

MIFFLIN PRE

PARKING

X PARKING

CARPENTER ROAD

MILL STREET

HIGH STREET

GAHANNA BAPTIST CH
ALLEY

WALNUT STREET

PARKING

POST OFFICE
GAHANNA
BRANCH

PARKING

MILL ST.

HIGH ST.

ALLEY

PARKING

GAHANNA CREEKSIDE TOWN

PARKING

10/16/2000

EXECUTIVE SUMMARY

for

THE "CREEKSIDE" DEVELOPMENT CONCEPTUAL PLAN

Synopsis

This conceptual plan for the "Creekside" Development along the banks of Big Walnut Creek, covers an area bordered by Granville Street on the South, High Street on the East, Carpenter Street on the North and Walnut Creek on the West.

Within this area, it is proposed to improve the existing mill race and extend canals from the mill race into the through Creekside to create approximately 1500 l.f. of developable river walk.

This river walk area can be developed for approximately 130,000 sq. ft. of usable retail or entertainment space adjacent to the canal and walkways at an elevation within 12 – 18 inches of the proposed water surface.

This walkway and canal will traverse the Creekside area at a level approximately 12 – 14 feet below existing street level, and will be protected from flood waters of Walnut Creek by a system of gates.

This plan also proposes to continue with existing plans for restoration and conservation of the Big Walnut Creek in its natural condition, and for an interface with the west bank of the Big Walnut with additional recreational facilities and additional trail systems.

Implementation

Implementation of this concept is going to require a carefully structured partnership between the private sector and the public sector.

This partnership should utilize the private sector to the maximum degree possible but the public sector must provide the legislative support and economic stability necessary to assure that the overall plan is accomplished.

The public sector will also need to provide those items of public infrastructure which are required to achieve the goals of the concept plan.

Both public sector and private sector efforts can be carried out in a phased manner as described in the following section.

Phasing

The development of this project can be carried out in phases that can be designed to accomplish total development without undue disruption of existing viable businesses that presently exist in the area.

The first zone would then be redeveloped to provide a new river walk orientation, on a segment of the new channel, that would provide desirable new space into which existing businesses within the area could be relocated.

After relocation of these existing uses is accomplished, the properties they are now occupying would be redeveloped with a new river walk orientation.

Subsequent phases would follow the same logic until all of the area has been developed.

Estimated Project Cost – Initial Phase

Estimated Land Purchase Price

On the basis of completed acquisitions and various appraisals, an average sq. foot price for land was established at \$20. The total project area for the initial development phase includes approximately 250,000 sq. ft. of land.

250,000 sq. ft. @ \$20.00 =	\$ 5,000,000.00
Demolition and Site Preparation	1,200,000.00

Estimated Construction Cost

The initial development phase includes the following:

1. Flood protection wall for the project from the north end connection adjacent to Mill Street, to the south end connection at the Post Office property.

1,200 l.f. @ \$850.00 =	\$ 1,020,000.00
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2. Excavation behind the flood wall is intended to remove all earth, to the elevation of the creek walk, in the area bounded by the flood wall on the west and north, Mill Street on the east, the post office on the south, plus all of the area under the proposed parking structure east of Mill Street. This excavation will require the removal of approximately 120,000 c.y. of earth.

119,300 c.y. @ \$12.00 =	1,431,600.00
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3.	A basement retaining wall is proposed to be placed around the excavated areas to tie into the flood wall.	
	2,100 l.f. @ \$850.00 =	1,764,000.00
4.	A new creek channel will extend from the mill race into the project, terminating under the southeast part of the parking garage.	
	850 l.f. @ \$2,500.00	2,125,000.00
5.	A new flood gate and bridge is proposed to be constructed in the flood wall across the new channel.	
		500,000.00
6.	A new bridge and approaches are required for Mill Street.	
		400,000.00
7.	The new parking garage for 400 car spaces.	
		5,000,000.00
8.	Landscaping lighting, fountains and other amenities.	
		1,500,000.00
9.	Ice sheet equipment for the canal	
		600,000.00
10.	Utility relocations	
		<u>200,000.00</u>
	Total Infrastructure	\$14,540,600.00
	Engineering & Contingencies	<u>2,226,090.00</u>
		\$16,766,690.00

Project Budget

The project budget for land purchase and infrastructure is	\$ 6,200,000.00
	<u>16,766,690.00</u>
	\$22,966,690.00
Project Budget	\$23,000,000.00

Anticipated Returns:

The project is anticipated to yield the following tangible returns for the City of Gahanna and its citizens:

1. New Commercial Business

The project will provide for approximately 300,000 sq. ft. of new commercial, with approximately 130,000 sq. ft. of that space being unique destination type business on the creek walk. These businesses should employ approximately one person for each 300 s.f. or a total of approximately 1,000 people.

2. The project provides for a new destination hotel of from 100-150 rooms which will employ 30-45 new people.

3. The project provides for approximately 250,000 s.f. of new office building which would employ another 1,000 people.

4. The project also envisions approximately 30-50 new higher end residential units integrated into the community fabric.

5. From the public standpoint, the project will provide a unique gathering place for citizens and visitors and a center focus for community participation.

6. The proposed parking garage will accommodate approximately 400 cars for workers and visitors with additional separate parking being provided for residential units.

GAHANNA CREEKSIDE
Preliminary Site Improvements - Construction Cost Estimate

Item	Amount	Unit	Unit Price	Cost
Mobilization	11%	L.S.		\$745,000.00
Site Preparation & Demolition	1	L.S.	L.S.	\$470,000.00
Site & Channel Excavation	119,300	C.Y.	\$12.00	\$1,431,600.00
Concrete Rip-Rap (6" Thick)	38,150	S.Y.	\$55.00	\$2,098,250.00
Gravel Subgrade Filler	675	C.Y.	\$25.00	\$16,875.00
Concrete Retaining Wall	3,550	C.Y.	\$600.00	\$2,130,000.00
Reinforcing Steel	346,860	LBS.	\$1.20	\$416,232.00
Crushed Rock/Gravel French Drain	1,029	C.Y.	\$20.00	\$20,580.00
8" Perforated P.V.C. Pipe w/ Fittings	2,800	L.F.	\$60.00	\$168,000.00
Erosion Control	1	L.S.	L.S.	\$15,000.00
Total				\$7,511,537.00

Calculations			MOB	\$744,319.07
			SITE PREP	7.5%
concrete ditch with 6' sidewalk each side				
	5916.51+	30281.29	36197.8	
toe		1287.12x1.5	1930.68	
			38128.48 SY Conc Rip-Rap	
gravel subgrade		27,234	x.67/27	672.44
ret wall		928.29		
		774.99		
		1159.06		
		397.61		
		3,259.95	x1.08	3520.746 conc
			x106.4	346858.7 steel
8" perforated Drain		193.47		
		617.58		
		1035.74		
		195.18		
		930.13		
		2,778.63	x10/27	
gravel				1029.122
sodding	1925*20/9			4277.78
sidewalk	1925x2x6/9=			2566.667

GAHANNA SANITARY SEWER RELOCATION
Estimated Construction Cost

	Quantity	Unit	Unit Price	Extension
Mobilization	1	L.S.	\$ 10,000.00	\$ 10,000.00
8" PVC SDR 35 San. Sewer	1400	L.F.	40.00	56,000.00
Watertight MH w/Boltdown Cover and Concrete Encasement (Comp.) and Extra Depth	4	EA.	3,000.00	12,000.00
Tie-In to Existing MH	2	EA.	2,000.00	4,000.00
Air or Water Testing	1	L.S.	5,000.00	5,000.00
Trench Excavation Safety	1400	L.F.	1.00	1,400.00
Cut & Replace Asphalt	320	S.Y.	20.00	6,400.00
Services Reconnection	3	E.A.	600.00	<u>1,800.00</u>
Subtotal:				96,600.00
TOTAL:				<u>\$96,600.00</u>

Anticipated Returns:

The project is anticipated to yield the following tangible returns for the City of Gahanna and its citizens:

1. **New Commercial Business**

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6. The proposed parking garage will accommodate approximately 400 cars for workers and visitors with additional separate parking being provided for residential units.

Economic Returns:

The sources of funds for debt service on the public infrastructure cost and for maintenance and operation are the following:

1. Lease Payments on the Land

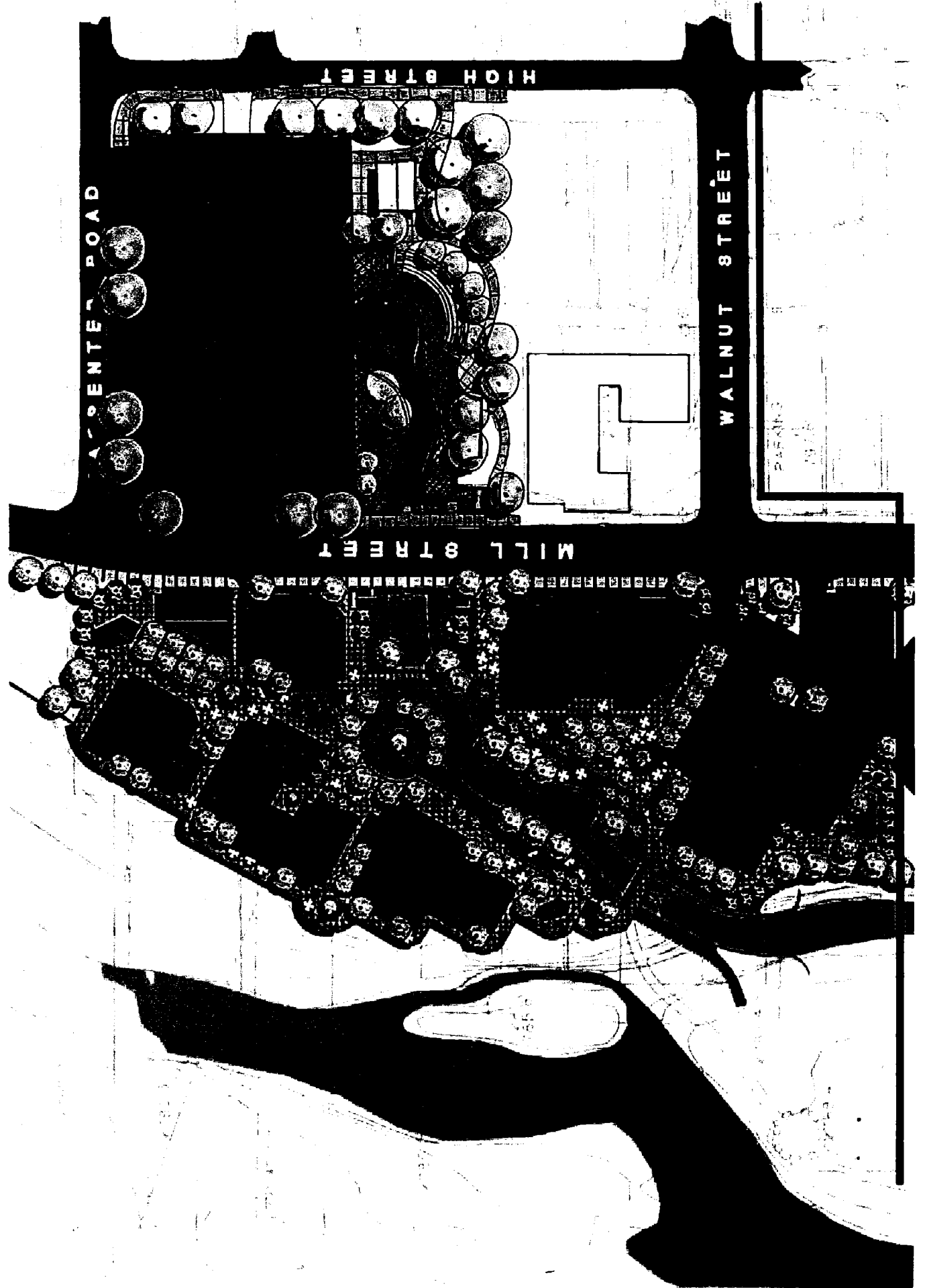
The City intends to retain title to the land within the project area and lease it for development on long term leases.

2. Parking Revenues

The parking revenues from the parking garage should be established to cover their portion of debt service and operation.

3. T.I.F. Financing

Tax increment financing will be applied on the differential between existing values and the value of the proposed development.



PARKING

X PARKING X

CARPENTER ROAD

SERVICE

ELEVATOR CORE

RETAIL

RETAIL

MILL STREET

HIGH STREET

GAYANNA ENT
BAPTIST CH

ALLEY

RIVER LEVEL

WALNUT STREET

PARKING

94

X

T

PARKING

PARKING

CARPENTER ROAD

MILL STREET

HIGH STREET

SERVICE

SERVICE

GAHANNA ENT BAPTIST CH

ALLEY

STREET LEVEL

WALNUT STREET



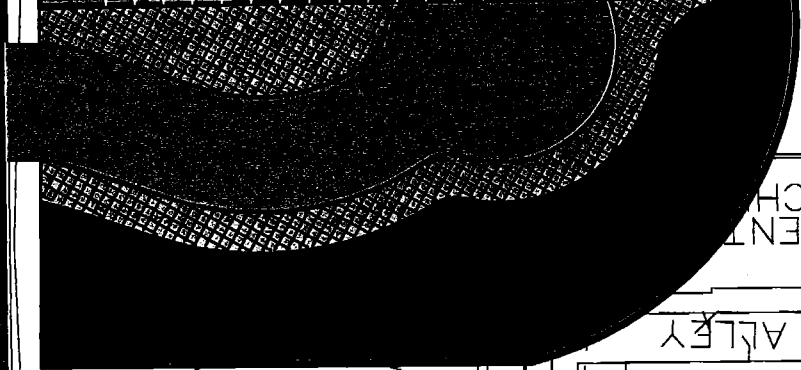
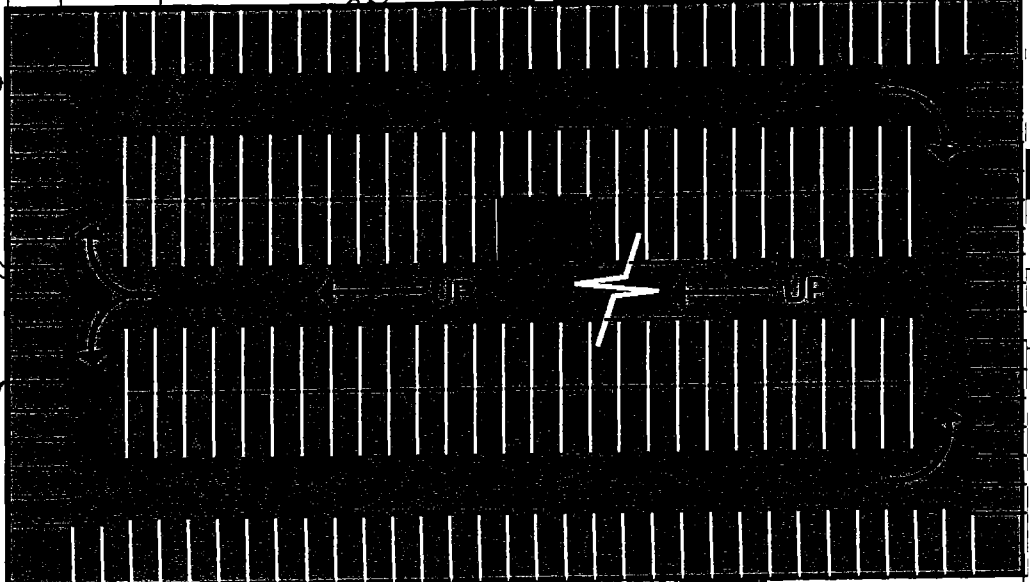
PARKING

X PARKING X

CARPENTER ROAD

MILL STREET

HIGH STREET



GAIHANNA ENT
BAPTIST CH

ALLEY

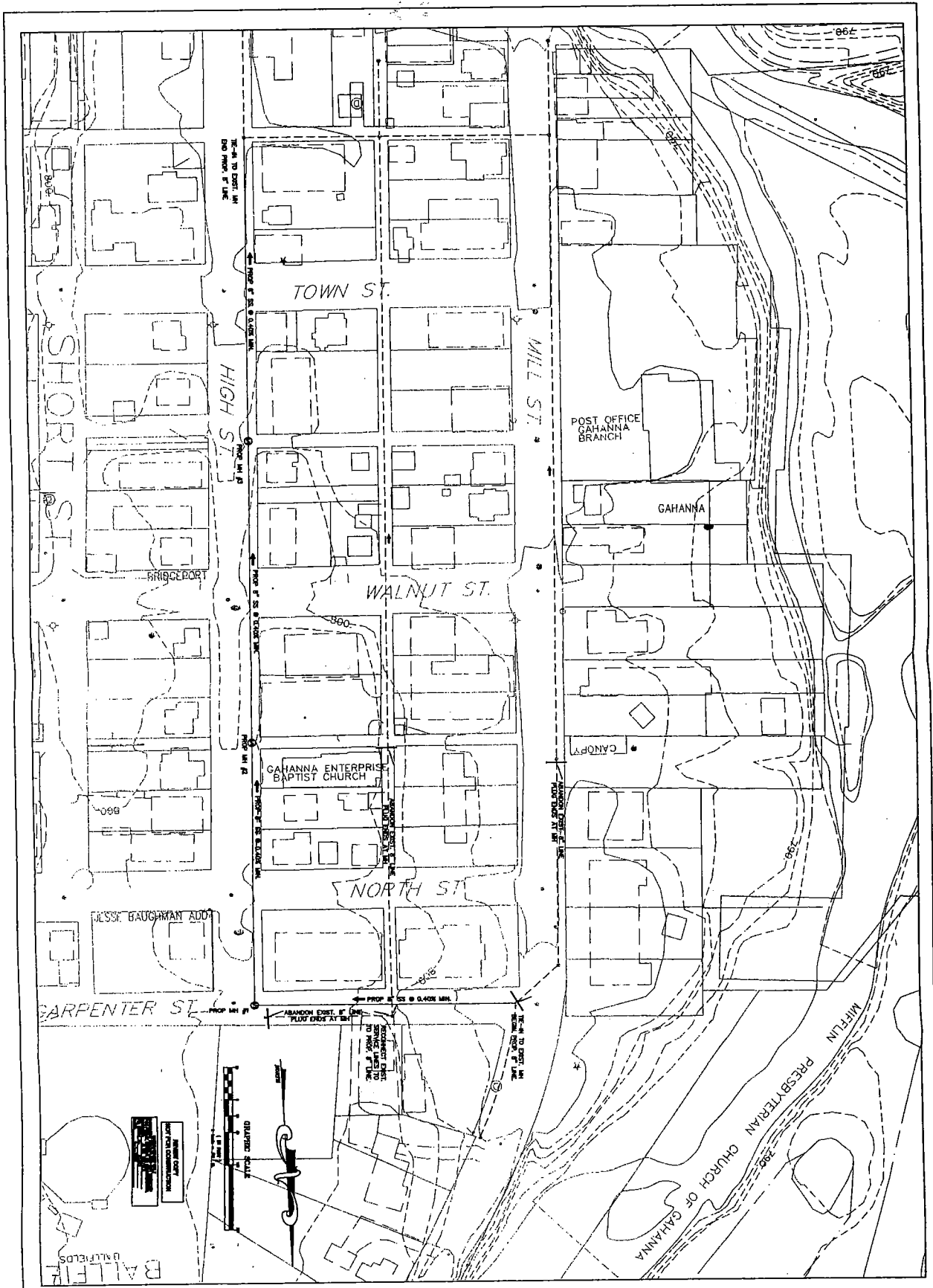
PARKING LEVEL

WALNUT STREET

PARKING

91

X



DATE: AUGUST 2008
 SCALE: 1" = 40'
 THE INFORMATION ON THIS SHEET IS FOR GENERAL INFORMATION ONLY. CONSULT THE ENGINEER FOR ALL DETAILS.

URBAN SPACES DESIGN GROUP, INC.
 111 BOLLEAS ROAD
 SUITE 100
 GAHANNA, OHIO 43031
 TEL: 614.466.1111
 FAX: 614.466.1112
 WWW.URBANSAPACESDESIGN.COM

**GAHANNA CREEKSIDE
 SANITARY SEWER RELOCATION
 GAHANNA, OHIO**

NO.	DATE	REVISIONS

Creekside Development Team Roles & Responsibilities

City Council

- Authorizing expenditures and appropriations
- Approval of public space plan
- Creation of any necessary authorities such as parking or C/A/B, and/or TIFs
- Authorizing City to enter into contracts or agreements
- Handle special district concerns
- Adopt legislation
- Health and safety provision

Urban Spaces

(includes Robert Weiler Co., George Parker, Tri Car, others)

- Design management
- Project coordination
- Project cost estimation
- Marketing and parking analysis
- Financial analysis
- Partnership formation
- Report to City Council - Development Committee
- Retail marketing and promotions

CIC:

- Parking authority
- Collection and visitors bureau
- Parking mechanisms

Administration/Development

- Maintenance of public space
- Personnel management
- Enter into contracts and agreements
- Infrastructure management
- Promotions/special events
- Tax incentives
- Facilitate Planning and Zoning process
- Land acquisition
- Finances/bonding
- CURC- land leases

Columbus Metropolitan Real Estate Market Conditions

Introduction

This profile provides an overview of economic conditions and the real estate market in the Columbus metropolitan area. It provides a framework for future development at Creekside..

Economy

The Columbus metropolitan area economy is strong and diversified. With employers such as the Ohio state government, Ohio State University, major private sector employers such as The Limited, Inc., Honda of America, and Nationwide Insurance, and federal government offices, the Columbus economy is driven by service sector businesses. The unemployment rate is less than 3%, and Columbus continues to post steady economic gains. Major employers are shown in the table below.

Largest Employers in Greater Columbus

Employer	Industry	Number Employed Locally
State of Ohio	Government	28,015
U.S. Government	Government	16,500
Ohio State University	Higher Education	15,707
Honda of America Manufacturing	Manufacturing	13,000
Banc One Corporation	Finance	10,000
The Limited, Inc.	Retail	10,000
Columbus Public Schools	Education	9,124
City of Columbus	Government	9,112
Nationwide Insurance Enterprise	Insurance	9,100
Kroger Company	Retail	7,500
Mount Carmel Health System	Health Care	7,000
Grant/Riverside Methodist Hospital	Health Care	6,328
Franklin County	Government	6,300
Lucent Technologies	Telecommunications	5,800
National City Bank, Columbus	Finance	4,200

Source: Greater Columbus Chamber of Commerce

Job growth has fueled population growth. During the 1990 to 1996 period, the Columbus region increased by 7.6%, reaching 1.45 million residents. Among the top 50 urban population centers in the country, Columbus ranks 30th. The population in the region is younger than the national median, at 31.5 years compared to the national median age of 33.

Real Estate Market Conditions

Because of steady economic and employment growth, all sectors of the real estate market--office, industrial, residential and retail--are healthy. Each real estate sector is described below. Office, retail and residential include more detail since these are the sectors that will be included in Creekside.

Office Market

The office market includes a total of more than 27 million square feet, of which more than 12 million square feet is in downtown Columbus. Until recently, the downtown market has not seen office space added. The Bicentennial Plaza is currently under construction and will include approximately 60,000 square feet. A second phase is being planned which would add another 40,000 square feet. Two additional projects in the downtown area have been announced: a 200,000 square foot office tower at State and High Streets, and a 500,000 square foot office building at State and Third Streets.

Suburban office construction has outpaced the downtown area significantly. Areas experiencing new construction include Tuttle Crossing, Easton and Polaris. According to CB Commercial figures, the suburban office inventory is distributed as follows: Worthington, 4.08 million square feet; Dublin, 1.99 million square feet; North Columbus/Worthington, 1.07 million square feet; Easton/Gahanna, 424,000 square feet; and Polaris 133,000 square feet.

According to the Greater Columbus Chamber of Commerce, the vacancy rate in the CBD is approximately 6%, while the vacancy rate outside the CBD is 5%, which is considered a balanced market. More than 1.3 million square feet of Class A office space is under construction or has been completed during the first half of 1997 in suburban locations.

Lease rates for downtown Class A space averaged \$18 to \$24 per square foot during 1996, and \$19 to \$21 per square foot in suburban locations. Class B space lease rates ranged from \$14 to \$19 in the CBD, and \$16.50 to \$19.50 in the suburbs. Rental rates are expected to increase by 6% - 10% during 1997.

Development momentum in the northeast quadrant has increased construction activity in the Gahanna area as well. Several speculative office projects are under construction or have recently been completed.

Generally, office development has occurred in the northern half of the metropolitan area, and industrial development in the southern half, based on a number of factors, including land prices, access to transportation, and proximity to new residential development.

Industrial Market

Because of Columbus's location and access--within 500 miles of 70% of the U.S. population--it is becoming a significant distribution center. The industrial market reflects this, with 139 million square feet of industrial space at the end of 1996. Of that total, only 4% is located in the central city. The overall vacancy rate is less than 7%. Absorption has kept pace with construction. Nearly three million square feet of industrial space is under construction or recently completed. Lease rates range from \$2.75 for larger blocks of space to \$7.50 for high-tech/R&D space.

Retail Market

The retail development market is also strong. As in other markets, big-box retailers and "category killers" continue to dominate development. Other retail development trends include combining retail with dining and entertainment tenants, creating "family-friendly" environments, and creating specialty shopping districts based on unique themes.

The Columbus area includes more than 28 million square feet of shopping center space in 177 shopping centers, according to the Greater Columbus Chamber of Commerce. Major new retail projects include the Mall at Tuttle Crossing, The Lennox Town Center, and Easton. The one-million square foot Mall at Tuttle Crossing, in the northwest quadrant, opened in 1997, the first new regional mall developed in Columbus since the City Center Mall opened in downtown Columbus in 1989. The Lennox Town Center will include AMC theaters, a Target and specialty stores.

The Easton project will increase the retail market significantly on the northeastern side of the metro area. Retail development at Easton includes the Easton Town Center and the Easton Market. The Easton Market will include approximately 500,000 square feet of retail space, and 12 to 15 retailers. All the retailers at the Easton Market are either large discounters or specialty "category killers." The Town Center, anchored by a 300-room Hilton Hotel includes restaurant chains Planet Hollywood and Tavern on the Green, a multi screen movie complex, and specialty retail.

Gahanna has also experienced retail development, serving the growing residential base in the area. It is apparent, however, that planned and recently developed retail projects in the eastern Columbus area are quite different than that envisioned for Creekside. Creekside will complement rather than compete directly with other retail developments.

Hotel/Lodging Market

Economic growth and new attractions such as the recently announced National Hockey League expansion franchise, the new privately-funded arena, and the new COSI in downtown will continue to fuel expansion in the lodging industry.

The extended stay/business travel segment currently holds the most interest for hotel owners and operators. In addition to the Hilton Hotel planned at Easton, Extended Stay America has recently opened a 199-room property in Columbus, and Red Roof Inns announced plans for an economy hotel across from the Columbus Convention Center in the CBD. The overall full-service occupancy rate in 1996 was 67.1%, while the East Columbus submarket occupancy rate was 64.8%.

The convention/meeting market in the Columbus area is strong and growing. According to the Greater Columbus Convention and Visitors Bureau, there were 702 conventions in Columbus in 1996 (up 15% over 1995), attended by 826,000 people (a 1.5% increase over 1995). The economic impact of conventions increased 11.4% between 1995 and 1996, from \$459 million to \$512 million.

Residential

Economic expansion has created both employment and population growth. To support that population growth, building permits in the Columbus MSA have experienced steady growth as well. Between 1992 and 1996, according to Census Bureau figures, permits increased from less than 10,000 in 1992 to 12,100 in 1996. During that period, the number of single family detached permits has averaged about 65% of the total building permits issued in the metropolitan area.

Residential development is occurring in Columbus as well as the suburbs. During the first three months of 1997, a total of 2,508 permits were issued in the region, according to the Building Industry Association of Central Ohio. Nearly 2,000 were in Columbus, including more than 1,300 multifamily permits. A total of 145 were issued in Dublin during this period, while 57 were in Grove City. Hilliard, Pickerington and Reynoldsburg each accounted for more than 50 permits. Gahanna issued 32 permits during this period.

Gahanna is attracting upscale residential development. Sycamore Woods, a 92-unit luxury condominium project is breaking ground this summer, with the first phase opening this fall. Prices for the units are \$130,000 to \$175,000, or approximately \$90 per square foot.

According to the Columbus Board of Realtors, the average sales price for homes continued to grow, increasing from \$115,546 in 1995 to \$123,789 in 1996, a 7% increase.

Conclusions

The Columbus metropolitan area economy is strong and diversified. The overall real estate market is in balance, with absorption keeping pace with construction. While there is significant new office, residential and commercial construction, economic growth is supporting development. In addition, the development concept for Creekside is different from other planned and developing projects in the eastern metropolitan area. Thus, with careful planning and quality development and management, Creekside should be able to occupy a distinct niche as a unique destination for both residents and visitors.

Planning Commission Recommendations 8-17-00

Creekside Concept Plan

The following are Planning Commission recommendations established on August 17, 2000:

- The first recommendation is a minimization of the density of the project. Most buildings along Mill Street should not exceed two stories above Mill Street level.
- Setbacks and open space requirements for the canal should be maximized.
- Parking structures should be smaller as reflected in the concept schematic dated 8/17/00.
- A defined theme is recommended as well. A mixed use/residential development is essential. Planning Commission would like to see that the plan maintain a “village” atmosphere with more of a market type feeling. “Mom and Pop” businesses should be stressed with art festival vendors in mind. They would like to see subsidized leases similar to Pikes Market in Seattle, WA. Maintaining existing businesses should also be a key to the concept plan. Finally, an anchor must be established.
- Other recommendations include creating a Creekside Authority to oversee the maintenance and enforcement of the development standards.
- There should be an investigation into re-routing US Route 62 out of the Creekside area.
- Planning Commission recommends that an independent marketing study be prepared after the concept plan has been adopted. A traffic study should accompany this report.



Visit us at: www.cimcorefrigeration.com

August 25, 2000

Mr. Al Groves
Groves Associates, Inc.
501 Solidad
San Antonio, TX 78205

Subject: Columbus, OH Outdoor Skating Path

Dear Mr. Groves:

CIMCO Refrigeration is pleased to submit our "Design/Build Technical Proposal" for the above subject project.

The attached specification covers: Design; Equipment and Material Supply; Installation; Testing; Start-up; Warranty; and Service of an artificial ice system as outlined herein:

DESIGN

Furnish necessary design collaboration with Owner's Architectural and Engineering Consultants to assure Project continuity as regards to structural, mechanical, electrical, and aesthetic requirements.

Furnish necessary plan, elevation, mechanical, electrical, and detail drawings to assure conformance with overall Arena requirements, and as required to accommodate Plan Check and Permit needs.

Drawings to be provided of quality and quantity as detailed in the "General Conditions" section of this specification, or as otherwise defined herein.

Operation and Maintenance Manuals to be provided of quality and quantity as detailed in "General Conditions" section of this specification, or as otherwise defined herein.

CIMCO Refrigeration
65 Villiers Street, Toronto, Ontario M5A 3S1



Tel: (416) 465-7581 Head Office Fax: (416) 465-8815,
Toronto Sales Fax: (905) 761-9794, U.S. Sales Fax: (416) 465-3584

DESIGN CRITERIA

This specification is based on the following Design Criteria:

Ambient Design Conditions

Summer: 55F Dry Bulb Temperature
45F Wet Bulb Temperature

Winter: 0°F Dry Bulb Temperature

Skating Rink Size and Characteristics

The following criteria apply to the rink covered by this specification:

- Rink Duty: Outdoor Skating Path operating Mid November through Mid March
- Rink Size - 21,000 sq. ft. approximately 30' wide X 580' long.
- Under floor heating system not required for 4 month operation.
- Mechanical Room Size - 30' wide X 40' long X 14' high.
- Electrical
 - Prime Energy: 480 volt; 3 phase; 60 cycle
 - Control Energy: 110 volt; 1 phase; 60 cycle

Plumbing

Owner to provide water source and drain hubs as shown on Construction Drawings.

PART 1 - GENERAL

1.01

SCOPE OF WORK

A. This Section of the Contract includes all Ice Rink Equipment work called for or implied by the drawings and specifications, together with all necessary incidentals whether referred to or not, as will be required to complete the work to the full intent and meaning of the drawings and specifications. The work includes but is not limited to the following:

1. Compressors and motors.
2. Flooded R-22/Calcium Chloride Brine Chiller.
3. Evaporative Condenser.
4. All inter-connecting refrigerant piping.
5. Refrigerant charge, oil charge & Calcium Chloride Brine.
6. Brine pumps, freezing & snow melt pit.
7. Brine mains and rink piping for freezing floor including rink pipe supporting chairs for **concrete** floor.
8. Brine balance tanks.
9. Insulation of Cold Piping & Chiller.
10. Snow Melt Pit Coil c/w Shell & Tube Hot Gas to Water heat exchanger.
11. Shell & Tube Hot Gas (waste Heat) to Brine Heat. Exchanger for snow melt system.
12. Power and control wiring. **(Except for item #7, Page 4)**
13. Ice floor thermostats.
14. R-22 Gas Detector.
15. Honeywell Ice Rink Controller, one for each ice surface located between two pipes at header end of rink.
16. Painting and Identification of mains .
17. Start-up and testing.
18. Training on the operation & maintenance of the equip.
19. Instruction and operating manuals and as-built drawings (3 copies).
20. Supervision of the Owner's operating personnel in making the first sheet of ice..
21. Sub-floor sand fill (7") compacted to 95% and level to plus or minus 3/16". **(OPTION EXTRA)**
22. 3" of sub-floor insulation c/w vapour barrier. **(OPTION EXTRA)**

1.02 RELATED WORK GENERAL

- A. The Ice Rink Contractor shall co-ordinate all phases of the above Scope of Work with the General Contractor, Electrical and Mechanical Contractors.

1.03 RELATED WORK

A. Work by Other Subcontractor(s) - not in CIMCO'S SCOPE:

1. 4" structural concrete equipment isolation pads for refrigeration compressors, and pads for pumps and heat exchangers.
2. Temporary lighting and heating will be provided. Should the Ice Rink Contractor require additional light or heat, he shall provide same in order to complete his work.
3. 1-1/2 inch cold water service to Mechanical Room for system filling c/w backflow preventer.
4. Floor drain (6") in mechanical room.
5. Mechanical exhaust and fresh air to meet latest ASHRAE requirements with proper damper and thermostatic control to ensure that room temperature will not go below 50°F. (Two speed 5,000 CFM)
6. Heat for equipment room to maintain minimum 50°F. (if necessary).
7. 480 V, 3-phase, 60 HZ, 800 Amp electric service wired by Owner to CIMCO pre-wired motor control centre on the package.
8. 110 V temporary power in equipment room for test and lighting purposes.
9. Level Evaporative Condenser Roof supports or Stands outside the equipment room, c/w foundations.
Operating weight - 21,000 Lbs.
10. Excavation of ice rink floors down 15" from finished concrete or sand floors.
11. Snow melt Pit c/w drain and galvanized metal grating.
12. Soils & concrete Testing & inspection.
13. Supply & installation of perimeter curb, benches or walkway
14. Perforated drain tile system installed by "Owner".
Geo textile Fabric between gravel & sand.
15. 5" thick reinforced concrete floor.
16. Ice making, ice paint & painting, "Logos" etc.
17. Trenching and backfill for "Brine Mains" between mechanical room ice floors & snow melt pit.

1.04

REFERENCED STANDARDS

B. ANSI/ASHRAE 15 Safety Code for Mechanical Refrigeration.

ASME Boiler and Pressure Vessel Code, Section VIII, Division

PART 2 - EQUIPMENT

2.01

GENERAL

A. Manufacturers and equipment specified below are for the purpose of setting a minimum standard of capacity and quality of equipment for the performance of the ice rink system.

Provide a complete and automatic flooded R-22/CaCl₂ refrigeration system capable of producing and maintaining ice conditions year round under the following specified design criteria.

1. Refrigeration Capacity of each system is as outlined in APPENDIX A-1.
2. Ambient (a) Dry Bulb 55
(b) Wet Bulb 45°F
(mean coincident)
3. Number of Compressors - per Appendix
4. Horsepower of Compressors SEE APPENDIX A
5. Electrical Supply (Power) 480V/3Ph/60 Cycl.
(Control) 120V/1Ph/60 Cycl.
6. Evaporative Condenser- Model - SEE APPENDIX A
Fan Motor HP - " " "
Water Circulating Pump - " " "
Pump HP - " " "
7. Cold Brine Pumps - " " "
8. Cooling Brine Flow each - SEE APPENDIX A
9. Secondary Refrigerant Calcium Chloride
To Rink Floor 1.20 Sp.Gr.
10. Chiller Shell & Tube. Tubes 3/4"
OD - 16 GA. SA214 DWP

COMPRESSORS

- A. The compressor shall be multi-cylinder single acting Mycom Model FWB (or equal) R-22 units and shall include suction and discharge stop valves, forced feed oil lubrication replaceable cylinder liners, mechanical shaft seal.
- B. Capacity - SEE APPENDIX - "A"
- C. Each compressor shall be fitted with high efficiency discharge line oil separators. Each separator to be complete with automatic oil return float valve and connection to oil receiver. Each separator shall have a full size discharge line check valve and stop valve installed downstream.

2.03

COMPRESSOR MOTORS

- A. Compressor motors shall be, 480V/3 Ph/60 Cycle EEMAC 1, Class B insulation, open drip proof with 1.15 SF, 1800 RPM and available for Two Step PW type starting.

Motors will be mounted on adjustable sliding bases for tightening belts.

2.04

BRINE CHILLER

- A. The chiller shall be 2 pass all steel shell and tube type construction arranged for flooded Ammonia operation.
- B. Design flow is per APPENDIX
- C. Chiller to be constructed to ASME Code and registered by National Board for 250 psi working pressure.
- D. Chiller shall be with 3/4" OD 16 BWG tubes. Surge drum shall be sized for 210 tons and attached to chiller with 3 gas risers.
- E. Chiller to be equipped with dual pressure relief valves, and bulls-eye (reflex type) sight glasses (min. 2) to establish operating level of refrigerant.
- F. Chiller and surge drum to be factory insulated with 2" of foamed in place urethane insulation covered with a fibreglass jacket to protect against damage. Headcovers (insulated) shall be removable without damage.

2.05

BRINE CHILLER CONTROLS

- A. The chiller is to be complete with a float switch and isolating valves to protect the compressors against high liquid levels in the chiller. Chiller to also be complete with oil return system as shown on Dwgs.
- B. High pressure liquid feeding the chiller shall be controlled using a PHILLIPS Series 701 control valve with a Series 275 pilot float valve. Valves shall be isolated with hand stop valves. A 2" Hand Expansion Valve bypass shall also be included

2.06

BRINE COOLING PUMPS

- A. The brine pumps supplying the floor grid shall be a base mounted centrifugal type rated @ 900 USGPM when operating @ 1800 RPM. Pump shall be all iron construction c/w mechanical shaft seal and stainless steel shaft sleeve. Motor shall be 25HP, 480V/3 Ph/60 Cycle, 1800 RPM for direct drive pumps.

2.07

EVAPORATIVE CONDENSER (For outdoor location)

- A. The refrigeration equipment will include an evaporative condenser for outdoor service supplied to operate at the design conditions outlined on page 11 of the proposal.

2.08

CONDENSER SUPPORTS - by others

The condenser will be elevated on concrete piers and rest on structural I beams running the length of condenser.

2.09

CONTROL CENTRE MOUNTED & WIRED ON EACH THE PACKAGE

- A. For all refrigeration system equipment provide a motor control centre including:
 - 1 - 100 HP Two Step PW compressor Motor Starters
 - 2 - 40 HP Brine pump Motor Starters ACL (1-100% standby)
 - 1 - 15 HP Fan motors
 - 1 - 5 HP Water spray pump.
 - 1 - 5 HP Pumps - snow melt
- B. All starters shall be sized for 480V/3 ph/60 cycle power. Control power shall be 120V/1 ph/60 cycle.

- C. Panel shall be complete with pilot lights to indicate run status of each motor, overload relays and resets, gauges to indicate system suction pressure & system discharge pressure. Oil pressure gauges shall be mounted at each machine using a steady mount.
- All compressor safety controls shall be mounted, piped and wired to the panel. All relays, terminal strips, wiring to U/L, state, and local regulations.
- D. Each motor starter shall be equipped with a H.O.A. selector switch.
- E. All gauges, cutouts and selector switches shall be properly identified with engraved lamacoid nameplates.
- F. Provide hour meters for each compressor in this panel.
- G. Automatic Control of Ice Surface Temperature.
- Honeywell Ice Rink Controllers. Thermostat to be located between two pipes at the header end of the rink surface.
- H. Supply and install one R-22 Gas Detector. Detector to designed to provide Alarm at 300 ppm. Alarm horn and alarm light to be mounted in Control Panel and complete with push button acknowledgment and alarm light.

2.10

RINK PIPING AND FREEZING FLOOR HEADERS

A. Headers

All brine piping to and from the rink floors shall be steel Schedule 40 A-53 plain end butt welded piping. All pipe shall be new, straight and true before fabrication. Piping sizing indicated on drawings.

The header piping shall be carbon steel schedule 40 with 3/4" E.H. nipples welded in on 7" centres on the feed and return headers, nipples shall not protrude into the headers and must be factory fabricated, straight and true. Support headers on steel channel frames on minimum 8 ft. centres.

B. Rink Floor Pipe

All rink floor piping shall be 1.05" ID X 1.25" OD Polyethylene. Freezing floor piping shall be installed on 3-1/2 " centers.

C. Pipe Chairs

Provide and install pipe supporting spacers made of a minimum 3/16" steel rod fabricated with 24 gauge steel plate 3" wide on the bottom. Supports shall space rink piping on 3-1/2" centres and shall be placed on 3'-0" centres down the length of the rink.

D. Testing

Rink floor and header systems shall be tested with minimum of 50 psi water pressure, 48 hours prior to pouring of concrete. Pressure shall remain on the floor for the duration of the pour.

2.11 **BRINE BALANCE TANKS**

A. Provide and install one (1) 115 gal. brine balance tank to allow for expansion and contraction of the brine charge in both the sub-floor and freezing floor system.

2.12 **REFRIGERANT PIPING**

A. All R-22 piping shall conform to the ASME B31.5 Refrigeration Pressure piping code and the ASHRAE/ANSI 15 Safety Code for Mechanical Refrigeration.

2.13 **REFRIGERANT VALVES & CONTROLS**

Supply and install all refrigerant stop and control valves as shown on the drawings. Valves to be Henry, Hubbel, Phillips, Hansen or approved equal. Supply and install two replaceable core dryers c/w additional replacement cores and valves as shown on Dwgs.

2.14 **GAUGES & THERMOMETERS**

Supply and install min. 3½" Diam. Gauges, Marsh or equal c/w gauge stop valves as shown on Dwgs. and constructed of material compatible with fluid being measured. Thermometers shall be Tererice 9" stem or equal as shown on Dwgs. & c/w thermometer wells.

2.15 **BRINE VALVES**

Supply and install all cold brine valves as shown on the drawings. Valves shall be lug type butterfly equal to Keystone or approved equal. All valves 10" and larger shall have worm gear operators

PART 3 - EXECUTION

3.01 BRINE CHARGE

- A. The Ice Rink Contractor shall supply and install a complete initial charge of Calcium Chloride brine to a specific gravity of 1.20 and complete with inhibitors to prevent corrosion of the cooling rink pipe system.

3.02 R-22 CHARGE

- A. Supply and install a complete operating charge of Ammonia refrigerant.

3.03 OIL CHARGE

- A. Contractor shall provide a complete initial charge of oil for the compressors plus one spare 50 gallon drum. Oil to be Suniso 4GS or equal. Provide a hand oil pump for charging of oil.

3.04 INSULATION

- A. Piping. Provide insulation on all cold Brine lines between chillers and floor. Provide insulation on low pressure liquid and suction lines. Insulation shall be 2" thick urethane or equal complete with vapour barrier and finished with P.V.C. covering.

3.05 PAINTING

- A. All fabricated steel shall be painted with a primer, ready to receive final coat by Owner.

3.06 IDENTIFICATION

- A. All refrigerant lines, brine lines; and water lines pertaining to the ice rink refrigeration system will be identified after painting and insulation as to the substance in the pipe, and the direction of flow. All lines penetrating a wall section must be immediately identified on either side of the wall. Markers shall be by Brady, IIAR, or equal.

3.07 Testing and Instruction

The Ice Rink Contractor shall test run the equipment and provide supervision of the Owner's operating personnel in the making of the first ice sheet. He shall also provide 16 hours instruction on the care and maintenance of the ice rink equipment.

3.08 Manuals

Provide 3 copies of operating and maintenance manuals for all ice rink equipment covered under this contract; including 3 copies of as-built drawings.

