APPENDIX

SUSTAINABLE SITES

WATER EFFICIENCY

ENERGY & ATMOSPHERE

MATERIALS & RESOURCES

INDOOR ENVIRONMENTAL QUALITY

PHOTOGRAPHS

LEED for New Construction

Macalester IGC (10110542)

St. Paul, MN, US

Certification Level: Platinum

Certification Date: 2009.09.22

0	**Points Achieved**	**Possible Points:**	69

Certified 26 to 32 points Silver 33 to 38 points Gold 39 to 51 points Platinum 52 or more points

10	**Sustainable Sites**	**Possible Points:**	14

Y	Prereq 1	Construction Activity Pollution Prevention	
1	Credit 1	Site Selection	1
1	Credit 2	Development Density & Community Connectivity	1
	Credit 3	Brownfield Redevelopment	1
1	Credit 4.1	Alternative Transportation, Public Transportation Access	1
1	Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms	1
1	Credit 4.3	Alternative Transportation, Low-Emitting & Fuel-Efficient Vehicles	1
1	Credit 4.4	Alternative Transportation, Parking Capacity	1
	Credit 5.1	Site Development, Protect or Restore Habitat	1
1	Credit 5.2	Site Development, Maximize Open Space	1
1	Credit 6.1	Stormwater Design, Quantity Control	1
1	Credit 6.2	Stormwater Design, Quality Control	1
	Credit 7.1	Heat Island Effect, Non-Roof	1
1	Credit 7.2	Heat Island Effect, Roof	1
	Credit 8	Light Pollution Reduction	1

4	**Water Efficiency**	**Possible Points:**	5

1	Credit 1.1	Water Efficient Landscaping, Reduce by 50%	1
1	Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation	1
	Credit 2	Innovative Wastewater Technologies	1
1	Credit 3.1	Water Use Reduction, 20% Reduction	1
1	Credit 3.2	Water Use Reduction, 30% Reduction	1

14	**Energy & Atmosphere**	**Possible Points:**	17

Y	Prereq 1	Fundamental Commissioning of the Building Energy Systems	
Y	Prereq 2	Minimum Energy Performance	
Y	Prereq 3	Fundamental Refrigerant Management	1
1	Credit 1.1	Optimize Energy Performance, 10.5% New / 3.5% Existing	1
1	Credit 1.2	Optimize Energy Performance, 14% New / 7% Existing	1
1	Credit 1.3	Optimize Energy Performance, 17.5% New / 10.5% Existing	1
1	Credit 1.4	Optimize Energy Performance, 21% New / 14% Existing	1
1	Credit 1.5	Optimize Energy Performance, 24.5% New / 17.5% Existing	1
1	Credit 1.6	Optimize Energy Performance, 28% New / 21% Existing	1
1	Credit 1.7	Optimize Energy Performance, 31.5% New / 24.5% Existing	1
1	Credit 1.8	Optimize Energy Performance, 35% New / 28% Existing	1
1	Credit 1.9	Optimize Energy Performance, 38.5% New / 31.5% Existing	1
1	Credit 1.10	Optimize Energy Performance, 42% New / 35% Existing	1
	Credit 2.1	Renewable Energy, 2.5%	1
	Credit 2.2	Renewable Energy, 7.5%	1
	Credit 2.3	Renewable Energy, 12.5%	1
1	Credit 3	Enhanced Commissioning	1
1	Credit 4	Enhanced Refrigerant Management	1
1	Credit 5	Measurement & Verification	1
1	Credit 6	Green Power	1

6	**Materials & Resources**	**Possible Points:**	13

Y	Prereq 1	Storage & Collection of Recyclables	
	Credit 1.1	Building Reuse, Maintain 75% of Existing Walls, Floors, & Roof	1
	Credit 1.2	Building Reuse, Maintain 95% of Existing Walls, Floors, & Roof	1
	Credit 1.3	Building Reuse, Maintain 50% of Interior Non-Structural Elements	1
1	Credit 2.1	Construction Waste Management, Divert 50% from Disposal	1
1	Credit 2.2	Construction Waste Management, Divert 75% from Disposal	1
	Credit 3.1	Materials Reuse, 5%	1
	Credit 3.2	Materials Reuse, 10%	1
1	Credit 4.1a	Recycled Content, 10% (Post-consumer + 1/2 pre-consumer)	1
	Credit 4.1b	Recycled Content, 20% (Post-consumer + 1/2 pre-consumer)	1
1	Credit 5.1	Regional Materials, 10% Extracted, Processed, and Manufactured Regionally	1
1	Credit 5.2	Regional Materials, 20% Extracted, Processed, and Manufactured Regionally	1
	Credit 6	Rapidly Renewable Materials	1
1	Credit 7	Certified Wood	1

15	**Indoor Environmental Quality**	**Possible Points:**	15

Y	Prereq 1	Minimum IAQ Performance	
Y	Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1	Credit 1	Outdoor Air Delivery Monitoring	1
1	Credit 2	Increased Ventilation	1
1	Credit 3.1	Construction IAQ Management Plan, During Construction	1
1	Credit 3.2	Construction IAQ Management Plan, Before Occupancy	1
1	Credit 4.1	Low-Emitting Materials, Adhesives & Sealants	1
1	Credit 4.2	Low-Emitting Materials, Paints & Coatings	1
1	Credit 4.3	Low-Emitting Materials, Carpet Systems	1
1	Credit 4.4	Low-Emitting Materials, Composite Wood & Agrifiber Products	1
1	Credit 5	Indoor Chemical & Pollutant Source Control	1
1	Credit 6.1	Controllability of Systems, Lighting	1
1	Credit 6.2	Controllability of Systems, Thermal Comfort	1
1	Credit 7.1	Thermal Comfort, Design	1
1	Credit 7.2	Thermal Comfort, Verification	1
1	Credit 8.1	Daylight & Views, Daylight 75% of Spaces	1
1	Credit 8.2	Daylight & Views, Views for 90% of Spaces	1

5	**Innovation & Design Process**	**Possible Points:**	5

1	Credit 1.1	Innovation in Design	1
1	Credit 1.2	Innovation in Design	1
1	Credit 1.3	Innovation in Design	1
1	Credit 1.4	Innovation in Design	1
1	Credit 2	LEED® Accredited Professional	1

SUSTAINABLE SITES

CREDIT 2

CREDIT 4.1

CREDIT 4.2

CREDIT 4.3

CREDIT 5.2

CREDIT 6.1

CREDIT 6.2

CREDIT 7.2

SUSTAINABLE SITES

CREDIT 2: DEVELOPMENT DENSITY & COMMUNITY CONNECTIVITY

POPULATION DENSITY MAP

RADIUS MAP FOR SERVICES

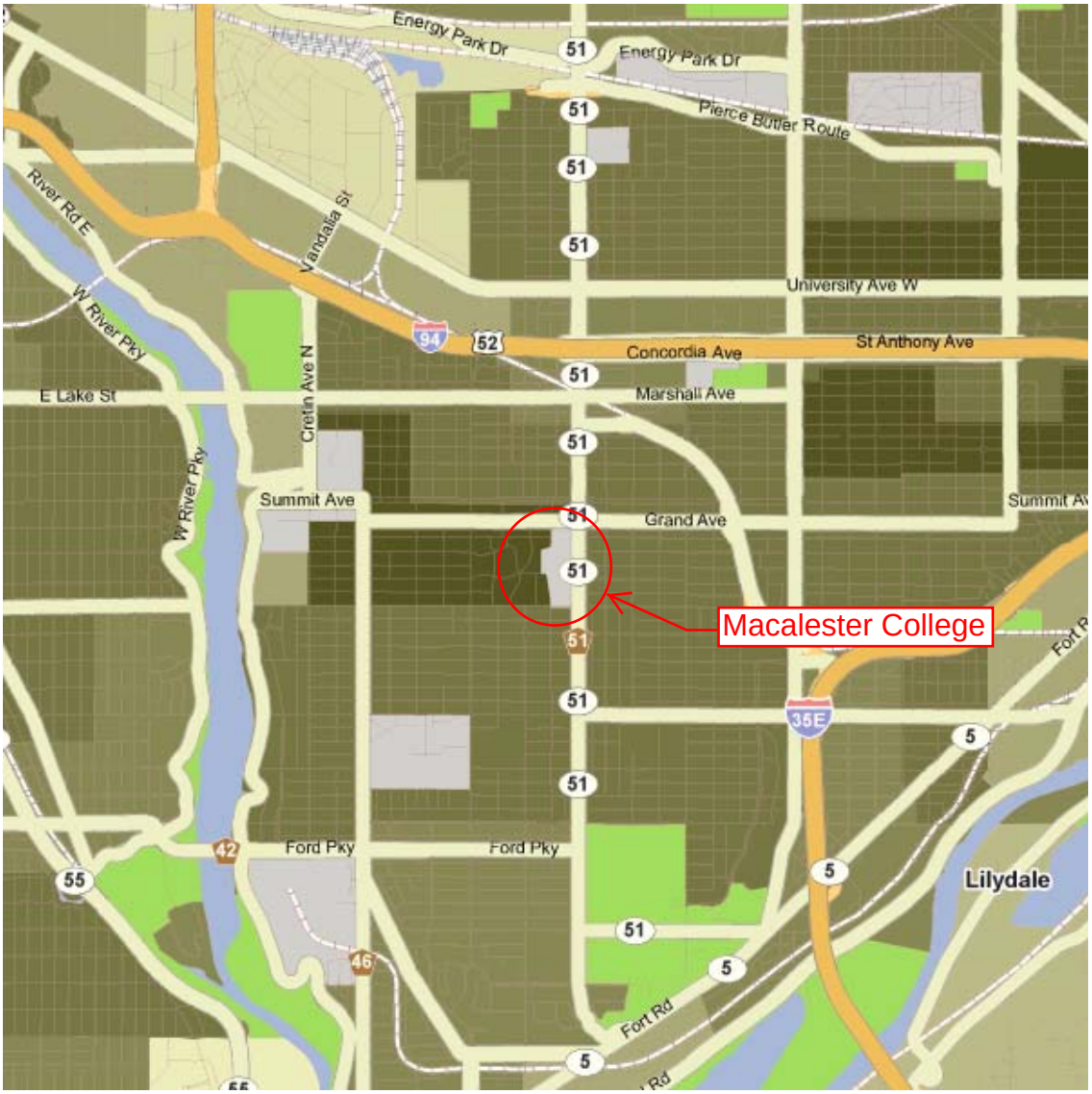
SERVICES CHART

ZONING MAP

ZONING DEFINITIONS

DataPlace

Map of Population density (people per square mile)2000 in Minneapolis-St. Paul, MN Metro



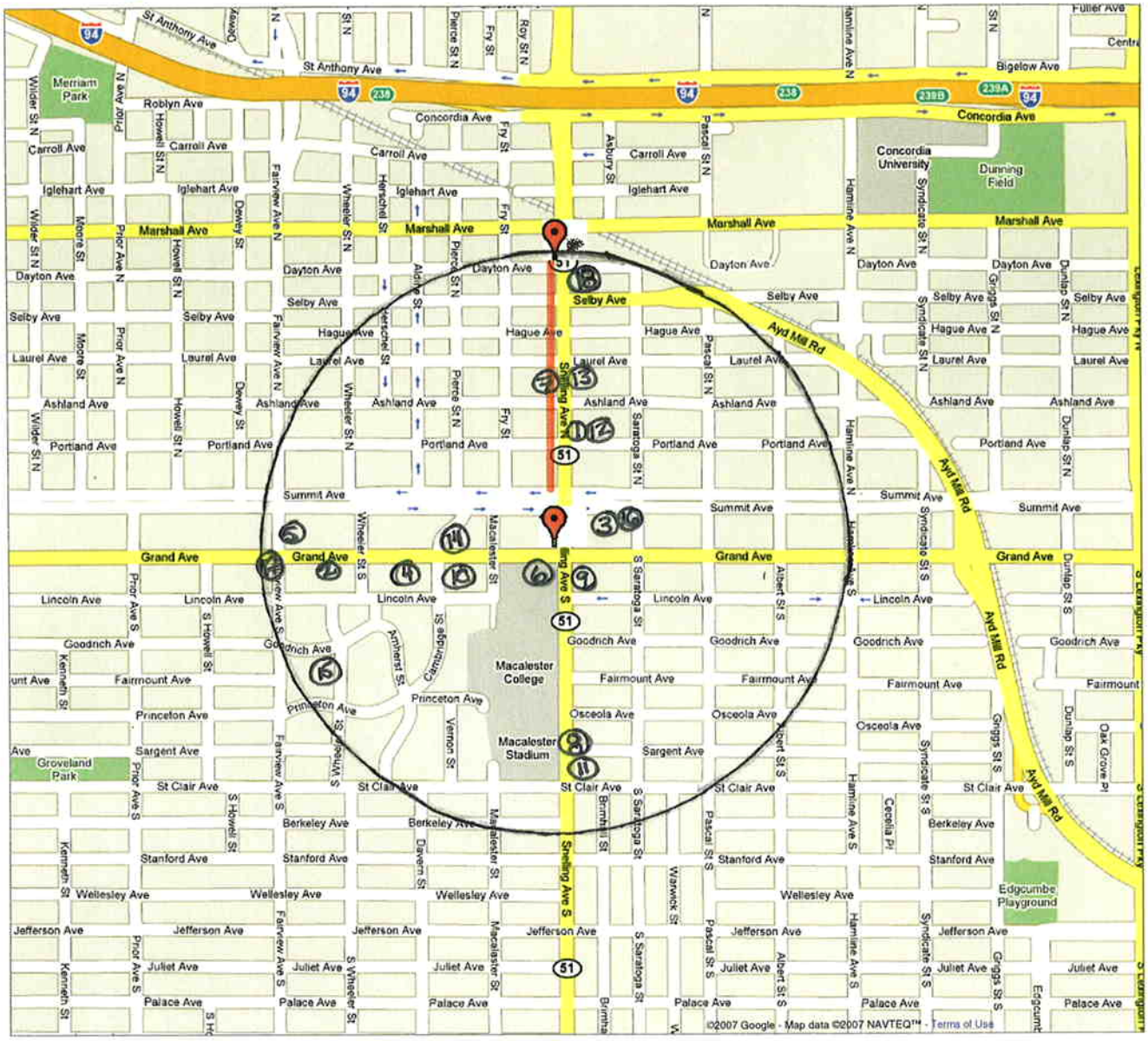
(c) 2008 Fannie Mae Foundation. Printed from DataPlace -- www.dataplace.org

Macalester IGC
Project #: 2415808979104146

Google Maps

Address

1600 Grand Ave
St Paul, MN 55105



0.5 mile

12/7/2007

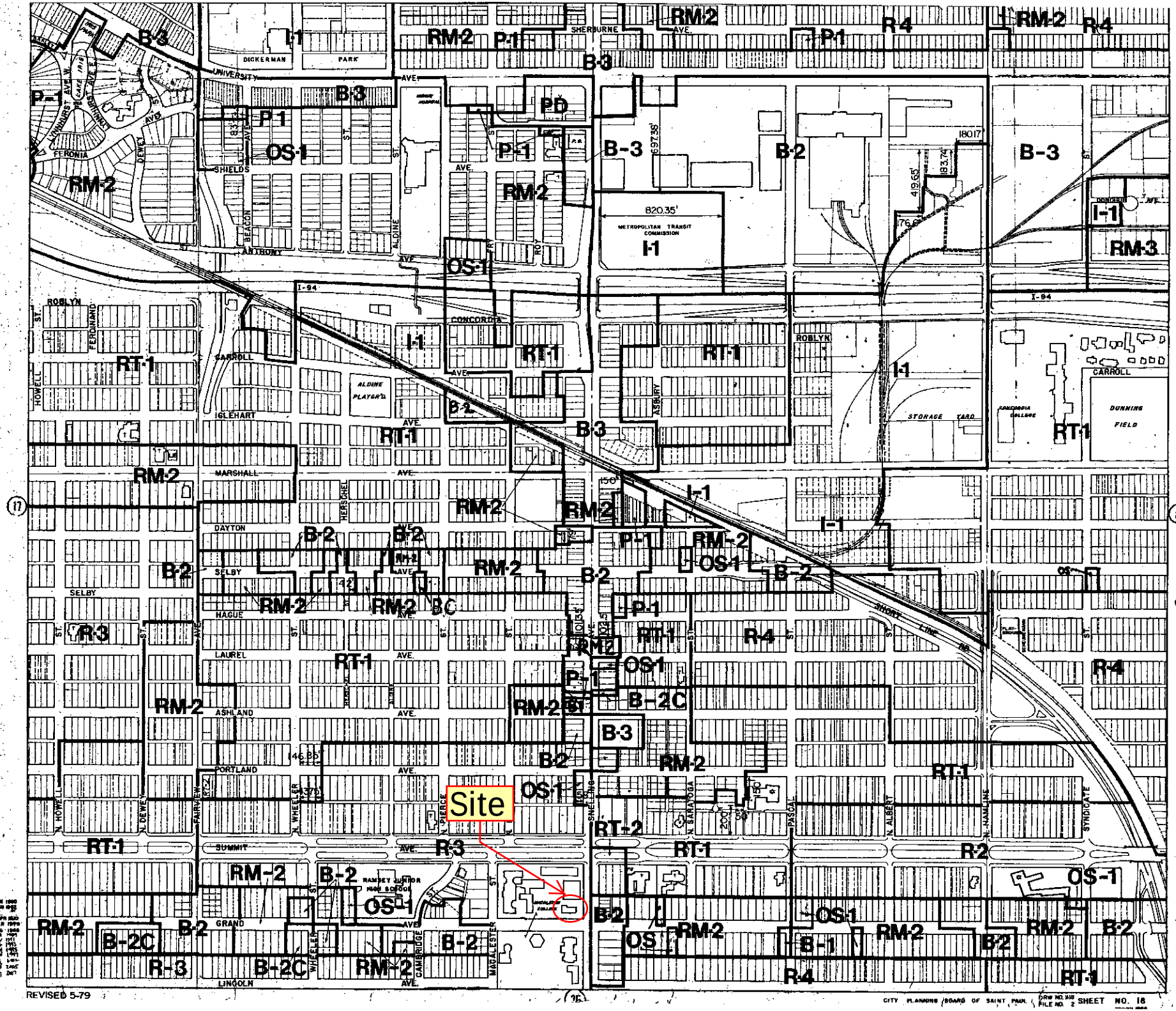
Macalester College Institute for Global Citizenship
Project #: 2415808979104146

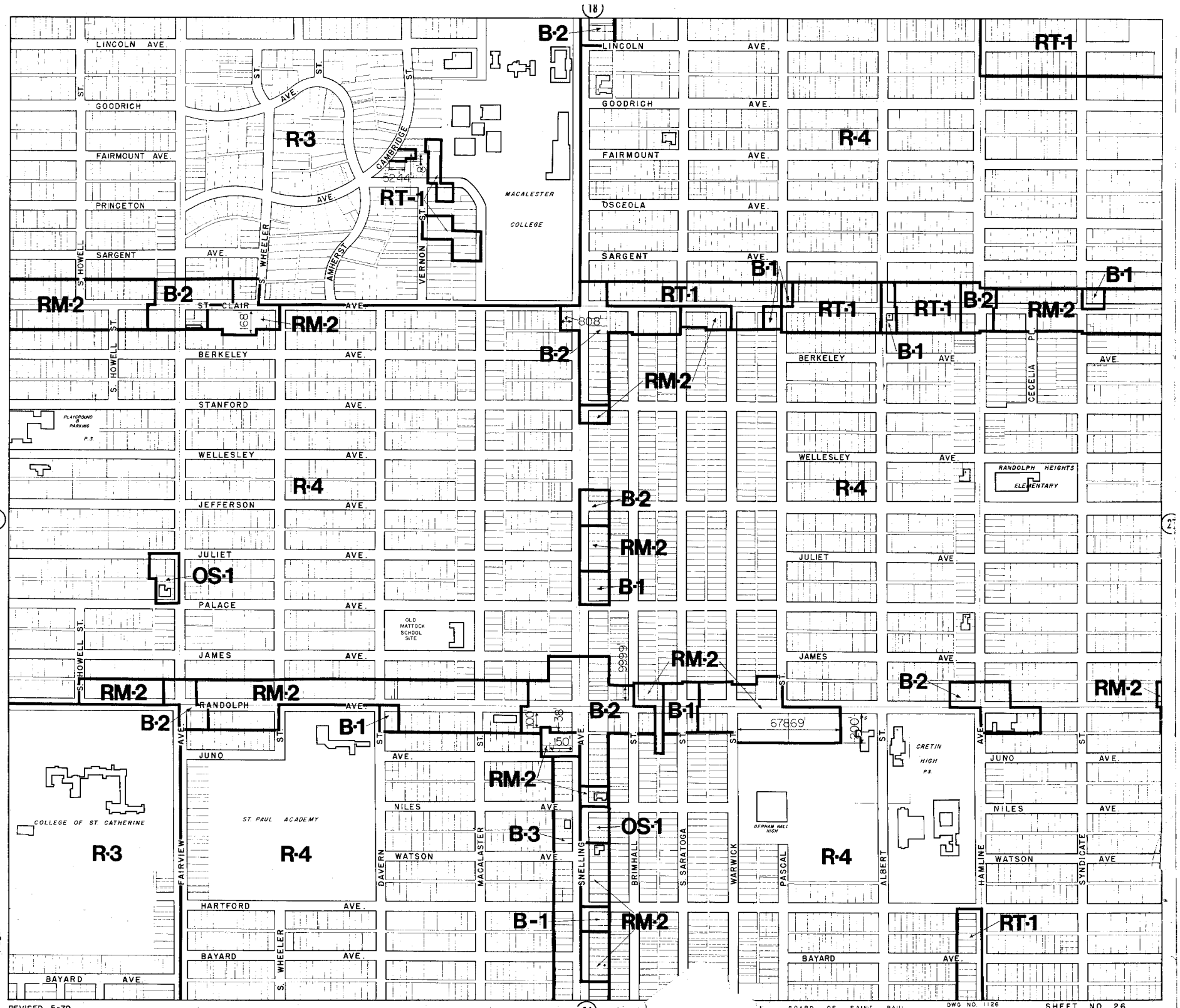
Bruner/Cott & Associates, Inc.
130 Prospect Street
Cambridge, Massachusetts 02139
Tel: 617 492 8400
Fax: 617 876 4002
Web: www.brunercott.com

Architecture/Urban Design
Preservation/Space Planning

Bruner/Cott

Key #	Map Key Category	Business	Address	Distance (mile)
1	Bank	Wells Fargo	56 Snelling Ave N	0.3
2	Child Care	La Petite Academy	1770 Grand Ave	0.4
3	Place of Worship	Immaculate Heart of Mary	1550 Summit Ave	0.1
4	Cleaners	Grand Laundromat	1700 Grand Ave	0.2
5	Supermarket	Whole Foods Market	30 Fairview Ave S	0.5
6	Library	Dewitt Wallace Library	1600 Grand Ave	0.1
7	Dental	Kubes Dental Care	91 Snelling Ave N	0.3
8	Pharmacy	St Paul Corner Drug	240 Snelling Ave S	0.4
9	Restaurant 1	Caibou Coffe	68 Snelling Ave S	0.1
10	Beauty	Grand Hair & Beyond	1674 Grand Ave	0.1
11	Restaurant 2	Carmelo's Ristorante	238 Snelling Ave S	0.4
12	Convenience Grocery	Superamerica	56 Snelling Ave N	0.3
13	Fire Station	St Paul Fire Department	111 Snelling Ave N	0.4
14	Hardware	Ace Hardware	1676 Grand Ave	0.2
15	Senior Services	Rakhma Incorporated	123 Wheeler St S	0.5
16	K-12 School	Highland Park Montessori School	1550 Summit Ave	0.2
17	Theater	Mann Grandview 2 Theater	1830 Grand Ave	0.5
18	Fitness Center	Sweatshop Fitness Training Center	171 Snelling Ave N	0.4


Site
UNIVERSITY AVE.
SHERBURNE AVE.
DICKERMAN PARK
FERONIA
SHIELDS
ARTHUR
ROBLYN
CARROLL
IGLEHART
MARSHALL
DAYTON
SELBY
HAGUE
LAUREL
ASHLAND
PORTLAND
SUMMIT
GRAND
LINCOLN
I-94
SHORT LINE
DUNNING FIELD
CONCORDIA COLLEGE
STORAGE YARD
METROPOLITAN TRANSIT COMMISSION
RAMSEY JUNIOR HIGH SCHOOL
REVISED 5-79
CITY PLANNING BOARD OF SAINT PAUL
SHEET NO. 18



JAN 1960
JAN 1962
APR 1970
MAR 1979
SEP 1988
APR 1994
JAN 1995

REVISED 5-79

BOARD OF SAINT PAUL

DWG NO 1126
FILE NO. 2

SHEET NO 26

Conditional uses that are found in this code require approval by the planning commission. These land uses could not be conveniently allocated to one (1) zone or another, or the effects of such uses could not be definitely foreseen as of a given time. The general characteristics of these uses include one (1) or more of the following:

a. They require large areas;

b. They are infrequent;

c. They sometimes create an unusual amount of traffic;

d. They are sometimes obnoxious or hazardous;

e. They are required for public safety and convenience.

ARTICLE III. 60.300. ZONING DISTRICTS AND MAPS GENERALLY

Sec. 60.301. Zoning districts established.

For the purposes of this code, the city is hereby divided into the following zoning districts:

(a) Residential districts.

RL one-family large lot residential district

R1 one-family residential district

R2 one-family residential district

R3 one-family residential district

R4 one-family residential district

RT1 two-family residential district

RT2 townhouse residential district

RM1 low-density, low-rise multiple-family residential district

RM2 medium-density, low-rise multiple-family residential district

RM3 high-density, high-rise multiple-family residential district

(b) Traditional neighborhood districts.

TN1 traditional neighborhood district

TN2 traditional neighborhood district

TN3 traditional neighborhood district

(c) Business districts.

OS office-service district

B1 local business district

BC community business (converted) district

B2 community business district

B3 general business district

B4 central business district

B5 central business-service district

(d) Industrial districts.

IR river corridor industrial district

I1 light industrial district

I2 general industrial district

I3 restricted industrial district

(e) Civic and open space districts.

CO civic and open space district

CV conservancy district

(f) Special districts.

VP vehicular parking district

PD planned development district

(g) Overlay districts.

SF state fair parking and vending overlay districts

TP tree preservation overlay district

SD Shepard Davern redevelopment overlay district

WB White Bear Avenue overlay district

HV Hillcrest Village overlay district

(h) River corridor overlay districts.

RC1 river corridor floodway overlay district

RC2 river corridor flood fringe overlay district

RC3 river corridor urban open overlay district

RC4 river corridor urban diversified overlay district

(C.F. No. 05-443, § 1, 7-15-05)

Sec. 60.302. Primary and overlay districts.

Primary zoning districts include the districts listed in section 60.301(a) through (f). All property in the city shall be located within a primary zoning district. Overlay districts include the districts listed in section 60.301(g) and (h)

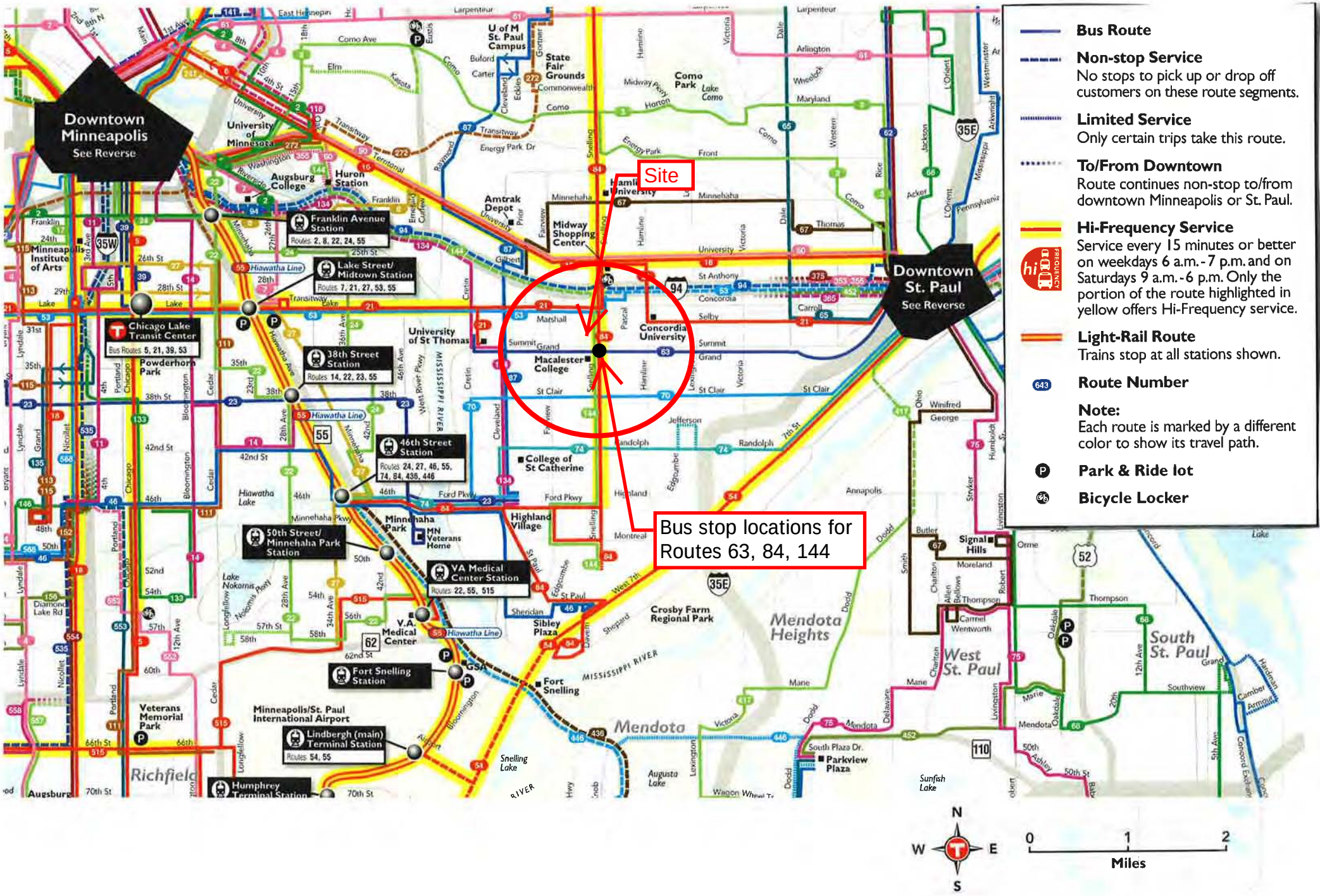
Sec. 60.303. Official zoning maps.

SUSTAINABLE SITES

CREDIT 4.1: ALTERNATIVE TRANSPORTATION: PUBLIC TRANSPORTATION ACCESS

BUS MAPS

BUS ROUTE SCHEDULE


Site
Bus stop locations for Routes 63, 84, 144
Downtown Minneapolis
See Reverse
Downtown St. Paul
See Reverse
Bus Route
Non-stop Service
No stops to pick up or drop off customers on these route segments.
Limited Service
Only certain trips take this route.
To/From Downtown
Route continues non-stop to/from downtown Minneapolis or St. Paul.
Hi-Frequency Service
Service every 15 minutes or better on weekdays 6 a.m.-7 p.m. and on Saturdays 9 a.m.-6 p.m. Only the portion of the route highlighted in yellow offers Hi-Frequency service.
Light-Rail Route
Trains stop at all stations shown.
643 Route Number
Note:
Each route is marked by a different color to show its travel path.
Park & Ride lot
Bicycle Locker
Macalester College
Franklin Avenue Station
Routes 2, 8, 22, 24, 55
Lake Street/ Midtown Station
Routes 7, 21, 27, 53, 55
Chicago Lake Transit Center
Bus Routes 5, 21, 39, 53
38th Street Station
Routes 14, 22, 23, 55
46th Street Station
Routes 24, 27, 46, 55, 74, 84, 436, 446
50th Street/ Minnehaha Park Station
VA Medical Center Station
Routes 22, 55, 515
Fort Snelling Station
Lindbergh (main) Terminal Station
Routes 54, 55
Humphrey Terminal Station
Hiawatha Line
Mendota Heights
West St. Paul
South St. Paul
Mendota
Richfield
Miles
0
1
2
N
W
E
S

84

Effective 09/09/06
Local Bus Route

Serving:
Roseville
- Rosedale Shopping Center
- Har Mar Mall

St. Paul
- Snelling Avenue
- Midway Shopping Center
- Highland Park Neighborhood
- Highland Village

Minneapolis
- 46th Street Station

All buses on this route are wheelchair accessible.

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www.metrotransit.com

612-373-3333

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24-hour Automated Schedule Information
Direct Dial: **612-341-4287**

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570-6th Ave. N., Mpls.

Give us your comments and suggestions or check on lost items

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Monday-Friday 7:00 am - 6:00 pm
Closed holidays

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Carpool registration and matching, Guaranteed Ride Home and bike lockers

Fare Hotline
Call for a postage-paid order form by mail:
612-349-7681

TTY Service
TTY service is available for the deaf and hard of hearing. Call 612-341-0140 for route and schedule information; call 612-349-7439 to reach Customer Relations/Lost & Found.

www.metrotransit.org

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Minneapolis, MN 55411-4398

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612-373-3333
www.metrotransit.org

Monday–Friday Southbound
From Roseville to St. Paul and south Minneapolis

| route number & letter | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84D | 84H | 84F | 84D | 84F | 84D | 84F | 84F | 84F

Saturday Southbound

From Roseville to St. Paul and south Minneapolis

route number & letter	Rosedale Transit Center	Snelling Ave and Larpenteur Ave	Snelling Ave and Como Ave	Snelling Ave and University Ave	Snelling Ave and Grand Ave	Snelling Ave and Randolph Ave	Ford Pkwy and Cleveland Ave	46th St Station (Hiawatha Ave)	W 7th St and W Meyrnam Dr	Dayern St and Shepard Rd
	1	2	3	4	5	6	9	10	11	12
				AM						
84F				4:51	4:55	4:58	5:03	5:09		
84F	5:07	5:13	5:15	5:21	5:25	5:28	5:33	5:39		
84F	5:37	5:43	5:45	5:51	5:55	5:58	6:03	6:09		
84D	6:07	6:13	6:15	6:21	6:25	6:28	6:33	—	6:39	6:41
84F	6:37	6:43	6:45	6:51	6:55	6:58	7:04	7:10		
84D	7:07	7:13	7:15	7:21	7:25	7:28	7:34	—	7:40	7:42
84F	7:37	7:43	7:45	7:51	7:55	7:58	8:04	8:10		
84F	7:57	8:03	8:05	8:11	8:15	8:18	8:24	8:30		
84D	8:12	8:18	8:20	8:26	8:30	8:33	8:39	—	8:45	8:47
84F	8:27	8:33	8:35	8:41	8:45	8:48	8:54	9:01		
84D	8:42	8:48	8:50	8:56	9:00	9:03	9:09	—	9:15	9:17
84F	8:57	9:03	9:05	9:11	9:15	9:18	9:24	9:31		
84D	9:12	9:18	9:20	9:26	9:30	9:33	9:39	—	9:45	9:47
84F	9:27	9:33	9:35	9:41	9:45	9:48	9:54	10:01		
84D	9:42	9:48	9:51	9:57	10:02	10:05	10:11	—	10:17	10:19
84F	9:57	10:03	10:06	10:12	10:17	10:20	10:26	10:33		
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84F	10:27	10:34	10:37	10:43	10:48	10:51	10:57	11:04		
84D	10:41	10:48	10:51	10:57	11:02	11:05	11:11	—	11:17	11:19
84F	10:56	11:03	11:06	11:12	11:17	11:20	11:26	11:33		
84D	11:11	11:18	11:21	11:27	11:32	11:35	11:41	—	11:47	11:49
84F	11:26	11:33	11:36	11:42	11:47	11:50	11:56	12:03		
84D	11:41	11:48	11:51	11:57	12:02	12:05	12:11	—	12:17	12:19
84F	11:56	12:03	12:06	12:12	12:17	12:20	12:26	12:33		
				PM						
84D	12:10	12:18	12:21	12:27	12:32	12:35	12:41	—	12:47	12:49
84F	12:25	12:33	12:36	12:42	12:47	12:50	12:56	1:03		
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84F	12:55	1:03	1:06	1:12	1:17	1:20	1:26	1:33		
84D	1:10	1:18	1:21	1:27	1:32	1:35	1:41	—	1:47	1:49
84F	1:25	1:33	1:36	1:42	1:47	1:50	1:56	2:03		
84D	1:40	1:48	1:51	1:57	2:02	2:05	2:11	—	2:17	2:19
84F	1:55	2:03	2:06	2:12	2:17	2:20	2:26	2:33		
84D	2:10	2:18	2:21	2:27	2:32	2:35	2:41	—	2:47	2:49
84F	2:25	2:33	2:36	2:42	2:47	2:50	2:56	3:03		
84D	2:40	2:48	2:51	2:57	3:02	3:05	3:11	—	3:17	3:19
84F	2:55	3:03	3:06	3:12	3:17	3:20	3:26	3:33		
84D	3:09	3:17	3:20	3:27	3:32	3:35	3:41	—	3:47	3:49
84F	3:24	3:32	3:35	3:42	3:47	3:50	3:56	4:03		
84D	3:38	3:47	3:50	3:57	4:02	4:05	4:11	—	4:17	4:19
84F	3:53	4:02	4:05	4:12	4:17	4:20	4:26	4:33		
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84F	4:23	4:32	4:35	4:42	4:47	4:50	4:56	5:03		
84D	4:40	4:49	4:52	4:59	5:04	5:07	5:13	—	5:19	5:21
84F	4:55	5:03	5:06	5:12	5:17	5:20	5:26	5:33		
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84F	5:57	6:04	6:07	6:13	6:17	6:20	6:26	6:33		
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84F	6:27	6:34	6:37	6:43	6:47	6:50	6:56	7:03		
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84F	7:21	7:28	7:31	7:37	7:41	7:44	7:50	7:57		
84F	7:51	7:58	8:01	8:07	8:11	8:14	8:20	8:27		
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84F	10:52	10:59	11:01	11:07	11:11	11:14	11:19	11:26		
84F	11:22	11:29	11:31	11:37	11:41	11:44	11:49	11:56		
84F	11:52	11:59	12:01	12:07	12:11	12:14	12:19	12:26		

Saturday Northbound

From south Minneapolis and St. Paul to Roseville

route number & letter	Dayern St and Shepard Rd	W 7th St and W Meyrnam Dr	46th St Station (Hiawatha Ave)	Ford Pkwy and Cleveland Ave	Snelling Ave and Randolph Ave	Snelling Ave and Grand Ave	Snelling Ave and University Ave	Snelling Ave and Como Ave	Snelling Ave and Larpenteur Ave	Rosedale Transit Center
	12	11	10	9	6	5	4	3	2	1
					AM					
84							5:10	5:14	5:16	5:22
84			5:19	5:25	5:31	5:34	5:40	5:44	5:46	5:52
84			5:49	5:55	6:01	6:04	6:10	6:14	6:16	6:22
84			6:19	6:25	6:31	6:34	6:40	6:44	6:46	6:52
84	6:45	6:48	—	6:54	7:00	7:03	7:09	7:13	7:15	7:21
84			7:17	7:24	7:30	7:33	7:39	7:43	7:45	7:51
84	7:30	7:33	—	7:39	7:45	7:48	7:54	7:58	8:00	8:06
84			7:47	7:54	8:00	8:03	8:09	8:13	8:15	8:21
84	8:00	8:03	—	8:09	8:15	8:18	8:24	8:28	8:30	8:36
84			8:17	8:24	8:30	8:33	8:39	8:43	8:45	8:51
84	8:30	8:33	—	8:39	8:45	8:48	8:54	8:58	9:00	9:06
84			8:47	8:54	9:00	9:03	9:09	9:13	9:16	9:22
84	9:00	9:03	—	9:09	9:15	9:18	9:24	9:28	9:31	9:37
84			9:17	9:24	9:30	9:33	9:39	9:44	9:47	9:53
84	9:29	9:32	—	9:39	9:45	9:48	9:54	9:59	10:02	10:08
84			9:47	9:55	10:01	10:04	10:10	10:15	10:18	10:25
84	10:01	10:04	—	10:11	10:17	10:20	10:26	10:31	10:34	10:41
84			10:18	10:26	10:32	10:35	10:42	10:47	10:50	10:57
84	10:31	10:34	—	10:41	10:47	10:50	10:57	11:02	11:05	11:12
84			10:48	10:56	11:02	11:05	11:12	11:17	11:20	11:27
84	11:01	11:04	—	11:11	11:17	11:20	11:27	11:32	11:35	11:42
84			11:18	11:26	11:32	11:35	11:42	11:47	11:50	11:57
84	11:31	11:34	—	11:41	11:47	11:50	11:57	12:02	12:05	12:13
84			11:48	11:56	12:02	12:05	12:12	12:17	12:20	12:28
					PM					
84	12:01	12:04	—	12:11	12:17	12:20	12:27	12:32	12:35	12:43
84			12:18	12:26	12:32	12:35	12:42	12:47	12:50	12:58
84	12:31	12:34	—	12:41	12:47	12:50	12:57	1:02	1:05	1:13
84			12:48	12:56	1:02	1:05	1:12	1:17	1:20	1:28
84	1:01	1:04	—	1:11	1:17	1:20	1:27	1:32	1:35	1:43
84			1:18	1:26	1:32	1:35	1:42	1:47	1:50	1:58
84	1:31	1:34	—	1:41	1:47	1:50	1:57	2:02	2:05	2:13
84			1:48	1:56	2:02	2:05	2:12	2:17	2:20	2:28
84	2:01	2:04	—	2:11	2:17	2:20	2:27	2:32	2:35	2:43
84			2:18	2:26	2:32	2:35	2:42	2:47	2:50	2:58
84	2:31	2:34	—	2:41	2:47	2:50	2:57	3:02	3:05	3:13
84			2:48	2:56	3:02	3:05	3:11	3:16	3:19	3:26
84	3:01	3:04	—	3:11	3:17	3:20	3:26	3:31	3:34	3:41
84			3:18	3:26	3:32	3:35	3:41	3:46	3:49	3:56
84	3:31	3:34	—	3:41	3:47	3:50	3:56	4:01	4:04	4:11
84			3:49	3:56	4:02	4:05	4:11	4:16	4:19	4:26
84	4:01	4:04	—	4:11	4:17	4:20	4:26	4:31	4:34	4:41
84			4:19	4:26	4:32	4:35	4:41	4:46	4:49	4:56
84	4:31	4:34	—	4:41	4:47	4:50	4:56	5:01	5:04	5:11
84			4:49	4:56	5:02	5:05	5:11	5:16	5:19	5:26
84	5:01	5:04	—	5:11	5:17	5:20	5:26	5:31	5:34	5:41
84			5:19	5:26	5:32	5:35	5:41	5:46	5:49	5:56
84	5:31	5:34	—	5:41	5:47	5:50	5:56	6:01	6:04	6:11
84			5:49	5:56	6:02	6:05	6:11	6:16	6:19	6:26
84	6:01	6:04	—	6:11	6:17	6:20	6:26	6:31	6:34	6:41
84			6:17	6:24	6:30	6:33	6:39	6:44	6:47	6:54
84			6:40	6:47	6:53	6:56	7:02	7:07	7:10	7:17
84			7:10	7:17	7:23	7:26	7:32	7:37	7:40	7:47
84			7:40	7:47	7:53	7:56	8:02	8:07	8:10	8:17
84			8:10	8:17	8:23	8:26	8:32	8:37	8:40	8:46
84			8:40	8:47	8:53	8:56	9:02	9:07	9:10	9:16
84			9:10	9:17	9:23	9:26	9:32	9:37	9:40	9:46
84			9:40	9:47	9:53	9:56	10:02	10:06	10:08	10:14
84			10:10	10:17	10:23	10:26	10:32	10:36	10:38	10:44
84			10:41	10:47	10:53	10:56	11:02	11:06	11:08	11:14
84			11:11	11:17	11:23	11:26	11:32	11:36	11:38	11:44
84			11:41	11:47	11:53	11:56	12:02	12:06	12:08	12:14
					AM					
84X			12:41	12:47	12:53	12:56	1:02			

Sunday & Holiday Southbound

From Roseville to St. Paul and south Minneapolis

route number & letter	Rosedale Transit Center	Snelling Ave and Larpenteur Ave	Snelling Ave and Como Ave	Snelling Ave and University Ave	Snelling Ave and Grand Ave	Snelling Ave and Randolph Ave	Ford Pkwy and Cleveland Ave	46th St Station (Hiawatha Ave)
	1	2	3	4	5	6	9	10
				AM				
84F					4:53	4:55	5:00	5:07
84F	6:14	6:20	6:22	6:28	6:32	6:34	6:39	6:46
84F	7:24	7:30	7:32	7:38	7:42	7:44	7:49	7:56
84F	7:54	8:00	8:02	8:08	8:12	8:14	8:19	8:26
84F	8:24	8:30	8:32	8:38	8:42	8:44	8:49	8:56
84F	8:54	9:00	9:02	9:08	9:12	9:14	9:19	9:26
84F	9:23	9:29	9:31	9:37	9:41	9:44	9:49	9:56
84F	9:53	9:59	10:01	10:07	10:11	10:14	10:19	10:26
84F	10:22	10:28	10:31	10:37	10:41	10:44	10:50	10:57
84F	10:52	10:58	11:01	11:07	11:11	11:14	11:20	11:27
84F	11:22	11:28	11:31	11:37	11:41	11:44	11:50	11:57
84F	11:52	11:59	12:02	12:08	12:12	12:15	12:21	12:28
				PM				
84F	12:22	12:29	12:32	12:38	12:42	12:45	12:51	12:58
84F	12:52	12:59	1:02	1:08	1:12	1:15	1:21	1:28
84F	1:22	1:30	1:33	1:39	1:43	1:46	1:52	1:59
84F	1:52	2:00	2:03	2:09	2:13	2:16	2:22	2:29
84F	2:22	2:30	2:33	2:39	2:43	2:46	2:52	2:59
84F	2:52	3:00	3:03	3:09	3:13	3:16	3:22	3:29
84F	3:22	3:30	3:33	3:39	3:43	3:46	3:52	3:59
84F	3:52	4:00	4:03	4:09	4:13	4:16	4:22	4:29
84F	4:22	4:30	4:33	4:39	4:43	4:46	4:52	4:59
84F	4:52	5:00	5:03	5:09	5:13	5:16	5:22	5:29
84F	5:22	5:30	5:33	5:39	5:43	5:46	5:52	5:59
84F	5:52	6:00	6:03	6:09	6:13	6:16	6:21	6:28
84F	6:22	6:29	6:32	6:38	6:42	6:45	6:50	6:57
84F	6:52	6:59	7:02	7:08	7:12	7:15	7:20	7:27
84F	7:22	7:29	7:32	7:38	7:42	7:45	7:50	7:57
84F	7:52	7:59	8:02	8:08	8:12	8:14	8:19	8:26
84F	8:23	8:30	8:32	8:38	8:42	8:44	8:49	8:56
84F	9:24	9:30	9:32	9:38	9:42	9:44	9:49	9:56
84F	10:24	10:30	10:32	10:38	10:42	10:44	10:49	10:56
84F	11:24	11:30	11:32	11:38	11:42	11:44	11:49	11:56

Sunday & Holiday Northbound

From south Minneapolis and St. Paul to Roseville

route number & letter	46th St Station (Hiawatha Ave)	Ford Pkwy and Cleveland Ave	Snelling Ave and Randolph Ave	Snelling Ave and Grand Ave	Snelling Ave and University Ave	Snelling Ave and Como Ave	Snelling Ave and Larpenteur Ave	Rosedale Transit Center
	10	9	6	5	4	3	2	1
			AM					
84	5:14	5:20	5:25	5:28	5:33	5:37	5:39	5:45
84	6:58	7:04	7:09	7:12	7:17	7:21	7:23	7:29
84	7:41	7:47	7:52	7:55	8:00	8:04	8:06	8:12
84	8:11	8:17	8:22	8:25	8:30	8:34	8:36	8:42
84	8:41	8:47	8:52	8:55	9:00	9:04	9:06	9:12
84	9:11	9:17	9:22	9:25	9:30	9:34	9:36	9:42
84	9:39	9:45	9:51	9:54	10:00	10:04	10:06	10:12
84	10:08	10:14	10:20	10:23	10:30	10:34	10:36	10:42
84	10:37	10:44	10:50	10:53	11:00	11:04	11:06	11:12
84	11:06	11:13	11:19	11:22	11:29	11:34	11:37	11:44
84	11:36	11:43	11:49	11:52	11:59	12:04	12:07	12:14
				PM				
84	12:06	12:13	12:19	12:22	12:29	12:34	12:37	12:44
84	12:36	12:43	12:49	12:52	12:59	1:04	1:07	1:15
84	1:06	1:13	1:19	1:22	1:29	1:34	1:37	1:45
84	1:36	1:43	1:49	1:52	1:59	2:04	2:07	2:15
84	2:06	2:13	2:19	2:22	2:29	2:34	2:37	2:44
84	2:36	2:43	2:49	2:52	2:59	3:04	3:07	3:14
84	3:06	3:13	3:19	3:22	3:29	3:34	3:37	3:44
84	3:36	3:43	3:49	3:52	3:59	4:04	4:07	4:14
84	4:07	4:14	4:20	4:23	4:29	4:34	4:37	4:44
84	4:37	4:44	4:50	4:53	4:59	5:04	5:07	5:14
84	5:07	5:14	5:20	5:23	5:29	5:34	5:37	5:44
84	5:37	5:44	5:50	5:53	5:59	6:04	6:07	6:14
84	6:07	6:14	6:20	6:23	6:28	6:34	6:37	6:43
84	6:37	6:44	6:50	6:53	6:58	7:03	7:06	7:12
84	7:07	7:14	7:20	7:23	7:28	7:34	7:37	7:43
84	7:37	7:44	7:50	7:53	7:58	8:02	8:04	8:10
84	8:37	8:44	8:50	8:53	8:58	9:02	9:04	9:10
84	9:38	9:44	9:50	9:53	9:58	10:02	10:04	10:10
84	10:39	10:45	10:50	10:53	10:58	11:02	11:04	11:10
84	11:39	11:45	11:50	11:53	11:58	12:02	12:04	12:10
				AM				
84X	12:49	12:55	1:00	1:03	1:08			

Holiday service operates on the following holidays:
New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas.

Metro Transit may operate reduced service on days before or after Independence Day, Thanksgiving or Christmas. Look for details in TAKEOUT on buses and trains prior to these holidays.

612-373-3333
www.metrotransit.org

It's easy to ride – Here's how:

Bus:

1 Arrive at your stop a few minutes early.

2 Check the sign above the windshield for the route number and letter. Unsure it is the right one? Ask your driver.

3 Pay your fare with:
Cash: Put bills, coins or tokens in the farebox. Change is not available. If you need to change buses or ride rail, ask for a transfer.
Go-To Card: Touch your card to the reader. A transfer is embedded.
SuperSaver 31-Day Pass: Insert it in the reader. A transfer is embedded.
SuperSaver Stored Value Card: Insert it in the reader. A bus-only transfer is embedded. To transfer to rail, ask for a rail-only transfer.

4 Take a seat and watch for your stop.

5 About one block from your stop, pull the cord above the window to signal the driver. If possible, exit through the back door.

Rail:

1 Arrive at your station a few minutes early.

2 Purchase a ticket from the station's vending machine or touch your Go-To Card to the station's card reader before boarding.

3 You must have a valid ticket, transfer, Go-To Card or an activated SuperSaver 31-Day Pass to ride. A fare inspector randomly will ask to see proof of payment. A SuperSaver Stored Value Card cannot be used on rail.

4 Move toward the closest door as the train nears your station. Push the blue button to open the door.

These rules apply for the comfort and safety of all customers:

- No eating, smoking, alcohol or littering. Beverages in covered containers are allowed.
- Anything that interferes with safe operation of the vehicle is prohibited.
- Those who try to ride without paying a fare will be charged with a misdemeanor and fined $180.

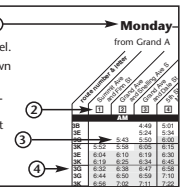
Reading a schedule a step-by-step guide

1 Find the schedule for the **day** of the week and the **direction** you plan to travel.

2 Find the **timepoints** nearest your origin and destination. Timepoints are shown on the route map. Bus stops may be between timepoints.

3 Read downward in a column to see **times** when a trip will be at a given timepoint. Read the times across to the right to see when the trip reaches other timepoints. If no time is shown, that trip does not serve the area of that timepoint.

4 The route number in the left column will appear in the sign above the windshield.



Park & Ride Lot Location

No overnight parking.

Roseville

Rosedale Park & Ride - southeast side of Rosedale near Highway 36 and Snelling. Park east of the perimeter road.

Bike Racks

Metro Transit buses and trains have free bike racks. Look for instructions on the rack.

NOTE: If transferring, not all regional buses have racks.

Schedule subject to change.

Traffic and weather conditions may delay buses.

Please have exact fare ready. Bus fareboxes and drivers do not make change.

This document is available in alternate formats to individuals with disabilities by calling 612-349-7365 (TTY 612-341-0140).

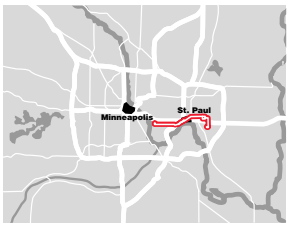
612-373-3333
www.metrotransit.org

63

Effective 9/8/07
Local Bus Route

Serving:
Western St. Paul
St. Thomas University
Grand Avenue
Macalester College
Downtown St. Paul
Eastern St. Paul
East 3rd Street
Sun Ray Shopping Center
McKnight Road

All buses on this route are wheelchair accessible.



MetroTransit
a service of the Metropolitan Council
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www.metrotransit.org

Printed on recycled paper containing at least 10% post-consumer fiber

Metro Transit buses and trains have free bike racks. Look for instructions on the rack.

NOTE: If transferring, not all regional buses have racks.

Monday–Friday Eastbound

from Grand Ave. to Lower Afton Rd. and McKnight Rd. via downtown St. Paul

| route number & letter | 63S | 63K | 63S | 63K | 63S | 63K

Saturday Eastbound

from Grand Ave. to Lower Afton Rd. and McKnight Rd. via downtown St. Paul

route number & letter	1	2	3	5		7	8	9	10	11	12	11
	Summit Ave and Finn St	Grand Ave and Snelling Ave S	Grand Ave and Dale St S	**Arrive** 5th St and Minnesota St	**Depart** 5th St and Minnesota St	3rd St E and Maria Ave	3rd St E and White Bear Ave	Suburban Ave and White Bear Ave	Sun Ray Transit Center	McKnight Rd and Lower Afton Rd	Londin Ln and McKnight Rd	McKnight Rd and Lower Afton Rd
						Downtown St. Paul						
						AM						
63K	5:34	5:40	5:47	5:55	5:57	6:03	6:11	6:13	6:16	6:21	6:24	6:25
63K	6:16	6:22	6:31	6:40	6:45	6:51	6:59	7:01	7:04	7:09	7:12	7:13
63K	6:46	6:52	7:01	7:10	7:15	7:21	7:29	7:31	7:35	7:40	7:43	7:44
63K	7:16	7:22	7:31	7:40	7:45	7:51	7:59	8:01	8:05	8:10	8:13	8:14
63K	7:46	7:52	8:01	8:10	8:15	8:21	8:29	8:31	8:35	8:40	8:43	8:44
63K	8:16	8:22	8:31	8:40	8:45	8:51	8:59	9:01	9:05	9:10	9:13	9:14
63K	8:46	8:52	9:01	9:10	9:15	9:21	9:29	9:31	9:35	9:40	9:43	9:44
63K	9:16	9:22	9:31	9:40	9:45	9:51	9:59	10:01	10:06	10:11	10:14	10:15
63K	9:46	9:52	10:01	10:10	10:15	10:21	10:29	10:31	10:36	10:41	10:44	10:45
63K	10:16	10:22	10:31	10:40	10:45	10:51	10:59	11:01	11:06	11:11	11:14	11:15
63K	10:47	10:53	11:03	11:12	11:15	11:21	11:29	11:31	11:36	11:41	11:44	11:45
63K	11:17	11:23	11:33	11:42	11:45	11:51	11:59	12:01	12:06	12:12	12:15	12:16
63K	11:47	11:53	12:03	12:12	12:15	12:21	12:29	12:31	12:36	12:42	12:45	12:46
						PM						
63K	12:17	12:23	12:33	12:42	12:45	12:51	12:59	1:01	1:06	1:12	1:15	1:16
63K	12:47	12:53	1:03	1:12	1:15	1:21	1:29	1:31	1:36	1:42	1:45	1:46
63K	1:17	1:23	1:33	1:42	1:45	1:51	1:59	2:01	2:06	2:12	2:15	2:16
63K	1:47	1:53	2:03	2:12	2:15	2:21	2:29	2:31	2:36	2:42	2:45	2:46
63K	2:17	2:23	2:33	2:42	2:45	2:51	2:59	3:01	3:06	3:12	3:15	3:16
63K	2:46	2:53	3:03	3:12	3:15	3:21	3:29	3:31	3:36	3:42	3:45	3:46
63K	3:16	3:23	3:33	3:42	3:45	3:51	3:59	4:01	4:06	4:12	4:15	4:16
63K	3:48	3:54	4:03	4:12	4:15	4:21	4:29	4:31	4:36	4:42	4:45	4:46
63K	4:18	4:24	4:33	4:42	4:45	4:51	4:59	5:01	5:06	5:12	5:15	5:16
63K	4:48	4:54	5:03	5:12	5:15	5:21	5:29	5:31	5:36	5:42	5:45	5:46
63K	5:18	5:24	5:33	5:42	5:45	5:51	5:59	6:01	6:06	6:12	6:15	6:16
63K	5:48	5:54	6:03	6:12	6:15	6:21	6:29	6:31	6:36	6:42	6:45	6:46
63S	6:18	6:24	6:33	6:42	6:45	6:51	6:59	7:01	7:05			
63K	6:49	6:55	7:03	7:12	7:15	7:21	7:29	7:31	7:35	7:40	7:43	7:44
63S	7:19	7:25	7:33	7:42	7:45	7:51	7:59	8:01	8:05			
63K	7:50	7:56	8:03	8:12	8:15	8:21	8:28	8:30	8:34	8:39	8:42	8:43
63S	8:20	8:26	8:33	8:42	8:45	8:51	8:58	9:00	9:04			
63K	8:50	8:56	9:03	9:12	9:15	9:21	9:28	9:30	9:34	9:39	9:42	9:43
63S	9:20	9:26	9:33	9:42	9:45	9:51	9:58	10:00	10:04			
63K	9:51	9:57	10:04	10:12	10:15	10:21	10:28	10:30	10:34	10:39	10:42	10:43
63S	10:21	10:27	10:34	10:42	10:45	10:51	10:58	11:00	11:04			
63K	10:51	10:57	11:04	11:12	11:15	11:21	11:28	11:30	11:34	11:39	11:42	11:43
63K	11:50	11:56	12:03	12:11	12:15	12:21	12:28	12:30	12:33	12:38	12:41	12:42
						AM						
63K	12:50	12:56	1:03	1:11	1:15	1:21	1:28	1:30	1:33	1:38	1:41	1:42

Saturday Westbound

from Lower Afton Rd. and McKnight Rd. to Grand Ave. via downtown St. Paul

route number & letter	11	12	11	10	9	8	7		6		3	2	1
	Lower Afton Rd and McKnight Rd	Londin Ln and McKnight Rd	McKnight Rd and Lower Afton Rd	McKnight Rd and Lower Afton Rd	Sun Ray Transit Center	Suburban Ave and White Bear Ave	3rd St E and White Bear Ave	3rd St E and Maria Ave	**Arrive** 6th St and Cedar St	**Depart** 6th St and Cedar St	Grand Ave and Dale St S	Grand Ave and Snelling Ave S	Summit Ave and Finn St
									Downtown St. Paul				
						AM							
63A									5:47	5:47	5:56	6:03	6:08
63A	5:54	5:57	5:58	6:05	6:09	6:11	6:19		6:25	6:25	6:34	6:41	6:46
63A	6:38	6:41	6:42	6:49	6:53	6:55	7:03		7:10	7:15	7:25	7:33	7:38
63A	7:09	7:12	7:13	7:19	7:23	7:25	7:33		7:40	7:45	7:55	8:03	8:08
63A	7:39	7:42	7:43	7:49	7:53	7:55	8:03		8:10	8:15	8:26	8:34	8:39
63A	8:09	8:12	8:13	8:19	8:23	8:25	8:33		8:40	8:45	8:56	9:04	9:09
63A	8:39	8:42	8:43	8:49	8:53	8:55	9:03		9:10	9:15	9:26	9:34	9:39
63A	9:09	9:12	9:13	9:19	9:23	9:25	9:33		9:40	9:45	9:56	10:04	10:09
63A	9:39	9:42	9:43	9:49	9:53	9:55	10:03		10:10	10:15	10:26	10:35	10:40
63A	10:08	10:11	10:12	10:18	10:22	10:25	10:33		10:40	10:45	10:56	11:05	11:10
63A	10:38	10:41	10:42	10:48	10:52	10:55	11:03		11:10	11:15	11:26	11:36	11:41
63A	11:08	11:11	11:12	11:18	11:22	11:25	11:33		11:40	11:45	11:56	12:06	12:11
63A	11:38	11:41	11:42	11:48	11:52	11:55	12:03		12:10	12:15	12:26	12:36	12:41
						PM							
63A	12:08	12:11	12:12	12:18	12:22	12:25	12:33		12:40	12:45	12:56	1:06	1:11
63A	12:38	12:41	12:42	12:48	12:52	12:55	1:03		1:10	1:15	1:26	1:36	1:41
63A	1:08	1:11	1:12	1:18	1:22	1:25	1:33		1:40	1:45	1:56	2:06	2:11
63A	1:38	1:41	1:42	1:48	1:52	1:55	2:03		2:10	2:15	2:26	2:36	2:41
63A	2:08	2:11	2:12	2:18	2:22	2:25	2:33		2:40	2:45	2:56	3:06	3:11
63A	2:38	2:41	2:42	2:48	2:52	2:55	3:03		3:10	3:15	3:26	3:36	3:41
63A	3:07	3:10	3:11	3:18	3:22	3:25	3:33		3:40	3:45	3:56	4:06	4:11
63A	3:37	3:40	3:41	3:48	3:52	3:55	4:03		4:10	4:15	4:26	4:35	4:40
63A	4:07	4:10	4:11	4:18	4:22	4:25	4:33		4:40	4:45	4:56	5:05	5:10
63A	4:37	4:40	4:41	4:48	4:52	4:55	5:03		5:10	5:15	5:26	5:35	5:40
63A	5:07	5:10	5:11	5:18	5:22	5:25	5:33		5:40	5:45	5:56	6:05	6:10
63A	5:40	5:43	5:44	5:51	5:55	5:57	6:05		6:12	6:15	6:25	6:33	6:38
63A	6:10	6:13	6:14	6:21	6:25	6:27	6:35		6:42	6:45	6:55	7:03	7:08
63A	6:40	6:43	6:44	6:51	6:55	6:57	7:05		7:12	7:15	7:25	7:32	7:37
63A				7:22	7:26	7:28	7:35		7:42	7:45	7:54	8:01	8:06
63A			7:46	7:52	7:56	7:58	8:05		8:12	8:15	8:24	8:31	8:36
63A				8:22	8:26	8:28	8:35		8:42	8:45	8:54	9:01	9:06
63A			8:46	8:52	8:56	8:58	9:05		9:12	9:15	9:24	9:31	9:36
63A				9:22	9:26	9:28	9:35		9:42	9:45	9:54	10:01	10:06
63A			9:46	9:52	9:56	9:58	10:05		10:12	10:15	10:24	10:31	10:36
63A				10:22	10:26	10:28	10:35		10:42	10:45	10:54	11:01	11:06
63A			10:47	10:53	10:56	10:58	11:05		11:12	11:15	11:24	11:31	11:36
63A			11:47	11:53	11:56	11:58	12:05		12:12	12:15	12:24	12:31	12:36
						AM							
63A			12:47	12:53	12:56	12:58	1:05		1:12	1:15	1:24	1:31	1:36

Route 63

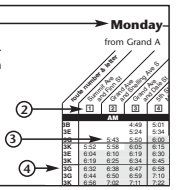
Approximate Bus Frequency

Minutes between buses on this route:

Rush Hours 6–9 am and 3:00–6:30 pm	Midday	Evening	Owl 1 am–5 am	Saturday	Sunday/Hol.
12-15	15-30	30	—	30	60

Note: These times are averages and may apply only to the main portion of the route. Refer to the schedule for details.

Reading a schedule a step-by-step guide



1 Find the schedule for the **day** of the week and the **direction** you plan to travel.

2 Find the **timepoints** nearest your origin and destination. Timepoints are shown on the route map. Bus stops may be between timepoints.

3 Read downward in a column to see **times** when a trip will be at a given timepoint. Read the times across to the right to see when the trip reaches other timepoints. If no time is shown, that trip does not serve the area of that timepoint.

4 The route number in the left column will appear in the sign above the windshield.

Sunday & Holiday Eastbound

from Grand Ave. to Lower Afton Rd. and McKnight Rd. via downtown St. Paul

route number & letter	1	2	3	5		7	8	9	10	11	12	11
	Summit Ave and Finn St	Grand Ave and Snelling Ave S	Grand Ave and Dale St S	**Arrive** 5th St and Minnesota St	**Depart** 5th St and Minnesota St	3rd St E and Maria Ave	3rd St E and White Bear Ave	Suburban Ave and White Bear Ave	Sun Ray Transit Center	McKnight Rd and Lower Afton Rd	Londin Ln and McKnight Rd	McKnight Rd and Lower Afton Rd
						Downtown St. Paul						
						AM						
63K	5:36	5:42	5:49	5:57	6:00	6:06	6:13	6:15	6:19	6:24		
63K	6:36	6:42	6:49	6:57	7:00	7:06	7:13	7:15	7:19	7:24		
63K	7:36	7:42	7:49	7:57	8:00	8:06	8:13	8:15	8:19	8:24		
63S	8:35	8:41	8:49	8:57	9:00	9:06	9:13	9:15	9:19			
63K	9:35	9:41	9:49	9:57	10:00	10:06	10:14	—	10:18	10:23		
63S	10:35	10:41	10:49	10:58	11:00	11:06	11:14	11:16	11:20			
63K	11:34	11:40	11:49	11:58	12:00	12:06	12:14	—	12:18	12:23		
						PM						
63S	12:34	12:40	12:49	12:58	1:00	1:06	1:14	1:16	1:20			
63K	1:34	1:40	1:49	1:58	2:00	2:06	2:14	—	2:18	2:23	2:26	2:27
63S	2:34	2:40	2:49	2:58	3:00	3:06	3:14	3:16	3:20			
63K	3:34	3:40	3:49	3:58	4:00	4:06	4:14	—	4:18	4:23	4:26	4:27
63S	4:34	4:40	4:49	4:58	5:00	5:06	5:14	5:16	5:20			
63K	5:35	5:41	5:49	5:58	6:00	6:06	6:14	—	6:18	6:23	6:26	6:27
63S	6:35	6:41	6:49	6:58	7:00	7:06	7:14	7:16	7:20			
63K	7:36	7:42	7:49	7:58	8:00	8:06	8:14	—	8:18	8:23	8:26	8:27
63K	8:36	8:42	8:49	8:58	9:00	9:06	9:14	—	9:17	9:22	9:25	9:26
63K	9:36	9:42	9:49	9:58	10:00	10:06	10:14	—	10:17	10:22	10:25	10:26
63K	10:35	10:41	10:48	10:56	11:00	11:06	11:13	—	11:16	11:21	11:24	11:25
63K	11:35	11:41	11:48	11:56	12:00	12:06	12:13	—	12:16	12:21	12:24	12:25

Holiday service operates on the following holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas.

Metro Transit may operate reduced service on days before or after Independence Day, Thanksgiving or Christmas. Look for details in *TAKEOUT* on buses and trains prior to these holidays.

Sunday & Holiday Westbound

from Lower Afton Rd. and McKnight Rd. to Grand Ave. via downtown St. Paul

route number & letter	11	12	11	10	9	8	7		6		3	2	1
	Lower Afton Rd and McKnight Rd	Londin Ln and McKnight Rd	McKnight Rd and Lower Afton Rd	McKnight Rd and Lower Afton Rd	Sun Ray Transit Center	Suburban Ave and White Bear Ave	3rd St E and White Bear Ave	3rd St E and Maria Ave	**Arrive** 6th St and Cedar St	**Depart** 6th St and Cedar St	Grand Ave and Dale St S	Grand Ave and Snelling Ave S	Summit Ave and Finn St
									Downtown St. Paul				
						AM							
63A	6:29	6:32	6:33	6:38	6:41	6:43	6:51		6:57	7:00	7:08	7:15	7:20
63A	7:29	7:32	7:33	7:38	7:41	7:43	7:51		7:57	8:00	8:09	8:16	8:21
63A	8:28	8:31	8:32	8:38	8:41	8:43	8:51		8:57	9:00	9:09	9:17	9:22
63A				9:37	9:41	9:43	9:51		9:57	10:00	10:10	10:18	10:23
63A	10:29	10:32	10:33	10:39	—	10:43	10:51		10:57	11:00	11:10	11:18	11:23
63A				11:37	11:41	11:43	11:51		11:57	12:00	12:10	12:18	12:23
						PM							
63A	12:29	12:32	12:33	12:39	—	12:43	12:51		12:57	1:00	1:10	1:18	1:23
63A				1:37	1:41	1:43	1:51		1:57	2:00	2:10	2:18	2:23
63A			2:33	2:39	—	2:43	2:51		2:57	3:00	3:10	3:18	3:23
63A				3:37	3:41	3:43	3:51		3:57	4:00	4:10	4:18	4:23
63A			4:33	4:39	—	4:43	4:51		4:57	5:00	5:10	5:18	5:23
63A				5:37	5:41	5:43	5:51		5:57	6:00	6:10	6:18	6:23
63A			6:33	6:39	—	6:43	6:50		6:56	7:00	7:10	7:17	7:22
63A				7:37	7:41	7:43	7:50		7:56	8:00	8:09	8:16	8:21
63A			8:34	8:40	—	8:43	8:50		8:56	9:00	9:09	9:16	9:21
63A			9:34	9:40	—	9:43	9:50		9:56	10:00	10:08	10:15	10:20
63A			10:35	10:40	—	10:43	10:50		10:56	11:00	11:08	11:15	11:20

Holiday service operates on the following holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas.

Metro Transit may operate reduced service on days before or after Independence Day, Thanksgiving or Christmas. Look for details in *TAKEOUT* on buses and trains prior to these holidays.

It's easy to ride – Here's how:

Bus:

1 Arrive at your stop a few minutes early.

2 Check the sign above the windshield for the route number and letter. Unsure it is the right one? Ask your driver.

3 Pay your fare with:
Cash: Put bills, coins or tokens in the farebox. Change is not available. If you need to change buses or ride rail, ask for a transfer.
Go-To Card: Touch your card to the reader. A transfer is embedded.
SuperSaver 31-Day Pass: Insert it in the reader. A transfer is embedded.
SuperSaver Stored Value Card: Insert it in the reader. A bus-only transfer is embedded. To transfer to rail, ask for a rail-only transfer.

4 Take a seat and watch for your stop.

5 About one block from your stop, pull the cord above the window to signal the driver. If possible, exit through the back door.

Rail:

1 Arrive at your station a few minutes early.

2 Purchase a ticket from the station's vending machine or touch your Go-To Card to the station's card reader before boarding.

3 You must have a valid ticket, transfer, Go-To Card or an activated SuperSaver 31-Day Pass to ride. A fare inspector randomly will ask to see proof of payment. A SuperSaver Stored Value Card cannot be used on rail.

4 Move toward the closest door as the train nears your station. Push the blue button to open the door.

These rules apply for the comfort and safety of all customers:

- No eating, smoking, alcohol or littering. Beverages in covered containers are allowed.
- Anything that interferes with safe operation of the vehicle is prohibited.
- Those who try to ride without paying a fare will be charged with a misdemeanor and fined $180.

Schedule subject to change.

Traffic and weather conditions may delay buses.

Please have exact fare ready. Bus fareboxes and drivers do not make change.

This document is available in alternate formats to individuals with disabilities by calling 612-349-7365 (TTY 612-341-0140).

144

Effective 12/1/07
Limited Stop Bus Route

Serving:
Downtown Minneapolis
University of Minnesota
St. Paul
Snelling Avenue
Highland Park Neighborhood

All buses on this route are wheelchair accessible.

Metro Transit
a service of the Metropolitan Council
612-373-3333
www.metrotransit.org

It's easy to ride – Here's how:

Bus:

1 Arrive at your stop a few minutes early.

2 Check the sign above the windshield for the route number and letter. Unsure it is the right one? Ask your driver.

3 Pay your fare with:
Cash: Put bills, coins or tokens in the farebox. Change is not available. If you need to change buses or ride rail, ask for a transfer.
Go-To Card: Touch your card to the reader. A transfer is embedded.
SuperSaver 31-Day Pass: Insert it in the reader. A transfer is embedded.
SuperSaver Stored Value Card: Insert it in the reader. A bus-only transfer is embedded. To transfer to rail, ask for a rail-only transfer.

4 On buses leaving downtown, pay your fare when you leave the bus. The time you exit the bus determines the fare amount.

5 Take a seat and watch for your stop.

6 About one block from your stop, pull the cord above the window to signal the driver. Please have your fare ready (see #3 for payment options).

Rail:

1 Arrive at your station a few minutes early.

2 Purchase a ticket from the station's vending machine or touch your Go-To Card to the station's card reader before boarding.

3 You must have a valid ticket, transfer, Go-To Card or an activated SuperSaver 31-Day Pass to ride. A fare inspector randomly will ask to see proof of payment. A SuperSaver Stored Value Card cannot be used on rail.

4 Move toward the closest door as the train nears your station. Push the blue button to open the door.

These rules apply for the comfort and safety of all customers:

- No eating, smoking, alcohol or littering. Beverages in covered containers are allowed.
- Anything that interferes with safe operation of the vehicle is prohibited.
- Those who try to ride without paying a fare will be charged with a misdemeanor and fined $180.

612-373-3333

One call links you to all the information you need to use the transit system, including:

Metropolitan Transit Information
Talk to a representative about routes and schedules

Hours:
Monday-Friday 6:30 am - 9:00 pm
Saturday, Sunday & holidays 8:00 am - 5:00 pm
Closed Thanksgiving Day and Christmas Day

24-hour Automated Schedule Information
Direct Dial: **612-341-4287**

Customer Relations and Lost & Found
570-6th Ave. N., Mpls.

Give us your comments and suggestions or check on lost items

Hours:
Monday-Friday 7:00 am - 6:00 pm
Closed holidays

Programs for Commuters
Carpool registration and matching, Guaranteed Ride Home and bike lockers

Fare Hotline

Call for a postage-paid order form by mail:
612-349-7681

TTY Service

TTY service is available for the deaf and hard of hearing. Call 612-341-0140 for route and schedule information; call 612-349-7439 to reach Customer Relations/Lost & Found.

www.metrotransit.org

Visit us online for riding tips, fare information, maps, schedules, route planning and to purchase transit passes for all regional routes.

Metro Transit
560 Sixth Avenue North
Minneapolis, MN 55411-4398

Fare Information

		non-rush hours	rush hours
Adults	Local Fare	**$1.50**	**$2.00**
(ages 13-64)	Express Fare	**$2.00**	**$2.75**
Seniors (65+)	Local Fare	**$ .50**	**$2.00**
Youth (6-12) & Medicare card holders	Express Fare	**$ .50**	**$2.75**
Persons with disabilities	any trip	**$ .50**	**$ .50**

Rush hours: Monday-Friday 6:00-9:00 am & 3:00-6:30 pm
Local fare is charged on light rail.

Reduced Fares

Please tell the bus driver **before you pay your fare** if you qualify for a fare listed below. On rail, be ready to show fare inspectors you qualify for the reduced fare.

These fares apply only during non-rush hours:
Seniors (65+): To qualify, show a Minnesota driver's license/state ID with a T endorsement.
Youth: Ages 6-12 qualify for a reduced fare.
Medicare card holders: To qualify show Medicare card along with photo ID.

These fares are in effect at all times:
Persons with Disabilities: To qualify, show your Metro Mobility card or transfer, Metro Transit temporary ID with a photo ID or Minnesota driver's license/state ID with an A or L endorsement. For information on certification, call Customer Relations at 612-373-3333.
Children: Ages 5 and under ride free (limit 3) when accompanied by a paid fare.
Downtown Zone: Ride in the Downtown Zone for 50¢.
Young Adults: Students and workers ages 17 and under may qualify for a discounted Young Adult Card – contact your school or employer.

Fare Cards Save money purchasing fare cards at Metro Transit stores, 175 retail outlets or at metrotransit.org.

Fareboxes Buses accept U.S. bills and coins. Change is not available.

Transfers give you unlimited rides on buses and trains – for 2½ hours. Ask for one when you pay your cash fare. Transfers are automatically embedded on fare cards and rail tickets. To transfer from bus to rail using a SuperSaver Stored Value Card, you must ask the bus driver for a rail transfer.

Route 144

Monday–Friday Westbound

from Highland Park to Minneapolis via Snelling, I-94 and U of M

route number	Snelling Ave and Edgcumbe Rd	Snelling Ave and Ford Pkwy	Snelling Ave and Randolph Ave	Snelling Ave and St Clair Ave	Snelling Ave and Grand Ave	I-94 and Snelling Ave	Washington Ave SE and Oak St SE	Willey Hall	7th St and Hennepin Ave (Downtown Minneapolis)
	11	10	9	8	7	6	5	4	3
AM									
144	6:21	6:26	6:29	6:32	6:34	6:39	6:45	6:49	7:00
144	6:49	6:54	6:57	7:00	7:02	7:08	7:14	7:18	7:30
144	7:02	7:07	7:10	7:13	7:15	7:22	7:29	7:33	7:45
144	7:12	7:17	7:20	7:23	7:25	7:32	7:39	7:43	7:55
144	7:32	7:37	7:40	7:43	7:45	7:52	7:59	8:03	8:15
144	8:09	8:14	8:17	8:20	8:22	8:29	8:36	8:40	8:52

Monday–Friday Eastbound

from Minneapolis to Highland Park via U of M, I-94 and Snelling

route number	7th Street Garage Transit Center (Downtown Minneapolis)	6th St and Hennepin Ave	Anderson Hall	Washington Ave SE and Oak St SE	Snelling Ave and I-94	Snelling Ave and Grand Ave	Snelling Ave and St Clair Ave	Snelling Ave and Randolph Ave	Snelling Ave and Ford Pkwy	Snelling Ave and Edgcumbe Rd
	1	2	4	5	6	7	8	9	10	11
PM										
144	3:30	3:33	3:43	3:48	3:56	4:00	4:02	4:04	4:07	4:13
144	4:10	4:13	4:24	4:29	4:37	4:42	4:44	4:46	4:49	4:55
144	4:25	4:28	4:40	4:45	4:54	4:59	5:01	5:03	5:06	5:12
144	4:40	4:43	4:56	5:01	5:10	5:15	5:17	5:19	5:22	5:28
144	5:05	5:08	5:22	5:27	5:37	5:42	5:44	5:46	5:49	5:55
144	5:35	5:38	5:49	5:54	6:03	6:07	6:09	6:11	6:14	6:20

Shaded times denote rush-hour service. See fare panel on other side for rush-hour fares.

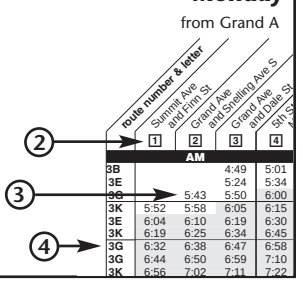
Service operates Monday through Friday except on the following holidays:
New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas.

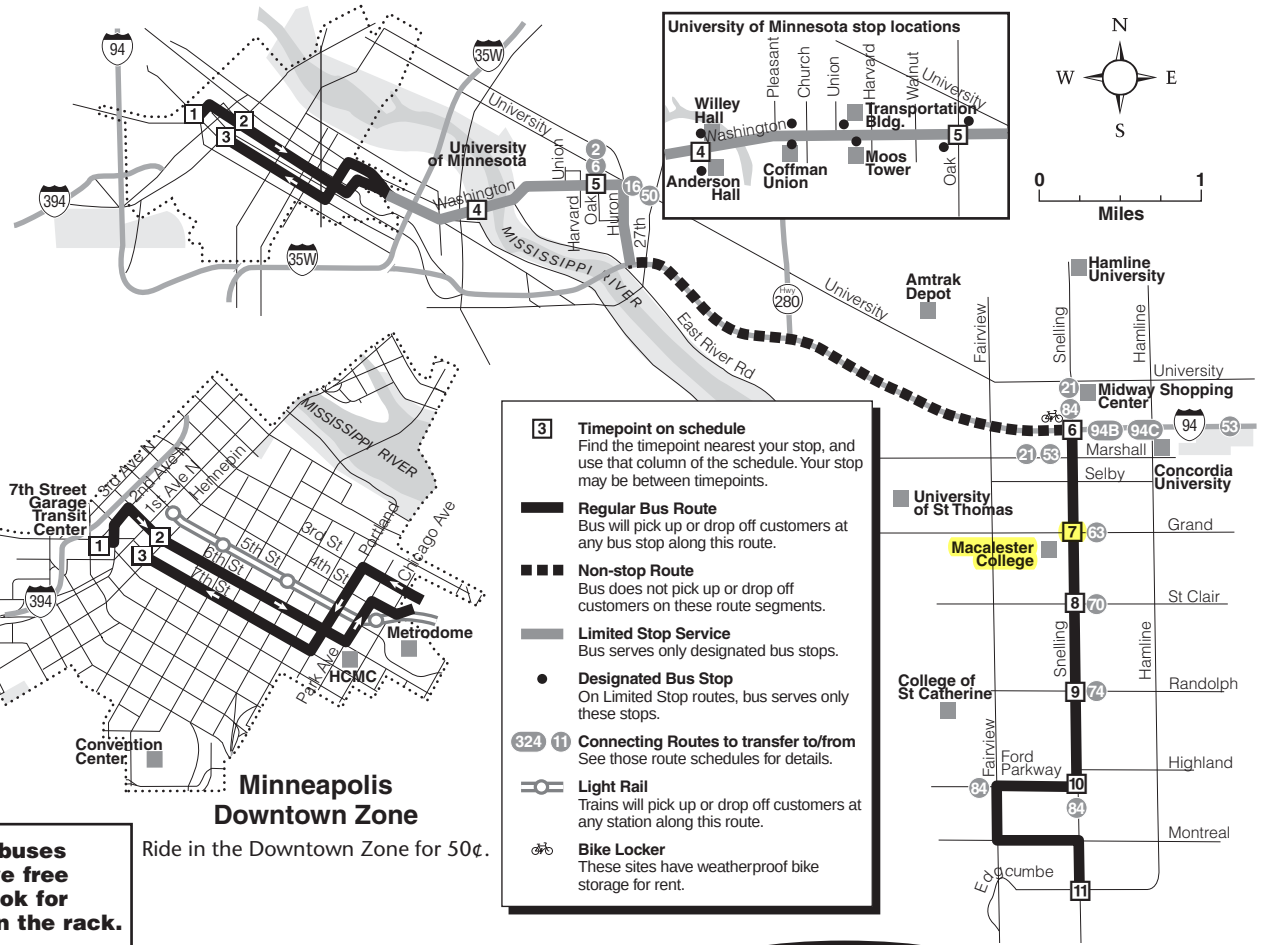
Metro Transit may operate reduced service on days before or after Independence Day, Thanksgiving or Christmas. Look for details in *TAKEOUT* on buses and trains prior to these holidays.

Schedule subject to change.
Traffic and weather conditions may delay buses.
Please have exact fare ready. Bus fareboxes and drivers do not make change.
This document is available in alternate formats to individuals with disabilities by calling 612-349-7365 (TTY 612-341-0140).

Reading a schedule a step-by-step guide

1. Find the schedule for the **day** of the week and the **direction** you plan to travel.
2. Find the **timepoints** nearest your origin and destination. Timepoints are shown on the route map. Bus stops may be between timepoints.
3. Read downward in a column to see **times** when a trip will be at a given timepoint. Read the times across to the right to see when the trip reaches other timepoints. If no time is shown, that trip does not serve the area of that timepoint.
4. The route number in the left column will appear in the sign above the windshield.





Ride in the Downtown Zone for 50¢.

3 **Timepoint on schedule**
Find the timepoint nearest your stop, and use that column of the schedule. Your stop may be between timepoints.

Regular Bus Route
Bus will pick up or drop off customers at any bus stop along this route.

Non-stop Route
Bus does not pick up or drop off customers on these route segments.

Limited Stop Service
Bus serves only designated bus stops.

Designated Bus Stop
On Limited Stop routes, bus serves only these stops.

324 **11** **Connecting Routes to transfer to/from**
See those route schedules for details.

Light Rail
Trains will pick up or drop off customers at any station along this route.

Bike Locker
These sites have weatherproof bike storage for rent.

Bike Racks

Metro Transit buses and trains have free bike racks. Look for instructions on the rack.

NOTE: If transferring, not all regional buses have racks.

Printed on recycled paper containing at least 10% post-consumer fiber

612-373-3333
www.metrotransit.org

SUSTAINABLE SITES

CREDIT 4.2: ALTERNATIVE TRANSPORTATION: BICYLE STORAGE & CHANGING ROOMS

BIKE RACK SPECIFICATION SHEET

FLOOR PLAN WITH SHOWER LOCATION

FLOOR PLAN WITH BIKE RACK LOCATION

DERO

BIKE HITCH

- High security
- Great for sidewalk placement
- One unit parks two bikes

The Dero Bike Hitch is an attractive and space efficient bike rack. The Dero Bike Hitch was specifically designed for sidewalks and other narrow space applications. The rack's design restricts bikes to parking parallel with the rack so bikes won't protrude out into the sidewalk or street.

Your Logo Here!

We can include your organization's logo in the center of a specially designed Dero Bike Hitch. Contact us for more details on this unique option.

DERO BIKE RACKS

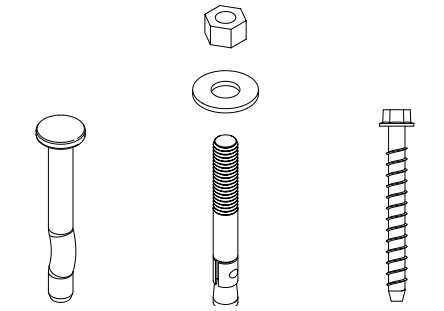
www.dero.com 1.800.298.4915

U.S. GREEN BUILDING COUNCIL MEMBER

printed on recycled paper

Tools Needed for Installation

Tape Measure
Marker or Pencil
Masonry Drill Bit
Drill (Hammer drill recommended)
Hammer
Wrench 9/16"
Level
Washers (for leveling if necessary)



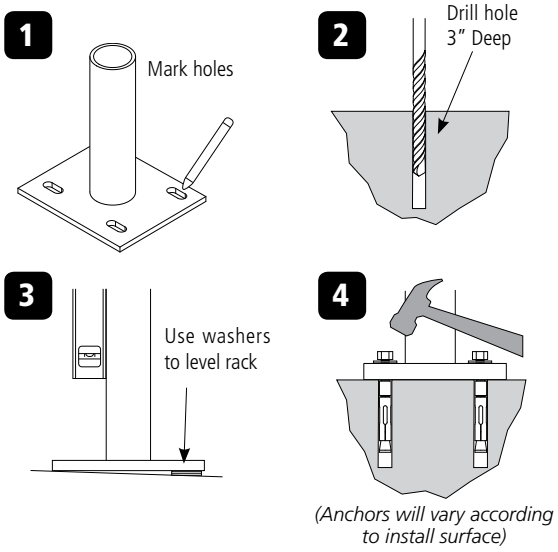
Standard Anchor Types

Recommended Base Materials:

Solid concrete is the best base material for installation. Ask your Dero Rack representative which anchor is appropriate for your application to ensure the proper anchors are shipped with your rack. Be sure nothing is underneath the base material that could be damaged by drilling.

Installation:

3/8" anchors are shipped with the rack. Place the rack in the desired location. Use a marker or pencil to outline the holes of the flange onto the base material. Drill the holes in accordance with the specifications shipped with the anchors. Make sure the holes are at least 6" away from any cracks in the base material.



(Anchors will vary according to install surface)

Tamper Resistant Fasteners

The concrete spike is a permanent anchor. The top of the wedge anchor can also be pounded sideways after installation so that it cannot be removed. Other tamper resistant fasteners are also available for purchase.

When using the special tamper resistant nuts, always set and first tighten the anchors. Once the rack is installed, replace two nuts from the bracket (opposite sides from each other) with the tamper resistant fastener. DO NOT OVERTIGHTEN the tamper resistant nut.

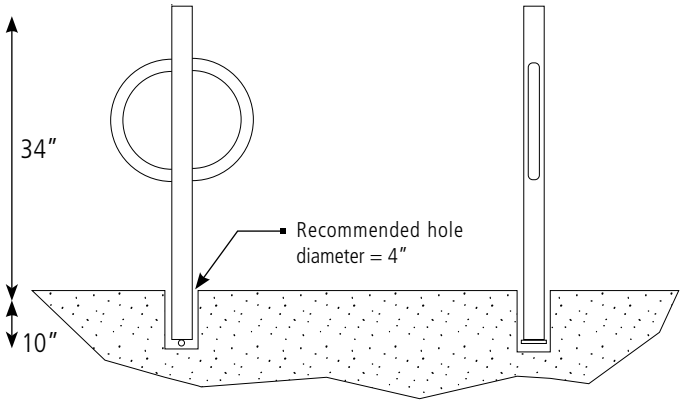
Breakaway Nut *Stainless Tamper-Proof Nut* *Triple-slot Nut*

Concrete Spike

If you have any questions about installation or other features of the Bike Hitch, please call us toll free at 1-800-298-4915

Tools needed for installation

Level	Hole coring machine with 4" bit
Cement mixing tub	Access to water hose
Shovel	Materials to build brace (see "Install Tip"
Trowel	at bottom of page)

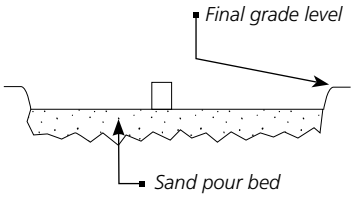


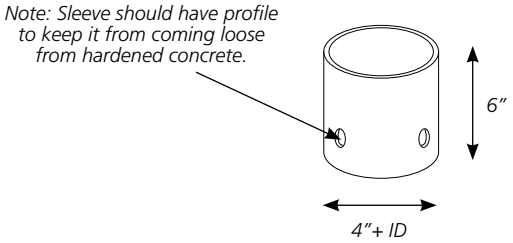
Installing into Existing Sidewalk

Core holes no less than 3" diameter (4" recommended) and 10" deep into sidewalk. Place Bike Hitch into hole making sure the rack is level. Fill hole with Por-Rok or epoxy grout. 34-36" of the Bike Hitch should remain above the surface. Make sure Hitch is level and held in place until the grout has completely set.

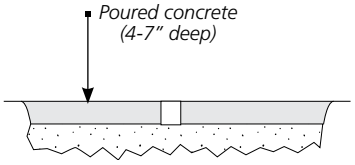
Installing Into a New Sidewalk:

1 Place corrosion resistant sleeve (min. 3" inside diameter) in sand pour bed in exact location where rack will be installed. Make sure top of sleeve is at same level as desired finished concrete surface. Fill sleeve with sand to keep it in place and prevent it from filling with concrete.

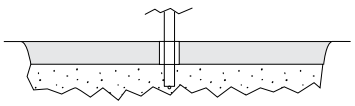




2 Pour concrete and allow to cure.

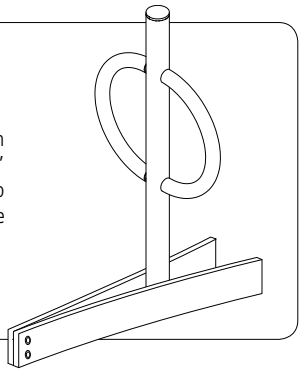


3 After appropriate cure time, dig out sand from sleeves and insert racks, making sure they are level and at the appropriate height. Pour in Por-Rok or epoxy grout and allow to set.



INSTALL TIP

An easy way to brace the Bike Hitch while the grout sets is to bolt two 1x4" boards together at one end and clamp them onto the legs of the Bike Hitch like a clothes pin.



GENERAL NOTES:

1. REFER TO A000 FOR SYMBOLS AND ABBREVIATIONS.
2. REFER TO PARTITION TYPE SHEET FOR PARTITION TYPES. WHERE APPLICABLE, PARTITION TYPES ARE SHOWN ON ENLARGED PLANS.
3. REFER TO FINISH SCHEDULE FOR ROOM FINISH INFORMATION.

LEGEND:

MB	MARKER BOARD
TB	TACK BOARD
FEC	FIRE EXTINGUISHER CABINET
HO	HOLD-OPEN (REFER TO DOOR SCHED. FOR TYPE)
FD	FLOOR DRAIN
ECS	EMERGENCY CALL STATION

Shower

ADD LAYER OF 5/8" GWB TO EXT. WALL ASSEMBLY TO COMPLETE 2 HOUR SHAFT RATING

6" GWB TO COL CL

ROOF OF CONNECTOR TO KAGIN COMMONS

ELEVATOR

OPENING ABOVE

OPEN TO BELOW

OVERLOOK AND GUARDRAIL, SEE A910

HALLWAY 200

STAIR 1

STAIR 2

AREA OF REFUGE

A.V. CLOS. 201A

CONFERENCE ROOM 201

ADMIN. 203

LIBRARY 202

STUDENT WORK AREA 204

HALLWAY 205

OFFICE 206

OFFICE 207

OFFICE 208

OFFICE 209

CUST. 212

COFFEE/RECY. 213

COPY RM 214

COPIER

TEL/COM. RISER

ELECTRONIC DISPLAY BOARD, N.I.C.

COPPER ROOF OF ENTRY VESTIBULE BELOW

CANOPY BELOW

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Preservation/Landscape Architecture
Space Planning/Interior Design

Rev	Date	Remarks

Date	JANUARY 14, 2008
Scale	1/4" = 1'-0"
Project Number	871-00
Drawn By	JJ/RM

Macalester College

Institute for Global Citizenship

Grand Avenue
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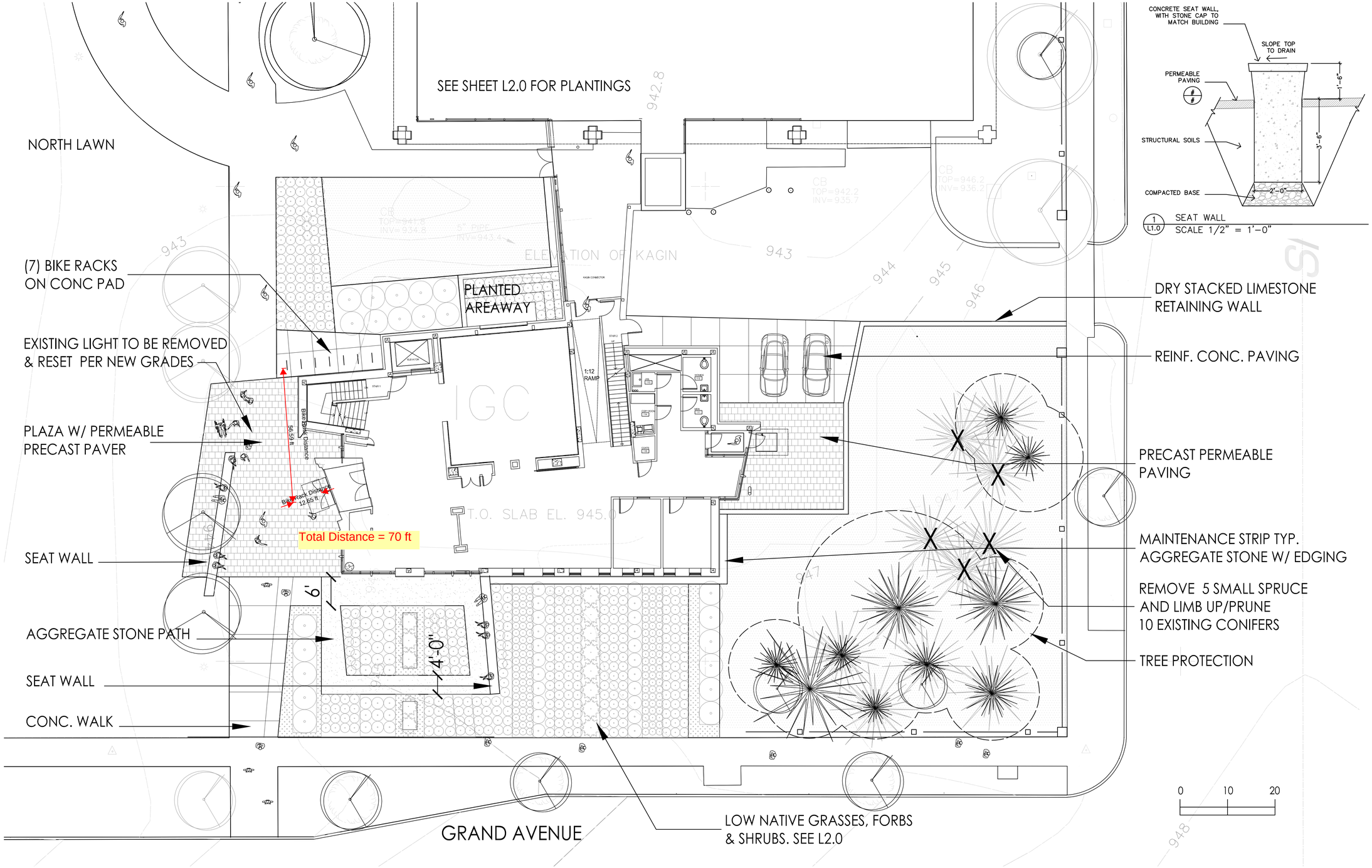
SECOND FLOOR PLAN

A-102



1 L1.0 SEAT WALL
SCALE 1/2" = 1'-0"

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Rev.	Date	Remarks

Date	07-30-07
Scale	1" = 10'
Project Number	07-013 CLA
Drawn By	JG

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DESIGN DEVELOPMENT

SITE PLAN

L1.0

SUSTAINABLE SITES

CREDIT 4.3: ALTERNATIVE TRANSPORTATION: LOW EMITTING & FUEL EFFICIENT VEHICLES

PARKING MEMO

PARKING MAP

MACALESTER COLLEGE

1600 GRAND AVENUE
SAINT PAUL, MINNESOTA 55105-1899

TELEPHONE:
651-696-6000

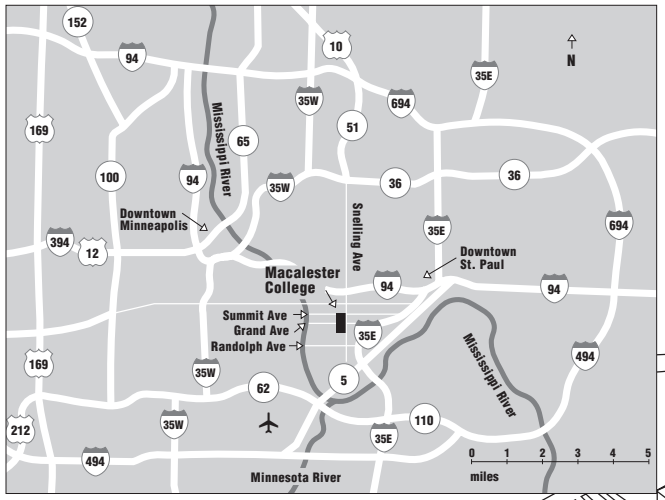
SSc4.3: Alternative Transportation, Low-Emitting & Fuel-Efficient Vehicles

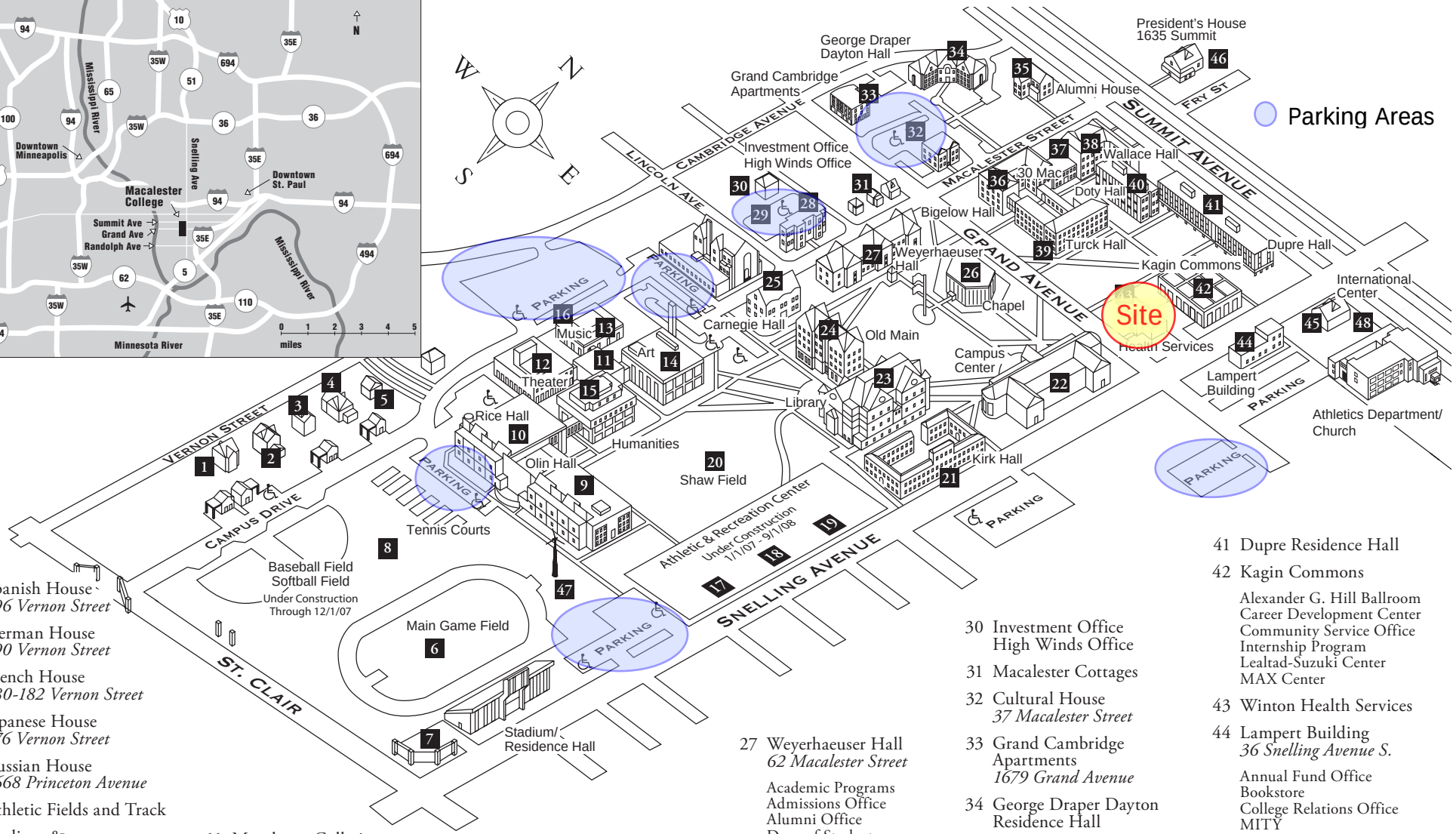
Zero parking spaces are associated specifically with the IGC project. The College intends to implement a Preferred Parking Program on a campus-wide basis, beginning July 1, 2008. This program will be available for the life of the building, at a minimum.

Because convenience is relative to the building that the driver occupies, parking spaces will be designated on an on-request basis. At least 5% of the campus's total parking spaces may be designated for this purpose, and at least 3% of the campus's total parking spaces may be designated for qualified occupants of the IGC.

Drivers of vehicles that meet the definition of "Low-Emitting" or "Fuel-Efficient" will be provided with a reserved parking space in an appropriate location (based on need) upon request. Signage will be placed at the designated spaces upon assignment. The program will be advertised on the Macalester College Parking webpage, and in the Bulletin. Drivers may apply for a Preferred Parking Space through the Facilities Management Office.

David Wheaton
Vice President for Administration and Finance





1 Spanish House
196 Vernon Street

2 German House
190 Vernon Street

3 French House
180-182 Vernon Street

4 Japanese House
176 Vernon Street

5 Russian House
1668 Princeton Avenue

6 Athletic Fields and Track

7 Stadium &
Stadium Residence Hall

8 Baseball, Softball Fields,
& Tennis Courts

9-10 Olin-Rice Science Center
9 Olin Hall
10 Rice Hall

11-15 Janet Wallace
Fine Arts Center
11 Macalester Galleries
12 Theater Building
13 Music Building/
Concert Hall
14 Art Building
15 Humanities/
Information
Technology
Services Building

11 Macalester Galleries

12 Theater Building

13 Music Building/
Concert Hall

14 Art Building

15 Humanities/Information
Technology Services
Building

16 Facilities Management &
Safety/Security Office

17-19 Athletics &
Recreation Center
(Under Construction)

20 Shaw Field

21 Kirk Residence Hall

22 Ruth Stricker Dayton
Campus Center
Campus Programs
Café Mac
Document Services
Highlander
Information Desk
Mailing Services
John B. Davis Lecture Hall
Residential Life Office

23 DeWitt Wallace Library

24 Old Main

25 Carnegie Hall

26 Weyerhaeuser
Memorial Chapel

27 Weyerhaeuser Hall
62 Macalester Street
Academic Programs
Admissions Office
Alumni Office
Dean of Students
Development Office
Financial Aid Office
President's Office
Provost's Office
Treasurer's Office

28 77 Macalester
77 Macalester Street
Business Services
-Accounting
-Business &
Administrative
Services
-Cashier's Office
Human Resources
Institutional Research
Registrar's Office

29 Parking-Visitor
1653 Lincoln

30 Investment Office
High Winds Office

31 Macalester Cottages

32 Cultural House
37 Macalester Street

33 Grand Cambridge
Apartments
1679 Grand Avenue

34 George Draper Dayton
Residence Hall

35 Hugh S. Alexander
Alumni House
1644 Summit Avenue

36 Bigelow Residence Hall

37 30 Macalester
Residence Hall

38 Wallace Residence Hall

39 Turck Residence Hall

40 Doty Residence Hall

41 Dupre Residence Hall

42 Kagin Commons
Alexander G. Hill Ballroom
Career Development Center
Community Service Office
Internship Program
Lealtad-Suzuki Center
MAX Center

43 Winton Health Services

44 Lampert Building
36 Snelling Avenue S.
Annual Fund Office
Bookstore
College Relations Office
MITY
MN State HS Math League

45 International Center
1576 Summit Avenue

46 President's House
1635 Summit Avenue

47 Wind Turbine

48 Athletics Department/
Immaculate Heart of Mary
Church
1550 Summit Avenue

MACALESTER

Macalester College 1600 Grand Avenue, St. Paul, MN 55105
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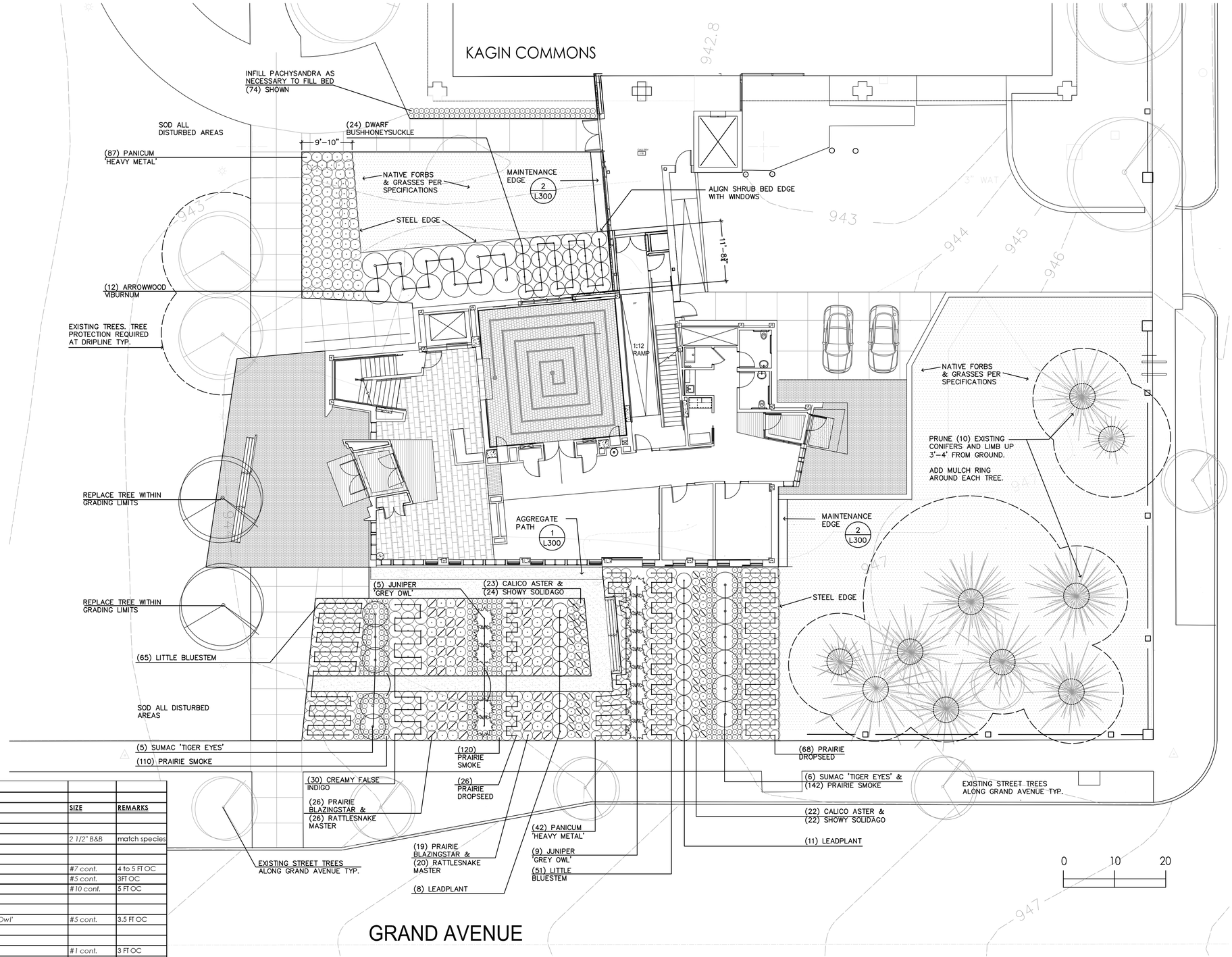
4/07

SUSTAINABLE SITES

CREDIT 5.2: SITE DEVELOPMENT: MAXIMIZE OPEN SPACE

LANDSCAPE PLAN



Plant Schedule

QTY	COMMON NAME	SCIENTIFIC NAME	SIZE	REMARKS
	Deciduous Trees			
2	Maple hybrid	*Acer x (match species)*	*2 1/2" B&B*	match species
	Deciduous Shrubs			
11	Sumac 'Tiger Eyes'	*Rhus typhina 'Bailtiger'*	*#7 cont.*	4 to 5 FT OC
24	Dwarf Bush Honeysuckle	*Diervilla Lonicera*	*#5 cont.*	3FT OC
12	Arrowwood Viburnum	*Viburnum dentatum*	*#10 cont.*	5 FT OC
	Evergreen Shrubs			
14	Grey Owl Juniper	*Juniperus virginiana 'Grey Owl'*	*#5 cont.*	3.5 FT OC
	Perennials			
19	Leadplant	*Amorpha canescens*	*#1 cont.*	3 FT OC
129	Panicum 'Heavy Metal'	*Panicum virgatum 'Heavy Metal'*	*#1 cont.*	2FT OC
116	Little Bluestem	*Schizachyrium scoparium*	*#1 cont.*	2 FT OC
30	Creamy False Indigo	*Baptisia bracteata*	*#1 cont.*	2.5 FT OC
372	Prairie Smoke	*Geum triflorum*	*#1 cont.*	12 IN OC
94	Prairie Dropseed	*Sporobolus heterolepis*	*#1 cont.*	2 FT OC
45	Prairie Blazingstar	*Liatris pycnostachya*	*#1 cont.*	18 IN OC
46	Rattlesnake Master	*Eryngium yuccifolium*	*#1 cont.*	18IN OC
45	Calico Aster	*Aster lateriflorus*	*#1 cont.*	18IN OC
46	Showy Solidago	*Solidago speciosa*	*#1 cont.*	18 IN OC
74	Pachysandra	*Pachysandra terminalis 'Green Carpet'*	*6-pack*	12 IN OC

1 L200 LANDSCAPE PLAN
SCALE 1" = 10'

NOTE:
1) ALL PLANTINGS ARE TO BE IRRIGATED WITH TEMPORARY SYSTEM FOR ESTABLISHMENT PERIOD OF 1 YR.
2) SEE SPECIFICATIONS FOR NATIVE FORBS AND GRASSES.

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Rev.	Date	Remarks

Date	January 14, 2008
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Project Number	07-013 CLA
Drawn By	JG

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LANDSCAPE PLAN

L-200

SUSTAINABLE SITES

CREDIT 6.1: STORMWATER DESIGN: QUANTITY CONTROL

PROPOSED HYDROCAD REPORT

EXISTING HYROCAD REPORT

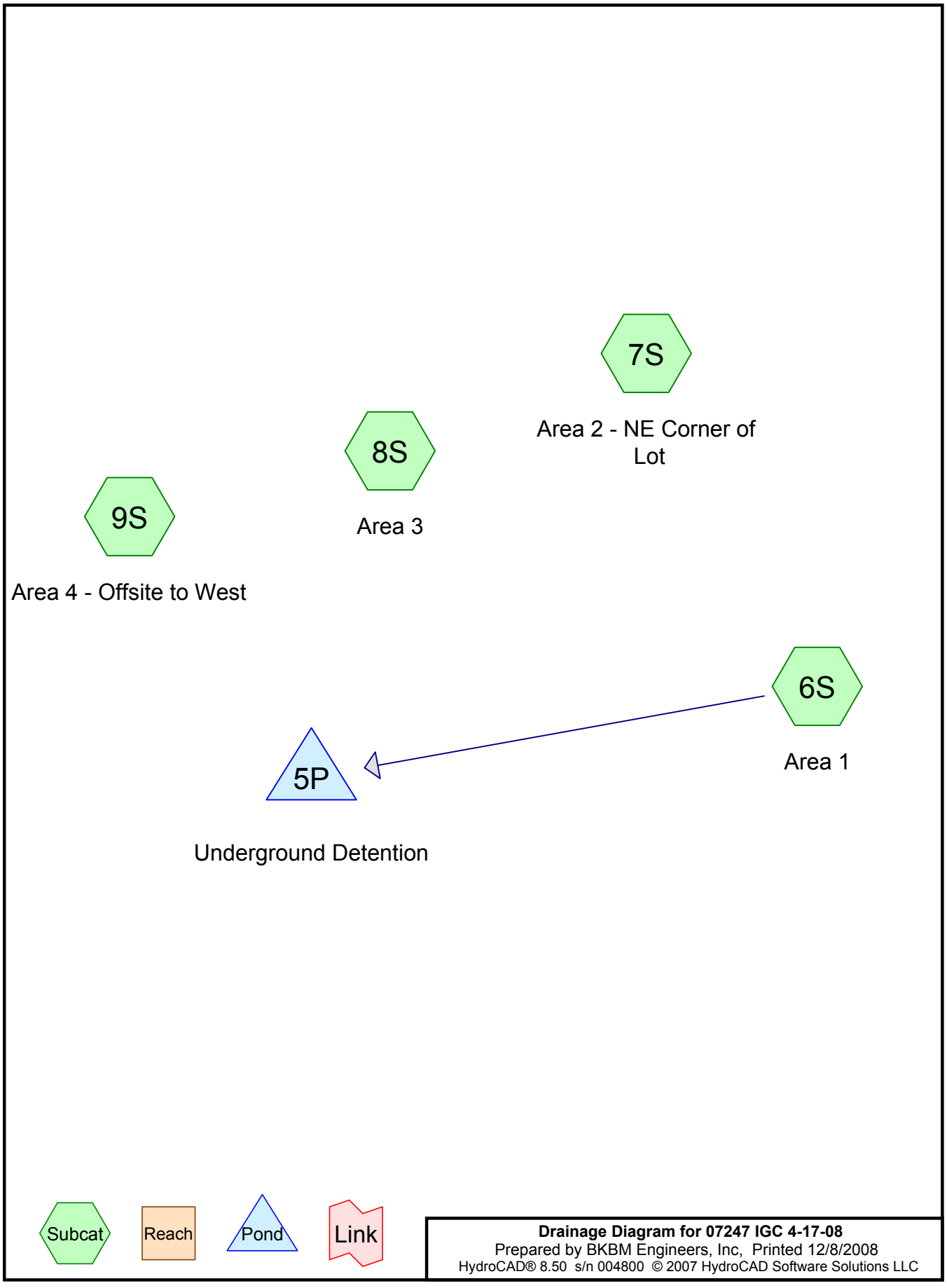
HYROLOGY REPORT

WATERSHED PLAN

GRADING PLAN

UTILITIES PLAN

GEOMETRIC AND PAVING PLAN



Drainage Diagram for 07247 IGC 4-17-08
Prepared by BKBM Engineers, Inc, Printed 12/8/2008
HydroCAD® 8.50 s/n 004800 © 2007 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.246	63	Grass (6S,8S,9S)
0.004	70	Pavers (9S)
0.046	70	Perm Pavers (6S)
0.051	98	Bit (7S,9S)
0.150	98	Bldg/Bit (6S)
0.008	98	Walk (8S)
0.505		**TOTAL AREA**

Time span=0.00-120.00 hrs, dt=0.01 hrs, 12001 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment6S: Area 1 Runoff Area=0.337 ac 44.51% Impervious Runoff Depth=0.82"
Tc=5.0 min CN=80 Runoff=0.51 cfs 0.023 af

Subcatchment7S: Area 2 - NE Corner of Runoff Area=0.042 ac 100.00% Impervious Runoff Depth=2.17"
Tc=5.0 min CN=98 Runoff=0.15 cfs 0.008 af

Subcatchment8S: Area 3 Runoff Area=0.036 ac 22.22% Impervious Runoff Depth=0.44"
Flow Length=50' Slope=0.0600 '/' Tc=6.8 min CN=71 Runoff=0.02 cfs 0.001 af

Subcatchment9S: Area 4 - Offsite to West Runoff Area=0.090 ac 10.00% Impervious Runoff Depth=0.32"
Flow Length=115' Slope=0.1500 '/' Tc=9.2 min CN=67 Runoff=0.03 cfs 0.002 af

Pond 5P: Underground Detention Peak Elev=930.86' Storage=0.010 af Inflow=0.51 cfs 0.023 af
Discarded=0.01 cfs 0.018 af Primary=0.03 cfs 0.005 af Outflow=0.04 cfs 0.023 af

Total Runoff Area = 0.505 ac Runoff Volume = 0.034 af Average Runoff Depth = 0.82"
58.61% Pervious = 0.296 ac 41.39% Impervious = 0.209 ac

Summary for Subcatchment 6S: Area 1

Runoff = 0.51 cfs @ 11.97 hrs, Volume= 0.023 af, Depth= 0.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.40"

	Area (ac)	CN	Description
*	0.150	98	Bldg/Bit
*	0.141	63	Grass
*	0.046	70	Perm Pavers
	0.337	80	Weighted Average
	0.187		Pervious Area
	0.150		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 7S: Area 2 - NE Corner of Lot

Runoff = 0.15 cfs @ 11.96 hrs, Volume= 0.008 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.40"

	Area (ac)	CN	Description
*	0.042	98	Bit
	0.042		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 8S: Area 3

Runoff = 0.02 cfs @ 12.00 hrs, Volume= 0.001 af, Depth= 0.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.40"

	Area (ac)	CN	Description
*	0.008	98	Walk
*	0.028	63	Grass
	0.036	71	Weighted Average
	0.028		Pervious Area
	0.008		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0600	0.12		**Sheet Flow,** n= 0.300 P2= 2.75"

Summary for Subcatchment 9S: Area 4 - Offsite to West

Runoff = 0.03 cfs @ 12.04 hrs, Volume= 0.002 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=2.40"

	Area (ac)	CN	Description
*	0.077	63	Grass
*	0.009	98	Bit
*	0.004	70	Pavers
	0.090	67	Weighted Average
	0.081		Pervious Area
	0.009		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	115	0.1500	0.21		**Sheet Flow,** n= 0.300 P2= 2.75"

Summary for Pond 5P: Underground Detention

Inflow Area = 0.337 ac, 44.51% Impervious, Inflow Depth = 0.82" for 1-yr event
Inflow = 0.51 cfs @ 11.97 hrs, Volume= 0.023 af
Outflow = 0.04 cfs @ 12.63 hrs, Volume= 0.023 af, Atten= 92%, Lag= 39.6 min
Discarded = 0.01 cfs @ 11.64 hrs, Volume= 0.018 af
Primary = 0.03 cfs @ 12.63 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
Peak Elev= 930.86' @ 12.63 hrs Surf.Area= 0.017 ac Storage= 0.010 af

Plug-Flow detention time= 364.6 min calculated for 0.023 af (100% of inflow)
Center-of-Mass det. time= 364.6 min (1,219.2 - 854.5)

Volume	Invert	Avail.Storage	Storage Description
#1	930.25'	0.030 af	**36.0"D x 184.00'L Horizontal Cylinder** Inside #2
#2	929.75'	0.012 af	**4.00'W x 188.00'L x 3.50'H Prismatoid** 0.060 af Overall - 0.030 af Embedded = 0.031 af x 40.0% Voids
		0.042 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	929.75'	**0.600 in/hr Exfiltration over Horizontal area**
#2	Primary	930.25'	**12.0" x 53.0' long Culvert** Ke= 0.500 Outlet Invert= 929.60' S= 0.0123 '/' Cc= 0.900 n= 0.013
#3	Device 2	930.75'	**4.0" Vert. Orifice/Grate** C= 0.600

#4 Device 2 933.00' **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=0.01 cfs @ 11.64 hrs HW=929.79' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.03 cfs @ 12.63 hrs HW=930.86' (Free Discharge)
└**2=Culvert** (Passes 0.03 cfs of 1.33 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.13 fps)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-120.00 hrs, dt=0.01 hrs, 12001 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment6S: Area 1 Runoff Area=0.337 ac 44.51% Impervious Runoff Depth=1.07"
Tc=5.0 min CN=80 Runoff=0.67 cfs 0.030 af

Subcatchment7S: Area 2 - NE Corner of Runoff Area=0.042 ac 100.00% Impervious Runoff Depth=2.52"
Tc=5.0 min CN=98 Runoff=0.17 cfs 0.009 af

Subcatchment8S: Area 3 Runoff Area=0.036 ac 22.22% Impervious Runoff Depth=0.62"
Flow Length=50' Slope=0.0600 '/' Tc=6.8 min CN=71 Runoff=0.04 cfs 0.002 af

Subcatchment9S: Area 4 - Offsite to West Runoff Area=0.090 ac 10.00% Impervious Runoff Depth=0.47"
Flow Length=115' Slope=0.1500 '/' Tc=9.2 min CN=67 Runoff=0.06 cfs 0.003 af

Pond 5P: Underground Detention Peak Elev=930.97' Storage=0.012 af Inflow=0.67 cfs 0.030 af
Discarded=0.01 cfs 0.019 af Primary=0.09 cfs 0.011 af Outflow=0.11 cfs 0.030 af

Total Runoff Area = 0.505 ac Runoff Volume = 0.044 af Average Runoff Depth = 1.05"
58.61% Pervious = 0.296 ac 41.39% Impervious = 0.209 ac

Summary for Subcatchment 6S: Area 1

Runoff = 0.67 cfs @ 11.97 hrs, Volume= 0.030 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.75"

	Area (ac)	CN	Description
*	0.150	98	Bldg/Bit
*	0.141	63	Grass
*	0.046	70	Perm Pavers
	0.337	80	Weighted Average
	0.187		Pervious Area
	0.150		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 7S: Area 2 - NE Corner of Lot

Runoff = 0.17 cfs @ 11.96 hrs, Volume= 0.009 af, Depth= 2.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.75"

	Area (ac)	CN	Description
*	0.042	98	Bit
	0.042		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 8S: Area 3

Runoff = 0.04 cfs @ 11.99 hrs, Volume= 0.002 af, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.75"

	Area (ac)	CN	Description
*	0.008	98	Walk
*	0.028	63	Grass
	0.036	71	Weighted Average
	0.028		Pervious Area
	0.008		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0600	0.12		**Sheet Flow,** n= 0.300 P2= 2.75"

Summary for Subcatchment 9S: Area 4 - Offsite to West

Runoff = 0.06 cfs @ 12.03 hrs, Volume= 0.003 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-yr Rainfall=2.75"

	Area (ac)	CN	Description
*	0.077	63	Grass
*	0.009	98	Bit
*	0.004	70	Pavers
	0.090	67	Weighted Average
	0.081		Pervious Area
	0.009		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	115	0.1500	0.21		**Sheet Flow,** n= 0.300 P2= 2.75"

Summary for Pond 5P: Underground Detention

Inflow Area = 0.337 ac, 44.51% Impervious, Inflow Depth = 1.07" for 2-yr event
Inflow = 0.67 cfs @ 11.97 hrs, Volume= 0.030 af
Outflow = 0.11 cfs @ 12.17 hrs, Volume= 0.030 af, Atten= 84%, Lag= 12.0 min
Discarded = 0.01 cfs @ 11.45 hrs, Volume= 0.019 af
Primary = 0.09 cfs @ 12.17 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.01 hrs
Peak Elev= 930.97' @ 12.17 hrs Surf.Area= 0.017 ac Storage= 0.012 af

Plug-Flow detention time= 305.9 min calculated for 0.030 af (100% of inflow)
Center-of-Mass det. time= 305.9 min (1,152.5 - 846.6)

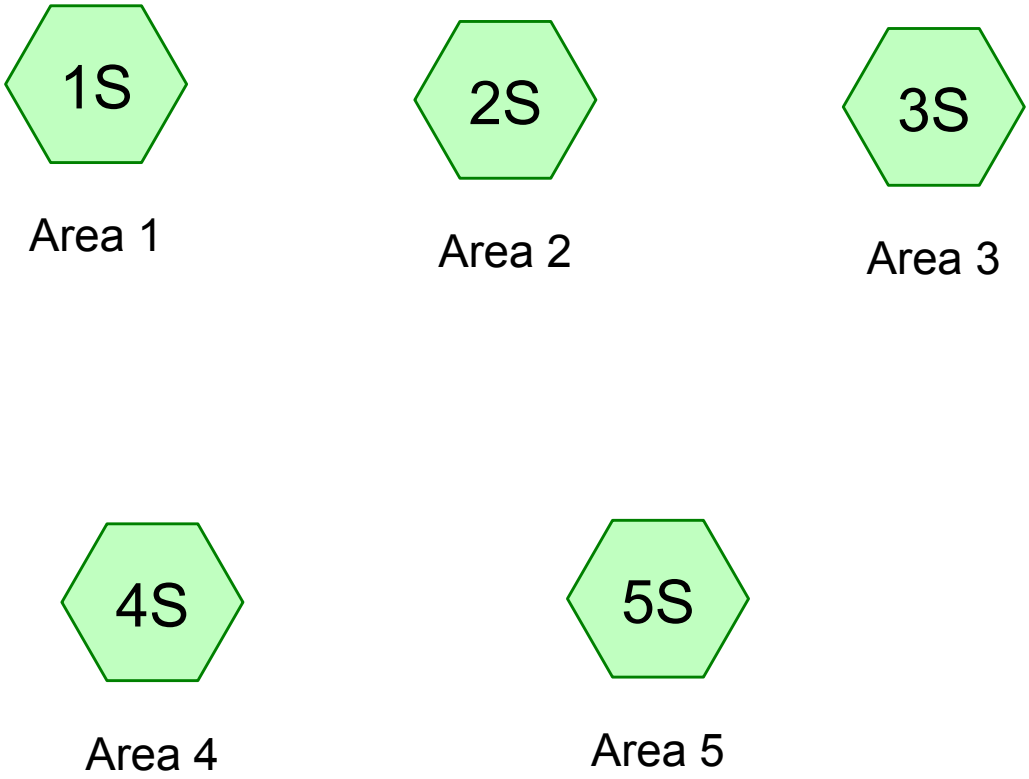
Volume	Invert	Avail.Storage	Storage Description
#1	930.25'	0.030 af	**36.0"D x 184.00'L Horizontal Cylinder** Inside #2
#2	929.75'	0.012 af	**4.00'W x 188.00'L x 3.50'H Prismatoid** 0.060 af Overall - 0.030 af Embedded = 0.031 af x 40.0% Voids
		0.042 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	929.75'	**0.600 in/hr Exfiltration over Horizontal area**
#2	Primary	930.25'	**12.0" x 53.0' long Culvert** Ke= 0.500 Outlet Invert= 929.60' S= 0.0123 '/' Cc= 0.900 n= 0.013
#3	Device 2	930.75'	**4.0" Vert. Orifice/Grate** C= 0.600

#4 Device 2 933.00' **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=0.01 cfs @ 11.45 hrs HW=929.79' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.09 cfs @ 12.17 hrs HW=930.97' (Free Discharge)
└**2=Culvert** (Passes 0.09 cfs of 1.73 cfs potential flow)
  ├**3=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.58 fps)
  └**4=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)



Subcat Reach Pond Link

Drainage Diagram for 07247 IGC Existing 2-7-08
Prepared by BKBM Engineers, Inc, Printed 12/8/2008
HydroCAD® 8.50 s/n 004800 © 2007 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.254	63	(2S,3S,4S,5S)
0.245	98	(1S,3S,4S,5S)
0.500		**TOTAL AREA**

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Area 1 Runoff Area=2,946 sf 100.00% Impervious Runoff Depth>2.02"
Tc=5.0 min CN=98 Runoff=0.23 cfs 0.011 af

Subcatchment2S: Area 2 Runoff Area=2,042 sf 0.00% Impervious Runoff Depth>0.18"
Tc=9.3 min CN=63 Runoff=0.01 cfs 0.001 af

Subcatchment3S: Area 3 Runoff Area=5,516 sf 81.24% Impervious Runoff Depth>1.41"
Tc=5.0 min CN=91 Runoff=0.34 cfs 0.015 af

Subcatchment4S: Area 4 Runoff Area=3,674 sf 38.00% Impervious Runoff Depth>0.57"
Tc=9.9 min CN=76 Runoff=0.08 cfs 0.004 af

Subcatchment5S: Area 5 Runoff Area=7,595 sf 24.54% Impervious Runoff Depth>0.42"
Tc=15.9 min CN=72 Runoff=0.09 cfs 0.006 af

Total Runoff Area = 0.500 ac Runoff Volume = 0.037 af Average Runoff Depth = 0.89"
50.92% Pervious = 0.254 ac 49.08% Impervious = 0.245 ac

Summary for Subcatchment 1S: Area 1

Runoff = 0.23 cfs @ 11.95 hrs, Volume= 0.011 af, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.40"

	Area (sf)	CN	Description
*	2,946	98	
	2,946		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 2S: Area 2

Runoff = 0.01 cfs @ 12.06 hrs, Volume= 0.001 af, Depth> 0.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.40"

	Area (sf)	CN	Description
*	2,042	63	
	2,042		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3					**Direct Entry, Kerby Method**

Summary for Subcatchment 3S: Area 3

Runoff = 0.34 cfs @ 11.95 hrs, Volume= 0.015 af, Depth> 1.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.40"

	Area (sf)	CN	Description
*	1,035	63	
*	4,481	98	
	5,516	91	Weighted Average
	1,035		Pervious Area
	4,481		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 4S: Area 4

Runoff = 0.08 cfs @ 12.03 hrs, Volume= 0.004 af, Depth> 0.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.40"

	Area (sf)	CN	Description
*	2,278	63	
*	1,396	98	
	3,674	76	Weighted Average
	2,278		Pervious Area
	1,396		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9					**Direct Entry, Kerby Method**

Summary for Subcatchment 5S: Area 5

Runoff = 0.09 cfs @ 12.11 hrs, Volume= 0.006 af, Depth> 0.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.40"

	Area (sf)	CN	Description
*	5,731	63	
*	1,864	98	
	7,595	72	Weighted Average
	5,731		Pervious Area
	1,864		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9					**Direct Entry, Kerby**

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Area 1 Runoff Area=2,946 sf 100.00% Impervious Runoff Depth>2.34"
Tc=5.0 min CN=98 Runoff=0.26 cfs 0.013 af

Subcatchment2S: Area 2 Runoff Area=2,042 sf 0.00% Impervious Runoff Depth>0.28"
Tc=9.3 min CN=63 Runoff=0.02 cfs 0.001 af

Subcatchment3S: Area 3 Runoff Area=5,516 sf 81.24% Impervious Runoff Depth>1.72"
Tc=5.0 min CN=91 Runoff=0.41 cfs 0.018 af

Subcatchment4S: Area 4 Runoff Area=3,674 sf 38.00% Impervious Runoff Depth>0.76"
Tc=9.9 min CN=76 Runoff=0.11 cfs 0.005 af

Subcatchment5S: Area 5 Runoff Area=7,595 sf 24.54% Impervious Runoff Depth>0.59"
Tc=15.9 min CN=72 Runoff=0.13 cfs 0.009 af

Total Runoff Area = 0.500 ac Runoff Volume = 0.046 af Average Runoff Depth = 1.11"
50.92% Pervious = 0.254 ac 49.08% Impervious = 0.245 ac

Summary for Subcatchment 1S: Area 1

Runoff = 0.26 cfs @ 11.95 hrs, Volume= 0.013 af, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.75"

	Area (sf)	CN	Description
*	2,946	98	
	2,946		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 2S: Area 2

Runoff = 0.02 cfs @ 12.05 hrs, Volume= 0.001 af, Depth> 0.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.75"

	Area (sf)	CN	Description
*	2,042	63	
	2,042		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3					**Direct Entry, Kerby Method**

Summary for Subcatchment 3S: Area 3

Runoff = 0.41 cfs @ 11.95 hrs, Volume= 0.018 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.75"

	Area (sf)	CN	Description
*	1,035	63	
*	4,481	98	
	5,516	91	Weighted Average
	1,035		Pervious Area
	4,481		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment 4S: Area 4

Runoff = 0.11 cfs @ 12.03 hrs, Volume= 0.005 af, Depth> 0.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.75"

	Area (sf)	CN	Description
*	2,278	63	
*	1,396	98	
	3,674	76	Weighted Average
	2,278		Pervious Area
	1,396		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9					**Direct Entry, Kerby Method**

Summary for Subcatchment 5S: Area 5

Runoff = 0.13 cfs @ 12.10 hrs, Volume= 0.009 af, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=2.75"

	Area (sf)	CN	Description
*	5,731	63	
*	1,864	98	
	7,595	72	Weighted Average
	5,731		Pervious Area
	1,864		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9					**Direct Entry, Kerby**

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HYDROLOGY FOR MACALESTER COLLEGE INSTITUTE FOR GLOBAL CITIZENSHIP SAINT PAUL, MINNESOTA

March 12, 2008
REVISED April 18, 2008
REVISED December 8, 2008

SITE DESCRIPTION:

The entire site is located within the Macalester College campus with a construction disturbance of approximately 0.58 acres. The site is located in the northwest corner of Snelling Ave. and Grand Ave. in St. Paul, MN. The existing site consists of the Winton Health Services building.

EXISTING STORM DRAINAGE:

Refer to detail 1/C-600 on sheet C-600 for existing drainage area details. Storm water from drainage area 1, which includes the bituminous loading dock/parking area on the northeast side of the site, sheet flows into an existing catch basin that currently flows to the northwest and connects to the main storm sewer system for the college. Drainage area 2 on the east side of the site sheet flows to Snelling Ave. Drainage area 3, which includes the existing building and the area to the northwest of the building, sheet flows into an existing catch basin. In drainage area 4, the storm water runoff sheet flows to the south onto Grand Ave. Drainage area 5 is the area to the west of the existing building and storm water runoff sheet flows west to a grass area and eventually ends up in the campus storm sewer system.

PROPOSED SITE:

The proposed site improvements include the demolition of the existing Winton Health Services building and the construction of the Institute for Global Citizenship Building. The proposed building is going for LEED platinum certification with new sidewalks, plaza areas, and landscaping. The storm water will be treated with permeable pavers and underground infiltration tanks. The total impervious area on the site will remain approximately the same as existing conditions (0.01 acre more than existing).

PROPOSED STORM DRAINAGE:

Refer to detail 2/C-600 on sheet C-600 for proposed drainage area details. Drainage area 1 includes most of the proposed site including the proposed building. Runoff from this drainage area is collected into a proposed storm sewer system and is retained and infiltrated by underground perforated pipes for treatment to LEED standards. Over flow from the tanks is routed directly into the storm sewer system. Drainage area 2 includes the bituminous loading dock area to the northeast which drains into the existing storm sewer system. Drainage area 3 includes the grassed area just to the north of the proposed building. Storm water from this area flows into the existing storm sewer system. Storm water runoff from drainage area 4 on the west part of the site sheet flows to an existing grassed area where it is eventually picked up by the campus storm sewer system.

METHOD:

Hydrocad was used for this hydrologic study, using a NRCS Type II 24 –hr. rainfall. Assumptions used in the calculations include SCS runoff curve numbers of 63 for pervious areas, 70 for the permeable pavers, and 98 for impervious areas. Peak runoff calculations were done for both pre-development and post-development using the Ramsey County 1-year, 10-year, and 100-year/24-hour storm events.

STORAGE:

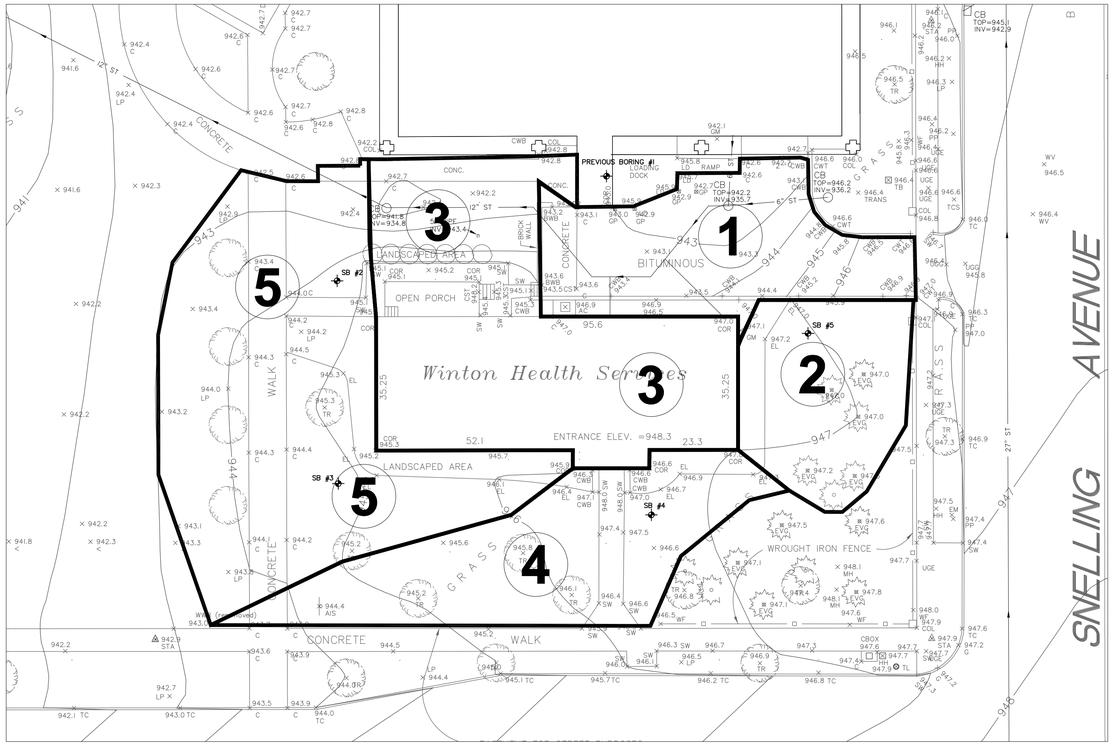
To meet the US Green Building Council LEED standards for storm water treatment the project is required to remove 80% of the total suspended solids from the site storm water runoff. The total proposed underground storage retention provided will be 1742 cubic feet. The proposed system will consist of 184-feet of 36-inch diameter perforated pipe over a gravel bed. The outlet is a 4-inch diameter orifice for rate control. The orifice is located 0.50-feet above the invert of the perforated pipes to retain the infiltration volume. The storage tanks are designed to collect the runoff from the new building and plaza areas.

STORM SEWER:

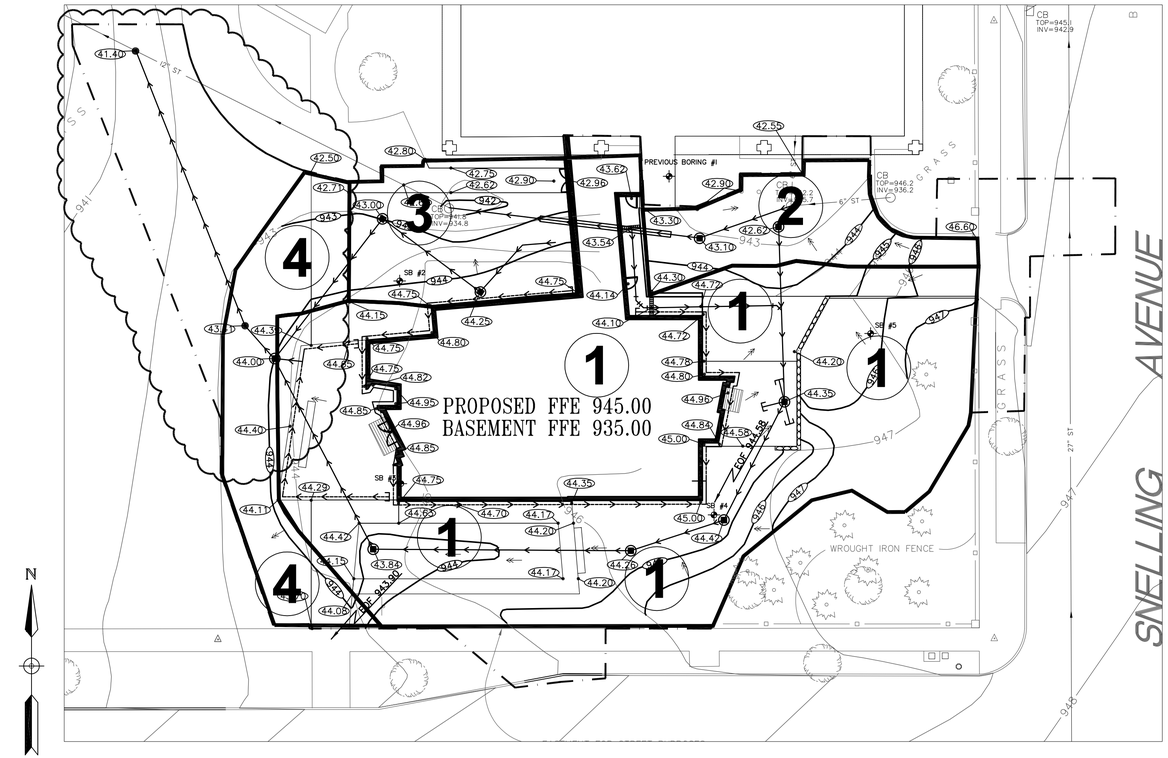
The proposed underground storage is designed infiltrate stormwater to meet LEED standards. Runoff amounts were calculated from the Hydrocad model.

STORM WATER RUNOFF FROM DISTURBED AREA (0.48 ACRES)		
24-HOUR STORM EVENT	EXIST. TOTAL RUNOFF RATE	PROPOSED TOTAL RUNOFF RATE
1-year (2.40”)	0.75 cfs	0.23 cfs
2-year (2.75”)	0.93 cfs	0.36 cfs

STORM WATER RUNOFF FROM DISTURBED AREA (0.48 ACRES)		
24-HOUR STORM EVENT	EXIST. TOTAL RUNOFF VOLUME	PROPOSED TOTAL RUNOFF VOLUME
1-year (2.40”)	1612 cf	1481 cf
2-year (2.75”)	2004 cf	1917 cf



1 C-600 EXISTING CONDITIONS
1" = 20'



2 C-600 PROPOSED CONDITIONS
1" = 20'

N

20' 10' 0 20' 40'
SCALE 1" = 20'

EXISTING SITE						
DRAINAGE AREA NUMBER	IMPERVIOUS (ACRES)	PERVIOUS (ACRES)	TOTAL (ACRES)	Q out (CFS) Storm Event		
				1-yr	10-yr	100-yr
1	0.07	0.00	0.07	0.23	0.40	0.57
2	0.00	0.05	0.05	0.01	0.07	0.15
3	0.11	0.02	0.13	0.34	0.68	1.01
4	0.01	0.07	0.08	0.08	0.24	0.42
5	0.03	0.12	0.15	0.09	0.33	0.63
TOTAL	0.22	0.26	0.48	0.75	1.72	2.78

ABBREVIATIONS

BMP	Best Management Practice
NPDES	National Pollutant Discharge Elimination System

PROPOSED SITE						
DRAINAGE AREA NUMBER	IMPERVIOUS (ACRES)	PERVIOUS (ACRES)	TOTAL (ACRES)	Q out (CFS) Storm Event		
				1-yr	10-yr	100-yr
1	0.17	0.17	0.34	0.03	0.38	0.61
2	0.04	0.00	0.04	0.15	0.23	0.32
3	0.01	0.04	0.05	0.02	0.11	0.22
4	0.01	0.04	0.05	0.03	0.10	0.20
TOTAL	0.23	0.25	0.48	0.23	0.82	1.35

PROJECT NARRATIVE

EXISTING SITE:

THE EXISTING SITE CONTAINS THE WINTON HEALTH SERVICES BUILDING. LOADING DOCK, AND LANDSCAPING. CURRENTLY THERE ARE NO WATER QUALITY TREATMENT FACILITIES ON SITE. STORM WATER SHEET FLOWS UNCONTROLLED INTO CATCHBASINS WHICH ARE CONNECTED TO THE CAMPUS STORMWATER COLLECTION SYSTEM.

PROPOSED SITE:

THE PROPOSED SITE WILL CONTAIN MACALASTER COLLEGE'S INSTITUTE FOR GLOBAL CITIZENSHIP BUILDING. THE PROPOSED BUILDING IS 3-STORIES HIGH WITH A BASEMENT. THE PROPOSED BUILDING WILL CONTAIN A SMALL PARKING AREA, PERVIOUS PAVERS IN THE PATIO AREAS, AND UNDERGROUND INFILTRATION PIPES FOR STORMWATER TREATMENT TO MEET LEED REQUIREMENTS. THE HIGH WATER LEVEL WITHIN THE INFILTRATION PIPES IS CALCULATED TO BE AT 933.00, WHICH IS 2-FEET BELOW THE BASEMENT FLOOR ELEVATION.

GRADING & SOILS

A GEOTECHNICAL EVALUATION OF THE SITE INDICATED THAT THE SUBSURFACE SOILS PROFILE CONSISTS OF A VARIABLE DEPTH OF UNCONTROLLED FILL MATERIAL.

THE UNCONTROLLED FILL GENERALLY CONSISTS OF SAND, CLAYEY SAND, AND SILTY SAND WITH VARIABLE AMOUNTS OF GRAVEL. THE FILL MATERIAL WAS LOCATED ON AVERAGE BETWEEN 0 TO 6-FEET BELOW THE GROUND SURFACE.

THE MATERIAL BELOW THE FILL MATERIAL TO AN AVERAGE DEPTH OF 9-FEET BELOW THE GROUND SURFACE CONTAINED MOSTLY TILL AND TOPSOIL. THE TILL CONSISTED OF SILTY SAND, CLAYEY SAND, AND A LITTLE GRAVEL.

BELOW THE TILL LIES A LAYER OF FINE TO COARSE ALLUVIUM CONTAINING SAND WITH SILT AND SILTY SAND TO AN AVERAGE DEPTH OF 19-FEET. THE ESTIMATED INFILTRATION RATE OF THIS SOIL IS 3" PER HOUR.

GROUNDWATER, DURING THE TIME OF OBSERVATION WAS DETECTED IN ONLY TWO OF THE BORING LOCATIONS AT A MINIMUM DEPTH OF 19.5 FEET BELOW THE GROUND SURFACE.

POLLUTION PREVENTION MANAGEMENT MEASURES

SOLID WASTE DISPOSED PROPERLY; COMPLY WITH MPCA REQUIREMENTS.
HAZARDOUS WASTE STORED (SECONDARY CONTAINMENT, RESTRICTED ACCESS) AND DISPOSED IN COMPLIANCE WITH MPCA REQUIREMENTS.
EXTERNAL WASHING OF VEHICLES LIMITED. RUNOFF CONTAINED AND WASTE PROPERLY DISPOSED.
NO ENGINE DEGREASING ALLOWED ON SITE.

FINAL STABALIZATION

STABILIZATION BY UNIFORM PERENNIAL VEGETATIVE COVER (70% DENSITY)
DRAINAGE DITCHES STABALIZED.
ALL TEMPORARY SYNTHETIC AND STRUCTURAL BMP'S REMOVED.
CLEAN OUT SEDIMENT FROM CONVEYANCES AND SEDIMENTATION BASINS (RETURN TO DESIGN CAPACITY).

SEDIMENT AND EROSION CONTROL MAINTENANCE

PERIMETER SEDIMENT CONTROL PRACTICES: WHEN SEDIMENT REACHES 1/3 THE HEIGHT OF THE BMP, THE SEDIMENT MUST BE REMOVED WITHIN 24 HOURS. IF PERIMETER SEDIMENT CONTROL HAS BEEN DAMAGED OR IS NOT FUNCTIONING PROPERLY, IT MUST BE REPAIRED AND/OR REPLACED WITHIN 24 HOURS. PERIMETER BMP MEASURES MAY INCLUDE SILT FENCING.

CONSTRUCTION SITE VEHICLE EXIT LOCATIONS: ALL TRACKED SEDIMENT ONTO PAVED SURFACES MUST BE REMOVED WITHIN 24 HOURS OF DISCOVERY OR MORE FREQUENTLY IF REQUIRED BY CITY OR WATERSHED.

CONSTRUCTION SITE DEWATERING: SITE WATER DISCHARGE DUE TO CONSTRUCTION DEWATERING OPERATIONS SHALL BE MONITORED FOR SEDIMENTATION AND TREATED PRIOR TO DISCHARGE TO PUBLIC STORM SEWERS. TREATMENT OF DEWATERING DISCHARGE MAY BE ACCOMPLISHED BY GRAVITY BAG FILTRATION.

INSPECTIONS

EXPOSED SOIL AREAS: ONCE EVERY 7 DAYS AND WITHIN 24 HOURS FOLLOWING A 1/2 INCH OVER 24 HOURS RAIN EVENT.

STABILIZED AREAS: ONCE EVERY 30 DAYS.

FROZEN GROUND: AS SOON AS RUNOFF OCCURS OR PRIOR TO RESUMING CONSTRUCTION.

RECORDS: A COPY OF THE GRADING, AND WATERSHED DATA & SWPP PLANS AS WELL AS THE INSPECTIONS/MAINTENANCE LOGS ARE TO BE KEPT EITHER IN THE FIELD OFFICE, INSPECTOR'S VEHICLE OR CONTRACTOR'S VEHICLE.

CONSTRUCTION ACTIVITY EROSION PREVENTION PRACTICES

TIME AN AREA CAN REMAIN OPEN WHEN NOT ACTIVELY BEING WORKED:
SLOPES STEEPER THAN 3:1 - 7 DAYS
SLOPES 10:1 TO 3:1 - 14 DAYS
SLOPES FLATTER THAN 10:1 - 14 DAYS

TEMPORARY PROTECTION OR PERMANENT COVER MUST BE ON:
EXPOSED SOIL AREAS WITH A CONTINUOUS POSITIVE SLOPE WITHIN 200 FEET OF A :
SURFACE WATER
CURB AND GUTTER
CATCH BASIN
ANY STORM WATER CONVEYANCE SYSTEM ON SITE
STORM WATER MANAGEMENT POND SIDE SLOPES
PERMANENT DRAINAGE DITCH

AGENCY CONTACTS

CITY OF ST. PAUL
PUBLIC WORKS DEPARTMENT
140 CITY HALL
15 WEST KELLOGG BOULEVARD
ST. PAUL, MN 55102
PHONE: (651) 266-6080

MINNESOTA POLLUTION CONTROL AGENCY
520 LAFAYETTE ROAD
SAINT PAUL, MN 55155
PHONE: (651) 296-6300

CAPITOL REGION WATERSHED DISTRICT
1410 ENERGY PARK DRIVE SUITE 4
ST. PAUL, MN 55108
PHONE: (651) 644-8888

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Preservation/Landscape Architecture
Space Planning/Interior Design

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BKBM Job No. 07247.00

Rev	Date	Remarks
	3-13-2008	SITE PLAN REVIEW SET
	4-7-2008	RESUBMIT OF SITE PLAN REVIEW SET
	4-18-2008	RESUBMIT OF SITE PLAN REVIEW SET

Date JUNE 03, 2008
Scale
Project Number 871-00
Drawn By RGE

Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

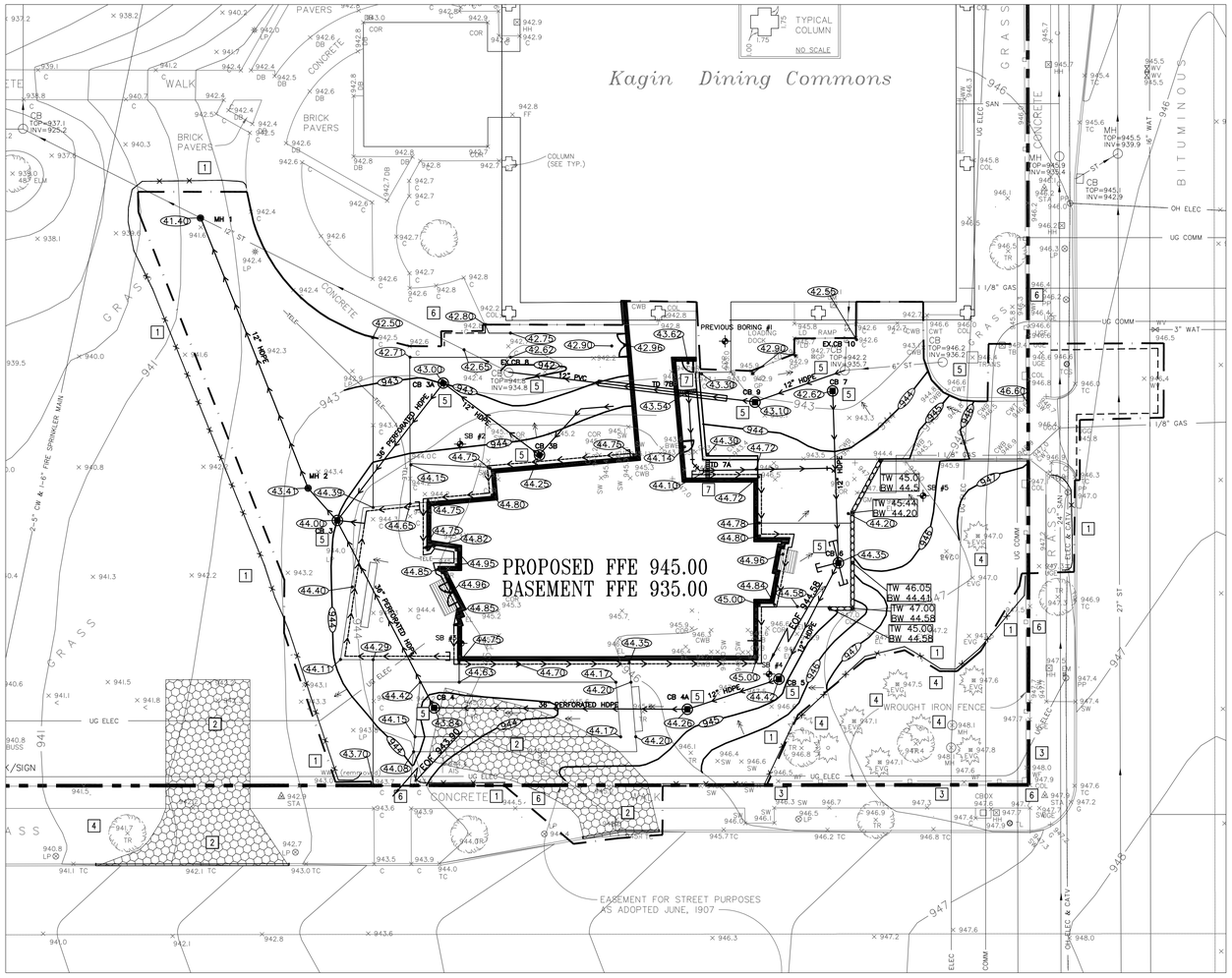
CONSTRUCTION DOCUMENTS
April 28, 2008

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Joel W. Maier P.E.
Registration Number 19181 Date 4/28/08

WATERSHED PLAN

C-600



1 C-200 GRADING, DRAINAGE, AND EROSION CONTROL PLAN
1" = 20'

PROPOSED PLAN SYMBOLS

- CONSTRUCTION LIMITS
- SILTATION FENCE
- PROPERTY LINE
- SAWCUT LINE (APPROX.)
- STORM SEWER
- DRAINTILE
- PROPOSED CONTOUR (944)
- SPOT ELEVATION (44.45)
- DRAINAGE FLOW ARROW
- RETAINING WALL
- RETAINING WALL SPOT ELEVATION (TW 45.00 / BW 42.00)
- SOIL BORING LOCATION (SB #4)

ABBREVIATIONS

BLDG	Building
BM	Bench Mark
BW	Bottom of Wall Elevation
CB	Catch Basin
CONC	Concrete
ELEV	Elevation
EX	Existing
FFE	Finished Floor Elevation
HDPE	High Density Polyethylene
INV	Invert
MH	Manhole
NWL	Normal Water Level
PVC	Polyvinyl Chloride
RCP	Reinforced Concrete Pipe
TD	Trench Drain
TW	Top of Wall Elevation

APPROXIMATE DISTURBED AREA IS 0.58 ACRES

N

20' 10' 0 20' 40'

SCALE 1" = 20'

EROSION CONTROL NOTES:

1. ALL EROSION CONTROL FACILITIES SHALL BE INSTALLED PRIOR TO ANY SITE GRADING OPERATIONS. THE CITY ENGINEER MUST BE NOTIFIED UPON COMPLETION OF THE INSTALLATION OF THE REQUIRED EROSION CONTROL FACILITIES AND PRIOR TO ANY GRADING OPERATION BEING COMMENCED. THE CONTRACTOR IS RESPONSIBLE TO SCHEDULE A PRE-CONSTRUCTION GRADING MEETING ON-SITE WITH THE CITY ENGINEER. IF DAMAGED OR REMOVED DURING CONSTRUCTION, ALL EROSION CONTROL FACILITIES SHALL BE RESTORED AND IN PLACE AT THE END OF EACH DAY.
2. ANY EROSION CONTROL FACILITIES DEEMED NECESSARY BY THE CITY; BEFORE, DURING OR AFTER THE GRADING ACTIVITIES, SHALL BE INSTALLED AT THE REQUEST OF THE CITY.
3. NO DEVIATIONS SHALL BE MADE FROM THE ELEVATIONS SHOWN ON THE APPROVED GRADING PLAN, WITHOUT PRIOR APPROVAL FROM THE CITY.
4. SOILS TRACKED FROM THE SITE BY MOTOR VEHICLES OR EQUIPMENT SHALL BE CLEANED DAILY FROM PAVED ROADWAY SURFACES, OR MORE FREQUENTLY IF REQUESTED BY THE CITY, THROUGHOUT THE DURATION OF CONSTRUCTION.
5. DUST CONTROL MEASURES SHALL BE PERFORMED PERIODICALLY WHEN CONDITIONS REQUIRE AND/OR AS DIRECTED BY THE CITY.
6. ALL EROSION CONTROL MEASURES SHALL BE USED AND MAINTAINED FOR THE DURATION OF SITE CONSTRUCTION. IF CONSTRUCTION OPERATIONS OR NATURAL EVENTS DAMAGE OR INTERFERE WITH THESE EROSION CONTROL MEASURES, THEY SHALL BE RESTORED TO SERVE THEIR INTENDED FUNCTION AT THE END OF EACH DAY OR AS SOON AS FIELD CONDITIONS ALLOW ACCESS.
7. ALL CONSTRUCTION AREAS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED AS SOON AS POSSIBLE. ANY AREAS WHICH HAVE BEEN FINISHED GRADED OR AREAS THAT HAVE BEEN DISTURBED AND FOR WHICH GRADING OR SITE BUILDING CONSTRUCTION OPERATIONS ARE NOT ACTIVELY UNDERWAY SHALL BE SEEDED AND MULCHED AS SET FORTH IN THE FOLLOWING PARAGRAPHS WITHIN 14 DAYS:
   A. ALL SEEDED AREAS SHALL BE EITHER MULCHED AND DISC-ANCHORED OR COVERED BY FIBROUS BLANKETS TO PROTECT SEEDS AND LIMIT EROSION. TEMPORARY MULCH SHALL BE DISC-ANCHORED AND APPLIED AT A UNIFORM RATE OF NOT LESS THAN TWO TONS PER ACRE AND NOT LESS THAN 80% COVERAGE.
   B. IF THE GRADED AREA IS ANTICIPATED TO BE RE-DISTURBED/DEVELOPED WITHIN SIX MONTHS, PROVIDE A TEMPORARY VEGETATIVE COVER CONSISTING OF MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT) SEED MIXTURE 100 AT A RATE OF 100 POUNDS PER ACRE.
   C. IF GRADED AREA WILL NOT BE DEVELOPED FOR A PERIOD GREATER THAN SIX MONTHS, PROVIDE A PERMANENT VEGETATIVE COVER OF SEED MIXTURE MNDOT 190 AT A RATE OF 60 POUNDS PER ACRE.
   D. GRADING BONDS OR THE EQUIVALENT SECURITIES SHALL BE RETAINED UNTIL TURF HAS GERMINATED AND SURVIVED A 60-DAY GROWING PERIOD.
   E. WHENEVER OTHER EROSION AND SEDIMENT CONTROL PRACTICES ARE INADEQUATE, TEMPORARY ON-SITE SEDIMENT BASINS THAT CONFORM TO THE CRITERIA FOR ON-SITE DETENTION BASINS SHALL BE PROVIDED.
8. RUNOFF SHALL BE PREVENTED FROM ENTERING ALL STORM SEWER CATCH BASINS PROVIDING THEY ARE NOT NEEDED DURING CONSTRUCTION. WHERE STORM SEWER CATCH BASINS ARE NECESSARY FOR SITE DRAINAGE DURING CONSTRUCTION, A SILT FENCE OR SEDIMENT PROTECTION DEVICES AS DETAILED SHALL BE INSTALLED AND MAINTAINED AROUND ALL CATCH BASINS UNTIL THE AREA TRIBUTARY TO THE CATCH BASIN IS RESTORED.
9. GRADING ACTIVITIES PROPOSED TO BEGIN AFTER OCTOBER 15 WILL REQUIRE AN APPROVED PHASING SCHEDULE. THE AREA OF LAND THAT THE CITY WILL ALLOW TO BE DISTURBED AT THIS TIME OF YEAR WILL BE SEVERELY LIMITED. THE CITY WILL ALSO REQUIRE ADDITIONAL EROSION CONTROL DEVISES, I.E., TEMPORARY SEDIMENT BASINS, DORMANT SEEDING AND HIGH RATES OF APPLICATION OF BOTH SEED AND MULCH.
10. EROSION CONTROL FACILITIES SHALL BE INSTALLED AND MAINTAINED AROUND AREA TO BE GRADED UNTIL THE AREA TRIBUTARY TO THE AREA IS RESTORED.
11. ACCUMULATION OF ALL SEDIMENT OCCURRING IN STORM SEWERS SHALL BE REMOVED PRIOR TO, DURING AND AFTER COMPLETION OF GRADING ACTIVITIES.
12. EROSION CONTROL ITEMS AND DEVICES SHOULD BE REMOVED ONLY AS DIRECTED BY THE CITY.

GRADING NOTES:

1. THE CONTRACTOR IS TO VISIT THE SITE, REVIEW ALL CONSTRUCTION DOCUMENTS AND FIELD VERIFY THE EXISTING CONDITIONS PRIOR TO BIDDING. NO ADDITIONAL COMPENSATION WILL BE GIVEN FOR WORK THAT COULD HAVE BEEN IDENTIFIED BY A SITE VISIT OR CONSTRUCTION DOCUMENT REVIEW.
2. THE BACKGROUND INFORMATION WAS PREPARED BY SUNDE LAND SURVEYING, (952) 881-2455.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ASCERTAIN THE LOCATION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY THE LOCATION, ELEVATION AND MARK ALL EXISTING UTILITIES 48 HOURS BEFORE CONSTRUCTION STARTS. THE ENGINEER, ARCHITECT OR OWNER DOES NOT GUARANTEE THAT ALL THE UTILITIES ARE MAPPED, OR IF MAPPED, ARE SHOWN CORRECTLY. CONTACT GOPHER ONE AT 651-454-0002 FOR FIELD LOCATING EXISTING UTILITIES. CONTACT UTILITY OWNER IF DAMAGE OCCURS DUE TO CONSTRUCTION.
4. PROTECT ALL EXISTING STRUCTURES AND UTILITIES WHICH ARE NOT SCHEDULED FOR REMOVAL.
5. NOTIFY CITY BUILDING INSPECTOR BEFORE TRENCHING AND EXCAVATION WORK COMMENCES. THE CONTRACTOR SHALL OBTAIN ALL APPLICABLE PERMITS PRIOR TO START OF CONSTRUCTION.
6. ALL SPOT ELEVATIONS SHOWN AS 44.45, FOR EXAMPLE, ARE TO BE UNDERSTOOD TO MEAN 944.45.
7. NO SLOPES ARE TO EXCEED 3:1 (3 FEET HORIZONTAL TO 1 FOOT VERTICAL) UNLESS NOTED OTHERWISE.
8. PROVIDE POSITIVE DRAINAGE FROM BUILDINGS AT ALL TIMES.
9. UPON COMPLETION OF THE GRADING AND UTILITY WORK, THE CONTRACTOR SHALL CERTIFY THAT ALL GRADING AND UTILITY WORK WAS PERFORMED IN ACCORDANCE WITH THE APPROVED GRADING AND UTILITY PERMITS. A RECORD GRADING AND UTILITY PLAN SHALL BE SUBMITTED TO THE CITY FOR REVIEW AND DISTRIBUTION.
10. PRIOR TO ISSUANCE OF BUILDING PERMITS, ALL NECESSARY EROSION CONTROL DEVICES MUST BE IN PLACE AND FUNCTIONING. THE CITY WILL INSPECT THE SITE TO DETERMINE ITS SUITABILITY FOR BUILDING ACTIVITIES. IF THE PUBLIC UTILITIES HAVE NOT BEEN INSTALLED AT THIS POINT, IT MAY BE NECESSARY TO WITHHOLD BUILDING PERMITS FOR VARIOUS LOTS TO ALLOW THE CONTRACTOR ADEQUATE SPACE TO PERFORM THIS WORK.
11. ALL DEBRIS CREATED IN THE PROCESS OF CLEARING AND GRADING THE SITE SHALL BE REMOVED FROM THE SITE. THIS INCLUDES TREES AND SHRUBS. UNDER NO CIRCUMSTANCES SHALL THIS TYPE OF MATERIAL BE BURIED OR BURNED ON THE SITE.
12. ALL TOPSOIL SHALL BE STRIPPED AND SALVAGED FOR RE-SPREADING ON THE SITE. SIX INCHES OF TOPSOIL – AFTER COMPACTION– SHALL BE RE-SPREAD PRIOR TO SEEDING AND MULCHING. EXCESS TOPSOIL MAY BE REMOVED FROM THE SITE PROVIDING THERE IS ADEQUATE TOPSOIL REMAINING TO PROPERLY FINISH THE SITE AS NOTED ABOVE. THE TOPSOIL STRIPPING, STOCKPILING AND RE-SPREADING SHALL BE DONE IN ACCORDANCE TO, AND NOTED ON, THE APPROVED GRADING PLAN AND SPECIFICATIONS.
13. ALL GRADING OPERATIONS SHALL BE CONDUCTED IN A MANNER TO MINIMIZE THE POTENTIAL FOR SITE EROSION. EROSION CONTROL MEASURES SHALL BE INSTALLED TO PREVENT SEDIMENT FROM RUNNING OFF ONTO ADJACENT PROPERTIES. ANY DAMAGE TO ADJACENT PROPERTIES MUST BE CORRECTED AND RESTORED AS SOON AS PERMISSION IS GRANTED FROM THE ADJACENT PROPERTY OWNER(S).
14. IF CONSTRUCTION OF THE SITE WORK PROCEEDS THROUGH THE WINTER MONTHS, ANY DISTURBED AREAS OUTSIDE THE BUILDING FOOTPRINTS ARE TO BE MINIMALLY STABILIZED PRIOR TO MARCH 1, AS FOLLOWS: AREAS PLANNED TO RECEIVE PAVEMENTS ARE TO HAVE CLASS 5 BASE INSTALLED; ALL OTHER DISTURBED AREAS ARE TO BE SEEDED, STRAW MULCH PLACED, AND DISC-MULCHED.
15. THE CONTRACTOR SHALL LIMIT THE DISTURBED AREA AS MUCH AS POSSIBLE.

KEYED NOTES

KEYED NOTES ARE DENOTED BY [NO] ON PLAN.

1. INSTALL SILT FENCE PER DETAIL 2/C-500.
2. INSTALL ROCK CONSTRUCTION ENTRANCE PER DETAIL 1/C-500.
3. PROTECT FENCE AT ALL TIMES DURING CONSTRUCTION.
4. EXISTING TREES ARE NOT TO BE DISTURBED. PROTECT TREES AT ALL TIMES DURING CONSTRUCTION.
5. INSTALL SEDIMENT PROTECTION AT STORM SEWER INLETS. REFER TO DETAIL 3/C-500. PROTECTION SHALL REMAIN IN PLACE UNTIL BITUMINOUS AREAS HAVE BEEN PAVED AND LAWN AREAS HAVE BEEN ESTABLISHED.
6. SIDEWALK IS NOT TO BE DISTURBED DURING CONSTRUCTION. PROTECT AT ALL TIMES.
7. REFER TO ARCHITECTURAL PLANS FOR RAMP GRADING.

NOTE:

1. WHEN ABANDONING AN EXISTING SEWER SERVICE OR WHEN MAKING NEW CONNECTIONS TO A CITY SEWER, THIS MUST BE DONE IN ACCORDANCE WITH CITY STANDARDS BY A LICENSED HOUSE DRAIN CONTRACTOR UNDER PERMIT FROM THE PUBLIC WORKS SEWER SECTION. (651-266-6234)
2. UPON COMPLETION OF STORM SEWER INSTALLATION, STORM SEWER INLETS SHALL BE PROTECTED FROM SEDIMENT BY INLET SEDIMENT PROTECTION DEVICES AS DETAILED. PROTECTION SHALL REMAIN IN PLACE UNTIL BITUMINOUS AREA'S HAVE BEEN PAVED AND LAWN AREA'S HAVE BEEN ESTABLISHED.
3. ALL DISTURBED GROUND LEFT INACTIVE FOR FOURTEEN OR MORE DAYS MUST BE STABILIZED BY SEEDING, SODDING, OR MULCHING.
4. DRIVEWAYS TO BE REMOVED AND CONSTRUCTED TO CITY STANDARDS BY A LICENSED AND BONDED CONTRACTOR UNDER PERMIT FROM THE PUBLIC WORKS SIDEWALK SECTION (651-266-6120). SIDEWALK GRADES MUST BE CARRIED ACROSS THE DRIVEWAYS.
5. WORK ON PUBLIC CURBS, SIDEWALKS AND ALLEYS TO BE DONE TO CITY STANDARDS BY A LICENSED AND BONDED CONTRACTOR FROM THE PUBLIC WORKS SIDEWALK SECTION (651-266-6120)
6. THE CONTRACTOR MUST OBTAIN AN OBSTRUCTION / EXCAVATION PERMIT FROM PUBLIC WORKS (651-266-6151) IF TRUCKS/EQUIPMENT WILL BE DRIVING OVER CURBS OR IF CONSTRUCTION WILL BLOCK CITY STREETS, SIDEWALKS, OR ALLEYS. THE CONTRACTOR SHALL CONTACT THE INSPECTOR TO COORDINATE ALL UTILITY WORK AND OTHER EXCAVATIONS IN THE PUBLIC RIGHT OF WAY (651-485-0419).
7. CONTACT ROB KLEMM AT (651-487-7226) TO DISCUSS TRAFFIC CONTROL, PEDESTRIAN SAFETY ISSUES, PERMITS, AND OTHER RIGHT OF WAY CONCERNS. CONTACT MUST BE MADE AT LEAST A WEEK PRIOR TO ORDERING AN OBSTRUCTION PERMIT AND THE START OF DEMOLITION.
8. ADJACENT STREETS AND ALLEYS MUST BE SWEPT TO KEEP THEM FREE OF SEDIMENT. CONTRACTOR MUST MONITOR CONDITIONS AND SWEEP AS NEEDED OR WITHIN 24 HOURS OF NOTICE BY THE CITY.
9. CARE MUST BE TAKEN DURING CONSTRUCTION AND EXCAVATION TO PROTECT ANY SURVEY MONUMENTS AND/OR PROPERTY IRONS.
10. ALL UTILITIES AND CONTRACTORS MUST BE REGISTERED, INSURED, AND BONDED, AS RECOGNIZED BY THE PUBLIC WORKS RIGHT OF WAY DESK, (651-266-6154) IF THEY WILL BE WORKING IN THE PUBLIC ROAD RIGHT OF WAY. THE CONTRACTOR MUST COORDINATE WITH GAS, ELECTRIC, TELEVISION, AND TELEPHONE UTILITIES PRIOR TO CONSTRUCTION TO DETERMINE FEED POINTS INTO THE PROPERTY. THE UTILITY MUST SUBMIT A PLAN FOR THE APPROVAL OF THE PUBLIC WORKS UTILITY REVIEW COMMITTEE IF THE PROPOSED ROUTE REQUIRES ONE, AND IS RESPONSIBLE FOR ORDERING ALL PERMITS FOR THEIR UTILITY'S SERVICES INTO A SITE.
11. THE CONTRACTOR SHALL PROVIDE A CONTINUOUS, ACCESSIBLE AREA AND SAFE PEDESTRIAN WALKWAY THAT MEETS ADA AND MN MUTCD STANDARDS IF WORKING IN A SIDEWALK AREA, AND TRAFFIC CONTROL PER MN MUTCD FOR WORK IN THE PUBLIC RIGHT OF WAY AREA.
12. THE INSTALLATION OF PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES, AND/OR LIGHTING IS STRICTLY PROHIBITED IN THE CITY RIGHT OF WAY.

GRADING HOLD DOWN TABLE

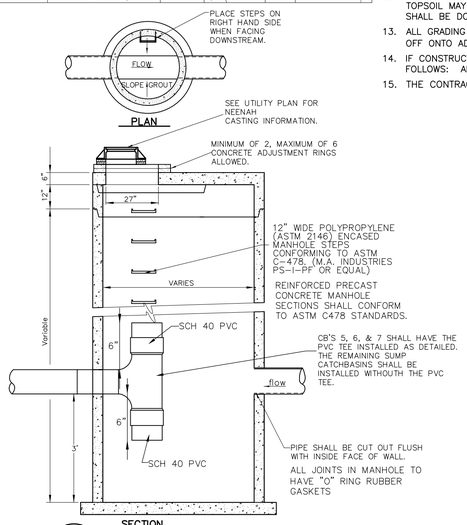
BITUMINOUS PAVEMENT
2" BITUMINOUS WEAR COURSE
2" BITUMINOUS NON-WEAR COURSE
8" MN/DOT 3138 CLASS 5 AGG. BASE

PRIVATE CONCRETE SIDEWALK PAVEMENT
4" CONCRETE PAVEMENT
6" MN/DOT 3149.2B SAND CUSHION

NORTH-SOUTH SIDEWALK CONCRETE PAVEMENT
5" CONCRETE PAVEMENT
6" MN/DOT 3149.2B SAND CUSHION

PAVER SIDEWALK
2.38"AQUA-BRIC PERMEABLE PAVERS
2.0" BEDDING COURSE ⅜" CLEAR CRUSHED AGGREGATE
4.0" BASE COURSE OPEN GRADED AGGREGATE ½" TO 1"
12" SUB-BASE COURSE OPEN GRADED AGGREGATE 2½" TO 3"

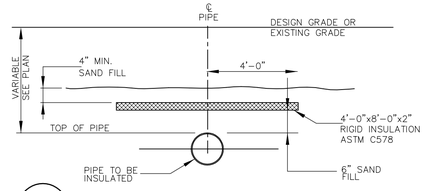
CONCRETE DRIVE PAVEMENT
6" CONCRETE PAVEMENT
6" MN/DOT 3138 CLASS 5 AGG. BASE



2 C-200 SUMP CATCHBASIN
NOT TO SCALE

RETAINING WALL NOTES:

1. ALL TOP AND BOTTOM ELEVATIONS RESPECTIVELY CORRESPOND TO THE HIGH-GRADE AND LOW-GRADE ELEVATIONS ON EACH SIDE OF THE WALL.
2. THE BOTTOM ELEVATION IS THE ELEVATION OF THE LOW-GRADE SIDE OF THE WALL, NOT THE TOP ELEVATION OF THE BURIED BLOCK COURSE.
3. MODULAR BLOCK RETAINING WALL SHALL BE DESIGNED AND CERTIFIED BY A MINNESOTA LICENSED PROFESSIONAL ENGINEER. DESIGN CALCULATIONS AND SHOP DRAWINGS SHALL BE SUBMITTED TO THE OWNER AND ARCHITECT PRIOR TO CONSTRUCTION OF WALL.
4. RETAINING WALLS AND APPROPRIATE SAFETY FENCING ALONG THE TOP OF WALLS ARE TO BE DESIGNED AND CERTIFIED BY A MINNESOTA REGISTERED PROFESSIONAL ENGINEER. SUBMIT RETAINING WALL AND FENCE SHOP DRAWINGS TO PROJECT TEAM PRIOR TO CONSTRUCTION.



3 C-200 PIPE INSULATION DETAIL
NOT TO SCALE

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CONSTRUCTION DOCUMENTS
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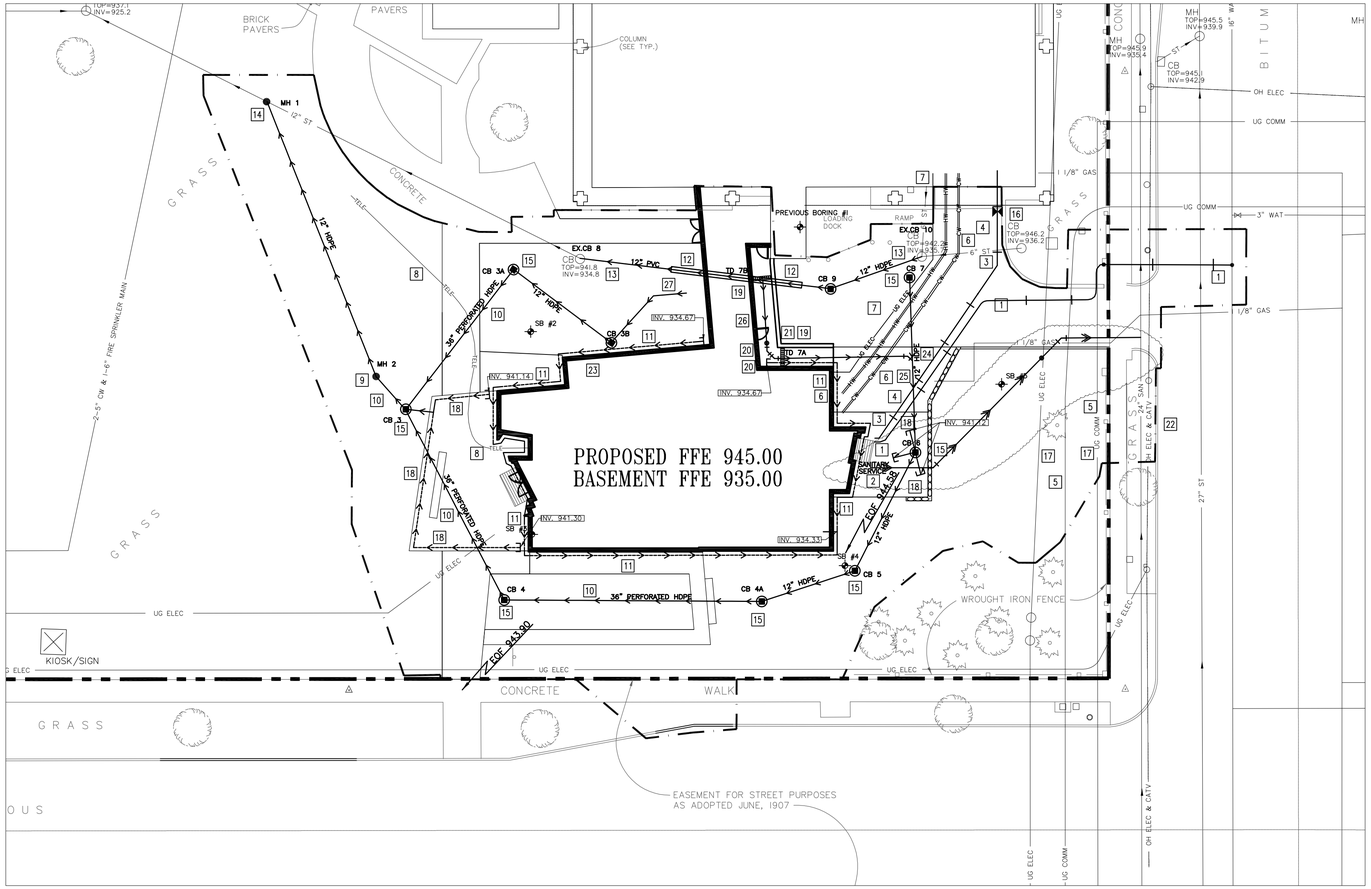
Joel W. Maier P.E.
Registration Number 19181 Date 4/28/08

GRADING, DRAINAGE, AND EROSION CONTROL PLAN

C-200



1 C-300 UTILITY PLAN
1" = 20'

PROPOSED PLAN SYMBOLS

- PROPERTY LINE
- WATER SERVICE
- SANITARY SEWER
- STORM SEWER
- CONSTRUCTION LIMITS
- CATCH BASIN/MANHOLE
- SEWER CLEANOUT
- WATER VALVE
- SOIL BORINGS — SB #3
- DRAINTILE INVERT ELEVATION — INV. 934.16

ABBREVIATIONS

BLDG	Building
BM	Bench Mark
CB	Catch Basin
CD	Curtain Drain
CONC	Concrete
ELEV	Elevation
EX	Existing
FFE	Finished Floor Elevation
HDPE	High Density Polyethylene
INV	Invert
MH	Manhole
PVC	Polyvinyl Chloride
RCP	Reinforced Concrete Pipe

N

20' 10' 0 20' 40'
SCALE 1" = 20'

APPROXIMATE DISTURBED AREA IS 0.58 ACRES

UTILITY NOTES:

1. COORDINATE SERVICE CONNECTION LOCATIONS AT THE BUILDING WITH THE MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION. NO ADDITIONAL COMPENSATION WILL BE GIVEN FOR UNCOORDINATED WORK.
2. PROTECT ALL EXISTING STRUCTURES AND UTILITIES WHICH ARE NOT SCHEDULED TO BE REMOVED.
3. ALL SEWER AND WATER CROSSINGS SHALL HAVE A MINIMUM VERTICAL SEPARATION OF 1.5 FEET AND HORIZONTAL SEPARATION OF 10 FEET. FOLLOW ALL HEALTH DEPARTMENT, CITY OF ST. PAUL, AND RAMSEY COUNTY STANDARDS AND SPECIFICATIONS.
4. ALL WATER SERVICES SHALL HAVE A MINIMUM DEPTH OF COVER OF 8.0-FEET OVER TOP OF WATER SERVICE.
5. SANITARY SEWER SERVICE PIPING SHALL BE PVC SDR 26 PVC UNLESS NOTED OTHERWISE.
6. STORM SEWER PIPING SHALL BE HIGH DENSITY POLYETHYLENE (HDPE), UNLESS NOTED OTHERWISE.
7. CONTRACTORS ARE TO COORDINATE ALL WORK WITH GAS, ELECTRIC, TELEVISION AND TELEPHONE COMPANIES PRIOR TO START OF CONSTRUCTION.
8. RIGID POLYSTYRENE INSULATION BOARD SHALL BE INSTALLED ON ALL UTILITY PIPE STUBS SERVICING THE BUILDING, IF THE PIPE HAS LESS THAN 5-FEET OF COVER OVER THE TOP OF PIPE. OBTAIN WRITTEN APPROVAL FROM ENGINEER PRIOR TO INSTALLATION.

UTILITY NOTES FOR WORK IN PUBLIC RIGHT-OF-WAY:

1. FOLLOW ALL CITY OF ST. PAUL AND RAMSEY COUNTY STANDARDS AND SPECIFICATIONS.
2. PRIOR TO CONSTRUCTION, CONTRACTORS ARE TO COORDINATE ALL WORK WITHIN RIGHT OF WAY WITH BILL MCDONALD (651-485-0419) AND OBTAIN ALL APPLICABLE PERMITS.
3. ALL DIGGING IN THE PUBLIC RIGHT OF WAY, FOR UTILITIES OR OTHER PURPOSES, REQUIRES AN EXCAVATING PERMIT. IF THE PROPOSED BUILDING IS CLOSE TO THE RIGHT OF WAY, AND EXCAVATING INTO THE RIGHT OF WAY IS NEEDED TO FACILITATE BUILDING CONSTRUCTION, THE CONTRACTOR MUST DISCUSS WITH THE UTILITY INSPECTOR THE EXTENT OF THE PROPOSED EXCAVATION, AND SECURE THE INSPECTOR'S APPROVAL TO DO SO.
4. UTILITY WORK IN THE STREET ON SNELLING AVE. IS A BIG CONCERN, AND WILL NEED TO BE WELL PLANNED OUT DUE TO HEAVY TRAFFIC. CONTACT BILL MCDONALD (651-485-0419) OF RIGHT OF WAYS WELL IN ADVANCE OF ACTUAL WORK AND MEET WITH HIM.

KEYED NOTES

KEYED NOTES ARE DENOTED BY [NO] ON PLAN.

[1] INSTALL NEW 2-INCH TYPE K WATER SERVICE. PRIVATE PLUMBER WILL INSTALL NEW WATER SERVICE OUT TO THE PROPERTY LINE ACCORDING TO SAINT PAUL REGIONAL WATER SERVICE STANDARDS (651-266-6270). THE SAINT PAUL REGIONAL WATER SERVICE WILL INSTALL SERVICE IN THE RIGHT OF WAY AT THE PROPERTY OWNERS EXPENSE. COORDINATE WITH MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION. NO ADDITIONAL COMPENSATION WILL BE GIVEN FOR UNCOORDINATED WORK. RESTORE PAVEMENT AND FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS FOR WORK WITHIN THE RIGHT-OF-WAY.

[2] INSTALL 4-INCH SDR 26 SANITARY SEWER SERVICE TO WITHIN 5-FEET OF BUILDING AT INVERT ELEVATION OF 938.97. CONTRACTOR IS TO COORDINATE EXACT PIPE SIZE, INVERT ELEVATION AND LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION. NO ADDITIONAL COMPENSATION FOR UNCOORDINATED WORK.

[3] INSTALL 45 DEGREE, 6-INCH D.I.P. BEND WITH THRUST BLOCKING. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[4] 6-INCH D.I.P. FIRE SERVICE FROM KAGIN HALL. CONTRACTOR SHALL COORDINATE EXACT LOCATION, SIZE, AND INVERT ELEVATION WITH MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS. NO ADDITIONAL COMPENSATION FOR UNCOORDINATED WORK.

[5] INSTALL 4-INCH, 45-DEGREE PVC BEND.

[6] SCHEMATIC LOCATION OF STEAM AND CHILLED WATER SERVICE SUPPLY AND RETURN LINES. REFER TO MECHANICAL PLANS FOR DETAILS.

[7] APPROXIMATE LOCATION OF ELECTRICAL SERVICE FROM KAGIN HALL. COORDINATE EXACT LOCATION WITH MECHANICAL/ELECTRICAL ENGINEER AND UTILITY OWNER.

[8] APPROXIMATE LOCATION OF EXISTING COMMUNICATION SERVICE. COORDINATE EXACT LOCATION AND REUSE WITH MECHANICAL/ELECTRICAL ENGINEER AND UTILITY OWNER.

[9] INSTALL MH 2. REFER TO DETAIL 2/C-300.

[10] INSTALL 36-INCH, PERFORATED HDPE PIPE. REFER TO DETAIL 3/C-300. THE 100-YR HWL IN THE PIPES = 933.00

[11] INSTALL 4-INCH DRAINTILE PER DETAIL 7/C-500. DRAINTILE SHALL DRAIN INTO BUILDING SUMP. REFER TO MECHANICAL PLANS PRIOR TO CONSTRUCTION FOR EXACT LOCATION AND ELEVATION OF SUMP PIT.

[12] STORM SEWER TO BE INSTALLED IN A STEEL CASING PIPE UNDER THE PROPOSED BUILDING LINK. REFER TO DETAIL 14/C-500 FOR CASING PIPE DIAMETER. CASING PIPE SHALL EXTEND 10-FEET PAST FOUNDATION WALL OF BUILDING LINK ON EAST AND WEST SIDES.

[13] CORE DRILL AND INSTALL NEW STORM SEWER PIPE INTO EXISTING CATCH BASIN. GROUT SEAL AROUND OPENING. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[14] INSTALL NEW STORM SEWER MANHOLE OVER EXISTING PIPE. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[15] INSTALL SUMP CATCH BASIN. REFER TO DETAIL 2/C-200. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[16] INSTALL 6-INCH GATE VALVE AND BOX. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[17] INSTALL SANITARY SEWER CLEANOUT. REFER TO DETAIL 4/C-500. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[18] INSTALL 4-INCH HDPE DRAINTILE PIPE FOR PERVIOUS PAVEMENT SYSTEM. REFER TO DETAIL 12/C-500. REFER TO STORM SEWER TABLE FOR INVERT ELEVATION AT STRUCTURE.

[19] INSTALL TRENCH DRAIN. REFER TO DETAIL 5/C-500.

[20] INSTALL 45-DEGREE, 6-INCH PVC BEND.

[21] CONNECT TD 7A TO 6-INCH PVC STORM PIPE USING A 6-INCH x 6-INCH PVC TEE.

[22] CORE DRILL THE EXISTING 24-INCH SANITARY SEWER MAIN AT INVERT ELEVATION 937.70 TO ACCEPT THE 4-INCH PVC SERVICE PIPE USING A ROMAC INDUSTRIES "CB" STYLE SADDLE OR APPROVED EQUAL, OR A PVC SADDLE TEE AND GASKET SECURED TO PIPE WITH TWO STAINLESS STEEL COMPRESSION STRAPS. PVC SADDLE TO BE GPK OR APPROVED EQUAL. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[23] INSTALL CATCHBASIN TO RECEIVE OUTFLOW FROM ROOF DRAINAGE EXITING THE BUILDING 1.5-FEET ABOVE GRADE. CATCHBASIN SHALL BE INSTALLED UNDER 6-INCHES OF 1 TO 2-INCH DIAMETER WASHED ROCK. CONTRACTOR SHALL WRAP THE CASTING IN GEOTEXTILE FABRIC TO PREVENT THE ROCK FROM ENTERING THE STORM SEWER CASTING. COORDINATE EXACT CATCH BASIN LOCATION WITH THE ARCHITECT AND MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION.

[24] CONNECT 6-INCH, PVC PIPE TO 12-INCH HDPE PIPE USING AN HDPE WYE AND ADAPTOR AT INVERT ELEVATION 938.67.

[25] DEFLECT THE WATERMAIN AROUND THE STORM SEWER PIPE IF NECCESARY TO MAINTAIN 1.5-FOOT SEPARATION. FOLLOW ALL CITY OF ST. PAUL AND HEALTH DEPARTMENT STANDARDS AND SPECIFICATIONS.

[26] INSTALL SEWER CLEANOUT FOR PAVED AREA. REFER TO DETAIL 4/C-500. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

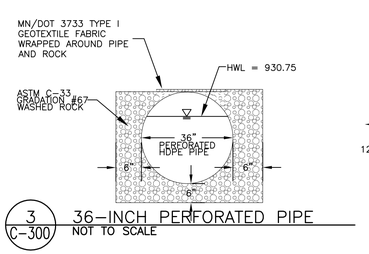
[27] STUB 3-INCH PVC ROOF DRAIN TO WITHIN 5-FEET OF THE PROPOSED BUILDING AT INVERT ELEVATION 940.50. ROOF DRAIN PIPE SHALL BE INSULATED PER DETAIL 3/C-200. CONTRACTOR IS TO COORDINATE EXACT PIPE SIZE, INVERT ELEVATION AND LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION.

NOTE:

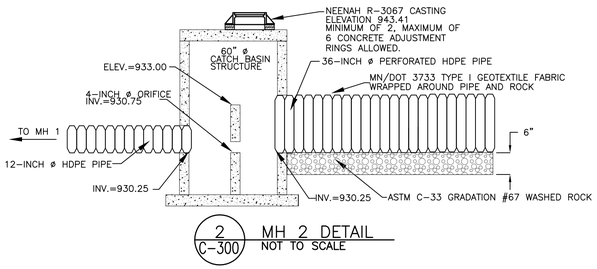
1. WHEN ABANDONING AN EXISTING SEWER SERVICE OR WHEN MAKING NEW CONNECTIONS TO A CITY SEWER, THIS MUST BE DONE IN ACCORDANCE WITH CITY STANDARDS BY A LICENSED HOUSE DRAIN CONTRACTOR UNDER PERMIT FROM THE PUBLIC WORKS SEWER SECTION. (651-266-6234)
2. UPON COMPLETION OF STORM SEWER INSTALLATION, STORM SEWER INLETS SHALL BE PROTECTED FROM SEDIMENT BY INLET SEDIMENT PROTECTION DEVICES AS DETAILED. PROTECTION SHALL REMAIN IN PLACE UNTIL BITUMINOUS AREA'S HAVE BEEN PAVED AND LAWN AREA'S HAVE BEEN ESTABLISHED.
3. ALL DISTURBED GROUND LEFT INACTIVE FOR FOURTEEN OR MORE DAYS MUST BE STABILIZED BY SEEDING, SODDING, OR MULCHING.
4. DRIVEWAYS TO BE REMOVED AND CONSTRUCTED TO CITY STANDARDS BY A LICENSED AND BONDED CONTRACTOR UNDER PERMIT FROM THE PUBLIC WORKS SIDEWALK SECTION (651-266-6120). SIDEWALK GRADES MUST BE CARRIED ACROSS THE DRIVEWAYS.
5. WORK ON PUBLIC SIDEWALKS AND ALLEYS TO BE DONE TO CITY STANDARDS BY A LICENSED AND BONDED CONTRACTOR FROM THE PUBLIC WORKS SIDEWALK SECTION (651-266-6120)
6. THE CONTRACTOR MUST OBTAIN AN OBSTRUCTION / EXCAVATION PERMIT FROM PUBLIC WORKS (651-266-6151) IF TRUCKS/EQUIPMENT WILL BE DRIVING OVER CURBS OR IF CONSTRUCTION WILL BLOCK CITY STREETS, SIDEWALKS, OR ALLEYS. THE CONTRACTOR SHALL CONTACT THE INSPECTOR TO COORDINATE ALL UTILITY WORK AND OTHER EXCAVATIONS IN THE PUBLIC RIGHT OF WAY (651-485-0419).
7. CONTACT ROB KLEMM AT (651-487-7226) TO DISCUSS TRAFFIC CONTROL, PEDESTRIAN SAFETY ISSUES, PERMITS, AND OTHER RIGHT OF WAY CONCERNS. CONTACT MUST BE MADE AT LEAST A WEEK PRIOR TO ORDERING AN OBSTRUCTION PERMIT AND THE START OF DEMOLITION.
8. ADJACENT STREETS AND ALLEYS MUST BE SWEPT TO KEEP THEM FREE OF SEDIMENT. CONTRACTOR MUST MONITOR CONDITIONS AND SWEEP AS NEEDED OR WITHIN 24 HOURS OF NOTICE BY THE CITY.
9. CARE MUST BE TAKEN DURING CONSTRUCTION AND EXCAVATION TO PROTECT ANY SURVEY MONUMENTS AND/OR PROPERTY IRONS.
10. ALL UTILITIES AND CONTRACTORS MUST BE REGISTERED, INSURED, AND BONDED, AS RECOGNIZED BY THE PUBLIC WORKS RIGHT OF WAY DESK, (651-266-6154) IF THEY WILL BE WORKING IN THE PUBLIC ROAD RIGHT OF WAY. THE CONTRACTOR MUST COORDINATE WITH GAS, ELECTRIC, TELEVISION, AND TELEPHONE UTILITIES PRIOR TO CONSTRUCTION TO DETERMINE FEED POINTS INTO THE PROPERTY. THE UTILITY MUST SUBMIT A PLAN FOR THE APPROVAL OF THE PUBLIC WORKS UTILITY REVIEW COMMITTEE IF THE PROPOSED ROUTE REQUIRES ONE, AND IS RESPONSIBLE FOR ORDERING ALL PERMITS FOR THEIR UTILITY'S SERVICES INTO A SITE.
11. THE CONTRACTOR SHALL PROVIDE A CONTINUOUS, ACCESSIBLE AREA AND SAFE PEDESTRIAN WALKWAY THAT MEETS ADA AND MN MUTCD STANDARDS IF WORKING IN A SIDEWALK AREA, AND TRAFFIC CONTROL PER MN MUTCD FOR WORK IN THE PUBLIC RIGHT OF WAY AREA.
12. THE INSTALLATION OF PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES, AND/OR LIGHTING IS STRICTLY PROHIBITED IN THE CITY RIGHT OF WAY.

STORM SEWER TABLE

STRUCTURE IDENTIFICATION	STRUCTURE DIMENSION (INCHES)	NEENAH CASTING	TOP ELEVATION	INVERT ELEVATION	PIPE LENGTH, DIAMETER, SLOPE & NEXT UPSTREAM STRUCTURE
MH 1	72	R-1733	941.40	EX. NW. 928.75 EX. SE. 928.75 SE. 929.47	78 L.F. OF 12-INCH HDPE @ 1.00%, MH 2
MH 2	60	R-1733	943.41	REFER TO DETAIL 2/C300	12 L.F. OF 36-INCH PERFORATED HDPE @ 0.00%, CB 3
CB 3	84	R-2535	944.00	NW. 930.25 NE. 930.25 E. 941.00 SW. 930.25 SUMP 927.25	47 L.F. OF 36-INCH PERFORATED HDPE @ 0.00%, CB 3A 4-INCH PERFORATED HDPE DRAINTILE 57 L.F. OF 36-INCH PERFORATED HDPE @ 0.00%, CB 4
CB 3A	60	R-2535	943.00	SW. 930.25 SE. 938.00 SUMP 927.25	32 L.F. OF 12-INCH HDPE @ 3.91%, CB 3B
CB 3B	48	R-2535	944.25	NW. 939.25 NE. 940.00	25 L.F. OF 3-INCH PVC @ 2.00%, ROOF DRAIN LEAD
CB 4	60	R-2535	943.84	NW. 930.25 E. 930.25 SUMP 927.25	68 L.F. OF 36-INCH PERFORATED HDPE @ 0.00%, CB 4A
CB 4A	60	R-2535	944.26	W. 930.25 E. 936.28 SUMP 927.25	26 L.F. OF 12-INCH HDPE @ 1.00%, CB 5
CB 5	48	R-2535	944.42	W. 936.54 NE. 936.54 SUMP 933.54	35 L.F. OF 12-INCH HDPE @ 1.00%, CB 6
CB 6	48	R-2535	944.35	SW. 936.89 N. 936.17 S,N,W. 941.00 SUMP 933.89	25 L.F. OF 12-INCH HDPE @ 1.00%, 12"x6" WYE 4-INCH PERFORATED HDPE DRAINTILE
12"x6" WYE	N/A	N/A	N/A	S. 938.42 N. 938.42 W. 938.67	21 L.F. OF 12-INCH HDPE @ 1.00%, CB 7 34 L.F. OF 6-INCH PVC @ 2.91%, TD 7A
CB 7	48	R-2535	942.62	S. 938.63 SUMP 935.63	———
TD 7A	REFER TO DETAIL 5/C-500		944.10	E. 939.66 W. 939.66	24 L.F. OF 6-INCH PVC @ 0.50%, TD 7B
TD 7B	REFER TO DETAIL 5/C-500		943.54	S. 939.78	———
EX. CB 8	EXISTING	EXISTING	EXISTING	EX. NW. 934.80 E. 934.80	67 L.F. OF 12-INCH SCH 40 PVC @ 1.00%, MH 9
CB 9	48	R-2535	943.10	E. 935.47 W. 935.47	26 L.F. OF 12-INCH HDPE @ 0.88%, EX. CB 10
EX. CB 10	EXISTING	EXISTING	EXISTING	EX. N. 935.70 EX. E. 935.70 W. 935.70	———



3 C-300 36-INCH PERFORATED PIPE
NOT TO SCALE



2 C-300 MH 2 DETAIL
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617 492 8400
www.brunercott.com

Architecture/Urban Design
Preservation/Landscape Architecture
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BKBM Job No. 07247.00

Rev	Date	Remarks
	3-13-2008	SITE PLAN REVIEW SET
	4-7-2008	RESUBMIT OF SITE PLAN REVIEW SET
	4-18-2008	RESUBMIT OF SITE PLAN REVIEW SET

Date	JUNE 03, 2008
Scale	
Project Number	871-00
Drawn By	RGE

Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

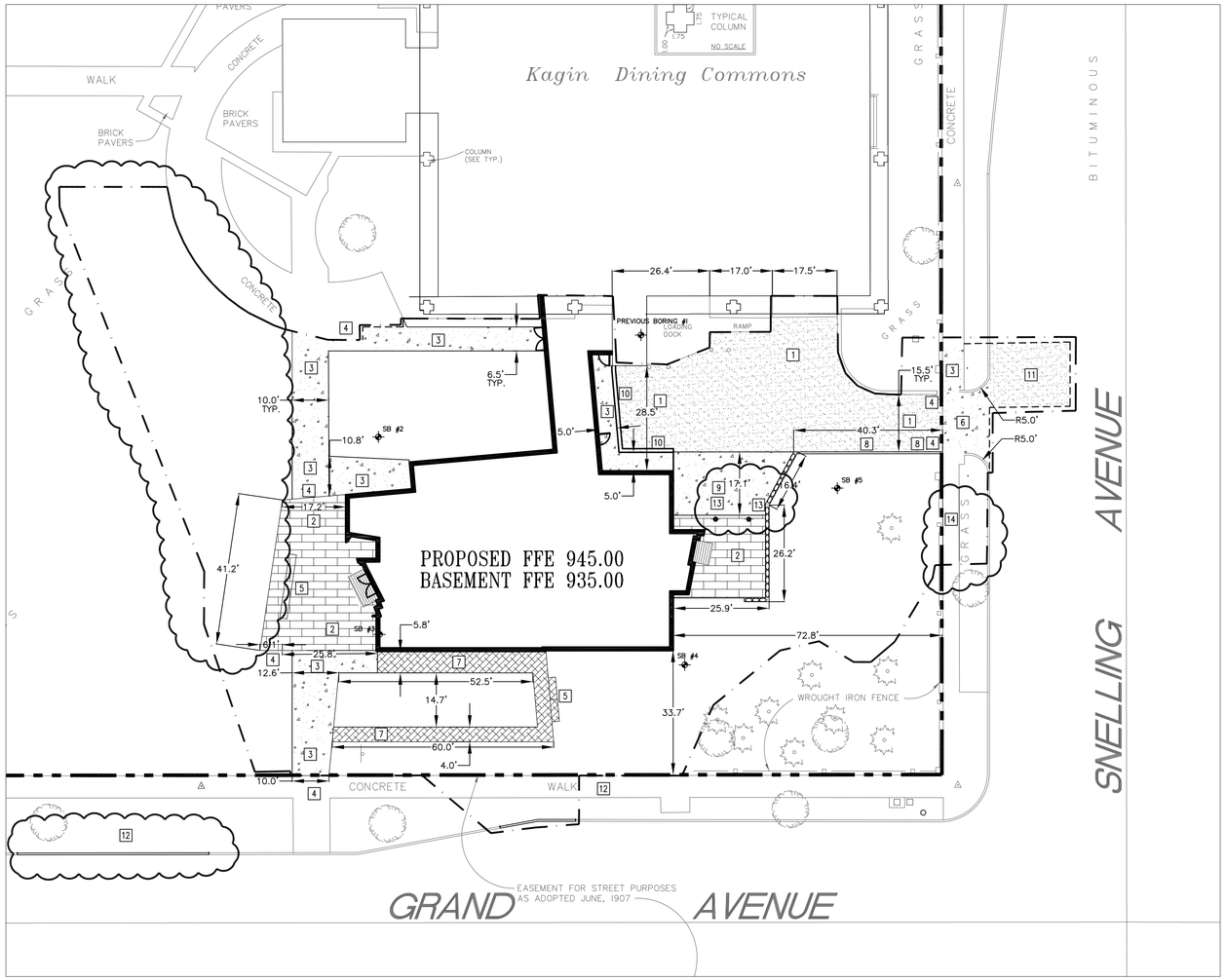
CONSTRUCTION DOCUMENTS
April 28, 2008

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Joel W. Maier P.E.
Registration Number 19181 Date 4/28/08

UTILITY PLAN

C-300



1 C-400 GEOMETRIC AND PAVING PLAN
1" = 20'

PROPOSED PLAN SYMBOLS

- BITUMINOUS PAVEMENT
- PERVIOUS PAVEMENT
- CONCRETE PAVEMENT
- CRUSHED STONE
- CONSTRUCTION LIMITS
- SAWCUT LINE
- PROPERTY LINE
- RETAINING WALL
- NO PARKING SIGN

ABBREVIATIONS

BLDG	Building
BM	Bench Mark
CONC	Concrete
EX	Existing
SF	Square Foot
SP	Surface Parking

N

20' 10' 0 20' 40'

SCALE 1" = 20'

GENERAL NOTES:

1. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS NOTED OTHERWISE.
2. ALL CURB AND GUTTER ON PRIVATE PROPERTY IS TO BE B612 CONCRETE CURB AND GUTTER UNLESS NOTED OTHERWISE.
3. NO SIDEWALK IS TO HAVE MORE THAN A 2% CROSS SLOPE OR MORE THAN A 5% LONGITUDINAL SLOPE.
4. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR PROPOSED BUILDING LAYOUT.
5. FOLLOW ALL CITY OF ST. PAUL AND RAMSEY COUNTY RULES, REGULATIONS AND SPECIFICATIONS WHEN WORKING IN PUBLIC RIGHT OF WAY.
6. NO PONDING OF WATER WILL BE ALLOWED WHERE NEW PAVEMENT MATCHES INTO EXISTING PAVEMENT.
7. PRIOR TO START OF CONSTRUCTION, THE CONTRACTORS ARE TO COORDINATE ALL WORK WITH THE GAS, ELECTRIC, TELEPHONE AND CABLE COMPANIES.

KEYED NOTES

KEYED NOTES ARE DENOTED BY [NO] ON PLAN.

[1] INSTALL BITUMINOUS PAVEMENT PER DETAIL 10/C-500 FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS WHEN IN PUBLIC RIGHT OF WAY.

[2] INSTALL PERMEABLE PAVERS PER DETAIL 12/C-500. REFER TO LANDSCAPE ARCHITECT'S PLANS FOR EXACT TYPE AND LAYOUT.

[3] INSTALL CONCRETE PAVEMENT PER DETAIL 11/C-500. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[4] NEW CONCRETE WALK WORK ABUTTING TO EXISTING CONCRETE AND/OR NEW PERVIOUS PAVEMENT MUST MAKE A SMOOTH TRANSITION. NO PONDING OF WATER OR ABRUPT TRANSITIONS WILL BE PERMITTED.

[5] REFER TO LANDSCAPE PLANS FOR BENCH INFORMATION.

[6] INSTALL CONCRETE DRIVE ENTRANCE. REFER TO DETAIL 4/C-400.

[7] INSTALL CRUSHED STONE. REFER TO LANDSCAPE ARCHITECT'S PLANS.

[8] INSTALL B612 CONCRETE CURB AND GUTTER. REFER TO DETAIL 13/C-500.

[9] INSTALL CONCRETE PAD PER DETAIL 3/C-400. REFER TO LANDSCAPE PLAN FOR JOINT LAYOUT.

[10] INSTALL CONCRETE CURB WALL. REFER TO ARCHITECTURAL PLANS.

[11] INSTALL BITUMINOUS PAVEMENT TO MATCH EXISTING CROSS SECTION IN SNELLING AVENUE. WORK SHALL BE COMPLETED BY THE CITY OF ST. PAUL AT THE OWNER'S EXPENSE. COORDINATE ALL WORK TO BE COMPLETED WITH THE CITY OF ST. PAUL PRIOR TO CONSTRUCTION.

[12] THE CONTRACTOR SHALL REPLACE THE CONCRETE SIDEWALK AND CURB AND GUTTER DISTURBED WITH THE INSTALLATION OF THE CONSTRUCTION ENTRANCE. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[13] INSTALL NO PARKING SIGN. REFER TO DETAIL 2/C-400.

[14] THE CONTRACTOR SHALL REPLACE THE CONCRETE SIDEWALK AND CURB AND GUTTER DISTURBED WITH THE INSTALLATION OF THE SANITARY SEWER SERVICE. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

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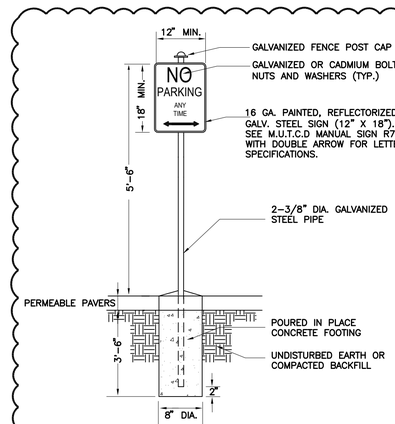
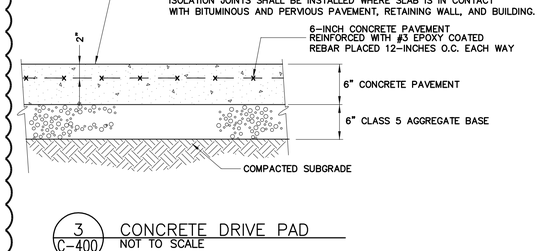
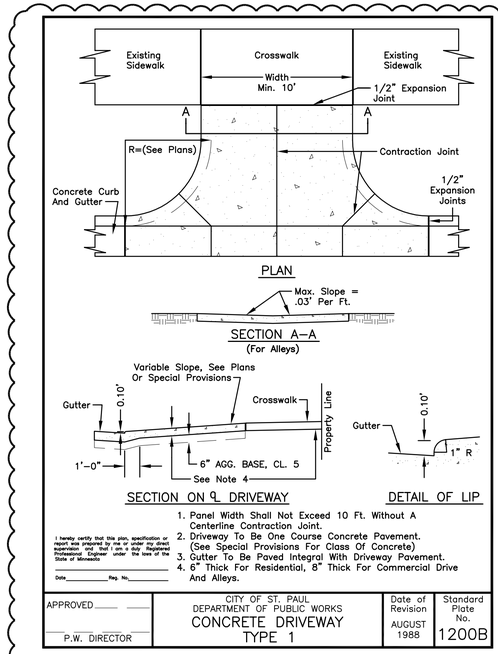


2 C-400 NO PARKING SIGN
NOT TO SCALE



3 C-400 CONCRETE DRIVE PAD
NOT TO SCALE



4 C-400 CONCRETE DRIVEWAY
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BKBM Job No. 07247.00

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Date	JUNE 03, 2008
Scale	
Project Number	871-00
Drawn By	RGE

Macalester College

Institute for Global Citizenship

Grand Avenue St. Paul, MN

CONSTRUCTION DOCUMENTS
April 28, 2008

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Joel W. Maier P.E.
Registration Number 19181 Date 4/28/08

GEOMETRIC AND PAVING PLAN

C-400

SUSTAINABLE SITES

CREDIT 6.2: STORMWATER DESIGN: QUALITY CONTROL

INPUT AND RESULTS TABLE

WATERSHED PLAN

GRADING PLAN

UTILITIES PLAN

GEOMETRIC AND PAVING PLAN

CIVIL DETAILS SHEET

P8-V3.X IGC 4-17-08.p8c Watersheds

						Directly Connected UnSwept Areas--->				Directly Connected Swept Areas--->				Street Sweeping Parameters		
Watershed Label	Total Area acres	Outflow Device	Pervious Curve Number	Indirect Imperv Fraction	Pervious Load Factor	Imperv Fraction	Depress Storage inches	Runoff Coef	Imperv Load Factor	Imperv Fraction	Depress Storage inches	Runoff Coef	Imperv Load Factor	Start Date MMDD	Stop Date MMDD	Sweep Freq 1/week
Watershed 1	0.34	Infiltration Tanks	63	0.000	1	0.25	0.02	1	1	0.25	0.02	1	1	401	1001	0.08
Watershed 2	0.04	Off Site	63	0.000	1	0	0.02	1	1	1	0.02	1	1	401	1001	0.08
Watershed 3	0.05	Off Site	63	0.200	1	0	0.02	1	1	0	0.02	1	1	401	1001	0.08
Watershed 4	0.05	Off Site	63	0.200	1	0	0.02	1	1	0	0.02	1	1	401	1001	0.08

P8 Urban Catchment Model, Version 3.4 Run Date 12/10/08
Case IGC 4-17-08.p8c FirstDate 07/01/69 Precip(in) 0.8
Title IGC Randy 2-7-08 LastDate 07/02/69 Rain(in) 0.75
PrecFile type2.pcp Events 1 Snow(in) 0.00
PartFile nurp50.p8p TotalHrs 48 TotalYrs 0.01

File Directory C:\Program Files\P8 Urban Catchment Model\P8 Version 3.4\
Case Title IGC Randy 2-7-08
Case File IGC 4-17-08.p8c
Particle File nurp50.p8p
Temperature File Msp5095.tmp
Storm File type2.pcp
Precip Scale Factor 1

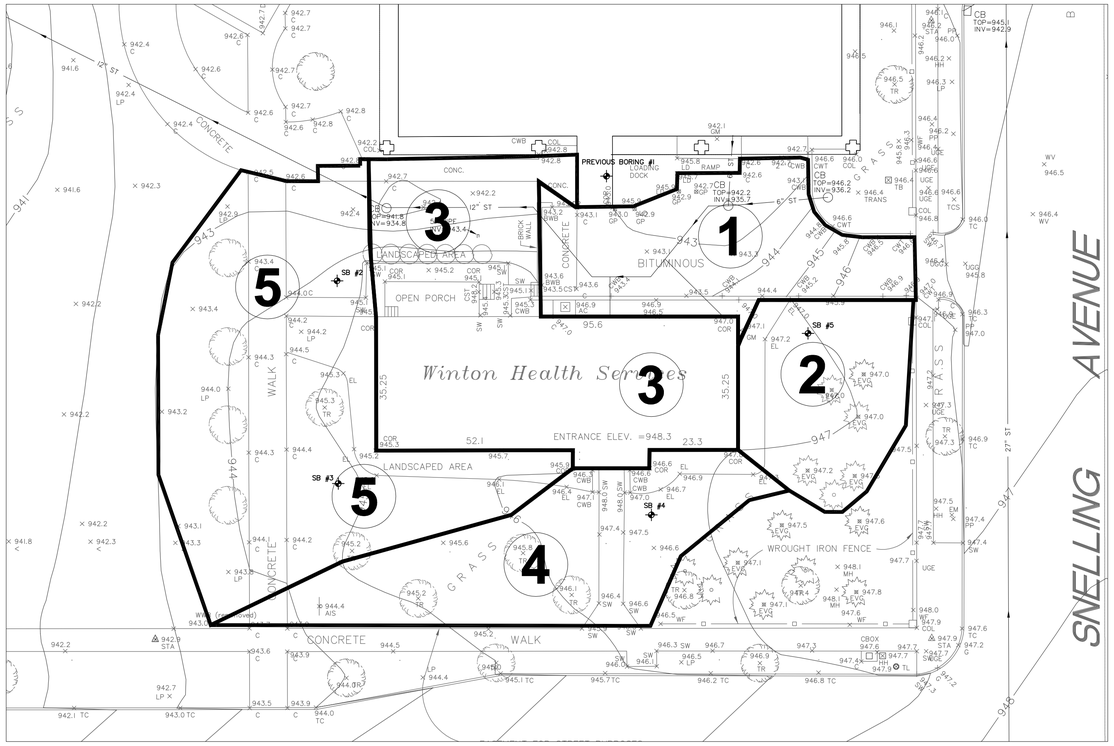
Watersheds 4
Devices 2
Particles 5
WQ Components 7

Start Date 06/30/69
Keep Date 07/01/69
Stop Date 07/02/69
Storm Count 1
Total Hours 48
Wet Hours 24
Precip (in) 1
Rain (in) 1
Snowfall (in) 0
Snowmelt (in) 0
EvapoTran(in) 0

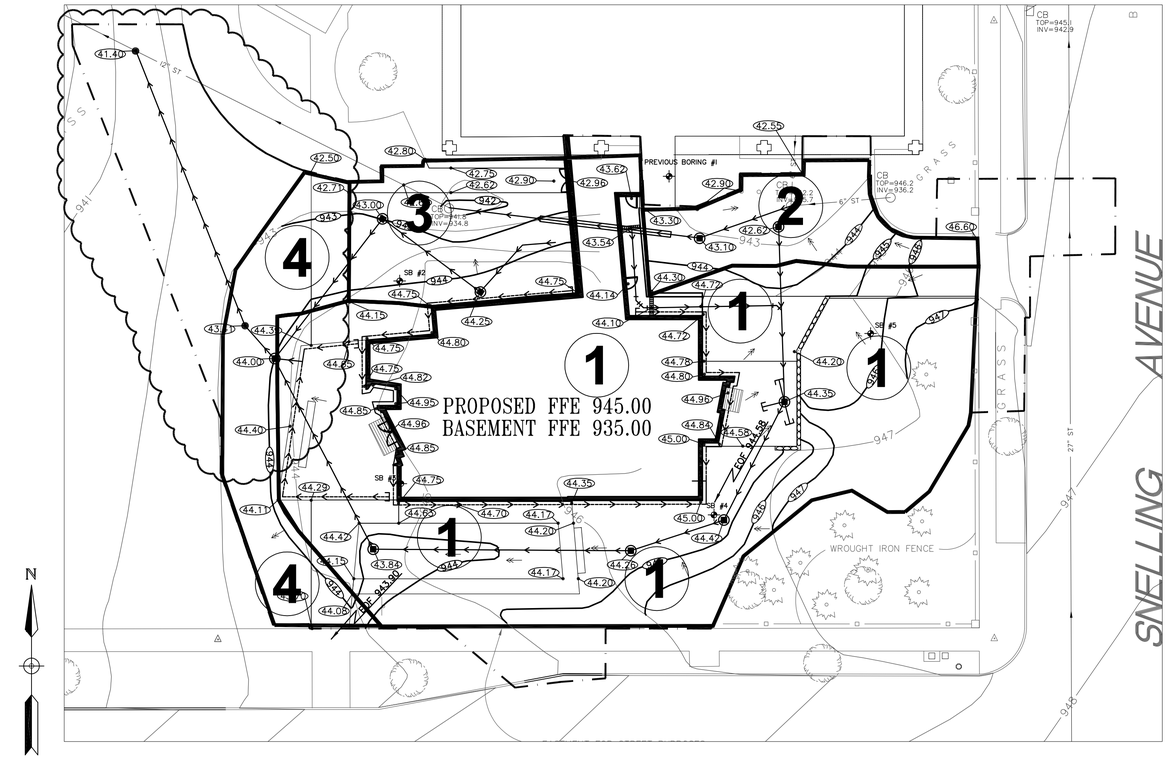
Overall TSS Removal(%) 1
Water Balance Error(%) 0
TSS Mass Balance Error 0

P-8 Results

Variable	OVERALL	Infiltration Tanks
P0%	71.7	88.5
P10%	80.9	100
P30%	81	100
P50%	81	100
P80%	81	100
TSS	81	100
TP	78	96.4
TKN	77.1	95.2
CU	78.2	96.6
PB	80	98.8
ZN	72.8	89.9
HC	80	98.8



1 C-600 EXISTING CONDITIONS
1" = 20'



2 C-600 PROPOSED CONDITIONS
1" = 20'

N

20' 10' 0 20' 40'
SCALE 1" = 20'

EXISTING SITE						
DRAINAGE AREA NUMBER	IMPERVIOUS (ACRES)	PERVIOUS (ACRES)	TOTAL (ACRES)	Q out (CFS) Storm Event		
				1-yr	10-yr	100-yr
1	0.07	0.00	0.07	0.23	0.40	0.57
2	0.00	0.05	0.05	0.01	0.07	0.15
3	0.11	0.02	0.13	0.34	0.68	1.01
4	0.01	0.07	0.08	0.08	0.24	0.42
5	0.03	0.12	0.15	0.09	0.33	0.63
TOTAL	0.22	0.26	0.48	0.75	1.72	2.78

ABBREVIATIONS

BMP	Best Management Practice
NPDES	National Pollutant Discharge Elimination System

PROPOSED SITE						
DRAINAGE AREA NUMBER	IMPERVIOUS (ACRES)	PERVIOUS (ACRES)	TOTAL (ACRES)	Q out (CFS) Storm Event		
				1-yr	10-yr	100-yr
1	0.17	0.17	0.34	0.03	0.38	0.61
2	0.04	0.00	0.04	0.15	0.23	0.32
3	0.01	0.04	0.05	0.02	0.11	0.22
4	0.01	0.04	0.05	0.03	0.10	0.20
TOTAL	0.23	0.25	0.48	0.23	0.82	1.35

PROJECT NARRATIVE

EXISTING SITE:

THE EXISTING SITE CONTAINS THE WINTON HEALTH SERVICES BUILDING. LOADING DOCK, AND LANDSCAPING. CURRENTLY THERE ARE NO WATER QUALITY TREATMENT FACILITIES ON SITE. STORM WATER SHEET FLOWS UNCONTROLLED INTO CATCHBASINS WHICH ARE CONNECTED TO THE CAMPUS STORMWATER COLLECTION SYSTEM.

PROPOSED SITE:

THE PROPOSED SITE WILL CONTAIN MACALASTER COLLEGE'S INSTITUTE FOR GLOBAL CITIZENSHIP BUILDING. THE PROPOSED BUILDING IS 3-STORIES HIGH WITH A BASEMENT. THE PROPOSED BUILDING WILL CONTAIN A SMALL PARKING AREA, PERVIOUS PAVERS IN THE PATIO AREAS, AND UNDERGROUND INFILTRATION PIPES FOR STORMWATER TREATMENT TO MEET LEED REQUIREMENTS. THE HIGH WATER LEVEL WITHIN THE INFILTRATION PIPES IS CALCULATED TO BE AT 933.00, WHICH IS 2-FEET BELOW THE BASEMENT FLOOR ELEVATION.

GRADING & SOILS

A GEOTECHNICAL EVALUATION OF THE SITE INDICATED THAT THE SUBSURFACE SOILS PROFILE CONSISTS OF A VARIABLE DEPTH OF UNCONTROLLED FILL MATERIAL.

THE UNCONTROLLED FILL GENERALLY CONSISTS OF SAND, CLAYEY SAND, AND SILTY SAND WITH VARIABLE AMOUNTS OF GRAVEL. THE FILL MATERIAL WAS LOCATED ON AVERAGE BETWEEN 0 TO 6-FEET BELOW THE GROUND SURFACE.

THE MATERIAL BELOW THE FILL MATERIAL TO AN AVERAGE DEPTH OF 9-FEET BELOW THE GROUND SURFACE CONTAINED MOSTLY TILL AND TOPSOIL. THE TILL CONSISTED OF SILTY SAND, CLAYEY SAND, AND A LITTLE GRAVEL.

BELOW THE TILL LIES A LAYER OF FINE TO COARSE ALLUVIUM CONTAINING SAND WITH SILT AND SILTY SAND TO AN AVERAGE DEPTH OF 19-FEET. THE ESTIMATED INFILTRATION RATE OF THIS SOIL IS 3" PER HOUR.

GROUNDWATER, DURING THE TIME OF OBSERVATION WAS DETECTED IN ONLY TWO OF THE BORING LOCATIONS AT A MINIMUM DEPTH OF 19.5 FEET BELOW THE GROUND SURFACE.

POLLUTION PREVENTION MANAGEMENT MEASURES

SOLID WASTE DISPOSED PROPERLY; COMPLY WITH MPCA REQUIREMENTS.
HAZARDOUS WASTE STORED (SECONDARY CONTAINMENT, RESTRICTED ACCESS) AND DISPOSED IN COMPLIANCE WITH MPCA REQUIREMENTS.
EXTERNAL WASHING OF VEHICLES LIMITED. RUNOFF CONTAINED AND WASTE PROPERLY DISPOSED.
NO ENGINE DEGREASING ALLOWED ON SITE.

FINAL STABALIZATION

STABILIZATION BY UNIFORM PERENNIAL VEGETATIVE COVER (70% DENSITY)
DRAINAGE DITCHES STABALIZED.
ALL TEMPORARY SYNTHETIC AND STRUCTURAL BMP'S REMOVED.
CLEAN OUT SEDIMENT FROM CONVEYANCES AND SEDIMENTATION BASINS (RETURN TO DESIGN CAPACITY).

SEDIMENT AND EROSION CONTROL MAINTENANCE

PERIMETER SEDIMENT CONTROL PRACTICES: WHEN SEDIMENT REACHES 1/3 THE HEIGHT OF THE BMP, THE SEDIMENT MUST BE REMOVED WITHIN 24 HOURS. IF PERIMETER SEDIMENT CONTROL HAS BEEN DAMAGED OR IS NOT FUNCTIONING PROPERLY, IT MUST BE REPAIRED AND/OR REPLACED WITHIN 24 HOURS. PERIMETER BMP MEASURES MAY INCLUDE SILT FENCING.

CONSTRUCTION SITE VEHICLE EXIT LOCATIONS: ALL TRACKED SEDIMENT ONTO PAVED SURFACES MUST BE REMOVED WITHIN 24 HOURS OF DISCOVERY OR MORE FREQUENTLY IF REQUIRED BY CITY OR WATERSHED.

CONSTRUCTION SITE DEWATERING: SITE WATER DISCHARGE DUE TO CONSTRUCTION DEWATERING OPERATIONS SHALL BE MONITORED FOR SEDIMENTATION AND TREATED PRIOR TO DISCHARGE TO PUBLIC STORM SEWERS. TREATMENT OF DEWATERING DISCHARGE MAY BE ACCOMPLISHED BY GRAVITY BAG FILTRATION.

INSPECTIONS

EXPOSED SOIL AREAS: ONCE EVERY 7 DAYS AND WITHIN 24 HOURS FOLLOWING A 1/2 INCH OVER 24 HOURS RAIN EVENT.

STABILIZED AREAS: ONCE EVERY 30 DAYS.

FROZEN GROUND: AS SOON AS RUNOFF OCCURS OR PRIOR TO RESUMING CONSTRUCTION.

RECORDS: A COPY OF THE GRADING, AND WATERSHED DATA & SWPP PLANS AS WELL AS THE INSPECTIONS/MAINTENANCE LOGS ARE TO BE KEPT EITHER IN THE FIELD OFFICE, INSPECTOR'S VEHICLE OR CONTRACTOR'S VEHICLE.

CONSTRUCTION ACTIVITY EROSION PREVENTION PRACTICES

TIME AN AREA CAN REMAIN OPEN WHEN NOT ACTIVELY BEING WORKED:
SLOPES STEEPER THAN 3:1 - 7 DAYS
SLOPES 10:1 TO 3:1 - 14 DAYS
SLOPES FLATTER THAN 10:1 - 14 DAYS

TEMPORARY PROTECTION OR PERMANENT COVER MUST BE ON:
EXPOSED SOIL AREAS WITH A CONTINUOUS POSITIVE SLOPE WITHIN 200 FEET OF A :
SURFACE WATER
CURB AND GUTTER
CATCH BASIN
ANY STORM WATER CONVEYANCE SYSTEM ON SITE
STORM WATER MANAGEMENT POND SIDE SLOPES
PERMANENT DRAINAGE DITCH

AGENCY CONTACTS

CITY OF ST. PAUL
PUBLIC WORKS DEPARTMENT
140 CITY HALL
15 WEST KELLOGG BOULEVARD
ST. PAUL, MN 55102
PHONE: (651) 266-6080

MINNESOTA POLLUTION CONTROL AGENCY
520 LAFAYETTE ROAD
SAINT PAUL, MN 55155
PHONE: (651) 296-6300

CAPITOL REGION WATERSHED DISTRICT
1410 ENERGY PARK DRIVE SUITE 4
ST. PAUL, MN 55108
PHONE: (651) 644-8888

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BKBM Job No. 07247.00

Rev	Date	Remarks
	3-13-2008	SITE PLAN REVIEW SET
	4-7-2008	RESUBMIT OF SITE PLAN REVIEW SET
	4-18-2008	RESUBMIT OF SITE PLAN REVIEW SET

Date JUNE 03, 2008
Scale
Project Number 871-00
Drawn By RGE

Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

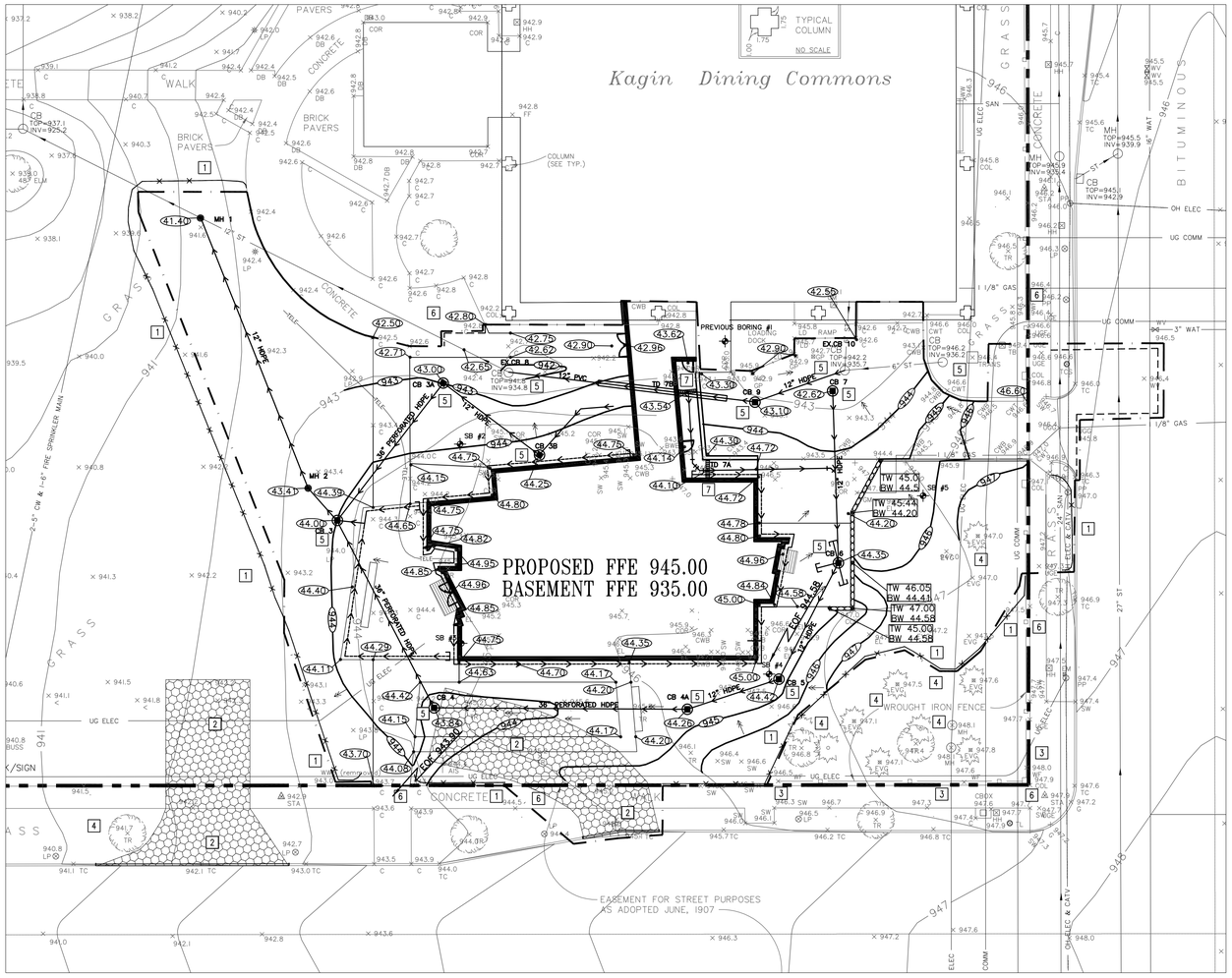
CONSTRUCTION DOCUMENTS
April 28, 2008

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Joel W. Maier P.E.
Registration Number 19181 Date 4/28/08

WATERSHED PLAN

C-600



1 C-200 GRADING, DRAINAGE, AND EROSION CONTROL PLAN
1" = 20'

PROPOSED PLAN SYMBOLS

- CONSTRUCTION LIMITS
- SILTATION FENCE
- PROPERTY LINE
- SAWCUT LINE (APPROX.)
- STORM SEWER
- DRAINTILE
- PROPOSED CONTOUR (944)
- SPOT ELEVATION (44.45)
- DRAINAGE FLOW ARROW
- RETAINING WALL
- RETAINING WALL SPOT ELEVATION (TW 45.00 / BW 42.00)
- SOIL BORING LOCATION (SB #4)

ABBREVIATIONS

BLDG	Building
BM	Bench Mark
BW	Bottom of Wall Elevation
CB	Catch Basin
CONC	Concrete
ELEV	Elevation
EX	Existing
FFE	Finished Floor Elevation
HDPE	High Density Polyethylene
INV	Invert
MH	Manhole
NWL	Normal Water Level
PVC	Polyvinyl Chloride
RCP	Reinforced Concrete Pipe
TD	Trench Drain
TW	Top of Wall Elevation

APPROXIMATE DISTURBED AREA IS 0.58 ACRES

N

20' 10' 0 20' 40'

SCALE 1" = 20'

EROSION CONTROL NOTES:

1. ALL EROSION CONTROL FACILITIES SHALL BE INSTALLED PRIOR TO ANY SITE GRADING OPERATIONS. THE CITY ENGINEER MUST BE NOTIFIED UPON COMPLETION OF THE INSTALLATION OF THE REQUIRED EROSION CONTROL FACILITIES AND PRIOR TO ANY GRADING OPERATION BEING COMMENCED. THE CONTRACTOR IS RESPONSIBLE TO SCHEDULE A PRE-CONSTRUCTION GRADING MEETING ON-SITE WITH THE CITY ENGINEER. IF DAMAGED OR REMOVED DURING CONSTRUCTION, ALL EROSION CONTROL FACILITIES SHALL BE RESTORED AND IN PLACE AT THE END OF EACH DAY.
2. ANY EROSION CONTROL FACILITIES DEEMED NECESSARY BY THE CITY; BEFORE, DURING OR AFTER THE GRADING ACTIVITIES, SHALL BE INSTALLED AT THE REQUEST OF THE CITY.
3. NO DEVIATIONS SHALL BE MADE FROM THE ELEVATIONS SHOWN ON THE APPROVED GRADING PLAN, WITHOUT PRIOR APPROVAL FROM THE CITY.
4. SOILS TRACKED FROM THE SITE BY MOTOR VEHICLES OR EQUIPMENT SHALL BE CLEANED DAILY FROM PAVED ROADWAY SURFACES, OR MORE FREQUENTLY IF REQUESTED BY THE CITY, THROUGHOUT THE DURATION OF CONSTRUCTION.
5. DUST CONTROL MEASURES SHALL BE PERFORMED PERIODICALLY WHEN CONDITIONS REQUIRE AND/OR AS DIRECTED BY THE CITY.
6. ALL EROSION CONTROL MEASURES SHALL BE USED AND MAINTAINED FOR THE DURATION OF SITE CONSTRUCTION. IF CONSTRUCTION OPERATIONS OR NATURAL EVENTS DAMAGE OR INTERFERE WITH THESE EROSION CONTROL MEASURES, THEY SHALL BE RESTORED TO SERVE THEIR INTENDED FUNCTION AT THE END OF EACH DAY OR AS SOON AS FIELD CONDITIONS ALLOW ACCESS.
7. ALL CONSTRUCTION AREAS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED AS SOON AS POSSIBLE. ANY AREAS WHICH HAVE BEEN FINISHED GRADED OR AREAS THAT HAVE BEEN DISTURBED AND FOR WHICH GRADING OR SITE BUILDING CONSTRUCTION OPERATIONS ARE NOT ACTIVELY UNDERWAY SHALL BE SEEDED AND MULCHED AS SET FORTH IN THE FOLLOWING PARAGRAPHS WITHIN 14 DAYS:
   A. ALL SEEDED AREAS SHALL BE EITHER MULCHED AND DISC-ANCHORED OR COVERED BY FIBROUS BLANKETS TO PROTECT SEEDS AND LIMIT EROSION. TEMPORARY MULCH SHALL BE DISC-ANCHORED AND APPLIED AT A UNIFORM RATE OF NOT LESS THAN TWO TONS PER ACRE AND NOT LESS THAN 80% COVERAGE.
   B. IF THE GRADED AREA IS ANTICIPATED TO BE RE-DISTURBED/DEVELOPED WITHIN SIX MONTHS, PROVIDE A TEMPORARY VEGETATIVE COVER CONSISTING OF MINNESOTA DEPARTMENT OF TRANSPORTATION (MNDOT) SEED MIXTURE 100 AT A RATE OF 100 POUNDS PER ACRE.
   C. IF GRADED AREA WILL NOT BE DEVELOPED FOR A PERIOD GREATER THAN SIX MONTHS, PROVIDE A PERMANENT VEGETATIVE COVER OF SEED MIXTURE MNDOT 190 AT A RATE OF 60 POUNDS PER ACRE.
   D. GRADING BONDS OR THE EQUIVALENT SECURITIES SHALL BE RETAINED UNTIL TURF HAS GERMINATED AND SURVIVED A 60-DAY GROWING PERIOD.
   E. WHENEVER OTHER EROSION AND SEDIMENT CONTROL PRACTICES ARE INADEQUATE, TEMPORARY ON-SITE SEDIMENT BASINS THAT CONFORM TO THE CRITERIA FOR ON-SITE DETENTION BASINS SHALL BE PROVIDED.
8. RUNOFF SHALL BE PREVENTED FROM ENTERING ALL STORM SEWER CATCH BASINS PROVIDING THEY ARE NOT NEEDED DURING CONSTRUCTION. WHERE STORM SEWER CATCH BASINS ARE NECESSARY FOR SITE DRAINAGE DURING CONSTRUCTION, A SILT FENCE OR SEDIMENT PROTECTION DEVICES AS DETAILED SHALL BE INSTALLED AND MAINTAINED AROUND ALL CATCH BASINS UNTIL THE AREA TRIBUTARY TO THE CATCH BASIN IS RESTORED.
9. GRADING ACTIVITIES PROPOSED TO BEGIN AFTER OCTOBER 15 WILL REQUIRE AN APPROVED PHASING SCHEDULE. THE AREA OF LAND THAT THE CITY WILL ALLOW TO BE DISTURBED AT THIS TIME OF YEAR WILL BE SEVERELY LIMITED. THE CITY WILL ALSO REQUIRE ADDITIONAL EROSION CONTROL DEVISES, I.E., TEMPORARY SEDIMENT BASINS, DORMANT SEEDING AND HIGH RATES OF APPLICATION OF BOTH SEED AND MULCH.
10. EROSION CONTROL FACILITIES SHALL BE INSTALLED AND MAINTAINED AROUND AREA TO BE GRADED UNTIL THE AREA TRIBUTARY TO THE AREA IS RESTORED.
11. ACCUMULATION OF ALL SEDIMENT OCCURRING IN STORM SEWERS SHALL BE REMOVED PRIOR TO, DURING AND AFTER COMPLETION OF GRADING ACTIVITIES.
12. EROSION CONTROL ITEMS AND DEVICES SHOULD BE REMOVED ONLY AS DIRECTED BY THE CITY.

GRADING NOTES:

1. THE CONTRACTOR IS TO VISIT THE SITE, REVIEW ALL CONSTRUCTION DOCUMENTS AND FIELD VERIFY THE EXISTING CONDITIONS PRIOR TO BIDDING. NO ADDITIONAL COMPENSATION WILL BE GIVEN FOR WORK THAT COULD HAVE BEEN IDENTIFIED BY A SITE VISIT OR CONSTRUCTION DOCUMENT REVIEW.
2. THE BACKGROUND INFORMATION WAS PREPARED BY SUNDE LAND SURVEYING, (952) 881-2455.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ASCERTAIN THE LOCATION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY THE LOCATION, ELEVATION AND MARK ALL EXISTING UTILITIES 48 HOURS BEFORE CONSTRUCTION STARTS. THE ENGINEER, ARCHITECT OR OWNER DOES NOT GUARANTEE THAT ALL THE UTILITIES ARE MAPPED, OR IF MAPPED, ARE SHOWN CORRECTLY. CONTACT GOPHER ONE AT 651-454-0002 FOR FIELD LOCATING EXISTING UTILITIES. CONTACT UTILITY OWNER IF DAMAGE OCCURS DUE TO CONSTRUCTION.
4. PROTECT ALL EXISTING STRUCTURES AND UTILITIES WHICH ARE NOT SCHEDULED FOR REMOVAL.
5. NOTIFY CITY BUILDING INSPECTOR BEFORE TRENCHING AND EXCAVATION WORK COMMENCES. THE CONTRACTOR SHALL OBTAIN ALL APPLICABLE PERMITS PRIOR TO START OF CONSTRUCTION.
6. ALL SPOT ELEVATIONS SHOWN AS 44.45, FOR EXAMPLE, ARE TO BE UNDERSTOOD TO MEAN 944.45.
7. NO SLOPES ARE TO EXCEED 3:1 (3 FEET HORIZONTAL TO 1 FOOT VERTICAL) UNLESS NOTED OTHERWISE.
8. PROVIDE POSITIVE DRAINAGE FROM BUILDINGS AT ALL TIMES.
9. UPON COMPLETION OF THE GRADING AND UTILITY WORK, THE CONTRACTOR SHALL CERTIFY THAT ALL GRADING AND UTILITY WORK WAS PERFORMED IN ACCORDANCE WITH THE APPROVED GRADING AND UTILITY PERMITS. A RECORD GRADING AND UTILITY PLAN SHALL BE SUBMITTED TO THE CITY FOR REVIEW AND DISTRIBUTION.
10. PRIOR TO ISSUANCE OF BUILDING PERMITS, ALL NECESSARY EROSION CONTROL DEVICES MUST BE IN PLACE AND FUNCTIONING. THE CITY WILL INSPECT THE SITE TO DETERMINE ITS SUITABILITY FOR BUILDING ACTIVITIES. IF THE PUBLIC UTILITIES HAVE NOT BEEN INSTALLED AT THIS POINT, IT MAY BE NECESSARY TO WITHHOLD BUILDING PERMITS FOR VARIOUS LOTS TO ALLOW THE CONTRACTOR ADEQUATE SPACE TO PERFORM THIS WORK.
11. ALL DEBRIS CREATED IN THE PROCESS OF CLEARING AND GRADING THE SITE SHALL BE REMOVED FROM THE SITE. THIS INCLUDES TREES AND SHRUBS. UNDER NO CIRCUMSTANCES SHALL THIS TYPE OF MATERIAL BE BURIED OR BURNED ON THE SITE.
12. ALL TOPSOIL SHALL BE STRIPPED AND SALVAGED FOR RE-SPREADING ON THE SITE. SIX INCHES OF TOPSOIL – AFTER COMPACTION– SHALL BE RE-SPREAD PRIOR TO SEEDING AND MULCHING. EXCESS TOPSOIL MAY BE REMOVED FROM THE SITE PROVIDING THERE IS ADEQUATE TOPSOIL REMAINING TO PROPERLY FINISH THE SITE AS NOTED ABOVE. THE TOPSOIL STRIPPING, STOCKPILING AND RE-SPREADING SHALL BE DONE IN ACCORDANCE TO, AND NOTED ON, THE APPROVED GRADING PLAN AND SPECIFICATIONS.
13. ALL GRADING OPERATIONS SHALL BE CONDUCTED IN A MANNER TO MINIMIZE THE POTENTIAL FOR SITE EROSION. EROSION CONTROL MEASURES SHALL BE INSTALLED TO PREVENT SEDIMENT FROM RUNNING OFF ONTO ADJACENT PROPERTIES. ANY DAMAGE TO ADJACENT PROPERTIES MUST BE CORRECTED AND RESTORED AS SOON AS PERMISSION IS GRANTED FROM THE ADJACENT PROPERTY OWNER(S).
14. IF CONSTRUCTION OF THE SITE WORK PROCEEDS THROUGH THE WINTER MONTHS, ANY DISTURBED AREAS OUTSIDE THE BUILDING FOOTPRINTS ARE TO BE MINIMALLY STABILIZED PRIOR TO MARCH 1, AS FOLLOWS: AREAS PLANNED TO RECEIVE PAVEMENTS ARE TO HAVE CLASS 5 BASE INSTALLED; ALL OTHER DISTURBED AREAS ARE TO BE SEEDED, STRAW MULCH PLACED, AND DISC-MULCHED.
15. THE CONTRACTOR SHALL LIMIT THE DISTURBED AREA AS MUCH AS POSSIBLE.

KEYED NOTES

KEYED NOTES ARE DENOTED BY [NO] ON PLAN.

1. INSTALL SILT FENCE PER DETAIL 2/C-500.
2. INSTALL ROCK CONSTRUCTION ENTRANCE PER DETAIL 1/C-500.
3. PROTECT FENCE AT ALL TIMES DURING CONSTRUCTION.
4. EXISTING TREES ARE NOT TO BE DISTURBED. PROTECT TREES AT ALL TIMES DURING CONSTRUCTION.
5. INSTALL SEDIMENT PROTECTION AT STORM SEWER INLETS. REFER TO DETAIL 3/C-500. PROTECTION SHALL REMAIN IN PLACE UNTIL BITUMINOUS AREAS HAVE BEEN PAVED AND LAWN AREAS HAVE BEEN ESTABLISHED.
6. SIDEWALK IS NOT TO BE DISTURBED DURING CONSTRUCTION. PROTECT AT ALL TIMES.
7. REFER TO ARCHITECTURAL PLANS FOR RAMP GRADING.

NOTE:

1. WHEN ABANDONING AN EXISTING SEWER SERVICE OR WHEN MAKING NEW CONNECTIONS TO A CITY SEWER, THIS MUST BE DONE IN ACCORDANCE WITH CITY STANDARDS BY A LICENSED HOUSE DRAIN CONTRACTOR UNDER PERMIT FROM THE PUBLIC WORKS SEWER SECTION. (651-266-6234)
2. UPON COMPLETION OF STORM SEWER INSTALLATION, STORM SEWER INLETS SHALL BE PROTECTED FROM SEDIMENT BY INLET SEDIMENT PROTECTION DEVICES AS DETAILED. PROTECTION SHALL REMAIN IN PLACE UNTIL BITUMINOUS AREA'S HAVE BEEN PAVED AND LAWN AREA'S HAVE BEEN ESTABLISHED.
3. ALL DISTURBED GROUND LEFT INACTIVE FOR FOURTEEN OR MORE DAYS MUST BE STABILIZED BY SEEDING, SODDING, OR MULCHING.
4. DRIVEWAYS TO BE REMOVED AND CONSTRUCTED TO CITY STANDARDS BY A LICENSED AND BONDED CONTRACTOR UNDER PERMIT FROM THE PUBLIC WORKS SIDEWALK SECTION (651-266-6120). SIDEWALK GRADES MUST BE CARRIED ACROSS THE DRIVEWAYS.
5. WORK ON PUBLIC CURBS, SIDEWALKS AND ALLEYS TO BE DONE TO CITY STANDARDS BY A LICENSED AND BONDED CONTRACTOR FROM THE PUBLIC WORKS SIDEWALK SECTION (651-266-6120)
6. THE CONTRACTOR MUST OBTAIN AN OBSTRUCTION / EXCAVATION PERMIT FROM PUBLIC WORKS (651-266-6151) IF TRUCKS/EQUIPMENT WILL BE DRIVING OVER CURBS OR IF CONSTRUCTION WILL BLOCK CITY STREETS, SIDEWALKS, OR ALLEYS. THE CONTRACTOR SHALL CONTACT THE INSPECTOR TO COORDINATE ALL UTILITY WORK AND OTHER EXCAVATIONS IN THE PUBLIC RIGHT OF WAY (651-485-0419).
7. CONTACT ROB KLEMM AT (651-487-7226) TO DISCUSS TRAFFIC CONTROL, PEDESTRIAN SAFETY ISSUES, PERMITS, AND OTHER RIGHT OF WAY CONCERNS. CONTACT MUST BE MADE AT LEAST A WEEK PRIOR TO ORDERING AN OBSTRUCTION PERMIT AND THE START OF DEMOLITION.
8. ADJACENT STREETS AND ALLEYS MUST BE SWEPT TO KEEP THEM FREE OF SEDIMENT. CONTRACTOR MUST MONITOR CONDITIONS AND SWEEP AS NEEDED OR WITHIN 24 HOURS OF NOTICE BY THE CITY.
9. CARE MUST BE TAKEN DURING CONSTRUCTION AND EXCAVATION TO PROTECT ANY SURVEY MONUMENTS AND/OR PROPERTY IRONS.
10. ALL UTILITIES AND CONTRACTORS MUST BE REGISTERED, INSURED, AND BONDED, AS RECOGNIZED BY THE PUBLIC WORKS RIGHT OF WAY DESK, (651-266-6154) IF THEY WILL BE WORKING IN THE PUBLIC ROAD RIGHT OF WAY. THE CONTRACTOR MUST COORDINATE WITH GAS, ELECTRIC, TELEVISION, AND TELEPHONE UTILITIES PRIOR TO CONSTRUCTION TO DETERMINE FEED POINTS INTO THE PROPERTY. THE UTILITY MUST SUBMIT A PLAN FOR THE APPROVAL OF THE PUBLIC WORKS UTILITY REVIEW COMMITTEE IF THE PROPOSED ROUTE REQUIRES ONE, AND IS RESPONSIBLE FOR ORDERING ALL PERMITS FOR THEIR UTILITY'S SERVICES INTO A SITE.
11. THE CONTRACTOR SHALL PROVIDE A CONTINUOUS, ACCESSIBLE AREA AND SAFE PEDESTRIAN WALKWAY THAT MEETS ADA AND MN MUTCD STANDARDS IF WORKING IN A SIDEWALK AREA, AND TRAFFIC CONTROL PER MN MUTCD FOR WORK IN THE PUBLIC RIGHT OF WAY AREA.
12. THE INSTALLATION OF PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES, AND/OR LIGHTING IS STRICTLY PROHIBITED IN THE CITY RIGHT OF WAY.

GRADING HOLD DOWN TABLE

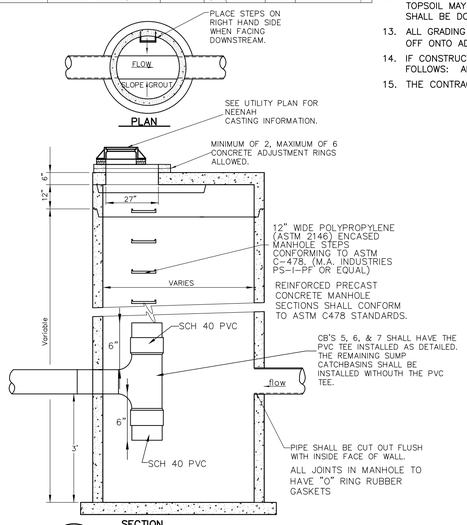
BITUMINOUS PAVEMENT
2" BITUMINOUS WEAR COURSE
2" BITUMINOUS NON-WEAR COURSE
8" MN/DOT 3138 CLASS 5 AGG. BASE

PRIVATE CONCRETE SIDEWALK PAVEMENT
4" CONCRETE PAVEMENT
6" MN/DOT 3149.2B SAND CUSHION

NORTH-SOUTH SIDEWALK CONCRETE PAVEMENT
5" CONCRETE PAVEMENT
6" MN/DOT 3149.2B SAND CUSHION

PAVER SIDEWALK
2.38"AQUA-BRIC PERMEABLE PAVERS
2.0" BEDDING COURSE ⅜" CLEAR CRUSHED AGGREGATE
4.0" BASE COURSE OPEN GRADED AGGREGATE ½" TO 1"
12" SUB-BASE COURSE OPEN GRADED AGGREGATE 2½" TO 3"

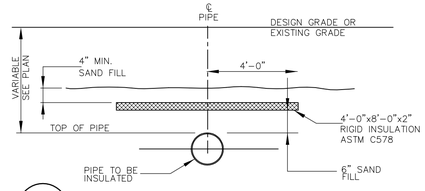
CONCRETE DRIVE PAVEMENT
6" CONCRETE PAVEMENT
6" MN/DOT 3138 CLASS 5 AGG. BASE



2 C-200 SUMP CATCHBASIN
NOT TO SCALE

RETAINING WALL NOTES:

1. ALL TOP AND BOTTOM ELEVATIONS RESPECTIVELY CORRESPOND TO THE HIGH-GRADE AND LOW-GRADE ELEVATIONS ON EACH SIDE OF THE WALL.
2. THE BOTTOM ELEVATION IS THE ELEVATION OF THE LOW-GRADE SIDE OF THE WALL, NOT THE TOP ELEVATION OF THE BURIED BLOCK COURSE.
3. MODULAR BLOCK RETAINING WALL SHALL BE DESIGNED AND CERTIFIED BY A MINNESOTA LICENSED PROFESSIONAL ENGINEER. DESIGN CALCULATIONS AND SHOP DRAWINGS SHALL BE SUBMITTED TO THE OWNER AND ARCHITECT PRIOR TO CONSTRUCTION OF WALL.
4. RETAINING WALLS AND APPROPRIATE SAFETY FENCING ALONG THE TOP OF WALLS ARE TO BE DESIGNED AND CERTIFIED BY A MINNESOTA REGISTERED PROFESSIONAL ENGINEER. SUBMIT RETAINING WALL AND FENCE SHOP DRAWINGS TO PROJECT TEAM PRIOR TO CONSTRUCTION.



3 C-200 PIPE INSULATION DETAIL
NOT TO SCALE

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BKBM Job No. 07247.00

Rev	Date	Remarks
	3-13-2008	SITE PLAN REVIEW SET
	4-7-2008	RESUBMIT OF SITE PLAN REVIEW SET
	4-18-2008	RESUBMIT OF SITE PLAN REVIEW SET

Date	JUNE 03, 2008
Scale	
Project Number	871-00
Drawn By	RGE

Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

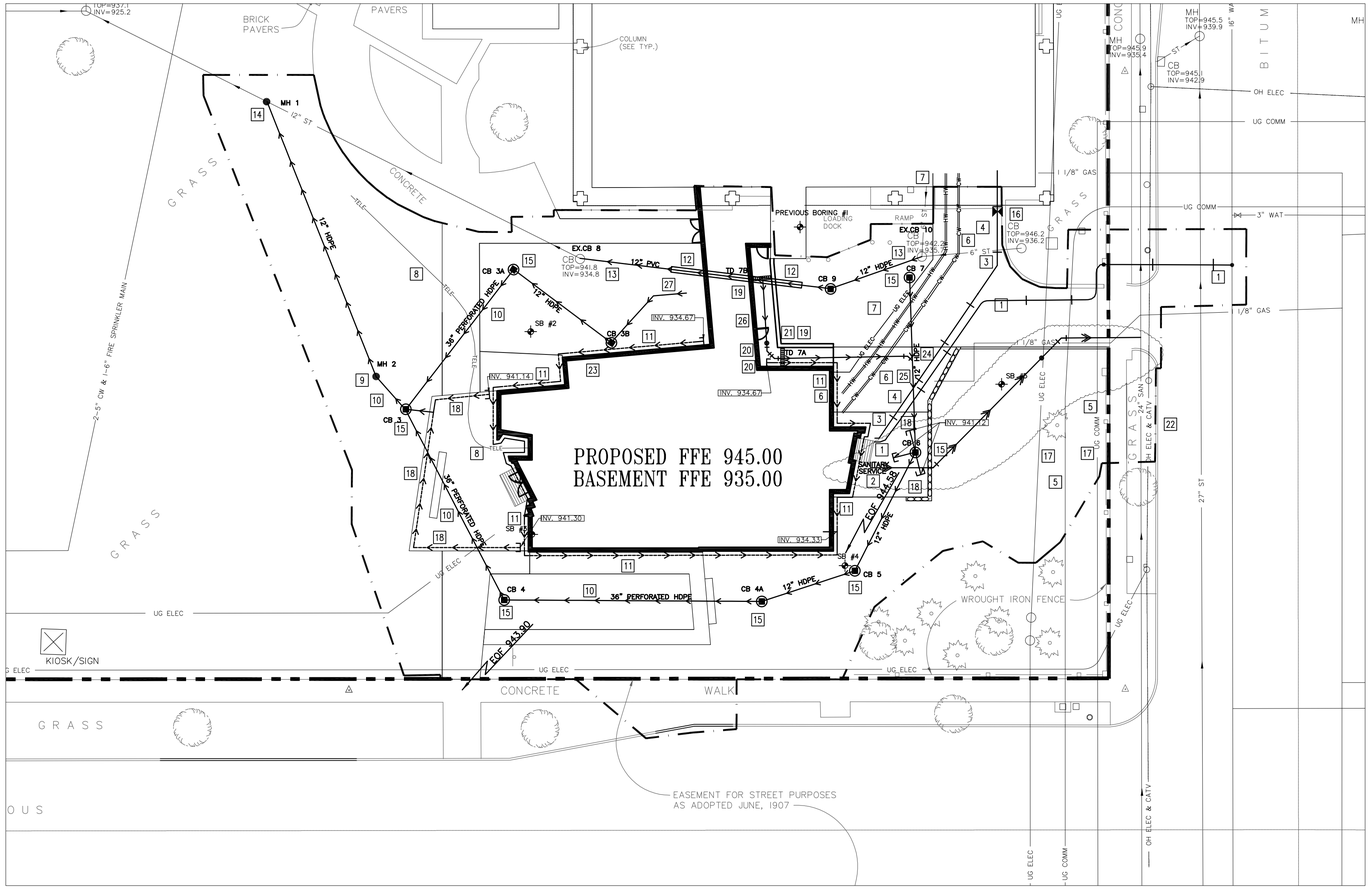
CONSTRUCTION DOCUMENTS
April 28, 2008

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Joel W. Maier P.E.
Registration Number 19181 Date 4/28/08

GRADING, DRAINAGE, AND EROSION CONTROL PLAN

C-200



1 C-300 UTILITY PLAN
1" = 20'

PROPOSED PLAN SYMBOLS

- PROPERTY LINE
- WATER SERVICE
- SANITARY SEWER
- STORM SEWER
- CONSTRUCTION LIMITS
- CATCH BASIN/MANHOLE
- SEWER CLEANOUT
- WATER VALVE
- SOIL BORINGS — SB #3
- DRAINTILE INVERT ELEVATION — INV. 934.16

ABBREVIATIONS

BLDG	Building
BM	Bench Mark
CB	Catch Basin
CD	Curtain Drain
CONC	Concrete
ELEV	Elevation
EX	Existing
FFE	Finished Floor Elevation
HDPE	High Density Polyethylene
INV	Invert
MH	Manhole
PVC	Polyvinyl Chloride
RCP	Reinforced Concrete Pipe

N

20' 10' 0 20' 40'
SCALE 1" = 20'

APPROXIMATE DISTURBED AREA IS 0.58 ACRES

UTILITY NOTES:

1. COORDINATE SERVICE CONNECTION LOCATIONS AT THE BUILDING WITH THE MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION. NO ADDITIONAL COMPENSATION WILL BE GIVEN FOR UNCOORDINATED WORK.
2. PROTECT ALL EXISTING STRUCTURES AND UTILITIES WHICH ARE NOT SCHEDULED TO BE REMOVED.
3. ALL SEWER AND WATER CROSSINGS SHALL HAVE A MINIMUM VERTICAL SEPARATION OF 1.5 FEET AND HORIZONTAL SEPARATION OF 10 FEET. FOLLOW ALL HEALTH DEPARTMENT, CITY OF ST. PAUL, AND RAMSEY COUNTY STANDARDS AND SPECIFICATIONS.
4. ALL WATER SERVICES SHALL HAVE A MINIMUM DEPTH OF COVER OF 8.0-FEET OVER TOP OF WATER SERVICE.
5. SANITARY SEWER SERVICE PIPING SHALL BE PVC SDR 26 PVC UNLESS NOTED OTHERWISE.
6. STORM SEWER PIPING SHALL BE HIGH DENSITY POLYETHYLENE (HDPE), UNLESS NOTED OTHERWISE.
7. CONTRACTORS ARE TO COORDINATE ALL WORK WITH GAS, ELECTRIC, TELEVISION AND TELEPHONE COMPANIES PRIOR TO START OF CONSTRUCTION.
8. RIGID POLYSTYRENE INSULATION BOARD SHALL BE INSTALLED ON ALL UTILITY PIPE STUBS SERVICING THE BUILDING, IF THE PIPE HAS LESS THAN 5-FEET OF COVER OVER THE TOP OF PIPE. OBTAIN WRITTEN APPROVAL FROM ENGINEER PRIOR TO INSTALLATION.

UTILITY NOTES FOR WORK IN PUBLIC RIGHT-OF-WAY:

1. FOLLOW ALL CITY OF ST. PAUL AND RAMSEY COUNTY STANDARDS AND SPECIFICATIONS.
2. PRIOR TO CONSTRUCTION, CONTRACTORS ARE TO COORDINATE ALL WORK WITHIN RIGHT OF WAY WITH BILL MCDONALD (651-485-0419) AND OBTAIN ALL APPLICABLE PERMITS.
3. ALL DIGGING IN THE PUBLIC RIGHT OF WAY, FOR UTILITIES OR OTHER PURPOSES, REQUIRES AN EXCAVATING PERMIT. IF THE PROPOSED BUILDING IS CLOSE TO THE RIGHT OF WAY, AND EXCAVATING INTO THE RIGHT OF WAY IS NEEDED TO FACILITATE BUILDING CONSTRUCTION, THE CONTRACTOR MUST DISCUSS WITH THE UTILITY INSPECTOR THE EXTENT OF THE PROPOSED EXCAVATION, AND SECURE THE INSPECTOR'S APPROVAL TO DO SO.
4. UTILITY WORK IN THE STREET ON SNELLING AVE. IS A BIG CONCERN, AND WILL NEED TO BE WELL PLANNED OUT DUE TO HEAVY TRAFFIC. CONTACT BILL MCDONALD (651-485-0419) OF RIGHT OF WAYS WELL IN ADVANCE OF ACTUAL WORK AND MEET WITH HIM.

KEYED NOTES

KEYED NOTES ARE DENOTED BY [NO] ON PLAN.

[1] INSTALL NEW 2-INCH TYPE K WATER SERVICE. PRIVATE PLUMBER WILL INSTALL NEW WATER SERVICE OUT TO THE PROPERTY LINE ACCORDING TO SAINT PAUL REGIONAL WATER SERVICE STANDARDS (651-266-6270). THE SAINT PAUL REGIONAL WATER SERVICE WILL INSTALL SERVICE IN THE RIGHT OF WAY AT THE PROPERTY OWNERS EXPENSE. COORDINATE WITH MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION. NO ADDITIONAL COMPENSATION WILL BE GIVEN FOR UNCOORDINATED WORK. RESTORE PAVEMENT AND FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS FOR WORK WITHIN THE RIGHT-OF-WAY.

[2] INSTALL 4-INCH SDR 26 SANITARY SEWER SERVICE TO WITHIN 5-FEET OF BUILDING AT INVERT ELEVATION OF 938.97. CONTRACTOR IS TO COORDINATE EXACT PIPE SIZE, INVERT ELEVATION AND LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION. NO ADDITIONAL COMPENSATION FOR UNCOORDINATED WORK.

[3] INSTALL 45 DEGREE, 6-INCH D.I.P. BEND WITH THRUST BLOCKING. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[4] 6-INCH D.I.P. FIRE SERVICE FROM KAGIN HALL. CONTRACTOR SHALL COORDINATE EXACT LOCATION, SIZE, AND INVERT ELEVATION WITH MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS. NO ADDITIONAL COMPENSATION FOR UNCOORDINATED WORK.

[5] INSTALL 4-INCH, 45-DEGREE PVC BEND.

[6] SCHEMATIC LOCATION OF STEAM AND CHILLED WATER SERVICE SUPPLY AND RETURN LINES. REFER TO MECHANICAL PLANS FOR DETAILS.

[7] APPROXIMATE LOCATION OF ELECTRICAL SERVICE FROM KAGIN HALL. COORDINATE EXACT LOCATION WITH MECHANICAL/ELECTRICAL ENGINEER AND UTILITY OWNER.

[8] APPROXIMATE LOCATION OF EXISTING COMMUNICATION SERVICE. COORDINATE EXACT LOCATION AND REUSE WITH MECHANICAL/ELECTRICAL ENGINEER AND UTILITY OWNER.

[9] INSTALL MH 2. REFER TO DETAIL 2/C-300.

[10] INSTALL 36-INCH, PERFORATED HDPE PIPE. REFER TO DETAIL 3/C-300. THE 100-YR HWL IN THE PIPES = 933.00

[11] INSTALL 4-INCH DRAINTILE PER DETAIL 7/C-500. DRAINTILE SHALL DRAIN INTO BUILDING SUMP. REFER TO MECHANICAL PLANS PRIOR TO CONSTRUCTION FOR EXACT LOCATION AND ELEVATION OF SUMP PIT.

[12] STORM SEWER TO BE INSTALLED IN A STEEL CASING PIPE UNDER THE PROPOSED BUILDING LINK. REFER TO DETAIL 14/C-500 FOR CASING PIPE DIAMETER. CASING PIPE SHALL EXTEND 10-FEET PAST FOUNDATION WALL OF BUILDING LINK ON EAST AND WEST SIDES.

[13] CORE DRILL AND INSTALL NEW STORM SEWER PIPE INTO EXISTING CATCH BASIN. GROUT SEAL AROUND OPENING. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[14] INSTALL NEW STORM SEWER MANHOLE OVER EXISTING PIPE. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[15] INSTALL SUMP CATCH BASIN. REFER TO DETAIL 2/C-200. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[16] INSTALL 6-INCH GATE VALVE AND BOX. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[17] INSTALL SANITARY SEWER CLEANOUT. REFER TO DETAIL 4/C-500. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[18] INSTALL 4-INCH HDPE DRAINTILE PIPE FOR PERVIOUS PAVEMENT SYSTEM. REFER TO DETAIL 12/C-500. REFER TO STORM SEWER TABLE FOR INVERT ELEVATION AT STRUCTURE.

[19] INSTALL TRENCH DRAIN. REFER TO DETAIL 5/C-500.

[20] INSTALL 45-DEGREE, 6-INCH PVC BEND.

[21] CONNECT TD 7A TO 6-INCH PVC STORM PIPE USING A 6-INCH x 6-INCH PVC TEE.

[22] CORE DRILL THE EXISTING 24-INCH SANITARY SEWER MAIN AT INVERT ELEVATION 937.70 TO ACCEPT THE 4-INCH PVC SERVICE PIPE USING A ROMAC INDUSTRIES "CB" STYLE SADDLE OR APPROVED EQUAL, OR A PVC SADDLE TEE AND GASKET SECURED TO PIPE WITH TWO STAINLESS STEEL COMPRESSION STRAPS. PVC SADDLE TO BE GPK OR APPROVED EQUAL. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[23] INSTALL CATCHBASIN TO RECEIVE OUTFLOW FROM ROOF DRAINAGE EXITING THE BUILDING 1.5-FEET ABOVE GRADE. CATCHBASIN SHALL BE INSTALLED UNDER 6-INCHES OF 1 TO 2-INCH DIAMETER WASHED ROCK. CONTRACTOR SHALL WRAP THE CASTING IN GEOTEXTILE FABRIC TO PREVENT THE ROCK FROM ENTERING THE STORM SEWER CASTING. COORDINATE EXACT CATCH BASIN LOCATION WITH THE ARCHITECT AND MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION.

[24] CONNECT 6-INCH, PVC PIPE TO 12-INCH HDPE PIPE USING AN HDPE WYE AND ADAPTOR AT INVERT ELEVATION 938.67.

[25] DEFLECT THE WATERMAIN AROUND THE STORM SEWER PIPE IF NECCESARY TO MAINTAIN 1.5-FOOT SEPARATION. FOLLOW ALL CITY OF ST. PAUL AND HEALTH DEPARTMENT STANDARDS AND SPECIFICATIONS.

[26] INSTALL SEWER CLEANOUT FOR PAVED AREA. REFER TO DETAIL 4/C-500. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

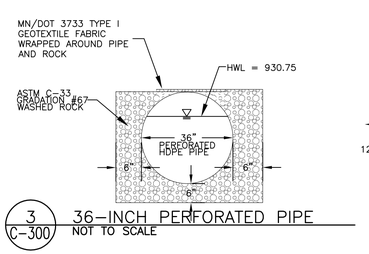
[27] STUB 3-INCH PVC ROOF DRAIN TO WITHIN 5-FEET OF THE PROPOSED BUILDING AT INVERT ELEVATION 940.50. ROOF DRAIN PIPE SHALL BE INSULATED PER DETAIL 3/C-200. CONTRACTOR IS TO COORDINATE EXACT PIPE SIZE, INVERT ELEVATION AND LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION.

NOTE:

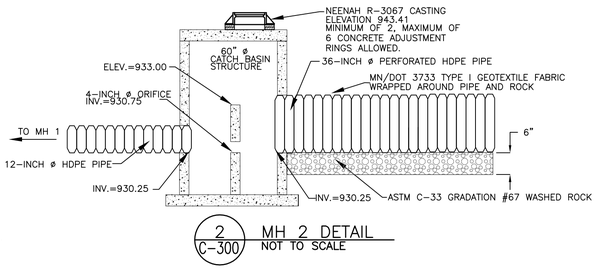
1. WHEN ABANDONING AN EXISTING SEWER SERVICE OR WHEN MAKING NEW CONNECTIONS TO A CITY SEWER, THIS MUST BE DONE IN ACCORDANCE WITH CITY STANDARDS BY A LICENSED HOUSE DRAIN CONTRACTOR UNDER PERMIT FROM THE PUBLIC WORKS SEWER SECTION. (651-266-6234)
2. UPON COMPLETION OF STORM SEWER INSTALLATION, STORM SEWER INLETS SHALL BE PROTECTED FROM SEDIMENT BY INLET SEDIMENT PROTECTION DEVICES AS DETAILED. PROTECTION SHALL REMAIN IN PLACE UNTIL BITUMINOUS AREA'S HAVE BEEN PAVED AND LAWN AREA'S HAVE BEEN ESTABLISHED.
3. ALL DISTURBED GROUND LEFT INACTIVE FOR FOURTEEN OR MORE DAYS MUST BE STABILIZED BY SEEDING, SODDING, OR MULCHING.
4. DRIVEWAYS TO BE REMOVED AND CONSTRUCTED TO CITY STANDARDS BY A LICENSED AND BONDED CONTRACTOR UNDER PERMIT FROM THE PUBLIC WORKS SIDEWALK SECTION (651-266-6120). SIDEWALK GRADES MUST BE CARRIED ACROSS THE DRIVEWAYS.
5. WORK ON PUBLIC SIDEWALKS AND ALLEYS TO BE DONE TO CITY STANDARDS BY A LICENSED AND BONDED CONTRACTOR FROM THE PUBLIC WORKS SIDEWALK SECTION (651-266-6120)
6. THE CONTRACTOR MUST OBTAIN AN OBSTRUCTION / EXCAVATION PERMIT FROM PUBLIC WORKS (651-266-6151) IF TRUCKS/EQUIPMENT WILL BE DRIVING OVER CURBS OR IF CONSTRUCTION WILL BLOCK CITY STREETS, SIDEWALKS, OR ALLEYS. THE CONTRACTOR SHALL CONTACT THE INSPECTOR TO COORDINATE ALL UTILITY WORK AND OTHER EXCAVATIONS IN THE PUBLIC RIGHT OF WAY (651-485-0419).
7. CONTACT ROB KLEMM AT (651-487-7226) TO DISCUSS TRAFFIC CONTROL, PEDESTRIAN SAFETY ISSUES, PERMITS, AND OTHER RIGHT OF WAY CONCERNS. CONTACT MUST BE MADE AT LEAST A WEEK PRIOR TO ORDERING AN OBSTRUCTION PERMIT AND THE START OF DEMOLITION.
8. ADJACENT STREETS AND ALLEYS MUST BE SWEPT TO KEEP THEM FREE OF SEDIMENT. CONTRACTOR MUST MONITOR CONDITIONS AND SWEEP AS NEEDED OR WITHIN 24 HOURS OF NOTICE BY THE CITY.
9. CARE MUST BE TAKEN DURING CONSTRUCTION AND EXCAVATION TO PROTECT ANY SURVEY MONUMENTS AND/OR PROPERTY IRONS.
10. ALL UTILITIES AND CONTRACTORS MUST BE REGISTERED, INSURED, AND BONDED, AS RECOGNIZED BY THE PUBLIC WORKS RIGHT OF WAY DESK, (651-266-6154) IF THEY WILL BE WORKING IN THE PUBLIC ROAD RIGHT OF WAY. THE CONTRACTOR MUST COORDINATE WITH GAS, ELECTRIC, TELEVISION, AND TELEPHONE UTILITIES PRIOR TO CONSTRUCTION TO DETERMINE FEED POINTS INTO THE PROPERTY. THE UTILITY MUST SUBMIT A PLAN FOR THE APPROVAL OF THE PUBLIC WORKS UTILITY REVIEW COMMITTEE IF THE PROPOSED ROUTE REQUIRES ONE, AND IS RESPONSIBLE FOR ORDERING ALL PERMITS FOR THEIR UTILITY'S SERVICES INTO A SITE.
11. THE CONTRACTOR SHALL PROVIDE A CONTINUOUS, ACCESSIBLE AREA AND SAFE PEDESTRIAN WALKWAY THAT MEETS ADA AND MN MUTCD STANDARDS IF WORKING IN A SIDEWALK AREA, AND TRAFFIC CONTROL PER MN MUTCD FOR WORK IN THE PUBLIC RIGHT OF WAY AREA.
12. THE INSTALLATION OF PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES, AND/OR LIGHTING IS STRICTLY PROHIBITED IN THE CITY RIGHT OF WAY.

STORM SEWER TABLE

STRUCTURE IDENTIFICATION	STRUCTURE DIMENSION (INCHES)	NEENAH CASTING	TOP ELEVATION	INVERT ELEVATION	PIPE LENGTH, DIAMETER, SLOPE & NEXT UPSTREAM STRUCTURE
MH 1	72	R-1733	941.40	EX. NW. 928.75 EX. SE. 928.75 SE. 929.47	78 L.F. OF 12-INCH HDPE @ 1.00%, MH 2
MH 2	60	R-1733	943.41	REFER TO DETAIL 2/C300	12 L.F. OF 36-INCH PERFORATED HDPE @ 0.00%, CB 3
CB 3	84	R-2535	944.00	NW. 930.25 NE. 930.25 E. 941.00 SW. 930.25 SUMP 927.25	47 L.F. OF 36-INCH PERFORATED HDPE @ 0.00%, CB 3A 4-INCH PERFORATED HDPE DRAINTILE 57 L.F. OF 36-INCH PERFORATED HDPE @ 0.00%, CB 4
CB 3A	60	R-2535	943.00	SW. 930.25 SE. 938.00 SUMP 927.25	32 L.F. OF 12-INCH HDPE @ 3.91%, CB 3B
CB 3B	48	R-2535	944.25	NW. 939.25 NE. 940.00	25 L.F. OF 3-INCH PVC @ 2.00%, ROOF DRAIN LEAD
CB 4	60	R-2535	943.84	NW. 930.25 E. 930.25 SUMP 927.25	68 L.F. OF 36-INCH PERFORATED HDPE @ 0.00%, CB 4A
CB 4A	60	R-2535	944.26	W. 930.25 E. 936.28 SUMP 927.25	26 L.F. OF 12-INCH HDPE @ 1.00%, CB 5
CB 5	48	R-2535	944.42	W. 936.54 NE. 936.54 SUMP 933.54	35 L.F. OF 12-INCH HDPE @ 1.00%, CB 6
CB 6	48	R-2535	944.35	SW. 936.89 N. 936.17 S,N,W. 941.00 SUMP 933.89	25 L.F. OF 12-INCH HDPE @ 1.00%, 12"x6" WYE 4-INCH PERFORATED HDPE DRAINTILE
12"x6" WYE	N/A	N/A	N/A	S. 938.42 N. 938.42 W. 938.67	21 L.F. OF 12-INCH HDPE @ 1.00%, CB 7 34 L.F. OF 6-INCH PVC @ 2.91%, TD 7A
CB 7	48	R-2535	942.62	S. 938.63 SUMP 935.63	———
TD 7A	REFER TO DETAIL 5/C-500		944.10	E. 939.66 W. 939.66	24 L.F. OF 6-INCH PVC @ 0.50%, TD 7B
TD 7B	REFER TO DETAIL 5/C-500		943.54	S. 939.78	———
EX. CB 8	EXISTING	EXISTING	EXISTING	EX. NW. 934.80 E. 934.80	67 L.F. OF 12-INCH SCH 40 PVC @ 1.00%, MH 9
CB 9	48	R-2535	943.10	E. 935.47 W. 935.47	26 L.F. OF 12-INCH HDPE @ 0.88%, EX. CB 10
EX. CB 10	EXISTING	EXISTING	EXISTING	EX. N. 935.70 EX. E. 935.70 W. 935.70	———



3 C-300 36-INCH PERFORATED PIPE
NOT TO SCALE



2 C-300 MH 2 DETAIL
NOT TO SCALE

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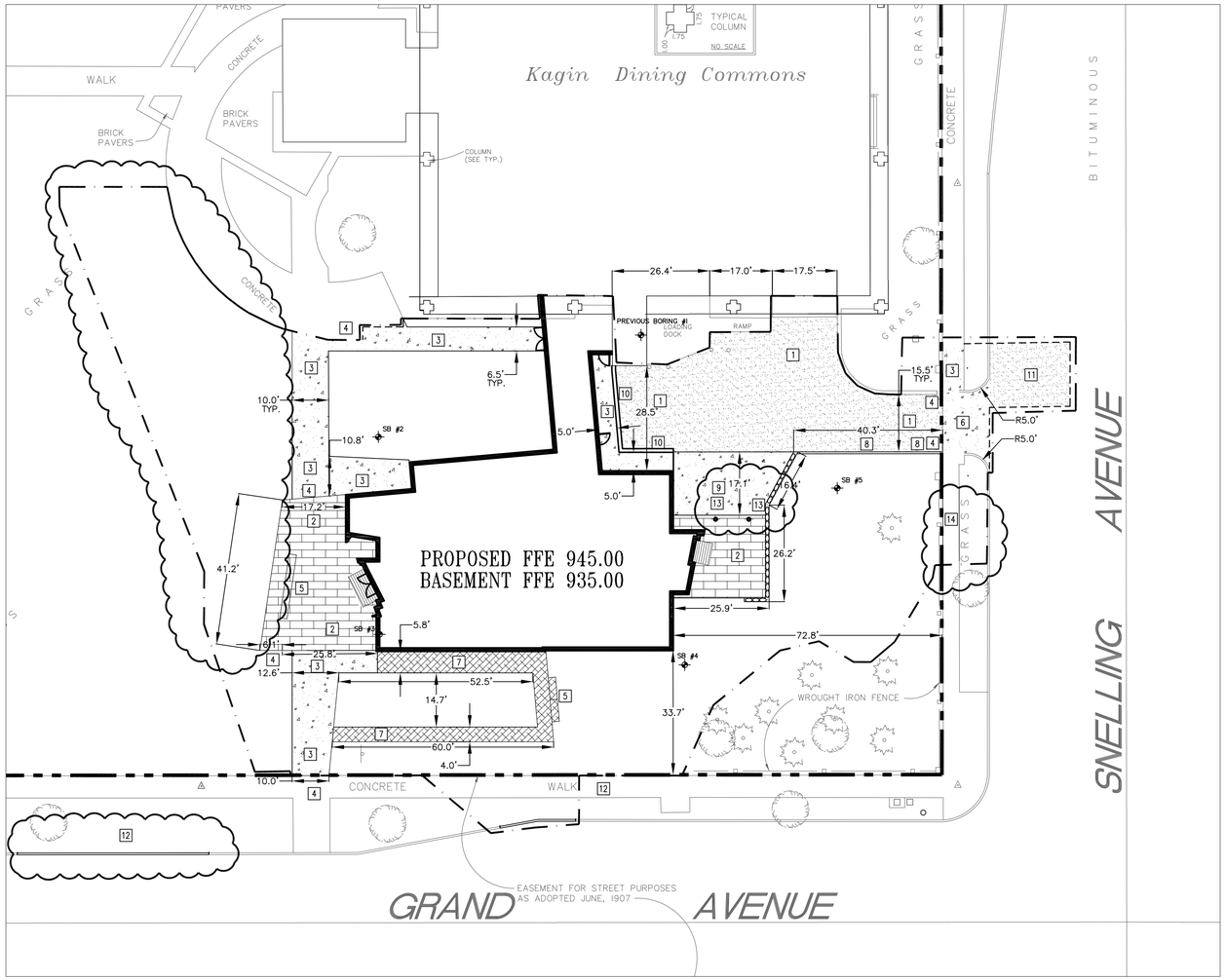
Joel W. Maier P.E.
Registration Number 19181 Date 4/28/08

UTILITY PLAN

C-300



1 C-400 GEOMETRIC AND PAVING PLAN
1" = 20'

PROPOSED PLAN SYMBOLS

- BITUMINOUS PAVEMENT
- PERVIOUS PAVEMENT
- CONCRETE PAVEMENT
- CRUSHED STONE
- CONSTRUCTION LIMITS
- SAWCUT LINE
- PROPERTY LINE
- RETAINING WALL
- NO PARKING SIGN

ABBREVIATIONS

BLDG	Building
BM	Bench Mark
CONC	Concrete
EX	Existing
SF	Square Foot
SP	Surface Parking

N

20' 10' 0 20' 40'

SCALE 1" = 20'

GENERAL NOTES:

1. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS NOTED OTHERWISE.
2. ALL CURB AND GUTTER ON PRIVATE PROPERTY IS TO BE B612 CONCRETE CURB AND GUTTER UNLESS NOTED OTHERWISE.
3. NO SIDEWALK IS TO HAVE MORE THAN A 2% CROSS SLOPE OR MORE THAN A 5% LONGITUDINAL SLOPE.
4. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR PROPOSED BUILDING LAYOUT.
5. FOLLOW ALL CITY OF ST. PAUL AND RAMSEY COUNTY RULES, REGULATIONS AND SPECIFICATIONS WHEN WORKING IN PUBLIC RIGHT OF WAY.
6. NO PONDING OF WATER WILL BE ALLOWED WHERE NEW PAVEMENT MATCHES INTO EXISTING PAVEMENT.
7. PRIOR TO START OF CONSTRUCTION, THE CONTRACTORS ARE TO COORDINATE ALL WORK WITH THE GAS, ELECTRIC, TELEPHONE AND CABLE COMPANIES.

KEYED NOTES

KEYED NOTES ARE DENOTED BY [NO] ON PLAN.

[1] INSTALL BITUMINOUS PAVEMENT PER DETAIL 10/C-500 FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS WHEN IN PUBLIC RIGHT OF WAY.

[2] INSTALL PERMEABLE PAVERS PER DETAIL 12/C-500. REFER TO LANDSCAPE ARCHITECT'S PLANS FOR EXACT TYPE AND LAYOUT.

[3] INSTALL CONCRETE PAVEMENT PER DETAIL 11/C-500. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[4] NEW CONCRETE WALK WORK ABUTTING TO EXISTING CONCRETE AND/OR NEW PERVIOUS PAVEMENT MUST MAKE A SMOOTH TRANSITION. NO PONDING OF WATER OR ABRUPT TRANSITIONS WILL BE PERMITTED.

[5] REFER TO LANDSCAPE PLANS FOR BENCH INFORMATION.

[6] INSTALL CONCRETE DRIVE ENTRANCE. REFER TO DETAIL 4/C-400.

[7] INSTALL CRUSHED STONE. REFER TO LANDSCAPE ARCHITECT'S PLANS.

[8] INSTALL B612 CONCRETE CURB AND GUTTER. REFER TO DETAIL 13/C-500.

[9] INSTALL CONCRETE PAD PER DETAIL 3/C-400. REFER TO LANDSCAPE PLAN FOR JOINT LAYOUT.

[10] INSTALL CONCRETE CURB WALL. REFER TO ARCHITECTURAL PLANS.

[11] INSTALL BITUMINOUS PAVEMENT TO MATCH EXISTING CROSS SECTION IN SNELLING AVENUE. WORK SHALL BE COMPLETED BY THE CITY OF ST. PAUL AT THE OWNER'S EXPENSE. COORDINATE ALL WORK TO BE COMPLETED WITH THE CITY OF ST. PAUL PRIOR TO CONSTRUCTION.

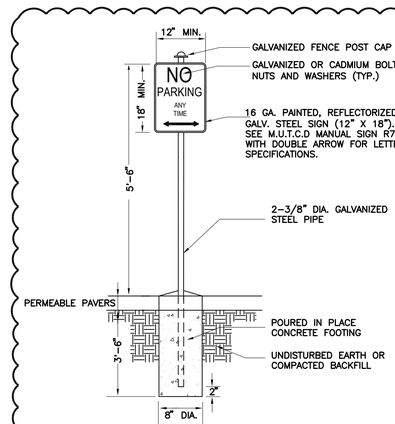
[12] THE CONTRACTOR SHALL REPLACE THE CONCRETE SIDEWALK AND CURB AND GUTTER DISTURBED WITH THE INSTALLATION OF THE CONSTRUCTION ENTRANCE. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

[13] INSTALL NO PARKING SIGN. REFER TO DETAIL 2/C-400.

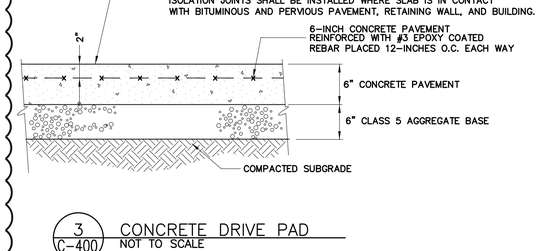
[14] THE CONTRACTOR SHALL REPLACE THE CONCRETE SIDEWALK AND CURB AND GUTTER DISTURBED WITH THE INSTALLATION OF THE SANITARY SEWER SERVICE. FOLLOW ALL CITY OF ST. PAUL STANDARDS AND SPECIFICATIONS.

NOTE:

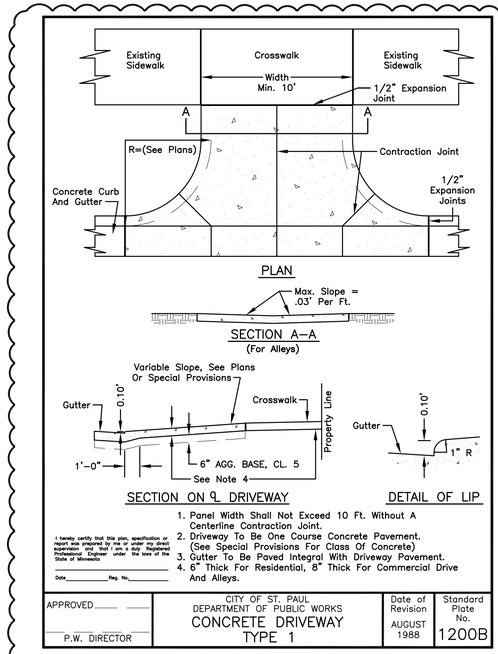
1. WHEN ABANDONING AN EXISTING SEWER SERVICE OR WHEN MAKING NEW CONNECTIONS TO A CITY SEWER, THIS MUST BE DONE IN ACCORDANCE WITH CITY STANDARDS BY A LICENSED HOUSE DRAIN CONTRACTOR UNDER PERMIT FROM THE PUBLIC WORKS SEWER SECTION. (651-266-6234)
2. UPON COMPLETION OF STORM SEWER INSTALLATION, STORM SEWER INLETS SHALL BE PROTECTED FROM SEDIMENT BY INLET SEDIMENT PROTECTION DEVICES AS DETAILED. PROTECTION SHALL REMAIN IN PLACE UNTIL BITUMINOUS AREA'S HAVE BEEN PAVED AND LAWN AREA'S HAVE BEEN ESTABLISHED.
3. ALL DISTURBED GROUND LEFT INACTIVE FOR FOURTEEN OR MORE DAYS MUST BE STABILIZED BY SEEDING, SODDING, OR MULCHING.
4. DRIVEWAYS TO BE REMOVED AND CONSTRUCTED TO CITY STANDARDS BY A LICENSED AND BONDED CONTRACTOR UNDER PERMIT FROM THE PUBLIC WORKS SIDEWALK SECTION (651-266-6120). SIDEWALK GRADES MUST BE CARRIED ACROSS THE DRIVEWAYS.
5. WORK ON PUBLIC CURBS, SIDEWALKS AND ALLEYS TO BE DONE TO CITY STANDARDS BY A LICENSED AND BONDED CONTRACTOR FROM THE PUBLIC WORKS SIDEWALK SECTION (651-266-6120)
6. THE CONTRACTOR MUST OBTAIN AN OBSTRUCTION / EXCAVATION PERMIT FROM PUBLIC WORKS (651-266-6151) IF TRUCKS/EQUIPMENT WILL BE DRIVING OVER CURBS OR IF CONSTRUCTION WILL BLOCK CITY STREETS, SIDEWALKS, OR ALLEYS. THE CONTRACTOR SHALL CONTACT THE INSPECTOR TO COORDINATE ALL UTILITY WORK AND OTHER EXCAVATIONS IN THE PUBLIC RIGHT OF WAY (651-485-0419).
7. CONTACT ROB KLEMM AT (651-487-7226) TO DISCUSS TRAFFIC CONTROL, PEDESTRIAN SAFETY ISSUES, PERMITS, AND OTHER RIGHT OF WAY CONCERNS. CONTACT MUST BE MADE AT LEAST A WEEK PRIOR TO ORDERING AN OBSTRUCTION PERMIT AND THE START OF DEMOLITION.
8. ADJACENT STREETS AND ALLEYS MUST BE SWEPT TO KEEP THEM FREE OF SEDIMENT. CONTRACTOR MUST MONITOR CONDITIONS AND SWEEP AS NEEDED OR WITHIN 24 HOURS OF NOTICE BY THE CITY.
9. CARE MUST BE TAKEN DURING CONSTRUCTION AND EXCAVATION TO PROTECT ANY SURVEY MONUMENTS AND/OR PROPERTY IRONS.
10. ALL UTILITIES AND CONTRACTORS MUST BE REGISTERED, INSURED, AND BONDED, AS RECOGNIZED BY THE PUBLIC WORKS RIGHT OF WAY DESK, (651-266-6154) IF THEY WILL BE WORKING IN THE PUBLIC ROAD RIGHT OF WAY. THE CONTRACTOR MUST COORDINATE WITH GAS, ELECTRIC, TELEVISION, AND TELEPHONE UTILITIES PRIOR TO CONSTRUCTION TO DETERMINE FEED POINTS INTO THE PROPERTY. THE UTILITY MUST SUBMIT A PLAN FOR THE APPROVAL OF THE PUBLIC WORKS UTILITY REVIEW COMMITTEE IF THE PROPOSED ROUTE REQUIRES ONE, AND IS RESPONSIBLE FOR ORDERING ALL PERMITS FOR THEIR UTILITY'S SERVICES INTO A SITE.
11. THE CONTRACTOR SHALL PROVIDE A CONTINUOUS, ACCESSIBLE AREA AND SAFE PEDESTRIAN WALKWAY THAT MEETS ADA AND MN MUTCD STANDARDS IF WORKING IN A SIDEWALK AREA, AND TRAFFIC CONTROL PER MN MUTCD FOR WORK IN THE PUBLIC RIGHT OF WAY AREA.
12. THE INSTALLATION OF PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES, AND/OR LIGHTING IS STRICTLY PROHIBITED IN THE CITY RIGHT OF WAY.



2 C-400 NO PARKING SIGN
NOT TO SCALE



3 C-400 CONCRETE DRIVE PAD
NOT TO SCALE



4 C-400 CONCRETE DRIVEWAY
NOT TO SCALE

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BKBM Job No. 07247.00

Rev	Date	Remarks
	3-13-2008	SITE PLAN REVIEW SET
	4-7-2008	RESUBMIT OF SITE PLAN REVIEW SET
	4-18-2008	RESUBMIT OF SITE PLAN REVIEW SET

Date	JUNE 03, 2008
Scale	
Project Number	871-00
Drawn By	RGE

Macalester College

Institute for Global Citizenship

Grand Avenue St. Paul, MN

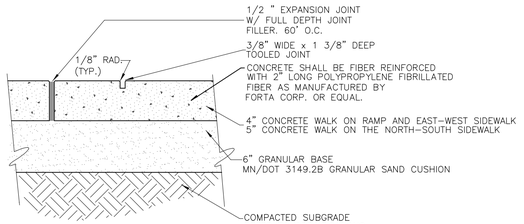
CONSTRUCTION DOCUMENTS
April 28, 2008

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

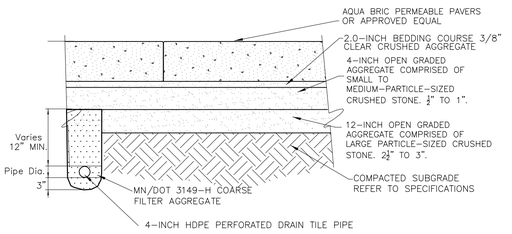
Joel W. Maier P.E.
Registration Number 19181 Date 4/28/08

GEOMETRIC AND PAVING PLAN

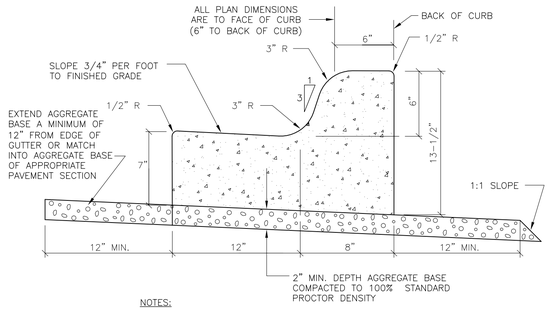
C-400



11 C-500 CONCRETE SIDEWALK CONSTRUCTION (PRIVATE PROPERTY)
NOT TO SCALE



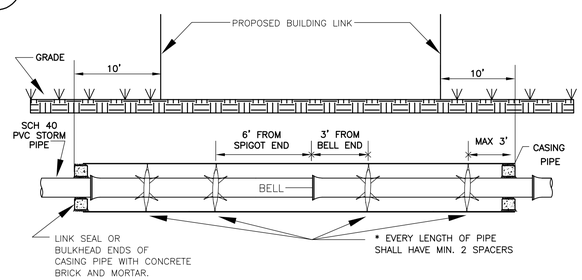
12 C-500 PERVIOUS PAVEMENT
NOT TO SCALE



NOTES:

1. DIRECTION OF TRANSVERSE GUTTER SLOPE TO MATCH DIRECTION OF ADJACENT PAVEMENT SLOPE.
2. CONSTRUCT CURB AND GUTTER IN ACCORDANCE WITH MNDOT SPECIFICATION 2531.

13 C-500 B612 CONCRETE CURB AND GUTTER (PRIVATE PROPERTY)
NOT TO SCALE

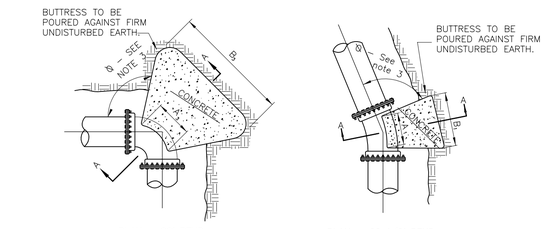


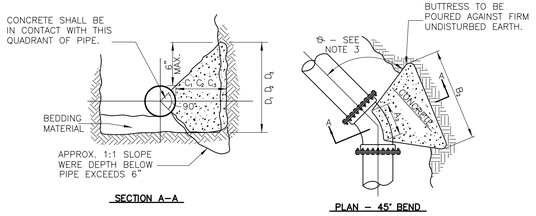
BELL O.D. (MJ PIPE)	SIZE OF MAIN	MINIMUM CASING SIZE	MINIMUM CASING WALL THICKNESS
11.12"	6"	18"	0.250"
13.37"	8"	20"	0.250"
17.88"	12"	24"	0.250"
22.50"	15"	30"	0.375"
27.00"	20"	36"	0.500"
31.50"	24"	42"	0.500"

* CASING SPACERS ARE REQUIRED AND SHALL BE INCIDENTAL TO CASING UNLESS OTHERWISE SPECIFIED.

* CASING PIPE TO BE WELDED STEEL WITH A MINIMUM YIELD OF 35,000 PSI. WALL THICKNESS SHALL BE AS DESIGNATED BY THE PERMITTING AUTHORITY. IN NO CASE SHALL THE CASING PIPE WALL THICKNESS BE LESS THAN 0.25". STEEL CASING PIPE COATING AS PER ASTM A139, GRADE B RED MILL ON THE INSIDE AND OUTSIDE OF THE PIPE SHALL BE COAL TAR ENAMEL COATED AS PER AWWA C203.
* CASING SPACERS SHALL BE STAINLESS STEEL AS MANUFACTURED BY CASCADE WATERWORKS MFG., ADVANCED PRODUCTS & SYSTEMS, INC., OR APPROVED EQUAL.
* ENDS OF CASING PIPE SHALL BE SEALED WITH BRICKS AND MORTAR OR LINK SEAL, SAND FILL IN CASING TUBE IS NOT ALLOWED.

14 C-500 PIPE CASING
NOT TO SCALE





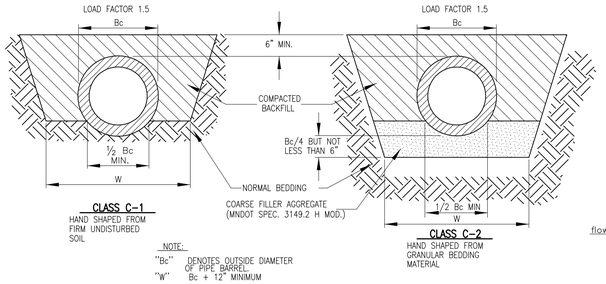
NOTES:

1. DIMENSIONS IN TABLE ARE BASED ON A WATER PRESSURE OF 150 P.S.I. AND AN EARTH RESISTANCE OF 1 TON PER SQUARE FOOT.
2. DIMENSIONS C_1, C_2, C_3 SHOULD BE LARGE ENOUGH TO MAKE ANGLE O EQUAL TO OR LARGER THAN 45°.
3. DIMENSION A_1, A_2, A_3 SHOULD BE AS LARGE AS POSSIBLE WITHOUT INTERFERING WITH M.J. BOLTS.
4. SHAPE OF BACK OF BUTTRESS MAY VARY AS LONG AS POUR IS AGAINST FIRM UNDISTURBED EARTH.

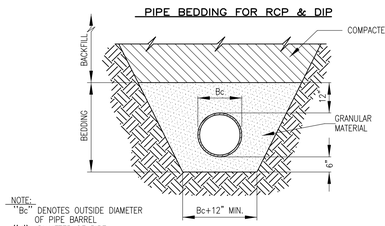
BUTTRESS DIMENSIONS

PIPE	22 ½° Bend		45° Bend		90° Bend	
SIZE	B_1	D_1	B_2	D_2	B_3	D_3
6"	1'-5"	1'-5"	1'-5"	1'-5"	2'-1"	1'-6"
8"	1'-5"	1'-5"	2'-1"	1'-6"	2'-8"	2'-0"
12"	1'-10"	1'-10"	3'-4"	2'-0"	4'-9"	2'-6"
16"	3'-0"	2'-0"	3'-10"	3'-0"	6'-2"	3'-6"
20"	3'-6"	2'-8"	5'-6"	3'-4"	8'-4"	4'-0"
24"	4'-0"	3'-0"	6'-10"	3'-10"	9'-8"	5'-0"

8 C-500 THRUST BLOCK DETAIL
NOT TO SCALE

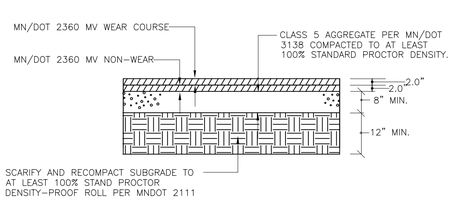


PIPE BEDDING FOR RCP & DIP

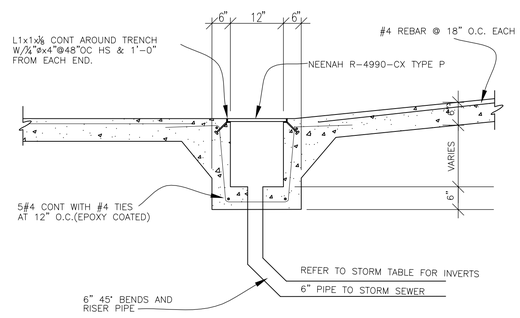


PVC PIPE BEDDING IN GOOD SOILS

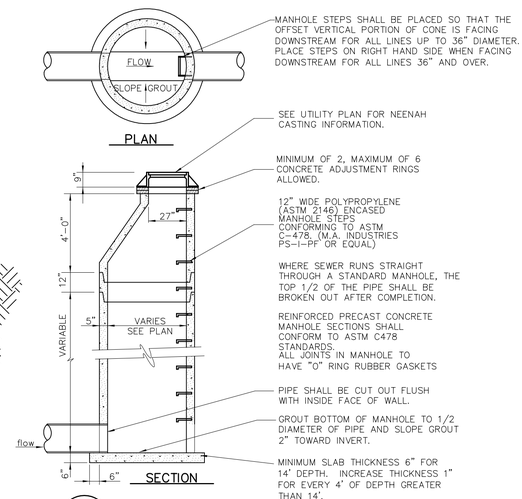
9 C-500 TYPICAL PIPE BEDDING
NOT TO SCALE



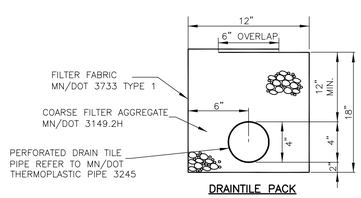
10 C-500 BITUMINOUS PAVEMENT
NOT TO SCALE



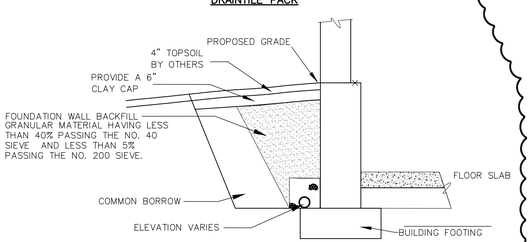
5 C-500 TRENCH DRAIN DETAIL
NOT TO SCALE



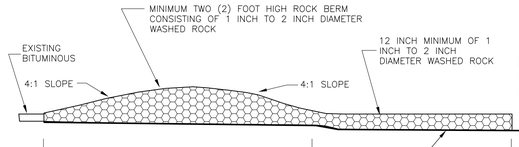
6 C-500 STORM SEWER MANHOLE
NOT TO SCALE



DRAINTILE PACK

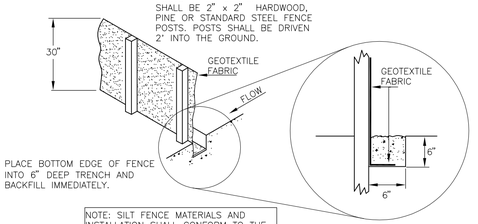


7 C-500 BUILDING PERIMETER DRAINTILE
NOT TO SCALE



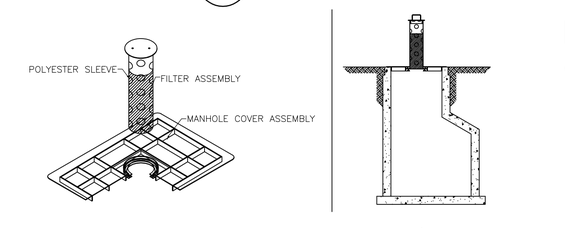
NOTE:
1. MINIMUM LENGTH OF 50 FEET AND OF NECESSARY WIDTH FOR CONSTRUCTION TRAFFIC.
2. FOLLOW ALL CITY, WATERSHED DISTRICT AND MPCA STANDARDS.
3. A ROCK CONSTRUCTION ENTRANCE MUST BE INSTALLED AND MAINTAINED AT ENTRANCES TO EXISTING HARD SURFACE ROADS.
4. CLEAN STREETS ON A DAILY BASIS OR MORE FREQUENTLY IF REQUESTED BY CITY.

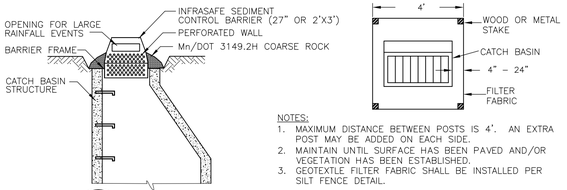
1 C-500 BERMED ROCK CONSTRUCTION ENTRANCE
NOT TO SCALE



NOTE: SILT FENCE MATERIALS AND INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF MN/DOT 3886.2

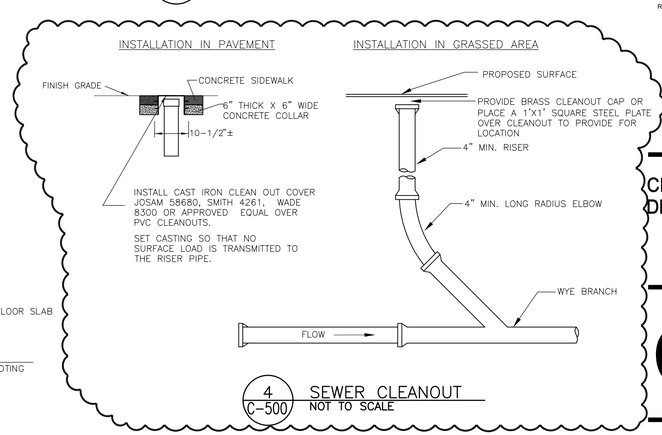
2 C-500 SILTATION FENCE
NOT TO SCALE





NOTES:
1. MAXIMUM DISTANCE BETWEEN POSTS IS 4'. AN EXTRA POST MAY BE ADDED ON EACH SIDE.
2. MAINTAIN UNTIL SURFACE HAS BEEN PAVED AND/OR VEGETATION HAS BEEN ESTABLISHED.
3. GEOTEXTILE FILTER FABRIC SHALL BE INSTALLED PER SILT FENCE DETAIL.

3 C-500 INLET SEDIMENT PROTECTION OPTIONS
NOT TO SCALE



4 C-500 SEWER CLEANOUT
NOT TO SCALE

Bruner/Cott

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BKBM Job No. 07247.00

Rev	Date	Remarks
	3-13-2008	SITE PLAN REVIEW SET
	4-7-2008	RESUBMIT OF SITE PLAN REVIEW SET
	4-18-2008	RESUBMIT OF SITE PLAN REVIEW SET

Date	JUNE 03, 2008
Scale	
Project Number	871-00
Drawn By	RGE

Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

CONSTRUCTION DOCUMENTS
April 28, 2008

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Joel W. Maier P.E.
Registration Number 19181 Date 4/28/08

CIVIL DETAILS

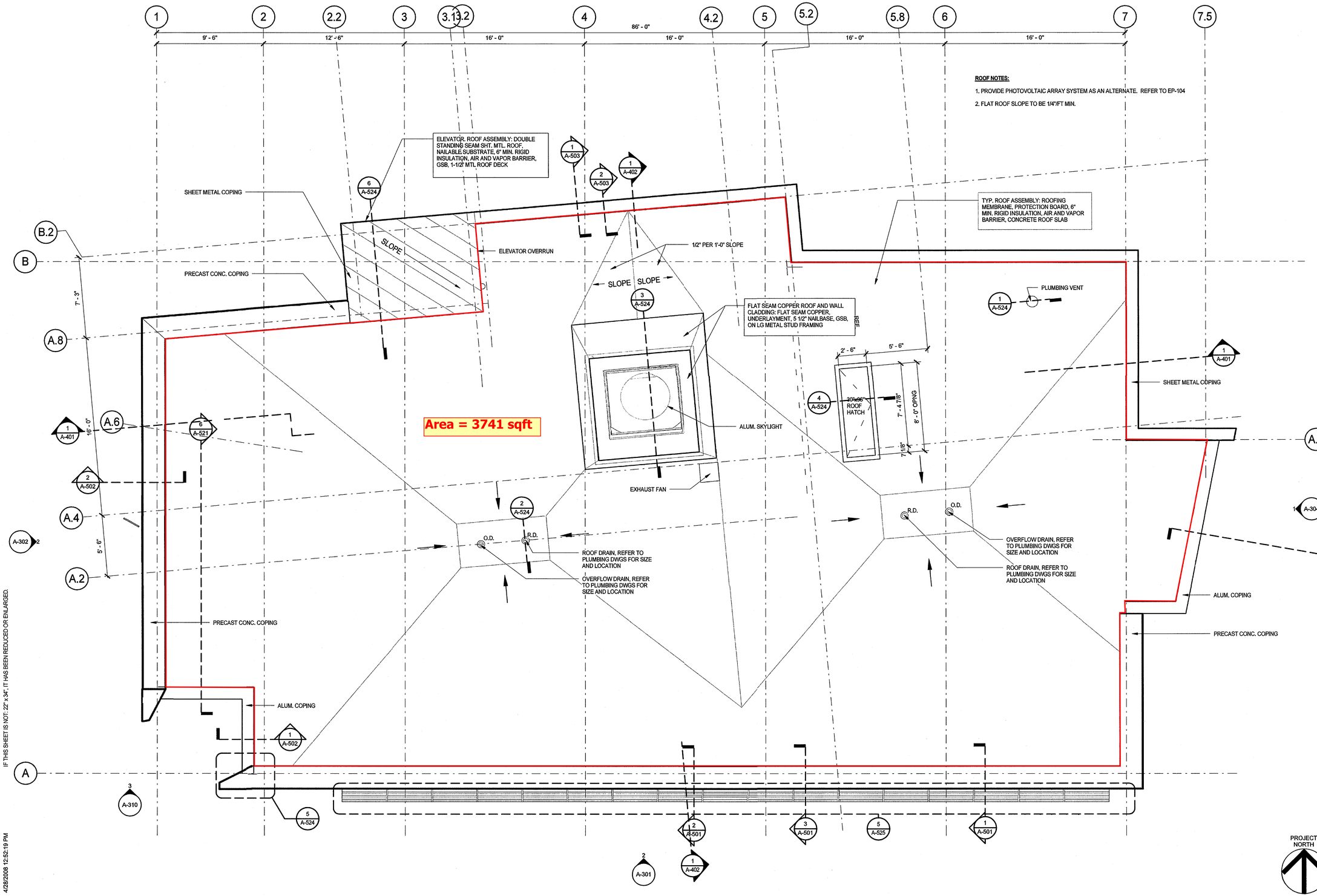
C-500

SUSTAINABLE SITES

CREDIT 7.2: HEAT ISLAND EFFECT: ROOF

ROOF PLAN

ROOFING MATERIAL SPECIFICATION SHEET



IF THIS SHEET IS NOT 22" x 34", IT HAS BEEN REDUCED OR ENLARGED.

4/28/2008 12:52:19 PM

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Rev	Date	Remarks

Date	APRIL 28, 2008
Scale	1/4" = 1'-0"
Project Number	871-00
Drawn By	Author

Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

CONSTRUCTION DOCUMENTS
APRIL 28, 2008

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the State of Minnesota.

Print Name: Norris Strawbridge

Signature:

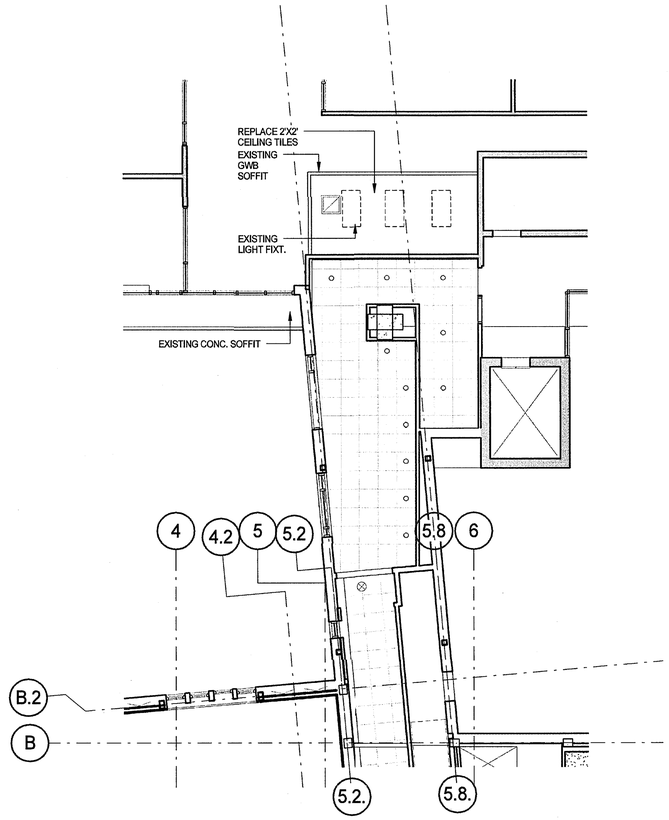
Date: 04/28/08 License #: 26327

ROOF PLAN

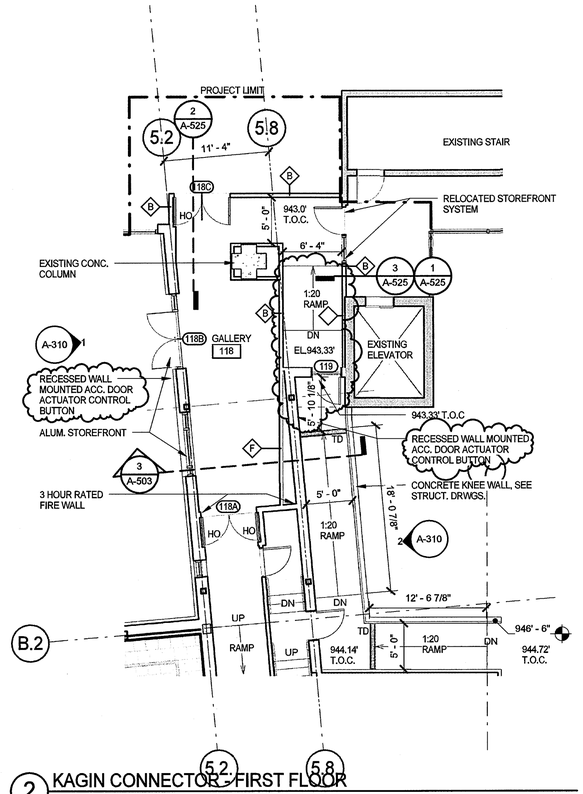
PROJECT NORTH

A-104

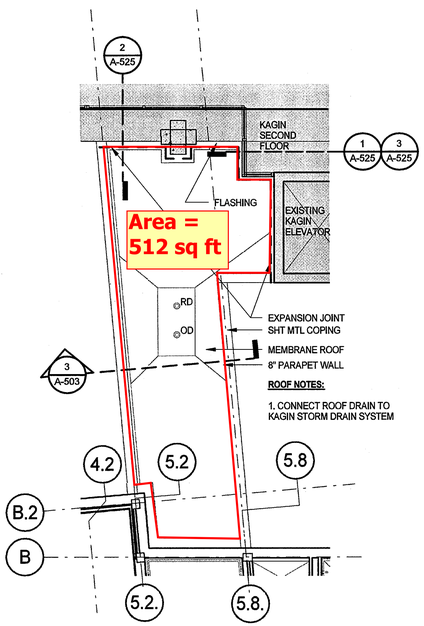
Total Roof Area = 3,741 + 512 = 4,253 sq ft



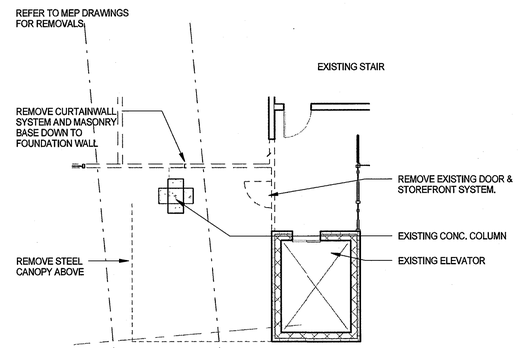
4 KAGIN CONNECTOR REFLECED CEILING PLAN
SCALE: 1/8" = 1'-0"



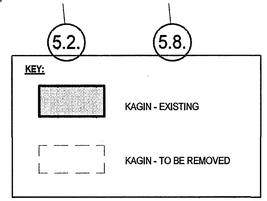
2 KAGIN CONNECTOR - FIRST FLOOR
SCALE: 1/8" = 1'-0"



3 KAGIN CONNECTOR ROOF PLAN
SCALE: 1/8" = 1'-0"



1 KAGIN CONNECTOR - DEMO PLAN
SCALE: 1/8" = 1'-0"



PROJECT NORTH

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Rev	Date	Remarks
5	3/18/2008	Addendum No. 5

Date	APRIL 28, 2008
Scale	As indicated
Project Number	871-00
Drawn By	Author

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Grand Avenue
St. Paul, MN

CONSTRUCTION DOCUMENTS
APRIL 28, 2008

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the State of Minnesota.

Print Name: Norris Strawbridge

Signature:

Date: 04/28/08 License #: 26327

KAGIN CONNECTOR PLANS

A-110

IF THIS SHEET IS NOT 22" x 34", IT HAS BEEN REDUCED OR ENLARGED.

4/28/2008 12:52:28 PM

Johns Manville

GlasKap® CR

Cool Roof Cap Sheet

Description

GlasKap CR is a white mineral surfaced, white acrylic coated, fiber glass cap sheet for use in built-up roofing systems.

Use

GlasKap CR is used as the uppermost finish ply in a variety of built-up roofing systems. The unique surfacing provides protection to the underlying asphalt and membrane, as well as the benefit of a reflective, emissive surface **that meets California Title 24.**

Color

GlasKap CR is available in white only.

Advantages

- Meets same ASTM as GlasKap
- Same installation as regular GlasKap
- Numerous UL Class A and FM fire approvals
- Should the roof be damaged, repairs are easy to make

JM GlasKap CR meets CA Title 24 under the Standard Prescriptive Approach. For more information, visit www.jmcoolroofs.com.

Typical Physical Properties

Material meets the requirements of ASTM D 3909.

Sizes

Roll size	1 square (9.29 m^2)
Roll weight	78 lbs. (35.4 kgs.)
Roll length	36′ (11 m)
Roll width	36″ (0.92 m)
Rolls per pallet	30
Pallets per truckload	19
Pallet size	45″ (1.14 m) square
Pallet weight	2,375 lbs. (1,077 kgs.)

Energy and the Environment

CRRC COOL ROOF RATING COUNCIL ® MEMBER

	Initial	Weathered
Solar Reflectance	0.76	Pending
Thermal Emittance	0.85	Pending
Rated Product ID	0662-0007	
Licensed Manufacturer ID	0662	
Classification	Production Line	

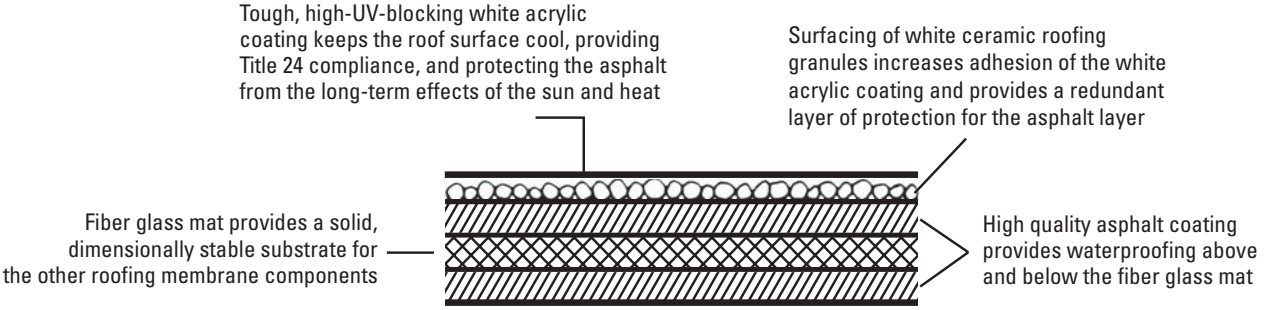
Cool Roof Rating Council ratings are determined for a fixed set of conditions, and may not be appropriate for determining seasonal energy performance. The actual effect of solar reflectance and thermal emittance on building construction may vary.

Manufacturer of product stipulates that these ratings were determined in accordance with the applicable Cool Roof Rating normal procedures.

CA Title 24 (CRRC) Compliant	Reflectivity .76	Emissivity .85
LEED	Recycled Content: 0%	SRI 92
	Producing Locations: Oklahoma City, OK	

Precautions

Refer to the Material Safety Data Sheet and Product Label prior to using this product.



WATER EFFICIENCY

CREDIT 1.1 - 1.2

CREDIT 3.1 - 3.2

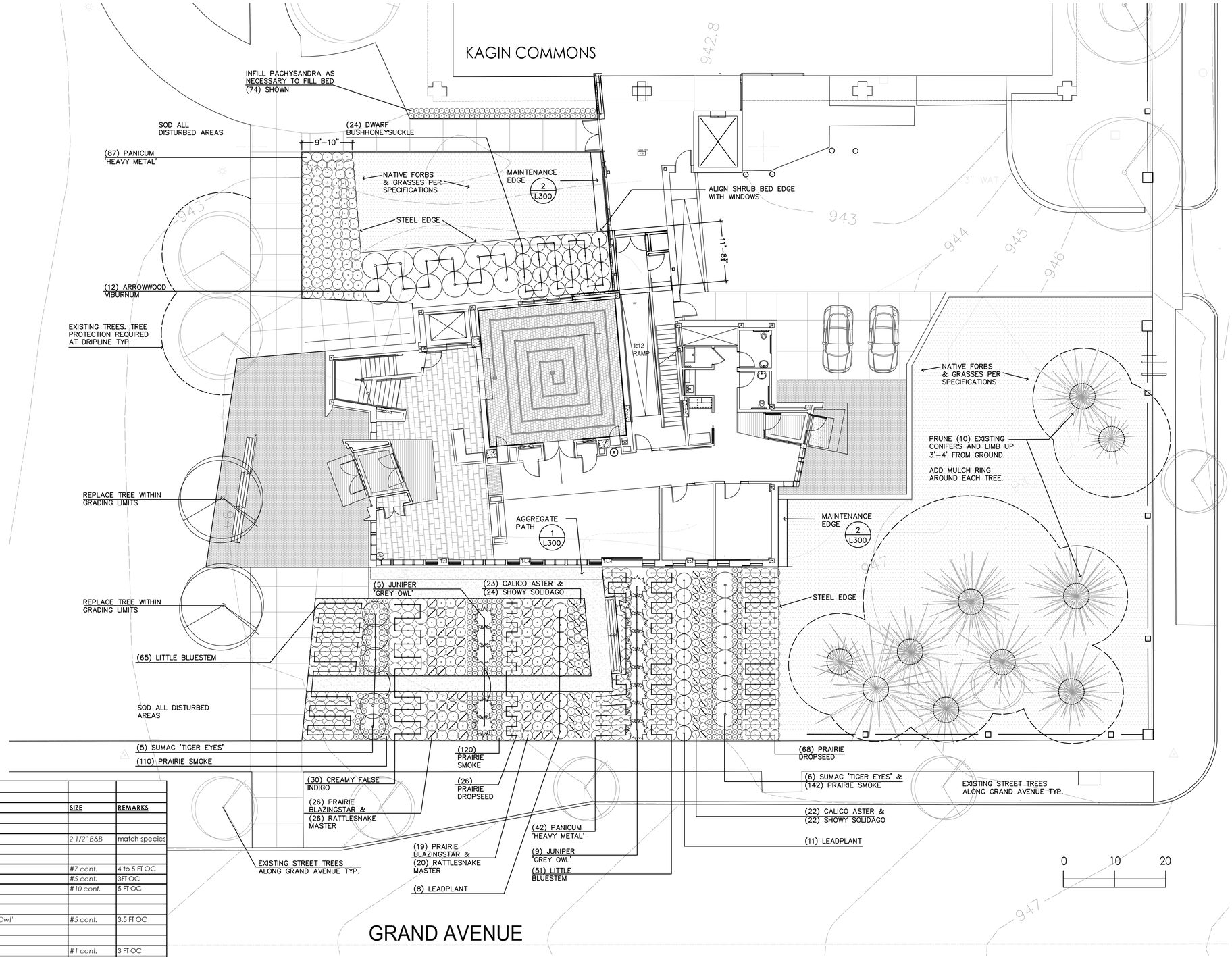
WATER EFFICIENCY

CREDIT 1.1: WATER EFFICIENT LANDSCAPING: REDUCE BY 50%

&

CREDIT 1.2: WATER EFFICIENT LANDSCAPING: NO POTABLE WATER USE OR IRRIGATION

LANDSCAPE PLAN



Plant Schedule

QTY	COMMON NAME	SCIENTIFIC NAME	SIZE	REMARKS
	Deciduous Trees			
2	Maple hybrid	*Acer x (match species)*	*2 1/2" B&B*	match species
	Deciduous Shrubs			
11	Sumac 'Tiger Eyes'	*Rhus typhina 'Bailtiger'*	*#7 cont.*	4 to 5 FT OC
24	Dwarf Bush Honeysuckle	*Diervilla Lonicera*	*#5 cont.*	3FT OC
12	Arrowwood Viburnum	*Viburnum dentatum*	*#10 cont.*	5 FT OC
	Evergreen Shrubs			
14	Grey Owl Juniper	*Juniperus virginiana 'Grey Owl'*	*#5 cont.*	3.5 FT OC
	Perennials			
19	Leadplant	*Amorpha canescens*	*#1 cont.*	3 FT OC
129	Panicum 'Heavy Metal'	*Panicum virgatum 'Heavy Metal'*	*#1 cont.*	2FT OC
116	Little Bluestem	*Schizachyrium scoparium*	*#1 cont.*	2 FT OC
30	Creamy False Indigo	*Baptisia bracteata*	*#1 cont.*	2.5 FT OC
372	Prairie Smoke	*Geum triflorum*	*#1 cont.*	12 IN OC
94	Prairie Dropseed	*Sporobolus heterolepis*	*#1 cont.*	2 FT OC
45	Prairie Blazingstar	*Liatris pycnostachya*	*#1 cont.*	18 IN OC
46	Rattlesnake Master	*Eryngium yuccifolium*	*#1 cont.*	18IN OC
45	Calico Aster	*Aster lateriflorus*	*#1 cont.*	18IN OC
46	Showy Solidago	*Solidago speciosa*	*#1 cont.*	18 IN OC
74	Pachysandra	*Pachysandra terminalis 'Green Carpet'*	*6-pack*	12 IN OC

1 L200 LANDSCAPE PLAN
SCALE 1" = 10'

NOTE:
1) ALL PLANTINGS ARE TO BE IRRIGATED WITH TEMPORARY SYSTEM FOR ESTABLISHMENT PERIOD OF 1 YR.
2) SEE SPECIFICATIONS FOR NATIVE FORBS AND GRASSES.

IF THIS SHEET IS NOT 22" x 34", IT HAS BEEN REDUCED OR ENLARGED.

1/10/2008 9:46 AM

Bruner/Cott

Bruner/Cott & Associates, Inc.
130 Prospect Street
Cambridge, Massachusetts 02139
617 492 8400
www.brunercott.com

Architecture/Urban Design
Preservation/Landscape Architecture
Space Planning/Interior Design

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LANDSCAPE ARCHITECTURE +
400 1st Avenue North #528
Minneapolis, MN 55401
612 455 2980
www.closelandarch.com

Rev.	Date	Remarks

Date	January 14, 2008
Scale	1" = 10'
Project Number	07-013 CLA
Drawn By	JG

Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

LANDSCAPE PLAN

L-200

WATER EFFICIENCY

CREDIT 3.1: WATER USE REDUCTION: 20% REDUCTION

&

CREDIT 3.2: WATER USE REDUCTION: 30% REDUCTION

KITCHEN FAUCET SPECIFICATION SHEET (CHICAGO MODEL # 786-GN2FC)

JANITOR FAUCET SPECIFICATION SHEET (CHICAGO MODEL # 897-CP)

SHOWERHEAD SPECIFICATON SHEET (DELTA MODEL # RP46384)

SHOWER VALVE SPECIFICATION SHEET (SYMMONS MODEL # 4-427)

LAVORATORY FAUCET SPECIFICATION SHEET (ZURN MODEL # Z6915-GEN-F-MT)

DUAL-FLUSH TOILET (CAROMA MODEL # 326013)

CHICAGO FAUCETS

Last As Long As The Building

2100 SOUTH CLEARWATER DRIVE
DES PLAINES, ILLINOIS 60018-5999

FITTING NO.

786-GN2FC

SUBMITTED MODEL NO.

JOB NAME

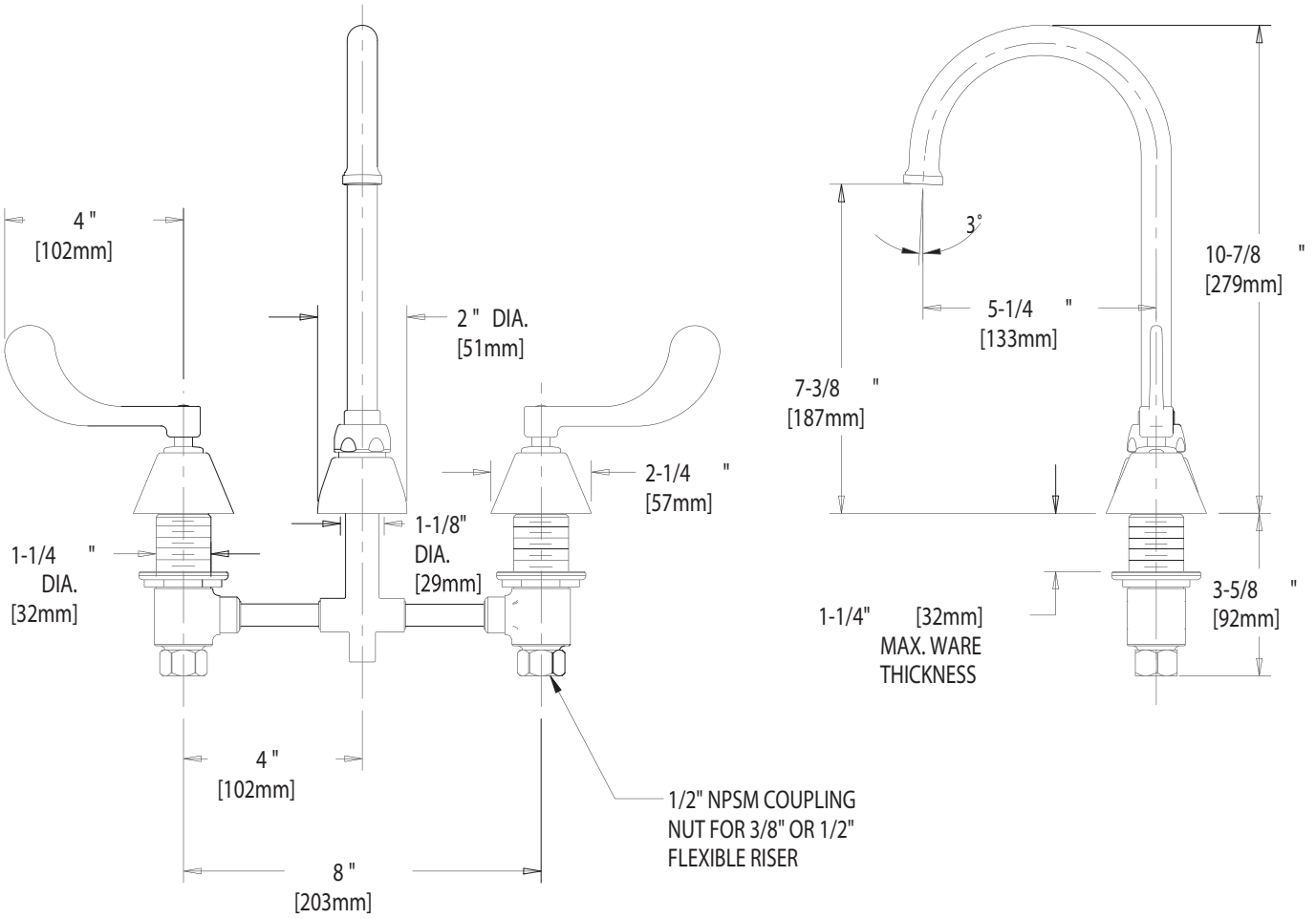
ITEM NO.

SUBMITTED AS SHOWN	
SUBMITTED AS NOTED	
SEE ATTACHED FOR SUBMITTED MODIFICATION	

ADA COMPLIANT

IS ASSUMED FOR USE OF SUPERCEDED OR VOIDED DATA.

ROUGHING IN DIMENSIONS MAY VARY AND ARE SUBJECT TO CHANGE. NO RESPONSIBILITY



DIMENSIONS IN INCHES AND [MILLIMETERS].

TECHNICAL DATA

- DECK MOUNTED FAUCET
- GN2FC RIGID/SWING GOOSENECK SPOUT
- 317 INDEXED WRISTBLADE HANDLES
- QUATURN OPERATING CARTRIDGES
- FINISH: CHROME PLATE
- PLAIN END SPOUT
- 1.6 GPM [6.1 L/min.] INTERNAL FLOW CONTROL
- ASME A112.18.1M COMPLIANT
- CSA B125 APPROVED
- NSF 61 COMPLIANT

DATE: 05-16-02
BY: SID
CHK'D:
APP'D:
REV: A

786-GN2FC

MECHANICAL FAUCETS

897-CP

Sink Faucets

Product Type

Wall Mounted 8" Body, Adjustable Arms 7 5/8" - 8 3/4" Hot and Cold Water Sink Faucet

Features & Specifications

- 8" Body, Adjustable Arms 7 5/8" - 8 3/4"
- 2 3/8" Lever Handle
- Quaturn Compression Operating Cartridge
- 1/2" NPT Adjustable Female Union Nut Supply Arms
- 3/4" Male Hose Thread Outlet
- Integral Stop Valves for Servicing the product
- Atmospheric Vacuum Breaker, Not Intended for Continuous Pressure Applications
- Vacuum Breaker Spout with Pail Hook and Wall Brace
- Atmospheric Vacuum Breaker, Not Intended for Continuous Pressure Applications
- CFNow! Item Ships in 5 Days

Job Name _____

Item Number _____

Section/Tag _____

Model Specified _____

Architect _____

Engineer _____

Contractor _____

[ ] Submitted as Shown [ ] Submitted with Variations

Date _____

Performance Specification

- Rated Operating Pressure: 20-125 PSI
- Rated Operating Temperature: 40-140ºF

Warranty

- Lifetime Limited Faucet Warranty
- 5-Year Limited Cartridge Warranty
- 1-Year Limited Finish Warranty

Codes & Standards

- ASME A112.18.1/CSA B125.1
- ADA ANSI/ICC A117.1

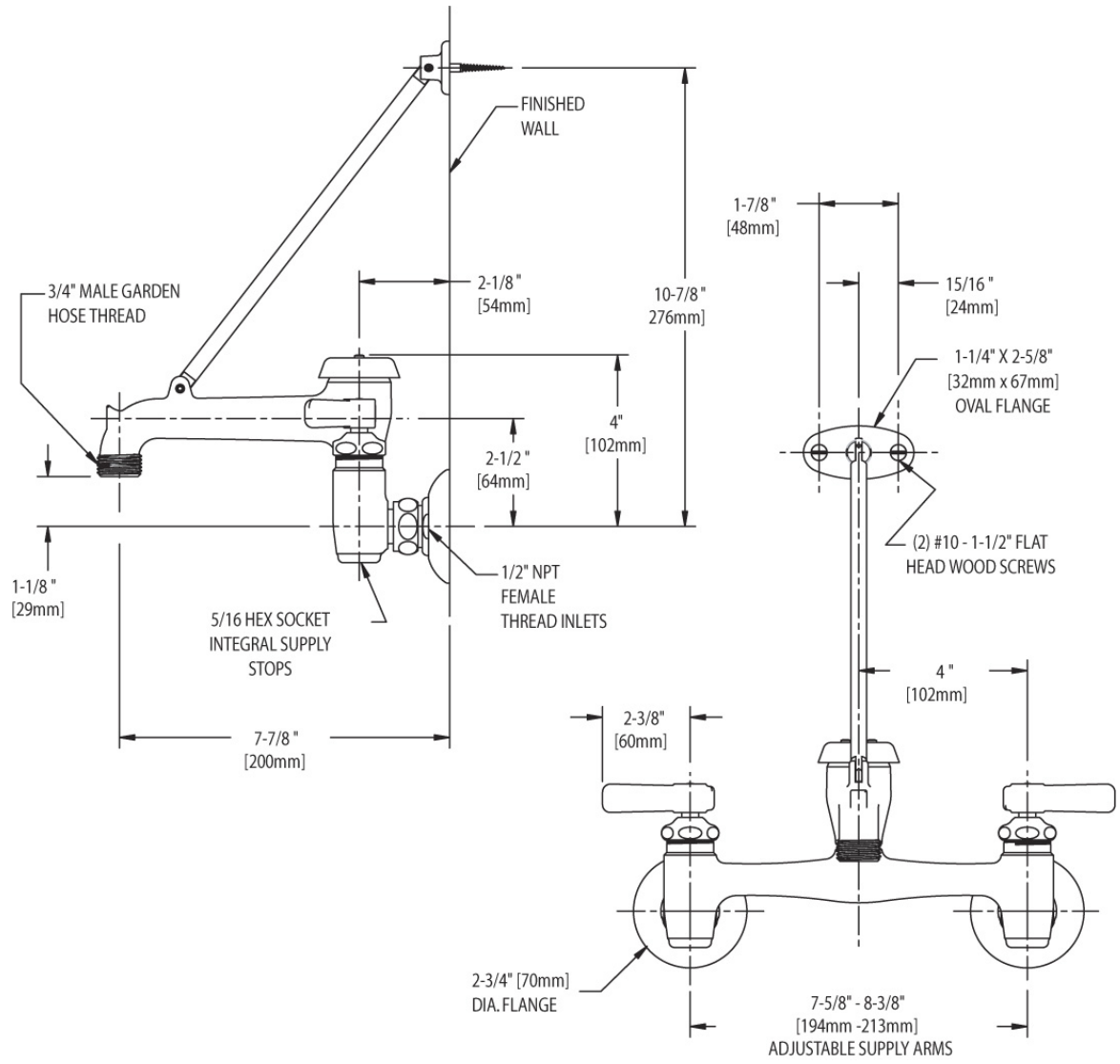
2100 South Clearwater Drive
Des Plaines, IL
P: 847/803-5000
F: 847/803-5454
Technical: 800/TEC-TRUE
www.chicagofaucets.com

897-CP

Sink Faucets

Architect/Engineer Specification

Chicago Faucets No. 897-CP, Wall Mounted 8" Body, Adjustable Arms 7 5/8" - 8 3/4" Hot and Cold Water Sink Faucet, polished chrome plated solid brass constructionVacuum Breaker Spout with Pail Hook and Wall Brace. 2 3/8" Metal Lever handle(s) with Eight Point Tapered Broach and Secured Blue and Red Buttons. Quaturn™ rebuildable compression cartridge, opens and closes 90°, closes with water pressure, features square tapered stem. 1/2" NPT Adjustable Female Union Nut Supply Arms. 3/4" Male Hose Thread Outlet. Integral Stop Valves for Servicing the product. Atmospheric Vacuum Breaker, Not Intended for Continuous Pressure Applications. Mounting hardware includedAtmospheric Vacuum Breaker, Not Intended for Continuous Pressure Applications. Secondary Control Valve: Vacuum Breaker Spout with Pail Hook and Wall Brace. .

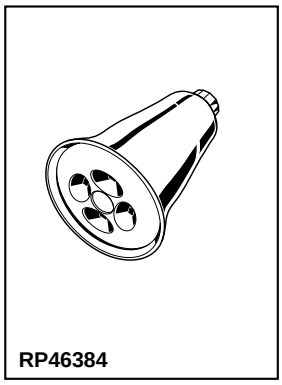


Operation and Maintenance

Installation should be in accordance with local plumbing codes. Flush all pipes thoroughly before installation. After installation, remove spout outlet or flow control and flush faucet thoroughly to clear any debris. Care should be taken when cleaning the product. Do not use abrasive cleaners, chemicals or solvents as they can result in surface damage. Use mild soap and warm water for cleaning and protecting the life of Chicago Faucet products. For specific operation and maintenance refer to the installation instructions and repair parts documents that are located at www.chicagofaucets.com.

Chicago Faucets, member of the Geberit Group, is the leading brand of commercial faucets and fittings in the United States, offering a complete range of products for schools, laboratories, hospitals, office buildings, food service, airports and sport facilities. Call 1.800.TECTRUE or 1.847.803.5000 Option 1 for installation or other technical assistance.

2100 South Clearwater Drive
Des Plaines, IL
P: 847/803-5000
F: 847/803-5454
Technical: 800/TEC-TRUE
www.chicagofaucets.com



RP46384

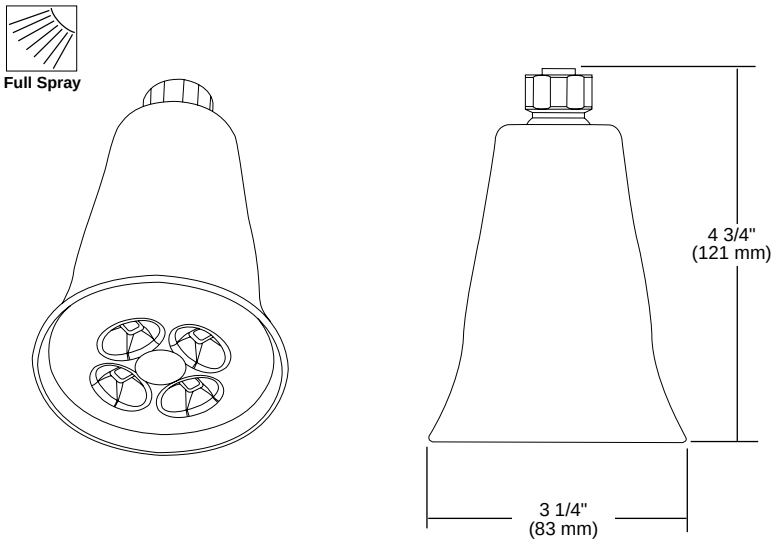
LOW FLOW SHOWERHEAD

- Full spray function
- 1.6 GPM @ 80 PSI
- H_2OKinetic Technology

Submitted Model No.: _____

Specific Features: _____

RP46384▲ Low Flow Showerhead



▲ **Designate proper finish suffix**

STANDARD SPECIFICATIONS:

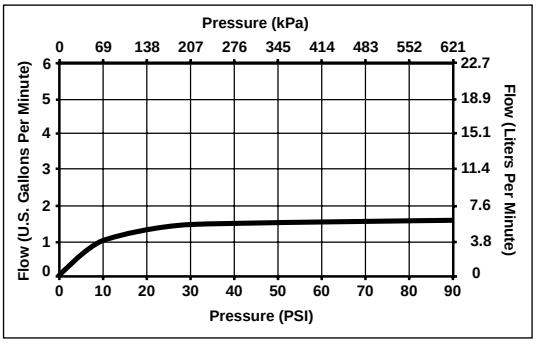
- *Full spray function.*
- *1.6 GPM @ 80 PSI.*
- *H_2OKinetic technology.*

WARRANTY

- *Lifetime Faucet and Finish Limited Warranty to the original consumer purchaser to be free from defects in material and workmanship.*
- *5 Year Limited Warranty for usage in all industrial, commercial and business applications.*

COMPLIES WITH:

- *ASME A112.18.1 / CSA B125.1*
- *CSA Certified*
- *IAPMO Listed*



DELTA FAUCET COMPANY

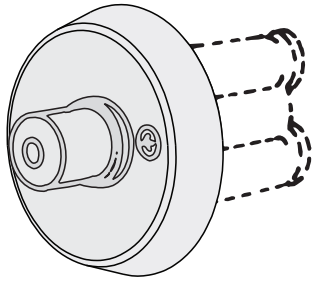
55 E. 111th Street, Indianapolis, Indiana 46280
395 Matheson Blvd. E., Mississauga, ON L4Z 2H2
© 2007 Masco Corporation of Indiana

Delta reserves the right (1) to make changes in specifications and materials, and (2) to change or discontinue models, both without notice or obligation. Dimensions are for reference only. See current full line price book or www.specselect.com for finish options and product availability.

Location:

SYMMONS®

Showeroff Shower Limiter Valve 4-427
Specification Submittal



Model Numbers

☑ 4-427 Showeroff Shower limiter valve

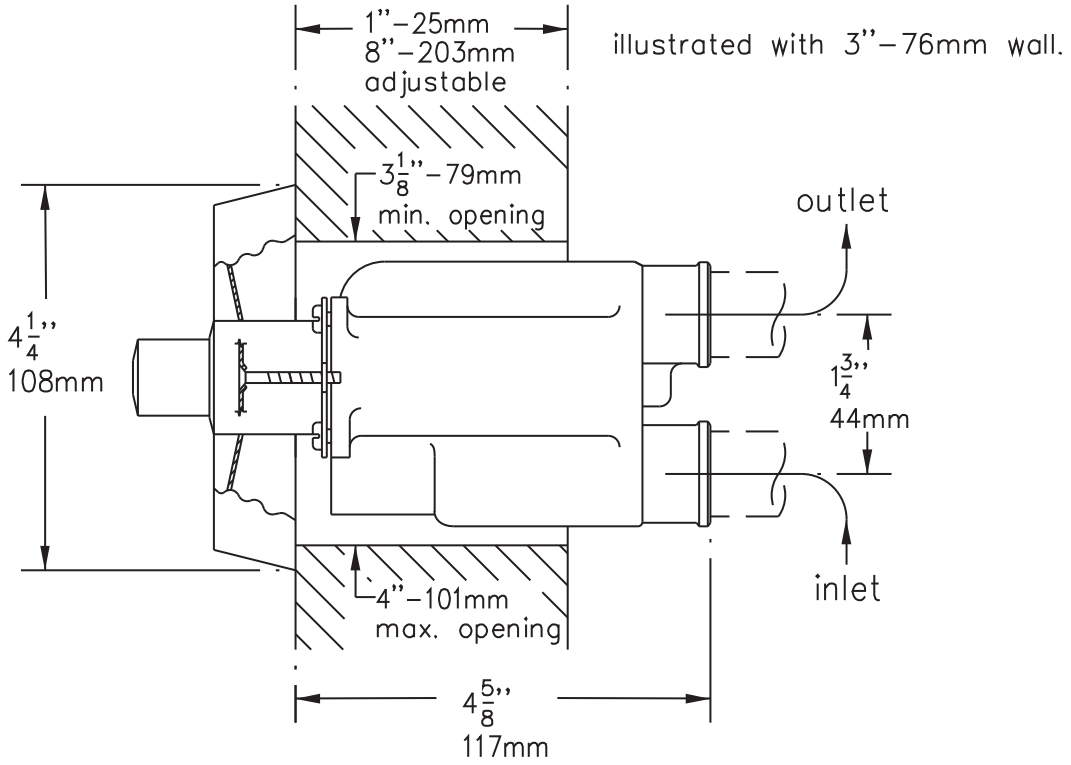
Warranty

- Limited Lifetime - to the original end purchaser in residential / consumer installations.
- 5 years - for commercial installations

Feature Highlights

- Manual Showeroff limiter valve
- Integral service stop for shutting water off when servicing valve cartridge
- 1/2 inch IPS back connections
- Vandal resistant mounting fasteners, recessed hex socket type.
- Polished chrome finish

Dimensions Showeroff Shower Limiter Valve, *4-427*



Note: Dimensions subject to change without notice.

Symmons Industries, Inc. 31 Brooks Drive ▪ Braintree, MA 02184 ▪ (800)796-6667, (781)848-2250 ▪ Fax: (800)961-9621, (781)664-1300
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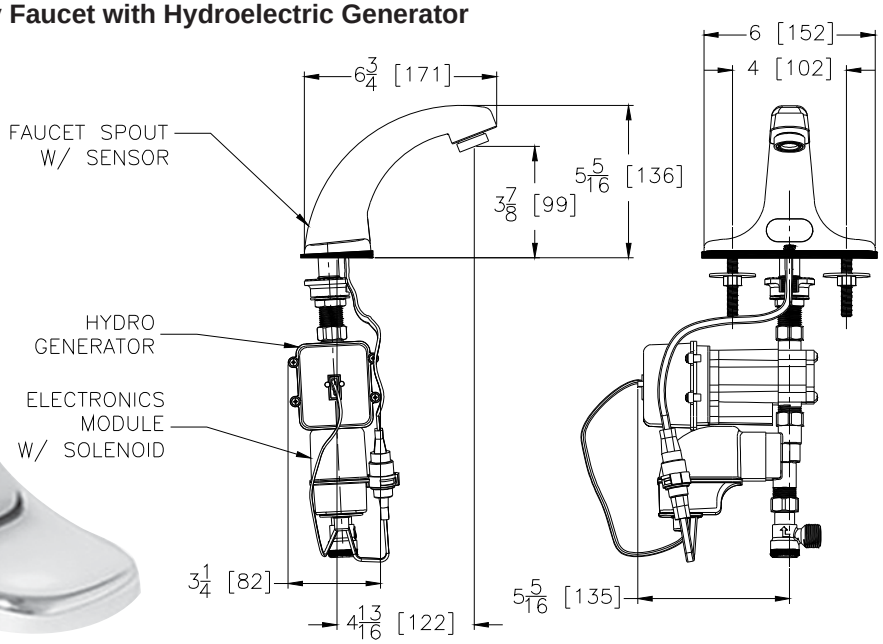
Print Email Reset Form

AquaSense®
TAG _____

Z6915-GEN

Lavatory Faucet with Hydroelectric Generator



Flow Control Options

- ☐ **-J** 1.5 gpm/ 5.7 Lpm Vandal-Resistant Laminar Flow
- ☐ **-K** 1.0 gpm/ 3.8 Lpm Vandal-Resistant Laminar Flow
- ☐ **-L** 1.0 gpm/ 3.8 Lpm Vandal-Resistant Aerator

Accessories

- ☐ **-ADM** Above Deck Mixer *
- ☐ **-H4** Wrist Blade Handle for ADM *
- ☐ **-MT** Mixing Tee *
- ☐ **-MV** Temperature Mixing Valve
- ☐ **-SH** Supply Hoses for Mixing Valve
- ☐ **-TMV** Thermostatic Mixing Valve for Multiple Faucets
- ☐ **-TMV-1** Thermostatic Mixing Valve for Single Faucets
- ☐ **-_____** Other

☐ **-XL** *Zurn Lead Compliant products (-XL) are manufactured to comply with state laws and local codes that mandate lead content levels less than one quarter of one percent (0.25%) total lead content by weighted average.*

* Option not available for -XL faucets

Engineering Specification

ADA compliant, chrome plated sensor faucet for retrofit and new construction.

- Flow Rate
  - 1.5 gpm Vandal Resistant Aerator
  - (0.25 gal per 10 sec. cycle)
- Occupant Detection
  - Infrared convergence-type proximity sensor
  - Thirty Second Time out feature
- Power Supply
  - Self Sustaining Hydroelectric Generator
  - Approximately 10 years (1.5 gpm)/5 years (1.0 gpm)
- Spout module
  - Chrome Plated Cast Brass
- Also Includes
  - Integral 4": cover plate
  - In-line filter
  - Inlet for a 1/2"[13] ball riser
  - Single supply hose

Architectural/Engineering Approval

ZURN INDUSTRIES, LLC. ♦ COMMERCIAL BRASS OPERATION
5900 ELWIN BUCHANAN DRIVE ♦ SANFORD NC 27330
Phone: 1-800-997-3876 ♦ Fax: 919-775-3541
www.zurn.com
In Canada: ZURN INDUSTRIES LIMITED
3544 Nashua Drive ♦ Mississauga, Ontario L4V1L2
Phone: 905-405-8272 Fax: 905-405-1292

AquaSense® is a registered trademark of Zurn Industries, LLC.

The information contained in this document is subject to change without notice.
Please contact Zurn for most up to date information.

caroma®

CI/SfB	(74.1)	g3	
Date	October 2008		

Supersedes all previous issues

Walvit Elongated

2.9.2

1.6/0.8 gpf (6/3 l) Water Saving Dual Flush High Efficiency Toilet (HET)
Ultra Low Flush (ULF) Vitreous China Washdown Toilet

HIGH EFFICIENCY TOILET HET

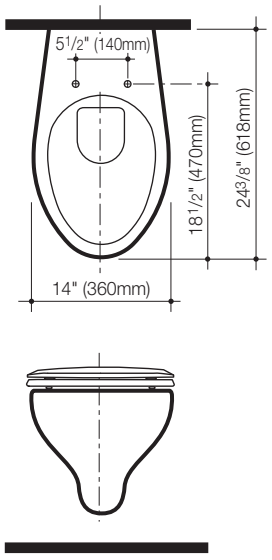
c-UPC®
IAPMO listed for USA & Canada

Walvit Wall Hung Elongated 1.6/0.8 gpf (6/3 l) Dual Flush HET

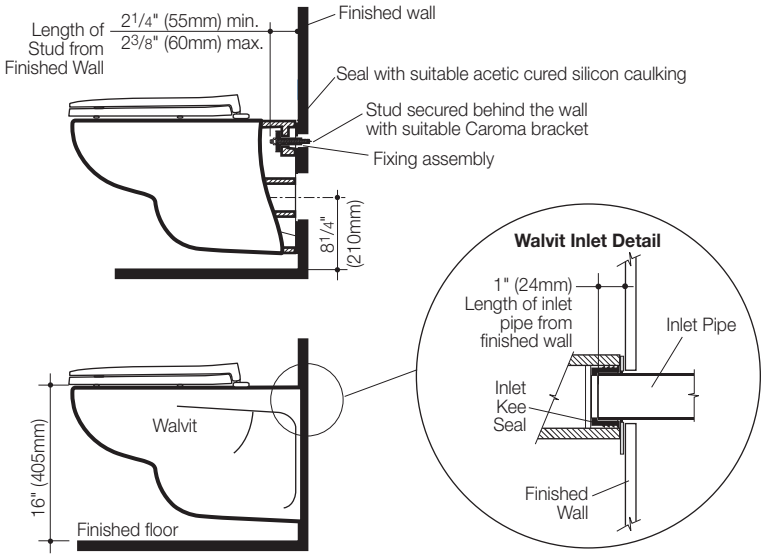
Ultra Low Flush (ULF)
Vitreous China Washdown Toilet

A classically styled box rim wall hung closet bowl featuring smooth sculptured contours and advantages of unobstructed floor for easy cleaning. The closet bowl features concealed shrouded outlet and closet bowl fixings providing optimum appearance to the wall. The Walvit Elongated closet bowl has been developed to be installed directly to the wall using the Sanifix bracketing system. The closet bowl is suitable for domestic and commercial applications.

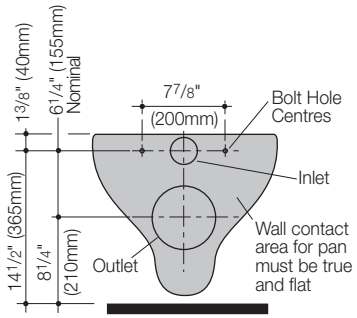
Closet Bowl:	**Walvit Elongated** 1.6 gal (6 l) full flush, wall hung, wash down type with box rim. Code No. 604119.
Outlet:	Wall mounted outlet only, unvented.
Inlet:	2" (50mm) back inlet for concealed tank and flushvalve installation. Option top inlet S.M.O.
Tanks:	Caroma Concealed Tank options are available: **Invisi Inwall/Induct/Inceiling Tanks**. Code No. 227006.
Weight:	116 lbs (53 kg).
Fixing:	Sanifix bracket option available for fixing the Walvit Elongated closet bowl directly to the wall: **D.715 Tank Chair Bracket** Code No. 687715, fixing pack Code No. 687812.
Seats:	The following Caroma seats are recommended: **Elongated** Code No. 326307, **Elongated Soft Close** Code No. 326221, and **Commercial** Code No. 326813.
Color:	White.
Dimensions:	All dimensions are in inches and millimetres and are subject to normal manufacturing variations. Caroma pursues a policy of continuing improvement in design and performance of its products. The right is therefore reserved to vary specifications without notice.



Walvit Installation Detail



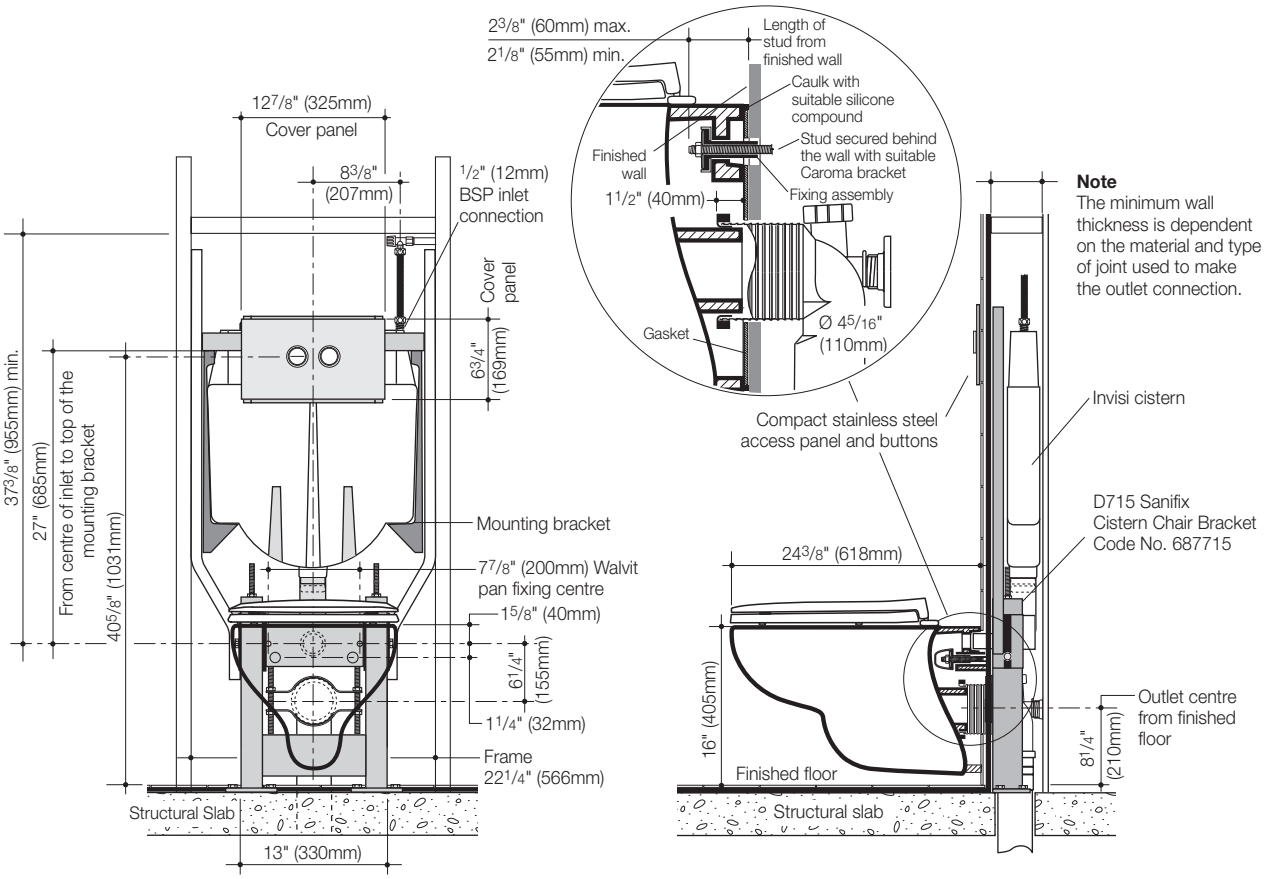
Rough in Dimension



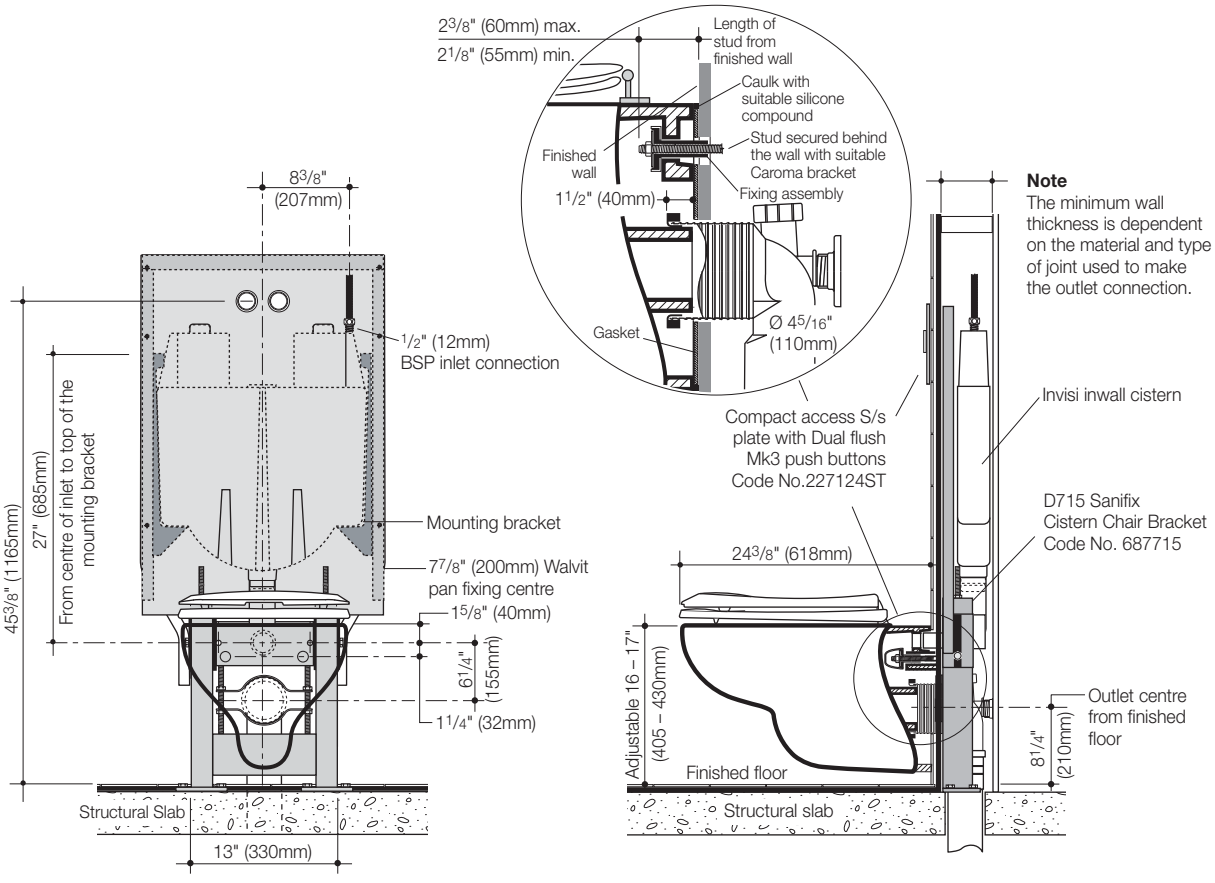
HIGH EFFICIENCY TOILET
HET

c-UPC®
IAPMO listed for USA & Canada

Walvit Elongated Invisi
Inwall Installation
Compact Panel Kit



Walvit Elongated Invisi
Inwall Installation
Large Panel Kit



ENERGY AND ATMOSPHERE

PREREQUISITE 1

CREDIT 1

CREDIT 5

CREDIT 6

ENERGY AND ATMPOSHERE

PREREQUISITE 1: FUNDAMENTALS COMMISSIONING OF THE BUILDING ENERGY SYSTEMS

COMMISIONING SCOPE OF WORK

FINAL COMMISIONING REPORT

PROJECT APPROACH

Karges Faulconbridge, Inc. understands the required scope of service. Our background and experience as a firm, as well as our qualified staff will assist the project team to deliver a successful project. The following sections illustrate our approach and methodology for providing LEED EA Prerequisite 1: Fundamental Commissioning of the Building Energy Systems and EA Credit 3: Enhanced Commissioning Services.

EA PREREQUISITE 1: FUNDAMENTAL COMMISSIONING

Design Phase Activities

- Owner's Requirements Review: KFI will review the Owner's Project Requirements (OPR) and the Basis of Design (BOD) documents developed by the project team. Comments will be documented and forwarded to the design team for review and action.
  Deliverable: OPR and BOD review comments

- Commissioning Requirements: KFI will develop a project specific commissioning specification for inclusion in the construction documents.
  Deliverable: Commissioning Specification.

- Commissioning Plan: KFI will develop and implement a project specific Commissioning Plan for the project.
  Deliverable: Commissioning Plan.

Construction Phase Activities

- Construction Meetings: Gaining contractor trust and acceptance is essential for successful commissioning implementation. KFI will participate in a preconstruction meeting to introduce ourselves to the team, outline the requirements of the commissioning process and our expectations of the contractor's assistance.

  KFI will attend and participate in up to 5 construction meetings as requested by the project team. Meeting participation will assist in coordinating commissioning activities and resolution of installation and operational related issues.

- Construction Review: KFI will perform 5 construction observations to review component and equipment installations. KFI will provide written documentation of any noted deficiencies. Site visit observation documents will be forwarded to the construction team for discussion and proper action.
  Deliverables: Construction observation reports.
  Equipment installation deficiency lists.

- Start-up Review: KFI will be on-site for up to 3 days to witness equipment and system start-ups. While start-up is the responsibility of the contractors, KFI will assist with coordination and review contractor supplied start-up forms to ensure that proper documentation is produced. KFI participation minimizes multiple start-up attempts and ensures that equipment does not run until all proper precautions and steps have been taken.

Acceptance Phase Activities

- Functional Testing: KFI specializes in the review of controls systems. Our staff is intimately familiar with all types of control systems through years of experience installing, testing,

troubleshooting and repairing systems. We are a hands-on organization that is not afraid to get dirty to confirm operation.

Control sequences will be verified along with the hardware and software points required to perform the control sequences. Testing will begin when the controls contractor supplies KFI with documentation confirming that equipment and systems are fully operational and any graphical interface is complete.

Upon completion of our initial testing, a deficiency punchlist is promptly developed and issued to the project team to forward to the contractors for appropriate action.

KFI will come to the site to review the punchlist items with the contractors and later return to verify the rework when notified that correction actions were completed.

Deliverables: System functional test forms
Deficiency punchlist

- TAB Review: KFI will utilize our National Environmental Balancing Bureau (NEBB) certification expertise to review test and balance procedures and documentation. Balance reports will be reviewed for accuracy and completeness. Sample measurements will be performed by KFI staff to verify report validity. Certified equipment will be used as necessary to assist with these procedures.

  Deliverables: TAB verification form

- Final Report: A final report will be developed upon commissioning completion. The report will detail the procedures used and the results achieved. A copy of all project documentation developed or obtained by KFI during the project is also included. The report format will follow LEED Commissioning Requirements format. KFI will also complete all on-line LEED filing requirements.

  Deliverables: Final Report

EA CREDIT 3: ENHANCED COMMISSIONING

Design Phase Activities

- Design Phase Review: KFI will perform one design review prior to mid-point of design. In addition to the cursory technical review, our review will include system operability, maintainability and conformance to industry standards. Deficiencies and project document concerns (i.e. coordination issues, missing information, etc.) will be documented for design team review. KFI can participate in a design review meeting to provide insight and background on our design review comments if requested by the project team.

  Deliverables: Design document review comments

Construction Phase Activities

- Shop Drawing Review: KFI will review major equipment and controls shop drawing submittals for conformance to project documents. KFI specializes in the review of DDC and lighting controls systems. Our staff is familiar with multiple control systems through years of experience installing, testing, troubleshooting and repairing systems. This expertise will be used to ensure control shop drawings are accurate before the installation starts and that the systems are able to operate properly upon building turnover.

  Deliverables: Major equipment and control shop drawing review comments.

Acceptance Phase Activities

- Systems Manual: Complete system documentation is required to ensure that staff that the information necessary to properly operate and maintain the commissioned systems. KFI will work with the contractors to develop a project specific Systems Manual that will supplement the information in the O&M manuals to provide all of the necessary documentation.

  Deliverable: Systems Manual

- Training Verification: KFI will assist with contractor training coordination. While training is the contactor's responsibility, we will work to ensure that the sessions meet the owner's needs. This is accomplished by reviewing contractor supplied training agendas and training providers resumes, coordinating schedules and staff, and witnessing actual training sessions for content approval.

  Deliverable: Training documentation verification form

- Warranty Review: A warranty inspection will performed 10 months after substantial completion to review the status of all outstanding issues and provide a "walk-through" of the entire system. The warranty review should include project team members and the O&M building staff. KFI will identify any remaining items and assist the building staff with any building operation problems. A Warranty Review observation report will summarize all findings, required action items and recommendations.

  Deliverable: Warranty Review documentation

Systems Commissioned

- HVAC systems and controls
- Lighting, lighting controls and PhotoVoltaic System
- Domestic hot water

Karges-Faulconbridge, Inc.
Engineers

MACALESTER COLLEGE
INSTITUTE FOR GLOBAL CITIZENSHIP

LEED COMMISSIONING
FINAL REPORT

August 6, 2009

KFI Project No. 07-372

Contact Information

Robert J. Linder
Department Head – Owner Services Group
rjlinder@kfi-eng.com
Phone Number: 651-771-0880
Fax Number: 651-771-0878

Table of Contents

EXECUTIVE SUMMARY

LEED DOCUMENTATION

COMMISSIONING AUTHORITY

OWNER'S PROJECT REQUIREMENTS

COMMISSIONING REQUIREMENTS

COMMISSIONING PLAN

DESIGN REVIEW

SUBMITTAL REVIEW

INSTALLATION VERIFICATION

PERFORMANCE TESTING

TRAINING DOCUMENTATION

O&M DOCUMENTATION

TAB REVIEW

SYSTEMS MANUAL

FINAL OPERATIONS REVIEW

Executive Summary

Karges Faulconbridge was contracted to provide LEED Energy & Atmosphere Prerequisite 1 Fundamental Building Systems Commissioning and Energy & Atmosphere Credit 1 Enhanced Commissioning for the project. The executed commissioning process meets LEED requirements:

KFI participated in the design process to ensure the Owner's Project Requirements were identified and met by the design process. Design documents were reviewed and commissioning requirements were

KFI met with contractors on site to review installation of mechanical equipment as described in the project specifications. Deficiencies were noted and corrected as required by the construction team. Equipment start-up forms were provided to the construction team to prepare units for proper start-up. Equipment was reviewed for cleanliness and BAS operation including all related safety devices prior to equipment being placed in service.

When HVAC equipment was operational KFI met with controls contractor to confirm that preliminary testing was completed by the construction team. Contractor supplied KFI with point testing sheets to support the testing that had been done. During follow up site visits KFI conduct our own testing to verify the operations and accuracy of the BAS. KFI reviewed the TAB procedures with TAB technician and witnessed a sampling of their work. KFI will review the final TAB report to verify data provided in the report is within specified requirements and accurate.

During the course of functional testing it was determined that some of the condensate sensors on the cooling systems are causing nuisance alarms. The operation of the sensors will be reviewed by the design/construction teams and corrective action will be determined and reviewed by KFI during seasonal testing. All other deficiencies were noted on the Issue Tracking Form and were corrected and verified by KFI as complete and acceptable.

Point of use hot water systems were confirmed operational and to be providing hot water as designed.

KFI witnessed start-up procedures for lighting controls and verified operation of the occupancy sensors in the spaces.

KFI verified Owner Training using contractor supplied attendance sheets and agendas. Operation and Maintenance Manuals were reviewed for content and to insure that all systems and equipment was provided. KFI will prepare a Commissioning Systems Manual that will provide the owner with specific O&M information pertaining to the HVAC equipment in the facility

The commissioning process identified potential issues and worked with the project team to facilitate resolutions throughout the project. The process assisted the project team to deliver a quality project to the owner. Details of the process and the results are contained in this report.

LEED Documentation

EA Prerequisite 1: **Requirement**
EA Credit 3: **Requirement**

Task: Complete LEED EA Prerequisite 1 and EA Credit 3 completion documentation.

Execution: LEED forms were completed and submitted. Submittal documentation is included in this section.

- EA Prerequisite 1 – Fundamental Commissioning Template
- EA Credit 3 – Enhanced Commissioning Template

(Responsible Individual) (Company Name)

I, Robert Linder , from Karges-Faulconbridge, Inc.

verify that the information provided below is accurate, to the best of my knowledge.

CREDIT COMPLIANCE

Name of Cx Authority	Robert Linder, LEED AP, PE, NEBB
Name of Company	Karges-Faulconbridge, Inc.

Credit Requirements *(check all that apply)*

Completed Owner's Project Requirments (OPR) and Basis of Design (BOD) documentation.	☒
Incorporated Commissioning requirements into construction documents.	☒
Developed and utilized a commissioning plan.	☒
Verified installation and performance of commissioned systems.	☒
Completed Commissioning Report.	☒

NARRATIVE (Required)

Provide a narrative description of the systems that were commissioned and the results of the commissioning process.

Please see uploaded documentation to support commissioning scope of work and results.

NARRATIVE (Optional)

Please provide any additional comments or notes regarding special circumstances or considerations regarding the project's credit approach.

☐ The project is seeking point(s) for this credit using an alternate compliance approach. The compliance approach, including references to any applicable Credit Interpretation Rulings is fully documented in the narrative above.

Project Name: Macalester IGC

Credit: EA Prerequisite 1: Fundamental Commissioning of the Building Energy Systems Points Documented: Y

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Robert	Linder	2009-08-06	rjlinder@kfi-eng.com	******
First Name	Last Name	Date	Username (Email Address)	Password

SAVE TEMPLATE TO LEED-ONLINE PRINT TEMPLATE

10000409

Letter Template Version A1 .

(Responsible Individual) (Company Name)

I, Robert Linder , from Karges-Faulconbridge, Inc.

verify that the information provided below is accurate, to the best of my knowledge.

CREDIT COMPLIANCE

Name of Independent Commissioning Authority (CxA)	Robert Linder, LEED AP, PE, NEBB
Name of Company	Karges-Faulconbridge, Inc.

The CxA meets the qualifications outlined in the credit requirements. ☒

Enhanced Commissioning Tasks *(check all that apply)*	Completed	Tasks Completed by
The CxA has conducted at least one Commissioning Design Review of the Owner's Project Requirements (OPR), Basis of Design (BOD), and design documents prior to mid-construction documents phase and back-check the review comments following design submission.	☒	John Clark, P.E. Robert Linder, P.E.
The CxA has reviewed contractor submittals applicable to systems being commissioned for compliance with the OPR and BOD.	☒	John Clark, P.E. Robert Linder, P.E. Chris Regnier
A systems manual that provides future operating staff the information needed to understand and optimally operate the commissioned systems has been prepared for the project.	☒	Dave Ross Casey Batenhorst
The operating personnel and building occupants have been trained in the operation and maintenance of the commissioned systems.	☒	Dave Ross (verification) MMC (contractor) performed
The CxA will review building operation within 10 months after substantial completion, and a plan for resolution of outstanding issues has been completed.	☒	Robert Linder Dave Ross Ted Ciganik

NARRATIVE (Required)

Provide specific information regarding the enhanced commissioning processes that were employed on the project.

Please see uploaded information to support the commissioning process and results.

NARRATIVE (Optional)

Please provide any additional comments or notes regarding special circumstances or considerations regarding the project's credit approach.

☐ The project is seeking point(s) for this credit using an alternate compliance approach. The compliance approach, including references to any applicable Credit Interpretation Rulings is fully documented in the narrative above. *(Indicate the number of points documented in the field below).*

Alternative Compliance Points Documented

Project Name: Macalester IGC

Credit: EA Credit 3: Enhanced Commissioning

Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Robert	Linder	2009-08-06	rjlinder@kfi-eng.com	******
First Name	Last Name	Date	Username (Email Address)	Password

SAVE TEMPLATE TO LEED-ONLINE PRINT TEMPLATE

T0000404

Letter Template Version A1 .

Commissioning Authority

EA Prerequisite 1: **Requirement**
EA Credit 3: **Requirement**

Task: Designate a Commissioning Authority that meets LEED eligibility requirements

Execution: Robert Linder was designated as the Commissioning Authority for this project. His qualifications include:

- Bachelor of Science Mechanical Engineering from the University of Wisconsin- Madison
- Registered Mechanical Engineer in the State of Minnesota (MN Registration No. 26821)
- Over eleven years of experience in the Commissioning Industry
- Directed and participated in over a fifty commissioning projects covering over 2.5 million ft^2
- National Environmental balancing Bureau (NEBB) certified supervisor for Air & Hydronic Balancing and Commissioning
- LEED Accredited Professional

The Commissioning Team was made up of individuals for the design team, owner, and contractors and assisted by other KFI staff members.

- Chris Regnier – Owner Services Construction Specialist
- Dave Ross – Owner Services Controls Technician
- Ted Ciganik – Owner Services Mechanical Engineer
- John Clark - Owner Services Mechanical Engineer
- Casey Batenhorst - Owner Services Mechanical Engineer

KFI was not under contract to perform design services for this project. KFI is a third party representative.

Owner's Project Requirements

EA Prerequisite 1: **Requirement**
EA Credit 3: **Requirement**

Task: Review the owner's project requirements (OPR) and Basis of Design (BOD) documents for clarity and completeness.

Execution: The owner's original project requirements, and subsequent revisions, were reviewed by KFI staff during the design phase. Review comments were passed along to the project team in project meetings. Design review comments also address some issues identified during the review of the project documents.

Commissioning Requirements

EA Prerequisite 1: **Requirement**
EA Credit 3: **Requirement**

Task: Incorporate commissioning requirements into the construction documents.

Execution: KFI developed a Commissioning speciation for inclusion in the construction documents. The specification outlines the commissioning process, contractor responsibilities and the role of KFI. A copy of the specification is included in this section.

- Commissioning Specification

COMMISSIONING

PART 1 GENERAL

1.1 SUMMARY

A. The owner has elected to implement the Leadership in Energy and Environmental Design (LEED) process on this project. Commissioning is a requirement of the process under the section Energy and Atmosphere – Fundamental Commissioning of the Building Energy Systems.

B. Commissioning Intent:

1. Provide design assistance to ensure owner's needs are met
2. Verify equipment and systems are installed in accordance with manufacturer's instructions, industry accepted minimum standards, and Contract Documents.
3. Verify equipment and systems receive adequate operational checkout by Contractor.
4. Verify and document proper performance of equipment and systems.
5. Verify complete operation and maintenance documentation is delivered to Owner.
6. Verify Owner's operating personnel are adequately trained.

C. Commissioning activities are directed by the Commissioning Authority (CxA). The CxA is contracted directly with the owner.

D. The CxA's responsibilities during construction and project turnover are
1. review equipment submittals
2. verify equipment installations
3. verify system start-ups and corresponding documentation
4. verify and document systems performance
5. verify TAB
6. verify training
7. verify O&M documentation
8. provide warranty review

E. Commissioning Process Overview and Tasks:
1. Commissioning begins with initial commissioning meeting.
2. Conduct progress commissioning meetings throughout construction, to plan, scope, coordinate, schedule future activities and resolve problems.
3. Equipment documentation is submitted to the CxA for review along with detailed start-up and testing procedures.
4. CxA works with Contractor and equipment and system installers to develop startup plans and startup documentation formats, including verification checklists to be completed by installers, during verification check and startup process.
5. In general, verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels with verification checklists being completed before functional testing.
6. Equipment and system installers execute and document verification checklists and perform verification check and startup. CxA witnesses and confirms checklists and startups were completed according to approved plans.

7. CxA works with contractors to develop specific equipment and system functional performance test procedures.
8. Equipment and system installers execute procedures under direction of CxA.
9. Items of non-compliance in material, installation or setup are corrected at Contractor's expense and system retested.
10. CxA reviews operation and maintenance documentation for completeness.
11. CxA reviews, approves and assists in coordinating training provided by equipment and system installers and verifies training was completed.
12. Deferred testing is conducted, as specified.

F. Lines of Communication
1. The CxA does not have the contractual authority to direct contractor work. The CxA will report all project related information to the owner and the owner's representatives. The owner's representative will provide contractor work direction through established communication channels.
2. The CxA may provide contractors with verbal finding results of their work. Contractors can use, and proceed, with this information as they deem appropriate per their contractual obligations.

G. CxA may not:
1. Release, revoke, alter or enlarge Contract Document requirements
2. Assume duties of the Contractor, Architect or Engineer

1.2 SYSTEMS COMMISSIONED

A. The systems that will be Commissioned throughout this project include:
1. HVAC
2. Building automation
3. Lighting controls
4. Domestic hot water systems

1.3 SUBMITTAL INFORMATION

A. A copy of equipment submittals will be forwarded by the owner's representative to the CxA for a concurrent review with the project engineer.

B. CxA comments will be forwarded to the owner's representative for review and inclusion in final comments returned to the contractors if deemed appropriate.

C. Submittals for the CxA must include one copy of the following items for use by the CxA:
1. Manufacturer recommended installation instructions
2. Equipment performance curves
3. Equipment control diagrams
4. Manufacturer recommended start-up procedures
5. Manufacturer recommended operating, troubleshooting and maintenance procedures
6. Manufacturer recommended field checkout and testing report forms
7. Contractors in-house field checkout, start-up and test report forms (if available)
8. Complete warranty information

D. This information will not be returned to the contractors. Information must be specific to the piece of equipment, or system, being submitted on.

1.4 MEETINGS

A. Additional coordination meetings are required to assist in implementing the Commissioning process. These meetings will be scheduled with standard construction meetings whenever possible to minimize time impacts on the participants. Meetings are anticipated to last 30 minutes to 1 hour (each).
   1. Construction kick-off
      a. Purpose: to review the commissioning process procedures and requirements.
      b. When: early stages of construction.
      c. Contractor Attendance: Project Managers and site foremen for the Lead contractor, Mechanical and Electrical contractors and relevant subcontractors with work scope pertaining to the systems identified above.
   2. HVAC Controls Review
      a. Purpose: to review the controls submittal with the project engineer to facilitate and expedite the submittal approval. Review will include, but is not limited to, wiring, components and sequences.
      b. When: 10-21 days after receipt of the controls submittal.
      c. Contractor Attendance: Project Manager and site foremen for the Controls contractor.
   3. Equipment Start-up
      a. Purpose: to review and coordinate the requirements for equipment start-up.
      b. When: 10-14 days prior to start-up of first piece of equipment.
      c. Contractor Attendance: Project Managers and site foremen for the Lead contractor, Mechanical and Electrical contractors and relevant subcontractors, including Controls and TAB, with work scope pertaining to the systems identified above.
   4. System Pre-Functional Testing
      a. Purpose: to review and coordinate the requirements for verification of total system operations.
      b. When: post equipment start-up, minimum of 21 days prior to substantial completion of controls system.
      c. Contractor Attendance: Project Managers and site foremen for the Lead contractor, Mechanical and Electrical contractors and relevant subcontractors, including Controls and TAB, with work scope pertaining to the systems identified above.
   5. TAB Coordination
      a. Purpose: to review and coordinate the requirements for TAB work.
      b. When: 10-14 days prior to start of on-site balancing work.
      c. Contractor Attendance: Project Managers and site foremen for the Lead contractor, Mechanical contractors and relevant subcontractors, including Controls, with work scope pertaining to the systems identified above.
   6. Warranty Review
      a. Purpose: to review system operations and owner issues prior to the end of the warranty period.
      b. When: 10 months after the date of substantial completion.
      c. Contractor Attendance: Project Managers and site foremen for the Lead contractor, Mechanical and Electrical subcontractors, including Controls and TAB

1.5 SCHEDULING

A. Schedule work to allow adequate time for commissioning activities

B. Identify commissioning milestones, activities and durations on project schedule:
   1. Submittals
   2. Verification and start-up
   3. Functional testing
   4. Deficiency rework and retesting
   5. TAB review
   6. Operations and maintenance documentation
   7. Training
   8. Warranty review

PART 2 PRODUCTS

NONE

PART 3 EXECUTION

3.1 DELIVERY ACCEPTANCE DOCUMENTATION

A. Delivery Acceptance (DA) checklists will be developed by the CxA for use by the contractors to confirm that the equipment delivered to the site matches the approved submittal and that it was not damaged during shipping. The checklists will be organized by individual piece of equipment, one piece of equipment per page. Checklists will be bound in a 3 ring log book, called the DA Log. The DA Log will be located on site and available for review by the CxA and owner's representative.

B. The DA Log will be turned over to the Lead contractor within 30 days of when all of the required equipment submittals are approved. The lead contractor is responsible for ensuring the completion of each checklist within the DA Log by the appropriate contractor. Some equipment may require more than one contractor sign-off per checklist.

C. Checklist documentation requires a thorough inspection of the piece of equipment within 24 hours of the equipment being delivered to the project site. The lead contractor is responsible of removal of equipment shipping and storage protection for the inspection and for re-applying the storage protection. Storage protection must be re-applied to ensure that no dirt, debris, water or other contaminants penetrate the protective barrier.

D. Discrepancies and equipment damage must be reported to the owner's representative and CxA within 24 hours of identification.

E. A bi-monthly equipment delivery schedule must be submitted to the owner's representative and CxA. The schedule will include:
   1. Anticipated/scheduled ship dates
   2. Expected delivery dates
   3. Delivery location (site or storage facility)
   4. Repair schedule for items noted as deficient on equipment already delivered to the site

F. Equipment that will be included in the DA Log are:
   1. DTP 1,2
   2. HWP,2

3. CHWP 1,2
4. EF 1-3
5. RCP A-H
6. AHU-1
7. Heat Pipe

3.2 EQUIPMENT START-UP

A. Overview

1. Installation Verification
   a. It is important to ensure that the equipment and systems are installed and ready for start-up operations. Each piece of equipment must receive a full installation checkout by the Contractor. No sampling strategies are allowed. Installation verification for each piece of equipment for a given system must be successfully completed prior to Start-up of equipment or subsystems of the given system.
   b. Installation verifications are primarily static inspections to ensure that the equipment or system is ready for initial operation (e.g., oil levels OK, shipping bolts removed, fan belt tension OK, labels affixed, gages in place, etc.). However, some verification items entail simple testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a three phase pump motor of a chiller system, verifying proper fan rotation, safeties, etc.). Contractors typically already perform most, if not all, of the required verification. This project requires that the verification be documented by the installing technician. The CxA does not confirm all of the installation verification was completed by the contractors; however some documentation will be spot-checked.
2. Start-Up
   a. Equipment manufacturers have documented procedures and forms for the start-up of their equipment. Experienced contractors may also have internally developed procedures and forms to supplement the manufacturer's procedures. Contractors are required to implement these procedures to ensure that equipment is properly started and the start-up results are documented.
   b. The CxA does not witness all of the Start-Up performance; however some start-ups and resulting documentation will be spot-checked.

3. Equipment that will be included in the Start-Up process is:
   a. DTP 1,2
   b. HWP,2
   c. CHWP 1,2
   d. AHU-1
   e. Heat Pipe

B. PROCEDURES AND DOCUMENTATION

1. The CxA assists the contractors with Installation Verification and Start-Up procedure development and documentation by creating a Start-Up Manual. This process is outlined as follows:
   a. The CxA obtains manufacturer installation, startup and reporting forms through the equipment submittal process

b. The CxA reviews the submitted information and provides comments back to the contractors through the owner's representative
c. The contractor responds to the review comments and provides additional information as required
d. The CxA organizes the approved information into a finalized Start-Up Manual.
e. The CxA turns the Start-Up Manual over to the lead contractor for implementation. The lead contractor designates which trade or contractor is responsible to perform the required tasks and procedures.
f. The designated contractors document proper equipment installations and perform and document start-up procedures

2. The Start-Up Manual will be turned over to the lead contractor within 60 days of when all of the required equipment submittals are approved and contractor responses to CxA comments are addressed. The lead contractor is responsible for ensuring the completion of each equipment installation verification and start-up form within the Start-Up Manual. Most equipment start-ups will require multiple contractor assistance.

3. The Start-Up Manual procedures do not eliminate the contractor's responsibility for properly starting equipment. If variations to the Start-Up Manual procedures are required, the appropriate contractor will document the procedure changes in the manual.

4. Incomplete start-ups and equipment non-conformance must be reported to the owner's representative and CxA within 24 hours of identification.

5. A bi-monthly start-up schedule must be submitted to the owner's representative and CxA. The schedule will include anticipated/scheduled start-up dates and incomplete and non-conformance item repair schedule

6. The Start-Up Manual will be located in the lead contractor's site office and available for review by the CxA and owner's representative. KFI recommends that the individual start-up forms be attached each piece of equipment for contractor ease of documentation. Completed forms would then be returned to the Start-Up Manual binder in the Lead contractor's site office.

C. COORDINATION AND EXECUTION

1. A start-up coordination meeting will be organized by the CxA as identified in this specification. The Lead contractor is responsible for ensuring the attendance of the identified contractors.

2. The lead contractors shall notify the CxA at least 7 days in advance of equipment start-ups if the date is different than noted on the bi-monthly start-up schedule.

3. The lead contractor is responsible for coordinating all contractor and factory representation at equipment start-ups as needed.

4. The CxA will witness a sampling of the start-ups and review Start-Up Manual documentation.

3.3 FUNCTIONAL PERFORMANCE TESTING

A. Overview

1. Functional testing is the dynamic testing of systems under full operation. The systems are run through all of the control system's sequences of operation and components are verified to be responding as the sequences state.

2. The contractors are responsible for verifying the complete operation of all building systems. Commissioning enhances this verification by ensuring that proper functional testing has been performed and results are documented.

3. Systems to be functionally tested are:
   a. HVAC
   b. Building automation
   c. Lighting control

B. PROCEDURES AND DOCUMENTATION

1. HVAC , Building Automation and Lighting control,
   a. The contractor develops and submits written step-by-step plan to the CxA which describes the process they intend to follow for verifying system operations and the forms on which they will document the results.
   b. Test plan and reporting forms must be submitted to the CxA within 30 days of submittal acceptance.
   c. The CxA reviews the submitted information and provides comments back to the contractors through the owner's representative.
   d. The contractor responds to the review comments and updates the test procedures and forms. Updated information is submitted to the CxA for final approval.

C. COORDINATION AND EXECUTION

1. A Pre-Functional Testing meeting will be organized by the CxA for each system identified in this specification. The lead contractor is responsible for ensuring the attendance of the identified contractors.
2. A testing schedule must be submitted to the owner's representative and CxA within 60 days of submittal acceptance. The schedule will include start and completion dates and will be updated and submitted bi-monthly until functional testing is complete.
3. The CxA will coordinate with the contractors to verify test results.
   a. Verification demonstration may require multiple dates to cover the complete scope.
      1) The installing contractor will be made available to confirm 25% of the test results in the presence of the CxA or owner's representative.
      2) The HVAC controls technician will be made available to confirm 20% of the sensor, device and alarm test results and 100% of sequence of control test results in the presence of the CxA or owner's representative.
   b. In lieu of demonstration, the CxA may witness test procedures and resulting operations.
4. All verification documentation requires the name, signature and contact information of the technician performing the testing.

3.4 AIR AND WATER BALANCING VERIFICATION

A. Coordination

1. A TAB coordination meeting will be organized by the CxA as identified in this specification. The Lead contractor is responsible for ensuring the attendance of the identified contractors.
2. A TAB schedule must be submitted to the owner's representative and CxA. The schedule will include start and estimated completion dates for each system and area
3. The CxA will coordinate with the TAB technician to review their on-site TAB practices during the early stages of TAB
4. The CxA will coordinate with the TAB technician to review preliminary results prior to 95% completion. The CxA may require 2 or 3 demonstration dates to cover the complete review scope.
5. Deficiencies, incomplete work and non-conformance items that affect the TAB schedule must be reported to the Lead contractor, owner's representative and CxA within 24 hours of identification.
6. The CxA may request demonstration of items noted as deficient or areas that required rebalancing.

B. Execution

1. The TAB technician shall be made available to confirm accuracy of preliminary balancing report air and water results through measurement of up to 20% of report readings in the presence of the CxA or owner's representative before the final report is accepted. 100% of all outside airflow measurements will also be confirmed with the CxA by the TAB contractor.
2. Confirmation requires that the systems are in the same modes of operation as when balancing was performed.
3. The TAB technician shall use the instrumentation submitted with the preliminary balancing report.

3.5 DEFICIENCY RESOLUTION

A. Issue Tracking

1. Contractor Identified Issues
   a. Contractors are responsible for tracking deficiencies, incomplete work and non-conformance items identified during installation; start-up and testing on a deficiency report log separate from the testing record.
   b. The report log will be updated as corrective actions are performed
   c. Submit deficiency report log to owner's representative bi-monthly.
2. CxA Test Result Verification Issues
   a. Deficiencies or non-conformance issues are documented on a rolling Issue Tracking form (ITF).
   b. The ITF is developed and maintained by the CxA.
   c. The deficiencies noted on the ITF are reviewed by the owner's representatives to confirm deficient item status. The ITF is then forwarded to the contractors for corrective actions.

d. Contractors correct deficiencies, document results on the ITF and return the it to the CxA for rework verification.

3. Decisions regarding deficiencies and corrections are made at as low a level as possible, preferably between CxA and contractor whenever possible. The owner and owner's representative have final authority over items in dispute.

B. Rework and Retesting

1. Minor deficiencies identified during functional testing may be corrected at the discretion of the CxA and responsible contractor during testing.
2. The CxA will either perform retesting independently or schedule retesting directly with the contactor based on the CxA's discretion.

C. Non-Compliance

1. The contractor will compensate the CxA at a rate of $100/hr for additional trips and time to:
   a. Witness equipment start-ups when initial coordinated start-up failed
   b. Retest or verify corrective actions on deficient items that had previously been signed off on by the contractor as complete.
2. The owner or owner's representative will establish which contractor, or contractors, is responsible for the non-compliant issue.

D. Final Acceptance

1. The CxA recommends final acceptance of each test to the owner and the owner's representative.
2. Owner and owner's representative provides final acceptance.

3.6 TRAINING

A. Perform training as required per contract documents

3.7 OPERATIONS AND MAINTENANCE DOCUMENTATION

A. Provide documentation as required per contract documents

B. Documentation must also include the following items for all commissioned systems:

1. Contractor responsible for system
2. System description
3. Shop drawings and product data
4. Installation and Startup manuals
5. Control Drawings
6. Air and water balance reports
7. Operations and Maintenance instructions
8. Troubleshooting techniques
9. Parts list
10. Lubrication Schedules
11. Filter Schedules
12. Preventative Maintenance instructions

13. Procedure and blank forms for verifying system operations
14. Originals of warranties and bonds

3.8 WARRANTY REVIEW

A. Return to the site two months before warranty expiration to participate in a pre-warranty review

B. Perform rework to repair deficiencies noted during the warranty review

C. Assist owner's personnel to develop reports, documents and requests for services to remedy outstanding problems

D. This review does not alleviate any other warranty related services required per contract documents.

END OF SECTION

Commissioning Plan

EA Prerequisite 1: **Requirement**
EA Credit 3: **Requirement**

Task: Develop and implement a Commissioning Plan.

Execution: A Commissioning Plan was developed that meets the LEED requirements and incorporates additional owner requirements into commissioning scope contracted with our firm. The plan was presented to the project team and contractors. See attached Commissioning Plan.

COMMISSIONING PLAN

MACALESTER COLLEGE

INSTITUTE FOR GLOBAL CITIZENSHIP

APRIL, 2008

The owner has elected to implement the Commissioning Process, as detailed in this document, as their quality control process for the project. As the Commissioning Authority, it is the responsibility of Karges-Faulconbridge, Inc. to implement the Commissioning Process and along with the Commissioning Team ensure that the final product meets the owner's.

The commissioning process outlined in this document conforms with LEED Energy and Atmosphere Prerequisite 1: Fundamental Commissioning of the Building Energy Systems and Energy and Atmosphere Credit 3: Enhanced Commissioning Services.

Scope of Work

Systems to be tested include the following:

1. HVAC and controls
2. Lighting control system
3. Domestic Hot Water

CX Team

The Commissioning Team shall consist of representatives from all of the participating parties. Commissioning is the joint responsibility of the staffs of the designers, contractors, Owner and the commissioning Authority. Each entity has its own set of responsibilities and interests, with the best interest of the Owner as the driving force. The individual entities will come together to create a commissioning team.

The commissioning team for this project shall be:

Team Member	Company	Role	Telephone	Email
Robert Linder	KFI	CX Authority	651-254-6881	rjlinder@kfi-eng.com
Duane Shambour	KFI	Electrical CX Technician		
Jason J. Jewhurst	Bruner/Cott	Project Manager	617.492.840	jjewhurst@brunercott.com
Kevin Maynard	Macalester College	Project Manager		maynard@macalester.edu
Mark D. Dickinson	Macalester College	Director of Facilities Service	651.696.614	dickinsonm@macalester.edu
Erica Downs	Bruner/Cott	Sustainability Program Manager	617.492.840	edowns@brunercott.com
Ken Potts	McGough			KPotts@mcgough.com
Dustin Schwake	McGough		651-361-5881	DSchwake@mcgough.com
Peter Duwenhoegger	MMC	Mechanical Contractor	952-914-3283	peter.duwenhoegger@metromech.com
Greg Kotaska	Trane	Controls Technician	651- 468-2200	

Other staff members from these entities may also be asked to participate on the team. Contractors may also be asked to participate. Each entity has its own set of responsibilities and interests, with the best interest of the Owner as the driving force. The individual entities will come together to create a commissioning team.

Lines of Communication

The Commissioning Authority is contracted by the owner. The Commissioning Authority will report to the owner's project team for distribution to the contractors. Specific protocol was established at the Commissioning Kickoff meeting prior to construction - KFI sends correspondence to Macalester College and McGough for review. McGough then forwards on the information to provide clear direction to contractors as required.

Activities

The commissioning process is a systematic procedure designed to verify quality installation, conformance to construction documents and system performance during each phase of a construction project. The full adherence to each phase of the process described below may vary depending on the current stage of the project at the time the commissioning process is implemented.

Design Phase

Design Intent: A preliminary Design Intent was developed by the Owner (with outside assistance). The Commissioning Authority reviewed the preliminary Design Intent and provide comments. The comments will be reviewed and incorporated into the document. The document will be used by the Project Team as the basis of design. The document will be updated through the project to record the design criteria used by to achieve the project's intent.

Design Review: the Commissioning Authority performed and independent project document review. The key objective of the review was to support the Project Team to meet key elements of the Design Intent, such as maintainability, indoor air quality, noise control, constructability, etc. Comments will be directed to the Project Team for review and action.

Construction Phase

Construction Meeting Kick-off: Gaining contractor trust and acceptance is essential for successful commissioning implementation. KFI participated in a construction meeting to introduce ourselves to the team, outline the requirements of the commissioning process and our expectations of the contractor's assistance.

Delivery Acceptance Checklists: KFI developed Delivery Acceptance checklists to be used to document that the equipment delivered to the site matches the approved shop drawings and arrives undamaged. All completed Delivery Acceptance checklists are required to be completed by the contractor and turned over to KFI

Installation Verification: The Commissioning Authority is performing construction observations to verify that details of construction are being followed. Contract documents and equipment supplier installation manuals are referenced for verification purposes. The Commissioning Authority issues deficiency reports to the Commissioning Team, as outlined in the Lines of Communication, identifying any component and equipment installation discrepancies. The Project Team forwards issue corrective action direction.

Start-up Checklists: KFI developed Start-up checklists to be used to document start-up procedures. The Commissioning Authority will witness selected start-up procedures and verify documentation was completed. All completed start-up forms are required to be completed by the contractor and turned over to KFI.

Occupancy Phase

Functional Testing: Functional testing takes over where the construction ends. The intent of functionally testing is to evaluate the building components and systems and ensure that the entire "system" as a whole works to achieve the project's intent. For functional testing to provide valid results, the individual components and systems have to be verified to be operating properly.

The Mechanical, Electrical and Controls Contractors will develop functional testing forms that will be used to verify operations. The forms will be reviewed with the Commissioning Authority. The contractors will be required to document testing results on these forms and submit the information to the Commissioning Authority. The Commissioning Authority will review the information and coordinate with the contractor to witness and spot check the results. Comments will be directed to the Project Team for review and action.

HVAC functional verification will include all HVAC equipment through the front end DDC system:

- point-to-point
- sequences of control
- graphical representations
- alarms

Electrical System functional verification will include:

- Lighting control system

Domestic hot water functional verification will include:

- Point of use systems

Test & Balance Report: KFI will coordinate and lead a TAB kick-off meeting. The meeting will ensure the TAB, controls and mechanical contractor's coordination issues are addressed allowing the TAB contractor to properly implement their services.

KFI will review the Test and Balance report for completion. The TAB technician will be asked to confirm accuracy of final balancing report through measurement of up to 10% of report readings before the final report is accepted. The TAB technician shall use the instrumentation submitted with the final balancing report. A failure of more than 10 percent of the selected items shall result in the rejection of the final TAB report. Comments will be directed to the Project Team for review and action.

A preliminary TAB schedule will be developed by the Bal Tech for review by the project team and commissioning authority. A TAB report outline, complete with sample forms, should also be submitted to the project team and commissioning authority for review prior to starting TAB services. This allows the team to agree to the final document format and included information, reducing rework and assisting with the final acceptance.

Turnover Phase

O&M Manuals: the Contractor shall provide the O&M information for review by the Owner and Commissioning Authority as outlined in the construction documents. O&M's will be reviewed for completeness and conformance. Comments will be directed to the Project Team for review and action.

Information from the O&M Manuals will be used to assist the Commissioning Authority to develop a sit specific Systems Manual.

Staff Training: O&M staff training will be given towards the end of construction. Training sessions will include both hands-on and classroom education. Training agendas will be submitted by the appropriate contractor for review and acceptance by the Project Team prior to the scheduled system training. The lead contractor for the respective system is responsible for the development of the training material for the system. Any coordination of training between different contractors is the responsibility of the lead contractor. Training shall be completed and accepted by the owner prior to substantial completion and occupancy.

Seasonal Testing: due to weather conditions, not all systems in the building will be able to be tested at or near full load. Therefore, seasonal functional testing is required. This testing will be carried out in when weather conditions permit.

Warranty Review: at the 10-month point of occupancy, the operation of the system and components is critically reviewed to identify any item that should be repaired or replaced under warranty.

Schedule

The Commissioning Responsibility Matrix details the status of all commissioning activities.

Deliverables

In addition to the project related documentation identified above, the deliverables to be provided to the owner include:

- Final Commissioning Report
- Required LEED documentation

The final report will provide details on the Commissioning Plan implementation and results. The report will contain contractor and Commissioning Authority completion documentation as well as pertinent project correspondence.

COMMISSIONING MEETING AGENDA

Karges-Faulconbridge, Inc.
Engineers
670 West County Road B
St. Paul, MN 55113-4527

Phone: 651-771-0880
Fax: 651-771-0878
E-Mail: OwnerServices@kfi-eng.com

Project:	**Macalester IGC Commissioning**
KFI Job Number:	**07-372**
Date:	**1/28/09 1:00 pm**
Location:	**Project Site**

RE: The meeting is called by KFI to provide information on the commissioning process to the contractors.

Attendance: General, mechanical and electrical contractors and subcontractors.

1. Commissioning Authority Overview
    a. Commissioning outlined in Addendum 2
    b. Identify corrections necessary and forward to Construction/Design Team

2. Systems Commissioned
    a. HVAC
    b. Building Automation System
    c. Lighting Controls
    d. Domestic Hot Water System

3. HVAC Commissioning Process
    a. Equipment Delivery Acceptance (Complete)
    b. Construction Observation (Ongoing)
    c. Equipment Start-up Documentation (to be scheduled)
    d. Functional Performance Testing (following start-up)
    e. Test & Balance Verification (when preliminary TAB report is submitted)
    f. Training Coordination (to be scheduled)

4. Construction Team Expectations
    a. Testing and start up documents
    b. Final notice on readiness
    c. O&M submitted for review
    d. Training Agendas and Schedule

5. Scheduling
    a. Commissioning milestones
    b. Advance notification of contractor start-up and testing

6. Closeout
    a. Completed punch list
    b. O&M manuals approved
    c. As-built drawings approved
    d. Training completed and approved

Design Review

EA Prerequisite 1: Not Required
EA Credit 3: **Requirement**

Task: Conduct a design review prior to mid-construction documents and review the comments in subsequent documents.

Execution: Karges Faulconbridge, Inc. performed an two independent design reviews prior to issuing the construction documents. Comments were forwarded to the Project Team for review, discussion and moved forward as deemed appropriate. This section includes documentation produced and obtained during the two design reviews.

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SD DESIGN REVIEW

50% Drawings			Plumbing			Project:	Macalester College
Design Development Drawings Drawings	X		Architectual			KFI Job Number:	07-372
Final Drawings			Mechanical	X		Date Issued:	9/12/07
Structural			Electrical	X		Reviewed By:	JAC, RJL

Item No.	Equipment	Drawing Number or Paragraph Number	Comment
1	N/A	N/A	All storm water drainage systems in St Paul require a detention design (slow down the drainage into the municipal system).
2	N/A	N/A	Coordinate the detention design with the site Civil engineer.
3	N/A	N/A	Controlled flow roof drainage with roof ponding is the traditional plumbing detention design.
4	N/A	N/A	Low flow plumbing sanitary drain lines should have greater pitch than normal to avoid blockages in the lines. Provide drain line flush out access openings. KFI has observed this problem in our facility.
5	N/A	N/A	Foot pedal control should be for on/off of the flow. Use only one pedal.
6	N/A	N/A	Consider single level to adjust the sink out water temperature.
7	N/A	N/A	Provide a controlled local heat system for the reception desk area. The goal is to not have a portable electric heater used in the winter for the comfort of the staff person at the reception desk.
8	N/A	N/A	Provide heat in the restrooms.
9	N/A	N/A	Provide a transfer air path into the restrooms. A door undercut will not handle 100 cfm.
10	N/A	N/A	Provide low cool air supply and high ceiling return for the teladata room. Provide a 24/7 cooling system.
11	N/A	N/A	Provide cooling for transformers located in the electrical room.
12	N/A	N/A	Design the outdoor air intakes to deal with the intrusion of fine snow and cotton wood bloom. Consider a method to melt the snow before it gathers on the AHU filters. Provide a drain line for the snow melt and rain intrusion into the AHU.

Item No.	Equipment	Drawing Number or Paragraph Number	Comment
13	N/A	N/A	Heating and cooling pump sets should be selected to as a pump pair to run together. If one pump is off line for maintenance or repair the other will carry 80% of full load. The operation of the two smaller pumps is more energy efficient and will be sure that the “standby pump” will operate when needed.
14	N/A	N/A	Provide pipe chase spaces for the waste drain to the composting toilet system.
15	N/A	N/A	Provide winter heat for the exterior elevator shaft. If the elevator system is within the shaft, provide cooling in the summer to remove the motor heat. The motor heat may be enough to heat the shaft in the winter.
16	N/A	N/A	Provide an elevator drain system or sump with water presence alarm.
17	N/A	N/A	Provide a standpipe drain to receive the Sprinkler system test flow water vs. draining to the outdoors.
18	N/A	N/A	Verify the ground water conditions and need for a pumped drain tile system. This pumped ground water can be used for site irrigation vs. drained into the storm lines.
19	N/A	N/A	Will this facility have a “Green Roof Garden”? The cooling cool condensate can be used for a watering system. All condensate in St Paul must drain to the storm system if not used for other systems.
20	N/A	N/A	Provide a heating path that the structure of the skylight will be kept above the winter dew point temperature so that when the sun comes out any frost on the structure will not melt and drip.

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DESIGN REVIEW SUMMARY

50% Drawings	X		Plumbing	X		Project:	Macalester Collage LEED CX
Design Development			Architectural			KFI Job Number:	07-372
Final Drawings			Mechanical	X		Date Issued:	2/13/08
Structural			Electrical	X		Reviewed By:	All Reviewers

Item No.	Equipment	Drawing Number or Paragraph Number	Comment
1	Fire Service Detail	FP-002	Detail 3, Send the Design Engineer a copy of the Typical Setting for a Detector Check meter used in St Paul projects.
2	Sprinkler System	FP-102	Note to provide sprinkler coverage under the stairs between floor levels.
3	Duct System	M-100	Arrange supply air ductwork serving the First Floor IGC Court to avoid running in the fire rated wall of the Elevator Machine Room 106.
4	Duct System	M-100	Electrical Room 005 has no intake air source for the return air duct. Similar condition fot Tel/Data Room 004.
5	Duct System	M-100	Verify the cooling loads for the Tel/Data Room. This room may contain a UPS System and the Facility Telephone switch that would require 24/7 cooling.
6	Duct System	M-100	Verify if the Tel/Data room walls are fire rated and would require fire dampers.
7	Duct System	M-100	Provide Elevator Shaft Heat. Two exposed walls in a cold climate require heating of the shaft. Provide a shaft vent for systems with more than two stops. Refer to MN Code Document " Are You Ready For An Elevator Inspection".
8	Duct System	M-101	Provide fire dampers in the ducts from the lower level serving in IGC Court. Coordinate the shaft space required for air supply and the storm drain drops shown in the Storage Rooms 104 & 104 B
9	General Construction	M-107 & M108	Define new construction from existing construction. Is this Elevator new or existing.

10	Heating System	MP-101.1	Provide a winter controlled heat source for the occupant of the reception desk. Avoid the occupant need for a portable electric heater.
11	Heating System	MP-102	Provide Heat in the Women's Rest Room.
12	Heating System	MP-103	Provide heat for Storage (215), should be Room 315.
13	Plumbing System	P-100	Sump pumps in elevator pits are not allowed in St Paul. Send the Engineer the Detail from the MN Health Department. An Elevator sump pit can be in the shaft if the pit is alarmed for water. Then the maintenance staff can use a portable pump to remove the water. Verify that ground water will not be a problem at this site.

Submittal Review

EA Prerequisite 1: Not Required
EA Credit 3: **Requirement**

Task: Review contractor submittals for OPR, BOD and construction document compliance.

Execution: Major equipment submittals were reviewed to ensure conformance to the contract documents and the owner's best interests (i.e. maintainability, accessibility, etc.). Comments were forwarded to the project team for review and direction. Included in this section are the submittal review comment forms.

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SUBMITTAL REVIEW

Listed below are items identified during the shop drawing review process. Please review, comment, and distribute all applicable information to the appropriate contractors.	Project:	Macalaster College LEED Cx
	KFI Job #:	07-372.00
	Date Issued:	15-Jul-08
	Reviewed By:	John A. Clark, PE

Item No.	Equipment	Section	Comment
1	VFD's Pumps	15951-2.1	Verify the need for the by pass control. The VFD's are very reliable & the local supplier stocks parts for the units. The operations staff may not want to run the system on full gpm.
2	VFD's Fans	15951-2.1	Verify the need for the by pass control. The VFD's are very reliable & the local supplier stocks parts for the units. The operations staff may not want to run the system on full cfm.
3	HVAC Pumps	15185	Consider maintenance rings above the pumps to be able to remove them for service.
4	Domestic Water Expansion Tank	15485-2.3	No Comments
5	Radiant Tubing & Manifold	15772	No Comments

SUBMITTAL REVIEW

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Listed below are items identified during the shop drawing review process. Please review, comment, and distribute all applicable information to the appropriate contractors.	Project:	Macalester College LEED Cx
	KFI Job #:	07-372.00
	Date Issued:	28-Oct-08
	Reviewed By:	Gerald R. Chartrand, PE, CLEP

Item No.	Equipment	Section	Comment
1	Lighting Type LA2	16510	The specified luminaire is indirect and the submittal shows a direct luminaire.
2	Lighting Type LA2E	16510	Not indicated in plan schedule but included in submittal.,
3	Lighting Type LB1EM	16510	Not indicated in plan schedule but included in submittal.,
4	Lighting Type LD1	16510	Different manufacturer than specified in schedule.
5	Lighting Type LD1D	16510	Not indicated in plan schedule but included in submittal. Dimming type of LD1.
6	Lighting Type LD5	16510	Different manufacturer than specified in schedule.
7	Lighting Type LD6	16510	No cutsheets provided for this luminaire type.
8	Lighting Type LSEM	16510	Not indicated in plan schedule but included in submittal.,
9	Lighting Type LU1	16510	Different manufacturer than specified in schedule.
10	Lighting Type LV1	16510	No cutsheets provided for this luminaire type.
11	OS - Wattstopper	16510	No comments
12	DIM - Lutron	16510	No comments

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SUBMITTAL REVIEW

Listed below are items identified during the shop drawing review process. Please review, comment, and distribute all applicable information to the appropriate contractors.	Project:	Macalister College ICG LEEDCx
	KFI Job #:	07-372.00
	Date Issued:	3-Nov-08
	Reviewed By:	John A. Clark, PE

Item No.	Equipment	Section	Comment
1	Trane Control System	General	Coordinate graphic approval with the owner's staff.
2	Trane Control System	15940.02.0	Any low temperature freeze protection devices should only send an alarm, verify with the client.
3	Trane Control System	15940.02.0	Provide a device to detect snow build up on the filter banks to prevent their collapse.
4	Trane Control System	Sheet 33	Unoccupied sequence does not appear to address the operation of AHU-1 (i.e. enable the unit, etc.).
5	Trane Control System	Sheet 8	It might be useful to have the heating valve open if the MA temp is below 38 F (adj) in unoccupied operation to prevent potential coil freezeup if the OA damper leaks or is open.

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SUBMITTAL REVIEW

Listed below are items identified during the shop drawing review process. Please review, comment, and distribute all applicable information to the appropriate contractors.	Project: Macalester College LEED Cx KFI Job #: 07-372.00 Date Issued: 2-Sep-08 Reviewed By: John A. Clark, PE

Item No.	Equipment	Section	Comment
1	HVAC Unit,AHU-1	15785	Verify if the static pressure capacity of the supply fan includes a value for dirty Merv 13 filters on the supply air path from the heat recovery wheel. The fan static pressure appears too low.
2	EF-1		Verify if the static pressure of the exhaust fan includes a value for dirty Merv 13 filters on the exhaust inlet air path to the heat recovery wheel. The fan static pressure appears too low.

SUBMITTAL REVIEW

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Listed below are items identified during the shop drawing review process. Please review, comment, and distribute all applicable information to the appropriate contractors.	Project:	Macalister College LEED Cx
	KFI Job #:	07-372.00
	Date Issued:	15-Sep-08
	Reviewed By:	john A. Clark, PE

Item No.	Equipment	Section	Comment
1	Radiant Panels	15769.01	Request a shop drawing to indicate the piping between the panels that make up a large sail.
2	Fans	15837.01	Provide the damper tray in the roof curb for the LB fan.

Installation Verification

EA Prerequisite 1: **Requirement**
EA Credit 3: **Requirement**

Task: Review individual system component installations and start-up for conformance to contract documents and manufacturer recommendations.

Execution: This section includes documentation produced and obtained during KFI's field inspections in the construction phase. Installation reviews were performed by KFI for each piece of equipment. A sampling of equipment start-ups was witnessed and contractor provided documentation was reviewed. Deficiencies were documented and included in the construction observation reports. Documents included in this section:

- Construction Observations
- Start-up reports

Observation Reports

OBSERVATION REPORT

Karges-Faulconbridge, Inc.
Engineers

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St. Paul, MN 55113-4527

Phone: 651-771-0880
Fax: 651-771-0878
E-Mail: OwnerServices@kfi-eng.com

REPORT NUMBER: 01		**REPORT BY: Chris Regnier**	
PROJECT: Macalester College IGC		**KFI JOB NUMBER: 07-372.00**	
Date: 12/16/08	**Weather: Cloudy**	**Temperature: -8°F**	**Time of Visit: 8:15AM**

OBSERVATIONS: Conducted site walk-thru prior to 9:00AM M&E Coordination Meeting. Attended meeting and gave 10+ minute overview of our commissioning scope, processes and concerns.

1. Very good overall effort in protecting staged and installed equipment and materials, with just a couple exceptions: Spiral pipe standing on end on 1st floor and rectangular fittings on floor of lower level mechanical room. Ensure all interior surfaces are clean prior to installation and system start-ups. **See photos 1 through 3**

RESPONSE:

2. Very good job in providing adequate clearances for proper insulation of mechanical systems. Insulator appears to be doing a good job of installation continuously through penetrations. **See photo 2.**

RESPONSE: *No response rquired--KFI*

3. Very good overall coordination and workmanship of mechanical systems. **See photo 4.**

RESPONSE: *No response rquired--KFI*

4. Contractors need to be certain to maintain current, accurate as-built drawings on-site. (Example: EF-2 at lower level is installed at different location than indicated on plan)

RESPONSE:

5. Access to balance ports on some circuit setters appears questionable. MMC should coordinate with balancer to verify adequate access to all required devices and equipment. **See photo 5.**

RESPONSE:

REFERENCE PHOTOS

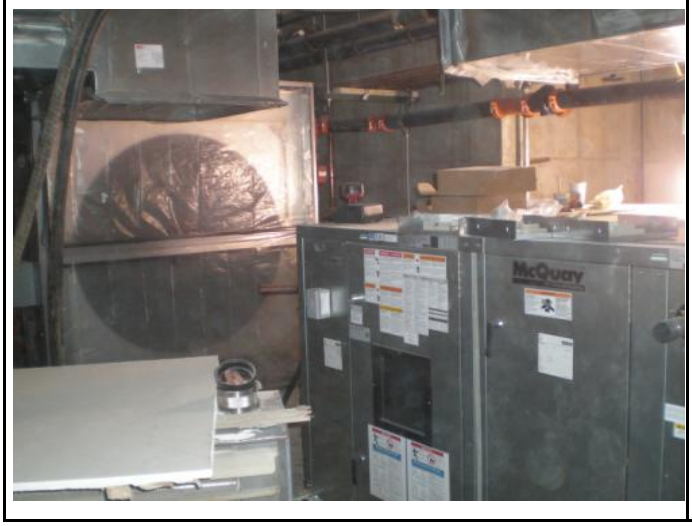
PHOTO 1	PHOTO 2
	

PHOTO 3	PHOTO 4

PHOTO 5	

DISTRIBUTION	
1. Kevin Maynard--Macalester College	
2. Jason Jewhurst--Bruner/Cott	
3. Dustin Schwake--McGough Construction	
4.	
5.	

OBSERVATION REPORT

Karges-Faulconbridge, Inc.
Engineers

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St. Paul, MN 55113-4527

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REPORT NUMBER: 02		**REPORT BY: Chris Regnier**	
PROJECT: Macalester College IGC		**KFI JOB NUMBER: 07-372.00**	
Date: 1/06/09	**Weather: Sunny**	**Temperature: 25°F**	**Time of Visit: 12:15AM**

OBSERVATIONS: Conducted site walk-thru prior to attending 1:00 PM M&E Coordination Meeting.

1. Continued very good overall effort in protecting staged and installed equipment and materials.

RESPONSE: *No response required--KFI*

2. Continued very good job in providing adequate clearances for proper insulation of mechanical systems. Insulator appears to be doing a good job of installation continuously through penetrations.

RESPONSE: *No response rquired--KFI*

3. Continued very good overall coordination and workmanship of mechanical systems.

RESPONSE: *No response rquired--KFI*

4. Hydronic radiant panel valve handle clearances appear they may be in conflict with ceiling tile on 3rd floor.

RESPONSE:

5. Drains may need to be extended or grid may need to be removed in order to make hose connection .

RESPONSE:

REFERENCE PHOTOS: None

DISTRIBUTION	
1. Kevin Maynard--Macalester College	
2. Jason Jewhurst--Bruner/Cott	
3. Dustin Schwake--McGough Construction	
4.	
5.	

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OBSERVATION REPORT

REPORT NUMBER: M- 3/10/09		**REPORT BY:David Ross**	
PROJECT: Macalester IGC LEED Cx		**KFI JOB NUMBER: 07-372.00**	
Date: 3/10/09	**Weather: rain/snow**	**Temperature: 25-30**	**Time of Visit: 11:30-2:00**

OBSERVATIONS

Reveiwed MMC equipment start-up documents for HVAC equipment. The following items should be addressed prior to placing units in operation.

1 . The internal surfaces of AHU-1 and associated ductwork have a layer of construction dust that should be removed prior to operation. See Photos 1-3

RESPONSE: MMC will have ductwork cleaned on 3-11-09.

2. Filter doors on AHU-1 should be gasketed to prevent leakage around filters.

RESPONSE: MMC will install gasket material.

3 AHU-1 heating and cooling control valves are not wired. (Not required for start-up informational purposes only)

Trane/Ace Electrical scheduled to be on site 3-12-09 to complete this work.

4. AHU-1 coil condensate drains are not complete.(Not required for start-up informational purposes only)

RESPONSE: MMC to complete this work 3-11-09.

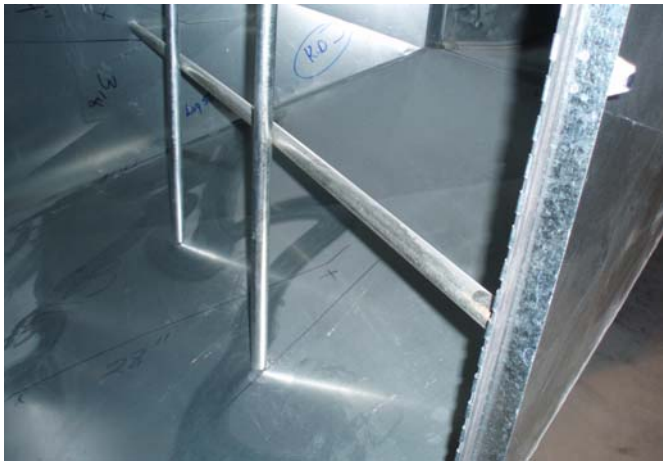
5 General cleanliness of the first floor and basement should be addressed prior to operation of air moving equipment. All dust creating constrution activity should be contained prior to start-up operation.

RESPONSE:

6.

RESPONSE:

REFERENCE PHOTOS



DISTRIBUTION	
1 Dustin Schwake McGough Construction	
2.Peter Duwenhoegger MMC	
3 Brad Coleman McGough Construction	
4.	
5.	

Start-up Documentation

Fan Start-up Report

Unit Tag:	EF 3	**Location (Room #):**	Roof
Project:	0	**Date:**	2-20-09
	0		
	,	**MMC Job #:**	/
Manufacturer:	Greenheck		UP25
Model:	LB-10-3		AK49
Serial #:	1158884 0012	Belt #:	3L320R(1)
Motor RPM:	~~1760~~ 1725	Motor Nameplate Amps:	2/.45
Motor Hp:	1/3	Actual Motor Amps:	3 —
Motor Voltage:	~~208~~ 120		
Line Volts:	L1-L2: 121	L1-L3: —	L2-L3: —

	Start Up Checklist:		**Yes**	**n/a**
1	Shipping Blocks Removed	Compressor:	☐	☒
		Fans:	☐	☒
2	Sensors Connected	Thermostat:	☐	☒
		Building Automation:	☒	☐
3	Fan Blades Tight		☒	☐
4	Belt Alignment & Tension:		☒	☐
5	Set Screws Tight:		☒	☐
6	Bearings Greased:		☐	☒
7	Proper Motor Rotation		☒	☐
8	Fire Smoke Dampers Open		☐	☒
9	Tight Electrical Connections:		☒	☐
10	Vibration Sensor installed		☐	☒
11	Physically marked the date started on the equipment:		☒	☐
12			☐	☐
13			☐	☐
14			☐	☐
15			☐	☐

Signatures:

MMC Technician: Corey Sorenson

Comments:

METROPOLITAN MECHANICAL CONTRACTORS, INC.

7340 Washington Avenue South - Eden Prairie, Minnesota 55344 - Phone: (952) 941-7010 w Fax: (952) 941-9118

Water Heater Start-up Report

Unit Tag: _____ **Location (Room #):** Lower Level

Project: 0 **Date:** 2-19-09
0
,

MMC Job #: /

Manufacturer:	A.O. Smith	Burner Manufacturer:	NA
Model #:	DEL 10 102	Burner Model #:	NA
Serial #:	0850J006152	Burner Serial #:	NA
Motor Hp:	NA	Burner UL #:	NA
Motor Voltage:	NA	Motor Nameplate Amps:	NA
Motor Drive#:	NA	Actual Motor Amps:	NA
Motor RPM:	NA	Full Load Amp Rating:	NA
VFD FLA Setting:	NA	Motor Starter Overload Rating:	NA

Water Temperature Setpoint: 110°F

Electric water Heater - 6000 Watts
Act. Amp Reading - 18 Amps

Start Up Checklist:

		Yes	n/a
1	Shipping Blocks Removed?	☐	☒
2	Shipping Damage?	☐	☒
3	Tight Electrical Connections	☒	☐
4	Gas Piping Checked and Tightened if necessary	☐	☒
5	Does all field piping conform to piping detail	☒	☐
6	Guages, thermometers & sensors installed	☐	☒
7	Unit positioned for adequate free area for service & operation?	☒	☐
8	Is there adequate supply of makeup air for this water heater?	☒	☐
9	Does the gas supply meet the recommendations in the manual?	☐	☒
10	Are gas regulators vented per code?	☐	☒
11	Are regulators the proper size and pressure range for the input of the heater?	☐	☒
12	Is the barametric damper installed per instructions?	☐	☒
13	Have the solid fuel tabs been removed from the damper housing blade?	☐	☒
14	Is the vent system in compliance with the National Fuel Gas Code or Local Code?	☐	☒
15	Insert draft gauge and insure that some negative draft is present.	☐	☒
16	Insure that supply gas pressure is adequate.	☐	☒
17	Insure that the heater is completely filled with water and set to call for heat.	☒	☐
18	Adjust manifold pressure to the value given on the water heater rating plate.	☐	☒
19	Physically marked the date started on the equipment:	☒	☐

Supply Gas Pressure:		% CO2:	
Manifold Gas Pressure:		CO PPM:	
Pilot Gas Pressure:		%O2	
Stack Temperature:		Lower Thermostat Setting:	
Efficiency (%):		Upper Thermostat Setting:	

Signatures:

MMC Technician: George Sorenson

Comments: _____

METROPOLITAN MECHANICAL CONTRACTORS, INC.
7340 Washington Avenue South - Eden Prairie, Minnesota 55344 - Phone: (952) 941-7010 w Fax: (952) 941-9118

Water Heater Start-up Report

Unit Tag: _____ **Location (Room #):** 1st Floor

Project: 0
0
, **Date:** 2-19-09

MMC Job #: /

Manufacturer: A.O. Smith
Model #: DEL 10 102 200
Serial #: 0844510076 48
Motor Hp: NA
Motor Voltage: _____
Motor Drive#: _____
Motor RPM: _____
VFD FLA Setting: _____

Burner Manufacturer: NA
Burner Model #: _____
Burner Serial #: _____
Burner UL #: _____
Motor Nameplate Amps: _____
Actual Motor Amps: _____
Full Load Amp Rating: _____
Motor Starter Overload Rating: _____

Water Temperature Setpoint: 110°F

Amp Rating 6000 Watts
Act. Amps 25 Amps

	Start Up Checklist:	**Yes**	**n/a**
1	Shipping Blocks Removed?	☐	☒
2	Shipping Damage?	☐	☒
3	Tight Electrical Connections	☒	☐
4	Gas Piping Checked and Tightened if necessary	☐	☒
5	Does all field piping conform to piping detail	☒	☐
6	Guages, thermometers & sensors installed	☐	☒
7	Unit positioned for adequate free area for service & operation?	☒	☐
8	Is there adequate supply of makeup air for this water heater?	☒	☐
9	Does the gas supply meet the recommendations in the manual?	☐	☒
10	Are gas regulators vented per code?	☐	☒
11	Are regulators the proper size and pressure range for the input of the heater?	☐	☒
12	Is the barametric damper installed per instructions?	☐	☒
13	Have the solid fuel tabs been removed from the damper housing blade?	☐	☒
14	Is the vent system in compliance with the National Fuel Gas Code or Local Code?	☐	☒
15	Insert draft gauge and insure that some negative draft is present.	☐	☒
16	Insure that supply gas pressure is adequate.	☐	☒
17	Insure that the heater is completely filled with water and set to call for heat.	☒	☐
18	Adjust manifold pressure to the value given on the water heater rating plate.	☐	☒
19	Physically marked the date started on the equipment:	☒	☐

Supply Gas Pressure: _____
Manifold Gas Pressure: _____
Pilot Gas Pressure: _____
Stack Temperature: _____
Efficiency (%): _____

% CO2: _____
CO PPM: _____
%O2 _____
Lower Thermostat Setting: _____
Upper Thermostat Setting: _____

Signatures:

MMC Technician: George Sarossa

Comments: _____

METROPOLITAN MECHANICAL CONTRACTORS, INC.
7340 Washington Avenue South - Eden Prairie, Minnesota 55344 - Phone: (952) 941-7010 w Fax: (952) 941-9118

Water Heater Start-up Report

Unit Tag: _____ **Location (Room #):** 2nd Floor

Project: 0 **Date:** 2-19-09
0
,

MMC Job #: /

Manufacturer:	A.O. Smith	Burner Manufacturer:	NA
Model #:	DEL 10 102	Burner Model #:	
Serial #:	0850J006153	Burner Serial #:	
Motor Hp:	NA	Burner UL #:	
Motor Voltage:		Motor Nameplate Amps:	
Motor Drive#:		Actual Motor Amps:	
Motor RPM:		Full Load Amp Rating:	
VFD FLA Setting:		Motor Starter Overload Rating:	

Water Temperature Setpoint: 1100F

Total Watts 6000 Rating
Amp Draw 25 Actual

Start Up Checklist:

		Yes	n/a
1	Shipping Blocks Removed?	☐	☒
2	Shipping Damage?	☐	☒
3	Tight Electrical Connections	☒	☐
4	Gas Piping Checked and Tightened if necessary	☐	☒
5	Does all field piping conform to piping detail	☒	☐
6	Guages, thermometers & sensors installed	☐	☒
7	Unit positioned for adequate free area for service & operation?	☒	☐
8	Is there adequate supply of makeup air for this water heater?	☒	☐
9	Does the gas supply meet the recommendations in the manual?	☐	☒
10	Are gas regulators vented per code?	☐	☒
11	Are regulators the proper size and pressure range for the input of the heater?	☐	☒
12	Is the barametric damper installed per instructions?	☐	☒
13	Have the solid fuel tabs been removed from the damper housing blade?	☐	☒
14	Is the vent system in compliance with the National Fuel Gas Code or Local Code?	☐	☒
15	Insert draft gauge and insure that some negative draft is present.	☐	☒
16	Insure that supply gas pressure is adequate.	☐	☒
17	Insure that the heater is completely filled with water and set to call for heat.	☒	☐
18	Adjust manifold pressure to the value given on the water heater rating plate.	☐	☒
19	Physically marked the date started on the equipment:	☒	☐

Supply Gas Pressure:		% CO2:	
Manifold Gas Pressure:		CO PPM:	
Pilot Gas Pressure:		%O2	
Stack Temperature:		Lower Thermostat Setting:	
Efficiency (%):		Upper Thermostat Setting:	

Signatures:

MMC Technician: George Sorenson

Comments: _____

METROPOLITAN MECHANICAL CONTRACTORS, INC.
7340 Washington Avenue South - Eden Prairie, Minnesota 55344 - Phone: (952) 941-7010 w Fax: (952) 941-9118

Water Heater Start-up Report

Unit Tag: _____ **Location (Room #):** 3rd Floor

Project: 0 **Date:** _____

0

, **MMC Job #:** /

Manufacturer: A.O. Smith | Burner Manufacturer: NA

Model #: DEL 6 102 | Burner Model #: _____

Serial #: 0902J004789 | Burner Serial #: _____

Motor Hp: NA | Burner UL #: _____

Motor Voltage: _____ | Motor Nameplate Amps: _____

Motor Drive#: _____ | Actual Motor Amps: _____

Motor RPM: _____ | Full Load Amp Rating: _____

VFD FLA Setting: _____ | Motor Starter Overload Rating: _____

Water Temperature Setpoint: 110°F

Total watts 3000
Amp Draw 13 Amps Act.

Start Up Checklist:

		Yes	n/a
1	Shipping Blocks Removed?	☐	☒
2	Shipping Damage?	☐	☒
3	Tight Electrical Connections	☒	☐
4	Gas Piping Checked and Tightened if necessary	☐	☒
5	Does all field piping conform to piping detail	☒	☐
6	Guages, thermometers & sensors installed	☐	☒
7	Unit positioned for adequate free area for service & operation?	☒	☐
8	Is there adequate supply of makeup air for this water heater?	☒	☐
9	Does the gas supply meet the recommendations in the manual?	☐	☒
10	Are gas regulators vented per code?	☐	☒
11	Are regulators the proper size and pressure range for the input of the heater?	☐	☒
12	Is the barametric damper installed per instructions?	☐	☒
13	Have the solid fuel tabs been removed from the damper housing blade?	☐	☒
14	Is the vent system in compliance with the National Fuel Gas Code or Local Code?	☐	☒
15	Insert draft gauge and insure that some negative draft is present.	☐	☒
16	Insure that supply gas pressure is adequate.	☐	☒
17	Insure that the heater is completely filled with water and set to call for heat.	☒	☐
18	Adjust manifold pressure to the value given on the water heater rating plate.	☐	☒
19	Physically marked the date started on the equipment:	☒	☐

Supply Gas Pressure: _____ | % CO2: _____

Manifold Gas Pressure: _____ | CO PPM: _____

Pilot Gas Pressure: _____ | %O2 _____

Stack Temperature: _____ | Lower Thermostat Setting: _____

Efficiency (%): _____ | Upper Thermostat Setting: _____

Signatures:

MMC Technician: George Sorenson

Comments: _____

METROPOLITAN MECHANICAL CONTRACTORS, INC.

7340 Washington Avenue South - Eden Prairie, Minnesota 55344 - Phone: (952) 941-7010 w Fax: (952) 941-9118

Fan Start-up Report

Unit Tag:	EF 2	**Location (Room #):**	Elevator Machine Room
Project:	0	**Date:**	2-19-09
	0		
	,	**MMC Job #:**	/
Manufacturer:	Greenheck		
Model:	CSP-A200-QD		
Serial #:	11604735	Belt #:	N/A
Motor RPM:	N/A	Motor Nameplate Amps:	N/A
Motor Hp:	48 watt	Actual Motor Amps:	.4
Motor Voltage:	120		
Line Volts:	L1-L2: 121	L1-L3: —	L2-L3: —

	Start Up Checklist:		**Yes**	**n/a**
1	Shipping Blocks Removed	Compressor:	☐	☒
		Fans:	☐	☒
2	Sensors Connected	Thermostat:	☐	☒
		Building Automation:	☒	☐
3	Fan Blades Tight		☒	☐
4	Belt Alignment & Tension:		☐	☒
5	Set Screws Tight:		☒	☐
6	Bearings Greased:		☐	☒
7	Proper Motor Rotation		☒	☐
8	Fire Smoke Dampers Open		☐	☒
9	Tight Electrical Connections:		☒	☐
10	Vibration Sensor installed		☐	☒
11	Physically marked the date started on the equipment:		☒	☐
12			☐	☐
13			☐	☐
14			☐	☐
15			☐	☐

Signatures:

MMC Technician: Doug Sorenson

Comments:

METROPOLITAN MECHANICAL CONTRACTORS, INC.

7340 Washington Avenue South - Eden Prairie, Minnesota 55344 - Phone: (952) 941-7010 w Fax: (952) 941-9118

Fan Coil Unit Start-up Report

Unit Tag: ~~CUH~~ CUH A **Location (Room #):** 1st Floor east entrance

Project: 0
0
, **Date:** 2-19-09

MMC Job #: 1

Manufacturer:	Rittling	Motor Drive#:	NA
Model:	RRW320	Fan Drive #:	NA
Serial #:	30036978	Belt #:	Direct Drive
Motor RPM:	1080	Motor Nameplate Amps:	.85 FLA
Motor Hp:	30 watt	Actual Motor Amps:	.6
Motor Voltage:	120		

Line Volts: L1-L2: 121 L1-L3: — L2-L3: —

Main Power Amperes: L1: .6 L2: — L3: —

Start Up Checklist:

		Yes	n/a
1	Shipping Blocks Removed	☐	☒
	Compressor:	☐	☒
	Fans:	☒	☐
2	Sensors Connected	☐	☒
	Economizer:	☐	☒
	Thermostat:	☐	☒
	Building Automation	☒	☐
3	Fan Blades Tight	☒	☐
4	Belt Alignment & Tension:	☐	☒
5	Set Screws Tight:	☒	☐
6	Bearings Greased:	☐	☒
7	Transformer primary tapped for correct voltage	☐	☒
8	Proper Motor Rotation (Including Compressors):	☒	☐
9	Tight Electrical Connections:	☒	☐
10	Check economizer operation (Minimum position left at _____%):	☐	☒
11	Crankcase heater operating:	☐	☒
12	Final Filters Installed (Mark Date on Filter for record):	☒	☐
13	Physically marked the date started on the equipment:	☒	☐

Outdoor Air Temp:		Supply Air Temp:	
BTU/Hr input:		Suction PSI:	
Discharge PSI:		Return Air Temp:	
Super heat:		Suction Temp:	

Filter 9 3/4 x 34 x 1

Signatures:

MMC Technician: George Sorenson

Comments: No control valve, cycle fan on temp.

METROPOLITAN MECHANICAL CONTRACTORS, INC.
7340 Washington Avenue South - Eden Prairie, Minnesota 55344 - Phone: (952) 941-7010 w Fax: (952) 941-9118

Fan Coil Unit Start-up Report

Unit Tag: FCU-A **Location (Room #):** Kagin Corridor

Project: 0 0 , **Date:** 2-19-09

MMC Job #: 1

Manufacturer:	McQuay	Motor Drive#:	N/A
Model:	FCBB-060	Fan Drive #:	N/A
Serial #:	285054300	Belt #:	Direct Drive
Motor RPM:	1080	Motor Nameplate Amps:	1.7 Amps
Motor Hp:	1/8	Actual Motor Amps:	1.2
Motor Voltage:	120		

Line Volts: L1-L2: 121 L1-L3: — L2-L3: —

Main Power Amperes: L1: 1.2 L2: — L3: —

Start Up Checklist:

		Yes	n/a
	Compressor:	☐	☒
	Fans:	☐	☒
2	Sensors Connected — Economizer:	☐	☒
	Thermostat:	☐	☒
	Building Automation	☒	☐
3	Fan Blades Tight	☒	☐
4	Belt Alignment & Tension:	☐	☒
5	Set Screws Tight:	☒	☐
6	Bearings Greased:	☐	☒
7	Transformer primary tapped for correct voltage	☐	☒
8	Proper Motor Rotation (Including Compressors):	☒	☐
9	Tight Electrical Connections:	☒	☐
10	Check economizer operation (Minimum position left at ____%):	☐	☒
11	Crankcase heater operating:	☐	☒
12	Final Filters Installed (Mark Date on Filter for record):	☒	☐
13	Physically marked the date started on the equipment:	☒	☐

Outdoor Air Temp:		Supply Air Temp:	
BTU/Hr input:		Suction PSI:	
Discharge PSI:		Return Air Temp:	
Super heat:		Suction Temp:	

Filters 10X24X1 (2)

Signatures:

MMC Technician: George Sorensen

Comments: No control valve, fan cycles on temp.

METROPOLITAN MECHANICAL CONTRACTORS, INC.

7340 Washington Avenue South - Eden Prairie, Minnesota 55344 - Phone: (952) 941-7010 w Fax: (952) 941-9118

Fan Coil Unit Start-up Report

Unit Tag: CUH B **Location (Room #):** 1st Floor West

Project: 0 0 , **Date:** 2-19-09

MMC Job #: 1

Manufacturer:	Rittling	Motor Drive#:	NA
Model:	RRW320	Fan Drive #:	NA
Serial #:	30036979	Belt #:	Direct Drive
Motor RPM:	1080	Motor Nameplate Amps:	.85 FLA
Motor Hp:	30 watt	Actual Motor Amps:	.65
Motor Voltage:	120		

Line Volts: L1-L2: 121 L1-L3: — L2-L3: —

Main Power Amperes: L1: .65 L2: — L3: —

Start Up Checklist:

		Yes	n/a
	Compressor:	☐	☒
	Fans:	☒	☐
2	Sensors Connected — Economizer:	☐	☒
	Thermostat:	☐	☒
	Building Automation	☒	☐
3	Fan Blades Tight	☒	☐
4	Belt Alignment & Tension:	☐	☒
5	Set Screws Tight:	☒	☐
6	Bearings Greased:	☐	☒
7	Transformer primary tapped for correct voltage	☐	☒
8	Proper Motor Rotation (Including Compressors):	☒	☐
9	Tight Electrical Connections:	☒	☐
10	Check economizer operation (Minimum position left at _____%):	☐	☒
11	Crankcase heater operating:	☐	☒
12	Final Filters Installed (Mark Date on Filter for record):	☒	☐
13	Physically marked the date started on the equipment:	☒	☐

Outdoor Air Temp:		Supply Air Temp:	
BTU/Hr input:		Suction PSI:	
Discharge PSI:		Return Air Temp:	
Super heat:		Suction Temp:	

Filter 9 3/4 X 34 X 1 (1)

Signatures:

MMC Technician: George Sorensen

Comments: No control valves, cycle fan on temp.

METROPOLITAN MECHANICAL CONTRACTORS, INC.

7340 Washington Avenue South - Eden Prairie, Minnesota 55344 - Phone: (952) 941-7010 w Fax: (952) 941-9118

Fan Start-up Report

Unit Tag:	EF 1	**Location (Room #):**	Lower Level
Project:	0 0 ,	**Date:**	2-18-09
		MMC Job #:	/
Manufacturer:	Greenheck		1VP56 1 1/8
Model:	BSQ-160RP-30-X		AK46 1
Serial #:	1158834 0812	Belt #:	AP54(1)
Motor RPM:	1760	Motor Nameplate Amps:	8.8
Motor Hp:	3	Actual Motor Amps:	6.3 @ Load
Motor Voltage:	208/230		20 Amp breaker
Line Volts:	L1-L2: 215	L1-L3: 216	L2-L3: 216

	Start Up Checklist:		**Yes**	**n/a**
1	Shipping Blocks Removed	Compressor:	☐	☒
		Fans:	☒	☐
2	Sensors Connected	Thermostat:	☐	☒
		Building Automation:	☒	☐
3	Fan Blades Tight		☒	☐
4	Belt Alignment & Tension:		☒	☐
5	Set Screws Tight:		☒	☐
6	Bearings Greased:		☒	☐
7	Proper Motor Rotation		☒	☐
8	Fire Smoke Dampers Open		☐	☒
9	Tight Electrical Connections:		☒	☐
10	Vibration Sensor installed		☐	☒
11	Physically marked the date started on the equipment:		☒	☐
12			☐	☐
13			☐	☐
14			☐	☐
15			☐	☐

Signatures:

MMC Technician: Jacob Sorenson

Comments: VFD Drive

METROPOLITAN MECHANICAL CONTRACTORS, INC.

7340 Washington Avenue South - Eden Prairie, Minnesota 55344 - Phone: (952) 941-7010 w Fax: (952) 941-9118

AHU Start-up Report

Unit Tag: AHU #1 Supply Fan **Location (Room #):** Lower Level

Project: 0 0 , **Date:** 2-18-09

MMC Job #: /

Manufacturer:	McQuay	Motor Drive#:	IVP56X 1/8
Model:	CAH017GHDC	Fan Drive #:	BK55X 13/16
Serial #:	FBOW08100215B	Belt #:	B61 (1)
Motor RPM:	1760	Motor Nameplate Amps:	9.3
Motor Hp:	3	Actual Motor Amps:	7 FLA L60
Motor Voltage:	208/230	Main Fuse Size:	20 Amp breaker

Line Volts: L1-L2: 215 L1-L3: 216 L2-L3: 216

Main Power Amperes: L1: 7 L2: 7 L3: 7

	Start Up Checklist:		Yes	n/a
1	Shipping Blocks Removed	Compressor:	☐	☒
		Fans:	☒	☐
2	Sensors Connected	Economizer:	☐	☒
		Thermostat:	☐	☒
		Building Automation:	☒	☐
3	Fan Blades Tight		☒	☐
4	Belt Alignment & Tension:		☒	☐
5	Set Screws Tight:		☒	☐
6	Bearings Greased:		☒	☐
7	Transformer primary tapped for correct voltage		☐	☒
8	Proper Motor Rotation (Including Compressors):		☒	☐
9	Fire Smoke Dampers Open		☒	☐
10	Tight Electrical Connections:		☒	☐
11	Check economizer operation (minimum position left at _____%)		☐	☒
12	Crankcase heater operating:		☐	☒
13	Final Filters Installed (Mark Date on Filter for record):		☒	☐
14	Final Filters Installed (Mark Date on Filter for record):		☒	☐
15	Physically marked the date started on the equipment/leave start up tag:		☒	☐

Outdoor Air Temp:		Supply Air Temp:	
BTU/Hr input:		Suction PSI:	
Discharge PSI:		Return Air Temp:	
Super heat:		Suction Temp:	

Filters 30 x 30 x 2 (1) RA
24 x 24 x 2 (1) OA

Signatures:

MMC Technician: Loose Sorenson

Comments:

METROPOLITAN MECHANICAL CONTRACTORS, INC.
7340 Washington Avenue South - Eden Prairie, Minnesota 55344 - Phone: (952) 941-7010 w Fax: (952) 941-9118

Unit Heater Start-up Report

Unit Tag: UH #1 **Location (Room #):** Lower Level

Project: 0 **Date:** 2-18-09
0
,

MMC Job #: 1

Manufacturer: Sterling
Model: HS-036
Serial #: M07798042001001
Motor RPM: ~~1350~~ 1350
Motor Hp: 25 Watts
Motor Voltage: 115

Motor Nameplate Amps: 1.2 FLA
Actual Motor Amps: 1
Heater Element Amps: NA (Actuator)

Line Volts: L1-L2: 121 L1-L3: — L2-L3: —

	Start Up Checklist:		**Yes**	**n/a**
1	Shipping Blocks Removed	Fans:	☐	☒
2	Sensors Connected	Thermostat:	☐	☒
		Building Automation	☒	☐
3	Fan Blades Tight		☒	☐
4	Fan Rotation		☒	☐
5	Set Screws Tight:		☒	☐
6	Bearings Greased:		☐	☒
7	Tight Electrical Connections:		☒	☐
8	Physically marked the date started on the equipment:		☒	☐

BTU/Hr input:
Manifold Pressure:
CO PPM:

Gas Supply Pressure:
% CO2:
% O2
% Eff:
Vent Temperature:

Signatures:

MMC Technician: George Sorenson

Comments: Hot water, no gas. Also no control valve, just cycle the fan.

METROPOLITAN MECHANICAL CONTRACTORS, INC.
7340 Washington Avenue South - Eden Prairie, Minnesota 55344 - Phone: (952) 941-7010 w Fax: (952) 941-9118

ABB inc.
16250 West Glendale Dr
New Berlin, WI 53151

Warranty Registration Form
F-3BUAQ981902B
Rev 8, Jan. 16, 2007

Certified Start-Up Extended Warranty Registration

This form is to be used by factory authorized personnel only for ABB drive product warranty registration as part of the Certified Start-Up program. This form must be completed in it's entirety and submitted to the ABB drives Technical Support within **10** days from start-up to receive warranty extension. For AC & DC drives, email to DrivesSupportLine@us.abb.com with subject line "Certified Start-Up". For AC drives only, we will continue to accept faxed forms @ 262-780-5135, for the near term.

* All procedures and requirements as documented in the user Manuals for the product you are commissioning must be followed. AHU #1

End User installation site

Start-Up Date: 2-20-09

Company Name	Contact Name	Contact Phone		
Macalester	Kurt Stainbrook	651-696-6918		
Street Address	**City**	**State**	**Zip Code**	**Country**
1595 Grand Ave	St. Paul	MN	55105	USA

Purchased From

Supplier Type:

Company Name	City	State	Contact Name	Contact Phone
Mulcahy	Eagan	MN	Jim Burns	651-686-8500

Drive Product Information

Model Number (Type Code)	Serial Number	Software Revision code
ACH550-UDR-012A-2+F267	2084402270	U.3.12B

Application Information

Industry type	Application type	Drive control mode	Operation mode
HVAC	E-Clipse	Scalar: Freq.	Auto

Motor Information

Select motor type	AC motor			
Motor HP: 3	Voltage: 230	RPM: 1760	FLA: 9.3	Freq: 60

Installation Checks - Mechanical

Mechanical Installation	☑	Control (I/O, Feedback)	☑
Cable Connections	☑	Ambient Temperature	70°F
Proper Grounding	☑	Drive Unit cooling / Air flow	☑
Input Fuses	☑	Motor disengaged	☑
Wire run to/from motor	☑	Safe to operate machine	☑
Motor cable length	☑	AutoTune completed	☑

Installation Checks - Electrical

Drive disconnected - Megger Cable/Motor:

Megger test voltage = —	Reading	Reading
	T1-PE = Good	T3-PE = Good
	T2-PE = Good	

Input Voltage @ Base Spd	L1-L2= 215		Input Current @ Base Spd	L1 = 5.8
	L2-L3= 215			L2 = 5.8
	L3-L1= 214			L3 = 5.8
Output Voltage @ Base Spd	T1-T2= 123		Output Current @ Base Spd	T1 = 7
	T2-T3= 123			T2 = 7
	T3-T1= 123			T3 = 7

Additional Comments:

Performed by: George Sorenson	Registration No: MN-9015

ABB inc.
16250 West Glendale Dr
New Berlin, WI 53151

Warranty Registration Form
F-3BUAQ981902B
Rev 8, Jan. 16, 2007

Certified Start-Up Extended Warranty Registration

This form is to be used by factory authorized personnel only for ABB drive product warranty registration as part of the Certified Start-Up program. This form must be completed in it's entirety and submitted to the ABB drives Technical Support within **10** days from start-up to receive warranty extension. For AC & DC drives, email to DrivesSupportLine@us.abb.com with subject line "Certified Start-Up". For AC drives only, we will continue to accept faxed forms @ 262-780-5135, for the near term.

* All procedures and requirements as documented in the user Manuals for the product you are commissioning must be followed. EF#1

End User installation site

Start-Up Date: 2-20-09

Company Name	Contact Name	Contact Phone		
Macalester I.G.C.	Kurt Stambrook	651-696-8580		
Street Address	**City**	**State**	**Zip Code**	**Country**
1595 Grand Ave	St. Paul	MN	55105	USA

Purchased From

Supplier Type:

Company Name	City	State	Contact Name	Contact Phone
Mulcahy	Eagan	MN	Jim Burns	651-686-8580

Drive Product Information

Model Number (Type Code)	Serial Number	Software Revision code
ACH550-UOR-012A-2+F269	2084402244	V.3.12B

Application Information

Industry type	Application type	Drive control mode	Operation mode
HVAC	E-Clipse	Scalar: Freq	Auto

Motor Information

Select motor type	AC motor			
Motor HP: 3	Voltage: 230	RPM: 1760	FLA: 8.8	Freq: 60

Installation Checks - Mechanical

Mechanical Installation	☑	Control (I/O, Feedback)	☑
Cable Connections	☑	Ambient Temperature	70°F
Proper Grounding	☑	Drive Unit cooling / Air flow	☑
Input Fuses	☑	Motor disengaged	☑
Wire run to/from motor	☑	Safe to operate machine	☑
Motor cable length	☑	AutoTune completed	☑

Installation Checks - Electrical

Drive disconnected - Megger Cable/Motor:

	Reading		Reading
T1-PE =	Good	T3-PE =	Good
T2-PE =	Good		

Megger test voltage = —

Input Voltage @ Base Spd	L1-L2= 214		Input Current @ Base Spd	L1 = 5
	L2-L3= 214			L2 = 5
	L3-L1= 214			L3 = 5
Output Voltage @ Base Spd	T1-T2= 199		Output Current @ Base Spd	T1 = 6.2
	T2-T3= 199			T2 = 6.2
	T3-T1= 199			T3 = 6.2

Additional Comments:

Performed by: George Sorenson	Registration No: MN-9715

ABB inc.
16250 West Glendale Dr
New Berlin, WI 53151

Warranty Registration Form
F-3BUAQ981902B
Rev 8, Jan. 16, 2007

Certified Start-Up Extended Warranty Registration

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* All procedures and requirements as documented in the user Manuals for the product you are commissioning must be followed. OT #1

End User installation site

Start-Up Date: 2-2009

Company Name	Contact Name	Contact Phone		
Macalester I.G.C.	Kurt Stainbrook	651-696-6918		
Street Address	**City**	**State**	**Zip Code**	**Country**
1595 Grand Ave	St. Paul	MN	55105	USA

Purchased From

Supplier Type:

Company Name	City	State	Contact Name	Contact Phone
Mulcahy	Eagan	MN	Jim Burns	651-686-8580

Drive Product Information

Model Number (Type Code)	Serial Number	Software Revision code
ACH550-VBR-04A6-2+F269	2084402274	V.3.12B

Application Information

Industry type	Application type	Drive control mode	Operation mode
HVAC	E-Clipse	Scalar: Freq	Auto

Motor Information

Select motor type	AC motor			
Motor HP: 1	Voltage: 208/230	RPM: 1725	FLA: 3.4	Freq: 60

Installation Checks - Mechanical

Mechanical Installation	☑	Control (I/O, Feedback)	☑
Cable Connections	☑	Ambient Temperature	70°F
Proper Grounding	☑	Drive Unit cooling / Air flow	☑
Input Fuses	☑	Motor disengaged	☑
Wire run to/from motor	☑	Safe to operate machine	☑
Motor cable length	☑	AutoTune completed	☑

Installation Checks - Electrical

Drive disconnected - Megger Cable/Motor:

Megger test voltage = —

	Reading		Reading
T1-PE =	Good	T3-PE =	Good
T2-PE =	Good		

Input Voltage @ Base Spd	L1-L2= 212	Input Current @ Base Spd	L1 = .9
	L2-L3= 213		L2 = 1
	L3-L1= 212		L3 = .9
Output Voltage @ Base Spd	T1-T2= 168	Output Current @ Base Spd	T1 = 1.8
	T2-T3= 169		T2 = 1.8
	T3-T1= 169		T3 = 1.8

Additional Comments:

Performed by: George Swanson	Registration No: MN-9715

ABB inc.
16250 West Glendale Dr
New Berlin, WI 53151

Warranty Registration Form
F-3BUAQ981902B
Rev 8, Jan. 16, 2007

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* All procedures and requirements as documented in the user Manuals for the product you are commissioning must be followed. DT #2

End User installation site — Start-Up Date: 2-20-09

Company Name	Contact Name	Contact Phone		
~~Mateo~~ Macalester IBC	Kurt Steinbrook	651-696-6918		
Street Address	**City**	**State**	**Zip Code**	**Country**
1595 Grand Ave	St. Paul	MN	55105	USA

Purchased From — Supplier Type:

Company Name	City	State	Contact Name	Contact Phone
Mulcahy	Eagan	MN	Jim Burns	651-686-8590

Drive Product Information

Model Number (Type Code)	Serial Number	Software Revision code
ACH550-UPR-04A6-2+F267	2084402468	V.3.12B

Application Information

Industry type	Application type	Drive control mode	Operation mode
HVAC	E-Clipse	Scalar: Freq	Auto

Motor Information

Select motor type	AC motor			
Motor HP: 1	Voltage: 208/230	RPM: 1725	FLA: 3.4	Freq: 60

Installation Checks - Mechanical

Mechanical Installation	☒	Control (I/O, Feedback)	☒
Cable Connections	☒	Ambient Temperature	50°F
Proper Grounding	☒	Drive Unit cooling / Air flow	☒
Input Fuses	☑	Motor disengaged	☒
Wire run to/from motor	☑	Safe to operate machine	☒
Motor cable length	☑	AutoTune completed	☒

Installation Checks - Electrical

Drive disconnected - Megger Cable/Motor:

Megger test voltage = —

	Reading		Reading
T1-PE =	Good	T3-PE =	Good
T2-PE =	Good		

Input Voltage @ Base Spd	L1-L2= 212	Input Current @ Base Spd	L1 = 1
	L2-L3= 212		L2 = 1
	L3-L1= 213		L3 = 1
Output Voltage @ Base Spd	T1-T2= 169	Output Current @ Base Spd	T1 = 1.8
	T2-T3= 169		T2 = 1.8
	T3-T1= 169		T3 = 1.8

Additional Comments:

Performed by: George Sorensen — Registration No: MN-9915

ABB inc.
16250 West Glendale Dr
New Berlin, WI 53151

Warranty Registration Form
F-3BUAQ981902B
Rev 8, Jan. 16, 2007

Certified Start-Up Extended Warranty Registration

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* All procedures and requirements as documented in the user Manuals for the product you are commissioning must be followed. HWP # 1

End User installation site

Start-Up Date: 2-20-09

Company Name	Contact Name	Contact Phone		
Macalester I.C.C.	Kurt Stainbrook	651-696-6918		
Street Address	**City**	**State**	**Zip Code**	**Country**
1595 Grand Av.	St. Paul	MN	55105	USA

Purchased From

Supplier Type:

Company Name	City	State	Contact Name	Contact Phone
Mulcahy	Eagan	MN	Jim Boms	651-686-8580

Drive Product Information

Model Number (Type Code)	Serial Number	Software Revision code
ACH550-UDR-04A6-2+F267	2084402483	V. 3.12B

Application Information

Industry type	Application type	Drive control mode	Operation mode
HVAC	E-Clipse	Scalar: Freq	Auto

Motor Information

Select motor type: AC motor

Motor HP:	Voltage:	RPM:	FLA:	Freq:
1.5HP	230	1725	4.9	60

Installation Checks - Mechanical

Mechanical Installation	☒	Control (I/O, Feedback)	☒
Cable Connections	☒	Ambient Temperature	75°F
Proper Grounding	☒	Drive Unit cooling / Air flow	☒
Input Fuses	☒	Motor disengaged	☒
Wire run to/from motor	☒	Safe to operate machine	☒
Motor cable length	☒	AutoTune completed	☒

Installation Checks - Electrical

Drive disconnected - Megger Cable/Motor:

Megger test voltage = —

	Reading		Reading
T1-PE =	Good	T3-PE =	Good
T2-PE =	Good		

Input Voltage @ Base Spd	L1-L2=	213	Input Current @ Base Spd	L1 = 1.8
	L2-L3=	214		L2 = 1.9
	L3-L1=	212		L3 = 1.8
Output Voltage @ Base Spd	T1-T2=	195	Output Current @ Base Spd	T1 = 2.8
	T2-T3=	195		T2 = 2.8
	T3-T1=	195		T3 = 2.8

Additional Comments:

Performed by: George Sorenson

Registration No: MN 9715

ABB inc.
16250 West Glendale Dr
New Berlin, WI 53151

Warranty Registration Form
F-3BUAQ981902B
Rev 8, Jan. 16, 2007

Certified Start-Up Extended Warranty Registration

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* All procedures and requirements as documented in the user Manuals for the product you are commissioning must be followed. HWP#2

End User installation site

Start-Up Date: 2-20-09

Company Name	Contact Name	Contact Phone		
Macalester I.G.C.	Kurt Steinbrook	651-696-6918		
Street Address	**City**	**State**	**Zip Code**	**Country**
1595 Grand Ave	St. Paul	MN	55105	USA

Purchased From

Supplier Type:

Company Name	City	State	Contact Name	Contact Phone
Mulcahy	Eagan	MN	Jim Burns	651-686-8580

Drive Product Information

Model Number (Type Code)	Serial Number	Software Revision code
ACH550-VOR-04A6-2 +F267	2084402474	V. 3.12B

Application Information

Industry type	Application type	Drive control mode	Operation mode
HVAC	E-Clipse	Scalar: Freq	Auto

Motor Information

Select motor type	AC motor			
Motor HP: 1.5	Voltage: 230	RPM: 1725	FLA: 4.8	Freq: 60

Installation Checks - Mechanical

Mechanical Installation	☒	Control (I/O, Feedback)	☒
Cable Connections	☒	Ambient Temperature	75°F
Proper Grounding	☒	Drive Unit cooling / Air flow	☒
Input Fuses	☒	Motor disengaged	☒
Wire run to/from motor	☒	Safe to operate machine	☒
Motor cable length	☒	AutoTune completed	☒

Installation Checks - Electrical

Drive disconnected - Megger Cable/Motor:

Megger test voltage =	—	Reading		Reading
		T1-PE = Good	T3-PE = Good	
		T2-PE = Good		

Input Voltage @ Base Spd	L1-L2= 214	Input Current @ Base Spd	L1 = 1.9	
	L2-L3= 214		L2 = 1.8	
	L3-L1= 212		L3 = 1.8	
Output Voltage @ Base Spd	T1-T2= 184	Output Current @ Base Spd	T1 = 2.9	
	T2-T3= 184		T2 = 2.9	
	T3-T1= 184		T3 = 2.9	

Additional Comments:

Performed by: George Sorenson	Registration No: MN 9715

not wired yet 2-2009

ABB inc.
16250 West Glendale Dr
New Berlin, WI 53151

Warranty Registration Form
F-3BUAQ981902B
Rev 8, Jan. 16, 2007

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* All procedures and requirements as documented in the user Manuals for the product you are commissioning must be followed. CWP# 1

End User installation site

Start-Up Date: 2-2009

Company Name	Contact Name	Contact Phone		
Macalester I.G.C.	Kurt Stainbrook	651-696-6918		
Street Address	**City**	**State**	**Zip Code**	**Country**
1595 Grand Ave	St. Paul	MN	55105	USA

Purchased From

Supplier Type:

Company Name	City	State	Contact Name	Contact Phone
Mulcahy	Eagan	MN	Jim Burns	651-686-8580

Drive Product Information

Model Number (Type Code)	Serial Number	Software Revision code
ACH550-UDR-04A6-2+F267	2084402257	V. 3.12B

Application Information

Industry type	Application type	Drive control mode	Operation mode
HVAC	E-Clipse	Scalar: Freq	Auto

Motor Information

Select motor type	AC motor			
Motor HP: 1½	Voltage: 208/230	RPM: 1725	FLA: 4.8	Freq: 60

Installation Checks - Mechanical

Mechanical Installation	☒	Control (I/O, Feedback)	☒
Cable Connections	☒	Ambient Temperature	75°F
Proper Grounding	☒	Drive Unit cooling / Air flow	☒
Input Fuses	☒	Motor disengaged	☒
Wire run to/from motor	☒	Safe to operate machine	☒
Motor cable length	☒	AutoTune completed	☒

Installation Checks - Electrical

Drive disconnected - Megger Cable/Motor:

Megger test voltage = —

	Reading		Reading
T1-PE =	Gnd	T3-PE =	Gnd
T2-PE =	Gnd		

Input Voltage @ Base Spd	L1-L2= 213	Input Current @ Base Spd	L1 =
	L2-L3= 213		L2 =
	L3-L1= 212		L3 =
Output Voltage @ Base Spd	T1-T2=	Output Current @ Base Spd	T1 =
	T2-T3=		T2 =
	T3-T1=		T3 =

Additional Comments:

Performed by: George Sorenson

Registration No: MN 9715

not wired yet 2-20-09

ABB inc.
16250 West Glendale Dr
New Berlin, WI 53151

Warranty Registration Form
F-3BUAQ981902B
Rev 8, Jan. 16, 2007

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* All procedures and requirements as documented in the user Manuals for the product you are commissioning must be followed.

CWP #2

End User installation site

Start-Up Date:

Company Name	Contact Name	Contact Phone		
Malcolester	Kurt Stainbrook	651-696-6918		
Street Address	**City**	**State**	**Zip Code**	**Country**
1595 Grand Ave	St. Paul	MN	55105	USA

Purchased From

Supplier Type:

Company Name	City	State	Contact Name	Contact Phone
Mulcahy	Eagan	MN	Jim Burns	651-686-8590

Drive Product Information

Model Number (Type Code)	Serial Number	Software Revision code
ACH550-VOR-04A6-2+F269	2094402275	V. 3.12B

Application Information

Industry type	Application type	Drive control mode	Operation mode
HVAC	E-Clipse	Scalar: Freq	Auto

Motor Information

Select motor type	AC motor			
Motor HP: 1½	Voltage: 208/230	RPM: 1725	FLA: 4.9	Freq: 60

Installation Checks - Mechanical

Mechanical Installation	☒	Control (I/O, Feedback)	☒
Cable Connections	☒	Ambient Temperature	75°F
Proper Grounding	☒	Drive Unit cooling / Air flow	☒
Input Fuses	☒	Motor disengaged	☒
Wire run to/from motor	☒	Safe to operate machine	☒
Motor cable length	☒	AutoTune completed	☒

Installation Checks - Electrical

Drive disconnected - Megger Cable/Motor:

Megger test voltage = —

	Reading		Reading
T1-PE =	Good	T3-PE =	Good
T2-PE =	Good		

Input Voltage @ Base Spd	L1-L2=	Input Current @ Base Spd	L1 =
	L2-L3=		L2 =
	L3-L1=		L3 =
Output Voltage @ Base Spd	T1-T2=	Output Current @ Base Spd	T1 =
	T2-T3=		T2 =
	T3-T1=		T3 =

Additional Comments:

Performed by: Jacob Sorenson Registration No: MN 9715

Performance Testing

EA Prerequisite 1: **Requirement**
EA Credit 3: **Requirement**

Task: Verify system operations comply with the OPR, BOD and contract documents.

Execution: This section includes documentation produced and obtained during functional performance testing. This includes:

- Initial Performance Test Results
- Final Performance Test Results
- Issue tracking

Initial Performance Test Results

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009 Project Manager: GK Designed By: SCL

HEATING / COOLING WATER SYSTEM MP581 - 6 WIRING DETAIL 2
KAGIN CHW / HW PUMPS MP581 - 7 WIRING DETAIL 4
CHW / HW PUMPS EX2 - 15 WIRING DETAIL 6
AHU - 1 MP580 - 1 WIRING DETAIL 7
AHU - 1 EX2 - 1 WIRING DETAIL 9
AHU - 1 EX2 - 2 WIRING DETAIL 11
1ST FLOOR RADIANT PANELS MP581 - 4 WIRING DETAIL 13
1ST FLOOR RADIANT PANELS EX2 - 10 WIRING DETAIL 15
1ST FLOOR COND SENSORS EX2 - 11 WIRING DETAIL 17
1ST FLOOR COND SENSORS EX2 - 12 WIRING DETAIL 18
CONNECTOR FCU EX2 - 16 WIRING DETAIL 19
2ND FLOOR RADIANT PANELS MP581 - 3 WIRING DETAIL2 20
2ND FLOOR RADIANT PANELS EX2 - 9 WIRING DETAIL 22
2ND FLOOR COND SENSORS EX2 - 13 WIRING DETAIL 24
2ND FLOOR COND SENSORS EX2 - 14 WIRING DETAIL 25
3RD FLOOR RADIANT PANELS MP581 - 2 WIRING DETAIL 26
3RD FLOOR RADIANT PANELS EX2 - 5 WIRING DETAIL 28
3RD FLOOR RADIANT PANELS EX2 - 6 WIRING DETAIL 30
3RD FLOOR RADIANT PANELS EX2 - 7 WIRING DETAIL 32
3RD FLOOR COND SENSORS MP581 - 5 WIRING DETAIL 34
UH-1 MP501 - 1 WIRING DETAIL 36
CUH-A MP501 - 2 WIRING DETAIL 37
CUH-B MP501 - 3 WIRING DETAIL 38

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***HEATING / COOLING WATER SYSTEM MP581 - 6 WIRING DETAIL*** System: HEATING / COOLING WATER SYSTEM Location: L-L MECH ROOM 003	Controller Description: MP581 FULL ENCLOSURE, NO DISPLAY 120V Controller Tag: MP581 - 6 Controller Vendor: TRANE Controller Part No.: BMTM000AAC00 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1	*527*	*VFD - 4 DT PUMP 1 VFD SPEED*	2-WIRE	*O*	*GND SHIELD*	0/50/100%	0/5/10V		
AO2	*528*	*VFD - 5 DT PUMP 2 VFD SPEED*	2-WIRE	*O*	*GND SHIELD*	0/50/100%	0/5/10V		BS/KC
AO3	*529*	*VAL - 39 DUAL TEMP MIXING VALVE*	2-WIRE	*E*	*GND SHIELD*	100-0% OPEN	2-10V		
AO4	*530*	*VAL - 43 IN-FLOOR RADIANT CONTROL VALVE*	2-WIRE	*E*	*GND SHIELD*	Moved to	MP581-4	AO-6	
AO5	*531*								
AO6	*532*								
BO1	*521*	*VFD - 4 DT PUMP 1 VFD START/STOP*	2-WIRE	*O*	*GND SHIELD*	ON/OFF	24V/0V	Rib Relay	BS/KC
BO2	*522*	*VFD - 5 DT PUMP 2 VFD START/STOP*	2-WIRE	*O*	*GND SHIELD*	ON/OFF	24V/0V	Rib Relay	BS/KC
BO3	*523*	*VAL - 37 HW SUPPLY CHANGEOVER VALVE*	2-WIRE	*E*	*GND SHIELD*	OPEN/Closed	0V/24V		
BO4	*524*	*VAL - 35 HW RETURN CHANGEOVER VALVE*	2-WIRE	*E*	*GND SHIELD*	OPEN/closed	0V/24V		
BO5	*525*	*VAL - 38 CHW SUPPLY CHANGEOVER VALVE*	2-WIRE	*E*	*GND SHIELD*	OPEN/Closed	24V/0V		
BO6	*526*	*VAL - 36 CHW RETURN CHANGEOVER VALVE*	2-WIRE	*E*	*GND SHIELD*	OPEN/closed	24V/0V		
UI01	*533*	*VFD - 4 DT PUMP 1 VFD STATUS*	2-WIRE	*O*	*GND SHIELD*	Stopped/Running	OPEN/closed		
UI02	*534*	*VFD - 4 DT PUMP 1 VFD FAULT*	2-WIRE	*O*	*GND SHIELD*	Fault/Normal	OPEN/closed		
UI03	*535*	*VFD - 5 DT PUMP 2 VFD STATUS*	2-WIRE	*O*	*GND SHIELD*	Stopped/Running	OPEN/closed		
UI04	*536*	*VFD - 5 DT PUMP 2 VFD FAULT*	2-WIRE	*O*	*GND SHIELD*	Fault/Normal	OPEN/closed		
UI05	*537*	*TE - 41 HW SUPPLY TEMPERATURE (THERM)*	2-WIRE	*D*	*GND SHIELD*	157.5°F	1773 ohms		

UI06	538	TE - 42 HW RETURN TEMPERATURE (THERM)	2-WIRE	D	GND SHIELD	147.2°F	2153 ohms		BB
UI07	539	TE - 43 CHW SUPPLY TEMPERATURE (THERM)	2-WIRE	D	GND SHIELD	94.4°F	6612 ohms		BB
UI08	540	TE - 44 CHW RETURN TEMPERATURE (THERM)	2-WIRE	D	GND SHIELD	93.4°F	6774 ohms		BB
UI09	541	TE - 45 DUAL TEMP SUPPLY TEMPERATURE (THERM)	2-WIRE	D	GND SHIELD	155.9	1828 ohms		BB
UI10	542	TE - 46 DUAL TEMP RETURN TEMPERATURE (THERM)	2-WIRE	D	GND SHIELD	151.3°F	1999 ohms		BB
UI11	543	DPT - 9 DUAL TEMP WATER DIFFERENTIAL PRESSURE (4-20 MA)	2-WIRE W/ INT DC PWR	E	GND SHIELD	6 psi	5.92 mA		KC
UI12	544								

Checklist Complete

Technician Signature

3-3-09

Date

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***KAGIN CHW / HW PUMPS MP581 - 7 WIRING DETAIL*** System: CHW / HW PUMPS Location: KAGIN BLDG BASEMENT	Controller Description: MP581 FULL ENCLOSURE, NO DISPLAY 120V Controller Tag: MP581 - 7 Controller Vendor: TRANE Controller Part No.: BMTM000AAC00 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1	*559*	*VFD - 6 KAGIN CHW PUMP 1 SPEED*	2-WIRE	*O*	*GND SHIELD*	o/50/100%	o/5/10v		BS
AO2	*560*	*VFD - 7 KAGIN CHW PUMP 2 SPEED*	2-WIRE	*O*	*GND SHIELD*	o/50/100%	o/5/10v		BS
AO3	*561*	*VFD - 9 KAGIN HW PUMP 1 SPEED*	2-WIRE	*O*	*GND SHIELD*	o/50/100%	o/5/10v		BS
AO4	*562*	*VFD - 8 KAGIN HW PUMP 2 SPEED*	2-WIRE	*O*	*GND SHIELD*	o/50/100%	o/5/10v		BS
AO5	*563*								
AO6	*564*								
BO1	*553*	*VFD - 6 KAGIN CHW PUMP 1 START/STOP*	2-WIRE	*O*	*GND SHIELD*	Start/Stop	24v/0v	Rib Relay	BS
BO2	*554*	*VFD - 7 KAGIN CHW PUMP 2 START/STOP*	2-WIRE	*O*	*GND SHIELD*	Start/Stop	24v/0v	Rib Relay	BS
BO3	*555*	*VFD - 9 KAGIN HW PUMP 1 START/STOP*	2-WIRE	*O*	*GND SHIELD*	Start/Stop	24v/0v	Rib Relay	BS
BO4	*556*	*VFD - 8 KAGIN HW PUMP 2 START/STOP*	2-WIRE	*O*	*GND SHIELD*	Start/Stop	24v/0v	Rib Relay	BS
BO5	*557*								
BO6	*558*								
UI01	*565*								
UI02	*566*								
UI03	*567*	TE - 18 Kagin CHW Supply Temp				82.4°F	8789 ohms		BS
UI04	*568*	*TE - 62 KAGIN CHW RETURN TEMPERATURE (THERM)*	2-WIRE	*D*	*GND SHIELD*	82.5°F	8762 ohms		BS
UI05	*569*	*DPT - 11 KAGIN CHW DIFFERENTIAL PRESSURE (4-20 MA)*	2-WIRE W/ INT DC PWR	*E*	*GND SHIELD*	-0.2 psi	3.86 mA	0-20 psi / 4-20 mA	BS
UI06	*570*	*VFD - 6 KAGIN CHW PUMP 1 STATUS*	2-WIRE	*O*	*GND SHIELD*	stopped/running	open/closed		BS

UI07	571	VFD - 7 KAGIN CHW PUMP 2 STATUS	2-WIRE	O	GND SHIELD	Stopped/Running	OPEN/closed		BB
UI08	572	VFD - 9 KAGIN HW PUMP 1 STATUS	2-WIRE	O	GND SHIELD	Stopped/Running	OPEN/closed		BB
UI09	573	VFD - 8 KAGIN HW PUMP 2 STATUS	2-WIRE W/ INT DC PWR	O	GND SHIELD	Stopped Running	OPEN Closed		BB
UI10	574	DPT - 12 KAGIN HW DIFFERENTIAL PRESSURE (4-20 MA)	2-WIRE W/ INT DC PWR	E	GND SHIELD	10.2 psi	12.12 mA	0-20psi/4-20mA	BB
UI11	575	TE - 60 KAGIN HW SUPPLY TEMPERATURE (THERM)	2-WIRE	D	GND SHIELD	144.9°F	2266 ohms		BB
UI12	576	TE - 61 KAGIN HW RETURN TEMPERATURE (THERM)	2-WIRE	D	GND SHIELD	134.0	2814 ohms		BB

Checklist Complete

Technician Signature

3-3-09

Date

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***CHW / HW PUMPS EX2 - 15 WIRING DETAIL*** System: CHW / HW PUMPS Location: KAGIN BLDG BASEMENT	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2 - 15 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1	*595*								
AO2	*596*								
AO3	*597*								
AO4	*598*								
BO1	*591*								
BO2	*592*								
BO3	*593*								
BO4	*594*								
UI1 - 13	*585*	*CHW FLOW (4-20 MA)*	2-WIRE W/ INT DC PWR	*D*	*GND SHIELD*				
UI2 - 14	*586*	*CHW BTU TOTALIZER (PULSE)*	2-WIRE	*D*	*GND SHIELD*			move	
UI3 - 15	*587*	*KAGIN HW FLOW (4-20 MA)*	2-WIRE W/ INT DC PWR	*D*	*GND SHIELD*				
UI4 - 16	*588*	*KAGIN HW BTU TOTALIZER (PULSE)*	2-WIRE	*D*	*GND SHIELD*			Move to Input 1	
UI5 - 17	*589*								
UI6 - 18	*590*								

Checklist Complete

Technician Signature

3-3-09

Date

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***AHU - 1 MP580 - 1 WIRING DETAIL*** System: AHU - 1 Location: L-L MECH ROOM 003	Controller Description: MP580 CONTROLLER DETAIL Controller Tag: MP580 - 1 Controller Vendor: TRANE Controller Part No.: BMTM Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1	*113*	*VFD - 2 SUPPLY FAN VFD SPEED*	2-WIRE	*D*	*GND SHIELD*	0/50/100	0/5/10V		BS/KC
AO2	*114*	*ACT - 1 CHILLED WATER COIL VALVE (2-10 VDC)*	3-WIRE W/ INT PWR	*E*	*GND SHIELD*			Not Pulled 2/10	
AO3	*115*	*ACT - 2 HOT WATER COIL VALVE (2-10 VDC)*	3-WIRE W/ INT PWR	*E*	*GND SHIELD*			Not Pulled 2/10	
AO4	*116*								
AO5	*117*								
AO6	*118*								
BO1	*119*	*VFD - 2 SUPPLY FAN VFD START/STOP*	2-WIRE	*D*	*GND SHIELD*	ON/OFF	24V/0V	Rib Relay	BS/KC
BO2	*120*								
BO3	*121*	*HEAT PIPE HEAT PIPE SOLENOID VALVE*	2-WIRE	*E*	*GND SHIELD*	on/off	24V off	Not Pulled 2/10 OK 3-16	KGC
BO4	*122*								
BO5	*123*								
BO6	*124*								
DUCT STATIC	*125*	*DPT - 1 DISCHARGE STATIC PRESSURE*							
UI1 > Jump	*101*	*TE - 1 DISCHARGE AIR TEMPERATURE (BALCO)*	2-WIRE	*D*	*GND SHIELD*	89.9°F	78.0°F	Wiring ok	BS/KC
UI10	*110*	*OUTSIDE AIR DAMPER STATUS*	2-WIRE	*D*	*GND SHIELD*	DAMPER OPEN/closed	Contact closed/OPEN		BS/KC
UI11	*111*	*EXHAUST AIR DAMPER STATUS*	2-WIRE	*D*	*GND SHIELD*	Damper OPEN/closed	Contact closed/OPEN		BS/KC
UI12	*112*	*DPT - 4 SUPPLY AIR FILTER STATUS*	2-WIRE W/ INT DC PWR	*E*	*GND SHIELD*	0.0 in/wg	11.97 mA		BS/KC

UI2	102	VFD - 2 SUPPLY FAN VFD STATUS	2-WIRE	D	GND SHIELD	off/on	OPEN/closed		BS/KC
UI3	103	TE - 30 MIXED AIR TEMPERATURE ~~(BALCO)~~ Thermistor	2-WIRE	D	GND SHIELD	71.4°F	11480 ohms		BS/KC
UI4	104	HE - 2 MIXED AIR HUMIDITY (4-20 MA)	2-WIRE W/ INT DC PWR	D	GND SHIELD	30.8%	8.93mA		BS/KC
UI5	105	HE - 1 DISCHARGE AIR HUMIDITY (4-20 MA)	2-WIRE W/ INT DC PWR	D	GND SHIELD	33.8%	9.40mA		BS/KC
UI6	106	DPT - 7 EXHAUST FILTER STATUS (4-20 MA)	2-WIRE W/ INT DC PWR	E	GND SHIELD	0.00 in wg	11.85mA		BS/KC
UI7	107	LLT - 1 SUPPLY AIR LOW LIMIT THERMOSTAT OPEN	2-WIRE	D	GND SHIELD	Normal Tripped	OPEN closed		BS/KC
UI8	108	DPS - 2 HIGH STATIC PRESSURE CUT-OUT	2-WIRE	D	GND SHIELD			Not Pulled 2/10	
UI9 CFM	109	DPT - 3 SUPPLY FAN CFM (4-20 MA, 0-3 IN WC)	2-WIRE	D	GND SHIELD			Not Pulled 2/10	

Checklist Complete

[signature] 3-3-09

Technician Signature **Date**

CFM Supply Fan UI9
Exhaust Fan UI 15

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Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***AHU - 1 EX2 - 1 WIRING DETAIL*** System: AHU-1 Location: L-L MECH ROOM 003	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2-1 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1 - 7	143	VFD - 1 EF-1 EXHAUST FAN VFD SPEED	2-WIRE	D	GND SHIELD	0/50/100%	0/5/10V		BS/KC
AO2 - 8	144								
AO3 - 9	145								
AO4 - 10	146								
BO1 - 7	139	DA - 1 EXHAUST AIR DAMPER (2 - POSITION)	2-WIRE	E	GND SHIELD	Damper OPEN/closed	Contacts Closed/OPEN		BS/KC
BO2 - 8	140	DA - 4 OUTSIDE AIR DAMPER (2 - POSITION)	2-WIRE	E	GND SHIELD	DAMPER OPEN/closed	Contacts closed/OPEN		BS/KC
BO3 - 9	141	VFD - 1 EF-1 EXHAUST FAN VFD START/STOP	2-WIRE	D	GND SHIELD	ON/OFF	24v/0v	R:b Relay	BS/KC
BO4 - 10	142								
UI1 - 13	133	VFD - 1 EF-1 EXHAUST FAN VFD STATUS	2-WIRE	D	GND SHIELD	ON/off	Closed/OPEN		BS/KC
UI2 - 14	134	TE - 29 RETURN AIR TEMPERATURE (BALCO)	2-WIRE	D	GND SHIELD	77.6°F	9855 ohms		BS/KC
UI3 - 15	135	DPT - 2 EF-1 EXHAUST FAN CFM (4-20 MA, 0-3 IN WC)	2-WIRE W/ INT DC PWR	D	GND SHIELD				
UI4 - 16	136	DPT - 5 HEAT WHEEL SUPPLY DIFFERENTIAL PRESSURE (4-20 MA)	2-WIRE W/ INT DC PWR	E	GND SHIELD	-0.01 in wg	11.89 mA		BS/KC
UI5 - 17	137	DPT - 6 HEAT WHEEL EXHAUST DIFFERENTIAL PRESSURE (4-20 MA)	2-WIRE W/ INT DC PWR	E	GND SHIELD	-0.01 in wg	11.85 mA		BS/KC
UI6 - 18	138	DPS - 3 EF-1 EXHAUST FAN LOW STATIC PRESSURE CUT-OUT	2-WIRE	D	GND SHIELD	Tripped Normal	Open Closed		BS/KC

Checklist Complete

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3-3-09

Date

10

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***AHU - 1 EX2 - 2 WIRING DETAIL*** System: HEAT WHEEL Location: L-L MECH ROOM 003	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2-2 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1 - 11	161								
AO2 - 12	162								
AO3 - 13	163								
AO4 - 14	164								
BO1 - 11	157	HEAT WHEEL ENABLE	2-WIRE	D	GND SHIELD	Enable/Disable	ON/Off		BS/KC
BO2 - 12	158								
BO3 - 13	159	Reassigned Elev. Rm Exh Fan/Damper							
BO4 - 14	160	DA - 5 EF-2 DAMPER CONTROL	2-WIRE	E	GND SHIELD	Damper OPEN	ON	Fan Not wired in 2/10	
UI1 - 19	151	HE - 4 HEAT WHEEL RETURN AIR HUMIDITY	2-WIRE W/ INT DC PWR	D	GND SHIELD			Not Pulled 2/10	
UI2 - 20	152	TE - 3 HEAT WHEEL SUPPLY AIR TEMPERATURE (~~BALCO~~)	2-WIRE	D	GND SHIELD	78.0°F	9778 ohms		BS/KC
UI3 - 21	153	TE - 31 EXHAUST AIR TEMPERATURE (BALCO)	2-WIRE	D	GND SHIELD	78.1°F	9739 ohms		BS/KC
UI4 - 22	154	HE - 3 HEAT WHEEL SUPPLY AIR HUMIDITY	2-WIRE W/ INT DC PWR	D	GND SHIELD	32.5%	9.17 mA		BS/KC
UI5 - 23	155	TE - 47 ELEVATOR EQPT ROOM (THERM)	2-WIRE	D	GND SHIELD	74.8°F	10551 ohms		BS
UI6 - 24	156	IGC VENT IGC COURT VENTILATION TIMER SWITCH OPEN	2-WIRE	D	GND SHIELD				

Checklist Complete

Technician Signature

3-3-09

Date

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Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***1ST FLOOR RADIANT PANELS MP581 - 4 WIRING DETAIL*** System: RADIANT PANELS Location: ELEC ROOM 005	Controller Description: MP581 FULL ENCLOSURE, NO DISPLAY 120V Controller Tag: MP581 - 4 Controller Vendor: TRANE Controller Part No.: BMTM000AAC00 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1	*339*	*VAL - 21 IGC RECEPTION 102 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2v 10v	OPEN closed		BS/KC
AO2	*340*	*VAL - 22 LOBBY 101 AND LIBRARY 103 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2v 10v	OPEN Closed		BS/KC
AO3	*341*	*VAL - 23 CEC STUDENT WORKERS 105 ~~AND CEC ADMIN ASSIST 106~~ RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2v 10v	OPEN closed		BS/KC
AO4	*342*	*VAL - 24 CEC ASST DIRECTOR 107 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2v 10v	open Closed		KC BS
AO5	*343*	*VAL - 25 CEC ASSOC DIRECTOR 108 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2V 10V	Open Closed		BS KC
AO6	*344*	117 in Floor Rad Valve				2v 10v	OPEN Closed		BS/KC
BO1	*333*								
BO2	*334*								
BO3	*335*								
BO4	*336*								
BO5	*337*								
BO6	*338*								
UI01	*345*	*TE - 21 IGC RECEPTION 102 SETPOINT*	2-WIRE	*E*	*GND SHIELD*	Max Setpoint	Fail OK	69.2 F	KC BS
UI02	*346*	*TE - 21 IGC RECEPTION 102 TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Pulled Wire	Fail OK	77.7 F	
UI03	*347*	*TE - 22 LOBBY 101 AND LIBRARY 103 SETPOINT*	2-WIRE	*E*	*GND SHIELD*	Max Setpoint	Fail OK	72.5 F	
UI04	*348*	*TE - 22 LOBBY 101 AND LIBRARY 103 TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Pulled Wire	Fail OK	75.4 F	

UI05	349	TE - 23 CEC STUDENT WORKERS 105 ~~AND CEC ADMIN ASSIST 106~~ SETPOINT	2-WIRE	E	GND SHIELD			OK 105	BS/KC
UI06	350	TE - 23 CEC STUDENT WORKERS 105 ~~AND CEC ADMIN ASSIST 106~~ TEMPERATURE	2-WIRE	E	GND SHIELD			OK 105	BS/KC
UI07	351	TE - 24 CEC ASST DIRECTOR 107 SETPOINT	2-WIRE	E	GND SHIELD	Max SP Pulled Wire	Fail OK	45.4	KEC BS
UI08	352	TE - 24 CEC ASST DIRECTOR 107 TEMPERATURE	2-WIRE	E	GND SHIELD		Fail OK	77.6	KEC BS
UI09	353	TE - 25 CEC ASSOC DIRECTOR 108 SETPOINT	2-WIRE	E	GND SHIELD	Max SP	Fail OK	70.8 F	
UI10	354	TE - 25 CEC ASSOC DIRECTOR 108 TEMPERATURE	2-WIRE	E	GND SHIELD	Pulled Wire	Fail OK	76.4 F	
UI11	355	CO2 - 3 IGC COURT 117 CO2 (4-20 MA)	2-WIRE W/ INT DC PWR	E	GND SHIELD				BS/KC
UI12	356	IGC COURT 117 TEMPERATURE	2-WIRE	D	GND SHIELD				BS/KC

Checklist Complete

Technician Signature

3-3-09

Date

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***1ST FLOOR RADIANT PANELS EX2 - 10 WIRING DETAIL*** System: RADIANT PANELS Location: ELEC ROOM 005 (1)	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2 - 10 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1 - 7	*375*	*VAL - 26 HALLWAY 109 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2V 10V	Open Closed		KC BS
AO2 - 8	*376*	*VAL - 27 COPY ROOM 114 RADIANT PANEL VALVE (0-10 VDC)*	Ceiling 2-WIRE / Tile	*E*	*GND SHIELD*	2V 10V	Open Closed		KC BS
AO3 - 9	*377*	*VAL - 28 COFFEE ROOM RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2V 10V	Open Closed		KC BS
AO4 - 10	*378*	*VAL - 29 RESTROOM FTR VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*			No wire Pulled 2/17	
BO1 - 7	*371*								
BO2 - 8	*372*								
BO3 - 9	*373*								
BO4 - 10	*374*								
UI1 - 13	*365*	*TE - 26 HALLWAY 109 SETPOINT*	2-WIRE	*E*	*GND SHIELD*			n/a	
UI2 - 14	*366*	*TE - 26 HALLWAY 109 TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Pulled wire	Bad		BS/KC
UI3 - 15	*367*	*TE - 27 COPY ROOM 114 SETPOINT*	2-WIRE	*E*	*GND SHIELD*			N/A	
UI4 - 16	*368*	*TE - 27 COPY ROOM 114 TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Pulled wire	Failed OK		BS KC
UI5 - 17	*369*	*TE - 28 COFFEE ROOM SETPOINT*	2-WIRE	*E*	*GND SHIELD*			N/A	
UI6 - 18	*370*	*TE - 28 COFFEE ROOM TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Pulled wire	Failed ON		BS/KC

Checklist Complete

Technician Signature

3-3-09

Date

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Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***1ST FLOOR COND SENSORS EX2 - 11 WIRING DETAIL*** System: COND SENSORS Location: ELEC ROOM 005 (2)	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2 - 11 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1 - 11	400								
AO2 - 12	401								
AO3 - 13	402								
AO4 - 14	403								
BO1 - 11	396								
BO2 - 12	397								
BO3 - 13	398								
BO4 - 14	399								
UI1 - 19	390	102 CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	Opened Connection			BS/KC
UI2 - 20	391	103 CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	Opened Connection OK			BS/KC
UI3 - 21	392	105 ~~106~~ CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	Opened Connection	OK OFF		KC BS
UI4 - 22	393	107 CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	Opened Connection	OK off		KC BS
UI5 - 23	394	108 CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	Opened Connection	OK off		KC BS
UI6 - 24	395	109 CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	Opened Connection	OK OFF		KC BS

Checklist Complete

Technician Signature

3-3-09

Date

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***1ST FLOOR COND SENSORS EX2 - 12 WIRING DETAIL*** System: COND SENSORS Location: ELEC ROOM 005 (3)	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2-12 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1 -15	418								
AO2 -16	419								
AO3 -17	420								
AO4 -18	421	106 CEC AdmnAssist Valve	2-Wire		Ground Shield	0V 10V	open closed		BS/KC
BO1 -15	414								
BO2 -16	415								
BO3 -17	416								
BO4 -18	417								
UI1 -25	408	114 CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	Opened Connect	OK Off		KC BS
UI2 -26	409	COFFEE ROOM CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	Opened Connect	OK Off		KC BS
UI3 -27	410	106 CEC Admin Assist COND				Opened Connection	OK Off		BS/KC
UI4 -28	411								
UI5 -29	412	106 CEC Admin Assist. SP				Max 4 pnt	Fail		KC BS
UI6 -30	413	106 Cec Admin Assist Temp				Pulled Wire	Fail		KC BS

Checklist Complete

Technician Signature

3-3-09

Date

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Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***CONNECTOR FCU EX2 - 16 WIRING DETAIL*** System: CONNECTOR FCU Location: ELEC ROOM 005	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2 - 16 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1 - 19	618	VAL - 41 HEAT / COOL VALVE	2-WIRE	E	GND SHIELD			Moved to MPS81-8 AO2	
AO2 - 20	619								
AO3 - 21	620								
AO4 - 22	621	Basement Valve							
BO1 - 19	614	~~R - 19 CONNECTOR FCU FAN S/S~~	2-WIRE	D	GND SHIELD	OPEN/closed	0V/24V	Moved to MPS81-8 BO1	BB *2
BO2 - 20	615	Basement East Stair FTR Valve				OPEN/closed	0V/24V		BB
BO3 - 21	616	West Stair Fin Tube Valve				OPEN/closed	0V/24V		BB
BO4 - 22	617	CUHC Fan S/S				0% Off	24V/0V		BB
UI1 31	608	~~Basement TE - 54 CONNECTOR SPACE Zone Temp~~ TEMPERATURE	2-WIRE	D	GND SHIELD	75.5°F	10389 ohms	Moved to MPS81-8 UI-9	BB
UI2 32	609	~~TE - 55 CONNECTOR FCU DISCHARGE AIR TEMPERATURE (THERM)~~	2-WIRE	D	GND SHIELD			Moved to MPS81-8 UI-7	
UI3 33	610	Basement East Stair Temp				76.6°F	10096 ohms		BB
UI4 34	611								
UI5 35	612	W. Stairwell Temp				79.5°F	9421 ohms		BB
UI6 36	613	CUH-C Space Temp				73.3°F	10951 ohms		BB

*CUH-C - No Valve installed 2/18

Checklist Complete

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3-3-09

Date

*2 - Valve Operates - No Heat/Cool Coil Attached.

19

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Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***2ND FLOOR RADIANT PANELS MP581 - 3 WIRING DETAIL2*** System: RADIANT PANELS Location: ELEC ROOM 313	Controller Description: MP581 FULL ENCLOSURE, NO DISPLAY 120V Controller Tag: MP581 - 3 Controller Vendor: TRANE Controller Part No.: BMTM000AAC00 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1	*289*	*VAL - 15 CONF ROOM 201 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2 V 10 V	Open Close		
AO2	*290*	*VAL - 16 IC LIBRARY 202 AND 204 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2 V 10 V	Open Close		
AO3	*291*	*VAL - 17 IC ASST COOR 206 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2 V 10 V	Open Close		
AO4	*292*	*VAL - 18 IC COOR 207 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2 V 10 V	Open Close		
AO5	*293*	203 Admin Rad Pan VLV				2 V 10 V	Open Close		
AO6	*294*								
BO1	*283*								
BO2	*284*								
BO3	*285*								
BO4	*286*								
BO5	*287*								
BO6	*288*								
UI01	*295*	*CO2 - 2 CONF RM 201 CO2 (4-20 MA)*	2-WIRE W/ INT DC PWR	*E*	*GND SHIELD*	1123 PPM		Calibrate after Const	
UI02	*296*	*CONF RM 201 TEMPERATURE*	2-WIRE	*D*	*GND SHIELD*	76°	OK		
UI03	*297*								
UI04	*298*	*TE - 15 IC LIBRARY 202 AND 204 SETPOINT*	2-WIRE	*E*	*GND SHIELD*	90.4	OK		
UI05	*299*	*TE - 15 IC LIBRARY 202 AND 204 TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Wiring	OK		

UI06	300	TE - 16 IC ASSIST COOR 206 SETPOINT	2-WIRE	E	GND SHIELD	90.5	OK		
UI07	301	TE - 16 IC ASSIST COOR 206 TEMPERATURE	2-WIRE	E	GND SHIELD	Wiring	OK		
UI08	302	TE - 17 IC COOR 207 SETPOINT	2-WIRE	E	GND SHIELD	90.4	OK		
UI09	303	TE - 17 IC COOR 207 TEMPERATURE	2-WIRE	E	GND SHIELD	Wiring	OK		
UI10	304	203 Admin SP				n/a		No TW	
UI11	305	203 Admin Temp				Wiring	OK		
UI12	306	TE - 20 HALLWAY 205 TEMPERATURE	2-WIRE	E	GND SHIELD	Wiring	OK		

Checklist Complete

K E Ch

Technician Signature

2-4-09

Date

Flash download ok 2-4-09 KEC

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***2ND FLOOR RADIANT PANELS EX2 - 9 WIRING DETAIL*** System: RADIANT PANELS Location: ELEC ROOM 313	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2 - 9 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1	*325*	*VAL - 19 IC ASST DIRECTOR 208 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2 V 10 V	Open Closed		
AO2	*326*	*VAL - 30 IC COOR 209 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2 V 10 V	Open Closed		
AO3	*327*	*VAL - 20 COFFEE RECYCLE 213 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2 V 10 V	Open Close		
AO4	*328*								
BO1	*321*								
BO2	*322*								
BO3	*323*								
BO4	*324*								
UI1	*315*	*TE - 18 IC ASSIST DIRECTOR 208 SETPOINT*	2-WIRE	*E*	*GND SHIELD*	90.4	OK		
UI2	*316*	*TE - 18 IC ASSIST DIRECTOR 208 TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Wiring	OK		
UI3	*317*	*TE - 37 IC COOR 209 SETPOINT*	2-WIRE	*E*	*GND SHIELD*	90.4	OK		
UI4	*318*	*TE - 37 IC COOR 209 TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Wiring	OK		
UI5	*319*	*TE - 19 COFFEE RECYCLE 213 SETPOINT*	2-WIRE	*E*	*GND SHIELD*	90.9 F	OK		
UI6	*320*	*TE - 19 COFFEE RECYCLE 213 TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Wiring	OK		

Checklist Complete

Technician Signature

2-6-09

Date

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***2ND FLOOR COND SENSORS EX2 - 13 WIRING DETAIL*** System: COND SENSORS Location: ELEC ROOM 313	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2-13 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1	*436*								
AO2	*437*								
AO3	*438*								
AO4	*439*								
BO1	*432*								
BO2	*433*								
BO3	*434*								
BO4	*435*								
UI1	*426*	*201 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK		
UI2	*427*	*204 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK		
UI3	*428*	*206 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK		
UI4	*429*	*207 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK		
UI5	*430*	*208 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK		
UI6	*431*	203 Condensation Sensor				NC	OK		

Checklist Complete

Technician Signature

2-6-09

Date

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***2ND FLOOR COND SENSORS EX2 - 14 WIRING DETAIL*** System: COND SENSORS Location: ELEC ROOM 313	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2-14 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1 -13	454								
AO2 -14	455								
AO3 -17	456								
AO4 -18	457	Shower FTR	—	—	—	On Off	Closed Open	Originally on Analog Out	D
BO1	450								
BO2	451								
BO3	452								
BO4	453								
UI1 -25	444	209 CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	NC	OK		
UI2 -26	445	213 CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	NC	OK		
UI3 -27	446								
UI4 -28	447								
UI5 -29	448								
UI6 -30	449	Shower Room Temp				Wiring			

Checklist Complete:

Technician Signature ***Date*** 2-4-09

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***3RD FLOOR RADIANT PANELS MP581 - 2 WIRING DETAIL*** System: RADIANT PANELS Location: ELEC ROOM 313	Controller Description: MP581 FULL ENCLOSURE, NO DISPLAY 120V Controller Tag: MP581 - 2 Controller Vendor: TRANE Controller Part No.: BMTM000AAC00 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1	*185*	*VAL - 4 HALLWAY 300 AND IGC ADMIN 302 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2 V 10 V	Open Closed	No Thumb Wheel	
AO2	*186*	*VAL - 5 STUDENT WORK ROOM 301 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2 V 10 V	Open Closed		
AO3	*187*	*VAL - 3 CONF ROOM 303 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2 10 V	Open Closed		
AO4	*188*	*VAL - 6 IGC DEAN 304 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*			Re Check OK KGC	
AO5	*189*								
AO6	*190*								
BO1	*179*	Initially this valve was latched - 581 power was 0V until panel was reset without AO connected							
BO2	*180*								
BO3	*181*								
BO4	*182*								
BO5	*183*								
BO6	*184*	*DA - 3 ; DA - 7*	2-WIRE	*E*	*GND SHIELD*	0-100 %	OK		
UI01	*191*	*TE - 59 HALLWAY 300 AND IGC ADMIN 302 SETPOINT*	2-WIRE		*GND SHIELD*			No T sheet	
UI02	*192*	*TE - 59 HALLWAY 300 AND IGC ADMIN 302 TEMPERATURE*	2-WIRE		*GND SHIELD*	Wiring	OK	Failed when disconnected	
UI03	*193*	*TE - 5 STUDENT WORK ROOM 301 SETPOINT*	2-WIRE	*E*	*GND SHIELD*	TW	OK		
UI04	*194*	*TE - 5 STUDENT WORK ROOM 301 TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Wiring	✓		

UI05	195	CO2 - 1 CONF RM 303 CO2 (4-20 MA)	2-WIRE W/ INT DC PWR	E	GND SHIELD	690.2	499 ppm		
UI06	196	CONF RM 303 TEMPERATURE	2-WIRE	D	GND SHIELD	71.7	OK		
UI07	197								
UI08	198	TE - 6 IGC DEAN 304 SETPOINT	2-WIRE	E	GND SHIELD	Signal	OK	Wireless	
UI09	199	TE - 6 IGC DEAN 304 TEMPERATURE	2-WIRE	E	GND SHIELD	Signal	OK	Wireless	
UI10	200								
UI11	201								
UI12	202								

Checklist Complete

Technician Signature

2-4-09

Date

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TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***3RD FLOOR RADIANT PANELS EX2 - 5 WIRING DETAIL*** System: RADIANT PANELS Location: ELEC ROOM 313	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2 - 5 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1 - 7	221	VAL - 7 WAITING AREA 305 RADIANT PANEL VALVE (0-10 VDC)	2-WIRE	E	GND SHIELD	2 V 10 V	Open Closed		
AO2 - 8	222	VAL - 8 VISITING SCHOLAR 306 RADIANT PANEL VALVE (0-10VDC)	2-WIRE	E	GND SHIELD	2 V 10 V	Open Closed		
AO3	223								
AO4	224								
BO1	217								
BO2	218								
BO3	219								
BO4	220								
UI1 - 13	211	TE - 58 WAITING AREA 305 SETPOINT	2-WIRE		GND SHIELD	TW	OK	wireless	
UI2 - 14	212	TE - 58 WAITING AREA 305 TEMPERATURE	2-WIRE		GND SHIELD	signal	OK	wireless	
UI3 - 15	213	TE - 8 VISITING SCHOLAR 306 SETPOINT	2-WIRE	E	GND SHIELD	TW	OK		
UI4 - 14	214	TE - 8 VISITING SCHOLAR 306 TEMPERATURE	2-WIRE	E	GND SHIELD	Wiring	OK		
UI5	215								
UI6	216								

Checklist Complete

Technician Signature

2-4-09

Date

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***3RD FLOOR RADIANT PANELS EX2 - 6 WIRING DETAIL*** System: RADIANT PANELS Location: ELEC ROOM 313	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2 - 6 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1 - 11	*239*	*VAL - 9 IGC ASSOC DEAN 307 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2V 10V	Open Closed		
AO2 - 12	*240*	*VAL - 10 IGC ASSOC DEAN 308 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2V 10V	Open Closed		
AO3 - 13	*241*	*VAL - 11 IC DIRECTOR 309 RADIANT PANEL VALVE (0-10 VDC)*	2-WIRE	*E*	*GND SHIELD*	2V 10V	Open Closed		
AO4	*242*								
BO1	*235*								
BO2	*236*								
BO3	*237*								
BO4	*238*								
UI1 - 19	*229*	*TE - 9 IGC ASSOC DEAN 307 SETPOINT*	2-WIRE	*E*	*GND SHIELD*	TW	OK		
UI2 - 20	*230*	*TE - 9 IGC ASSOC DEAN 307 TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Wiring	OK		
UI3 - 21	*231*	*TE - 10 IGC ASSOC DEAN 308 SETPOINT*	2-WIRE	*E*	*GND SHIELD*	TW	OK		
UI4 - 22	*232*	*TE - 10 IGC ASSOC DEAN 308 TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Wiring	OK		
UI5 - 23	*233*	*TE - 11 IC DIRECTOR 309 SETPOINT*	2-WIRE	*E*	*GND SHIELD*	TW	OK		
UI6 - 24	*234*	*TE - 11 IC DIRECTOR 309 TEMPERATURE*	2-WIRE	*E*	*GND SHIELD*	Wiring	OK		

Checklist Complete

Technician Signature

2-4-09

Date

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***3RD FLOOR RADIANT PANELS EX2 - 7 WIRING DETAIL*** System: RADIANT PANELS Location: ELEC ROOM 313	Controller Description: EX2 EXPAN MODULE WITH METAL ENC Controller Tag: EX2 - 7 Controller Vendor: TRANE Controller Part No.: 4950-0500 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1 - 15	257	VAL - 12 IGC ST COUNCIL 310 RADIANT PANEL VALVE (0-10 VDC)	2-WIRE	E	GND SHIELD	2V 10V	Open Closed		
AO2 - 16	258	VAL - 13 LOUNGE 318 RADIANT PANEL VALVE (0-10 VDC)	2-WIRE	E	GND SHIELD	2V 10V	Open Closed		
AO3 - 17	259	VAL - 14 ATRIUM RADIANT PANEL VALVE (0-10 VDC)	2-WIRE	E	GND SHIELD	100% 50%	OK		
AO4	260								
BO1	253								
BO2	254								
BO3	255								
BO4	256								
UI1 - 25	247	TE - 12 IGC ST COUNCIL 310 SETPOINT	2-WIRE	E	GND SHIELD	TW	OK		
UI2 - 26	248	TE - 12 IGC ST COUNCIL 310 TEMPERATURE	2-WIRE	E	GND SHIELD	Wiring	OK		
UI3 - 27	249	TE - 13 LOUNGE 318 SETPOINT	2-WIRE	E	GND SHIELD			No TW	
UI4 - 28	250	TE - 13 LOUNGE 318 TEMPERATURE	2-WIRE	E	GND SHIELD	Wiring	OK		
UI5 - 29	251	TE - 57 ATRIUM SETPOINT	2-WIRE		GND SHIELD			No TW	
UI6 - 30	252	TE - 57 ATRIUM TEMPERATURE	2-WIRE		GND SHIELD	Wiring	OK		

Checklist Complete

Technician Signature

2-4-09

Date

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***3RD FLOOR COND SENSORS MP581 - 5 WIRING DETAIL*** System: COND SENSORS Location: ELEC ROOM 313	Controller Description: MP581 FULL ENCLOSURE, NO DISPLAY 120V Controller Tag: MP581 - 5 Controller Vendor: TRANE Controller Part No.: BMTM000AAC00 Controller Configuration:

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AO1	*468*								
AO2	*469*								
AO3	*470*								
AO4	*471*								
AO5	*472*								
AO6	*473*								
BO1	*462*								
BO2	*463*								
BO3	*464*								
BO4	*465*								
BO5	*466*								
BO6	*467*								
UI01	*474*	*302 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	Normally Closed	OK		
UI02	*475*	*301 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK		
UI03	*476*	*303 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK		
UI04	*477*	*304 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK		
UI05	*478*	*305 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK		
UI06	*479*	*306 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK		
UI07	*480*	*307 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK	Initially read fault - moved - OK	
UI08	*481*	*308 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK		
UI09	*482*	*309 CONDENSATION SENSOR*	2-WIRE	*D*	*GND SHIELD*	NC	OK		

UI10	483	310 CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	NC	OK		
UI11	484	318 CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	NC	OK		
UI12	485	ATRIUM CONDENSATION SENSOR	2-WIRE	D	GND SHIELD	NC	OK		

Checklist Complete

[signature] 2-4-09

Technician Signature **Date**

- Downloaded Ref + Flashed img 2-3-09 - KGC
- Opened NC connection on each sensor to verify location & operation

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***UH-1 MP501 - 1 WIRING DETAIL*** System: UH-1 Location: L-L MECH ROOM 003	Controller Description: MP501 W/METAL ENCLOSURE Controller Tag: MP501 - 1 Controller Vendor: TRANE Controller Part No.: 49500586 Controller Configuration: SCC STAGED

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AI1 - NOT USED	*495*								
AO1 - 0-10VDC ANALOG OUTPUT	*501*								
BI1 - OCCUPANCY OR GENERIC	*494*								
BO1 - STAGE 1	*497*	~~*VAL - 31 HW CONTROL VALVE*~~	~~2 WIRE~~	*E*	~~*GND SHIELD*~~			*N4*	
BO2 - FLTG PT ACTUATOR	*498*								
BO2 - STAGE 2	*499*								
BO3 - FAN	*500*								
ZONE SENSOR	*496*	*TE - 38 MECHANICAL ROOM SPACE TEMPERATURE (THERM)*	ZONE	*D*	*GND SHIELD*	OL			KC

Checklist Complete

Technician Signature

3-2-09

Date

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***CUH-A MP501 - 2 WIRING DETAIL*** System: CUH-A Location: WEST VEST 100	Controller Description: MP501 W/PLASTIC ENCLOSURE Controller Tag: MP501 - 2 Controller Vendor: TRANE Controller Part No.: 49500486 Controller Configuration: SCC STAGED

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AI1 - NOT USED	*504*								
AO1 - 0-10VDC ANALOG OUTPUT	*510*								
BI1 - OCCUPANCY OR GENERIC	*503*								
BO1 - STAGE 1	*506*	*VAL - 32 CUH-A 2-WAY VALVE*	2-WIRE	*E*	*GND SHIELD*			No Valve	KBS BS
BO2 - FLTG PT ACTUATOR	*507*								
BO2 - STAGE 2	*508*								
BO3 - FAN	*509*	*R - 3 CUH-A FAN*	2-WIRE	*D*	*GND SHIELD*	Cycled on/off	Observed Fan	OK	KBS BS
ZONE SENSOR	*505*	*TE - 39 WEST VESTIBULE SPACE TEMPERATURE*	ZONE	*D*	*GND SHIELD*	Dropped Connection	83.4 Failed	OK Missunned	KBS BS

Checklist Complete

Technician Signature

3-2-09

Date

TRANE

Control Technician
Point to Point Wiring Checklist
Connections Per Controller

Project Name: MACALESTER IGC ST PAUL, MN *Project Number:* S343336	*Sold To:* Date Printed: 1/23/2009
Drawing Page: ***CUH-B MP501 - 3 WIRING DETAIL*** System: CUH-B Location: EAST VEST 110	Controller Description: MP501 W/PLASTIC ENCLOSURE Controller Tag: MP501 - 3 Controller Vendor: TRANE Controller Part No.: 49500486 Controller Configuration: SCC STAGED

I/O POINT	*Cable Tag*	*Device Connected*	Wiring Type	*Cable Type*	*Shield Config*	*Tracer Summit Status*	*Measured Field Status*	*Notes:*	*Chk By*
AI1 - NOT USED	*513*								
AO1 - 0-10VDC ANALOG OUTPUT	*519*								
BI1 - OCCUPANCY OR GENERIC	*512*								
BO1 - STAGE 1	*515*	~~*VAL - 33 CUH-B 2-WAY VALVE*~~	~~2-WIRE~~	*E*	~~*GND SHIELD*~~				
BO2 - FLTG PT ACTUATOR	*516*								
BO2 - STAGE 2	*517*								
BO3 - FAN	*518*	*R - 4 CUH-B FAN*	2-WIRE	*D*	*GND SHIELD*	Cycle on /off	Observed OK		
ZONE SENSOR	*514*	*TE - 40 EAST VESTIBULE SPACE TEMPERATURE*	ZONE	*D*	*GND SHIELD*	Dropped Connection	93. Failed	OK Miswired	

Checklist Complete

Technician Signature

3-2-09

Date

Final Performance Test Results

Karges-Faulconbridge, Inc.
Engineers
670 West County Road B
St. Paul, MN 55113-4527

Phone: 651-771-0880
Fax: 651-771-0878
E-Mail OwnerServices@kfi-eng.com

FUNCTIONAL PERFORMANCE VERIFICATION

Project: **Macalaster Inst. For Global Citizenship** **KFI Job Number:** **07-372.00**

AHU-A1	**Serves: Entire Building**						**Location: Basement Mech Room**			
Point Description	**CALIBRATION**		**CONTROL OUTPUT**		**STATUS INPUT**		**ALARM RECEIVED**		**TEST**	**Notes**
	Actual	**Graphic**	**PASS**	**FAIL**	**PASS**	**FAIL**	**PASS**	**FAIL**	**DATE**	
DA-RH	24.5	26.0			PASS		PASS		3/18/2009	
MA-RH	33	32.1							3/18/2009	
OA RH	47.6	55.0							3/18/2009	
DA Temp	67.5	67.5							3/18/2009	
MA Temp.	68.0	71.5							3/18/2009	
EA Temp.	75.0	74.4							3/18/2009	
O.A. Temp.	50.2	50.0							3/18/2009	
SA AF Measuring	1520	1506							3/24/09	
EA Damper Posit.			PASS		PASS				3/24/09	DAMPER DOES NOT CLOSE ON
OA Damper Posit.									3/24/09	
Supply Fan VFD Speed	43.8	43.3	PASS		PASS		NA		3/24/09	NO ALARM SPEC'D BY ENGINE
Exhaust Fan VFD Speed	36.0	35.7	PASS		PASS				3/24/09	EXHAUST FAN GOES TO MINIMUM
Wheel VFD										
CHW Valve Posit.			OK		OK		NA		3/18/2009	
HW Valve Posit.			OK		OK		NA		3/18/2009	
HT PIPE VLV POS.										
HIGH PRESS. LIMIT			PASS		PASS		PASS		3/24/09	
EA PRESS LIMIT			PASS		PASS		PASS		3/18/2009	MOUNTED ON LOW SIDE OF FA
HEAT PIPE										PASS WITH THE EXCEPTION O
Alarms										
RA DIRTY FILTER	.11"	-0.17							3/24/09	need pressure set point from engi
OA DIRTY FILTER	0.52	-0.56							3/24/09	
HT. WHL DIRTY	0.29	0.12							3/24/09	check calibration
HT. WHL LOW TEMP							PASS		3/24/09	ALARM IS ON THE OUTSIDE OF
FREEZE PROTECTION			PASS		PASS		PASS		3/18/2009	

Notes:
1. ALARMS FOR HI/LO DUCT STATIC PRESSURE AND FREEZE STAT ALARM BUT NOT A SPECIFIC ALARM AS TO WHAT TRIPPED THE FAN.
2. RFI to engineer to find out what pressure differential he wants to see across the filters for alarm to appear
3. Filter pressure sensors should read out a positive value.
4. service lights in the unit not operational. VFD's not labeled. Insulation for supply duct has pitot tube holes that has to be repaired.
5. Filters in return air and ouside air are 2", not 4" as scheduled. 30x30 filter is a 30x20 and a 30x10 taped together.

FUNCTIONAL PERFORMANCE VERIFICATION

670 West County Road B
St. Paul, MN 55113-4527

Phone: 651-771-0880
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E-Mail OwnerServices@kfi-eng.com

Project: Macalaster Inst. For Global Citizenship **KFI Job Number: 07-372.00**

AHU-A1	**Serves: Entire Building**			**Location: Basement Mech Room**
Sequences	**Mode**		**TEST**	**NOTES**
	FAIL	**PASS**	**DATE**	
Cooling		x	7/31/2009	
Heating		X	7/31/2009	
Economizer		X	7/31/2009	

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Engineers

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Heating Water Pumps

Unit #	LEAD/LAG ALARM		SEQUENCE		PUMP SPEED		STATUS			Notes
	PASS	FAIL	PASS	FAIL	GFX	ACTUAL	PASS	FAIL	DATE	
DTB-1 ICG	pass		pass		100%	100%	pass		7/31/2009	
DTB-2 ICG	pass		pass		100%	100%	pass		7/31/2009	
HWP-1 Kagin	pass		pass		89%	90.50%	PASS		7/31/2009	
HWP-2 Kagin	pass		pass		90.50%	91.50%	PASS		7/31/2009	
CHWP-1 Kagin	pass		pass		89%	90.50%	PASS		7/31/2009	
CHWP-2 Kagin	pass		pass		90.50%	91.50%	PASS		7/31/2009	

Notes:

ALL LBAELING FOR PUMPS IS WITH TAPE AND PERMANENT MARKER. SAME FOE ALL VFD'S

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MECHANICAL VALVES

Unit #	CALIBRATION		SEQUENCE		STATUS			Notes
	GRAPHIC	ACTUAL	PASS	FAIL	PASS	FAIL	DATE	
HTG. SUPPLY	100%	100%	X		X		7/31/2009	
HTG. RETURN	100%	100%	X		X		7/31/2009	
CHW. SUPPLY	100%	100%	X		X		7/31/2009	
CHW RETURN	100%	100%	X		X		7/31/2009	

Notes:

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FUNCTIONAL PERFORMANCE CHECKLIST

Project: Macalaster Inst. For Global Citizenship **KFI Job Number: 07-372.00**

VAV Boxes and CO2 Set Points

Unit & Location	Space Temp		Damper Position		Heating Valve	Sequence	TEST	Notes
	ACTUAL	Gfx / Txt	ACTUAL	Gfx / Txt		pass/fail	DATE	
VAV-1	72.6	71.2	pass	pass	no coils		3/24/09	balancing damper final position is not
VAV-2	71.2	72	pass	pass	no coils		3/24/09	
CO2 1st Floor (ppm)	550	435					3/24/09	
CO2 2nd Floor (ppm)	450	504					3/24/09	
CO2 3rd Floor (ppm)	530	468					3/24/09	

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Existing Finned Tube and In-Floor Heat

Unit # & Location	SPC. TEMP. SETPT.		CONTROL			TREND LOGS	TEST DATE	Notes
	ACTUAL	GRAPHIC	VALVE	STATUS	ALARM			
FTR LL Stairs	73.2	71.4	pass	pass			3/24/09	
FTR LL Storage	72.5	71.4	pass	pass			3/24/09	
FTR West Stairs	74	73.1	pass	pass			3/24/09	
FTR Conn. Stairs	70.4	69.4	pass	pass			3/24/09	
In Floor Heat	78.00	72.20	pass	pass			3/26/09	check temperature sensor
3rd Floor Shower			fail	fail			3/26/09	no graphic point for radiation

Notes:

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Passive Heating and Cooling 1st Floor

Unit # & Location	SPC. TEMP. SETPT.		CONTROL		COND. SENSOR		TEST	Notes
	ACTUAL	GRAPHIC	VALVE	STATUS	PASS	FAIL	DATE	
Brk Rm 1st Fl	75.4	73.9	pass	pass			3/24/09	
Hallway 109 Unit 1	75.2	74.3	pass	pass			3/24/09	
Hallway 109 Unit 2	75.2	73.3	pass	pass			3/24/09	
Room 108	74.8	73.9	pass	pass			3/24/09	
Room 106	75.2	74.1	pass	pass			3/24/09	
Room 105	75.5	74.5	pass	pass			3/24/09	
Room 103	76.2	74.6	pass	pass			3/24/09	
Room 102	76.8	75	pass	pass			3/24/09	
Room 107	75.1	74.2	pass	pass			3/24/09	

Notes:

1. Condensate sensors were too high and behind obstructions to actually test.

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CABINET UNIT HEATERS

Unit # & Location	SPACE TEMP. SETPOINT		CONTROL			TREND LOGS	TEST DATE	Notes
	ACTUAL	GRAPHIC	VALVE	STATUS	FAN			
CUH-A Vest. 100	75.7	74.4	NA	PASS	PASS		3/24/09	
CUH-B Vest. 110	73.5	71.3	NA	PASS	PASS		3/24/09	
FCU-A Kagin Conn.					PASS		3/26/09	POINTS NOT ON FRONT END GRAPHICS.
FCU-B Kagin Conn.	73.4	72.9	pass	pass	PASS		3/26/09	not on plans but installed above ceiling in cor

Notes:

1. Fan coil above ceiling in the connector has dirty filters from construction and they should be replaced. Filter rack appears to be

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UNIT HEATERS

Unit # & Location	SPACE TEMP. SETPOINT		CONTROL			TREND LOGS	TEST DATE	Notes
	ACTUAL	GRAPHIC	VALVE	STATUS	ALARM			
UH-1	72.6	71.8	PASS	PASS			3/24/09	
Elec. Htr. Elev. Rm	?	?	?	?			3/26/09	

Notes:
1. thermostat should be moved up out of the way of the and secured to the j-box
2. the plans call for a 500W electric heater in the elevator equipment room. The heater is not installed.

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FUNCTIONAL PERFORMANCE VERIFICATION

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Existing Exhaust Fans

	CONTROL			OCC.	DAMPER	ALARM	TEST	Notes
	S/S	STATUS	ALARM	UNOCC	POSIT.	LOGS	DATE	
EF-2	pass	pass			pass		3/26/09	
EF-3	pass	pass	NA	NA	pass		3/26/09	switch had to be turned to nearly 10

Notes:

Issue Tracking Forms

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ISSUE TRACKING FORM-ITF1

Project: Macalester College IGC
KFI Job Number: 07-372.00
Date Issued: 03/31/09
Reissue Number:
Written By: Ted A. Ciganik, Dave Ross

Listed below are items identified during functional testing. Please review, comment, and distribute this form; return when the items are corrected.

Item #:	Area	Issue	KFI Test	Contractor		KFI
			Test Date	Date Corrected	Corrected By	Date Verified
1	AHU-1	OA relative humidity sensor varied by over 7% verify accuracy of sensor.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		Set Up Trend Viewers				
2	AHU-1	Exhaust Damper does not close down when exhaust fan is shut down at VFD	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		Corrected				
3	AHU-1	No alarm specified when supply fan loses status through VFD. Alarm was added. Can be removed if engineer does not wish to have it monitored.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		VanZelm: No objection to alarm				
4	AHU-1	Exhaust fan goes to minimum when supply fan is shut down at VFD.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		VanZelm: When supply fan is off the exhaust fan should also be off. Fans are to track and operate in unison.				

Item #:	Area	Issue	KFI Test	Contractor		KFI
			Test Date	Date Corrected	Corrected By	Date Verified
5	AHU-1	Low limit pressure for exhaust fan is mounted on the low pressure side of the fan, not as engineer showed. This location is acceptable to KFI.	03/18/09-3/26/09		VZ	07/31/09
		VanZelm: No Objection				
6	AHU-1	Heat Pipe Solenoids passed with the exception of valve #2. It had to be reset twice during testing.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		Kory to get new				
7	AHU-1	OA and Exhaust dirty filter sensors. Engineer to provide static pressure drop indicating when to alarm.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		VanZelm: Set alarm at 2 times the clean filter pressure drop. This setting should be made when the final clean filters are in place.				
8	AHU-1	Heat recovery wheel pressure sensor. Check calibration.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		MMC: TRANE checking pressure sensors.				
9	AHU-1	In general, the pressure sensors for dirty filters/wheel function properly. Pressures should be referenced as positive numbers versus negative as currently shown.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		MMC: TRANE will change graphics to represent positive number.				
10	AHU-1	heat wheel low temperature protection is on the leaving side of the heat wheel as shown by engineer. Should this sensor be located on the incoming outdoor air side of the wheel?	03/18/09-3/26/09		VZ	07/31/09
		VanZelm: Freeze sensors shown after the heat wheel is for coil protection and should remain at this location. Wheel "frost' protection should be looking at the leaving side of the exhaust air stream.				
11	AHU-1	Alarms for Hi and Lo static and freeze protection shut down the fan and alarm. However, they do not specifically alarm to the specific cause. Not specified to do so in the control drawings.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		VanZelm: Recommended that DDC indicate the nature of each alarm condition.				

Item #:	Area	Issue	KFI Test	Contractor		KFI
			Test Date	Date Corrected	Corrected By	Date Verified
12	AHU-1	Service lights in the unit do not function	03/18/09-3/26/09		MMC	07/31/09
		MMC Corrected				
13	AHU-1	VFD's not labeled.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		OK (VFD'S NOT LABELED IN KAGIN)				
14	AHU-1	there are holes in the ductwork from balancing that require repair or plugs.	03/18/09-3/26/09	MMC		07/31/09
		OK				
15	AHU-1	OA and Exhaust filters are not 4" as scheduled in the plans.	03/18/09-3/26/09	MMC		07/31/09
		OK				
16	VAV-1	Final Balancing damper position not marked	03/18/09-3/26/09	MMC	KFI	07/31/09
17	Radiation	In-Floor heat temperature sensor not reading to within 3 degrees. Check for calibration.	03/18/09-3/26/09	07/31/09	KGC	07/31/09
		MMC: TRANE verify calibration sensor				
18	Radiation	radiation for 3rd floor shower does not have graphic points on the front end.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		No 3rd floor shower???? (2nd floor shower)				
19	Cond. Sens.	Room 206, 306 and 304 condensate sensor failed. There is one other failure shown on the graphics. Sensors most likely have been painted and need to be replaced.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		MMC: TRANE to verify and replace condensate sensors if required				
20	Cond. Sens.	Room 203 Condensate sensor mounted horizontally, not per mfg suggested.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		No condensate sensor				

Item #:	Area	Issue	KFI Test	Contractor		KFI
			Test Date	Date Corrected	Corrected By	Date Verified
21	Cond. Sens.	Note: Condensate sensors that were accessible were tested by breathing on them per mfg instructions. Could not sustain humidity levels long enough to witness valves closing.	03/18/09-3/26/09		KFI	07/31/09
		MMC: Commissioning Agent will need to re-check during cooling season				
22	Fan Coil.	FCU-A in the Kagin Connector is not shown on the graphical front end.	03/18/09-3/26/09	05/21/09	KGC	07/31/09
		OK				
23	Fan Coil.	The fan coil installed above the ceiling in the connector requires clean filters. The installed filters have construction dust and should be replaced. The filter rack appears nearly impossible to add or remove filters. MMC should demonstrate easy way to Macalester maintenance staff to service.	03/18/09-3/26/09		MMC	07/31/09
		MMC: MMC will demonstrate filter installation and removal during Owner training. (DID THIS HAPPEN)				
24	Unit Htr.	The plans show a 500W electric heater for the elevator room. This heater is not installed.	03/18/09-3/26/09		VZ	07/31/09
		MMC: MMC to coordinate installation of heater with Peoples. VanZelm: Only required to be installed if elevator inspector requires a heater in this room. Building insulation and heat provided for the building as a whole will maintain adequate temperature in this room. Air is transferred into the machine room for ventilation from the basement which is heated. Peoples: The heater is not installed and is by mechanical based on note 8/Sheet E100. When installed we will connect. This heater is NOT on the motor schedule.				
25	EF-3	Switch for fan had to be turned almost 100% in order to activate the fan. Verify switch works when turned past the number one setting.	03/18/09-3/26/09			08/06/09
		MMC: MMC & Peoples to check fan switch. Peoples: The control for this exhaust fan were by mechanical.				
26	EF-3	Backdraft damper at the fan curb remains open when fan is not energized.	03/18/09-3/26/09			08/06/09
		MMC: MMC to check operation of back draft damper				
27	T-Stats	some zone temperature stats are labeled and some are not. please be consistent. If the college would like them labeled, then label all. If the college prefers no labels, then please remove the labels. Verify what form of labeling is acceptable to the college.	03/18/09-3/26/09			08/06/09

Item #:	Area	Issue	KFI Test	Contractor		KFI
			Test Date	Date Corrected	Corrected By	Date Verified
		MMC: MMC to verify with Macalester if labels are required				
28	General	Note: There are control valves, condensate sensors, and balancing valves that are located such that service will be extremely difficult. The main area of concern is on the first floor where there is very little room between the ceiling and the structure above. This item is intended to highlight the issue. There is little if anything that can be done to remedy the space limitations.	03/18/09-3/26/09		KFI	07/31/09
		MMC: MMC is aware of the limited ceiling space and has installed everything per Van Zelm's drawings.				
29						
30						

Training Documentation

EA Prerequisite 1: Not Required
EA Credit 3: **Requirement**

Task: Ensure operations staff receives contractual, and proper, training and O&M documentation.

Execution: This section includes the agendas to provide training to the operations staff. Training was also videotaped by the contractors and turned over to the owner. Training documentation includes:

- Training agendas

Training Agenda

Project: Macalester IGC ***Date:*** 3-30-09

Equipment / System: Mechanical ***Spec Section:*** 15000

Section 1. Audience and General Scope

Audience: ___facility manager, X_facility engineer, ___facility technician
___project manager, ___tenant, ___other:_____

General objectives and scope of training:

___ A. Overview ___ B. Intermediate ___ C. Detailed

Section 2. Instructors

ID#	Trainer	Company	Position / Qualifications
1.	George Sorenson	MMC	Service Technician
2.	Kevin Cambrone	Trane	Service Technician

Section 3. Agenda

Location: Site: IGC Bldg Room(s): Main Lobby Date(s): 4-16-09 @ 8:00 am

Agenda

Session Subject	Date	Duration (min)	Instructor (ID#)	Completed (✓)
a. Hydronic system: pumps, exp tank & air separators				
b. VFD's				
c. Terminal heating & cooling units: unit heaters, fan coil unit, cabinet unit heaters, radiant panels & chilled sails				
d. Air handling equipment: AHU & fans				
e. Plumbing components: sump pumps, sewage ejectors & water htrs.				
f. Temperature Control				

Total Duration of training (hrs) ----------→

Attendance: Curt Stainbrook, Mike O'Conner & Dayshift maintenance staff.

Section 4. Approvals and Use

This plan has been approved by the following individuals, subject to any additions and clarifications noted (*this is not an approval of training completion*).

_____ _____
Owner's Representative Date

_____ _____
Commissioning Authority Date

O&M Documentation

EA Prerequisite 1: **Requirement**
EA Credit 3: **Requirement**

Task: Ensure operations staff receives contractual, and proper, O&M documentation.

Execution: KFI reviewed the O&M manuals. Comments were redlined in the manual and returned to the contractor for update and turnover to the owner.

TAB Review

EA Prerequisite 1: **Requirement**
EA Credit 3: **Requirement**

Task: Review final TAB report for completeness and accuracy and sample minimum outside airflow settings and diffuser flow rates.

Execution: KFI met with the TAB technician to review the procedures to be used to balance the air and water systems. Procedures were verified as appropriate as discussed. KFI witnessed a sampling of the actual test and balance work performance. Work was done properly and the results observed were within design tolerances. The final TAB report documentation will be reviewed when submitted

Systems Manual

EA Prerequisite 1: Not Required
EA Credit 3: **Requirement**

Task: Assist with the development of a manual that provides future operating staff the information necessary to understand and optimally operate the commissioned systems.

Execution: The Systems Manual is in development. The manual will include:

- Design Team developed Basis of Design
- Design Team developed single line diagrams
- Controls contractor supplied as-built control sequences and original setpoints
- Integrated system operating instructions
- Maintenance requirements and schedules
- System conformance retesting procedures and test forms
- Sensor and actuator calibration retesting schedule

Final Operations Review

EA Prerequisite 1: Not Required
EA Credit 3: **Requirement**

Task: Review building operation prior to warranty date to identify and resolve any outstanding commissioning related issues.

Execution: The building operations will be reviewed with the owner's facility manager prior to the completion of the warranty period to verify that systems continue to operate properly. If there are any issues found, KFI will coordinate with the owner's representative to ensure the contractors return to the site and perform corrective actions.

ENERGY AND ATMPOSHERE

CREDIT 1: OPTIMIZE ENERGY PERFORMANCE

BASIS OF DESIGN DOCUMENT – MEP SYSTEMS

eQUEST ENERGY COST SUMMARY OUTPUT

HYDRONIC SAIL SPECIFICATION SHEET

Macalester College
Institute for Global Citizenship
September 10, 2008
(Updated January 7, 2009)

Basis of Design Document – MEP Systems

A. Design Intent

The new Institute for Global Citizenship is to be an example of integrated design with low energy and high user comfort performance goals. The building is to be constructed of high mass to take advantage of its ability to retain thermal energy for load shifting resulting in the moderation of building heating and cooling loads. The envelope will be highly insulated and a high performance air barrier is to be provided to greatly reduce heat loss due to infiltration and direct conduction. Glazing has been selectively located and thermal and solar characteristics chosen to minimize heat loss and solar gain, while providing for optimum daylight harvesting.

The building occupancy is relatively moderate, with the exception of the IGC court which is a multi-function room. Occupancy patterns and density most closely resembles an academic office building.

HVAC systems have been selected which will permit for optimization of operation and control, following building thermal loads and ventilation requirements. Sensible only Hydronic heating/cooling terminals will be used with a dedicated outdoor air system (DOAS) to provide latent load control (humidity) and building ventilation.

Due to the relatively low heating load (despite the very low design conditions of St Paul, MN), a radiant heating approach was selected. The cooling loads have been moderated through careful solar control and mass coupling opportunities provided by exposing a large part of the building's concrete frame/structure. A predominately radiant cooling approach has been selected as the delivery system for occupant cooling. The use of radiant delivery offers the ability to design for mean-radiant temperature criteria for the human occupants of the building. Since the delivery of cooling (and similar for heating) from a radiant source directly acts on the body (and other objects in line of sight), the effect on space temperature is a secondary result. By looking at the mean radiant temperature of a body within a room, with overhead radiant panels providing either a heating or cooling view along with the effect of moderately sized, high performance glazing, a comfort criteria which falls into the zone identified by ASHRAE 55 may be achieved with slightly warmer space temperature in cooling mode and slightly cooler in heating mode.

The radiant panels chosen for this building are not a flat plane, but rather have a "sail" shape which affords both radiant and convective delivery. These panels are suspended below the exposed concrete mass of the building, offering mass coupling and thermal storage. The ability to pre-cool the mass and then release this energy during the high solar gain period of the day offers a further peak cooling demand reduction.

An elevated, non-condensing, chilled water supply will be generated from the campus chilled water distribution system. This water temperature will be maintained above the space dew-point to eliminate the chance of condensation on the terminal panels. Straight low-temperature chilled water will be delivered to the DOAS air handler for conditioning and dehumidification of the outdoor air supply to the building.

B. Building Services

1. Storm Water Service: Storm water from roof drains will be extended to the municipal sewer system in the adjacent street.
2. Sanitary Service: Sanitary piping will extend from the building to the municipal sanitary sewer system in the adjacent street.
3. Domestic Water: A new 2" water main will be extended from the existing water main in the adjacent street. Metering to utility standards will be provided in the basement of the new building.
4. Fire Water: A 6" fire main is to be extended from the existing fire service in Kagin Commons basement. This service main will run from the Kagin service room, through the basement of Kagin, exit the building to the south and run buried to the basement of the new building. A PIV (Post Indicator Valve) will be provided on this main between the two buildings. Upon entry into the new building, service valves, alarm check valve and fire department connection will be provided to meet code and NFPA-13.
5. Telecommunications Service: (2) 4" conduits will be extended to the new building from a point of connection to be determined.
6. Electric Service:

    a. A 600amp, 208v 3-phase service will be extended from available capacity at Kagin Commons. Conduits and conductors will be extended from Kagin to the new building, entering the basement electrical room and terminating at a new main distribution panel. The main service equipment will be provided with Owner's electric metering equipment which will output demand, usage, and electrical system voltage characteristics to a building management system.

7. Heating Service:

    a. Extend heating hot water mains from Kagin Commons. A pair of 2-1/2" mains would connect to the available heating water supply after the existing steam to HW heat exchanger. A set of pumps dedicated to the new building would be provided. The heating water flow will be metered with output recorded by the building management system.

8. Chilled Water: Campus chilled water will be extended from available service mains in Kagin Commons. A pair of dedicated secondary building pumps would be provided to serve the new building. Chilled water flow will be metered with output recorded by the building management system.

C. Plumbing Systems

1. Low-flush toilet fixtures will be used.
2. Waterless urinals will be used.
3. Lavatories will be wall-hung fixtures with metering faucet trim.
4. Counter sinks will be stainless steel with hi-arc faucets and metering control and foot pedal operation.
5. Domestic hot water will be generated from local electric instantaneous water heaters.
6. NO building hot water circulator is expected to be required.
7. Roof drainage and overflow drainage will be provided and internally piped.

D. Fire Protection System

1. A complete wet-pipe sprinkler system is planned for the entire building.
2. Standpipes: A 6" combined sprinkler/standpipe riser and 2-1/2 x 1-1/2" angle valves at each stairwell landing in each stairwell will be provided.
3. An exterior fire department connection will be provided on the Grand Avenue side of the building.

E. Building Heating Systems

1. Primary hot water will be distributed via a three-way mixing valve to provide reset water temperature based on outdoor air temperature and/or building demand. Pump control will be provided via variable frequency drive operation. A pair of building pumps - one operating, one standby - will be provided.
2. A second heating loop, generated from a second three-way mixing valve and single pump will operate to serve the in-floor radiant heating system for portions of the first floor. The initial design temperature for this loop will be fixed at 90 deg. F. An in-slab temperature sensor will regulate flow through this loop to maintain the design floor temperature whenever the space sensor calls for heating.
3. Heating at vestibules and points of entry to the building will be provided via local heating only convector terminals with local thermostatic control.
4. The remaining building areas will be heated through the use of overhead radiant panels which will also provide radiant cooling service. A 2-pipe dual temperature distribution system is planned to serve the radiant panel systems.
5. Each private enclosed office or conference room will have a separate heating control valve and thermostat. Each open area with perimeter exposure will be zoned for heating control every 500 ft. of floor area. Separate control by exposure will be provided. Each local space sensor with have user adjustments for comfort control.

F. Building Cooling Systems:

1. The entire building, with the exception of the basement, roof utility/vestibules and entry vestibules will be cooled.
2. The ventilation air supply will provide dry cooled air to all occupied building spaces, and local sensible only cooling terminals will be used to accommodate the remaining cooling load.
3. The same panels used for radiant heating will also be used for cooling service. These panels will be constructed of aluminum and will be supported as a separate element from the structure above.
4. Two temperatures of chilled water supply will be required for this building and will be controlled as follows: The building water supply will be +/- 44 deg F. A set of pumps (one operating, one standby) will distribute this water supply to the ventilation air handler and also to a three way mixing valve for generating non-condensing chilled water (CHW-RAD). The CHW-RAD water will be maintained at +/- 58 degrees F and will be adjustable based on dew-point determination in the building. The return water from the CHW-RAD zone will mix back to temper the CHW-RAD supply water down to the desired water temp or mix back with the remaining low-temp CHW before heading back to the campus distribution system. Flow rates on both distribution systems will be controlled by variable speed pumps.
5. A 10-12 degree Delta T will be used for the ventilation air handler coil selection. A 3-degree Delta T will be used for the CHW-RAD system.
6. Moisture sensors will be used on the CHW-RAD piping supply at each control zone to sense the presence of moisture on the pipe and report indication that the space dew-point is above the supply water temperature. In this event, the control valve serving the radiant panel in this space will be closed.

G. Ventilation Supply Air Systems

1. **Two** Dedicated Outdoor Air Systems (DOAS) zones will be used to provide conditioned, dry air to all building areas. One of these systems (serving the IGC Court) will operate based on ventilation demand and flow will be regulated through the use of a VAV terminal box and fan speed control at the AHU.
2. **Zone #1** will supply ventilation air to all building areas excluding the IGC Court. This system will be controlled as follows: Based on building schedule, system will run to ventilate all building areas. Occupancy sensor override will permit system to be placed into operating (occupied) mode when otherwise scheduled for no-occupancy.
3. **Zone #2** will supply ventilation air to the IGC Court. This room will have supply air distributed through displacement ventilation terminals located approximately 8 ft. high on the wall. This air flow will be regulated based on ventilation demand as determined by a space CO2 sensor.
4. A single air handler and heat recovery unit containing an enthalpy heat wheel will precondition the outdoor air using the building exhaust air. The air handler will contain fan, hot water and chilled water coils. A wrap-around heat-pipe will be used on the chilled water coil to “reheat” the discharge supply air to the desired distribution temperature. The heat pipe will be thermostatically controlled to regulate the supply air temperature leaving each AHU extracting heat from the inlet side of the chilled water coil and warming up the supply air stream after the coil.
5. Generally the supply air discharge from the CHW coil will be 52 degrees F saturated. The supply air temperature to the DOAS system will be regulated from 52 to 65 degrees F depending on cooling demand for the building.

6. The entire air system will be designed and equipment selected for low pressure drop and reduced fan energy.
7. Exhaust and Intake air ducts from the Ventilation Air system in the basement will rise up through the building in shafts to wall louvers on different sides of the building for intake/exhaust.

H. Building Control System

1. An integrated building control system will manage and control all of the building environmental systems as described herein.
2. Additionally, metering of all incoming services including HW, CHW, Electricity, and Domestic Water will be integrated into the system.
3. The campus control network will provide for a central computer/server to provide access to historical data and trending/logging routines will be available for study of the building and its systems.

I. Electrical

1. A main electrical distribution panel will be provided with circuit breaker distribution for each major building load, such as branch circuit panels and the Elevator.
2. Lighting and plug/motor circuits will be segregated and served from separate panels. In this way, all of the lighting loads can be separately metered.
3. A Photovoltaic Panel system is planned for the roof of the building. This system will consist of a series of rack mounted PV panels, angled for optimal performance. Initial layouts indicate that 90 such panels at nominal 210w each could potentially be sited on this roof. The DC output from these panels will feed to a pair of inverters to provide AC power to the building. (Installation of PV panels is an Alternate to the project.)
4. Power/Device Requirements:

    a. Each office will have power receptacles on all 4 walls.
    b. Each office will have voice/data drop on two walls.
    c. Each open office/common space will have power receptacles spaced at no more than 10 ft. around the perimeter of the room.
    d. Each open office/common space will have voice/data drops spaced at no more than 15 ft. around the perimeter of the room.
    e. Corridors will have power receptacles spaced at 25 ft.
    f. Conference Rooms will have outlets spaced similar to open offices as well as provisions for audio-visual systems including:

        1.) Overhead projector (Power, Data, empty conduit)
        2.) A/V Input location on wall (power, data, empty conduit)
        3.) Floor Box (power, data, empty conduit)

    g. Storage, support, mechanical, electrical rooms: each will have 1 power receptacle.
    h. 2 exterior WP/GFCI outlets shall be provided.
    i. The IGC Court will be provided with 2 floor boxes and AV provisions similar to the conference rooms.

5. Telecommunications Support:

    a. (1) 4" conduit shall extend form the basement telecom room up to above the ceiling at each floor level. From this point on each floor, cabling will be run using J hooks and open cabling practices.
    b. Each voice/data drop will be wired with (2) Cat 6 cables (one for voice, one for data), tested and terminated on both ends. In the main telecom room, rack and termination patch panels will be provided for termination of all voice and data cables.

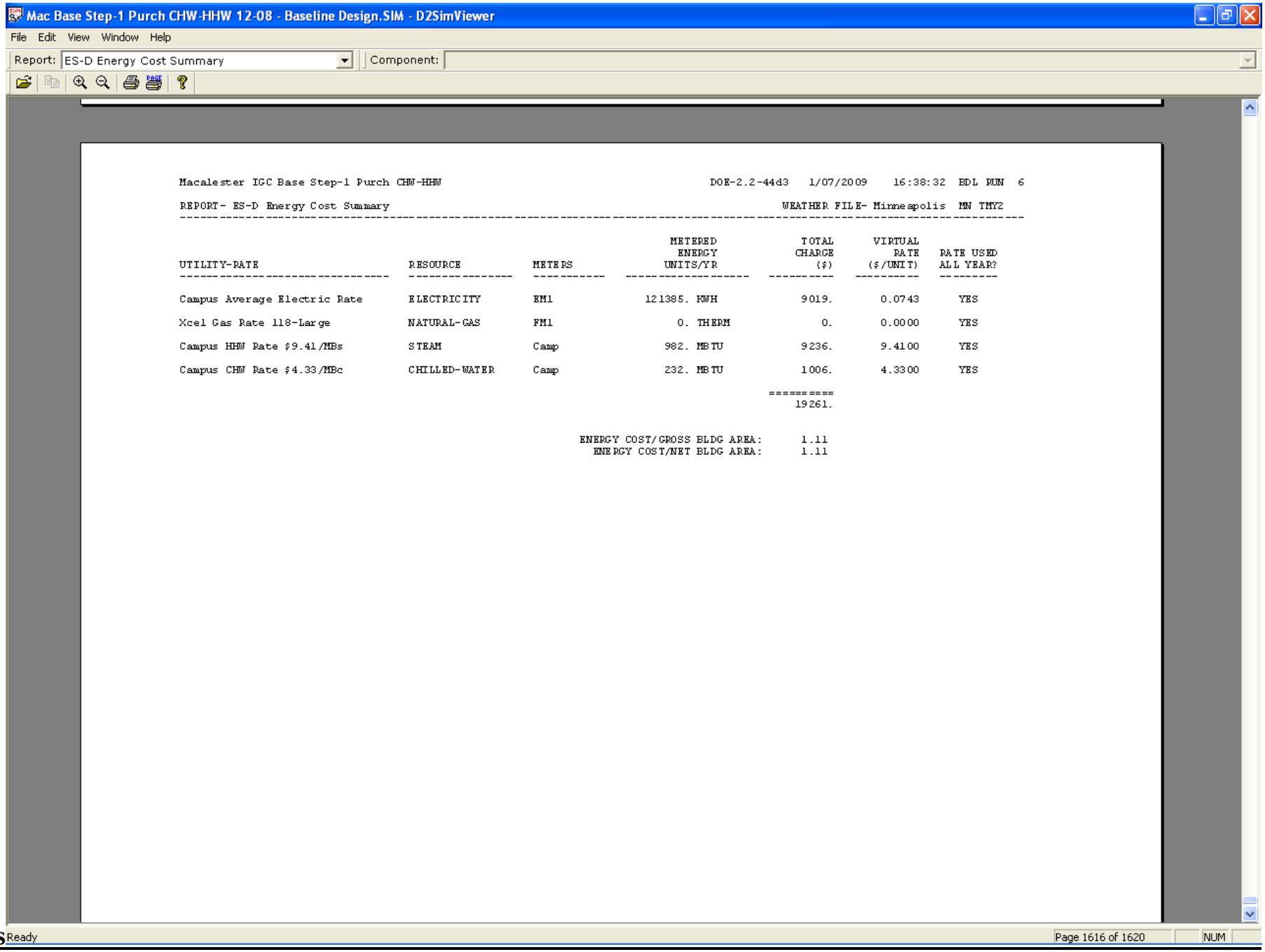
6. Lighting Controls:

    a. Each enclosed space will have occupancy sensor control for lighting with a local override switch to shut the lights off. A daylight sensor by exposure will dim the perimeter lighting fixtures when adequate sunlight is available.
    b. Open spaces will have daylight and occupancy sensor controls.
    c. Conference Rooms will contain a occupancy/daylight control mode as well as a "presentation" mode where the local lighting fixtures will be controlled by an architectural dimming/control system – similar to Lutron Graphic Eye.
    d. The IGC Court will be designed for passive daylight harvesting through north facing window and overhead skylight. Daylight sensor in this space will control the use of any electric lighting installed.

7. Lighting: Light fixtures will be selected by the Project Lighting Consultant. NO Incandescent lamps are intended to be used.
8. A Fire Alarm system will be provided including:

    a. Supervision of the sprinkler system
    b. Manual pull stations at each exterior door and at each floor entrance to stairwells
    c. Audio/visual signaling devices
    d. Duct Smoke Detectors on AHU Systems
    e. Connection to Campus FA monitoring system
    f. Battery Back-up for 60 Hours per NFPA-72
    g. Magnetic Door hold open devices and controls for stairwell doors

Macalester IGC eQuest Energy Cost Summary Output



Screens

Mac Base Step-1 Turn 90-degrees 12-08 - Baseline Design.SIM - D2SimViewer

File Edit View Window Help

Report: ES-D Energy Cost Summary | Component:

Macalester IGC Base Step-1 Turned 90-deg DOE-2.2-44d3 1/07/2009 16:40:21 BDL RUN 7

REPORT- ES-D Energy Cost Summary WEATHER FILE- Minneapolis MN TMY2

UTILITY-RATE	RESOURCE	METERS	METERED ENERGY UNITS/YR	TOTAL CHARGE ($)	VIRTUAL RATE ($/UNIT)	RATE USED ALL YEAR?
Campus Average Electric Rate	ELECTRICITY	EM1	120660. KWH	8965.	0.0743	YES
Xcel Gas Rate 118-Large	NATURAL-GAS	FM1	0. THERM	0.	0.0000	YES
Campus HHW Rate $9.41/MBs	STEAM	Camp	992. MBTU	9338.	9.4100	YES
Campus CHW Rate $4.33/MBc	CHILLED-WATER	Camp	227. MBTU	984.	4.3300	YES
				19287.		

ENERGY COST/GROSS BLDG AREA: 1.12
ENERGY COST/NET BLDG AREA: 1.12

Ready Page 1616 of 1620 NUM

Mac Base Step-1 Turn 180-degrees 12-08 - Baseline Design.SIM - D2SimViewer

File Edit View Window Help

Report: ES-D Energy Cost Summary | Component:

Macalester IGC Base Step-1 Turned 180-de DOE-2.2-44d3 1/07/2009 16:41:41 BDL RUN 8

REPORT- ES-D Energy Cost Summary WEATHER FILE- Minneapolis MN TMY2

UTILITY-RATE	RESOURCE	METERS	METERED ENERGY UNITS/YR	TOTAL CHARGE ($)	VIRTUAL RATE ($/UNIT)	RATE USED ALL YEAR?
Campus Average Electric Rate	ELECTRICITY	EM1	120953. KWH	8987.	0.0743	YES
Xcel Gas Rate 118-Large	NATURAL-GAS	FM1	0. THERM	0.	0.0000	YES
Campus HHW Rate $9.41/MBs	STEAM	Camp	988. MBTU	9294.	9.4100	YES
Campus CHW Rate $4.33/MBc	CHILLED-WATER	Camp	232. MBTU	1003.	4.3300	YES
				19284.		

ENERGY COST/GROSS BLDG AREA: 1.11
ENERGY COST/NET BLDG AREA: 1.11

Ready Page 2440 of 1620 NUM

Mac Base Step-1 Turn 270-degrees 12-08 - Baseline Design.SIM - D2SimViewer

File Edit View Window Help

Report: ES-D Energy Cost Summary | Component:

Macalester IGC Base Step-1 Turned 270-de DOE-2.2-44d3 1/07/2009 16:54:15 EDL RUN 9

REPORT- ES-D Energy Cost Summary WEATHER FILE- Minneapolis MN TMY2

UTILITY-RATE	RESOURCE	METERS	METERED ENERGY UNITS/YR	TOTAL CHARGE ($)	VIRTUAL RATE ($/UNIT)	RATE USED ALL YEAR?
Campus Average Electric Rate	ELECTRICITY	EM1	120932. KWH	8985.	0.0743	YES
Xcel Gas Rate 118-Large	NATURAL-GAS	FM1	0. THERM	0.	0.0000	YES
Campus HHW Rate $9.41/MBs	STEAM	Camp	987. MBTU	9291.	9.4100	YES
Campus CHW Rate $4.33/MBc	CHILLED-WATER	Camp	228. MBTU	987.	4.3300	YES
				19264.		

ENERGY COST/GROSS BLDG AREA: 1.11
ENERGY COST/NET BLDG AREA: 1.11

Ready Page 2451 of 1620 NUM

Mac Base Step-2 DX-boiler 12-08 - Baseline Design.SIM - D2SimViewer

File Edit View Window Help

Report: ES-D Energy Cost Summary | Component:

Macalester IGC Base Step-2 DOE-2.2-44d3 1/07/2009 16:55:44 BDL RUN 10

REPORT- ES-D Energy Cost Summary WEATHER FILE- Minneapolis MN TMY2

UTILITY-RATE	RESOURCE	METERS	METERED ENERGY UNITS/YR	TOTAL CHARGE ($)	VIRTUAL RATE ($/UNIT)	RATE USED ALL YEAR?
Xcel Electric Rate A14	ELECTRICITY	EM1	143817. KWH	9291.	0.0646	YES
Xcel Gas Rate 118-Large	NATURAL-GAS	FM1	13992. THERM	13879.	0.9919	YES
				23170.		

ENERGY COST/GROSS BLDG AREA: 1.34
ENERGY COST/NET BLDG AREA: 1.34

Ready Page 1609 of 1612 NUM

Mac Base Step-2 Turned 90-deg 12-08 - Baseline Design.SIM - D2SimViewer

File Edit View Window Help

Report: ES-D Energy Cost Summary | Component:

Macalester IGC Base Step-2 Turned 90-deg DOE-2.2-44d3 1/07/2009 16:59:19 BDL RUN 11

REPORT- ES-D Energy Cost Summary WEATHER FILE- Minneapolis MN TMY2

UTILITY-RATE	RESOURCE	METERS	METERED ENERGY UNITS/YR	TOTAL CHARGE ($)	VIRTUAL RATE ($/UNIT)	RATE USED ALL YEAR?
Xcel Electric Rate A14	ELECTRICITY	EM1	145403. KWH	9339.	0.0642	YES
Xcel Gas Rate 118-Large	NATURAL-GAS	FM1	13962. THERM	13849.	0.9920	YES
				23188.		

ENERGY COST/GROSS BLDG AREA: 1.34
ENERGY COST/NET BLDG AREA: 1.34

Ready Page 1609 of 1612 NUM

Mac Base Step-2 Turned 180-deg 12-08 - Baseline Design.SIM - D2SimViewer

File Edit View Window Help

Report: ES-D Energy Cost Summary | Component:

Macalester IGC Base Step-2 Turned 180-de DOE-2.2-44d3 1/07/2009 17:00:16 BDL RUN 12

REPORT- ES-D Energy Cost Summary WEATHER FILE- Minneapolis MN TMY2

UTILITY-RATE	RESOURCE	METERS	METERED ENERGY UNITS/YR	TOTAL CHARGE ($)	VIRTUAL RATE ($/UNIT)	RATE USED ALL YEAR?
Xcel Electric Rate A14	ELECTRICITY	FM1	144648. KWH	9389.	0.0649	YES
Xcel Gas Rate 118-Large	NATURAL-GAS	FM1	13860. THERM	13752.	0.9922	YES
				23141.		

ENERGY COST/GROSS BLDG AREA: 1.34
ENERGY COST/NET BLDG AREA: 1.34

Ready Page 1609 of 1612 NUM

Mac Base Step-2 Turned 270-deg 12-08 - Baseline Design.SIM - D2SimViewer

File Edit View Window Help

Report: ES-D Energy Cost Summary | Component:

Macalester IGC Base Step-2 Turned 270-de DOE-2.2-44d3 1/07/2009 17:01:07 BDL RUN 13

REPORT- ES-D Energy Cost Summary WEATHER FILE- Minneapolis MN TMY2

UTILITY-RATE	RESOURCE	METERS	METERED ENERGY UNITS/YR	TOTAL CHARGE ($)	VIRTUAL RATE ($/UNIT)	RATE USED ALL YEAR?
Xcel Electric Rate A14	ELECTRICITY	FM1	144142. KWH	9315.	0.0646	YES
Xcel Gas Rate 118-Large	NATURAL-GAS	FM1	13982. THERM	13869.	0.9919	YES
				23185.		

ENERGY COST/GROSS BLDG AREA: 1.34
ENERGY COST/NET BLDG AREA: 1.34

Ready Page 1609 of 1612 NUM

Mac Proposed Step-1 Purch CHW-HHW 12-08 - Baseline Design.SIM - D2SimViewer

File Edit View Window Help

Report: ES-D Energy Cost Summary | Component:

Macalester IGC Proposed Step-1 Purch CHW DOE-2.2-44d3 1/07/2009 17:02:08 BDL RUN 14

REPORT- ES-D Energy Cost Summary WEATHER FILE- Minneapolis MN TMY2

UTILITY-RATE	RESOURCE	METERS	METERED ENERGY UNITS/YR	TOTAL CHARGE ($)	VIRTUAL RATE ($/UNIT)	RATE USED ALL YEAR?
Campus CHW Rate	CHILLED-WATER	Buil	106. MBTU	458.	4.3300	YES
Campus HHW Rate	STEAM	Buil	385. MBTU	3619.	9.4100	YES
Xcel Gas Rate 118 Large	NATURAL-GAS	EM1	0. THERM	0.	0.0000	YES
Campus Average Electric Rate	ELECTRICITY	EM1	66375. KWH	4932.	0.0743	YES
				9009.		

ENERGY COST/GROSS BLDG AREA: 0.52
ENERGY COST/NET BLDG AREA: 0.52

Ready Page 1704 of 1708 NUM

Mac Proposed Step-2 Local Util Rates 12-08 - Baseline Design.SIM - D2SimViewer

File Edit View Window Help

Report: ES-D Energy Cost Summary | Component:

Macalester IGC Proposed Step-2 Local Rat DOE-2.2-44d3 1/07/2009 17:03:07 BDL RUN 15

REPORT- ES-D Energy Cost Summary WEATHER FILE- Minneapolis MN TMY2

UTILITY-RATE	RESOURCE	METERS	METERED ENERGY UNITS/YR	TOTAL CHARGE ($)	VIRTUAL RATE ($/UNIT)	RATE USED ALL YEAR?
Virtual Chlr Electric Rate A14	CHILLED-WATER	Virt	6449. MBTU	1200.	0.1861	YES
Xcel Electric Rate A14	ELECTRICITY	EM1	70352. KWH	3883.	0.0552	YES
Xcel Gas Rate 118 Large	NATURAL-GAS	FM1	0. THERM	0.	0.0000	YES
Virtual Boiler Gas Rate 118 Larg	STEAM	Virt	6382. MBTU	6564.	1.0286	YES
				11648.		

ENERGY COST/GROSS BLDG AREA: 0.67
ENERGY COST/NET BLDG AREA: 0.67

Ready Page 1705 of 1711 NUM

Product Overview

Chilled sails couple the radiant cooling and heating effects of standard radiant panels with a convective component. Their unique shape gives them many times the surface area of a traditional radiant panel, dramatically increasing the capacity. Price Chilled sails also allow air to pass through openings between their fins, cooling the air and supplying tempered air to the occupied space. This secondary method of cooling increases the capacity of the unit and provides an effective means of dealing with sensible cooling load.

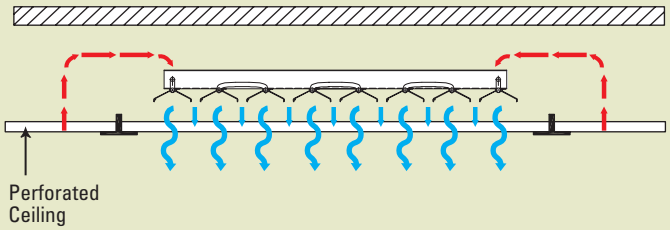
The Price chilled sails manufactured by Krantz Komponenten® are specifically designed to condition occupied areas with uniform loads in heating and cooling modes. Price chilled sails can be incorporated as part of any HVAC system as the primary supplemental source of room temperature control. The quiet operation of chilled sails also makes them a great choice for occupied areas.

The **CSC** is designed to be used in concealed applications. With its standard black finish, it remains undetected from the room side when mounted above perforated ceiling tiles.

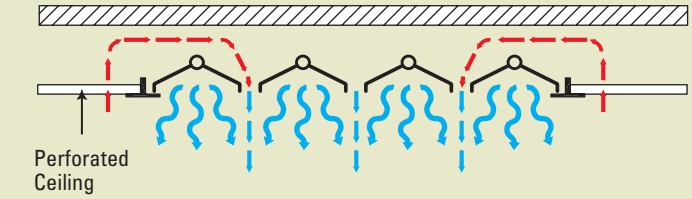
The **CSA** is designed for visible applications. This unit fits in standard suspended ceiling frames. The CSA is constructed with an attractive face allowing it to be incorporated into any room design.

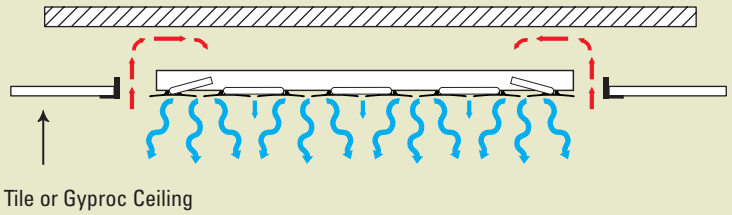
Both models have a robust construction and have a high thermal conductivity and are therefor quick to respond to room load fluctuations. The operating pressure of these units can be as high as 232 psi [16 bar]. In addition, their low installation height makes the CS series well suited for renovation and retrofitting as well as savings in floor-to-floor height.

CSC – Concealed Chilled Sail



CSA – Architectural Chilled Sail





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All Metric dimensions ( ) are soft conversion.
Imperial dimensions are converted to metric and rounded to the nearest millimeter.

Exposed Architectural Chilled Sail
CSA

Product Features

The CSA is a high capacity element with an attractive face for exposed installation in a T-Bar or architectural ceiling system. This versatile product can be used in various applications such as an installation below ceiling height as an architectural feature, as a chilled area built into suspended ceiling systems, or as a linear grid ceiling. Used in both heating and cooling operations, the CSA can be placed around utilities such as lighting, sprinklers, air outlets, etc. incorporating itself into any building design.

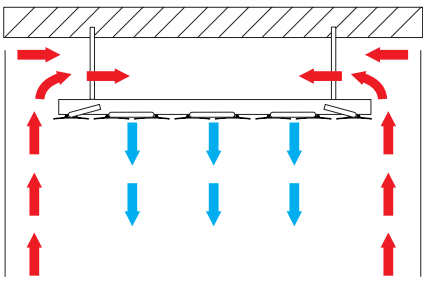
Features
- Architecturally appealing
- Quiet Operation
- Standard cooling capacity of 50.75 Btu/hr•ft²(160W/m²)
- Suitable for rooms with cooling loads up to 35 BTU/hr•ft²(110 W/m²)
- Responds quickly to room load fluctuation
- Well suited for renovation and retro-fit applications.

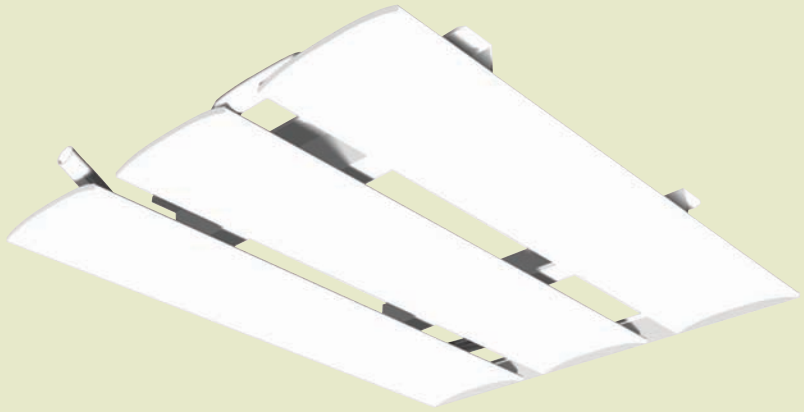
Finish
- White Powder coat

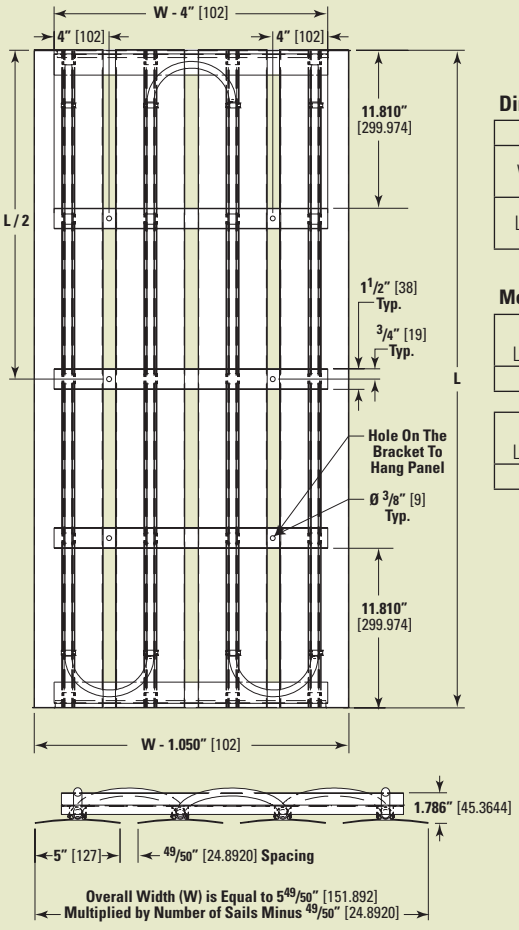
Construction
- All metal assembly
- Extruded Aluminum Fins

Connection Type
- ½" [.5] Sweat
- ½" [.5] NPT (Female)
- ½" [.5] NPT (Male)

Air Pattern







Dimensional Data - Imperial [Metric]

	Min	Max
Width	5 [127]	59 [1498.60]
Length	24 [610]	192 [4885]

Mounting Brackets Included

Length	0-47 [0-1200]	48-114 [1221-2900]
Qty.	2	3

Length	115-162 [2901-4112]	163-192 [4113-4885]
Qty.	4	5

Product Information Index

Installation Instructions..... H41
Performance Data H42
Suggested Specification H54

✓ Product Selection Checklist

1] Select chilled sail size based on desired performance characteristic
2] Select Finish
Example: CSA / I / 24 x 48 / B12

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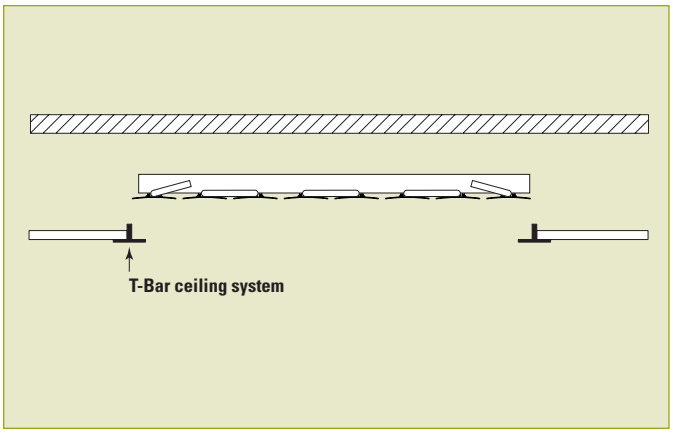
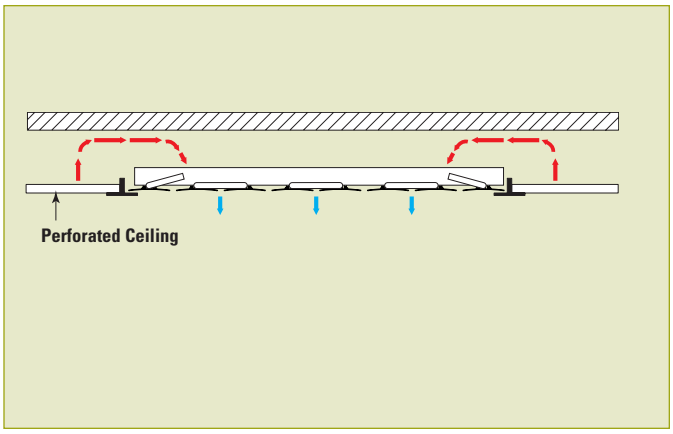
All Metric dimensions ( ) are soft conversion.
Imperial dimensions are converted to metric and rounded to the nearest millimeter.

Installation Instructions





Installation level with suspended ceiling

For mounting level with suspended ceilings, the chilled sail must be suspended from the building structure with the use of either threaded rod or wire hangers. The edge of the chilled sail can then sit in the T-Bar used in suspended ceiling applications when perforated tiles are used. If solid ceiling tiles are used a 0.5 - 1.0 inch gap should be allowed between the sail and the nearest T to allow room air to enter the plenum space. To ensure optimum performance, the chilled sail CSA must be installed such that the top of the chilled sail is at least 2 inches from the structure above.

All Metric dimensions ( ) are soft conversion.
Imperial dimensions are converted to metric and rounded to the nearest millimeter.

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Performance Data

24" x 48" CSA

(T_{Room}- MWT) (°F)	Capacity (BTU/hr)	Water Flowrate (usgpm)	Head Loss (ft wg)
14	317	0.35	0.216
16	370	0.41	0.297
18	424	0.47	0.390
20	479	0.53	0.496

Based on 2°F water temperature drop.

24" x 60" CSA

(T_{Room}- MWT) (°F)	Capacity (BTU/hr)	Water Flowrate (usgpm)	Head Loss (ft wg)
12	332	0.37	0.281
14	397	0.44	0.397
16	463	0.51	0.533
18	530	0.59	0.714
20	599	0.66	0.893

Based on 2°F water temperature drop.

24" x 72" CSA

(T_{Room}- MWT) (°F)	Capacity (BTU/hr)	Water Flowrate (usgpm)	Head Loss (ft wg)
10	322	0.36	0.303
12	398	0.44	0.452
14	476	0.53	0.656
16	555	0.62	0.898
18	636	0.71	1.177
20	719	0.80	1.494

Based on 2°F water temperature drop.

24" x 84" CSA

(T_{Room}- MWT) (°F)	Capacity (BTU/hr)	Water Flowrate (usgpm)	Head Loss (ft wg)
14	555	0.31	0.247
16	645	0.36	0.316
18	735	0.41	0.386
20	825	0.45	0.455

Based on 4°F water temperature drop.

24" x 96" CSA

(T_{Room}- MWT) (°F)	Capacity (BTU/hr)	Water Flowrate (usgpm)	Head Loss (ft wg)
14	635	0.35	0.356
16	740	0.41	0.488
18	848	0.47	0.642
20	959	0.53	0.816

Based on 4°F water temperature drop.

48" x 48" CSA

(T_{Room}- MWT) (°F)	Capacity (BTU/hr)	Water Flowrate (usgpm)	Head Loss (ft wg)
14	635	0.35	0.435
16	738	0.41	0.557
18	841	0.46	0.678
20	944	0.52	0.800

Based on 4°F water temperature drop.

Performance Notes:

1. T_{Room} - MWT is the difference in temperature between the Room air temperature and the average water temperature. The average water temperature is calculated as follows (LWT + EWT)/2. Units are °F.
2. Chilled water flow rate is in USGPM.
3. Capacity is in BTU per hour.
4. Capacity is based on panel being installed with no suspended false ceiling.
5. Capacity is based on occupation density of 50%. Occupation density refers to percentage of ceiling covered by chilled panels. Contact Price Application Engineering for occupation densities other than 50%.

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Radiant Panels & Chilled Sails

RPM
Modular Radiant Panel

Supply and install Price RPM Modular Radiant Panel of the sizes and capacities indicated on the drawings or schedule.

The Modular Radiant Panel, model RPM, shall be constructed with 5/8" or 1/2" OD copper tubing fitted into engineered heat sinks for optimal heat transfer from the cooling or heating fluid to the panel face. The heat sinks shall be extruded aluminum and designed to retain the copper pipe by interference, evenly applying pressure on the pipe and maximizing the contact surface area as well as heat conduction.

The panel face shall be constructed of 18 ga. aluminum painted with highly emissive powder coat polyester paint for optimal radiative properties as well as durability and easy cleaning. Epoxies and their derivatives are unacceptable. 1.5" 1.1 lbs. foil-backed fiberglass insulation shall be glued to the back side of the panel assembly to maximize panel efficiency.

Panels to be offered with optional open-ended straight copper lengths to allow for the series connection of multiple panels with field sweat fit 180° return and 360° loop inter-connects.

Panel manufacturer shall provide water pressure drop data as well as heat output data derived from tests in accordance with DIN 14037 for heating and DIN 14240 for cooling.

RPL
Linear Radiant Panel

Supply and install Price RPL Linear Radiant Panel of the sizes and capacities indicated on the drawings or schedule.

The Linear Radiant Panel, model RPL, shall be constructed with 5/8" or 1/2" OD copper tubing fitted into engineered heat sinks for optimal heat transfer from the cooling or heating fluid to the panel face. The panel shall be constructed of one piece extruded aluminum and feature integrated heat sinks designed to retain the copper pipe by interference, without the need for auxiliary clips for pipe retention, evenly applying pressure on the pipe and maximizing the contact surface area as well as heat conduction. The panel shall be constructed of tongue-and-groove extruded sections for seamless construction with a face profile designed to optimize heat transfer and shall feature integrated fastening slots to accept hanger brackets. Hanger brackets shall be constructed of steel and shall apply slight pressure on the copper piping, locking it in place.

The panel face shall be painted with highly emissive powder coat polyester paint for optimal radiative properties as well as durability and easy cleaning. Epoxies and their derivatives are unacceptable. 1.5" 1.1 lbs. foil-backed fiberglass insulation shall be glued to the back side of the panel assembly to maximize panel efficiency.

Panels to be offered with optional open-ended straight copper lengths to allow for the series connection of multiple panels with field sweat fit 180° return and 360° loop inter-connects.

Panels manufacturer shall provide water pressure drop data as well as heat output data derived from tests in accordance with DIN 14037 for heating and DIN 14240 for cooling.

CSC
Concealed Chilled Sail

Supply and install Price CSC Concealed Chilled Sail of the sizes and capacities indicated on the drawings or schedule.

The Concealed Chilled Sail, model CSC, shall be constructed with 12mm nominal copper tubing fitted into engineered heat sinks for optimal heat transfer from the cooling or heating fluid to the sail face. The sail shall be constructed of one piece extruded aluminum and feature integrated heat sinks designed to retain the copper pipe by interference, without the need for auxiliary clips for pipe retention, evenly applying pressure on the pipe and maximizing the contact surface area as well as heat conduction. The sail shall be constructed of extruded sections with a profile designed to optimize heat transfer by radiation as well as promote heat transfer by natural convection as surrounding air falls though openings between profiles. The sail shall feature a frame with integrated hanger brackets and shall be constructed of steel.

The panel face shall be painted with highly emissive powder coat polyester paint for optimal radiative properties as well as durability and easy cleaning. Epoxies and their derivatives are unacceptable.

Panel manufacturer shall provide water pressure drop data as well as heat output data derived from tests in accordance with DIN 4715.

CSA
Architectural Chilled Sail

Supply and install Price CSA Architectural Chilled Sail of the sizes and capacities indicated on the drawings or schedule.

The Architectural Chilled Sail, model CSA, shall be constructed with 1/2" nominal copper tubing fitted into engineered heat sinks for optimal heat transfer from the cooling or heating fluid to the sail face. The sail shall be constructed of one piece extruded aluminum designed to be visually appealing and feature integrated heat sinks designed to retain the copper pipe by auxiliary clips for pipe retention, evenly applying pressure on the pipe and maximizing the contact surface area as well as heat conduction. The sail shall be constructed of extruded sections with a profile designed to optimize heat transfer by radiation as well as promote heat transfer by natural convection as surrounding air falls though openings between profiles. The sail shall feature a frame with integrated hanger brackets and shall be constructed of steel.

The panel face shall be painted with highly emissive powder coat polyester paint for optimal radiative properties as well as durability and easy cleaning. Epoxies and their derivatives are unacceptable.

Panel manufacturer shall provide water pressure drop data as well as heat output data derived from tests in accordance with DIN 4715.

All Metric dimensions ( ) are soft conversion.
Imperial dimensions are converted to metric and rounded to the nearest millimeter.

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ENERGY AND ATMPOSHERE

CREDIT 5: MEASUREMENT & VERIFICATION

MEASUREMENT & VERIFICATION PLAN

MEASUREMENT & VERIFICATION PLAN

For:

INSTITUTE FOR GLOBAL CITIZENSHIP
MACALESTER COLLEGE
ST. PAUL, MN

Prepared By:

van Zelm Heywood & Shadford, Inc
Mechanical & Electrical Engineers
10 TALCOTT NOTCH
FARMINGTON, CT
(860) 284-5064

August 7, 2009

Table of Contents

Part 1 – Overview & Process

Part 2 – Description of Building Systems

Part 3 – Baseline Data

Part 4 – Measurement & Verification Plan

Appendix A:

Table A-1: Building As Designed – Anticipated Results (from Energy Model)
Table A-2: Baseline Building – Minimum Code Complaint (from Energy Model)
Chart A-3: Summary of Water and Energy Graphics for "Green Touch Screen" Kiosk

Appendix B:

B-1 Drawing E-300: Showing electrical meter locations
B-2 Drawing M-204: Showing BTU meter locations on HW and CHW services
B-3 Page from Specification Section 15940 – Control System Sequence of Operations
B-4 ASI #18 – Control System Interface to Owner's data collection system
B-5 ASI#5 – Revised Water Meter Service and Metering
B-6 Signed Contract between Macalester College and Quality Attributes Software for "Display Kiosk" and data collection

PART 1 – Overview and Process

This measurement and verification plan has been prepared for the purposes of tracking actual energy usage for the new biology building and comparing this data to models which were developed during the design. The design of this facility was undertaken with a interactive collaboration amongst the design team members to optimize the building systems' performance and minimize it's energy consumption. Members of the project team are:

Owner:	**Macalester College** St. Paul, MN
Architect:	**Bruner/Cott and Associates** Cambridge, MA
M&E Engineer	**vanZelm Heywood & Shadford, Inc.** Farmington, CT
Modeling Engineering:	**vanZelm Heywood & Shadford, Inc.** Farmington, CT
Contractor:	**McGough Construction Co, Inc.** St. Paul. MN.
Commissioning Agent:	**K.F.I. Engineering, Inc.** St. Paul. MN.

This plan has been prepared utilizing the form and format of **Option D** from the International Performance Measurement and Verification Protocol (IPMVP), Volume III, March 2003 Edition. This M&V methodology involves whole building simulation and associated metering. Tracking of individual ECMs are not practical for this building.

Existing baseline data is not available for this facility since it is a new structure and newly organized program grouping. Therefore whole building modeling of energy and water usage was performed during the design phase to establish a design baseline to which alternative or Energy Conservation Measures (ECMs) were applied. The result of these modeling efforts, combined with project cost analysis, resulted in a final selection of accepted ECMs which were incorporated into the final Contract Documents and used for construction.

For the purposes of this plan, energy and water usage for the entire building will be recorded and compared in units of energy and not cost. Segments of the building energy use will be tracked separately for direct comparison to the baseline model.

The overall process and status of activities associated with this M&V Plan is as follows:

M&V Process Chart

	Task	Responsibility	Status
1.	Select IPMVP Option	Team	Completed
2.	Energy and Water Modeling	Engineer	Completed
3.	Draft M&V Plan	Engineer	Completed
4.	Design Process	Team	Completed
5.	Installation	Contractor	Completed
6.	Final M&V Plan	Engineer	Completed
7.	Commissioning	Cx Agent	Completed
8.	Data Gathering	Owner	**In progress**
9.	Compute and Report	Owner	**In progress**
10.	Adjust and Modify Systems	Owner	To Be Completed as required

PART 2 – Description of Building Systems

Project Overview:

The Institute For Global Citizenship is a newly constructed +/- 17,000 SF, multi-use office and cultural research building dedicated to the Undergraduate and Graduate "Global Citizenship" Program at Macalester College. The building is 3 stories tall with a full basement level. There is a center "court" which serves as a social core and communicates directly with the first two levels of the building. A mechanical room is located in the basement of the building and houses all of the central building systems.

The building is situated on a prominent street corner on the edge of campus and serves as a gateway structure. Orientation of the building was optimized to take advantage of site solar opportunities. The building is highly day-lighted with solar control features to minimize impact on space comfort and cooling loads.

Base Building Systems and Primary Energy Systems:

- Hot Water in generated for building use through an existing steam to HW converter located in the Adjacent Kagan Commons Building. A dedicated HW loop to the IGC is provided which is separately metered to record the energy used by the IGC.
- Individual point of use and small tank Electric Water Heaters are used to make domestic hot water.
- Chilled water is received from the campus central chilled water plant which was recently renovated to be CFC free.
- Electricity is delivered to this building from the Kagan Building and is separately metered. Two sub meters are also used to separately measure the lighting portion of the building's power usage.
- Domestic Water is provided to this building through a dedicated service lateral from the municipal utility. A output transducer on the utility meter has been provided for integration to the B.M.S. system for recording water usage.
- The primary environmental systems for this building consist of the following:

    - A single 100% Outdoor Air (DOAS) air handling system with an energy recovery heat wheel, chilled water coil, hot water coil and Filters. A wrap around heat pipe is installed on the chilled water coil to provide "free" reheat for dehumidification of the distributed air supply. Ventilation air is directly delivered to all occupied areas of the building.

    - Heating and cooling is provided through radiant and convective terminal systems. These are coupled to the building mass in most cases and provide the ability to maintain a steady indoor comfort level without significant changes in air flow or temperature. A mean radiant temperature approach was employed to establish the comfort criteria and system performance requirements, consistent with ASHRAE 55 guidelines.

    - The IGC Court is provided with a supply of ventilation air from the central DOAS air handler. This air supply is introduced through low velocity side wall slots which generate a displacement pattern of distribution for this 2-1/2 story tall space. The air volume is controlled through a VAV terminal to permit reset of supply air based on CO2 monitoring of the space conditions and space

temperature requirements. An in-slab radiant heating and cooling system provides basic space thermal comfort. A natural ventilation mode utilizing an exhaust fan at the top of the IGC court and manually operated windows has also been provided.

- All of the building lighting systems are part of a central lighting control system. All spaces with daylight availability are provided with daylight sensors and continuous fluorescent dimming operation.

List of Specific ECM's accepted and incorporated into project design:

1. Use of external, fixed, shading devices on selected South facing windows
2. Use of external, fixed shading devices on West facing windows
3. Minimized glazing on East and West exposures
4. High Performance Windows – optimized in size, location, and characteristics for maximum daylighting potential with minimal solar gain impact.
5. High performance envelope construction
6. Use of spray foam as exterior insulation method for reduced infiltration
7. High mass (Concrete) structural system for thermal storage
8. Mass coupled radiant heating and cooling delivery systems
9. Enthalpy Wheel Heat with 100% D.O.A.S. Exhaust/Supply Air System
10. Daylight sensor control of dimmable lighting fixtures
11. Central lighting controls with occupancy and time of day features
12. Variable flow dual temp (HW / CHW) distribution
13. Night Set-back of space temperatures
14. Low Static air distribution System
15. Displacement ventilation for the I.G.C. Court

PART 3 – Baseline Data

Energy and Water Consumption profiles for a baseline (Minimum Code Complaint) and the building as designed are provided in Appendix A.

The energy profile information was obtained from the DOE-2 modeling performed for documentation of LEED Credit EAc1 – Optimize Energy Performance.

> *As a footnote to this report – while data collection from the now occupied building is still being structured, initial electrical metering has shown direct correlation to the anticipated results from the model.*

PART 4 – Measurement and Verification Plan

Energy and water use data for this building will be obtained from the following:

Water Usage: The water service is metered with a pulse output transmitter tied to the Building Management System (BMS). This data is shared through the BMS with the Owner's "building performance display" system where usage is tracked and compared to baseline data. Additionally, water utility bills may used as a comparison to check against recorded data.

Hot Water Usage: BTU Meter on the building hot water service. This meter is monitored by the BMS with data collected for calculation and output. This data is shared through the BMS with the Owner's "building performance display" system where usage is tracked and compared to baseline data.

Chilled Water Usage: BTU Meter on the building chilled water service. This meter is monitored by the BMS with data collected for calculation and output. This data is shared through the BMS with the Owner's "building performance display" system where usage is tracked and compared to baseline data.

Electrical Usage: Output from the building service meter is monitored by the BMS with data collected for calculation and output. The lighting portion of the electrical usage is separately metered by two sub-meters which are monitored by the BMS. This data is shared through the BMS with the Owner's "building performance display" system where usage is tracked and compared to baseline data.

Energy Recovered: Temperature and humidity sensors at the entering and leaving side of the heat wheel is monitored by the BMS and data collected for calculation and output of the energy recovered through the use of the heat wheel on the DOAS air system. This data is shared through the BMS with the Owner's "building performance display" system where usage is tracked and compared to baseline data.

M&V Plan Outline

1. System Commissioning and Calibration Period:

    a) Calibrate and Commission the BTU energy metering system on the Hot Water and Chilled Water Services and the interface with BMS.
    b) Calibrate and Commission the interface between the Electric Service meter and Lighting sub-meters and the BMS.
    c) Calibrate and Commission water meter output transmitter and BMS collection of water use data. Calibrate against utility bills.
    d) Commission "Energy Report" functions in BMS software and BMS central display terminal at Campus Central Plant
    e) Commission data transfer between BMS system and Owner's "building performance display" system.

2. Continuous recording of operational criteria changes

    a) The Owner will record changes in building operational setting such as space temperature set-points, occupancy schedules, and system set-points including campus hot/chilled water service parameters.
    b) This information will be kept in a log for correlation against the building metering data. This will be used for reconciliation of unexpected results and re-calibration of the building energy and water use models.

3. Continuous recording of building energy and water use data

    a) The Owner's "building performance display" system will record and track all of the metering data collected from the BMS.
    b) This system will continuously be reporting through an in-building "Touch Screen Kiosk" on certain building performance parameters with visual comparison to established baselines. This same data will be available to the Owner's operations and maintenance staff and the Design/Construction team through a web-based interface.
    c) At no greater than annual intervals, a report on the annual consumption from all services will be generated from the data collected in this system and used for recalibration of baselines and re-commissioning of systems as required.

4. At the end of one calendar year, the following summaries will be generated by the Owner

    a) Report of energy use and water use by monthly tabulation and annual totalization.
    b) Comparison between baseline model and actual usage with differences noted and calculated.
    c) Monthly inventory of operation changes to system, indexed to changes in energy or water use deviations from expected results.

5. A detailed analysis of the building performance results may be generated to correlate the data collected with the energy and water use models. This work will include:

    a) Adjustment of the original model to new operating parameters (if any).
    b) Statistical analysis of results to determine correlation to predicted building performance.
    c) Site review of energy and water metering systems, BMS program, and "building performance display" system for confirmation of proper working operation (if necessary).
    d) Meet with operations staff to review building energy and water use data and operational experiences from subject year.
    e) Develop plan for ongoing M&V activities.

end

APPENDIX A

Table A-1 **Macalester College - IGC**

BUILDING AS DESIGNED - Anticipated Results (from Energy Model)

Electrical Usage - metered at Building

Units (kWh x 000)

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	TOTAL
Hot Water Usage	1.07	1.15	1.02	1.05	1.20	0.59	0.66	0.94	0.65	0.84	0.95	0.63	**10.75**
Fans	1.59	1.43	1.53	1.35	1.22	1.05	0.77	0.35	0.17	0.53	0.95	1.54	**12.48**
Pumps	0.13	0.11	0.13	0.12	0.14	0.13	0.10	0.06	0.04	0.05	0.08	0.12	**1.21**
Misc Equipment (plugs)	1.44	1.48	1.31	1.36	1.70	0.90	1.11	1.70	1.17	1.44	1.50	0.91	**16.02**
Lighting	2.47	2.47	2.12	2.15	2.57	1.38	1.68	2.58	1.85	2.38	2.62	1.64	**25.91**
TOTAL	**6.70**	**6.64**	**6.11**	**6.03**	**6.83**	**4.05**	**4.32**	**5.63**	**3.88**	**5.24**	**6.10**	**4.84**	**66.37**

Cooling Energy (purchased CHW from Campus Plant, Metered at Building)

Units (MBTU)

Cooling Energy	0	0	0	0.874	11.325	19.428	26.469	31.572	12.96	1.326	0	0	**103.954**

Heating Energy (purchased HW/steam from Central Plant, Metered at Building)

Units (MBTU)

Heating Energy	74.1	60.7	58.2	41.5	20.2	6.3	3.7	2.5	2	11.7	34.4	69.4	**384.7**

Table A-2 **Macalester College - IGC**

BASELINE BUILDING - Minimum Code Complaint (From Energy Model)

Electrical Usage - metered at Building

Units (kWh x 000)

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	TOTAL
Hot Water Usage	1.07	1.15	1.02	1.04	1.20	0.58	0.66	0.94	0.65	0.84	0.95	0.63	**10.73**
Fans	3.73	3.13	3.32	3.20	3.16	2.68	2.10	1.60	0.96	1.75	2.55	3.38	**31.56**
Pumps	1.30	1.15	1.24	1.17	1.15	1.01	0.80	0.59	0.34	0.64	0.96	1.24	**11.59**
Misc Equipment (plugs)	1.44	1.48	1.31	1.36	1.70	0.90	1.11	1.70	1.17	1.44	1.50	0.91	**16.02**
Lighting	4.62	4.76	4.20	4.39	5.47	2.90	3.56	5.47	3.75	4.62	4.81	2.92	**51.47**
TOTAL	**12.16**	**11.67**	**11.09**	**11.16**	**12.68**	**8.07**	**8.23**	**10.30**	**6.87**	**9.29**	**10.77**	**9.08**	**121.37**

Cooling Energy (purchased CHW from Campus Plant, Metered at Building)

Units (MBTU)

Cooling Energy	2	2	2	5	28	50	64	59	12	4	2	2	**232**

Heating Energy (purchased HW/steam from Central Plant, Metered at Building)

Units (MBTU)

Heating Energy	237	180	130	59	19	4	4	3	3	34	102	207	**982**

CHART A-3

Summary of Water and Energy Graphics for "Green Touch Screen" Kiosk

1. Domestic Water Consumption

This section will contain a one month weekly graph and a one year monthly graph for water use along with a typical building line. It will also contain a savings box and an equivalency box.

- Annual Domestic Water Consumption for Baseline (conventional) Building Estimated as: **78,000 g/yr**
- Annual Domestic Water Consumption for "as-designed" Building estimated as: **43,000 g/yr** (44.6% savings)

The water usage graph should include the following lines of data for comparison:

Line 1: Baseline = conventional fixtures - straight line 12 month average
78,000 / 12 = 6,500 ga/month

Line 2: Baseline = predicted savings (44.6%) - Straight line 12 month average
43,000 / 12 = 3,583 ga/month

Line 3: Actual = Acquired from the BMS.

2. Building Energy Usage

This section will contain a one month weekly graph and a one year monthly graph for electricity use along with a typical building line. It will also contain a savings box and an equivalency box.

- See **Table A-1** and **A-2** for summary of Energy Modeling results for use in graphics.

The energy usage graph should include the following lines of data for comparison:

Line 1: Baseline = Conventional Building Design - Data from Table A-2

Line 2: Baseline = Anticipated Results - Data from Table A-1

Line 2: Macalester College Average Baseline:
Calculated from campus average "btu/sf" x SF of IGC building

Line 3: Actual – Actual Usage as obtained from BMS

- **Separate line for Lighting Only Energy Consumed and expressed as % of total electrical load.**
- **Separate Indication of instantaneous lighting demand (kw) and comparison to total demand (%)**

Macalester College
Institute for Global Citizenship
Measurement and Verification Plan
August 7, 2009

APPENDIX B

B-1 Drawing E-300: Showing electrical meter locations

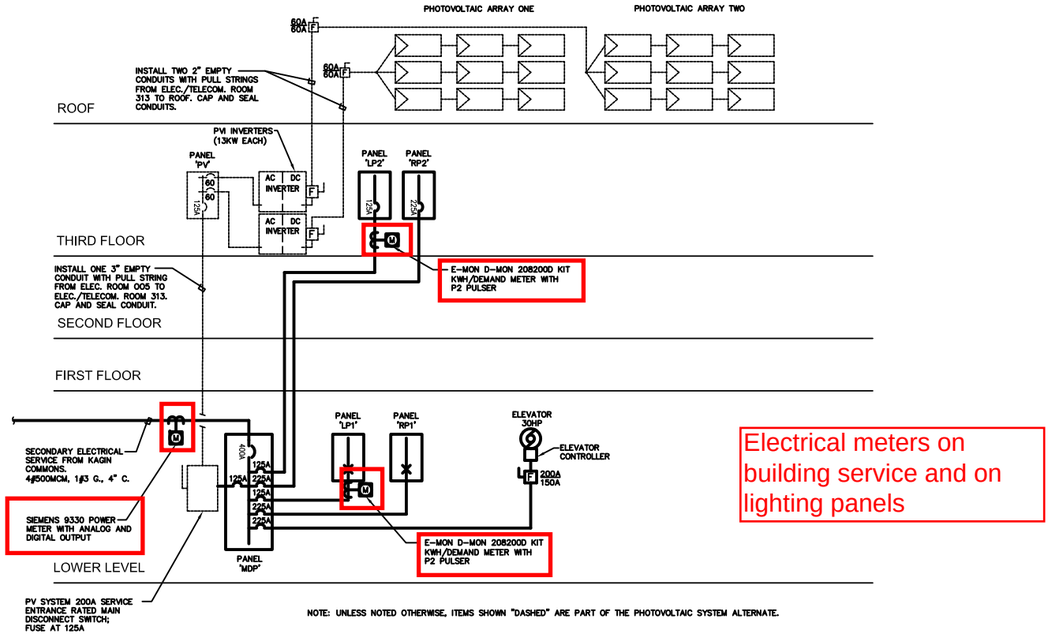
B-2 Drawing M-204: Showing BTU meter locations on HW and CHW services

B-3 Page from Specification Section 15940 – Control System Sequence of Operations

B-4 ASI #18 – Control System Interface to Owner's data collection system

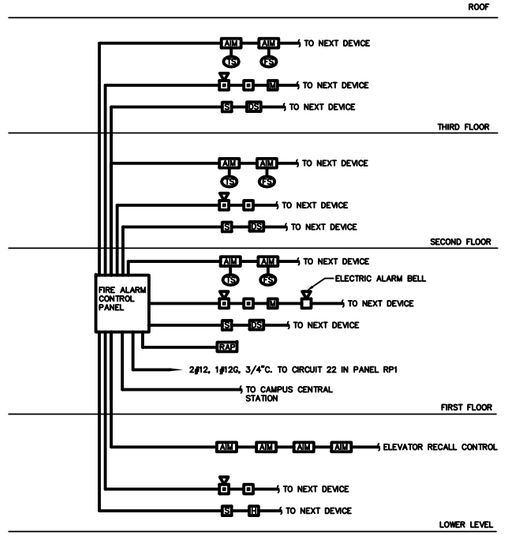
B-5 ASI#5 – Revised Water Meter Service and Metering

B-6 Signed Contract between Macalester College and Quality Attributes Software for "Display Kiosk" and data collection



1 POWER RISER DIAGRAM
SCALE: NO SCALE

Electrical meters on building service and on lighting panels



2 FIRE ALARM RISER
SCALE: NO SCALE

GENERAL NOTES:

A. SPEAKERS ON EACH FLOOR SHALL BE EVENLY DIVIDED INTO TWO CIRCUITS. ADJACENT FLOOR SPEAKERS SHALL BE ALTERNATELY CONNECTED TO EACH OF THE TWO FLOOR CIRCUITS SO THAT LOSS OF EITHER FLOOR CIRCUIT WILL NOT RESULT IN LOSS OF VOICE SIGNALING CAPABILITIES ON ANY FLOOR.

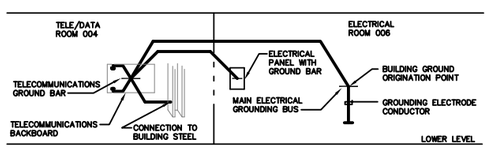
B. QUANTITIES SHOWN FOR REFERENCE ONLY. REFER TO FLOOR PLANS FOR EXACT QUANTITIES OF DEVICES.

C. ALL WIRING PER MANUFACTURERS REQUIREMENTS.

D. PROVIDE AIM UNITS FOR ALL TAMPER SWITCHES, FLOW SWITCHES AND OTHER CONTACT DEVICES.

E. PROVIDE REMOTE TEST/ON/OFF INDICATORS FOR ALL DUCT SMOKE DETECTORS WHETHER SHOWN ON DRAWINGS OR NOT.

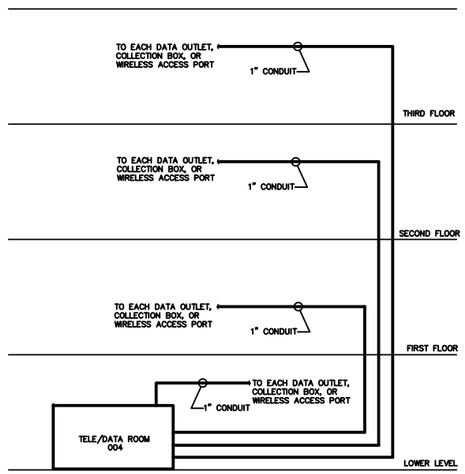
F. SMOKE DETECTORS SHALL BE KEPT A MINIMUM OF 3'-0" AWAY FROM ALL AIRSYSTEM DIFFUSERS AND GRILLS.



DETAIL NOTES:

1. GROUND ALL TELCOM AND POWER RACEWAYS THAT ENTER THE TELE/DATA ROOM, INCLUDING ALL SLEEVES AND CABLE TRAY SYSTEMS.
2. REFER TO SPECIFICATION SECTIONS 16700 AND 16710 FOR ADDITIONAL REQUIREMENTS.
3. COORDINATE WORK WITH TELECOMMUNICATIONS WIRING AND EQUIPMENT SYSTEMS SUPPLIERS.

3 TEL/DATA GROUNDING RISER
SCALE: NO SCALE



4 TEL/DATA CONDUIT RISER
SCALE: NO SCALE

Bruner/Cott

Bruner/Cott & Associates, Inc.
130 Prospect Street
Cambridge, Massachusetts 02139
617 492 8400
www.brunercott.com

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10 TALCOTT NOTCH ROAD FARMINGTON, CT 06032
TEL (860) 284-5554 FAX (860) 284-0098

PROJECT NO.: 2006303.00

Mechanical and Electrical Engineers

Rev.	Date	Remarks
10	9/5/08	BULLETIN #10

Date: April 28, 2008
Scale: 1/4" = 1'-0"
Project Number: 2006303.00
Drawn By: MER

Macalester College
Institute for Global Citizenship

GRAND AVENUE
ST. PAUL, MN

CONSTRUCTION DOCUMENTS

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: Edward D. Allen, PE

Signature: _____

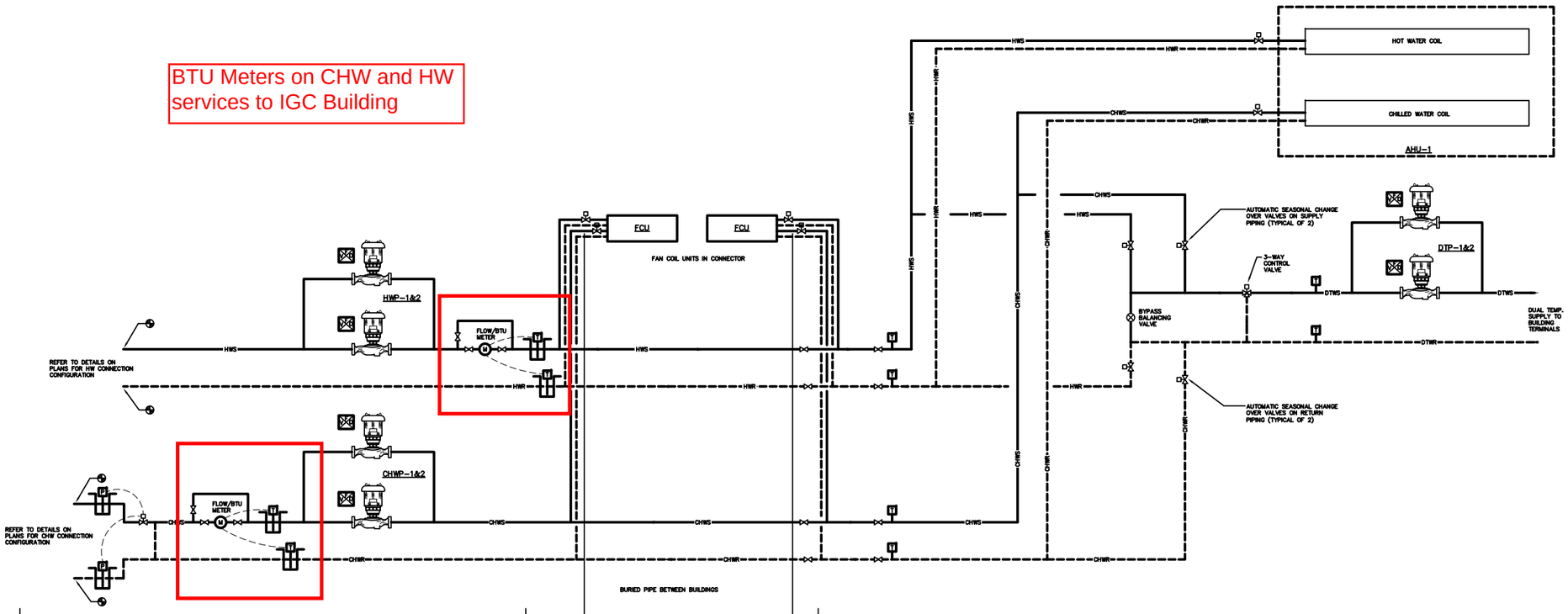
Date: _____ License #: 46406

ELECTRICAL RISER DIAGRAMS

E-300

File Path: U:\2006\2006303.00\Dwgs\Electrical\
File Name: E-RISER DIAGRAMS.dwg Layout: E-300 Thu, Aug 06, 2009 - 2:05 PM User: BOS

BTU Meters on CHW and HW services to IGC Building



SEQUENCE OF OPERATION AHU-1

CONTROL SEQUENCE - AHU-1/EF-1/HEAT WHEEL

OCCUPIED MODE: UNIT WILL BE INDEXED TO OCCUPIED MODE (FANS RUNNING) AND UNOCCUPIED MODE (FANS OFF) BY TIME CLOCK SCHEDULE AND INPUT FROM OCCUPANCY SENSORS WITHIN THE BUILDING. SUPPLY AND EXHAUST FANS SHALL OPERATE CONTINUOUSLY DURING OCCUPIED MODE.

SUPPLY AND EXHAUST FAN OPERATION: THE SUPPLY AND EXHAUST FANS WILL OPERATE TOGETHER, MAINTAINING THE SAME VOLUME OF AIR FLOW, LESS OFFSET OF TOILET EXHAUST FANS AS DETERMINED BY FLOW STATIONS MOUNTED AT EACH FAN. THE FAN SYSTEM SHALL OPERATE DYNAMICALLY TO DELIVER THE REQUIRED VENTILATION AIR VOLUME TO/FROM THE BUILDING AS REQUIRED TO MAINTAIN CO2 LEVELS LESS THAN 1000 PPM

CALCULATION OF VENTILATION AIR VOLUME: EACH CO2 SENSOR INSTALLED IS ASSIGNED A CO2 SETPOINT VALUE. WHEN CO2 LEVELS AT ANY CO2 SENSOR EXCEED 1000 PPM THE VAV BOX ASSOCIATED WITH THE CO2 SENSOR SHALL BE INCREASED THE BMS SHALL CALCULATE THE REQUIRED CFM TO BE DELIVERED FROM THE VAV BOX AND INDEX THE VAV BOX TO THIS CFM ACCORDINGLY.

SUPPLY AIR TEMPERATURE CONTROL: THE SUPPLY AIR TEMPERATURE WILL BE REGULATED THROUGH THE USE OF THE ENTHALPY WHEEL, HOT WATER HEATING COIL, AND CHILLED WATER COOLING COIL AND HEAT PIPES. SUPPLY AIR TEMPERATURE FOR HEATING MODE WILL BE 65 DEGREES F (ADJUSTABLE). SUPPLY AIR TEMPERATURE FOR COOLING MODE WILL BE 55 DEGREES F (ADJUSTABLE).

HEATING MODE TEMPERATURE CONTROL: SUPPLY AIR TEMPERATURE CONTROL WILL BE MAINTAINED BY MODULATING CONTROL OF THE 2WAY HEATING COIL CONTROL VALVE.

COOLING MODE TEMPERATURE CONTROL: WHEN THE OUTDOOR AIR HUMIDITY CONDITIONS LEAVING THE ENTHALPY WHEEL ARE BELOW 50 DEGREE DEW-POINT (ADJUSTABLE, CALCULATED FROM TEMPATURE AND HUMIDITY SENSORS) THE SUPPLY AIR TEMPERATURE CONTROL WILL BE MAINTAINED BY THE CHILLED WATER COOLING COIL ONLY. WHEN THE OUTDOOR AIR HUMIDITY CONDITIONS LEAVING THE ENTHALPY WHEEL ARE ABOVE SET-POINT, THE SUPPLY AIR TEMPERATURE CONTROL WILL BE MAINTAINED BY STAGED CONTROL OF THE HEAT PIPE SOLENOID VALVES TO REHEAT TO THE DESIRED SUPPLY AIR TEMPERATURE. THE COOLING COIL WILL OPERATE TO DISCHARGE 52 DEGREE SUPPLY AIR, SATURATED (51 DEGREE WET-BULB, 50 DEGREE DEW-POINT).

HEAT WHEEL CONTROL (ECONOMIZER): WHEN THE OUTDOOR AIR CONDITIONS (TEMPERATURE AND HUMIDITY) ARE SUITABLE TO MEET THE SUPPLY AIR TEMPERATURE AND HUMIDITY (50 DEGREE DEW-POINT) REQUIREMENTS, THEN THE ENTHALPY WHEEL WILL BE COMMANDED TO STOP ROTATION.

HEAT WHEEL OPERATION: THE ENTHALPY HEAT WHEEL WILL OPERATE BASED ON IT'S OWN MANUFACTURER'S CONTROLS AND SAFTIES. THE BMS SHALL INDEX THE WHEEL TO OPERATE WHENEVER THE AHU IS IN OPERATION, EXCEPT WHEN ECONOMIZER MODE IN ENABLED.

ALARM CONDITIONS: AS A MINIMUM THE FOLLOWING CONDITIONS WILL INDICATE AS AN ALARM IN THE BMS: EXCESSIVE WHEEL PRESSURE DROP, FILTER DIRTY CONDITION AS INDICATED BY DIFFERENTIAL PRESSURE SENSOR, HIGH HUMIDITY LEVEL ON SUPPLY AIR DISCHARGE, LOW TEMPERATURE CONDITION LEAVING HEAT WHEEL.

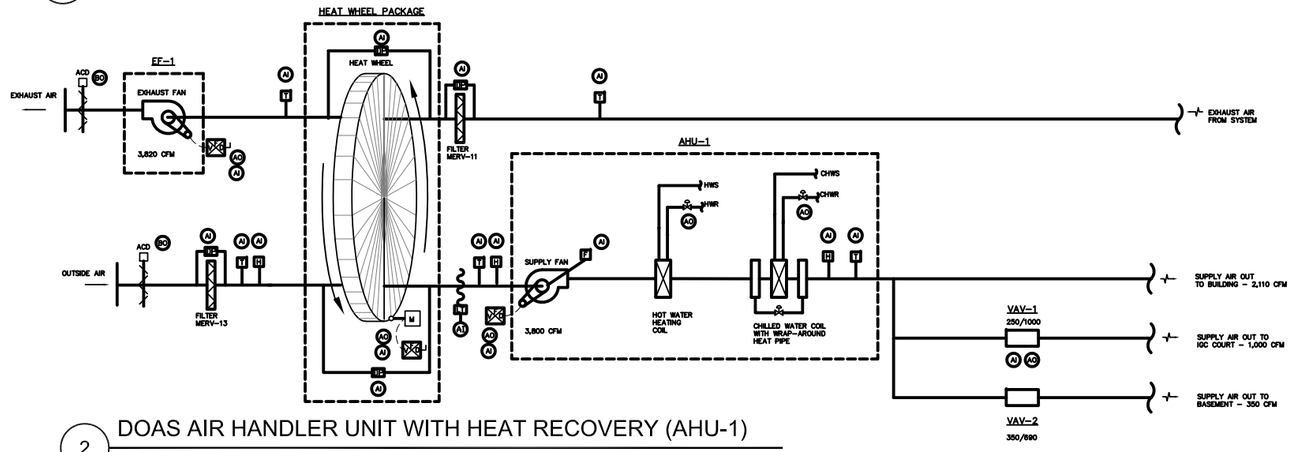
1 BULL-1

1 HOT WATER AND CHILLED WATER FLOW DIAGRAM

SCALE: NONE

2 DOAS AIR HANDLER UNIT WITH HEAT RECOVERY (AHU-1)

NOT TO SCALE



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Architecture/Urban Design
Preservation/Landscape Architecture
Space Planning/Interior Design

VANZELM ENGINEERS
van Zelm Heywood & Shadford, Inc.
10 TALCOTT NOTCH ROAD FARMINGTON, CT 06032
TEL (860) 284-5064 FAX (860) 284-0288

PROJECT NO.: 2006303.00

Mechanical and Electrical Engineers

Rev.	Date	Remarks
001	7/16/08	BUL-1,AS-2, SKM-5
10	9/5/08	BULLETIN #10

Date:	April 28, 2008
Scale:	AS NOTED
Project Number:	2006303.00
Drawn By:	EDA

Macalester College

Institute for Global Citizenship

GRAND AVENUE
ST. PAUL, MN

CONSTRUCTION DOCUMENTS

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: Edward D. Allen, PE

Signature: _____

Date: _____ License #: 46406

MECHANICAL ONE-LINE DIAGRAMS AND DETAILS

M-204

5. AHU-1:

   a. DDC controls for the AHU logic
   b. Control of HW coil control valve
   c. Control of CHW coil control valve
   d. Control of Heat-pipe solenoid control valves
   e. Control of Supply fan operated through VFD.

6. Built-Up Heat Recovery System AHU-1, EF-1, and Heat Wheel:

   a. DDC controls for the heat recovery system logic
   b. Motorized EA damper interlocked with an end switch to EF-1
   c. Motorized OA damper interlocked with an end switch to AHU-1
   d. HW reheat control valve
   e. Smoke detector wiring for fan shutdown
   f. Air flow station at the inlet fan of EF-1
   g. Air flow station at the inlet fan of AHU-1

7. IGC Court Exhaust Fan EF-3

   a. DDC controlled
   b. Motorized dampers interlocked to the EF motor with an end switch
   c. Manual control switch in IGC Court to initiate fan operation and damper control.

8. Elevator Machine Room Ventilation EF-2:

   a. DDC controlled
   b. Operation from local reverse acting thermostat.

Original Specification Text - See ASI-18 for revisions

9. Instrumentation for monitoring of building performance.

   a. Provide all indicated metering, flow measurement, and system programming for collection of building systems.
   b. Data shall be collected and displayed on a series of custom screens at the operator workstation.

1.4 SHOP DRAWINGS AND OTHER SUBMITTALS

A. Make preliminary submittal of two sets of Pneumatic and Electric control drawings to Engineer for review before shop drawings are submitted through normal channels. The purpose of this preliminary submittal is to save time. Include the following information:

   1. Temperature control ranges
   2. Spring pressure ranges
   3. Transducer ranges
   4. Method of control
   5. Control devices selected
   6. Description of operation

B. Submit, for review, shop drawings for each item of material, equipment and system component furnished or installed as part of the work of this Section. Shop drawing requirements are specified under SECTION 15010, GENERAL REQUIREMENTS FOR MECHANICAL WORK and under DIVISION 1.

☒ Owner
☒ Architect/Office
☐ Structural
☒ MEP
☒ Contractor (Field)
☒ Contractor (Office)

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Architect's Supplemental Instructions

Project:	Macalester IGC	Instruction No:	18
Owner:	Macalester College	Date of Issuance:	1/16/2009
To:	McGough Construction Attn: Jenny Hassenfritz 2797 Fairview Avenue N. Saint Paul, MN 55113	Architect's Project No: Contract for:	871-00 Construction

Subject: Revisions to Contract Documents

The following revisions have been made to the contract documents. Please see below:

MECHANICAL:

1. Specification Section 15940, CONTROL SYSTEMS AND SEQUENCE OF OPERATIONS: SEE ATTACHED BULLETIN.
2. Specification Section 1670, FIRE ALARM SYSTEM: SEE ATTACHED BULLETIN.
3. Specification Section 1670, FIRE ALARM SYSTEM: SEE ATTACHED BULLETIN.

Attachments: BULLETIN # ASI 18

☐ **No Change in Cost or Time**
The work shall be carried out in accordance with the described supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Prior to proceeding in accordance with these instructions, indicate your acceptance of these instructions for minor change to the Work as consistent with the Contract Documents and return a copy to the Architect within 10 working days.

☐ **Estimate Change in Cost/Time, Do Not Proceed with Work - Provide Proposed Change Order**
Please submit a proposal showing itemized cost breakdown of labor and material for the proposed change, showing either credit or extra cost to the Contract time, prior to proceeding with this work. Do not proceed with this work unless authorized by the Owner or Development Manager in writing.

☒ **Estimate Change in Cost/Time, Proceed with Work**
In order to expedite the Work and avoid or minimize delays in the Work which may affect Contract Sum or Contract Time, the Contract Documents are hereby amended as described above. Proceed with this Work promptly. Submit final costs for Work involved and change in Contract Time (if any), for inclusion in a subsequent Change Order.

Owner's Signature_____

Issued By: Jason J. Jewhurst

VAN ZELM ENGINEERS
VAN ZELM HEYWOOD & SHADFORD, INC.
10 TALCOTT NOTCH FARMINGTON, CT 06032-1800
P:(860) 284-5064 F:(860) 284-5098

BULLETIN # ASI 18

Issue Date: January 15, 2009

Project Name: Macalester College - IGC

Project No.: 2006303.01

Written by: Ed Allen/Morris Rosen

Please submit detailed change order proposal(s) for the changes as described below, itemized to show extra costs and/or credit amounts and the net adjustment to the Contract. Where requested, submit separate change order pricing.

THIS IS NOT A CHANGE ORDER, NOR A DIRECTIVE TO PROCEED WITH THE FOLLOWING WORK.

REVISIONS TO SPECIFICATIONS

Added scope for collection of data and interface with Owner's "Touch Screen" Kiosk

ITEM DESCRIPTION

1. Specification **Section 15940**, CONTROL SYSTEMS AND SEQUENCE OF OPERATIONS:

Paragraph 1.3.A.9, Instrumentation for monitoring of building performance, **ADD** the following:

"c. Interface with the building domestic water service meter and output transducer to collect data on instantaneous and totalized use of domestic water.

d. Interface with the electric meters (3 locations) provided under Division 16 for collection of data on building electrical use including, instantaneous, peak and totalized energy. One meter is located on the main feed to the IGC building, two meters are located on lighting panel feeders.

***10.** Interface with Owner supplied Building Performance Monitoring System*

a. Provide for the following information to be electronically collected from the Building Control System and used by the Owner supplied syste4m.

a. Cooling energy use

b. Heating energy use

c. Domestic water use

d. Electric power use (total building)

e. Electric power use (Lighting only - summation from both lighting meters)

Continued on next page

f. Effectiveness of the Enthalpy wheel as calculated by the supply and exhaust side conditions, expressed as a percentage of exhaust energy (sensible and latent) recovered and/or in energy units.

b. ***Provide assistance as required to Owner's vendor to facilitate and format information transfer to their system."***

2. Specification **Section 1670**, FIRE ALARM SYSTEM:

Paragraph 2.1, FIRE ALARM SYSTEM - GENERAL , **ADD** the following

"G. Campus security system shall supervise sprinkler "Flow and "Tamper" alarms as well as fire alarm "alarm" and "trouble" conditions."

3. Specification **Section 1670**, FIRE ALARM SYSTEM:

Paragraph 2.7, MISCELLANEOUS: **ADD** the following.

"H. Provide wiring (4 sets) from the Fire Alarm Control Panel to the nearest Building Automation Panel (Trane) to permit supervision of the FA and Sprinkler system as described in paragraph 2.1.G"

end of Bulletin

Reasons for Modification: Coordination with Macalester Campus systems.

☒ Owner
☒ Architect/Office
☐ Structural
☒ MEP
☒ Contractor (Field)
☒ Contractor (Office)

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Architect's Supplemental Instructions

Project:	Macalester IGC	Instruction No:	05
Owner:	Macalester College	Date of Issuance:	09-16-2008
To:	McGough Construction Attn: Jenny Hassenfritz 2797 Fairview Avenue N. Saint Paul, MN 55113	Architect's Project No: Contract for:	871-00 Construction

Subject: Revisions to Contract Documents

The following revisions have been made to the contract documents. Please see below:

PLUMBING:
See attached BULLETIN #10

Attachments: BULLETIN #10

☐ **No Change in Cost or Time**
The work shall be carried out in accordance with the described supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Prior to proceeding in accordance with these instructions, indicate your acceptance of these instructions for minor change to the Work as consistent with the Contract Documents and return a copy to the Architect within 10 working days.

☐ **Estimate Change in Cost/Time, Do Not Proceed with Work - Provide Proposed Change Order**
Please submit a proposal showing itemized cost breakdown of labor and material for the proposed change, showing either credit or extra cost to the Contract time, prior to proceeding with this work. Do not proceed with this work unless authorized by the Owner or Development Manager in writing.

☒ **Estimate Change in Cost/Time, Proceed with Work**
In order to expedite the Work and avoid or minimize delays in the Work which may affect Contract Sum or Contract Time, the Contract Documents are hereby amended as described above. Proceed with this Work promptly. Submit final costs for Work involved and change in Contract Time (if any), for inclusion in a subsequent Change Order.

Owner's Signature_____

Issued By: Jason J. Jewhurst

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10 TALCOTT NOTCH FARMINGTON, CT 06032-1800
P:(860) 284-5064 F:(860) 284-5098

BULLETIN # 10

Issue Date: September 15, 2008

Project Name: MACALESTER COLLEGE CENTER FOR GLOBAL CITIZENSHIP

Project No.: 2006303.00

Please submit detailed change order proposal(s) for the changes as described below, itemized to show extra costs and/or credit amounts and the net adjustment to the Contract. Where requested, submit separate change order pricing.

THIS IS NOT A CHANGE ORDER, NOR A DIRECTIVE TO PROCEED WITH THE FOLLOWING WORK.

REVISIONS:

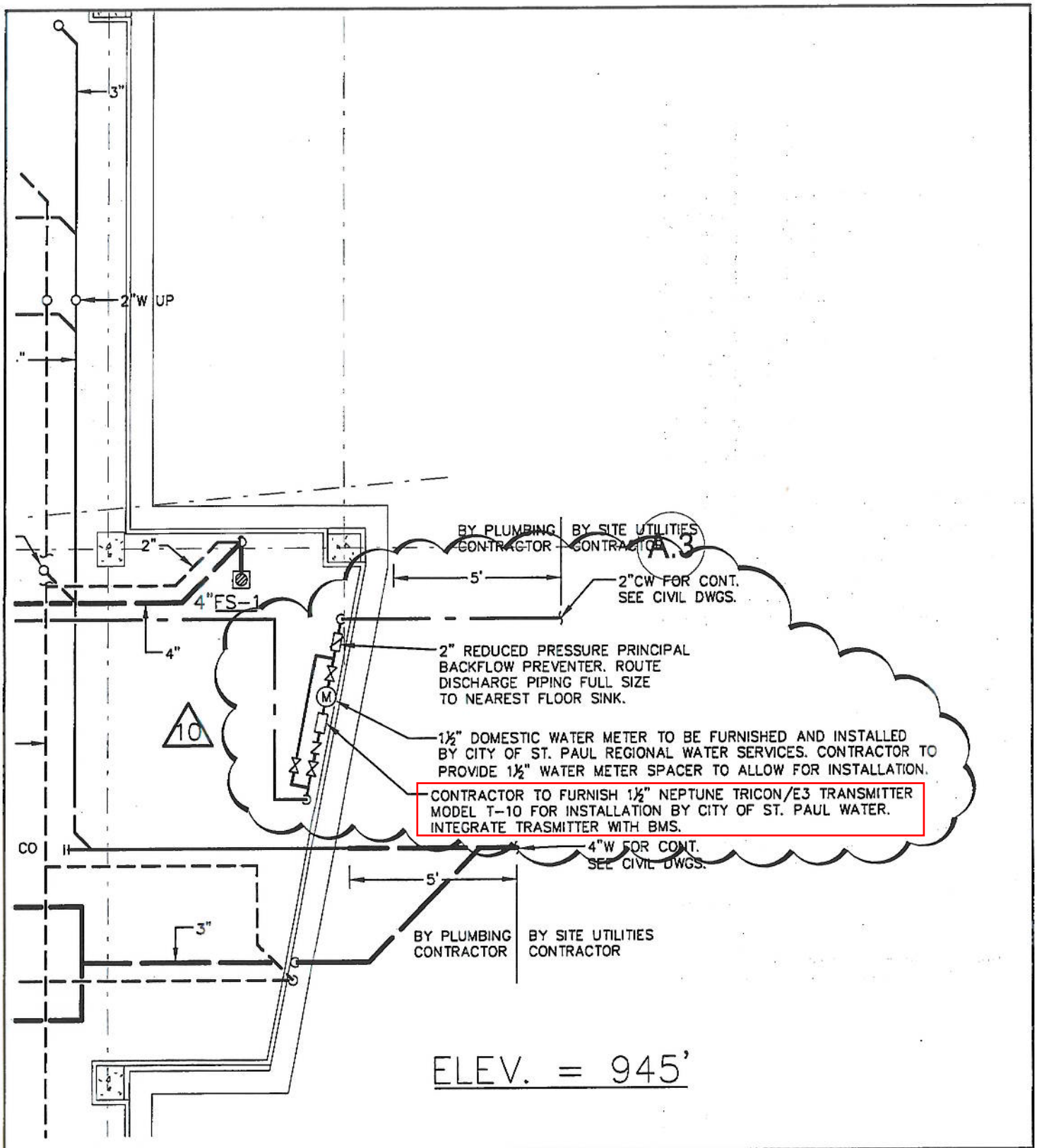
ITEM	DESCRIPTION
1	**PROVIDE** 1½" water meter spacer assembly, Neptune Tricon E/3 transmitter, and 2" backflow preventer for domestic water service entry to IGC Building.
2	On Drawing E-101, First Floor Electrical Power Plan, **REVISE** sliding metal fire door power and fire alarm connections per the attached sketches SKE-014 and SKE-015.

Reasons for Modification: PLUMBING CLARIFICATIONS

ATTACHMENTS SKP-018, Tricon E/3 transmitter cut sheet
SKE-014, SKE-015

Scott Steindler

cc: EDA, BS, file



PROJECT NAME

Macalester College
Institute for Global Citizenship

DRAWING TITLE

PLUMBING LOWER LEVEL FLOOR PLAN

VANZELM ENGINEERS
MECHANICAL AND ELECTRICAL ENGINEERS
10 TALCOTT NOTCH FARMINGTON CT 06032-1800
(860) 284-5064 FAX (860) 284-5098

PROJECT NO.: 2006303.00

REVISION TO: P-100 REV.: 10

SCALE: NTS DATE: 9/11/2008

SKP-018

DWG. NO.

REMARKS: Bulletin #10

File Path: W:\2006\2006303.00\Dwgs\Plumbing\
File Name: P-100.dwg Layout: SKP-018 September 11, 2008 - 9:13 AM User: SMS

ARB® UTILITY MANAGEMENT SYSTEMS™

NEPTUNE TECHNOLOGY GROUP

TRICON/E®3 TRANSMITTER

TRICON/E3 transmitters provide an interface between the water meter and an electronic controller for batching processes, monitoring flow totalization, and/or flow rate data.

An electronic digital pulse output with the 4–20mA option is available for customers requiring both digital and analog outputs. Reverse flow indication is available with the high frequency forward/reverse pulse output option.

The TRICON/E3 transmitter mounts between the meter maincase and the register. The bayonet-type mount allows the TRICON/E3 to be easily retrofitted to many existing Neptune meters without interruption. Contact Neptune regarding compatibility.

The TRICON/E3 with the 4–20mA option provides an analog signal that is proportional to the flow. Together, the digital pulse signal and the 4–20mA output provide information on total consumption and flow rate for close monitoring of water usage.

The TRICON/E3 with the high frequency forward/reverse pulse output option can be used in applications where directional flow monitoring is required in addition to total consumption and flow information.

Every Neptune meter meets or exceeds the latest AWWA standards ensuring accurate, dependable performance.

Neptune TRICON/E3 units are ideally suited for monitoring/controlling total flow rate data such as:

- Instantaneous readout of customer consumption via remote instrumentation or computer
- Batch or continuous process
- Water softening regeneration
- Demineralization
- Reverse osmosis
- Chemical treatment/injection
- Filtration
- Boiler feed water make-up
- Cooling tower water make-up
- Irrigation
- High or low rate alarming
- Reverse flow alarming

Dual optical switches allow the TRICON/E3 to distinguish between forward and reverse rotation, eliminating false pulse generation under low or no flow conditions.

KEY FEATURES

- Electronic pulse output proportional to the meter's rate of flow
- Electronic pulse output available with 4–20mA output or high frequency forward/reverse pulse output
- Mounts between the meter and register – Direct Read, ARB®, or ProRead AutoDetect
- Utilizes dual optical switch type design which is more accurate and reliable than the older single optical switch designs
- Stainless steel ball bearings minimize torque
- Tamperproof seal pin to prevent unauthorized access
- In-line adaptability allows installation or service without interrupting the meter service

WARRANTY

Neptune provides a limited warranty with respect to its TRICON/E3 transmitters for performance, materials, and workmanship.

PERFORMANCE DATA

Meter Type & Size	Pulses/ US Gallons	Flow Rate @ 4 mA Output (US GPM)	Flow Rate Value @ 20 mA Output (US GPM)
T-10			
5/8"	578.1	0	20
3/4"	322.6	0	30
1"	150.8	0	50
1 1/2"	67.57	0	100
2"	37.3	0	160
Tru/Flo® Compound (Turbine Side) and HP Tru/Flo (Turbine Side)			
2" HP	6.095	0	200
3"	2.890	0	450
4"	1.590	0	1,000
6"	0.464	0	2,000
HP Turbine			
1 1/2"	6.095	0	160
2"	6.095	0	200
3"	11.20	0	450
4"	7.556	0	1,200
6"	0.7273	0	3,000
8"	0.7556	0	4,000
10"	0.7556	0	6,500
12"	0.7556	0	8,000
16"	0.07556	0	13,500
20"	0.07556	0	22,000
HP Protectus III®			
4"	7.556	0	1,200
6"	0.7556	0	2,888
8"	0.6095	0	4,959
10"	0.5333	0	9,209

ELECTRICAL CHARACTERISTICS (OVER 0-70°C OPERATING TEMPERATURE)

Parameter	Description	Min	Max	Units
HF and UP/DN Digital Pulse Model				
VCC	Supply Voltage (DC)	11.5	26.5	Volts
Is	Supply Current	0.020	0.050	Amps
Vol	Low Output Voltage	0	0.4	Volts
Voh	High Output Voltage	8.5	12	Volts
Iol	Current at Vol		.010	Amps
Ioh	Current at Voh		.010	Amps
tr l-h	Output Rise Time		2*	µsec
tf h-l	Output Fall Time		2*	µsec
Measured with RL = 2.4 Kohms, CL = 50 pF				
4-20 ma Model				
VCC	Supply Voltage (DC)	22.5	26.5	Volts
Is	Supply Current		0.1	Amps
RL	Loop Resistance	0	600	Ohms
Gain	Scaling Accuracy		0.5	%FS
Zero	Offset Accruacy		0.2	%FS
Note: initial calibration is 1% total				
Both Models (unless otherwise specified)				
	Operating Temperature	0	70	Degrees C
	Storage Temperature	-40	85	Degrees C
	Supply Voltage	-30	30	Volts
	Output Load (Pulse Output)	1200		Ohms
	Output Current (Pulse Output)		0.01	Amps

SPECIFICATIONS

- Sizes:
  - T-10 (5/8"–2")
  - HP Turbine (1 1/2"–20")
  - Tru/Flo Compound (2"–6"x8")
  - HP Fire Service Turbine (3"–10")
  - HP Protectus III (4"–10")
- Register Compatibility:
  - Direct Read
  - ARB®V
  - ProRead™ (ARB VI)
  - E-Coder™
  - E-Coder)R900*i*
- Connection Wire:
  - Distances up to 1000 feet – AWG
  - #22 twisted pair cable

Neptune engages in ongoing research and development to improve and enhance its products. Therefore, Neptune reserves the right to change product or system specifications without notice.

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NEPTUNE TECHNOLOGY GROUP

neptunetg.com

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Quality Attributes Software
Empowering Intelligent Buildings
Phone: 515.956.1599 Fax: 515.233.3380
Website: www.qualityattributes.com www.greentouchscreen.com
Address: 416 Billy Sunday Rd., Suite 150 Ames IA 50010

Agreement Number: CLTN-IGC-C08-09 10/15/2008

Quality Attributes Software Kiosk Agreement

This Standard Purchase Agreement (hereinafter "Agreement") is made between Quality Attributes Software, Inc., an Iowa corporation having an office at 416 Billy Sunday Road, Suite 150, Ames, IA 50010 (hereinafter "QAS") and **Macalester College,** with its principal place of business at **1600 Grand Avenue St. Paul, MN 55105** (hereinafter "Customer").

1. General

QAS agrees to develop the software according to the requirements as per the attached and referenced proposal dated **10/08/2008** with proposal number **CLTN-IGC-P08-09** and subject to the terms listed below. This agreement will expire thirty (30) days after the above date unless it is signed by QAS and Customer. If the end user is different from Customer then the end user accepts the same terms and conditions as outlined in this agreement.

2. Billing

Upon the signing of this agreement, Customer agrees to pay QAS **$34,994.00** (see Quote dated **10/08/2008**) with an initial fee of 50% of the quote of the kiosk software. Sixty (60) days following the initial invoice date 25% of the quote will be billed by QAS. The remaining 25% of the quote will be retained until the kiosk software has been completely finished and delivered, assuming there are no changes to the end product (scope), at which time it will be paid to Quality Attributes Software. QAS' fees are exclusive of all taxes, shipping, levies, or duties imposed by taxing authorities, and Customer shall be responsible for payment of all such taxes, shipping, levies, or duties.

Customer agrees to provide QAS with complete and accurate billing and contact information. This information includes Customer legal company name, street address, e-mail address, and name and telephone number of an authorized billing contact and License Administrator. Customer agrees to update this information within 30 days of any change to it. If the contact information Customer has provided is false or fraudulent, QAS reserves the right to terminate Customer's access to the Service in addition to any other legal remedies. Unless QAS, in its discretion, determines otherwise: all entities will be billed in U.S. dollars and be subject to U.S. payment terms and pricing schemes at the discretion of QAS. If Customer believes their bill is incorrect, they must contact QAS in writing within 60 days of the invoice date of the invoice containing the amount in question to be eligible to receive an adjustment or credit. If the Customer issues a Purchase Order without signing this contract, the Customer accepts all of the terms that are bound in this agreement.

3. Charges and Payment of Fees

Customer shall pay all fees or charges to their account in accordance with the fees, charges, and billing terms in effect at the time a fee or charge is due and payable. All payment obligations are noncancelable and all amounts paid are nonrefundable. Customer must provide QAS with valid credit card or approved purchase order information as a condition to signing up for the Service.

4. Live Data Accessibility Requirements

In order for the GreenTouchscreen® Live Data Module to utilize real time data, the following must be provided by Customer: any real time data must be made available from the data source(s) as either an OPC, BACnet/IP, LonWorks, an RSS feed or an XML web services feed.

If the GreenTouchscreen® Live Data Module is located remotely, access through certain ports in the

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customer's firewall must be provided in order for us to make requests to devices within the customer's network to collect the data. If the GreenTouchscreen® Local Live Data Service is located within customer's network, coordination must be made with customer's IT department to facility installation and maintenance.

5. Maintenance Agreement
Please refer to QAS' separate Maintenance Agreement.

6. LEED® Credit
GreenTouchscreen® is eligible to qualify as one of two required items needed for Customer to obtain a LEED® Educational Outreach Program Innovation and Design credit for their facility. If Customer is attempting to obtain a LEED® certification for their facility, QAS will provide Customer with a copy of this document, the requirements document and other project notes relating to the planning and development of the GreenTouchscreen® upon request. These documents can be provided in order to assist Customer with developing a manual, guideline or case study as the second requirement for a LEED® Educational Outreach Program Innovation and Design credit. Due to the subjective nature of the LEED® credits, QAS does not guarantee that Customer will obtain a LEED® Educational Outreach Program Innovation and Design credit for their facility.

7. Software or Hardware Changes
Any changes to the software or hardware requirements, timeline or project scope, based on known assumptions, must be approved in writing by both QAS and Customer, and may require additional charges.

8. Project Deadline
QAS agrees to provide the kiosk software according to the items described within the attached and referenced proposal within the specified Project Schedule section. Work will be authorized to begin once QAS is in receipt of both the down payment for the project and a signed copy of this agreement has been received by QAS. QAS agrees to meet the established time frame, provided Customer and any other entities involved with the development of the kiosk software provide the following required items to QAS according to the below specified schedule. Failure to do so may cause the overall project deadline to slip.

- All text, images and other required information listed on the content needed document that is available must be delivered to QAS within four weeks from the date Customer receives the content needed document. QAS agrees to provide the content needed document within one week after the initial design meeting.
- The proof must be commented on and returned to QAS within one week of receipt from QAS.
- All data points that will be monitored by the GreenTouchscreen® Live Data Module must be developed and made available to QAS in an acceptable format within eight weeks after this agreement is signed. QAS retains all rights associated with the proprietary acquisition, ordering, storage, manipulation or representation of the data points subsequent to the provision by Customer in an acceptable format.
- Sign off documents must be returned to QAS within two business days of receipt from QAS. Sign off documents will be delivered after proof approval (completion of design phase), after the kiosk shell is delivered on the test site and after work has been complete.
- QAS reserves the right to supplement any missing or incomplete data or content with placeholder content, to consider the kiosk project complete and commence the maintenance phase of the project if the project experiences a client caused delay of more then four weeks, unless this delay is approved in writing beforehand by both the client and QAS. Should this occur, replacement of the missing or incomplete data or content

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may be charged to the maintenance agreement hours or require additional payment.
- QAS reserves the right to send the final invoice to Customer at the end of the sixteen weeks if the delay in completion of the kiosk software is not the fault of QAS.

9. Hardware Requirements

For each physical touchscreen kiosk, Customer agrees to provide a high speed internet connection with access to any necessary internet site(s) as determined by QAS, a standard duplex power outlet within ten feet of the location of each physical touchscreen kiosk and a surge protector for each physical touchscreen kiosk. An uninterruptible power supply (UPS) device is recommended for use with each physical touchscreen kiosk.

The touchscreen kiosk will include the hardware outlined in the attached and referenced proposal.

10. Software Service

As part of the Service, QAS will provide Customer with use of the Service, including a browser interface and data encryption, transmission, access and storage. Customer's registration for, or use of, the Service shall be deemed to be their agreement to abide by this Agreement including any materials available on the QAS website incorporated by reference herein.

Because the Service is a hosted, online application, QAS occasionally may need to notify all users of the Service (whether or not they have opted out as described above) of important announcements regarding the operation of the Service. If Customer becomes a paying customer of the Service, Customer agrees that QAS can disclose the fact that they are a paying customer and the edition of the Service that they are using.

11. License Grant & Restrictions

QAS hereby grants Customer a non-exclusive, non-transferable, worldwide right to use the Service, solely for Customer's own internal business purposes, subject to the terms and conditions of this Agreement. All rights not expressly granted to Customer are reserved by QAS and its licensors.

Customer may not access the Service if they are a direct competitor of QAS, except with QAS' prior written consent. In addition, Customer may not access the Service for purposes of monitoring its availability, performance or functionality, or for any other benchmarking or competitive purposes.

Customer shall not (i) license, sublicense, sell, resell, transfer, assign, distribute or otherwise commercially exploit or make available to any third party the Service, Data or the Content in any way; (ii) modify or make derivative works based upon the Service, Data or the Content; (iii) "mirror" any Content on any other server or wireless or Internet-based device; or (iv) reverse engineer or access the Service in order to (a) build a competitive product or service, (b) build a product using similar ideas, features, functions or graphics of the Service, or (c) copy any ideas, features, functions or graphics of the Service.

Customer may use the Service only for internal business purposes and shall not: (i) send or store infringing, obscene, threatening, libelous, or otherwise unlawful or tortious material, including material harmful to children or violative of third party privacy rights; (ii) send or store material containing software viruses, worms, Trojan horses or other harmful computer code, files, scripts, agents or programs; (iii) interfere with or disrupt the integrity or performance of the Service or the data contained therein; or (iv) attempt to gain unauthorized access to the Service or its related systems or networks.

Certain editions of the Service offer integration capabilities via web services. The number of web service calls Customer can make per account may be limited.

12. Customer Responsibilities

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Customer is responsible for all activity occurring under their accounts and shall abide by all applicable local, state, national and foreign laws, treaties and regulations in connection with their use of the Service, including those related to data privacy, international communications and the transmission of technical or personal data. Customer shall: (i) notify QAS immediately of any unauthorized use of any password or account or any other known or suspected breach of security; (ii) report to QAS immediately and use reasonable efforts to stop immediately any copying or distribution of Content or Data that is known or suspected by Customer or Customer's users; and (iii) not impersonate another QAS user or provide false identity information to gain access to or use the Service.

13. Data

Customer does own any data, information or material that Customer submits to the Service in the course of using the Service. QAS retains all rights for usage associated with the proprietary acquisition, ordering, storage, manipulation or representation of the data points, information or material subsequent to the provision by Customer in an acceptable format.

14. Intellectual Property Ownership

QAS alone (and its licensors, where applicable) shall own all right, title and interest, including all related Intellectual Property Rights, in and to the QAS Technology, the Content and the Service and any suggestions, ideas, enhancement requests, feedback, recommendations or other information provided by Customer or any other party relating to the Service. This Agreement is not a sale and does not convey to Customer any rights of ownership in or related to the Service, the QAS Technology or the Intellectual Property Rights owned by QAS. The QAS name, the QAS logo, and the product names and logos associated with the Service are trademarks of QAS or third parties, and no right or license is granted to use them.

15. Third Party Interactions

During use of the Service, Customer may enter into correspondence with, purchase goods and/or services from, or participate in promotions of advertisers or sponsors showing their goods and/or services through the Service. Any such activity, and any terms, conditions, warranties or representations associated with such activity, is solely between Customer and the applicable third-party. QAS and its licensors shall have no liability, obligation or responsibility for any such correspondence, purchase or promotion between Customer and any such third-party. QAS does not endorse any sites on the Internet that are linked through the Service. QAS provides these links to Customer only as a matter of convenience, and in no event shall QAS or its licensors be responsible for any content, products, or other materials on or available from such sites. QAS provides the Service to Customer pursuant to the terms and conditions of this Agreement. Customer recognizes, however, that certain third-party providers of ancillary software, hardware or services may require Customer agreement to additional or different license or other terms prior to Customer use of or access to such software, hardware or services.

16. Excess Data Storage

QAS reserves the right to establish or modify its general practices and limits relating to storage of Customer Data.

17. Non-Payment and Suspension

In addition to any other rights granted to QAS herein, QAS reserves the right to suspend or terminate this Agreement and Customer's access to the Service if Customer account becomes delinquent (falls into arrears). Delinquent invoices (accounts in arrears) are subject to interest of 1.5% per month on any outstanding balance, or the maximum permitted by law, whichever is less, plus all expenses of collection. Customer will continue to be charged for licenses during any period of suspension. If Customer or QAS initiates termination of this Agreement, Customer will be obligated to pay the balance due on Customer account computed in accordance with the Charges and Payment of Fees section above. Customer agrees

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that QAS may charge such unpaid fees to Customer's credit card or otherwise bill Customer for such unpaid fees.

QAS reserves the right to impose a reconnection fee in the event Customer is suspended and thereafter request access to the Service. Customer agrees and acknowledges that QAS has no obligation to retain Customer Data and that such Customer Data may be irretrievably deleted if their account is 30 days or more delinquent.

18. Termination for Cause

Any breach of Customer payment obligations or unauthorized use of the QAS Technology or Service will be deemed a material breach of this Agreement. QAS, in its sole discretion, may terminate Customer's password, account or use of the Service if Customer breaches or otherwise fails to comply with this Agreement. In addition, QAS may terminate a free account at any time in its sole discretion. Customer agrees and acknowledges that QAS has no obligation to retain the Customer Data, and may delete such Customer Data, if Customer has materially breached this Agreement, including but not limited to failure to pay outstanding fees, and such breach has not been cured within 30 days of notice of such breach.

19. Representations & Warranties

QAS provides an industry standard initial warranty of ninety days after substantial completion. Each party hereto warrant to the other that Services provided by it to the receiving Party under the Agreement will be performed in a professional and workmanlike manner, in accordance with industry standards. Each party represents and warrants that it has the legal power and authority to enter into this Agreement. QAS represents and warrants that it will provide the Service in a manner consistent with general industry standards reasonably applicable to the provision thereof and that the Service will perform substantially in accordance with normal use and circumstances. Customer represents and warrants that they have not falsely identified them self nor provided any false information to gain access to the Service and that Customer billing information is correct.

20. Mutual Indemnification

Customer shall indemnify and hold QAS, its licensors and each such party's parent organizations, subsidiaries, affiliates, officers, directors, employees, attorneys and agents harmless from and against any and all claims, costs, damages, losses, liabilities and expenses (including attorneys' fees and costs) arising out of or in connection with: (i) QAS needs to add something concerning data; (ii) QAS needs to add something concerning control systems (i) a claim alleging that use of the Customer Data infringes the rights of, or has caused harm to, a third party; (ii) a claim, which if true, would constitute a violation by Customer of Customer's representations and warranties; or (iii) a claim arising from the breach by Customer or Customer's users of this Agreement, provided in any such case that QAS (a) gives written notice of the claim promptly to Customer; (b) gives Customer sole control of the defense and settlement of the claim (provided that Customer may not settle or defend any claim unless Customer unconditionally releases QAS of all liability and such settlement does not affect QAS' business or Service); (c) provides to Customer all available information and assistance; and (d) has not compromised or settled such claim.

QAS shall indemnify and hold Customer and Customer's parent organizations, subsidiaries, affiliates, officers, directors, employees, attorneys and agents harmless from and against any and all claims, costs, damages, losses, liabilities and expenses (including attorneys' fees and costs) arising out of or in connection with: (i) a claim alleging that the Service directly infringes a copyright, a U.S. patent issued as of the Effective Date, or a trademark of a third party; (ii) a claim, which if true, would constitute a violation by QAS of its representations or warranties; or (iii) a claim arising from breach of this Agreement by QAS; provided that Customer (a) promptly give written notice of the claim to QAS; (b) give QAS sole control of the defense and settlement of the claim (provided that QAS may not settle or defend any claim unless it unconditionally releases Customer of all liability); (c) provide to QAS all available information and

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assistance; and (d) have not compromised or settled such claim. QAS shall have no indemnification obligation, and Customer shall indemnify QAS pursuant to this Agreement, for claims arising from any infringement arising from the combination of the Service with any of Customer products, service, hardware or business process(s).

21. Disclaimer of Warranties

QAS AND ITS LICENSORS MAKE NO REPRESENTATION, WARRANTY, OR GUARANTY AS TO THE RELIABILITY, TIMELINESS, QUALITY, SUITABILITY, TRUTH, AVAILABILITY, ACCURACY OR COMPLETENESS OF THE SERVICE OR ANY CONTENT. QAS AND ITS LICENSORS DO NOT REPRESENT OR WARRANT THAT (A) THE USE OF THE SERVICE WILL BE SECURE, TIMELY, UNINTERRUPTED OR ERROR-FREE OR OPERATE IN COMBINATION WITH ANY OTHER HARDWARE, SOFTWARE, SYSTEM OR DATA, (B) THE SERVICE WILL MEET CUSTOMER REQUIREMENTS OR EXPECTATIONS, (C) ANY STORED DATA WILL BE ACCURATE OR RELIABLE, (D) THE QUALITY OF ANY PRODUCTS, SERVICES, INFORMATION, OR OTHER MATERIAL PURCHASED OR OBTAINED BY CUSTOMER THROUGH THE SERVICE WILL MEET CUSTOMER'S REQUIREMENTS OR EXPECTATIONS, (E) ERRORS OR DEFECTS WILL BE CORRECTED, OR (F) THE SERVICE OR THE SERVER(S) THAT MAKE THE SERVICE AVAILABLE ARE FREE OF VIRUSES OR OTHER HARMFUL COMPONENTS. THE SERVICE AND ALL CONTENT IS PROVIDED TO CUSTOMER STRICTLY ON AN "AS IS" BASIS. ALL CONDITIONS, REPRESENTATIONS AND WARRANTIES, WHETHER EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF THIRD PARTY RIGHTS, ARE HEREBY DISCLAIMED TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW BY QAS AND ITS LICENSORS.

22. Internet Delays

QAS' SERVICES MAY BE SUBJECT TO LIMITATIONS, DELAYS, AND OTHER PROBLEMS INHERENT IN THE USE OF THE INTERNET AND ELECTRONIC COMMUNICATIONS. QAS IS NOT RESPONSIBLE FOR ANY DELAYS, DELIVERY FAILURES, OR OTHER DAMAGE RESULTING FROM SUCH PROBLEMS.

23. Limitation of Liability

IN NO EVENT SHALL EITHER PARTY'S AGGREGATE LIABILITY EXCEED THE AMOUNTS ACTUALLY PAID BY AND/OR DUE FROM CUSTOMER IN THE TWELVE (12) MONTH PERIOD IMMEDIATELY PRECEDING THE EVENT GIVING RISE TO SUCH CLAIM. IN NO EVENT SHALL EITHER PARTY AND/OR ITS LICENSORS BE LIABLE TO ANYONE FOR ANY INDIRECT, PUNITIVE, SPECIAL, EXEMPLARY, INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES OF ANY TYPE OR KIND (INCLUDING LOSS OF DATA, REVENUE, PROFITS, USE OR OTHER ECONOMIC ADVANTAGE) ARISING OUT OF, OR IN ANY WAY CONNECTED WITH THIS SERVICE, INCLUDING BUT NOT LIMITED TO THE USE OR INABILITY TO USE THE SERVICE, OR FOR ANY CONTENT OBTAINED FROM OR THROUGH THE SERVICE, ANY INTERRUPTION, INACCURACY, ERROR OR OMISSION, REGARDLESS OF CAUSE IN THE CONTENT, EVEN IF THE PARTY FROM WHICH DAMAGES ARE BEING SOUGHT OR SUCH PARTY'S LICENSORS HAVE BEEN PREVIOUSLY ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

24. Additional Rights

Certain states and/or jurisdictions do not allow the exclusion of implied warranties or limitation of liability for incidental, consequential or certain other types of damages, so the exclusions set forth above may not apply to Customer.

25. Local Laws and Export Control

This site provides services and uses software and technology that may be subject to United States export controls administered by the U.S. Department of Commerce, the United States Department of Treasury Office of Foreign Assets Control, and other U.S. agencies and the export control regulations of Switzerland and the European Union. The user of this site ("User") acknowledges and agrees that the site shall not be

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used, and none of the underlying information, software, or technology may be transferred or otherwise exported or re-exported to countries as to which the United States, Switzerland and/or the European Union maintains an embargo (collectively, "Embargoed Countries"), or to or by a national or resident thereof, or any person or entity on the U.S. Department of Treasury's List of Specially Designated Nationals or the U.S. Department of Commerce's Table of Denial Orders (collectively, "Designated Nationals"). The lists of Embargoed Countries and Designated Nationals are subject to change without notice. By using the Service, Customer represents and warrant that they are not located in, under the control of, or a national or resident of an Embargoed Country or Designated National. Customer agrees to comply strictly with all U.S., Swiss and European Union export laws and assume sole responsibility for obtaining licenses to export or re-export as may be required.

This site may use encryption technology that is subject to licensing requirements under the U.S. Export Administration Regulations, 15 C.F.R. Parts 730-774 and Council Regulation (EC) No. 1334/2000.

QAS and its licensors make no representation that the Service is appropriate or available for use in other locations. If Customer uses the Service from outside the United States of America, Switzerland and/or the European Union, Customer is solely responsible for compliance with all applicable laws, including without limitation export and import regulations of other countries. Any diversion of the Content contrary to United States, Swiss or European Union (including European Union Member States) law is prohibited. None of the Content, nor any information acquired through the use of the Service, is or will be used for nuclear activities, chemical or biological weapons, or missile projects, unless specifically authorized by the United States government or appropriate European body for such purposes.

26. Notice

QAS may give notice by means of a general notice on the Service, electronic mail to Customer's e-mail address on record in QAS' account information, or by written communication sent by first class mail or pre-paid post to Customer's address on record in QAS' account information. Such notice shall be deemed to have been given upon the expiration of 48 hours after mailing or posting (if sent by first class mail or pre-paid post) or 12 hours after sending (if sent by email). Customer may give notice to QAS (such notice shall be deemed given when received by QAS) at any time by any of the following: letter sent by confirmed facsimile to QAS at the following fax number: (515) 233-3380; letter delivered by nationally recognized overnight delivery service or first class postage prepaid mail to QAS at the following address: Quality Attributes Software, Inc., 416 Billy Sunday Road, Suite 150, Ames, IA 50010.

27. Modification to Terms

QAS reserves the right to modify the terms and conditions of this Agreement or its policies relating to the Service at any time, effective upon posting of an updated version of this Agreement on the Service. QAS is responsible for notifying Customer of changes to this Agreement.

28. Assignment; Change in Control

This Agreement may not be assigned by Customer without the prior written approval of QAS but may be assigned without Customer's consent by QAS to (i) a parent or subsidiary, (ii) an acquirer of assets, or (iii) a successor by merger. Any purported assignment in violation of this section shall be void. Any actual or proposed change in control of Customer that results or would result in a direct competitor of QAS directly or indirectly owning or controlling 50% or more of Customer shall entitle QAS to terminate this Agreement for cause immediately upon written notice.

29. Marketing

QAS reserves the right to use Customer information provided including, but not restricted to Customer name and logo, for marketing purposes including, but not restricted to, programs that generate awareness and educate and update users on new features, functionality, and news. The format and frequency of

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these marketing messages will not be restricted unless specifically requested by Customer. QAS' GreenTouchscreen®, iBDirectory or iBDonor logo and trademark will be displayed on all software pages and solutions developed.

30. General

With respect to U.S. Customers, this Agreement shall be governed by Iowa law and controlling United States federal law, without regard to the choice or conflicts of law provisions of any jurisdiction, and any disputes, actions, claims or causes of action arising out of or in connection with this Agreement or the Service shall be subject to the exclusive jurisdiction of the state and federal courts located in Ames, Iowa. No text or information set forth on any other purchase order, preprinted form or document (other than an Order Form, if applicable) shall add to or vary the terms and conditions of this Agreement. If any provision of this Agreement is held by a court of competent jurisdiction to be invalid or unenforceable, then such provision(s) shall be construed, as nearly as possible, to reflect the intentions of the invalid or unenforceable provision(s), with all other provisions remaining in full force and effect. No joint venture, partnership, employment, or agency relationship exists between Customer and QAS as a result of this agreement or use of the Service. The failure of QAS to enforce any right or provision in this Agreement shall not constitute a waiver of such right or provision unless acknowledged and agreed to by QAS in writing. This Agreement, together with any applicable Order Form, comprises the entire agreement between Customer and QAS and supersedes all prior or contemporaneous negotiations, discussions or agreements, whether written or oral, between the parties regarding the subject matter contained herein.

31. Definitions

As used in this Agreement and in any Order Forms now or hereafter associated herewith: "Agreement" means these terms of use, any Order Forms, whether written or submitted online, and any materials available on the QAS website specifically incorporated by reference herein, as such materials, including the terms of this Agreement, may be updated by QAS from time to time in its sole discretion; "Content" means the audio and visual information, documents, software, products, data and services contained or made available to Customer in the course of using the Service; "Customer Data" means any data, information or material provided or submitted by Customer to the Service in the course of using the Service; "Effective Date" means date this Agreement is accepted by signing this agreement; "Initial Term" means the initial period during which Customer is obligated to pay for the Service equal to the billing frequency selected by Customer during the subscription process; "Intellectual Property Rights" means unpatented inventions, patent applications, patents, design rights, copyrights, trademarks, service marks, trade names, domain name rights, mask work rights, know-how and other trade secret rights, and all other intellectual property rights, derivatives thereof, and forms of protection of a similar nature anywhere in the world "Order Form(s)" means the form evidencing the initial subscription for the Service and any subsequent order forms submitted online or in written form, specifying, among other things, the number of licenses and other services contracted for, the applicable fees, the billing period, and other charges as agreed to between the parties, each such Order Form to be incorporated into and to become a part of this Agreement (in the event of any conflict between the terms of this Agreement and the terms of any such Order Form, the terms of this Agreement shall prevail); "QAS" means collectively Quality Attributes Software, Inc., an Iowa corporation, having its principal place of business at 416 Billy Sunday Road, Suite 150, Ames, IA 50010; "QAS Technology" means all of QAS' proprietary technology (including software, data, hardware, products, processes, algorithms, user interfaces, know-how, techniques, designs and other tangible or intangible technical material or information) made available to Customer by QAS in providing the Service; "Service(s)" means the specific software features identified during the ordering process, developed, operated, and maintained by QAS, accessible via http://www.qualityattributes.com or another designated web site or IP address, or ancillary online or offline products and services provided to Customer by QAS, to which Customer is being granted access under this Agreement, including the QAS Technology and the Content; "User(s)" means employees, representatives, consultants, contractors,

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visitors or agents that use the Service.

"CUSTOMER"

By: _____

(name)

(title)

Date: 10/15/08

"QAS"
Quality Attributes Software, Inc.

By: _____

(name) GREG THOMPSON

(title) CEO

Date: 10/20/08

Contract or PO #: _____

Billing Contact: Suzanne Hansen

Billing Phone: 651-696-6019

Billing Address: 1600 Grand Ave
St Paul MN 55105

Shipping Contact: Suzanne Hansen

Shipping Phone: 651-696-6019

Shipping Address: 1606 Grand Ave
St Paul MN 55105

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ENERGY AND ATMPOSHERE

CREDIT 6: GREEN POWER

RENEWABLE CHOICE ENERGY EMISSION IMPACT REPORT AND PROPOSAL

RENEWABLE CHOICE ENERGY RENEWABLE ENERGY PURCHASE AGREEMENT

RENEWABLE CHOICE ENERGY CARBON CREDIT PURCHASE AGGREEMENT (NOT PART OF LEED)

July 8, 2008

Suzanne Hansen
Sustainability Coordinator
Macalester College
1600 Grand Ave.
St. Paul, MN 55105

Dear Suzanne,

Enclosed you'll find a free Emissions Impact Report along with a proposal for purchasing renewable energy.

Renewable Choice Energy is the national leader in providing green power options to the green building market. Since 2003, Renewable Choice has helped more than 450 LEED projects earn the Energy & Atmosphere Green Power Credit. By working with Renewable Choice, your green power purchase will be quick, cost-effective, and meaningful.

Renewable Choice is a US Green Building Council member and has a LEED accredited professional on staff. Renewable Choice's clients have enjoyed a 100% success rate achieving LEED credit approval.

Thank you for your work in the world and for your consideration. All of us at Renewable Choice look forward to helping make your green building project a successful one!

Sincerely,

Steve Kemper
Office: (303) 551.7574
Mobile: (303) 587.0915
eFax: (303) 648.5278

INSTITUTE OF GLOBAL CITIZENSHIP

Emissions Impact Report*

Prepared Exclusively for
Institute of Global Citizenship

July 8, 2008

Square Footage:	16,700
LEED Certification:	NC 2.2
Calculation Methodology:	Square Footage Est.
Kilowatt hours a year:	110,220
Kilowatt hours for 2 years:	77,154

(based on 35% option for 1 point)

Institute of Global Citizenship Environmental Impact

CO2 pollution emitted: 150,230 lbs.

Your purchase would be similar to not burning 69,392 pounds of coal

Or not driving 164,006 miles

Or planting 618 trees

* Your Emissions Impact Report is based on the information you've provided.

INSTITUTE OF GLOBAL CITIZENSHIP

The Green Power Advantage

Renewable Choice delivers high quality renewable energy credits (RECs) that satisfy the most stringent industry standards and are Green-e certified, the leading protocol in the industry. (For more about Green-e, see below.) Based on our conversations, I recommend you use the following product to address your electricity consumption and receive your Green Power Credit:

cleanSOURCE

cleanSOURCE

Clean Source is Renewable Choice's national, Green-e certified mixed renewable energy product. Clean Source supports the development of a variety of renewable energy resources by blending credits from a range of facilities including biomass, small-scale hydro, geothermal and wind.

Green-e Certified

About Green-e:

The Green-e program is administered by the nonprofit Center for Resource Solutions, the nation's leading independent certification and auditing program for renewable energy and companies that use renewable energy. The governance board includes members from Environmental Defense, the National Renewable Energy Laboratory, National Resource Defense Council, and the Union of Concerned Scientists, among others. Each year, the Center for Resource Solutions joins with the U.S. Environmental Protection Agency and the U.S. Department of Energy to recognize the leading green power purchasers in the country.

The Green-e Program was established by the non-profit Center for Resource Solutions to provide information and an objective standard for consumers to compare renewable energy options, and to verify that consumers get what they pay for. For more information on Green-e certification requirements, call 1-888-63-GREEN or log on to www.green-e.org.

INSTITUTE OF GLOBAL CITIZENSHIP

Marketing and Educational Support

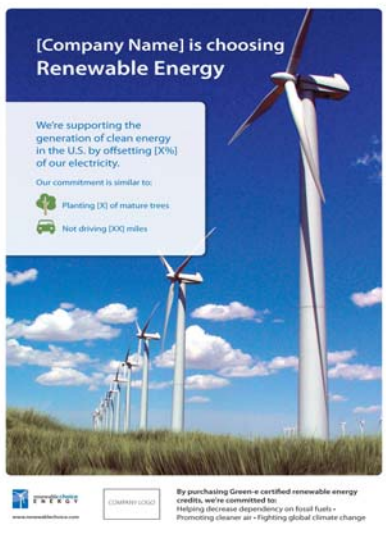
Your purchase does more than offset the pollution your project will emit. It sets an example for other businesses and people to do the same. That's why Renewable Choice helps you make the most of your purchase by providing its industry-leading marketing to support your effort for FREE.

1. Certificate

Your project will receive an 8.5" x 11" certificate printed on recycled paper suitable for framing.

2. Signage

Upon your request, we'll provide you with a poster template to help you promote your renewable energy purchase and associated emissions reductions (Example Below: 16"x 20")



3. Window Clings

These window clings are perfect for a store front or a breakroom. They'll communicate your purchase to building occupants.

4. Logos, Images, and More

We'll provide a customized marketing CD that includes the following resources:

- Digital file of the educational display
- Renewable Choice Energy logos and brand standards
- Wind farm images
- Suggested text for client website

INSTITUTE OF GLOBAL CITIZENSHIP

Pricing

35% Green Power for LEED NC 2.2 EAc6:

*Electrical load based on square footage estimate of 16,700 sq ft x DOE recommended value of 6.6 kWh for Education

Estimated Annual Use:		110,220	kWh
35% of Estimated Use:		38,577	kWh
Multiplied for 2 years:		77,154	kWh
Discounted Price:	$	0.00696	/kWh
Total for 2 yrs and 1 Credit:	**$**	**536.99**	(0.00696 /kWh)

70% Green Power for LEED NC 2.2 EAc6 & an Innovation Credit:

*Electrical load based on square footage estimate of 16,700 sq ft x DOE recommended value of 6.6 kWh for Education

Estimated Annual Use:		110,220	kWh
70% of Estimated Use:		77,154	kWh
Multiplied for 2 years:		154,308	kWh
Discounted Price:	$	0.00694	/kWh
Total for 2 yrs and 2 Credits:	**$**	**1,070.90**	(0.00694 /kWh)

Pricing shown is based on Clean Source energy blend.

This confidential pricing is valid until July 21, 2008 and is subject to change thereafter due to market factors.

Contact Steve Kemper at (303) 551.7574 with comments or questions.

mail 2500 55th Street, Suite 210 . Boulder, CO 80301 . *phone* 877.810.8670 . *web* www.renewablechoice.com

renewable choice ENERGY

CONFIDENTIAL

002
MACALESTER PRESIDENT OFF
03/31/2009 11:51 FAX 651 696 6500

renewable choice ENERGY
2500 55th Street, Suite 210
Boulder, CO 80301
303.468.0405
FAX: 303.648.5769

AMERICAN WIND

Renewable Energy Purchase Agreement

LEED

Account #:

Project Name:	Institute of Global Citizenship		
Contact Name:	Suzanne Hansen	Billing Company:	Macalester College
E-mail Address:	shansen2@macalester.edu	Contact Name:	Suzanne Hansen
Shipping Address:	1600 Grand Ave	E-mail Address:	Shansen2@macalester.edu
	St Paul, MN 55105	Billing Address:	1600 Grand Ave
Phone:	651.696.6019		St Paul, MN 55105
Fax:	651.696.6030	Phone:	651.696.6019
		Fax:	651.696.6030

LEED SUBMITTAL FORM

Based on Expected Emissions for:	Option	Description	Annual kWh	Price ($/kWh)	Annual Amount
2009	100% offset	Green-e Certified American Wind™	76,793	[redacted]	
2010	100% offset	Green-e Certified American Wind™	76,793		

The undersigned agrees that he is authorized to engage in an agreement on behalf of the company below.
By signing, the company agrees to the purchase amount and terms outlined on this page

David M. Wheaton
Printed Name

3/30/2009
Signature / Date

Macalester College, VP for Administration & Finance
Company Name / Title

Representative	Sully Lineberger		
PO Number			
Order Date			
Client Location	MN		
Project Name	Institute of Global Citizenship		
Payment Terms	Net 30		
PA Expiration Date	4/13/09	Created	3/30/09

Order Acceptance: The undersigned agrees that he is authorized to and has accepted this order and the tariffs outlined on this page on behalf of Renewable Choice Energy.

Aran Rice – Vice President of Sales – Renewable Choice Energy

Prospective Product Content Label

This is a renewable certificate product. For every unit of renewable electricity generated, an equivalent amount of renewable certificates is produced. The purchase of renewable certificates supports renewable electricity generation, which can help offset conventional electricity generation in the region where the renewable generator is located. You will continue to receive a separate electricity bill from your utility. This product matches up to 100% of your estimated electricity usage. The product will be made of any or all of the new renewable resources listed below and updated annually.

New[1] Renewable Resources in American Wind™	Generation Location
Wind 100%	Nationwide

[1] Includes renewable generators that first started operating after January 1, 1997 or as regionally defined.

For comparison, the current average mix of energy sources supplying the U.S. includes: Coal (50%), Nuclear (20%), Natural Gas (18%), Large Hydro-electric (7%), Oil (3%), and Renewables (2%). *(data from USEPA E-GRID)*

For specific information about this product, contact Renewable Choice Energy at 877-511-9570 or on the web at www.renewablechoice.com.

Energy

The Green-e® Energy Program certifies that American Wind™ meets the minimum environmental and consumer protection standards established by the non-profit Center for Resource Solutions. For more information on Green-e Energy certification requirements, call 1-888-63-GREEN or log on to www.green-e.org

Questions or comments? Contact us:
Renewable Choice Energy
2500 55th Street, Suite 210
Boulder, CO 80301
www.renewablechoice.com

01/09

Carbon Credit Purchase Agreement

renewable choice ENERGY

2500 55th Street, Suite 210
Boulder, CO 80301
303.468.0405
FAX: 303.648.5769

CHOICEcarbon

Client Name:	Institute of Global Citizenship-Macalester College	Billing Company:	Macalester College
Contact Name:	Suzanne Hansen	Contact Name:	Suzanne Hansen
E-mail Address:	Shansen2@macalester.edu	E-mail Address:	Shansen2@macalester.edu
Shipping Address:	1600 Grand Ave	Billing Address:	1600 Grand Ave
	St Paul, MN 55105.		St Paul, MN 55105
Phone:	651.696.6019	Phone:	651.696.6019
Fax:	651.696.6030	Fax:	651.696.6030

Account #:

Based on Expected Emissions for:	Option	Description	Metric Tons	Price ($/MtCO2e)	Annual Amount	
2009	100% offset	ACR Verified Choice Carbon	33.89	$6.29	$213.02	
2010	100% offset	ACR Verified Choice Carbon	33.89	$6.88	$233.26	

The undersigned agrees that he is authorized to engage in an agreement on behalf of the company below. By signing, the company agrees to the purchase amount and terms outlined on this page

David M. Wheaton
Printed Name

3/30/2009
Signature / Date

Macalester College, VP for Administration & Finance
Company Name / Title

Representative	Sully Lineberger		
PO Number			
Order Date			
Client Location	MN		
Client Name	Institute of Global Citizenship		
Payment Terms	Net 30		
Contract Term	2 yrs		
PA Expiration Date	4/13/09	Created	3/30/09

Order Acceptance: The undersigned agrees that he is authorized to and has accepted this order and the tariffs outlined on this page on behalf of Renewable Choice Energy.

Aran Rice – Vice President of Sales – Renewable Choice Energy

American Carbon Registry

Choice Carbon is verified by American Carbon Registry

Questions or comments? Contact us:
Renewable Choice Energy
2500 55th Street, Suite 210
Boulder, CO 80301
www.renewablechoice.com

MATERIALS AND RESOURCES

CREDIT 2

CREDIT 4.1

MATERIALS AND RESOURCES

CREDIT 2: CONSTRUCTION WASTE MANAGEMENT: DIVERT 50%

MCGOUGH WASTE MANAGEMENT PLAN

BRUNER/COTT & ASSOCIATES CONSTRUCTION WASTE MANAGEMENT

Construction Waste Management Plan

Project: Macalester College Institute for Global Citizenship, St. Paul, MN
Company: McGough Construction
Designated Recycling Coordinator: Amanda Nonnemacher, McGough Construction

Waste Management Goals:

- This project will recycle a minimum of 75% by weight of the waste generated on-site.
- The project site will utilize the Macalester Campus Recycling program for recycling of, non-construction debris. The designated break area will be provided with recycling bins for paper, cans, and bottles.

Communication Plan:

- Waste prevention and recycling activities will be discussed at each site safety/LEED meeting.
- As each new subcontractor comes on-site, they will be presented with a copy of the Waste Management Plan and given a tour of the recycling areas.
- The subcontractors are responsible for separating and recycling/disposing of their own materials. Subcontractors will be expected to make sure their crews comply with the Waste Management Plan.
- All recycling containers will be clearly labeled.
- Lists of acceptable/unacceptable materials will be posted.
- Veit will provide all dumpsters and oversight of waste management progress. Veit will submit monthly Waste Management Progress Reports showing waste recycled and total waste generated.

Expected Project Materials, Disposal, and Handling:

The following chart identifies waste materials expected on this project, their disposal method, and handling procedures.

Material	Disposal Method	Handling Procedure
Concrete	Recycle	Deposit in concrete bin
Wood Scraps	Scraps reused for formwork, etc. Remaining recycled	Stack reusable pieces in boneyard. Place unusable clean wood in wood recycling dumpster
Metal	Recycle	Deposit all metals in metal dumpster
Drywall	Recycle	Deposit all drywall in drywall dumpster
Cardboard	Recycle	Break down and deposit all in cardboard dumpster
Construction/Demo Debris	Recycle	Dispose in mixed construction debris dumpster. Sorted at recycling facility.
Ceiling Tile	Recycle- Armstrong Recycling Program	Stack scraps on pallets. Send to Architectural Sales (Armstrong Certified Recycler).

SECTION 01570

CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

1.02 SUMMARY

A. This Section specifies requirements for the Contractor's implementation of waste management controls and systems for the duration of the Work.

B. The intent of this Section is to develop and implement a waste management plan, quantifying material diversion by either weight or volume to recycle and/or salvage at least 75 percent (LEED Credit MR 2.2) of non-hazardous construction and demolition debris.

1. Excavated soil and land-clearing debris do not contribute to this credit.
2. Incineration does not contribute to this credit.
3. Reuse of existing concrete masonry or asphalt on-site shall include the weight of these materials in the calculations for this credit.
4. Alternative Daily Cover (ADC) may contribute to this credit, with paper documentation.
5. Wood Derived Fuel (WDF) may contribute to this credit, with paper documentation.

C. Sustainable Design Intent: Comply with project requirements intended to achieve certification, measured and documented according to the LEED Green Building Rating System, of the US Green Building Council. Refer to Section 01015, LEED REQUIREMENTS for certification level and certification requirements.

1.03 INTENT

A. The Owner and Architect have established that this Project shall generate the least amount of waste practical and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.

B. Of the waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized to the greatest extent practical.

C. With regard to these goals the Contractor shall develop, for the Architect's review, a Construction Waste Management Plan (CWMP) for this Project.

D. Each Subcontractor shall be responsible for segregating his own waste into different dumpsters as directed by the Contractor.

E. Contractor shall be responsible for ensuring that debris will be disposed of at appropriately designated licensed solid waste disposal facilities.

1.04 SUBMITTALS

A. Waste Management Plan: Within 21 calendar prior to start of demolition, the Contractor shall provide a plan containing the following:

1. Analysis of the proposed jobsite waste to be generated, including types and rough quantities.
2. Landfill Options: The name of the landfills where trash and building debris will be disposed of, the applicable landfill tipping fees, and the projected cost of disposing of all Project waste in the landfills.
3. Landfill Certification: Contractor's statement of verification that landfills proposed for use are licensed for types of waste to be deposited and have sufficient capacity to receive waste from this project.
4. Alternatives to Landfilling: A list of each material proposed to be salvaged or recycled during the course of the Project. Include the following and any additional items proposed:
   a. Cardboard.
   b. Clean dimensional wood. If means of diversion is Wood Derived Fuel (WDF) refer to submittal requirements below.
   c. Beverage containers.
   d. Concrete.
   e. Slurry wall materials.
   f. Bricks and masonry.
   g. Asphalt.
   h. Metals from framing, banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
   i. Mechanical and electrical equipment.
   j. Building components which can be removed relatively intact from existing construction.
   k. Packaging materials.
   l. Glass.
   m. Scraps from new gypsum wall board.
   n. Carpet and pad.
   o. Acoustical ceiling panels.
   p. Plastics.
   q. Vegetation.
   r. Paper.
5. Meetings: A description of the regular meetings to be held to address waste management.
6. Materials Handling Procedures: A description of the means by which any waste materials identified above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.
7. Transportation: A description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site) and destination of materials.

B. Waste Management Progress Report: Concurrent with each Application for Payment, submit a written Waste Management Progress Report in the same format as required for Final Report.

C. Waste Management Final Report: Prior to Substantial Completion, submit a written Waste Management Final Report summarizing the types and quantities of materials recycled and disposed of under the Waste Management Plan. Include the name and location of disposal facilities. Quantity may be measured by either weight or volume; be consistent in calculations. Include the following:

1. Material category.
2. Generation point of waste.
3. Total quantity of waste, by weight.
4. Quantity of waste salvaged, both estimated and actual.
5. Quantity of waste recycled, both estimated and actual.
6. Total quantity of waste diverted (salvaged plus recycled).
7. Total quantity of waste diverted (salvaged plus recycled) as a percentage of total waste.

D. Other Submittals:

1. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
2. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
3. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
4. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
5. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

E. Commingling Waste Vendor Submittals: Provide annual report from state government authority and summary attachment of diverted materials with the average annual recycling rate. Figures in the summary must be derived from the annual reports in concise clear language.

1. Provide tipping invoices for commingled waste and the following:
   a. Vendor’s most recent annual report from state government authority.
   b. Vendor’s annual report summary attachment of diverted materials in tonnage, with the average annual recycling rate.
   c. Vendors must demonstrate compliance with LEED CIR 12.2.05 (Commingled Waste).
2. If Alternative Daily Cover (ADC) was listed as a diverted material in the above, vendors must demonstrate compliance with LEED CIR 5.17.02 (ADC), with the following document:
   a. Letter from the landfill stating that ADC was received from vendor and that the same was actually used as cover, for the same year as the annual report.
3. If Wood Derived Fuel (WDF) was listed as a diverted material in the above, vendors must demonstrate compliance with LEED CIR 2.6.07 (WDF), with the following document:
   a. Letter from the biomass plant stating their DOE operating permit number and that WDF was received from vendor, for the same year as the annual report.

1.05 CONTRACTORS

A. Contractor may subcontract work of this Section to a sub-contractor specializing in recycling and salvaging of construction waste.

B. Acoustical Ceiling Panel Recycling: Demolition and construction waste pulpable mineral fiber ceiling panels may be recycled by Armstrong World Industries and US Gypsum. Contact Armstrong at 1-877-ARMSTRONG (1-877-276-7876) or www.armstrong.com or contact USG at 1-800-USG-4YOU or www.usg.com, to coordinate recycling efforts, apply for product approvals, and receive reclamation procedure requirements.

C. Carpet Recycling: Demolition and construction waste carpet and carpet padding may be recycled by Carpet America Recovery Effort (CARE). Visit www.carpetrecovery.org to locate carpet reclaimers in local project area and reclamation procedure requirements.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 RECYCLING

A. Metal, including but not limited to aluminum stairs, structural beams and sections, and reinforcing steel shall be recycled.

B. Wood that is not painted and does not contain preservatives (i.e. creosote, arsenic, and chromium-containing preservatives) shall be segregated and recycled.

C. Commingling Waste: Commingling waste at the job site may be allowed, provided that the following conditions are met:

1. Comminglers shall be included in the Construction Waste Management Plan (CWMP).
2. Additional comminglers must be pre-approved by the Architect via CWMP addenda, prior to tipping on the job site.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: The Contractor shall designate an on-site person responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.

B. Distribution: The Contractor shall distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor, the Owner and the Architect.

C. Instruction: The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.

D. Separation Facilities: The Contractor shall lay out and label a specific area to facilitate separation of materials for recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials. Location shall be acceptable to the Architect.

1. Waste commingling shall be approved prior to jobsite tipping, per requirements of this Section.

E. Hazardous Wastes: Any unforeseen hazardous wastes shall be separated, stored, and disposed of according to local regulations and as directed by the Owner.

END OF SECTION

MATERIALS AND RESOURCES

CREDIT 4: RECYCLED CONTENT: 10% (post-consumer + ½ pre-consumer)

MATERIAL SPECIFICATION SHEETS

FSC™ PC-5 Novodor® FD 1/3 Hour

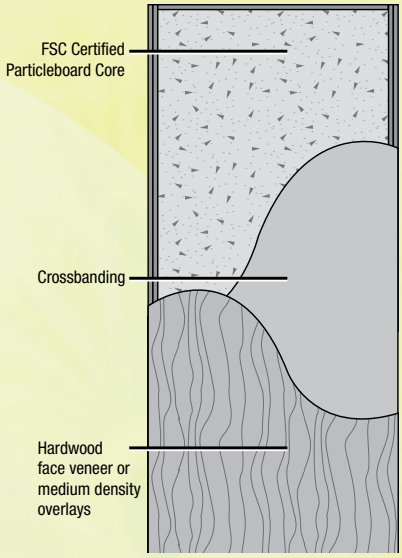
(Neutral or Positive Pressure)

Algoma's Novodor is an architectural door made with FSC Certified particleboard core.

Solid lumber outer stiles, along with Structural Composite Lumber (SCLC) rails and inner stiles, are securely bonded to the core under side pressure. To ensure strength, rigidity and freedom from telegraphing of core parts, this bonded core is then sanded before **hot pressing** a crossband and face on each side of the core assembly. This makes the highest quality assembly for fine hardwood veneers and composite overlays for solid color finishes. **Algoma uses only the better of two grades of particleboard** conforming to ANSI Standard A208.1-1993, Grade LD-2 with face screw holding power of 124 pounds, modulus of rupture of 725 psi, modulus of elasticity of 148,700 psi and density of 30–32 pounds per cubic foot.

Algoma uses only face veneers at least 1/50" (0.5mm) thick at 12% moisture content.

Positive Pressure Note: Algoma recommends using Category B 1/3 hour single swing doors. Please refer to Positive Pressure in Product Features Detail Section below. The selection of Category B 1/3 hour doors will offer cost savings and no aesthetic compromise.



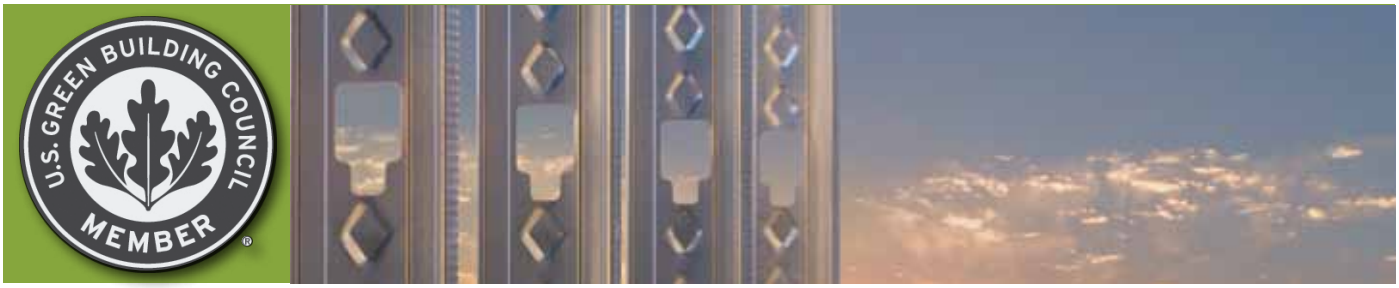
Product Features

THICKNESS – 1 3/4" (44mm) available FD 1/3 hour labeled. 1 3/8" (35mm) available FD 1/3 hour labeled. 2 1/4 (57mm) available, neutral pressure only.
MAXIMUM SIZE – Available prefit up to 4'0" x 10'0" (1219 x 3048mm); Category B: 4'0" x 9'0" (1219 x 2743mm). In FD 1/3 hour, 4'0" x 10'0" is maximum for singles and 8'0" x 10'0" (2438 x 3048mm) pairs. Also available in double egress pairs up to 8'0" x 9'0".
STILES (EDGE BANDS) – 1 3/8" (35mm) prior to factory trimming, glued to core. CE–compatible edges standard. ME–same species available.
SPECIAL EDGE TREATMENTS – To reduce edge damage, polymer edges with FD 1/3 hour label available.
TOP & BOTTOM RAILS – 7/8" (22mm) prior to factory trimming, glued to core; Structural Composite Lumber (SCL).
CORE – FSC Certified, Conforms to ANSI A208.1-1993, GRADE LD-2 covering mat-formed particleboard with face screw holding power of 124 pounds, modulus of rupture of 725 psi, modulus of elasticity of 148,700 psi and density of 30–32 pounds per cubic foot.
REINFORCEMENT – Reinforced top and/or bottom rails are available to eliminate the need for through-bolting when installing closers or holders. Note: Screws must penetrate doors a minimum of 1 1/2". Please see Hardware 5 and 13 for PC-5 reinforcement options.
CROSSBANDS – 1/16" (1.6mm) minimum wood-based composite.
FACES – Various foreign and domestic species, medium density overlay (MDO) and most low sheen .050 thickness High Pressure Decorative Laminates. Faces are a minimum of 1/5 0 " (0.5mm) at 12% moisture content. All faces to be per WDMA I.S.1-A face grades unless otherwise specified.
ADHESIVE – Doors constructed using water-resistant adhesives (Type 1).
VENEER MATCHING – Available in pairs, sets or matching transoms.
DETAILS – Standard lites and louvers available not to exceed 40% of door area and 54" (1372mm) in length. Maximum glass opening on FD 1/3 hour doors is 1,296 sq. in. (0.836m2) with wood beads and clips or metal vision panels. Applied mouldings, quirks, and divided lites also available. Larger lites available with special glazing. (Contact Algoma for positive pressure approvals.)
MACHINING – Available with hinge and lock machining as well as rabbets, holders, drop seals, pivots, etc.
FINISHING – Available in finishes with performance characteristics equivalent to AWI System TR-6, standard or custom colors. Also available primed four sides, painted, or sealed top and bottom. Opaque finish (OP-6) on medium density overlay only.
WARRANTY – For interior, full warranty for life of original installation.
STANDARDS MET OR EXCEEDED – WDMA I.S.1-A Series, ARCHITECTURAL WOOD FLUSH DOORS. Architectural Woodwork Quality Standards Section 1300, Architectural Flush Doors and Section 1500, Factory Finish.
SPECIAL SERVICES – Provides STC rating of 28-32 when supplied with gasketing/drop seal. Provides detention security rating of Grade #40 with ASTM Impact Test F 476.
POSITIVE PRESSURE – CATEGORY A: Singles and pairs have intumescent built into the door, and no additional fire seals are required. If smoke and draft control doors are also required, then a category H seal must be applied to the frame. **CATEGORY B:** Singles and pairs require a category G edge seal applied to the frame. Pairs also require a category G edge seal applied to one of the meeting edges.

The mark of responsible forestry © 1996 Forest Stewardship Council A.C.
FSC-C008037

ALGOMA HARDWOODS, INC.
More than a name...it's a standard.

800.678.8910 • 1001 Perry St • Algoma, WI 54201 • www.algomahardwoods.com



CW LEED Request Form
online at clarkwestern.com

CW plant locations:

Baltimore, MD
Bristol, CT
Pendergrass, GA
Dade City, FL
Dallas, TX
Rochelle, IL
Riverside, CA
Woodland, CA

ClarkWestern LEED® Information and Requirements

LEED Credit MR 2 (Construction Waste Management):

ClarkWestern products are manufactured from cold-formed steel. Steel is 100% recyclable. This attribute can help when diverting construction debris from the waste stream. Recycling construction waste contributes to LEED Credits MR 2.1 and 2.2. The specific contribution will vary by project and must be determined by the contractor. (Up to 2 pts.)

LEED Credit MR 4 (Recycled Content):

ClarkWestern's steel products have a minimum of 25.5% for post-consumer recycled content, and 6.8% pre-consumer. Recycled content of materials contributes to LEED Credits MR 4.1 and 4.2, and possibly an Innovation in Design Credit if the project's overall recycled content exceeds 30%. While ClarkWestern, nationwide, has an average recycled content of 48%, we recommend using the default number of 25.5% post-consumer and 6.8% pre-consumer for your project calculations. If a higher content is desired, ClarkWestern can provide this information if mill certifications are requested at time of order. (Up to 3 pts.)

LEED Credit MR 5 (Regional Materials):

LEED Credit MR 5 requires the job site to be within a 500 mile radius of the manufacturing plant and from the point of extraction of raw materials. With 9 manufacturing locations, ClarkWestern plants as well as our steel sources often fall within the required 500 mile radius. Each product must be tracked from the mill to the recycling center and then these values must be weighted by recycled content percentages. If you wish to report MR 5 Credits please contact ClarkWestern Tech Support at 888-437-3244 for procedures. (Up to 2 pts.)

ClarkWestern Building Systems

ClarkWestern Building Systems, Inc. is an active member of the U.S. Green Building Council with LEED® Accredited Professionals on staff. ClarkWestern is committed to supplying quality products and continually looking for new ways to develop greener building products and sustainable business practices. In total, ClarkWestern products can help your project qualify for up to 7 LEED Credits under LEED for New Construction and Major Renovations, (LEED-NC Ver. 2.2).

EFCO GREEN BUILDING / LEED's STATEMENT

LEED™ is an acronym for "Leadership in Energy and Environmental Design", which is a standard created to manage the development of environmentally responsive buildings and building products. The U.S. Green Building Council has developed, and administers, a points based certification program that identifies the use of these standards in any given design or product. Points are earned in a number of areas, which include preservation and conservation of materials, resources and energy, the use of recycled materials, the indoor environmental quality of occupied space and site planning. Different levels of certification are awarded based on the number of points earned. Tax incentives are the benefit for the successful implementation of these standards. You can read more about LEED's and Green building certification at www.usgbc.org or www.greenerbuildings.com.

Architectural window, curtain wall and storefront performance is an important part of the certification process and is generally specified the same way other projects are. Review your specifications carefully for the performance values needed, make sure they fall in line with our published values and look for references to LEED's or Green building certification. If you require further information or assistance feel free to call your nearest EFCO sales representative or EFCO's engineering tech department (800) 221.4169.

The information below is provided to aid anyone with their LEED's certification submission, by providing them with the percentages of recycled materials used in the major components of EFCO products.

Material Type	Supplier Name	% of Recycled Material
Aluminum Billet	Hydro Aluminum North America	49 % post consumer and 21% post industrial
Oversize Alum Extrusions	Bonnell	49% post industrial and 6% post consumer
Insulating Glass	VIRACON	25% recycled cullet
Insulating Glass	AFG	Minimum 20% recycled cullet.
White bronze hardware	Bronzecraft	Ranges between 85% and 95 %
Cardboard Packaging	Sun Container	Ranges between 20% and 24 %

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Environ Biocomposites, located in Mankato, Minnesota, produces environmentally friendly alternatives to wood composite boards. They use recycled materials and renewable agricultural resources to produce their beautiful and distinctive material options.

Dakota Burl, which utilizes the raw material of sunflower hulls, is made of 84% rapidly renewable and recycled content and is harvested within 250 miles (500 mile maximum) of Mankato, where it is manufactured. This makes Dakota Burl a regional, recycled, and rapidly renewable material, assisting a project earn LEED credits under Materials and Resources.

Dakota Burl is also manufactured with a urethane based resin rather than a urea formaldehyde system utilizing no off-gassing solvents and emitting no VOCs into the atmosphere. This helps a project earn LEED Indoor Environmental Quality credits.

Dakota Burl can be cut, sanded, and routed with traditional wood working tools and stained to change the materials appearance. It is manufactured in four foot by eight foot panels and comes in ½", ¾", and 1" thicknesses. It is intended for indoor horizontal and vertical surfaces including cabinetry, furniture, and architectural applications.

Firestone BUILDING PRODUCTS

ISO 95+™ GL Flat and Tapered

DESCRIPTION:
Firestone ISO 95+ GL flat and tapered roof insulation consists of a closed-cell polyiso foam core laminated to a black glass reinforced mat facer on both major surfaces. Flat and tapered ISO 95+ GL provide outstanding thermal performance on commercial roofing applications, while providing positive roof top drainage to help eliminate ponding water when tapered ISO 95+ GL is used.

All Firestone polyiso insulations use EPA accepted blowing agents and qualify under the Federal Procurement Regulation for Recycled Material. Flat and tapered ISO 95+ GL with IsoGard ™ Foam Technology incorporates a HCFC-free blowing agent that does not contribute to the depletion of the ozone (ODP-free).

METHOD OF APPLICATION:
Insulation shall be neatly fitted to all roof penetrations, projections and nailers. No more insulation shall be installed than can be covered with membrane and completed before the end of each day's work or before the onset of inclement weather.

ISO 95+ GL FLAT AND TAPERED MUST BE INSTALLED USING: Fasteners and plates, hot asphalt or Firestone approved insulation adhesives.

For ballasted systems, the top layer of Firestone insulation may not be mechanically attached.

ISO 95+ GL Flute Span Over Metal Decks				
Thickness	1.0"	1.25"	1.5"-3.8"	4.0"
Span	2.625"	3.675"	4.375"	4.5"

SPECIFICATION COMPLIANCE:
ASTM C1289, Type II, Class 1
UL Classified
FM Class 1 Approved
Manufactured in an ISO 9002 Registered Facility
CAN/ULC-S704, Type 1, Class 3

FM APPROVED

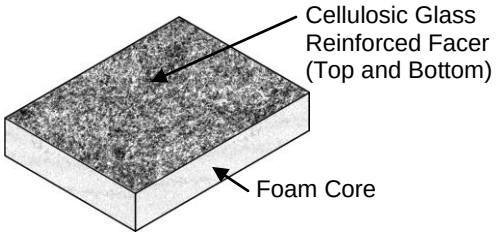
CLASSIFIED C UL US

MIAMI-DADE COUNTY APPROVED

CCMC 13274-L

PIMA QualityMark™ The Certified LTTR-value

This sheet is meant to highlight Firestone's products and specifications and is subject to change without notice. Firestone takes responsibility for furnishing quality materials, which meet Firestone's published product specifications. Neither Firestone nor its representatives practice architecture. Firestone offers no opinion on and expressly disclaims any responsibility for the soundness of any structure. Firestone accepts no liability for structural failure or resultant damages. Consult a competent structural engineer prior to installation if the structural soundness or structural ability to properly support a planned installation is in question. No Firestone representative is authorized to vary this disclaimer.



PRODUCT DATA

Typical Thickness (inches)	(mm)	LTTR* R-Value
1.00	25.4	6.0
1.25	31.7	7.5
1.50	38.1	9.0
1.75	44.5	10.5
2.00	50.8	12.1
2.30	58.4	14.0
2.50	63.5	15.3
2.80	71.1	17.2
3.00	76.2	18.5
3.25	82.6	20.1
3.50	88.9	21.7
3.75	95.3	23.4
4.00	101.6	25.0

**Long Term Thermal Resistance (LTTR) values provide a 15-year time-weighted average in accordance with CAN/ULC-S770.*

POLYISO TYPICAL PROPERTIES

Physical Property	ASTM Test	English Values	Metric Values
Compressive Strength*	D 1621	20 psi, typical	138 kPa, typical
Density	D 1622	2 pcf	32 kg/m^3
Dimensional Stability	D 2126	<2%	<2%
Moisture Vapor Transmission	E 96	<1.0 Perm	<57.5 ng/(Pa•s•m^2)
Water Absorption	C 209	<1% by Volume	<1% by Volume
Service Temperature		-100º to 250º F	-73º to 121º C

**25 psi (172 kPa) available upon request.*

AVAILABLE SIZES:
Flat Boards: 4' x 4' (1.22 m x 1.22 m)
4' x 8' (1.22 m x 2.44 m)
Thickness ranging 1.0" (25.4 mm) to 4.0" (101.6 mm)

Tapered Boards: 4' x 4' (1.22 m x 1.22 m)
4' x 8' (1.22 m X 2.44 m) (special order)
Thickness ranging 0.5" (12.7 mm) to 4.0" (101.6 mm)
Slopes ranging 1/16" per foot (.5%) to ½" per foot (4%)
See chart on page 2.

STORAGE AND PRECAUTIONS:
- Keep insulation dry at all times.
- Elevate insulation above the deck or ground.
- Cover insulation with waterproof tarps.
- Combustible. Refer to MSDS for more information.
- Do not install over wet, damp or uneven substrates.

MANUFACTURING LOCATIONS:

Florence, KY	Corsicana, TX	
Bristol, CT	Jacksonville, FL	Salt Lake, UT
DeForest, WI	Youngwood, PA	

Firestone Building Products Company
250 W. 96th Street, Indianapolis, IN 46260
Sales: (800) 428-4442 • Technical (800) 428-4511
www.firestonebpco.com

TECHNICAL INFORMATION SHEET

901
01/09/2012

LEED INFORMATION:
Firestone ISO 95+ GL flat and tapered can help contribute to overall L.E.E.D. certification due to its thermal efficiency (R-Value), recycled content, and zero ozone depletion. ISO 95+ GL flat and tapered can help achieve valuable credits in the following categories:

- Energy and Atmosphere
  - Benefits of commissioning building energy systems include lower energy use and lower operating costs.
  - Firestone ISO 95+ GL contains the highest R-Value per inch to help assist in the following credits:
    - EA Pre-requisite 2: Minimum Energy Performance
    - EA Credit 1: Optimize Energy Performance (1-19 points)

- Material & Resources
  - Benefits include the reduction of waste, as well the preservation of landfill space and raw materials.
  - Firestone ISO 95+ GL contains recycled content, can be re-used, and is manufactured strategically across the United States.
    - MR Credit 2: Construction Waste Management (1-2 points)
    - MR Credit 3: Material Re-Use (1-2 points)
    - MR Credit 4: Recycled Content (1-2 points)
    - MR Credit 5: Regional Material (1-2 points)

RECYCLE CONTENT OF ISO 95+ GL

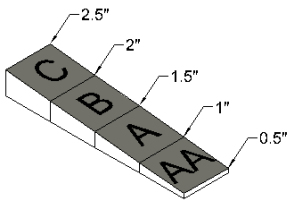
Typical Thickness (inches)	Thickness, (millimeters)	% Post Consumer	% Post Industrial	TOTAL RECYCLE CONTENT
1.00	25.40	37%	15%	52%
1.25	31.75	33%	15%	48%
1.50	38.10	29%	15%	44%
1.75	44.45	26%	15%	41%
2.00	50.80	24%	15%	39%
2.30	58.42	21%	15%	36%
2.50	63.50	20%	15%	35%
2.80	71.12	18%	15%	33%
3.00	76.20	17%	15%	32%
3.25	82.55	16%	15%	31%
3.50	88.90	15%	15%	30%
3.75	95.25	14%	15%	29%
4.00	101.60	14%	15%	29%

LEED Reference Guide information can be obtained on line at http://www.usgbc.org/.
"LEED is trademark of the U.S. Green Building Council."

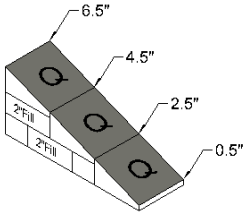
TAPERED ISO 95+ GL (Common Panel Types)

Panel Code	Min-Max Thickness		Slope		Pieces Per Bundle (4'x4')
AA	0.5" - 1.0"	12.7 mm – 25.4 mm	1/8"/ft.	1%	64
A	1.0" - 1.5"	25.4 mm – 38.1 mm	1/8"/ft.	1%	38
B	1.5" - 2.0"	38.1 mm – 50.8 mm	1/8"/ft.	1%	26
C	2.0" - 2.5"	50.8 mm – 63.5 mm	1/8"/ft.	1%	20
G	1.0" - 2.0"	25.4 mm – 50.8 mm	1/4"/ft.	2%	32
H	2.0" - 3.0"	50.8 mm – 76.2 mm	1/4"/ft.	2%	18
I	3.0" - 4.0"	76.2 mm – 100.6 mm	1/4"/ft.	2%	12
X	0.5" - 1.5"	12.7 mm – 38.1 mm	1/4"/ft.	2%	48
Y	1.5" - 2.5"	38.1 mm – 63.5 mm	1/4"/ft.	2%	24
Z	2.5" - 3.5"	63.5 mm – 88.9 mm	1/4"/ft.	2%	16
Q	0.5" - 2.5"	12.7 mm – 63.5 mm	1/2"/ft.	4%	32

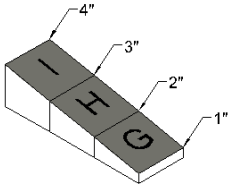
Contact Firestone's Estimating Services Department for a project quotation or for layout guidance. For site assistance or contractor support, contact Firestone's Tapered Project Management Team by calling: 1-800-428-4442 or by emailing: estimatingservicesdept@firestonebp.com



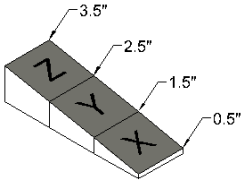
1/8"/ft. Tapered Section



1/2"/ft. Tapered Section



1/4"/ft. Tapered Section



1/4"/ft. Tapered Section

Contact Firestone's Estimating Services Department for a project quotation or for layout guidance. For site assistance or contractor support, contact Firestone's Tapered Project Management Team by calling: 1-800-428-4442 or by emailing: estimatingservicesdept@firestonebp.com

sustainability data sheet

Carousel™

November 2009

With our roots in the landscape and a stated purpose to "Enrich Outdoor Spaces," Landscape Forms has a special relationship to the natural environment. We have always been mindful that as we design and manufacture products that are acted upon by the environment, we act upon it in turn. Environmental sustainability is completely consistent with our purpose, our goals, our values and our principles. We make stewardship of the environment a vital part of our business.

To learn more about our sustainability initiatives, refer to our Environmental Statement.

CAROUSEL IS MANUFACTURED USING THE FOLLOWING MATERIALS:

Material	Parts	Recyclable
steel	supports, seats, surface mount brackets, Steelhead/Catena table top	100%
solid surface acrylic	Marneaux table top	100%

Finishing

All metal is finished with Pangard II ® polyester powdercoat, which is lead-free, hazardous air pollutants-(HAPS) free, does not generate hazardous waste, and contains less than 1% VOCs. Once processed, these trace VOCs are fully inert therefore the finish does not release airborne contaminants.

Packaging Materials	Parts	Recyclable
plastic	product bagged to protect finish	100%
recycled skid		100%
cardboard with 35% recycled content		100%

To find local recyclers visit: for steel: www.recycle-steel.org; for cardboard: www.corrugated.org.

LEED®

This product may help achieve the following points under the LEED 2009 Rating System. For specifics regarding rules for the inclusion of furniture, please consult the rating system and reference guide that applies to your project.

IEQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control

Intent

To prevent or minimize exposure of building occupants, indoor surfaces and ventilation air distribution systems to environmental tobacco smoke (ETS).

Benches, tables, chairs and ash urns help create a designated smoking area 25 feet or more from entries, outdoor air intakes and operable windows to support the intent of this prerequisite.

Materials and Resources

MR Credit 4, Recycled Content

Intent
To increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.

Recycled Content

Style	Total	Post Consumer	Pre Consumer
grid or perforated seats	90	59	31

MR Credit 5, Regional Materials

Intent
To increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

This product is manufactured in our Kalamazoo, MI facility, zip code 49048. For calculations regarding material extraction, please contact Landscape Forms.

CARE AND MAINTENANCE

Carousel is designed and engineered to live a long, useful life in outdoor spaces without the use of chemical cleaners to maintain the finish. The durability, longevity and low maintenance of our products contribute to responsible stewardship of the earth's resources.

All metal is finished with Landscape Forms' proprietary Pangard II® polyester powdercoat, a hard yet flexible finish that resists rusting, chipping, peeling and fading and requires no cleaning solvents once installed. Clean surface as needed using a soft cloth or brush with a mild detergent. Avoid steam cleaning, abrasive cleansers, carbon steel brushes/wools and cleaners containing chlorine. Outdoor use will require periodic finish inspection and maintenance. Inspect periodically for scratches, nicks and gouges. Touch-up paint is included with every order and can be used to repair minor nicks and scratches.

Marneaux® Solid Surface Table Tops: Use a conventional cleaning agent such as an ammonia-based liquid cleaner (glass cleaner). Dry stains can be removed with Scotch-Brite scouring pad by 3M or a mild abrasive cleaner. Remove burns or scorches by sanding with coarse grit sandpaper followed by finer grit sandpaper. Follow sanding with a Scotch-Brite 7447 red pad by 3M (or equivalent) to match finish of sanded area to surrounding area. Small chips may be sanded smooth.

Stainless Steel: Clean as needed using a soft cloth or brush with a mild detergent. Avoid steam cleaning, abrasive cleansers, carbon steel brushes/wools and cleaners containing chlorine. Stainless steel cleaners may be used on stainless tabletops to remove stubborn stains.

sustainability data sheet

Sonoma™

November 2009

With our roots in the landscape and a stated purpose to "Enrich Outdoor Spaces," Landscape Forms has a special relationship to the natural environment. We have always been mindful that as we design and manufacture products that are acted upon by the environment, we act upon it in turn. Environmental sustainability is completely consistent with our purpose, our goals, our values and our principles. We make stewardship of the environment a vital part of our business.

To learn more about our sustainability initiatives, refer to our Environmental Statement.

SONOMA IS MANUFACTURED USING THE FOLLOWING MATERIALS:

Material	Parts	Recyclable
steel	supports, back panel, arms	100%
wood	seat panel	100%

Finishing

All metal is finished with Pangard II ® polyester powdercoat, which is lead-free, hazardous air pollutants-(HAPS) free, does not generate hazardous waste, and contains less than 1% VOCs. Once processed, these trace VOCs are fully inert therefore the finish does not release airborne contaminants.

Landscape Forms wood furniture for outdoor use is manufactured from wood species that weather naturally in outdoor settings to a beautiful pewter gray. We do not apply paints or finishes to these products and do not recommend the use of finishes which would require ongoing maintenance programs as the wood weathers. Our wood furniture for indoor use is finished with LF 80, a clear, catalyzed low-VOC acrylic finish.

Packaging Materials	Parts	Recyclable
plastic	product bagged to protect finish	100%
recycled skid		100%
cardboard with 35% recycled content		100%

To find local recyclers visit: for steel: www.recycle-steel.org; for cardboard: www.corrugated.org.

LEED®

This product may help achieve the following points under the LEED 2009 Rating System. For specifics regarding rules for the inclusion of furniture, please consult the rating system and reference guide that applies to your project.

IEQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control

Intent

To prevent or minimize exposure of building occupants, indoor surfaces and ventilation air distribution systems to environmental tobacco smoke (ETS).

Benches, tables, chairs and ash urns help create a designated smoking area 25 feet or more from entries, outdoor air intakes and operable windows to support the intent of this prerequisite.

Materials and Resources

MR Credit 4, Recycled Content

Intent
To increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.

Recycled Content

Style	Total	Post Consumer	Pre Consumer
backed	63	41	22
backless	21	14	7

MR Credit 5, Regional Materials

Intent
To increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

This product is manufactured in our Kalamazoo, MI facility, zip code 49048. For calculations regarding material extraction, please contact Landscape Forms.

MR Credit 7, Certified Wood

Intent
To encourage environmentally responsible forest management.

Landscape Forms is certified for Forest Stewardship Council Chain of Custody. Certification registration number SW-COC-001261. This product is offered with FSC certified wood as an option. Contact Landscape Forms for pricing and lead times.

CARE AND MAINTENANCE

Sonoma is designed and engineered to live a long, useful life in outdoor spaces without the use of chemical cleaners to maintain the finish. It is tested to BIFMA durability standards. The durability, longevity and low maintenance of our products contribute to responsible stewardship of the earth's resources.

All metal is finished with Landscape Forms' proprietary Pangard II® polyester powdercoat, a hard yet flexible finish that resists rusting, chipping, peeling and fading and requires no cleaning solvents once installed. Clean surface as needed using a soft cloth or brush with a mild detergent. Avoid steam cleaning, abrasive cleansers, carbon steel brushes/wools and cleaners containing chlorine. Outdoor use will require periodic finish inspection and maintenance. Inspect periodically for scratches, nicks and gouges. Touch-up paint is included with every order and can be used to repair minor nicks and scratches.

Wood: Exterior woods require no maintenance. If desired, the surface may be scrubbed with warm soapy water and soft bristle brush. Pressure washing, steel wool/wire brushes are not recommended. Heavily ingrained stains may be sanded away with fine grade sandpaper worked in the direction of the grain. Sanded wood will weather to a gray patina. Interior woods require only dusting or occasional cleaning with a good-quality furniture polish.

Purekor MDF Plus

Description

Purekor MDF Plus is a premium grade MDF panel that contains no added Urea Formaldehyde and uses fiber that contains 100% pre-consumer recycled.

LEED Credits

MR 4.1 + 4.2
MR 5.1 + 5.2 (location dependent)
EQ 4.4

Uses

PureKor MDF Plus can be used in multiple interior applications, ranging from interior paneling, cabinetry, store fixtures and displays, case backs, veneered cores, hardwood plywood cores, molding, millwork, trim, doors, and furniture-both household and office

.

Features/Customer Benefits

Multiple LEED Credits:
Contributes to multiple LEED Credits simultaneously
Moisture Resistant:
Can be used in any interior location
Superior bonding:
Bonds well with all common glues
Superior physical properties:
Allows for great machinability and cutting
Resists warping:
Provides superior dimensional stability
Broad selection of thicknesses:
Available from 1/4” to 1 1/4”
Melamine Laminated:
Available in a variety of melamine laminates
Class A Fire Retardant:
Also available as a Class A Fire Retardant Panel
See Pyroblock MDF Plus

Service

McKillican can provide you with all your green forest product needs. Our product experts are available to answer any questions you may have regarding this product or any other, as well as LEED® requirements.

Specifications

Most thicknesses are available in all panel sizes. Purekor MDF Plus is made with no added urea formaldehyde and is produced in accordance with the requirements of ANSI A208.2-2002 as per ASTM E 1037-96a Part A. Purekor and Pyroblock are registered trademarks of Panel Source.

Sizes/Thicknesses

Thicknesses	1/4”, 3/8”, 1/2”, 5/8”, 11/16” 3/4”, 1”, 1 1/8”, 1 1/4”
Finished Mat Size	49”X97”, 49”X109”, 49”X121” 61”X97”, 61”X109”, 61”X121”
Thickness Tolerance	+/- .005” average thickness
Length/Width Tolerance	+/- 1/32” per lineal foot

Physical Properties

Modulus of Rupture	4750 psi	(33.8 N/mm2)
Modulus of Elasticity	490,000 psi	(3378 N/mm2)
Internal Bond	125 psi	(0.85 N/mm2)
Screw Hold (face)	325 lbs	(1445 N)
Density	48lbs / cu ft	(770kg/M3)
Color	Light to medium brown	

Panel Source – A Division of McKillican International, Inc.
www.mckillican.com **www.panelsource.net**
Green Building Information Center: 1-877-464-7246

SDF

sustainable design fiberboard

Features & Benefits

- Awarded CARB NAF Exemption due to formaldehyde-free adhesive system
- Performance characteristics equal to standard MDF
- Most affordable SDF product
- Meets physical properties of ANSI A208.2-2009 130-F11
- ANSI MR10 moisture resistant properties on thicknesses ≥ 5/8"
- FSC® certified panels available upon request

Mill Capabilities

- Panels available in 4' and 5' widths and lengths up to 18'
- Thicknesses ranging from 1/4" - 1-1/2"
- Minimum order may be required for some sizes

Handling & Installation

- Store indoors on a flat, level surface away from products containing urea-formaldehyde. Provide adequate support to prevent sagging
- Refer to Architectural Woodwork Standards (AWS) for fabrication and installation procedures.
- For best results, Arreis® should be conditioned to the environment 48-72 hours prior to installation.

How to Specify

Industrial Grade Medium Density Fiberboard (MDF), manufactured with a formaldehyde-free adhesive system and which meets the physical properties of ANSI A208.2-2009 Grade 130 specifications.

Finished Product Options

- Decorative Surfaces
- Hardwood Veneer
- Pre-primed, profiled, lineal mouldings

Ask your SierraPine sales representative for more information.

Ideal Applications

- LEED® Projects
- Cabinetry
- Furniture
- Moulding & Millwork
- Casework
- Wall Panels
- Shelving
- Retail Fixtures
- Museum Displays

arreis®

When the earth demands affordable excellence

Arreis®, a sustainable medium density fiberboard (MDF) panel manufactured from pre-consumer recycled wood residuals, meets the most stringent formaldehyde emission standards in the world. SierraPine's patent pending manufacturing process utilizes a formaldehyde-free adhesive system to produce Arreis®, the ideal sustainable design fiberboard (SDF) for commercial interior applications.

Technical Data	Imperial	Metric
Density	48 lb/ft^3	769 kg/m^3
Internal Bond	115 lb/in^2	0.79 N/mm^2
Modulus of Rupture	4,200 lb/in^2	28.94 N/mm^2
Modulus of Elasticity	420,000 lb/in^2	2894 N/mm^2
Modulus of Hardness	1,000 lbs, Janka ball	4,448 N
Screw Holding, Face	225 lbs	1,001 N
Screw Holding, Edge	180 lbs	801 N
Thickness Tolerance	± 0.005 inch	±0.127 mm
Thickness Swell	5%	
Linear Expansion	0.3%	
Water Absorption	8%	
Flame Spread Rating	Class C (3)	
Moisture Content	4 - 6%	
Formaldehyde Emissions	as low as 0.01 ppm	

Average physical properties for 3/4" panel when tested in accordance with ASTM D1037. Emissions tested in accordance with ASTM E-1333. Specific design applications and technical data are available upon request.

FSC© C014647
The mark of sustainable forest management

SCS Certified
Pre-Consumer Recycled Wood Fiber
No-Added Formaldehyde

EPP Certified
Specification CPA EPPS 3-08
CARB Third Party Certifier TPC-1

LEED® 2009 Credits Supported
Materials & Resources: 4, 5, 7
Indoor Environmental Quality: 4.4

CHPS Compliant
Meets Materials Specifications for VOC emissions section 01350

Japanese F-4 Star
MLIT Certified

SierraPine warrants that its products will meet the specifications applicable to such products in effect at the time of shipment as disclosed to customer and available on SierraPine's website at www.sierrapine.com under Terms & Conditions. Any claim for breach of such warranty must be received by SierraPine within 90 days after delivery of products to customer. SierraPine makes no other warranty or guarantee, either express or implied, including implied warranties of merchantability and of fitness for a particular purpose to the original purchaser or to any subsequent user of the products, except as expressly contained in our Terms & Conditions. In the event state or provincial law precludes exclusion or limitation of implied warranties, the duration of any such warranties shall be no longer than, and the time and manner of presenting any claim hereon shall be the same as, that provided in the express warranty stated therein.

SierraPine COMPOSITE SOLUTIONS

800-676-3339

3010 Lava Ridge Ct., Suite 220, Roseville, CA 95661
www.sierrapine.com

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Sustainability Tables

Related USGBC LEED Credits	MR 4		EQ 4			MR 5
Product Family:	Post-Consumer	Pre-Consumer	Content or CHPS	Formaldehyde & VOC Emission	Approx. Density lbs /cu ft	Raw Materials (percentage by weight) Values based on average during:2009 January through December
Steel framing	0	25%				Steel: (material location varies both US and international)
Paper tape	0	0				Paper: manufactured at Gypsum, OH; (paper from Georgetown, SC)
Glass fiber tape	0	0				Fibrous glass
Paper-faced bead	0	25%				Steel, Paper, Adhesive: manufactured in Auburn, WA & Weirton, WV.
Metal bead	0	25%				Steel: (material location varies)
SHEETROCK® BRAND FIRST COAT	0	0	< 50 g/L			40% Water, 20% Polymer, 20% Clay, 10% Limestone: manufactured at Gypsum, OH
SHEETROCK® COVER COAT™ compound	0	0	< 2 g/L.		105	50% Limestone, 30% Water, 5% Mica, 5% Latex, & 5% Attapulgite: Manufactured at East Chicago, In; Port Reading, NJ; & Jacksonville, FL.
SHEETROCK® Joint compound – Ready mix (drying type)	0	0	< 2 g/L.		67-105	50% Limestone, 30% Water, 5% Mica, 5% Polymer Emulsion, & 5% Clay: North East Plants: Baltimore, MD; Gypsum, OH; & Port Reading, NJ. South Central Plants: Bridgeport, AL; Chamblee, GA; East Chicago, IN; Fort Dodge, IA; & Jacksonville, FL. Western Plants: Auburn, WA; Dallas, TX; Galena Park, TX; Phoenix, AZ; Sigurd, UT; & Torrance, CA. Canadian Plants: Hagersville, Ontario; Montreal, Quebec; Calgary, AB.; Surrey, BC.
SHEETROCK® Joint Compound – Setting Type	0	0	NA		40-80	60% Plaster of Paris, 20% Limestone & 10% Mica-only in the U.S.: (Mixed on Job Site) North East Plants: Gypsum, OH (plaster from Fort Dodge, IA); & Port Reading NJ (plaster from Fort Dodge, IA). South Central Plants: Chamblee, GA (plaster from Southard, OK); East Chicago, IN (plaster from Fort Dodge, IA); Fort Dodge, IA (plaster onsite); & Southard, OK (plaster onsite). Western Plants: Auburn, WA (plaster from Mexico); Dallas, TX (plaster from Southard, OK); Phoenix, AZ (plaster from Southard, OK); & Torrance CA (plaster from Southard, OK). Canadian Plants: Hagersville (plaster from); Montreal (plaster from); Surrey (plaster from).
SHEETROCK® TUFF-HIDE™ primer-surfacer	0	0	< 50g/L		100	90% Polymer Emulsion, <5% Silica, <5% Talc: manufactured at Gypsum, OH; Dallas, TX; Jacksonville, FL; or Phoenix, AZ.
MICORE™ 160 & 300 panels (12% rapid renewable content.)	19%	37%	Pass	Low	3	28% Perlite,12% Starch, Clay; 4%, 37% Mineral Wool from Red Wing, MN; 19% recycled paper: manufactured at Cloquet; MN
USG DONN® Brand AX™ Aluminum Suspension System	68	22				Recycled Aluminum: manufactured at Oakville, Ontario, Canada.
USG DONN® Brand Hot-Dipped Galvanized Steel, and Stainless Steel Suspension Systems	25 to 50%	6 to 8%				US and foreign steel: manufactured at Cartersville, GA; Oakville, Ontario, Canada; Stockton, CA and Westlake, OH (Steel can specify US material, paint locally supplied). See USG Design Studio LEED Report Tool for specific information: (http://www.usgdesignstudio.com/LEEDreport.asp)
SHEETROCK® Acoustical sealant	0	0	15 g/L			Limestone, Water, Polymer Emulsion: manufactured at Toronto, Ontario, Canada
SHEETROCK® FIRECODE® Brand Compound	0	0	NA			60% Plaster of Paris, 20% Limestone & 10% Mica: (Mixed on Job Site) Manufactured at Gypsum, OH (plaster from Fort Dodge, IA)

Valders Stone & Marble, Inc.

www.valdersstone.com

From Stone to Sign

When it comes to designing with natural stone, we can fabricate whatever your heart desires! The Chelstars logo was scanned from a business card and converted to a software picture format (jpeg.) It was then imported into CorelDraw and using the trace capabilities of the software, converted to a vector drawing. Vector drawings differ from photos in that they are much more easily manipulated. The paw prints came from stock clipart. After a couple revisions with the owner, the final layout was approved and sent to have a rubber template made. The stone slab was chosen from our Valders facilities, where our skilled tradesmen sandblasted the sign and painted it to the customer's specification.

Macalestar College Receives LEED Platinum Certification for Markim Hall (IGC)

Markim Hall on the campus of Macalestar College in St. Paul, MN has been awarded LEED Platinum certification from the U.S. Green Building Council. Platinum certification is the highest possible rating for a building, and Markim Hall is the first higher educational building in the state of Minnesota to achieve this certification level.

LEED (Leadership in Energy and Environmental Design) certification verifies through independent audit that a building's design meets the highest performance and Green Building standards.

Macalester College, with the guidance of Bruner/Cott & Associates of Cambridge, MA, set a goal to design a structure with sustainability in mind. They needed to meet the needs of the college and students, while at the same time blending the look with the existing buildings already on campus. The architects at Bruner/Cott and the project's General Contractor, McGough Construction of St. Paul, worked locally with Valders Stone & Marble's dealer in the twin cities, ACME Ochs Brick & Stone. Together the partners produced and delivered a unique building stone veneer package, using our Valders Gray dolomitic limestone in a very basic, yet elegant split-face finish. Natural stone was selected for the majority of the building's exterior cladding, which also includes other products that helped contributed to the Platinum rating. Some very uniquely shaped pieces of stone were used near the main entry and the outer corners to give the stone an almost seamless appearance as it continued around the building.

LEED PLATINUM CERTIFIED

Valders Stone & Marble would like to congratulate Macalester College and all those involved on a job well done. For more information and pictures of Markim Hall (Institute for Global Citizenship) visit http://www.macalester.edu/igc/markimhall/.

Advanced Freeze-Thaw Durability Testing Results

Many areas of the country are susceptible to bitter cold temperatures. Freezing and thawing cycles can deteriorate, even destroy masonry or stone over time. The successful use of Valders stone has been well documented for over half of a century. Tests were recently conducted in accordance with ASTM guidelines. The results clearly showed that Valders stone exhibited no signs of distress, and registered at 0.0% mass loss after all 35 cycles. No matter what Mother Nature decides to unleash, you can feel at ease knowing you picked the best quality limestone available.

GO GREEN! *Receive our newsletter electronically! E-mail us at marketing@valdersstone.com.*

Wet-Dry Testing Results

Valders stone has been known for decades as a quality building stone, but not many people know that it is also one of the premier choices for rip rap stone. Millions of tons of our material have been doing an excellent job protecting the shorelines of the Great Lakes and other inland water bodies. What makes Valders stone such a suitable match for this harsh application? Durability! To help affirm this statement, we've recently had wet/dry durability testing completed on our stone. During the testing, the stone is subjected to 80 wet-dry cycles. At the completion of this testing there was no evidence of distress and the stone samples had experienced a Mass Loss of 0.0-0.1%. Typically, an industry accepted average is 2%.

May 23, 2008

VIA E-MAIL

Mr. Shawn Grave
Minnesota Acoustics
Maple Grove, MN
E-Mail: shawn@mnacoustics.com

Dear Shawn:

Project: Macalaster Institute
St. Paul, MN
Installation Date: 3rd Qtr 2008

Armstrong ceiling, wall, and suspension system products contain varying amounts of recycled material. Effective March 2008, the total recycled material content is:

	MR Credits 5.1, 5.2			MR Credit 4.1, 4.2			MR Credit 6.0
Product	**Mfg. Plant**	**Mfg. Plant Distance from Project**	***Regional Material (w/i 500 miles of project)**	**Total Recycle Content**	**Post Industrial**	**Post Consumer**	**Rapidly Renewable**
Ultima, #1912HRC	N/A	>500 miles	0%	80%	65%	15%	4.3%
MetalWorks, #9420U6A2MY	N/A	>500 miles	0%	25%	25%	0%	0%
Suprafine Grid	N/A	>500 miles	0%	30%	7%	23%	0%
Prelude Grid	Benton Harbor, MI	387 miles	0%	30%	7%	23%	0%

Notes:
*Raw Material information not pertinent, mfg. plant and/or source >500 miles from project.

The post consumer recycled content includes ceilings recycled from the renovation of old buildings through the Armstrong Recycling Program. The recycled content figures do not include production trim and scrap, which are reused in the manufacturing process.

Armstrong World Industries, Inc.
P.O. Box 3001 Lancaster, Pennsylvania 17604
T: [717] 397-0611

Armstrong

The composition is subject to change according to plant and date of production and must be verified periodically. The most up-to-date information regarding recycled content can be found on the Armstrong website at www.ceilings.com.

* The Federal Trade Commission guidelines on environmental claims define recycled content as that material having been recovered or diverted from the solid waste stream, either during the manufacturing process (pre-consumer) or after consumer use (post-consumer).

Sincerely,

Lori Chappory
Technical Specialist
Armstrong Building Products

WINDOW

SIMPLY REVOLUTIONARY™

Regarding the Macalester Institute for Global Citizenship

If the Glass is suppose to be Cardinal, the recycled glass content in the raw glass manufacturing is 23% (pre consumer)

The exterior aluminum extruded by Gordon Aluminum for H Window Company is **Virgin Billet**, which means there is **NO** recycled content in extrusions made for HWC.

H Window Company, LLC • 401 17th Avenue West • Ashland, WI 54806
Phone: (715) 685-2793 • Fax: (715) 685-9441 • (800) THE-H-WAY

DensGlass Gold®
Exterior Sheathing

Georgia-Pacific Gypsum Sustainable Materials Data Sheet

(See MSDS for additional information)

SECTION 1 Product and Company Identification

Product Name: DensGlass Gold® Sheathing. Performance qualities of this product based upon material composition are obtained by referencing ASTM C 1177 and applicable sections of ASTM C 1396.

Product Use: Glass mat facers, moisture resistant gypsum sheathing board.

Manufactured by:

Georgia-Pacific Gypsum LLC
133 Peachtree Street
Atlanta, GA 30303
(800) 225-6119 (Technical Information)
(404) 652-5119 (MSDS Request)

Georgia-Pacific Canada, Inc.
Allanburg Road
Thorold, Ontario L2V 3ZB, Canada
(800) 225-6119 (Technical Information)
(404) 652-5119 (MSDS Request)

SECTION 2 Materials and Resources (MR) Recycled Content

LEED for New Construction: MR 4.1 & 4.2
LEED Core & Shell: MR 4.1 & 4.2
LEED for Retail: MR 4.1 & 4.2
LEED for Schools: MR Credit 4

Manufacturing Location	Total Recycled Content	Pre Consumer Recycled Content	Post Consumer Recycled Content
Acme, TX	0%	0%	0%
Antioch, CA	0%	0%	0%
Blue Rapids, KS	0%	0%	0%
Brunswick, GA	0%	0%	0%
Caledonia, ON	4%	4%	0%
Camden, NJ	3%	3%	0%
Edmonton, AB	0%	0%	0%
Ft. Dodge, IA	4%	4%	0%
Las Vegas, NV	0%	0%	0%
Lovell, WY	0%	0%	0%
Long Beach, CA	0%	0%	0%
Savannah, GA	2%	2%	0%
Sigurd, UT	0%	0%	0%
Surrey, BC	0%	0%	0%
Tacoma, WA	(see below)	(see below)	0%

For current Tacoma, WA plant total recycled content information, call the Technical Services Hotline at 1-800-225-6119.

Plants are being added on an on-going basis. Please call the technical information line to determine if a closer plant has been brought on-line.

continued on next page

Materials and Resources (MR) Local and Regional Materials

LEED for New Construction: MR 5.1 & 5.2
LEED Core & Shell: MR 5.1 & 5.2
LEED for Retail: MR 5.1 & 5.2
LEED for Schools: MR Credit 5

Please determine the distance in statute miles to your project site from the closest DensGlass Gold® manufacturing location.

Manufacturing Location	Extraction Location
Acme, TX	Acme, TX
Antioch, CA	San Marcos Island, Mexico
Blue Rapids, KS	Blue Rapids, KS
Brunswick, GA	Port Hawkesbury, Nova Scotia
Caledonia, ON	Port Hawkesbury, Nova Scotia
Camden, NJ	Port Hawkesbury, Nova Scotia
Edmonton, AB	Canal Flats, BC
Ft. Dodge, IA	Ft. Dodge, IA
Las Vegas, NV	St. George, UT
Long Beach, CA	San Marcos Island, Mexico
Lovell, WY	Lovell, WY
Savannah, GA	Port Hawkesbury, Nova Scotia
Sigurd, UT	Emery, UT
Surrey, BC	San Marcos Island, Mexico
Tacoma, WA	San Marcos Island, Mexico/Centralia, WA
Wheatfield, IN	Wheatfield, IN

SECTION 3 Environmental Quality (EQ)

LEED for New Construction: EQ Credit 3.1 Construction IAQ Management Plan: During Construction
LEED Core and Shell: EQ Credit 3 Construction IAQ Management Plan: During Construction
LEED for Retail: EQ Credit 3.1 Construction IAQ Management Plan: During Construction
LEED for Schools: EQ Credit 3 Construction IAQ Management Plan: During Construction

Potential Technologies and Strategies

The use of DensGlass Gold can be considered a potential technology and a component of an IAQ management plan during construction. By the nature of its paperless construction, it avoids the contamination of absorptive materials such as traditional paper faced gypsum sheathing.

When tested as manufactured, product resists growth of mold pursuant to the test method ASTM D 3273 and may qualify for a LEED Innovation Credit based upon the environmental mitigation of mold and mildew related to Indoor Air Quality (IAQ). Additionally, in fire-rated assemblies, product is a Type X product according to ASTM E 119 and ASTM C 1177.

**All LEED rating point references are suggested applications of Dens™ to the LEED rating system. LEED applicants should use their own objective determinations of product attributes for LEED certification purposes.*

continued on next page

Georgia-Pacific Gypsum

SALES INFORMATION AND ORDER PLACEMENT

U.S.A. Midwest: **1-800-876-4746** West: **1-800-824-7503**
South: **1-800-327-2344** Northeast: **1-800-947-4497**

CANADA Canada Toll Free: **1-800-387-6823**
Quebec Toll Free: **1-800-361-0486**

TECHNICAL INFORMATION

Georgia-Pacific Gypsum Technical Hotline
U.S.A. and Canada: **1-800-225-6119**
Mon.-Fri., 8 a.m.-5 p.m. ET
www.gpgypsum.com

Some of our products have been certified by Scientific Certification Systems (SCS). SCS is an internationally recognized third-party evaluation, testing and certification organization. Its program spans a wide cross-section of the economy, including manufacturing and retailing, consumer products, the energy industry, and the home improvement and construction sectors. For details on specific Georgia-Pacific Gypsum products and plants, please contact our Technical Hotline: 800-225-6119.

CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

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TRADEMARKS

The Georgia-Pacific logo and all trademarks are owned by or licensed to Georgia-Pacific Gypsum LLC.

UPDATES AND CURRENT INFORMATION

The information in this document may change without notice. Visit our website at www.gpgypsum.com for updates and current information.

LIMITATION OF REMEDIES AND DAMAGES

Unless otherwise stated in our written warranty for these products, our sole liability for any product claim shall be limited to reimbursement of the cost of repair or replacement of the affected product, up to a maximum amount of two times the original purchase price for the affected product. We shall not be responsible under any circumstances for lost profits, damage to a structure or its contents, or indirect, incidental, special or consequential damages. Claims shall be deemed waived if they are not submitted to us in writing within ten (10) days after discovery.

CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

HANDLING AND USE

CAUTION: This product contains fiberglass. Fibers and dust may be released from this product during normal handling and may result in skin, eye and respiratory irritation. Avoid breathing dust and contact with the skin and eyes. Follow these standard work practices: Wear a loose-fitting, long-sleeved shirt and long pants, protective gloves and eye protection (goggles or safety glasses with side shields). Wear a dust mask when sanding. Additional protection such as NIOSH-approved dust mask may be needed in poorly ventilated areas or when very dusty. Do not use a power saw. For Material Safety Data Sheet or additional information, call 1-800-225-6119 or visit www.gpgypsum.com.

FIRE SAFETY CAUTION

Passing a fire test in a controlled laboratory setting and/or certifying or labeling a product as having a one-hour, two-hour, or any other fire resistance or protection rating and, therefore, as acceptable for use in certain fire rated assemblies/systems, does not mean that either a particular assembly/system incorporating the product, or any given piece of the product itself, will necessarily provide one-hour fire resistance, two-hour fire resistance, or any other specified fire resistance or protection in an actual fire. In the event of an actual fire, you should immediately take any and all actions necessary for your safety and the safety of others without regard for any fire rating of any product or assembly/system.

•MR CREDIT 3.1: Material Reuse: 5% (1 pt.)

The intent of MR Credit 3.1 is to reuse building materials in order to reduce waste. Salvaged materials should constitute a minimum of 5% based on cost of the total value of materials on the project.

•MR CREDIT 3.2: Material Reuse: 10% (2 pts.)

The intent of MR Credit 3.1 is to reuse building materials in order to reduce waste. Salvaged materials should constitute a minimum of 10% based on cost of the total value of materials on the project.

Firestone Solution: Firestone suggests opportunities in re-using ballast, insulation (non wet or damaged).

•MR CREDIT 4.1 Recycle Content: 10% (1 pt.)

The intent of MR Credit 4.1 is to increase the demand for building products that incorporate recycle content. Recycled material should constitute at least 10% based on the total value of the materials on the project.

•MR CREDIT 4.2 Recycle Content: 20% (2 pt.)

The intent of MR Credit 4.1 is to increase the demand for building products that incorporate recycle content. Recycled material should constitute at least 20% based on the total value of the materials on the project.

Firestone Solution: Firestone, in a an effort to meet this requirement uses the following amounts of post industrial and post consumer waste: (metals may have more accurate percentages given if requested at time of order placement)

FIRESTONE BUILDING PRODUCTS
MR CREDIT 4.1 AND 4.2: RECYCLED CONTENT
(Table 3)

Firestone Product	Post Industrial Waste	Post Consumer Waste
ReflexEON TPO White	15%	0%
UltraPly TPO White	15%	0%
UltraPly TPO Tan	15%	0%
UltraPly TPO XR White	15%	0%
Acrylitop PC-100 White	0%	0%
Acrylitop PC-100 Tan	0%	0%
Acrylitop PC-100 Gray	0%	0%
Acrylitop PC-100 Base	0%	0%
SBS Metal Flash AL	0%	0%
Aluminum Fibered Coating	0%	0%
APP 180 White	0%	6%
APP 180 FR White	0%	6%
APP 180 COOL White	0%	6%
APP 180 FR COOL White	0%	6%
APP Premium White	0%	6%
SBS Granule White	0%	4%
SBS FR Cap	0%	4%
SBS Premium White	0%	5%
SBS Premium FR White	0%	5%
SBS Torch White	0%	3%
SBS FR Torch White	0%	3%
SBS Premium FR Torch	0%	5%
RubberGard EPDM	0%	0%
ISO 95+ Insulation	Average 19% (thickness dependant)	Average 15% (thickness dependant)
Steel (Galvanized and Galvalume)	7.3%	23%
Aluminum Painted (3xxx)	Up to 100% scrap between the two	
Aluminum Anodized (5005)	30 – 60% varies between the two	
Copper	82 – 95%	
Zinc (total recycle content)	30 - 40%	
If more accurate recycle content is required contact Firestone Building Products prior to order placement.		

nailbase

Firestone GREEN

Firestone
BUILDING PRODUCTS
NOBODY COVERS YOU BETTER.®

marmoleum® dual tile

MCT

marmoleum composition tile

certified sustainable tile

material:	Marmoleum® Dual Tile	Marmoleum® Composition Tile (MCT)
physical properties:	size . . . . . 13″ x 13″ approx. (33 cm x 33 cm) 20″ x 20″ approx. (50 cm x 50 cm) gauge. . . . . 1/10″ (2.5 mm)	size . . . . . 13″ x 13″ approx. (33 cm x 33 cm) gauge. . . . . 0.080″ (2.0 mm)
recycled content: materials & resources credit 4 1-2 points (NC, schools, CS, CI)	pre-consumer (post-industrial)* . . . . . 46.5% (wood flour, tall oil) post-consumer 0%	
rapidly renewable materials: materials & resources credit 6 1 point (NC, schools, CS, CI)	23% by weight . . . . . linseed oil, pine rosin	
PBT source reduction: pilot credit 2 1 point (NC, schools, CS, CI)	compliant	
acoustical performance: IEQ prerequisite 3 (schools)	noise reduction coefficient (NRC) ASTM C423-02a. . . . 0.05 sound absorption coefficient (SAA) ASTM C423-02a . . 0.06 sound transmission class (STC) ASTM E423-04. . . . . 55 impact sound transmission impact insulation class (IIC) ASTM E492-96 . . . . . Marmoleum over a 6 inch concrete slab - IIC 27 Marmoleum installed on 2.0mm Corkment over a 6 inch concrete slab - IIC 42 Marmoleum over a wood joist construction - IIC 51	
indoor environmental quality: low emitting materials (flooring systems) credit 4.3 1 point (NC, schools, CS, CI) option 2	collaborative for high performance schools low emitting materials section 01350 Low Emitting Materials Table (LEM). . . . . listed	
indoor environmental quality: low emitting materials (adhesives & sealants) credit 4.1 1 point (NC, schools, CS, CI)	adhesives meet the requirements set forth in the SCAQMD Rule #1168 . . . . . Forbo T940, L-885	
regional material: materials & resources credit 5 1-2 points (NC, schools, CS, CI)	manufacturing . . . . . facility: Forbo-Nairn Ltd. Kirkcaldy, Fife, Great Britain	
regional extraction/process:	**ingredient** — **extraction location** linseed oil (flax). . . . . Canada tall oil . . . . . United States gum rosin . . . . . Indonesia wood flour. . . . . Germany limestone . . . . . Germany pigment . . . . . Germany glass backing . . . . . United Kingdom topshield finish (water-based) . . . . . The Netherlands	
sustainable attributes:	92% bio-based content (Radiocarbon Analyses conducted by Iowa State University, January 30, 2009)	
innovation & design: sustainable certifications 1 point	SMaRT© Sustainable Products Standard . . . . . platinum level certification see Forbo sales rep for details	

** recycled content calculated following Federal Trade Commission (FTC) –Part 260 - GUIDES FOR THE USE OF ENVIRONMENTAL MARKETING CLAIMS (wood flour, tall oil)*

** recycled content materials shall be defined in accordance with the International Organization of Standards document, ISO 14021 - environmental labels and declarations - self-declared environmental claims (type II environmental)*

NATIONAL GYPSUM PRODUCTS
SUSTAINABLE FEATURES

The following information is applicable for products manufactured by National Gypsum at these plant locations. The sustainable features listed can be used in achieving credit towards all sustainable construction practices.* National Gypsum manufacturing facilities are referenced below along with the extraction location for raw materials. If your project is located within 500 miles of the manufacturing facility, additional credits can contribute to your project. Accountability for all sustainable calculations is the responsibility of the architectural firm or consultant on the project.**

Plant Locations	Post Consumer %	Post Industrial %	Total Recycled Content %	Material Extraction to Plant (Miles)	Raw Material Extraction Location
GYPSUM WALLBOARD PLANTS					
Apollo Beach, FL	5	95	100	1	Tampa Electric Co., Tampa, FL
Baltimore, MD	5	3	8	Over 500	Halifax, Nova Scotia
Burlington, NJ	5	6	11	Over 500	Halifax, Nova Scotia
Fort Dodge, IA	5	4	9	8	Fort Dodge, IA
Long Beach, CA	5	3	8	Over 500	San Marcos, Mexico
Lorain, OH	5	6	11	296	National City, MI
Medicine Lodge, KS	5	3	8	20	Medicine City, KS
National City, MI	5	3	8	5	National City, MI
Phoenix, AZ	5	3	8	102	Winkleman, AZ
Portsmouth, NH	5	3	8	Over 500	Halifax, Nova Scotia
Rensselaer, NY	5	3	8	500	Halifax, Nova Scotia
Richmond, CA	5	6	11	Over 500	Santa Rosalia, Mexico
Rotan, TX	5	3	8	13	Rotan, TX
Savannah, GA	5	6	11	Over 500	Halifax, Nova Scotia
Shippingport, PA	5	95	100	1	First Energy Corp., Shippingport, PA
Shoals, IN	5	3	8	0	Shoals, IN
Tampa, FL	5	3	8	Over 500	Halifax, Nova Scotia
Waukegan, IL	5	3	8	412	National City, MI
Westwego, LA	5	10	15	Over 500	Halifax, Nova Scotia
Wilmington, NC	5	3	8	Over 500	Halifax, Nova Scotia
CEMENT BOARD PLANTS					
Bromont, Quebec	0	15	15	55	Grenville-sur-la-Rouge, Quebec
Cleburne, TX	0	15	15	26	Midlothian, TX
Clinton, IN	0	15	15	40	Greencastle, IN
Green Cove Springs, FL	0	15	15	38	Jacksonville, FL

* Applicable LEED Credits: CI, NC Credit 4.1 and 4.2, EB Credit 2.1 – 2.5
** Applicable LEED Credits: CI, NC Credit 3.1, 3.2, 5.1, 5.2, EB – EQ Credit 3

National Gypsum products have no reportable VOC content. Information listed is applicable for the following National Gypsum trademarks: Durasan®, Fire-Shield®, Fire-Shield C™, Gold Bond®, High Flex®, Hi-Abuse® XP®, Hi-Impact® XP®, Kal-Kore®, MR®, PermaBase®, PermaBase Flex®, Shaftliner XP®, XP®

U.S. GREEN BUILDING COUNCIL MEMBER

Corporate Headquarters
National Gypsum Company
2001 Rexford Road
Charlotte, NC 28211
Phone: (704) 365-7300
Web: nationalgypsum.com

Technical Information
Phone: (800) NATIONAL
(800) 628-4662
Fax: (800) FAX-NGC1
(800) 329-6421

National Gypsum®

111008 1/06

OCEANSIDE GLASSTILE

COLOR	PRE-CONSUMER	POST-CONSUMER	TOTAL RECYCLED CONTENT
Amber	0%	0%	0%
Aqua	0%	0%	0%
Black	13.20%	72.80%	86%
Bohemian	16.60%	58.20%	74.80%
Bronze	13.20%	72.80%	86%
Cane	30%	0%	30%
Clear	30%	0%	30%
Cobalt	12.80%	74.60%	87.40%
Equator	30%	0%	30%
Fleet Blue	30%	0%	30%
Harvest	0%	0%	0%
Incense	13.20%	72.80%	86%
Midori	16.60%	58.20%	74.80%
Moonstone	25.40%	20%	45.40%
Olive	30%	0%	0%
Oxygen	0%	0%	0%
Palladium	0%	0%	0%
Pear	25.40%	20%	45.40%
Pewter	13.20%	72.80%	86%
Rainbow	13.20%	72.80%	86%
Sandstone	25.40%	20%	45.40%
Spruce	16.40%	59.20%	75.60%
Tahoe	30%	0%	30%
Tourmaline	13.20%	72.80%	86%
White	30%	0%	30%
COLOR	**PRE-CONSUMER**	**POST-CONSUMER**	**TOTAL RECYCLED CONTENT**
Red	58%	0%	58%
COLOR	**PRE-CONSUMER**	**POST-CONSUMER**	**TOTAL RECYCLED CONTENT**
Alpine Spring	23.94%	26.33%	50.30%
Arctic Sky	19.50%	45.57%	65.10%
Beach Blonde	26.92%	13.38%	40.30%
Blue Streak	24.04%	0%	24.04%
Cammie	21.07%	0%	21.07%
Cappertone	14.58%	24.06%	38.70%
Crème Brulee	18.52%	6.70%	25.20%
Disco Inferno	46.89%	18.04%	65%
Enchantment	21.03%	36.70%	57.70%
Escape	21.09%	0%	21.09%
Frontier	18.53%	6.80%	25.30%
Gold Coast	4.46%	24.66%	29.10%
Ice Tea	11.90%	0%	11.90%
Mediterranean Sea	4.23%	52.44%	56.70%
Mendocino	20.08%	0%	20.08%
Moroccan Desert	13.19%	72.79%	86%
Nordic Ice	23.90%	20.38%	44.30%

OWENS CORNING
LEED™ Submittal Sheet

Date: March 14, 2007

Project

Name: _____

Location: _____

LEED Contact -

Name: _____

Phone #.: _____

Submitted by -

Name: David W. Ware, Leader--State & Regional Energy Efficiency, Owens Corning

Phone #.: 530-885-7558

Subcontractor -

Name/Address: _____

_____

Contact Person: _____

LEED Credit Areas (Check all that apply)

Project Specification & Product Description

Specificaton	Product	R-value
	1) Thermal batt insulation	Varies
	2)	
	3)	

[■] Materials & Resource - Credit 4: Recycled Content

Points dependent on the aggregate of recycled materials used by all products in the project.

NOTE: SCS recycled content certification--All fiber glass products 35% total (9% post-consumer & 26% post-industrial); all Foamular® products 15% total (0% post-consumer & 35% post-industrial)

Product	% Total	% Post-Consumer	% Post-Industrial
1) Thermal batt insulation	35%	9%	26%
2)			
3)			

[■] Materials & Resource - Credit 5: Local/Regional Materials Y/N

Points dependent on amount of materials mfgd./extracted within a radius of 500 miles of the project.

Product	Mfg. Local	Place	Dist. (miles)	Raw Mat. Local	Place	Dist. (miles)
1) Thermal batt insulation	Yes	KC, Kansas.	<500	Yes	KC, KS..	<500
2)						
3)						

[■] Indoor Environmental Quality - Credit 4: Low-Emitting Materials

Points dependent on amount of materials meeting indoor emissions criteria.

Product	VOC/Certification Type
1) Thermal batt insulation	GreenGuard, CHPS 01350
2)	GreenGuard, CHPS 01350
3)	GreenGuard, CHPS 01350
4)	

INDOOR ENVIRONMENTAL QUALITY

PREREQUISITE 1

CREDIT 1

CREDIT 2

CREDIT 3.1

CREDIT 3.2

CREDIT 5

CREDIT 6.2

CREDIT 7.2

CREDIT 8.1 & 8.2

INDOOR ENVIRONMENTAL QUALITY

PREREQUISITE 1: MINIMUM IAQ PERFORMANCE

EQUIPMENT SCHEDULE

MECHANICAL ONE LINE DIAGRAM

MINIMUM IAQ PERFORMANCE CALCULATIONS

1ST, 2ND, AND 3RD FLOOR SPACE DIAGRAMS

PUMP SCHEDULE

UNIT NO.	LOCATION	SERVING	MANUFACTURER	MODEL & SIZE	TYPE	GPM	HEAD FT.	FLUID	RPM	PUMP EFF.	IMP. SIZE IN.	BHP	TRIPLE DUTY VALVE SIZE	CONTROL	ELEC. DATA			REMARKS
															MOTOR HP	VOLTS	PH	
DTP-1,2	MECH ROOM	RADIANT SYSTEMS	B & G	60-1 1/2x 1 1/2x 5 1/4	IN-LINE	52	15	H20	1750	54	4.25	.36	–	VFD	1/2	208	3	ONE OPERATING, ONE STANDBY
HWP-1,2	KAGIN	IGC-HTG	B & G	60-1 1/2x 1 1/2x 5 1/4	IN-LINE	60	12	H20	1750	53	4.25	.35	–	VFD	1/2	208	3	ONE OPERATING, ONE STANDBY
CHWP-1,2	KAGIN	IGC-CLG	B & G	60-2 x 2 x 5 1/4	IN-LINE	68	12	H20	1750	57	4.25	.38	–	VFD	1/2	208	3	ONE OPERATING, ONE STANDBY

FAN SCHEDULE

UNIT NO.	LOCATION	SERVING	MANUFACTURER	MODEL & SIZE	CFM	T.S.P.	RPM	SPEED CONTROL	BHP	MHP	ELEC. DATA				LWA OR SONES	REMARKS
											VOLTS	PH	Hz	RPM		
EF-1	MECHANICAL ROOM	AHU-1	GREENHECK	BSQ-160HP-30	3,820	1.0"	2,100	VFD	–	3	208V	3	60	–	30	LEFT SIDE DISCHARGE
EF-2	ELEVATOR MACHINE RM	ELEVATOR MACHINE RM	GREENHECK	CSP-A200	200	0.25"	900	R'VRSE T'STAT	–	48W	120V	1	60	–	1.3	–
EF-3	ROOF	FAN ASSIST NAT. VENT.	GREENHECK	LB-10-3	1,500	0.25"	1,760	CONSTANT	0.34	1/3	208V	3	60	–	12.6	MANUAL SWITCH LOCATED IN IGC COURT; PROVIDE 12" ROOF CURB

RADIANT CEILING PANEL SCHEDULE

SYMBOL	MANUFACTURER (NOTE 1)	MODEL	MATERIAL/THICKNESS	FINISH	WIDTH	LENGTH	HOT WATER (NOTE 2)			CHILLED WATER			BTU/PANEL (HTG)	BTU/PANEL (CLG)	CIRCUITS PER PANEL	REMARKS
							E.W.T.	L.W.T.	GPM	E.W.T.	L.W.T.	GPM				
RCP-A	PRICE	CSA	ALUMINUM	WHITE	48"	96"	85'-100'	90'-105'	0.75	58'	61'	0.845	---	1268	1	NOTE
RCP-B	PRICE	CSA	ALUMINUM	WHITE	72"	96"	85'-100'	90'-105'	1.0	58'	61'	1.268		1902	1	NOTE
RCP-Cx	PRICE	CSA	ALUMINUM	CUSTOM COLOR			85'-100'	90'-105'	0.75	58'	61'	1.0		---	1	NOTE 4
RCP-D	PRICE	RPM SERIES	ALUMINUM/0.375	WHITE	24"	24"	85'-100'	90'-105'	0.75	58'	61'	0.2		158	1	NOTE 3
RCP-E	PRICE	CSA	ALUMINUM	WHITE	96"	96"	85'-100'	90'-105'	1.0	58'	61'	1.691		2536	1	NOTE
RCP-F	PRICE	CSA	ALUMINUM	WHITE	48"	48"	85'-100'	90'-105'	0.75	58'	61'	0.423		634	1	NOTE
RCP-G	PRICE	CSA	ALUMINUM	WHITE	72"	72"	85'-100'	90'-105'	0.75	58'	61'	0.951		1426	1	NOTE
RCP-H	PRICE	CSA	ALUMINUM	WHITE	24"	72"	85'-100'	90'-105'	0.75	58'	61'	0.317		475	1	NOTE 5

NOTES:
1. OR EQUAL BY BARCOL-AIR OR TWA
2. HW SUPPLY TEMP WILL BE RESET BASED ON OUTDOOR AIR TEMP FROM 85° SUPPLY @ 60°OAT TO 100° AT 20°OAT
3. INSTALL 2" INSULATION PAD OVER TOP OF RADIANT TUBING ON PLANS.
4. REFER TO PLANS FOR SIZE AND CONFIGURATION OF TYPE C PANELS. THESE PANELS WILL BE INSTALLED IN A PERFORATED METAL GRID CEILING.
5 TYPE H PANELS WILL BE INSTALLED EXPOSED WITH 12" PERFORATED METAL CEILING ON EITHER SIDE OF PANEL..

FINNED TUBE RADIATION SCHEDULE

TYPE	MANUFACTURER	MODEL	ELEMENT						ENCLOSURE		REMARKS
			FIN SIZE/ MATERIAL	TUBE DIA./ MATERIAL	FINS/FT.	ROWS	BTU/HR./FT.	A.W.T. °F	HEIGHT IN.	WIDTH IN.	
FTR-1	RUNTAL	R2F-2	STEEL	STEEL	–	2	993	170	5.7	5	PEDESTAL MOUNTED
FTR-2	VULCAN	MINI-SERIES	.016"AL	1/2"C	48	1	580	170	9 1/2	4 1/4	–

CUSTOM AIR HANDLING UNIT SCHEDULE

AIR HANDLING UNIT DATA							SUPPLY FAN DATA							ELEC. DATA	
UNIT NO.	LOCATION	SERVING	MANUFACTURER (NOTE 2)	MODEL & SIZE	TOTAL CFM	MIN. O.A. CFM	FAN TYPE	E.S.P. "WC	T.S.P. "WC	RPM	SPEED CONTROL	BHP	MHP	VOLTS	PH
AHU-1	BASEMENT MECH ROOM	IGC	CAMBRIDGEPORT	CUSTOM	3,800	100%	PLENUM	1.0	2.0	1725	VFD	---	3	208	3

CHILLED WATER COIL DATA													HOT WATER COIL DATA									
FLUID	#HIGH/#WIDE/ ROWS/F.P.I.	E.D.B. °F	E.W.B. °F	L.D.B. °F	L.W.B. °F	E.W.T. °F	L.W.T. °F	MBH (TOTAL)	MBH (SENS.)	GPM	W.P.D. FT.	FACE VEL. FPM	A.P.D. "WC	FLUID	#HIGH/#WIDE/ ROWS/F.P.I.	E.D.B. °F	L.D.B. °F	E.W.T. °F	L.W.T. °F	MBH	GPM	W.P.D. FT.	FACE VEL. FPM	A.P.D. "WC
H20	---	66.0	60.0	51.6	51.3	44	56.0	94.6	61.5	15.8	4.5	400	0.4	H2O	---	40	68	180	160	115	11.5	1.5	400	0.05

HEAT PIPE DATA (NOTE 1)

PRE-COOL HEAT PIPE												RE-HEAT HEAT PIPE												REMARKS
E.D.B. °F	E.W.B. °F	RH %	ΔP "WC	ΔT °F	TEMP EFFEC %	ENERGY TRANS BTUH	FIN HT IN	FIN LTH IN	FACE AREA S.F.	FACE VEL FPM	#ROWS/FPI	E.D.B. °F	E.W.B. °F	RH %	ΔP "WC	ΔT °F	TEMP EFFEC %	ENERGY TRANS BTUH	FIN HT IN	FIN LTH IN	FACE AREA S.F.	FACE VEL FPM	#ROWS/FPI	
78.5	64.5	47.0	0.24	12.77	48.17	75,797	51	43	15.23	354.58	4/12	52.0	51.0	93.63	0.23	12.81	48.35	75,797	51	43	15.23	354.58	4/12	--

NOTES:
1. HEAT PIPE BY HEAT PIPE TECHNOLOGIES
2. OR EQUAL BY: GREENHECK, TEMTROL, GOVERNAIRE.

DIFFUSER & REGISTER SCHEDULE

TYPE	MANUFACTURER	MODEL & SIZE	FUNCTION	DESCRIPTION	REMARKS
A	PRICE	520D	SUPPLY	LOUVERED SIDEWALL SUPPLY REGISTER WITH STEEL DAMPER	NOTE 1, 2, 3, 4
B	PRICE	80	EXHAUST	CEILING EXHAUST; EGG CRATE	NOTE 1, 2, 3, 4
C	PRICE	530	EXHAUST	CEILING EXHAUST; BAR GRILLE	NOTE 1, 2, 3, 4
D	PRICE	SCD	SUPPLY	CEILING SUPPLY DIFFUSER; LAY-IN	NOTE 1, 2, 3, 4
E	PRICE	530	RETURN	LOUVERED SIDEWALL RETURN REGISTER	NOTE 1, 2, 3, 4
F	PRICE	SCD	SUPPLY	CEILING SUPPLY DIFFUSER; CUT INTO METAL CEILING	CUT INTO METAL CEILING; NOTE 1, 2, 3, 4

NOTES:
1. ALL NECK SIZES ARE NOTED ON DRAWINGS.
2. THROW PATTERNS ARE 4-WAY UNLESS NOTED OTHERWISE.
3. PROVIDE OPPOSED BLADE DAMPER.
4. COLOR BY ARCHITECT.

CABINET UNIT HEATER SCHEDULE

UNIT NO.	SERVING	MANUFACTURER	MODEL & SIZE	CFM	E.D.B. °F	L.D.B. °F	E.W.T. °F	L.W.T. °F	MBH	GPM	MHP	ELEC. DATA				CABINET TYPE	CAB. DIM. LxHxD IN.	REMARKS
												VOLTS	PH	Hz	RPM			
CUH-A,B	WEST VESTIBULE	VULCAN	RW-02	185	60	110	180	60	10	.5	1/15	115	1	60	875	RECESSED WALL	35 x 25 x 9 1/2	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

UNIT HEATER SCHEDULE

UNIT NO.	SERVING	MANUFACTURER	MODEL & SIZE	CFM	E.D.B. °F	L.D.B. °F	E.W.T. °F	L.W.T. °F	MBH	GPM	MHP (W)	ELEC. DATA				REMARKS
												VOLTS	PH	Hz	RPM	
UH-1	MECHANICAL ROOM	VULCAN	HV-108A	210	60	85	180	160	5.5	0.8	9	115	1	60	1350	ADDITIONAL SPEED CONTROLLER REQUIRED

VARIABLE AIR VOLUME BOX SCHEDULE

UNIT NO.	MANUFACTURER	MODEL & SIZE	CFM RANGE		INLET SP IN. WG	DIS. NC dB	RAD. NC dB	APD IN. WG	REMARKS
			MAX	MIN					
VAV-1	PRICE	SDV-10	250	1,000	0.50	–	–	–	–
VAV-2	PRICE	SDV-8	350	690	0.50	–	–	–	–

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PROJECT NO.: 2006303.00

Mechanical and Electrical Engineers

Rev.	Date	Remarks

Date:	January 14, 2008
Scale:	AS NOTED
Project Number:	2006303.00
Drawn By:	EDA

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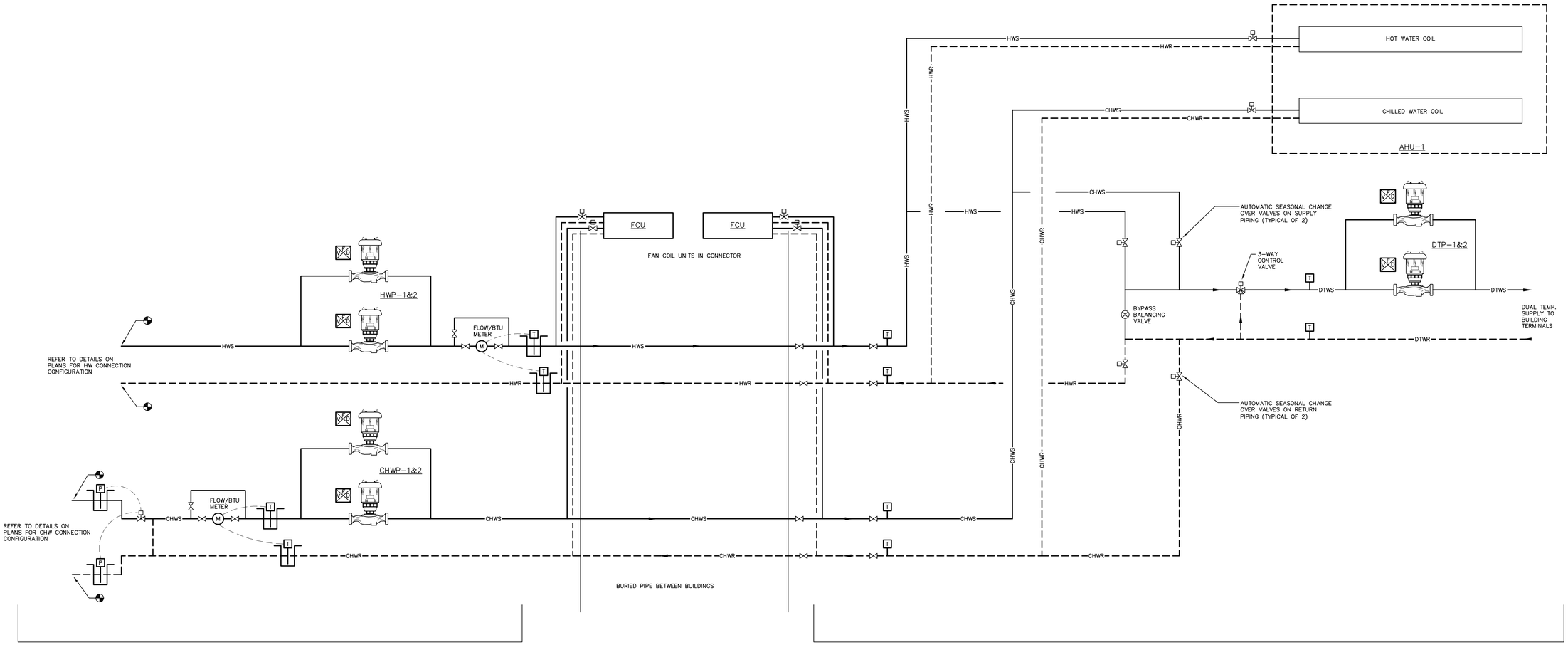
ST. PAUL, MN

MECHANICAL SCHEDULES

M-301



CONTROL SEQUENCE – AHU-1/EF-1/HEAT WHEEL

OCCUPIED MODE: UNIT WILL BE INDEXED TO OCCUPIED MODE (FANS RUNNING) AND UNOCCUPIED MODE (FANS OFF) BY TIME CLOCK SCHEDULE AND INPUT FROM OCCUPANCY SENSORS WITHIN THE BUILDING. SUPPLY AND EXHAUST FANS SHALL OPERATE CONTINUOUSLY DURING OCCUPIED MODE.

SUPPLY AND EXHAUST FAN OPERATION: THE SUPPLY AND EXHAUST FANS WILL OPERATE TOGETHER, MAINTAINING THE SAME VOLUME OF AIR FLOW AS DETERMINED BY FLOW STATIONS MOUNTED AT EACH FAN. THE FAN SYSTEM SHALL OPERATE DYNAMICALLY TO DELIVER THE REQUIRED VENTILATION AIR VOLUME TO/FROM THE BUILDING.

CALCULATION OF VENTILATION AIR VOLUME: EACH CONTROL DAMPER INSTALLED IS ASSIGNED A VALUE CORRESPONDING TO THE DESIGN AIR FLOW THROUGH THAT DAMPER. AS CONTROL DAMPERS ARE INDEXED OPEN AND CLOSED BY OCCUPANCY SENSORS AND/OR TIME CLOCK, THE BMS SHALL CALCUALTE THE REQUIRED CFM TO BE DELIVERED FROM THE SUPPLY FAN AND INDEX THE SUPPLY AND EXHAUST FANS TO THIS CFM ACCORDINGLY.

SUPPLY AIR TEMPERATURE CONTROL: THE SUPPLY AIR TEMPERATURE WILL BE REGULATED THROUGH THE USE OF THE ENTHALPY WHEEL, HOT WATER HEATING COIL, AND CHILLED WATER COOLING COIL AND HEAT PIPES. SUPPLY AIR TEMPERATURE FOR HEATING MODE WILL BE 65 DEGREES F (ADJUSTABLE). SUPPLY AIR TEMPERATURE FOR COOLING MODE WILL BE 55 DEGREES F (ADJUSTABLE).

HEATING MODE TEMPERATURE CONTROL: SUPPLY AIR TEMPERATURE CONTROL WILL BE MAINTAINED BY MODULATING CONTROL OF THE 2WAY HEATING COIL CONTROL VALVE.

COOLING MODE TEMPERATURE CONTROL: WHEN THE OUTDOOR AIR HUMIDITY CONDITIONS LEAVING THE ENTHALPY WHEEL ARE BELOW 50 DEGREE DEW-POINT (ADJUSTABLE, CALCULATED FROM TEMPATURE AND HUMIDITY SENSORS) THE SUPPLY AIR TEMPERATURE CONTROL WILL BE MAINTAINED BY THE CHILLED WATER COOLING COIL ONLY. WHEN THE OUTDOOR AIR HUMIDITY CONDITIONS LEAVING THE ENTHALPY WHEEL ARE ABOVE SET-POINT, THE SUPPLY AIR TEMPERATURE CONTROL WILL BE MAINTAINED BY STAGED CONTROL OF THE HEAT PIPE SOLENOID VALVES TO REHEAT TO THE DESIRED SUPPLY AIR TEMPERATURE. THE COOLING COIL WILL OPERATE TO DISCHARGE 52 DEGREE SUPPLY AIR, SATURATED (51 DEGREE WET-BULB, 50 DEGREE DEW-POINT).

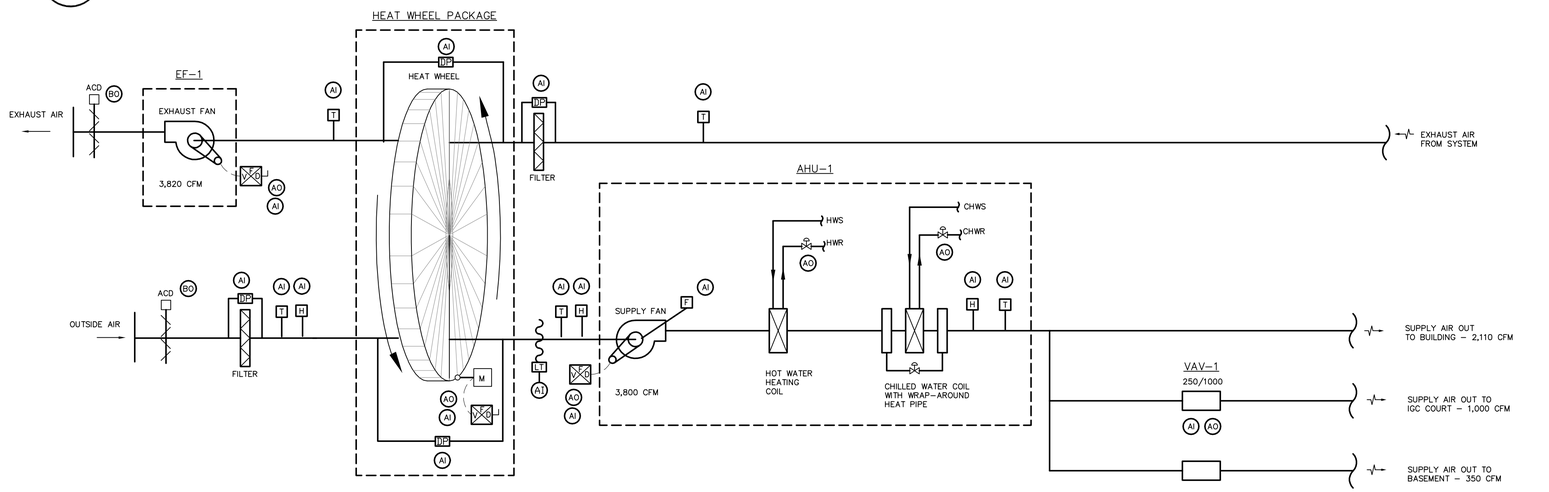
HEAT WHEEL CONTROL (ECONOMIZER): WHEN THE OUTDOOR AIR CONDITIONS (TEMPERATURE AND HUMIDITY) ARE SUITABLE TO MEET THE SUPPLY AIR TEMPERATURE AND HUMIDITY (50 DEGREE DEW-POINT) REQUIREMENTS, THEN THE ENTHAPLY WHEEL WILL BE COMMANDED TO STOP ROTATION.

HEAT WHEEL OPERATION: THE ENTHALPY HEAT WHEEL WILL OPERATE BASED ON IT'S OWN MANUFACTURER'S CONTROLS AND SAFTIES. THE BMS SHALL INDEX THE WHEEL TO OPERATE WHENEVER THE AHU IS IN OPERATION, EXCEPT WHEN ECONOMIZER MODE IN ENABLED.

ALARM CONDITIONS: AS A MINIMUM THE FOLLOWING CONDITIONS WILL INDICATE AS AN ALARM IN THE BMS: EXCESSIVE WHEEL PRESSURE DROP, FILTER DIRTY CONDITION AS INDICATED BY DIFFERENTIAL PRESSURE SENSOR, HIGH HUMIDITY LEVEL ON SUPPLY AIR DISCHARGE, LOW TEMPERATURE CONDITION LEAVING HEAT WHEEL.

1 HOT WATER AND CHILLED WATER FLOW DIAGRAM

SCALE: NONE



2 DOAS AIR HANDLER UNIT WITH HEAT RECOVERY (AHU-1)

NOT TO SCALE

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Macalester College

Institute for Global Citizenship

GRAND AVENUE
ST. PAUL, MN

MECHANICAL
ONE-LINE DIAGRAMS
AND DETAILS

M-204

IEQ Prerequisite #1 - Minimum IAQ Performance

MACALESTER COLLEGE - Institute for Global Citizenship **Occupancy and Ventilation Chart** 24-Dec-08

Building Program						ASHRAE 62.1-2004 requirements					Design Conditions				
Level	Space #	Space Name	Space SF	Design Occupancy # of People	SF/person (Under 40 req's CO2)	Ventilation Classification per Table 6-1	Per Tabel 6-1 CFM/p	Per Tabel 6-1 CFM/sf	Calculated OA Vent. Table 6-1	Ventilation Effectiveness Table 6-2	**Adjusted required OA (CFM)**	**Ventilation (DOAS) CFM**	Ventilation Density CFM/sf	Vent % greater than std	Comments	Excess CFM Shared to adjoining Spaces
Basement																
		No normally occupied spaces														
		General ventilation of utility and storage spaces Only														
		Basement	1,850	0	0.0	General - Storage	0	0.12	222	1.0	**222.0**	**350**	0.19	58%		
First Floor																
	101,102,103	IGC Reception, library, lobby	540	8	67.5	Office - Reception	5	0.06	72.4	1	**72.4**	**160**	0.30	121%	Shared Ventilation with space #109 & 114	66
	105	Student Workers	330	6	55.0	Office - Office	5	0.06	49.8	1	**49.8**	**120**	0.36	141%	Shared Ventilation with space #109 & 114	55
	106	CEC Admin Assist	135	2	67.5	Office - Office	5	0.06	18.1	1	**18.1**	**40**	0.30	121%		
	107	CEC Admin Dir.	145	2	72.5	Office - Office	5	0.06	18.7	1	**18.7**	**40**	0.28	114%		
	108	CEC Assoc Director	156	2	78.0	Office - Office	5	0.06	19.36	1	**19.4**	**40**	0.26	107%		
	109, 114	Hallway & copy room **(See footnote #1)**	589	1	589.0	General - Corridor	0	0.06	35.34	1	**35.3**	**40**	0.07	**13%**	Open to spaces #101,102,103,105 - so 121 CFM of shared "excess ventilation from those spaces will bring this space to **343%** over standard	
	117	IGC Court	705	50	**14.1**	Educational - Multiuse	7.5	0.06	417.3	1.2	**347.8**	**1000**	1.42	188%	Displacement supply with overhead exhaust - **CO2 Monitoring & ventilation supply demand control provided**	
Second Floor																
	201	Conference Room	300	16	**18.8**	General - Conference	5	0.06	98	0.8	**122.5**	**320**	1.07	161%	Wall supply and exhaust grills, **CO2 Monitoring provided**	
	202, 204	IC Library, IS Student Workers	610	8	76.3	Office-Office	5	0.06	76.6	1	**76.6**	**160**	0.26	109%	Shared ventilation with Space #202, 205, etc	60
	200,205,214,213	Hallways, copy rm, coffee **(See footnote #2)**	512	1	512.0	General - Corridor	0	0.06	30.72	1	**30.7**	**0**	0.00	**-100%**	Open to spaces 202, 203,204 - so 60 CFM of excess ventilation from those spaces will result in hallway being ventilated to **100%** greater than 62.1 standard	
	206	IC Asst Coord	140	2	70.0	Office-Office	5	0.06	18.4	1	**18.4**	**40**	0.29	54%		
	207	IC Coord	145	2	72.5	Office-Office	5	0.06	18.7	1	**18.7**	**40**	0.28	53%		
	208	IC Assist Director	170	2	85.0	Office-Office	5	0.06	20.2	1	**20.2**	**40**	0.24	50%		
	209	IC Coord	165	4	41.3	Office-Office	5	0.06	29.9	0.8	**37.4**	**160**	0.97	77%	Wall supply and exhaust grills	
Third Floor																
	300,314	Hallway, Copy rm	900	0	0.0	General - Corridor	0	0.06	54	1	**54.0**	**80**	0.09	33%	Open to space #302 #318 (shared Vent)	10
	302	Asmin Assist (open with Hallway) **(See footnote #3)**	60	1	60.0	Office - Reception	5	0.06	8.6	1	**8.6**	**0**	0.00	**-100%**	Open to Hallway/open plan on third floor Excess from hallway and Lounge applied to this area (35 CFM) will yield **307%** above 62.1 std.	
	303	SM conference Rm	286	16	**17.9**	General - Conference	5	0.06	97.16	0.8	**121.5**	**270**	0.94	55%	Wall supply and exhaust grills, **CO2 Monitoring provided**	
	304	IGC Dean	286	4	71.5	Office-Office	5	0.06	37.16	1	**37.2**	**80**	0.28	54%		
	305	Waiting Area	204	2	102.0	Office - Reception	5	0.06	22.24	1	**22.2**	**40**	0.20	44%		
	306	Visiting Scholar	225	2	112.5	Office-Office	5	0.06	23.5	1	**23.5**	**80**	0.36	71%		
	307	IGC Assoc Dean	143	2	71.5	Office-Office	5	0.06	18.58	1	**18.6**	**40**	0.28	54%		
	308	IGC Assoc Dean	150	2	75.0	Office-Office	5	0.06	19	1	**19.0**	**40**	0.27	53%		
	309	IC Director	161	2	80.5	Office-Office	5	0.06	19.66	1	**19.7**	**40**	0.25	51%		
	310	IGC Student Council	166	4	41.5	Office-Office	5	0.06	29.96	1	**30.0**	**80**	0.48	63%		
	318	Lounge/Break	227	4	56.8	General - Conference	5	0.06	33.62	0.8	**42.0**	**80**	0.35	47%	Open to Hallway/open plan (shared vent)	25
	301	Student Work Room	140	3	46.7	Office-Office	5	0.06	23.4	1	**23.4**	**80**	0.57	71%		

Building Totals	**Ventilated Square Footage**	**9,440**
	Peak Building Occupancy	**148**
	Total Building Required Peak Ventilation (OA)	**1527.52**
	Delivered OA by System as Designed	**3460**
	Average "increased" ventilation percentage	**127%**

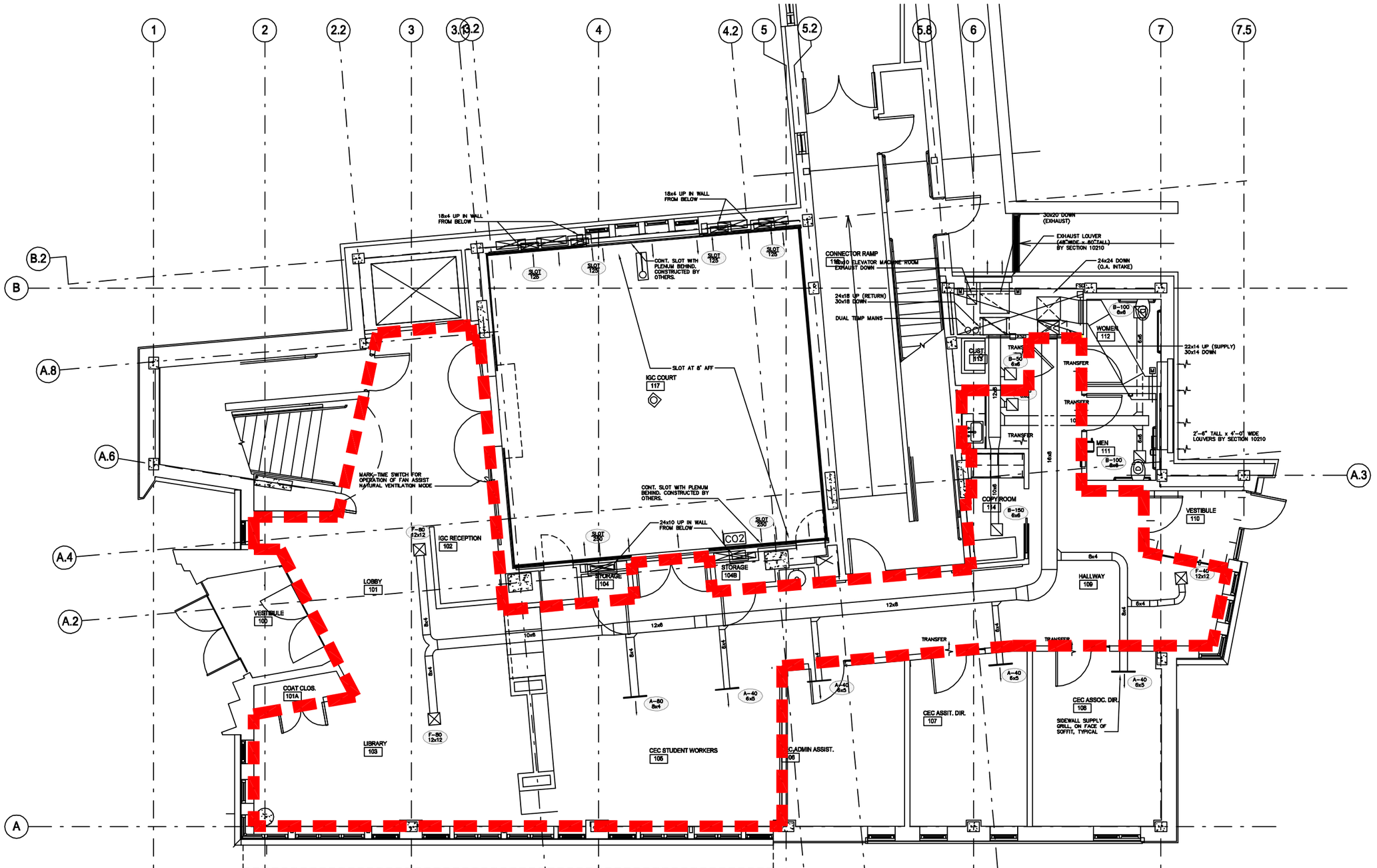
Footnotes:

1. Spaces #101,102, 103, 105, 109 and 114 all share a common ventilation atmosphere. Ventilation supply has been determined individually to permit separate accounting of the function and occupancy of each space, but ventilation compliance has been considered in aggregate due to lack of separation between these areas. See Attachment #1
2. Spaces #200, 202, 204, 205, 213 & 214 all share a commonventilation atmosphere. Ventilation supply has been determined individually to permit separate accounting of the function and occupancy of each space, but ventilation compliance has been considered in aggregate due to lack of separation between these areas. See attachment #2
3. Spaces #300, 302, 314, & 318 all share a commonventilation atmosphere. Ventilation supply has been determined individually to permit separate accounting of the function and occupancy of each space, but ventilation compliance has been considered in aggregate due to lack of separation between these areas. See attachment #3

IEQ PREREQUISITE 1:

ATTACHMENT 1

MACALESTER COLLEGE - IGC

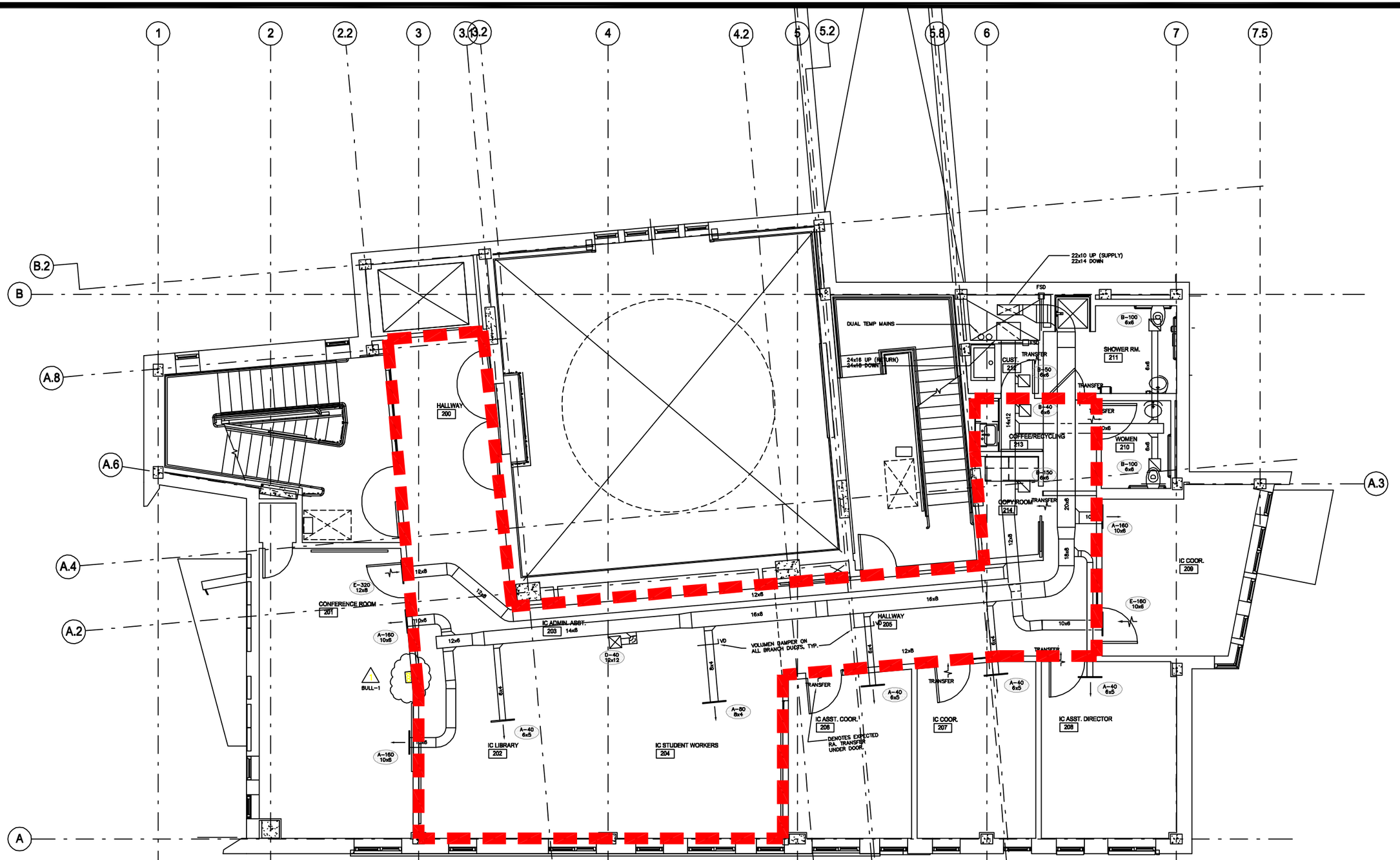


FOOTNOTE: THE INDICATED SPACES ARE CONTIGUOUS AND ARE CONSIDERED AS A SINGLE ENVIRONMENT. VENTILATION AIR IS DISTRIBUTED TO ALL NORMALLY OCCUPIED ZONES WITHIN THIS ENVIRONMENT. EXHAUST IS DRAWN FROM ADJOINING SPACES WHERE HIGHER DEGREE OF CONTAMINATION IS PRESENT, I.E. TOILETS, COPY RM., COFFEE STATION.

IEQ PREREQUISITE 1:

ATTACHMENT 2

MACALESTER COLLEGE - IGC



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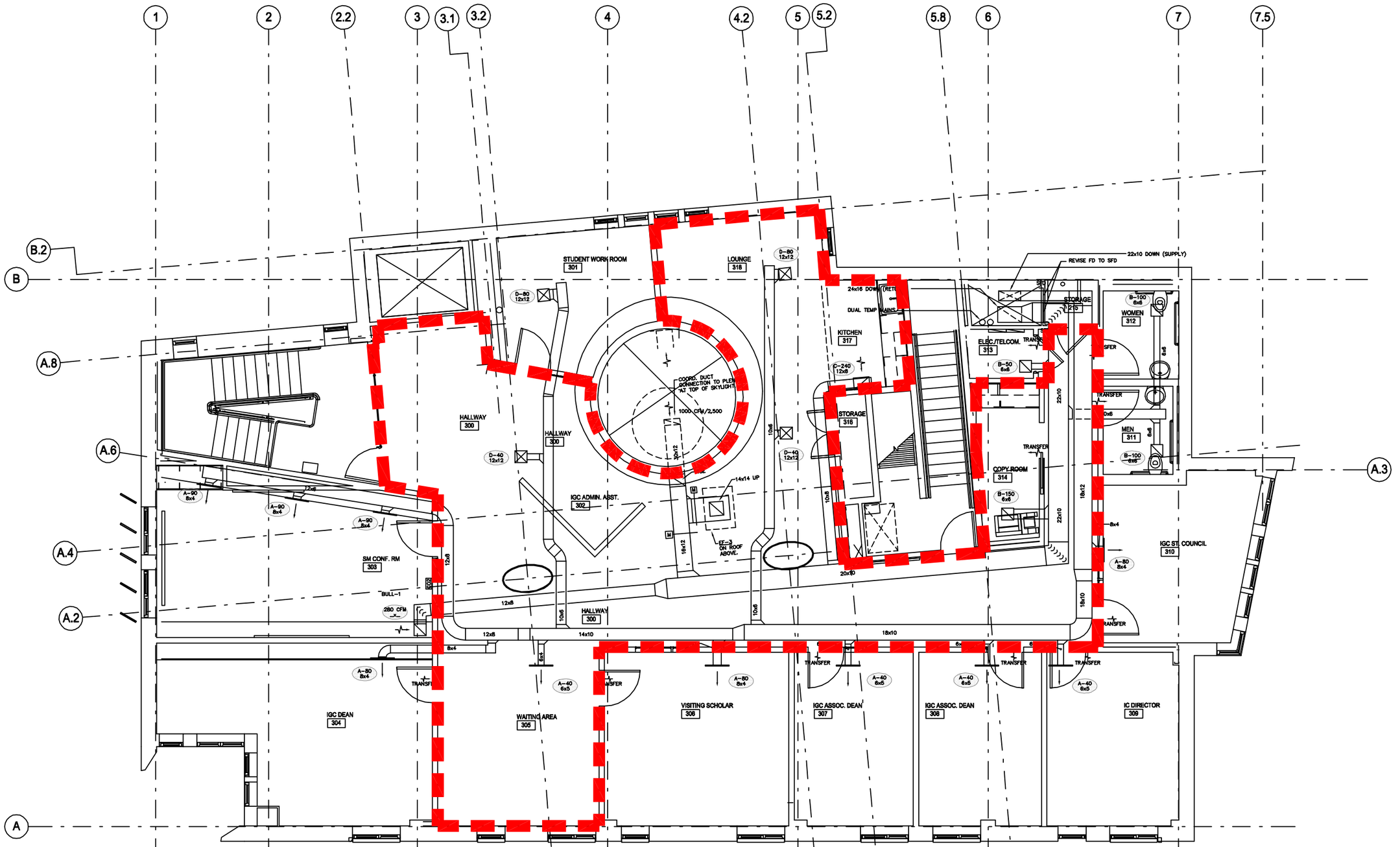
IEQ PREREQUISITE 1:

ATTACHMENT 3

MACALESTER COLLEGE - IGC



FOOTNOTE: THE INDICATED SPACES ARE CONTIGUOUS AND ARE CONSIDERED AS A SINGLE ENVIRONMENT. VENTILATION AIR IS DISTRIBUTED TO ALL NORMALLY OCCUPIED ZONES WITHIN THIS ENVIRONMENT. EXHAUST IS DRAWN FROM ADJOINING SPACES WHERE HIGHER DEGREE OF CONTAMINATION IS PRESENT, I.E. TOILETS, COPY RM., COFFEE STATION.

INDOOR ENVIRONMENTAL QUALITY

CREDIT 1: OUTDOOR AIR DELIVERY MONITORING

CO_2 SENSOR SPECIFICATION SHEET

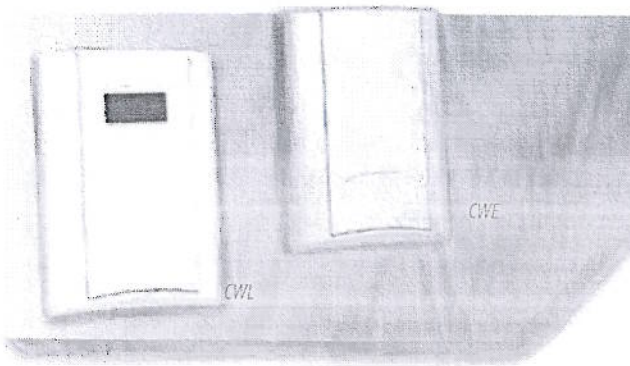
1^{ST}, 2^{ND}, AND 3^{RD} FLOOR CO_2 SENSOR LOCATIONS

BASEMENT MECHANICAL AIRFLOW MONITORING

DOAS AIR HANDLER ONE-LINE & CONTROL SUMMARY

OUTDOOR AIR DELIVERY MONITORING CALCULATIONS

8



C Series

CO_2 Sensors with Field-Selectable 4-20mA/0-5V/0-10VDC Outputs

WALL CO_2 + RH + T IN ONE UNIT!

The C Series carbon dioxide sensor is designed for use in HVAC control applications. Inside buildings, people are the major source of CO_2. By controlling fresh air based on CO_2 levels, energy can be saved and tenant comfort improved.

The C Series ensures that adequate ventilation is provided, while maximizing energy savings by ventilating at the optimum level.

The Deluxe CWL Series is available with relative humidity and temperature sensors for lowest installed cost.

APPLICATIONS

- Control HVAC in response to occupancy—save energy by providing ventilation only as required
- Improve tenant comfort
- Facilitate compliance with ASHRAE 62.1-2004 standard for air quality

Microprocessor design reduces long-term drift and calibration requirements

- Non-dispersive infrared technology (NDIR) repeatable to ±20 ppm ±1% of measured value
- Innovative self-calibration algorithm
- 5-year calibration interval (recommended)
- Low ambient sensitivity

Demand control ventilation provides reduction in energy costs

- Improve comfort and facilitate compliance with ASHRAE 62.1-2004 standard for air quality
- Alarm relay with setpoint for direct ventilation control
- Output 4-20mA/0-5V/0-10V for flexible control system interface
- Non-dispersive infrared technology (NDIR) for high accuracy and long term stability
- 1-year factory warranty from date of purchase on CWE products. CWL models carry a 5-year warranty

Both Deluxe and Economy versions available

- Field selectable 4-20mA/0-5V/0-10V outputs on CWL models 4-20mA, and 0-10V on CWE models
- Deluxe units feature optional RH, temp, and CO_2 in one unit with all analog outputs and display
- Economy versions feature optional resistive temperature output

ORDERING INFORMATION

CE

WALL DELUXE MODELS:

CWL [S] [ ] [ ] [ ]

(RH Option): H = RH 2% X = No RH

(Temp.): T = Temp X = No (stop here)

(Sensor Type): *A = Transmitter B = 100R Platinum, RTD C = 1k Platinum, RTD D = 10k T2, RTD, Thermistor E = 2.2k, Thermistor F = 3k, Thermistor G = 10k CPC, Thermistor H = 10k T3, Thermistor J = 10k Dale, Thermistor K = 10k w/11k shunt, Thermistor M = 20k NTC, Thermistor N = 1800 ohm, Thermistor R = 10k US, Thermistor S = 10k 3A221, Thermistor T = 100k, Thermistor

WALL ECONOMY MODELS:

CWE [S] [ ]

(Sensor Type): B = 100R Platinum, RTD C = 1k Platinum, RTD D = 10k T2, RTD, Thermistor E = 2.2k, Thermistor F = 3k, Thermistor G = 10k CPC, Thermistor H = 10k T3, Thermistor J = 10k Dale, Thermistor K = 10k w/11k shunt, Thermistor M = 20k NTC, Thermistor N = 1800 ohm, Thermistor R = 10k US, Thermistor S = 10k 3A221, Thermistor T = 100k, Thermistor

NOTE: The push button override feature is not available with temperature transmitter models. Only resistive temperature models qualify for the push button override feature.

Options Available

(Temp Cal Cert)	(Option)	(Slide Pot Value)
X = No	1 = Push Button Override*	-
1 = 1pt Temp Cal	2 = Set Point Slider	A = 1k
2 = 2pt Temp Cal	3 = Push Button* Override+Set Point Slider	F = 10k G = 20k K = 50k M = 100k

ACCESSORIES

Calibration kits, disposable gasses, duct boxes, handheld meters... *See page 234*

Examples: (Options)

C [W] [L] [S] [H] [T] [C] [2] [2] [A]

C [W] [E] [S] [H]

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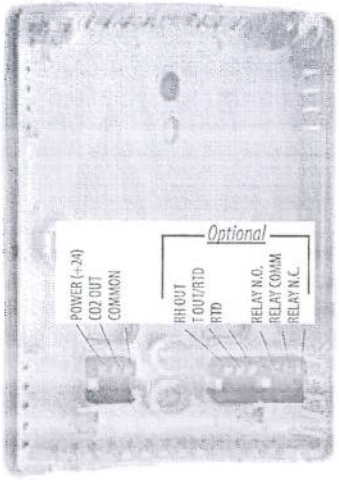
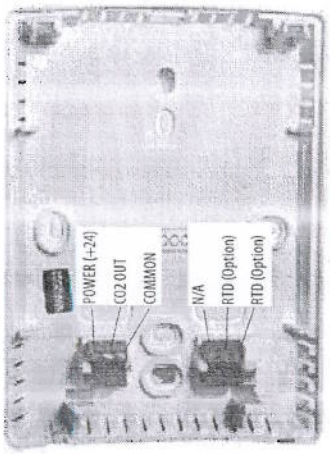
WIRING DIAGRAMS

CWL Wall Mount

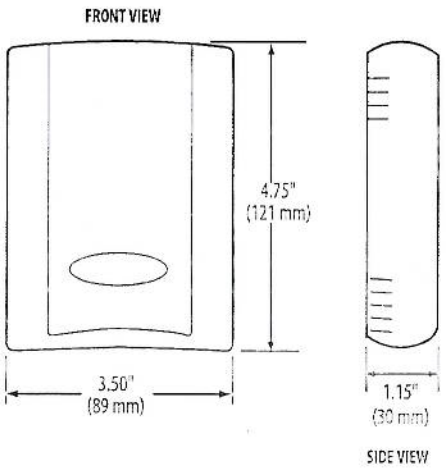


CWE Wall Mount



DIMENSIONS

CW & CWE Wall Mount

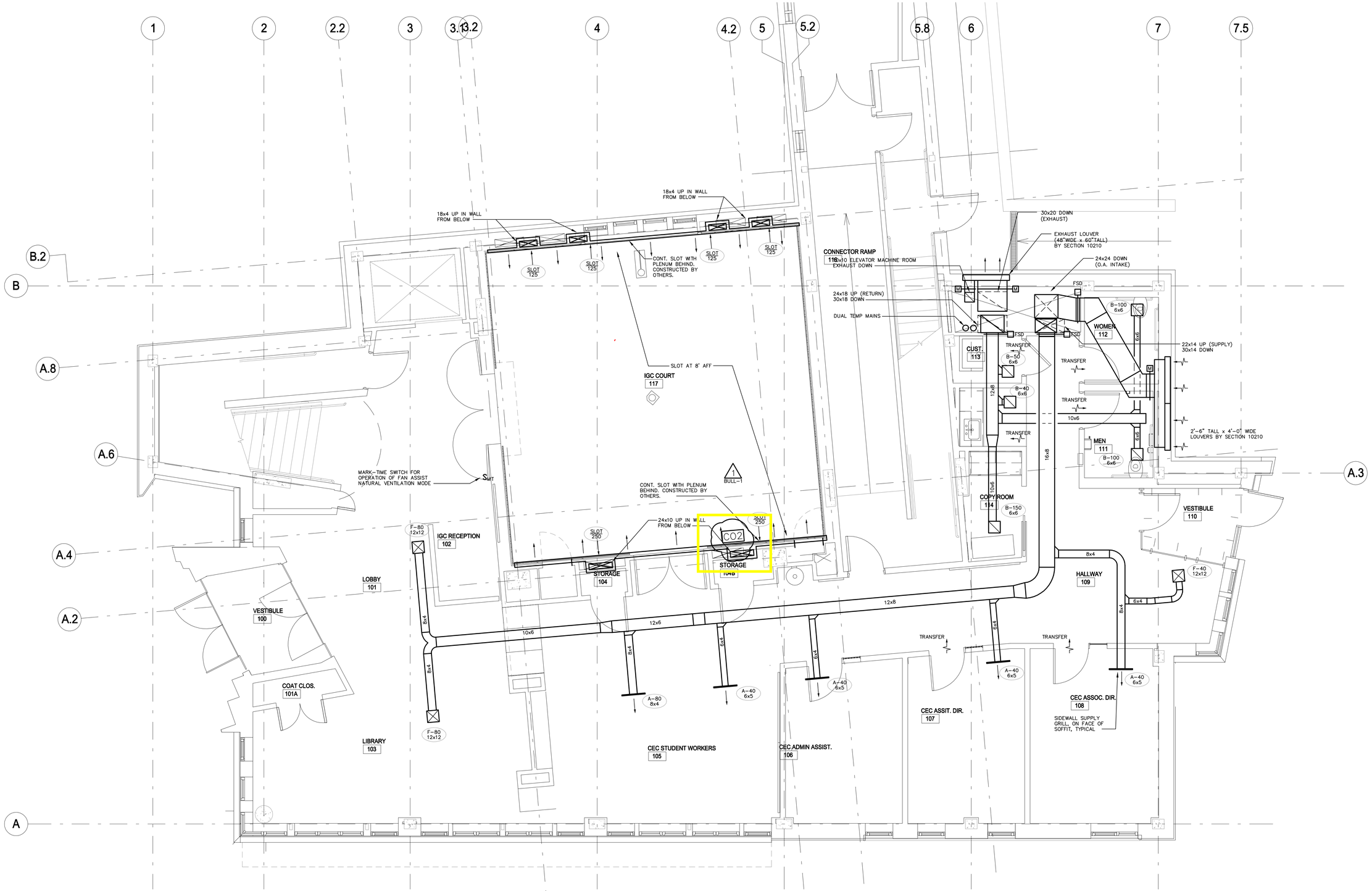


SPECIFICATIONS

Input Voltage	20 to 30VDC, 24AC
Analog Output	4-20mA, (clipped & capped)/0-5VDC/0-10VDC (selectable)-CWL models 4-20mA, (clipped & capped)/0-10VDC (selectable)-CWE models
Sensor Current Draw	100mA Maximum
Operating Temperature Range	0° to 50°C(32° to 122°F)
Housing Material	High impact ABS plastic
CO_2 Transmitter	
Sensor Type	Non-dispersive infrared (NDIR), diffusion sampling
Measurement Range	0-2000 ppm or 0-5000 ppm, user selectable on CWL models, 0-2000 ppm on CWE models
Accuracy	±30 ppm ±5% of measured value
Repeatability	±20 ppm ±1% of measured value
Response Time	<60 seconds for 90% step change
RH Transmitter	
HS Sensor	Digitally profiled thin-film capacitive (32-bit mathematics) U.S. Patent 5,844,138
Accuracy	±2% from 10 to 80% RH; Multi-point calibration NIST
Stability	±1% @ 20°C (68°F) annually, for two years
Operating Humidity Range	0 to 100% RH (non-condensing)
Operating Temperature Range	10° to 35°C (50° to 95°F)
Temperature Coefficient	±0.1% RH/°C above or below 25°C (typical)
Temperature (Transmitter)	
Sensor Type	Solid-state, integrated circuit
Accuracy	±0.5°C (±1°F) typical
Resolution	0.1°C (0.2°F)
Range	10° to 35°C (50° to 95°F)
Relay Contacts	
1 Form C	1A@30VDC, resistive; 30W max.

RTD/Thermistors in wall packages are not compensated for internal heating of product.

EMC Conformance: EN 61000-6-3:2001 Class B, EN 61000-6-1:2001, EN 61000-3-2:2000, EN 61000-3-3:2001, EMC Test Methods: CISPR 22:1997 (Amended A1:2000, A2:2002), IEC 61000-4-2:2002, IEC 61000-4-3:2006, IEC 61000-4-4:2004, IEC 61000-4-5:2001, IEC 61000-4-6:2004, IEC 61000-4-8:2001, IEC 61000-4-11:2004.
EMC Special Note: Connect this product to a DC distribution network or an AC/DC power adaptor with proper SURGE PROTECTION (EN 61000-6-1:2001 specification requirements).



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PROJECT NO.: 2006303.00

Mechanical and Electrical Engineers

Rev.	Date	Remarks
001	7/16/08	BULL-1,ASI-2
10	9/5/08	BULLETIN #10

Date:	April 28, 2008
Scale:	1/4" = 1'-0"
Project Number:	2006303.00
Drawn By:	EDA

Macalester College

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GRAND AVENUE
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CONSTRUCTION DOCUMENTS

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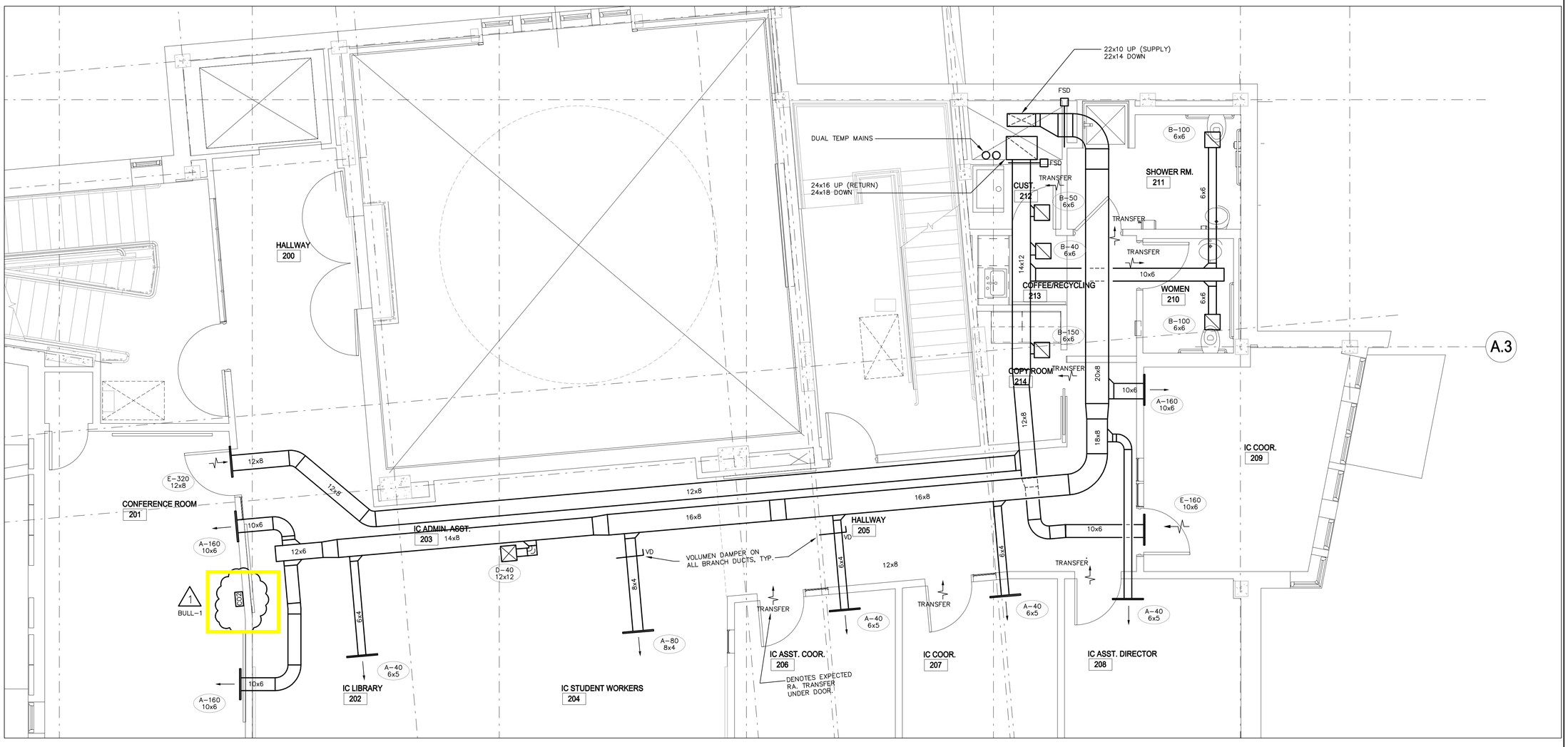
Print Name: Edward D. Allen, PE

Signature: _____

Date: _____ License #: 46406

FIRST FLOOR MECHANICAL PLAN

M-101



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Drawn By:	MRC

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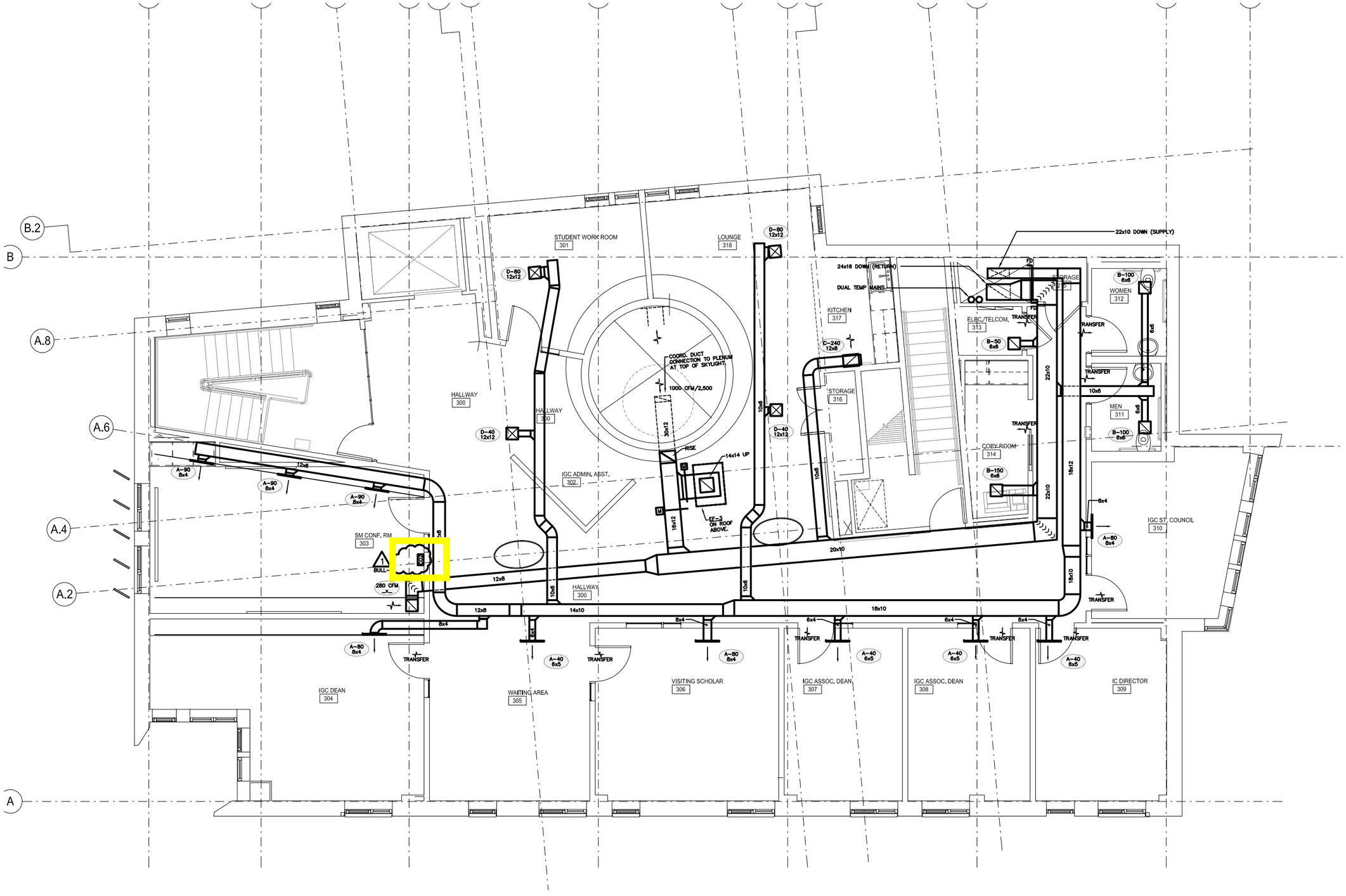
SECOND FLOOR MECHANICAL PLAN

M-102



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Drawn By:	MRC

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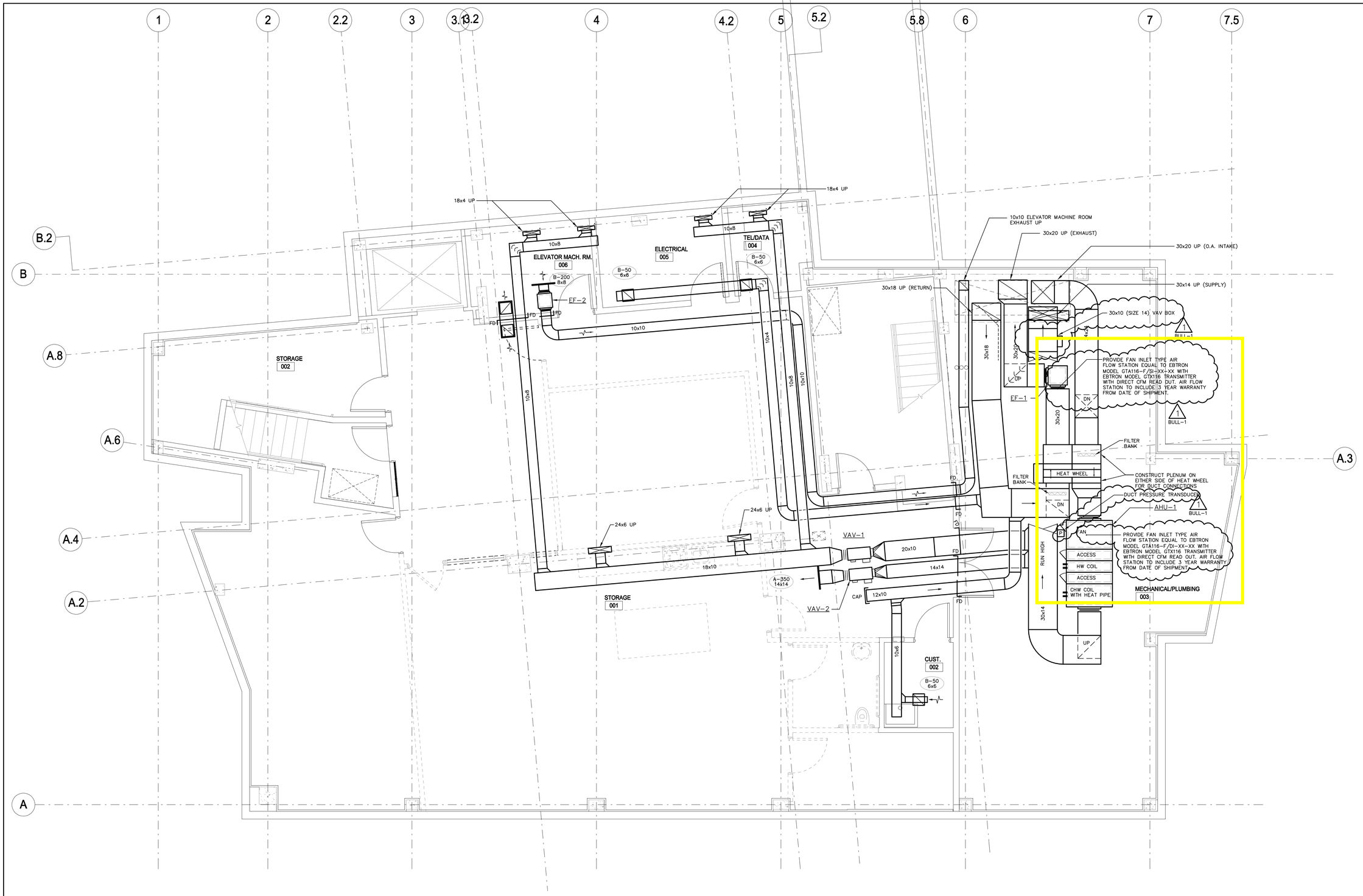
THIRD FLOOR MECHANICAL PLAN

M-103



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Date:	April 28, 2008
Scale:	1/4" = 1'-0"
Project Number:	2006303.00
Drawn By:	EDA

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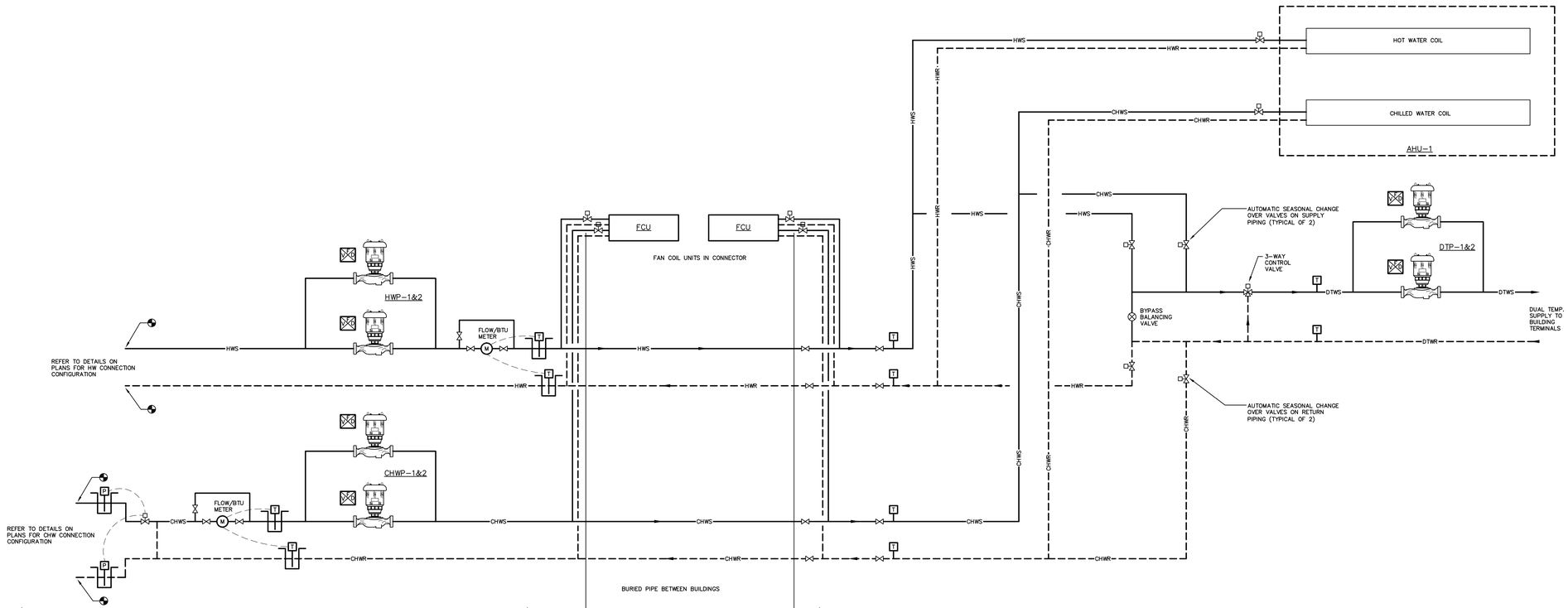
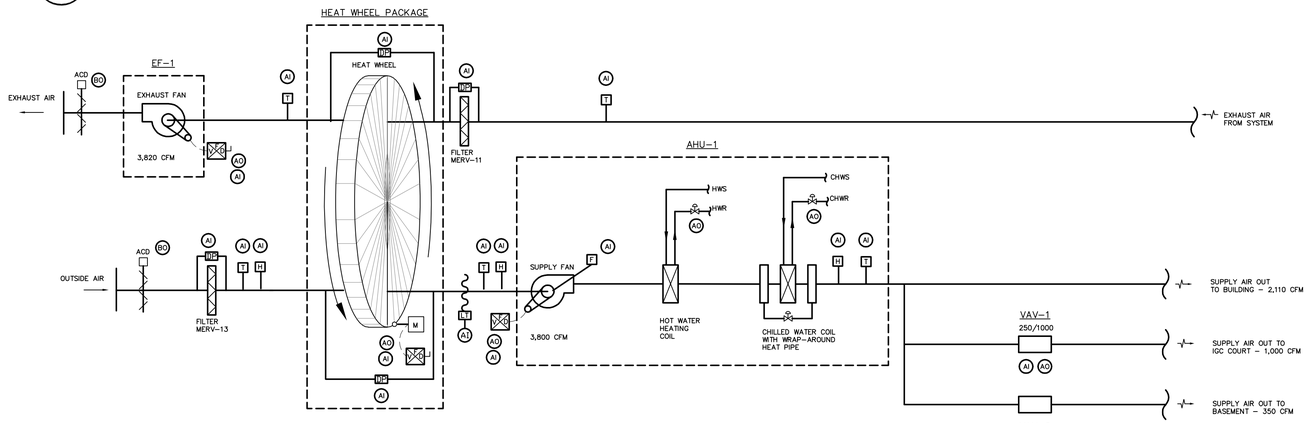
LOWER LEVEL MECHANICAL FLOOR PLAN

M-100



1 HOT WATER AND CHILLED WATER FLOW DIAGRAM

SCALE: NONE



2 DOAS AIR HANDLER UNIT WITH HEAT RECOVERY (AHU-1)

NOT TO SCALE

SEQUENCE OF OPERATION AHU-1

CONTROL SEQUENCE – AHU-1/EF-1/HEAT WHEEL

OCCUPIED MODE: UNIT WILL BE INDEXED TO OCCUPIED MODE (FANS RUNNING) AND UNOCCUPIED MODE (FANS OFF) BY TIME CLOCK SCHEDULE AND INPUT FROM OCCUPANCY SENSORS WITHIN THE BUILDING. SUPPLY AND EXHAUST FANS SHALL OPERATE CONTINUOUSLY DURING OCCUPIED MODE.

SUPPLY AND EXHAUST FAN OPERATION: THE SUPPLY AND EXHAUST FANS WILL OPERATE TOGETHER, MAINTAINING THE SAME VOLUME OF AIR FLOW, LESS OFFSET OF TOILET EXHAUST FANS AS DETERMINED BY FLOW STATIONS MOUNTED AT EACH FAN. THE FAN SYSTEM SHALL OPERATE DYNAMICALLY TO DELIVER THE REQUIRED VENTILATION AIR VOLUME TO/FROM THE BUILDING AS REQUIRED TO MAINTAIN CO2 LEVELS LESS THAN 1000 PPM

CALCULATION OF VENTILATION AIR VOLUME: EACH CO2 SENSOR INSTALLED IS ASSIGNED A CO2 SETPOINT VALUE. WHEN CO2 LEVELS AT ANY CO2 SENSOR EXCEED 1000 PPM THE VAV BOX ASSOCIATED WITH THE CO2 SENSOR SHALL BE INCREASED THE BMS SHALL CALCUALTE THE REQUIRED CFM TO BE DELIVERED FROM THE VAV BOX AND INDEX THE VAV BOX TO THIS CFM ACCORDINGLY.

SUPPLY AIR TEMPERATURE CONTROL: THE SUPPLY AIR TEMPERATURE WILL BE REGULATED THROUGH THE USE OF THE ENTHALPY WHEEL, HOT WATER HEATING COIL, AND CHILLED WATER COOLING COIL AND HEAT PIPES. SUPPLY AIR TEMPERATURE FOR HEATING MODE WILL BE 65 DEGREES F (ADJUSTABLE). SUPPLY AIR TEMPERATURE FOR COOLING MODE WILL BE 55 DEGREES F (ADJUSTABLE).

HEATING MODE TEMPERATURE CONTROL: SUPPLY AIR TEMPERATURE CONTROL WILL BE MAINTAINED BY MODULATING CONTROL OF THE 2WAY HEATING COIL CONTROL VALVE.

COOLING MODE TEMPERATURE CONTROL: WHEN THE OUTDOOR AIR HUMIDITY CONDITIONS LEAVING THE ENTHALPY WHEEL ARE BELOW 50 DEGREE DEW-POINT (ADJUSTABLE, CALCULATED FROM TEMPATURE AND HUMIDITY SENSORS) THE SUPPLY AIR TEMPERATURE CONTROL WILL BE MAINTAINED BY THE CHILLED WATER COOLING COIL ONLY. WHEN THE OUTDOOR AIR HUMIDITY CONDITIONS LEAVING THE ENTHALPY WHEEL ARE ABOVE SET-POINT, THE SUPPLY AIR TEMPERATURE CONTROL WILL BE MAINTAINED BY STAGED CONTROL OF THE HEAT PIPE SOLENOID VALVES TO REHEAT TO THE DESIRED SUPPLY AIR TEMPERATURE. THE COOLING COIL WILL OPERATE TO DISCHARGE 52 DEGREE SUPPLY AIR, SATURATED (51 DEGREE WET-BULB, 50 DEGREE DEW-POINT).

HEAT WHEEL CONTROL (ECONOMIZER): WHEN THE OUTDOOR AIR CONDITIONS (TEMPERATURE AND HUMIDITY) ARE SUITABLE TO MEET THE SUPPLY AIR TEMPERATURE AND HUMIDITY (50 DEGREE DEW-POINT) REQUIREMENTS, THEN THE ENTHAPLY WHEEL WILL BE COMMANDED TO STOP ROTATION.

HEAT WHEEL OPERATION: THE ENTHALPY HEAT WHEEL WILL OPERATE BASED ON IT'S OWN MANUFACTURER'S CONTROLS AND SAFTIES. THE BMS SHALL INDEX THE WHEEL TO OPERATE WHENEVER THE AHU IS IN OPERATION, EXCEPT WHEN ECONOMIZER MODE IN ENABLED.

ALARM CONDITIONS: AS A MINIMUM THE FOLLOWING CONDITIONS WILL INDICATE AS AN ALARM IN THE BMS: EXCESSIVE WHEEL PRESSURE DROP, FILTER DIRTY CONDITION AS INDICATED BY DIFFERENTIAL PRESSURE SENSOR, HIGH HUMIDITY LEVEL ON SUPPLY AIR DISCHARGE, LOW TEMPERATURE CONDITION LEAVING HEAT WHEEL.

1 BULL-1

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Rev.	Date	Remarks
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Date:	April 28, 2008
Scale:	AS NOTED
Project Number:	2006303.00
Drawn By:	EDA

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MECHANICAL ONE-LINE DIAGRAMS AND DETAILS

M-204

IEQ CREDIT #1 - Outdoor Air Delivery Monitoring

MACALESTER COLLEGE - Institute for Global Citizenship **Occupancy and Ventilation Chart** 24-Dec-08

Building Program						ASHRAE 62.1-2004 requirements					Design Conditions				
Level	Space #	Space Name	Space SF	Design Occupancy # of People	SF/person (Under 40 req's CO2)	Ventilation Classification per Table 6-1	Per Tabel 6-1 CFM/p	Per Tabel 6-1 CFM/sf	Calculated OA Vent. Table 6-1	Ventilation Effectiveness Table 6-2	Adjusted required OA (CFM)	Ventilation (DOAS) CFM	Ventilation Density CFM/sf	Vent % greater than std	Comments	Excess CFM Shared to adjoining Spaces
Basement																
		No normally occupied spaces														
		General ventilation of utility and storage spaces Only														
		Basement	1,850	0	**0.0**	General - Storage	0	0.12	222	1.0	222.0	350	0.19	58%		
First Floor																
	101,102,103	IGC Reception, library, lobby	540	8	**67.5**	Office - Reception	5	0.06	72.4	1	72.4	160	0.30	121%	Shared Ventilation with space #109 & 114	66
	105	Student Workers	330	6	**55.0**	Office - Office	5	0.06	49.8	1	49.8	120	0.36	141%	Shared Ventilation with space #109 & 114	55
	106	CEC Admin Assist	135	2	**67.5**	Office - Office	5	0.06	18.1	1	18.1	40	0.30	121%		
	107	CEC Admin Dir.	145	2	**72.5**	Office - Office	5	0.06	18.7	1	18.7	40	0.28	114%		
	108	CEC Assoc Director	156	2	**78.0**	Office - Office	5	0.06	19.36	1	19.4	40	0.26	107%		
	109, 114	Hallway & copy room	589	1	**589.0**	General - Corridor	0	0.06	35.34	1	35.3	40	0.07	**13%**	Open to spaces #101,102,103,105 - so 121 CFM of shared "excess ventilation from those spaces will bring this space to **343%** over standard	
		(See footnote #1)														
	117	IGC Court	705	50	14.1	Educational - Multiuse	7.5	0.06	417.3	1.2	347.8	1000	1.42	188%	**Displacement supply with overhead exhaust -** CO2 Monitoring & ventilation supply demand control provided	
Second Floor																
	201	Conference Room	300	16	18.8	General - Conference	5	0.06	98	0.8	122.5	320	1.07	161%	**Wall supply and exhaust grills,** CO2 Monitoring provided	
	202, 204	IC Library, IS Student Workers	610	8	**76.3**	Office-Office	5	0.06	76.6	1	76.6	160	0.26	109%	Shared ventilation with Space #202, 205, etc	60
	200,205,214,213	Hallways, copy rm, coffee	512	1	**512.0**	General - Corridor	0	0.06	30.72	1	30.7	**0**	0.00	**-100%**	Open to spaces 202, 203,204 - so 60 CFM of excess ventilation from those spaces will result in hallway being ventilated to **100%** greater than 62.1 standard	
		(See footnote #2)														
	206	IC Asst Coord	140	2	**70.0**	Office-Office	5	0.06	18.4	1	18.4	40	0.29	54%		
	207	IC Coord	145	2	**72.5**	Office-Office	5	0.06	18.7	1	18.7	40	0.28	53%		
	208	IC Assist Director	170	2	**85.0**	Office-Office	5	0.06	20.2	1	20.2	40	0.24	50%		
	209	IC Coord	165	4	**41.3**	Office-Office	5	0.06	29.9	0.8	37.4	160	0.97	77%	Wall supply and exhaust grills	
Third Floor																
	300,314	Hallway, Copy rm	900	0	**0.0**	General - Corridor	0	0.06	54	1	54.0	80	0.09	33%	Open to space #302 #318 (shared Vent)	10
	302	Asmin Assist (open with Hallway)	60	1	**60.0**	Office - Reception	5	0.06	8.6	1	8.6	**0**	0.00	**-100%**	Open to Hallway/open plan on third floor Excess from hallway and Lounge applied to this area (35 CFM) will yield **307%** above 62.1 std.	
		(See footnote #3)														
	303	SM conference Rm	286	16	17.9	General - Conference	5	0.06	97.16	0.8	121.5	270	0.94	55%	**Wall supply and exhaust grills,** CO2 Monitoring provided	
	304	IGC Dean	286	4	**71.5**	Office-Office	5	0.06	37.16	1	37.2	80	0.28	54%		
	305	Waiting Area	204	2	**102.0**	Office - Reception	5	0.06	22.24	1	22.2	40	0.20	44%		
	306	Visiting Scholar	225	2	**112.5**	Office-Office	5	0.06	23.5	1	23.5	80	0.36	71%		
	307	IGC Assoc Dean	143	2	**71.5**	Office-Office	5	0.06	18.58	1	18.6	40	0.28	54%		
	308	IGC Assoc Dean	150	2	**75.0**	Office-Office	5	0.06	19	1	19.0	40	0.27	53%		
	309	IC Director	161	2	**80.5**	Office-Office	5	0.06	19.66	1	19.7	40	0.25	51%		
	310	IGC Student Council	166	4	**41.5**	Office-Office	5	0.06	29.96	1	30.0	80	0.48	63%		
	318	Lounge/Break	227	4	**56.8**	General - Conference	5	0.06	33.62	0.8	42.0	80	0.35	47%	Open to Hallway/open plan (shared vent)	25
	301	Student Work Room	140	3	**46.7**	Office-Office	5	0.06	23.4	1	23.4	80	0.57	71%		

Building Totals	**Ventilated Square Footage**	**9,440**	
	Peak Building Occupancy	**148**	
	Total Building Required Peak Ventilation (OA)		**1527.52**
	Delivered OA by System as Designed		**3460**
	Average "increased" ventilation percentage		**127%**

Footnotes:

1. Spaces #101,102, 103, 105, 109 and 114 all share a common ventilation atmosphere. Ventilation supply has been determined individually to permit separate accounting of the function and occupancy of each space, but ventilation compliance has been considered in aggregate due to lack of separation between these areas.
2. Spaces #200, 202, 204, 205, 213 & 214 all share a commonventilation atmosphere. Ventilation supply has been determined individually to permit separate accounting of the function and occupancy of each space, but ventilation compliance has been considered in aggregate due to lack of separation between these areas.
3. Spaces #300, 302, 314, & 318 all share a commonventilation atmosphere. Ventilation supply has been determined individually to permit separate accounting of the function and occupancy of each space, but ventilation compliance has been considered in aggregate due to lack of separation between these areas.

INDOOR ENVIRONMENTAL QUALITY

CREDIT 2: INCREASED VENTILATION

INCREASED VENTILATION CALCULATIONS

IEQ CREDIT #2 - Increased Ventilation

MACALESTER COLLEGE - Institute for Global Citizenship **Occupancy and Ventilation Chart** 24-Dec-08

Building Program						ASHRAE 62.1-2004 requirements						Design Conditions				
Level	Space #	Space Name	Space SF	Design Occupancy # of People	SF/person (Under 40 req's CO2)	Ventilation Classification per Table 6-1	Per Tabel 6-1 CFM/p	Per Tabel 6-1 CFM/sf	Calculated OA Vent. Table 6-1	Ventilation Effectiveness Table 6-2	Adjusted required OA (CFM)	Ventilation (DOAS) CFM	Ventilation Density CFM/sf	Vent % greater than std	Comments	Excess CFM Shared to adjoining Spaces
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	105	Student Workers	330	6	55.0	Office - Office	5	0.06	49.8	1	49.8	120	0.36	141%	Shared Ventilation with space #109 & 114	55
	106	CEC Admin Assist	135	2	67.5	Office - Office	5	0.06	18.1	1	18.1	40	0.30	121%		
	107	CEC Admin Dir.	145	2	72.5	Office - Office	5	0.06	18.7	1	18.7	40	0.28	114%		
	108	CEC Assoc Director	156	2	78.0	Office - Office	5	0.06	19.36	1	19.4	40	0.26	107%		
	109, 114	Hallway & copy room	589	1	589.0	General - Corridor	0	0.06	35.34	1	35.3	40	0.07	13%	Open to spaces #101,102,103,105 - so 121 CFM of shared "excess ventilation from those spaces will bring this space to **343%** over standard	
		(See footnote #1)														
	117	IGC Court	705	50	**14.1**	Educational - Multiuse	7.5	0.06	417.3	1.2	347.8	1000	1.42	188%	Displacement supply with overhead exhaust - **CO2 Monitoring & ventilation supply demand control provided**	
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	201	Conference Room	300	16	**18.8**	General - Conference	5	0.06	98	0.8	122.5	320	1.07	161%	Wall supply and exhaust grills, **CO2 Monitoring provided**	
	202, 204	IC Library, IS Student Workers	610	8	76.3	Office-Office	5	0.06	76.6	1	76.6	160	0.26	109%	Shared ventilation with Space #202, 205, etc	60
	200,205,214,213	Hallways, copy rm, coffee	512	1	512.0	General - Corridor	0	0.06	30.72	1	30.7	0	0.00	-100%	Open to spaces 202, 203,204 - so 60 CFM of excess ventilation from those spaces will result in hallway being ventilated to **100%** greater than 62.1 standard	
		(See footnote #2)														
	206	IC Asst Coord	140	2	70.0	Office-Office	5	0.06	18.4	1	18.4	40	0.29	54%		
	207	IC Coord	145	2	72.5	Office-Office	5	0.06	18.7	1	18.7	40	0.28	53%		
	208	IC Assist Director	170	2	85.0	Office-Office	5	0.06	20.2	1	20.2	40	0.24	50%		
	209	IC Coord	165	4	41.3	Office-Office	5	0.06	29.9	0.8	37.4	160	0.97	77%	Wall supply and exhaust grills	
Third Floor																
	300,314	Hallway, Copy rm	900	0	0.0	General - Corridor	0	0.06	54	1	54.0	80	0.09	33%	Open to space #302 #318 (shared Vent)	10
	302	Asmin Assist (open with Hallway)	60	1	60.0	Office - Reception	5	0.06	8.6	1	8.6	0	0.00	-100%	Open to Hallway/open plan on third floor Excess from hallway and Lounge applied to this area (35 CFM) will yield **307%** above 62.1 std.	
		(See footnote #3)														
	303	SM conference Rm	286	16	**17.9**	General - Conference	5	0.06	97.16	0.8	121.5	270	0.94	55%	Wall supply and exhaust grills, **CO2 Monitoring provided**	
	304	IGC Dean	286	4	71.5	Office-Office	5	0.06	37.16	1	37.2	80	0.28	54%		
	305	Waiting Area	204	2	102.0	Office - Reception	5	0.06	22.24	1	22.2	40	0.20	44%		
	306	Visiting Scholar	225	2	112.5	Office-Office	5	0.06	23.5	1	23.5	80	0.36	71%		
	307	IGC Assoc Dean	143	2	71.5	Office-Office	5	0.06	18.58	1	18.6	40	0.28	54%		
	308	IGC Assoc Dean	150	2	75.0	Office-Office	5	0.06	19	1	19.0	40	0.27	53%		
	309	IC Director	161	2	80.5	Office-Office	5	0.06	19.66	1	19.7	40	0.25	51%		
	310	IGC Student Council	166	4	41.5	Office-Office	5	0.06	29.96	1	30.0	80	0.48	63%		
	318	Lounge/Break	227	4	56.8	General - Conference	5	0.06	33.62	0.8	42.0	80	0.35	47%	Open to Hallway/open plan (shared vent)	25
	301	Student Work Room	140	3	46.7	Office-Office	5	0.06	23.4	1	23.4	80	0.57	71%		

Building Totals	**Ventilated Square Footage**	**9,440**
	Peak Building Occupancy	**148**
	Total Building Required Peak Ventilation (OA)	**1527.52**
	Delivered OA by System as Designed	**3460**
	Average "increased" ventilation percentage	**127%**

Footnotes:

1. Spaces #101,102, 103, 105, 109 and 114 all share a common ventilation atmosphere. Ventilation supply has been determined individually to permit separate accounting of the function and occupancy of each space, but ventilation compliance has been considered in aggregate due to lack of separation between these areas.
2. Spaces #200, 202, 204, 205, 213 & 214 all share a commonventilation atmosphere. Ventilation supply has been determined individually to permit separate accounting of the function and occupancy of each space, but ventilation compliance has been considered in aggregate due to lack of separation between these areas.
3. Spaces #300, 302, 314, & 318 all share a commonventilation atmosphere. Ventilation supply has been determined individually to permit separate accounting of the function and occupancy of each space, but ventilation compliance has been considered in aggregate due to lack of separation between these areas.

INDOOR ENVIRONMENTAL QUALITY

CREDIT 3.1: CONSTRUCTION IAQ MANAGEMENT PLAN: DURING CONSTRUCTION

IAQ PLAN DURING CONSTRUCTION

PHOTO DOCUMENTATION

Macalester College Institute for Global Citizenship
St. Paul, MN

LEED EQ Credit 3.1 Indoor Air Quality Management Plan During Construction

Purpose: The purpose of this Indoor Air Quality Plan is to provide the construction team with a management tool to effectively monitor, mitigate, and control the air quality conditions that may arise during the construction of the project.

Scope: The plan will follow the 5 measures described in SMACNA's IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3. This plan will address control measures in five areas: HVAC protection, Source Control, Pathway Interruption, Housekeeping, and Scheduling.

Photographs will be taken throughout the construction process to demonstrate compliance with this plan.

The Plan

3.2 HVAC Protection

- It is our intent to strictly adhere to Chapter 3 of SMACNA's IAQ Guidelines for Occupied Buildings Under Construction for HVAC equipment and subsystems
- Store HVAC equipment in a clean dry location: Until HVAC system is fully installed; all parts of the system shall be covered or stored in a location where contaminants are not introduced
- Seal all HVAC inlets/outlets: All air inlets and outlets shall be sealed during the first phase of construction.
- Filters: The permanent HVAC system will not be used until final phase of construction. MERV 8 filters to be installed at each return air grille prior to initial start-up. Filters to be replaced immediately prior to occupancy.
- Avoid contaminated air entry: When dust is produced from heavy outside work, all outside air supplies shall be closed to mitigate contaminated air intrusion into the building

3.3 Source Control, after dry-in

- Drywall dust to be controlled through proper ventilation, isolation of affected areas, filtration, and protective equipment for individual workers
- Whenever possible, cutting of material to be done in isolated areas; any cutting done elsewhere to utilize dust protection system
- Negative air machines and/or air scrubbers to be used when work is performed in enclosed areas
- Paint and clear finishing operations to be well-ventilated
- No storage of containers with toxic materials allowed inside the building

- Only low-emitting products (paints, primers, coatings, adhesives, sealants, cleaning agents, solvents, etc.) are allowed within the building. All products referenced above need to be approved by McGough and the Architect before they are brought on-site. No product substitution is allowed.

- **All onsite forepersons** are required to check in with the site superintendent before using any adhesives, sealants, primers, paints, coatings, or cleaning agents inside the building

- Idling vehicles and gas-powered tools not allowed near the building to minimize exhaust fumes

- Materials with high-VOC content to off-gas prior to installation: plastic, fabric, laminates, or assembled materials that are packaged or rolled-up shall be opened up and ventilated prior to arrival on site

- No smoking is allowed on the job site. All contractors are responsible for policy adherence and enforcement

3.4 Pathway Interruption

- Construction entry mats will be maintained at each entry to limit dirt and debris from entering the buildings

- Where applicable, dust curtains or temporary enclosures will be used to prevent dust or contaminated air from migrating to other areas

3.5 Housekeeping

- Interior absorptive materials such as insulation, drywall, carpet, cabinets, doors, millwork, etc. will be protected from exposure to moisture and stored in clean, dry areas

- All on-site personnel will keep their work areas clean, dry, and orderly on a daily basis

- Sweeping compound to be used on concrete floors

- Minimize dust- tools such as saws, drywall sanders, etc. will use dust collection systems

- Only low-VOC cleaning products will be used

- When appropriate, use damp rags or an HEPA vacuum to clean work areas

3.6 Scheduling

- Porous materials shall be installed after building is closed and dried-in

- Coordinate material installation to limit absorption by porous materials of wet or odorous materials—i.e., painting to be completed before the carpet or furniture installation

01 – Indoor Air Quality Management Plan During Construction – ***3.2 HVAC Protection***
Store HVAC equipment in a clean, dry location; all parts of system shall be covered or stored in a location where contaminants are not introduced.

02 – Indoor Air Quality Management Plan During Construction – ***3.2 HVAC Protection***
All inlets/outlets of the HVAC system were covered to not allow the introduction of contaminants

03 – Indoor Air Quality Management Plan During Construction – *3.3 Source Control, after dry-in*
Cutting of material to be done in isolated areas.

04 – Indoor Air Quality Management Plan During Construction – *3.3 Source Control, after dry-in*
Cutting of material to be done in isolated areas.

05 – Indoor Air Quality Management Plan During Construction – *3.3 Source Control, after dry-in*
Negative air machines to be used when work is performed in enclosed areas.

06 – Indoor Air Quality Management Plan During Construction – *3.4 Pathway Interruption*
Construction entry mats will be maintained at each entry to limit dirt and debris from entering the building

07 – Indoor Air Quality Management Plan During Construction – 3.4 Pathway Interruption
Where applicable, dust curtains or temporary enclosures will be used to prevent dust or contaminated air from migrating to other areas

08 – Indoor Air Quality Management Plan During Construction – 3.4 Pathway Interruption
Construction entry mats will be maintained at each entry to limit dirt and debris from entering the building

09 – Indoor Air Quality Management Plan During Construction – *3.5 Housekeeping*
Interior absorptive materials such as insulation, drywall, carpet, cabinets, doors, millwork, etc. will be protected from exposure to moisture and stored in clean, dry areas.

10 – Indoor Air Quality Management Plan During Construction – *3.5 Housekeeping*
All on-site personnel will keep their work areas clean, dry, and orderly on a daily basis
Sweeping compound to be used on concrete floors

11 – Indoor Air Quality Management Plan During Construction – *3.5 Housekeeping*
All on-site personnel will keep their work areas clean, dry, and orderly on a daily basis
Sweeping compound to be used on concrete floors

INDOOR ENVIRONMENTAL QUALITY

CREDIT 3.2: CONSTRUCTION IAQ MANAGEMENT PLAN: BEFORE OCCUPANCY

FLUSHOUT NARRATIVE

FLUSHOUT DATA

FLUSHOUT AIRFLOW BALANCE REPORT

Macalester IGC
LEED EQc3.2 Construction IAQ Management Plan, Before Occupancy
Flush-out Narrative

Flush-out to begin after completion of construction punch-list and final test and balance. The building flush-out is to be performed prior to occupancy utilizing a temporary 25,000 CFM air handling unit (AHU) and the building's permanent 3,800 CFM AHU. The building will be flushed continuously with 100% outside air for 7.5 days. Please reference Macalester IGC Flush-out Calculation and Data for supporting information.

Below is a summary of work associated with the LEED flush-out.

Summary

- Extend natural gas piping from temporary gas meter on east side of site to one temporary air handling unit. Gas meter set to support 1,200 CFH of gas usage.
- Set one temporary* 25,000 direct fired air handling unit at east side of building
- Extend 36" Ø supply air duct from temporary air handling unit to east vestibule exterior door. Sheet metal transition piece to be located in door opening during flush out.
- Building's permanent interior air handling unit to run during flush-out. (Reference Macalester IGC Flush-out Calculation and Data.)
- Building roof hatch to be utilized for relief of supply air from temporary and permanent air handling unit. Temporary protection to be built at roof to prevent snow or rain from entering roof hatch.
- Temporary filters to be used during flush-out. Permanent filters to be installed upon completion of flush-out and prior to occupancy. All filters to be MERV-13.
- Prior to start of flush-out, balancer to verify CFM of both temporary* and permanent air handling units. (Reference Macalester IGC Flush-out Calculation and Data.)
- Temperature and humidity to be checked and documented two times each day in two separate areas of the building for the duration of flush-out. (Reference Macalester IGC Flush-out Calculation and Data for documentation.)

*Actual CFM of temporary unit measured at 17,695 CFM. Actual CFM is used in referenced calculations.

Macalester IGC
Building Flush-out Calculation & Data

Calculation

Flush-out prior to occupancy performed utilizing one (1) temporary 17,695 CFM AHU and one (1) permanent 3,800 CFM AHU for a total of 21,495 CFM

Required

GSF		LEED Requirement		Total Cubic Feet
16,565 SF	x	14,000 CF/SF	=	231,910,000 CF

Capacity

Total CF Required		100% O.A. AHU Operation		Time Required
231,910,000 CFM	/	21,495 CFM	=	**7.5 Days**

Flush-out Start 03/31/09 (PM)
Fush-out Complete 04/08/09 (AM)

Flush-out Data

Date	Duration (Days)	Time	Location	Indoor Air Temperature	Indoor Humidity
3/31/2009	1	3:31 PM	Floor 1	75 ºF	32 %
		3:31 PM	Floor 3	75 ºF	31 %
		9:13 PM	Floor 1	79 ºF	28 %
		9:14 PM	Floor 3	79 ºF	27 %
4/1/2009	2	6:03 AM	Floor 1	78 ºF	28 %
		6:03 AM	Floor 3	78 ºF	26 %
		4:30 PM	Floor 1	78 ºF	26 %
		4:32 PM	Floor 3	78 ºF	25 %
4/2/2009	3	6:04 AM	Floor 1	78 ºF	24 %
		6:04 AM	Floor 3	78 ºF	24 %
		4:05 PM	Floor 1	80 ºF	24 %
		4:06 PM	Floor 3	79 ºF	16 %
4/3/2009	4	6:15 AM	Floor 1	78 ºF	16 %
		6:17 AM	Floor 3	78 ºF	16 %
		4:27 PM	Floor 1	80 ºF	16 %
		4:28 PM	Floor 3	80 ºF	15 %
4/4/2009	5	8:42 AM	Floor 1	78 ºF	16 %
		8:44 AM	Floor 3	78 ºF	16 %
		9:14 PM	Floor 1	79 ºF	25 %
		9:16 PM	Floor 3	79 ºF	25 %
4/5/2009	6	9:19 AM	Floor 1	78 ºF	25 %
		9:22 AM	Floor 3	78 ºF	24 %
		8:07 PM	Floor 1	81 ºF	16 %
		8:09 PM	Floor 3	80 ºF	16 %
4/6/2009	7	6:25 AM	Floor 1	79 ºF	16 %
		6:26 AM	Floor 3	79 ºF	16 %
		4:15 PM	Floor 1	81 ºF	16 %
		4:15 PM	Floor 3	80 ºF	16 %
4/7/2009	8	6:14 AM	Floor 1	79 ºF	16 %
		6:15 AM	Floor 3	79 ºF	16 %
		3:15 PM	Floor 1	82 ºF	16 %
		3:16 PM	Floor 3	81 ºF	16 %
4/8/2009	9	6:06 AM	Floor 1	80 ºF	16 %
		6:07 AM	Floor 3	79 ºF	16 %
		9:02 AM	Floor 1	80 ºF	16 %
		9:03 AM	Floor 3	81 ºF	16 %

ATTN. TERRY D.

AIR OUTLET REPORT

Area Served	Outlet			CFM		
	No.	Type	Size	Design	Prelim	Final
100% OA	1	TEMP UNIT		N/A	N/A	17695
Bldg	1	AHU-1		N/A	N/A	38660

Remarks:

Project Name Macalester IGC Project # 202X8027

System/Unit TEMP UNIT Area Served

Test Date 3/31/09 Report Date

Readings By ST

Page 1 of 1

METROPOLITAN MECHANICAL
CONTRACTORS
7340 Washington Avenue South
Eden Prairie, Minnesota 55344

ABT-2 0183

McGough-Macalester Jo 01:28:39 p.m. 03-31-2009 1/1
651 361 5885

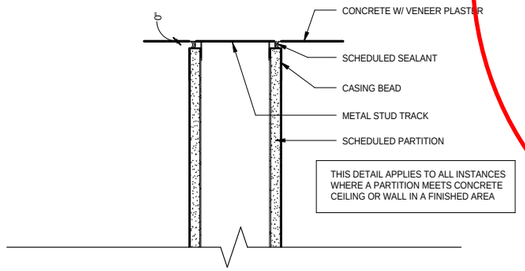
INDOOR ENVIRONMENTAL QUALITY

CREDIT 5: INDOOR CHEMICAL & POLLUTANT SOURCE CONTROL

PARTITION TYPES

ROOM LOCATIONS

ENTRY MAT LOCATIONS



4 GWB WALL AT CONCRETE CEILING
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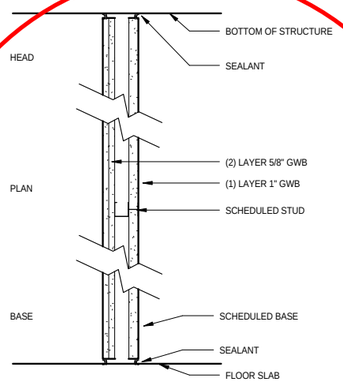
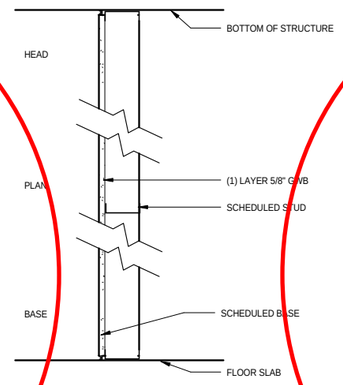


H PARTITION TYPE H
SCALE: 1 1/2" = 1'-0"

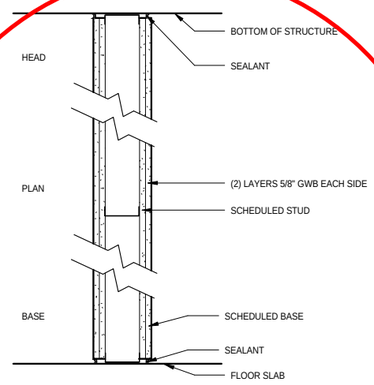
H - 2 1/2" CH STUD

2 HOUR RATED



F PARTITION TYPE F
SCALE: 1 1/2" = 1'-0"

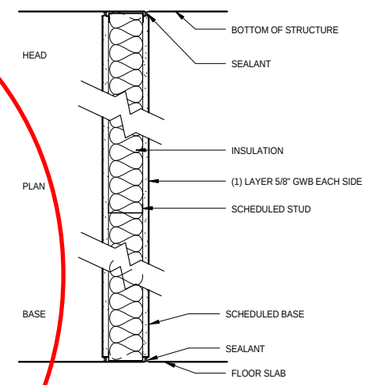
F - 3 5/8" STUD
F1- 6" STUD
F2- 1 5/8" STUD W/ MW INSULATION BEHIND



D PARTITION TYPE D
SCALE: 1 1/2" = 1'-0"

D - 3 5/8" STUD

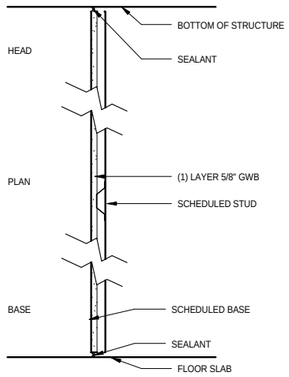
2 HOUR RATED



B PARTITION TYPE B
SCALE: 1 1/2" = 1'-0"

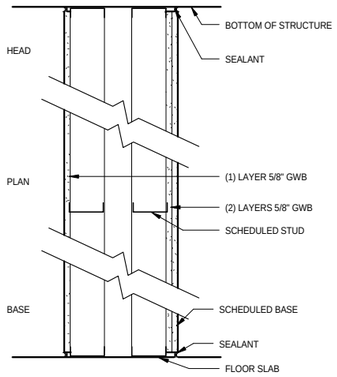
B - 3 5/8" STUD

1 HOUR RATED



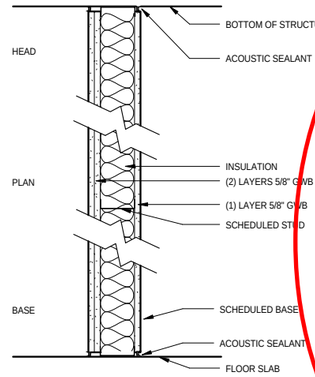
G PARTITION TYPE G
SCALE: 1 1/2" = 1'-0"

G - 7/8" FURRING CHANNEL



E PARTITION TYPE E
SCALE: 1 1/2" = 1'-0"

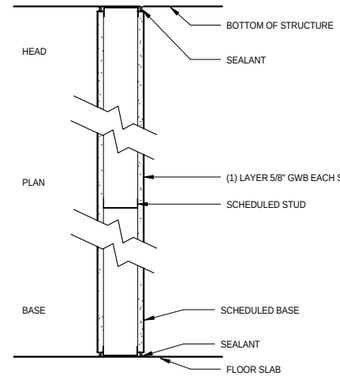
E - 3 5/8" STUD



C PARTITION TYPE C
SCALE: 1 1/2" = 1'-0"

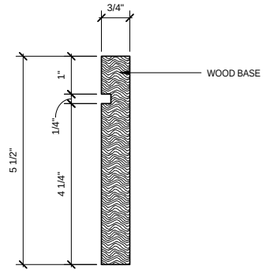
C - 3 5/8" STUD

I HOUR RATED

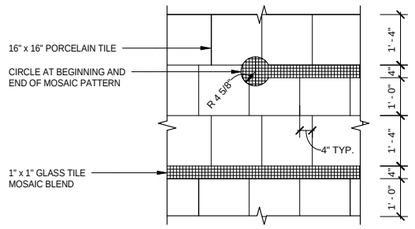


A PARTITION TYPE A
SCALE: 1 1/2" = 1'-0"

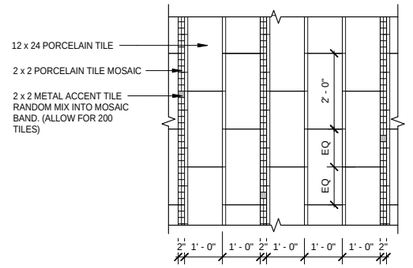
A - 3 5/8" STUD
A1- 6" STUD



3 WOOD BASE PROFILE
SCALE: 6" = 1'-0"



2 IGC COURT 117 FLOOR TILE PATTERN
SCALE: 1/2" = 1'-0"



1 LOBBY 101 FLOOR TILE PATTERN
SCALE: 1/2" = 1'-0"

IF THIS SHEET IS NOT 22" x 34", IT HAS BEEN REDUCED OR ENLARGED.

1/18/2008 12:44:44 PM

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Architecture/Urban Design
Preservation/Landscape Architecture
Space Planning/Interior Design

Rev	Date	Remarks

Date	JANUARY 14, 2008
Scale	As indicated
Project Number	871-00
Drawn By	Author

Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

PARTITION TYPES & FINISH DETAILS

A-902

GENERAL NOTES:

1. REFER TO A000 FOR SYMBOLS AND ABBREVIATIONS.
2. REFER TO PARTITION TYPE SHEET FOR PARTITION TYPES. WHERE APPLICABLE, PARTITION TYPES ARE SHOWN ON ENLARGED PLANS.
3. REFER TO FINISH SCHEDULE FOR ROOM FINISH INFORMATION.

LEGEND:

MB	MARKER BOARD
TB	TACK BOARD
FEC	FIRE EXTINGUISHER CABINET
HO	HOLD-OPEN (REFER TO DOOR SCHED. FOR TYPE)
FD	FLOOR DRAIN
ECS	EMERGENCY CALL STATION

GALLERY 118

REFER TO A110 FOR KAGIN CONNECTOR

KAGIN CONNECTOR

ADD LAYER OF 5/8" GWB TO EXT. WALL ASSEMBLY TO COMPLETE 2 HOUR SHAFT RATING

CONNECTOR RAMP 116

1:20 RAMP

1:12 RAMP

STAIR 1

STAIR 2

ELEVATOR

IGC COURT 117

IGC RECEPTION 102

LOBBY 101

VESTIBULE 100

VESTIBULE 110

COAT CLOS. 101A

LIBRARY 103

LOW WALL FOR RECEPTION DESK

A.V. CLOS. 117B

STOR. 104

STOR. 104B

RECYL

CUST. 113

COFFEE 114

UPPER/LOWER CABINETS 115

COPY RM 115

COPIER

WOMEN 112

MEN 111

HALLWAY 109

STUDENT WORK AREA 105

OFFICE 106

OFFICE 107

OFFICE 108

RECESSED SLAB FOR RADIANT FLOOR

PORCELAIN TILE FLOORING REFER TO A902 FOR PATTERN

GLASS MOSAIC TILE ACCENT BAND.

BRONZE PLATE THRESHOLD

27' - 0" GWB TO GWB

8 1/8" GWB TO COL CL

943.0' T.O.S.

944.18' T.O.S.

944.14' T.O.C.

945.0' T.O.S.

EL. 944.72' SEE CIVIL

PROVIDE SECOND LAYER OF GWB AT EXTERIOR WALL OF SHAFT FOR 2 HR RATING

RECESSED INTERIOR WALK OFF MAT.

RECESSED WALL MOUNTED ACC. DOOR ACTUATOR CONTROL BUTTON

RECESSED VESTIBULE WALK OFF MAT.

RECESSED EXTERIOR WALK OFF MAT.

LINE OF CANOPY ABOVE

RECESSED WALL MOUNTED ACC. DOOR ACTUATOR CONTROL BUTTON

RECESSED WALL MOUNTED ACC. DOOR ACTUATOR CONTROL BUTTON

VENEER PLASTER ON CONC. COLUMN

ELECTRONIC DISPLAY BOARD, N.I.C.

PORCELAIN TILE FLOORING, REFER TO A902 FOR PATTERN

BUILT -IN WOOD BOOKSHELF ASSEMBLY

24" x 36" PORC TILE THRESHOLD

SUNSHADE, ABOVE

FIRST FLOOR NOTES:

1. PROVIDE CRACK ISOLATION MEMBRANE AT ALL TILE AREAS.

PROJECT NORTH

IF THIS SHEET IS NOT: 22" x 34", IT HAS BEEN REDUCED OR ENLARGED.

4/28/2008 12:51:40 PM

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Rev.	Date	Remarks
5	3/18/2008	Addendum No. 5

Date	APRIL 28, 2008
Scale	1/4" = 1'-0"
Project Number	871-00
Drawn By	JJ/RM

Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

CONSTRUCTION DOCUMENTS
APRIL 28, 2008

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the State of Minnesota.

Print Name: Norris Strawbridge

Signature:

Date: 04/28/08 License #: 26327

0 2' 4' 8'

FIRST FLOOR PLAN

A-101

GENERAL NOTES:

1. REFER TO A000 FOR SYMBOLS AND ABBREVIATIONS.
2. REFER TO PARTITION TYPE SHEET FOR PARTITION TYPES. WHERE APPLICABLE, PARTITION TYPES ARE SHOWN ON ENLARGED PLANS.
3. REFER TO FINISH SCHEDULE FOR ROOM FINISH INFORMATION.

LEGEND:

MB	MARKER BOARD
TB	TACK BOARD
FEC	FIRE EXTINGUISHER CABINET
HO	HOLD-OPEN (REFER TO DOOR SCHED. FOR TYPE)
FD	FLOOR DRAIN
ECS	EMERGENCY CALL STATION

IF THIS SHEET IS NOT: 22" x 34", IT HAS BEEN REDUCED OR ENLARGED.

4/28/2008 1:32:03 PM

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Preservation/Landscape Architecture
Space Planning/Interior Design

Rev	Date	Remarks

Date	APRIL 28, 2008
Scale	1/4" = 1'-0"
Project Number	871-00
Drawn By	JJ/RM

Macalester College

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Grand Avenue
St. Paul, MN

CONSTRUCTION DOCUMENTS
APRIL 28, 2008

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the State of Minnesota.

Print Name: Norris Strawbridge

Signature:

Date: 04/28/08 License #: 26320

SECOND FLOOR PLAN

PROJECT NORTH

A-102

GENERAL NOTES:

1. REFER TO A000 FOR SYMBOLS AND ABBREVIATIONS.
2. REFER TO PARTITION TYPE SHEET FOR PARTITION TYPES. WHERE APPLICABLE, PARTITION TYPES ARE SHOWN ON ENLARGED PLANS.
3. REFER TO FINISH SCHEDULE FOR ROOM FINISH INFORMATION.

LEGEND:

MB	MARKER BOARD
TB	TACK BOARD
FEC	FIRE EXTINGUISHER CABINET
HO	HOLD-OPEN (REFER TO DOOR SCHED. FOR TYPE)
FD	FLOOR DRAIN
ECS	EMERGENCY CALL STATION

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Preservation/Landscape Architecture
Space Planning/Interior Design

Rev	Date	Remarks

Date	APRIL 28, 2008
Scale	1/4" = 1'-0"
Project Number	871-00
Drawn By	JJ/RM

Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

CONSTRUCTION DOCUMENTS
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Signature:

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THIRD FLOOR PLAN

PROJECT NORTH

A-103

IF THIS SHEET IS NOT: 22" x 34", IT HAS BEEN REDUCED OR ENLARGED.

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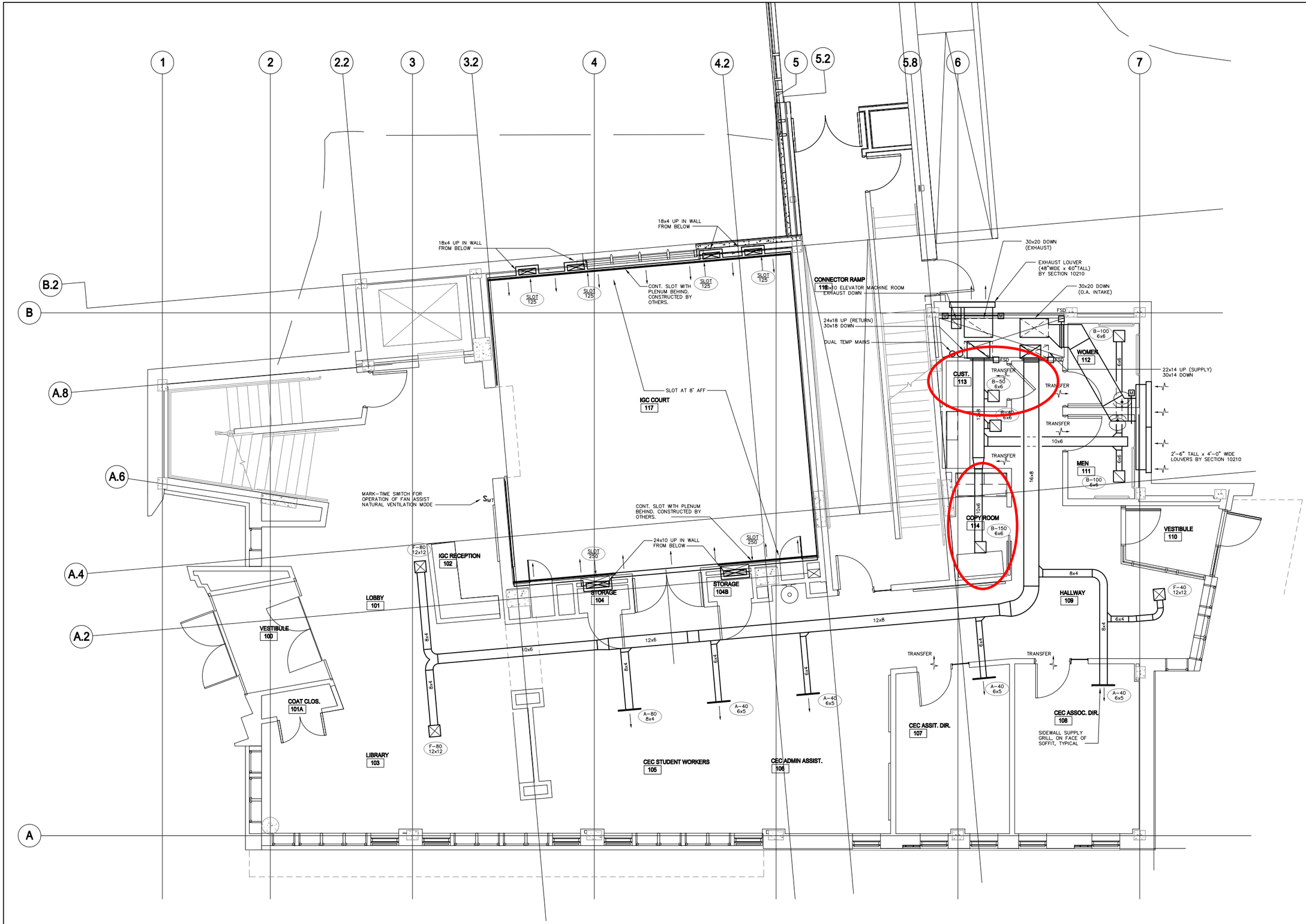

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TEL (860) 284-4304 FAX (860) 284-4288
PROJECT NO.: 2006303.00
Mechanical and Electrical Engineers

Rev.	Date	Remarks

Date:	January 14, 2008
Scale:	1/4" = 1'-0"
Project Number:	2006303.00
Drawn By:	EDA

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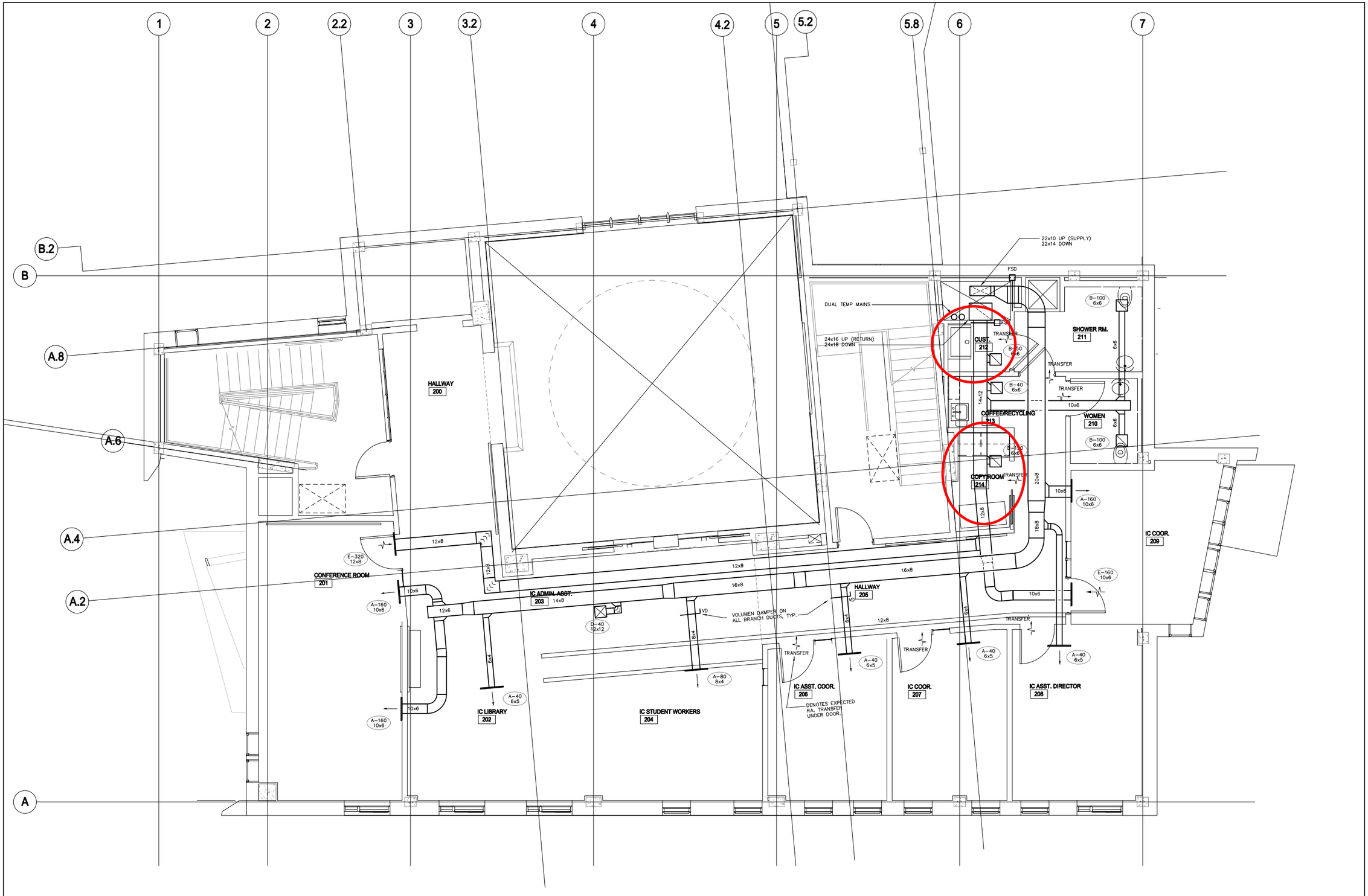
GRAND AVENUE
ST. PAUL, MN

○ Exhaust system

FIRST FLOOR MECHANICAL PLAN

M-101



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PROJECT NO.: 2006303.00

Mechanical and Electrical Engineers

Rev.	Date	Remarks

Date:	January 14, 2008
Scale:	1/4" = 1'-0"
Project Number:	2006303.00
Drawn By:	MRC

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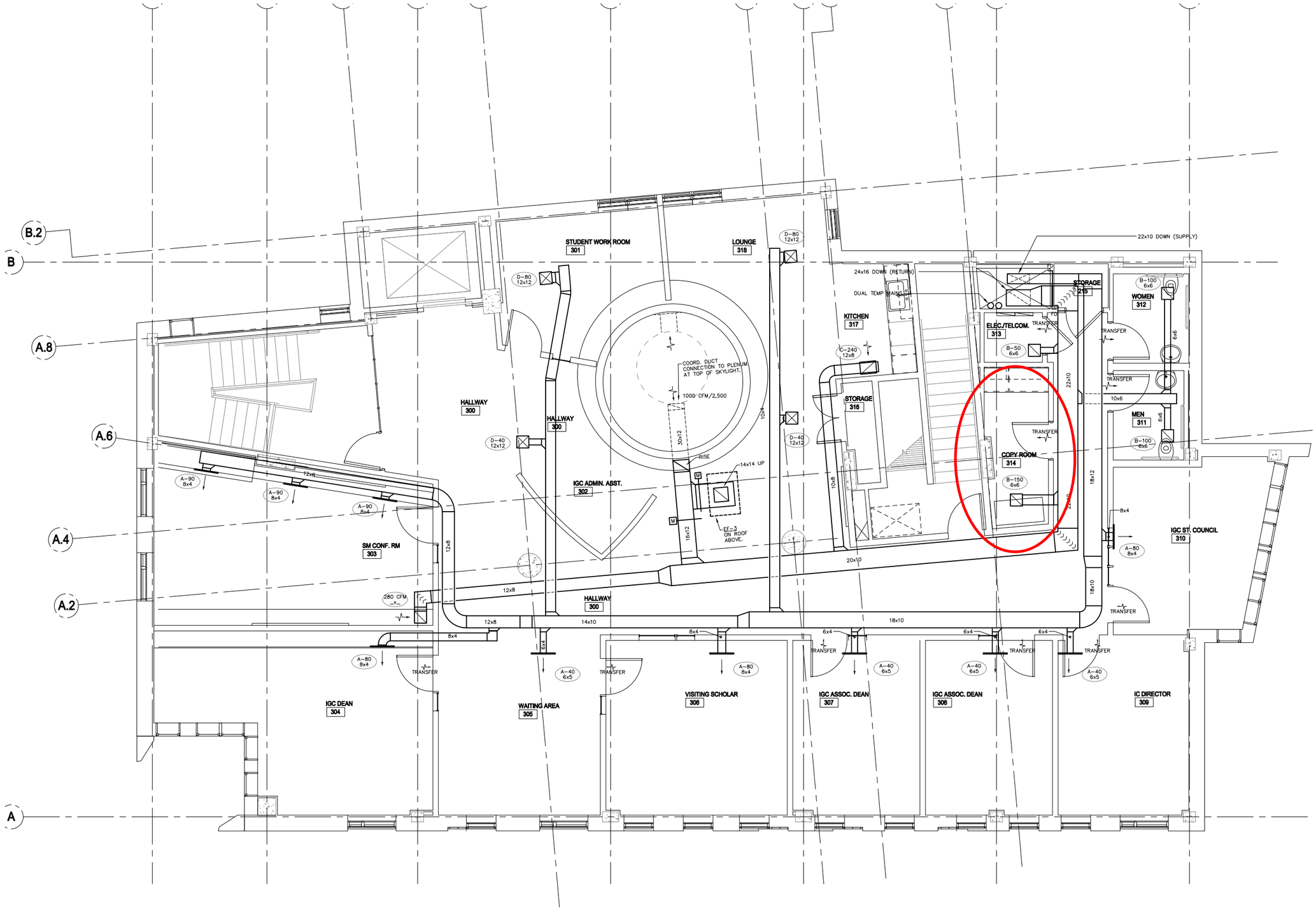
GRAND AVENUE
ST. PAUL, MN

○ Exhaust system

SECOND FLOOR MECHANICAL PLAN

M-102



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PROJECT NO.: 2006303.00

Mechanical and Electrical Engineers

Rev.	Date	Remarks

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Project Number:	2006303.00
Drawn By:	MRC

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GRAND AVENUE
ST. PAUL, MN

○ Exhaust system

THIRD FLOOR MECHANICAL PLAN

M-103

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TB	TACK BOARD
FEC	FIRE EXTINGUISHER CABINET
HO	HOLD-OPEN (REFER TO DOOR SCHED. FOR TYPE)
(FD)	FLOOR DRAIN
ECS	EMERGENCY CALL STATION

KAGIN CONNECTOR

REFER TO A110 FOR KAGIN CONNECTOR

ADD LAYER OF 5/8" GWB TO EXT. WALL ASSEMBLY TO COMPLETE 2 HOUR SHAFT RATING

6" GWB TO CL COL

PROVIDE SECOND LAYER OF GWB AT EXTERIOR WALL OF SHAFT FOR 2 HR RATING

RECESSED SLAB FOR RADIANT FLOOR

PORCELAIN TILE FLOORING REFER TO A902 FOR PATTERN

GLASS MOSAIC TILE ACCENT BAND

BRONZE PLATE THRESHOLD

ELECTRONIC DISPLAY BOARD, N.I.C.

LOW WALL FOR RECEPTION DESK

BUILT -IN WOOD BOOKSHELF ASSEMBLY

PORCELAIN TILE FLOORING REFER TO A902 FOR PATTERN

VENEER PLASTER ON CONC. COLUMN

24" x 36" PORC TILE THRESHOLD

SUNSHADE, ABOVE

LINE OF CANOPY ABOVE

FIRST FLOOR NOTES:

1. PROVIDE CRACK ISOLATION MEMBRANE AT ALL TILE AREAS.

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Scale	1/4" = 1'-0"
Project Number	871-00
Drawn By	JJ/RM

Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

Entry Mat System

0 2' 4' 8'

FIRST FLOOR PLAN

A-101

INDOOR ENVIRONMENTAL QUALITY

CREDIT 6.2: CONTROLLABILITY OF SYSTEMS: THERMAL COMFORT

CONTROL SYSTEMS & SEQUENCE OF OPERATIONS

1^{ST}, 2^{ND}, AND 3^{RD} FLOOR SENSOR LOCATIONS

SECTION 15940

CONTROL SYSTEMS AND SEQUENCE OF OPERATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes control sequences for HVAC systems, subsystems and equipment.

B. Acceptable Manufacturers:
1. Johnson Controls
2. Other Campus Approved System providers

1.3 SCOPE

A. Provide labor, materials, services, equipment and transportation necessary for complete and operational system of automatic temperature control and building management (i.e., DDC system), as indicted on Contract Drawings and specified herein, including, but NOT limited to, the following:

1. Controls for all air systems including supply fans, heating coils, cooling coils, exhaust fans and dampers.
2. Variable volume air supply regulators and controls.
3. Controls for space heating systems including direct radiation, convectors, unit heaters.
4. Controls for heating hot water pumps.
5. Controls for cooling water pumps.
6. Controls for dual temperature pump system
7. Heat recovery system controls.
8. Furnishing of automatic control valves and dampers, pressure sensors and sensor wells to be installed under Division 15.
9. Building Management System including:
    a. Control of mechanical systems
    b. Monitoring
    c. Alarm
    d. Energy Management
    e. Energy use reporting
    f. Calculation of data for custom reports
    g. Color graphics of floor plans and mechanical systems
    h. Totalization logs
    i. Historical trend logs
10. Fire dampers, volume dampers and control dampers.
11. Smoke dampers.
12. Combination fire/smoke dampers.
13. Sleeves, escutcheons, seals, waterproofing and similar devices.
14. Thermometers.
15. Pressure gauges.

16. Utility rebate motors for all applications, unless noted otherwise.
17. High efficiency motors for all applications unless noted otherwise.
18. Standard motors for all applications unless noted otherwise.
19. Motor starters.
20. Painting as required under Division 15.
21. Expansion joints and loops.
22. Hangers, anchors, guides, bases and other supports.
23. Access panels and access doors.
24. System identification, including valve tags.
25. Noise and vibration control.
26. Seismic restraints, including equipment bolts and welding.
27. Cleaning, lubrication, testing, balancing and adjusting.
28. Coordination drawings.
29. Record drawings.
30. Operating and Maintenance Manuals.
31. Instructions.

B. Specific ATC Contractor Responsibilities:

1. Networked DDC Controls - ATC Contractor to Provide:

   a. Web based DDC control network.
   b. Color graphic interface provided on campus control network server.
   c. (40) hours customer training

2. Heating and Cooling water services: HW Pumps P-3 &4, CHW Pumps 3 & 4 - ATC Contractor to Provide:

   a. BTU flow meters on Chilled Water and Hot Water Services from Kagin Commons Building.
   b. Control for 2 heating and 2 cooling pumps
   c. HW DP control through the HW pump VFD drives and HW DP Sensor
   d. HW DP control sensor
   e. CHW DP control through the CHW pump VFD drives and CHW DP sensor
   f. CHW DP Control sensor
   g. Interface with existing Johnson Controls system in Kagin Commons and expand as required for control of new pumps. Interface with new DDC system in the IGC Building for control sequences.

3. Dual Temp Radiant Loop:

   a. Control for 2 dual temperature pumps.
   b. Dual Temp DP control through DT Pump VFD Drives and Dual Temp DP sensor
   c. Dual Temp DP control sensor
   d. Control of 3-Way valve for setting dual temp system supply water temperature
   e. Control of seasonal switch over valves between heating and cooling supply water (4 two-way valves)

4. Radiant Zones:

   a. DDC controls for the radiant zone logic
   b. Radiant Panel control valve and space temp sensor with local adjust for each zone

1) Water zone valves: normally open.
2) Heating coils in air handlers: normally open.
3) Other applications: as scheduled or as required by sequences of operation.

D. Binary Temperature Devices.

1. Low-Voltage Space Thermostats. Low-voltage space thermostats shall be 24 V, bimetal-operated, mercury-switch type, with adjustable or fixed anticipation heater, concealed setpoint adjustment, 13°C-30°C (55°F-85°F) setpoint range, 1°C (2°F) maximum differential, and vented ABS plastic cover.
2. Line-Voltage Space Thermostats. Line-voltage space thermostats shall be bimetal-actuated, open-contact type or bellows-actuated, enclosed, snap-switch type or equivalent solid-state type, with heat anticipator, UL listing for electrical rating, concealed setpoint adjustment, 13°C-30°C (55°F-85°F) setpoint range, 1°C (2°F) maximum differential, and vented ABS plastic cover.
3. Low-Limit Thermostats. Low-limit airstream thermostats shall be UL listed, vapor pressure type. Element shall be at least 6 m (20 ft) long. Element shall sense temperature in each 30 cm (1 ft) section and shall respond to lowest sensed temperature. Low-limit thermostat shall be manual reset only.

E. Temperature Sensors.

1. Type. Temperature sensors shall be Resistance Temperature Device (RTD) or thermistor.
2. Duct Sensors. Duct sensors shall be single point or averaging as shown. Averaging sensors shall be a minimum of 1.5 m (5 ft) in length per 1 m^2 (10 ft^2) of duct cross-section.
3. Immersion Sensors. Provide immersion sensors with a separable stainless steel well. Well pressure rating shall be consistent with system pressure it will be immersed in. Well shall withstand pipe design flow velocities.
4. Space Sensors. Space sensors shall have setpoint adjustment, override switch, display, and communication port as shown.
5. Differential Sensors. Provide matched sensors for differential temperature measurement.

F. Humidity Sensors.

1. Duct and room sensors shall have a sensing range of 20%-80%.
2. Duct sensors shall have a sampling chamber.
3. Outdoor air humidity sensors shall have a sensing range of 20%-95% RH and shall be suitable for ambient conditions of 40°C-75°C (40°F-170°F).
4. Humidity sensors shall not drift more than 1% of full scale annually.

G. Flow Switches. Flow-proving switches shall be paddle (water service only) or differential pressure type (air or water service) as shown. Switches shall be UL listed, SPDT snap-acting, and pilot duty rated (125 VA minimum).

1. Paddle switches shall have adjustable sensitivity and NEMA 1 enclosure unless otherwise specified.
2. Differential pressure switches shall have scale range and differential suitable for intended application and NEMA 1 enclosure unless otherwise specified.

1 FIRST FLOOR PLAN - OVERHEAD SYSTEMS
SCALE: 1/4" = 1'-0"

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TEL (860) 284-4304 FAX (860) 284-0098

PROJECT NO.: 2006303.00

Mechanical and Electrical Engineers

Rev.	Date	Remarks
10	9/5/08	BULLETIN #10

Date:	April 28, 2008
Scale:	1/4" = 1'-0"
Project Number:	2006303.00
Drawn By:	EDA

Macalester College

Institute for Global Citizenship

GRAND AVENUE
ST. PAUL, MN

CONSTRUCTION DOCUMENTS

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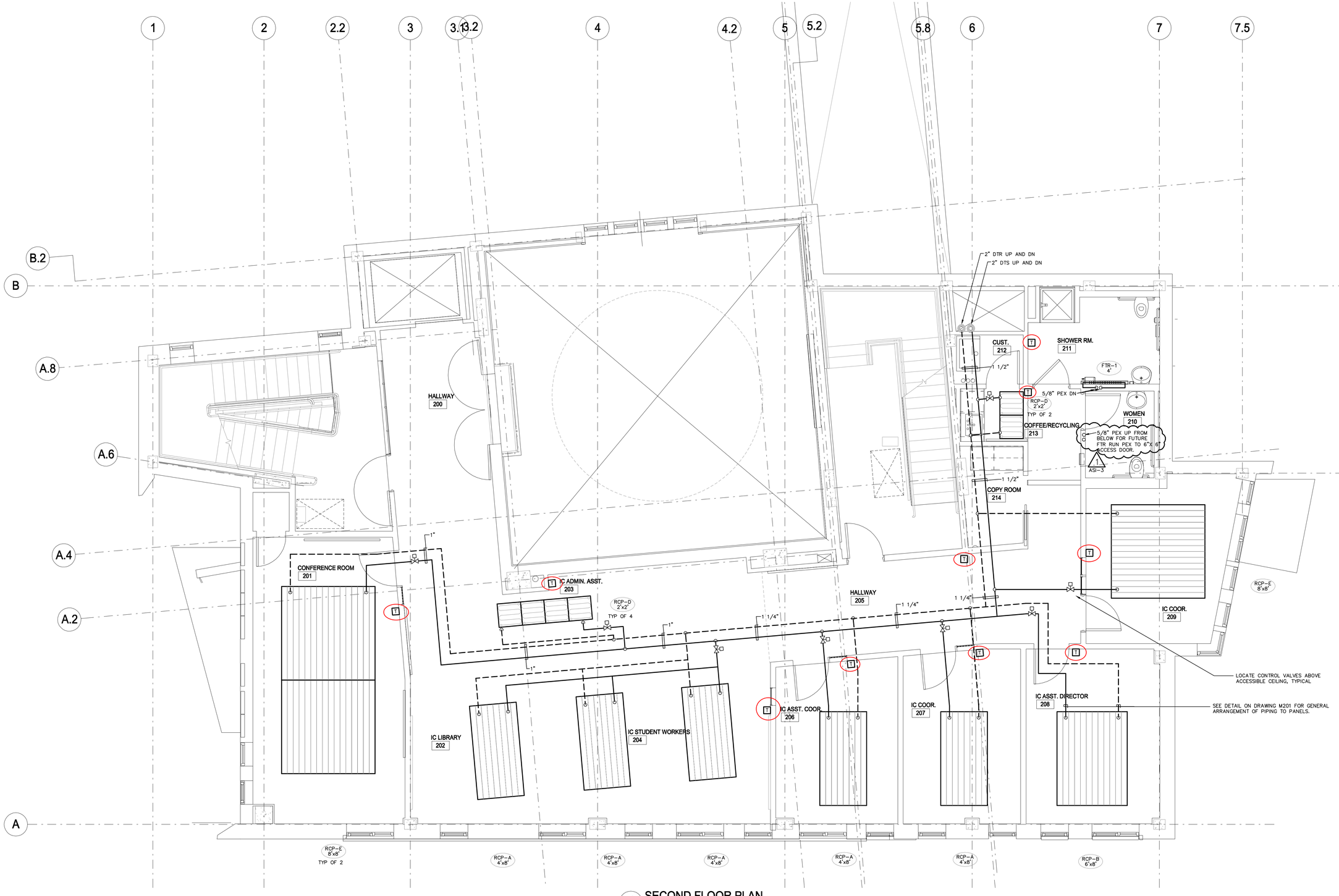
Print Name: Edward D. Allen, PE

Signature: _____

Date: _____ License #: 46406

FIRST FLOOR PLAN
MECHNICAL PIPING
OVERHEAD SYSTEMS

MP-101



1 SECOND FLOOR PLAN
SCALE: 1/4" = 1'-0"

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PROJECT NO.: 2006303.00

Mechanical and Electrical Engineers

Rev.	Date	Remarks
1	08/14/08	ASI-3
10	9/5/08	BULLETIN #10

Date:	April 28, 2008
Scale:	1/4" = 1'-0"
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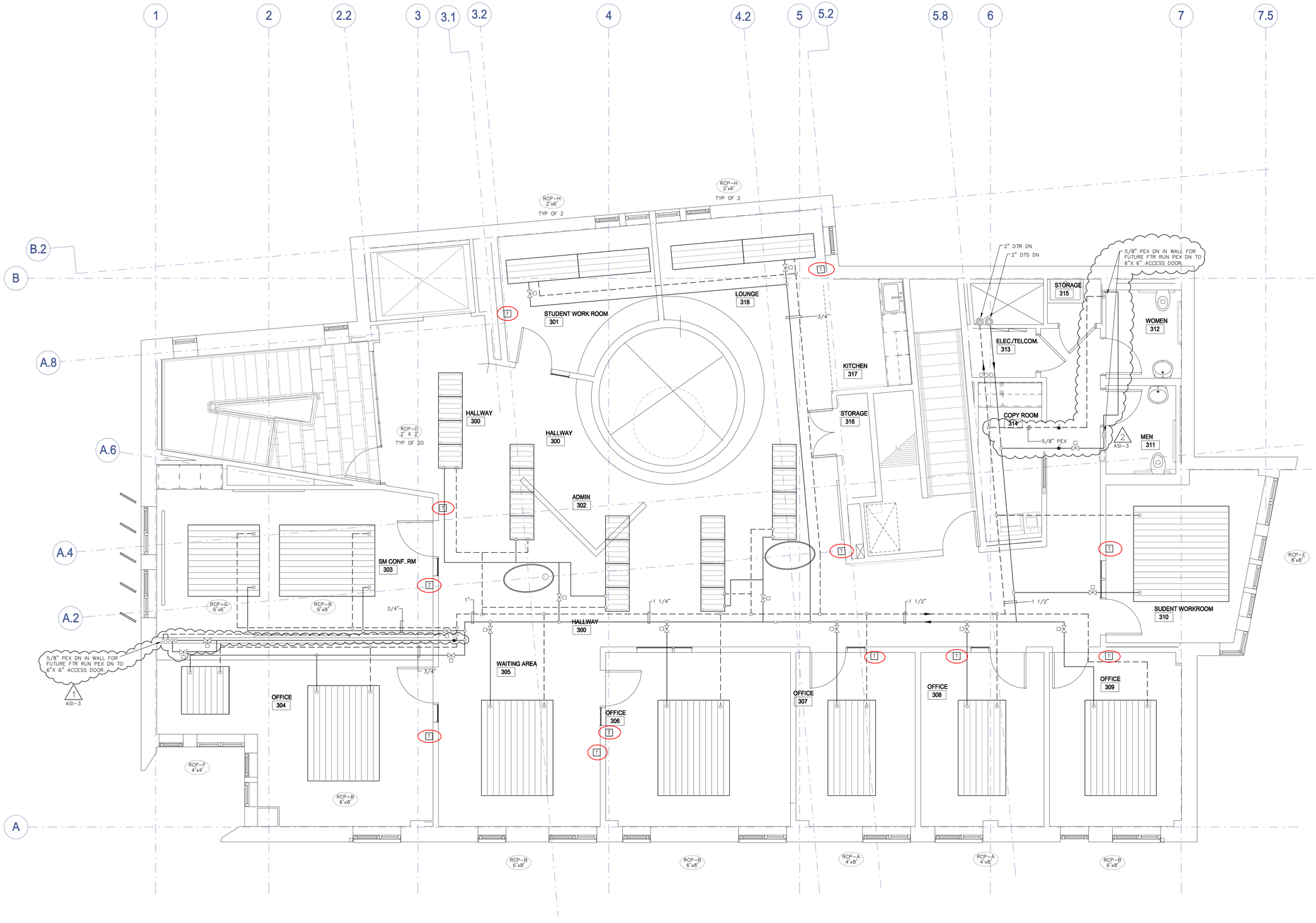
SECOND FLOOR PLAN
MECHANICAL PIPING

MP-102



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THIRD FLOOR PLAN MECHANICAL PIPING

MP-103

INDOOR ENVIRONMENTAL QUALITY

CREDIT 7.2: THERMAL COMFORT: VERIFICATION

INDOOR ENVIRONMENTAL QUALITY NARRATIVE

OCCUPANT COMFORT SURVEY

Indoor Environmental Quality, Credit 7.2: Thermal Comfort – Verification

Summary
The Macalester College IGC building has been designed to meet the requirement of EQ Credit 7.1: Thermal Comfort – Design, and is intended to provide all occupants with a high degree of comfort and control over their space.

Macalester will implement a thermal comfort survey of building occupants within 6 to 18 months after occupancy. The survey will collect anonymous responses from the occupants regarding thermal comfort in the building, including an assessment of overall satisfaction with thermal performance and identification of thermal comfort-related problems.

Based on the results of this survey, if greater than 20% of the building occupants express dissatisfaction, the College will implement a corrective action plan. The corrective action plan will include measurement of relevant environmental variables in problem areas, in accordance with ASHRAE Standard 55-2004.

Survey Description
The survey will address the factors identified in ASHRAE Standard 55-2004, including temperature, thermal radiation, humidity, and air speed. The survey will be administered by Macalester College Facilities Staff.

The primary parameter to be measured is satisfaction with thermal environment. The answer will be posed in a seven-point scale format, running from very satisfied (+3) to very dissatisfied (-3), with the center (0) signifying the neutral point. The survey will include follow-up questions to be asked if the respondent indicates dissatisfaction, in order to identify the nature and cause of the problem. Survey respondents will identify their approximate location by building nominal zone, or can voluntarily specify their exact location. The survey will be administered on paper in a consistently applied manner and be made available for participation by all regular building occupants. Participation will be encouraged, though voluntary.

“Percent dissatisfied” will be the percentage of respondents who answer “dissatisfied” (any of the lower three points of the seven-point scale) on the satisfaction with the thermal environment question.

Plan for Corrective Action
Once the survey has identified the location and nature of any thermal environmental problems, the direction of corrective action measures will be determined. Corrective action measures may include (but are not limited to) control adjustments (e.g., temperature setpoints, schedules, operating modes), diffuser airflow adjustments, and solar control. The resolution of thermal comfort problems will be at the discretion of the Facilities O&M staff and design team. Short-term monitoring and spot measurements of environmental variables with temporary equipment will be done once problem areas have been identified trough the survey. Corrective action measures will be determined and implemented by Macalester College Facilities Staff.

MACALESTER COLLEGE FACILITIES SERVICES
Occupant Comfort Survey

The Institute for Global Citizenship building is a high-performance building, and has been designed with occupant comfort in mind. In effective design, a wide variety of comfort levels must be accommodated. Thus, to help make occupants as comfortable as possible, while also making the building energy efficient, an array of amenities and controls has been provided.

Macalester College is providing this survey to regular building occupants. Your answers will help the College determine the efficiency and effectiveness of this building and influence future design decisions. Please take a few minutes to complete the survey. Thank you for your participation.

Date: _____ Name (optional): _____

PART 1: BACKGROUND

1. How would you describe your occupation?
   Faculty _____ Staff _____ Administrative Support _____ Student _____

2. What is your gender? Male _____ Female _____

3. Room # (optional): _____

4. On which floor is your space located? First _____ Second _____ Third _____

5. Which direction does your space face?
   South _____ East _____ West _____ Don't Know _____

6. Is your workspace located in a closed office or an open area?
   Closed office (private) _____ Closed office (shared) _____ Open space _____

7. In an average week, how many hours do you spend in your workspace?
   > 10 _____ 10-20 _____ 20-30 _____ 30-40 _____ < 40 _____

8. What is your typical activity level in this building?
   Standing _____ Mostly sedentary (sitting) _____
   Medium activity _____ High activity (constantly moving) _____

PART 2: THERMAL COMFORT

9. Which of the following do you personally adjust in your workspace?
   Window _____ Blinds _____ Thermostat _____ Door to interior space _____
   Personal heater _____ Portable fan _____ None of these _____

10. How satisfied are you with your workspace temperature? (+3 = very satisfied, 0=neutral, -3=very dissatisfied)
    +3 _____ +2 _____ +1 _____ 0 _____ -1 _____ -2 _____ -3 _____

If you responded with -1, -2, or -3, please continue with questions 11 through 16.

11. In cool/cold weather, your work space is (check any that apply):
    Often too hot _____ Often too cold _____

12. In warm/hot weather, your work space is (check any that apply):
    Often too hot _____ Often too cold _____

13. At what time of day is this most often a problem (check all that apply)?
    Morning (before 11 AM) _____ Midday (11 AM – 1 PM) _____ Afternoon (2 – 5 PM) _____
    Evening (After 5 PM) _____ Weekdays/holidays _____ Monday mornings _____
    No particular time _____ Other _____

14. What are some of the possible reasons for your discomfort (check all that apply)?
    Air movement too high _____
    Air movement too low _____
    Humidity too high _____
    Humidity too low _____
    Incoming sun _____
    Draft from window _____
    Draft from vent _____
    My workspace is hotter or colder than other areas _____
    Dress code not flexible enough _____
    Heating/Cooling system does not respond quickly enough to thermostat adjustment _____
    Temperature shifts too frequent _____
    Temperature shifts too large _____
    Thermostat adjusted by others _____

15. Do the temperature problems in your workspace have a negative effect on your work performance?
    No negative effect_____ Mild negative effect _____
    Moderate negative effect _____ Significant negative effect ____

16. Please describe any other temperature-related concerns you may have with your workspace.

INDOOR ENVIRONMENTAL QUALITY

CREDIT 8.1: DAYLIGHT & VIEWS: DAYLIGHT 75% OF SPACES

&

CREDIT 8.2: DAYLIGHT & VIEWS: VIEWS FOR 90% OF SPACES

DAYLIGHT AND VIEWS CALCULATIONS

DAYLIGHT FLOOR PLAN

VIEWS FLOOR PLAN

DAYLIGHT & VIEWS BUILDING SECTIONS

EQ Credit 8: Daylight and Views

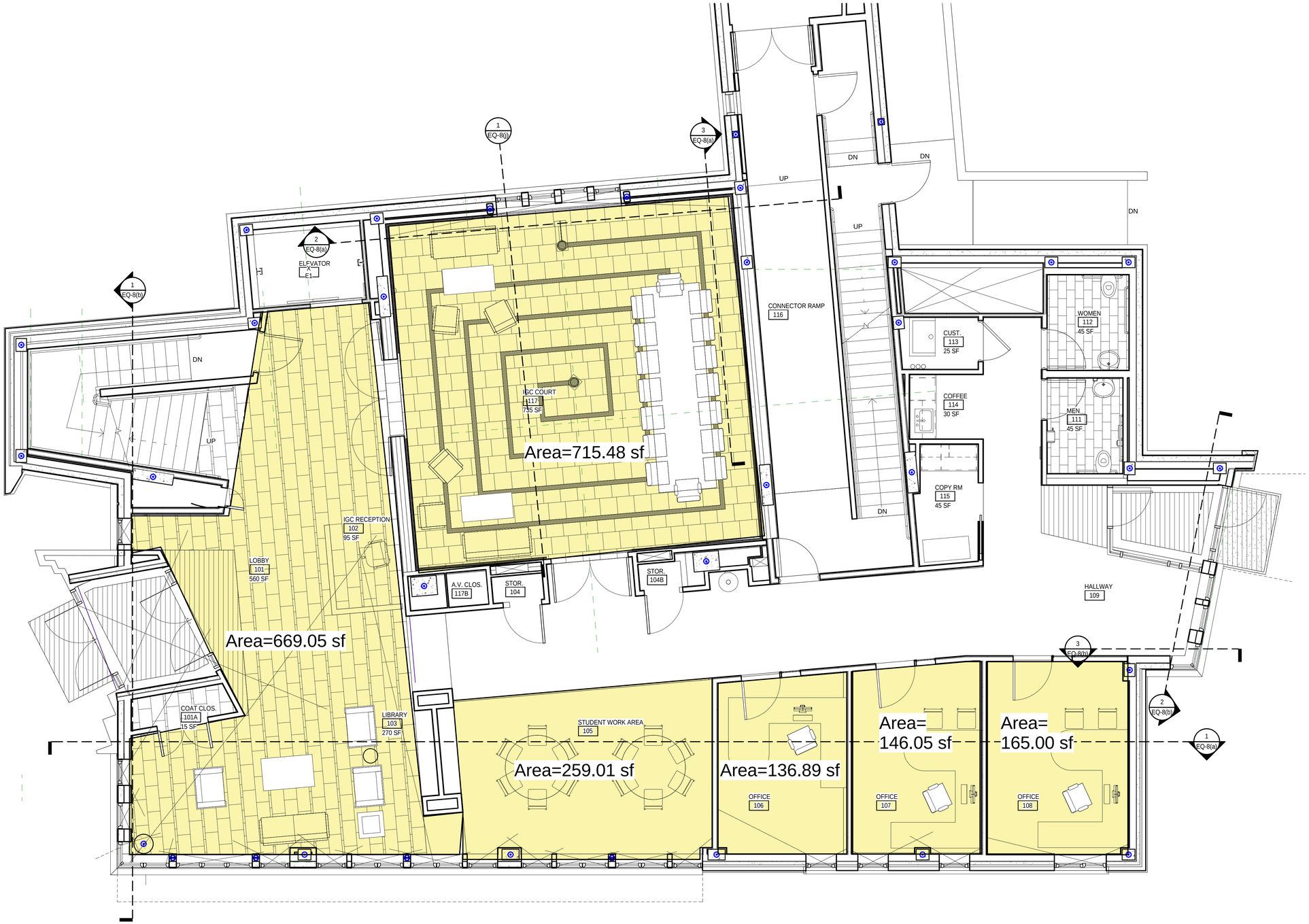
Daylighting and View Table

Regularly Occupied Space Name	Room No.	Floor Area	Glazing Area	Window Geometry		Transmittance (T_{VIS})		Window Height	Daylight Factor		Daylit Area		Views	Horizontal View at 42 inches	Glare Control
		[SF]	[SF]	Type	Factor	Actual	Min	Factor	Each	Room	[SF]		[SF]	[Yes/No]	
Lobby/ Reception/ Library	101/102/103	669	61	d	0.1	0.56	0.7	1.4	1.0%	4.5%	669		668	Y	1,5
			138	v	0.1	0.56	0.4	0.8	2.3%						
			17	d	0.1	0.70	0.7	1.4	0.4%						
			37	v	0.1	0.70	0.4	0.8	0.8%						
Student Worker Area	105	259	32	d	0.1	0.56	0.7	1.4	1.4%	4.6%	259		254	Y	1,5
			74	v	0.1	0.56	0.4	0.8	3.2%						
Office	106	137	8	d	0.1	0.70	0.7	1.4	0.8%	1.9%	0		137	Y	5
			11	v	0.1	0.70	0.4	0.8	1.1%						
Office	107	146	16	d	0.1	0.70	0.7	1.4	1.6%	3.7%	146		146	Y	5
			22	v	0.1	0.70	0.4	0.8	2.1%						
Office	108	165	13	d	0.1	0.70	0.7	1.4	1.1%	2.7%	165		165	Y	5
			19	v	0.1	0.70	0.4	0.8	1.6%						
IGC Court	117	715	84	d	0.1	0.56	0.7	1.4	1.3%	8.8%	715		710	Y	5
			25	d	0.33	0.56	0.4	1.0	7.1%						
			30	v	0.1	0.56	0.4	0.8	0.5%						
Conference Room	201	306	9	d	0.1	0.70	0.7	1.4	0.4%	4.0%	306		306	Y	1,5
			18	v	0.1	0.70	0.4	0.8	0.8%						
			14	d	0.1	0.56	0.7	1.4	0.5%						
			64	v	0.1	0.56	0.4	0.8	2.3%						
Library/ Admin Asst/ Student Work Area	202/203/204	555	32	d	0.1	0.70	0.7	1.4	0.8%	2.5%	555		547	Y	5
			65	v	0.1	0.70	0.4	0.8	1.6%						
Office	206	146	14	d	0.1	0.70	0.7	1.4	1.3%	4.0%	146		146	Y	5
			28	v	0.1	0.70	0.4	0.8	2.6%						
Office	207	151	10	d	0.1	0.70	0.7	1.4	0.9%	2.8%	151		151	Y	5
			20	v	0.1	0.70	0.4	0.8	1.9%						
Office	208	175	13	d	0.1	0.70	0.7	1.4	1.1%	3.3%	175		175	Y	5
			28	v	0.1	0.70	0.4	0.8	2.2%						
Office	209	166	24	d	0.1	0.56	0.7	1.4	1.6%	5.9%	166		166	Y	5
			63	v	0.1	0.56	0.4	0.8	4.2%						
Student Work Rm	301	120	4	d	0.1	0.56	0.7	1.4	0.3%	2.2%	120		120	Y	5
			19	v	0.1	0.56	0.4	0.8	1.8%						
Admin Asst/ Waiting Area	302/305	463	13	d	0.1	0.70	0.7	1.4	0.4%	1.2%	0		459	Y	1,5
			28	v	0.1	0.70	0.4	0.8	0.9%						
Sm Conf Rm	303	286	14	d	0.1	0.56	0.7	1.4	0.5%	2.1%	286		282	Y	1,5
			40	v	0.1	0.56	0.4	0.8	1.6%						
Office	304	287	15	d	0.1	0.70	0.7	1.4	0.7%	4.2%	287		287	Y	5
			50	v	0.1	0.70	0.4	0.8	2.4%						
			5	d	0.1	0.56	0.7	1.4	0.2%						
			21	v	0.1	0.56	0.4	0.8	0.8%						
Office	306	225	13	d	0.1	0.70	0.7	1.4	0.8%	2.6%	225		225	Y	1,5
			28	v	0.1	0.70	0.4	0.8	1.7%						
Office	307	145	8	d	0.1	0.70	0.7	1.4	0.8%	2.5%	145		145	Y	1,5
			18	v	0.1	0.70	0.4	0.8	1.7%						
Office	308	150	8	d	0.1	0.70	0.7	1.4	0.8%	2.4%	150		150	Y	1,5
			18	v	0.1	0.70	0.4	0.8	1.7%						
Office	309	161	13	d	0.1	0.70	0.7	1.4	1.1%	3.6%	161		161	Y	1,5
			28	v	0.1	0.70	0.4	0.8	2.5%						
Student Workroom	310	166	24	d	0.1	0.56	0.7	1.4	1.6%	5.8%	166		166	Y	5
			63	v	0.1	0.56	0.4	0.8	4.2%						
Lounge/Kitchen	318	210	8	d	0.1	0.56	0.7	1.4	0.4%	2.0%	210		193	Y	5
			31	v	0.1	0.56	0.4	0.8	1.6%						
	TOTAL	**5,804**									**5,204**		**5,757**		

Percentage of Daylit Area	**90%**
Percentage of Area with Sufficient Views	**99%**

Glare Control Chart

Type	Description
1	Fixed exterior shading devices
2	Light shelf, exterior
3	Light shelf, interior
4	Interior blinds
5	Pull-down shades
6	Fritted glazing
7	Drapes
8	Electronic black-out glazing



1 EQc8.1 - Daylight - First Floor
SCALE: 1/4" = 1'-0"

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Rev	Date	Remarks

Date	June 19, 2008
Scale	1/4" = 1'-0"
Project Number	871-00
Drawn By	Author

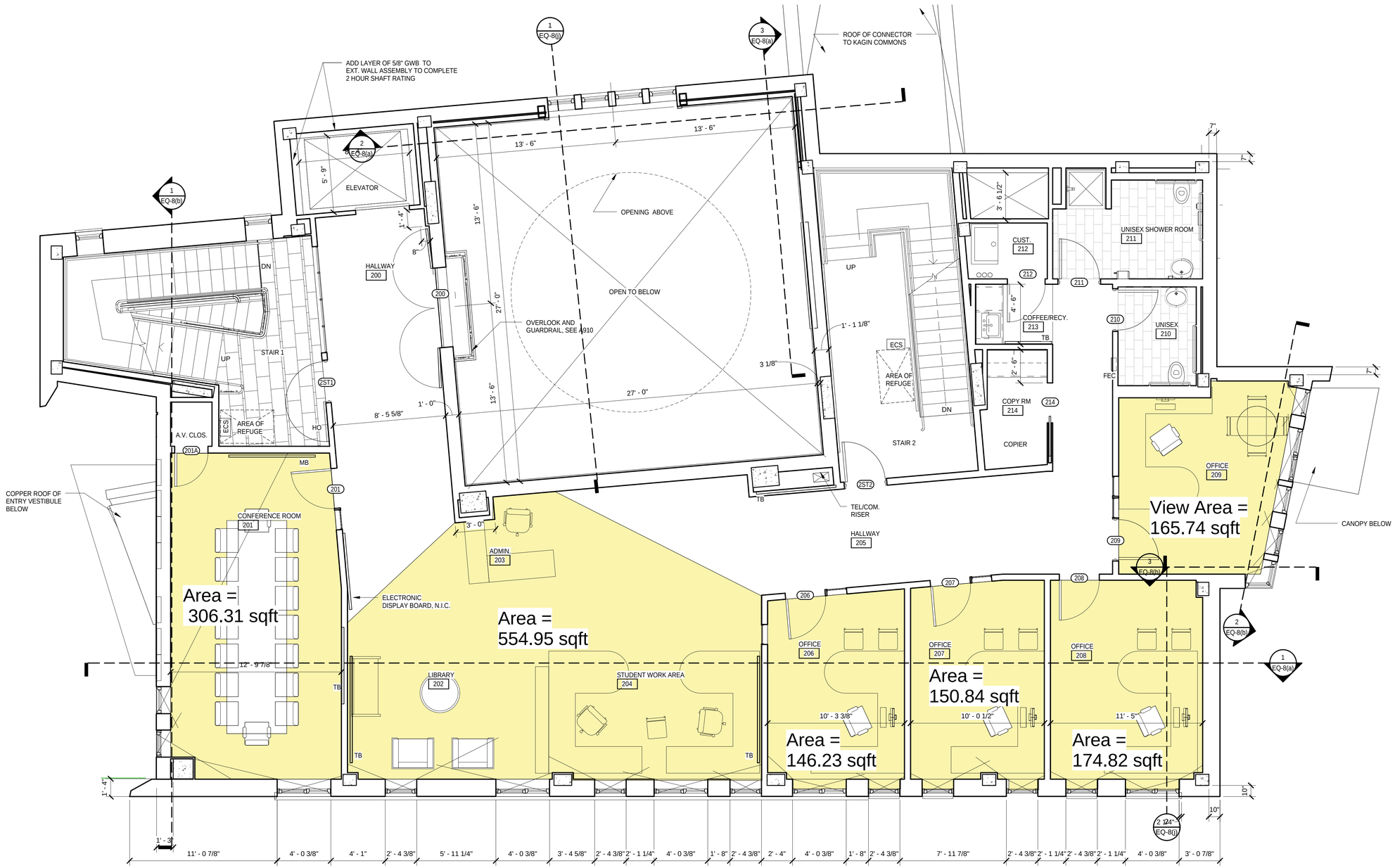
Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

EQc8 - Daylight & Views

EQ-8(d)



1 EQc8.1 - Daylight - Second Floor

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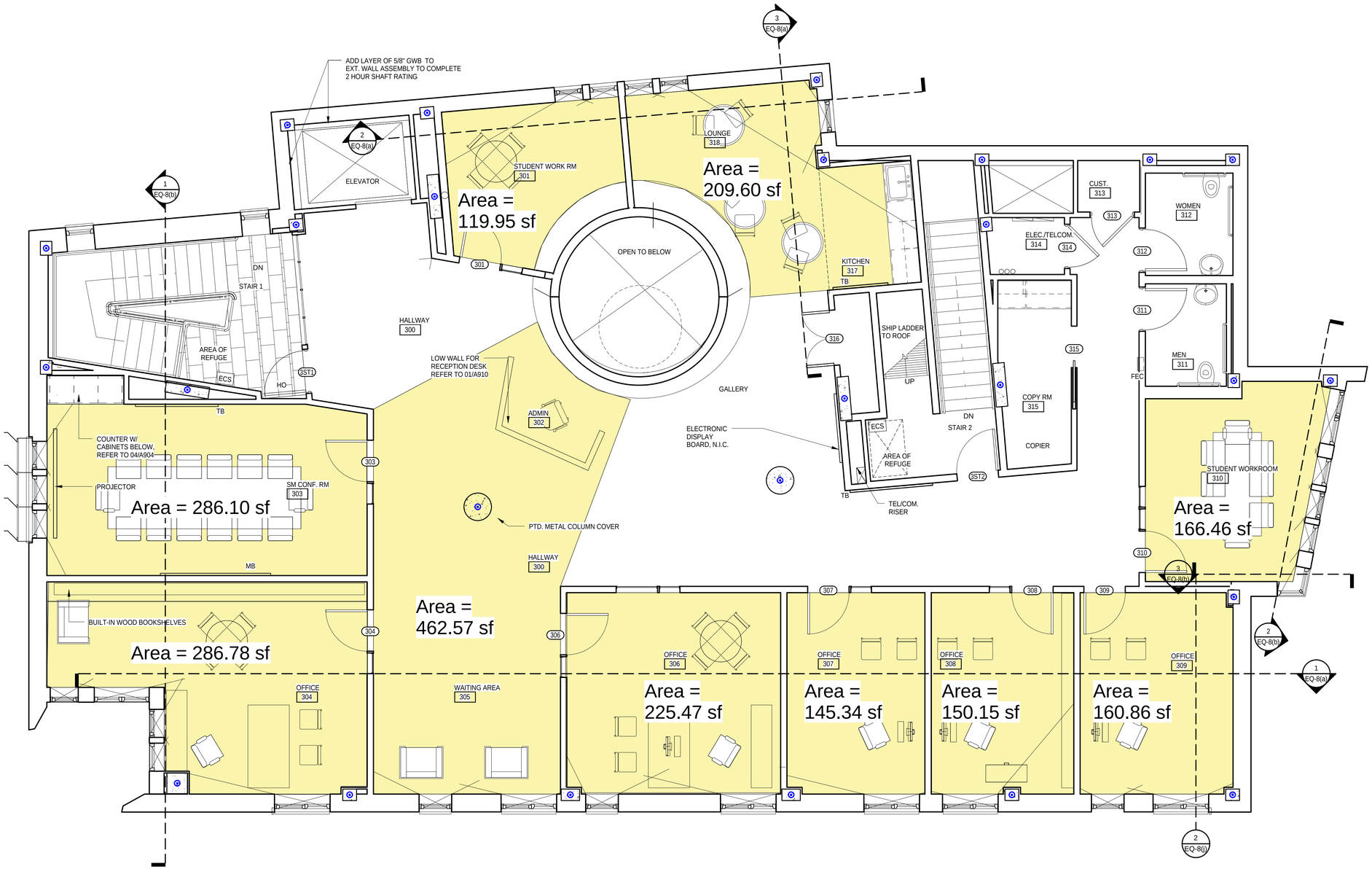
Macalester College

Institute for Global Citizenship

Grand Avenue
St. Paul, MN

EQc8 - Daylight & Views

EQ-8(e)



1 EQc8.1 - Daylight - Third Floor
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Rev	Date	Remarks

Date	June 19, 2008
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Project Number	871-00
Drawn By	Author

Macalester College

Institute for Global Citizenship

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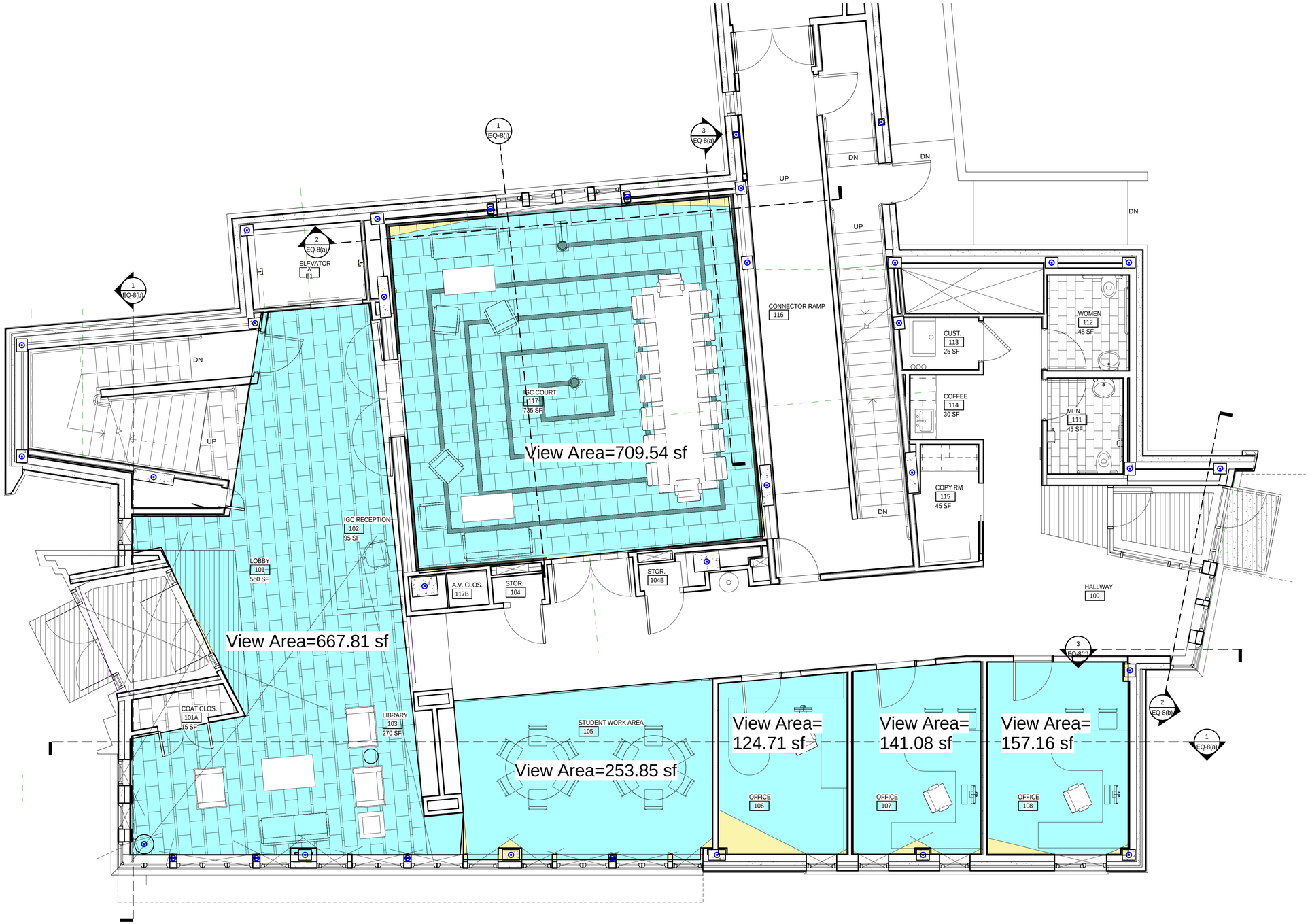
St. Paul, MN

EQc8 - Daylight & Views

EQ-8(f)



1 EQc8.2 - Views - First Floor
SCALE: 1/4" = 1'-0"

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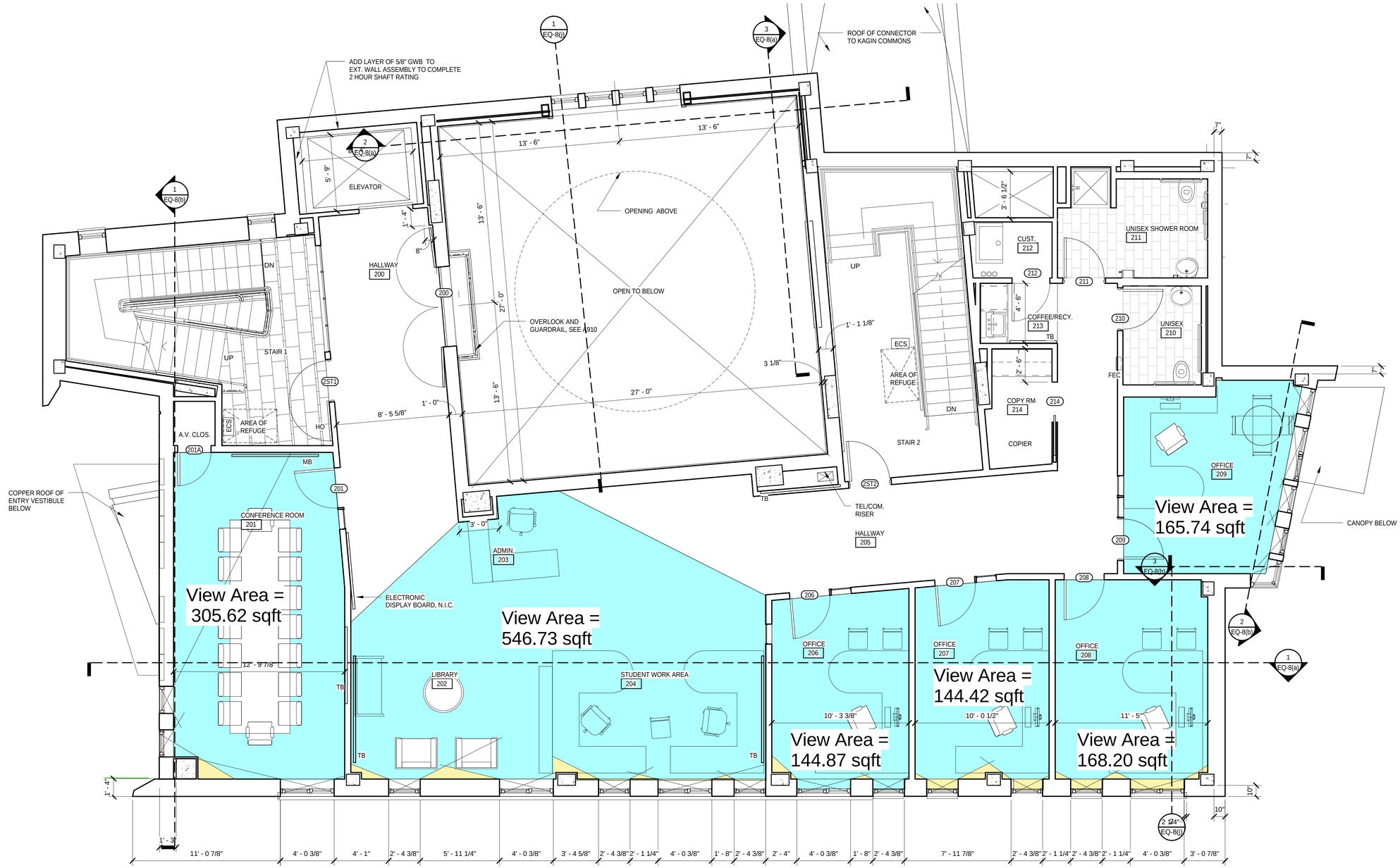
EQc8 - Daylight & Views

EQ-8(g)



1 EQc8.2 - Views - Second Floor
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Drawn By	Author

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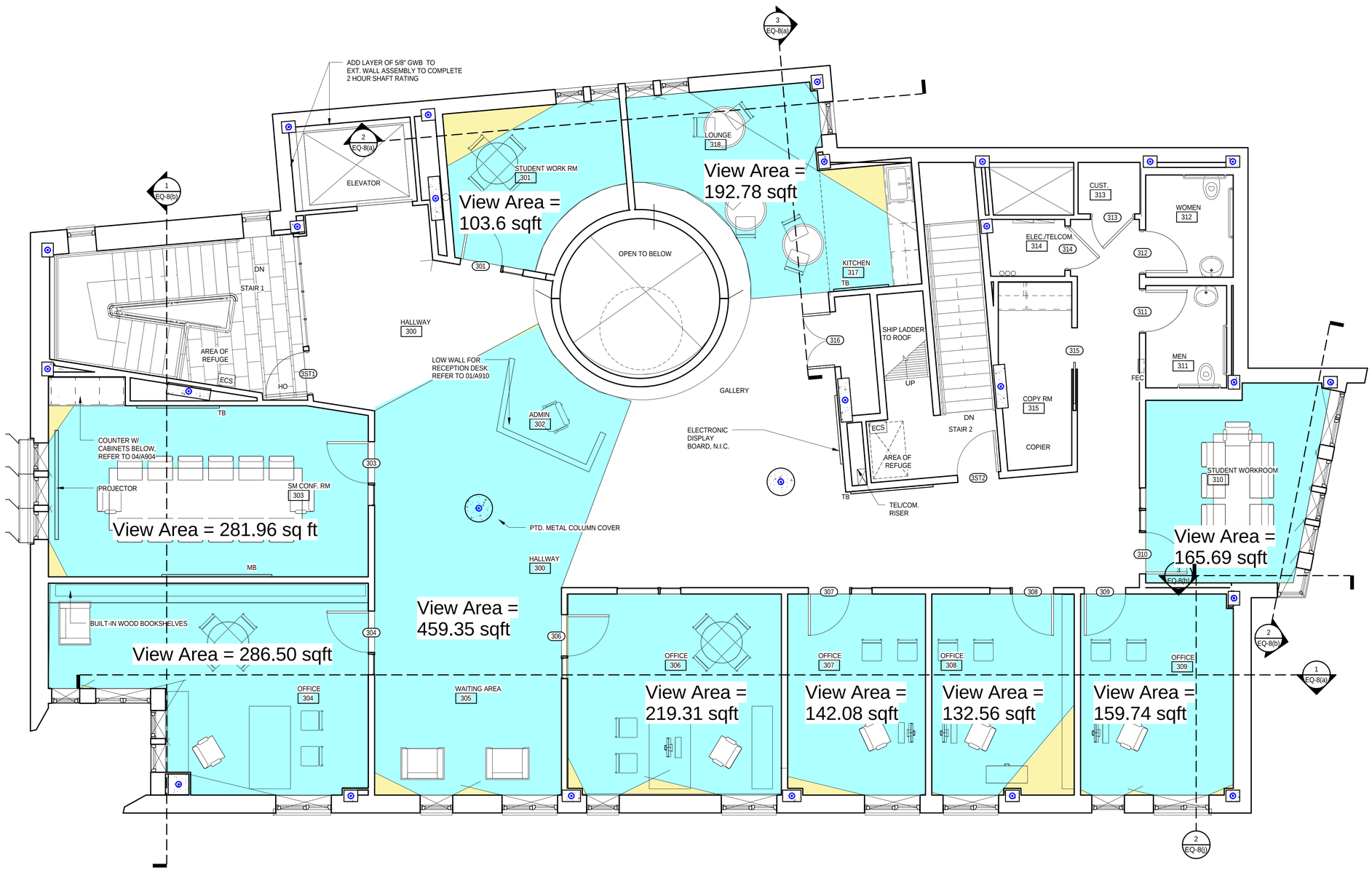
EQc8 - Daylight & Views

EQ-8(h)



1 EQc8.2 - Views - Third Floor
SCALE: 1/4" = 1'-0"

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Project Number	871-00
Drawn By	Author

Macalester College

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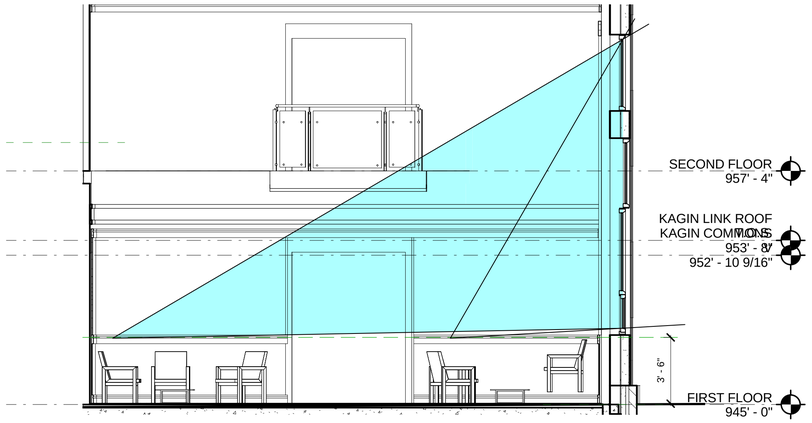
EQc8 - Daylight & Views

EQ-8(i)



1 EQc8 - Views - Section - Seated - IGC Court
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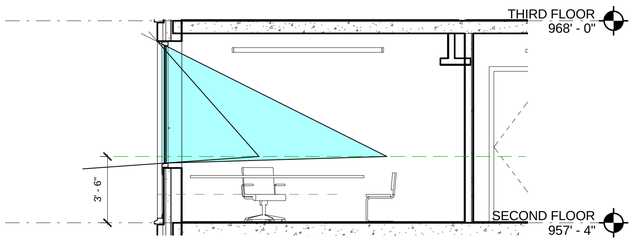

2 EQc8 - Views - Section - Seated - Typ Office
SCALE: 1/4" = 1'-0"

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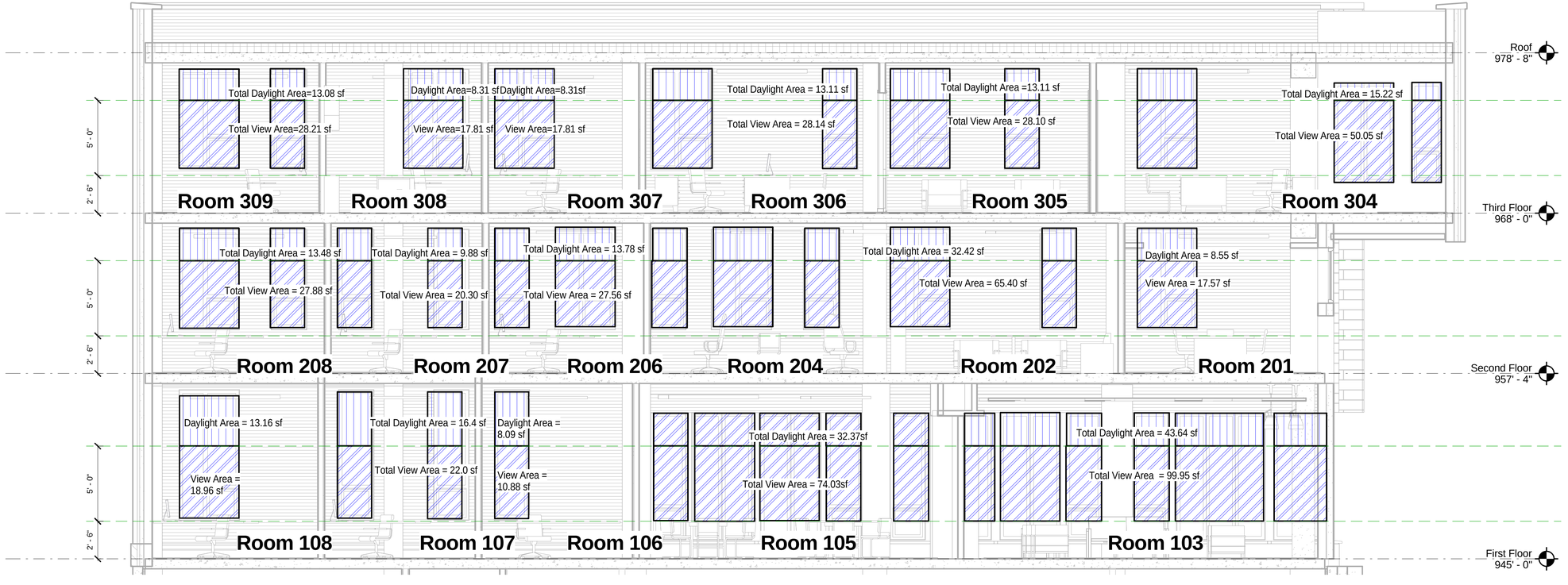
EQc8 - Daylight & Views

EQ-8(j)



1 EQc8 - Section - South
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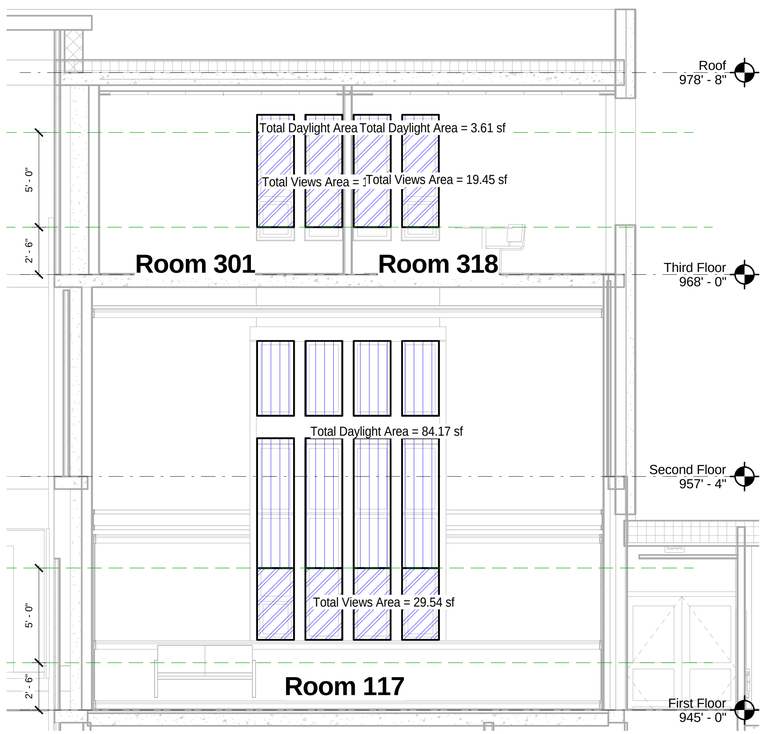

2 EQc8 - Section - North
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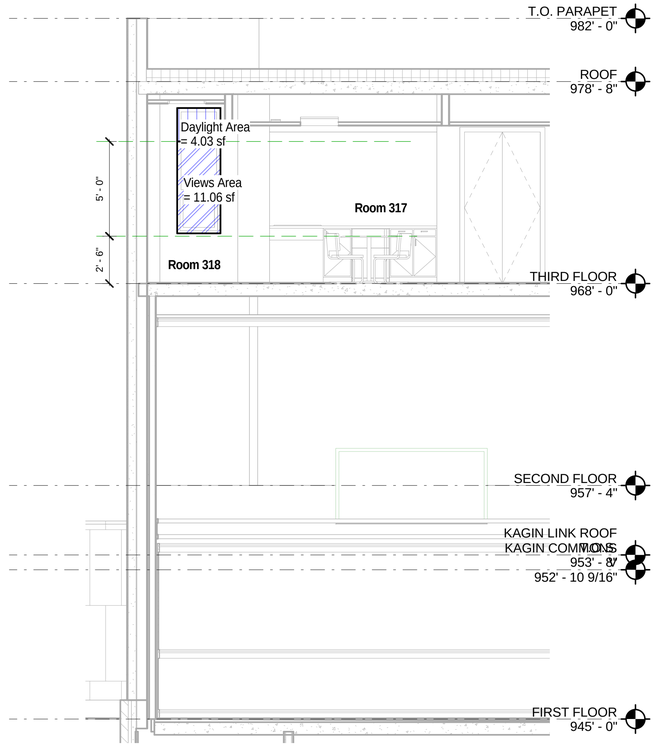

3 EQc8 - Section - Northeast corner
SCALE: 1/4" = 1'-0"

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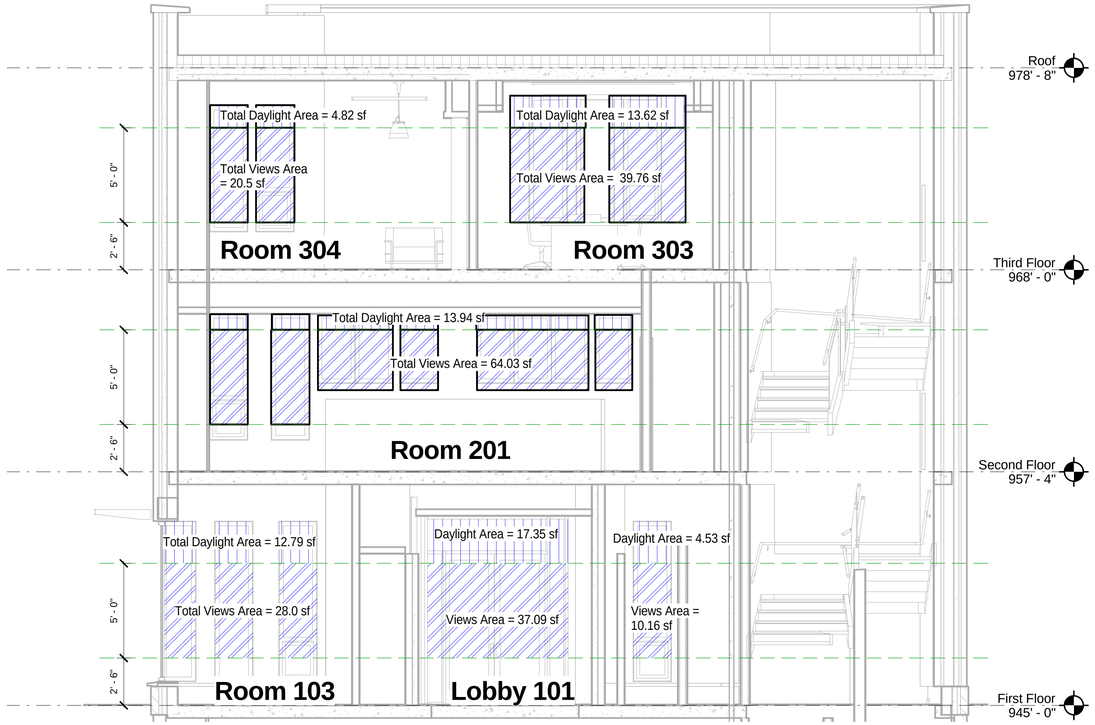
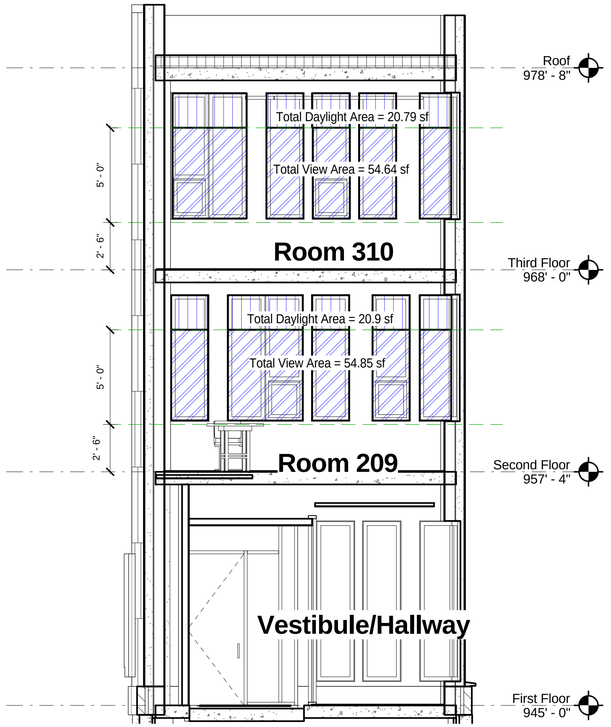
EQc8 - Daylight & Views

EQ-8(a)



1 EQc8 - Section - West
SCALE: 1/4" = 1'-0"



2 EQc8 - Section - East
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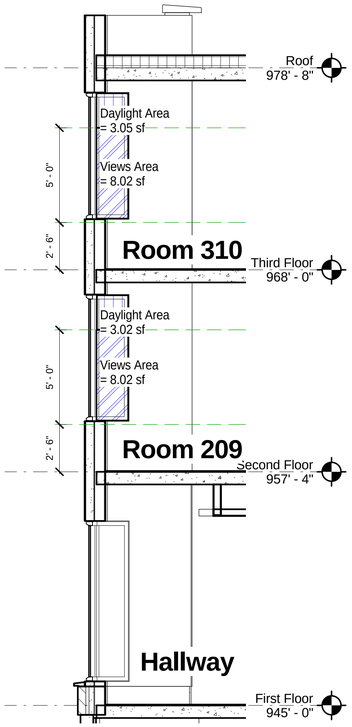

3 EQc8 - Section - Southeast corner
SCALE: 1/4" = 1'-0"

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Project Number	871-00
Drawn By	Author

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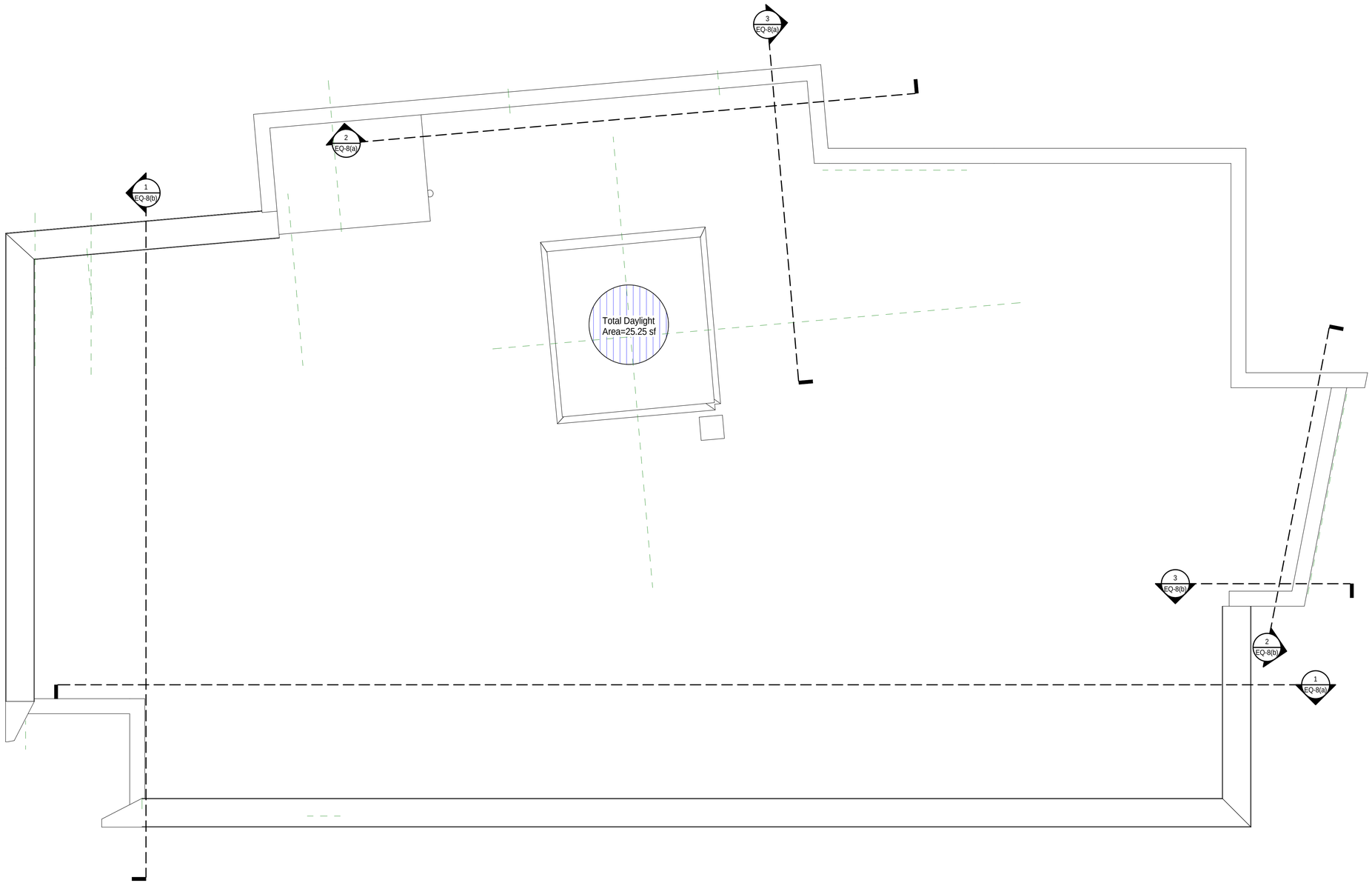
EQc8 - Daylght & Views

EQ-8(b)



1 EQc8.1 - Daylight - Skylight
SCALE: 1/4" = 1'-0"

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Project Number	871-00
Drawn By	Author

Macalester College

Institute for Global Citizenship

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EQc8 - Daylight & Views

EQ-8(c)

INNOVATION & DESIGN

CREDIT 1.1: PUBLIC EDUCATION

CREDIT 1.2: WATER USE REDUCTION, 40%

CREDIT 1.3: GREEN CLEANING

&

CREDIT 2: LEED ACCREDITED PROFESSIONAL

PUBLIC EDUCATION NARRATIVE

PLUMBING EQUIPMENT AND FIXTURES

GREEN CLEANING NARRATIVE

LEED ACCREDITED PROFESSIONAL CERTIFICATE

Macalester College Institute for Global Citizenship
Project #: 2415808979104146

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Fax: 617 876 4002
Web: www.brunercott.com

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INNOVATION IN DESIGN: CREDIT 1.1 – PUBLIC EDUCATION

EXHIBT A: CIR IDc1.1 dated 9/24/2001.

EXHIBIT B: GreenTouchscreen installation proposal and contract.

EXHIBIT C: Copy of Macalester Guided Tour.

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CREDIT 1.1: INNOVATION & DESIGN PROCESS

Innovation in Design: Public Education Program Credit Description

Macalester College is proposing an Innovation & Design Credit for Public Education.

Credit Intent
To create an ongoing education program associated with green building, and the green building strategies of the Institute for Global Citizenship and Macalester College.

Requirements
- Per CIR dated 9/24/2001, two of the following three criteria must be met:
  1) A comprehensive signage program built into the building's spaces to educate the occupants and visitors of the benefits of green buildings. This program may include windows to view energy-saving mechanical equipment or signs to call attention to water-conserving landscape features.
  2) The development of a manual, guideline or case study to inform the design of other buildings based on the successes of this project. This manual will be made available to the USGBC for sharing with other projects.
  3) An educational outreach program or guided tour could be developed to focus on sustainable living, using the project as an example.

Submittals
- Copy of the self-guided Mac Sustainability Tour brochure.
- GreenTouchscreen kiosk information, proposal, and signed contract.

Narrative
This building will consist of 16,000 gross square feet of space and house the Institute for Global Citizenship (IGC), which includes the Internship Program, the Civic Engagement Center (CEC), and the International Center (IC). The IGC building consists of offices, conference rooms, workrooms, a large function space, and a kitchen and lounge. The building is designed to operate at a very high level of performance and efficiency. The project will actively incorporate Requirements #1 and #3, while the College as a whole has adopted numerous sustainable education measures.

We believe that the IGC project and the College meet the requirements set forth in the ID Credit 1 Credit Interpretation Ruling dated 9/24/2001 (Exhibit A). The two criteria met are the following:

- *A comprehensive signage program built into the building's spaces to educate the occupants and visitors of the benefits of green buildings.*

  The comprehensive signage program will be met through the use of a "GreenTouchscreen." GreenTouchscreen is a web-based kiosk, which will be permanently installed in the building's lobby. The GreenTouchscreen will be accessible to all who enter the building, as well as to anyone in the Macalester community, from anywhere on

campus, via on-line access. The proposal and signed contract for the installation of the GreenTouchscreen have been attached (EXHIBIT B). The GreenTouchscreen will provide the following information modules:

1) **Green Building Information** (i.e., Answers the questions, What is sustainability? What is LEED?)
2) **Live Building Data**. The system will be tied into the Building automation system and will show live data for water and energy use, amount of carbon saved, and outdoor air conditions. Historical data will also be shown by day, week, month, or year.
3) **Animated educational graphics** will be overlaid with live building data (e.g., schematic of HVAC system and water pumps, with actual energy or water usage).
4) **Green Features Map**. A map of the building will highlight the locations of "green" features and describe, and compare the "green" features to standard features, including the "intent/solution" of the green feature.
5) **Interactive LEED Checklist**. The user can select a LEED credit to see information on the intent of each credit, how the credit was achieved, and the occupant/environmental benefit.
6) **Green Calculators**. Interactive calculators will show resource and monetary savings (e.g., light bulb savings, water savings, etc.). Users can experience via the calculator how even small changes can make a difference.

Examples of the GreenTouchscreen modules can be seen on the company's website at www.qualityattributes.com/greentouchscreen/.

- *An educational outreach program or guided tour could be developed to focus on sustainable living, using the project as an example.*

The guided building tour will include highlights of the interior and exterior green features of the project, including the mechanical and ventilation systems; water-saving features; low-emitting, recycled, and local materials; site orientation and daylighting; envelope construction; native landscaping; permeable pavers; etc. The tour will be given to students and the Macalester community, as well as visitors to the campus, and by appointment to interested groups. The tour narrative and a map of the coordinating stops in the building have been attached (EXHIBIT C).

EXHIBIT A

Credit Interpretations

Credit Rulings Home

INNOVATION & DESIGN PROCESS: Innovation in Design: Specific Title (IDc11)

9/24/2001 - Credit Interpretation Request

Credit Title: Green Building Education

INTENT: To provide public education focusing on green building strategies and solutions.

REQUIREMENTS AND SUBMITTALS: Credit 1.1 (1 point) Provide permanent educational displays illustrating at least one component of each of the five major green building categories in the LEED rating system:
Sustainable Sites
Water Efficiency
Energy and Atmosphere
Indoor Environmental Quality
Materials and Resources
À Provide narrative to describe the intended green building education program that will use the displays.
À Provide narrative to describe the selected green building educational displays.
À Provide design drawings of the educational displays and their locations in the building.

Credit 1.2 (1 point) Provide educational outreach focusing on sustainable living and building practices to serve the general public.
À Provide education program with identifiable tasks and outcomes geared toward sustainable living and building practices.
À Develop an ongoing education program to provide access to practical methods for homeowners and others for sustainable living and building practices.

SUMMARY OF REFERENCED STANDARDS: There are no such referenced standards for this credit.

GREEN BUILDING CONCERNS: Public education is necessary to encourage green building practices in public programs, private development, and residential communities. The purpose of this innovative credit is to encourage public education in green building projects and provide a strategy to meet that goal.

Mission Statement:To inspire people to live more sustainably, using flexible and achievable standards for building and landscaping practices in such a way as it will protect our local and regional natural resources. (I

know this isnÆt the current statement, but you get the idea).

DESIGN APPROACH: Even though this credit is designed with an environmental education center in mind, the principles of public education can be applied to either public or private structures. For example, office buildings, although a private enterprise, have employees coming and going each day. A building that is didactic and is reinforced with clearly defined educational displays can have a significant impact on the userÆs understanding of the built and natural environment. Transforming thoughtful design solutions into educational opportunities is the intent of this credit. Also, disseminating effective and practical information on sustainable living and building practices to the general public is a fundamental way to make changes in our society.

9/24/2001 - Ruling

To take advantage of the educational value of the green building features of a project and to earn a LEED point, any approach should be ACTIVELY instructional. Two of the following three elements must be included in the educational program:

1) A comprehensive signage program built into the building's spaces to educate the occupants and visitors of the benefits of green buildings. This program may include windows to view energy-saving mechanical equipment or signs to call attention to water-conserving landscape features.

2) The development of a manual, guideline or case study to inform the design of other buildings based on the successes of this project. This manual will be made available to the USGBC for sharing with other projects.

3) An educational outreach program or guided tour could be developed to focus on sustainable living, using the project as an example.

U.S. GREEN BUILDING COUNCIL

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EXHIBIT B

Quality Attributes Software
Empowering Intelligent Buildings
Phone: 515.956.1599 Fax: 515.233.3380
Website: www.qualityattributes.com www.greentouchscreen.com
Address: 416 Billy Sunday Rd., Suite 150 Ames IA 50010

Agreement Number: CLTN-IGC-C08-09 10/15/2008

Quality Attributes Software Kiosk Agreement

This Standard Purchase Agreement (hereinafter "Agreement") is made between Quality Attributes Software, Inc., an Iowa corporation having an office at 416 Billy Sunday Road, Suite 150, Ames, IA 50010 (hereinafter "QAS") and **Macalester College,** with its principal place of business at **1600 Grand Avenue St. Paul, MN 55105** (hereinafter "Customer").

1. General

QAS agrees to develop the software according to the requirements as per the attached and referenced proposal dated **10/08/2008** with proposal number **CLTN-IGC-P08-09** and subject to the terms listed below. This agreement will expire thirty (30) days after the above date unless it is signed by QAS and Customer. If the end user is different from Customer then the end user accepts the same terms and conditions as outlined in this agreement.

2. Billing

Upon the signing of this agreement, Customer agrees to pay QAS **$34,994.00** (see Quote dated **10/08/2008**) with an initial fee of 50% of the quote of the kiosk software. Sixty (60) days following the initial invoice date 25% of the quote will be billed by QAS. The remaining 25% of the quote will be retained until the kiosk software has been completely finished and delivered, assuming there are no changes to the end product (scope), at which time it will be paid to Quality Attributes Software. QAS' fees are exclusive of all taxes, shipping, levies, or duties imposed by taxing authorities, and Customer shall be responsible for payment of all such taxes, shipping, levies, or duties.

Customer agrees to provide QAS with complete and accurate billing and contact information. This information includes Customer legal company name, street address, e-mail address, and name and telephone number of an authorized billing contact and License Administrator. Customer agrees to update this information within 30 days of any change to it. If the contact information Customer has provided is false or fraudulent, QAS reserves the right to terminate Customer's access to the Service in addition to any other legal remedies. Unless QAS, in its discretion, determines otherwise: all entities will be billed in U.S. dollars and be subject to U.S. payment terms and pricing schemes at the discretion of QAS. If Customer believes their bill is incorrect, they must contact QAS in writing within 60 days of the invoice date of the invoice containing the amount in question to be eligible to receive an adjustment or credit. If the Customer issues a Purchase Order without signing this contract, the Customer accepts all of the terms that are bound in this agreement.

3. Charges and Payment of Fees

Customer shall pay all fees or charges to their account in accordance with the fees, charges, and billing terms in effect at the time a fee or charge is due and payable. All payment obligations are noncancelable and all amounts paid are nonrefundable. Customer must provide QAS with valid credit card or approved purchase order information as a condition to signing up for the Service.

4. Live Data Accessibility Requirements

In order for the GreenTouchscreen® Live Data Module to utilize real time data, the following must be provided by Customer: any real time data must be made available from the data source(s) as either an OPC, BACnet/IP, LonWorks, an RSS feed or an XML web services feed.

If the GreenTouchscreen® Live Data Module is located remotely, access through certain ports in the

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customer's firewall must be provided in order for us to make requests to devices within the customer's network to collect the data. If the GreenTouchscreen® Local Live Data Service is located within customer's network, coordination must be made with customer's IT department to facility installation and maintenance.

5. Maintenance Agreement
Please refer to QAS' separate Maintenance Agreement.

6. LEED® Credit
GreenTouchscreen® is eligible to qualify as one of two required items needed for Customer to obtain a LEED® Educational Outreach Program Innovation and Design credit for their facility. If Customer is attempting to obtain a LEED® certification for their facility, QAS will provide Customer with a copy of this document, the requirements document and other project notes relating to the planning and development of the GreenTouchscreen® upon request. These documents can be provided in order to assist Customer with developing a manual, guideline or case study as the second requirement for a LEED® Educational Outreach Program Innovation and Design credit. Due to the subjective nature of the LEED® credits, QAS does not guarantee that Customer will obtain a LEED® Educational Outreach Program Innovation and Design credit for their facility.

7. Software or Hardware Changes
Any changes to the software or hardware requirements, timeline or project scope, based on known assumptions, must be approved in writing by both QAS and Customer, and may require additional charges.

8. Project Deadline
QAS agrees to provide the kiosk software according to the items described within the attached and referenced proposal within the specified Project Schedule section. Work will be authorized to begin once QAS is in receipt of both the down payment for the project and a signed copy of this agreement has been received by QAS. QAS agrees to meet the established time frame, provided Customer and any other entities involved with the development of the kiosk software provide the following required items to QAS according to the below specified schedule. Failure to do so may cause the overall project deadline to slip.

- All text, images and other required information listed on the content needed document that is available must be delivered to QAS within four weeks from the date Customer receives the content needed document. QAS agrees to provide the content needed document within one week after the initial design meeting.
- The proof must be commented on and returned to QAS within one week of receipt from QAS.
- All data points that will be monitored by the GreenTouchscreen® Live Data Module must be developed and made available to QAS in an acceptable format within eight weeks after this agreement is signed. QAS retains all rights associated with the proprietary acquisition, ordering, storage, manipulation or representation of the data points subsequent to the provision by Customer in an acceptable format.
- Sign off documents must be returned to QAS within two business days of receipt from QAS. Sign off documents will be delivered after proof approval (completion of design phase), after the kiosk shell is delivered on the test site and after work has been complete.
- QAS reserves the right to supplement any missing or incomplete data or content with placeholder content, to consider the kiosk project complete and commence the maintenance phase of the project if the project experiences a client caused delay of more then four weeks, unless this delay is approved in writing beforehand by both the client and QAS. Should this occur, replacement of the missing or incomplete data or content

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may be charged to the maintenance agreement hours or require additional payment.
- QAS reserves the right to send the final invoice to Customer at the end of the sixteen weeks if the delay in completion of the kiosk software is not the fault of QAS.

9. Hardware Requirements

For each physical touchscreen kiosk, Customer agrees to provide a high speed internet connection with access to any necessary internet site(s) as determined by QAS, a standard duplex power outlet within ten feet of the location of each physical touchscreen kiosk and a surge protector for each physical touchscreen kiosk. An uninterruptible power supply (UPS) device is recommended for use with each physical touchscreen kiosk.

The touchscreen kiosk will include the hardware outlined in the attached and referenced proposal.

10. Software Service

As part of the Service, QAS will provide Customer with use of the Service, including a browser interface and data encryption, transmission, access and storage. Customer's registration for, or use of, the Service shall be deemed to be their agreement to abide by this Agreement including any materials available on the QAS website incorporated by reference herein.

Because the Service is a hosted, online application, QAS occasionally may need to notify all users of the Service (whether or not they have opted out as described above) of important announcements regarding the operation of the Service. If Customer becomes a paying customer of the Service, Customer agrees that QAS can disclose the fact that they are a paying customer and the edition of the Service that they are using.

11. License Grant & Restrictions

QAS hereby grants Customer a non-exclusive, non-transferable, worldwide right to use the Service, solely for Customer's own internal business purposes, subject to the terms and conditions of this Agreement. All rights not expressly granted to Customer are reserved by QAS and its licensors.

Customer may not access the Service if they are a direct competitor of QAS, except with QAS' prior written consent. In addition, Customer may not access the Service for purposes of monitoring its availability, performance or functionality, or for any other benchmarking or competitive purposes.

Customer shall not (i) license, sublicense, sell, resell, transfer, assign, distribute or otherwise commercially exploit or make available to any third party the Service, Data or the Content in any way; (ii) modify or make derivative works based upon the Service, Data or the Content; (iii) "mirror" any Content on any other server or wireless or Internet-based device; or (iv) reverse engineer or access the Service in order to (a) build a competitive product or service, (b) build a product using similar ideas, features, functions or graphics of the Service, or (c) copy any ideas, features, functions or graphics of the Service.

Customer may use the Service only for internal business purposes and shall not: (i) send or store infringing, obscene, threatening, libelous, or otherwise unlawful or tortious material, including material harmful to children or violative of third party privacy rights; (ii) send or store material containing software viruses, worms, Trojan horses or other harmful computer code, files, scripts, agents or programs; (iii) interfere with or disrupt the integrity or performance of the Service or the data contained therein; or (iv) attempt to gain unauthorized access to the Service or its related systems or networks.

Certain editions of the Service offer integration capabilities via web services. The number of web service calls Customer can make per account may be limited.

12. Customer Responsibilities

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Customer is responsible for all activity occurring under their accounts and shall abide by all applicable local, state, national and foreign laws, treaties and regulations in connection with their use of the Service, including those related to data privacy, international communications and the transmission of technical or personal data. Customer shall: (i) notify QAS immediately of any unauthorized use of any password or account or any other known or suspected breach of security; (ii) report to QAS immediately and use reasonable efforts to stop immediately any copying or distribution of Content or Data that is known or suspected by Customer or Customer's users; and (iii) not impersonate another QAS user or provide false identity information to gain access to or use the Service.

13. Data

Customer does own any data, information or material that Customer submits to the Service in the course of using the Service. QAS retains all rights for usage associated with the proprietary acquisition, ordering, storage, manipulation or representation of the data points, information or material subsequent to the provision by Customer in an acceptable format.

14. Intellectual Property Ownership

QAS alone (and its licensors, where applicable) shall own all right, title and interest, including all related Intellectual Property Rights, in and to the QAS Technology, the Content and the Service and any suggestions, ideas, enhancement requests, feedback, recommendations or other information provided by Customer or any other party relating to the Service. This Agreement is not a sale and does not convey to Customer any rights of ownership in or related to the Service, the QAS Technology or the Intellectual Property Rights owned by QAS. The QAS name, the QAS logo, and the product names and logos associated with the Service are trademarks of QAS or third parties, and no right or license is granted to use them.

15. Third Party Interactions

During use of the Service, Customer may enter into correspondence with, purchase goods and/or services from, or participate in promotions of advertisers or sponsors showing their goods and/or services through the Service. Any such activity, and any terms, conditions, warranties or representations associated with such activity, is solely between Customer and the applicable third-party. QAS and its licensors shall have no liability, obligation or responsibility for any such correspondence, purchase or promotion between Customer and any such third-party. QAS does not endorse any sites on the Internet that are linked through the Service. QAS provides these links to Customer only as a matter of convenience, and in no event shall QAS or its licensors be responsible for any content, products, or other materials on or available from such sites. QAS provides the Service to Customer pursuant to the terms and conditions of this Agreement. Customer recognizes, however, that certain third-party providers of ancillary software, hardware or services may require Customer agreement to additional or different license or other terms prior to Customer use of or access to such software, hardware or services.

16. Excess Data Storage

QAS reserves the right to establish or modify its general practices and limits relating to storage of Customer Data.

17. Non-Payment and Suspension

In addition to any other rights granted to QAS herein, QAS reserves the right to suspend or terminate this Agreement and Customer's access to the Service if Customer account becomes delinquent (falls into arrears). Delinquent invoices (accounts in arrears) are subject to interest of 1.5% per month on any outstanding balance, or the maximum permitted by law, whichever is less, plus all expenses of collection. Customer will continue to be charged for licenses during any period of suspension. If Customer or QAS initiates termination of this Agreement, Customer will be obligated to pay the balance due on Customer account computed in accordance with the Charges and Payment of Fees section above. Customer agrees

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that QAS may charge such unpaid fees to Customer's credit card or otherwise bill Customer for such unpaid fees.

QAS reserves the right to impose a reconnection fee in the event Customer is suspended and thereafter request access to the Service. Customer agrees and acknowledges that QAS has no obligation to retain Customer Data and that such Customer Data may be irretrievably deleted if their account is 30 days or more delinquent.

18. Termination for Cause

Any breach of Customer payment obligations or unauthorized use of the QAS Technology or Service will be deemed a material breach of this Agreement. QAS, in its sole discretion, may terminate Customer's password, account or use of the Service if Customer breaches or otherwise fails to comply with this Agreement. In addition, QAS may terminate a free account at any time in its sole discretion. Customer agrees and acknowledges that QAS has no obligation to retain the Customer Data, and may delete such Customer Data, if Customer has materially breached this Agreement, including but not limited to failure to pay outstanding fees, and such breach has not been cured within 30 days of notice of such breach.

19. Representations & Warranties

QAS provides an industry standard initial warranty of ninety days after substantial completion. Each party hereto warrant to the other that Services provided by it to the receiving Party under the Agreement will be performed in a professional and workmanlike manner, in accordance with industry standards. Each party represents and warrants that it has the legal power and authority to enter into this Agreement. QAS represents and warrants that it will provide the Service in a manner consistent with general industry standards reasonably applicable to the provision thereof and that the Service will perform substantially in accordance with normal use and circumstances. Customer represents and warrants that they have not falsely identified them self nor provided any false information to gain access to the Service and that Customer billing information is correct.

20. Mutual Indemnification

Customer shall indemnify and hold QAS, its licensors and each such party's parent organizations, subsidiaries, affiliates, officers, directors, employees, attorneys and agents harmless from and against any and all claims, costs, damages, losses, liabilities and expenses (including attorneys' fees and costs) arising out of or in connection with: (i) QAS needs to add something concerning data; (ii) QAS needs to add something concerning control systems (i) a claim alleging that use of the Customer Data infringes the rights of, or has caused harm to, a third party; (ii) a claim, which if true, would constitute a violation by Customer of Customer's representations and warranties; or (iii) a claim arising from the breach by Customer or Customer's users of this Agreement, provided in any such case that QAS (a) gives written notice of the claim promptly to Customer; (b) gives Customer sole control of the defense and settlement of the claim (provided that Customer may not settle or defend any claim unless Customer unconditionally releases QAS of all liability and such settlement does not affect QAS' business or Service); (c) provides to Customer all available information and assistance; and (d) has not compromised or settled such claim.

QAS shall indemnify and hold Customer and Customer's parent organizations, subsidiaries, affiliates, officers, directors, employees, attorneys and agents harmless from and against any and all claims, costs, damages, losses, liabilities and expenses (including attorneys' fees and costs) arising out of or in connection with: (i) a claim alleging that the Service directly infringes a copyright, a U.S. patent issued as of the Effective Date, or a trademark of a third party; (ii) a claim, which if true, would constitute a violation by QAS of its representations or warranties; or (iii) a claim arising from breach of this Agreement by QAS; provided that Customer (a) promptly give written notice of the claim to QAS; (b) give QAS sole control of the defense and settlement of the claim (provided that QAS may not settle or defend any claim unless it unconditionally releases Customer of all liability); (c) provide to QAS all available information and

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assistance; and (d) have not compromised or settled such claim. QAS shall have no indemnification obligation, and Customer shall indemnify QAS pursuant to this Agreement, for claims arising from any infringement arising from the combination of the Service with any of Customer products, service, hardware or business process(s).

21. Disclaimer of Warranties

QAS AND ITS LICENSORS MAKE NO REPRESENTATION, WARRANTY, OR GUARANTY AS TO THE RELIABILITY, TIMELINESS, QUALITY, SUITABILITY, TRUTH, AVAILABILITY, ACCURACY OR COMPLETENESS OF THE SERVICE OR ANY CONTENT. QAS AND ITS LICENSORS DO NOT REPRESENT OR WARRANT THAT (A) THE USE OF THE SERVICE WILL BE SECURE, TIMELY, UNINTERRUPTED OR ERROR-FREE OR OPERATE IN COMBINATION WITH ANY OTHER HARDWARE, SOFTWARE, SYSTEM OR DATA, (B) THE SERVICE WILL MEET CUSTOMER REQUIREMENTS OR EXPECTATIONS, (C) ANY STORED DATA WILL BE ACCURATE OR RELIABLE, (D) THE QUALITY OF ANY PRODUCTS, SERVICES, INFORMATION, OR OTHER MATERIAL PURCHASED OR OBTAINED BY CUSTOMER THROUGH THE SERVICE WILL MEET CUSTOMER'S REQUIREMENTS OR EXPECTATIONS, (E) ERRORS OR DEFECTS WILL BE CORRECTED, OR (F) THE SERVICE OR THE SERVER(S) THAT MAKE THE SERVICE AVAILABLE ARE FREE OF VIRUSES OR OTHER HARMFUL COMPONENTS. THE SERVICE AND ALL CONTENT IS PROVIDED TO CUSTOMER STRICTLY ON AN "AS IS" BASIS. ALL CONDITIONS, REPRESENTATIONS AND WARRANTIES, WHETHER EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF THIRD PARTY RIGHTS, ARE HEREBY DISCLAIMED TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW BY QAS AND ITS LICENSORS.

22. Internet Delays

QAS' SERVICES MAY BE SUBJECT TO LIMITATIONS, DELAYS, AND OTHER PROBLEMS INHERENT IN THE USE OF THE INTERNET AND ELECTRONIC COMMUNICATIONS. QAS IS NOT RESPONSIBLE FOR ANY DELAYS, DELIVERY FAILURES, OR OTHER DAMAGE RESULTING FROM SUCH PROBLEMS.

23. Limitation of Liability

IN NO EVENT SHALL EITHER PARTY'S AGGREGATE LIABILITY EXCEED THE AMOUNTS ACTUALLY PAID BY AND/OR DUE FROM CUSTOMER IN THE TWELVE (12) MONTH PERIOD IMMEDIATELY PRECEDING THE EVENT GIVING RISE TO SUCH CLAIM. IN NO EVENT SHALL EITHER PARTY AND/OR ITS LICENSORS BE LIABLE TO ANYONE FOR ANY INDIRECT, PUNITIVE, SPECIAL, EXEMPLARY, INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES OF ANY TYPE OR KIND (INCLUDING LOSS OF DATA, REVENUE, PROFITS, USE OR OTHER ECONOMIC ADVANTAGE) ARISING OUT OF, OR IN ANY WAY CONNECTED WITH THIS SERVICE, INCLUDING BUT NOT LIMITED TO THE USE OR INABILITY TO USE THE SERVICE, OR FOR ANY CONTENT OBTAINED FROM OR THROUGH THE SERVICE, ANY INTERRUPTION, INACCURACY, ERROR OR OMISSION, REGARDLESS OF CAUSE IN THE CONTENT, EVEN IF THE PARTY FROM WHICH DAMAGES ARE BEING SOUGHT OR SUCH PARTY'S LICENSORS HAVE BEEN PREVIOUSLY ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

24. Additional Rights

Certain states and/or jurisdictions do not allow the exclusion of implied warranties or limitation of liability for incidental, consequential or certain other types of damages, so the exclusions set forth above may not apply to Customer.

25. Local Laws and Export Control

This site provides services and uses software and technology that may be subject to United States export controls administered by the U.S. Department of Commerce, the United States Department of Treasury Office of Foreign Assets Control, and other U.S. agencies and the export control regulations of Switzerland and the European Union. The user of this site ("User") acknowledges and agrees that the site shall not be

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used, and none of the underlying information, software, or technology may be transferred or otherwise exported or re-exported to countries as to which the United States, Switzerland and/or the European Union maintains an embargo (collectively, "Embargoed Countries"), or to or by a national or resident thereof, or any person or entity on the U.S. Department of Treasury's List of Specially Designated Nationals or the U.S. Department of Commerce's Table of Denial Orders (collectively, "Designated Nationals"). The lists of Embargoed Countries and Designated Nationals are subject to change without notice. By using the Service, Customer represents and warrant that they are not located in, under the control of, or a national or resident of an Embargoed Country or Designated National. Customer agrees to comply strictly with all U.S., Swiss and European Union export laws and assume sole responsibility for obtaining licenses to export or re-export as may be required.

This site may use encryption technology that is subject to licensing requirements under the U.S. Export Administration Regulations, 15 C.F.R. Parts 730-774 and Council Regulation (EC) No. 1334/2000.

QAS and its licensors make no representation that the Service is appropriate or available for use in other locations. If Customer uses the Service from outside the United States of America, Switzerland and/or the European Union, Customer is solely responsible for compliance with all applicable laws, including without limitation export and import regulations of other countries. Any diversion of the Content contrary to United States, Swiss or European Union (including European Union Member States) law is prohibited. None of the Content, nor any information acquired through the use of the Service, is or will be used for nuclear activities, chemical or biological weapons, or missile projects, unless specifically authorized by the United States government or appropriate European body for such purposes.

26. Notice

QAS may give notice by means of a general notice on the Service, electronic mail to Customer's e-mail address on record in QAS' account information, or by written communication sent by first class mail or pre-paid post to Customer's address on record in QAS' account information. Such notice shall be deemed to have been given upon the expiration of 48 hours after mailing or posting (if sent by first class mail or pre-paid post) or 12 hours after sending (if sent by email). Customer may give notice to QAS (such notice shall be deemed given when received by QAS) at any time by any of the following: letter sent by confirmed facsimile to QAS at the following fax number: (515) 233-3380; letter delivered by nationally recognized overnight delivery service or first class postage prepaid mail to QAS at the following address: Quality Attributes Software, Inc., 416 Billy Sunday Road, Suite 150, Ames, IA 50010.

27. Modification to Terms

QAS reserves the right to modify the terms and conditions of this Agreement or its policies relating to the Service at any time, effective upon posting of an updated version of this Agreement on the Service. QAS is responsible for notifying Customer of changes to this Agreement.

28. Assignment; Change in Control

This Agreement may not be assigned by Customer without the prior written approval of QAS but may be assigned without Customer's consent by QAS to (i) a parent or subsidiary, (ii) an acquirer of assets, or (iii) a successor by merger. Any purported assignment in violation of this section shall be void. Any actual or proposed change in control of Customer that results or would result in a direct competitor of QAS directly or indirectly owning or controlling 50% or more of Customer shall entitle QAS to terminate this Agreement for cause immediately upon written notice.

29. Marketing

QAS reserves the right to use Customer information provided including, but not restricted to Customer name and logo, for marketing purposes including, but not restricted to, programs that generate awareness and educate and update users on new features, functionality, and news. The format and frequency of

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these marketing messages will not be restricted unless specifically requested by Customer. QAS' GreenTouchscreen®, iBDirectory or iBDonor logo and trademark will be displayed on all software pages and solutions developed.

30. General

With respect to U.S. Customers, this Agreement shall be governed by Iowa law and controlling United States federal law, without regard to the choice or conflicts of law provisions of any jurisdiction, and any disputes, actions, claims or causes of action arising out of or in connection with this Agreement or the Service shall be subject to the exclusive jurisdiction of the state and federal courts located in Ames, Iowa. No text or information set forth on any other purchase order, preprinted form or document (other than an Order Form, if applicable) shall add to or vary the terms and conditions of this Agreement. If any provision of this Agreement is held by a court of competent jurisdiction to be invalid or unenforceable, then such provision(s) shall be construed, as nearly as possible, to reflect the intentions of the invalid or unenforceable provision(s), with all other provisions remaining in full force and effect. No joint venture, partnership, employment, or agency relationship exists between Customer and QAS as a result of this agreement or use of the Service. The failure of QAS to enforce any right or provision in this Agreement shall not constitute a waiver of such right or provision unless acknowledged and agreed to by QAS in writing. This Agreement, together with any applicable Order Form, comprises the entire agreement between Customer and QAS and supersedes all prior or contemporaneous negotiations, discussions or agreements, whether written or oral, between the parties regarding the subject matter contained herein.

31. Definitions

As used in this Agreement and in any Order Forms now or hereafter associated herewith: "Agreement" means these terms of use, any Order Forms, whether written or submitted online, and any materials available on the QAS website specifically incorporated by reference herein, as such materials, including the terms of this Agreement, may be updated by QAS from time to time in its sole discretion; "Content" means the audio and visual information, documents, software, products, data and services contained or made available to Customer in the course of using the Service; "Customer Data" means any data, information or material provided or submitted by Customer to the Service in the course of using the Service; "Effective Date" means date this Agreement is accepted by signing this agreement; "Initial Term" means the initial period during which Customer is obligated to pay for the Service equal to the billing frequency selected by Customer during the subscription process; "Intellectual Property Rights" means unpatented inventions, patent applications, patents, design rights, copyrights, trademarks, service marks, trade names, domain name rights, mask work rights, know-how and other trade secret rights, and all other intellectual property rights, derivatives thereof, and forms of protection of a similar nature anywhere in the world "Order Form(s)" means the form evidencing the initial subscription for the Service and any subsequent order forms submitted online or in written form, specifying, among other things, the number of licenses and other services contracted for, the applicable fees, the billing period, and other charges as agreed to between the parties, each such Order Form to be incorporated into and to become a part of this Agreement (in the event of any conflict between the terms of this Agreement and the terms of any such Order Form, the terms of this Agreement shall prevail); "QAS" means collectively Quality Attributes Software, Inc., an Iowa corporation, having its principal place of business at 416 Billy Sunday Road, Suite 150, Ames, IA 50010; "QAS Technology" means all of QAS' proprietary technology (including software, data, hardware, products, processes, algorithms, user interfaces, know-how, techniques, designs and other tangible or intangible technical material or information) made available to Customer by QAS in providing the Service; "Service(s)" means the specific software features identified during the ordering process, developed, operated, and maintained by QAS, accessible via http://www.qualityattributes.com or another designated web site or IP address, or ancillary online or offline products and services provided to Customer by QAS, to which Customer is being granted access under this Agreement, including the QAS Technology and the Content; "User(s)" means employees, representatives, consultants, contractors,

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visitors or agents that use the Service.

"CUSTOMER"

By: _____

(name)

(title)

Date: 10/15/08

"QAS"
Quality Attributes Software, Inc.

By: _____

(name) GREG THOMPSON

(title) CEO

Date: 10/20/08

Contract or PO #: _____

Billing Contact: Suzanne Hansen

Billing Phone: 651-696-6019

Billing Address: 1600 Grand Ave
St Paul MN 55105

Shipping Contact: Suzanne Hansen

Shipping Phone: 651-696-6019

Shipping Address: 1606 Grand Ave
St Paul MN 55105

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Quality Attributes Software
Empowering Intelligent Buildings

Quality Attributes Software Quote

10.07.2008

Requesting Company Name	Macalester College
Company Address	
Role of Requesting Company	
Contact Name	Suzzane Hansen
Title	Sustainability Manager
E-mail	shansen2@macalester.edu
Phone	(651)696-6019
Fax	
Project Name	IGC Building
Project Address	
Owner of Project Facility	
Primary Function of Facility	Office Building
Construction Start Date	May of 2008
Construction End Date	
Anticipated Kiosk Installation Date	

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Solution Totals	
GreenTouchscreen Software Total	**$24,395**
GreenTouchscreen Hardware Total	**$9,099**
GreenTouchscreen Maintenance Option *(Please insert amount from table below)**	**$1,500**
iBPortal Integration Total	**$0**
iBPortal Professional Services Total	**$0**
iBPortal First Year Subscription Fee	**$0**
Initial First Year Cost	**$34,994**
iBPortal Subscription Term (In Years)	**5**
iBPortal Annual Subscription Fee	**$0**
System Total (Initial Year and Balance of iBPortal Term)	**$34,994**

*****Kiosk Yearly Maintenance**	**Paid Yearly**	**3 Years Paid Upfront**	**5 Years Paid Upfront**
Standard Includes: **10 hours of Support and Development** **Any company released Version updates** **Bi-monthly activity report** **Bi-monthly error check and report** **Customer portal to facilitate communication**	**Standard $1,500.00**	**10% Discount $4,050.00**	**15% Discount $6,375.00**
Standard Plus Includes: **All items above** ***NEW* User Access to Content Management System (ability to allow users to modify text and picture content)**	**$2,500.00**	**$6,750.00**	**$10,625.00**

Quality Attributes Software
Empowering Intelligent Buildings
Phone: 515.956.1599 Fax: 515.233.3380
Website: www.greentouchscreen.com
Address: 416 Billy Sunday Rd., Suite 150 Ames IA 50010

October 7, 2008

Proposal Number: CLTN-IGC-P08-09

Quality Attributes Software Kiosk proposal for Macalester College

IGC Building

by

Quality Attributes Software
Empowering Intelligent Buildings

http://www.qualityattributes.com

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Table of Contents

Table of Contents 2
Executive Summary 3
Corporate Background 3
Definitions 3
Software Solution 4
Work Plan 8
- Control System Data Collection 8
- GreenTouchscreen® Kiosk Software 9
- Implementation 11
- Execution 11

Bill of Materials 11
Pricing 12
Project Schedule 13

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Executive Summary

Quality Attributes Software, Inc. (QAS) will provide an innovative solution for Macalester College for implementation at IGC Building.

QAS is the industry leader in designing large scale software that integrates with energy management control systems, as well as in the development of interactive campus and building directories, real time animations and interactive user interfaces. QAS provides information technology solutions via a wide range of kiosk, control system integration, facilities management, business operations, and financial software products and services.

Since QAS is experienced with the technologies and goals of the IGC Building, QAS can fulfill the requirements at a very competitive price and on an aggressive schedule. QAS' track record of successful kiosk installations means that Macalester College will have a partner to ensure the solution continues to be effective and continues to create value not only now but in the future as well.

Corporate Background

GreenTouchscreen® is the leader in high quality, customized kiosk solutions for facility information, in general, and the sustainable building market, in particular.

As the touch screen kiosk division of Quality Attributes Software, GreenTouchscreen® builds upon the vast expertise of Quality Attributes in the fields of website development, database development, custom graphic design and software engineering. Quality Attributes also has extensive experience working with the HVAC industry and building automation systems. Let QAS put their technical expertise and experience to work for Macalester College to develop a custom GreenTouchscreen® solution that is sure to impress.

Each of QAS' kiosks are individually designed and developed using the latest technology and to the highest quality standards so that the end product not only meets but exceeds expectations.

Definitions

- Monitoring: Acquisition, processing, communication, and display of system and equipment status data and event and alarm signals.
- Systems Integration: The bringing together of components of several systems containing interacting components to achieve indicated functional operation of combined systems.

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Software Solution

Overview

Quality Attributes Software will provide a custom kiosk software solution with the following modules.

Modules

	General Kiosk Modules	
QAS-0001	**Base Cost – Basic Template Design** - Overall graphics design / proof development / design meetings. - Content organization / development. - Project management. - Testing.	
QAS-0002	**Custom Template Design - Add-On** - Custom detailed graphics design / proof development / design meetings. - Custom content organization / development.	
QAS-0003	**Screen Saver** - Required if software is used on physical kiosk. - Includes Rotating images to prevent image burn in Maximum Images: **20**	
QAS-0004	**Foreign Language** - Dynamic kiosk elements will not be translated - Content changes need to be made in all languages Language: Multi-Language Welcome Screen (Arabic, Chinese, French, Russian, English, Spanish)	
QAS-0005	**Time Clock** - Display current time clock on kiosk template.	
QAS-0006	**Live Data Weather - Current Conditions on Kiosk Template** - Display current outdoor conditions as an icon on kiosk template. - Display current temp, humidity, wind speed, wind direction, and conditions. - Data from National Online Weather Service	

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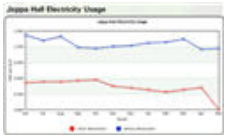
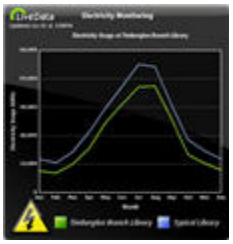
GreenTouchscreen®

	GreenTouchscreen Modules	
GT-0100	**Green Building Information Page** - This is an individual page containing static text and images. - Educate visitors about building's sustainable design. - Educate users and visitors about the LEED® rating and the USGBC. Number of Pages: **4**	
GT-0200	**Live Data:** - Please select controls vendor(s) to integrate to (multiple can be selected):(Must be BACnet/IP,LON, OPC or Web Services capable) Control System(s) to integrate to: **1 - Trane**	
GT-0210	**Live Data Gauge** - Uses real-time data and / or trended data. - Show water usage, energy, CO2, or any data points. - Display data points in dashboard gauges. - Gauges may link to graphs to show a value for a specific time. Number of Gauges: **3** Data Points to Display: **Electricity, Water, Gas**	
GT-0220	**Live Data Graph** - Uses real-time - Can show electricity consumption, temp or any data points. - Displays data points in interactive graphs. Number of Graphs: **3** Data Points to Display: **Electricity, Water, Gas**	
GT-0223	One Month Weekly Graphs	**3**
GT-0224	One Year Monthly Graphs	**3**
GT-0230	**Live Data Comparison Added to Above Graph** - Extends graphs to also show comparison or calculated data. - Compare energy usage to similar building, non –LEED building, goal or modeled data. - QAS will perform research to generate graph data if necessary. Data to have comparison: **Electricity, Water, Gas**	

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GT-0300	**System Animation** - Demonstrates the hidden systems within a building. - Educational 1-2-3 steps on how the system works. - Uses real-time or simulated data. - Depict a solar array, heat pump, wind mill, cooling system, etc. Systems: **TBD**	
GT-0310	2D Live Data	**1**
GT-0400	**Green Features Map** - Green features could be solar panel, carpet, insulation, etc. - Show features on a client supplied 2D floor directory or rendering. Can have an indoor or outdoor green features map. - Hot spot areas in which "Green Features" are located. Selecting an area or an icon displays more info about a feature (thumbnail image, title and brief description). Maximum Features: **20**	
	LEED® Checklist	
GT-0600	**Basic LEED® Checklist** Show LEED® Checklist and what points were earned in a static list.	
GT-0610	**Extended and Interactive LEED® Checklist - Add-On** - Visitors may obtain detailed information (thumbnail image, title, credit number, point value, and brief description) about each credit earned. *** Requires GE-0100**	
	Green Calculators	
GT-0700	**Pre-Configured Calculators** - Calculators accept user input and display a results page. Calculator types include: - **1 TBD**	

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iBDirectory

iBDirectory Modules		
	Site Map	
IBD-0200	**Site Map Module** - Must have existing digital maps or renderings. - Top-down view of site. - Ability to pan and zoom map.	
	Building Directory	
IBD-0300	**Floor Plan Module** - 2D top-down view of each floor in building. - Use existing digital floor plans (auto-cad, etc.) - Top-down view of floor. - Ability to pan and zoom floor plan. ***Insert number of floors in Quantity.** Number of Floors: **3**	

Maintenance

The yearly maintenance agreement ensures several key conditions to minimize service interruptions and maximize the quality of the kiosk's operation. This agreement is required for the first year and is then renewed on an annual basis. The features of the maintenance agreement include:

Initial Maintenance Service for the GreenTouchscreen®: Beginning at Substantial Completion, 12 months' full maintenance, including:

· 10 hours of phone and development support by the development professionals
· Hosting on our co-located, highly secure servers with nightly backups
· Bi-monthly quality assurance checks and fixes to any software problems.
· Bi-monthly kiosk status reports including detailed use information.

QAS will also make available parts and supplies same as those used in the manufacture and installation of original equipment and components.

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Work Plan

Control System Data Collection

Overview
QAS' solution will use the GreenTouchscreen® Live Data Module that is utilizes the core iBPortal technology to read values from the preexisting Building Automation System (BAS) or control system. This software will also facilitate the collection and trending of this sensor data at the specified sampling rate.

The data for these points will be stored and maintained at the GreenTouchscreen® datacenter. The GreenTouchscreen® kiosk will then render its graphs and gauges by making web service requests to the GreenTouchscreen® datacenter.

Macalester College is responsible for allowing QAS access to communicate to the BAS. This communication access is necessary in order to acquire the data points detailed above. Communication to the BAS can be established by allowing public access to the BAS over IP or via installing the GreenTouchscreen® Local Live Data Service software inside the customer's network that has access to the BAS.

Public access to the BAS network requires access to the BAS supervisory machine via the Internet. This Internet access should be secured by restricting access to only the GreenTouchscreen® datacenter IPs. In this scenario, the GreenTouchscreen® Live Data Module will reside at the GreenTouchscreen® data center and remotely pull the BAS data from the BAS machine.

Alternatively, GreenTouchscreen® Local Live Data Service software can be installed on the BAS supervisory machine or other machine with local network access to the BAS supervisory machine. This software will then acquire the BAS data locally and push the data to the GreenTouchscreen® data center. QAS also offers the Local Live Data Service on a hardware platform where the "black box" can be installed on the local network with access to the BAS supervisory machine.

Prerequisites:

- Ability to communicate to control system.

Procedure:

- The Live Data Module will be configured to read data from the BAS supervisory machine.
- The Live Data Module will then be configured to trend the sampled sensor readings at the specified sample rate to the GreenTouchscreen® data center.

Comments

The GreenTouchscreen® kiosk software will use this acquired control system data for displaying real-time and historical information.

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GreenTouchscreen® Kiosk Software

Overview

QAS proposes to create a kiosk using ASP.net, VBScript, CSS, VB.NET Web Services, and Macromedia Flash/Flex.

Flash is the optimal choice for the GreenTouchscreen® presentation layer due to its ability to retrieve real-time data on a frequent and consistent basis without having to refresh the page via web service integration. QAS will have the ability to refresh the interface every 3 to 5 minutes to reflect the changes in real-time and historical data (Figure 2). Also, Flash applications are platform independent and are a standardized widely adopted presentation layer for internet applications. This controlled programming environment allows us to focus more on user experience and less on testing for platform compatibility. Furthermore, Flash has a strong animation capability which allows for a more effective education and presentation. Additionally, QAS has extensive experience developing Flash applications and have created methods to ensure our Flash applications use a lower amount of bandwidth than corresponding HTML pages. Low bandwidth access is facilitated by the use of JIT (just-in-time) and On-Demand programming techniques. This allows for a rich user experience while increasing performance (Figure 1).

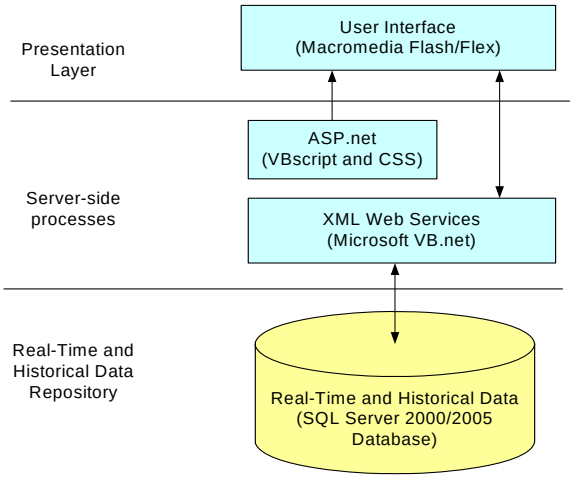

Figure 1, Example of bandwidth requirements between Flash and alternatives
(http://www.macromedia.com/devnet/blueprint/articles/performance.html#bandwidth)

Design

The kiosk navigational schema and number of sections will be determined through the Detailed Design Meetings. Through these discussions, QAS will determine a plan for the structure and organization of this kiosk software. QAS will present this plan to the decision makers to then have the opportunity to seek revisions to this plan. QAS will allow the opportunity to revise this plan a maximum of three times. The decision makers will then give final approval for the plan before QAS will commence work on the kiosk template.

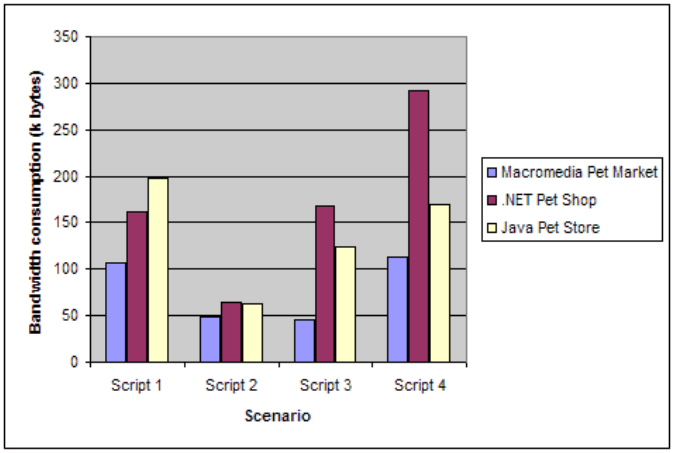

Figure 2, kiosk software schema using Macromedia Flash

QAS will then create a template for the

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kiosk. Each page in this kiosk will use this template. As a result of enforcing template use, the kiosk experience will be more intuitive, usable, and thereby create a unified appearance between sections.

Through discussions, QAS will present a framework which will illustrate the kiosk layout and placement of future content. The decision makers will have the opportunity to request revisions to this plan a maximum of three times. The decision makers will give final approval of this plan before QAS will commence work on the kiosk software.

Prerequisites:

- Receive detailed 2-dimensional renderings, text, and pictures from Macalester College necessary for completion of the various kiosk sections such as the Green Features Map, Building Automation Real-Time Animations, LEED checklist, etc.
- Detailed 2-dimensional renderings and floor plans will be provided to QAS to be integrated into the kiosk for system operation which shall be in AutoCAD or other comparable format.
- Integration to the automation systems which will enable the contractor to obtain live data for display on the touch screen kiosk.

Procedure:

- Detailed Design Meeting to discuss layout as well as look and feel of the kiosk software.
- Design and approval of templates and screens.
- Development of templates and screens.
- Development of the client relations portal (allows Macalester College easy access to messages from QAS, the project timeline, project documents as well as showing what is being developed when it is being developed).
- Testing of kiosk software.
- Integration of kiosk software with control systems.
- Testing of control system integration.
- Implementation and deployment of kiosk at the Site.
- Final testing of production systems.
- Final approval of project.

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Implementation

The kiosk software is hosted on QAS' Servers and viewed through the Internet via a web browser. Physical kiosk stations are configured to bring up the Internet-based Flash user interface through an Internet browser. Since this user interface is hosted on QAS' servers, maintenance and servicing activities are swift and automatically propagate to the physical kiosk stations. Additionally, content management and other administrative functions can be performed using a secure web-based management system and the physical kiosks will receive these updates in near real-time. In the event that a physical kiosk looses Internet connectivity, the kiosk station will continuously attempt to reconnect and show available information in the meantime.

1. Communication / Data Transfer
    a. Kiosk will consist of the micro-processor components (computer) and Flat Panel interface components required to perform the Kiosk system functions.

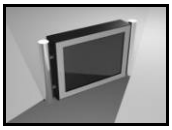
2. Component Protection (responsibility of client to provide this protection)
    a. Surge Protection: Protect components from voltage surges originating external to equipment housings and entering through power, communication, signal, control, and sensing leads. Include surge protection for external wiring of each conductor entry connecting to components.

3. Cables (responsibility of client to provide network and electrical access to the point of the kiosks)

Execution

QAS will work with a Contractor(s) for installation activities for QAS supplied hardware. The Contractor(s) will be assigned by the General Contractor to assure compliancy and acceptability.

Bill of Materials

QAS-Q5-46-1	**46" Mounted On Wall** -Ruggedized steel case, powdercoat finish -Integrated PC: Pentium mobile 1.7G CPU, 160GB HD, 512MB RAM, WiFi -Integrated Touchscreen: InfraRed (IR), 6MM Tempered Glass -Wall Bracket -Standard Ground Shipping -Standard One Year Warranty	Quantity: **1**	

Prerequisites:

- Power outlet at location of kiosk, standard 110V.
- High Speed data outlet at location of kiosk, standard CAT5 Ethernet or comparable.

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Quality Attributes Software will provide detailed installation instructions and will pre-configure the CPU to operate the kiosk automatically. QAS will not be responsible for the installation of this cited hardware. Macalester College will be responsible for performing installation tasks. Quality Attributes Software will be available for phone support as questions arise regarding installation.

Pricing

See attached Quote for itemized pricing.

The base cost for the proposed project is **$33,494.00** ($24,395.00 for software, $9,099.00 for hardware)

The cost of the maintenance agreement is $1,500 per year.

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Project Schedule

Although not all design considerations have been resolved (such as the timeframe for hardware purchases), Table 1 contains an estimate of the amount of time required to complete the work plan. This schedule assumes necessary content and live data are supplied to QAS by agreed upon deadlines. Excluding acceptance, the overall implementation duration is estimated as 16 weeks.

TABLE1. PROPOSED PROJECT SCHEDULE

Task Description or Project Milestone:	**Time from project start:**
Initial Design Meeting	1 week
Initial Content Worksheet Due From Client	3 weeks
Proof Development	4 weeks
Final Design Meeting	4 weeks
Final Content Worksheet Due From Client	5 weeks
Control System Data Available To QAS	5 weeks
Graphics Development	6 weeks
Shell On Test Site	6 weeks
Installation	14 weeks
Development Complete	15 weeks
Testing Complete	16 weeks
Verification	16 weeks
Acceptance Period	16 weeks to 20 weeks

QAS thanks Macalester College for their interest in GreenTouchscreen® and looks forward to having the opportunity to not only meet, but to exceed their expectations.

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EXHIBIT C

MACALESTER COLLEGE

1600 GRAND AVENUE
SAINT PAUL, MN
55105-1899

TELEPHONE:
651-696-6000
www.macalester.edu

Institute for Global Citizenship – Building Tour

① **Institute for Global Citizenship**

The IGC building was designed and constructed with sustainability in mind. From the very beginning, the project team wanted the building to express what it means to be a good "global citizen." One of the ways to be a good global citizen is to be as sustainable as possible, and the College wanted to set as good an example as possible. The team focused on issues of sustainability surrounding the site, the building's energy and water use, the indoor environmental quality, and the materials that went into and come out of the building, as well as issues such as educating the public (of which this tour is a part).

Some of you may be familiar with US Green Building Council and the LEED® Certification program. LEED stands for "Leadership in Energy and Environmental Design," and the certification program has become an internationally-recognized system for determining "how green is green." The building is scored on a point-based system, and there are four levels of certification, ranging from Certified to Platinum. The team felt it was important to certify the building in order to demonstrate in a tangible and measurable way, how the building compares to "typical" buildings. The IGC has been designed to achieve a LEED® Platinum Certification.

Throughout the design process, the team employed an approach called integrated design, or whole-building design. Integrated design is a collaborative approach, in which the College; the architect; the mechanical, structural, and civil engineers; the lighting designers; and the landscape consultants are all actively and continuously involved in the design process from the very beginning. No element of a building is a stand-alone system – everything needs to be weighed and balanced. Larger windows mean more daylight. More daylight coming in means less artificial light is required. However, larger glazing areas can also mean more solar heat gain in the summer or more conductive heat loss in the winter. So it is a balancing act. Integrated design results in a much more efficient building because all the interested parties are able to contribute their expertise up-front. Typically, the architects design the building, and then everyone else is asked to fit their systems into a design that is relatively inflexible. The typical approach tends to result in wasted resources.

② **Green TouchScreen**

The touchscreen you see here is our Green TouchScreen information kiosk, and it is part the College's Public Education program. The building's resource use is constantly monitored, and that information is fed back here to the Green TouchScreen in real time. You can then look at this data for right now, or on weekly or monthly basis, and compare the data across time, and in relation to weather data. You can also review our LEED Checklist to see which credits we achieved. If you click on the credit title, it will tell what the credit requirements are, and it's relation to sustainability. To better understand how a building system works, you can touch here, and an animated diagram will explain how things like the ventilation and heating systems operate. All of this data is also available from anywhere on campus through the Macalester website at http://_____. Environmental Science students will also be able to use this data for class projects.

③ **Energy**

On an annual basis, buildings in the United States consume about 39% of our country's energy, and 68% of the electricity. Buildings are also responsible for about 38% of the carbon dioxide released to the atmosphere annually. Currently, the vast majority of this energy comes from fossil fuels, which are non-renewable resources. Here in Minnesota, 77% of the energy comes from coal, which contributes heavily to air pollution and carbon dioxide emissions. Because of issues surrounding the world's diminishing fossil fuel supplies, the United States' dependence on foreign oil, security risks, and the impending hazards of climate change, it is essential that we make all efforts to minimize our energy use, and to make the energy we do use from renewable sources.

The IGC has been designed with all of this in mind. Through the integrated design process, the team modeled the building and its systems, to determine which heating and cooling system, how much daylight, how much insulation, what type of windows, and what building shape would result in the most efficient building. These variables and the layout of the building were all adjusted until the most efficient balance was found, while still being cost-effective. The envelope is superinsulated, with an average of R-40 walls and an R-60 roof. Spray-foam insulation has been used in the wall cavity. The construction integrity was verified using a blower-door and fog test, and later with Infrared Imaging. The windows in the lobby; on the north, east, and west façades; and the skylight are all triple-glazed and use low-e glass. The windows in the offices are double-glazed with low-e glass. The heating and cooling is a hydronic (or water-based) system that uses radiant ceiling panels. The IGC Court also uses radiant heat in the floor because of the large area of the space. The building is connected to the campus's central plant for chilled water and steam. The central plant has recently been upgraded to a more efficient system that does not use any CFC-based refrigerants.

All of this results in a building that uses 44% less energy than if it had been built using typical design and construction. It is over 53% more efficient in terms of energy cost. Compared to the average building on this campus, the IGC uses 65-75% less energy. The roof structure has been designed to someday hold photovoltaic panels, which will supplement the electricity use in the building.

④ **Environmentally Preferable Products and Waste Management**

About 40% of all the raw material stock consumed in the United States goes into building construction. The definition of sustainability includes the practice of using natural resources without depleting them, and minimizing our impact on the environment. We don't want to use resources faster than they can regenerate themselves. Most of the materials you see (and many you don't see) that went into the IGC are environmentally preferable, meaning they are made from recycled materials, produced locally, come from sustainably managed forests, or are rapidly renewable. Using environmentally preferable products also reduces the project's overall carbon footprint.

Products with recycled content make use of materials that have already been harvested, so that we don't have to use additional raw materials, and it keeps used materials from entering the waste stream. For example, the floor tile is made from recycled products. The glass mosaic tiles are made from recycled bottles collected in curbside recycling programs. Also, the window sills are a product called ShetkaStone, which is made from recycled paper. The kitchen cabinets are made from Dakota Burl, which is recycled sunflower seeds, and wheatboard.

Using products that have been manufactured locally, and from materials that were harvested or extracted locally, is also more sustainable than importing products from far away because of the energy required to transport those materials. The stone you see on the exterior of the building was quarried in Wisconsin.

Also, much of the wood in the building is certified by the Forest Stewardship Council as sustainably harvested wood. The windows are produced from FSC wood, as is all the wood paneling you see here in the Court. The gypsum wallboard was also manufactured within 500 miles from here – and it has recycled content.

In addition to the materials that were put into the building, a lot of attention was paid to the materials that left the site. In general, about 25% of all solid waste going to landfills in this country is construction and demolition waste. That's about 130 million tons per year. Through careful separation of materials during demolition of the building that previously occupied this site, and scrap debris from the construction process, the team was able to divert (TBD%) of all the waste from landfills. Some of these materials, like carpet scraps, gypsum scraps, and concrete were recycled. Wood debris was sent to an energy-recovery facility and used to make electricity.

⑤ **Ventilation**

The ventilation system is a very important part of the building. Ventilation brings in fresh air and oxygen, and removes the stale air and pollutants. This also helps to prevent "sick building syndrome."

From here you can see the ventilation air diffusers in the IGC court. The IGC uses a displacement system, so the air is introduced to the space at a very low velocity. There are CO_2 sensors throughout the building, including in the court, and the CO_2 sensors tell the system when fresh air is needed. 100% of the ventilation air coming into the building is outdoor air – no air is recirculated. By separating the ventilation air from the heating and cooling system, we can bring air in at a much lower velocity, which is better for occupant comfort (no drafts on your neck), and it also allows the use of the radiant sails, which is a very energy-efficient hydronic heating and cooling system. An enthalpy (or heat recovery) wheel is then used on the exhaust air to recovery some of the energy that is stored in the exhaust air, and to pre-condition the in-coming fresh air. In this way, we use less energy to heat and cool the building, because less of that energy is leaving the building with the exhaust. Also, the height of the IGC court allows us to take advantage of a natural stack effect to vent hot air through the vented skylight in the cone.

⑥ **Low-VOC Materials**

One of the things you might NOT notice in the IGC is that "new building smell." That smell that you associate with new carpet and new paint, is actually harmful chemicals called volatile organic compounds, or VOCs. Some VOCs are carcinogens; some irritate the eyes, nose, and lungs; and in general VOCs are not something you want to breathe. One VOC you have probably heard about in the news recently is formaldehyde. Formaldehyde is commonly used in construction materials and as a chemical binder, like the glue in fiberglass insulation or particleboard, and it is an irritant AND a suspected carcinogen. It was detected in dangerous concentrations in the FEMA trailers used for emergency housing after Hurricane Katrina. It was off-gassing from the wood products, such as fiberboard and plywood, in the trailers. All of the paints, carpets, adhesives, sealants, wood products, and furniture in the IGC are low- or zero-VOC. All of the furniture is certified by a program called GreenGuard to be low-VOC. So the IGC does not have that "new building" smell, which is a good thing.

⑦ **Daylight, Views, and Daylighting Sensors and Occupancy Sensor Controls**

Light is critical in any building. However, about 50% of the electricity used in a typical office building is used for artificial lighting. This is highly inefficient, especially when the sun is available all day long at no cost.

The IGC was designed with the idea of optimizing the use of daylight. Once again this becomes a balancing act. Larger windows mean more daylight can enter, but more daylight in a highly insulated building can mean more heat gain and more work for the mechanical system. Too much daylight also introduces the problem of glare, which is very undesirable, especially in work environments. The design team oriented the building and organized the massing so that the optimum solar orientation was achieved. Most of the offices in the building face south, which allows for controlled daylighting. Computer models were run with varying sizes and placement of windows to find the configuration that provided enough light without over-burdening the mechanical system. There are also internal window blinds and external sunshades that block the direct rays of the sun, to limit heat gain and glare.

In order to ensure that daylight is taken advantage of, and the artificial lighting is only on when necessary, there is a daylight sensor in each room. When there is adequate daylight, the lights turn off. There is also an occupancy sensor in each room. If the room is unoccupied for a length of time, the lights turn off.

Placement of all the regularly occupied spaces along the perimeter walls allowed for efficient daylighting of these spaces, and also allowed for views from every room. A connection to the outside environment through views and natural daylight has been shown to be very important in occupant productivity and comfort.

⑧ **Water Efficient Plumbing**

Another critical resource is water. The IGC has reduced water use over a typical building that meets code requirements by about 45%. That has been achieved by using a low-flow showerhead and faucets. The toilets are all dual-flush, so that you can use a full or half-size flush. These dual-flush toilets are standard practice in Europe and Australia, but are just catching-on here in the US. Not only does this reduce the amount of potable water that is consumed, it reduces the amount of waste sent to the sewer system, which in turn reduces demand on infrastructure.

⑨ **Site**

The site is also part of the project, and the team focused on the sustainability of it as well. About 30% of water use in the US goes to irrigation. Being conscious of this, all of the plantings introduced by the landscape architect are either native to the area, or are adaptive, meaning they are not invasive and they don't require large quantities of water to survive. In fact, there is no permanent irrigation installed on the site.

Stormwater runoff was also a concern. The pavers you are standing on are permeable, which allows rainwater to infiltrate back into the ground. Also, all of the runoff from the roof is directed to underground perforated pipes. This recharges the groundwater while minimizing demand on infrastructure.

As you may have noticed, there is no parking lot at the IGC, with the exception of the drop-off area. This was intentional. The College has made a conscious effort to reduce the number of Drive Alone Commute Trips. The College has signed-on to the President's Climate Initiative, and as part of that an organized carpool incentive program has been developed. There are a host of other incentives on campus as well, such as preferred parking spaces for drivers of qualifying low-emitting vehicles, a bus pass reimbursement plan, and ample bike storage areas. There are also several bus lines that intersect right here at the corner of Grand and Snelling Avenues.

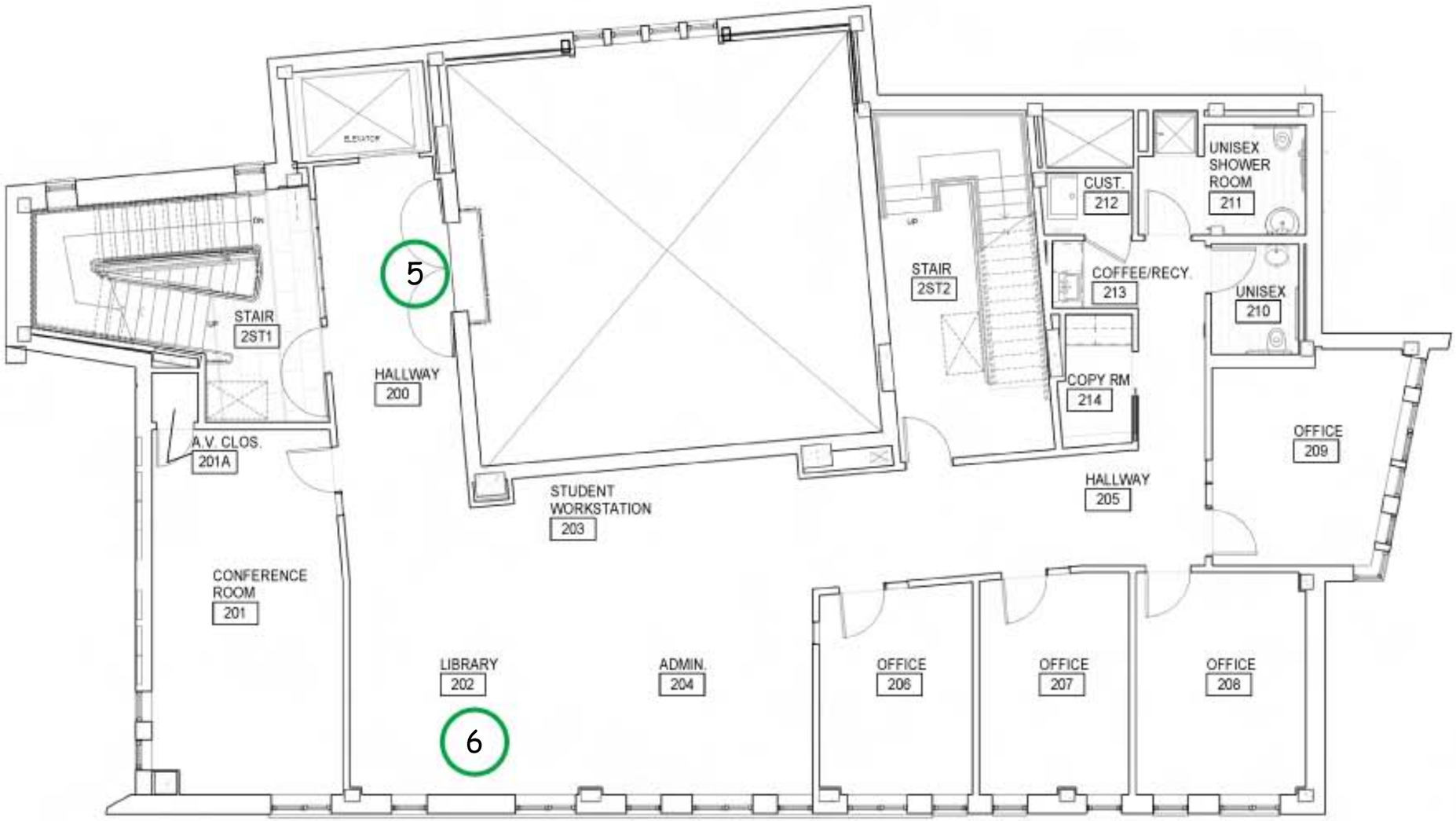
FIRST FLOOR PLAN

SCALE 1/8" = 1'-0"

Macalester College Institute for Global Citizenship

Bruner/Cott & Associates

12-18-2008



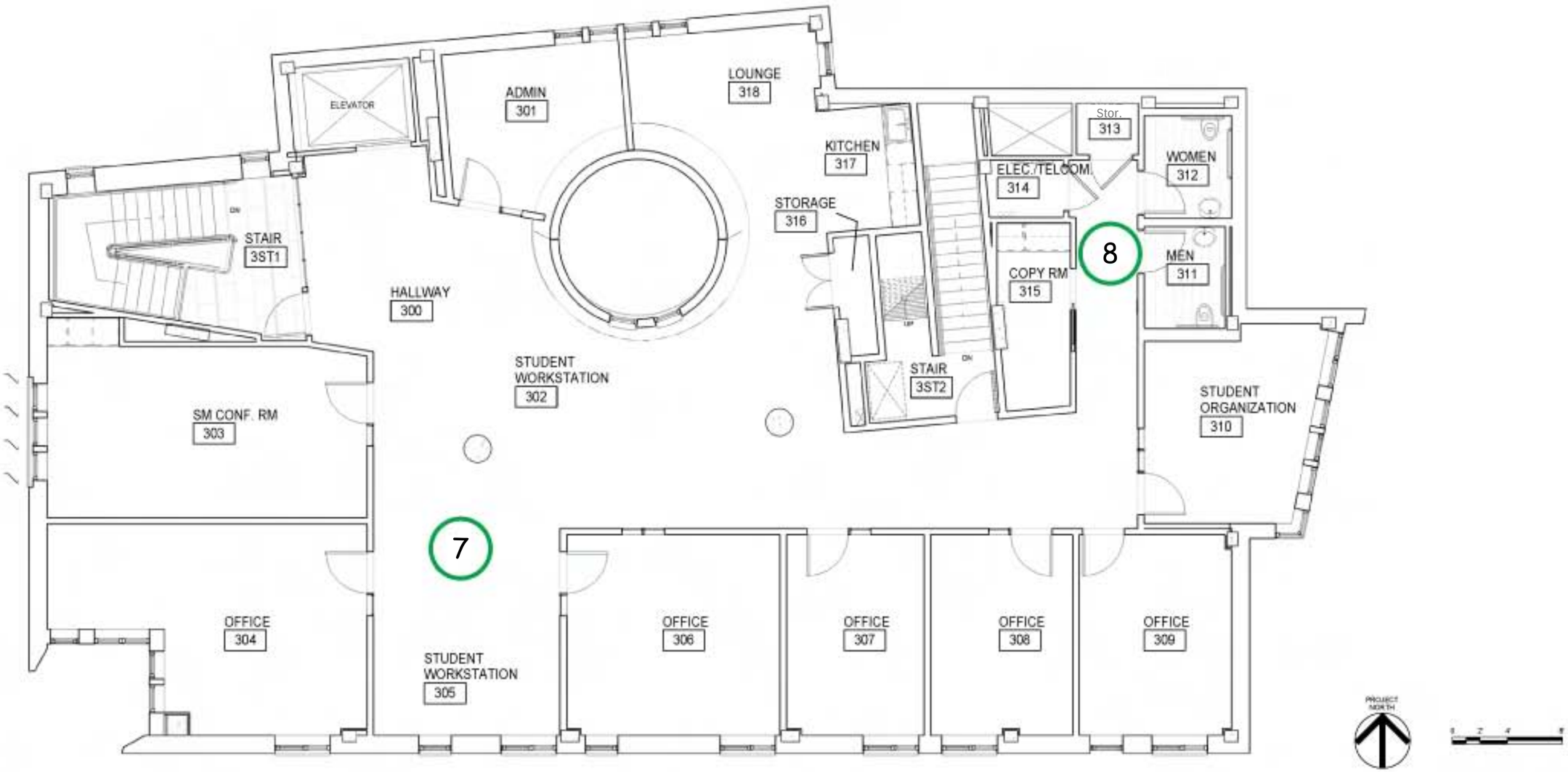
SECOND FLOOR PLAN

SCALE 1/4" = 1'-0"

Macalester College Institute for Global Citizenship

Bruner/Cott & Associates

12-18-2008



THIRD FLOOR PLAN

SCALE 1/8" = 1'-0"

Macalester College Institute for Global Citizenship

Bruner/Cott & Associates

12-18-2008

SECTION 15410

PLUMBING EQUIPMENT & FIXTURES

PART 1 - GENERAL

1.1 INTENT

A. It is the intent that this Section shall be used in conjunction with the PLUMBING TRADE and BASIC MATERIALS Sections of Division 15, to establish requirements for the Work. These Sections include but are not limited to:

1. Section 15050, Basic Materials & Methods
2. Section 15071, Basic Materials – Vibration and Seismic Controls
3. Section 15083, Basic Materials – Pipe Insulation
4. Section 15950, Basic Materials - Testing, Adjusting, and Balancing (Separately Contracted By Owner)
5. Section 15000, Plumbing Trade Work

B. THIS PROJECT WILL BE COMMISSIONED. REFER TO COMMISSIONING SPECIFICATIONS SECTION 18000 FOR INFORMATION AND RESPONSIBILITIES. THE COMMISSIONING PROCESS WILL REQUIRE ADDITIONAL LABOR, MATERIAL AND/OR OTHER COSTS WHICH MUST BE PROVIDED BY THE MECHANICAL CONTRACTOR AS PART OF THIS PROJECT.

1.2 SPECIAL SUBMITTALS

A. Refer to DIVISION 1 and to PLUMBING TRADE and BASIC MATERIALS Sections of Division 15, for requirements on general submittals, such as shop drawings and warranties.

PART 2 - PRODUCTS

2.1 FIXTURES - GENERAL

A. Water closets, urinals, and lavatories shall be by acceptable manufacturer. Flush valves shall be by Sloan or Zurn. Stainless steel sinks shall be by Elkay, Just or Moen. Service receptors and other special items shall be by acceptable manufacturer.

B. Provide trim, stops, trap and flush valve for each fixture. Exposed trim, fittings, traps, etc. shall be chrome plated. Provide escutcheons when not included with fixture trim.

2.2 WATER CLOSET, WC-1

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Caroma USA
2. Or Approved Equal

C. Basis-of-Design Product: Subject to compliance with requirements, provide the Caroma "Walvit" or a comparable product.

D. Description Accessible, wall mounting, back-outlet, vitreous-china fixture designed for in-wall gravity-type tank operation.

1. Style: One piece.

a. Bowl Type: Elongated with washdown design.
b. Design Consumption: 1.6 gal./flush / 0.8 gal/flush Dual Flush High Efficiency Toilet
c. Tank: In-wall Gravity type with trim.
d. Trip Mechanism: Push-button actuator.
e. Color: White

2. Supply: NPS 1/2 brass or copper with handle stop
3. Toilet Seat: Caroma model #326013 commercial, elongated, open -front seat.
4. Fixture Support: Water-closet support D715 combination carrier with all related appurtenances necessary for a complete installation.

2.3 LAVATORY

A. Wall Hung: Vitreous china, 20-1/2" x 16" oval, 4" centers, vitreous china, front overflow with faucet and waste assembly, supplies and adjustable "P" trap.

1. Crane model #111H "Erica"

2. Or Approved Equal

B. Faucet: Sensor operated, ADA compliant lavatory faucet with hydroelectric generator. Chrome finish, 0.5 gpm vandal resistant aerator, single inlet with local mixing valve and 4" deck plate.

1. Zurn model #Z6915-GEN-F-MT

2. Or Approved Equal

2.4 SHOWER UNITS & CONTROLS SH-1

A. Shower heads and valves shall be by Symmons, Lawler, or Leonard.

B. Wash Down Shower Stall: Comfort Designs Model XSS3600BFADA acrylic and be molded from a single sheet so as not to have any joints or seams. It shall meet ANSI Z124.2, shall be designed to meet FHA, HUD, BOCA, NAHB. The unit shall have inside dimensions of 36" x 36" and outside dimensions of 39" x 39-1/4" x 80".

C. The enclosure shall be equipped with the following factory installed accessories: 1) One 16" straight x 1-1/4" diameter, acrylic towel bar with 1-1/2" safety status clearance, 2) 1" diameter 20 gauge stainless steel curtain rod, 3) Self caulking brass drain with stainless steel strainer, 4) Two molded soap trays at 43" above floor in back corners, 5) smooth pattern on back wall. Equipped with white shower curtain and hooks. Shower Valve Assembly: Symmons #4-427 Showeroff limiter valve, 4-458 lever diverter, H321-V Euro-Flo Wall/ Hand Shower, and Delta #RP46384 1.6 GPM Lowflow Showerhead.

2.5 MOP SERVICE BASIN

A. MS-1 (Mop Service Basin) Floor mount, enameled cast-iron, 28" x 28" x 13 high, white color, with drain body complete with service faucet, vacuum breaker, hose, hose bracket, mop hanger, vinyl rim guard, and service faucet Chicago #897-CP.

1. Commercial Enameling Co. Model #871
2. Eljer Model #242-0050
3. American Standard Model #7741.000 “Florwell”

2.6 SINKS

A. KS-1 (Kitchen Sink) Counter Top, Single Bowl: ADA Compliant, 18 gauge, type 304 stainless steel, punched for faucet on 8” centers, self rimming, undercoated, nominal 31" x 22” x 6-1/2” deep compartment, faucet with aerator, lever handles, and basket strainer. Refer to architectural drawings for mounting height.

1. Elkay Model #LRAD3122 “Lustertone”
2. Or Equal

B. Faucet: ADA compliant, wrist blade handles, chrome finish, washerless, cartridge type flow elements, swing spout, 1/2" threaded male inlet shanks, and 1.6 gpm internal flow control. Chicago Faucet model #786-GN2FC.

C. KS-2 (Kitchen Sink) Counter Top, Single Bowl: ADA Compliant, 18 gauge, type 304 stainless steel, punched for faucet on 8” centers, self rimming, undercoated, nominal 25” x 22” x 6-1/2” deep compartment, faucet with aerator, lever handles, and basket strainer. Refer to architectural drawings for mounting height.

1. Elkay Model #LRAD2522 “Lustertone”
2. Just Model #SL-ADA-2125-A-GR “Stylist”

D. Faucet: ADA compliant, wrist blade handles, chrome finish, washerless, cartridge type flow elements, swing spout, 1/2" threaded male inlet shanks, and 1.6 gpm internal flow control. Chicago Faucet model #786-GN2FC.

2.7 FIXTURE SUPPORTS

A. Concealed arm supports for urinals shall have steel top and bottom plates with bolts to support fixture independently from the wall; adjustable sleeves, steel tubular uprights and alignment trusses, steel plates with adjustable holes, bolts, nuts, and chrome plated cap nuts and washers. Top supporting plates shall have cutouts when used with back inlet urinals.

2.8 WATER COOLERS AND DRINKING FOUNTAINS

A. DF-1 (Drinking Fountain) Single station, Barrier-free, shall have compressors, insulated tank, point of use filter, piping and heat exchanger, stainless steel bowl, and cabinet. Self-Closing controls to be provided on front, left, and right sides. Water piping shall be copper. Coolers unit shall be air-cooled with hermetically sealed compressors. Refrigerant piping shall be copper. Tank, piping and heat exchanger shall be insulated. Compressor motor shall be 120-volt, single phase, 60 Hz. Provide cold water supply connection with shut-off valve, and waste connection with P-trap and accessible cleanout. Unit shall be rated at minimum capacity indicated, from 80°F to 50°F, at room temperature of 90°F.

1. Elkay Model #EZS8C
2. Oasis Model #PRF8ACSL
3. Haws Model #HWUACO8LSS

2.9 VACUUM RELIEF VALVE

A. Provide vacuum relief valve:

1. On cold water entrance pipe to water heater, when heater is located above and down-feeds to fixtures
2. For pressure tanks on booster pump systems.

B. Valve shall be Watts #36A, bronze body.

PART 3 - EXECUTION

3.1 FIXTURE INSTALLATION

A. Fixture supports shall be anchored to slab with threaded rod and nuts. Inserts and expansion shields are NOT acceptable. Support feet for fixture carriers shall be entirely within pipe chase.

B. Mounting height of handicapped fixtures shall be as required by Code; mounting height of other fixtures and fixture locations shall be as shown on Architectural Contract Drawings. Refer discrepancies to Architect for resolution.

C. Flush valve handles for handicapped urinals and handicapped water closets shall be facing wide side of fixtures where wheelchair access occurs.

END OF SECTION 15410

Table of Contents
Section 15410 – Plumbing Equipment & Fixtures

PART 1 - GENERAL 1
1.1 INTENT 1
1.2 SPECIAL SUBMITTALS 1

PART 2 - PRODUCTS 1
2.1 FIXTURES - GENERAL 1
2.2 WATER CLOSET, WC-1 1
2.3 LAVATORY 2
2.4 SHOWER UNITS & CONTROLS SH-1 2
2.5 MOP SERVICE BASIN 3
2.6 SINKS 3
2.7 FIXTURE SUPPORTS 3
2.8 WATER COOLERS AND DRINKING FOUNTAINS 4
2.9 VACUUM RELIEF VALVE 4

PART 3 - EXECUTION 4
3.1 FIXTURE INSTALLATION 4

Macalester College Institute for Global Citizenship
Project #: 2415808979104146

Bruner/Cott & Associates, Inc.
130 Prospect Street
Cambridge, Massachusetts 02139
Tel: 617 492 8400
Fax: 617 876 4002
Web: www.brunercott.com

Architecture/Urban Design
Preservation/Space Planning

Bruner/Cott

INNOVATION IN DESIGN PROCESS – GREEN CLEANING

EXHIBIT A: Macalester College Green Cleaning Program Statement of Purpose memo dated 10/1/2009

EXHIBIT B: Innovation in Design Credit 1.1 Credit Interpretation Ruling dated 4/8/2004

EXHIBIT C: Green Cleaning Product and Training procurement contract between Macalester College and 3M Building and Commercial Services Division.

EXHIBIT D: Description of Macalester College's Green Cleaning Procedures.

EXHIBIT E: Description of 3M's Twist 'n Fill™ program.

EXHIBIT F: List and descriptions of, and invoices for, 3M Twist 'n Fill™ products used by Macalester College.

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130 Prospect Street
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Architecture/Urban Design
Preservation/Space Planning

Bruner/Cott

CREDIT 1.3: INNOVATION IN DESIGN PROCESS

Innovation in Design: Green Cleaning Program Credit Description

Credit Intent
To reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical contaminants that adversely impact air quality, occupant well-being, and the environment.

Requirements

- Statement of purpose.
- Contractual or procedural requirement with operations staff.
- Clear set of acceptable performance level standards.
- Documentation of the program's housekeeping policies and environmental cleaning solution specifications, including a list of approved and prohibited chemicals and practices.

Submittals

- LEED Letter Template.
- Macalester College Green Cleaning Program Statement of Purpose memo dated 10/1/2009.
- IDc1 CIR 4/8/2004.
- Green Cleaning Product and Training procurement letter agreement between Macalester College and 3M Building and Commercial Services Division.
- Description of Macalester College's Green Cleaning Procedures.
- Description of 3M's Twist 'n Fill™ program.
- List and descriptions of, and invoices for, 3M Twist 'n Fill™ products used by Macalester College.

Narrative

- The Macalester College IGC project incorporates a comprehensive Green Cleaning program, including training, performance standards, and a list of approved chemicals and practices. The project meets the requirements as stated in the Credit Interpretation Ruling dated 4/8/2004, and therefore it is eligible to receive an Innovation & Design Process Credit.

EXHIBIT A

MACALESTER COLLEGE

FACILITIES SERVICES
MEMORANDUM

TO: All Staff and Management- Facility Services Department

FR: Laurie Salden

DT: 10/01/2009

RE: Selection of Green Seal Cleaning Product Vendor

Over the past year the Custodial Services Department has been testing 5 different vendor lines of Green Seal Cleaning Products. After months of hands on testing and surveying of the users, the 3M line of Green Seal Products has been chosen.

The reasons for pursuing this project include, but are not limited to the following:

1. Interest in the safety of all Macalester College Staff and Students who work directly with cleaning solutions on a daily basis.
2. Interest in being proactive with regards to Macalester's on going commitment to environmental responsibility.
3. Interest in assuring that products and companies Macalester College aligns themselves with provide us with quality products, services, ongoing training, and prices that allow us to operate in a fiscally responsible manner.
4. We have no existing contract to take in to consideration. We are given State College Pricing with past and present vendors.

The distributor will be Dalco, based out of New Brighton Minnesota. Our account manager will be Jeff Madsen. The producer of our products will be 3M, based out of St. Paul Minnesota. Our account manager with 3M will be Greg Meyer.

I would like to thank all of the Custodial Staff who have participated in all of the testing and surveying of the products. You very carefully assessed each product line and helped us make the best decisions.

EXHIBIT B

Credit Rulings Home

INNOVATION & DESIGN PROCESS: Innovation in Design: Specific Title (IDc11)

4/8/2004 - **Credit Interpretation Request**

Green Cleaning/Housekeeping

Please describe generic requirements and submittals for a green cleaning/housekeeping innovation credit. Note that previous CIRs (e.g., IDc1.1 inquiry dated 6/2/03; and IDc1.4 inquiry dated 1/16/04) provide guidance that is relevant, but customized for particular projects.

4/8/2004 - **Ruling**

ENVIRONMENTALLY PREFERABLE CLEANING PRODUCTS AND PRACTICES:

The commitment to environmentally preferable cleaning products and practices is a noteworthy one that complements the IEQ requirements of LEED. Generic requirements for commercial and multi-unit residential buildings are addressed below.

INTENT: Reduce exposure of building occupants and maintenance personnel to potentially hazardous chemical contaminants that adversely impact air quality, occupant well-being, and the environment.

REQUIREMENTS FOR COMMERCIAL BUILDINGS:

To receive an innovation point, the project team will need to demonstrate that a comprehensive green cleaning/housekeeping program is in place with clear performance goals, including:

1. A statement of purpose describing what the policy is trying to achieve from a health and environmental standpoint, focusing on cleaning chemicals and custodial training at a minimum.
2. A contractual or procedural requirement for operations staff to comply with the guidelines, including a written program for training and implementation.
3. A clear set of acceptable performance level standards by which to measure progress or achievement, such as Green Seal standard GS-37 (see www.greenseal.org) or California Code of Regulations, Title 17 Section 94509, VOC standards for cleaning products (go to www.calregs.com, click on ôCalifornia Code of Regulationsö and perform a keyword search for ô94509ö).
4. Documentation of the programÆs housekeeping policies and environmental cleaning solution specifications, including a list of approved and prohibited chemicals and practices.

Demonstrate that the products used in the project are non-hazardous, have a low environmental impact, and meet the criteria set forth in #3 above. Concentrated cleaning products should be utilized when available.

REQUIREMENTS FOR MULTI-UNIT RESIDENTIAL BUILDINGS:

For cleaning and maintenance of common areas, a building owner/manager must comply with the requirements stated above. Additional steps are required to influence housekeeping protocols within residences. Select six major cleaning needs and identify products (compliant with #3, above) that will be supplied to meet these needs. Note that one cleaner may address several cleaning functions. Examples of cleaning needs include, but are not limited to: counter, sink, tub/shower, tile, limescale remover, toilet, hard flooring, laundry detergent, laundry bleach and windows. Provide an estimated 6 month supply of these products to residents, as well as information on how to easily purchase refills and/or replacements. Educate the residents on the green cleaning concepts and products via discussion and written materials upon move-in and periodically thereafter.

Additionally, if the building contains retail tenants, actively educate them on the cleaning products, standards and protocols that are being used in the common areas. Submit a narrative

and highlighted supportive documents (e.g., relevant to policy, O&M, communications, products and contracts) as part of your LEED certification submittal.

POTENTIAL TECHNOLOGIES AND STRATEGIES

Refer to ôCleaning for Healthö by Inform, Inc. (http://www.informinc.org/cleanforhealth.php)

U.S. Green Building Council

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EXHIBIT C

MACALESTER COLLEGE

Mr. Greg Meyer
3M Building and Commercial
Services Division
3M Center
Building 0223-02-N-21
St. Paul, MN 55144-1000

April 1st., 2009

Mr. Jeff Madsen
Dalco
300 5th. Avenue Northwest
New Brighton, MN 55112

Gentlemen,

This letter will serve as a letter of understanding regarding the conversion of our campus over to the 3M Green Seal Line of cleaning products.

We will continue training throughout the year as we continue to convert the different buildings. We have currently had training at two department meetings and at one building opening. I would like to see this happen at least 3 to 4 times per year, or more if issues arise.

I estimate that we have already converted approximately 50% of our buildings. The remainder will be converted as we use up all of the old product. The Institute for Global Citizenship will need to have the 3M Dispensers installed prior to opening.

Dalco/3M will provide and install the dispensers or any repairs on the dispensers that are required free of charge. Dalco/3M will provide the chemical identification stickers free of charge. Dalco/3M will honor State of Minnesota pricing for Macalester College.

Any invoicing should be sent directly to me. I respectfully request that all calls for service be answered within 48 hours during the business week.

All of us working together with our employees will determine this programs success. This letter does not serve as any type of contract for any certain length of time. If service or products issues arise and are not resolved in a timely manner, Macalester College reserves the right to change products/vendors.

Sincerely,

L. Salden

Laurie Salden
Macalester College Facilities Department

EXHIBIT D

Macalester College Facility Services Green Cleaning Procedures

The following section covers Green Cleaning procedures for Facility Services.

A key issue that cuts across all cleaning procedures is the issue of cleaning frequencies. Cleaning for health and green cleaning generally requires the same and sometimes higher frequencies. Green Chemicals frequently require us to give them some "stand time" to work. This may be different from chemicals you have used in the past.

Keep in mind too that these procedures can only serve as a general guideline because the buildings on our campus vary tremendously in sizes, level of traffic, finishes and staffing levels.

Identify people with special needs-

When a student, employee or other customer indicates that they have special needs and/or sensitivities, there are measures we can take to minimize their discomfort.

Some Examples:

1.) **We can have the ventilation frequencies increased to assist in drying carpets/floors and keeping the humidity and odor levels down.**
2.) **We can make note in the Janitorial Closet of any special requests for that building's customers.**
3.) **Vacuum rather than dust mop whenever possible to reduce the amount of dust released in the air. Keep your vacuum running in tip top shape and change the bag frequently. Use a damp cloth to dust surfaces.**
4.) **In a case of severe sensitivity, we can schedule the work to be done on a person's day off or on a different shift.**
5.) **Letting your customers know when you are planning projects a few days before you start is appreciated.**

Entryways-

Roughly 80% of the dirt in a building is tracked in through the entrance.

The matting system ideally should be 12-15 feet long. For a main entrance, an ideal system would have a foyer mat and an inside carpet mat.

Always place caution signs prior to cleaning an entrance.

Mats should be vacuumed at least once per day. Vacuum in both directions using an upright vacuum with a beater bar/brush. Be sure to clean the back side of the mats at least once per month. More during snowy times when salt usage is high. Remember that by doing a good job of entrance cleaning, you are making your job easier. Stop the dirt at the door rather than have it tracked down your hallways.

Providing trash receptacles and cigarette urns at all entrances will reduce the amount of food, cigarettes and other trash being brought into the building. Ensure that these containers are emptied and cleaned regularly.

Sweep exterior sidewalks, entry areas and steps leading into the building on a regular basis.

Clean and store equipment after each use.

Hard Floor Care-

Always place caution signs in the area you are working in before you begin.

Utilize your vacuum with attachments to clean around items in your hallways such as benches and radiators. These areas are typically where you will find a build up of dust. This will also help by keeping the level of dust in the air down.

Hard floors should be dust mopped daily. The mops should be kept clean and in good condition. Otherwise, you are just pushing the dirt around, not cleaning. Hallways with hard floors should be auto scrubbed daily using a neutral cleaner.

Utilize the use of a top scrub and recoat procedure versus a total strip down when possible. This will help keep the amount of strippers used and then poured down the drain.

Only use chemical products according to the label directions. Never mix chemicals together.

Carpet Care-

Always place caution signs in the area you are working in before you begin.

Vacuum carpet in lobbies, elevators and high traffic areas thoroughly every day. Replace vacuum bags when they are approximately half full to minimize dust emissions. Clean or replace filters regularly.

Clean up spills on carpet as quickly as possible. Blot the spill from the outside of the spill to the inside. Spray carpet cleaner on the spot after the gross soil has been

removed. Let stand 15 minutes, then wipe with a clean cloth. Put a wet floor sign over the spot until it is dry.

When preparing to extract a carpeted area, vacuum well first. Then use carpet pre spray in a spray bottle and go over any spots or traffic patterns. Let stand 10 minutes to allow the chemical to do its job. Extract the carpet with plain water.

When extracting, make sure that your machine is picking water up properly out of the carpet. This will help minimize moisture and potential for mold, mildew and bacterial growth.

Ask to have the ventilation increased in the area you are working in to help dry the carpet. Utilize floor fans as well.

<u>Dusting-</u>

Use a slightly dampened cloth. Frequently replace soiled cloths with clean ones. Use vacuum attachments for high dusting.

Avoid feather dusters and other methods that stir up dust into the air. That dust is not only an irritant, but it also just floats and lands on another surface. Then you have to clean it up again.

Avoid dust cloth treatments which can leave residues and emit VOCs (Volatile Organic Compounds).

<u>Restrooms-</u>

Always place caution signs in the doorway before beginning cleaning.

Be aware of cross contamination. Do not clean sinks with the same swab or cleaning cloth that you use on the toilet, etc. Place the bowl cleaner in the toilets and let stand while you clean the sinks. It will give the chemical a chance to work.

Clean sinks before mirrors. This will keep you from having to clean the mirrors twice because of water splashes.

Clean toilets both inside and out. Use a 3M Green pad on any stains. Wipe the seat and rinse. Do not leave cleaner in the bowl when you are done, as it may splash on someone when the toilet is flushed.

Wipe off any splashes/marks on walls, partitions and dispensers. Pay special attention to surfaces that people will touch a lot such as door knobs and handles.

Ensure floor drains are draining properly. Pour water down any dry drains to keep fumes from the sewer entering the space.

Always use the proper personal protective equipment. This includes gloves and even safety glasses if there is a chance of a chemical splashing.

Spills-

Clean up spills as soon as possible to prevent staining, or the chance that someone will slip and fall.

Place wet floor signs when necessary.

Make sure building occupants know who to contact in case of a spill.

Wear proper personal protective equipment.

Food Areas-

Wipe down floors, tables, counters and appliances.

Remove recyclables and trash on a daily basis. Clean containers both inside and out as needed.

Flush any floor drains.

Fabric Cleaning- Cubicles, Drapes and Furniture-

Treat spots immediately.

Vacuum Regularly.

Extract as needed.

Handling Chemicals and dilution of concentrated chemicals-

We use concentrated chemicals that reduce the overall environmental impact from packaging and shipping. This also reduces costs.

The 3M chemical system is a closed handling system. You turn the cold water on to the dispenser; place the sealed bottle in the dispenser and then turn. The dispenser automatically mixes the proper ratio of water and chemical.

Wear proper personal protective equipment.

Make sure all employees understand the safe handling and use of all products.

Put appropriate labels on secondary containers such as spray bottles.

Never mix chemicals together.

OSHA Blood-borne Pathogen Standard-

When you encounter a spill or substance that you believe may be blood or body fluids, special care must be taken to avoid exposure to you or others.

First place a wet floor sign so that no one can step in or touch the substance.

Wear your personal protective equipment.

Spray the soil with #25L- Quaternary Disinfectant. Allow it to stand for 10 minutes.

With a paper towel, remove gross soil. Place in Biohazard Bag or Container.

Spray the area a second time with #25L- Quaternary Disinfectant. Wipe with a clean paper towel and dispose of in Biohazard Bag. This is the only product that we will use in the IGC that is not Green Seal approved. It is required by OSHA

OSHA Right To Know Standard-

Update the Material Safety Data Sheets (MSDS) any time a chemical is changed or added.

Trash Removal-

Pull trash daily so as to not attract insects and other pests.

Clean both inside and outside of the containers as needed.

Use both hands to lift the bag out of the container. Hold it away from your body after doing so.

Cover cans that contain food waste.

Make sure outside dumpsters are emptied on a regular schedule.

Indoor Plants

Educate building occupants on appropriate care guidelines for indoor plants.
Monitor use of fertilizers or pesticides so as to not adversely affect the indoor air quality.
Ensure that plants are not in direct contact with carpets and ventilation units.

Clean up any spills of soil or moisture as soon as possible.

Integrated Pest Management (IPM)

Educate building occupants on how to report a pest issue.

Improve sanitation through thorough cleaning and removing food sources on a daily basis.

Install physical barriers to pest entry.

Maintain the building structure, seal cracks, fix leaks, etc.

Document any reported issues in the Plunkett's Log at the front desk in Facility Services.

Recycling Programs

Recycling reduces the amount of solid waste and lessens the burden on solid waste disposal sites, such as landfills and incinerators.

Recycling is picked up outside of Wallace at 1:00 p.m. on Thursdays. Recycling is collected by employees and student employees on a daily basis and then placed in the recycling sorting room. The carts are then moved outside on Thursday mornings.

Locate Recycling Bins throughout the buildings to increase participation. Also use signage near the recycling/trash stations to educate users on what can and cannot be recycled.

Track Recycling results.

Monitor recycling areas to make sure they are not attracting pests.

Basements, Stairways and Elevators-

Examine these areas for dirt, evidence of insects and other pests and excessive moisture. Insure that any floor drains are operating properly.

Cleaning Closets

They should be clean, dry and adequately ventilated.

Mop buckets should not be left with liquid or mops standing in them.

Check drains and floor sinks to make sure that they drain properly and are free of dirt and odors.

Report any chemical dispensers that do not appear to be operating properly.

Building Exterior-

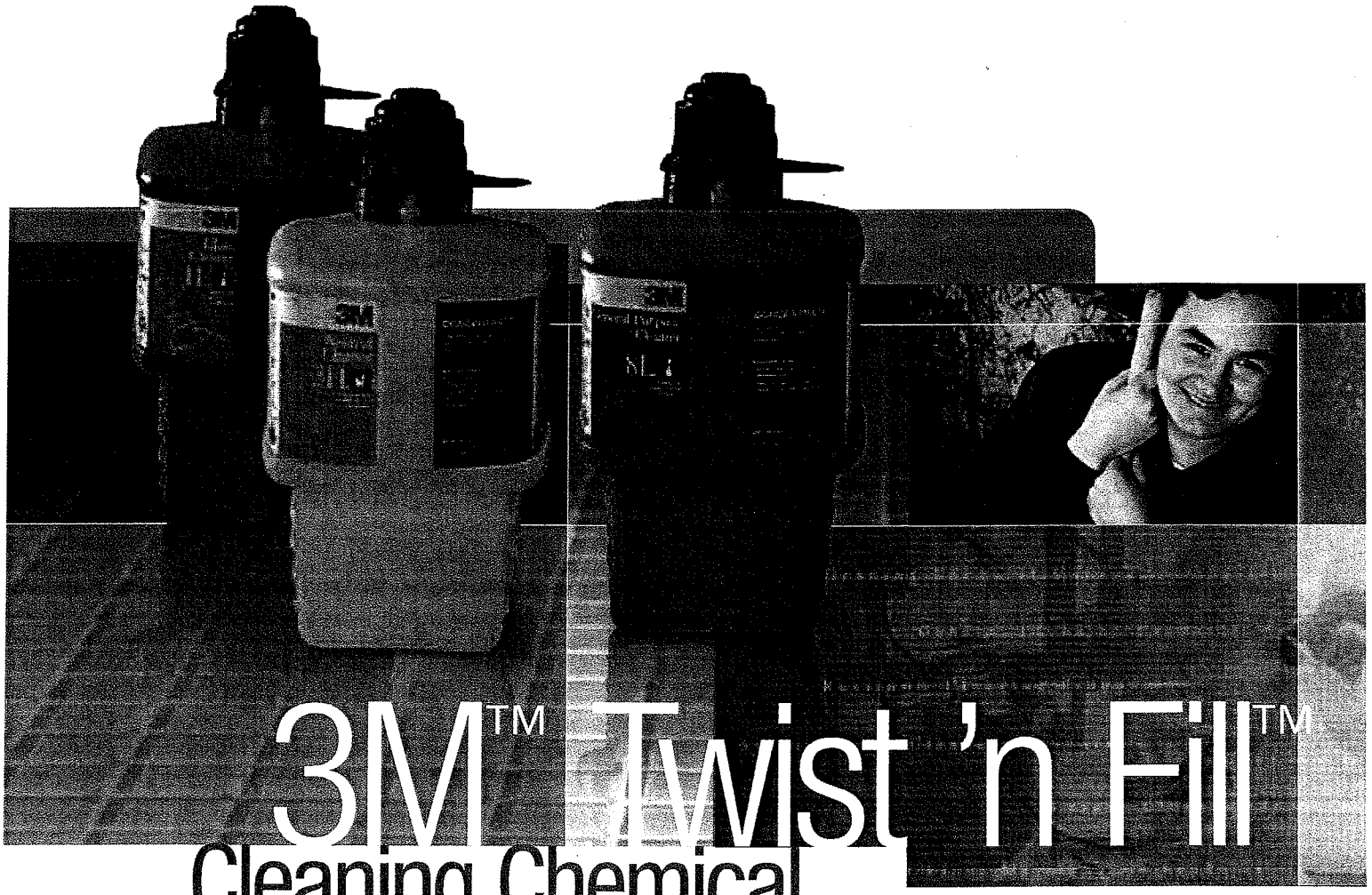
Look for excessive dirt, standing water and damage in parking lots.

Examine the buildings exterior and report any suspected damage.

Look for drainage problems around the building.

Insure that drains are operating properly.

EXHIBIT E



3M™ Twist 'n Fill™ Cleaning Chemical Management System

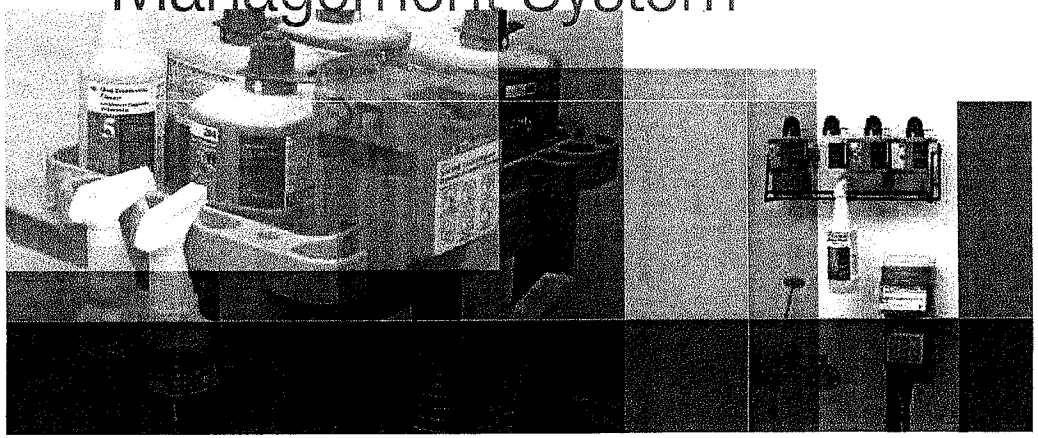
The 3M™ Twist 'n Fill™ Cleaning Chemical Management System features a single, compact dispenser that is designed to accurately mix and dispense a wide range of cleaning chemicals. You pick and choose only the chemicals you need for your cleaning tasks—and mix and dispense them all through the same dispenser.

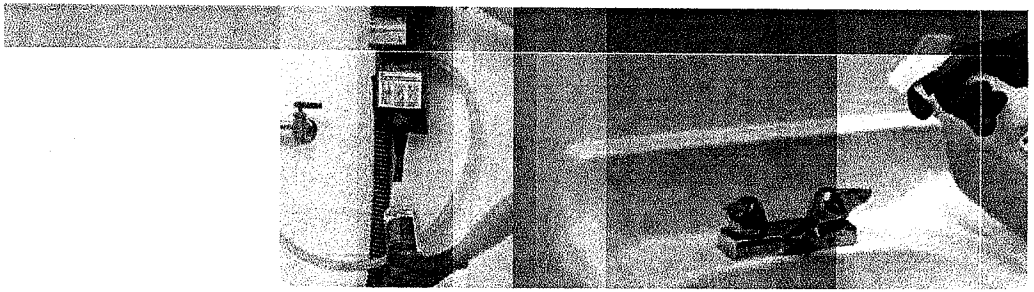
The result? Mixing is easy and less wasteful. Your cleaning chemicals are consistent. Storage of chemicals is simplified. And, in the long run, your costs are lower.

- Green Seal certification is awarded to products that meet the EPA's criteria for environmentally preferable products
- Dispense all products with cold water, using one compact dispenser
- Unique bottle and cap design lets you interchange chemicals in seconds
- Very compact—fits in most closets
- Easy to use—just insert bottle, twist and fill
- Integral air gap prevents chemical backflow
- Flexible—mount on wall or, for portability, on cart or cleaning equipment
- Accurate dispensing technology helps ensure consistent, effective chemical performance
- Automatic 3-gallon per minute dispense rate for bucket applications; 1-gallon per minute for trigger spray bottle applications
- Automatic shut-off attachment also available
- Tamper-resistant packaging helps control chemical mixing away from the dispenser

GREEN SEAL CERTIFIED PRODUCTS: TWIST 'N FILL: #1, #3, #8, #24, #33

The 3M™ Twist 'n Fill™ Cleaning Chemical Management System





Choose only the chemicals you need, only when you need them

Choose from a wide variety of top-performing chemicals formulated to meet most cleaning needs. All have these features in common:

- A single dispenser can be used for all chemicals
- Concentrated chemicals to maximize value and reduce packaging
- Packaged in easy-to-handle, easy-to-store 2-liter bottles
- English/Spanish labels, numbered and color-coded for easy identification

Benefits of 3M™ Cleaning Chemical Management

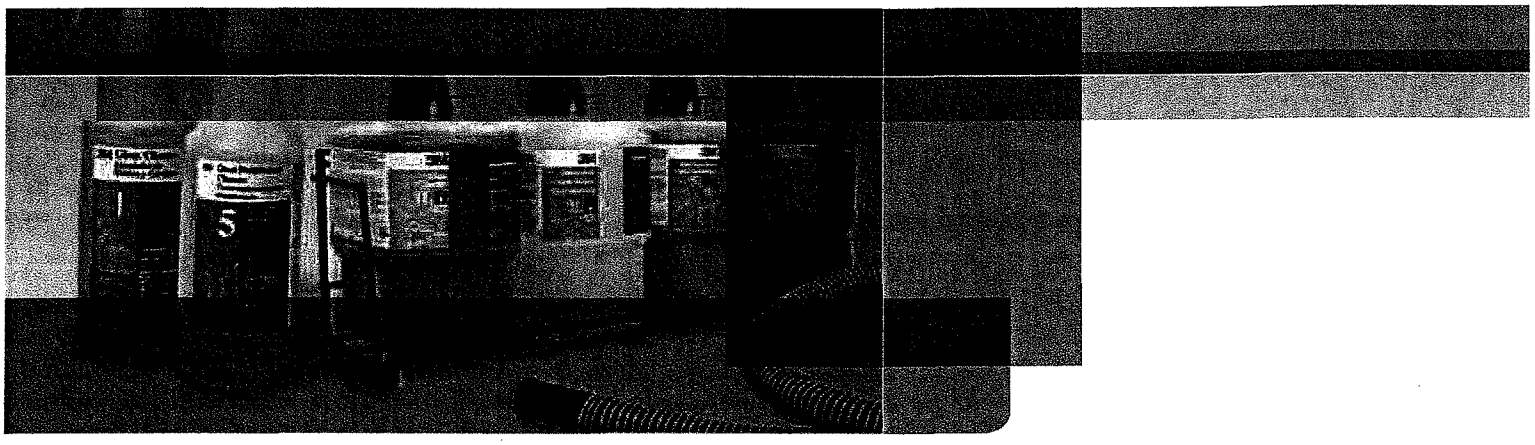
Consistent, effective chemicals in the working environment

Traditional systems of mixing and storing cleaning chemicals have always presented a number of challenges:

- Diluting concentrated chemicals to the correct use—dilution is difficult
- Over-diluting concentrated chemicals reduces product performance. Under-diluting concentrated chemicals increases costs and creates products that can be harder on surfaces
- User exposure to concentrated chemicals can pose health hazards
- Storage space limitations

The 3M™ Twist 'n Fill™ Cleaning Chemical Management System is designed to overcome these challenges. The idea is simple: Concentrated cleaning chemicals are automatically and accurately mixed with water to create properly diluted products that are ready to use.

- Automated mixing means consistent, *effective* chemicals
- Potential employee contact with concentrated chemicals is addressed
- Storage is reduced to a fraction of that needed with traditional systems
- Worker productivity is increased through consistent chemical performance
- Aids compliance with OSHA "right-to-know" laws. 3M provides Material Safety Data Sheets (MSDS) and labels for both the concentrated chemicals and the diluted products
- Tamper-resistant packaging helps to minimize the risk of inaccurate chemical mixing



Customized Accessories

- 32-ounce silk-screened bottles with trigger sprayers or flip-top caps
- Versatile storage racks for concentrate bottles and ready-to-use sprayers; available in standard and lockable styles
- Easy-to-understand wall charts help employees choose the right chemical for each job
- Dispenser mounts easily to most wall surfaces with pressure-sensitive, adhesive-backed installation kit
- Automatic shut-off assembly attachment automatically turns the cleaning chemical bottle to the "OFF" position when the bottle is released. Attachment simply snaps on the dispenser.
- Optional 8-foot hose available for use with various equipment such as an auto scrubber

All details concerning product specifications and terms of sale are available from 3M.

Distributed by:

3M Sales Offices

Anchorage
11151 Calaska Circle
Anchorage, AK 99515
907-522-5200
Fax: 907-522-1645

Hawaii
4443 Malaai Street
Honolulu, HI 96818
808-422-2721
Fax: 808-422-9557

Continental United States
Customer Service Department
3M Building & Commercial Services Division
3M Center Building 223-5S-07
St. Paul, MN 55144-1000
800-852-9722
Fax: 800-447-0408

Canada
1840 Oxford Street East
London, Ontario
Canada N5V 3G2
Mail to: P.O. Box 5757
London, Ontario
Canada N6A 4T1
519-451-2500
Fax: 519-452-6103

The 3M S.M.A.R.T. Program provides complete training for the 3M™ Easy Clean System

The 3M S.M.A.R.T. training system will provide your employees with comprehensive training for the new 3M Easy Clean System. The tools—which can be customized to meet your individual requirements—standardize cleaning procedures and make it easier to comply with JCAHO, OSHA and infection control guidelines.

How to reach us

For more information or to place an order, call your local 3M distributor. Or, for the name of the distributor nearest you, call: 1-800-852-9722

To speak to a technical support person, call: 1-800-626-8578

For general assistance, call: 1-800-3M-HELPS

For more information about 3M Building and Commercial Services offerings, visit our web site
www.3M.com/commcare

3M

Building and Commercial Services Division
3M Center
St. Paul, MN 55144-1000
USA
www.3M.com/commcare

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EXHIBIT F

MACALESTER COLLEGE

FACILITIES SERVICES
MEMORANDUM

TO: Suzanne Savanick Hansen

FR: Laurie Salden

DT: 4/1/2009

RE: Green Seal Products

The following is a list of Green Seal Products that we are using here at Macalester. These will be the only products used in the IGC Building. Also located in this packet are the MSDS Sheets for those products.

1. 3M Twist and Fill Glass Cleaner #1- Used for mirrors and shiny non-porous surfaces.

2. 3M Twist and Fill Neutral Cleaner #3- Used in mop buckets and auto scrubbers for cleaning floors

3. 3M Twist and Fill General Purpose Cleaner #8- Used as a spot cleaner for walls and etc. May also be used as a carpet spot treatment. We will continue to pre-spray carpets, wait 15 minutes and then extract with clean water with no chemical in the extractor.

4. 3M Twist and Fill Bathroom Cleaner #44- Used on all bathroom fixtures.

Environmentally Preferable Certifications

There's a new awareness sweeping through business today. It's the recognition that many people want more than just products that do as they promise; people are actively looking for products and services that have less impact on the environment. This isn't just "buying products"—this is a system approach involving a partnership between supplier and customer.

3M Building and Commercial Services Division is committed to providing you with innovative, cost-effective cleaning solutions that help protect facilities and people, while creating clean, safe and comfortable environments throughout the world. 3M has completed certification from Green Seal, a nationally-recognized not-for-profit environmental organization on a number of 3M™ Twist 'n Fill™ Products under the GS-37 Standard.

3M has demonstrated a long-standing commitment to protecting health, safety and the environment. Certification helps make it easier for our customers at Federal, State and Local Health Care Facilities, as well as their janitorial service providers, to demonstrate that they meet their environmentally preferable requirements.

GREEN SEAL CERTIFIED

The following 3M™ Twist 'n Fill™ Products are Green Seal certified:

3M™ Glass Cleaner
- No. 1 Twist 'n Fill™ Chemical

3M™ Neutral Cleaner
- No. 3 Twist 'n Fill™ Chemical

3M™ General Purpose Cleaner
- No. 8 Twist 'n Fill™ Chemical

3M™ 3-in-1 Floor Cleaner
- No. 24 Twist 'n Fill™ Chemical

3M™ Neutral Cleaner LO Concentrate
- No. 33 Twist 'n Fill™ Chemical

3M™ Bathroom Cleaner
- No. 44 Twist 'n Fill™ Chemical

Additional benefits of the 3M™ Twist 'n Fill™ System

- Accurate dispensing technology helps ensure the active ppm required by the EPA
- Highly concentrated formulas maximize value and minimize wasteful containers
- Employee contact with chemicals is limited for enhanced safety
- Integral air gap prevents chemical backflow
- Material Safety Data Sheets (MSDS) help make compliance with "right-to-know" law easier

3M

46705

dalco

Invoice
Remittance Stub

Remit To: PO Box 64777
St. Paul, MN 55164-0777
(800) 950-1975
FAX: (651) 604-2961

Co/ Cust #	Order #	Customer PO	Ter	Sls Rep	
1/0001283690	54999/00	LAURIE	999	31	Page 1 of 1

Ship Via: TGT 100108 Terms: Credit Card Amount: 1,175.00

Notes: Invoice: 2028004 Date: 10/02/08 Time: 14:43:03

Bill To:
MACALESTER COLLEGE-16
ATTN ACCTS PAYABLE
1600 GRAND AVE
ST PAUL MN 55105

Ship To:
MACALESTER COLLEGE-16
ATTN ACCTS PAYABLE
1600 GRAND AVE
ST PAUL MN 55105

...::Please return this portion with your payment::...
...::Thank you for your business::...

Invoice #: 2028004 Order #: 54999/00 Co/Cust #: 1/0001283690 Customer PO: LAURIE

Item Number/Description	U/M	Ordered	Shipped	Sell Price	Total
010794	CS	2.000	2.000	236.16000 CS	
3M TNF 1L GLASS CLEANER 6X2L GLASS CLNR					472.32
010799	CS	3.000	3.000	226.56000 CS	
3M TNF 3H NEUTRAL CLEANER NEUTRAL CLEANER	6X2L				679.68
010299	CS	3.000	.000	620.55000 CS	
3M TNF 44L BATHROOM CLEANER 6X2L RESTROOM CARE		B/O	3.000		.00
033333	EA	1.000	1.000	23.00000 EA	
TRANSPORTATION IN TOWN-MN-WI					23.00

INVOICE DUE: 10/12/08

dalco

300 5th Ave NW (800) 950-1975
New Brighton, MN 55112 Fax: (651) 604-2961

Thank you for your business! Please pay from this invoice.
1 1/2 % per month service charge added to delinquent accounts.
Payment due upon receipt of invoice. Dalco's Terms and Conditions Apply.

SUBTOTAL: 1,175.00

TOTAL: 1,175.00

DEPOSIT

dalco

Invoice Remittance Stub

REPRINT FROM HISTORY

Remit To: PO Box 64777
St. Paul, MN 55164-0777
(800) 950-1975
FAX: (651) 604-2961

Co/ Cust #	Order #	Customer PO	Ter	Sls Rep	
1/0001283690	52040/00	LAURIE	999	31	Page 1 of 2

Ship Via: TGT 100908 Terms: Credit Card Amount: 4,748.68

Notes: Invoice: 2031053 Date: 10/13/08 Time: 8:10:58

Bill To:
MACALESTER COLLEGE-16
ATTN ACCTS PAYABLE
1600 GRAND AVE
ST PAUL MN 55105

Ship To:
MACALESTER COLLEGE-16
ATTN ACCTS PAYABLE
1600 GRAND AVE
ST PAUL MN 55105

...::Please return this portion with your payment::...
...::Thank you for your business::...

Invoice #: 2031053 Order #: 52040/00 Co/Cust #: 1/0001283690 Customer PO: LAURIE

Item Number/Description	U/M	Ordered	Shipped	Sell Price	Total
007854	EA	10.000	10.000	105.24000 EA	
3M 59194 EASY SCRUB EXPRESS KIT					1,052.40
1-CADDY 1-TOOL 12-BOTTLES 2-MOP					
010794	CS	2.000	2.000	236.16000 CS	
3M TNF 1L GLASS CLEANER	6X2L				472.32
GLASS CLNR					
010799	CS	2.000	2.000	226.56000 CS	
3M TNF 3H NEUTRAL CLEANER	6X2L				453.12
NEUTRAL CLEANER					
010806	CS	2.000	2.000	176.76000 CS	
3M TNF 8L GENERAL PURPOSE	6X2L				353.52
GP CLNR					
010299	CS	2.000	2.000	645.60000 CS	
3M TNF 44L BATHROOM CLEANER					1,291.20
6X2L RESTROOM CARE					

SILK SCREEN BTLE W TRIGGER (24)

dalco

300 5th Ave NW (800) 950-1975
New Brighton, MN 55112 Fax: (651) 604-2961

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The U. S. Green Building Council

hereby certifies that

Erica Downs

has successfully demonstrated knowledge of the
green building design and construction industry and the
Leadership in Energy and Environmental Design (LEED®) 2.0
Green Building Rating System, Resources and Process required
to be awarded the title of

LEED® 2.0 Accredited Professional

LEED®
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

James Hartzfield, Chairman

S. Richard Fedrizzi, President,
CEO and Founding Chairman