORS</b> VORTEX COLOR CHOICES												
<p><b>PALM TREE</b> VOR - 0509</p>  <p><b>\$8,000</b></p> <table border="1"> <tr> <td><b>DIMENSIONS</b> 150 x 79 x 78 IN 381 x 200 x 198 CM</td><td><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</td></tr> <tr> <td><b>FLOW</b> 20-30 GPM 76-114 LPM</td><td><b>SMARTFLOW</b> -</td></tr> <tr> <td><b>BAY</b> FAMILY</td><td><b>COLORS</b> VORTEX COLOR CHOICES</td></tr> </table>	<b>DIMENSIONS</b> 150 x 79 x 78 IN 381 x 200 x 198 CM	<b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR	<b>FLOW</b> 20-30 GPM 76-114 LPM	<b>SMARTFLOW</b> -	<b>BAY</b> FAMILY	<b>COLORS</b> VORTEX COLOR CHOICES	<p><b>PLUX CANE</b> VOR - 7395</p>  <p><b>\$3,800</b></p> <table border="1"> <tr> <td><b>DIMENSIONS</b> 123 x 14 x 56 IN 312 x 36 x 142 CM</td><td><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</td></tr> <tr> <td><b>FLOW</b> 11-17 GPM 42-64 LPM</td><td><b>SMARTFLOW</b> -</td></tr> <tr> <td><b>BAY</b> FAMILY</td><td><b>COLORS</b> VORTEX COLOR CHOICES</td></tr> </table>	<b>DIMENSIONS</b> 123 x 14 x 56 IN 312 x 36 x 142 CM	<b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR	<b>FLOW</b> 11-17 GPM 42-64 LPM	<b>SMARTFLOW</b> -	<b>BAY</b> FAMILY	<b>COLORS</b> VORTEX COLOR CHOICES
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<b>BAY</b> FAMILY	<b>COLORS</b> VORTEX COLOR CHOICES												

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	<b>PLUX THRILL'N'SPILL</b> VOR - 7567	\$7,630		<b>ROOSTER TAIL</b> VOR - 0303	\$600
	<b>PLUX WATER TRIO</b> VOR - 7391	\$6,550		<b>SAIL TWIRL N°1</b> VOR - 7677	\$600
	<b>POWER VOLCANO</b> VOR - 7650	\$3,400		<b>SAILBOAT N°1</b> VOR - 7671	\$600
	<b>RAINBOW N°1</b> VOR - 0517	\$10,500		<b>SAILBOAT N°2</b> VOR - 7679	\$600
	<b>RAINBOW N°2</b> VOR - 0548	\$8,200		<b>SAILBOAT N°3</b> VOR - 7680	\$600
	<b>RAINING BUCKET N°1</b> VOR - 7503	\$12,710		<b>SAILBOAT N°4</b> VOR - 7681	\$600

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 <p><b>SCORPION</b> VOR - 7652</p> <p><b>DIMENSIONS</b> 190 x 139 x 187 IN 482 x 353 x 475 CM</p> <p><b>FLOW</b> 81-145 GPM 307-549 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 10-25 PSI 0.7-1.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$60,330</p>	 <p><b>SEA SILHOUETTE CRAB CLAW</b> VOR - 7686</p> <p><b>DIMENSIONS</b> 148 x 67 x 13 IN 376 x 170 x 33 CM</p> <p><b>FLOW</b> 7-13 GPM 27-49 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 6-10 PSI 0.4-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p>
 <p><b>SEA SERPENT N°1</b> VOR - 7577</p> <p><b>DIMENSIONS</b> 135 x 17 x 62 IN 343 x 44 x 158 CM</p> <p><b>FLOW</b> 20-40 GPM 76-151 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 10-20 PSI 0.7-1.4 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$6,600</p>	 <p><b>SEA SILHOUETTE FISH</b> VOR - 7687</p> <p><b>DIMENSIONS</b> 144 x 59 x 13 IN 366 x 150 x 33 CM</p> <p><b>FLOW</b> 10-18 GPM 38-68 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 6-10 PSI 0.4-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p>
 <p><b>SEA SERPENT N°2</b> VOR - 0525</p> <p><b>DIMENSIONS</b> 147 x 33 x 150 IN 373 x 85 x 381 CM</p> <p><b>FLOW</b> 30-50 GPM 114-189 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 5-15 PSI 0.3-1.0 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$9,690</p>	 <p><b>SEA SILHOUETTE LANTERNFISH</b> VOR - 7682</p> <p><b>DIMENSIONS</b> 142 x 120 x 13 IN 361 x 305 x 33 CM</p> <p><b>FLOW</b> 6-10 GPM 23-38 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 9-14 PSI 0.6-1.0 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p>
 <p><b>SEA SERPENT N°3</b> VOR - 0527</p> <p><b>DIMENSIONS</b> 147 x 51 x 265 IN 373 x 130 x 673 CM</p> <p><b>FLOW</b> 50-60 GPM 189-227 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 10-20 PSI 0.7-1.4 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$13,100</p>	 <p><b>SEA SILHOUETTE OCTOPUS</b> VOR - 7691</p> <p><b>DIMENSIONS</b> 85 x 134 x 129 IN 216 x 340 x 327 CM</p> <p><b>FLOW</b> 20-32 GPM 76-121 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 10-25 PSI 0.7-1.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p>
 <p><b>SEA SILHOUETTE ANGELFISH</b> VOR - 7685</p> <p><b>DIMENSIONS</b> 140 x 93 x 13 IN 356 x 236 x 33 CM</p> <p><b>FLOW</b> 11-19 GPM 42-72 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 6-10 PSI 0.4-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p>	 <p><b>SEA SILHOUETTE PELICAN</b> VOR - 7688</p> <p><b>DIMENSIONS</b> 143 x 102 x 13 IN 363 x 259 x 33 CM</p> <p><b>FLOW</b> 5-10 GPM 19-38 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 6-10 PSI 0.4-0.7 BAR</p> <p><b>COLORS</b> AS SHOWN</p> <p><b>SMARTFLOW</b> -</p>
 <p><b>SEA SILHOUETTE CRAB</b> VOR - 7690</p> <p><b>DIMENSIONS</b> 148 x 206 x 65 IN 376 x 523 x 165 CM</p> <p><b>FLOW</b> 18-34 GPM 68-129 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 10-25 PSI 0.7-1.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p>	 <p><b>SEA SILHOUETTE SEAHORSE</b> VOR - 7684</p> <p><b>DIMENSIONS</b> 150 x 50 x 13 IN 381 x 127 x 33 CM</p> <p><b>FLOW</b> 4-7 GPM 15-27 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 6-8 PSI 0.4-0.6 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p>

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## SEA SILHOUETTE SHARK

VOR - 7683

DIMENSIONS	PRESSURE
162x82x55 IN 411x208x140 CM	6-10 PSI 0.4-0.7 BAR
FLOW	SMARTFLOW
8-15 GPM 36-57 LPM	-
BAY	COLORS
TEEN	VORTEX COLOR CHOICES



## SILHOUETTE N°1

VOR - 7772

DIMENSIONS	PRESSURE
40x13x13 IN 102x33x33 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
10-18 GPM 38-68 LPM	-
BAY	COLORS
TODDLER	VORTEX COLOR CHOICES



## SEA SILHOUETTE TURTLE

VOR - 7689

DIMENSIONS	PRESSURE
144x127x13 IN 366x322x33 CM	6-10 PSI 0.4-0.7 BAR
FLOW	SMARTFLOW
9-18 GPM 34-68 LPM	-
BAY	COLORS
FAMILY & TEEN	VORTEX COLOR CHOICES



## SILHOUETTE N°2

VOR - 7773

DIMENSIONS	PRESSURE
55x13x13 IN 139x33x33 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
2-7 GPM 8-27 LPM	-
BAY	COLORS
TODDLER & FAMILY	VORTEX COLOR CHOICES



## SEAWEED N°1

VOR - 7779

DIMENSIONS	PRESSURE
57x11x25 IN 145x28x64 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
2-4 GPM 8-16 LPM	-
BAY	COLORS
FAMILY & TEEN	VORTEX COLOR CHOICES



## SILHOUETTE N°3

VOR - 7774

DIMENSIONS	PRESSURE
79x26x13 IN 201x66x33 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
4-8 GPM 15-30 LPM	-
BAY	COLORS
TODDLER & FAMILY	VORTEX COLOR CHOICES



## SEAWEED N°2

VOR - 7780

DIMENSIONS	PRESSURE
73x11x21 IN 185x28x53 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
3-6 GPM 11-22 LPM	-
BAY	COLORS
FAMILY & TEEN	VORTEX COLOR CHOICES



## SILHOUETTE N°4

VOR - 7776

DIMENSIONS	PRESSURE
112x21x25 IN 284x53x64 CM	10-15 PSI 0.7-1.0 BAR
FLOW	SMARTFLOW
4-7 GPM 15-26 LPM	-
BAY	COLORS
FAMILY	VORTEX COLOR CHOICES



## SEAWEED N°3

VOR - 7781

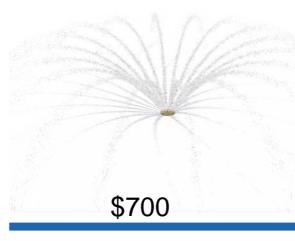
DIMENSIONS	PRESSURE
87x22x24 IN 221x55x61 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
4-7 GPM 15-27 LPM	-
BAY	COLORS
FAMILY	VORTEX COLOR CHOICES



## SILHOUETTE N°5

VOR - 7777

DIMENSIONS	PRESSURE
85x19x23 IN 216x48x58 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
4-7 GPM 15-26 LPM	-
BAY	COLORS
FAMILY	VORTEX COLOR CHOICES



## SIDE WINDER

VOR - 7518

DIMENSIONS	PRESSURE
0x5x5 IN 0x13x13 CM	5-15 PSI 0.3-1.0 BAR
FLOW	SMARTFLOW
10-20 GPM 39-77 LPM	-
BAY	COLORS
-	-

\$700



## SNAIL N°3

VOR - 7207

DIMENSIONS	PRESSURE
51x20x23 IN 132x51x56 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
57-65 GPM 216-246 LPM	24-27 GPM 91-102 LPM
BAY	COLORS
TODDLER	VORTEX COLOR CHOICES

\$7,420

# PRODUCT INDEX

<p><b>SNAIL N°4</b> VOR - 7217</p>  <p><b>DIMENSIONS</b> 31x18x27 IN 79x45x68 CM</p> <p><b>FLOW</b> 5-8 GPM 19-30 LPM</p> <p><b>BAY</b> TODDLER</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>	<p><b>SPIN N°1</b> VOR - 7450</p>  <p><b>DIMENSIONS</b> 44x37x37 IN 111x94x94 CM</p> <p><b>FLOW</b> 4-6 GPM 15-23 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 4-6 PSI 0.3-0.4 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> 6 COLOR OPTIONS</p>
<p><b>SNAKE N°1</b> VOR - 7213</p>  <p><b>DIMENSIONS</b> 137x57x24 IN 348x145x61 CM</p> <p><b>FLOW</b> 20-40 GPM 76-151 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 10-20 PSI 0.7-1.4 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>	<p><b>SPLIT STREAM</b> VOR - 7516</p>  <p><b>DIMENSIONS</b> 0x5x5 IN 0x13x13 CM</p> <p><b>FLOW</b> 5-10 GPM 19-39 LPM</p> <p><b>BAY</b> -</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> -</p>
<p><b>SNAKE N°2</b> VOR - 7214</p>  <p><b>DIMENSIONS</b> 142x56x20 IN 361x143x51 CM</p> <p><b>FLOW</b> 5-8 GPM 19-30 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>	<p><b>SPRAY CANNON</b> VOR - 0201</p>  <p><b>DIMENSIONS</b> 40x19x14 IN 102x48x36 CM</p> <p><b>FLOW</b> 5-10 GPM 19-38 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>
<p><b>SPIDER</b> VOR - 7653</p>  <p><b>DIMENSIONS</b> 125x191x205 IN 3178x485x521 CM</p> <p><b>FLOW</b> 59-118 GPM 224-447 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 10-25 PSI 0.7-1.7 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>	<p><b>SPRAY LOOP</b> VOR - 0519</p>  <p><b>DIMENSIONS</b> 64x75x3 IN 163x191x8 CM</p> <p><b>FLOW</b> 10-15 GPM 38-57 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 10-25 PSI 0.7-1.7 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>
<p><b>SPIDEY SPRAY</b> VOR - 7517</p>  <p><b>DIMENSIONS</b> 1x5x5 IN 3x13x13 CM</p> <p><b>FLOW</b> 7-10 GPM 27-38 LPM</p> <p><b>BAY</b> -</p> <p><b>PRESSURE</b> 2-5 PSI 0.1-0.3 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> -</p>	<p><b>SPRAY LOOPS</b> VOR - 0518</p>  <p><b>DIMENSIONS</b> 64x76x76 IN 162x193x193 CM</p> <p><b>FLOW</b> 40-60 GPM 152-228 LPM</p> <p><b>BAY</b> FAMILY</p> <p><b>PRESSURE</b> 10-15 PSI 0.7-1.7 BAR</p> <p><b>SMARTFLOW</b> 20-40 GPM 76-152 LPM</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>
<p><b>SPIDEY SPRAY N°2</b> VOR - 7674</p>  <p><b>DIMENSIONS</b> 0x5x5 IN 0x13x13 CM</p> <p><b>FLOW</b> 7-10 GPM 26-38 LPM</p> <p><b>BAY</b> -</p> <p><b>PRESSURE</b> 2-5 PSI 0.1-0.3 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> -</p>	<p><b>SUNSPRAY</b> VOR - 7578</p>  <p><b>DIMENSIONS</b> 121x14x26 IN 307x36x66 CM</p> <p><b>FLOW</b> 10-15 GPM 38-57 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 15-20 PSI 1.0-1.4 BAR</p> <p><b>SMARTFLOW</b> -</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p>

# PRODUCT INDEX

 <p><b>SUPERSPLASH N°1</b> VOR - 0128</p> <p><b>DIMENSIONS</b> 220x93x124 IN 559x237x315 CM</p> <p><b>FLOW</b> 25-38 GPM 95-144 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$30,800</p>	 <p><b>THREE BELLS N°2</b> VOR - 7571</p> <p><b>DIMENSIONS</b> 131x90x90 IN 333x229x229 CM</p> <p><b>FLOW</b> 9-15 GPM 35-57 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$10,680</p>
 <p><b>SUPERSPLASH N°2</b> VOR - 0130</p> <p><b>DIMENSIONS</b> 251x88x129 IN 638x224x328 CM</p> <p><b>FLOW</b> 25-38 GPM 97-147 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$28,650</p>	 <p><b>TOT TWISTER</b> VOR - 7030</p> <p><b>DIMENSIONS</b> 27x13x13 IN 69x33x33 CM</p> <p><b>FLOW</b> 10-20 GPM 38-76 LPM</p> <p><b>BAY</b> TODDLER</p> <p><b>PRESSURE</b> 10-20 PSI 0.7-1.4 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$3,900</p>
 <p><b>SUPERWAVE</b> VOR - 0136</p> <p><b>DIMENSIONS</b> 247x67x156 IN 627x170x396 CM</p> <p><b>FLOW</b> 25-38 GPM 97-147 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$60,000</p>	 <p><b>TRICKY BELLS</b> VOR - 7564</p> <p><b>DIMENSIONS</b> 136x86x86 IN 345x219x219 CM</p> <p><b>FLOW</b> 9-15 GPM 35-57 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$12,240</p>
 <p><b>TEAM SPRAY N°1</b> VOR - 7640</p> <p><b>DIMENSIONS</b> 1x44x93 IN 3x112x236 CM</p> <p><b>FLOW</b> 15-20 GPM 57-76 LPM</p> <p><b>BAY</b> -</p> <p><b>PRESSURE</b> 1-10 PSI 0.1-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$3,900</p>	 <p><b>TRICKY SOAKER</b> VOR - 1343</p> <p><b>DIMENSIONS</b> 103x35x30 IN 262x89x76 CM</p> <p><b>FLOW</b> 10-25 GPM 38-95 LPM</p> <p><b>BAY</b> FAMILY &amp; TEEN</p> <p><b>PRESSURE</b> 10-20 PSI 0.7-1.4 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$5,900</p>
 <p><b>TEAM SPRAY N°2</b> VOR - 8061</p> <p><b>DIMENSIONS</b> 1x38x38 IN 3x97x97 CM</p> <p><b>FLOW</b> 36-60 GPM 76-182 LPM</p> <p><b>BAY</b> -</p> <p><b>PRESSURE</b> 5-15 PSI 0.3-1.0 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$5,620</p>	 <p><b>TUBE N°1</b> VOR - 0220</p> <p><b>DIMENSIONS</b> 46x11x26 IN 117x28x66 CM</p> <p><b>FLOW</b> 5-10 GPM 19-38 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 10-15 PSI 0.7-1.0 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$5,900</p>
 <p><b>THREE BELLS N°1</b> VOR - 7372</p> <p><b>DIMENSIONS</b> 132x77x87 IN 335x196x221 CM</p> <p><b>FLOW</b> 9-15 GPM 35-57 LPM</p> <p><b>BAY</b> TEEN</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$9,200</p>	 <p><b>TURTLE N°2</b> VOR - 7216</p> <p><b>DIMENSIONS</b> 23x26x29 IN 58x66x74 CM</p> <p><b>FLOW</b> 6-10 GPM 23-38 LPM</p> <p><b>BAY</b> TODDLER</p> <p><b>PRESSURE</b> 5-10 PSI 0.3-0.7 BAR</p> <p><b>COLORS</b> VORTEX COLOR CHOICES</p> <p><b>SMARTFLOW</b> -</p> <p><b>PRICE</b> \$9,200</p>

# PRODUCT INDEX



## TURTLE N°3

VOR - 7219

DIMENSIONS	PRESSURE
50 x 24 x 28 IN 127 x 61 x 71 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
16-23 GPM 61-86 LPM	-
BAY	COLORS
TODDLER	VORTEX COLOR CHOICES



## WATER JELLY N°3

VOR - 7032

DIMENSIONS	PRESSURE
0 x 36 x 42 IN 0 x 91 x 107 CM	1-2 PSI 0.1-0.1 BAR
FLOW	SMARTFLOW
30-35 GPM 114-132 LPM	-
BAY	COLORS
-	-

\$2,200



## TWISTER

VOR - 0534

DIMENSIONS	PRESSURE
41 x 14 x 14 IN 105 x 36 x 36 CM	10-15 PSI 0.7-1.0 BAR
FLOW	SMARTFLOW
5-10 GPM 19-38 LPM	2-7 GPM 8-26 LPM
BAY	COLORS
TODDLER	VORTEX COLOR CHOICES

\$4,900



## UMBRELLA

VOR - 0114

DIMENSIONS	PRESSURE
120 x 60 x 60 IN 305 x 152 x 152 CM	5-15 PSI 0.3-1.0 BAR
FLOW	SMARTFLOW
50-100 GPM 190-379 LPM	-
BAY	COLORS
FAMILY & TEEN	VORTEX COLOR CHOICES

\$7,300



## VOLCANO

VOR - 1339

DIMENSIONS	PRESSURE
6 x 11 x 11 IN 15 x 28 x 28 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
1-5 GPM 4-19 LPM	-
BAY	COLORS
-	-

\$1,700



## WALL SPRAY

VOR - 0302

DIMENSIONS	PRESSURE
0 x 4 x 4 IN 0 x 10 x 10 CM	5-10 PSI 0.3-0.7 BAR
FLOW	SMARTFLOW
10-15 GPM 38-57 LPM	-
BAY	COLORS
-	-

\$680



## WATER JELLY N°1

VOR - 7010

DIMENSIONS	PRESSURE
0 x 5 x 5 IN 0 x 13 x 13 CM	1-2 PSI 0.1-0.1 BAR
FLOW	SMARTFLOW
10-12 GPM 38-45 LPM	-
BAY	COLORS
-	-

\$750



## WATER WILLOW

VOR - 7394

DIMENSIONS	PRESSURE
134 x 87 x 87 IN 340 x 221 x 221 CM	10-15 PSI 0.7-1.0 BAR
FLOW	SMARTFLOW
15-30 GPM 57-114 LPM	-
BAY	COLORS
FAMILY	VORTEX COLOR CHOICES

\$7,400

# PRODUCT INDEX

## WATERBUG N°1

VOR - 7580



\$4,800

DIMENSIONS	PRESSURE
21x20x20 IN 53x51x51CM	10-15 PSI 0.3-0.7 BAR
<b>FLOW</b>	<b>SMARTFLOW</b>

FLOW	
20-25 GPM	-
77-97 LPM	

BAY	COLORS
TODDLER	VORTEX COLOR CHOICES

## WATERBUG N°2

VOR - 7581



\$5,800

DIMENSIONS	PRESSURE
22x18x20 IN 56x46x51CM	5-10 PSI 0.3-0.7 BAR

FLOW	
5-7 GPM	-
19-27 LPM	

BAY	COLORS
TODDLER	VORTEX COLOR CHOICES

## WATERBUG N°3

VOR - 7582



\$5,800

DIMENSIONS	PRESSURE
22x18x20 IN 56x46x51CM	5-10 PSI 0.3-0.7 BAR

FLOW	
5-7 GPM	-
19-27 LPM	

BAY	COLORS
TODDLER	VORTEX COLOR CHOICES

## WATERBUG N°4

VOR - 7661



DIMENSIONS	PRESSURE
43x20x20 IN 110x51x51CM	5-10 PSI 0.3-0.7 BAR

FLOW	
57-65 GPM	SMARTFLOW
216-246 LPM	20-28 GPM

BAY	COLORS
TODDLER	VORTEX COLOR CHOICES

## WAVY PALM

VOR - 0510



\$8,390

DIMENSIONS	PRESSURE
150x82x82 IN 380x208x208 CM	10-15 PSI 0.7-1.0 BAR

FLOW	
20-30 GPM	SMARTFLOW
76-114 LPM	-

BAY	COLORS
FAMILY	VORTEX COLOR CHOICES

## WHALE

VOR - 0522



\$15,390

DIMENSIONS	PRESSURE
100x111x225 IN 254x282x572 CM	10-25 PSI 0.7-1.7 BAR

FLOW	
62-93 GPM	SMARTFLOW
235-353 LPM	31-62 GPM

BAY	COLORS
FAMILY	VORTEX COLOR CHOICES

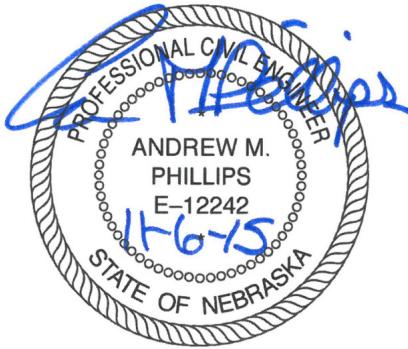
## Appendix D

# **REPORT OF PRELIMINARY GEOTECHNICAL EXPLORATION**

## **FAIRBURY PARK & POOL STUDY NEAR THE INTERSECTION OF WEST 8<sup>TH</sup> STREET & PARK ROAD FAIRBURY, NEBRASKA**

**PREPARED FOR  
CITY OF FAIRBURY, NEBRASKA**

**PREPARED BY  
OLSSON ASSOCIATES**



**NOVEMBER 6, 2015**

**OLSSON PROJECT No: 015-2112**

601 P Street, Lincoln, NE • (402) 474-6311 • FAX (402) 474-5160



Date: November 6, 2015

City of Fairbury, Nebraska  
Attn: Homer Ward  
PO Box 554  
Fairbury, Nebraska 68352

RE: Preliminary Geotechnical Exploration  
Fairbury Park & Pool Study  
Fairbury, Nebraska  
Olsson Project No. 015-2122

Dear Mr. Ward:

Olsson Associates has completed the authorized preliminary geotechnical exploration for the above referenced project. The preliminary geotechnical exploration was conducted to evaluate physical characteristics of subsurface conditions with respect to design and construction of this project. The enclosed preliminary report summarizes the project characteristics as we understand them, presents the findings of the borings and laboratory tests, discusses the observed subsurface conditions, and provides preliminary geotechnical engineering recommendations for this project.

We appreciate the opportunity to provide our geotechnical engineering services for this project. If you have any questions or need further assistance, please contact us at your convenience. We are also staffed and equipped to provide construction testing and inspection services on this project as well.

Respectfully submitted,  
**Olsson Associates**

A handwritten signature in blue ink that reads "Andrew M. Phillips".

Andrew M. Phillips, P.E.  
Geotechnical Engineer  
402.458.5625

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## APPENDICES

- Appendix A: Site Location Plan, Boring Location Map
- Appendix B: Symbols and Nomenclature, Boring Logs
- Appendix C: Summary of Laboratory Test Results

## **A. PROJECT UNDERSTANDING**

### **A.1. GEOTECHNICAL SCOPE**

This report presents the results of the preliminary geotechnical subsurface exploration performed for the proposed Fairbury Park & Pool Study project in Fairbury, Nebraska.

The purpose of this exploration was to evaluate the subsurface conditions and provide preliminary recommendations regarding the design of foundations and floor slabs of the proposed Fairbury pool improvements. We have completed the following scope of services for this project:

- Performed a site reconnaissance and reviewed geologic subsurface conditions.
- Drilled two soil test borings to a depth of 15 feet in the proposed site area.
- Performed laboratory tests on selected soil samples obtained during the drilling operations.
- Conducted a geotechnical engineering evaluation using information obtained from our observations, soil test borings and laboratory tests, and information available regarding the proposed construction.
- Preparation of this Preliminary Report of Geotechnical Exploration presenting the soil test borings, laboratory test results, and a summary of our engineering evaluations and recommendations.

The scope of this exploration did not include any environmental assessment for the presence of wetlands and/or hazardous or toxic materials in the soil or groundwater on or near the site. Any statements in this report regarding odors, discoloration, or suspicious conditions are strictly for the information of our client.

### **A.2. SITE LOCATION AND DESCRIPTION**

The project site is located southwest of the intersection of West 8<sup>th</sup> Street and Park Road in Fairbury, Nebraska. At the time of our field exploration, the site was utilized as an existing pool, bath house, grass vegetation and gravel parking lot, and was accessible with a truck-mounted drill rig. The approximate location of the proposed Fairbury Park & Pool Study project is depicted on the Site Location Plan included in *Appendix A*.

### A.3. PROJECT INFORMATION

The design team for the Fairbury Park & Pool Study is considering four site concepts. These site concepts could include a new bathhouse, a new 12-foot pool with a slide, improvements to the existing pool, a new parking lot, new mechanical room, and a new splash pad.

The four concepts provided by **Olsson** consist of either improvements to the existing pool or the construction of a new 12-foot pool. Depending on which concept is selected, the new 12-foot deep pool could be oriented in a north/south or east/west direction. The new bathhouse may be located at its current location or to the east of the existing swimming pool. A new parking lot could also be constructed to the north of the existing pool. The approximate location of the proposed construction area is depicted on the Boring Location Map included in *Appendix A*.

The finished floor and deck elevations for the proposed bathhouse, splash pad, and pool were not available at the time of this preliminary report. Topographic information for the site was obtained from **Olsson**. Based on the available topographic information, the soil test borings ranged from a high elevation of 1316.0 feet to a low elevation of 1315.5 feet. We have assumed a maximum structural fill depth of up to 2.0 feet and minimal excavation (less than 1 foot) for the project. Excavations of up to 12 feet will be needed to achieve the proposed bottom depth of the new pool.

At the time of this exploration, specific structural design loads were not provided; however, based on our experience with similar construction, **Olsson** anticipates that structural loads for the bath house to not exceed 30 kips and 3.0 kips per lineal foot for maximum and continuous wall loads, respectively.

## B. EXPLORATORY AND TEST PROCEDURES

### B.1. FIELD EXPLORATION

The field exploration program consisted of performing two soil test borings at the locations depicted on the Boring Location Map presented in *Appendix A*. The ground surface elevations at the boring locations were interpreted from the topographic map provided by **Olsson**. The surface elevations at the boring locations were rounded to the nearest half foot and are presented on the boring logs.

The soil test borings were extended to a depth of 15 feet below the existing ground surface with a truck-mounted drill rig using continuous-flight augers. Soil samples were obtained at selected intervals in the soil test borings. Soils samples designated as "U" samples on the boring logs were obtained in using Thin-Walled Tube Sampling techniques. Soil samples designed as "SS" samples were obtained during Penetration Test using a Split-Spoon Barrel sampler. Recovered samples were sealed in containers, labeled, and protected for transportation to the laboratory for testing.

### B.2. LABORATORY TESTING

Descriptions of the soils encountered in the soil test borings were prepared using Visual-Manual Procedures for Descriptions and Identification of Soils. Laboratory tests were also performed to evaluate the engineering properties for the recovered soil samples. Moisture content tests and density were used to determine the existing moisture/density condition of the soils. Unconfined compression tests were used to help define the stress-strain characteristics and related shear strength of the cohesive soils. An Atterberg limits test was conducted to aid in the classification of the soils under the Unified Classification System and to indicate the shrink/swell potential of the soils. One consolidation test was conducted to determine the potential settlement and shrink/swell potential of the proposed pool improvements. One standard proctor test was completed to determine the maximum dry density and optimum moisture content of the existing fill soils. A summary of the laboratory test results is presented in *Appendix C*.

## **C. SUBSURFACE CONDITIONS**

### **C.1. AREA GEOLOGY**

The site lies in the stream terraces region of Nebraska at the interface of the Muir Silt Loam complex. These soils are known to be gently sloping, well drained, and have a moderately high to high permeability.

### **C.2. TEST BORINGS AND LABORATORY SUMMARY**

The generalized subsurface profile for this site, in descending order, generally consisted of developed zone overlying existing fill and alluvial soils. Specific soil descriptions are noted in more detail on the Soil Test Boring Logs in *Appendix B*.

#### Developed Zone

A developed zone with approximately 3.0 inches of topsoil was encountered in each of the soil test borings, which consisted of varying amounts of organics and roots. Organic material is typically considered unsuitable for structural support or for use as structural fill due to its high organic content. It should be noted that the developed zone encountered in the soil test borings is to be stripped and stockpiled outside of the construction area prior to the placement of structural fill.

#### Existing Fill

Existing fill was encountered each of the soil test borings and extended to depths ranging from 2.0 to 3.5 feet below the existing ground surface. Soils identified as fill were generally firm, light to dark brown, dry to moist to moist, mostly silty lean clay with varying amounts of fine sand. Laboratory tests on recovered samples from this stratum depicted a moisture content ranging from 13.4 to 17.8 percent and dry densities ranging from 88.0 to 91.4 pounds per cubic foot (pcf). An Atterberg limits test performed on a bulk sample of the fill material indicated a liquid limit of 31 and a plasticity index of 13. A standard proctor test performed on a bulk sample from this stratum depicted a maximum dry density of 108.7 pcf at an optimum moisture content of 16.3 percent.

#### Alluvium

Alluvium was encountered in each of the soil test borings and extended to the base of the soil test borings. Soils identified as alluvium were generally soft to stiff, greyish brown, moist to wet, mostly silty lean clay with varying amounts of fine to medium sand, iron staining, and manganese. Laboratory tests on recovered samples from this stratum depicted a moisture content ranging from 20.8 to 26.1 percent, dry densities ranging from 88.4 to 103.2 pcf, and an unconfined

compressive strength value range of 0.8 to 1.1 tons per square foot (tsf). Standard penetration resistance "N" values obtained in the alluvial soils ranged from 3 to 7 blows per foot (bpf). The Standard penetration resistance "N" values and unconfined compressive strength values indicated a soft to stiff consistency for the alluvium material.

### C.3. GROUNDWATER SUMMARY

Groundwater was encountered in the soil test borings as summarized in Table 1. The dates, conditions and depths of the groundwater table are noted in more detail on the Soil Test Boring Logs in *Appendix B*. Groundwater levels will fluctuate depending on seasonal variations of precipitation and other factors that may occur at higher elevations at some time in the future. **Section D.5** of this report will address any site drainage concerns with water elevations in this region.

TABLE 1  
GROUNDWATER MEASUREMENTS

Boring No.	Groundwater Depth During Drilling (Feet)	Groundwater Elevation During Drilling	Groundwater Depth Immediately After Drilling (Feet)	Groundwater Elevation Immediately After Drilling	Groundwater Depth 6 Hours After Drilling (Feet)	Groundwater Elevation 6 Hours After Drilling
B-1	13.0	1303.0	11.0	1305.0	10.3	1305.7
B-2	12.5	1303.0	10.2	1305.3	10.4	1305.1

## D. GENERAL SITE PREPARATION

### D.1. GENERAL SITE CONDITIONS/SITE PREPARATION

There are several geotechnical related aspects of the site that should be considered in design and construction. These aspects are summarized as follows and will be discussed in more detail in later sections of the report.

- At the time of drilling, the site for the proposed project site was covered with topsoil (typically 3 inches thick), gravel parking lot, vegetation, and roots. Organic material is typically considered unsuitable for structural support or for use as structural fill.
- Groundwater was encountered in both soil test boring at a depth ranging from 10.3 to 10.4 feet below the existing ground surface at the time of this investigation. Site development and building plans should take into consideration the anticipated depth to groundwater when considering the grading operations, FFE, and pool depth. Please see **Section D.3** of this report for further recommendations related to the groundwater.
- The existing fill soils were found to be variable in density and moisture content and do not appear suitable for support for the proposed bathhouse, pool, and will need to be overexcavated. The overexcavation depth of the existing fill would likely need to extend approximately 2.0 to 3.5 feet below existing ground surface.
- High moisture content subgrade soils maybe encountered during excavation operations because of the relatively shallow depth to groundwater. Heavy scrapers and rubber tire construction equipment will apply high amounts of ground pressure which could result in pumping and rutting in the underlying soils. Continuous traffic in localized areas will also increase the chances of pumping and rutting. Consideration should be given to using a backhoe (or similar) equipment to excavate the final 3 feet in pool areas. Stabilization measures may be needed in the pool excavation, which could include placement of geogrid and aggregate.
- Areas to receive new structural fill should be proofrolled with a loaded tandem axle dump truck, loaded scarper, or similar rubber-tired equipment weighing at least 15 tons (with an equivalent axle load of up to 9 tons). Proofrolling operations should be observed and documented by an **Olsson** field representative. Unstable and unsuitable soils which are revealed by proofrolling and which cannot be adequately densified in-place should be documented, removed to a stable depth, undisturbed natural soils, and replaced with compacted structural fill placed under the direction of the geotechnical engineer.
- Based upon Atterberg limits results and site observations, the existing fill and alluvial soils appear suitable for re-use as structural fill.

## D.2. PRELIMINARY STRUCTURAL FILL

During construction, structural fill soils placed within building and pavement areas should have a liquid limit of less than 45 and a plasticity index of less than 25. The suitability of on-site soils for use as structural fill should be approved by an on-site representative of **Olsson** through Atterberg limits testing completed during construction.

In addition to the plasticity characteristics, the fill soils should also be relatively free of organic materials (less than about two hundredths by weight), other deleterious material and should not contain particle sizes larger than three inches. Imported fill material should be tested prior to placement at the site to verify it complies with the criteria stated in this section of the report. Samples of the proposed imported structural fill should be submitted at least three days prior to placement so the necessary laboratory tests can be performed.

We recommend that structural fill and backfill be compacted in accordance with the criteria stated in Table 2. A qualified field representative should periodically observe fill placement operations and perform field density tests concurrently to indicate if the specified compaction is being achieved.

**TABLE 2**  
**STRUCTURAL FILL PLACEMENT GUIDELINES**

Areas of Fill Placement	Compaction Recommendation (ASTM D698-Standard Proctor)	Moisture Content (Percent of Optimum)
Granular Cushion Beneath Floor Slab (if used)	98%*	As necessary to obtain density
Floor Slab/Soil Subgrade – 1' below the base of the granular cushion (if used) or Floor Slab	98%	-1 to +3 percent
Structural fill placed below the Floor Slab Subgrade and within 5 feet of the perimeter of the building pad	98%	-1 to +3 percent
Utility Trenches - Within building area	98%	-1 to +3 percent
Beneath Landscaped/Grass Areas	92%	As necessary to obtain density

The moisture content of suitable borrow soils should generally be between the specified ranges in Table 2. More stringent moisture limits may be necessary with certain soils. Adjustment of moisture content may be necessary to allow compaction in accordance with project specifications. Dependent on the percentage of fines, the clean free-draining aggregates utilized in the granular cushion beneath the floor slab could alternatively be consolidated by means of a vibratory compactor to at least 70% "relative density", as determined in accordance with ASTM D 4253

(Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table) and D 4254 (Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculations of Relative Density).

### **D.3. PRELIMINARY DRAINAGE AND GROUNDWATER CONSIDERATIONS**

Groundwater was encountered in the soil test borings, as stated in Table 1, and could affect pool excavation and construction. We note that groundwater levels will fluctuate depending on seasonal variations of precipitations and other factors that were not evident at the time of drilling and may occur at higher elevations in the future which could potentially impact construction operations.

Ultimately, dewatering methods and techniques (if required) will need to be determined by the contractor based on previous experience with similar soils in this area. In addition, due to the spacing and scarcity of the soil test borings, the groundwater data represents a very small sampling of the actual groundwater across the site. Dewatering methods could involve sump pumps, well points, or a combination of both. The contractor should utilize previous experience in this area to determine the most efficient and cost effective method to dewater. It will be critical that the method utilized for dealing with the on-site groundwater be sufficient to provide dry excavations.

**Note:** The structural engineer or pool designer should consider uplift forces acting on the base of the pool as part of their design.

In general, water should not be allowed to collect near the surface of the foundation or floor slab areas of the structures during or after construction. Since soils generally tend to soften when exposed to free water, provisions should be made to remove seepage water from excavations, should it occur. In addition, undercut or excavated areas should be sloped toward one corner to facilitate the collection and removal of rainwater or surface runoff.

The site should also be graded to avoid water flows, concentrations, or pools behind grade retaining walls. If swales are designed at the top of the walls, proper line and slope should be considered to avoid any moisture infiltration behind the walls. Special attention to sources of storm water from building roofs, gutter downspouts, and paved areas draining to one point is needed.

Additionally, in order to minimize concerns related to improper drainage away from the foundations that tend to soften subgrade soils when exposed to water; we provide the following general recommendations:

- Site grading should provide for efficient drainage of rainfall away from building and pool areas, with a minimum slope of 2% for pavement areas and 5% for grass or landscaped areas.
- Roof run-off should be collected and transferred directly to the storm sewer system, if possible, or to a location well away from the structures. Conventional downspout drainage leading to splash blocks, though not as desirable, may be used.
- Install clay plugs in each utility trench for utility line penetrations entering the building pad. The compacted clay plug should extend a minimum distance of five feet out from the building exterior.
- External hose connections should incorporate splash blocks to prevent localized accidental flooding of foundation soils. External hose connections should have cutoff valves inside the building to prevent accidental or unauthorized use of external hose connections.
- Building maintenance personnel should be informed of the potential problems associated with watering in close proximity to the building and pool. Excessive watering of shrubs or lawns near building and pool should be avoided. Placement of deep-rooted or water-intensive shrubs near buildings and pool also should be avoided.

## **E. PRELIMINARY FOUNDATION DESIGN**

### **E.1. PRELIMINARY SHALLOW FOUNDATION DESIGN**

Based on the results of the soil test borings, laboratory testing and our engineering evaluation, it is our preliminary opinion that the subsurface conditions are suitable for supporting the bathhouse on a conventional shallow foundation system. Assuming the recommendations in **Section D** of this report are followed, the interior and exterior foundations will likely be supported on structural fill and alluvial soils. Based on the above soil properties and assuming the recommendations above are followed, the bath house could be designed for a preliminary maximum net allowable soil bearing pressure ranging from 1,500 to 2,000 psf.

The net allowable bearing pressure refers to the bearing pressure at foundation level in excess of the surrounding overburden pressure. Footings should have minimum dimensions in accordance with local building codes. Exterior footings and footings in unheated areas should bear at a minimum depth of 3½ feet below the lowest adjacent final ground surface. It is recommended that interior footings in heated areas bear at a depth as shallow as possible below the lowest adjacent final ground surface. The analyses for interior and exterior footings utilized bearing depths of 2 and 3½ feet, respectively, below the finished floor elevation.

Provided the recommendations contained in this report are followed, total post-construction settlements are anticipated to be less than 1.0 inch with differential settlements anticipated to be less than 0.5 inches for the structure. To reduce effects of differential settlement, a floating floor slab independent from the wall and column loads with expansion joints will be critical in minimizing the potential cracking that can occur along and around the proposed foundation system. Floor slab control joints should be used to reduce damage due to shrinkage cracks.

## **F. LIMITATIONS**

### **F.1. REPORT LIMITATIONS**

The preliminary conclusions and recommendations presented in this report are based on the information available regarding the proposed construction, the results obtained from our soil test borings and sampling procedures, the results of the laboratory testing program, and our experience with similar projects. The soil test borings represent a very small statistical sampling of subsurface soils and conditions may be encountered during construction that are substantially different from those indicated by the soil test borings. In these instances, adjustments to design and construction may be necessary.

This preliminary geotechnical exploration is based on the site location and information provided to **Olsson** and our understanding of the project as noted in this report. Changes in the location or design of the proposed project could significantly affect the conclusions and recommendations presented in this geotechnical report. **Olsson** should be contacted in the event of such changes to determine if the recommendations of this report remain appropriate for the revised site design.

Additional soil test borings, laboratory testing, and engineering analysis will be necessary to provide final design recommendations. Grading operations and depths of structural fill have significant effects on the final bearing capacities.

Soil stratification, as shown on the Boring Logs, represent soil conditions at the boring locations; however, variations may occur between or around the boring locations. The lines of demarcation represent the approximate boundary between soil types but the transition may be more gradual.

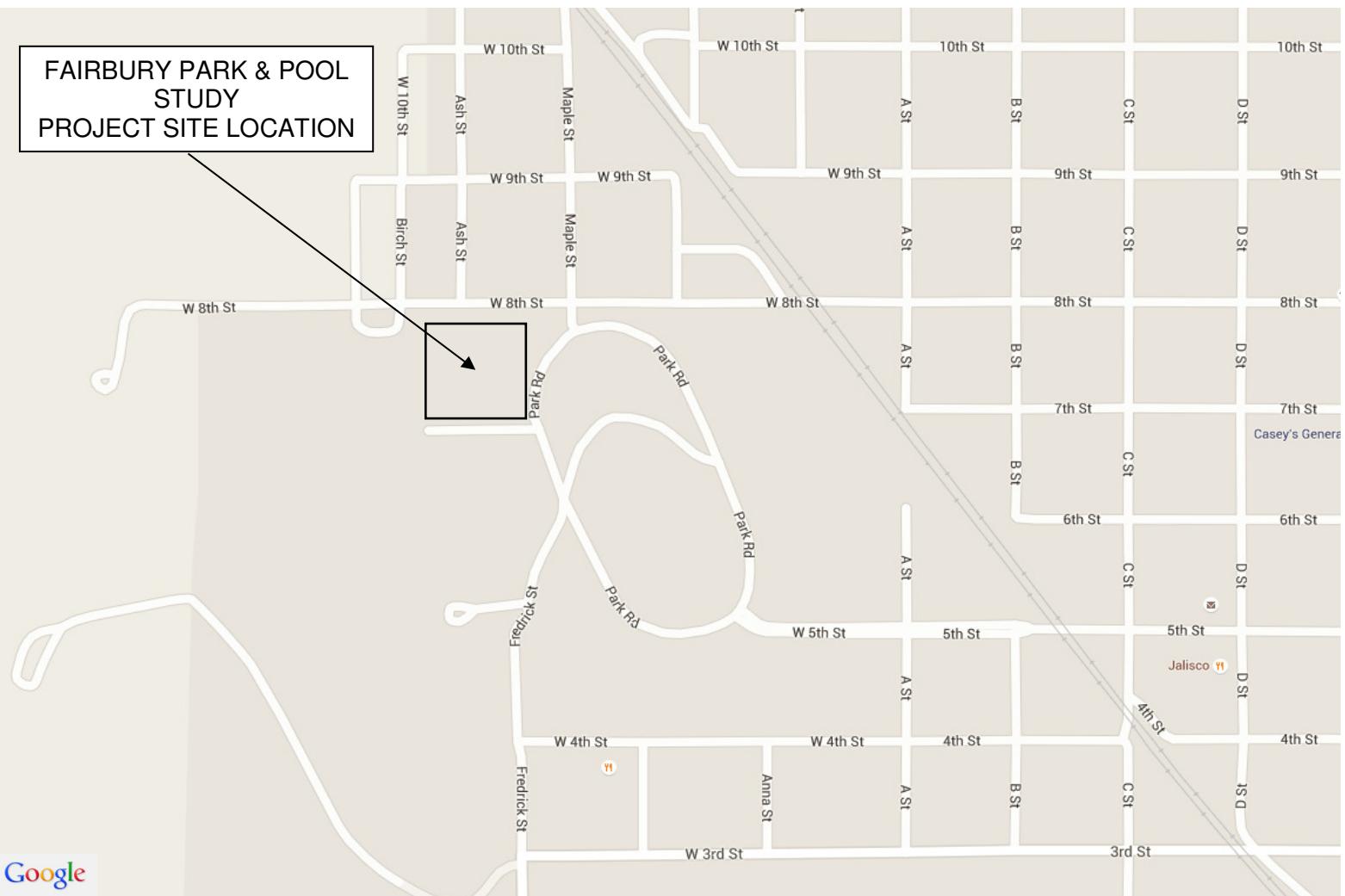
This report was prepared by a Professional Engineer registered in the State of Nebraska with the firm **Olsson Associates (Olsson)**. The conclusions and recommendations contained herein are based on generally accepted, professional, geotechnical engineering practice at the time of this report within this geographic area. No other warranty is expressed or implied. This report has been prepared for the exclusive use of the **City of Fairbury, Nebraska** with specific application to the proposed project.

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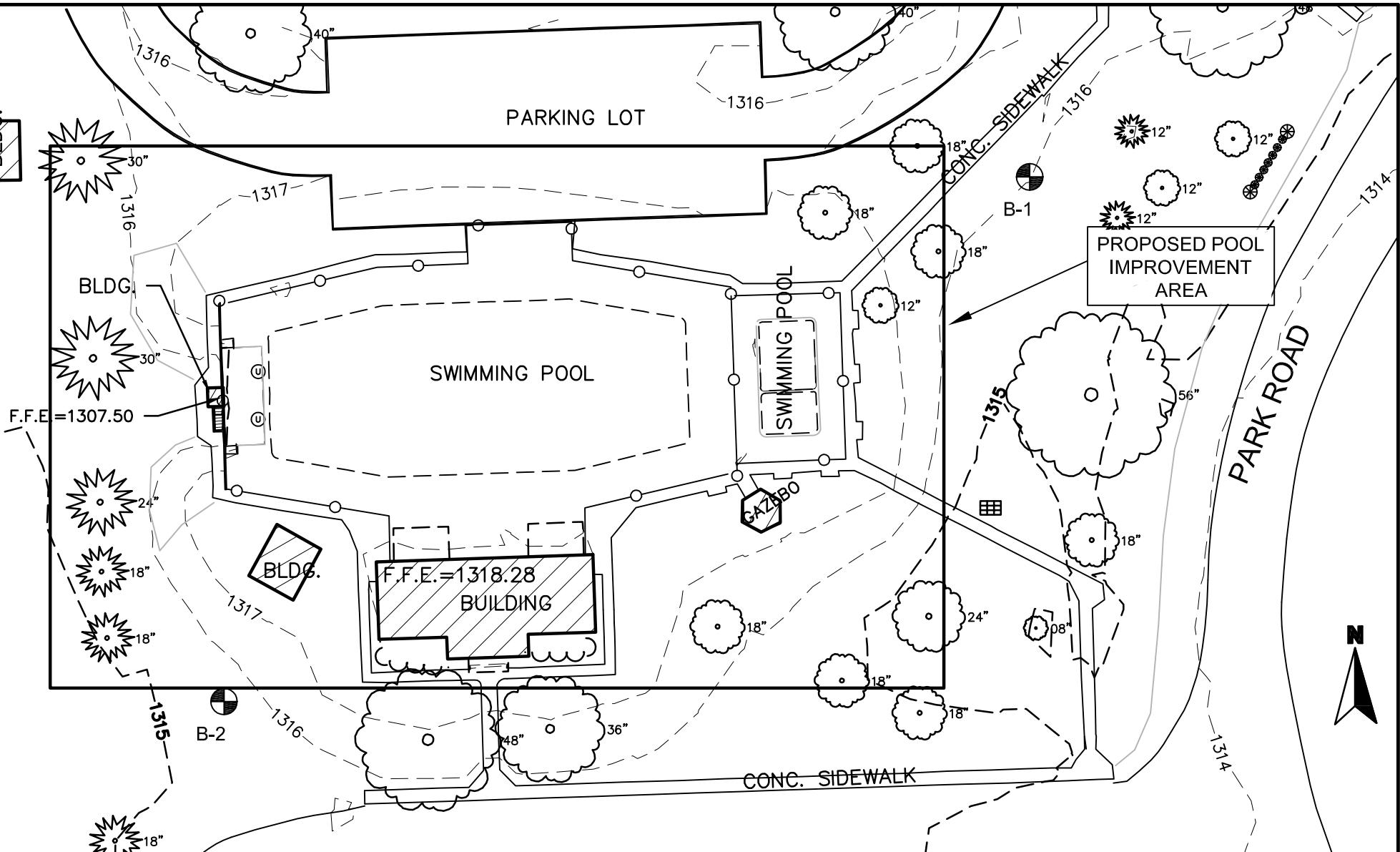
**APPENDIX A**  
**Site Location Plan**  
**Boring Location Map**

**FAIRBURY PARK & POOL  
STUDY  
PROJECT SITE LOCATION**



9-1

**SITE LOCATION PLAN  
FAIRBURY PARK & POOL STUDY  
FAIRBURY, NEBRASKA  
OA PROJECT NO. 015-2112**



LEGEND

SOIL BORING LOCATION

0 25 50 100  
SCALE IN FEET

PROJECT: 015-2112

DATE: 9/28/15 DRAWN BY: NAM

BORING LOCATION MAP  
FAIRBURY, NEBRASKA

OLSSON  
ASSOCIATES

601 P Street, Suite 200  
P.O. Box 84608  
Lincoln, NE 68508

TEL 402.474.6311  
FAX 402.474.5160  
[www.olssonassociates.com](http://www.olssonassociates.com)

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**APPENDIX B**  
**Symbols & Nomenclature**  
**Boring Logs**

# SYMBOLS AND NOMENCLATURE

## DRILLING NOTES

### DRILLING AND SAMPLING SYMBOLS

SS:	Split-Spoon Sample (1.375" ID, 2.0" OD)	HSA:	Hollow Stem Auger	NE:	Not Encountered
U:	Thin-Walled Tube Sample (3.0" OD)	CFA:	Continuous Flight Auger	NP:	Not Performed
CS:	Continuous Sample	HA:	Hand Auger	NA:	Not Applicable
BS:	Bulk Sample	CPT:	Cone Penetration Test	% Rec:	Percent of Recovery
MC:	Modified California Sampler	WB:	Wash Bore	WD:	While Drilling
GB:	Grab Sample	FT:	Fish Tail Bit	IAD:	Immediately After Drilling
SPT:	Standard Penetration Test Blows per 6.0"	RB:	Rock Bit	AD:	After Drilling
				CI:	Cave-In

### DRILLING PROCEDURES

Soil samples designated as "U" samples on the boring logs were obtained in using Thin-Walled Tube Sampling techniques. Soil samples designated as "SS" samples were obtained during Penetration Test using a Split-Spoon Barrel sampler. The standard penetration resistance 'N' value is the number of blows of a 140 pound hammer falling 30 inches to drive the Split-Spoon sampler one foot. Soil samples designated as "MC" were obtained in using Thick-Walled, Ring-Lined, Split-Barrel Drive sampling techniques. Recovered samples were sealed in containers, labeled, and protected for transportation to the laboratory for testing.

### WATER LEVEL MEASUREMENTS

Water levels indicated on the boring logs are levels measured in the borings at the times indicated. In relatively high permeable materials, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels is not possible with only short-term observations.

## SOIL PROPERTIES & DESCRIPTIONS

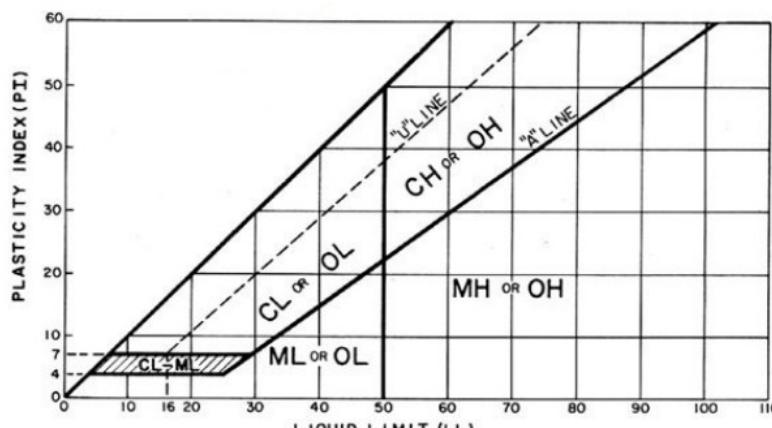
Descriptions of the soils encountered in the soil test borings were prepared using Visual-Manual Procedures for Descriptions and Identification of Soils.

### PARTICLE SIZE

Boulders	12 in. +	Coarse Sand	4.75mm-2.0mm	Silt	0.075mm-0.005mm
Cobbles	12 in.-3 in.	Medium Sand	2.0mm-0.425mm	Clay	<0.005mm
Gravel	3 in.-4.75mm	Fine Sand	0.425mm-0.075mm		

COHESIVE SOILS		COHESIONLESS SOILS		COMPONENT %	
Consistency	Unconfined Compressive Strength (Qu) (tsf)	Relative Density	'N' Value	Description	Percent (%)
Very Soft	<0.25	Very Loose	0 - 3	Trace	<5
Soft	0.25 - 0.5	Loose	4 - 9	Few	5 - 10
Firm	0.5 - 1.0	Medium Dense	10 - 29	Little	15 - 25
Stiff	1.0 - 2.0	Dense	30 - 49	Some	30 - 45
Very Stiff	2.0 - 4.0	Very Dense	≥ 50	Mostly	50 - 100
Hard	> 4.0				

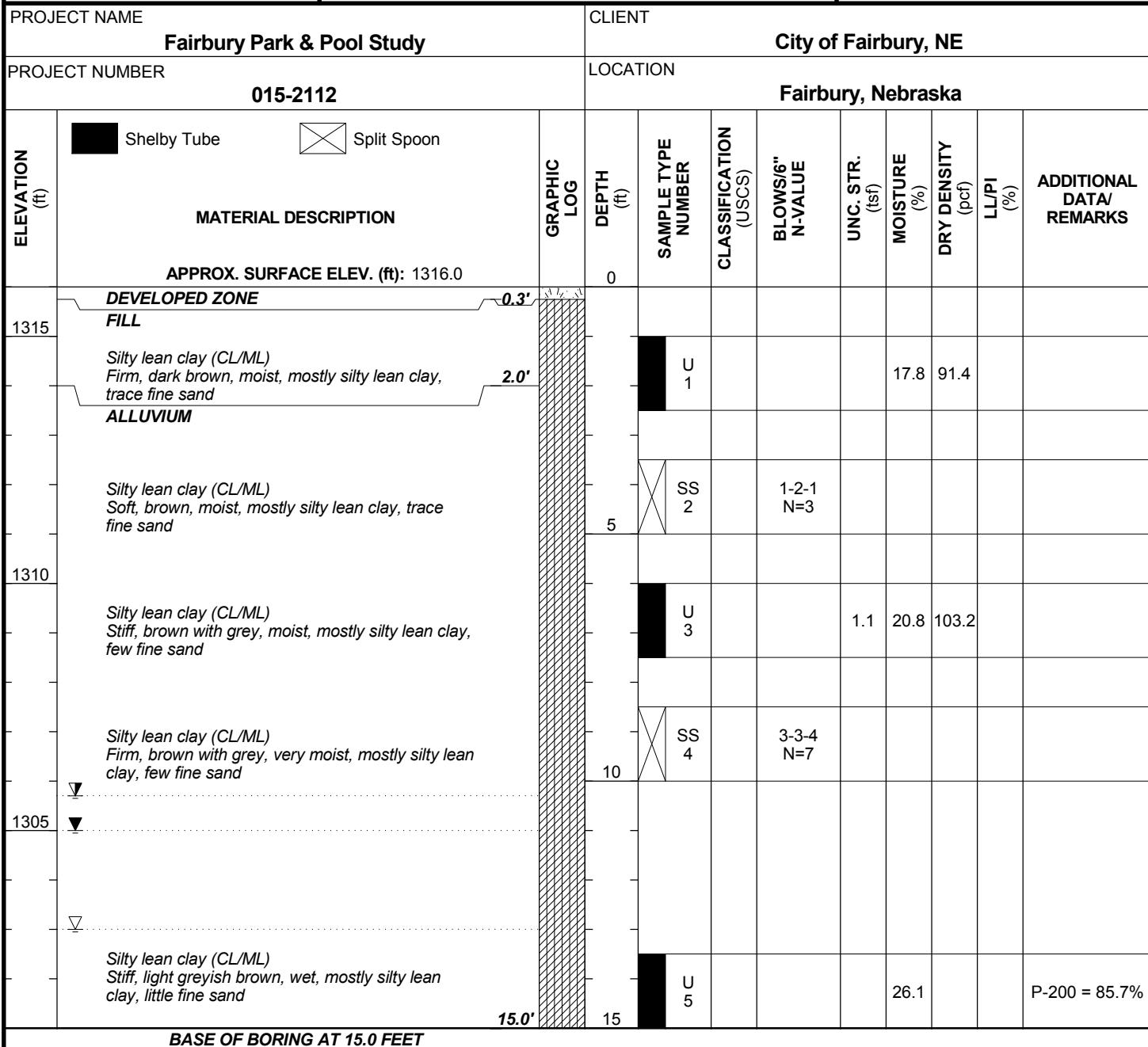
### PLASTICITY CHART



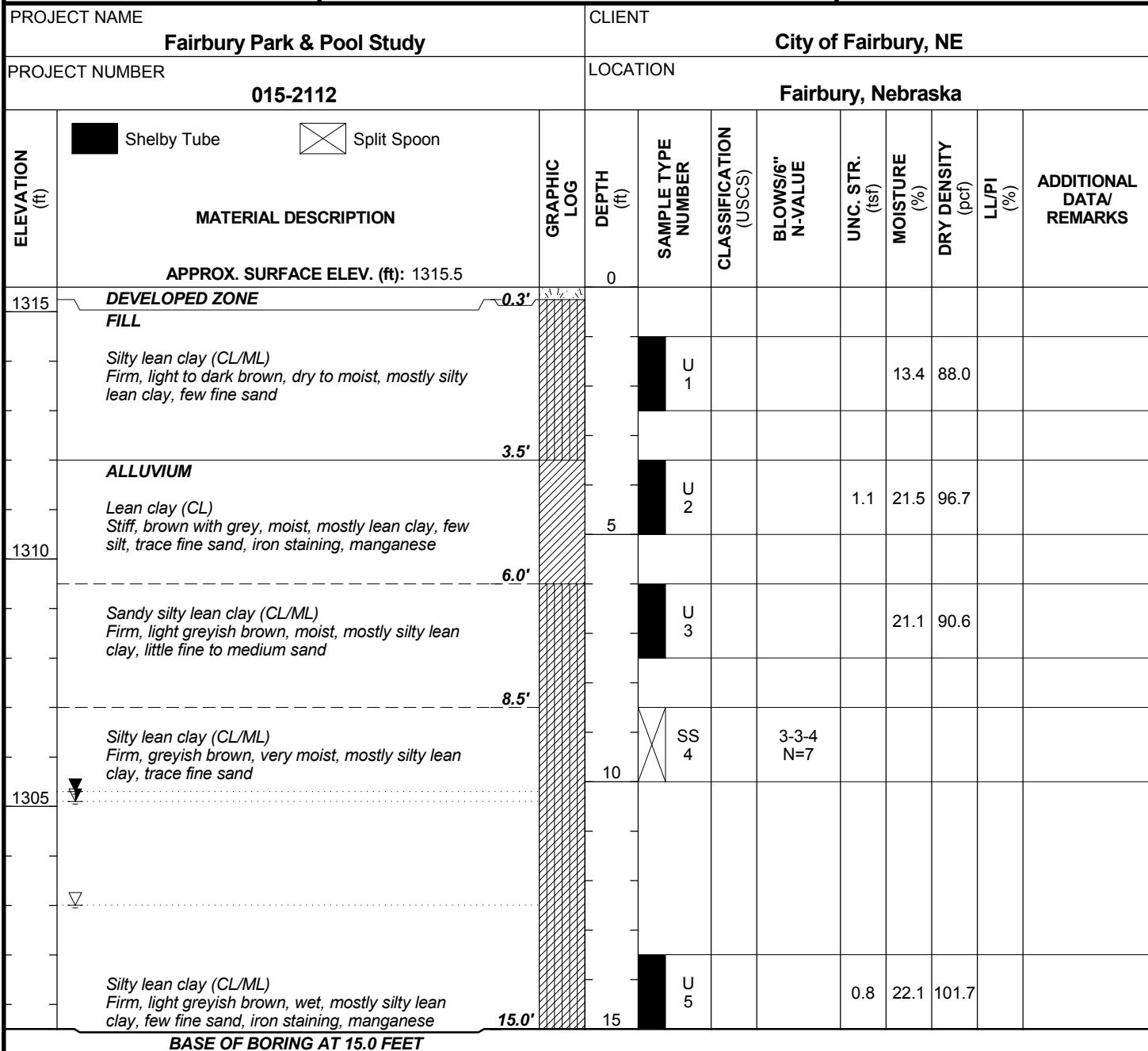
### ROCK QUALITY DESIGNATION (RQD)

Description	RQD (%)
Very Poor	0 - 25
Poor	25 - 50
Fair	50 - 75
Good	75 - 90
Excellent	90 - 100





WATER LEVEL OBSERVATIONS		OLSSON ASSOCIATES 601 P STREET, SUITE 200 LINCOLN, NEBRASKA 68508	STARTED:	9/1/15	FINISHED:	9/1/15
WD	▽ 13.0 ft		DRILL CO.:	OLSSON	DRILL RIG:	CME 45C
IAD	▽ 11.0 ft after 0 Hrs		DRILLER:	JSR	LOGGED BY:	CAH
AD	▽ 10.3ft after 6Hrs		METHOD:	CONTINUOUS FLIGHT AUGER		



WATER LEVEL OBSERVATIONS		<b>OLSSON ASSOCIATES</b> <b>601 P STREET, SUITE 200</b> <b>LINCOLN, NEBRASKA 68508</b>		STARTED:	9/1/15	FINISHED:	9/1/15
WD	▽ 12.5 ft			DRILL CO.:	OLSSON	DRILL RIG:	CME 45C
IAD	▽ 10.2 ft after 0 Hrs			DRILLER:	JSR	LOGGED BY:	CAH
AD	▽ 10.4ft after 6Hrs			METHOD:	CONTINUOUS FLIGHT AUGER		

## **APPENDIX C**

### **Summary of Laboratory Test Results**

OLSSON ASSOCIATES  
601 P STREET, SUITE 200  
LINCOLN, NEBRASKA 68508



## SUMMARY OF LABORATORY RESULTS

PAGE 1 OF 1

PROJECT NAME: Fairbury Park & Pool Study  
PROJECT NUMBER: 015-2112

CLIENT: City of Fairbury, NE  
PROJECT LOCATION: Fairbury, Nebraska

BORING NUMBER	SAMPLE I.D.	SAMPLE DEPTH (ft)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	VOID RATIO	SATURATION (%)	UNCONFINED STRENGTH (tsf)	STRAIN (%)	ATTERBERG LIMITS			P-200	USCS CLASS.
									LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX		
B-1	U-1	1.0 - 2.5'	17.8	91.4	0.843	56.9							
B-1	U-3	6.0 - 7.5'	20.8	103.2	0.633	88.7	1.1	3.4					
B-1	U-5	13.5 - 15.0'	26.1									85.7	
B-2	U-1	1.0 - 2.5'	13.4	88.0	0.915	39.6							
B-2	U-2	3.5 - 5.0'	21.5	96.7	0.744	78.2	1.1	2.5					
B-2	U-3	6.0 - 7.5'	21.1	90.6	0.861	66.3							
B-2	U-5	13.5 - 15.0'	22.1	101.7	0.658	90.8	0.8	2.5					

OLSSON ASSOCIATES  
601 P STREET, SUITE 200  
LINCOLN, NEBRASKA 68508

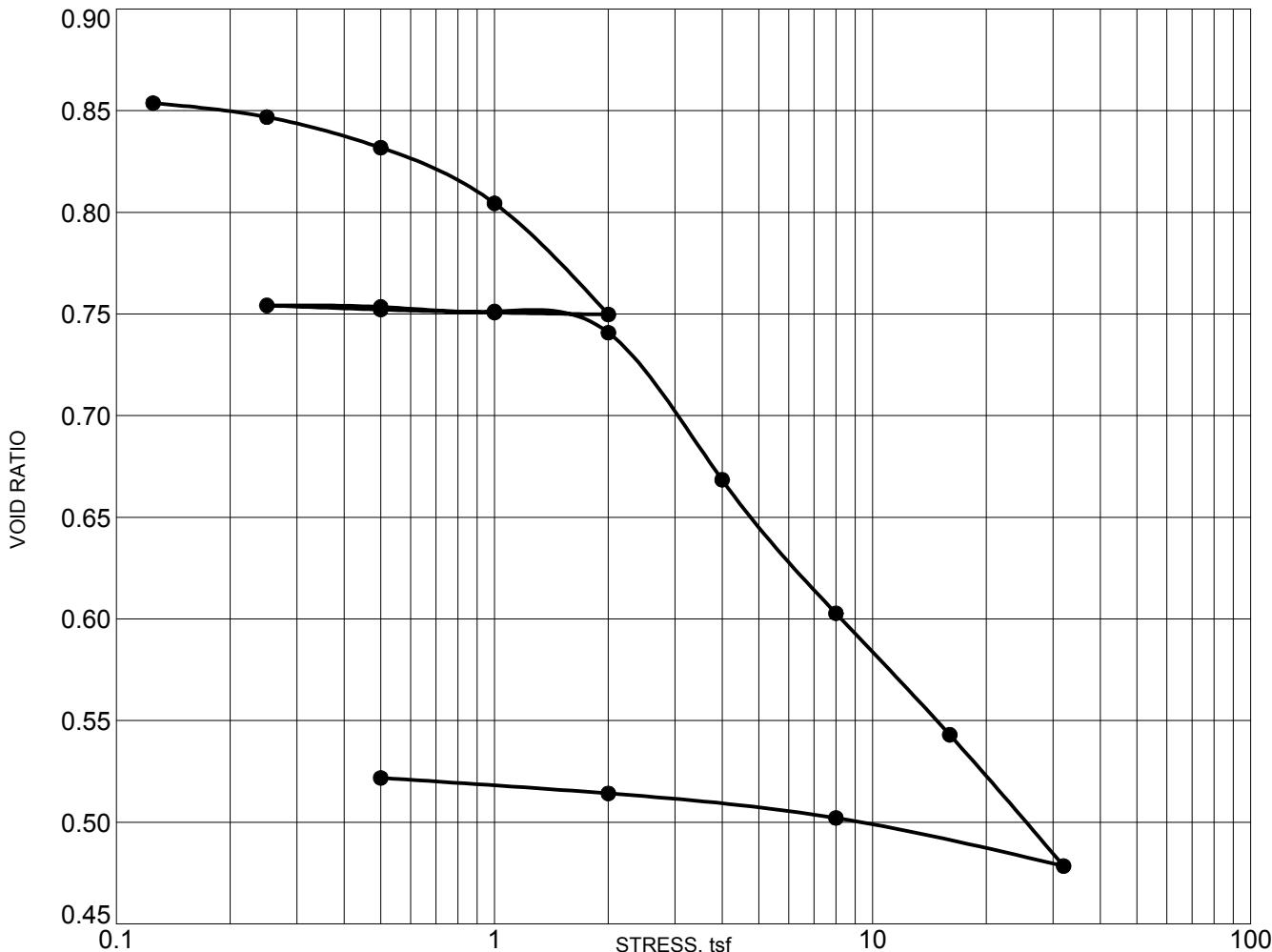
## CONSOLIDATION TEST

OLSSON  
ASSOCIATES

PROJECT NAME: Fairbury Park & Pool Study  
PROJECT NUMBER: 015-2112

CLIENT: City of Fairbury, NE

PROJECT LOCATION: Fairbury, Nebraska



Boring No: B-2

Initial Water Content (%): 21.1 Est. Preconsolidated Stress (tsf): 0.9

Sample ID: U-3

Final Water Content (%): 19.4 Laboratory Water Type: Distilled Water

Sample Depth: 6.0 - 7.5'

Initial Dry Density (pcf): 90.6 Test Procedure Method: NA

Start Date: 9/26/15

Initial Void Ratio: 0.860 Interpretation Procedure: NA

Technician: DDK

Final Void Ratio: 0.520 Stress at Inundation (psf): 50.0

Apparatus: LT II - 66

Initial Degree of Saturation (%): 66.6 Specimen Trimming Method: Turntable

Specific Gravity: 2.7

Final Degree of Saturation (%): 99.8

ATTERBERG LIMITS

LL PL PI Classification

Sample Description: Alluvium: Light greyish brown, Silty lean clay (CL/ML) Notes:

OLSSON ASSOCIATES  
601 P STREET, SUITE 200  
LINCOLN, NEBRASKA 68508

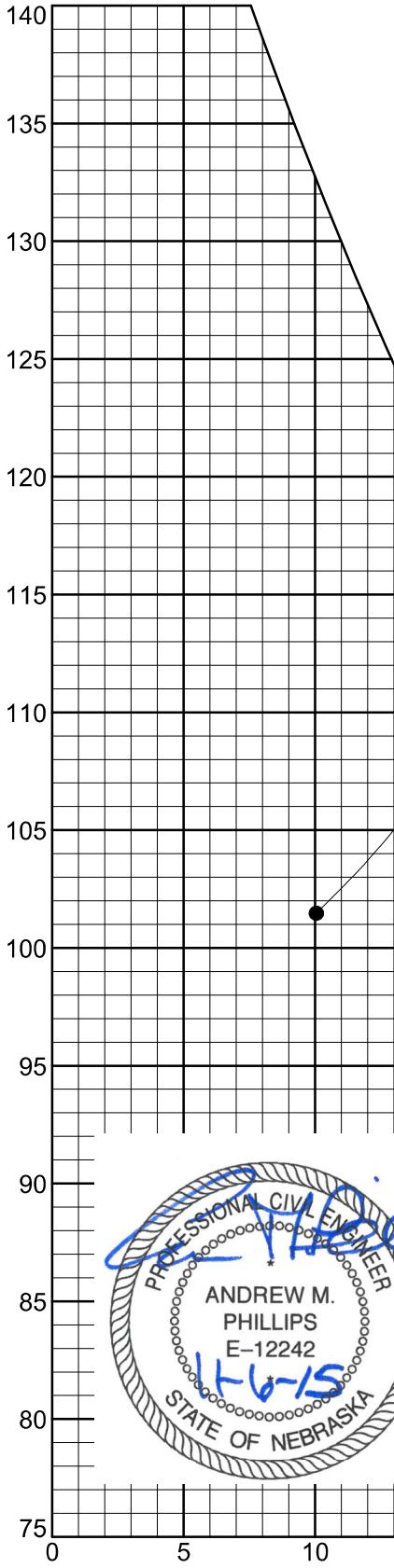


## MOISTURE-DENSITY RELATIONSHIP

PROJECT NAME: Fairbury Park & Pool Study  
PROJECT NUMBER: 015-2112

CLIENT: City of Fairbury, NE

PROJECT LOCATION: Fairbury, Nebraska



Date: 9/25/15

Type of Test: 698D

Sample Identification: Bulk Sample: B-2 (1-3.5')

Sample Description: Fill: Light to dark brown, Silty lean clay  
(CL/ML)

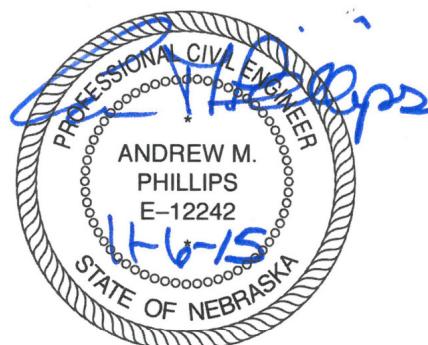
### TEST RESULTS

Maximum Dry Density 108.7 pcf  
Optimum Water Content 16.3 %

### ATTERBERG LIMITS

LL	PL	PI	Classification
31	18	13	CL/ML

Curves of 100% Saturation  
for Specific Gravity Equal to: 2.70



WATER CONTENT, %

## Appendix E

# PRELIMINARY DRAINAGE STUDY

## City of Fairbury Jefferson County, Nebraska

Prepared for:  
City of Fairbury  
Nebraska

Prepared by:

Olsson Associates  
1111 Lincoln Mall  
Lincoln, NE 68508  
402-474-6311  
402-474-5160

OA Project No. 010-0890



September 2010

The following preliminary drainage report is part of a CDBG project.

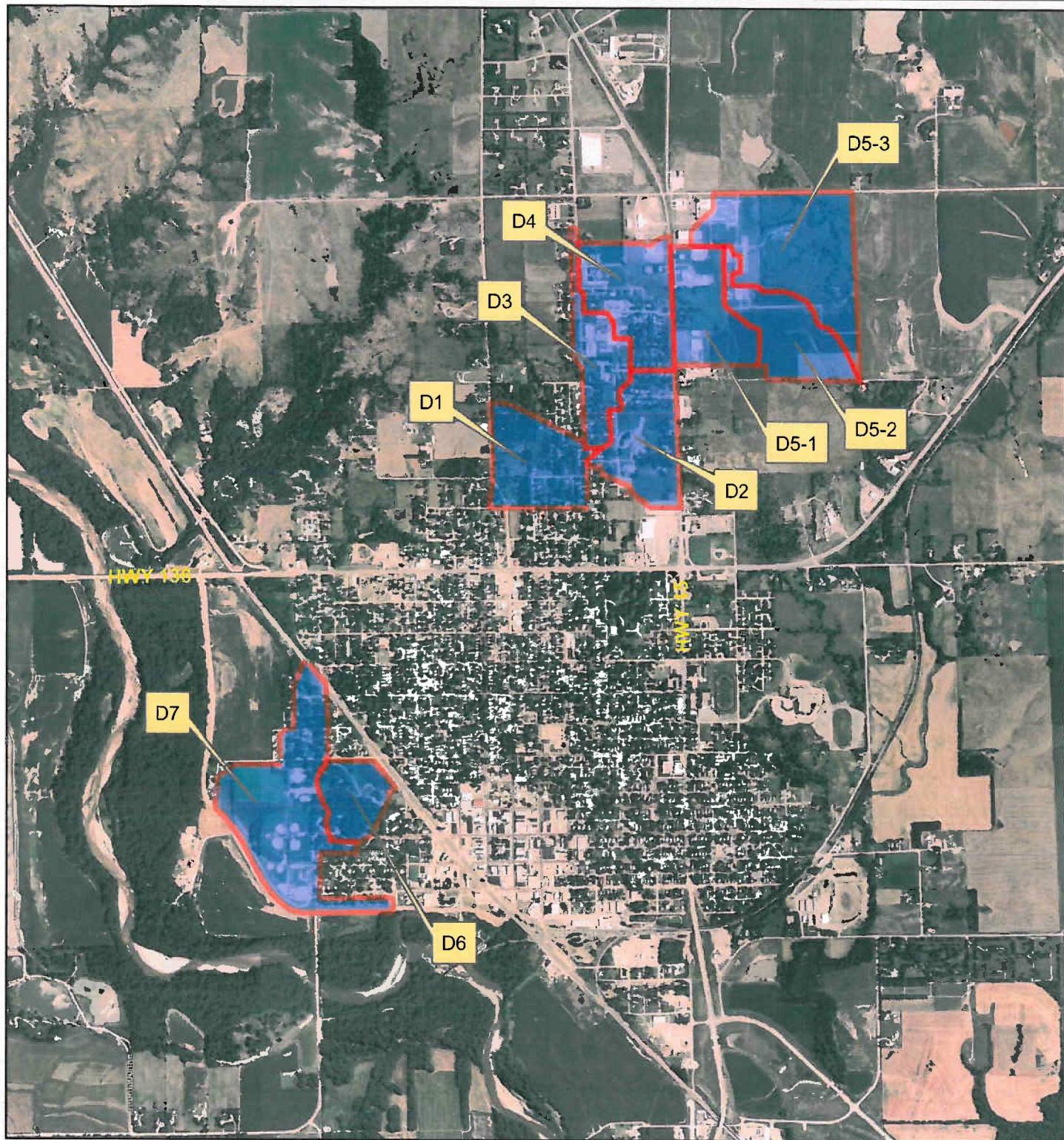
The City of Fairbury experiences frequent flooding, both from inadequate and dilapidated urban drainage systems and from flooding occurring along the Little Blue River. Frequent flooding occurs in numerous areas, located throughout the City.

Drainage in Fairbury generally flows from north to south. Runoff through town is conveyed southward by a series of storm sewer pipes and box culverts. These pipes and storm sewers were constructed at various times and many are in a state of disrepair. Several segments of the storm sewer system have failed in the past and emergency repairs were completed, including after the storms in May and June of 2008. The storm sewer system does not appear to be adequate to drain flows from even a moderate storm and modest rainfalls can result in storm sewer surcharging, street flooding, and even flooding of structures. Flooding has also occurred at the outlet of the storm sewer systems, on the northeast side of the railroad tracks. A comprehensive evaluation of the drainage systems through town, including recommendations for improvements, is needed.

Fairbury is subject to flooding from the Little Blue River on the west and south sides of town and Brawner Creek on the east and southeast sides of town. The Little Blue River flows from northwest to southeast and the southwest side of town is protected by a levee. These facilities, including Highway 136, Frederick Street, Highway 15, and the City Park at the southwest corner of town, are subject to flooding from one or both sources. An evaluation of the floodplain, including recommendations for flood protection measures or improvements, is needed.

Each drainage area focuses on areas which were pre-determined by the City of Fairbury. Each area was reviewed to develop a site description, location map, hydrologic analysis, hydraulic analysis, recommendations, preliminary cost analysis, and photo log. Hydrologic and hydraulic data can be found in the Appendix at the end of the report.

The following page shows an overall map of the drainage study, with each area noted.



### Legend

Scale: 1"=2000'



# Preliminary Drainage Study

## City of Fairbury

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<b>Appendix 7: Subwatershed D7 Data</b>	

## **SECTION 5**

---

### **Subwatershed D6**



### Legend

Storm Sewer

Drainage Area

Scale: 1"=600'



## Legend

- Proposed Inlets/Manhole
- Proposed Storm Sewer
- Existing Storm Sewer

Scale: 1"=600'

PROJECT: 010-0890	
DRAWN BY: EJB	
DATE: SEPTEMBER 2010	

## PROPOSED STORM SEWER CONCEPTUAL PLAN CITY PARK

## **D6: CITY PARK EAST**

This area is located in the southwest part of Fairbury, west of 'A' Street between W. 8<sup>th</sup> Street and W. 5<sup>th</sup> Street. The park consists of a ball field, playgrounds, recreational facility and open space. There is an existing inlet at the southeast part of the park, which is the only inlet collecting runoff in Subwatershed D6. The inlet connects to the City of Fairbury storm sewer system, which eventually drains to an existing 8 foot x 6 foot arch pipe between 'A' Street and 'B' Street on West 5<sup>th</sup> Street. This area lies within a Zone X on the Flood Insurance Rate Map, Panel # 3101200005C which is determined to be outside the 100- and 500-year floodplains.

### **HYDROLOGIC ANALYSIS**

This section provides a summary of the hydrologic conditions and drainage patterns developed for this site. Rainfall information for the 100-, 50-, 10-, and 2-year frequency storm events were used. Rainfall amounts were 6.80 inches, 6.10 inches, 4.70 inches, and 3.00 inches respectively for the storm events. Preliminary discharges were computed using the USDA Soil Conservation Service (previously SCS, now known as NRCS) Technical Release 55 (TR-55) equations. Soils in Subwatershed D6 consist of mainly Type B. Type B soils have a moderately high infiltration rate. A summary of the information obtained using the TR-55 methodology and equations are found in Table 5.1 below.

**Table 5.1: City Park East**

Summary of Hydrologic Elements determined using TR-55							
Subwatershed	Drainage Area (Acres)	Curve Number	Time of Concentration ( $T_c$ ) (min)	$Q_2$ (cfs)	$Q_{10}$ (cfs)	$Q_{50}$ (cfs)	$Q_{100}$ (cfs)
D6	22	76	21	20	40	70	90

### **HYDRAULIC ANALYSIS**

Drainage area D6 has a peak flow rate of 20 cfs in a 2-year storm event. Based on the soils in the area, the runoff most likely infiltrates into the ground or evaporates. The existing curb inlet at the southeast corner of the park, does not have the capacity to handle a 2-year storm event. The existing 15 inch storm sewer has a capacity of 4 - 6 cfs. Based on information from the City of Fairbury, this pipe experiences the effects of backwater from the downstream storm sewer system, which backs water up until it spills out of the curb inlet during larger storms. If the arch pipe is flowing full, the 15 inch pipe cannot discharge the amount of water that is collected. When this occurs, the runoff contained in the park area ponds until the storm sewers downstream are not flowing as full.

### **RECOMMENDATIONS**

One solution to remove storm water from this area is to add multiple storm sewer inlets around the loop road. These inlets would be connected with pipes ranging in size from 15 inch to 36 inch. The pipes would outlet into a drainage swale on the south side of the park or may need to be piped along the swale, depending on actual topographic survey information gathered during final design. The swale would then be picked up with a new storm sewer pipe and flared end section. The storm sewer pipe would run south along the west side Frederick Street, parallel to the existing storm sewer pipe. This area is extremely flat and pipes would need to be constructed at a flat slope. Starting at the storm sewer outfall elevation through the levee and working up gradient to the park, the pipe slopes would have to be 0.25% in order to keep proper cover over the pipes. This is very similar to the existing storm sewer system in Frederick Street which also has extremely flat slopes. Using a pipe slope of 0.25%, this would have to be a 36 inch diameter reinforced concrete pipe. This route would be selected to minimize pavement removal and replacement and avoid existing utility lines. This system would not only handle the 2-year storm event, but this new drainage system would allow for the area to drain down, even in larger storm events. A conceptual layout of inlets and storm sewer has been created for this report (See exhibit 6.1)

Another option is to remove the existing storm sewer system and rebuild it to handle the current pipe capacity (40cfs) plus the D6 runoff. The new system would require a minimum of a 54 inch pipe. This option would be more costly due to the need to remove existing pipes, rebuild structures and replace more pavement.

By adding another storm sewer system, the levee would have to be modified to allow for another pipe penetration. This new 36 inch storm sewer would have to be built with a flap gate and possibly a sluice gate, to meet U.S. Army Corps of Engineers (USACOE) standards. When working on or near a levee, the USACOE requires that an analysis be completed to prove that the project has "no-adverse impact" on the levee system. This analysis would include geotechnical borings, a global stability analysis, underseepage and uplift analysis. The pipe would be designed to cut off future "piping" potential, where water tries to flow through the levee penetration by running along the pipe. A manhole for the new 36 inch storm sewer would be built at the toe of the levee and connected to the existing manhole that is utilized as a pumping well. This would allow the pump to operate for both storm sewer systems. This pump is currently used to discharge storm runoff over the levee, when the flap gates on the river side of the levee have been activated. Based on inspections of the existing storm sewer along Frederick Street, the inlets need to be cleaned out and maintained. This should be done in order to make sure that the system is functioning properly.

### **PERMITS REQUIRED**

The USACOE does have jurisdiction over the Little Blue River, and must review any work done on or within 50 feet of the levee. If any work is to be done where drainage is discharged into the river, a section 404 permit is required. The construction of the proposed improvements will require some land disturbance and cause discharges of sediment into the drainage ditch downstream. Thus, the proposed improvements will require a National Pollution Discharge Elimination System (NPDES) Permit through the Nebraska Department of Environmental Quality (NDEQ).

### **PRELIMINARY COST ANALYSIS**

2-Year Storm Event

Item	Unit	Quantity	Unit Price	Total
Mobilization	LS	1	\$5,000.00	\$5,000.00
Construction Staking	LS	1	\$3,000.00	\$3,000.00
36 inch RCP	LF	2,075	\$95.00	\$197,125.00
30 inch RCP	LF	942	\$75.00	\$70,650.00
18 inch RCP	LF	315	\$45.00	\$14,175.00
15 inch RCP	LF	315	\$32.00	\$10,080.00
Inlets with beehive grate	EA	5	\$2,500.00	\$12,500.00
Standard manhole	EA	3	\$5,000.00	\$15,000.00
Special manhole	EA	1	\$5,000.00	\$5,000.00
Remove existing curb inlet	EA	1	\$500.00	\$500.00
Remove existing inlet	EA	1	\$500.00	\$500.00
30 inch flapgate & sluice gate with headwall structure	EA	1	\$12,000	\$12,000.00
24 inch end section RCP	EA	2	\$250.00	\$500.00
Seeding and mulch	AC	1	\$3,000.00	\$3,000.00
Remove & replace concrete pavement	SY	120	\$50.00	\$6,000.00
Temporary construction entrance	EA	1	\$2,000.00	\$2,000.00
Gravel re-surfacing	TN	7	\$50.00	\$350.00
<i>Preliminary Construction Cost</i>				<b>\$357,380.00</b>
<i>Survey/Engineering/Bidding</i>				<b>\$53,607.00</b>
<i>30% Contingency</i>				<b>\$107,214.00</b>
<i>Corps of Engineers permitting</i>				<b>\$10,000.00</b>
<b>Total Preliminary Cost</b>				<b>\$528,201.00</b>

*Note: A 30% contingency has been added to account for some potential unknown costs. The above costs do not take into account utility relocations, land rights or inflation. Utility conflicts and land rights issues would be determined during final design.*

## CITY PARK PHOTOS



**Photo 5.1** Existing inlet at the southeast corner of Park Road at the city park looking west.



**Photo 5.2** Existing inlet at the southeast corner of Park Road at the city park.



**Photo 5.3** View looking north from existing inlet at southeast part of the city park.



**Photo 5.4** View looking south from existing inlet at southeast part of the city park.



**Photo 5.5** View looking south at the city park entrance on W. 8<sup>th</sup> Street and Maple Street. Two existing inlets on Maple Street completely filled with debris.



**Photo 5.6** View of inlet on east side just north of W. 8<sup>th</sup> and Maple Street. Debris has collected in the inlet. Inlet connects to storm sewer system on west side of City Park.



**Photo 5.7** View of inlet on west side just north of W. 8<sup>th</sup> and Maple Street. Debris has collected in the inlet. Inlet connects to storm sewer system on west side of City Park.



**Photo 5.8** View looking east at south end of city park near the RV dumping station. Drainage swale collects runoff from the east and enters inlet as shown.



**Photo 5.9** View looking west at inlet by the RV dumping station on the southwest side of the city park. Inlet collects runoff and ties into the storm sewer system on the west side of Fredrick Street.



**Photo 5.10** View looking south on Fredrick Street toward the levee south of town. Existing storm sewer system on the west side of Fredrick Street which discharges into the Little Blue River.



**Photo 5.11** View looking north on Fredrick Street just north of W. 4<sup>th</sup> Street. Existing curb inlet on the west side collects runoff into the system which discharges into the Little Blue River.



**Photo 5.12** View looking north on Fredrick Street just north of W. 4<sup>th</sup> Street. Existing curb inlet on the east side collects runoff into the system which discharges into the Little Blue River.



**Photo 5.13** View looking south on Fredrick Street on the west side. Drainage ditch and existing inlet shown toward the drive. Inlet covered in grass.



**Photo 5.14** View looking north on Fredrick Street on the west side at entrance drive of maintenance building. Inlet appeared to be free of debris. Connects to storm sewer which discharges into the Little Blue.



**Photo 5.15** View looking north from the levee toward maintenance building on west side of Fredrick Street. Inlet with weir type structure collects runoff from the west and north.



**Photo 5.16** View looking south from top of levee where city park storm sewer on west side of Fredrick Street discharges into the Little Blue. Existing 36 inch culvert with flap gate.



**Photo 5.17** View looking west at inlet with weir structure on north side of levee west of Fredrick Street.



**Photo 5.18** View looking south at inlet with weir structure on north side of levee west of Fredrick Street.



**Photo 5.19** View looking north from top of levee on east side of Fredrick Street.  
Existing 24 inch culvert at toe of levee covered by vegetation.  
Connects to inlet on west side of Fredrick Street.



**Photo 5.20** View looking east from top of levee on Fredrick Street.

## **SECTION 6**

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### **Subwatershed D7**



### Legend

— Storm Sewer

■ Drainage Area

Scale: 1"=600'

## **D7: CITY PARK WEST**

This area is located in the southwest section of Fairbury, west of 'A' Street between W. 8<sup>th</sup> Street and W. 5<sup>th</sup> Street. The park consists of four ball fields, playgrounds, recreational facility, swimming pool, and open space. There is currently an existing storm sewer system with several inlets and manholes which lies between the levee and W. 8<sup>th</sup> Street, parallel with Frederick Street. This area lies within a Zone X, according to FIRM Panel # 3101200005C which is determined to be outside the 100- and 500-year floodplains.

### **HYDROLOGIC ANALYSIS**

This section provides a summary of the hydrologic conditions and drainage patterns that were used for this site. Rainfall information for the 100-, 50-, 10-, and 2-year frequency storm events were used. Rainfall amounts were 6.80 inches, 6.10 inches, 4.70 inches, and 3.00 inches respectively for the storm events. Preliminary discharges were computed using the USDA Soil Conservation Service (previously SCS, now known as NRCS) Technical Release 55 (TR-55) equations. Soils in subwatershed D7 consist of mainly Type B. Type B soils have a fairly high infiltration rate. See Figure 7.1 for location of subwatershed. Summary of the information obtained using the TR-55 methodology and equations, is found in Table 7.1 below.

**Table 7.1: City Park West**

Summary of Hydrologic Elements determined using TR-55							
Subwatershed	Drainage Area (Acres)	Curve Number	Time of Concentration ( $T_c$ ) (min)	$Q_2$ (cfs)	$Q_{10}$ (cfs)	$Q_{50}$ (cfs)	$Q_{100}$ (cfs)
D7	78	81	26	90	180	270	320

### **HYDRAULIC ANALYSIS**

Subwatershed D7 contributes 90 cfs of runoff in a 2-year storm event. Although not all of that storm water runoff will make it into the storm sewer system in Fredrick Street, a fair amount will. Based on conversations with the City of Fairbury this area does not experience frequent flooding. Using the best available data, the storm sewer was modeled and has a capacity of approximately 9 cfs on the upstream end, and approximately 42 cfs on the downstream end. Based on this information, it is apparent that the existing storm sewer under Fredrick Street does not have capacity to add drainage from area D6.

### **RECOMMENDATIONS**

Maintenance should be performed on all existing area and curb inlets throughout the park, and to the north in the residential areas as well. Many of these inlets have accumulated debris, which is limiting the amount of runoff it can handle.