UNIVERSITY OF WISCONSIN WHITEWATER

Comprehensive Campus Master Plan

DFD Project No. 1211D

PDF Part 7: Technical Appendix E - Campus Utilities


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WHITEWATER
Office of the Chancellor

The 2014 Campus Master Plan provides an ambitious framework for the University's physical campus over the next twenty years. Establishing the foundation for campus's growth and development has been an important undertaking. Our physical campus is one of our great assets. This plan ensures we are responsible stewards of our campus, enhancing the collegiate experience for future generations. The plan recognizes the critical importance of shaping a community through the development of spaces for our students to live, work, and learn.

As described on the following pages, the plan envisions:

- Identifying facility renewal and growth necessary to provide the high quality teaching and learning spaces necessary to support our University mission.
- Providing opportunities for residential growth, creating new living and gathering spaces that enhance student quality of life and reinforce a strong sense of community.
- Making our campus more welcoming and accessible by enhancing connections between buildings and grounds and establishing clear campus gateways.
- Establishing a new entry sequence for first time visitors with the addition of consolidated student services in a new facility centrally located along a primary pedestrian mall.
- Enhancing and preserving the natural features unique to campus, promoting efficient use of resources, and connecting people with each other and with their environment.

The plan balances new development with facility renewal and the preservation of abundant green space that is a defining characteristic of campus. The long-term strategy takes into account needed new infrastructure, utilities, and open spaces while establishing architectural and landscape design guidelines to help define a coherent sense of place. This integrated approach defines a more efficient campus for years to come.

I look forward to our continued work together as we continue to realize the aspirations of the plan.

Sincerely,

Richard J. Telfer, Chancellor

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FLORA
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Technical Appendices

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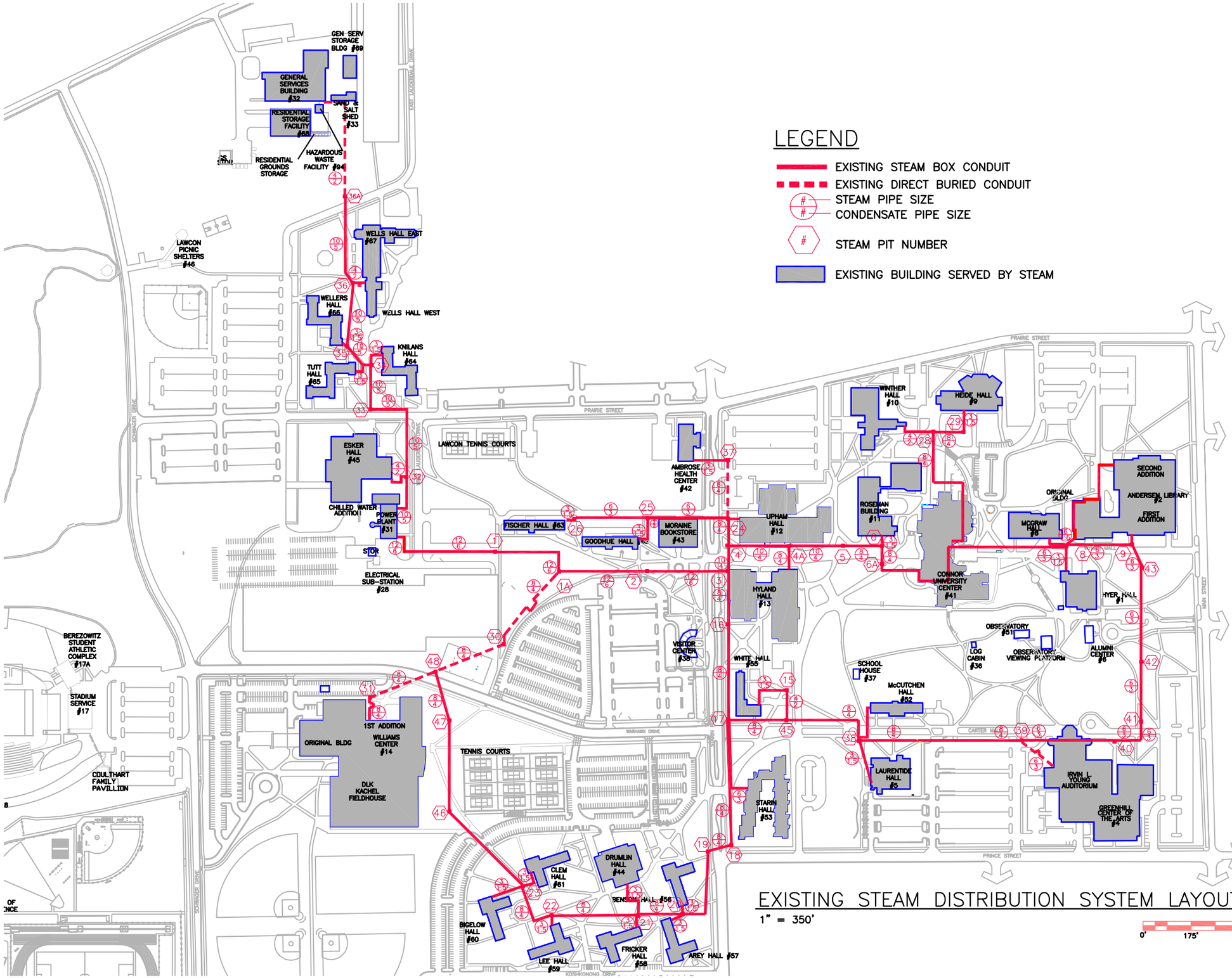

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UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

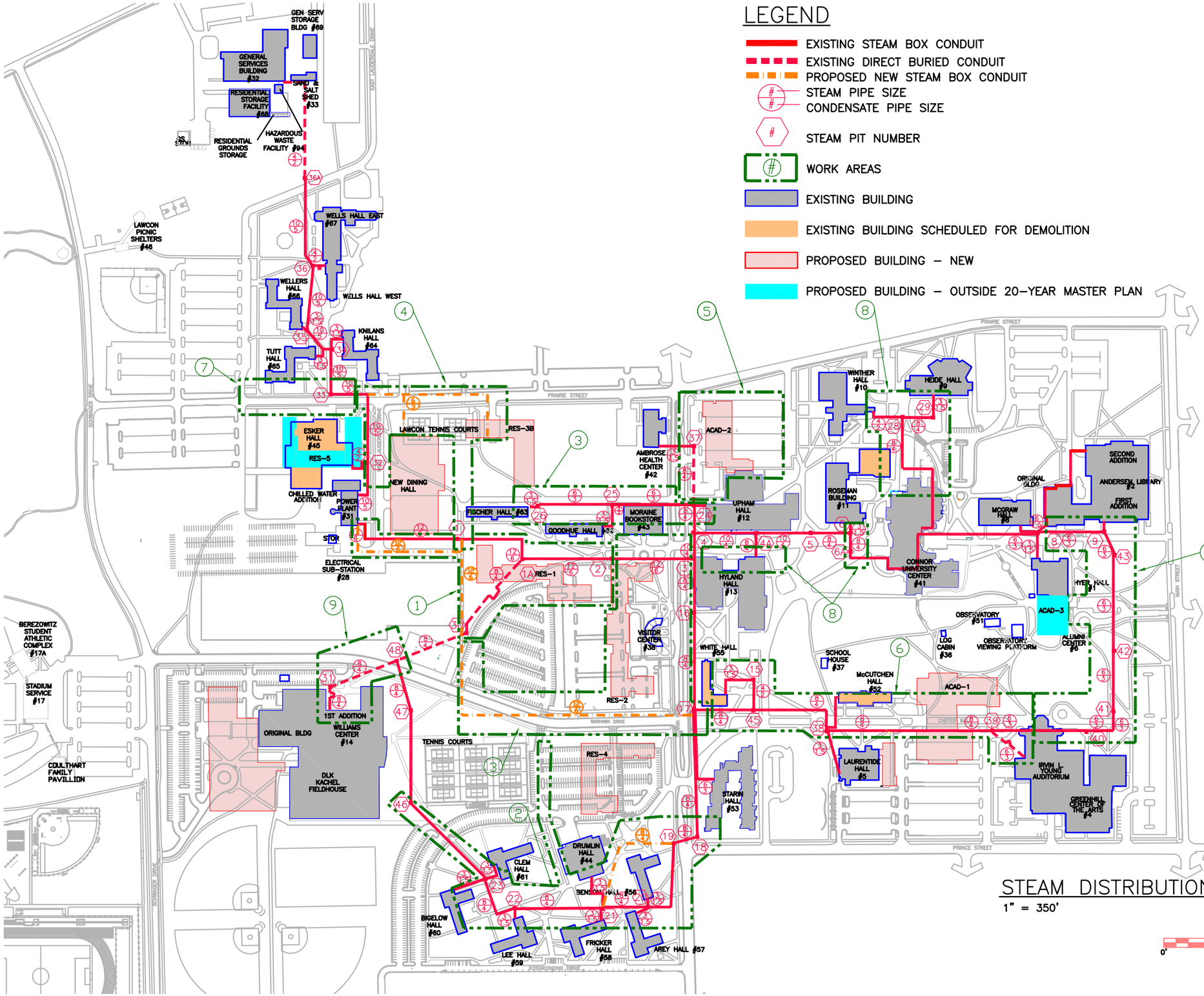
MASTER PLAN
UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

Sheet Title: EXISTING STEAM DISTRIBUTION SYSTEM LAYOUT

Revisions:

No.	Date:	Description:

Graphic Scale	
DFD Number	12I1D
Set Type	PR
Date Issued	4/1/2014
Sheet Number	A.1



LEGEND

- EXISTING STEAM BOX CONDUIT
- EXISTING DIRECT BURIED CONDUIT
- PROPOSED NEW STEAM BOX CONDUIT
- # STEAM PIPE SIZE
- # CONDENSATE PIPE SIZE
- # STEAM PIT NUMBER
- (#) WORK AREAS
- EXISTING BUILDING
- EXISTING BUILDING SCHEDULED FOR DEMOLITION
- PROPOSED BUILDING – NEW
- PROPOSED BUILDING – OUTSIDE 20-YEAR MASTER PLAN

STEAM DISTRIBUTION PLAN–NEW

1" = 350'

0' 175' 350'

NORTH

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MASTER PLAN
UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

Sheet Title: STEAM DISTRIBUTION PLAN–NEW

Revisions:

No.	Date:	Description:

Graphic Scale	
DFD Number	12I1D
Set Type	PR
Date Issued	4/1/2014
Sheet Number	A.2

Appendix A.3

UW WHITEWATER - Steam Load Projections

Last Update 3/21/13

Building Name	Building Use	Space Exist/Future	Area (GSF) (1)	Typ Load (BTU/SF)	Bldg Load (#/Hr)	Load Sum (#/Hr)	Bldg Pipe Size (In)	Diversity Factor	Adj Bldg (#/Hr)	Adj Sum (#/Hr)		GPR Area (GSF)	PR Area (GSF)
Existing Loads													
Fischer Hall	Residence Hall	Existing	41,825	30	1,328	1,328	3	0.60	797	797		0	41,825
Goodhue Hall	Offices	Existing	41,825	50	2,213	3,541	3	0.60	1,328	2,124		41,825	
Moraine Bookstore	Misc	Existing	28,176	50	1,491	5,032	4	0.60	894	3,019		0	28,176
Ambrose Health Center	Clinic	Existing	24,841	60	1,577	6,609	3	0.75	1,183	4,202		24,841	
Upham Hall	ClassRm/Labs	Existing	150,630	80	12,752	19,360	4	0.75	9,564	13,766		150,630	
Winther hall (4)	ClassRms/Off	Existing	89,010	50	4,710	24,070	4	0.60	2,826	16,591		89,010	
Heide Hall (5)	Residence Hall	Existing	64,752	30	2,056	26,126	3	0.60	1,233	17,825		0	64,752
Conner Center	Food/Svc/Union	Existing	142,229	55	8,278	34,404	6	0.60	4,967	22,791		0	142,229
Anderson Library	Library	Existing	198,813	35	7,363	41,767	3 & ?	0.60	4,418	27,210		198,813	
Hyer Hall	ClassRms/Off	Existing	65,893	50	3,486	45,253	3	0.60	2,092	29,301		65,893	
Bigelow Hall	Residence Hall	Existing	47,788	30	1,517	46,770	3	0.60	910	30,212		0	47,788
Clem Hall	Residence Hall	Existing	47,788	30	1,517	48,288	3	0.60	910	31,122		0	47,788
Lee Hall	Residence Hall	Existing	47,739	30	1,516	49,803	3	0.60	909	32,031		0	47,739
Fricker Hall	Residence Hall	Existing	47,739	30	1,516	51,319	3	0.60	909	32,940		0	47,739
Drumlin Hall	Food Service	Existing	33,407	55	1,944	53,263	3	0.60	1,167	34,107		0	33,407
Arey Hall	Residence Hall	Existing	47,733	30	1,515	54,778	3	0.60	909	35,016		0	47,733
Benson Hall	Residence Hall	Existing	47,733	30	1,515	56,294	3	0.60	909	35,925		0	47,733
Williams Center & Fieldhouse	Sports/Rec	Existing	329,278	50	17,422	73,716	4 & 8	0.55	9,582	45,508			329,278
General Services Bldg	Mainten./Shops	Existing	55,403	40	2,345	76,061	4	0.60	1,407	46,915		55,403	
McCutchan Hall	Offices	Existing	38,958	50	2,008	78,069	2 1/2	0.60	1,205	48,120		38,958	
White Hall	Residence Hall	Existing	40,538	30	1,287	79,356	3	0.60	772	48,892		0	40,538
Esker Hall	Food Service	Existing	74,076	55	4,311	83,667	4	0.60	2,587	51,479		0	74,076
Wells Hall (6)	Residence Hall	Existing	237,870	30	7,551	91,219	4	0.60	4,531	56,009		0	237,870
Wellers Hall	Residence Hall	Existing	53,122	30	1,686	92,905	3	0.60	1,012	57,021		0	53,122
Tutt Hall	Residence Hall	Existing	53,122	30	1,686	94,591	3	0.60	1,012	58,033		0	53,122
Knilans Hall	Residence Hall	Existing	53,122	30	1,686	96,278	3	0.60	1,012	59,045		0	53,122
McGraw Hall	Computer Center	Existing	44,393	40	1,879	98,157	?	0.75	1,409	60,454		44,393	
Roseman Building	Offices	Existing	51,333	50	2,716	100,873	3	0.60	1,630	62,084		51,333	
Hyland Hall	ClassRms/Off	Existing	187,085	50	9,899	110,772	8	0.60	5,939	68,023		187,085	
Center for the Arts & Young Auditorium	Mixed	Existing	216,489	65	14,891	125,662	6	0.60	8,934	76,958		216,489	
Laurentide Hall (6)	ClassRms/Off	Existing	100,960	50	5,342	131,004	3	0.60	3,205	80,163		100,960	
Starin Hall	Residence Hall	Existing	207,900	30	6,600	137,604	6	0.60	3,960	84,123		0	207,900
New Res Hall #1	Residence Hall	Future	130,000	30	4,127	141,731		0.60	2,476	86,599	2017	0	130,000
New Res Hall #2	Residence Hall	Future	130,000	30	4,127	145,858		0.60	2,476	89,075	2019	0	130,000
New Dining Hall	Food Service	Existing	74,076	55	4,311	150,169		0.60	2,587	91,662	2027	0	74,076
New Res Hall #3	Residence Hall	Future	130,000	30	4,127	154,296		0.60	2,476	94,138	2027	0	130,000
New Academic #1 (Upham)	Academic	Future	75,000	80	6,349	160,646		0.75	4,762	98,900	2027	75,000	0
New Athletic	Sports/Rec	Future	600,000	50	31,746	192,392		0.55	17,460	116,360	2030	0	600,000
New Res Hall #4	Residence Hall	Future	130,000	30	4,127	196,519		0.60	2,476	118,836	2032	0	130,000
Williams Tennis Center	Sports/Rec	Future	43,254	40	1,831	198,349		0.55	1,007	119,843		0	43,254
New Academic #2 (Carter Mall)	Academic	Future	170,000	50	8,995	207,344		0.60	5,397	125,240	2032	170,000	0
Esker Hall	Food Service	Exist Demo	74,076	55	4,311	211,655	4	0.60	2,587	127,827		0	74,076
New Res Hall #5	Residence Hall	Future	130,000	30	4,127	215,782	3	0.60	2,476	130,303		0	130,000
New Academic #3 (Hyer)	Academic	Future	68,000	50	3,598	219,380	3	0.60	2,159	132,462		68,000	0
McCutchan Hall	Offices	Exist Demo	38,958	50	2,008	217,372	2 1/2	0.60	1,205	131,257		38,958	
White Hall	Residence Hall	Exist Demo	40,538	30	1,287	216,085	3	0.60	772	130,485		0	40,538
Wells Hall	Residence Hall	Exist Demo	237,870	30	7,551	208,534	4	0.60	4,531	125,954		0	237,870

	#/hr	SF	SF	SF
Existing Buildings	**84,123**	**1,265,633**	**1,645,937**	**2,911,570**
Future Buildings	**45,752**	**313,000**	**1,367,330**	**1,680,330**
Total Existing & New	**129,875**	**1,578,633**	**3,013,267**	**4,591,900**
		34%	**66%**	**100%**
Buildings outside timeline of master plan	**4,635**	**68,000**	**130,000**	**198,000**
Total Existing, Future & Outside Timeline	**134,510**	**1,646,633**	**3,143,267**	**4,789,900**
		34%	**66%**	**100%**
Demo Bldgs	**9,095**	**38,958**	**352,484**	**391,442**
Total without Demo Bldgs & Outside Timeline	**120,780**	**1,539,675**	**2,660,783**	**4,200,458**
Net Increase	**144%**	**37%**	**63%**	**100%**

Notes:

1. GSF in blue font from 2005 General Building Report
2. Peak steam load in recent years is approx. 82,900 #/Hr (per Dave Floyd, 03/21/13)
3. Latent Heat of Vaporization for 15 psig sat steam is approximately 945 btu/lb. Using this value for approximated peak steam load estimates.
4. Includes 12,000 GSF for future proposed addition
5. Includes 2,200 GSF for future proposed addition
6. Includes 18,390 GSF for future proposed addition

Appendix A.4

UW Whitewater - Steam Distribution Condition Survey

Jun-13

Pit	Rating	Year Pit Built	Pit Conditions				Comments
			Structure	Insulation	Piping	Anchor	
1	2	6203-15, Jun 1964	See Comment	Poor	Good	Poor	Roof/wall spalling
1A	1	94246	Good	Good	Good	Good	
2	3	6203-15, Jun 1964	See Comment	Good	Good	Good	Roof/wall spalling
3	1	09J2M-01, Jun 2012	Good	Good	Good	Good	
4	1	5461, Jun 1962	Good	Good	Good	Good	
4A	1	03O1Q	Good	Good	Good	Good	
5	1	5461, Jun 1962	Good	Good	Good	Good	
6	3	Oct 1957	See Comment	Poor	Poor	Good	Roof/wall spalling
6A	3	03H2L	See Comment	Good	Good	None	Poor entrance
8	1	6208-14, April 1964	Good	Good	Good	Good	
9	1	6208-14, April 1964	Good	Good	Good	Good	
15	1	8006-16, Oct. 1980	Good	Good	Good	Good	
16	1	6211-13, Sep. 1963	Good	Good	Good	Good	
17	3/1	6211-13, Sep. 1963	Poor/Good	Poor	Good	Good	Original pit poor, New pit good
18	3	6211-13, Sep. 1963	Poor	Poor	Good	Poor	
19	1	6211-13, Sep. 1963	Good	Poor	Good	Good	
20	2	6211-13, Sep. 1963	Poor	Poor	Good	Good	Poor roof
21	1	6311-15, Jul 1964	Good	Poor	Good	Good	
22	1	6311-15, Jul 1964	Good	Good	Good	Good	

23	1	6410-14, Jan 1965	Good	Good	Good	Good	
24	1	5461, Jun 1962	Good	Poor	Good	Poor	
25	3	5461, Jun 1962	Poor	Poor	Good	Poor	
26	1	5461, Jun 1962	Good	Good	Good	Poor	
28	1	6309-7, Nov. 1964	Good	Poor	Good	Good	
29	1	6309-7, Nov. 1964	Good	Poor	Good	Good	
30	3	6309-3, April 1965	Poor	Poor	Good	Poor	
31	1	6309-3, April 1965	Good	Good	Good	Poor	
32	1	6411-6, Jul. 1965	Good	Good	Good	Good	
33	2	6411-6, Jul. 1965	Poor	Poor	Good	Good	Poor roof
34	1	6411-6, Jul. 1965	See Comment	Good	Good	Good	Entrance leaks
35	1	6411-6, Jul. 1965	See Comment	Good	Good	Good	Base slab/entry leaks
36	1	6508-15, Mar. 1966	See Comment	Good	Good	Good	Base slab/entry leaks
36A	1	99I3Y	Good	Good	Good	Good	
37		6807-16, Dec. 1964	Good	Poor	Good	Good	
38	2	6507-10, 6503-16, Jul. 1969	See Comment	Poor	Good	Good	Poor roof
39	1	6507-10, 6503-16, Jul. 1969	See Comment	Good	Good	Good	Poor roof
40	3	6507-10, 6503-16, Jul. 1969	See Comment	Poor	Good/Old EJ's	Good	Poor roof/walls
41	1	7001-16, May 1971	Good	Poor	Good/Old EJ's	Good	
42	1	7001-16, May 1971	Good	Poor	Good/Old EJ's	Good	
43	1	7001-16, May 1971	Good	Poor	Good/Old EJ's	Good	
45	2	8006-16, Oct. 1980	See Comment	Poor	Good/Old EJ's	Poor	Poor roof
46	1	09J2M, May 20011	Good	Good	Good	Good	
47	1	09J2M, May 20011	Good	Good	Good	Good	
48	1	09J2M, May 20011	Good	Good	Good	Good	

Rating Scale: 1 Good Condition, 2 Roof Replace, 3 Pit Replace

Appendix A.5

UW Whitewater - Steam Distribution Condition Survey

3/11/2014

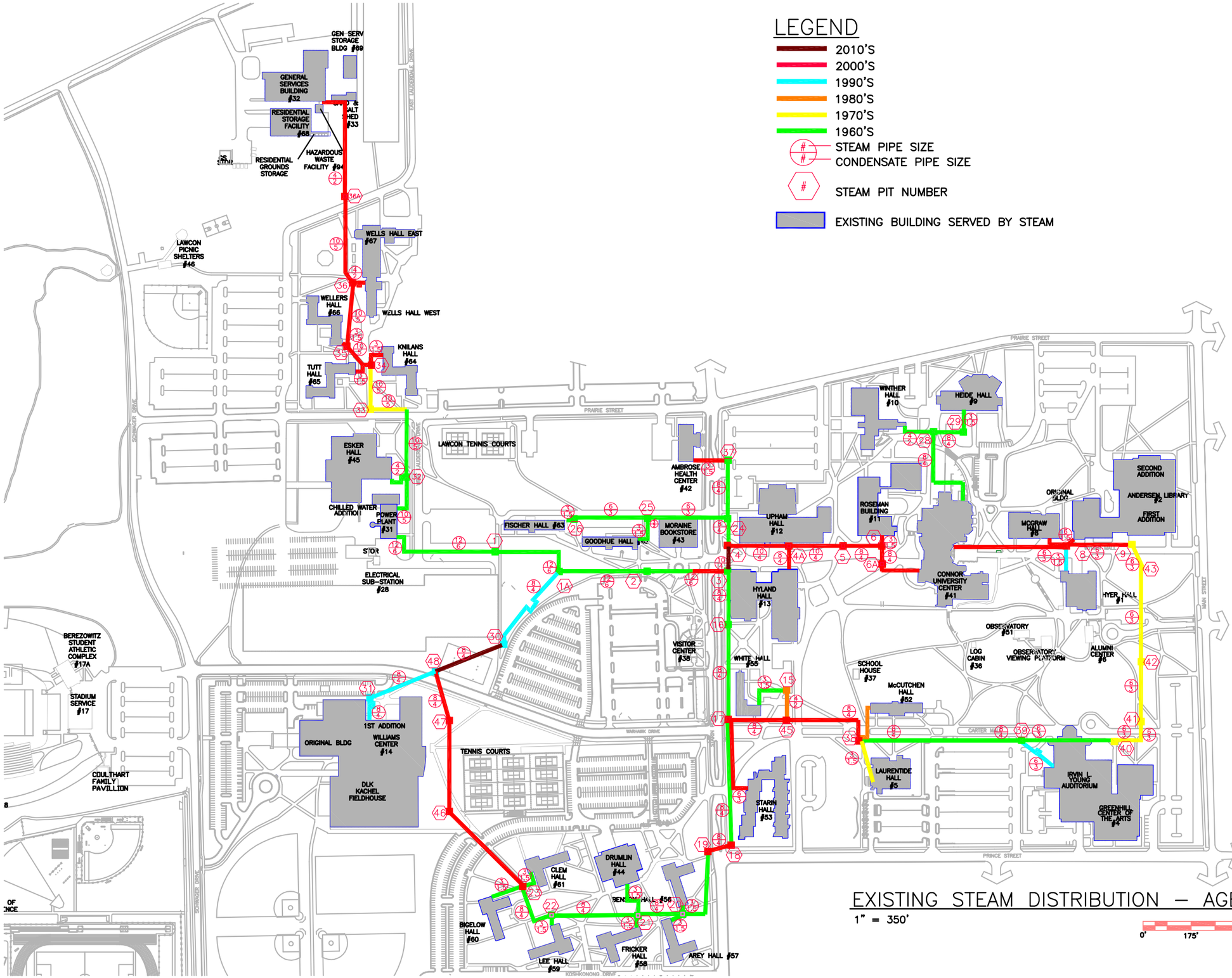
Pit	Area of Campus	Project #/Year Built	Length (ft)	Distribution Conditions			
				Box Conduit	Direct Buried	Pipe Insulation	Comments
1	North	6203-15, Jun 1964	534	Poor	NA	Poor	
	South	6203-15, Jun 1964	278	Poor	NA	Poor	
1A	East	94246, Jun 1997	In 1 South	Poor	NA	Poor	
	West	94246, Jun 1997	330	NA	Unknown	Not Visable	
	South	94246, Jun 1997	326	Poor	NA	Poor	
2	North	6203-15, Jun 1964	In 1A South	Poor	NA	Poor	
	South	6203-15, Jun 1964	295	Poor	NA	Poor	120' north of pit replaced 2001
3	North	6203-15, Jun 1964	In 2 South	Poor	NA	Poor	
	East	09J2M-02, Jun 2013	79	Good	NA	Good	
	West	6211-13, Sep. 1963	194	Poor	NA	Poor	
4	West	09J2M-02, Jun 2013	In 3 East	Good	NA	Good	
	East	01K2D, Jun 2001	137	Good	NA	Good	
	South	06B2D, June 2009	221	Good	NA	Good	
4A	North	06B2D, June 2009	In 4 South	Good	NA	Good	
	West	06B2D, June 2009	85	Good	NA	Good	
	South	06B2D, June 2009	197	Good	NA	Good	
5	North	06B2D, June 2009	In 4A South	Good	NA	Good	
	South	06B2D, June 2009	143	Good	NA	Good	
6	North	06B2D, June 2009	In 5 South	Good	NA	Good	
	East	Nov. 1958	35	Poor	NA	Poor	
	West	03O1Q	63	Good	NA	Good	
6A	East	03O1Q	In 6 West	Good	NA	Good	
	West	03O1Q	148	Good	NA	Good	
8	North	06B2D, June 2009	385	Good	NA	Good	
	South	06B2D, June 2009	240	Good	NA	Good	
	West		92	Unknown	NA	Unknown	
	North	06B2D, June 2009	77	Good	NA	Good	
	East	Nov. 1950	39	Poor	NA	Poor	

9	North	06B2D, June 2009	In 8 South	Good	NA	Good	
	East	6208-14, Apr. 1964	38	Poor	NA	Poor	
	West	7001-16, May 1971	90	Poor	NA	Poor	
15	West	8006-16, Oct. 1980	116	Good	NA	Good	
	North	09J2M-01, Jun 2012	174	Good	NA	Good	
16	East	6211-13, Sep. 1963	In 3 West	Good	NA	Poor	No PCR Insluation
	West	6211-13, Sep. 1963	348	Good	NA	Poor	No PCR Insluation
17	East	6211-13, Sep. 1963	In 16 west	Good	NA	Good	
	West	6211-13, Sep. 1963	452	Good	NA	Good	
	West	06C1Q	315	Good	NA	Good	Starin Hal Service
	South	95633, 2000	211	Good	NA	Good	
18	East	6211-13, Sep. 1963	In 17 West	Good	NA	Good	
	North	00L2J, 2000	90	Good	NA	Good	
19	South	00L2J, 2000	In 18 North	Good	NA	Good	
	West	6211-13, Sep. 1963	310	Good	NA	Poor	
20	South	6211-13, Sep. 1963	In 19 West	Poor	NA	Poor	No PCR Insluation
	East	6211-13, Sep. 1963	61	Poor	NA	Poor	No PCR Insluation, Leaking Box Conduit
	West	6211-13, Sep. 1963	49	Poor	NA	Poor	No PCR Insluation, Leaking Box Conduit
	North	6211-13, Sep. 1963	164	Poor	NA	Poor	No PCR Insluation
21	South	6311-15, Jul. 1964	In 20 North	Good	NA	Poor	No PCR Insulation
	North	6311-15, Jul. 1964	316	Good	NA	Poor	No PCR Insulation
	East	6311-15, Jul. 1964	155	Good	NA	Poor	No PCR Insulation
	West	6311-15, Jul. 1964	58	Good	NA	Poor	No PCR Insulation
22	North	6410-14, Jan. 1965	194	Good	NA	Poor	No PCR Insulation
	South	6311-15, Jul. 1964	In 21 North	Good	NA	Poor	No PCR Insulation
	West	6311-15, Jul. 1964	20	Good	NA	Poor	No PCR Insulation
23	North	6410-14, Jan. 1965	120	Good	NA	Good	No PCR Insulation
	South	6410-14, Jan. 1965	68	Good	NA	Good	No PCR Insulation
	West	6410-14, Jan. 1965	In 22 North	Good	NA	Good	No PCR Insulation

	East	09J2M, June 2011	In 46 West	Good	NA	Good	No PCR Insulation
24	West	01K2D, Jun 2001	In 4 East	Poor	NA	Poor	Leaking Box Conduit
	East	6807-16, Dec. 1969	210	NA	Unknown	Not Visable	
	North	08H1A	292	Good	NA	Good	
	South	01K2D, Jun 2001	44	Good	NA	Good	
25	South	5461, Jul. 1962	In 24 North	Poor	NA	Poor	
	North	5461, Jul. 1962	265	Poor	NA	Poor	
	West	6212-22, Apr. 1983	110	Poor	NA	Poor	
26	South	5461, Jul. 1962	In 25 North	Poor	NA	Poor	No PCR Insluation, Leaking Box Conduit
	North	5461, Jul. 1962	28	Poor	NA	Poor	
28	West	6309-7, Nov. 1964	353	Poor	NA	Poor	
	North	6603-17, Dec. 1967	122	Poor	NA	Poor	
	South	6309-7, Nov. 1964	115	Poor	NA	Poor	
29	North	6309-7, Nov. 1964	In 28 South	Poor	NA	Poor	No PCR Insluation, Leaking Box Conduit
	East	6309-7, Nov. 1964	73	Poor	NA	Poor	No PCR Insluation, Leaking Box Conduit
30	South	94246, Jun 1997	In 1A West	NA	Unknown	Not Visable	
	North	09J2M-03, Sept. 2013	270	NA	Good	Good	New
31	South	94246, Jun 1997	In 48 North	NA	Unknown	Not Visable	
	West	94246, Jun 1997	85	NA	Unknown	Not Visable	
32	West	6411-6, Jul. 1965	149	Good	NA	Good	
	North	6411-6, Jul. 1965	92	Good	NA	Good	
	East	6411-6, Jul. 1965	377	Good	NA	Good	
33	South	6411-6, Jul. 1965	In 32 East	Good	NA	Good	
	East	6411-6, Jul. 1965	162	Good	NA	Good	
34	West	6411-6, Jul. 1965	In 33 East	Good	NA	Good	
	East	09J2M, June 2011	112	Good	NA	Good	
	North	09J2M, June 2011	93	Good	NA	Good	
	South	08L1Z, Jun 2008	99	Good	NA	Good	
35	South	09J2M, June 2011	In 34 East	Good	NA	Good	
	North	09J2M, June 2011	30	Good	NA	Good	
	East	09J2M, June 2011	223	Good	NA	Good	

36	West	09J2M, June 2011	In 35 East	Good	NA	Good	
	East		319	Good	NA	Good	
	South	09J2M, June 2011	65	Good	NA	Good	
36A	West	99I3Y, 2001	In 36 East	Good	NA	Good	
	East	99I3Y, 2001	419	NA	Unknown	Not Visable	
37	West	6807-16, Dec. 1969	In 24 East	NA	Unknown	Not Visable	
	North	01G2M, 2000	128	Poor	NA	Good	Leaking Box Conduit
38	North	95633	327	Good	NA	Good	
	South	8212-22, Apr. 2983	592	Good	NA	Good	
	West	01K2D, Jun 2001	158	Good	NA	Good	
	East	09C3V, 2009	148	Good	NA	Good	
39	North	8212-22, Apr. 2983	In 38 South	Good	NA	Good	
	South	8212-22, Apr. 2983	337	Good	NA	Good	
	West	9306-30, 1995	151	NA	Unknown	Not Visable	
40	North	8212-22, Apr. 2983	In 39 South	Poor	NA	Poor	
	South	8006-16, Oct. 1980	192	Poor	NA	Poor	
41	West	7001-16, May 1971	In 40 South	Poor	NA	Poor	
	East	7001-16, May 1971	218	Poor	NA	Poor	
42	West	7001-16, May 1971	In 41 East	Poor	NA	Poor	
	East	7001-16, May 1971	346	Poor	NA	Poor	
43	East	7001-16, May 1971	In 9 west	Poor	NA	Poor	
	West	7001-16, May 1971	In 42 East	Poor	NA	Poor	
45	North	95633	In 17 South	Good	NA	Good	
	South	95633	In 38 North	Good	NA	Good	
	East	8006-16, Oct. 1980	In 15 West	Good	NA	Good	
46	West	09J2M-03, Sept. 2013	378	Good	NA	Good	
	East	09J2M-03, Sept. 2013	333	Good	NA	Good	
47	West	09J2M-03, Sept. 2013	In 46 East	Good	NA	Good	
	East	09J2M-03, Sept. 2013	In 48 West	Good	NA	Good	
48	North	94246, Jun 1997	In 31 South	NA	Unknown	Not Visable	
	South	09J2M-03, Sept. 2013	In 30 North	NA	New	Good	

	West	09J2M, June 2011	182	Good	NA	Good	
		Total	14,844				



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PROJECT NUMBER: 212145

State of Wisconsin
Department of Administration
Division of Facilities Development

UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

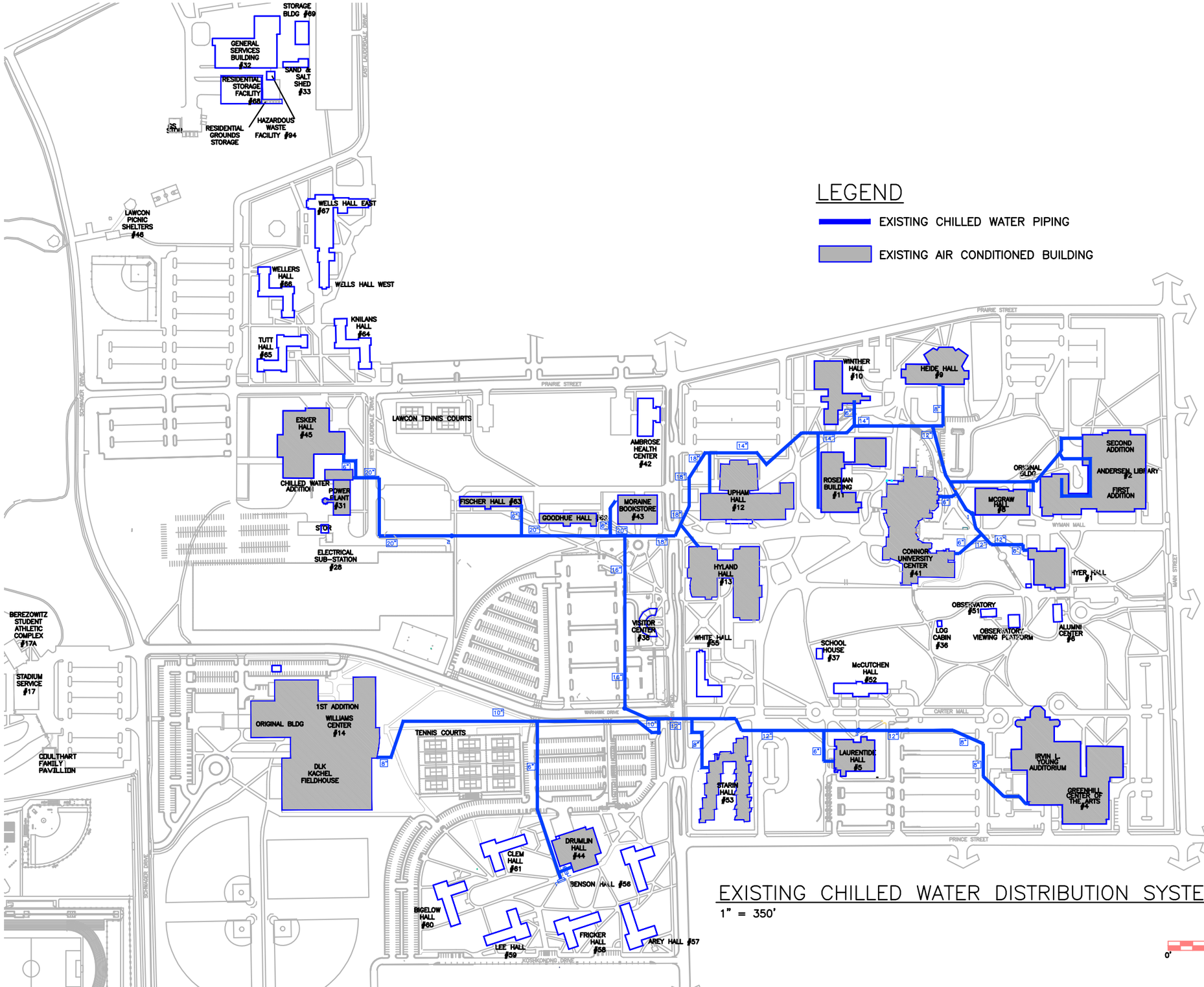
MASTER PLAN
UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

Sheet Title: EXISTING STEAM DISTRIBUTION – AGE

Revisions:

No.	Date:	Description:

Graphic Scale	
DFD Number	12I1D
Set Type	PR
Date Issued	4/1/2014
Sheet Number	A.6



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UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

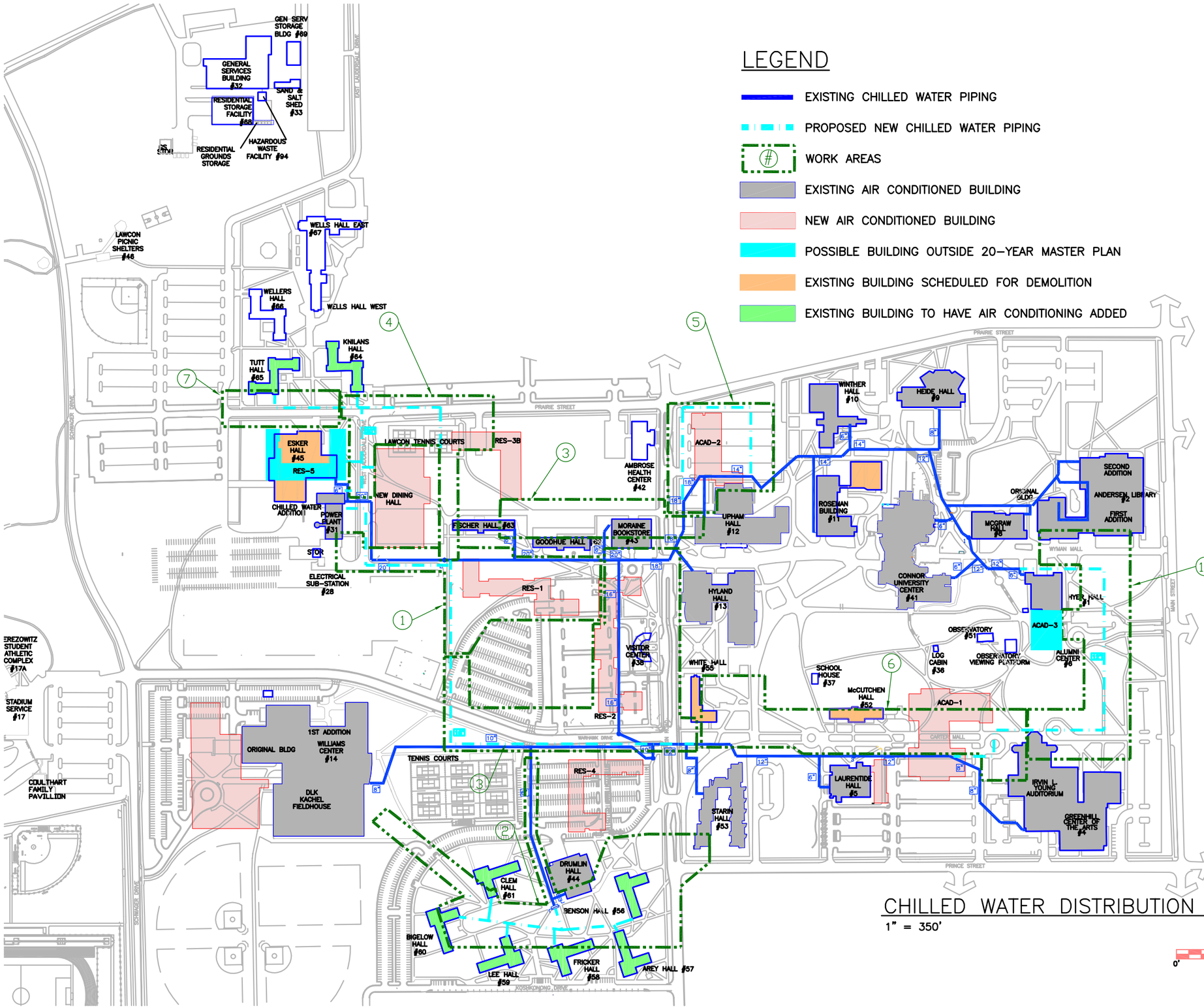
MASTER PLAN
UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

Sheet Title:
EXISTING CHILLED WATER DISTRIBUTION SYSTEM LAYOUT

Revisions:

No.	Date:	Description:

Graphic Scale	
DFD Number	12I1D
Set Type	PR
Date Issued	4/1/2014
Sheet Number	B.1



CHILLED WATER DISTRIBUTION PLAN – NEW

1" = 350'

0' 175' 350'

NORTH

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UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

MASTER PLAN
UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

Sheet Title: CHILLED WATER DISTRIBUTION PLAN – NEW

Revisions:

No.	Date:	Description:

Graphic Scale	
DFD Number	12I1D
Set Type	PR
Date Issued	4/1/2014
Sheet Number	B.2

UW-WHITEWATER - Chilled Water Load Projections (Option 1A)

13-Mar-14

Building Characteristics					Plant Tonnage						Deg. Delta T 12	Deg. Delta T 14	Deg. Delta T 12	Deg. Delta T 14					
Building Name	Occupancy (Existing/Future)	Area (GSF)	GSF per Ton	Building Load (Tons)	Running Total (Tons)	Diversity Factor	Plant Load (Tons)	Cumm. Adj Total Load (Tons)	Plant Cap (Tons)	Surplus (Deficit)	Building Flow (GPM)	Building Flow (GPM)	Cummulative Plant Flow (GPM)	Cummulative Plant Flow (GPM)	Date Online	Connected Load (Tons)	GPR Connected Load	PR Connected Load	GPR Area (GSF)	PR Area (GSF)
Three 800 Ton Chillers (1A)	System Gain (1B)	N/A	N/A	161	161	1.00	161	161	2,000	1,839					2000					
Esker Dining Hall	Planned Demo	74,076	325	228	389	0.70	160	321	2,000	1,679	456	391	641	550	2000	228		228		74,076
Laurentide Hall (27)	Existing (4)	100,960	459	220	609	0.60	132	453	2,000	1,547	440	377	905	776	2000	220	220		100,960	
Center of the Arts	Existing (5)	153,310	268	572	1,181	0.60	343	796	2,000	1,204	1,144	981	1,592	1,364	2000	572	572		153,310	
Upham Hall	Existing (6)	112,352	250	450	1,631	0.60	270	1,066	2,000	934	900	771	2,132	1,827	2000	450	450		112,352	
Winther Hall (25)	Existing (7)	89,010	318	280	1,911	0.60	168	1,234	2,000	766	560	480	2,468	2,115	2000	280	280		89,010	
Heide Hall (26)	Existing (8)	64,752	272	238	2,149	0.60	143	1,377	2,000	623	476	408	2,753	2,360	2000	238	238		64,752	
Connor Center with '64 & '88 Addt'ns	Existing (9)	139,540	300	465	2,614	0.70	326	1,702	2,000	298	930	797	3,404	2,918	2000	465		465		139,540
Hyer Hall	Existing (10)	65,893	392	168	2,782	0.60	101	1,803	2,000	197	336	288	3,606	3,091	2000	168	168		65,893	
Moraine Bookstore	Existing	28,176	350	81	2,863	0.65	52	1,855	2,000	145	161	138	3,711	3,181	2000	81		81		28,176
Young Auditorium	Existing (11)	63,179	226	280	3,143	0.70	196	2,051	2,000	(51)	560	480	4,103	3,517	2000	280	280		63,179	
Williams Center	Existing (12)	134,232	355	120	3,263	0.65	78	2,129	2,000	(129)	240	206	4,259	3,650	2001	120	120		134,232	
Drumlin Dining Hall	Existing	33,407	325	103	3,365	0.70	72	2,201	2,000	(201)	206	176	4,403	3,774	2001	103		103		33,407
Upham Hall Renovation & Addition	New (13)	29,572	230	129	3,494	0.70	90	2,291	2,000	(291)	257	220	4,583	3,928	2003	129	129		29,572	
Connor Center Renovation & Addt'n	Exist/New (14)	8,080	N/A	(18)	3,476	0.70	-13	2,279	2,000	(279)	(36)	(31)	4,557	3,906	2005	(18)		(18)		8,080
McGraw Hall	Existing (15)	44,393	313	142	3,618	0.60	85	2,364	2,000	(364)	284	243	4,728	4,052	2005	142	142		44,393	
Andersen Library	Existing (15)	198,813	427	465	4,083	0.65	302	2,666	2,000	(666)	930	797	5,332	4,570	2005	465	465		198,813	
Roseman Building	Existing (16)	51,333	375	147	4,230	0.65	96	2,762	2,000	(762)	294	252	5,523	4,734	2005	147	147		51,333	
1400 ton electric Chiller	System Gain (2)	N/A	N/A	0	4,230	1.00	0	2,762	3,400	0	0	0	0	0	2006					
Hyland Hall (C.O.B.E.)	Existing (17)	185,225	350	529	4,759	0.60	318	3,079	3,400	321	1,058	907	6,158	5,279	2008	529	529		185,225	
Starin Hall	Existing (18)	197,200	350	563	5,323	0.60	338	3,417	3,400	(17)	1,127	966	6,834	5,858	2009	563		563		197,200
Fischer Hall	Existing (19)	6,000	350	17	5,340	0.60	10	3,428	3,400	(28)	34	29	6,855	5,876	2011	17		17		6,000
Fricker Hall	Existing (21)	15,000	350	43	5,383	0.60	26	3,453	3,400	(53)	86	73	6,906	5,920	2015	43		43		15,000
Arey Hall	Existing (21)	15,000	350	43	5,425	0.60	26	3,479	3,400	(79)	86	73	6,958	5,964	2016	43		43		15,000
Install (1) 2000 ton Steam Chiller, Remove Absorber -1 & 2	System Gain (2)	N/A	N/A	42	5,467	1.00	42	3,521	4,100	579	84	72	7,042	6,036	2017					
Res Hall #1	New (22)	130,000	350	371	5,839	0.70	260	3,781	4,100	319	743	637	7,562	6,482	2017	371		371		130,000
Res Hall #2	New (22)	130,000	350	371	6,210	0.70	260	4,041	4,100	59	743	637	8,082	6,927	2019	371		371		130,000
Install (1) 2000 ton Steam Chiller Remove Absorber -3	System Gain (2)	N/A	N/A	0	6,210	1.00	0	4,041	5,400	1,359	0	0	0	0	2021					
Benson Hall	Exist/Future	47,733	350	136	6,347	0.85	116	4,157	5,400	1,243	273	234	8,314	7,126	2021	136		136		47,733
Clem Hall	Exist/Future	47,788	350	137	6,483	0.85	116	4,273	5,400	1,127	273	234	8,546	7,325	2022	137		137		47,788
Bigelow Hall	Exist/Future	47,788	350	137	6,620	0.85	116	4,389	5,400	1,011	273	234	8,778	7,524	2024	137		137		47,788
Lee Hall	Exist/Future	47,739	350	136	6,756	0.85	116	4,505	5,400	895	273	234	9,010	7,723	2025	136		136		47,739
New Dining Hall	New (24)														2027					
Res Hall #3	Future	130,000	350	371	7,128	0.70	260	4,765	5,400	635	743	637	9,530	8,168	2027	371		371		130,000
Academic #1 (Upham)	Future	75,000	230	326	7,454	0.70	228	4,993	6,000	1,007	652	559	9,986	8,560	2027	326	326		75,000	
Knilans Hall	Exist/Future	53,122	350	152	7,605	0.85	129	5,122	5,400	278	304	260	10,244	8,781	2029	152		152		53,122
Tutt Hall	Exist/Future	53,122	350	152	7,757	0.85	129	5,251	5,400	149	304	260	10,502	9,002	2030	152		152		53,122
Install (1) 2000 ton Electric Chiller Remove 1400 ton Elec	System Gain (2)	N/A	N/A	0	7,757	1.00	0	5,251	6,000	749	0	0	0	0	2032					
Athletic Facility	Exist/Future	80,000	355	225	7,983	0.65	146	5,398	6,000	602	451	386	10,795	9,253	2030	225		225		80,000
Res Hall #4	Future	130,000	350	371	8,354	0.70	260	5,658	6,000	342	743	637	11,315	9,699	2032	371		371		130,000
Academic #2 (Carter Mall)	Future	170,000	350	486	8,840	0.70	340	5,998	5,400	(598)	971	833	11,995	10,282	2032	486	486		170,000	
Res Hall #5	New (22)	130,000	350	371	9,211	0.70	260	6,258	6,000	(258)	743	637	12,515	10,727		371		371		130,000
Academic #3 (Hyer)	Future	68,000	350	194	9,405	0.70	136	6,394	6,000	(394)	389	333	12,787	10,961		194	194		68,000	
Ambrose Health Center	Existing/Future (23)	24,841	469	53	9,458	0.65	34	6,428	6,000	(428)	106	91	12,856	11,020		53	53		24,841	
Alumni Center Addition/ Remodel	Exist/Future	8,000	375	21	9,480	0.70	15	6,443	6,000	(443)	43	37	12,886	11,045		21	21		8,000	
McCutchan Hall	Planned Demo	38,958	0	0	9,480	0.85	0	6,443	6,000	(443)	0	0	12,886	11,045		0		0		38,958
White Hall	Planned Demo	40,538	0	0	9,480	0.85	0	6,443	6,000	(443)	0	0	12,886	11,045		0		0		40,538
Wells Hall	Planned Demo	237,870	0	0	9,480	0.85	0	6,443	6,000	(443)	0	0	12,886	11,045		0		0		237,870
														Existing Buildings		**5,384**	**3,860**	**1,525**	**1,427,256**	**516,479**	**1,943,735**
														% Split			**72%**	**28%**	**73%**	**27%**	
														Planned Future Buildings		**3,147**	**812**	**2,335**	**245,000**	**897,292**	**1,142,292**
														Total Existing & New		**8,531**	**4,672**	**3,860**	**1,672,256**	**1,413,771**	**3,086,027**
														% Split			**55%**	**45%**	**54%**	**46%**	
														Buildings outside timeline of master plan		**640**	**269**	**371**	**100,841**	**130,000**	**230,841**
														Total Existing & New & Unplanned		**9,171**	**4,940**	**4,231**	**1,773,097**	**1,543,771**	**3,316,868**
														% Split			**54%**	**46%**	**53%**	**47%**	
														Buildings scheduled for Demo		**228**	**0**	**228**	**0**	**391,442**	**391,442**
														Total Existing & New & Unplanned		**8,944**	**4,940**	**4,003**	**1,773,097**	**1,152,329**	**2,925,426**
														% Split			**55%**	**45%**	**61%**	**39%**	
														Approximate limit of 20" distribution pipe at 10 Ft/Sec							
														Unconfirmed							

Notes:

1A. Absorption Chiller #2 is performing noticably below nameplate capacity based on plant feedback. Data on a warmer than design day would indicate the other obsorbers are also underperforming. Since metered data is not available Absorber-1 & 3 is estimated to provide 700 tons each and Absorber #2 is estimated to provide 600 tons.

1B. Distribution pump gain estimated at (2) 200 HP = 85 Tons. Piping system gain estimated at 2% of 3800 Tons = 76 Tons.

2. Distribution pump gain estimated at (1) 200 HP = 42 Tons. No additional system piping gains added.

4. Laurentide (formerly Carlson Hall) load based on the size of the retrofit to the original Chrysler chiller, Project 8412-02. Plus 40 tons.

5. Center of the Arts load based on average GSF per ton for four (4) similar facilities at other campuses.

6. Upham Science Hall load based on original chiller selection.

7. Winther Hall load based on original chiller selection plus 30 tons for addition

8. Heide Hall load based on capacities of unit ventilators and cooling coils scheduled on original building plans plus 5 tons for an addition.

9. Original Connor University Center load based on average GSF per ton for three (3) similar facilities at other campuses.

10. Hyer Hall load from cooling coils scheduled on Sheet HV-10 of Hyer Hall capital renewal Project 95A33 (2017 MBH/12 = 168 tons).

11. Young Auditorium load from cooling coils scheduled on Sheet HV12 of the Multi-Purpose Auditorium Project 8810-15 (3369 MBH/12 = 280 tons).

12. Williams Center load from AHU schedule on Sheet H0.2 of Field House Addition Project 98186 (1445 MBH/12 = 120 tons). 42,650 GSF of facility cooled based on design drawings.

13. Upham Science Hall Addition load based on average of two (2) recently updated science facilities.

14. Renovated Conner Center net GSF is based on a 49,991 GSF addition with demolition of the original 41,911 GSF 1959 building. Cooling load is based on consultants design, 155 tons for 6" service to 1963 addition and 292 tons for 8" service to 1988 & 2007 additions.

15. Andersen Library & McGraw Hall loads CHW piping schematic on Sheet H4 of Andersen Library Computer Center Addt'n Project 8507-36 (GPM/2.4).

16. Roseman CW Load based on 2005 DSF Project 05L2U when 2-1/2" lines run to roof. 3-inch line to existing services were already functional.

17. Hyland Hall (College of Business & Economics) GSF based on Design Report information.

18. Starin Residence Hall GSF based on Feb 2008 Design Report.

19. GSF for cooling estimate is based on just the common spaces that are cooled within Res Hall.

20. GSF in blue font from 05/2005 General Building Report

21. GSF for cooling estimate is based on just the Res Hall common areas that will be cooled including one-half of the GSF associated to the new "link" building between Arey and Fricker. (Mead and Hunt Study - Jan 2013). GSF for campus split include one-half of link bldg GSF.

22. Res Hall GSF based on preliminary campus planning conversations (400 bed semi suite style)

23. Ambrose Health Center load based on cooling coil capacites shown on Sheet HV-3 of Student Health Center Project 6807-16 (640 MBH/12 = 53 tons).

24. Replacement facility for Esker. Sqaure footage and loads offset by Esker Demo.

25. Includes 12,000 GSF for future proposed addition

26. Includes 2,200 GSF for future proposed addition

27. Includes 18,390 GSF for future proposed addition

UW-WHITEWATER - Chilled Water Load Projections (Option 1B)

13-Mar-14

Building Characteristics					Plant Tonnage						Deg. Delta T 12	Deg. Delta T 14	Deg. Delta T 12	Deg. Delta T 14					
Building Name	Occupancy (Existing/Future)	Area (GSF)	GSF per Ton	Building Load (Tons)	Running Total (Tons)	Diversity Factor	Plant Load (Tons)	Cumm. Adj Total Load (Tons)	Plant Cap (Tons)	Surplus (Deficit)	Building Flow (GPM)	Building Flow (GPM)	Cummulative Plant Flow (GPM)	Cummulative Plant Flow (GPM)	Date Online	Connected Load (Tons)	GPR Connected Load	PR Connected Load	GPR Area (GSF)	PR Area (GSF)
Three 800 Ton Chillers (1A)	System Gain (1B)	N/A	N/A	161	161	1.00	161	161	2,000	1,839					2000					
Esker Dining Hall	Planned Demo	74,076	325	228	389	0.70	160	321	2,000	1,679	456	391	641	550	2000	228		228		74,076
Laurentide Hall (27)	Existing (4)	100,960	459	220	609	0.60	132	453	2,000	1,547	440	377	905	776	2000	220	220		100,960	
Center of the Arts	Existing (5)	153,310	268	572	1,181	0.60	343	796	2,000	1,204	1,144	981	1,592	1,364	2000	572	572		153,310	
Upham Hall	Existing (6)	112,352	250	450	1,631	0.60	270	1,066	2,000	934	900	771	2,132	1,827	2000	450	450		112,352	
Winther Hall (25)	Existing (7)	89,010	318	280	1,911	0.60	168	1,234	2,000	766	560	480	2,468	2,115	2000	280	280		89,010	
Heide Hall (26)	Existing (8)	64,752	272	238	2,149	0.60	143	1,377	2,000	623	476	408	2,753	2,360	2000	238	238		64,752	
Connor Center with '64 & '88 Addt'ns	Existing (9)	139,540	300	465	2,614	0.70	326	1,702	2,000	298	930	797	3,404	2,918	2000	465		465		139,540
Hyer Hall	Existing (10)	65,893	392	168	2,782	0.60	101	1,803	2,000	197	336	288	3,606	3,091	2000	168	168		65,893	
Moraine Bookstore	Existing	28,176	350	81	2,863	0.65	52	1,855	2,000	145	161	138	3,711	3,181	2000	81		81		28,176
Young Auditorium	Existing (11)	63,179	226	280	3,143	0.70	196	2,051	2,000	(51)	560	480	4,103	3,517	2000	280	280		63,179	
Williams Center	Existing (12)	134,232	355	120	3,263	0.65	78	2,129	2,000	(129)	240	206	4,259	3,650	2001	120	120		134,232	
Drumlin Dining Hall	Existing	33,407	325	103	3,365	0.70	72	2,201	2,000	(201)	206	176	4,403	3,774	2001	103		103		33,407
Upham Hall Renovation & Addition	New (13)	29,572	230	129	3,494	0.70	90	2,291	2,000	(291)	257	220	4,583	3,928	2003	129	129		29,572	
Connor Center Renovation & Addt'n	Exist/New (14)	8,080	N/A	(18)	3,476	0.70	-13	2,279	2,000	(279)	(36)	(31)	4,557	3,906	2005	(18)		(18)		8,080
McGraw Hall	Existing (15)	44,393	313	142	3,618	0.60	85	2,364	2,000	(364)	284	243	4,728	4,052	2005	142	142		44,393	
Andersen Library	Existing (15)	198,813	427	465	4,083	0.65	302	2,666	2,000	(666)	930	797	5,332	4,570	2005	465	465		198,813	
Roseman Building	Existing (16)	51,333	375	147	4,230	0.65	96	2,762	2,000	(762)	294	252	5,523	4,734	2005	147	147		51,333	
1400 ton electric Chiller	System Gain (2)	N/A	N/A	0	4,230	1.00	0	2,762	3,400	0	0	0	0	0	2006					
Hyland Hall (C.O.B.E.)	Existing (17)	185,225	350	529	4,759	0.60	318	3,079	3,400	321	1,058	907	6,158	5,279	2008	529	529		185,225	
Starin Hall	Existing (18)	197,200	350	563	5,323	0.60	338	3,417	3,400	(17)	1,127	966	6,834	5,858	2009	563		563		197,200
Fischer Hall	Existing (19)	6,000	350	17	5,340	0.60	10	3,428	3,400	(28)	34	29	6,855	5,876	2011	17		17		6,000
Fricker Hall	Existing (21)	15,000	350	43	5,383	0.60	26	3,453	3,400	(53)	86	73	6,906	5,920	2015	43		43		15,000
Arey Hall	Existing (21)	15,000	350	43	5,425	0.60	26	3,479	3,400	(79)	86	73	6,958	5,964	2016	43		43		15,000
Install (1) 2200 ton Steam Chiller, Remove Absorber -1 & 2	System Gain (2)	N/A	N/A	42	5,467	1.00	42	3,521	4,300	779	84	72	7,042	6,036	2017					
Res Hall #1	New (22)	130,000	350	371	5,839	0.70	260	3,781	4,300	519	743	637	7,562	6,482	2017	371		371		130,000
Res Hall #2	New (22)	130,000	350	371	6,210	0.70	260	4,041	4,300	259	743	637	8,082	6,927	2019	371		371		130,000
Benson Hall	Exist/Future	47,733	350	136	6,347	0.85	116	4,157	4,300	143	273	234	8,314	7,126	2021	136		136		47,733
Clem Hall	Exist/Future	47,788	350	137	6,483	0.85	116	4,273	4,300	27	273	234	8,546	7,325	2022	137		137		47,788
Install (1) 2200 ton Steam Chiller Remove Absorber -3	System Gain (2)	N/A	N/A	0	6,483	1.00	0	4,273	5,800	1,527	0	0	0	0	2022					
Bigelow Hall	Exist/Future	47,788	350	137	6,620	0.85	116	4,389	5,800	1,411	273	234	8,778	7,524	2024	137		137		47,788
Lee Hall	Exist/Future	47,739	350	136	6,756	0.85	116	4,505	5,800	1,295	273	234	9,010	7,723	2025	136		136		47,739
New Dining Hall	New (24)														2027					
Res Hall #3	Future	130,000	350	371	7,128	0.70	260	4,765	5,800	1,035	743	637	9,530	8,168	2027	371		371		130,000
Academic #1 (Upham)	Future	75,000	230	326	7,454	0.70	228	4,993	5,800	807	652	559	9,986	8,560	2027	326	326		75,000	
Knilans Hall	Exist/Future	53,122	350	152	7,605	0.85	129	5,122	5,800	678	304	260	10,244	8,781	2029	152		152		53,122
Tutt Hall	Exist/Future	53,122	350	152	7,757	0.85	129	5,251	5,800	549	304	260	10,502	9,002	2030	152		152		53,122
Athletic Facility	Exist/Future	80,000	355	225	7,983	0.65	146	5,398	5,800	402	451	386	10,795	9,253	2030	225		225		80,000
Res Hall #4	Future	130,000	350	371	8,354	0.70	260	5,658	5,800	142	743	637	11,315	9,699	2032	371		371		130,000
Academic #2 (Carter Mall)	Future	170,000	350	486	8,840	0.70	340	5,998	5,800	(198)	971	833	11,995	10,282	2032	486	486		170,000	
Res Hall #5	New (22)	130,000	350	371	9,211	0.70	260	6,258	5,800	(458)	743	637	12,515	10,727		371		371		130,000
Academic #3 (Hyer)	Future	68,000	350	194	9,405	0.70	136	6,394	5,800	(594)	389	333	12,787	10,961		194	194		68,000	
Ambrose Health Center	Existing/Future (23)	24,841	469	53	9,458	0.65	34	6,428	5,800	(628)	106	91	12,856	11,020		53	53		24,841	
Alumni Center Addition/ Remodel	Exist/Future	8,000	375	21	9,480	0.70	15	6,443	5,800	(643)	43	37	12,886	11,045		21	21		8,000	
McCutchan Hall	Planned Demo	38,958	0	0	9,480	0.85	0	6,443	5,800	(643)	0	0	12,886	11,045		0		0		38,958
White Hall	Planned Demo	40,538	0	0	9,480	0.85	0	6,443	5,800	(643)	0	0	12,886	11,045		0		0		40,538
Wells Hall	Planned Demo	237,870	0	0	9,480	0.85	0	6,443	5,800	(643)	0	0	12,886	11,045		0		0		237,870
														Existing Buildings		5,384	3,860	1,525	1,427,256	516,479	1,943,735
														% Split			72%	28%	73%	27%	
														Planned Future Buildings		3,147	812	2,335	245,000	897,292	1,142,292
														Total Existing & New		8,531	4,672	3,860	1,672,256	1,413,771	3,086,027
														% Split			55%	45%	54%	46%	
														Buildings outside timeline of master plan		640	269	371	100,841	130,000	230,841
														Total Existing & New & Unplanned		9,171	4,940	4,231	1,773,097	1,543,771	3,316,868
														% Split			54%	46%	53%	47%	
														Buildings scheduled for Demo		228	0	228	0	391,442	391,442
														Total Existing & New & Unplanned		8,944	4,940	4,003	1,773,097	1,152,329	2,925,426
														% Split			55%	45%	61%	39%	
														Approximate limit of 20" distribution pipe at 10 Ft/Sec							
														Unconfirmed							

Notes:

1A. Absorption Chiller #2 is performing noticably below nameplate capacity based on plant feedback. Data on a warmer than design day would indicate the other obsorbers are also underperforming. Since metered data is not available Absorber-1 & 3 is estimated to provide 700 tons each and Absorber #2 is estimated to provide 600 tons.

1B. Distribution pump gain estimated at (2) 200 HP = 85 Tons. Piping system gain estimated at 2% of 3800 Tons = 76 Tons.

2. Distribution pump gain estimated at (1) 200 HP = 42 Tons. No additional system piping gains added.

4. Laurentide (formerly Carlson Hall) load based on the size of the retrofit to the original Chrysler chiller, Project 8412-02 plus 40 tons for future addition.

5. Center of the Arts load based on average GSF per ton for four (4) similar facilities at other campuses.

6. Upham Science Hall load based on original chiller selection.

7. Winther Hall load based on original chiller selection plus 30 tons for addition.

8. Heide Hall load based on capacities of unit ventilators and cooling coils scheduled on original building plans plus 30 tons for addition.

9. Original Connor University Center load based on average GSF per ton for three (3) similar facilities at other campuses.

10. Hyer Hall load from cooling coils scheduled on Sheet HV-10 of Hyer Hall capital renewal Project 95A33 (2017 MBH/12 = 168 tons).

11. Young Auditorium load from cooling coils scheduled on Sheet HV12 of the Multi-Purpose Auditorium Project 8810-15 (3369 MBH/12 = 280 tons).

12. Williams Center load from AHU schedule on Sheet H0.2 of Field House Addition Project 98186 (1445 MBH/12 = 120 tons). 42,650 GSF of facility cooled based on design drawings.

13. Upham Science Hall Addition load based on average of two (2) recently updated science facilities.

14. Renovated Conner Center net GSF is based on a 49,991 GSF addition with demolition of the original 41,911 GSF 1959 building. Cooling load is based on consultants design, 155 tons for 6" service to 1963 addition and 292 tons for 8" service to 1988 & 2007 additions.

15. Andersen Library & McGraw Hall loads CHW piping schematic on Sheet H4 of Andersen Library Computer Center Addt'n Project 8507-36 (GPM/2.4).

16. Roseman CW Load based on 2005 DSF Project 05L2U when 2-1/2" lines run to roof. 3-inch line to existing services were already functional.

17. Hyland Hall (College of Business & Economics) GSF based on Design Report information.

18. Starin Residence Hall GSF based on Feb 2008 Design Report.

19. GSF for cooling estimate is based on just the common spaces that are cooled within Res Hall.

20. GSF in blue font from 05/2005 General Building Report

21. GSF for cooling estimate is based on just the Res Hall common areas that will be cooled including one-half of the GSF associated to the new "link" building between Arey and Fricker. (Mead and Hunt Study - Jan 2013). GSF for campus split include one-half of link bldg GSF.

22. Res Hall GSF based on preliminary campus planning conversations (400 bed semi suite style)

23. Ambrose Health Center load based on cooling coil capacites shown on Sheet HV-3 of Student Health Center Project 6807-16 (640 MBH/12 = 53 tons).

24. Replacement facility for Esker. Sqaure footage and loads offset by Esker Demo.

25. Includes 12,000 GSF for future proposed addition

26. Includes 2,200 GSF for future proposed addition

27. Includes 18,390 GSF for future proposed addition

UW-WHITEWATER - Chilled Water Load Projections (Option 2A)

13-Mar-14

Building Characteristics					Plant Tonnage						Deg. Delta T 12	Deg. Delta T 14	Deg. Delta T 12	Deg. Delta T 14					
Building Name	Occupancy (Existing/Future)	Area (GSF)	GSF per Ton	Building Load (Tons)	Running Total (Tons)	Diversity Factor	Plant Load (Tons)	Cumm. Adj Total Load (Tons)	Plant Cap (Tons)	Surplus (Deficit)	Building Flow (GPM)	Building Flow (GPM)	Cummulative Plant Flow (GPM)	Cummulative Plant Flow (GPM)	Date Online	Connected Load (Tons)	GPR Connected Load	PR Connected Load	GPR Area (GSF)	PR Area (GSF)
Three 800 Ton Chillers (1A)	System Gain (1B)	N/A	N/A	161	161	1.00	161	161	2,000	1,839					2000					
Esker Dining Hall	Planned Demo	74,076	325	228	389	0.70	160	321	2,000	1,679	456	391	641	550	2000	228		228		74,076
Laurentide Hall (27)	Existing (4)	77,666	353	220	609	0.60	132	453	2,000	1,547	440	377	905	776	2000	220	220		77,666	
Center of the Arts	Existing (5)	153,310	268	572	1,181	0.60	343	796	2,000	1,204	1,144	981	1,592	1,364	2000	572	572		153,310	
Upham Hall	Existing (6)	112,352	250	450	1,631	0.60	270	1,066	2,000	934	900	771	2,132	1,827	2000	450	450		112,352	
Winther Hall (25)	Existing (7)	77,010	275	280	1,911	0.60	168	1,234	2,000	766	560	480	2,468	2,115	2000	280	280		77,010	
Heide Hall (26)	Existing (8)	62,552	263	238	2,149	0.60	143	1,377	2,000	623	476	408	2,753	2,360	2000	238	238		62,552	
Connor Center with '64 & '88 Addt'ns	Existing (9)	139,540	300	465	2,614	0.70	326	1,702	2,000	298	930	797	3,404	2,918	2000	465		465		139,540
Hyer Hall	Existing (10)	65,893	392	168	2,782	0.60	101	1,803	2,000	197	336	288	3,606	3,091	2000	168	168		65,893	
Moraine Bookstore	Existing	28,176	350	81	2,863	0.65	52	1,855	2,000	145	161	138	3,711	3,181	2000	81		81		28,176
Young Auditorium	Existing (11)	63,179	226	280	3,143	0.70	196	2,051	2,000	(51)	560	480	4,103	3,517	2000	280	280		63,179	
Williams Center	Existing (12)	134,232	355	120	3,263	0.65	78	2,129	2,000	(129)	240	206	4,259	3,650	2001	120	120		134,232	
Drumlin Dining Hall	Existing	33,407	325	103	3,365	0.70	72	2,201	2,000	(201)	206	176	4,403	3,774	2001	103		103		33,407
Upham Hall Renovation & Addition	New (13)	29,572	230	129	3,494	0.70	90	2,291	2,000	(291)	257	220	4,583	3,928	2003	129	129		29,572	
Connor Center Renovation & Addt'n	Exist/New (14)	8,080	N/A	(18)	3,476	0.70	-13	2,279	2,000	(279)	(36)	(31)	4,557	3,906	2005	(18)		(18)		8,080
McGraw Hall	Existing (15)	44,393	313	142	3,618	0.60	85	2,364	2,000	(364)	284	243	4,728	4,052	2005	142	142		44,393	
Andersen Library	Existing (15)	198,813	427	465	4,083	0.65	302	2,666	2,000	(666)	930	797	5,332	4,570	2005	465	465		198,813	
Roseman Building	Existing (16)	51,333	375	147	4,230	0.65	96	2,762	2,000	(762)	294	252	5,523	4,734	2005	147	147		51,333	
1400 ton electric Chiller	System Gain (2)	N/A	N/A	0	4,230	1.00	0	2,762	3,400	0	0	0	0	0	2006					
Hyland Hall (C.O.B.E.)	Existing (17)	185,225	350	529	4,759	0.60	318	3,079	3,400	321	1,058	907	6,158	5,279	2008	529	529		185,225	
Starin Hall	Existing (18)	197,200	350	563	5,323	0.60	338	3,417	3,400	(17)	1,127	966	6,834	5,858	2009	563		563		197,200
Fischer Hall	Existing (19)	6,000	350	17	5,340	0.60	10	3,428	3,400	(28)	34	29	6,855	5,876	2011	17		17		6,000
Fricker Hall	Existing (21)	15,000	350	43	5,383	0.60	26	3,453	3,400	(53)	86	73	6,906	5,920	2015	43		43		15,000
Arey Hall	Existing (21)	15,000	350	43	5,425	0.60	26	3,479	3,400	(79)	86	73	6,958	5,964	2016	43		43		15,000
Install (1) 1500 ton Steam Chiller, In new Addition	System Gain (2)	N/A	N/A	42	5,467	1.00	42	3,521	4,900	1,379	84	72	7,042	6,036	2017					
Res Hall #1	New (22)	130,000	350	371	5,839	0.70	260	3,781	4,900	1,119	743	637	7,562	6,482	2017	371		371		130,000
Res Hall #2	New (22)	130,000	350	371	6,210	0.70	260	4,041	4,900	859	743	637	8,082	6,927	2019	371		371		130,000
Install (1) 1500 ton Steam Chiller Remove Absorber -1 & 2	System Gain (2)	N/A	N/A	0	6,210	1.00	0	4,041	5,100	1,059	0	0	0	0	2021					
Benson Hall	Exist/Future	47,733	350	136	6,347	0.85	116	4,157	5,100	943	273	234	8,314	7,126	2021	136		136		47,733
Clem Hall	Exist/Future	47,788	350	137	6,483	0.85	116	4,273	5,100	827	273	234	8,546	7,325	2022	137		137		47,788
Bigelow Hall	Exist/Future	47,788	350	137	6,620	0.85	116	4,389	5,900	1,511	273	234	8,778	7,524	2024	137		137		47,788
Lee Hall	Exist/Future	47,739	350	136	6,756	0.85	116	4,505	5,900	1,395	273	234	9,010	7,723	2025	136		136		47,739
Install (1) 1500 ton Electric Chiller Remove Absorber -3	System Gain (2)	N/A	N/A	0	6,756	1.00	0	4,505	5,900	1,395	0	0	0	0	2027					
New Dining Hall	New (24)														2027					
Res Hall #3	Future	130,000	350	371	7,128	0.70	260	4,765	5,900	1,135	743	637	9,530	8,168	2027	371		371		130,000
Academic #1 (Upham)	Future	75,000	230	326	7,454	0.70	228	4,993	5,900	907	652	559	9,986	8,560	2037	326	326		75,000	
Knilans Hall	Exist/Future	53,122	350	152	7,605	0.85	129	5,122	5,900	778	304	260	10,244	8,781	2029	152		152		53,122
Tutt Hall	Exist/Future	53,122	350	152	7,757	0.85	129	5,251	5,900	649	304	260	10,502	9,002	2030	152		152		53,122
Athletic Facility	Exist/Future	80,000	355	225	7,983	0.65	146	5,398	5,900	502	451	386	10,795	9,253	2030	225		225		80,000
Res Hall #4	Future	130,000	350	371	8,354	0.70	260	5,658	5,900	242	743	637	11,315	9,699	2032	371		371		130,000
Academic #2 (Carter Mall)	Future	170,000	350	486	8,840	0.70	340	5,998	5,900	(98)	971	833	11,995	10,282	2027	486	486		170,000	
Res Hall #5	New (22)	130,000	350	371	9,211	0.70	260	6,258	5,900	(358)	743	637	12,515	10,727		371		371		130,000
Academic #3 (Hyer)	Future	68,000	350	194	9,405	0.70	136	6,394	5,900	(494)	389	333	12,787	10,961		194	194		68,000	
Ambrose Health Center	Existing/Future (23)	24,841	469	53	9,458	0.65	34	6,428	5,900	(528)	106	91	12,856	11,020		53	53		24,841	
Alumni Center Addition/ Remodel	Exist/Future	8,000	375	21	9,480	0.70	15	6,443	5,900	(543)	43	37	12,886	11,045		21	21		8,000	
McCutchan Hall	Planned Demo	38,958	0	0	9,480	0.85	0	6,443	5,900	(543)	0	0	12,886	11,045		0		0		38,958
White Hall	Planned Demo	40,538	0	0	9,480	0.85	0	6,443	5,900	(543)	0	0	12,886	11,045		0		0		40,538
Wells Hall	Planned Demo	237,870	0	0	9,480	0.85	0	6,443	5,900	(543)	0	0	12,886	11,045		0		0		237,870
														Existing Buildings		**5,384**	**3,860**	**1,525**	**1,389,762**	**516,479**	**1,906,241**
														% Split			**72%**	**28%**	**73%**	**27%**	
														Planned Future Buildings		**3,147**	**812**	**2,335**	**245,000**	**897,292**	**1,142,292**
														Total Existing & New		**8,531**	**4,672**	**3,860**	**1,634,762**	**1,413,771**	**3,048,533**
														% Split			**55%**	**45%**	**54%**	**46%**	
														Buildings outside timeline of master plan		**640**	**269**	**371**	**100,841**	**130,000**	**230,841**
														Total Existing & New & Unplanned		**9,171**	**4,940**	**4,231**	**1,735,603**	**1,543,771**	**3,279,374**
														% Split			**54%**	**46%**	**53%**	**47%**	
														Buildings scheduled for Demo		**228**	**0**	**228**	**0**	**391,442**	**391,442**
														Total Existing & New & Unplanned		**8,944**	**4,940**	**4,003**	**1,735,603**	**1,152,329**	**2,887,932**
														% Split			**55%**	**45%**	**60%**	**40%**	
														Approximate limit of 20" distribution pipe at 10 Ft/Sec							
														Unconfirmed							

Notes:

1A. Absorption Chiller #2 is performing noticably below nameplate capacity based on plant feedback. Data on a warmer than design day would indicate the other obsorbers are also underperforming. Since metered data is not available Absorber-1 & 3 is estimated to provide 700 tons each and Absorber #2 is estimated to provide 600 tons.

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5. Center of the Arts load based on average GSF per ton for four (4) similar facilities at other campuses.

6. Upham Science Hall load based on original chiller selection.

7. Winther Hall load based on original chiller selection plus 30 tons for addition.

8. Heide Hall load based on capacities of unit ventilators and cooling coils scheduled on original building plans plus 5 tons for addition.

9. Original Connor University Center load based on average GSF per ton for three (3) similar facilities at other campuses.

10. Hyer Hall load from cooling coils scheduled on Sheet HV-10 of Hyer Hall capital renewal Project 95A33 (2017 MBH/12 = 168 tons).

11. Young Auditorium load from cooling coils scheduled on Sheet HV12 of the Multi-Purpose Auditorium Project 8810-15 (3369 MBH/12 = 280 tons).

12. Williams Center load from AHU schedule on Sheet H0.2 of Field House Addition Project 98186 (1445 MBH/12 = 120 tons). 42,650 GSF of facility cooled based on design drawings.

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18. Starin Residence Hall GSF based on Feb 2008 Design Report.

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20. GSF in blue font from 05/2005 General Building Report

21. GSF for cooling estimate is based on just the Res Hall common areas that will be cooled including one-half of the GSF associated to the new "link" building between Arey and Fricker. (Mead and Hunt Study - Jan 2013). GSF for campus split include one-half of link bldg GSF.

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24. Replacement facility for Esker. Sqaure footage and loads offset by Esker Demo.

25. Includes 12,000 GSF for future proposed addition

26. Includes 2,200 GSF for future proposed addition

27. Includes 18,390 GSF for future proposed addition

UW-WHITEWATER - Chilled Water Load Projections (Option 2B)

3-13-14

Building Characteristics					Plant Tonnage						Deg. Delta T 12	Deg. Delta T 14	Deg. Delta T 12	Deg. Delta T 14					
Building Name	Occupancy (Existing/Future)	Area (GSF)	GSF per Ton	Building Load (Tons)	Running Total (Tons)	Diversity Factor	Plant Load (Tons)	Cumm. Adj Total Load (Tons)	Plant Cap (Tons)	Surplus (Deficit)	Building Flow (GPM)	Building Flow (GPM)	Cummulative Plant Flow (GPM)	Cummulative Plant Flow (GPM)	Date Online	Connected Load (Tons)	GPR Connected Load	PR Connected Load	GPR Area (GSF)	PR Area (GSF)
Three 800 Ton Chillers (1A)	System Gain (1B)	N/A	N/A	161	161	1.00	161	161	2,000	1,839					2000					
Esker Dining Hall	Planned Demo	74,076	325	228	389	0.70	160	321	2,000	1,679	456	391	641	550	2000	228		228		74,076
Laurentide Hall (27)	Existing (4)	77,666	353	220	609	0.60	132	453	2,000	1,547	440	377	905	776	2000	220	220		77,666	
Center of the Arts	Existing (5)	153,310	268	572	1,181	0.60	343	796	2,000	1,204	1,144	981	1,592	1,364	2000	572	572		153,310	
Upham Hall	Existing (6)	112,352	250	450	1,631	0.60	270	1,066	2,000	934	900	771	2,132	1,827	2000	450	450		112,352	
Winther Hall (25)	Existing (7)	77,010	275	280	1,911	0.60	168	1,234	2,000	766	560	480	2,468	2,115	2000	280	280		77,010	
Heide Hall (26)	Existing (8)	62,552	263	238	2,149	0.60	143	1,377	2,000	623	476	408	2,753	2,360	2000	238	238		62,552	
Connor Center with '64 & '88 Addt'ns	Existing (9)	139,540	300	465	2,614	0.70	326	1,702	2,000	298	930	797	3,404	2,918	2000	465		465		139,540
Hyer Hall	Existing (10)	65,893	392	168	2,782	0.60	101	1,803	2,000	197	336	288	3,606	3,091	2000	168	168		65,893	
Moraine Bookstore	Existing	28,176	350	81	2,863	0.65	52	1,855	2,000	145	161	138	3,711	3,181	2000	81		81		28,176
Young Auditorium	Existing (11)	63,179	226	280	3,143	0.70	196	2,051	2,000	(51)	560	480	4,103	3,517	2000	280	280		63,179	
Williams Center	Existing (12)	134,232	355	120	3,263	0.65	78	2,129	2,000	(129)	240	206	4,259	3,650	2001	120	120		134,232	
Drumlin Dining Hall	Existing	33,407	325	103	3,365	0.70	72	2,201	2,000	(201)	206	176	4,403	3,774	2001	103		103		33,407
Upham Hall Renovation & Addition	New (13)	29,572	230	129	3,494	0.70	90	2,291	2,000	(291)	257	220	4,583	3,928	2003	129	129		29,572	
Connor Center Renovation & Addt'n	Exist/New (14)	8,080	N/A	(18)	3,476	0.70	-13	2,279	2,000	(279)	(36)	(31)	4,557	3,906	2005	(18)		(18)		8,080
McGraw Hall	Existing (15)	44,393	313	142	3,618	0.60	85	2,364	2,000	(364)	284	243	4,728	4,052	2005	142	142		44,393	
Andersen Library	Existing (15)	198,813	427	465	4,083	0.65	302	2,666	2,000	(666)	930	797	5,332	4,570	2005	465	465		198,813	
Roseman Building	Existing (16)	51,333	375	147	4,230	0.65	96	2,762	2,000	(762)	294	252	5,523	4,734	2005	147	147		51,333	
1400 ton electric Chiller	System Gain (2)	N/A	N/A	0	4,230	1.00	0	2,762	3,400	0	0	0	0	0	2006					
Hyland Hall (C.O.B.E.)	Existing (17)	185,225	350	529	4,759	0.60	318	3,079	3,400	321	1,058	907	6,158	5,279	2008	529	529		185,225	
Starin Hall	Existing (18)	197,200	350	563	5,323	0.60	338	3,417	3,400	(17)	1,127	966	6,834	5,858	2009	563		563		197,200
Fischer Hall	Existing (19)	6,000	350	17	5,340	0.60	10	3,428	3,400	(28)	34	29	6,855	5,876	2011	17		17		6,000
Fricker Hall	Existing (21)	15,000	350	43	5,383	0.60	26	3,453	3,400	(53)	86	73	6,906	5,920	2015	43		43		15,000
Arey Hall	Existing (21)	15,000	350	43	5,425	0.60	26	3,479	3,400	(79)	86	73	6,958	5,964	2016	43		43		15,000
Install (2) 1500 ton Steam Chillers, Remove All Absorbers	System Gain (2)	N/A	N/A	42	5,467	1.00	42	3,521	4,400	879	84	72	7,042	6,036	2017					
Res Hall #1	New (22)	130,000	350	371	5,839	0.70	260	3,781	4,400	619	743	637	7,562	6,482	2017	371		371		130,000
Res Hall #2	New (22)	130,000	350	371	6,210	0.70	260	4,041	4,400	359	743	637	8,082	6,927	2019	371		371		130,000
Benson Hall	Exist/Future	47,733	350	136	6,347	0.85	116	4,157	4,400	243	273	234	8,314	7,126	2021	136		136		47,733
Clem Hall	Exist/Future	47,788	350	137	6,483	0.85	116	4,273	4,400	127	273	234	8,546	7,325	2022	137		137		47,788
Bigelow Hall	Exist/Future	47,788	350	137	6,620	0.85	116	4,389	4,400	11	273	234	8,778	7,524	2024	137		137		47,788
Lee Hall	Exist/Future	47,739	350	136	6,756	0.85	116	4,505	4,400	(105)	273	234	9,010	7,723	2025	136		136		47,739
Install (1) 1500 ton Electric Chiller In new addition	System Gain (2)	N/A	N/A	0	6,756	1.00	0	4,505	5,900	1,395	0	0	0	0	2027					
New Dining Hall	New (24)														2027					
Res Hall #3	Future	130,000	350	371	7,128	0.70	260	4,765	5,900	1,135	743	637	9,530	8,168	2027	371		371		130,000
Academic #1 (Upham)	Future	75,000	230	326	7,454	0.70	228	4,993	5,900	907	652	559	9,986	8,560	2037	326	326		75,000	
Knilans Hall	Exist/Future	53,122	350	152	7,605	0.85	129	5,122	5,900	778	304	260	10,244	8,781	2029	152		152		53,122
Tutt Hall	Exist/Future	53,122	350	152	7,757	0.85	129	5,251	5,900	649	304	260	10,502	9,002	2030	152		152		53,122
Athletic Facility	Exist/Future	80,000	355	225	7,983	0.65	146	5,398	5,900	502	451	386	10,795	9,253	2030	225		225		80,000
Res Hall #4	Future	130,000	350	371	8,354	0.70	260	5,658	5,900	242	743	637	11,315	9,699	2032	371		371		130,000
Academic #2 (Carter Mall)	Future	170,000	350	486	8,840	0.70	340	5,998	5,900	(98)	971	833	11,995	10,282	2027	486	486		170,000	
Res Hall #5	New (22)	130,000	350	371	9,211	0.70	260	6,258	5,900	(358)	743	637	12,515	10,727		371		371		130,000
Academic #3 (Hyer)	Future	68,000	350	194	9,405	0.70	136	6,394	5,900	(494)	389	333	12,787	10,961		194	194		68,000	
Ambrose Health Center	Existing/Future (23)	24,841	469	53	9,458	0.65	34	6,428	5,900	(528)	106	91	12,856	11,020		53	53		24,841	
Alumni Center Addition/ Remodel	Exist/Future	8,000	375	21	9,480	0.70	15	6,443	5,900	(543)	43	37	12,886	11,045		21	21		8,000	
McCutchan Hall	Planned Demo	38,958	0	0	9,480	0.85	0	6,443	5,900	(543)	0	0	12,886	11,045		0		0		38,958
White Hall	Planned Demo	40,538	0	0	9,480	0.85	0	6,443	5,900	(543)	0	0	12,886	11,045		0		0		40,538
Wells Hall	Planned Demo	237,870	0	0	9,480	0.85	0	6,443	5,900	(543)	0	0	12,886	11,045		0		0		237,870
													Existing Buildings			**5,384**	**3,860**	**1,525**	**1,389,762**	**516,479**	**1,906,241**
													% Split				**72%**	**28%**	**73%**	**27%**	
													Planned Future Buildings			**3,372**	**812**	**2,560**	**245,000**	**897,292**	**1,142,292**
													Total Existing & New			**8,757**	**4,672**	**4,085**	**1,634,762**	**1,413,771**	**3,048,533**
													% Split				**53%**	**47%**	**54%**	**46%**	
													Buildings outside timeline of master plan			**640**	**269**	**371**	**100,841**	**130,000**	**230,841**
													Total Existing & New & Unplanned			**9,397**	**4,940**	**4,457**	**1,735,603**	**1,543,771**	**3,279,374**
													% Split				**53%**	**47%**	**53%**	**47%**	
													Buildings scheduled for Demo			**228**	**0**	**228**	**0**	**391,442**	**391,442**
													Total Existing & New & Unplanned			**9,169**	**4,940**	**4,229**	**1,735,603**	**1,152,329**	**2,887,932**
													% Split				**54%**	**46%**	**60%**	**40%**	
													Approximate limit of 20" distribution pipe at 10 Ft/Sec								
													Unconfirmed								

Notes:

1A. Absorption Chiller #2 is performing noticably below nameplate capacity based on plant feedback. Data on a warmer than design day would indicate the other obsorbers are also underperforming. Since metered data is not available Absorber-1 & 3 is estimated to provide 700 tons each and Absorber #2 is estimated to provide 600 tons.

1B. Distribution pump gain estimated at (2) 200 HP = 85 Tons. Piping system gain estimated at 2% of 3800 Tons = 76 Tons.

2. Distribution pump gain estimated at (1) 200 HP = 42 Tons. No additional system piping gains added.

4. Laurentide (formerly Carlson Hall) load based on the size of the retrofit to the original Chrysler chiller, Project 8412-02 plus 40 tons for future addition.

5. Center of the Arts load based on average GSF per ton for four (4) similar facilities at other campuses.

6. Upham Science Hall load based on original chiller selection.

7. Winther Hall load based on original chiller selection Plus 30 tons for future addition.

8. Heide Hall load based on capacities of unit ventilators and cooling coils scheduled on original building plans plus 5 tons for future addition.

9. Original Connor University Center load based on average GSF per ton for three (3) similar facilities at other campuses.

10. Hyer Hall load from cooling coils scheduled on Sheet HV-10 of Hyer Hall capital renewal Project 95A33 (2017 MBH/12 = 168 tons).

11. Young Auditorium load from cooling coils scheduled on Sheet HV12 of the Multi-Purpose Auditorium Project 8810-15 (3369 MBH/12 = 280 tons).

12. Williams Center load from AHU schedule on Sheet H0.2 of Field House Addition Project 98186 (1445 MBH/12 = 120 tons). 42,650 GSF of facility cooled based on design drawings.

13. Upham Science Hall Addition load based on average of two (2) recently updated science facilities.

14. Renovated Conner Center net GSF is based on a 49,991 GSF addition with demolition of the original 41,911 GSF 1959 building. Cooling load is based on consultants design, 155 tons for 6" service to 1963 addition and 292 tons for 8" service to 1988 & 2007 additions.

15. Andersen Library & McGraw Hall loads CHW piping schematic on Sheet H4 of Andersen Library Computer Center Addt'n Project 8507-36 (GPM/2.4).

16. Roseman CW Load based on 2005 DSF Project 05L2U when 2-1/2" lines run to roof. 3-inch line to existing services were already functional.

17. Hyland Hall (College of Business & Economics) GSF based on Design Report information.

18. Starin Residence Hall GSF based on Feb 2008 Design Report.

19. GSF for cooling estimate is based on just the common spaces that are cooled within Res Hall.

20. GSF in blue font from 05/2005 General Building Report

21. GSF for cooling estimate is based on just the Res Hall common areas that will be cooled including one-half of the GSF associated to the new "link" building between Arey and Fricker. (Mead and Hunt Study - Jan 2013). GSF for campus split include one-half of link bldg GSF.

22. Res Hall GSF based on preliminary campus planning conversations (400 bed semi suite style)

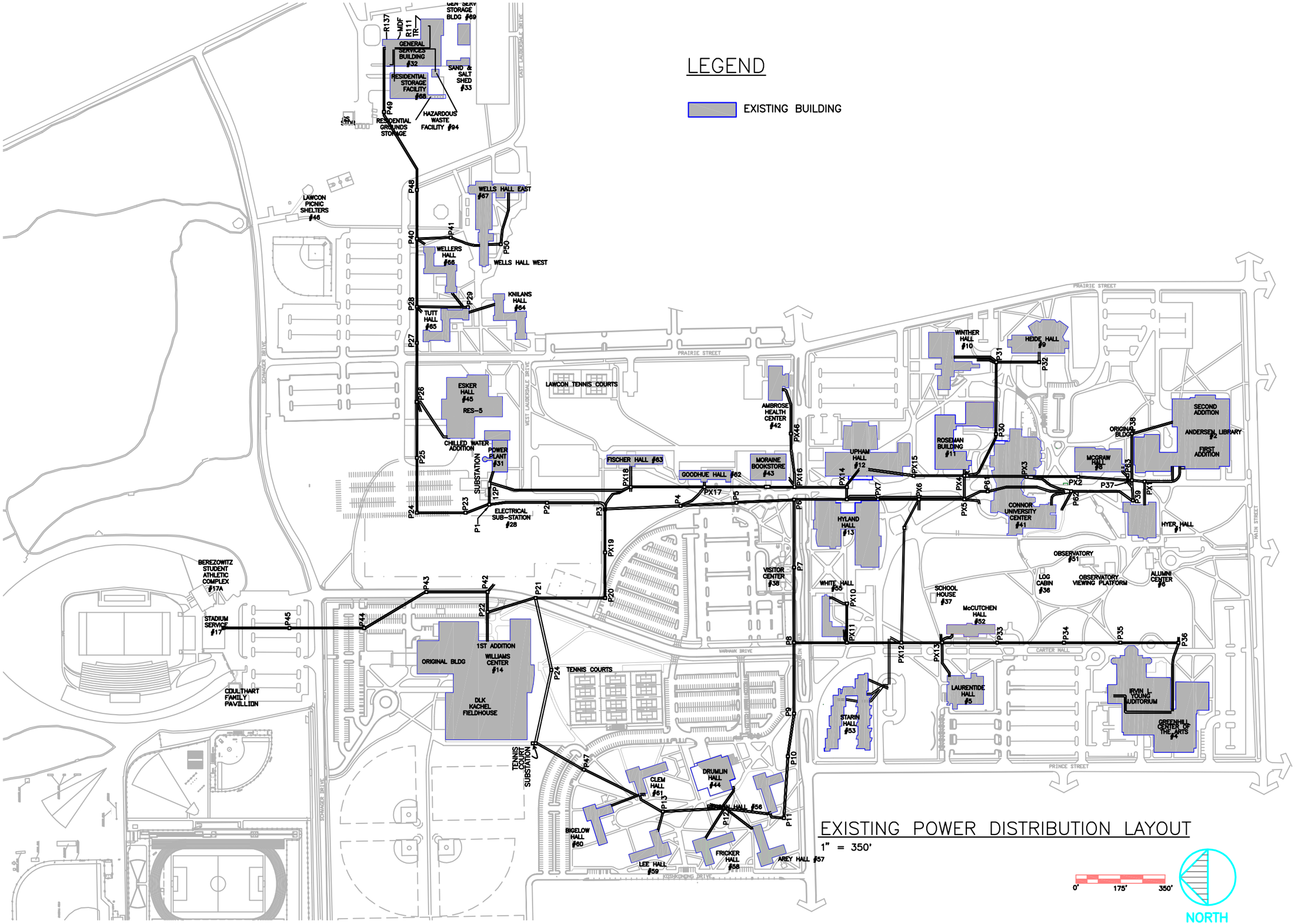
23. Ambrose Health Center load based on cooling coil capacites shown on Sheet HV-3 of Student Health Center Project 6807-16 (640 MBH/12 = 53 tons).

24. Replacement facility for Esker. Sqaure footage and loads offset by Esker Demo.

25. Includes 12,000 GSF for future proposed addition

26. Includes 2,200 GSF for future proposed addition

27. Includes 18,390 GSF for future proposed addition



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Department of Administration
Division of Facilities Development

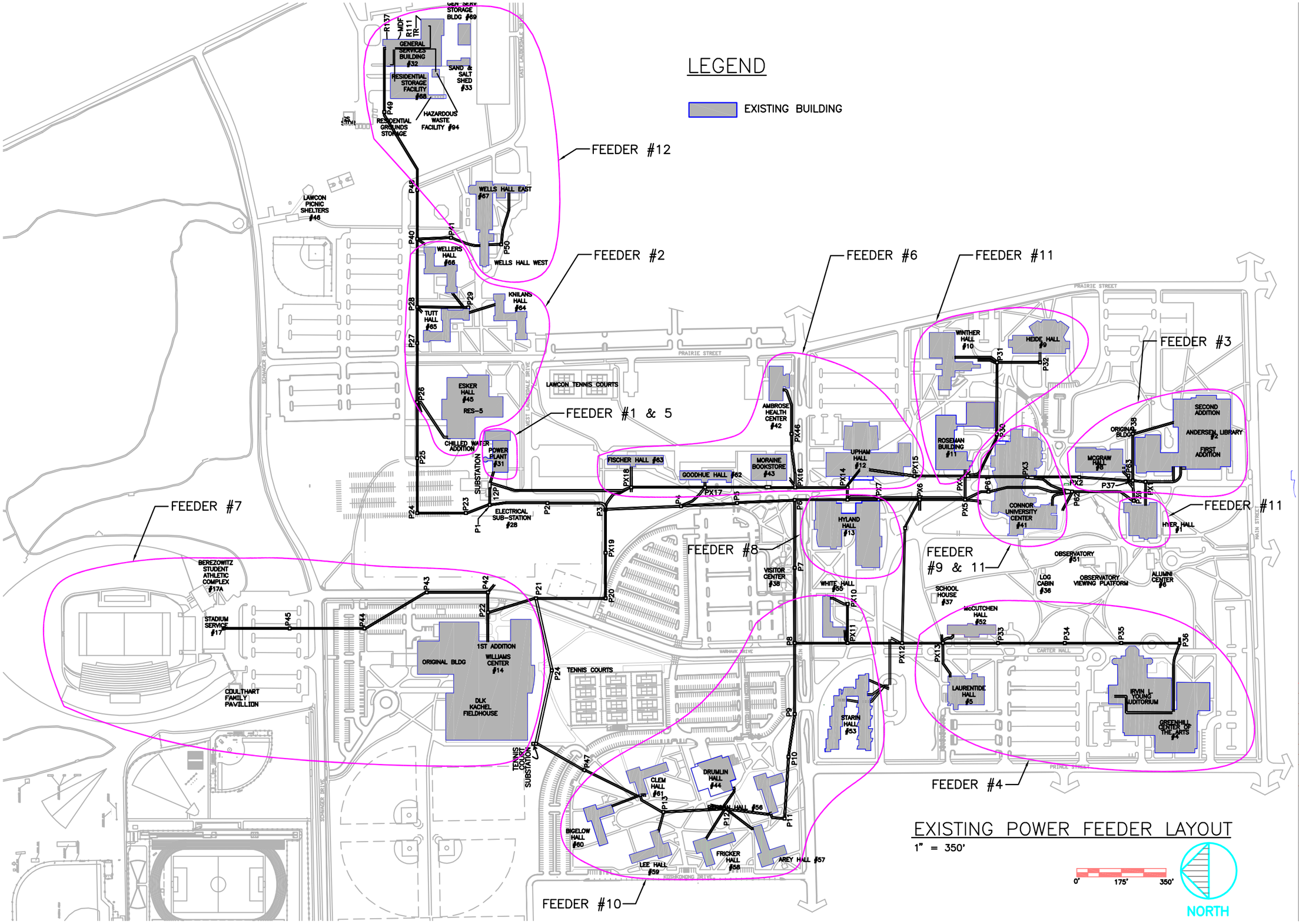
UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

MASTER PLAN
UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

Sheet Title: Site Plan – Existing Power Distribution Layout

Revisions:		
No.	Date:	Description:

Graphic Scale	0' 87.5'175' 350' 525'
DFD Number	12I1D
Set Type	PR
Date Issued	4/1/2014
Sheet Number	C.1



EXISTING POWER FEEDER LAYOUT

1" = 350'

0' 175' 350'

NORTH

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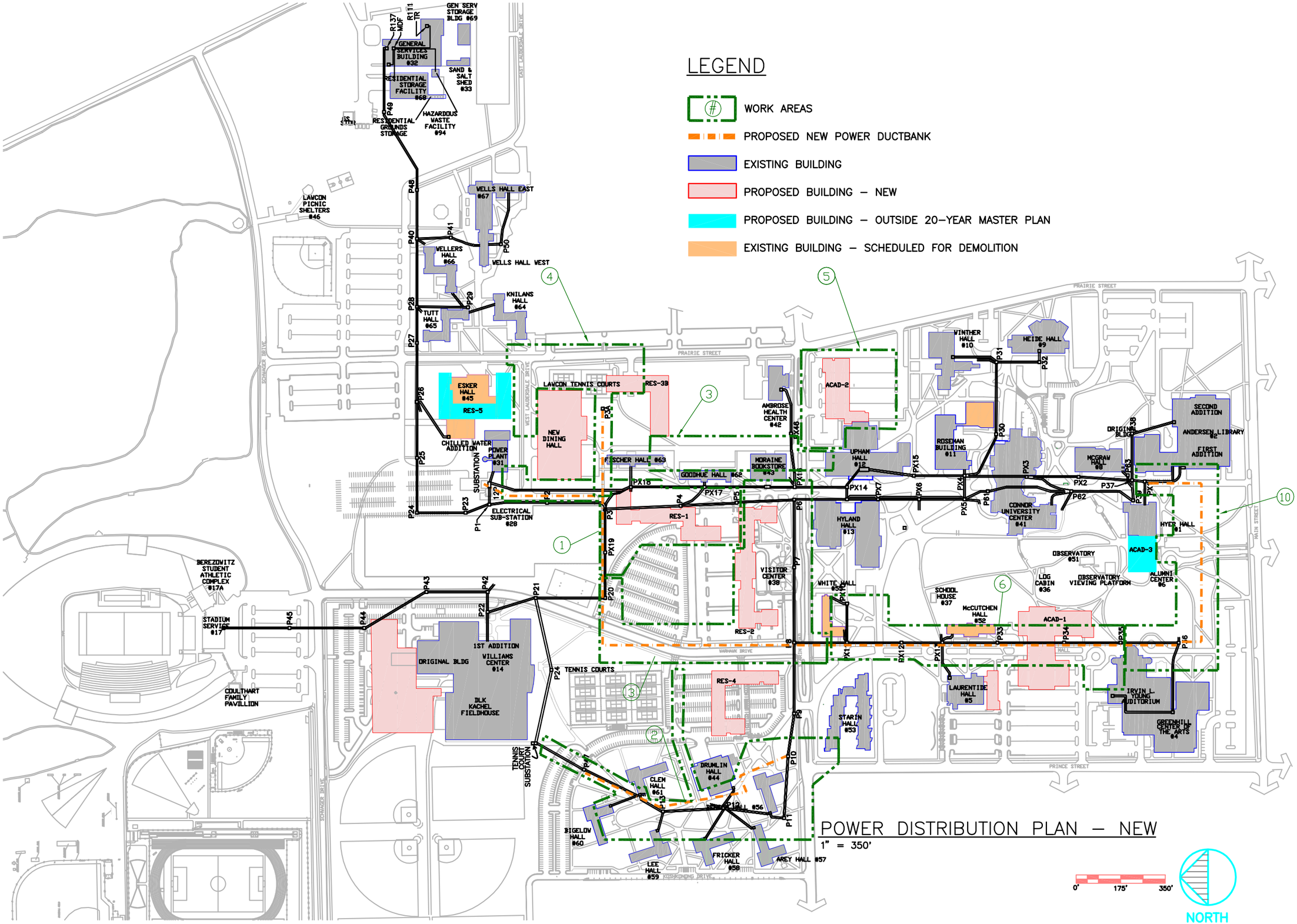
Sheet Title: EXISTING POWER FEEDER LAYOUT

Revisions:

No.	Date:	Description:

Graphic Scale	0' 87.5' 175' 350' 525'
DFD Number	12I1D
Set Type	PR
Date Issued	4/1/2014
Sheet Number	C.2



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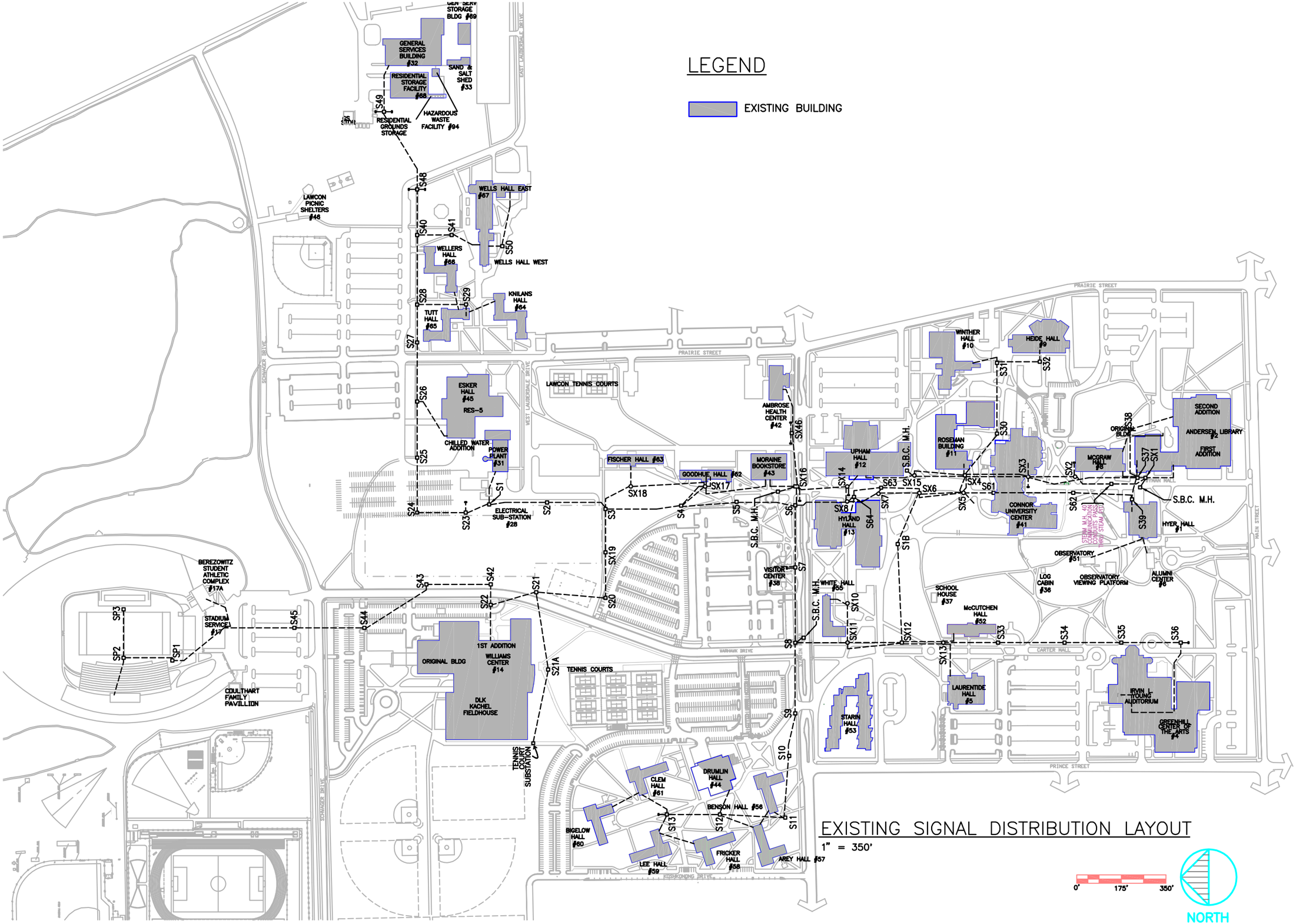
UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

Sheet Title: POWER DISTRIBUTION PLAN – NEW

Revisions:

No.	Date:	Description:

Graphic Scale	0' 87.5' 175' 350' 525'
DFD Number	12I1D
Set Type	PR
Date Issued	4/1/2014
Sheet Number	C.3



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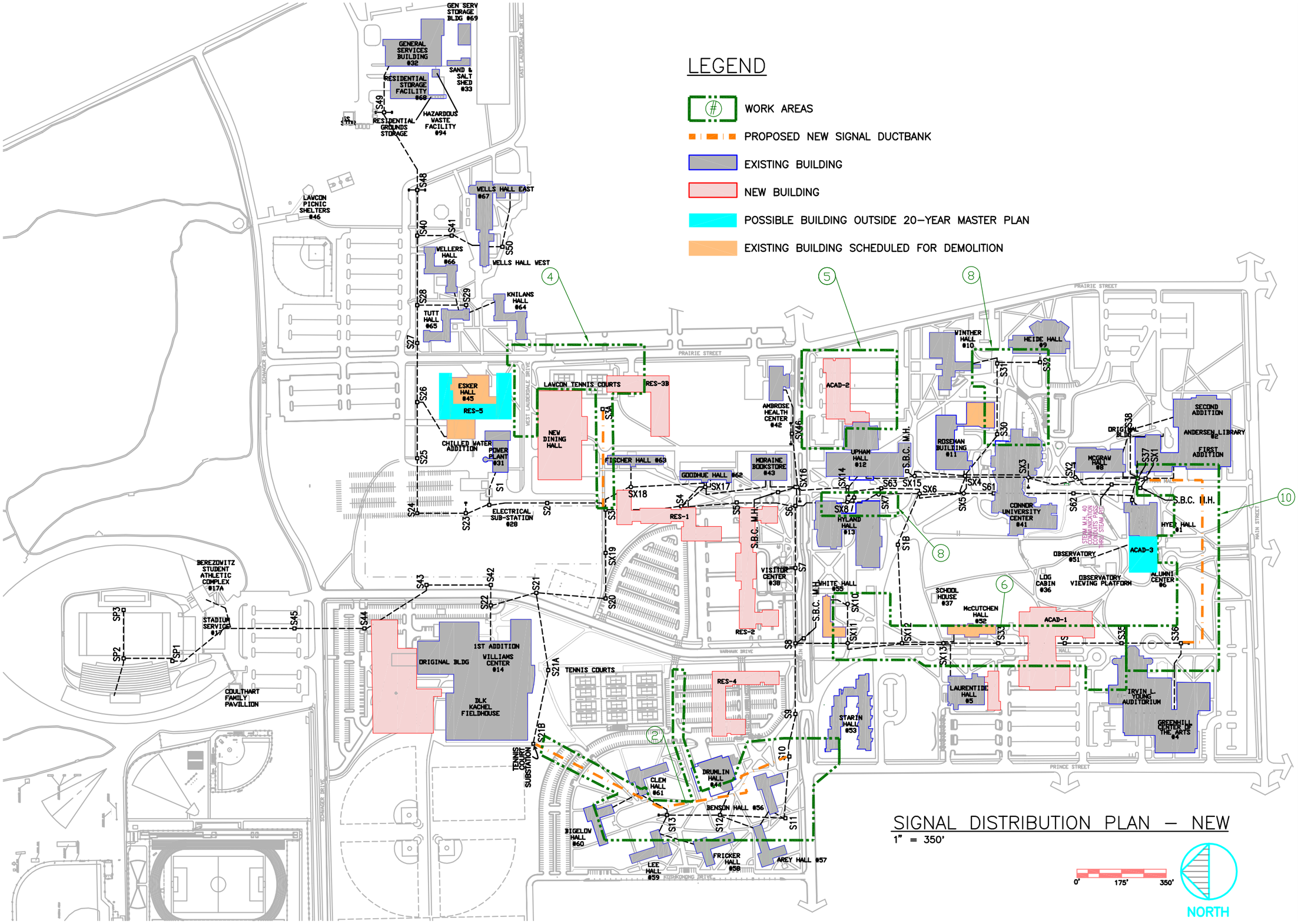
MASTER PLAN
UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

Sheet Title: Site Plan – Existing Signal Distribution Layout

Revisions:		
No.	Date:	Description:

Graphic Scale	0' 87.5' 175' 350' 525'
DFD Number	12I1D
Set Type	PR
Date Issued	4/1/2014
Sheet Number	D.1



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MASTER PLAN
UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

Sheet Title: SIGNAL DISTRIBUTION PLAN – NEW

Revisions:

No.	Date:	Description:

Graphic Scale	0' 87.5' 175' 350' 525'
DFD Number	12I1D
Set Type	PR
Date Issued	4/1/2014
Sheet Number	D.2

General

Title: AFT Fathom Model
Analysis run on: 7/10/2014 8:54:34 AM
Application version: AFT Fathom Version 7.0 (2008.12.03)
Input File: E:\212jobs\212145.00\hvac\calcs\UWW CW Campus B.7 Flow Model.fth
Scenario: Base Scenario
Output File: E:\212jobs\212145.00\hvac\calcs\UWW CW Campus B.7 Flow Model_1.out

Execution Time= 3.00 seconds
Total Number Of Head/Pressure Iterations= 2598
Total Number Of Flow Iterations= 342
Total Number Of Temperature Iterations= 0
Number Of Pipes= 180
Number Of Junctions= 159
Matrix Method= Gaussian Elimination

Pressure/Head Tolerance= 0.0001 relative change
Flow Rate Tolerance= 0.0001 relative change
Flow Relaxation= (Automatic)
Flow relaxation automatically lowered to 0.05
Pressure Relaxation= (Automatic)

Constant Fluid Property Model
Fluid Database: AFT Standard
Fluid: Water at 1 atm
Max Fluid Temperature Data= 212 deg. F
Min Fluid Temperature Data= 32 deg. F
Temperature= 42 deg. F
Density= 62.42752 lbm/ft3
Viscosity= 3.62639 lbm/hr-ft
Vapor Pressure= 0.12804 psia
Viscosity Model= Newtonian

Atmospheric Pressure= 1 atm
Gravitational Acceleration= 1 g
Turbulent Flow Above Reynolds Number= 4000
Laminar Flow Below Reynolds Number= 2300

Total Inflow= 34.52 gal/min
Total Outflow= 34.52 gal/min
Maximum Pressure is 82.90 psia at Junction 123 Outlet
Minimum Pressure is 9.847 psia at Junction 412 Inlet

Pump Summary

Jct	Name	Vol. Flow (gal/min)	dP (psid)	dH (feet)	Overall Efficiency (Percent)	Speed (Percent)	Overall Power (hp)	BEP (gal/min)
3	EXPump#11	3,433	72.14	166.4	100.0	100.0	144.4	N/A
123	EXPump#2	3,292	73.59	169.7	100.0	100.0	141.3	N/A
412	EXPump#1	3,241	72.82	168.0	100.0	100.0	137.6	N/A

Valve Summary

Jct	Name	Valve Type	Vol. Flow (gal/min)	dP Stag. (psid)	dH (feet)	P Inlet Static (psia)	Cv	K	Valve State
223	Valve	REGULAR	3,292.09	0.2674	0.6167	10.24	6,369.580	0.4550	Open
224	Valve	REGULAR	3,432.59	0.2907	0.6705	10.24	6,369.580	0.4550	Open
272	Valve	REGULAR	9,931.00	0.2656	0.6126	80.94	19,278.061	0.3000	Open
273	Valve	REGULAR	9,931.00	0.1770	0.4083	10.84	23,613.197	0.3000	Open
411	Valve	REGULAR	3,240.84	0.2651	0.6116	10.16	6,296.428	0.4561	Open

Jct	Name	Valve Type	Vol. Flow (gal/min)	dP Stag. (psid)	dH (feet)	P Inlet Static (psia)	Cv	K	Valve State
128	Esker	FCV	456.00	67.9875	156.8251	80.60	55.326	469.8929	Open
298	Bookstore	FCV	161.00	59.2124	136.5837	76.10	20.932	3,282.9200	Open
311	Drumlin	FCV	206.00	51.5781	118.9740	72.33	28.696	1,746.7500	Open
316	Williams	FCV	240.00	54.4525	125.6041	73.76	32.538	4,287.1060	Open
322	Fisher	FCV	35.00	62.2051	143.4870	77.60	4.440	72,977.5900	Open
331	Hyland	FCV	1,058.00	45.3228	104.5449	69.15	157.221	58.1895	Open
334	Upham	FCV	1,157.00	53.2329	122.7910	73.10	158.645	180.3361	Open
338	Roseman	FCV	294.00	50.4954	116.4766	71.75	41.391	839.5703	Open
348	Winther	FCV	500.00	48.4099	111.6659	70.71	71.893	278.2874	Open
355	Heide	FCV	466.00	46.1227	106.3900	69.64	68.645	305.2404	Open
359	McGraw	FCV	284.00	40.9914	94.5538	66.99	44.377	730.3911	Open
366	Library	FCV	930.00	38.8862	89.6979	65.93	149.200	203.8915	Open
372	Univ. Add	FCV	222.00	46.1879	106.5404	69.59	32.679	1,346.8580	Open
373	Univ. Center	FCV	781.00	41.3237	95.3204	67.16	121.544	97.3637	Open
378	Hyer	FCV	336.00	45.7586	105.5503	69.39	49.692	582.4976	Open
390	Starin	FCV	1,127.00	50.7598	117.0864	71.86	158.251	181.2347	Open
400	Laurentide	FCV	360.00	51.8215	119.5353	72.41	50.030	574.6512	Open
406	Center of Arts	FCV	1,144.00	45.1159	104.0678	69.08	170.390	156.3317	Open
446	Ayer	FCV	88.00	51.9394	119.8072	72.50	12.216	9,638.9750	Open
448	Fricker	FCV	86.00	52.0749	120.1200	72.57	11.922	10,118.8600	Open
170	Check Valve	CHECK	3,292.09	0.0000	0.0000	82.79	N/A	0.0000	Open
171	Check Valve	CHECK	3,432.59	0.0000	0.0000	81.25	N/A	0.0000	Open
413	Check Valve	CHECK	3,240.84	0.0000	0.0000	81.97	N/A	0.0000	Open

Heat Exchanger Summary

Jct	Name	Vol. Flow (gal/min)	dP (psid)	dH (feet)
129	Heat Exchanger	456.00	0.360291	0.831075
299	Heat Exchanger	161.00	0.021537	0.049679
312	Heat Exchanger	206.00	0.035259	0.081331
317	Heat Exchanger	240.00	0.015961	0.036816
323	Heat Exchanger	35.00	0.001018	0.002348
332	Heat Exchanger	1,058.00	0.930049	2.145320
336	Heat Exchanger	1,157.00	0.370933	0.855621
339	Heat Exchanger	294.00	0.071817	0.165659
349	Heat Exchanger	500.00	0.207718	0.479138
354	Heat Exchanger	466.00	0.180429	0.416191
360	Heat Exchanger	284.00	0.056123	0.129456
365	Heat Exchanger	930.00	0.239659	0.552816
374	Heat Exchanger	222.00	0.040949	0.094455
375	Heat Exchanger	781.00	0.506800	1.169022
380	Heat Exchanger	336.00	0.093802	0.216371
392	Heat Exchanger	1,127.00	0.351946	0.811825
401	Heat Exchanger	360.00	0.107681	0.248385
407	Heat Exchanger	1,144.00	0.362644	0.836502
447	Heat Exchanger	88.00	0.006434	0.014842
449	Heat Exchanger	86.00	0.006145	0.014175

Pipe Output Table

Pipe	Name	Vol. Flow Rate (gal/min)	Velocity (feet/sec)	dP Stag. Total (psid)	dP Static Total (psid)	dH (feet)	P Static In (psia)	P Static Out (psia)
3	CWS 20"	9,931.00	11.4634	0.3742390	0.3742390	0.863248	81.559	81.184
128	CWR 20"	9,931.00	11.4634	0.0748478	0.0748478	0.172650	10.115	10.040
148	CWR 12"	3,292.09	9.3390	0.0433088	0.0433088	0.099899	9.977	9.933
149	CWR 20"	6,517.15	7.5228	0.0502363	0.0502363	0.115879	10.544	10.494
150	CWS 10"	3,292.09	13.3945	0.1031802	0.1031802	0.238003	82.792	82.689
151	CWS 10"	3,432.59	13.9662	0.1174431	0.1174431	0.270903	81.247	81.130
152	CWS 20"	6,517.15	7.5228	0.0502363	0.0502363	0.115879	82.113	82.063
156	CWR 6"	456.00	7.3129	0.1554065	0.1554065	0.358472	12.401	12.246
187	CWS 20"	9,475.00	8.9291	0.4652623	0.4652623	1.073209	80.972	80.507
188	CWR 20"	9,475.00	8.9291	0.4652623	0.4652623	1.073209	11.413	10.948
190	CWS 10"	3,292.09	13.3945	0.1072778	0.1072778	0.247455	82.899	82.792
191	CWS 10"	3,432.59	13.9662	0.1162579	0.1162579	0.268169	81.364	81.247
193	CWR 12"	3,432.59	9.8390	0.0481358	0.0481358	0.111034	9.935	9.887
249	CWR 12"	3,292.09	9.3390	0.0433088	0.0433088	0.099899	10.287	10.244
250	CWR 12"	3,432.59	9.7376	0.0469011	0.0469011	0.108186	10.286	10.239
288	CWS 20"	9,931.00	11.4634	0.0748478	0.0748478	0.172650	81.015	80.941
289	CWR 20"	9,931.00	11.4634	0.0748478	0.0748478	0.172650	10.372	10.297
292	CWR 20"	9,931.00	9.3588	0.0509870	0.0509870	0.117610	10.895	10.844
293	CWS 20"	9,931.00	9.3588	0.0509870	0.0509870	0.117610	80.970	80.919
303	Pipe	456.00	4.6342	0.1401001	0.1401001	0.323166	80.744	80.604
304	Pipe	456.00	4.6342	0.2802003	0.2802003	0.646331	81.365	81.084
305	Pipe	456.00	4.6342	0.2802003	0.2802003	0.646331	81.054	80.774
306	Pipe	456.00	4.6342	0.2802003	0.2802003	0.646331	11.620	11.340
307	Pipe	456.00	4.6342	0.2802003	0.2802003	0.646331	11.931	11.650
308	Pipe	456.00	4.6342	0.1401001	0.1401001	0.323166	12.101	11.961
309	Pipe	9,475.00	8.9291	0.9305246	0.9305246	2.146418	80.417	79.486
311	Pipe	161.00	1.6362	0.0788492	0.0788492	0.181879	76.203	76.124
312	Pipe	161.00	1.6362	0.0788492	0.0788492	0.181879	16.834	16.755
313	Pipe	161.00	1.6362	0.0197123	0.0197123	0.045470	76.120	76.101
314	Pipe	161.00	1.7879	0.0091469	0.0091469	0.021099	16.885	16.876
315	Pipe	161.00	1.6362	0.0197123	0.0197123	0.045470	16.858	16.838
316	Pipe	9,475.00	8.9291	2.3263113	2.3263113	5.366045	79.396	77.070
317	Pipe	9,440.00	8.8961	1.3857667	1.3857667	3.196514	16.240	14.854
318	Pipe	9,279.00	8.7444	0.3350340	0.3350340	0.772815	75.706	75.371
319	Pipe	3,251.00	4.7847	1.0943648	1.0943648	2.524344	75.732	74.637
320	Pipe	9,279.00	8.7444	0.3350340	0.3350340	0.772815	16.593	16.258
321	Pipe	3,251.00	4.7847	1.0943648	1.0943648	2.524344	18.048	16.954
322	Pipe	3,251.00	4.7847	0.2735912	0.2735912	0.631086	74.610	74.336
323	Pipe	3,251.00	4.7847	0.2735912	0.2735912	0.631086	18.349	18.076
324	Pipe	620.00	2.3148	0.0405501	0.0405501	0.093536	74.454	74.414
325	Pipe	620.00	2.3148	0.4136115	0.4136115	0.954067	74.407	73.993
326	Pipe	620.00	2.3148	0.4136115	0.4136115	0.954067	19.006	18.593
327	Pipe	620.00	3.5471	0.1180403	0.1180403	0.272281	18.537	18.419
328	Pipe	380.00	3.8618	1.2859939	1.2859939	2.966370	73.929	72.643
329	Pipe	206.00	2.0935	0.3866000	0.3866000	0.891761	72.714	72.327
330	Pipe	206.00	2.2877	0.0286667	0.0286667	0.066125	20.744	20.715
331	Pipe	206.00	2.0935	0.3866000	0.3866000	0.891761	20.685	20.299
332	Pipe	380.00	3.8618	1.2859939	1.2859939	2.966370	20.228	18.942
333	Pipe	240.00	1.3731	0.1696299	0.1696299	0.391281	74.017	73.847
334	Pipe	240.00	1.3731	0.0598694	0.0598694	0.138099	73.845	73.785
335	Pipe	240.00	1.3731	0.0199565	0.0199565	0.046033	73.782	73.762
336	Pipe	240.00	1.5392	0.0099463	0.0099463	0.022943	19.307	19.297
337	Pipe	240.00	1.3731	0.1696299	0.1696299	0.391281	19.199	19.030
338	Pipe	240.00	1.3731	0.0598694	0.0598694	0.138099	19.262	19.202

Pipe	Name	Vol. Flow Rate (gal/min)	Velocity (feet/sec)	dP Stag. Total (psid)	dP Static Total (psid)	dH (feet)	P Static In (psia)	P Static Out (psia)
339	Pipe	240.00	1.3731	0.0199565	0.0199565	0.046033	19.284	19.264
340	Pipe	9,440.00	8.8961	1.3857667	1.3857667	3.196514	77.074	75.688
341	Pipe	9,475.00	8.9291	2.3263113	2.3263113	5.366045	14.850	12.524
342	Pipe	35.00	0.3557	0.0062343	0.0062343	0.014380	77.606	77.600
343	Pipe	35.00	0.3887	0.0006011	0.0006011	0.001387	15.394	15.394
344	Pipe	35.00	0.3557	0.0062343	0.0062343	0.014380	15.393	15.387
345	Pipe	6,028.00	7.0117	0.6608523	0.6608523	1.524372	75.555	74.894
346	Pipe	6,028.00	7.0117	0.6608523	0.6608523	1.524372	17.438	16.777
347	Pipe	1,058.00	10.7522	2.8545432	2.8545432	6.584504	74.308	71.453
348	Pipe	1,058.00	10.7522	2.1409073	2.1409073	4.938378	71.292	69.151
349	Pipe	1,058.00	11.7494	0.6122679	0.6122679	1.412303	23.677	23.065
350	Pipe	1,058.00	10.7522	2.1409073	2.1409073	4.938378	22.286	20.145
351	Pipe	1,058.00	10.7522	2.8545432	2.8545432	6.584504	19.983	17.129
352	Pipe	6,028.00	7.0117	0.0826065	0.0826065	0.190546	74.838	74.756
353	Pipe	4,970.00	5.7811	0.5120137	0.5120137	1.181049	74.862	74.350
354	Pipe	4,970.00	5.7811	0.5120137	0.5120137	1.181049	18.194	17.682
355	Pipe	6,028.00	7.0117	0.0826065	0.0826065	0.190546	17.576	17.494
356	Pipe	4,970.00	5.7811	0.1706712	0.1706712	0.393683	74.312	74.141
357	Pipe	1,157.00	6.6193	0.9757525	0.9757525	2.250744	74.071	73.095
358	Pipe	1,157.00	7.4201	0.1830249	0.1830249	0.422179	19.787	19.604
359	Pipe	1,157.00	6.6193	0.9757525	0.9757525	2.250744	19.308	18.333
360	Pipe	4,970.00	5.7811	0.1706712	0.1706712	0.393683	18.403	18.232
361	Pipe	294.00	3.2649	0.0551044	0.0551044	0.127108	21.241	21.186
363	Pipe	294.00	2.9878	0.3040449	0.3040449	0.701333	72.052	71.748
364	Pipe	3,813.00	7.3273	1.2197071	1.2197071	2.813468	74.005	72.785
365	Pipe	3,813.00	7.3273	0.6586419	0.6586419	1.519273	72.719	72.060
366	Pipe	3,813.00	7.3273	0.2439414	0.2439414	0.562694	71.995	71.751
367	Pipe	3,813.00	7.3273	0.2439414	0.2439414	0.562694	20.520	20.276
368	Pipe	3,813.00	7.3273	0.6586419	0.6586419	1.519273	20.210	19.552
369	Pipe	3,813.00	7.3273	1.2197071	1.2197071	2.813468	19.486	18.266
370	Pipe	294.00	2.9878	0.3040449	0.3040449	0.701333	21.126	20.822
371	Pipe	3,519.00	6.7623	0.5638565	0.5638565	1.300634	21.138	20.574
372	Pipe	3,519.00	6.7623	0.5638565	0.5638565	1.300634	71.804	71.240
373	Pipe	500.00	5.0814	0.6685889	0.6685889	1.542217	21.940	21.272
374	Pipe	500.00	5.0814	0.6685889	0.6685889	1.542218	71.375	70.706
375	Pipe	500.00	5.5526	0.1479696	0.1479696	0.341318	22.262	22.114
376	Pipe	3,019.00	5.8015	0.8543476	0.8543476	1.970703	71.322	70.467
377	Pipe	3,019.00	5.8015	0.8543476	0.8543476	1.970703	22.073	21.219
378	Pipe	466.00	4.7358	0.1460408	0.1460408	0.336869	22.295	22.149
379	Pipe	466.00	4.7358	0.1460408	0.1460408	0.336869	70.543	70.397
380	Pipe	466.00	4.7358	0.7302039	0.7302039	1.684343	70.366	69.635
381	Pipe	466.00	5.1750	0.1296878	0.1296878	0.299148	23.483	23.354
382	Pipe	466.00	4.7358	0.8762447	0.8762447	2.021212	23.203	22.326
383	Pipe	2,553.00	6.6532	0.8526142	0.8526142	1.966704	70.396	69.543
384	Pipe	2,553.00	6.6532	0.8526142	0.8526142	1.966704	22.854	22.002
385	Pipe	1,214.00	6.9454	2.5700176	2.5700176	5.928196	69.517	66.947
387	Pipe	284.00	2.8862	0.0455705	0.0455705	0.105116	25.996	25.951
388	Pipe	1,214.00	6.9454	2.5700176	2.5700176	5.928196	25.398	22.828
389	Pipe	284.00	2.8862	0.2278527	0.2278527	0.525582	25.894	25.667
390	Pipe	930.00	5.3206	0.1793458	0.1793458	0.413692	26.389	26.210
391	Pipe	930.00	5.3206	0.6405206	0.6405206	1.477473	26.173	25.532
392	Pipe	930.00	5.3206	0.2562083	0.2562083	0.590989	26.683	26.427
393	Pipe	930.00	5.9643	0.1212315	0.1212315	0.279642	26.995	26.874
394	Pipe	930.00	5.3206	0.2562083	0.2562083	0.590989	66.186	65.930

Pipe	Name	Vol. Flow Rate (gal/min)	Velocity (feet/sec)	dP Stag. Total (psid)	dP Static Total (psid)	dH (feet)	P Static In (psia)	P Static Out (psia)
395	Pipe	930.00	5.3206	0.1793458	0.1793458	0.413692	66.403	66.224
396	Pipe	930.00	5.3206	0.6405206	0.6405206	1.477473	67.081	66.440
397	Pipe	1,339.00	3.4895	0.1059853	0.1059853	0.244474	23.177	23.071
398	Pipe	1,339.00	3.4895	0.1059853	0.1059853	0.244474	69.759	69.654
399	Pipe	1,117.00	2.9109	0.1753608	0.1753608	0.404500	23.377	23.202
400	Pipe	1,117.00	2.9109	0.1753608	0.1753608	0.404500	69.678	69.503
401	Pipe	222.00	2.2561	0.1075728	0.1075728	0.248136	69.701	69.594
402	Pipe	222.00	2.4654	0.0328725	0.0328725	0.075826	23.399	23.366
403	Pipe	222.00	2.2561	0.1075728	0.1075728	0.248136	23.332	23.224
404	Pipe	781.00	7.9371	1.9761910	1.9761910	4.558431	69.136	67.160
405	Pipe	781.00	8.6732	0.3432265	0.3432265	0.791712	25.753	25.410
406	Pipe	781.00	7.9371	1.9761910	1.9761910	4.558431	24.986	23.010
407	Pipe	336.00	0.8756	0.0026883	0.0026883	0.006201	69.555	69.552
409	Pipe	336.00	3.4147	0.0782956	0.0782956	0.180603	69.466	69.388
410	Pipe	336.00	3.7314	0.0705428	0.0705428	0.162719	23.614	23.544
411	Pipe	336.00	3.4147	0.0782956	0.0782956	0.180603	23.465	23.387
412	Pipe	336.00	0.8756	0.0107531	0.0107531	0.024804	23.444	23.433
413	Pipe	336.00	0.8756	0.0026883	0.0026883	0.006201	23.432	23.429
414	Pipe	9,475.00	8.9291	0.9305246	0.9305246	2.146418	12.434	11.503
415	Pipe	2,631.00	6.8565	0.5164117	0.5164117	1.191194	74.174	73.657
416	Pipe	2,631.00	6.8565	0.5164117	0.5164117	1.191194	18.703	18.187
417	Pipe	1,127.00	7.2277	0.1741540	0.1741540	0.401717	21.028	20.854
418	Pipe	1,127.00	6.4476	0.1854929	0.1854929	0.427872	72.045	71.860
419	Pipe	1,127.00	6.4476	0.1854929	0.1854929	0.427872	20.574	20.389
420	Pipe	1,127.00	6.4476	0.7419718	0.7419718	1.711488	72.842	72.100
421	Pipe	1,127.00	6.4476	0.7419718	0.7419718	1.711488	20.334	19.592
422	Pipe	1,127.00	6.4476	0.3709859	0.3709859	0.855744	19.537	19.166
423	Pipe	1,127.00	6.4476	0.3709859	0.3709859	0.855744	19.111	18.740
424	Pipe	1,127.00	6.4476	0.3709859	0.3709859	0.855744	73.694	73.323
425	Pipe	1,127.00	6.4476	0.3709859	0.3709859	0.855744	73.268	72.897
426	Pipe	1,504.00	3.9195	0.3526318	0.3526318	0.813407	73.871	73.518
427	Pipe	1,504.00	3.9195	0.3526318	0.3526318	0.813407	19.269	18.917
428	Pipe	1,504.00	3.9195	0.0881580	0.0881580	0.203352	73.499	73.411
429	Pipe	1,504.00	3.9195	0.0881580	0.0881580	0.203352	19.376	19.288
430	Pipe	1,504.00	3.9195	0.5289478	0.5289478	1.220111	73.392	72.863
431	Pipe	1,504.00	3.9195	0.5289478	0.5289478	1.220111	19.924	19.395
432	Pipe	360.00	3.6586	0.3570172	0.3570172	0.823523	20.294	19.937
433	Pipe	360.00	3.6586	0.0892543	0.0892543	0.205881	20.402	20.313
434	Pipe	360.00	3.6586	0.3570172	0.3570172	0.823523	72.877	72.520
435	Pipe	360.00	3.6586	0.0892543	0.0892543	0.205881	72.501	72.412
436	Pipe	360.00	3.9979	0.0801741	0.0801741	0.184936	20.573	20.492
437	Pipe	1,144.00	3.2453	0.4754213	0.4754213	1.096643	72.896	72.420
438	Pipe	1,144.00	3.2453	0.4754213	0.4754213	1.096643	20.432	19.956
439	Pipe	1,144.00	7.3367	0.1791545	0.1791545	0.413251	23.888	23.709
440	Pipe	1,144.00	6.5449	1.5274863	1.5274863	3.523415	72.190	70.662
441	Pipe	1,144.00	6.5449	1.5274863	1.5274863	3.523415	70.606	69.078
442	Pipe	1,144.00	6.5449	1.5274863	1.5274863	3.523415	21.798	20.271
443	Pipe	1,144.00	6.5449	0.0381872	0.0381872	0.088085	23.421	23.382
444	Pipe	1,144.00	6.5449	1.5274863	1.5274863	3.523415	23.382	21.855
445	CWR 20"	3,240.84	3.7409	0.0360477	0.0360477	0.083150	10.781	10.745
446	CWR 12"	3,240.84	9.2893	0.0862774	0.0862774	0.199014	10.242	10.155
447	CWR 12"	3,240.84	9.2893	0.0431387	0.0431387	0.099507	9.890	9.847
448	CWR 10"	3,240.84	13.1860	0.1040908	0.1040908	0.240104	82.075	81.970
449	CWS 10"	3,240.84	13.1860	0.2081817	0.2081817	0.480207	81.970	81.762

Pipe	Name	Vol. Flow Rate (gal/min)	Velocity (feet/sec)	dP Stag. Total (psid)	dP Static Total (psid)	dH (feet)	P Static In (psia)	P Static Out (psia)
450	CWS 20"'	3,240.84	3.7409	0.0088369	0.0088369	0.020384	82.610	82.601
452	Pipe	9,931.00	10.9477	0.0333375	0.0333375	0.076899	10.226	10.193
453	Pipe	9,931.00	10.9477	0.0333375	0.0333375	0.076899	81.262	81.229
465	Pipe	174.00	1.7683	0.1593641	0.1593641	0.367601	72.722	72.563
466	Pipe	86.00	0.8740	0.0062415	0.0062415	0.014397	72.579	72.573
467	Pipe	88.00	0.8943	0.0455536	0.0455536	0.105077	72.579	72.533
468	Pipe	174.00	1.7683	0.1593641	0.1593641	0.367601	20.467	20.307
469	Pipe	86.00	0.9551	0.0029539	0.0029539	0.006814	20.497	20.494
470	Pipe	86.00	0.8740	0.0062415	0.0062415	0.014397	20.489	20.482
471	Pipe	88.00	0.8943	0.0455536	0.0455536	0.105077	20.528	20.482
472	Pipe	88.00	0.8943	0.0130153	0.0130153	0.030022	72.532	72.519
473	Pipe	88.00	0.8943	0.0130153	0.0130153	0.030022	72.518	72.505
474	Pipe	88.00	0.9773	0.0030779	0.0030779	0.007100	20.565	20.561
475	Pipe	88.00	0.8943	0.0130153	0.0130153	0.030022	20.556	20.543
476	Pipe	88.00	0.8943	0.0130153	0.0130153	0.030022	20.542	20.529
483	Pipe	284.00	2.8862	0.2278527	0.2278527	0.525582	67.215	66.988
484	Pipe	336.00	0.8756	0.0107531	0.0107531	0.024804	69.551	69.541
485	Pipe	336.00	0.8756	0.0005377	0.0005377	0.001240	23.433	23.433

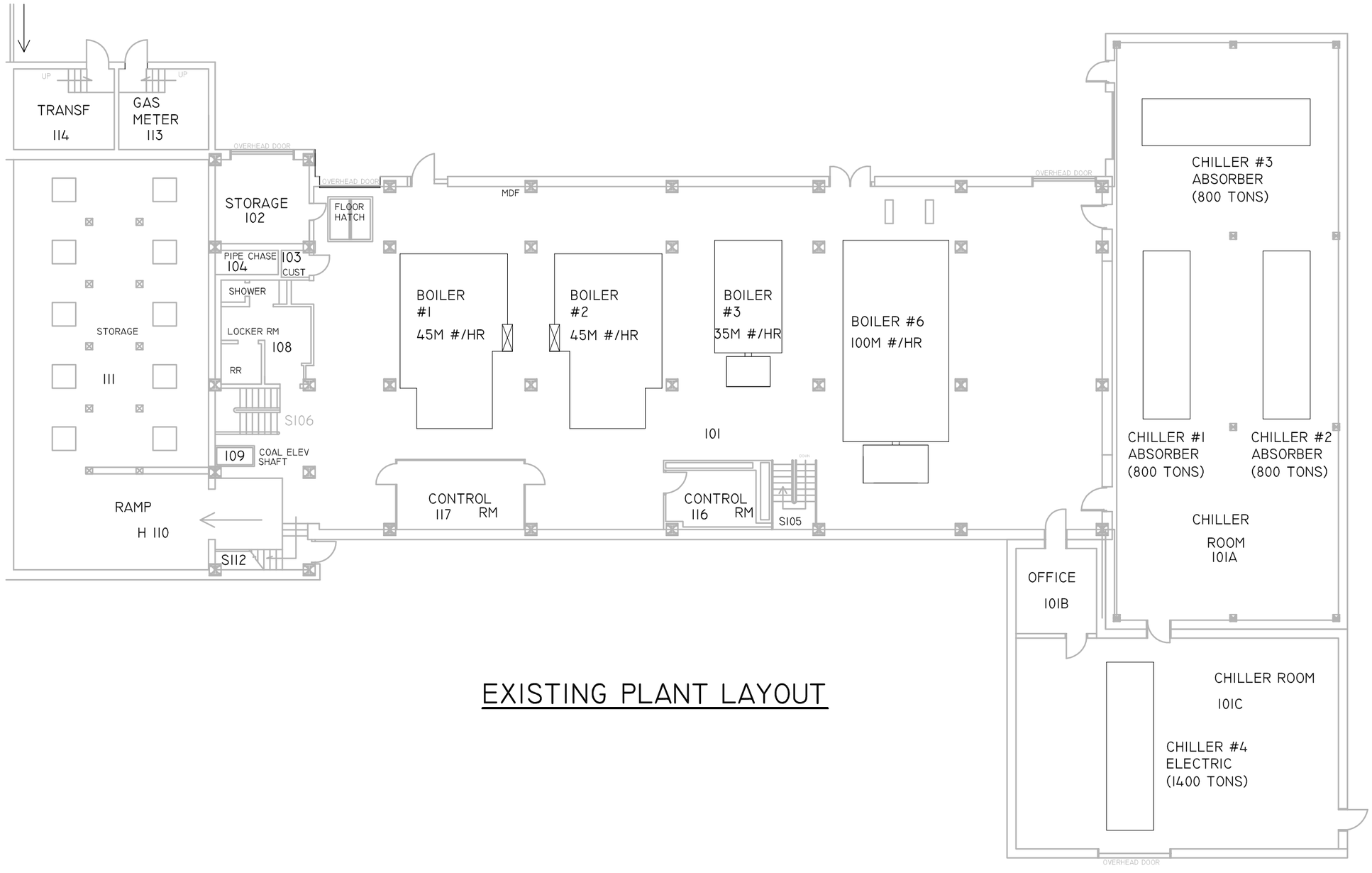
All Junction Table

Jct	Name	P Static In (psia)	P Static Out (psia)	P Stag. In (psia)	P Stag. Out (psia)	Vol. Flow Rate Thru Jct (gal/min)
3	EXPump#11	9.887	81.364	10.54	82.68	3,432.59
123	EXPump#2	9.933	82.899	10.52	84.11	3,292.09
126	Tee or Wye	10.308	10.308	10.93	10.93	N/A
127	Tee or Wye	81.631	81.631	82.44	82.44	N/A
128	Esker	80.604	12.401	80.75	12.76	456.00
129	Heat Exchanger	12.246	12.101	12.61	12.25	456.00
170	Check Valve	82.792	82.792	84.00	84.00	3,292.09
171	Check Valve	81.247	81.247	82.56	82.56	3,432.59
180	Tee or Wye	10.557	10.557	10.87	10.87	N/A
181	Tee or Wye	82.039	82.039	82.49	82.49	N/A
223	Valve	10.244	9.977	10.83	10.56	3,292.09
224	Valve	10.239	9.935	10.88	10.59	3,432.59
268	Tee or Wye	81.116	81.116	81.51	81.51	N/A
269	Tee or Wye	11.092	11.092	11.48	11.48	N/A
272	Valve	80.941	80.970	81.83	81.56	9,931.00
273	Valve	10.844	10.372	11.43	11.26	9,931.00
284	Bend	10.297	10.226	11.18	11.03	9,931.00
285	Bend	81.229	81.015	82.04	81.90	9,931.00
286	Bend	81.084	81.054	81.23	81.20	456.00
287	Bend	80.774	80.744	80.92	80.89	456.00
288	Bend	11.650	11.620	11.80	11.77	456.00
289	Bend	11.961	11.931	12.11	12.08	456.00
290	Bend	80.507	80.417	81.04	80.95	9,475.00
291	Bend	79.486	79.396	80.02	79.93	9,475.00
293	Bend	12.524	12.434	13.06	12.97	9,475.00
294	Tee or Wye	75.943	75.943	76.22	76.22	N/A
295	Tee or Wye	16.495	16.495	16.77	16.77	N/A
296	Bend	76.124	76.120	76.14	76.14	161.00
297	Bend	16.838	16.834	16.86	16.85	161.00

Jct	Name	P Static In (psia)	P Static Out (psia)	P Stag. In (psia)	P Stag. Out (psia)	Vol. Flow Rate Thru Jct (gal/min)
298	Bookstore	76.101	16.885	76.12	16.91	161.00
299	Heat Exchanger	16.876	16.858	16.90	16.88	161.00
300	Tee or Wye	75.570	75.570	75.89	75.89	N/A
301	Bend	74.637	74.610	74.79	74.76	3,251.00
302	Tee or Wye	16.792	16.792	17.11	17.11	N/A
303	Bend	18.076	18.048	18.23	18.20	3,251.00
304	Tee or Wye	74.345	74.345	74.49	74.49	N/A
305	Tee or Wye	18.331	18.331	18.50	18.50	N/A
306	Bend	74.414	74.407	74.45	74.44	620.00
307	Tee or Wye	73.987	73.987	74.03	74.03	N/A
308	Tee or Wye	19.000	19.000	19.04	19.04	N/A
309	Bend	18.593	18.537	18.63	18.62	620.00
311	Drumlin	72.327	20.744	72.36	20.78	206.00
312	Heat Exchanger	20.715	20.685	20.75	20.71	206.00
314	Bend	73.847	73.845	73.86	73.86	240.00
315	Bend	73.785	73.782	73.80	73.79	240.00
316	Williams	73.762	19.307	73.78	19.32	240.00
317	Heat Exchanger	19.297	19.284	19.31	19.30	240.00
318	Bend	19.202	19.199	19.21	19.21	240.00
319	Bend	19.264	19.262	19.28	19.27	240.00
320	Tee or Wye	77.359	77.359	77.61	77.61	N/A
321	Tee or Wye	15.140	15.140	15.39	15.39	N/A
322	Fisher	77.600	15.394	77.60	15.40	35.00
323	Heat Exchanger	15.394	15.393	15.39	15.39	35.00
324	Bend	17.494	17.438	17.82	17.77	6,028.00
325	Bend	74.894	74.838	75.23	75.17	6,028.00
326	Bend	74.350	74.312	74.57	74.54	4,970.00
327	Bend	18.232	18.194	18.46	18.42	4,970.00
328	Tee or Wye	74.672	74.672	75.09	75.09	N/A
329	Tee or Wye	17.492	17.492	17.91	17.91	N/A
330	Bend	71.453	71.292	72.23	72.07	1,058.00
331	Hyland	69.151	23.677	69.93	24.61	1,058.00
332	Heat Exchanger	23.065	22.286	23.99	23.06	1,058.00
333	Bend	20.145	19.983	20.92	20.76	1,058.00
334	Upham	73.095	19.787	73.39	20.16	1,157.00
335	Tee or Wye	74.075	74.075	74.37	74.37	N/A
336	Heat Exchanger	19.604	19.308	19.97	19.60	1,157.00
337	Tee or Wye	18.337	18.337	18.63	18.63	N/A
338	Roseman	71.748	21.241	71.81	21.31	294.00
339	Heat Exchanger	21.186	21.126	21.26	21.19	294.00
340	Tee or Wye	71.894	71.894	72.11	72.11	N/A
341	Tee or Wye	20.664	20.664	20.88	20.88	N/A
342	Bend	72.060	71.995	72.42	72.36	3,813.00
343	Bend	20.276	20.210	20.64	20.57	3,813.00
344	Bend	19.552	19.486	19.91	19.85	3,813.00
345	Bend	72.785	72.719	73.15	73.08	3,813.00
346	Tee or Wye	21.213	21.213	21.45	21.45	N/A
347	Tee or Wye	71.315	71.315	71.55	71.55	N/A
348	Winther	70.706	22.262	70.88	22.47	500.00
349	Heat Exchanger	22.114	21.940	22.32	22.11	500.00
350	Tee or Wye	70.473	70.473	70.69	70.69	N/A
351	Tee or Wye	22.079	22.079	22.30	22.30	N/A
352	Bend	22.326	22.295	22.48	22.45	466.00
353	Bend	70.397	70.366	70.55	70.52	466.00

Jct	Name	P Static In (psia)	P Static Out (psia)	P Stag. In (psia)	P Stag. Out (psia)	Vol. Flow Rate Thru Jct (gal/min)
354	Heat Exchanger	23.354	23.203	23.53	23.35	466.00
355	Heide	69.635	23.483	69.79	23.66	466.00
356	Tee or Wye	69.623	69.623	69.84	69.84	N/A
357	Tee or Wye	22.934	22.934	23.15	23.15	N/A
358	Tee or Wye	67.100	67.100	67.27	67.27	N/A
359	McGraw	66.988	25.996	67.04	26.05	284.00
360	Heat Exchanger	25.951	25.894	26.01	25.95	284.00
361	Tee or Wye	25.551	25.551	25.72	25.72	N/A
362	Bend	26.210	26.173	26.40	26.36	930.00
363	Bend	66.440	66.403	66.63	66.59	930.00
364	Bend	26.427	26.389	26.62	26.58	930.00
365	Heat Exchanger	26.874	26.683	27.11	26.87	930.00
366	Library	65.930	26.995	66.12	27.23	930.00
367	Bend	66.224	66.186	66.41	66.38	930.00
368	Tee or Wye	69.679	69.679	69.74	69.74	N/A
369	Tee or Wye	23.203	23.203	23.26	23.26	N/A
370	Tee or Wye	69.457	69.457	69.56	69.56	N/A
371	Tee or Wye	23.331	23.331	23.43	23.43	N/A
372	Univ. Add	69.594	23.399	69.63	23.44	222.00
373	Univ. Center	67.160	25.753	67.58	26.26	781.00
374	Heat Exchanger	23.366	23.332	23.41	23.37	222.00
375	Heat Exchanger	25.410	24.986	25.92	25.41	781.00
376	Bend	69.552	69.551	69.56	69.56	336.00
378	Hyer	69.388	23.614	69.47	23.71	336.00
380	Heat Exchanger	23.544	23.465	23.64	23.54	336.00
382	Bend	11.503	11.413	12.04	11.95	9,475.00
383	Tee or Wye	73.752	73.752	73.97	73.97	N/A
384	Tee or Wye	18.798	18.798	19.02	19.02	N/A
385	Bend	73.323	73.268	73.60	73.55	1,127.00
386	Bend	19.166	19.111	19.45	19.39	1,127.00
387	Bend	72.897	72.842	73.18	73.12	1,127.00
388	Bend	19.592	19.537	19.87	19.82	1,127.00
389	Bend	72.100	72.045	72.38	72.33	1,127.00
390	Starin	71.860	21.028	72.14	21.38	1,127.00
391	Bend	20.389	20.334	20.67	20.61	1,127.00
392	Heat Exchanger	20.854	20.574	21.21	20.85	1,127.00
393	Bend	73.518	73.499	73.62	73.60	1,504.00
394	Bend	19.288	19.269	19.39	19.37	1,504.00
395	Bend	73.411	73.392	73.51	73.50	1,504.00
396	Bend	19.395	19.376	19.50	19.48	1,504.00
397	Tee or Wye	72.879	72.879	72.97	72.97	N/A
398	Tee or Wye	19.940	19.940	20.03	20.03	N/A
399	Bend	72.520	72.501	72.61	72.59	360.00
400	Laurentide	72.412	20.573	72.50	20.68	360.00
401	Heat Exchanger	20.492	20.402	20.60	20.49	360.00
402	Bend	20.313	20.294	20.40	20.38	360.00
405	Bend	70.662	70.606	70.95	70.89	1,144.00
406	Center of Arts	69.078	23.888	69.37	24.25	1,144.00
407	Heat Exchanger	23.709	23.421	24.07	23.71	1,144.00
408	Bend	21.855	21.798	22.14	22.09	1,144.00
410	Bend	10.745	10.242	10.84	10.82	3,240.84
411	Valve	10.155	9.890	10.74	10.47	3,240.84
412	EXPump#1	9.847	82.075	10.43	83.25	3,240.84
413	Check Valve	81.970	81.970	83.14	83.14	3,240.84

Jct	Name	P Static In (psia)	P Static Out (psia)	P Stag. In (psia)	P Stag. Out (psia)	Vol. Flow Rate Thru Jct (gal/min)
414	Bend	81.762	82.610	82.93	82.70	3,240.84
421	Branch	23.382	23.382	23.67	23.67	1,144.00
425	Branch	23.433	23.433	23.44	23.44	336.00
426	Branch	81.184	81.262	82.07	82.07	9,931.00
427	Assigned Pressure	N/A	N/A	11.00	11.00	N/A
438	Tee or Wye	20.284	20.284	20.33	20.33	N/A
439	Tee or Wye	72.699	72.699	72.74	72.74	N/A
440	Tee or Wye	72.575	72.575	72.58	72.58	N/A
441	Tee or Wye	20.478	20.478	20.49	20.49	N/A
442	Bend	20.529	20.528	20.53	20.53	88.00
443	Bend	72.533	72.532	72.54	72.54	88.00
444	Bend	72.519	72.518	72.52	72.52	88.00
445	Bend	20.543	20.542	20.55	20.55	88.00
446	Ayer	72.505	20.565	72.51	20.57	88.00
447	Heat Exchanger	20.561	20.556	20.57	20.56	88.00
448	Fricker	72.573	20.497	72.58	20.50	86.00
449	Heat Exchanger	20.494	20.489	20.50	20.49	86.00
458	Bend	23.433	23.432	23.44	23.44	336.00
459	Bend	72.420	72.190	72.49	72.48	1,144.00
460	Bend	20.271	20.432	20.56	20.50	1,144.00
461	Bend	69.541	69.466	69.55	69.54	336.00
462	Bend	23.387	23.444	23.47	23.45	336.00



EXISTING PLANT LAYOUT

RING & DUCHATEAU
10101 INNOVATION DR.
MILWAUKEE, WI 53226
PHONE: 414.778.1700
FAX: 414.778.2360
EMAIL: R-D@RINGDU.COM
PROJECT NUMBER: 212145

State of Wisconsin
Department of Administration
Division of Facilities Development

UNIVERSITY OF WISCONSIN - WHITEWATER
WHITEWATER, WISCONSIN

MASTER PLAN
UNIVERSITY OF WISCONSIN - WHITEWATER
WHITEWATER, WISCONSIN

Sheet Title:
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Revisions:

No.	Date:	Description:

Graphic Scale	0' 4' 8' 16' 24'
DFD Number	1211D
Set Type	PR
Date Issued	4/1/2014
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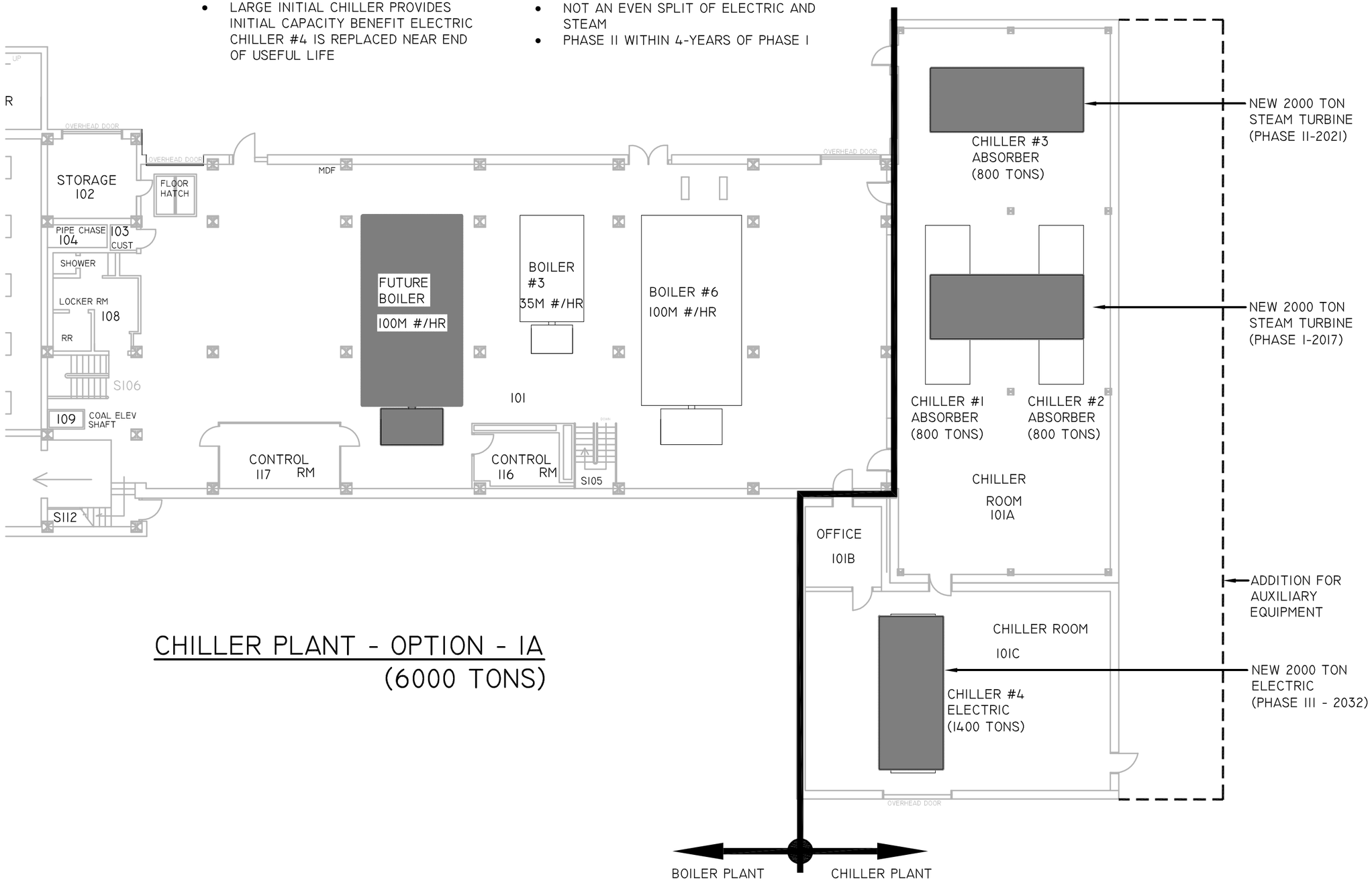
PROS

- ELIMINATES UNDERPERFORMING, AGING ABSORBERS
- LARGE INITIAL CHILLER PROVIDES INITIAL CAPACITY BENEFIT ELECTRIC CHILLER #4 IS REPLACED NEAR END OF USEFUL LIFE

CONS

- REQUIRES ADDITIONAL SPACE FOR AUXILIARY EQUIPMENT (PUMPS, TOWERS, ETC.)
- NOT AN EVEN SPLIT OF ELECTRIC AND STEAM
- PHASE II WITHIN 4-YEARS OF PHASE I



CHILLER PLANT - OPTION - IA
(6000 TONS)

RING & DUCHATEAU
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Department of Administration
Division of Facilities Development

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Sheet Title:
First Line
Second Line

Revisions:

No.	Date:	Description:

Graphic Scale	0' 4' 8' 16' 24'
DFD Number	1211D
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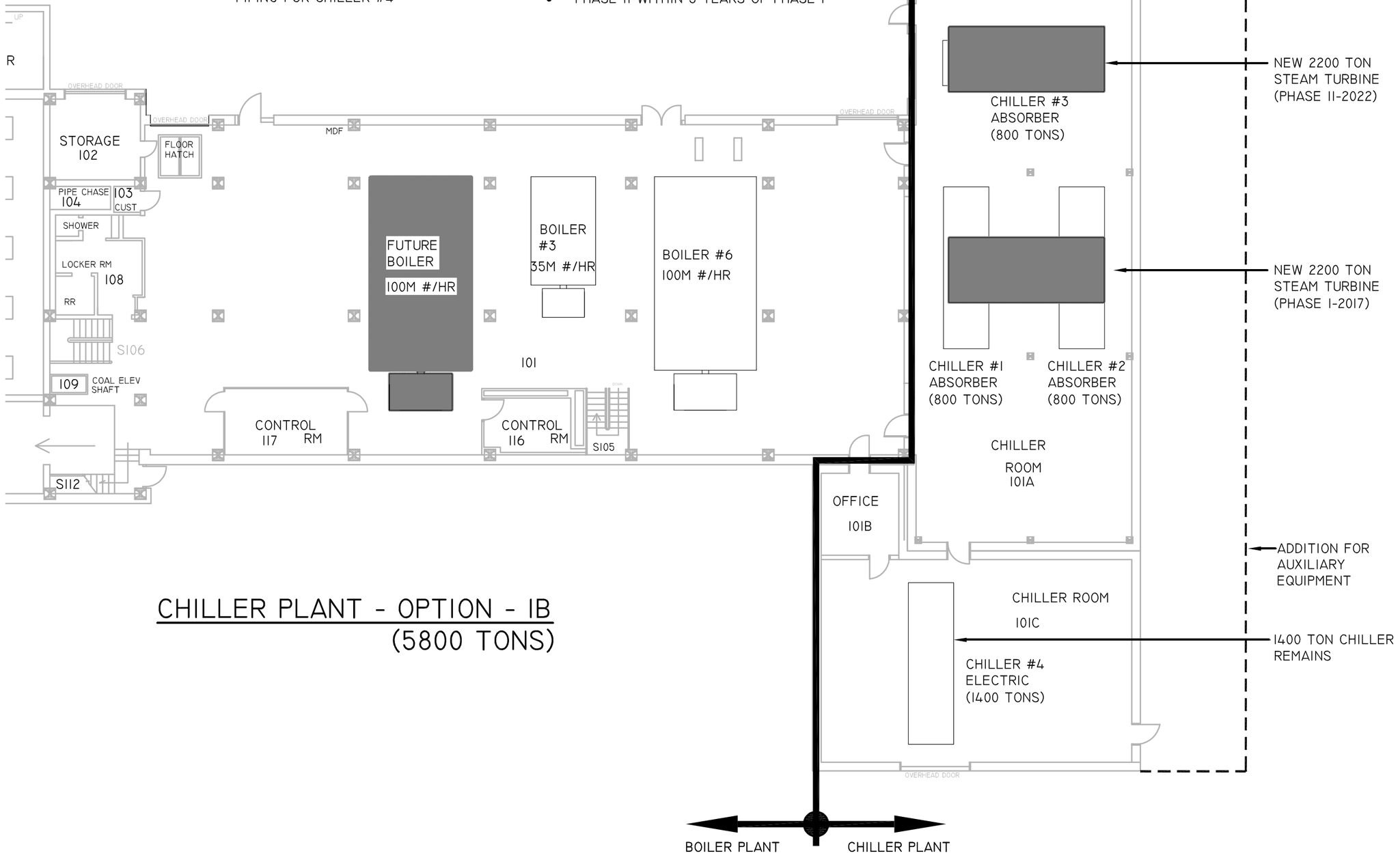
PROS

- ELIMINATES UNDERPERFORMING, AGING ABSORBERS
- LARGEST INITIAL CHILLER
- NO NEED TO MODIFY POWER AND PIPING FOR CHILLER #4

CONS

- REQUIRES ADDITIONAL SPACE FOR AUXILIARY EQUIPMENT (PUMPS, TOWERS, ETC.)
- NOT AN EVEN SPLIT OF ELECTRIC AND STEAM
- PHASE II WITHIN 5-YEARS OF PHASE I



CHILLER PLANT - OPTION - IB
(5800 TONS)

RING & DUCHATEAU
10101 INNOVATION DR.
MILWAUKEE, WI 53226
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PROJECT NUMBER: 212145

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Graphic Scale	0' 4' 8' 16' 24'
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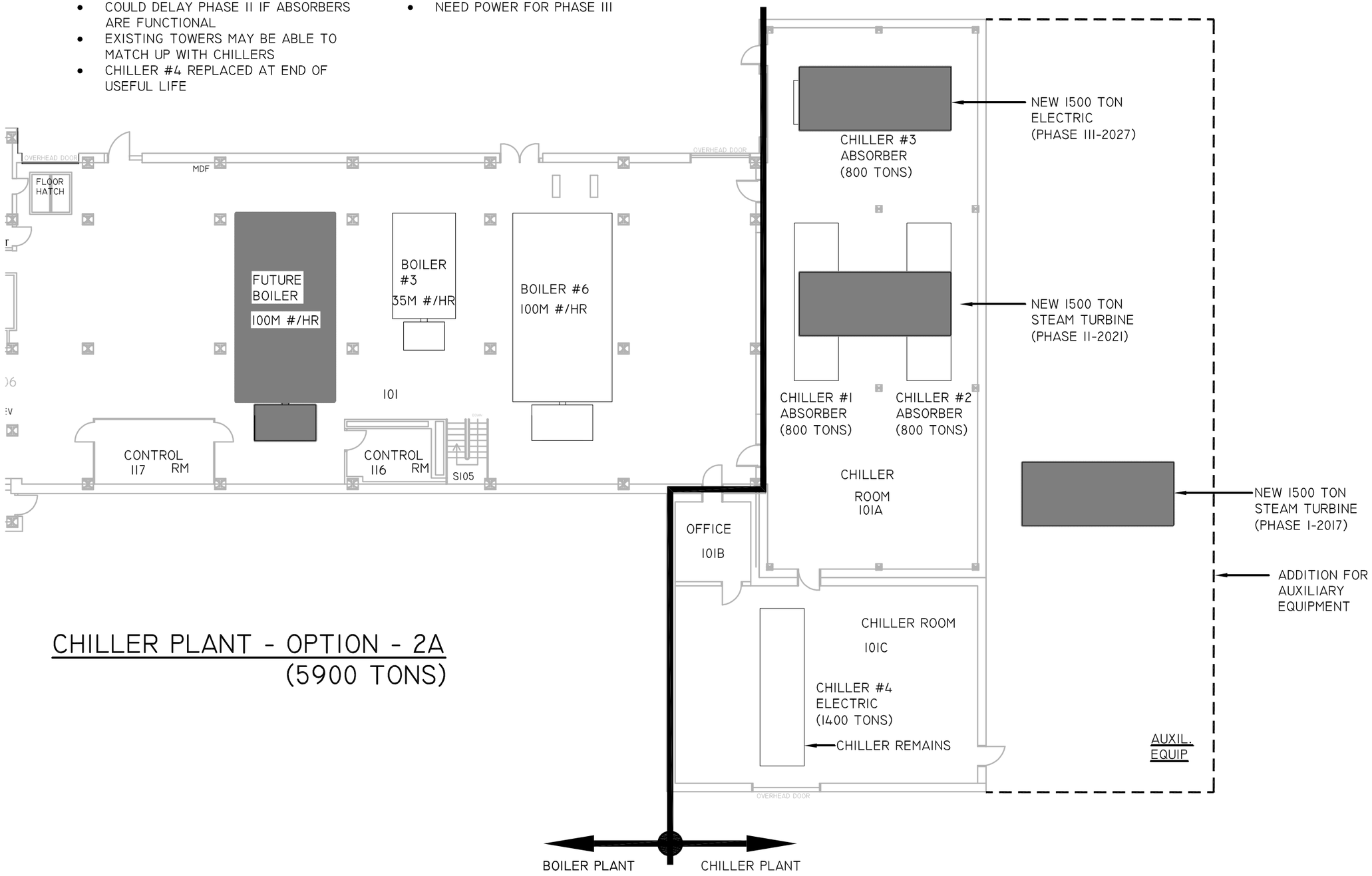
PROS
- MAXIMIZE USE OF EXISTING CHILLERS
- EQUAL STEAM/ELECTRIC DRIVEN
- COULD DELAY PHASE II IF ABSORBERS ARE FUNCTIONAL
- EXISTING TOWERS MAY BE ABLE TO MATCH UP WITH CHILLERS
- CHILLER #4 REPLACED AT END OF USEFUL LIFE

CONS
- REQUIRES ADDITIONAL SPACE
- INITIAL BUILDING COST
- NEED POWER FOR PHASE III



CHILLER PLANT - OPTION - 2A (5900 TONS)

RING & DUCHATEAU
10101 INNOVATION DR.
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Sheet Title: First Line Second Line

Revisions:

No.	Date:	Description:

Graphic Scale	0' 4' 8' 16' 24'
DFD Number	1211D
Set Type	PR
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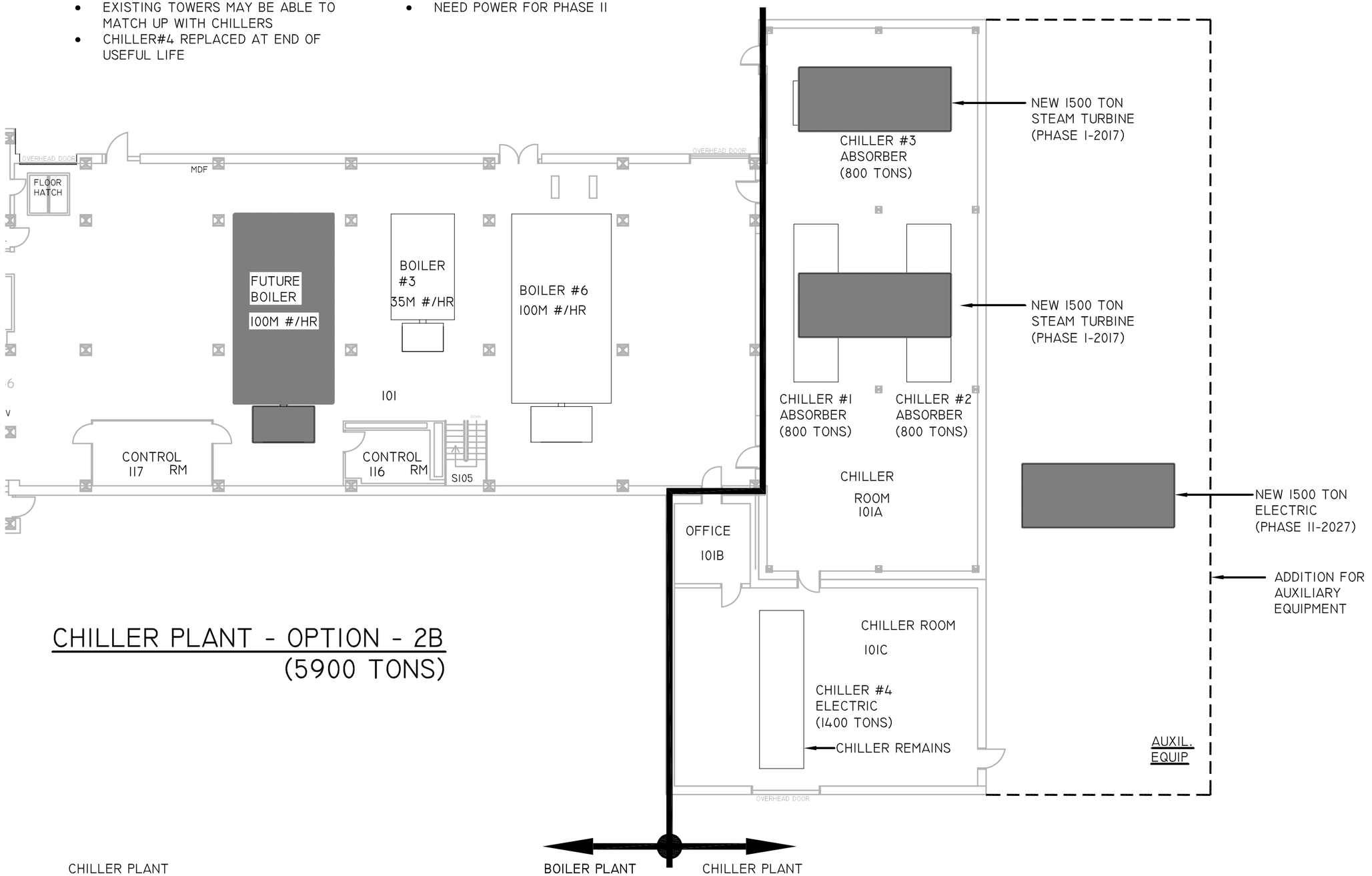
PROS
- EQUAL STEAM/ELECTRIC DRIVEN
- EXTENDED TIME TO PHASE II
- EXISTING TOWERS MAY BE ABLE TO MATCH UP WITH CHILLERS
- CHILLER#4 REPLACED AT END OF USEFUL LIFE

CONS
- DOESN'T MAXIMIZE LIFE OF EXISTING ABSORBERS
- INITIAL BUILDING COST
- NEED POWER FOR PHASE II



CHILLER PLANT - OPTION - 2B (5900 TONS)

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State of Wisconsin
Department of Administration
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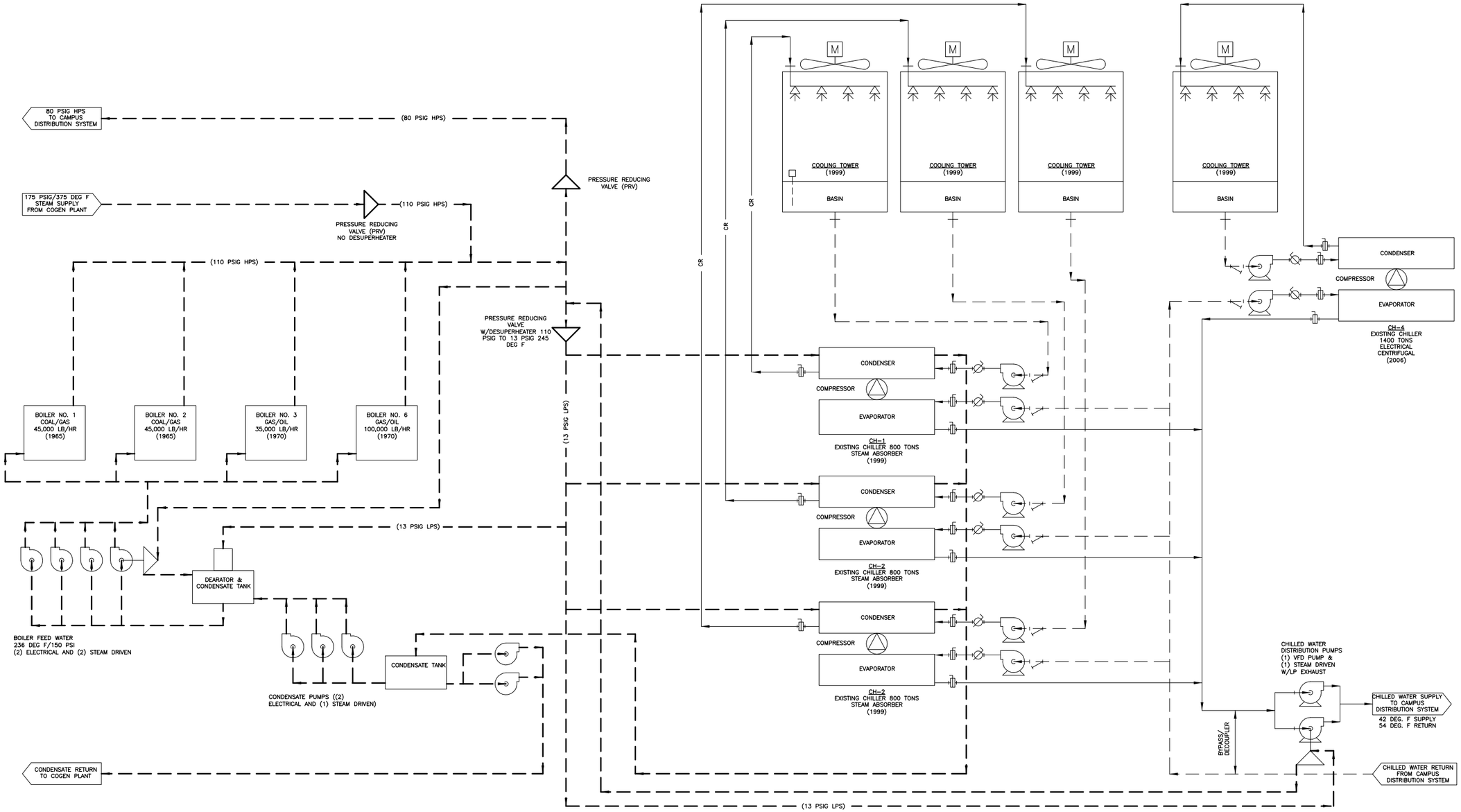

E.5 STEAM & CHILLED WATER SYSTEM DIAGRAM
NO SCALE

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Sheet Title: STEAM & CHILLED WATER SYSTEM DIAGRAM

Revisions:

No.	Date:	Description:

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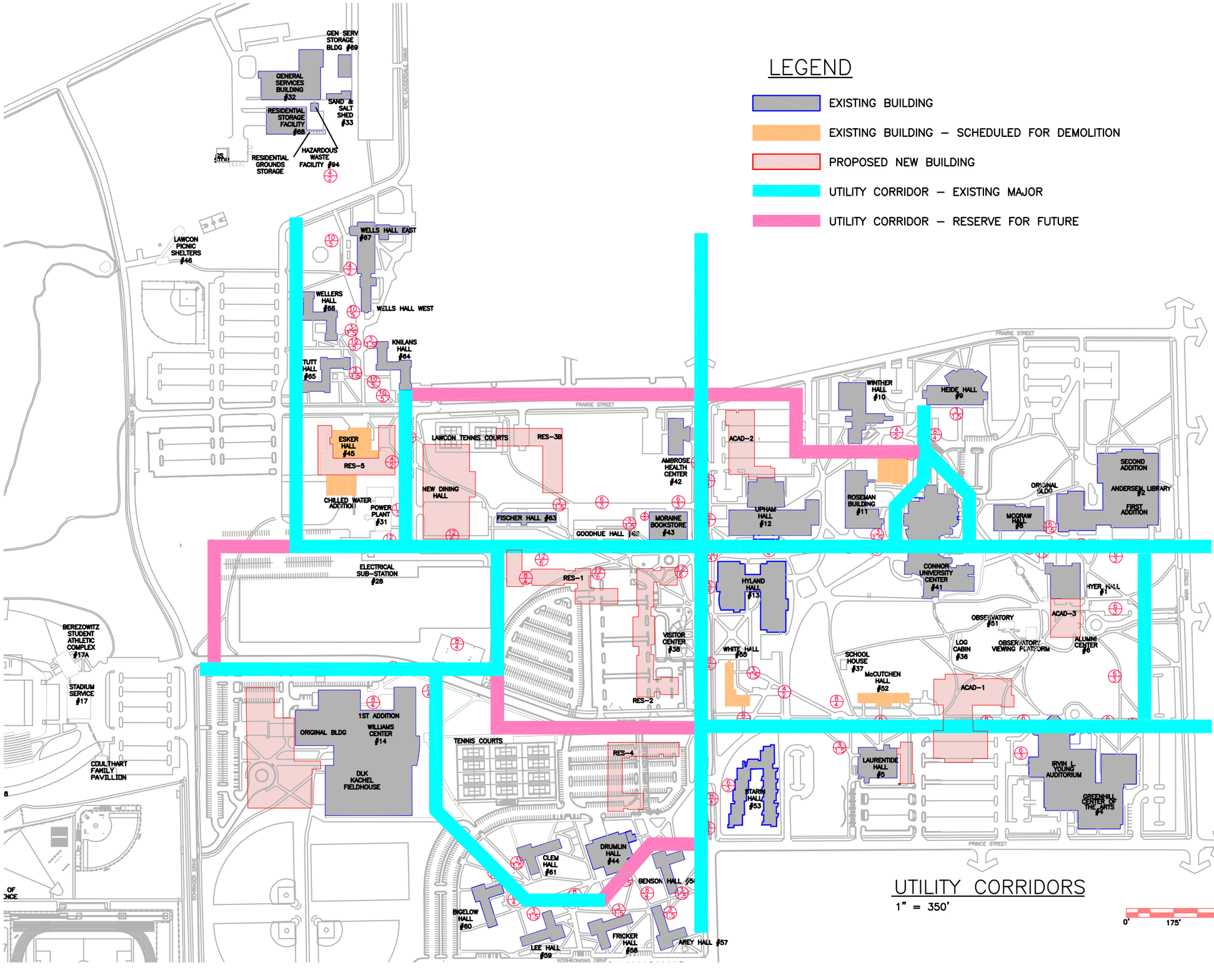

LEGEND

- EXISTING BUILDING
- EXISTING BUILDING – SCHEDULED FOR DEMOLITION
- PROPOSED NEW BUILDING
- UTILITY CORRIDOR – EXISTING MAJOR
- UTILITY CORRIDOR – RESERVE FOR FUTURE

UTILITY CORRIDORS

1" = 350'

0' 175' 350'

NORTH

RING & DUCHATEAU
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Sheet Title: UTILITY CORRIDORS

Revisions:		
No.	Date:	Description:

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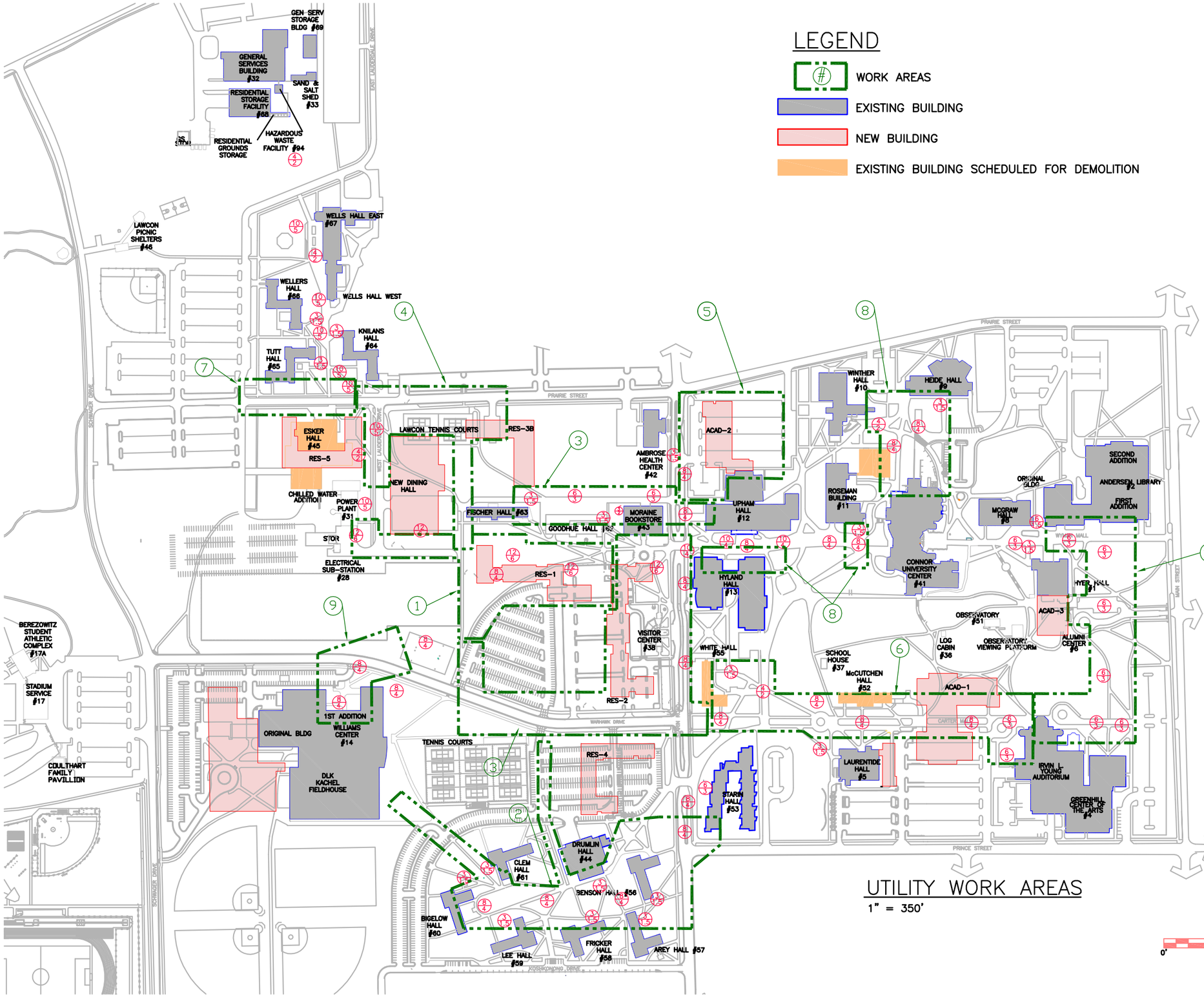

UTILITY WORK AREAS

1" = 350'

0' 175' 350'

NORTH

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Sheet Title: UTILITY WORK AREAS

Revisions:		
No.	Date:	Description:

Graphic Scale	
DFD Number	12I1D
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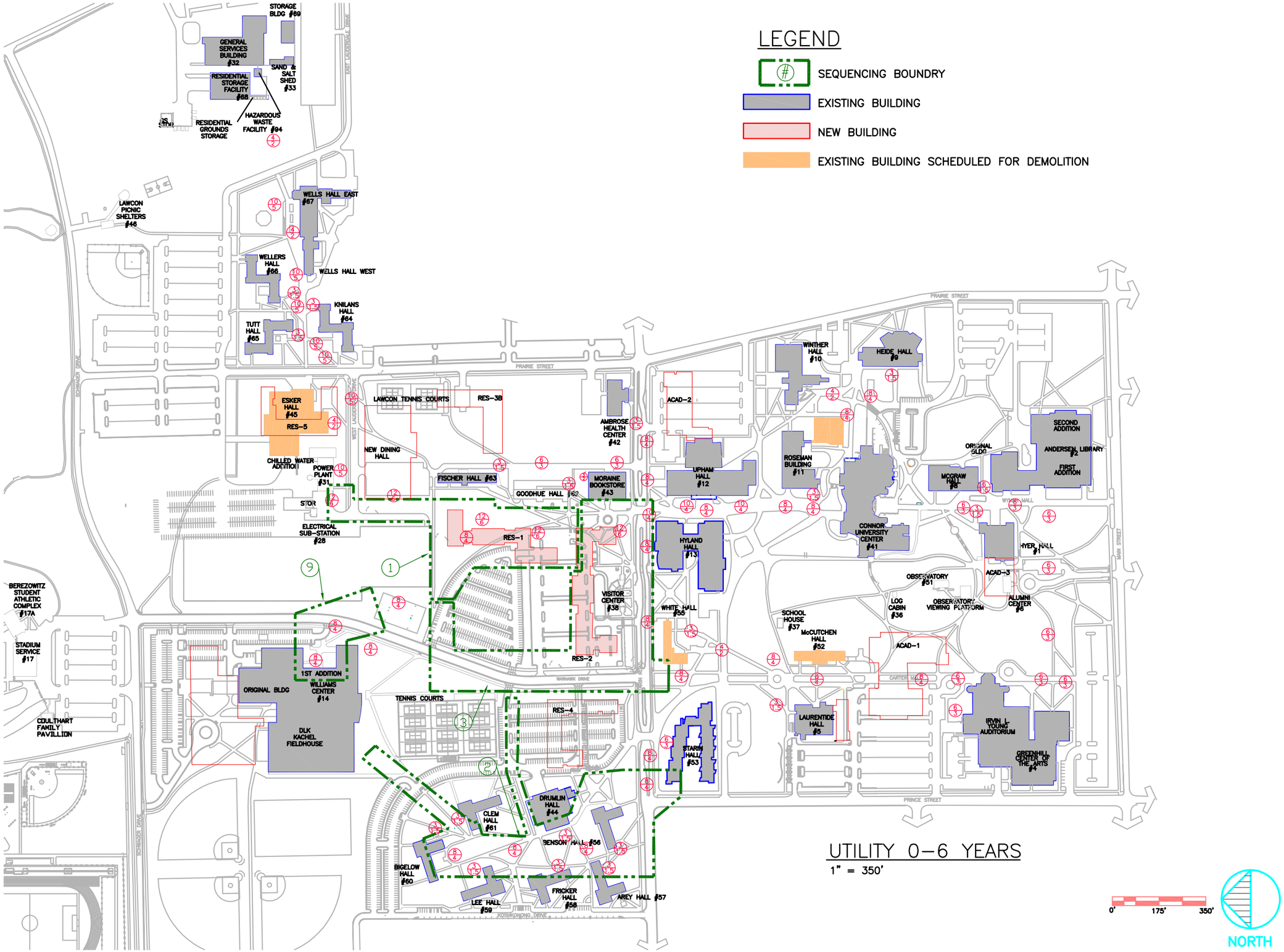
Date Issued	4/1/2014
Sheet Number	F.2



LEGEND

- SEQUENCING BOUNDRY
- EXISTING BUILDING
- NEW BUILDING
- EXISTING BUILDING SCHEDULED FOR DEMOLITION

UTILITY 0-6 YEARS

1" = 350'

0' 175' 350'

NORTH

RING & DUCHATEAU

10101 INNOVATION DR.
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State of Wisconsin
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UNIVERSITY OF WISCONSIN - WHITEWATER
WHITEWATER, WISCONSIN

MASTER PLAN
UNIVERSITY OF WISCONSIN - WHITEWATER
WHITEWATER, WISCONSIN

Sheet Title: UTILITY 0-6 YEARS

Revisions:

No.	Date:	Description:

Graphic Scale	
DFD Number	12I1D
Set Type	PR
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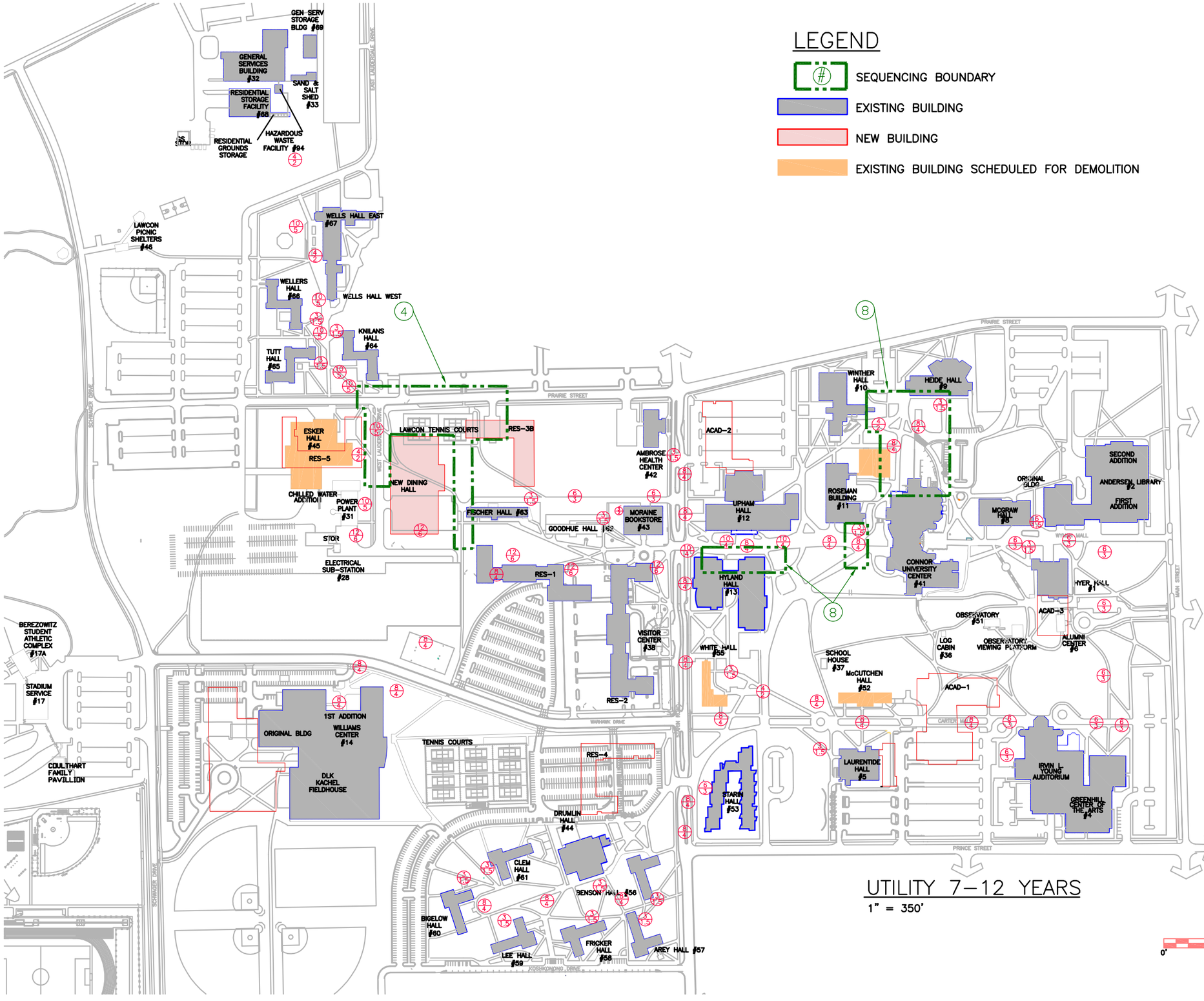
Sheet Number	F.3



UTILITY 7–12 YEARS

1" = 350'

0' 175' 350'

NORTH

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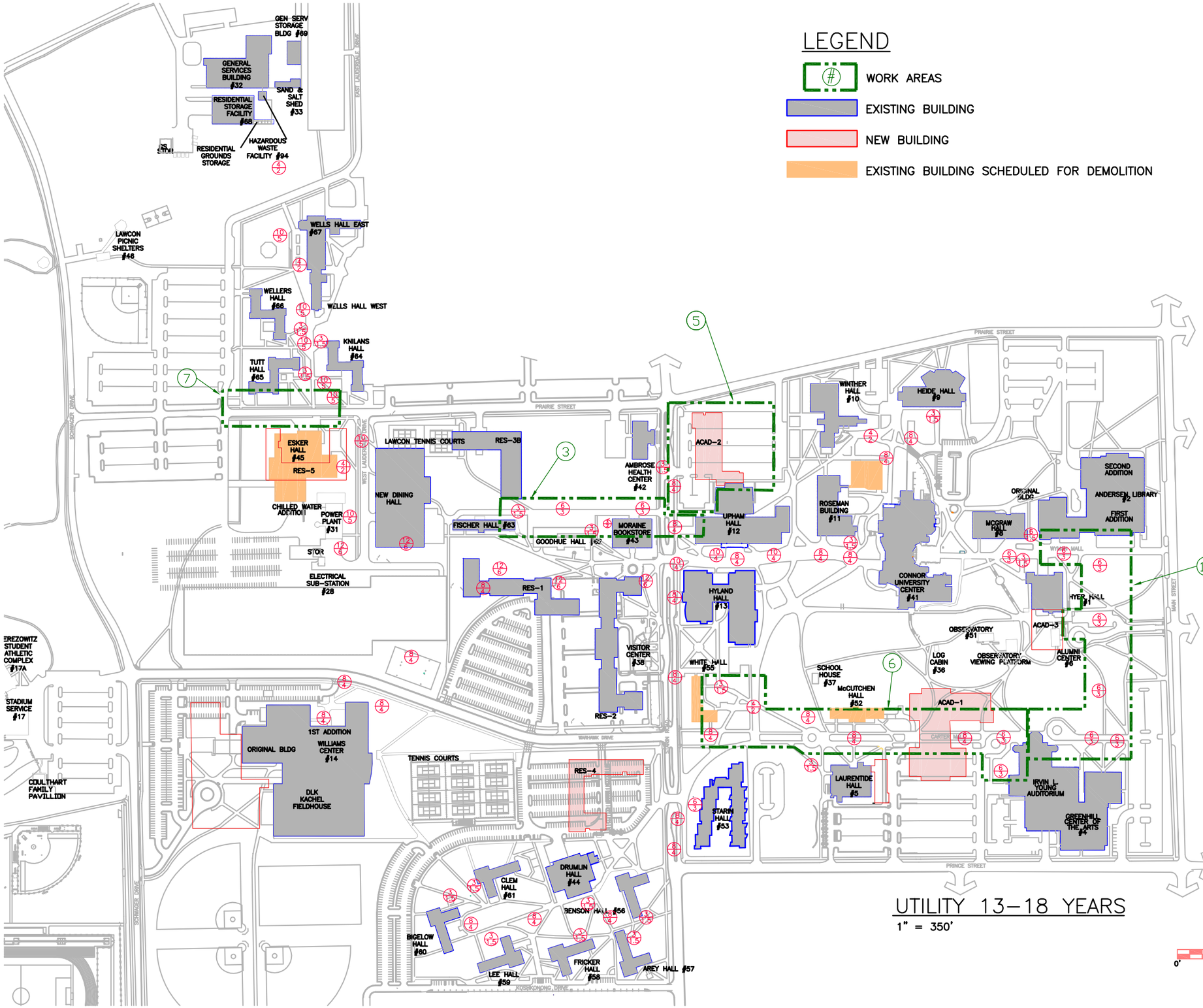
UNIVERSITY OF WISCONSIN – WHITEWATER
WHITEWATER, WISCONSIN

Sheet Title: UTILITY 7–12 YEARS

Revisions:

No.	Date:	Description:

Graphic Scale	
DFD Number	12I1D
Set Type	PR
Date Issued	4/1/2014
Sheet Number	F.4



UTILITY 13–18 YEARS

1" = 350'

0' 175' 350'

NORTH

RING & DUCHATEAU
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Sheet Title: UTILITY 13–18 YEARS

Revisions:

No.	Date:	Description:

Graphic Scale	
DFD Number	12I1D
Set Type	PR
Date Issued	4/1/2014
Sheet Number	F.5

Appendix F.6

UW Whitewater-Work Areas

7/9/2014

Area	Tag	Description	Justification	Sequence Driver	Cost Range					0 to 6 Years		7 to 12 Years	13-18 Years
					Steam	Chilled Water	Power	Telecom	Total				
Area-1													
	Steam-1:	A. Extend a new parallel 12" steam with 6" condensate from plant to Steam Pit 30. Reconstruct Pit 1. (850LF) B. Demo existing 8" steam and 4" condensate direct buried steam between Pit 1A and Pit 30. C. Reconstruct existing 12" steam and 6" condensate from plant to Pit 2 after new box conduit from plant to Pit 30 is active. (1050LF)	Condition / Capacity / Redundancy / Location	Prior to or in conjunction with Residence Hall-1 Construction	$ 1,800,000	$ -	$ -	$ -	$ 1,800,000	$ 1,800,000		$ -	$ -
	Chilled Water-1 (Warhawk Drive Option)	Extend new 20" chilled water from the plant to near Pit 30. (850LF)	Capacity / Redundancy		$ -	$ 600,000	$ -	$ -	$ 600,000	$ 600,000			
	Power-1:	A. Extend a new 6 conduit ductbank, parallel to the existing ductbank, from the substation to Manhole P3 (520LF) B. Extend a new 4 conduit ductbank, parallel to the existing ductbank, from Manhole P3 to Manhole P20 (350 LF) C. Install 2 new 4.16 kV feeders, 15 and 16, from substation to new pad mounted switch to serve new Residence Hall (520 LF)	Capacity / Redundancy		$ -	$ -	$ 600,000	$ -	$ 600,000	$ 600,000		$ -	$ -
	Telecom-1:	No work as new telecom cabling from Goodhue to Residence Hall-1 shall be routed through existing signal ductbank system and Manhole S4			$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -
											$ 3,000,000		
Area-2													
	Steam-2:	A. Construct new parallel steam box conduits and pits between Pit 18 and Pit 23. (900LF) B. Reconstruct Pit 18.	Grade Change	Prior to or in conjunction with West Campus Residence Hall Remodeling	$ 1,300,000	$ -	$ -	$ -	$ 1,300,000	$ 1,300,000		$ -	$ -
	Chilled Water-2 :	A. Extend chilled water to Benson, Lee, Clem and Bigelow Residence Halls from existing 6" main near Drumlin. (900LF) B. Upsize existing 6" chilled water branch from Warhawk Drive to Drumlin to 10". (630LF)	Grade Change		$ -	$ 850,000	$ -	$ -	$ 850,000	$ 850,000			
	Power-2:	A. Reconstruct the ductbank from Manhole P10 to Manhole P47, 6 conduits B. Reroute feeders and replace pad mounted switchgear	Grade Change		$ -	$ -	$ 1,300,000	$ -	$ 1,300,000	$ 1,300,000		$ -	$ -
	Telecom-2:	A. Reconstruct the ductbank from Manhole S10 to Manhole S21B, 4 conduits B. Reroute existing signal cables to new ductbank and to buildings	Grade Change		$ -	$ -	$ -	$ 1,300,000	$ 1,300,000	$ 1,300,000		$ -	$ -
											$ 4,750,000		

Appendix F.6

UW Whitewater-Work Areas

7/9/2014

Area	Tag	Description	Justification	Sequence Driver	Cost Range					0 to 6 Years		7 to 12 Years		13-18 Years
					Steam	Chilled Water	Power	Telecom	Total					
Area-3														
	Steam-3:	A. Extend the new parallel 12" steam with 6" condensate from Steam Pit 30 to Steam Pit 17. Reconstruct Steam Pit 17 & 30. Provide branch to serve new Residence Hall-2 and future Residence Hall-4. B. Reconstruct Steam Pits 24 and 26 and steam box conduit between those Pits (600LF)	Capacity / Redundancy / New Buildings	Prior to or in conjunction with New Residence Hall-2	$ 2,100,000	$ -	$ -	$ -	$ 2,100,000	$ 2,100,000		$ -	$ -
	Chilled Water-3 (Warhawk Drive Option):	A. Extend new 20" chilled water from near Pit 30 to near new Residence Hall-2 and then extend a 16" line to south of the Starin Hall take off. (1200LF) B. Remove existing 16" chilled water in the foot print of Residence Hall-2. C. Provide branch takeoffs to serve new Residence Hall-2 and future Residence Hall-4.	Capacity / Redundancy / New Buildings		$ -	$ 900,000	$ -	$ -	$ 900,000	$ 900,000			
	Power-3:	A. Extend a new 4 conduit ductbank, parallel to the existing ductbank, from Manhole P20 to Manhole P8 B. Extend feeders 15 and 16 to Residence Hall-2	Capacity / Redundancy / New Buildings		$ -	$ -	$ 850,000	$ -	$ 850,000	$ 850,000		$ -	$ -
	Telecom-3:	No work as new telecom cabling from Goodhue to Residence Hall-1 shall be routed through existing signal ductbank system and Manhole S5 or S8			$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -
											$ 3,850,000		
Area-9													
	Steam-9:	Reconstruct existing 8" steam and 4" condensate direct buried line between steam Pit 48 and the Williams Center. Reconstruct Pit 31 anchor. Direct buried line of same age south of Pit 48 recently failed and was	Condition	Due to current age/condition plan to reconstruct in 0-6 years	$ 350,000	$ -	$ -	$ -	$ 350,000	$ 350,000		$ -	$ -
	Chilled Water-9:	No Work			$ -	$ -	$ -	$ -	$ -	$ -			
	Power-9:	No Work			$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -
	Telecom-9:	No Work			$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -
											$ 350,000		
Area-4													
	Steam-4:	Construct new steam Pit at 90 degree bend west of Knilians. Extend new 6" steam and 3" condensate south with branch lines to serve New Residence Hall-3 and New Esker. (450LF)	New Buildings Service	Prior to or in conjunction with New Residence Hall-3 and New Dining Hall	$ 650,000	$ -	$ -	$ -	$ 650,000	$ -		$ 650,000	$ -
	Chilled Water-4 (Warhawk Drive Option):	Extend new 12" chilled water from plant to area of new Residence Hall-3 along Prairie Street. (700LF)	New Buildings Service		$ -	$ 450,000	$ -	$ -	$ 450,000	$ -		$ 450,000	
	Power-4:	A. Extend new 4 conduit ductbank from Manhole P3 to a new Manhole P3A to serve new buildings B. Extend new feeders 15 & 16 to new buildings	Capacity / Redundancy / New Buildings		$ -	$ -	$ 450,000	$ -	$ 450,000	$ -		$ 450,000	$ -
	Telecom-4:	Extend new 4 conduit ductbank from Manhole S3 to a new Manhole S3A to serve new building			$ -	$ -	$ -	$ 300,000	$ 300,000	$ -		$ 300,000	$ -
													$ 1,850,000	

Appendix F.6

UW Whitewater-Work Areas

7/9/2014

Area	Tag	Description	Justification	Sequence Driver	Cost Range					0 to 6 Years	7 to 12 Years		13-18 Years	
					Steam	Chilled Water	Power	Telecom	Total					
Area-5														
	Steam-5:	Reconstruct existing 8" steam and 4" condensate direct buried line between steam Pit 24 and 37. Extend new steam from Pit 37 to addition.	Condition	Prior to or in conjunction with addition to Upham Hall	$ 300,000	$ -	$ -	$ -	$ 300,000	$ -	$ 300,000			
	Chilled Water-5:	A. Reroute extend 18" east to Prairie Street. Continue south with 14" around new building addition and reconnect to existing 14" on south side of addition. Extend new branch piping to Upham addition. (950LF) B. Extend chilled water to Ambrose to replace DX system.	Location		$ -	$ 700,000	$ -	$ -	$ 700,000	$ -	$ 700,000			
	Power-5:	All work building related			$ -	$ -	$ -	$ -	$ -	$ -	$ -			
	Telecom-5:	All work building related			$ -	$ -	$ -	$ -	$ -	$ -	$ -			
												$ 1,000,000		
Area-8														
	Steam-8:	A. Reconstruct existing steam and condensate box conduits between University Center and Heide and Winther Halls. (550LF) B. Reconstruct Steam Pits 6 and 6A.	Condition	Due to current age/condition plan to reconstruct in 7-12 years	$ 1,000,000	$ -	$ -	$ -	$ 1,000,000	$ -	$ 1,000,000		$ -	
	Chilled Water-8:	No Work			$ -	$ -	$ -	$ -	$ -	$ -	$ -			
	Power-8:	No Work			$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	
	Telecom-8:	No Work			$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	
												$ 1,000,000		
Area-6														
	Steam-6:	Reconstruct existing steam Pit 38, 39 and 45.	Condition	Prior to or in conjunction with New Academic-1 Building	$ 450,000	$ -	$ -	$ -	$ 450,000	$ -			$ 450,000	
	Chilled Water-6:	Replace existing 12" chilled water from Starin to South of New Academic-1 Building with new 16" chilled water. (980LF)	Capacity		$ -	$ 650,000	$ -	$ -	$ 650,000	$ -			$ 650,000	
	Power-6:	Extend a new 4 conduit ductbank, parallel to the existing ductbank, from Manhole P8 to Manhole P36 (350 LF)	Capacity / Redundancy		$ -	$ -	$ -	$ 700,000	$ 700,000	$ -			$ 700,000	
	Telecom-6:	No work as new telecom cabling from McGraw to Academic-1 Building shall be routed through existing signal ductbank system and Manhole S34			$ -	$ -	$ -	$ -	$ -	$ -			$ -	
														$ 1,800,000
Area-7														
	Steam-7:	Reconstruct Steam Pit 33			$ 150,000	$ -	$ -	$ -	$ 150,000	$ -	$ -		$ 150,000	
	Chilled Water-7:	Extend 10" Chilled water from 12" Near Knilians Hall north to Tutt Hall. Extend branch services into buildings. (450LF)	Existing Building AC	Prior to or in conjunction with AC of Knilians and/or Tutt	$ -	$ 300,000	$ -	$ -	$ 300,000	$ -	$ -		$ 300,000	
	Power-7:	No Work			$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	
	Telecom-7:	No Work			$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	
														$ 450,000
Area-10														

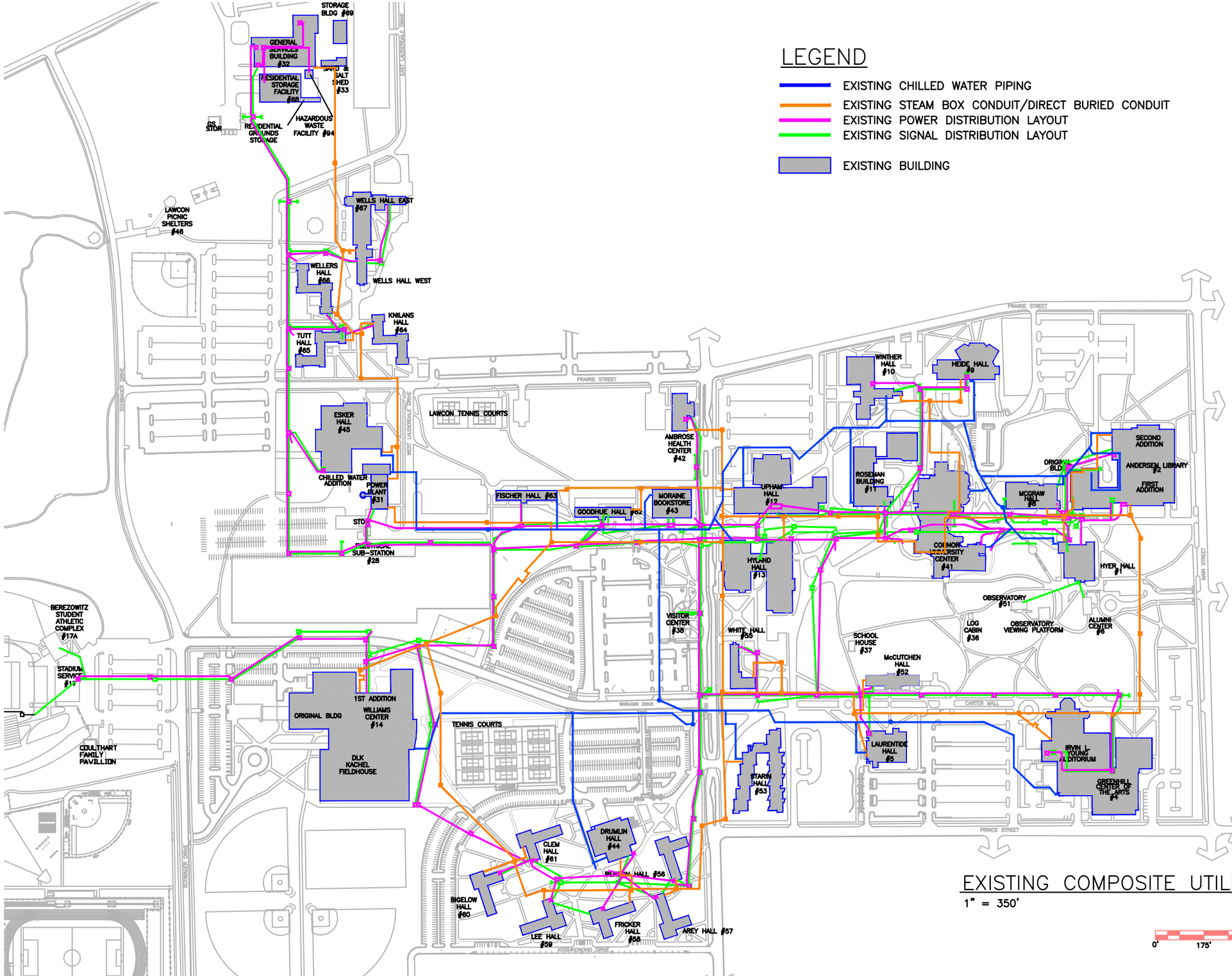
Appendix F.6

UW Whitewater-Work Areas

7/9/2014

Area	Tag	Description	Justification	Sequence Driver	Cost Range					0 to 6 Years	7 to 12 Years	13-18 Years
					Steam	Chilled Water	Power	Telecom	Total			
	Steam-10:	Reconstruct existing steam box conduit and pits between Pit 9 and 40. (1050LF)	Condition	Due to current age/condition of steam conduit plan to reconstruct in 13-18 years or at the time of Hyer Hall addition	$ 1,050,000	$ -	$ -	$ -	$ 1,050,000	$ -	$ -	$ 1,050,000
	Chilled Water-10:	When reconstructing steam box install new 12" chilled water supply and return from south of New Academic-1 Building to the 12" chilled water supply and return east of Hyer Hall. Route would parallel reconstructed steam box conduit. (1500LF)	Redundancy / Capacity		$ -	$ 750,000	$ -	$ -	$ 750,000	$ -		$ 750,000
	Power-10:	Construct new 4 conduit ductbank from Manhole PX1 to Manhole P36	Redundancy / Capacity		$ -	$ -	$ 850,000	$ -	$ 850,000	$ -	$ -	$ 850,000
	Telecom-10:	Construct new 4 conduit ductbank from Manhole SX1 to Manhole S36	Redundancy / Capacity		$ -	$ -	$ -	$ 850,000	$ 850,000	$ -	$ -	$ 850,000
												$ 3,500,000
										$ 11,950,000	$ 3,850,000	$ 5,750,000

Steam	$ 9,150,000.00	$ 5,550,000.00	$ 1,950,000.00	$ 1,650,000.00	$ 9,150,000.00
Chilled Water-Warhawk Drive	$ 5,200,000.00	$ 2,350,000.00	$ 1,150,000.00	$ 1,700,000.00	$ 5,200,000.00
Power	$ 4,750,000.00	$ 2,750,000.00	$ 450,000.00	$ 1,550,000.00	$ 4,750,000.00
Telecom	$ 2,450,000.00	$ 1,300,000.00	$ 300,000.00	$ 850,000.00	$ 2,450,000.00
Total	$ 21,550,000.00	$ 11,950,000.00	$ 3,850,000.00	$ 5,750,000.00	$ 21,550,000.00



LEGEND

- EXISTING CHILLED WATER PIPING
- EXISTING STEAM BOX CONDUIT/DIRECT BURIED CONDUIT
- EXISTING POWER DISTRIBUTION LAYOUT
- EXISTING SIGNAL DISTRIBUTION LAYOUT
- EXISTING BUILDING

EXISTING COMPOSITE UTILITY PLAN

1" = 350'

0' 175' 350'

NORTH

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WHITEWATER, WISCONSIN

Sheet Title: EXISTING COMPOSITE UTILITY PLAN

Revisions:

No.	Date:	Description:

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Set Type	PR
Date Issued	4/1/2014
Sheet Number	G.1

LEGEND

- EXISTING STEAM, CHILLED WATER, POWER, AND SIGNAL UTILITIES
- PROPOSED NEW CHILLED WATER PIPING
- PROPOSED NEW STEAM BOX CONDUIT
- PROPOSED POWER DUCT BANK ADDITIONS
- PROPOSED SIGNAL DUCT BANK ADDITIONS
- EXISTING BUILDING
- EXISTING BUILDING – SCHEDULED FOR DEMOLITION
- EXISTING BUILDING – TO HAVE AIR CONDITIONING ADDED
- PROPOSED BUILDING – NEW
- PROPOSED BUILDING – OUTSIDE 20–YEAR MASTER PLAN

GEN SERV STORAGE BLDG #69
GENERAL SERVICES BUILDING #32
SAND & SALT SHED #33
RESIDENTIAL STORAGE FACILITY #68
GS STOR
RESIDENTIAL GROUNDS STORAGE
HAZARDOUS WASTE FACILITY #94
EAST LOOKOUT DRIVE
LAWCON PICNIC SHELTERS #46
WELLS HALL EAST #67
WELLERS HALL #66
WELLS HALL WEST
KNILANS HALL #64
TUTT HALL #65
SCHWAGER DRIVE
ESKER HALL #45
RES–5
LAWCON TENNIS COURTS
RES–3B
WEST LOOKOUT DRIVE
NEW DINING HALL
CHILLED WATER ADDITION
POWER PLANT #31
STOR
ELECTRICAL SUB–STATION #28
FISCHER HALL #63
GOODHUE HALL #62
MORAINE BOOKSTORE #43
RES–1
RES–2
VISITOR CENTER #38
WHITE HALL #55
BEREZOWITZ STUDENT ATHLETIC COMPLEX #17A
STADIUM SERVICE #17
COULTHART FAMILY PAVILLION
ORIGINAL BLDG
1ST ADDITION
WILLIAMS CENTER #14
DLK KACHEL FIELDHOUSE
TENNIS COURTS
RES–4
WARWICK DRIVE
PRAIRIE STREET
AMBROSE HEALTH CENTER #42
ACAD–2
UPHAM HALL #12
HYLAND HALL #13
STARIN HALL #53
DRUMLIN HALL #44
CLEM HALL #61
BENSON HALL #56
BIGELOW HALL #60
LEE HALL #59
FRICKER HALL #58
AREY HALL #57
KOSHKONONG DRIVE
ROSEMAN BUILDING #11
CONNOR UNIVERSITY CENTER #41
SCHOOL HOUSE #37
McCUTCHEN HALL #52
ACAD–1
LAURENTIDE HALL #5
WINTHER HALL #10
HEIDE HALL #9
ORIGINAL BLDG
SECOND ADDITION
ANDERSEN LIBRARY #2
FIRST ADDITION
MCGRAW HALL #8
WYMAN MALL
HYER HALL #1
ACAD–3
OBSERVATORY #51
LOG CABIN #36
OBSERVATORY VIEWING PLATFORM
ALUMNI CENTER #6
MAIN STREET
IRVIN L. YOUNG AUDITORIUM
GREENHILL CENTER OF THE ARTS #4
PRINCE STREET

NEW COMPOSITE UTILITY PLAN

1" = 350'

0' 175' 350'

NORTH

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Sheet Title: NEW COMPOSITE UTILITY PLAN

Revisions:

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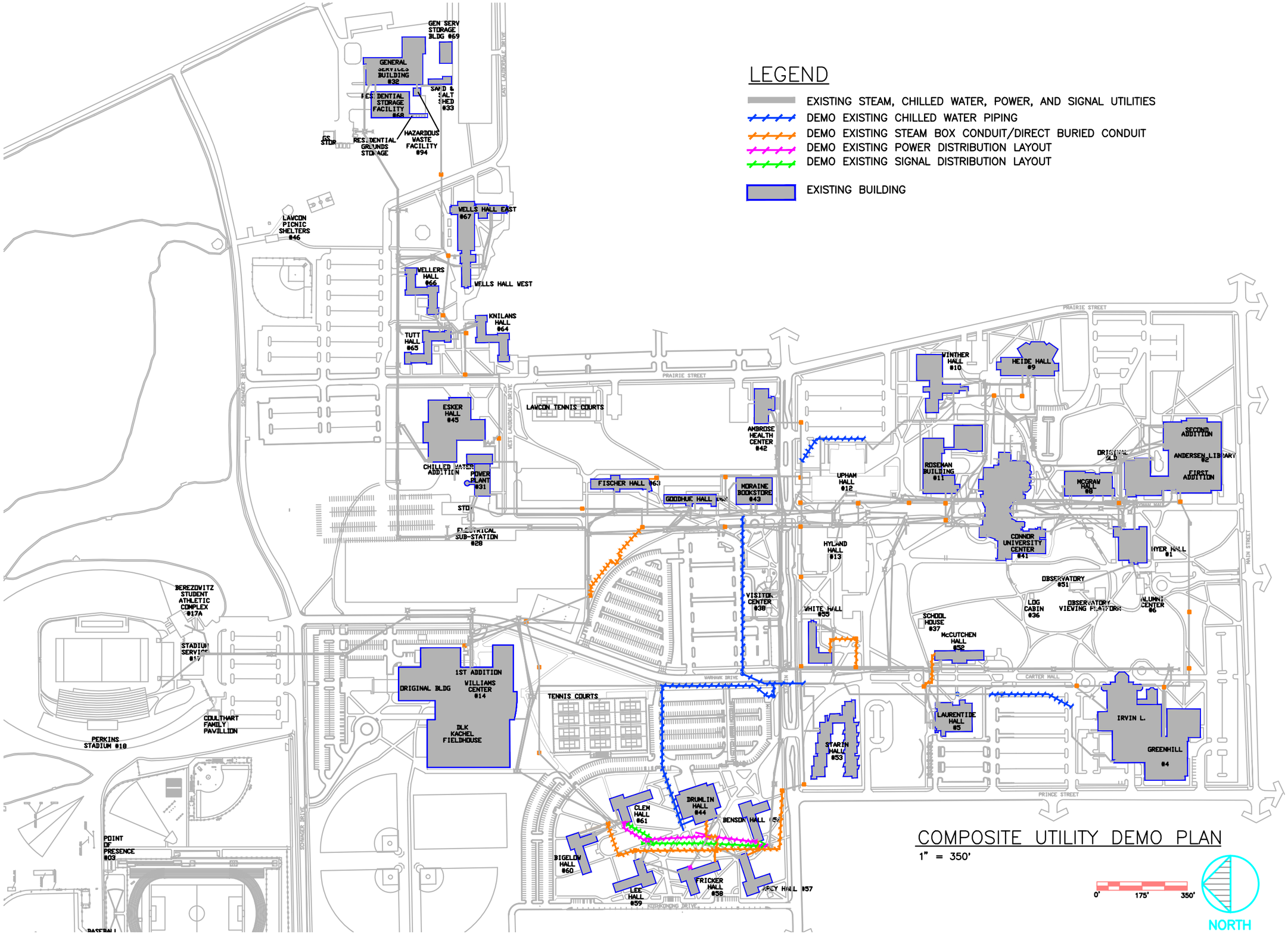
Sheet Number	G.2



LEGEND

- EXISTING STEAM, CHILLED WATER, POWER, AND SIGNAL UTILITIES
- DEMO EXISTING CHILLED WATER PIPING
- DEMO EXISTING STEAM BOX CONDUIT/DIRECT BURIED CONDUIT
- DEMO EXISTING POWER DISTRIBUTION LAYOUT
- DEMO EXISTING SIGNAL DISTRIBUTION LAYOUT
- EXISTING BUILDING

COMPOSITE UTILITY DEMO PLAN

1" = 350'

0' 175' 350'

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Sheet Title: COMPOSITE UTILITY DEMO PLAN

Revisions:

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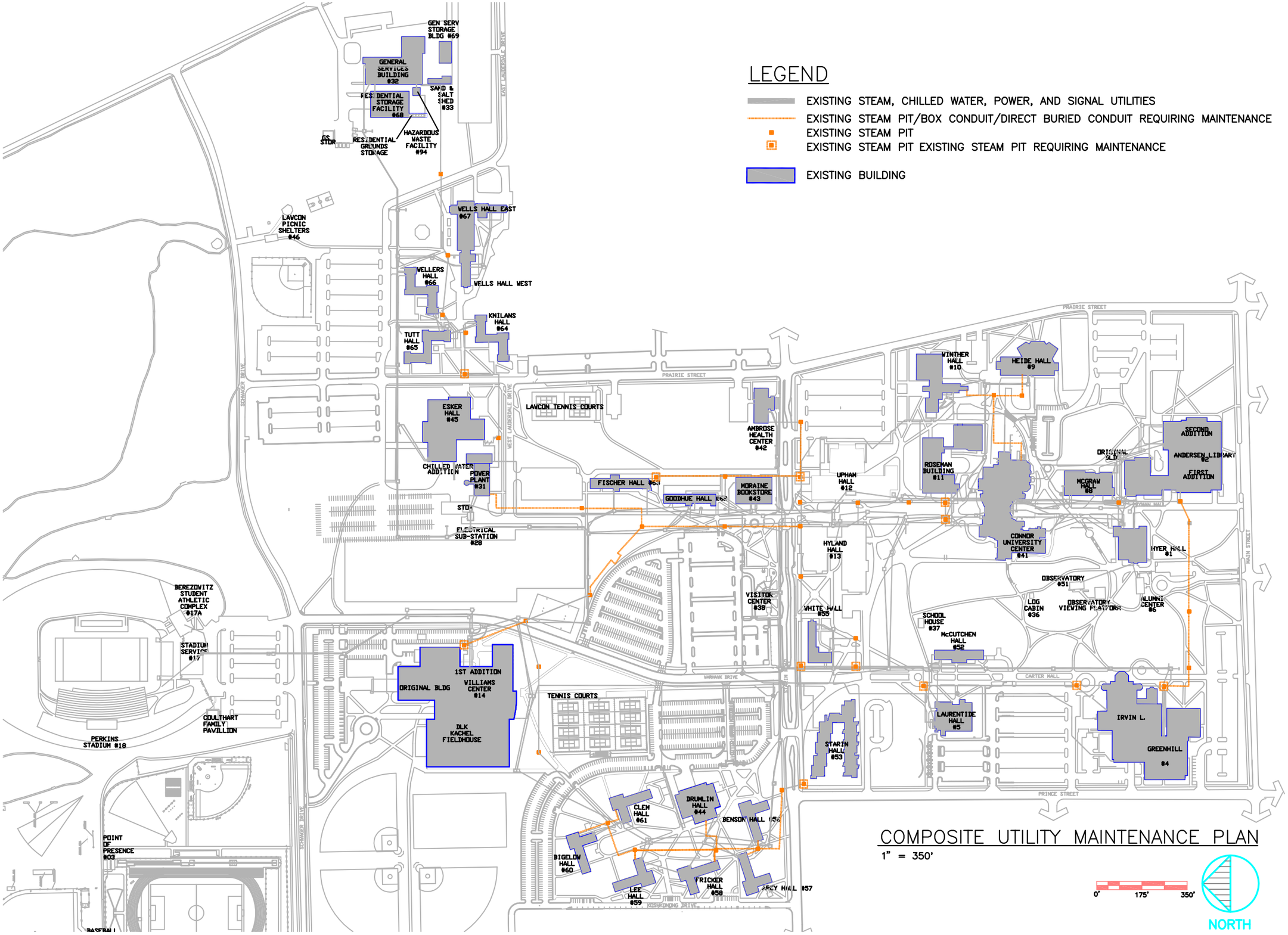
Sheet Number	G.3



LEGEND

- EXISTING STEAM, CHILLED WATER, POWER, AND SIGNAL UTILITIES
- EXISTING STEAM PIT/BOX CONDUIT/DIRECT BURIED CONDUIT REQUIRING MAINTENANCE
- EXISTING STEAM PIT
- EXISTING STEAM PIT EXISTING STEAM PIT REQUIRING MAINTENANCE
- EXISTING BUILDING

COMPOSITE UTILITY MAINTENANCE PLAN

1" = 350'

0' 175' 350'

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Sheet Title: COMPOSITE UTILITY MAINTENANCE PLAN

Revisions:		
No.	Date:	Description:

Graphic Scale	
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Set Type	PR
Date Issued	4/1/2014
Sheet Number	G.4

Legend

- Outfall
- Manhole
- Inlet
- End of Pipe
- UWW Manhole\Inlet
- UWW Storm
- Main
- Culvert
- Past Project Storm Manhole
- Past Project Storm Sewer
- Project Locations
- UW-Whitewater Boundary
- UWW Drainage Basins

CC-13
WC-58.1
WC-58.2
WC-62
WC-15
WC-1.1
WC-1.2
WC-63
WC-64
WC-65
WC-5
WC-57.1
WC-57.2
WC-59.1
WC-59.2
WC-2

Wet Detention Basin
Williams Center Upgrades
Year 2000
Approximate 10 Year Design
West Campus 1999
Flood Relief Bioswale
(Construction in 2012)
Approximate 100 Year Capacity
(Construction in 2012)
Starin Road
Approximate 100 Year Design
(Construction in 2001)
Approximate 10 Year Capacity
(Construction in 2012)
Prince Street
Year 2012
Approximate 10 Year Design
Wyman Mall
Year 2009
Approximate 10 Year Design
Wyman Mall
Year 2009
Approximate 10 Year Design
Winther/Heidi
Year 2006
Art Center
Year 1996
Approximate 10 Year Design

Tutt Hall
Wellers Hall
Wells Hall West
Wells Hall East
Knilans Hall
Fischer Hall
Bigelow Hall
Clem Hall
Lee Hall
Fricker Hall
Arey Hall
Benson Hall
Starin Hall

BURR OAK TR
SCHWAGER DR
WARHAWK DR
LAUDERDALE DR
FREMONT ST
FRAMBES ST
FOSHOMDING RD
HARMONY LN
CARRIAGE DR
PRINCE ST
FLORENCE ST
LINDSEY CT
HART ST
STARIN RD
FRANKLIN ST
ESTERLY AV
PARK ST
NORTH ST
MAIN ST
FOURTH ST
WATSON ST
COTTAGE ST
BOONE ST
CHURCH ST
SUMMIT ST
CONGER ST
BLACKHAWK DR
CENTER ST

0 62.5 125 250 Feet

FIGURE 3
STORM WATER SYSTEM MAP

12I1D UW-WHITEWATER MASTER PLAN
WI DOA/DFD AND UW-WHITEWATER
WALOWORTH AND JEFFERSON COUNTIES, WISCONSIN

STRAND ASSOCIATES®

1491.004

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